

Programmable Controller

FP7 series

# User's Manual

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Communication Cassette (Ethernet type)

Supported models

FP7 CPU Unit (model number AFP7CPS\*)

FP7 Extension Cassette (Communication Cassette)

- Ethernet × 1ch type (model number AFP7CCRET1)

(MEMO)

## 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 user's 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 from the Panasonic website:<https://industry.panasonic.com/global/en/downloads/?tab=manual>.

Unit name or purpose of use	Manual name	Manual code
FP7 Power Supply Unit	FP7 CPU Unit User's Manual (Hardware)	WUME-FP7CPUH
FP7 CPU Unit	FP7 CPU Unit Command Reference Manual	WUME-FP7CUPGR
	FP7 CPU Unit User's Manual (Logging Trace Function)	WUME-FP7CPULOG
	FP7 CPU Unit User's Manual (Security Function)	WUME-FP7CPUSEC
	Instructions for Built-in LAN Port	FP7 CPU Unit User's Manual (LAN Port Communication)
FP7 CPU Unit User's Manual (Ethernet Expansion Function)		WUME-FP7CPUETEX
FP7 CPU Unit User's Manual (EtherNet/IP Communication)		WUME-FP7CPUEIP
Web Server Function Manual		WUME-FP7WEB
Instructions for Built-in COM Port	FP7 Series User's Manual (SCU Communication)	WUME-FP7COM
FP7 Extension Cassette (Communication) (RS-232C / RS485 type)		
FP7 Extension Cassette (Communication) (Ethernet Type)	FP7 Series User's Manual (Communication Cassette Ethernet Type)	WUME-FP7CCET
FP7 Extension (Function) Cassette Analog Cassette	FP7 Analog Cassette User's Manual	WUME-FP7FCA
FP7 Digital Input / Output Unit	FP7 Digital Input / Output Unit User's Manual	WUME-FP7DIO
FP7 Analog Input Unit	FP7 Analog Input Unit User's Manual	WUME-FP7AIH
FP7 Analog Output Unit	FP7 Analog Output Unit User's Manual	WUME-FP7AOH
FP7 Thermocouple Multi-analog Input Unit	FP7 Thermocouple Multi-analog Input Unit FP7 RTD Input Unit	WUME-FP7TCRTD
FP7 RTD Input Unit	User's Manual	
FP7 Multi Input / Output Unit	FP7 Multi Input / Output Unit User's Manual	WUME-FP7MXY
FP7 High-speed counter unit	FP7 High-speed Counter Unit User's Manual	WUME-FP7HSC

<b>Unit name or purpose of use</b>	<b>Manual name</b>	<b>Manual code</b>
FP7 Pulse Output Unit	FP7 Pulse Output Unit User's Manual	WUME-FP7PG
FP7 Positioning Unit	FP7 Positioning Unit User's Manual	WUME-FP7POSP
FP7 Serial Communication Unit	FP7 Series User's Manual (SCU Communication)	WUME-FP7COM
FP7 Multi-wire Link Unit	FP7 Multi-wire Link Unit User's Manual	WUME-FP7MW
FP7 Motion Control Unit	FP7 Motion Control Unit User's Manual	WUME-FP7MCEC
PHLS System	PHLS System User's Manual	WUME-PHLS
Programming Software FPWIN GR7	FPWIN GR7 Introduction Guidance	WUME-FPWINGR7

## Safety Precautions

- In order to prevent injuries and accidents, always adhere to the following.
- Always read this manual thoroughly before performing installation, operation, maintenance, and inspection, and use the device correctly.
- Ensure you are familiar with all device knowledge, safety information, and other precautions before use.
- In this manual, safety precaution levels are classified into "warnings" and "cautions".



### **WARNING**

Cases where dangerous situations are expected to arise whereby the user could die or suffer serious injury if handled incorrectly

- Implement safety measures externally from this product so that the entire system can operate safely even if a failure occurs due to a fault in this product or some external factor.
- Do not use in an environment containing flammable gases.  
Doing so could cause explosions.
- Do not dispose of this product by placing it in fire.  
This could cause rupture of batteries, electronic components, etc.
- Do not apply force, electrical charge, fire or heat to the lithium batteries.  
It may lead to ignition and/or rupture.



### **CAUTION**

Cases where dangerous situations are expected to arise whereby the user could suffer injury or physical damage could occur if handled incorrectly

- In order to prevent the product from generating abnormal heat or emitting smoke, use the product with some margin to the guaranteed characteristics and performance values.
- Do not disassemble or modify the product.  
Doing so could cause abnormal heat generation or smoke.
- Do not touch electrical terminals while the power is on.  
There is a risk of electrical shock.
- Construct external emergency stop and interlock circuits.
- Securely connect wires and connectors.  
Poor connections can cause abnormal heat generation or smoke.
- The protective earthing (PE) terminals must be grounded with D class grounding.  
Failure to ground may result in electric shock.
- Do not allow foreign materials such as liquids, combustibles, or metals, to enter inside the product.  
Doing so could cause abnormal heat generation or smoke.
- Do not perform work (connection, disconnection, etc.) while the power is on.  
There is a risk of electrical shock.
- If methods other than those specified by our company are used when operating this product, the protection functions of the unit may be lost.
- This product was developed and manufactured for use in industrial environments.

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## FP7 Connector Compatibility

The connectors of old and new model FP7CPU units and add-on cassettes (hereinafter "cassettes") are shaped differently. Please use old model cassettes with old model units and new model cassettes with new model units as shown in the table below.

### ■ Old Model

Type	Old Product No.
CPU unit	AFP7CPS41ES, AFP7CPS41E, AFP7CPS31ES, AFP7CPS31E, AFP7CPS31S, AFP7CPS31, AFP7CPS21
Serial Communication Unit	AFP7NSC
Cassette	AFP7CCS1, AFP7CCS2, AFP7CCM1, AFP7CCM2, AFP7CCS1M1, AFP7CCET1, AFP7FCA21, AFP7FCAD2, AFP7FCTC2

### ■ New Model

Type	New Product No.
CPU unit	AFP7CPS4RES, AFP7CPS4RE, AFP7CPS3RES, AFP7CPS3RE, AFP7CPS3RS, AFP7CPS3R, AFP7CPS2R
Serial Communication Unit	AFP7NSCR
Cassette	AFP7CCRS1, AFP7CCRS2, AFP7CCRM1, AFP7CCRM2, AFP7CCRS1M1, AFP7CCRET1, AFP7FCRA21, AFP7FCRAD2, AFP7FCRTC2

### Note

- Each FP7 unit can be connected to the CPU unit of a new or old model.
- Firmware version upgrades for the CPU unit are available for both new and old models.
- When attaching expansion cassettes to the FP7CPU unit, please use only old models, or only new models. Trying to attach a combination of old models and new models may cause damage.

## Network Security

When this product is connected to a network, you might receive damage as listed below.

- (1) Information leakage or outflow through this product
- (2) Fraudulent operation of this product by a malicious third party
- (3) Obstructing or stopping this product by a malicious third party






Sufficient network security measures, including the following measures, should be taken at your own risk to prevent such damages.

- Use this product on a network where safety is secured by using a firewall.
- When using this product on a system where a PC is connected, make sure that checking and cleaning of infection by computer virus or malicious program is performed periodically.
- In order to prevent malicious attacks, set user name and password to limit users who can log in.
- Take measures such as limiting an access through a user authentication method so as not to leak information to the network such as image data, authentication information (user name and password), alarm email information, FTP server information, DDNS server information, etc.
- Be sure to close all browsers immediately after accessing this product as an administrator.

