

PROGRAMMABLE CONTROLLER

FP7-series

User's Manual

Communication Cassette
(Ethernet type)

[Applicable models]

FP7 CPU Unit (Model number AFP7CPS*)

FP7 Extension Cassettes (Communication Cassettes)

• Ethernet x 1ch type (Model number AFP7CCET1)

Safety Precautions

Observe the following notices to ensure personal safety or to prevent accidents.
To ensure that you use this product correctly, read this User's Manual thoroughly before use.
Make sure that you fully understand the product and information on safety.
This manual uses two safety flags to indicate different levels of danger.

WARNING

If critical situations that could lead to user's death or serious injury is assumed by mishandling of the product.

- Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
- Do not use this product in areas with inflammable gas. It could lead to an explosion.
- Exposing this product to excessive heat or open flames could cause damage to the lithium battery or other electronic parts.
- Battery may explode if mistreated. Do not recharge, disassemble or dispose of fire.

CAUTION

If critical situations that could lead to user's injury or only property damage is assumed by mishandling of the product.

- To prevent excessive exothermic heat or smoke generation, use this product at the values less than the maximum of the characteristics and performance that are assured in these specifications.
- Do not dismantle or remodel the product. It could cause excessive exothermic heat or smoke generation.
- Do not touch the terminal while turning on electricity. It could lead to an electric shock.
- Use the external devices to function the emergency stop and interlock circuit.
- Connect the wires or connectors securely.
The loose connection could cause excessive exothermic heat or smoke generation.
- Ground the protective earth (PE) terminal (Class D grounding). Failure to do so could lead to an electric shock.
- Do not allow foreign matters such as liquid, flammable materials, metals to go into the inside of the product. It could cause excessive exothermic heat or smoke generation.
- Do not undertake construction (such as connection and disconnection) while the power supply is on. It could lead to an electric shock.

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Introduction

Thank you for buying a Panasonic product. Before you use the product, please carefully read the installation instructions and the users manual, and understand their contents in detail to use the product properly.

Types of Manual

- There are different types of users manual for the FP7 series, as listed below. Please refer to a relevant manual for the unit and purpose of your use.
- The manuals can be downloaded on our website:
http://industrial.panasonic.com/ac/e/dl_center/manual/ .

Unit name or purpose of use	Manual name	Manual code
FP7 Power Supply Unit	FP7 CPU Unit Users Manual (Hardware)	WUME-FP7CPUH
FP7 CPU Unit	FP7 CPU Unit Command Reference Manual	WUME-FP7CPUPGR
	FP7 CPU Unit Users Manual (Logging Trace Function)	WUME-FP7CPULOG
	FP7 CPU Unit Users Manual (Security Function)	WUME-FP7CPUSEC
	Instructions for Built-in LAN Port	FP7 CPU Unit Users Manual (LAN Port Communication)
Instructions for Built-in COM Port	FP7 series Users Manual (SCU communication)	WUME-FP7COM
FP7 Extension Cassette (Communication) (RS-232C/RS485 type)		
FP7 Extension Cassette (Communication) (Ethernet type)	FP7 series Users Manual (Communication cassette Ethernet type)	WUME-FP7CCET
FP7 Extension (Function) Cassette Analog Cassette	FP7 Analog Cassette Users Manual	WUME-FP7FCA
FP7 Digital Input/Output Unit	FP7 Digital Input/Output Unit Users Manual	WUME-FP7DIO
FP7 Analog Input Unit	FP7 Analog Input Unit Users Manual	WUME-FP7AIH
FP7 Analog Output Unit	FP7 Analog Output Unit Users Manual	WUME-FP7AOH
FP7 High-speed counter Unit	FP7 High-speed counter Unit Users Manual	WUME-FP7HSC
FP7 Pulse Output Unit	FP7 Pulse Output Unit Users Manual	WUME-FP7PG
FP7 Positioning Unit	FP7 Positioning Unit Users Manual	WUME-FP7POSP
FP7 Serial Communication Unit	FP7 series Users Manual (SCU communication)	WUME-FP7COM
PHLS System	PHLS System Users Manual	WUME-PHLS
Programming Software FPWIN GR7	FPWIN GR7 Introduction Guidance	WUME-FPWINGR7

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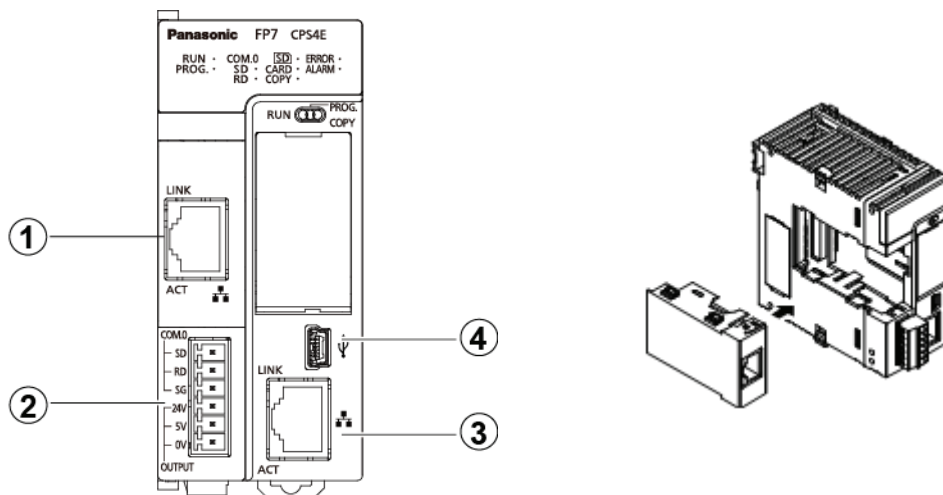
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Communication Functions of CPU Unit

1.1 Communication Ports of CPU Unit

1.1.1 Types and Purposes of Communication Ports

■ Communication Port of CPU Unit



(In the above figure, a communication cassette (Ethernet type) is attached to the COM.1 and COM.2 ports.)

■ Functions of Ports

(1) COM.1 and COM.2 ports

Attach a separately sold communication cassette to use these ports.

(2) COM.0 port, GT power supply terminals

This is an RS-232C port that is equipped to a standard model of CPU unit. It is equipped with power supply terminals (5V DC and 24V DC) to which a GT series display can be connected.

(3) LAN port

This is equipped to a standard model of CPU unit. This is used for connection to Ethernet.

(4) USB port

This is equipped to a standard model of CPU unit. This is used for connecting tool software.



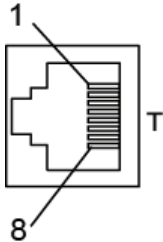
◆ REFERENCE

- See the "FP7 CPU unit User's manual (LAN port communication)" for the detailed information of communication method via built-in LAN port in the CPU unit. There is the deference of the usage between the Communication cassette(Ethernet type) AFP7CCET1 and built-in LAN port.

1.1.2 AFP7CCET1 Port Specifications

■ 100BASE-TX / 10BASE-T connector (RJ45)

When an Ethernet (100BASE-TX, 10BASE-T) is being used, this connector is used to connect the communication cassette and the hub, using a UTP cable.



Pin no.	Signal name
1	TX+
2	TX-
3	RX+
4	Not used
5	Not used
6	RX-
7	Not used
8	Not used

■ Functions of LED lamps

(1) LINK

Turns ON when the connection is connected between the communication cassette AFP7CCET1 and external equipment.

(2) ACK

Flashes when some communication is in progress with a connected device (e.g. sending/receiving a command or response).

1.1.3 Types of communication cassette

Model no.	Communication interface	Communication ports that can be allocated	
		COM.1	COM.2
AFP7CCET1	User connection	●	
	System connection		●

(Note) See 1.2 for the information of "User connection" or "System connection".

1.1.4 Configurator WD

- The communication tool software "Configurator WD" is required to set Ethernet communication for the AFP7CCET1
- The Configurator WD can be downloaded from our website free of charge.

http://industrial.panasonic.com/ac/e/dl_center/software/ (Member registration is required. Free of charge)

1.2 Available Function For Each COM Port

1.2.1 Applications that can be Used in Each Port

■ Mode

Type of connection	COM port	MEWTOCOL7—COM MEWTOCOL—COM		General Communication
		Master	Slave	
User connection	COM.1	○(Note)	●	●
System connection	COM.2		●	

(Note): MEWTOCOL7-COM do not support Master communication function.

■ User connection

- It can be used for data communication between external Ethernet equipment connected on LAN to open virtual connection via communication cassette AFP7CCET1.
- Any one of the following condition can be used, MEWTOCOL master communication *1 connection, MEWTOCOL slave communication *3 connection or General Communication*1 connection
- Parameters are set using the software FPWIN GR7 and Configurator WD.

■ System connection

- It can be used to connect tool software via communication cassette AFP7CCET1.
- Only 1 connection is available.
- COM.2 is allocated and communication conditions are fixed.
- Parameters are set using the software Configurator WD.

1.2.2 Restrictions

■ Behavior after the power has been turned on

It takes approx. 5 seconds to Initialize communication cassette AFP7CCET1, after the power has been turned on. Data transfer cannot be executed during initialization process. Please program to start communication, after the connection flag turns ON.

■ Restriction of broadcast communication

- Broadcast communication do not support communication via router, because generally a router do not forward broadcast packets.
- Broadcast communication put a load on all other equipment on the network. Please evaluate the effects on other equipment enough, before a broadcast communication executed.

■ Restriction to connect tool software communication

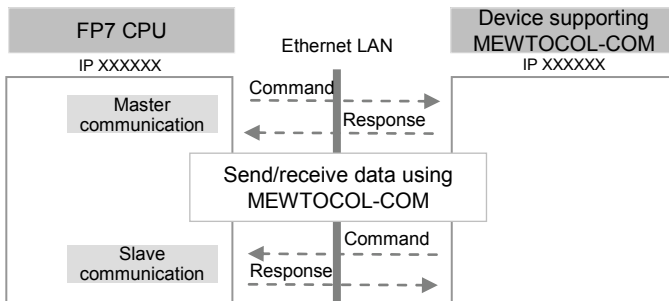
- Although there is no limitation of connection, if you select "UDP" as a protocol mode, but FPWIN GR7 do not support UDP communication.

1.3 Overview of Communication Functions

1.3.1 MEWTOCOL Master/Slave Communication

■ Overview of function

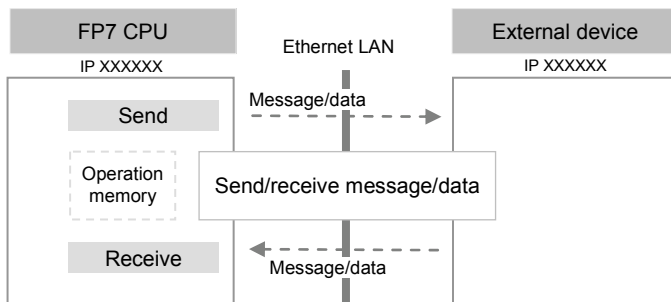
- Execute communication using MEWTOCOL-COM, a communication protocol used by our PLC.
- In master communication, PLC executes communication by sending commands to devices that support MEWTOCOL, and receiving responses. Messages in accordance with the protocol are automatically generated by PLC. In the user program, reading and writing can be done simply by specifying the station no. and memory address and executing SEND/RCV instructions.
- Slave communication is performed when the computer or display connected to PLC has the sending right, and sends commands, and PLC returns responses. In slave communication, PLC responds automatically, so no program concerning communication is necessary on the PLC side.
- The data size that can be sent or received in a single communication is up to 507 words for register transmission (up to 1,014 words for MEWTOCOL7-COM) and 1 bit for bit transmission.



1.3.2 General-Purpose Communication

■ Overview of function

- General-purpose communication is used when PLC executes communication in accordance with the protocol of the partner device.
- Formulation and sending of command messages to the partner device, and reception processing of responses from the partner device, are performed by the user program. Sending/receiving of data with an external device is executed via given operation memory (e.g. data register).
- Data are sent by converting commands in accordance with the partner device as strings into ASCII text, setting them into a given data register, and executing GPSEND instruction.
- Response received from the partner device is temporarily saved in the buffer. Based on the reception done flag, GPRECV instruction is executed. The ASCII strings can be converted into numerical data, etc. as necessary, by the user program.
- The data size that can be sent or received in a single communication is up to 4,096 bytes. (including control codes)



■ Applications of general-purpose communication

This is used for connection with devices made by differing manufacturers that have dedicated communication protocols.

1.4 Terms

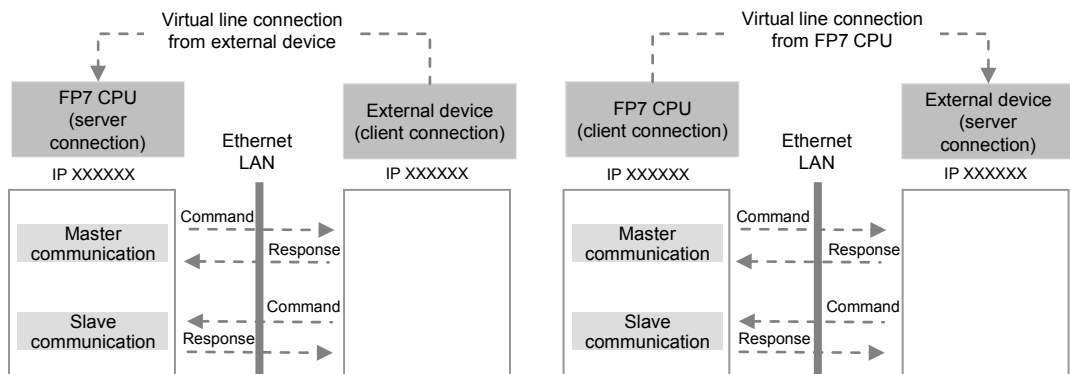
The following terms are used for settings on the software for connecting the FP7 CPU unit to Ethernet LAN, and in the Users Manuals.

■ Server connection and client connection

- These indicate methods for connecting a virtual communication line between FP7 and an external device.
- "Server connection" refers to a method to wait for connection from another client.
- "Client connection" refers to a method to connect a virtual communication line from the FP7 CPU unit to another external device port.

■ Master communication and slave communication

- These indicate methods for actually sending/receiving messages and data between FP7 and an external device.
- In master communication, PLC sends commands and receives responses.
- In slave communication, commands are received from an external device, and responses are returned.
- In a system using FP7, whether server connection or client connection is selected, once connection is opened and a virtual communication line is connected, commands and responses can be sent and received from both sides.



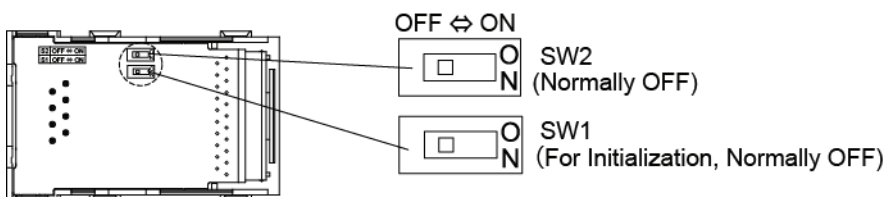
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Installation and Wiring

2.1 Attaching a Communication Cassette

2.1.1 Setting of Switches

- Two switches are mounted on the circuit board of communication cassette AFP7CCET1.
- SW1 is used to initialize communication conditions. SW2 is reserved. Please turn OFF during normal use.



◆ REFERENCE

- See 4.2.6 for initialization of communication conditions

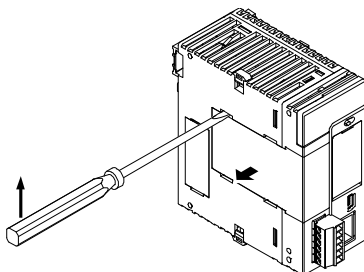
2.1.2 Attachment Instructions

When an optional communication cassette is to be used, attach it in the following procedures.



◆ PROCEDURE

1. Using a flathead screwdriver, remove the cover on the side of the CPU unit.
2. Attach a desired communication cassette.