- Periodically change the administrator's password.
- Do not install this product in a location where the product or cables can be easily damaged.
- Furthermore, it is recommended that the product be used in an environment that has VPN (Virtual Private Network) or leased line network.

## Handling Precautions

- In this manual, the following symbols are used to indicate safety information that must be observed.

	Indicates an action that is prohibited or a matter that requires caution.
	Indicates an action that must be taken.
 Info.	Indicates supplemental information.
 Note	Indicates details about the subject in question or information useful to remember.
 Procedure	Indicates operation procedures.

(MEMO)



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# 1 Communication Functions of CPU Unit

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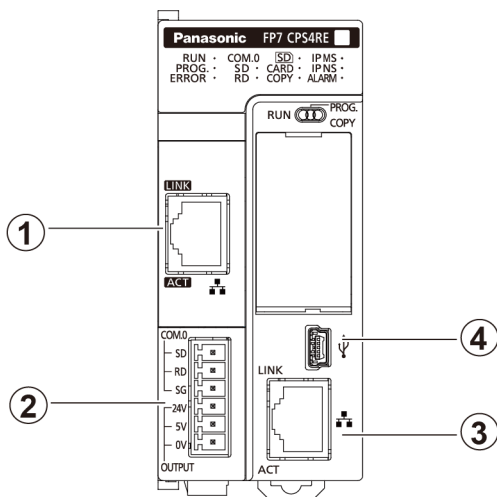
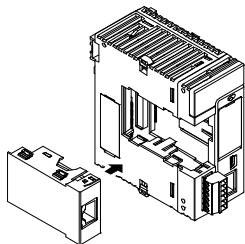
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## 1.1 Communication Port of CPU Unit

### 1.1 Communication Port 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 the product before use.

###### (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

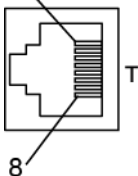
This is equipped to a standard model of CPU unit. This is used for connecting tool software.

**i Info.**

- See the *FP7 CPU unit User's manual (LAN port communication)* for detailed information on communication via the LAN port built into the CPU unit. There is a difference in usage between the Communication cassette (Ethernet type) AFP7CCRET1 and built-in LAN port.

**1.1.2 AFP7CCRET1 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**

Light turns ON when the connection is established between the communication cassette AFP7CCRET1 and an Ethernet-based device.

**(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 number	Communication interface	Communication ports that can be allocated	
		COM.1	COM.2
AFP7CCRET1	User connections	•	
	System connection		•

(Note 1) See 1.2 for information on user connection or system connection.

## 1.1 Communication Port of CPU Unit

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### 1.1.4 Configurator WD

- The communication tool software “Configurator WD” is required to set Ethernet communication for the AFP7CCRET1
- The Configurator WD can be downloaded from our website free of charge.  
<https://industry.panasonic.com/global/en/downloads/?tab=software> (Member registration is required. Free of charge)
- The previous unit name is displayed on the Configurator WD screen.

## 1.2 Available Function For Each COM Port

### 1.2.1 Applications that can be Used in Each Port

#### ■ Mode

Ethernet connection	Supported COM ports	MEWTOCOL7-COM MEWTOCOL-COM		General-purpose Communication
		Master	Slave	
User connections	COM.1	○(Note 1)	●	●
System connection	COM.2		●	

(Note 1) MEWTOCOL7-COM does not support the 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 AFP7CCRET1.
- Any one of the following conditions 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 when using tool software via communication cassette AFP7CCRET1.
- One connection is available per AFP7CCRET1 unit.
- 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 AFP7CCRET1, 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 does not support communication via router, because generally a router does not forward broadcast packets.
- Broadcast communication puts a load on all other equipment on the network. Please evaluate the effects on other equipment enough, before a broadcast communication is executed.

#### ■ Restriction to connect tool software communication

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

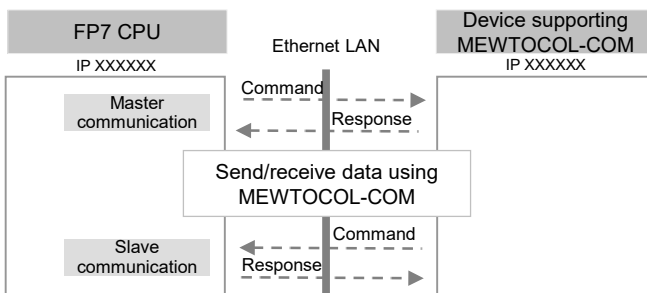
## 1.3 Overview of Communication Functions

### 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/RECV 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.

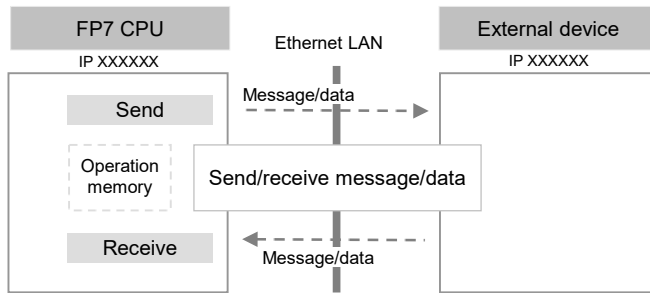


#### 1.3.2 General-purpose Communication

##### ■ 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

## 1.4 Terms

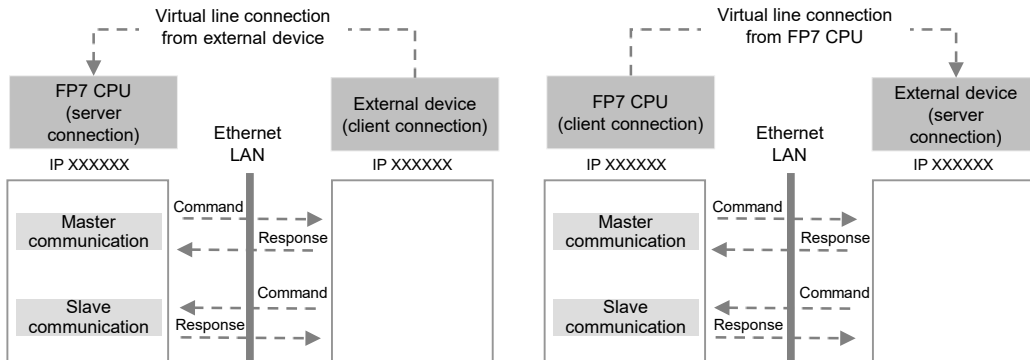
The following terms are used for settings on the software for connecting the FP7 CPU unit to Ethernet LAN, and in the Users Manuals.

### ■ 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.



## 2 Installation and Wiring

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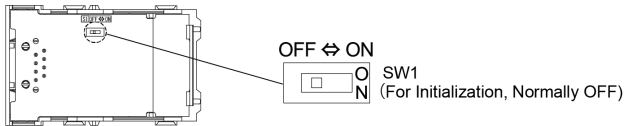
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## 2.1 Attaching a Communication Cassette

### 2.1 Attaching a Communication Cassette

#### 2.1.1 Setting of Switches

- A switch is mounted on the circuit board of communication cassette AFP7CCRET1.
- SW1 is used to initialize communication conditions. Please turn OFF during normal use.