2.2 Installation Environment and Wiring for LAN Ports

2.2.1 Before Installation and Wiring

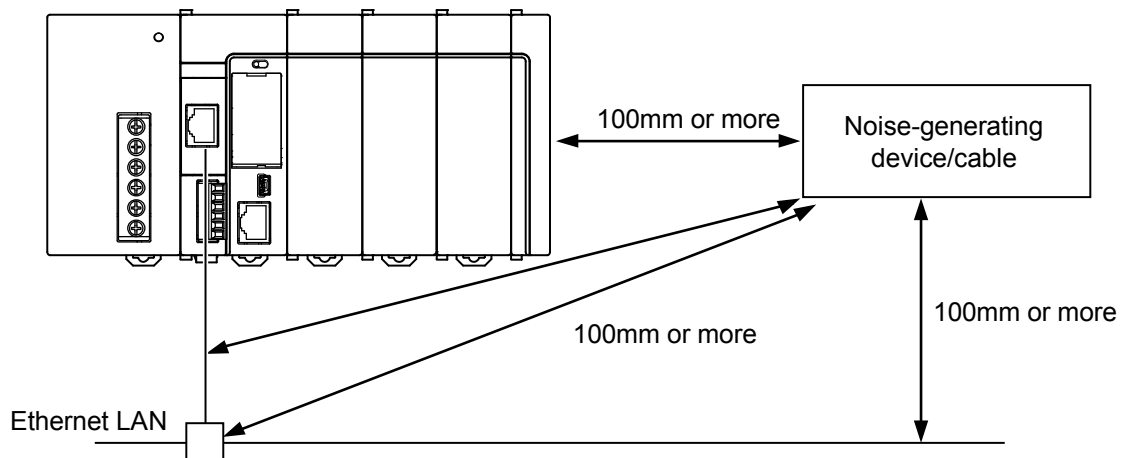
■ Noise resistance of Ethernet

The Ethernet is a network used in offices and buildings, where there is comparatively little noise. It does not have a higher resistance to noise than ordinary FA application networks. Caution is required when installing the hub, and when laying cables.

2.2.2 Installation Environment and Noise Control Measures

■ Measures that can be taken in the installation environment

- The CPU unit, transceiver, hub, and communication cables should be installed as far as possible from high-voltage wires, high-voltage equipment, power lines, power equipment, equipment that generates strong breaker surges, and the wiring for any of this equipment. At least 100 mm of clearance should be allowed when installing the equipment.

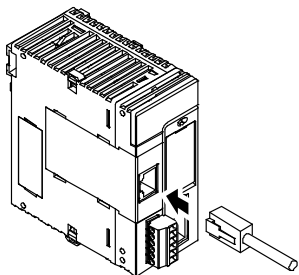


- When a device must be installed or a cable must be laid near a noise-generating device for special reasons, take measures such as:
 - install a programmable controller and a hub within a metal panel,
 - laying a communication cable inside a metal duct,
 - attaching a ferrite core near the CPU unit on the communication cable, etc.
- An alternative measure is to use an optical transceiver close to the noise-generating section of the equipment and install an optical fiber to keep the noise from affecting nearby equipment. (This is also effective as a lightning shield for outdoor wiring.)
- Metal panels and metal ducts should be grounded at a grounding resistance of 100 Ω or less. Also, metal panels and metal ducts should be insulated so that they do not come in contact with communication devices or cables.

2.3 Wiring the LAN Port

■ Selection of UTP cables

- Use Category 5 UTP cable.
- It is recommended to use a UTP cable of 10 m or shorter, taking account of noise resistance.
- In an environment where noise may occur, attach a ferrite core near the CPU unit on the UTP cable. It is also recommended to use a shielded cable.



◆ NOTE

- **For installation of 100BASE-TX or 10BASE-T hub, laying of cables, etc., please consult a specialized construction company. If this construction work is done incorrectly, it can adversely affect the entire network, and can cause accidents.**

3

I/O Number Allocation

3.1 Input/Output Signals Used for Communication

3.1.1 Occupied Area for Communication cassette (Ethernet type)

A fixed area is allocated as follows.

■ List of occupied words and I/O points by unit

Unit Type		Model number	Occupied words (occupied I/O points)	
			Input	Output
CPU Unit	Communication cassette (Ethernet type)	AFP7CCET1	4words(64points) WX0 - WX3	2words(32points) WY0 - WY1

3.1.2 I/O Number Allocation

■ Input signal (COM.1 port for User connection)

Input signal	Communication port	Name	Description	Effective operation mode
X0	For COM.1 Port	General-purpose communication Reception done flag	When the unit completes the data reception, it turns on (1). Waiting for data reception: 0, Reception completed: 1	General-purpose communication
X1 - X3	-	Not used	Do not use this.	-
X4	For COM.1 Port	General-purpose communication Reception done (copy) flag	It turns on (1) if there are copied data when GPRECV instruction is executed. It turns off (0) when END instruction is executed. (Note 1) Reading completed: 1 No data to be read: 0	General-purpose communication
X5 - X7	-	Not used	Do not use this.	-
X8	For COM.1 Port	General-purpose communication Clear to send flag	It turns on (1) when the unit is set to the general-purpose communication mode. It turns off (0) in other modes.	General-purpose communication
X9 - XB	-	Not used	Do not use this.	-
XC	For COM.1 Port	Master communication Clear to send flag	It turns on (1) when the unit is set to modes other than the general-purpose communication mode. It turns off (0) in other modes.	MEWTOCOL
XD - XF	-	Not used	Do not use this.	-
X10	For COM.1 Port	Reset done	When the communication channel is reset under the output Y10, the flag is turned on (1) once the resetting operation is completed. Resetting done: 1 Y10 is off: 0	General-purpose communication
X11 - X1F	-	Not used	Do not use this.	-

(Note 1): The general-purpose communication reception done (copy) flag is effective after the execution of the RECV instruction until one of the following instructions is executed. This flag does not remain ON across several scans. Execute 1: END instruction (scan header), and 2: RECV instruction

■ Input signal (COM.1 port User connection, COM.2 port for System connection)

Input signal	Communication port	Name	Description	Effective operation mode
X20	For COM.2 Port	Start status flag	0: During start process 1: Start process done	Normally
X21	For COM.2 Port	Link status flag	0: Link Up 1: Link Down	Normally
X22	For COM.2 Port	Initialized flag	0: Normal operation 1: During initialized process	Normally
X23 - X27	-	Not used	Do not use this.	-
X28	For COM.2 Port	Error status flag	0: Normal 1: Error occurred	Normally
X29	For COM.2 Port	DHCP acquisition flag	0: Normal 1: Acquisition error occurred	Normally
X2A	For COM.2 Port	Ver up error flag	0: Normal 1: Ver up error occurred	Normally
X2B - X2F	-	Not used	Do not use this.	-
X30	For COM.1 Port	Connection status flag	User connection 0: Disconnected 1: Connected	Normally
X31	For COM.1 Port	TCP Server connection Full flag	User connection 0: Not full 1: Full	Normally
X32	For COM.1 Port	TCP Client connection failure flag	User connection 0: Success0 1: Failure	Normally
X33	-	Not used	Do not use this.	-
X34	For COM.2 Port	Connection status flag	System connection 0: Disconnected 1: Connected	Normally
X35 - X3F	-	Not used	Do not use this.	-

■ Output signal (COM.1port: User connection use)

Output signal	Communication port	Name	Description	Effective operation mode
Y0	For COM.1 Port	Sending done result	Reports the results of sending in master communication or general-purpose communication. Normal completion: 0, Abnormal completion: 1	MEWTOCOL General-purpose communication
Y1 - Y7	-	Not used	Do not use this.	-
Y8	For COM.1 Port	General-purpose communication Sending active flag	It turns on (1) during sending in the general-purpose communication mode. (Note 1) Sending done: 0, Sending: 1	General-purpose communication
Y9 - YB	-	Not used	Do not use this.	-
YC	For COM.1 Port	Master communication Sending active flag	It turns on (1) during sending in the master communication mode. Sending done: 0, Sending: 1	MEWTOCOL
YD - YF	-	Not used	Do not use this.	-
Y10	For COM.1 Port	Request to reset CH	By turning on (1) Y10, the communication channel can be reset. Without a request to reset = 0, With a request to reset = 1 After ON (1) is output and the completion of the reset is confirmed by X10, return to OFF (0). The reset is performed only once when this signal rises. This function can be used to delete unnecessary received data or to clear errors before starting normal reception. 1:Sending canceled 2:Reception canceled 3:Re-set communication parameters 4:Clear error information (only for errors that can be cleared)	General-purpose communication
Y11 - Y1F	-	Not used	Do not use this.	-

(Note 1) When transmission is completed within one scan, it turns off when the GPSEND instruction is executed in the subsequent scan.



◆ NOTE

- Each contact (Y0, Y8, YC) in the table above is used for reading the operation status. Do not write over it with a user program. (excluding Y10)

4

Setting Communication Conditions

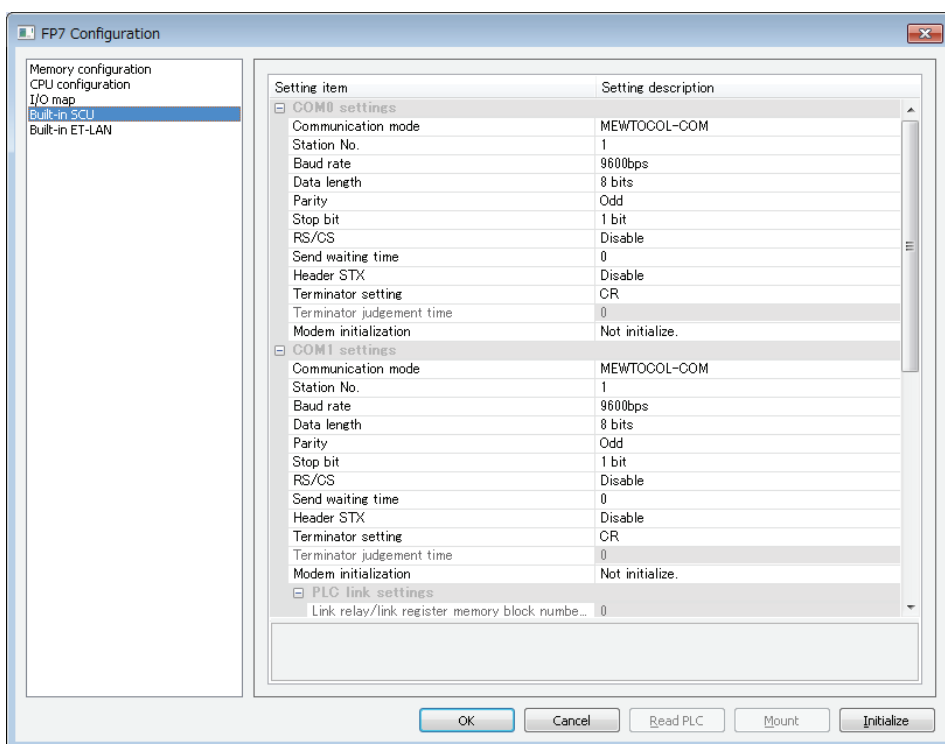
4.1 Settings Using FPWIN GR7

- Set the "Communication Mode", "Station no." and others in the FPWIN GR7.
- These configuration will downloaded to the PLC with Programs as a Project.



◆ PROCEDURE

1. Select "Options" > "FP7 Configuration" from the menu bar,
The "FP7 Configuration" dialog box opens.
2. Select "Built-in SCU".
Setting items for "Built-in SCU" appear.



3. Press [OK], after setting for communication conditions of COM.1 port.
Set conditions are incorporated into the project that is being edited.



◆ KEY POINTS

- Select the "Built-in SCU" for the Communication cassette AFP7CCET1 to recognised as serial communication in the internal system.
- Settings for the COM.2 ports is not available for the Communication cassette AFP7CCET1.

■ Specified using FPWINGR7 (COM.1port)

Parameter	Permissible range for AFPCCT1	Description
Communication mode	MEWTOCOL-COM MEWTOCOL-7 General-purpose Communication	Select the mode MEWTOCOL or General-purpose Communication to match the settings of Configurator WD.
Station No.	1to99 (MEWTOCOL-COM) 1to999 (MEWTOCOL7-COM)	It is not available for the General-purpose Communication mode.
Baud rate	230400 bps	These parameters are fixed regardless of the settings in the FPWINGR7.
Data length	8bits	
Parity	ODD	
Stop bit	1bits	
RS/CS	N/A	
Send waiting time	0-100ms	
Terminator setting	CR / CR+LF / Time	CR is fixed for the MEWTOCOL mode. CR, CR+LF or Time can be selected to match the settings of Configurator WD.
Terminator judgement time	0-10000*0.01ms	It is available, if terminator setting is "Time". Set the time to match the settings of Configurator WD.
Header STX	N/A	These parameters are fixed regardless of the settings in the FPWINGR7.
Modem initialization	Not initialize	



◆ KEY POINTS

- The parameters "Communication mode", "Station No.", "Send waiting time", "Terminator setting" and "Terminator judgement time" are available in the FPWINGR.

4.2 Specified using Configurator WD

4.2.1 Start Configurator WD and Serach units

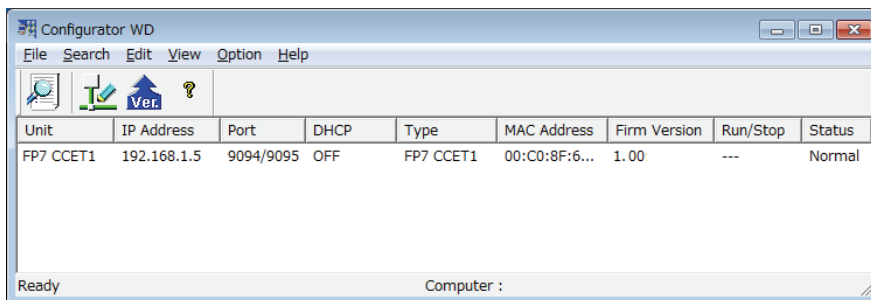
- The communication tool software “Configurator WD” is required to set Ethernet communication for the Communication cassette AFP7CCET1.
- The setting is saved in the Communication cassette AFP7CCET1.



◆ PROCEDURE

1. Start "Configurator WD".
2. Click [Search unit] icon, after confirmation to connect the PLC to the PC via the communication cassette AFP7CCET1.

Connected units are indicated, if they are connected correctly. If FP7 CCET is not indicated, please reconfirm the connection.



4.2.2 IP Address Settings

Set the IP address in the "Setting IP Address" dialogbox of Configurator WD.



◆ PROCEDURE

1. **Activate unit name, when connected unit is indicated.**

The unit name will be highlighted.

2. **Select "Edit" > "Setting IP Address" from the menu bar.**

The "IP AddressSetting" dialogbox will open.

3. **Enter the IP Address.**

4. **Press [OK].**

The message box "IP Address is updated" will appear.

■ IP Address Setting

Parameter	Description	Default
Obtain IP address automatically (Note1)	When selecting "Obtain an IP address automatically", an IP address is obtained from the DHCP server. When selecting "Use the following IP address", an IP address is set manually.	Use the following IP address
Unit name	Unit name for can be specified to identify iCommunication cassette AFP7 CCET1 in the Configurator WD.	FP7 CCET1
IP address (Note1)	IP address of Communication cassette AFP7 CCET1 Set an IP address other than 0.0.0.0 and 255.255.255.255.	192.168.1.5
Subnet mask	Netmask of Communication cassette AFP7 CCET1	255.255.255.0
Default Gateway	Gateway of Communication cassette AFP7 CCET1	192.168.1.1

(Note1): When an error occurs, its cause will be confirmed by specified I/O. See 3.1.2 I/O Number Allocation.

4.2.3 Communication Settings

Set the parameters for the User connection in the "Communication Setting" dialogbox of Configurator WD.



◆ PROCEDURE

1. **Activate unit name, when connected unit is indicated.**

The unit name will be highlighted.

2. **Select "Edit" > "Communication Setting" from the menu bar.**

"Communication Setting" dialigbox will open.

The screenshot shows the "Communication Setting" dialog box with the following fields and values:

- User Connection:**
 - Protocol Mode: TCP
 - Action Mode: Server Mode
- Communication Mode:** MEWTOCOL
- Send Type:** UNICAST
- Server Setting:**
 - Source Port No.: 9095 (502-65534)
 - Timeout: 15 sec (0: No Timeout) (0-1800)
- Client Setting:**
 - Destination IP Address: 192 . 168 . 1 . 100
 - Destination Port No.: 9094 (502-65534)
 - Source Port No.: 9095 (0, 502-65534)
 - Timeout: 15 sec (0: No Timeout) (0-1800)

3. **Enter the desired items.**

See the next page for the details.

4. **Press [OK].**

The message box "Unit communication setting was completed" will appear.

5. **Press [OK].**

■ Communication Settings

Parameters		Description	Default
Protocol Mode		Protocol Mode of Communication cassette AFP7 CCET1 Select TCP or UDP.	TCP
Action Mode		Action Mode of Communication cassette AFP7 CCET1 Select Client Mode or Server Mode.	Server Mode
Communication Mode		Communication Mode of Communication cassette AFP7 CCET1. Select MEWTOCOL or General communication to match the communication mode setting of FPWINGR7.	MEWTOCOL
Send type		Method for transmitting data to partner devices. Select UNICAST or BROADCAST. It is valid when selecting UDP in the communication protocol.	UNICAST
Server Setting (Note1)	Source Port No.	Port number that AFP7 CCET1 opens. Range: 502 to 32767	9095
	Timeout	If AFP7 CCET not communicate with a destination device during this setting time (seconds) in the state that connection is established, connection will be cut. Range: 0 to 1800s When 0 is set, the connection will not be cut.	15
Client Setting (Note2)	Destination IP Address	Specify IP address of destination Set an IP address other than 0.0.0.0 and 255.255.255.255.	192.168.1.100
	Destination Port No.	Specify port number of destination Range: 502 to 32767	9094
	Source Port No.	Source port number of a destination device Range: 0, 1025 to 32767 When 0 is set, optional.	9095
	Timeout	If AFPX-COM5 not communicate with a destination device during this setting time (seconds) in the state that connection is established, connection will be cut. Range: 0 to 1800 s When 0 is set, the connection will not be cut.	15

(Note1): This parameter is valid, if "Server Mode" is selected.

(Note2): This parameter is valid, if "Client Mode" is selected.

4.2.4 Option Settings

Set the parameters in the option dialogbox of Configurator WD for the User connection or System connection.



◆ PROCEDURE

1. **Activate unit name, when connected unit is indicated.**

The unit name will be highlighted.

2. **Select "Edit" > "Communication Setting" from the menu bar.**

"Communication Setting" dialigbox will open.

3. **Press [Option].**

"Option" dialigbox will open.

User Connection

Endcode : CR

Judgment time without termination : 20 0-100(ms)

Target IP address for unit number

Destination unit number and IP address is specified.

Unit Number	IP Address	Dest Port No.	Unit Number 'EE'
<input type="checkbox"/> 1	192.168.1.100	9095	Not Use
<input type="checkbox"/> 2	192.168.1.100	9095	Not Use
<input type="checkbox"/> 3	192.168.1.100	9095	Not Use
<input type="checkbox"/> 4	192.168.1.100	9095	Not Use
<input type="checkbox"/> 5	192.168.1.100	9095	Not Use

System Connection

Action Mode : Server Mode

Protocol Mode : TCP

Communication Mode : MEWTOCOL

Server setting

Source Port No. : 9094 (502-65534)

Timeout : 15 sec
(0 : No Timeout) (0-1800)

4. **Enter the desired items.**

See the next page for the details.

5. **Press [OK].**

"Communication Setting" dialigbox will open.

6. **Press [OK] in the "Communication Setting" dialigbox.**

The message box "Unit communication setting was completed" will appear.

7. **Press [OK].**

■ Option Setting

Parameter		Description	Default
End code		<p>This is the code for the AFP7 CCET1 to confirm the end of the message (data) to be received from the FP7 CPU unit.</p> <p>CR, CR+LF or NONE can be selected.</p> <p>Reception continues until the end of the message (CR, CR+LF) will be received. When selecting NONE, the end code is not confirmed.</p>	CR
Judgement time without termination		<p>Set the wait time for the end code.</p> <p>If the next message (data) is not received within the judgment time without termination (ms) after the last received message (data), the AFP7 CCET1 judges that is no termination, and performs the following operation.</p> <p>(End code: when selecting CR, CR+LF) The received message (data) is discarded. For TCP, the connection is disconnected.</p> <p>(End code: when selecting NONE) The message (data) is transmitted to the connected destination.</p>	20ms
Target IP Address for unit number	Destination unit number and IP address is specified	A command is transmitted to the IP address corresponding to the unit number.	N/A
	Unit Number	Specify a station number Specify a value between 1 and 99 in decimal format	N/A
	IP Address	Specify IP address	192.168.1.100
System connection	Action Mode	Server Mode is fixed for the "System connection".	Server Mode
	Protocol Mode	Protocol Mode of Communication cassette AFP7 CCET1 TCP is fixed.	TCP
	Communication Mode	Communication Mode of Communication cassette AFP7 CCET1 MEWTOCOL is fixed.	MEWTOCOL
	Source Port No.	Port number that AFP7 CCET1 opens. Range: 1025 to 32767	9094
	Timeout	If AFP7 CCET1 not communicate with a destination device during this setting time (seconds) in the state that connection is established, connection will be cut. Range: 0 to 1800s When 0 is set, the connection will not be cut.	15 sec

4.2.5 Target IP address for unit number Setting

"Target IP address for unit number Setting" is available, in case of the following conditions.

- Protocol Mode: TCP or UDP (UNICAST)
- Action Mode: Client Mode
- Communication Mode: MEWTOCOL



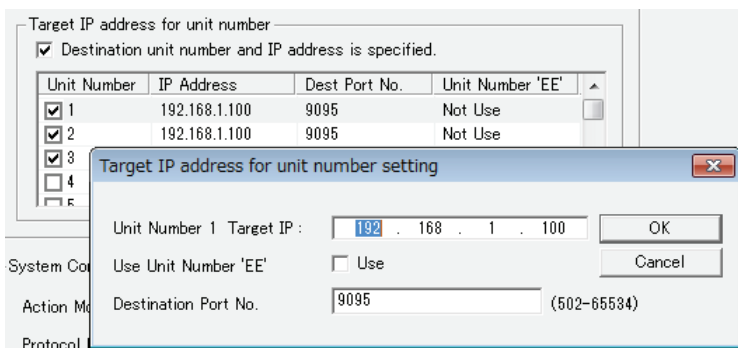
◆ PROCEDURE

1. Press [Option].

"Option" dialogbox will open.

2. Check the checkbox "Destination unit number and IP address is specified".
3. Double-click the line of the desired unit number.

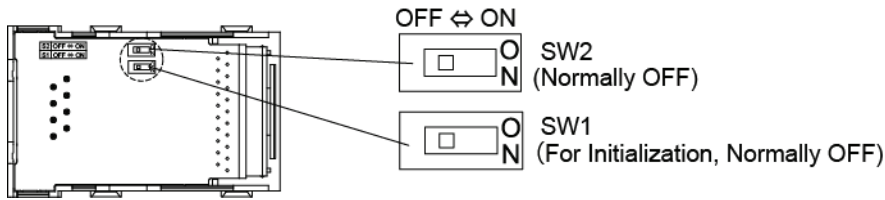
"Target IP address for unit number setting " dialogbox will open.



4. Enter IP Address for unit number
5. Press [OK].

4.2.6 Initialization of the environment setting of the cassette

- The Ethernet communication environment setting of the AFP7CCET1 can be initialized.



◆ PROCEDURE

- Turn on the SW1 at the back of the AFP7CCET1.
- Install the AFP7CCET1 on the FP7 CPU unit and turn on the power supply.
- Start "Configurator WD".
- Press [Search Unit] icon in the Configurator.
If FP7CCET1 is detected, it has successfully initialized.
- Turn off the power supply of the FP7 CPU unit. Remove the AFP7CCET1.
- Turn off the SW1 at the back of the AFP7CCET1.
- Install the AFP7CCET1 on the FP7 CPU unit.



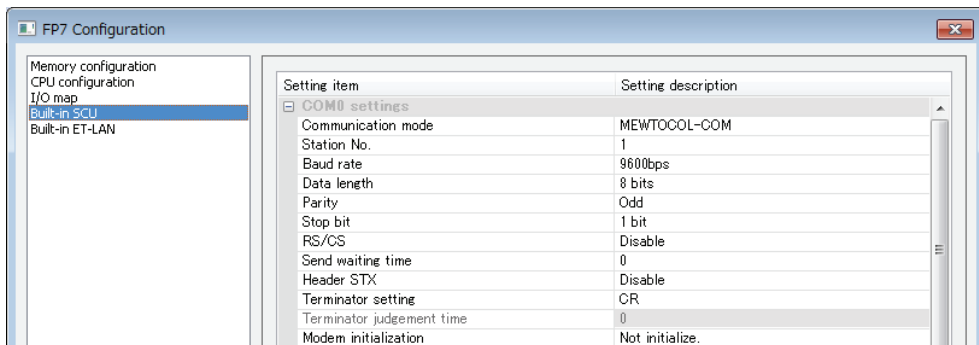
◆ KEY POINTS

- The Ethernet communication setting (including the IP address) cannot be changed when the SW1 of the AFP7CCET1 is on. Always turn it off after initialization.

4.3 Example of User connection (MEWTOCOL)

4.3.1 Specified using FPWINGR7

- Set the communication mode and station no. into the field built-in SCU >COM.1 settings in the FPWINGR7.

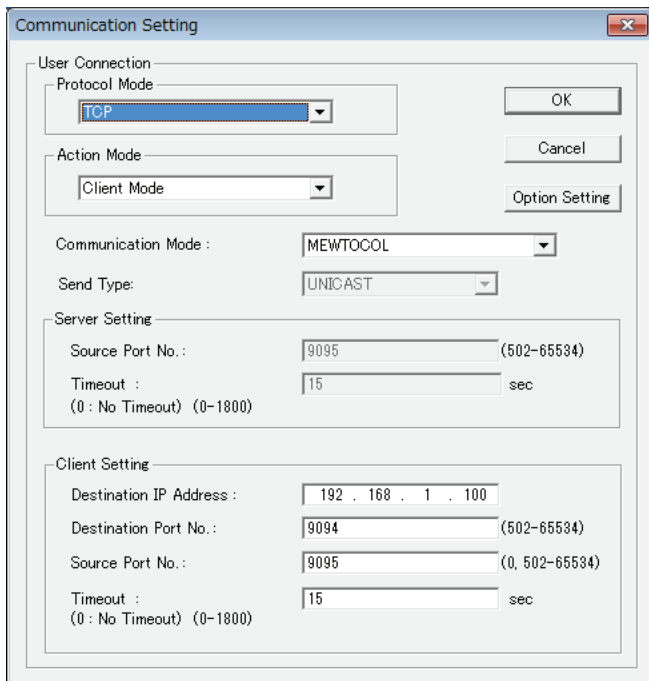


Setting items for COM.1 port (AFP7CCET1)

Setting item	Setting description
Communication Mode	MEWTOCOL-COM
Station No.	1to99

4.3.2 Specified using Configuration WD

■ TCP Client Mode



Parameter	Default
Protocol Mode	TCP
Action Mode	Client Mode
Communication Mode	MEWTOCOL
Destination IP Address	192.168.1.100
Destination Port No.	9094
Source Port No.	9095
Timeout	15 sec



◆ KEY POINTS

- Connection request will be performed when data transfer is executed. Please execute master communication command after confirming the connection status flag (X30) is OFF. When a connection successfully established, connection status flag (X30) turns ON. If a connection failed, connection status flag (X30) stays OFF and TCP client connection failure flag (X32) turns ON. Please reconfirm the conditions of destination or connection.
- If it needs to continue data transfer between the same connected equipment, please execute master communication command after confirming the connection status flag (X30) is ON.
- Timeout value of response reception for AFP7CCET1 is the same as connection termination timeout during no communication. Set the timeout of SEND/RCV instruction longer than the timeout during no communication to judge the timeout of response reception. Enter the "Time setting" filed of "CPU Configuration" in the "FP7 configuration" dialog box of FPWIN GR7.

□ Time setting	
End processing time (setting value * 0.1 ms)	125
Next frame wait timeout time during multi-fram...	6500
Monitor registration valid time (setting value * 1...	65535
Contact scan time (setting value * 1 ms)	0
Communications control instruction timeout tim...	100

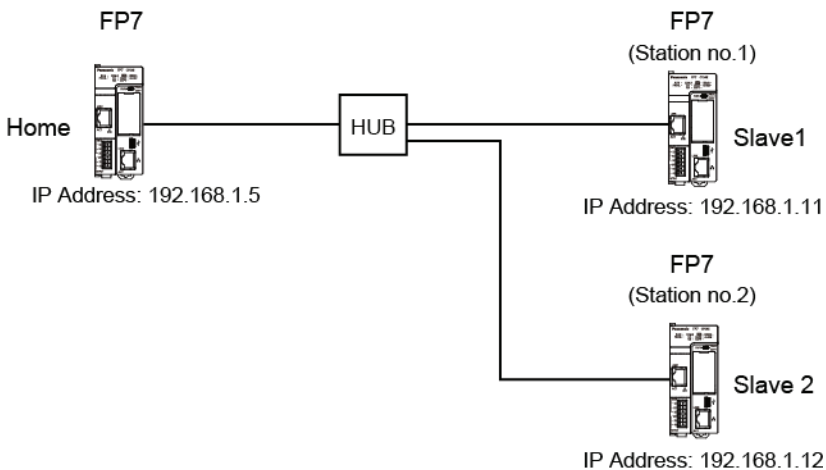
■ UDP Client mode

Parameter	Default
Protocol Mode	UDP
Action Mode	Client Mode
Communication Mode	MEWTOCOL
Send type	UNICAST /BROADCAST (Note1)
Destination IP Address	192.168.1.100
Destination Port No.	9094
Source Port No.	9095
Timeout	15 sec

(Note):
The parameter "IP Address" is not available, if BROADCAST is selected.

4.3.3 Example of MEWTOCOL Master Communication

The following example shows how to set the parameters, for the master communication from home station.



1) MEWTOCOL Master Communication in the TCP mode

Parameter		Example			
Dialogbox	Field	Home	Slave1	Slave2	
IP Address	IP Address	192.168.1.5	192.168.1.11	192.168.1.12	
	Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0	
	Default Gateway	192.168.1.1	192.168.1.1	192.168.1.1	
Communication Setting	Protocol Mode	TCP	TCP	TCP	
	Action Mode	Client Mode	Server Mode	Server Mode	
	Communication Mode	MEWTOCOL	MEWTOCOL	MEWTOCOL	
	Destination IP Address	192.168.1.11	N/A	N/A	
	Destination Port No	9094	N/A	N/A	
	Source Port No	0	9094	9094	
	Timeout	0	0	0	
Option	Destination unit number and IP address is specified	Activated	N/A	N/A	
	IP Address for unit no.	No.1	192.168.1.11	N/A	N/A
		No.2	192.168.1.12	N/A	N/A

2) MEWTOCOL Master Communication in the UDP UNICAST mode

Parameter		Example			
Dialogbox	Field	Home	Slave1	Slave2	
IP Address	IP Address	192.168.1.5	192.168.1.11	192.168.1.12	
	Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0	
	Default Gateway	192.168.1.1	192.168.1.1	192.168.1.1	
Communication Setting	Protocol Mode	UDP	UDP	UDP	
	Action Mode	Client Mode	Server Mode	Server Mode	
	Communication Mode	MEWTOCOL	MEWTOCOL	MEWTOCOL	
	Send type	UNICAST	UNICAST	UNICAST	
	Destination IP Address	192.168.1.11	N/A	N/A	
	Destination Port No	9094	N/A	N/A	
Option	Source Port No	0	9094	9094	
	Destination unit number and IP address is specified		Activated	N/A	N/A
	IP Address for unit no.	No.1	192.168.1.11	N/A	N/A
No.2		192.168.1.12	N/A	N/A	

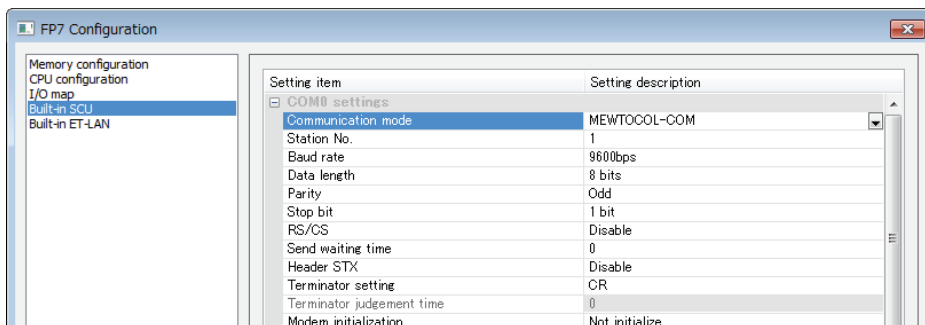
3) MEWTOCOL Master Communication in the UDP BROADCAST mode

Parameter		Example		
Dialogbox	Field	Home	Slave1	Slave2
IP Address	IP Address	192.168.1.5	192.168.1.11	192.168.1.12
	Subnet Mask	255.255.255.0	255.255.255.0	255.255.255.0
	Default Gateway	192.168.1.1	192.168.1.1	192.168.1.1
Communication Setting	Protocol Mode	UDP	UDP	UDP
	Action Mode	Client Mode	Server Mode	Server Mode
	Communication Mode	MEWTOCOL	MEWTOCOL	MEWTOCOL
	Send type	BROADCAST	BROADCAST	BROADCAST
	Destination IP Address	192.168.1.11	N/A	N/A
	Destination Port No	9094	N/A	N/A
Option	Source Port No	0	9094	9094
			N/A	N/A

4.4 Example of User connection (General Communication)

4.4.1 Specified using FPWINGR7

- Set the communication mode and format into the field built-in SCU >COM.1 settings in the FPWINGR7.