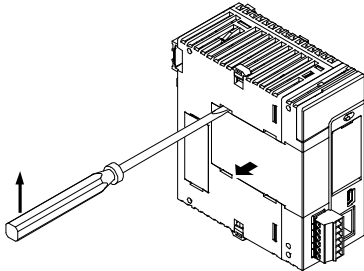


#### 2.1.2 Attachment Instructions

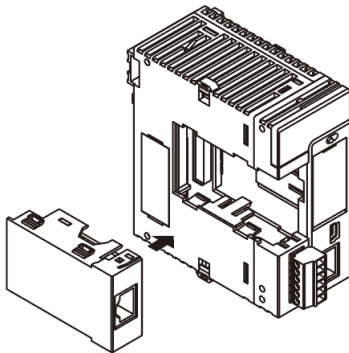
When an optional communication cassette is to be used, attach it in the following procedures.

##### 1 2 Procedure

1. Using a flathead screwdriver, remove the cover on the side of the CPU unit.



2. Attach the desired communication cassette.



### 2.2 Installation Environment and Wiring for LAN Ports

#### 2.2.1 Before Installation or Wiring

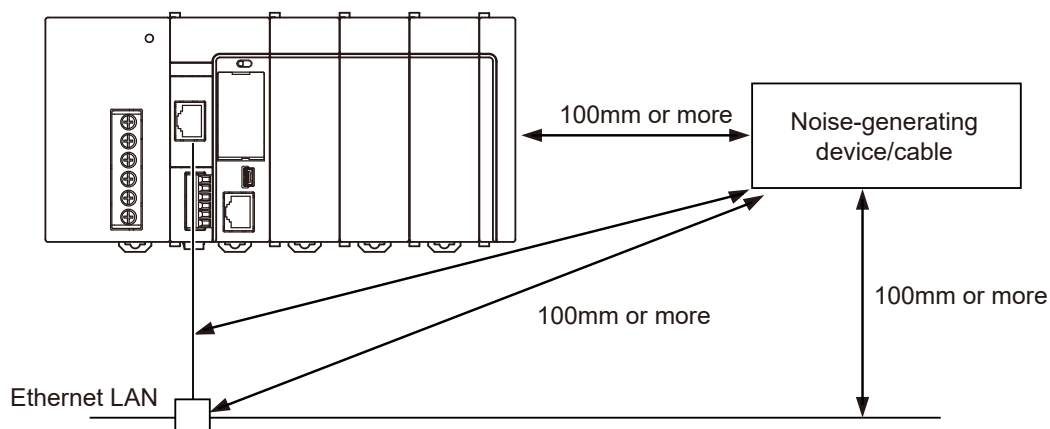
##### ■ Noise suppression of Ethernet

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. Consequently, precautions are required when installing a hub or 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.



- If you have no choice but to install equipment or lay cables close to noise-generating equipment, take measures such as:
  - Install the programmable controller and hub in a metal panel
  - Install the communications cable in a metal duct
  - Install a ferrite core near the CPU unit of the communications cableEtc.
- 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  $\Omega$  or less. Also, metal panels and metal ducts should be insulated so that they do not come in contact with communication devices or cables.

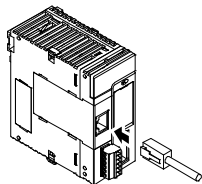
## 2.3 Wiring the LAN Port

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### 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

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## 3.1 Input/Output Signals Used for Communication

### 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)	AFP7CCRET1	4 words (64 points) WX0 - WX3 fixed	2 words (32 points) WY0 - WY1 fixed

#### 3.1.2 I/O 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 command is executed. It turns off (0) when END command is executed. Reading completed: 1 No data to be read: 0 (Note 1)	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	General-purpose Communication



### 3.1 Input/Output Signals Used for Communication

Input signal	Communication port	Name	Description	Effective operation mode
			Y10 is off: 0	
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 command (scan header), and 2: RECV command

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

Input signal	Communication port	Name	Description	Effective operation mode
X20	—	Start status flag	0: During start process 1: Start process done	Normally
X21	—	Link status flag	0: Link Up 1: Link Down	Normally
X22	—	Initialized flag	0: Normal operation 1: During initialized process	Normally
X23 - X27	—	Not used	Do not use this.	—
X28	—	Error status flag	0: Normal 1: Error occurred	Normally
X29	—	DHCP acquisition flag	0: Normal 1: Acquisition error occurred	Normally
X2A	—	Ver up error flag	0: Normal 1: Ver up error occurred	Normally
X2B	-	FROM error flag	Normal: 0, FROM error: 1	Normally <sup>(Note 1)</sup>
X2C	—	MAC address error flag	Normal: 0, MAC address error: 1	Normally <sup>(Note 1)</sup>
X2D	—	Watchdog timeout error flag	Normal: 0, Watchdog timer worked: 1	Normally <sup>(Note 1)</sup>
X2E~X2F	—	Not used	Do not use this.	—
X30	For COM.1 Port	Connection status flag	User connections 0: Disconnected 1: Connected	Normally
X31	For COM.1 Port	TCP Server connection Full flag	User connections 0: Not full 1: Full	Normally
X32	For COM.1 Port	TCP Client connection failure flag	User connections 0: Success 0 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.	—

(Note 1) Effective when the version is 1.05 or later.

### 3.1 Input/Output Signals Used for Communication

#### ■ Output signal (COM.1 port: 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. Sending done: 0, Sending: 1 (Note 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

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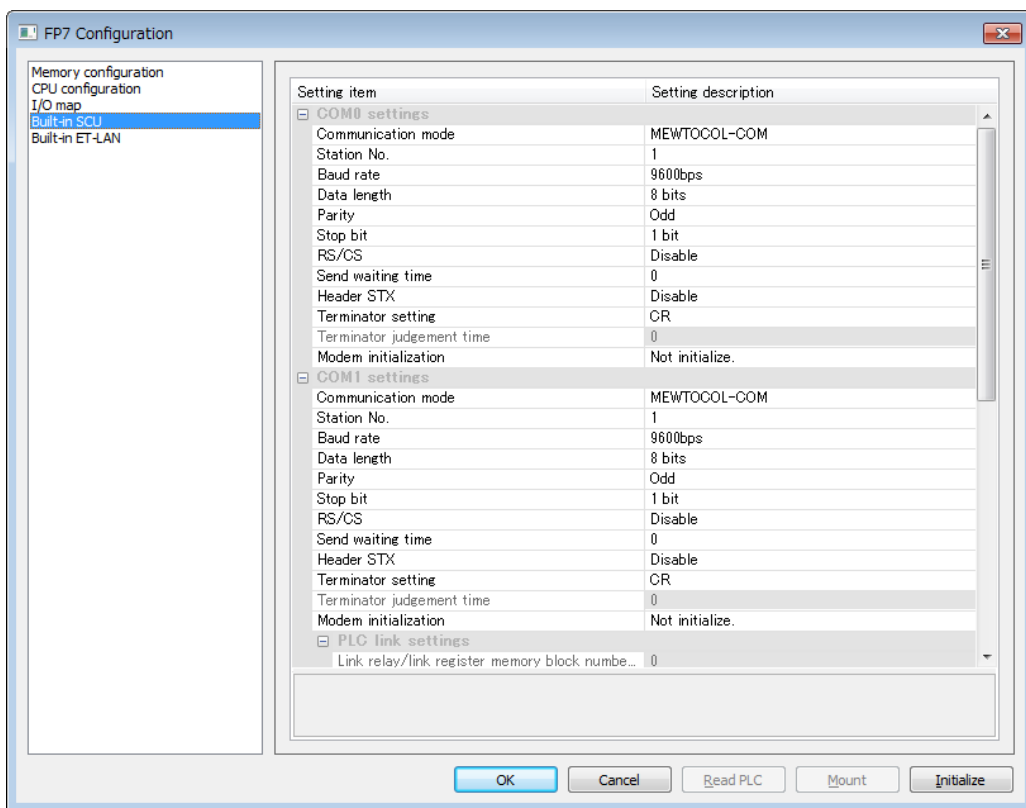
## 4.1 Settings Using FPWIN GR7

### 4.1 Settings Using FPWIN GR7

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

#### 1 2 Procedure

1. From the menu bar, select **Options>FP7 Configuration**.  
The "FP7 Configuration" dialog box will open.
2. Select "Built-in SCU".  
Setting items for "Built-in SCU" appear.



3. Set the communication conditions for the COM.1 port and press [OK].  
Set conditions are incorporated into the project that is being edited.

#### i Info.

- As communication cassette AFP7CCRET1 is treated the same as serial communication in the internal system, select "Built-in SCU".
- Settings for the COM.2 ports is not available for the Communication cassette AFP7CCRET1.

**Specified using FPWIN GR7 (COM.1port) Parameter**

Communication port	Permissible range for AFPCCRET1	Description
Communication Mode	MEWTOCOL-COM MEWTOCOL-7 General-purpose Communication	Set the time to match the settings of Configurator WD. For Configurator WD, select MEWTOCOL or General-purpose Communication.
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 FPWIN GR7.
Data length	8 bit	
Parity	ODD	
Stop bit	1 bit	
RS/CS	N/A	These parameters are fixed regardless of the settings in the FPWIN GR7.
Send Waiting	0 to 100ms	
End code	CR / CR+LF / Time	CR is fixed for the MEWTOCOL mode. Set the time to match the settings of Configurator WD. For Configurator WD, select CR, CR+LF, or None.
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 FPWIN GR7.
Modem initialization	Not initialize	These parameters are fixed regardless of the settings in the FPWIN GR7.

**Info.**

- The parameters "Communication mode", "Station No.", "Send waiting time", "Terminator setting" and "Terminator judgement time" are available in the FPWIN GR7.

## 4.2 Specified using Configurator WD

### 4.2 Specified using Configurator WD

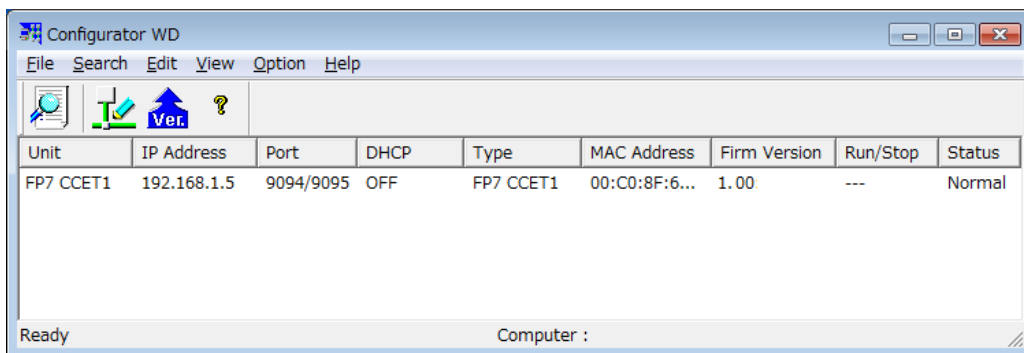
#### 4.2.1 Start Configurator WD and Search units

- Communication cassette AFP7CCRET1 configuration is carried out using the "Configurator WD" software.
- The setting is saved in the communication cassette AFP7CCRET1.

#### 1 2 Procedure

1. Start Configurator WD.
2. Confirm that the computer is connected to the communication cassette AFP7CCRET1 and click the "Search" icon.

Connected units are indicated, if they are connected correctly. If FP7 CCET1 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.

#### 1 2 Procedure

1. Select the unit name when the unit has been retrieved.  
The unit name will be highlighted.
2. Select **Edit>IP Address Settings** from the menu bar.  
The "IP Address Settings" dialog box will open.

3. Fill out the arbitrary IP address field.
4. Press the [Refresh] button.  
A message box will appear saying "IP Address updated".
5. Click the [OK] button.

### IP Address Setting

Parameter	Description	Default
Obtain IP address automatically	When "Obtain IP address automatically" is selected, the IP address is obtained from the DHCP server. When "Use the following IP address" is selected, you can select an IP address manually.	Use the following IP address
Unit name	Set a recognizable unit name in Configurator WD.	FP7CCRET1
IP Address	IP address of communication cassette AFP7CCRET1 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 AFP7CCRET1	255.255.255.0
Default Gateway	Gateway of communication cassette AFP7CCRET1	192.168.1.1

(Note 1) When an error occurs, it will be confirmed by allocated I/O signals. Refer to "3.1.2 I/O allocation".

## 4.2.3 Communication Settings

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

### 1 2 Procedure

1. Select the unit name when the unit has been retrieved.  
The unit name will be highlighted.
2. Select **Edit>Communication Settings** from the menu bar.

## 4.2 Specified using Configurator WD

The "Communication Settings" dialog box will open.

3. Enter the necessary information.  
See the page below for details.
4. Press the [Refresh] button.  
A message box will appear saying "Unit communication configuration complete".
5. Click the [OK] button.

### Communication Settings

Parameter	Description	Default
Protocol Mode	AFP7CCRET1 Communication protocol Select TCP or UDP.	TCP
Action Mode	AFP7CCRET1 Connection Operation Mode Select Client Mode or Server Mode.	Server Mode
Communication Mode	AFP7CCRET1 Communication Mode Select MEWTOCOL or general-purpose serial communication and match it to the FPWIN GR7 configuration communication mode setting.	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



Parameter		Description	Default
Server Setting	Source Port No.	Port number where AFP7CCRET1 is open. Setting range: 1024 to 65534	9095
	Timeout	If AFP7 CCET1 does 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
Client Setting	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 connection destination port number of destination. Setting range: 1 to 65534	9094
	Source Port No.	Specify connection source port number of destination. Range: 0, 1024 to 65534 When 0 is set, optional.	9095
	Timeout	If AFPX-COM5 does 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

(Note 1) This parameter is valid if "Server Connection" is selected as the operation mode.

(Note 2) This parameter is valid if "Client Connection" is selected as the operation mode.

#### 4.2.4 Option Settings

Set the parameters for the User connection and System connection with Configurator WD.

#### 1 2 Procedure

1. Select the unit name when the unit has been retrieved.  
The unit name will be highlighted.
2. Select **Edit > Communication Settings** from the menu bar.  
The "Communication Settings" dialog box will open.
3. Press the [Option] button.  
The "Option" dialog box will open.

## 4.2 Specified using Configurator WD

**Option**

User Connection

Endcode : CR

Judgement 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)

OK

Cancel

4. Enter the necessary information.  
See the page below for details.
5. Click the[OK]button.  
"Communication Settings"dialog box will open again.
6. Press[Update]in the"Communication Settings"dialog box.  
A message will appear saying"Unit communication configuration is complete".
7. Click the[OK]button.