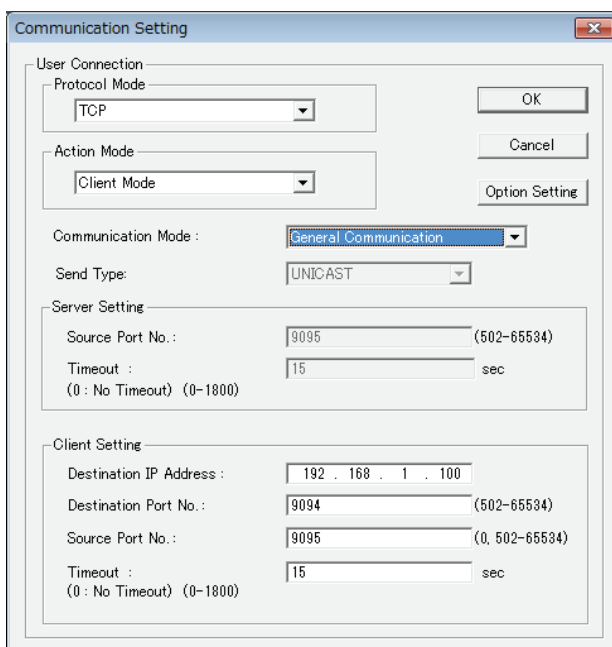


Setting of COM.1port (AFP7CCET1)

Parameter	Setting description
Communication mode	General Communication
Terminator setting	CR, CR+LF, Time
Terminator judgement time	0 to 100ms

4.4.2 Specified using Configuration WD

■ TCP Client Mode



Parameter	Default
Protocol Mode	TCP
Action Mode	Client Mode
Communication Mode	General Communication
Send type	UNICAST
Destination IP Address	192.168.1.100
Destination Port No.	9094
Source Port No.	9095
Timeout	15 sec

■ TCP Server Mode

Parameter	Default
Protocol Mode	TCP
Action Mode	Server Mode
Communication Mode	General Communication
Destination IP Address	192.168.1.100
Source Port No.	9095
Timeout	15 sec

■ UDP mode

Parameter	Default
Protocol Mode	UDP
Action Mode	Client Mode
Communication Mode	General Communication
Destination IP Address	192.168.1.100
Destination Port No.	9094
Source Port No.	9095
Timeout	15 sec

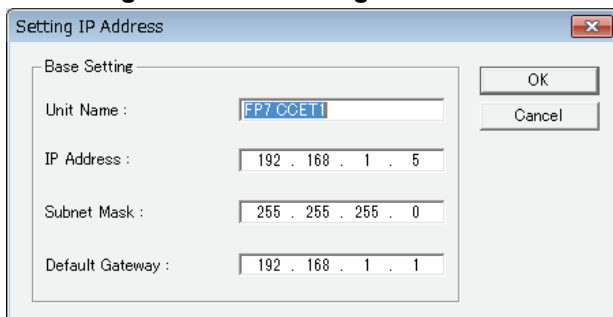
(Note):
The parameter "Destination IP Address" is not available, if BROADCAST is selected.

4.5 Example of System connection

4.5.1 Specified using Configuration WD

- System connection is used, when the tool software e.g. FPWIN GR7 is used via LAN port.
- Settings are necessary in the IP Address dialogbox and Option dialogbox for the System connection

■ Setting IP Address dialogbox

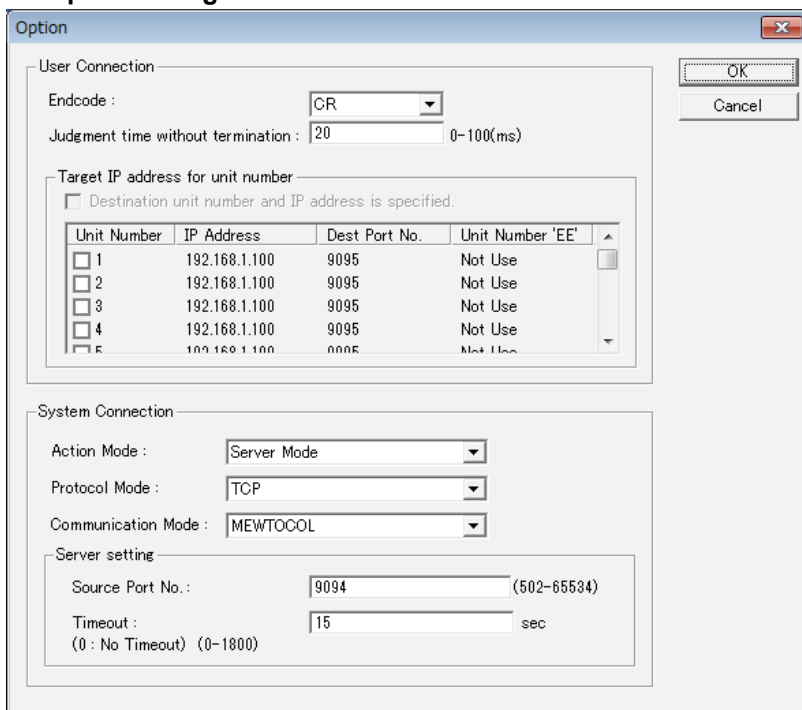


Setting IP Address dialog box showing Base Setting fields:

- Unit Name: FP7 CCET1
- IP Address: 192 . 168 . 1 . 5
- Subnet Mask: 255 . 255 . 255 . 0
- Default Gateway: 192 . 168 . 1 . 1

Buttons: OK, Cancel

■ Option dialogbox



Option dialog box showing User Connection and System Connection settings:

User Connection:

- Encode: CR
- Judgment time without termination: 20 (0-100(ms))

Target IP address for unit number:

Destination unit number and IP address is specified.

Unit Number	IP Address	Dest Port No.	Unit Number 'EE'
<input type="checkbox"/> 1	192.168.1.100	9095	Not Use
<input type="checkbox"/> 2	192.168.1.100	9095	Not Use
<input type="checkbox"/> 3	192.168.1.100	9095	Not Use
<input type="checkbox"/> 4	192.168.1.100	9095	Not Use
<input type="checkbox"/> 5	192.168.1.100	9095	Not Use

System Connection:

- Action Mode: Server Mode
- Protocol Mode: TCP
- Communication Mode: MEWTOCOL

Server setting:

- Source Port No.: 9094 (502-65534)
- Timeout: 15 sec (0: No Timeout) (0-1800)

Buttons: OK, Cancel



◆ KEY POINTS

- Select "Server Mode", "TCP" and "MEWTOCOL" for the System connection. And it need not set in the "Communication Setting" dialog box.

4.5.2 Specified using FPWIN GR7

- Please specify the following settings to connect with PLC via Communication cassette AFP7CCET1 using tool software FPWINGR7.



◆ PROCEDURE

1. Select "Online" > "Communications settings" from the menu bar.
"Communication Settings" dialogbox will open.

2. Select "LAN".
3. Enter the same IP Address and the same Source Port no. into "Connection destination" field, as the setting in the Configurator WD.
4. Press [OK].
5. Select "Online" > "Switch to Online Mode" from the menu bar.

5

MEWTOCOL Master/Slave Communication

5.1 List of MEWTOCOL / MEWTOCOL7 Supporting Commands

5.1.1 List of MEWTOCOL Commands

■ Commands to be used

Type of instruction	Code	Description
Read contact area	RC	Reads ON/OFF status of contact.
	(RCS)	- Specifies only one point.
	(RCP)	- Specifies multiple contacts.
	(RCC)	- Specifies a range in word units.
Write contact area	WC	Turns ON or OFF the contact.
	(WCS)	- Specifies only one point.
	(WCP)	- Specifies multiple contacts.
	(WCC)	- Specifies a range in word units.
Read data area	RD	Reads the contents of a data area.
Write data area	WD	Writes data to a data area.
Register or Reset contacts monitored	MC	Registers the contact to be monitored.
Register or Reset data monitored	MD	Registers the data to be monitored.
Monitoring start	MG	Monitors a registered contact or data using MC and MD.
Preset contact area (fill command)	SC	Embeds the area of a specified range in a 16-point on/off pattern.
Preset data area (fill command)	SD	Writes the same contents to the data area of a specified range.
Read the status of PLC	RT	Reads the specifications of the programmable controller and error codes if an error occurs.
Abort	AB	Aborts reception of multiple frame responses before completion.

(Note) Some devices are not accessible due to format restrictions of MEWTOCOL-COM communication commands.

5.1.2 List of MEWTOCOL7 Commands

■ Commands to be used

Type of instruction	Code	Description
Read data area	MMRD	Reads the contents of a data area.
Write data area	MMWT	Writes data to a data area.



◆ REFERENCE

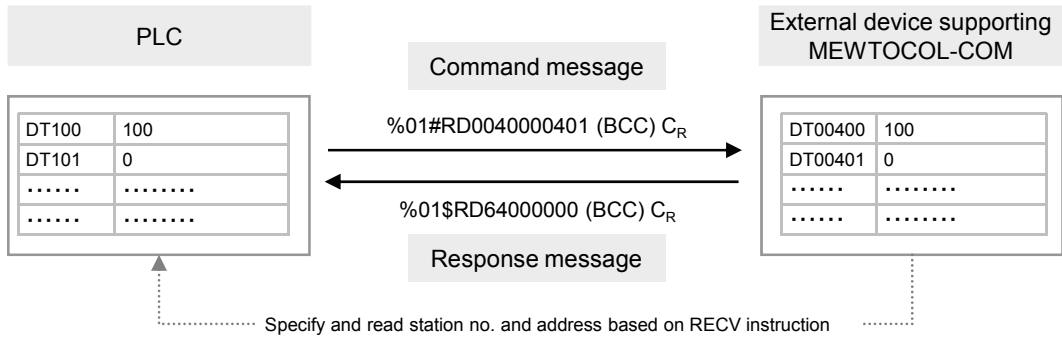
- For details of MEWTOCOL commands, please see 7.2 MEWTOCOL-COM Format and 7.3 MEWTOCOL7-COM Format.

5.2 MEWTOCOL-COM Master Communication (RECV)

5.2.1 Read Data from an External Device

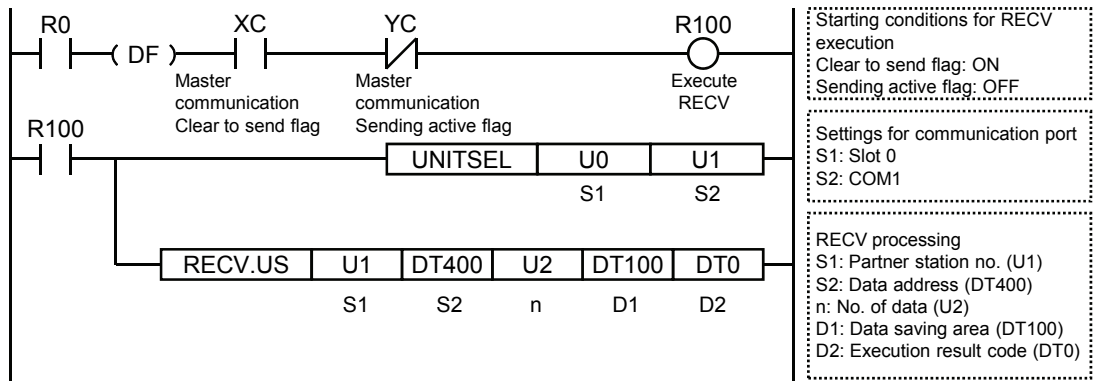
■ Instructions

In master communication, PLC has the sending right, and executes communication by sending commands to devices that support MEWTOCOL, and receiving responses. Messages in accordance with the protocol are automatically generated by PLC. In the user program, reading and writing can be done simply by specifying the station no. and memory address and executing SEND/RECV instructions.

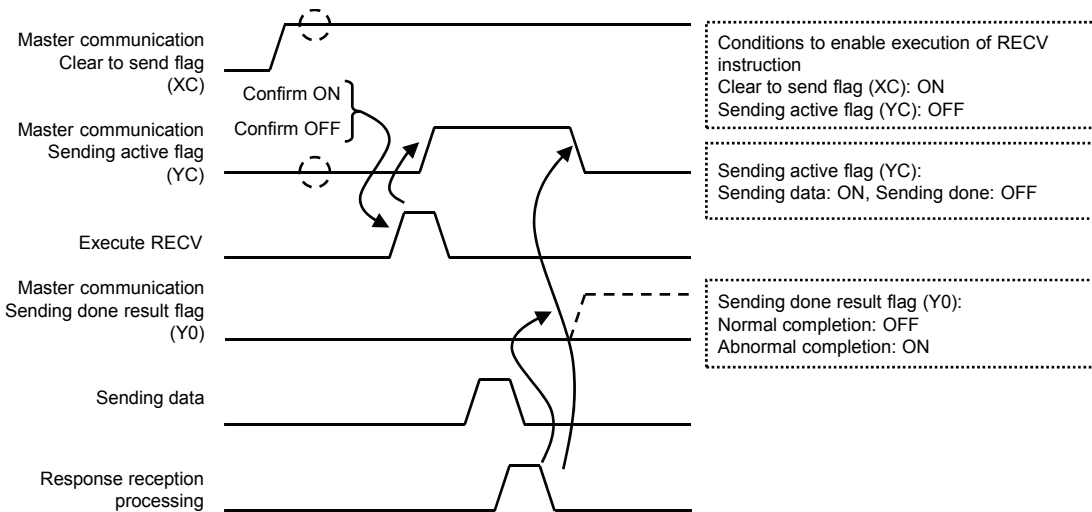


■ Sample program

- Send commands from the COM1 port of the CPU unit, read data from the data area of an external device (station no. 1) DT400 - DT401, and write the content into PLC's data register DT100 - DT101.
- Confirm that the unit is in the master mode (XC), and that the sending process is not in progress for the same port (YC), and start up the SEND instruction.
- In the UNITSEL instruction, specify the slot No. (U0) and the COM. port No. (U1).
- In the RECV instruction, specify and execute the partner station no. (U1), initial address (DT400), No. of data (U2), and initial address on the PLC side to save data (DT100).



■ Timing chart



■ I/O allocation

COM port no. 1	Name	Explanation
XC	Master communication Clear to send flag	Turns ON when MEWTOCOL-COM or MEWTOCOL7 is set for the communication mode, and the unit is in the RUN mode.
YC	Master communication Sending active flag	Turns ON during sending data based on SEND/RECV instruction. Turns OFF when the sending process is completed.
Y0	Sending done result flag	Reports completion result of sending data in general-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

(Note 1) Each contact is used for reading the operation status. Do not write over it with a user program.



◆ KEY POINTS

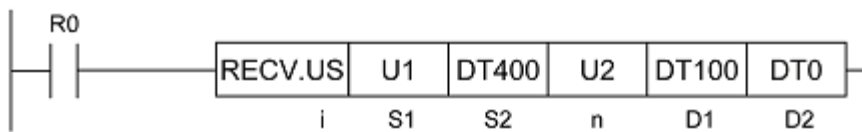
- Specify the port targeted for communication, using UNITSEL instruction immediately before SEND/RECV instruction.
- Master communication is only valid when MEWTOCOL is selected. Confirm that the "Master communication Clear to send flag" (XC) for the targeted channel is ON, and execute SEND/RECV instruction.
- You cannot execute other SEND/RECV instruction for a communication port in master communication. Confirm that the "Master communication Sending active flag" (YC) is OFF, and execute instruction.
- You cannot execute SEND/RECV instruction for a port in slave communication.
- If no response is received, the "Master communication Sending active flag" (YC) remains ON throughout the timeout setting time specified in CPU configuration.
- Up to 16 SEND/RECV instructions can be executed simultaneously for different COM. ports.

5.2.2 Precaution When Using TCP Client Mode

- Connection request will be performed when data transfer is executed. Please execute master communication command after confirming the connection status flag (X30) is OFF.
- When a connection successfully established, connection status flag (X30) turns ON. If a connection failed, connection status flag (X30) stays OFF and TCP client connection failure flag (X32) turns ON. Please reconfirm the conditions of destination or connection.
- If it needs to continue data transfer between the same connected equipment, please execute master communication command after confirming the connection status flag (X30) is ON.