### Option Setting

Parameter	Description	Default
End code	This is the code for the AFP7CCRET1 to confirm the end of the message (data) to be received from the FP7 CPU unit. CR, CR+LF or NONE can be selected. Reception continues until the end of the message (CR, CR+LF) will be received. When selecting NONE, the end code is not confirmed.	CR
Judgement time without termination	Set the wait time for the end code. If the received message (data) has no terminator (end code), and the next message (data) is not received within the judgment time without termination (ms), it will be determined as no termination, and AFP7CCRET1 will perform the following operation. (End code: when selecting CR, CR+LF)	20 ms

Parameter		Description	Default
		The received message (data) is discarded. For TCP, the connection is disconnected. (End code: when selecting NONE) The message (data) is transmitted to the connected destination.	
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	Select a unit number. Specify a value between 1 and 20.	N/A
	IP Address	Specify IP address	192.168.1.100
System connection	Action Mode	Server Mode is fixed for the "System connection". Fixed by server mode.	Server Mode
	Protocol Mode	AFP7CCRET1 Communication protocol TCP is fixed.	TCP
	Communication Mode	AFP7CCRET1 Communication Mode MEWTOCOL is fixed.	MEWTOCOL
	Source Port No.	Port number where AFP7CCRET1 is open. Setting range: 1024 to 65534	9094
	Timeout	If AFP7 CCET1 does not communicate with a destination device during this setting time (seconds) in the state that connection is established, connection will be cut. Setting 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

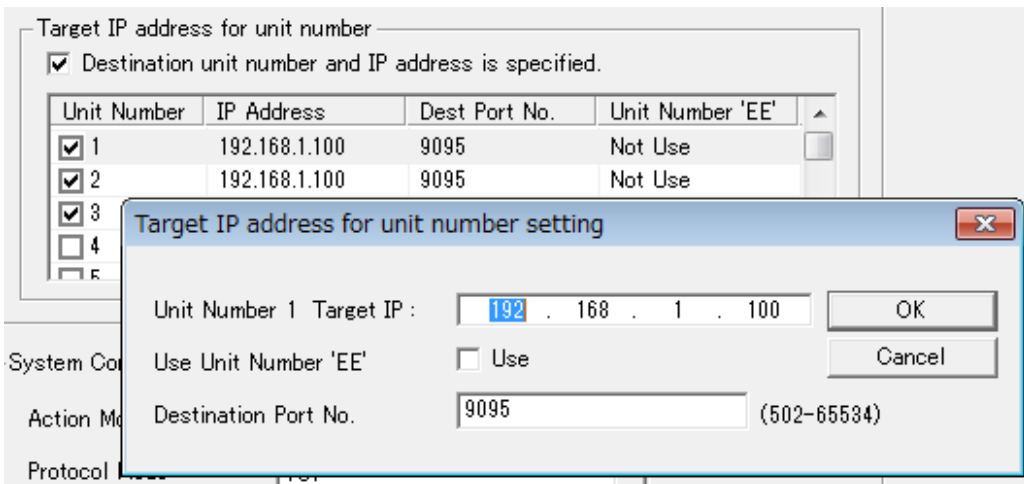
"Target IP address for unit number Setting" is available, in case of the following conditions.

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

#### 1 2 Procedure

1. Press the [Option] button.  
"Option" dialog box will open.
2. Check the "Destination unit number and IP address is specified" checkbox.
3. Double-click the line for setting the destination unit number you want to set.  
The "Target IP address for unit number setting" dialog box will open.

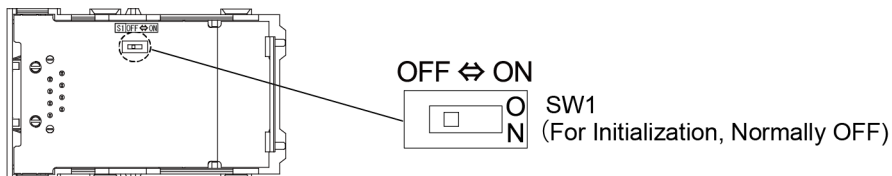
## 4.2 Specified using Configurator WD



4. Set the destination IP Address for the unit number.
5. Click the [OK] button.

### 4.2.6 Initialization of the environment setting of the cassette

- The Ethernet communication environment setting of the AFP7CCRET1 can be initialized.



#### 12 Procedure

1. Turn on the SW1 at the back of the AFP7CCRET1.
2. Install the AFP7CCRET1 on the FP7 CPU unit and turn on the power supply.
3. Start Configurator WD.
4. Run a search in the Configurator WD.  
If FP7CCRET1 is detected, it has successfully initialized.
5. Turn off the power supply of the FP7 CPU unit and remove the AFP7CCRET1.
6. Turn off the SW1 at the back of the AFP7CCRET1.
7. Install the AFP7CCRET1 on the FP7 CPU unit.

**i Info.**

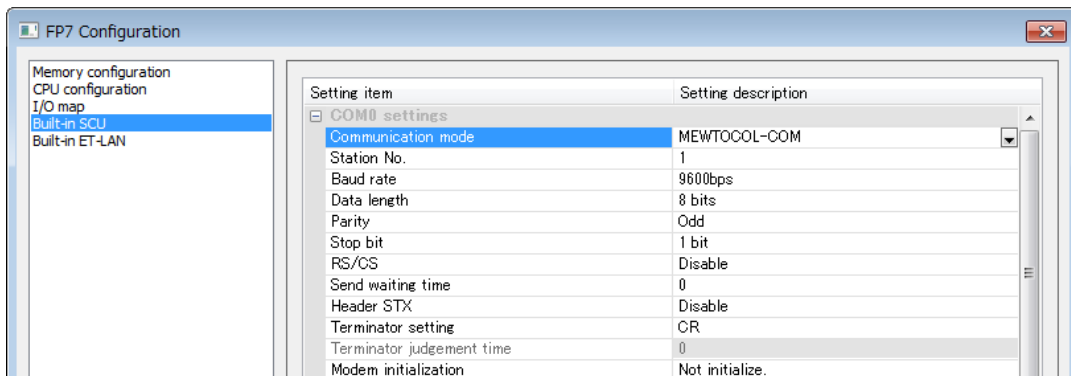
- The Ethernet communication setting (including the IP address) cannot be changed when the SW1 of the AFP7CCRET1 is on. Always turn it off after initialization.

## 4.3 Example of User connection (MEWTOCOL)

### 4.3 Example of User connection (MEWTOCOL)

#### 4.3.1 Specified using FPCWIN GR7

- Set the "Communication Mode" and "station number" under **Built-in SCU>COM.1 settings** using FPCWIN GR7.



#### Setting items for COM.1 port (AFP7CCRET1)

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

### 4.3.2 Specified using Configurator WD

#### ■ TCP Client Mode

The screenshot shows the 'Communication Setting' dialog box with the following configuration:

- User Connection:** Protocol Mode: TCP
- Action Mode:** Client 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)

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

### 4.3 Example of User connection (MEWTOCOL)

#### **i** Info.

- 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 AFP7CCRET1 is the same as connection termination timeout during no communication. Set the timeout of SEND/RECV instruction longer than the timeout during no communication to judge the timeout of response reception. Specify the timeout in **CPU Configuration>Time setting** in the "FP7 configuration" dialog box.

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 <sup>(Note 1)</sup>
Destination IP Address	192.168.1.100
Destination Port No.	9094



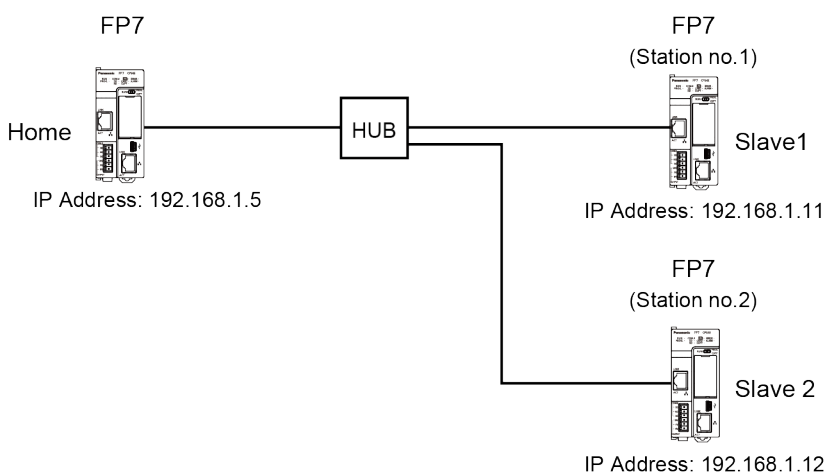
## 4.3 Example of User connection (MEWTOCOL)

Parameter	Default
Source Port No.	9095
Timeout	15 sec

(Note 1) The setting item Destination 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 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	
	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

### 4.3 Example of User connection (MEWTOCOL)

Parameter			Example		
Dialogbox	Field		Home	Slave1	Slave2
		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
	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
	Source Port No		0	9094	9094
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

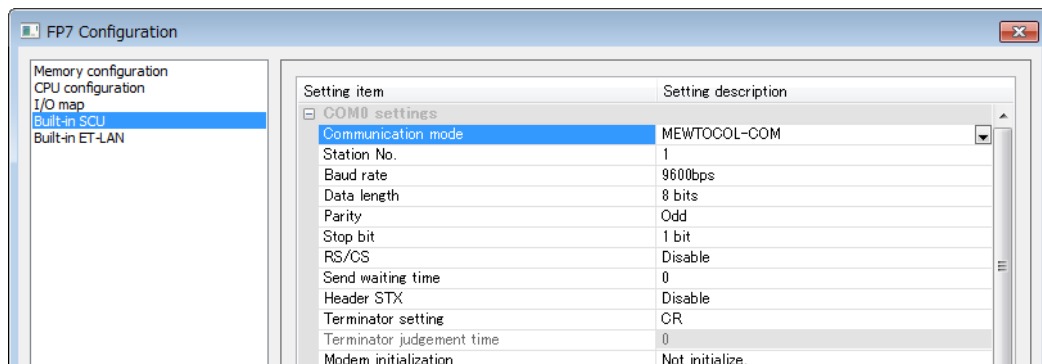
#### 3) MEWTOCOL Master Communication in the UDP BROADCAST mode

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
	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
	Source Port No		0	9094	9094
Option			N/A	N/A	N/A

### 4.4 Example of User connection (General Communication)

#### 4.4.1 Specified using FPWIN GR7

- Set the "communication mode" from **Built-in SCU>COM.1 setting** using FPWIN GR7.



#### Setting of COM.1port (AFP7CCRET1)

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

## 4.4 Example of User connection (General Communication)

### 4.4.2 Specified using Configurator WD

#### ■ TCP Client Mode

The screenshot shows the 'Communication Setting' dialog box with the following configuration:

- User Connection:** Protocol Mode: TCP
- Action Mode:** Action Mode: Client Mode
- Communication Mode:** General Communication
- 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)

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

## 4.4 Example of User connection (General Communication)

### ■ TCP Server Mode

The screenshot shows the 'Communication Setting' dialog box with the following configuration:

- User Connection:**
  - Protocol Mode: TCP
  - Action Mode: Server Mode
- Communication Mode:** General Communication
- 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)

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

## 4.4 Example of User connection (General Communication)

### ■ UDP mode

The screenshot shows the 'Communication Setting' dialog box with the following configuration:

- User Connection:**
  - Protocol Mode: UDP
  - Action Mode: Server Mode
- Communication Mode:** General Communication
- 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)

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

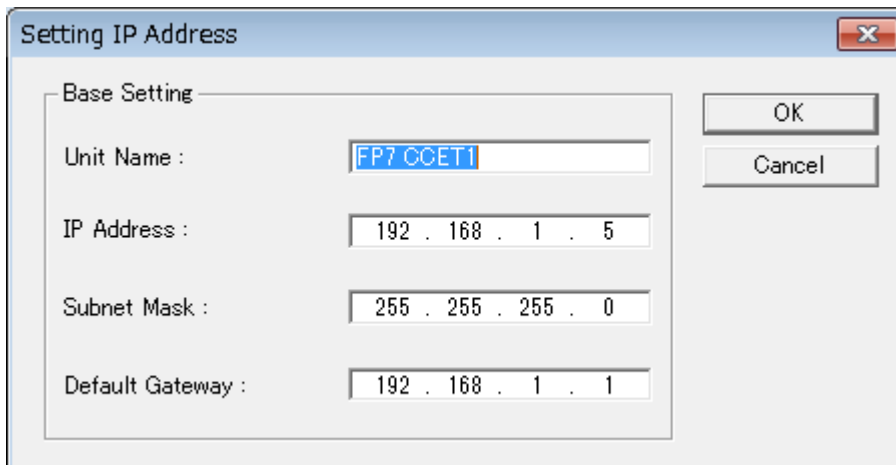
(Note 1) The "Destination IP Address" parameter is not available if BROADCAST is selected as the transfer method.

## 4.5 Example of System connection

### 4.5.1 Setting of Configurator 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" dialog box and "Option" dialog box for the system connection.

#### ■ IP Address setting dialog box



Setting IP Address

Base Setting

Unit Name : FP7 CCET1

IP Address : 192 . 168 . 1 . 5

Subnet Mask : 255 . 255 . 255 . 0

Default Gateway : 192 . 168 . 1 . 1

OK

Cancel

## 4.5 Example of System connection

### ■ Option dialog box

The 'Option' dialog box is divided into two main sections: 'User Connection' and 'System Connection'.  
In the 'User Connection' section, 'Endcode' is set to 'CR' and 'Judgment time without termination' is set to '20' (0-100ms). A checkbox for 'Destination unit number and IP address is specified.' is unchecked. Below it is a table with columns: Unit Number, IP Address, Dest Port No., and Unit Number 'EE'.  
In the 'System Connection' section, 'Action Mode' is 'Server Mode', 'Protocol Mode' is 'TCP', and 'Communication Mode' is 'MEWTOCOL'. The 'Server setting' section shows 'Source Port No.' as '9094' (502-65534) and 'Timeout' as '15' sec (0-1800).

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

### **i** Info.

- Select "Server Mode", "TCP" and "MEWTOCOL" for the system connection. It does not need to be set in the "Communication Setting" dialog box.

## 4.5.2 Setting of FPWIN GR7

- See below for which settings to apply on the FPWIN GR7 side when connecting the tool software FPWIN GR7 using the communication cassette AFP7CCRET1.

### **1 2** Procedure

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



Communications settings - FPWIN GR7

Computer communications port

Port to use: LAN

Communications condition settings

Title: Default

Please select if the connection destination is an ET-LAN unit.

Computer settings

IP address: [dropdown]

Port No: 9095 ( 0, 1025 - 65535 )

Unit No: 999

Connection destination

IP address: 192 . 168 . 1 . 5

Port No: 9094 ( 1 - 65535 )

Unit No: 1

Timeout settings

Communications timeout (sec): 15

Connection timeout (sec): 60

Register Settings(A) List Registrations

OK Cancel Initialize Browse

2. Select "LAN" from the ports to be used.
3. In the "Connection Destination Settings" field, input the IP address and Port No. (Source Port No.) set in the Configurator WD.
4. Click the [OK] button.
5. Select **Online>Switch to Online** from the menu bar.  
Once switched to online, the connection is complete.