5.2.3 RECV Instruction (When MEWTOCOL-COM is Used)

■ Instruction format



Items	Settings	Setting range
i	Specify the operation unit.	US / SS
S1	Specify the partner station no.	1 - 99
S2	Specify the device initial address of the source node data area in the partner node. (Note 1)(Note 2)	0 - 99999
n	Specify the No. of sent data. (Note 3)	1 - 509 words or 1 bit
D1	Specify the device initial address of the receiver node data area in the source node. (Note1)	(Note1)
D2	Specify the device area in the source node to save the execution result code (one word). (Note 4)	-

(Note 1) Transmission methods vary by the type of device to be specified for the operands [S2] and [D1].

Device to be specified for [S2] and [D1]	Transmission method
16 bit device: WX, WY, WR, WL, DT, LD	Register transmission
1 bit device: X; Y; R; L; DT,n; LD,	Bit transmission

(Note 2) Bit device DT, n and LD, n cannot be specified for the header of the sender data in the partner node.

(Note 3) The No. of sent data is on a word basis for register transmission, and on a bit basis for bit transmission.

(Note 4): Device that can be specified for [D2] are: WX, WY, WR, WL, DT, LD. Saved as one word in the specified area.

0: Normal completion

1: Communication port is being used for master communication

2: Communication port is being used for slave communication

3: No. of master communication instructions that can be used simultaneously has been exceeded

4: Sending timeout

5: Response reception timeout

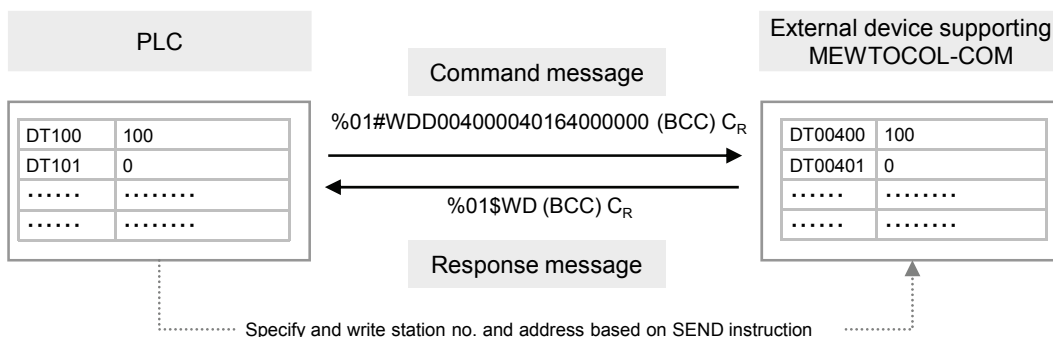
6: Received data error

5.3 MEWTOCOL-COM Master Communication (SEND)

5.3.1 Write Data into an External Device

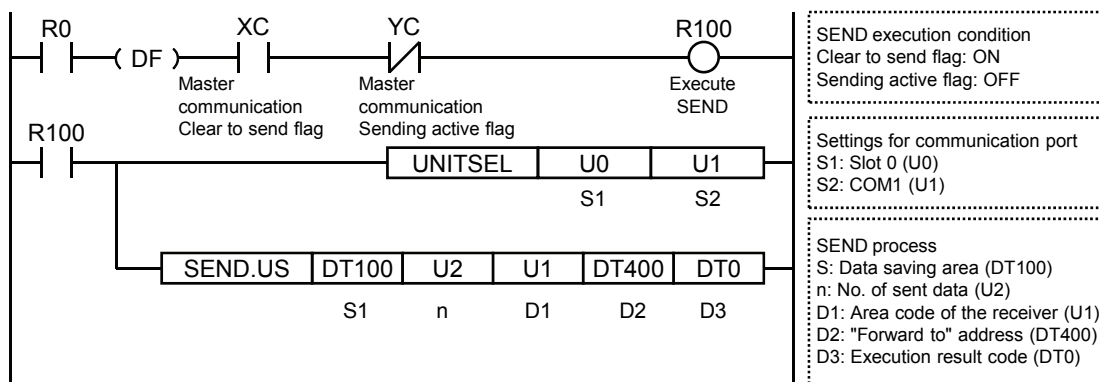
■ Instructions

In master communication, PLC has the sending right, and executes communication by sending commands to devices that support MEWTOCOL, and receiving responses. Messages in accordance with the protocol are automatically generated by PLC. In the user program, reading and writing can be done simply by specifying the station no. and memory address and executing SEND/RECV instructions.

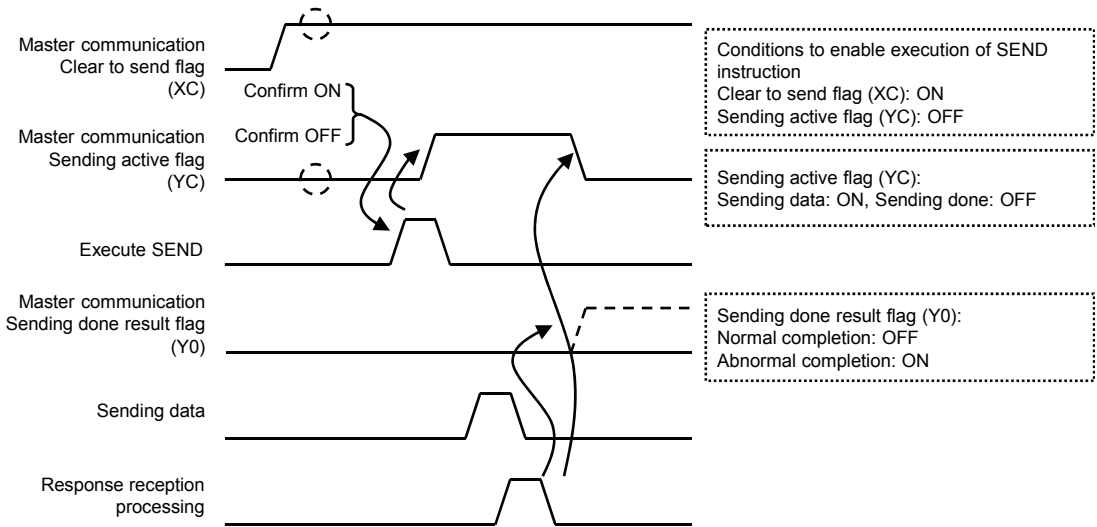


■ Sample program

- Send commands from the COM1 port of the CPU unit, and write the content of PLC's data register DT100 - DT101 into the data area of an external device (station no. 1) DT400 - DT401.
- Confirm that the unit is in the master mode (XC), and that the sending process is not in progress for the same port (YC), and start up the SEND instruction.
- In the UNITSEL instruction, specify the slot No. (U0) and the COM. port No. (U1).
- In the SEND instruction, specify and execute the sender initial address (DT100), No. of data (U2), "Transmit to" station no. (U1), and initial address (DT400).



■ Timing chart



■ I/O allocation

COM port no. 1	Name	Explanation
XC	Master communication Clear to send flag	Turns ON when MEWTOCOL-COM or MEWTOCOL7 is set for the communication mode, and the unit is in the RUN mode.
YC	Master communication Sending active flag	Turns ON during sending data based on SEND/RCV instruction. Turns OFF when the sending process is completed.
Y0	Sending done result flag	Reports completion result of sending data in general-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

(Note 1) Each contact is used for reading the operation status. Do not write over it with a user program.



◆ KEY POINTS

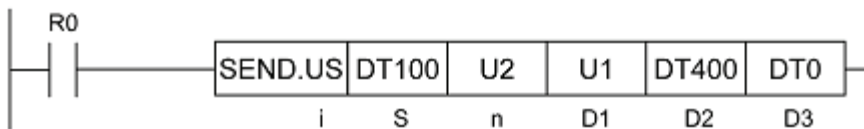
- Specify the port targeted for communication, using UNITSEL instruction immediately before SEND/RCV instruction.
- Master communication is only valid when MEWTOCOL is selected. Confirm that the "Master communication Clear to send flag" (XC) for the targeted channel is ON, and execute SEND/RCV instruction.
- You cannot execute other SEND/RCV instruction for a communication port in master communication. Confirm that the "Master communication Sending active flag" (YC) is OFF, and execute instruction.
- You cannot execute SEND/RCV instruction for a port in slave communication.
- If no response is received, the "Master communication Sending active flag" (YC) remains ON throughout the timeout setting time specified in CPU configuration.
- Up to 16 SEND/RCV instructions can be executed simultaneously for different COM. ports.

5.3.2 Precautions When Using TCP Client Mode

- Connection request will be performed when data transfer is executed. Please execute master communication command after confirming the connection status flag (X30) is OFF.
- When a connection successfully established, connection status flag (X30) turns ON. If a connection failed, connection status flag (X30) stays OFF and TCP client connection failure flag (X32) turns ON. Please reconfirm the conditions of destination or connection.
- If it needs to continue data transfer between the same connected equipment, please execute master communication command after confirming the connection status flag (X30) is ON.

5.3.3 SEND Instruction (When MEWTOCOL-COM is Used)

■ Instruction format



Setting items	Settings	Setting range
i	Specify the operation unit.	US / SS
S	Specify the header of the source node data area. (Note 1)	-
n	Specify the No. of sent data.	1 - 507 words or 1 bit
D1	Specify the partner station no. (Note 2) (Note 3)	0 - 99
D2	Specify the initial address of the receiver node data area in the partner node. (Note 4)	0 - 99999
D3	Specify the device area in the source node to save the execution result code (one word).	(Note 5)

(Note 1) Transmission methods vary by the type of device to be specified for the operands [S] and [D2].

Device to be specified for [S2] and [D1]	Transmission method
16 bit device: WX, WY, WR, WL, DT, LD	Register transmission
1 bit device: X, Y, R, L, DT, n, LD, n	Bit transmission

(Note 2) The No. of sent data is on a word basis for register transmission, and on a bit basis for bit transmission.

(Note 3) When "0" is specified for partner station no., global transmission is applied. In this case, no response message is received from the partner side.

(Note 4) Bit device DT, n and LD, n cannot be specified for the header of the receiver data in the partner node.

(Note 5): Device that can be specified for [D3] are: WX, WY, WR, WL, DT, LD. Saved as one word in the specified area.

- 0: Normal completion
- 1: Communication port is being used for master communication
- 2: Communication port is being used for slave communication
- 3: No. of master communication instructions that can be used simultaneously has been exceeded
- 4: Sending timeout
- 5: Response reception timeout
- 6: Received data error

6

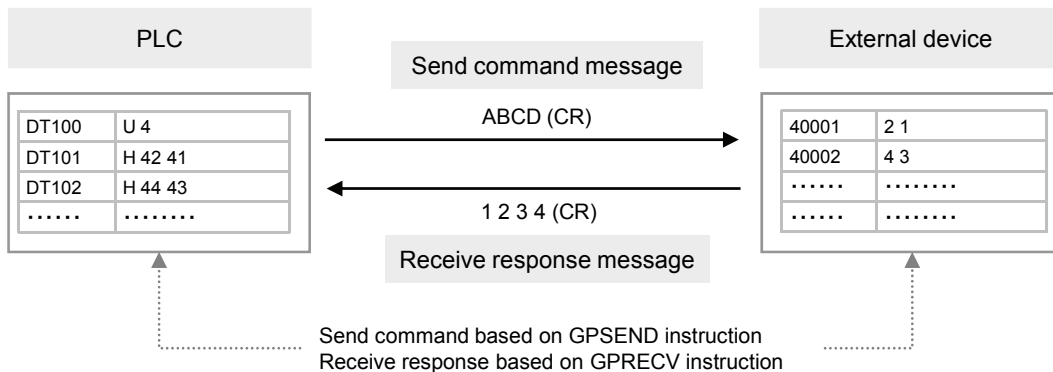
General-Purpose Communication

6.1 Operation of General-Purpose Communication

6.1.1 Read Data from an External Device

■ Read data from a partner device

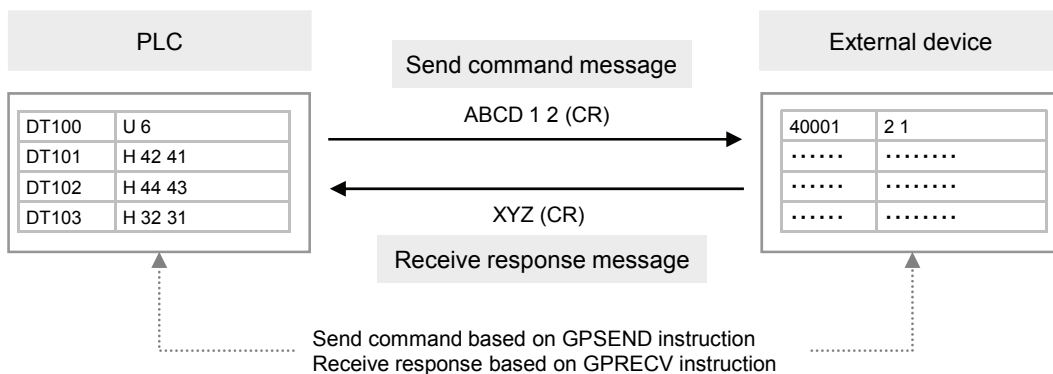
In general-purpose communication, communication is executed by sending commands that suit the partner device, and receiving responses. Command messages are sent by formulating a data table for message in accordance with the protocol, on the given data register, and subsequently executing GPSEND instruction.



6.1.2 Write Data into an External Device

■ Write data into a partner device

In general-purpose communication, communication is executed by sending commands that suit the partner device, and receiving responses. Command messages are sent by formulating a data table for message in accordance with the protocol, on the given data register, and subsequently executing GPSEND instruction.



◆ KEY POINTS

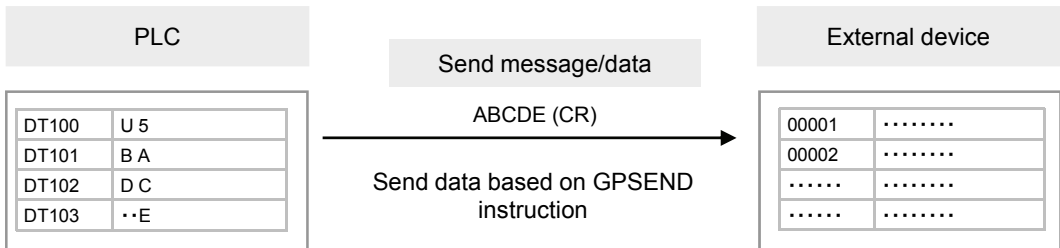
- There is no relevance between the operation of transmission by GPSEND instruction and the operation of reception by GPRECV instruction. The built-in SCU in the CPU unit is always clear to receive data.

6.2 Sending Operation

6.2.1 Overview of Sending Operation

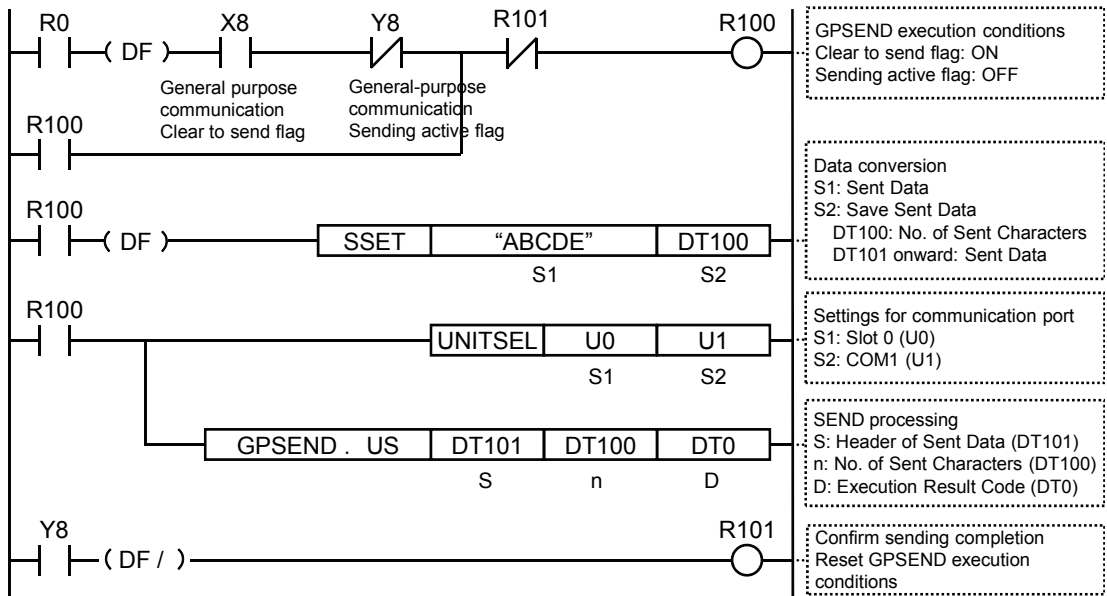
■ Instructions

Sending in the general-purpose communication is performed by formulating a data table for sending on the given operation memory, and subsequently executing GPSEND instruction.