(MEMO)

# 5 MEWTOCOL Master-Slave Communication

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## 5.1 List of MEWTOCOL / MEWTOCOL7 Supporting Commands

### 5.1 List of MEWTOCOL / MEWTOCOL7 Supporting Commands

#### 5.1.1 List of MEWTOCOL-COM Commands

##### ■ Commands to be used

Type of instruction	Code	Description
Read contact area	RC (RCS) (RCP) (RCC)	Reads contact ON/OFF status. <ul style="list-style-type: none"> <li>• Specifies only a single contact.</li> <li>• Specifies multiple contacts.</li> <li>• Specifies a range in word units.</li> </ul>
Write contact area	WC (WCS) (WCP) (WCC)	Turns contact ON or OFF. <ul style="list-style-type: none"> <li>• Specifies only a single contact.</li> <li>• Specifies multiple contacts.</li> <li>• Specifies a range in word units.</li> </ul>
Read data area	RD	Reads the contents of a data area.
Write data area	WD	Writes data to a data area.
Register / reset contacts monitored	MC	Registers the contact to be monitored.
Register / reset data monitored	MD	Registers the data to be monitored.
Monitoring start	MG	Monitors a registered contact or data using MD and MC.
Preset contact area (fill command)	SC	Fills the area of a specified range with 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 PLC specification, an error code when an error occurs, etc.
Abort	AB	The reception of multi-frame response is aborted.

(Note 1) Some devices cannot be accessed due to format limitations of MEWTOCOL-COM communication commands.

##### Info.

- For more details of MEWTOCOL command, refer to "7.2 MEWTOCOL-COM Format".

#### 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.

## 5.1 List of MEWTOCOL / MEWTOCOL7 Supporting Commands

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### Info.

- For details of MEWTOCOL commands, please see "[7.3 MEWTOCOL7-COM Format](#)".

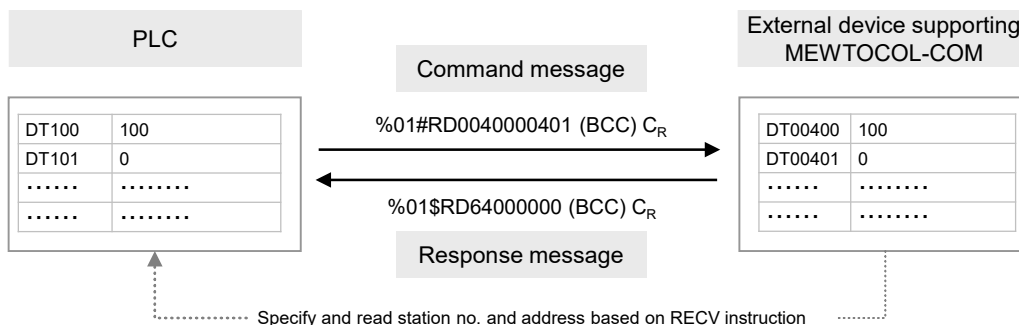
## 5.2 MEWTOCOL-COM Master Communication (RECV)

### 5.2 MEWTOCOL-COM Master Communication (RECV)

#### 5.2.1 Read Data from an External Device

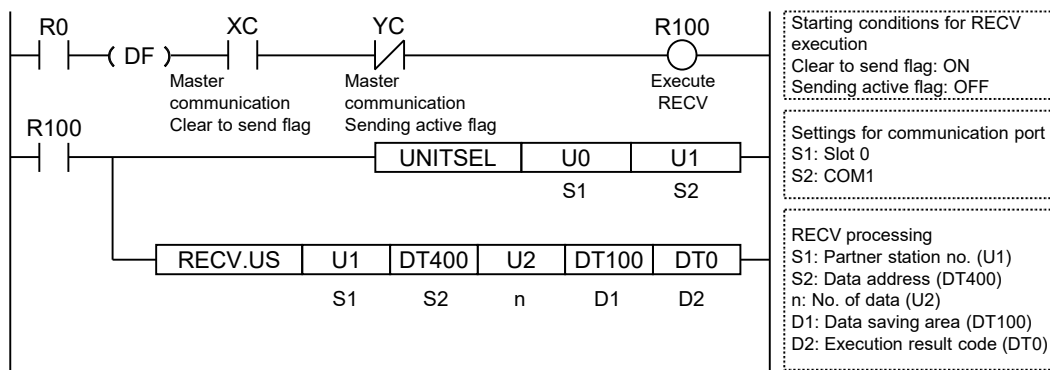
##### ■ Instructions

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.



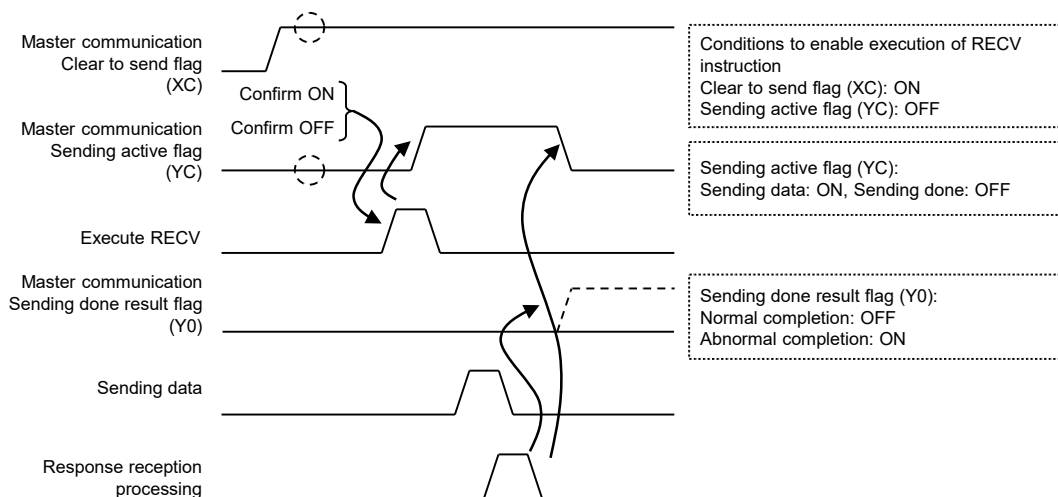
##### ■ Sample program

- 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).



## 5.2 MEWTOCOL-COM Master Communication (RECV)

### ■ 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 genera-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

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

### **i** Info.

- 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.

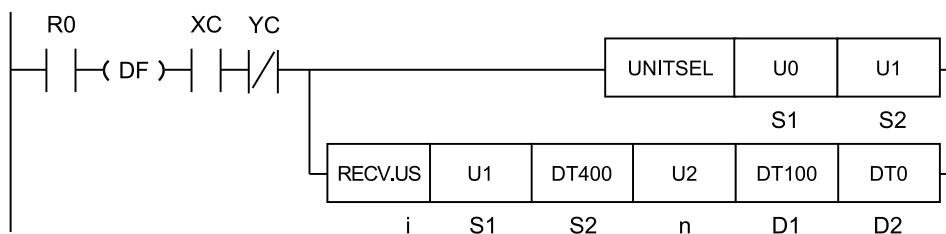
## 5.2 MEWTOCOL-COM Master Communication (RECV)

### 5.2.2 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.

### 5.2.3 RECV (MEWTOCOL Master / MODBUS Master)

#### ■ Ladder diagram



(Note 1) The above figure shows the case that S1=U0 (CPU unit with built-in SCU) and S2=U1 (port number 1) are specified by the UNITSEL instruction.