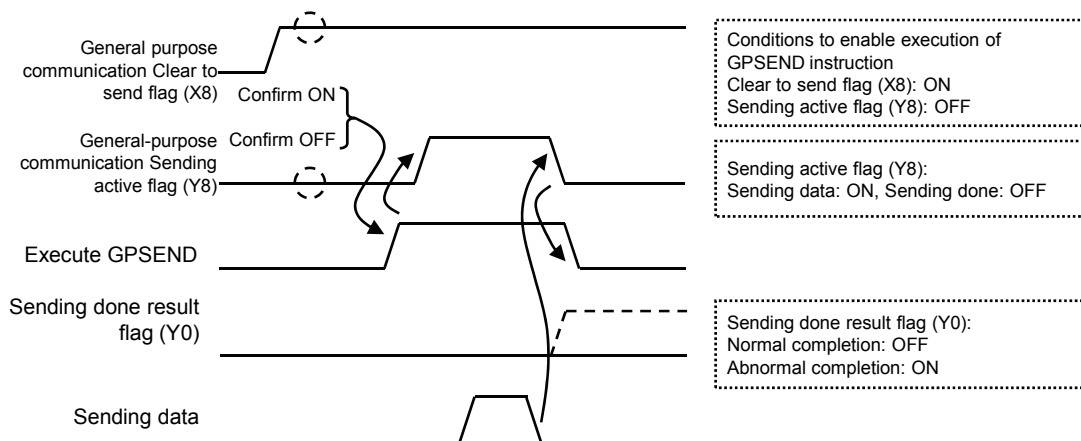
■ Sample program

- Confirm that the unit is in the general-purpose communication mode (X8), and that the general-purpose sending process is not in progress for the same port (Y8), and start up the sending program.
- In the SSET instruction, convert a given message into an ASCII text string, and specify the number of strings to be sent in the data register DT100, and the message to be sent from the data register DT101.
- In the UNITSEL instruction, specify the slot No. (U0) and the COM. port No. (U1).
- In the GPSEND instruction, specify and execute the header of the table where the message to be sent is saved (DT101) and the No. of characters (DT100).



■ **Timing chart**

- Data in the table [S] specified by GPSEND instruction are sent, in ascending order from lower bytes.
- During the sending process, the "General-purpose communication Sending active flag" (Y8) turns ON. The flag is turned OFF when sending is completed. (The flag does not turn off right after the execution of the instruction. It turns off at the beginning of the second scan.)
- The sending result (0: normal completion, 1: abnormal completion) is saved in the general-purpose communication sending result flag (Y0).



■ **I/O allocation**

COM port no.	Name	Explanation
X8	General-purpose communication Clear to send flag	Turns ON when the unit is set to the general-purpose communication mode.
Y8	General-purpose communication Sending active flag	Turns ON during sending data based on general-purpose communication GPSEND. Turns OFF when the sending process is completed.
Y0	Sending done result flag	Reports completion result of sending data in general-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

(Note 1) Each contact is used for reading the operation status. Do not write over it with a user program.

(Note 2) When the sending time is shorter than the scan time, the "General-purpose communication Sending active flag" (Y8) turns OFF when the GPSEND instruction is executed in the subsequent scan following data sending completion. In all cases, it is turned ON for at least one scan time.



◆ **KEY POINTS**

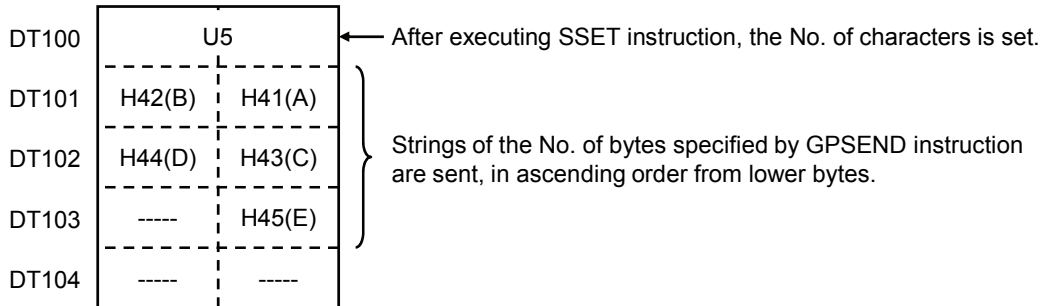
- **Specify the port targeted for communication, using UNITSEL instruction immediately before GPSEND instruction.**
- **Maintain the ON conditions for GPSEND instruction until sending is completed and the general-purpose communication sending active flag (Y8) turns OFF.**

6.2.2 Contents of Sent Data

Strings data sent by the GPSEND instruction are converted into ASCII text and saved in a given data register.

■ Sent data table

- Once the sent data are converted into strings data using the SSET instruction, the No. of characters is saved in the header area. The sent data are saved starting with lower bytes of the subsequent address.



◆ KEY POINTS

- The start code and the end code specified in the configuration menu are automatically added to the sent data. Do not include the start code or the end code into sent data.
- The maximum volume of data that can be sent is 4,096 bytes. If the start code is set to valid, the maximum size is 4,096 bytes including the start code and the end code.
- It is also possible to send binary data.

6.2.3 GPSEND (General-Purpose Communication Sending Instruction)

■ Instruction format



Items	Settings	Setting range
i	Specify the operation unit.	US / SS (Note 1)
S	Specify the header of the source node data area.	(Note 2)
n	Specify the No. of sent bytes.	1 to 4094, -1 to -4096 (Note 1) (Note 3)
D	Specify the device area in the source node to save the execution result (one word).	(Note 4)

(Note 1) When a K constant (integer with a symbol) is specified for the No. of sent bytes [n], select SS for operation unit [i]. When a U constant (integer without a symbol) or an H constant (hexadecimal integer), select US for operation unit [i].

(Note 2): Device that can be specified for S are: WX, WY, WR, WL, DT, LD.

(Note 3) If a negative value is specified, the end code is not automatically added to the sent data. (Where SCU is targeted)

(Note 4): Device that can be specified for D are: WX, WY, WR, WL, DT, LD.
Once the sending process is completed, the sent bytes are saved. When an error occurs, "FFFFH" is saved.



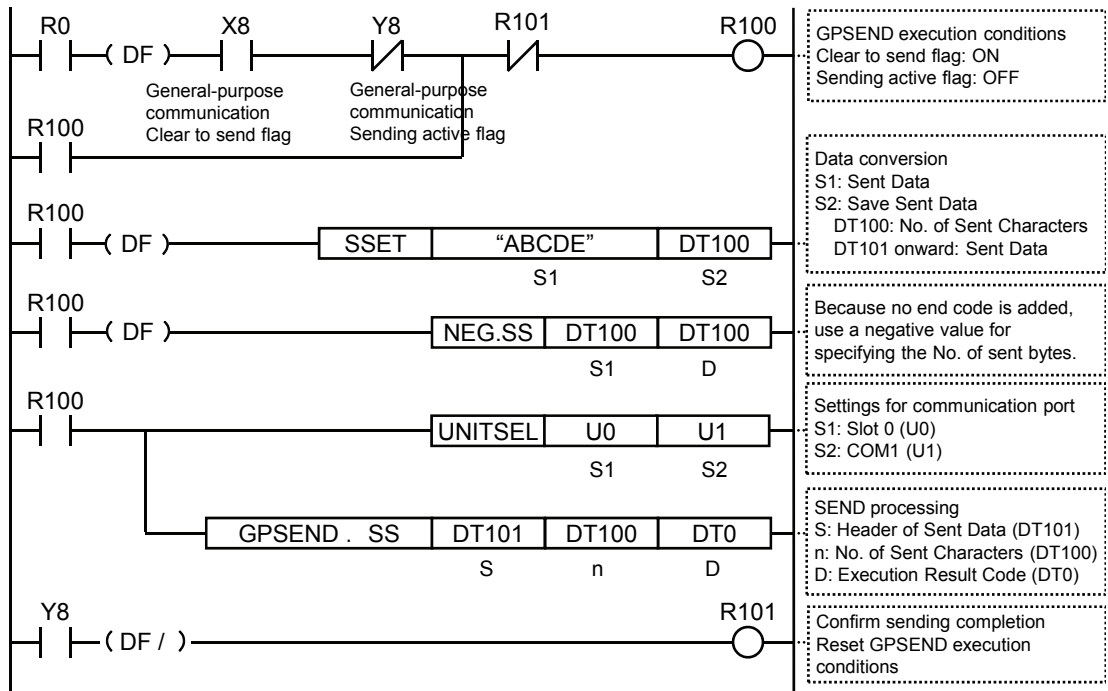
◆ KEY POINTS

- Specify the port targeted for communication, using UNITSEL instruction immediately before GPSEND instruction.
- Maintain the ON conditions for GPSEND instruction until sending is completed and the general-purpose communication sending active flag (Y8) turns OFF.
- Confirm that the "General-purpose communication Clear to send flag" for the targeted COM port has turned ON, and execute GPSEND instruction.
- When GPSEND instruction is executed for a communication port in the sending process, the sending active flag and the sending result are updated.
- GPSEND instruction cannot be used in an interrupt program.

6.2.4 Precautions on Sending Data

■ Procedures when the end code is not added in the sending process

When you do not wish to add the terminator (end code) in the sending process, use a negative value for specifying the No. of sent bytes.



◆ KEY POINTS

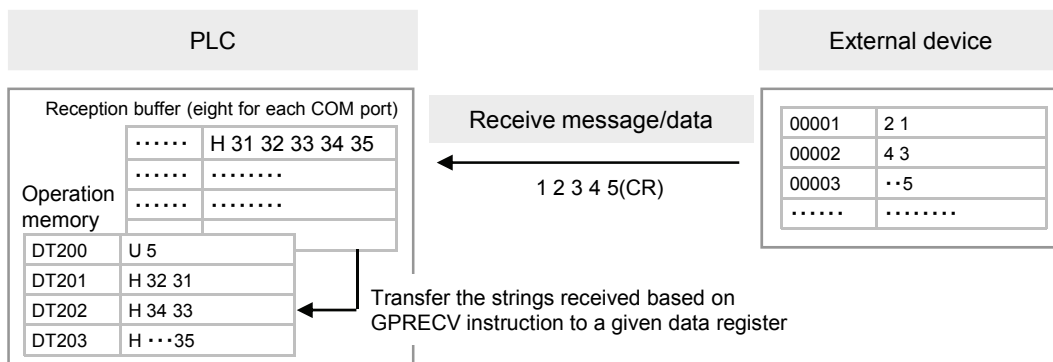
- When you do not wish to add the terminator (end code), use a negative value for specifying the No. of sent data in GPSEND instruction. Select "SS" for operation unit.

6.3 Receiving Operation

6.3.1 Overview of Receiving Operation

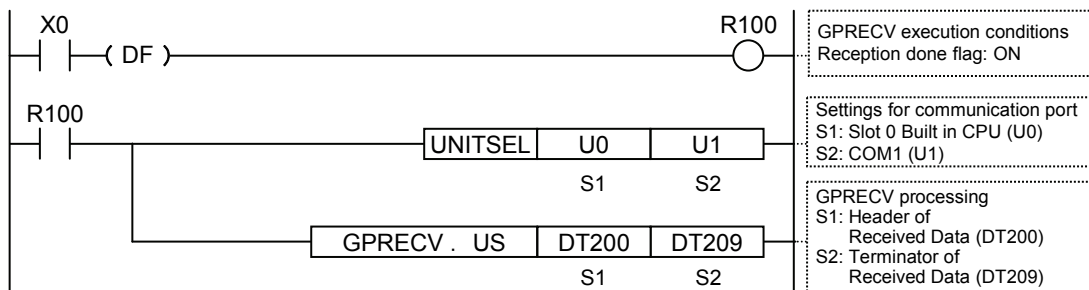
■ Instructions

In the general-purpose communication mode, data received from the partner device are saved in eight reception buffers for each COM port. When the GPRECV instruction is executed in a user program, data in the reception buffer can be copied into a given operation memory.



■ Sample program

- When the reception done flag (X0) turns ON, the reception program is started up by the GPRECV instruction.
- In the UNITSEL instruction, specify the slot No. (U0) and the COM. port No. (U1).
- In the GPRECV instruction, specify and execute the header of the data table where the received message is saved (DT200) and the final address (DT209).

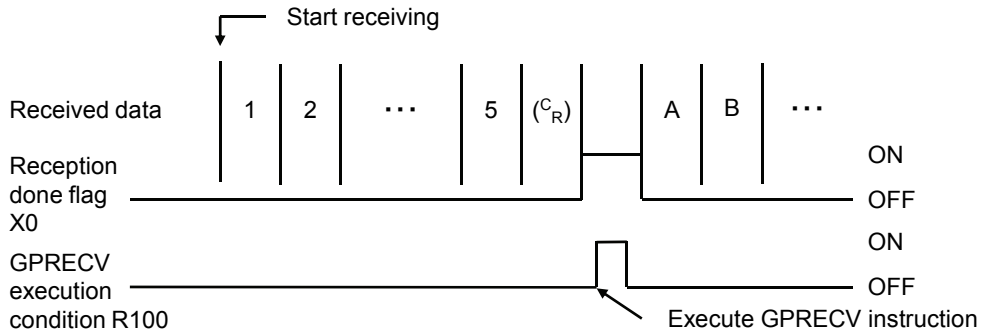


■ I/O allocation

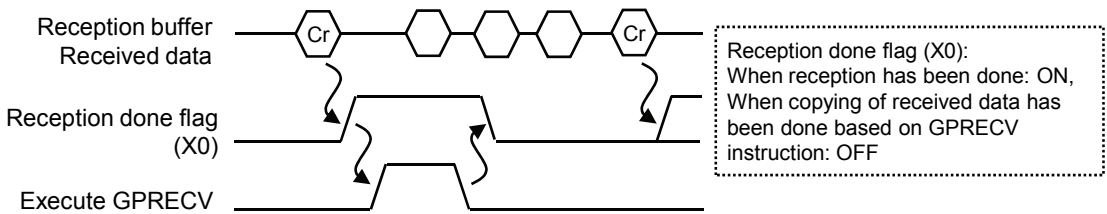
COM port no. 1	Name	Explanation
X0	General-purpose communication Reception done flag	Turns ON when the receiving process is completed in the general-purpose communication mode.
X4	General-purpose communication Reception copy done flag	Turns ON when the GPRECV instruction is executed and the received data have been copied into the specified operation memory. Turns OFF when there are no applicable data.

■ **Timing chart**

- Data received from an external device are saved in the same reception buffer.
- When the terminator (end code) is received, the “reception done” flag (X0) turns on. Subsequently, the following data are saved in the buffer upon reception. 8 data can be received consecutively.

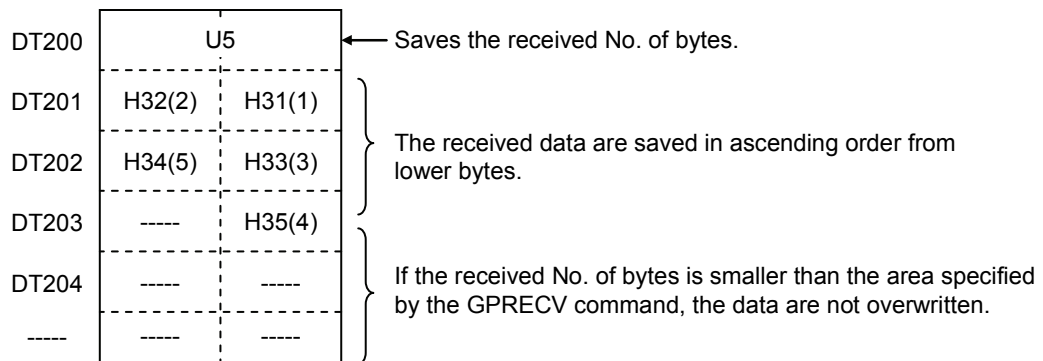


- When the GPREC instruction is executed, data are copied into the specified area, and the reception done flag (X0) turns OFF. The reception done flag (X0) turns OFF when the I/O refresh is executed at the beginning of the subsequent scans.



■ **Saving method for received data**

When data are saved in a given data register from the reception buffer, based on GPREC instruction, the data are saved in the following manner.

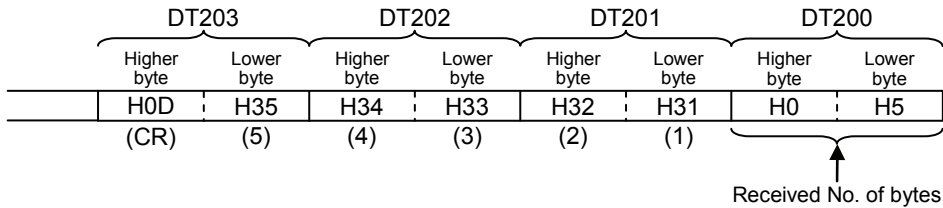


6.3.2 Contents of Received Data

When data are copied into a given data register, based on GPREC instruction, the data are saved in the following manner.

Example: The data "12345 CR" is transmitted from a device with RS-232C device.

- At the beginning of the data register, the No. of received bytes is saved.
- The received data are saved in ascending order from lower bytes to higher bytes, starting with DT201.



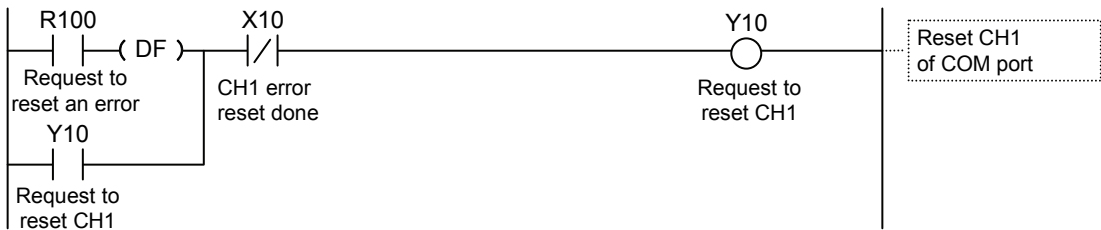
◆ KEY POINTS

- The received data that are copied based on the GPREC instruction do not include a start code or end code.
- It is also possible to receive binary data based on the GPREC instruction. In this case, the terminator should be specified using "Time".

6.3.3 Precautions on Receiving Data

■ Reset communication ports

- If a communication abnormality has occurred, communication ports can be reset by turning on the "Request to reset" signal (Y10) by the user program.
- Once reset is completed, (X10) turns ON. Subsequently, turn OFF the "Request to reset" (Y10).



■ Procedure for repeated reception of data

For repeated reception of data, perform the following steps 1 to 4:

- (1) Receive data.
- (2) Turn on the "General-purpose communication reception done" flag (X0).
- (3) Specify a port to receive data based on the UNITSEL instruction.
- (4) Execute the GPREC instruction and read the received data from the reception buffer.

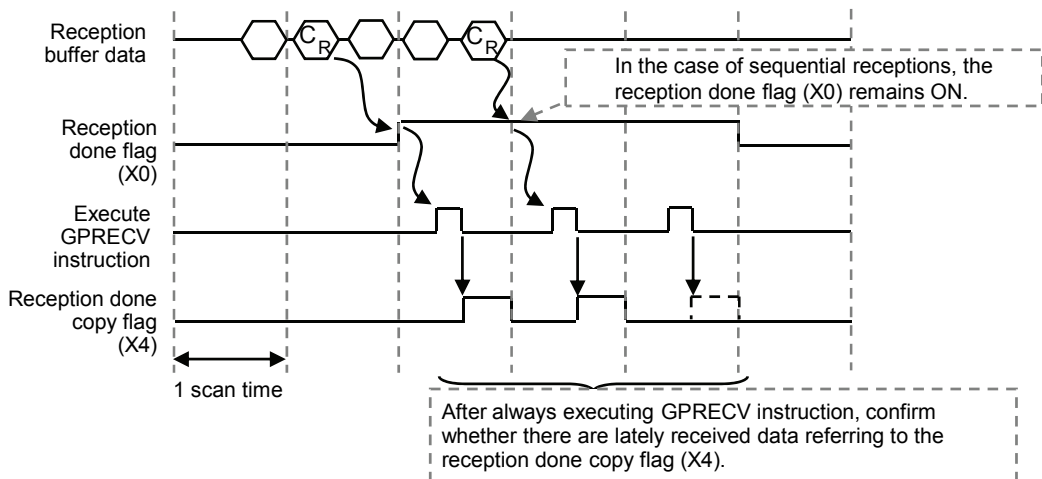
6.3.4 Operations of the "Reception done copy" flag (X4) and multiplex reception

■ Operation and function of the "reception done copy" flag (X4)

- The "reception done copy" flag (X4) turns ON when the GPRECV instruction is executed and data are copied from the reception buffer to the specified operation memory, and turns OFF when the END instruction is executed.

■ Processing in the case of multiplex reception

- If the time from the reception of data in the reception buffer to the subsequent data reception is shorter than the PLC scan time, and the receiving frequency is high, it is possible that the reception done flag (X0) remains ON and cannot detect sequential receptions.
- In cases where it is necessary to process sequentially received data, constantly execute the GPRECV instruction, in combination with the "reception done copy" flag (X4).
- Referring to the "reception done copy" flag (X4), you can confirm whether there are lately received data.



6.3.5 GPREC (General-Purpose Communication Receiving Instruction)

■ Instruction format



Setting items	Settings	Setting range
i	Specify the operation unit.	US / SS
D1	Specify the initial address of the data area to save the received data.	(Note 1)
D2	Specify the final address of the data area to save the received data.	(Note 2)

(Note 1): Device that can be specified for D1 are: WX, WY, WR, WL, DT, LD.

(Note 2): Device that can be specified for D2 are: WX, WY, WR, WL, DT, LD.



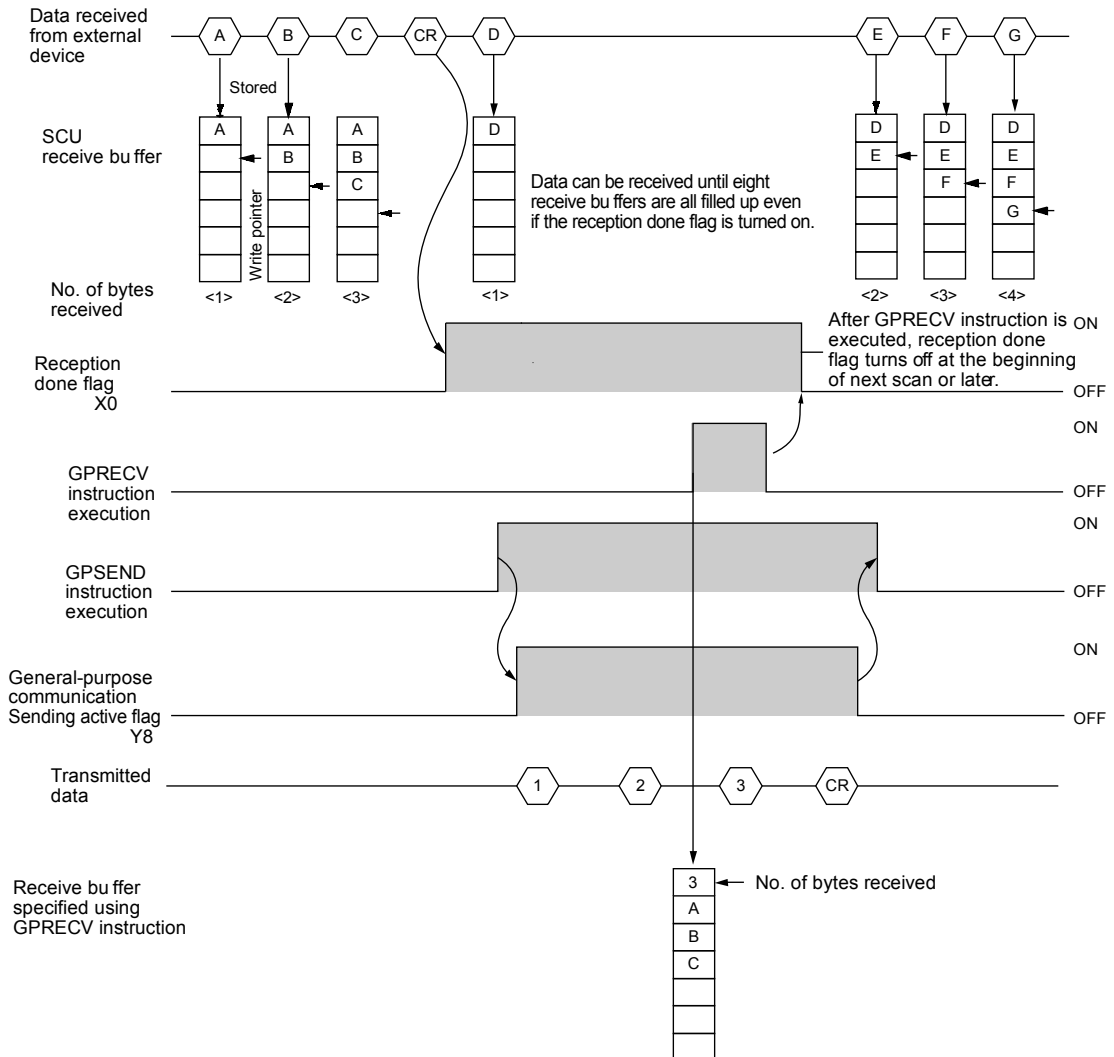
◆ KEY POINTS

- Specify the port targeted for communication, using UNITSEL instruction immediately before GPREC instruction.
- When the general-purpose communication reception done flag is ON for the targeted COM port, execute GPREC.
- When multiplex reception is carried out, the reception done flag (X0) remains ON after the received data are copied based on GPREC instruction. Therefore, the received data cannot be copied by when the “reception done” signal rises.

6.4 Sending/Receiving Flag Operation

6.4.1 No Header (Start Code), Terminator (End Code) "CR":

The "reception done" flag, the "sending active" flag, the GPSEND instruction, and the GPRECV instruction are related as follows:

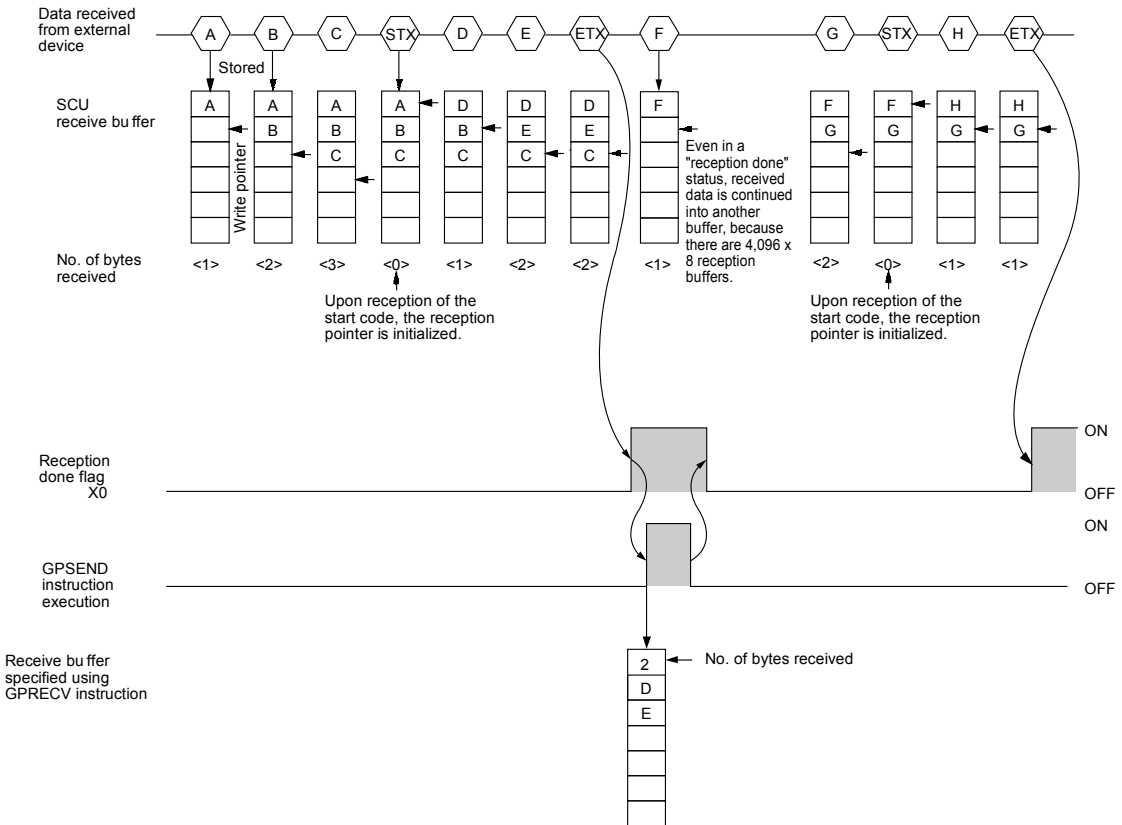


- The COM port has eight reception buffers. The reception process is continued after the reception done flag (X0) turns ON. The reception done flag (X0) does not turn OFF immediately following the execution of GPRECV instruction. It will be turned off at the beginning of the next scan or later.
- After GPSEND instruction is executed, data transmission is started in several μ s to several tens of ms. For time before transmission is started, please refer to the communication cycle time (SM208-SM210) using the system monitor function.

- After GPSEND instruction is executed, dual sending to the same port is not possible until the "sending General-purpose communication Sending active flag" (Y8) turns OFF. The "General-purpose communication Sending active flag" (Y8) turns OFF in instruction execution in the next scan or later following completion of data sending.

6.4.2 Start Code "STX", End Code "ETX":

Receiving process: Reception done flag and GPRECV instruction are related as follows:



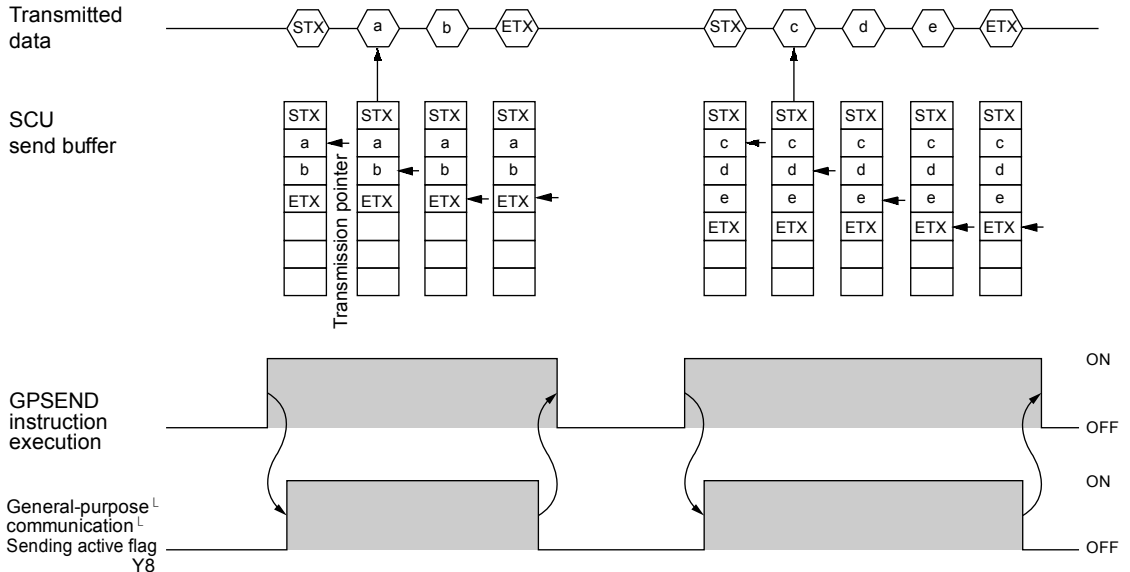
- When the start code is set to "STX", the data are saved in the reception buffer. When the start code is received, the receive pointer is initialized. If there are two headers, data following the second header overwrites the data in the reception buffer.
- The COM port has eight reception buffers. The reception process is continued after the reception done flag (X0) turns ON. The reception done flag (X0) does not turn OFF immediately following the execution of GPRECV instruction. It will be turned off at the beginning of the next scan or later.
- If there are no received data following execution of GPRECV instruction, the reception done copy flag (X4) turns OFF.



◆ KEY POINTS

- The data without the Code STX at the reception is saved in the reception buffer, and the “reception done” flag turns on when the end code is received.
- However, if the code STX is added in the middle of the data, the data are saved from the beginning of the reception buffer.

Sending process: Sending done flag and GPSEND instruction are related as follows:



- Header (STX) and terminator (ETX) are automatically added to the data to be sent. The data are transmitted to an external device.
- After GPSEND instruction is executed, data transmission is started in several μ s to several tens of ms. For time before transmission is started, please refer to the communication cycle time (SM208-SM210) using the system monitor function.
- After GPSEND instruction is executed, dual sending to the same port is not possible until the "sending general-purpose communication flag" (Y8) turns OFF.
- The "General-purpose communication Sending active flag" (Y8) turns OFF in GPSEND instruction execution in the next scan or later following completion of data sending to an external device. The "General-purpose communication Sending active flag" (Y8) always remains on for at least 1 scan time.

7

Specifications

7.1 Specifications

7.1.1 Communication

■ COM.1 port (User connection)

Communication port		Setting range	Default
Station no.		1 - 99 (MEWTOCOL-COM) 1 - 999 (MEWTOCOL7-COM)	1
Baud rate		230400 bps	230400
Communication format	Data length	8 bits	8 bits
	Parity	Odd	Odd
	Stop bit	1 bit	1 bit
	End code	CR, CR+LF, ETX , or time (0.01 ms – 100 ms, by the unit of 0.01 ms)	CR
	Start code	Without STX	Without STX
RS/CS controlled		No	Invalid
Send Waiting		0 to 100ms	0ms
Modem initialization		Invalid	Invalid

(Note1): Permissible communication conditions depend on communication mode (MEWTOCOL or General-purpose Communication)

■ COM.2 port (System connection)

Communication port		Setting range	Default
Station no.		1 - 99 (MEWTOCOL-COM slave) 1 - 999 (MEWTOCOL7-COM slave)	1
Baud rate		230400 bps	230400
Communication format	Data length	8 bits	8 bits
	Parity	Odd	Odd
	Stop bit	1 bit	1 bit
	End code	CR	CR
	Start code	Without STX	Without STX
RS/CS controlled		No	Invalid
Send Waiting		0 to 100ms	0ms
Modem initialization		Invalid	Invalid

(Note): Permissible communication mode is MEWTOCOL only.

■ Communication cassette AFP7CCET1

Items	Description	
Interface	100BASE-TX / 10BASE-T	
Baud rate	100 Mbps, 10 Mbps auto-negotiation (Note 1)	
Transmission system	Baseband	
Max. segment length	100 m (Note 2)	
Communication cable	UTP (Category 5)	
Max. distance between nodes	100BASE-TX: 2 segments	
	10BASE-T: 5 segments	
No. of nodes	254 units	
Types of connection	User connections	System connections (Note 3)
Communication protocol	TCP/IP, UDP/IP	TCP/IP
DHCP	IP address assigned automatically	
Numbers of connection depend on communication mode	MEWTOCOL-COM Master: 1 connection MEWTOCOL-COM Slave: 3 connection MEWTOCOL7-COM Slave: 3 connection General Communication: 1 connection	MEWTOCOL-COMSlave: 1 connection MEWTOCOL7-COMSlave: 1 connection

(Note 1) Switching between different speeds is done automatically by auto negotiation function.

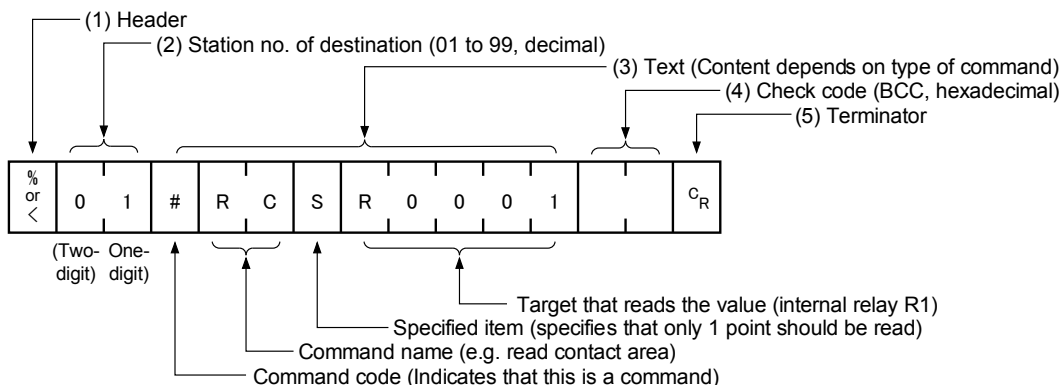
(Note 2) The standards cite 100 m as the maximum, but noise resistance measures such as attaching a ferrite core may be necessary in some cases, depending on the usage environment. Also, it is recommended to position a hub near the control board, and limit the length within 10 m

(Note 3) Used when connecting tool software via LAN.

7.2 MEWTOCOL-COM Format

7.2.1 MEWTOCOL-COM Command Format

■ Command message



(1) Header (start code)

Commands must always have a “%” (ASCII code: H25) or a “<” (ASCII code: H3C) at the beginning of a message.

(2) Station no.

- The station no. of the PLC to which you want to send the command must be specified. The station no. of the PLC is specified by the system register. In the case of the FP7 CPU unit, the station no. is specified in the FPWIN GR7 configuration menu.
- In 1:1 communication, specify "01" (ASCII code: H3031) or "EE" (ASCII code: H4545).

(3) Text

The content of this varies depending on the type of command. The content should be noted in all upper-case characters, following the fixed formula.

(4) Check code

- This is a BCC (block check code) for error detection using horizontal parity. The BCC should be created so that it targets all of the text data from the header to the last text character.
- The BCC starts from the header and checks each character in sequence, using the exclusive OR operation, and replaces the final result with ASCII code. It is normally part of the calculation program and is created automatically.
- By entering "***" (ASCII code: H2A2A) instead of BCC, you can omit BCC.

(5) Terminator (end code)

Messages must always end with a “CR” (ASCII code: H0D).



NOTE

- The method for writing text segments in the message varies depending on the type of command.
- When the message to be sent contains a large number of characters, send the command divided in several times.
- When the message contains a large number of characters, the response is sent divided in several times.



KEY POINTS

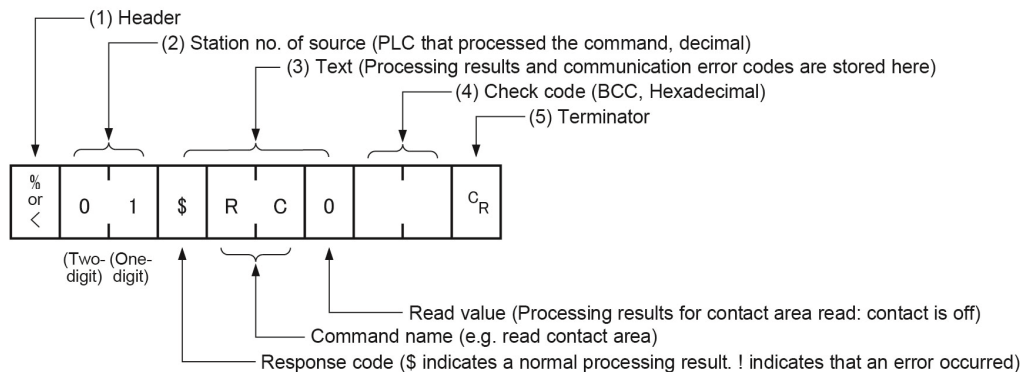
- An expansion header "<" is supported to send and receive single frames of up to 2048 characters as well as general "%".

Type of header	No. of characters that can be sent in 1 frame
%	Max. 118 characters
<	Max. 2048 characters

7.2.2 MEWTOCOL-COM Response Format

■ Response message

After PLC receives a command, it returns the processing result.



(1) Header (start code)

- A “%” (ASCII code: H25) or “<” (ASCII code: H3C) must be at the beginning of a message.
- The response must start with the same header that was at the beginning of the command.

(2) Station no.

This is the station no. of the PLC that processed the command.

(3) Text

The content of this varies depending on the type of command. If the processing is not completed successfully, an error code will be stored here, so that the content of the error can be checked.

(4) Check code

- This is a BCC (block check code) for error detection using horizontal parity.
- The BCC starts from the header and checks each character in sequence, using the exclusive OR operation, and converts the final result.

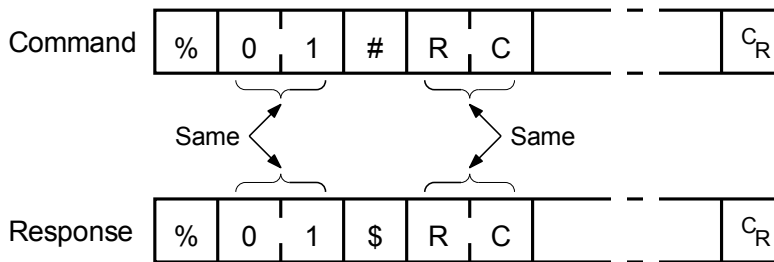
(5) Terminator (end code)

The message should end with "CR" (ASCII code: H0D).



NOTE

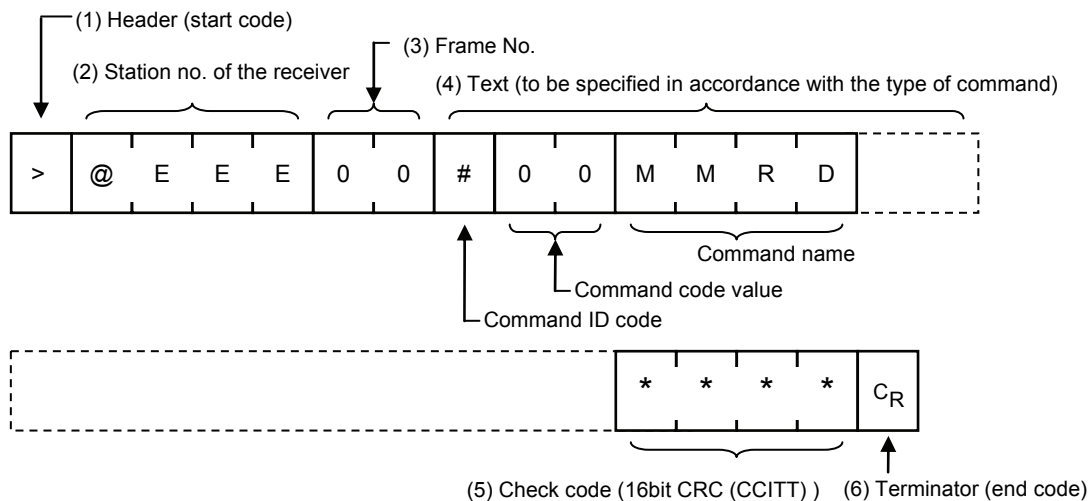
- If no response is returned, the communication format may not be correct, or the command may not have arrived at the PLC, or the PLC may not be functioning. Check to make sure all of the communication specifications (e.g. baud rate, data length, and parity) match.
- If the response contains an “!” instead of a “\$”, the command was not processed successfully. The response will contain a communication error code. Check the meaning of the error code.
- Station no. and command name are always identical in a command and its corresponding response (see below). This makes the correspondence between a command and a response clear.



7.3 MEWTOCOL7-COM Format

7.3.1 MEWTOCOL7-COM Command Format

■ Command message



(1) Header (start code)

A ">" (ASCII code: H3E) must be at the beginning of a message.

(2) Station no.

- The station no. of the receiving PLC to which you want to send the command must be specified with "@" and three digits". The station no. of the PLC is specified by the system register. In the case of the FP7 CPU unit, the station no. is specified in the FPWIN GR7 configuration menu.
- In 1:1 communication, specify "001" (ASCII code: H303031) or "EEE" (ASCII code: H45H4545).

(3) Frame No.

This indicates the sending frame No. Make sure to use consecutive frame numbers.

E.g. Commands for multiple frames

```
>@EEE00#00MMRDD001G0DT0000000001000****CR
```

```
>@EEE01****& CR
```

* Make sure to use consecutive values for frame numbers. The usable number range is from 00 to FF. After FF, return to 00.

(4) Text

The content of this varies depending on the type of command. The content should be noted in all upper-case characters, following the fixed formula for the particular command.

(5) Check code

- This is a CRC (Cyclic Redundancy Check) to detect errors using a generating polynomial of hamming codes.
- This should be created so that it targets all of the text data from the header to the last text character.
- CRC is a value given by replacing the result of calculation by CRC-16-CCITT with ASCII code. It is normally part of the calculation program and is created automatically.

(6) Terminator (end code)

Messages must always end with a “CR” (ASCII code: H0D).



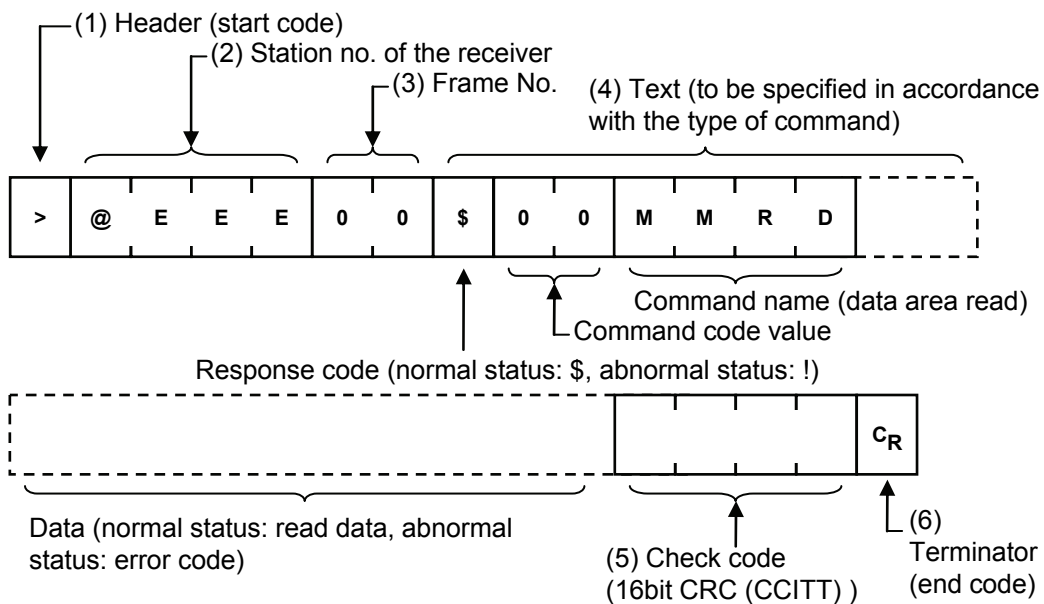
◆ KEY POINTS

- **The method for writing text segments in the message varies depending on the type of command.**
- **When the message to be sent contains a large number of characters, send the command divided in several times.**
- **When the message contains a large number of characters, the response is sent divided in several times.**
- **In MEWTOCOL7 command, up to 4096 characters can be sent/received in a single frame.**

Type of header	No. of characters that can be sent in 1 frame
>	Max. 4096 characters

7.3.2 MEWTOCOL7 Response Format

■ Response message



(1) Header (start code)

- A ">" (ASCII code: H3E) must be at the beginning of a message.
- The response must start with the same header (start code).

(2) Station no.

This is the station no. of the PLC that processed the command.

(3) Frame No.

This is the frame number where the command was processed.

(4) Text

The content of this varies depending on the type of command. If the processing is not completed successfully, an error code will be stored here, so that the content of the error can be checked.

(5) Check code

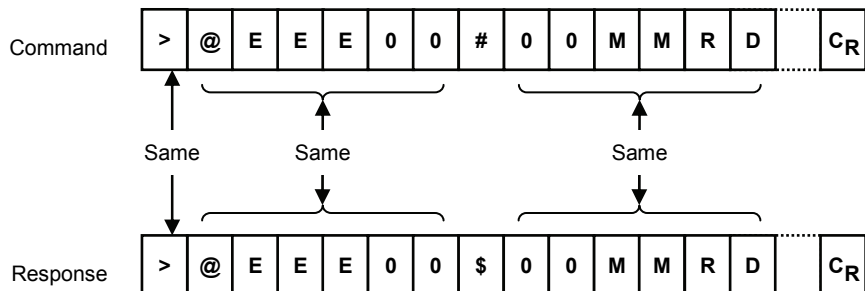
- This is a CRC (Cyclic Redundancy Check) to detect errors using a generating polynomial of hamming codes.
- This should be created so that it targets all of the text data from the header to the last text character.
- CRC is a value given by replacing the result of calculation by CRC-16-CCITT with ASCII code. It is normally part of the calculation program and is created automatically.

(6) Terminator (end code)

The message should end with "CR" (ASCII code: H0D).

**NOTE**

- **If no response is returned, the communication format may not be correct, or the command may not have arrived at the PLC, or the PLC may not be functioning. Check to make sure all of the communication specifications (e.g. baud rate, data length, and parity) match between the computer and the PLC.**
- **If the response contains an "!" instead of a "\$", the command was not processed successfully. The response will contain a communication error code. Check the meaning of the error code.**
- **Station no. and command name are always identical in a command and its corresponding response (see below). This makes the correspondence between a command and a response clear.**



Record of changes

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