#### ■ Available operation units (●: Available)

Operation unit	bit	US	SS	UL	SL	SF	DF
i		●	●				

#### ■ List of operands

Operand	Description
S1	Partner station number
S2	Starting address of the device in the sender data area of the partner unit
n	Number of received data
D1	Starting address of the device in the receiver data area of the master unit
D2	Starting address of the device area of the master unit that stores the execution result code (1 word)



### ■ Available word devices (●: Available)

Operand	16-Bit device:											32-Bit device:			Integer			Real number		String	Index modifier
	WX	WY	WR	WL	WS	SD	DT	LD	UM	WI	WO	TSCS	TECE	IX	K	U	H	SF	DF	""	
S1	●	●	●	●			●	●								●	●				
S2 <sup>(Note 1)</sup>	●	●	●	●			●	●													
n	●	●	●	●			●	●								●	●				
D1	●	●	●	●			●	●													
D2	●	●	●	●			●	●													

(Note 1) When the source unit is FP7, only global devices can be specified. (Local devices cannot be specified.)

### ■ Available bit devices (●: Available)

Operand	Bit device											Specification of bit of word device		Index modifier
	X	Y	R	L	T	C	P	E	SR	IN	OT	DT.n	LD.n	
S1														
S2 <sup>(Note 1)</sup>	●	●	●	(Note 2)								(Note 3)	(Note 3)	●
n														
D1	●	●	●	●								●	●	●
D2														

(Note 1) When the sender is FP7, only global devices can be specified. (A local device cannot be specified.)

(Note 2) In the case of MODBUS mode, a bit device cannot be specified.

(Note 3) In the case of MEWTOCOL-COM mode or MODBUS mode, a bit device cannot be specified.

### ■ Outline of operation

- Commands are sent from the communication port of the unit to perform the data transmission with external devices.
- Data can be read and written by specifying station numbers and memory addresses and executing the SEND and RECV instructions in a user program, because PLC automatically creates messages according to the protocol.
- Select **communication mode** in the **configuration** menu of the tool software FPWIN GR7.
- When the RECV instruction is executed, the data is read from the address that starts with [S2] in the partner station number [S1] and the data is stored in the area that starts with [D1] in the master unit.
- Depending on the type of device specified by [S2] and [D1], the transfer method (register transfer / bit transfer) varies.
- The amount of received data [n] is specified in words for the register transfer, and in the number of bits for the bit transfer.

## 5.2 MEWTOCOL-COM Master Communication (RECV)

- The execution result code is stored in the one-word area of the master unit that is specified by [D2].

### ■ Specification of partner unit station number [S1]

Communication Mode	When SCU is used	When ET-LAN is used
MEWTOCOL-COM	1 to 99, 238 (decimal) = EE (hexadecimal)	1 to 64, 238 (decimal) = EE (hexadecimal)
MEWTOCOL-DAT <sup>(Note 1)</sup>	Non-SCU-compliant	<sup>(Note 1)</sup>
MODBUS	1 to 255	1 to 255

(Note 1) For connection between FP7 and FP7, specify "1". Destination is determined by the IP address.

### ■ Specify the starting address [S2] of the sender data area

Transfer method	Communication Mode	Address range
Register transfer	MEWTOCOL-COM	0 to 99999
	MEWTOCOL-DAT	0 to 65535F
	MODBUS	0 to 65535 (H FFFF)
Bit transfer	MEWTOCOL-COM	0 to 999F
	MEWTOCOL-DAT	0 to 65535 (H FFFF)
	MODBUS	0 to 65535 (H FFFF)

(Note 1) When the receiver is the file register FL, specify a constant. Example) For FL100, specify U100. For the file register, only bank 0 can be specified.

### ■ Specification of the amount of received data [n]

Transfer method	Communication Mode	Types of communication port	Setting range
Register transfer <sup>(Note 1)</sup>	MEWTOCOL-COM	1 to 509 words	RCC command and RD command are used.
	MEWTOCOL-DAT	1 to 1020 words	Connection setting: Setting of the MEWTOCOL Communication type setting: Connect with FP2 ET-LAN
		1 to 2038 words	Connection setting: Setting of the MEWTOCOL Communication type setting: Do not connect with FP2 ET-LAN
	MODBUS	1 to 127 words	Command 1 is used for reading WY and WR. Command 2 is used for WX. Command 3 is used for reading DT Command 4 is used for reading WL and LD
Bit transfer <sup>(Note 2)</sup>	MEWTOCOL-COM	Fixed to 1 bit	During MEWTOCOL-COM, RCS command is used.
	MEWTOCOL-DAT	Fixed to 1 bit	During MEWTOCOL-DAT, read contact information 53H is used.
	MODBUS	1 to 2040 bits	Command 1 is used for reading Y and R. Command 2 is used for X.

(Note 1) When 16-bit devices are specified for sender [S] and receiver [D2]

(Note 2) When bit devices are specified for sender [S] and receiver [D2]

### ■ Execution result code [D2]

Code	Description	Code	Description
H0	Normal end	H7	I/O allocation shortage error <sup>(Note 2)</sup>
H1	The communication port is being used in the master communication.	H8	The send buffer is being used. <sup>(Note 3)</sup>
H2	The communication port is being used in the slave communication.	H41	Format error
H3	The number of master communication instructions simultaneously used is exceeded.	H60	Parameter error
H4	Transmission timeout	H61	Data error
H5	Response reception timeout	H91	Missing expansion slave unit error
H6	Reception error <sup>(Note 1)</sup>		

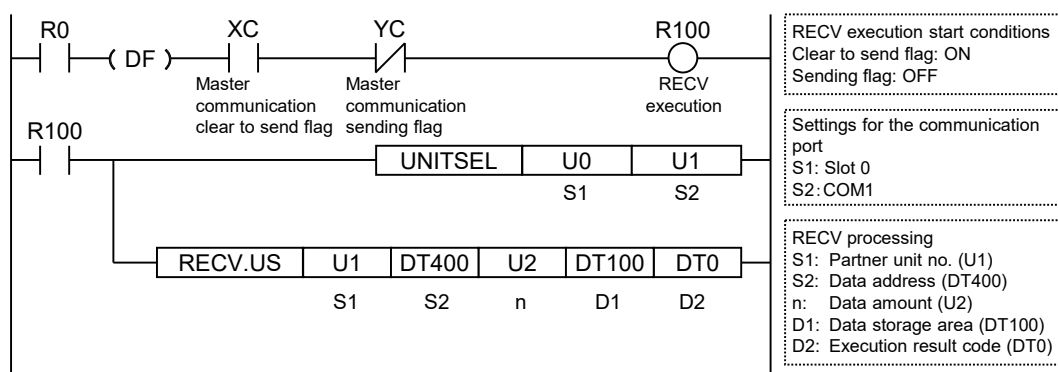
(Note 1) It occurs when an abnormal telegram is received. When there is a format error in the header of an individual protocol, the communication discards the received data and a response reception timeout occurs.

(Note 2) It occurs when the communication control I/O relays corresponding to the communication port (master communication clear to send flag, master communication send active flag, master communication send done result relay) are not allocated as I/O words of the CPU unit in the I/O map. It occurs only when the number of user connections of ET-LAN is expanded and this instruction is executed specifying the expanded connections.

(Note 3) Effective when the version is 4.57 or later.

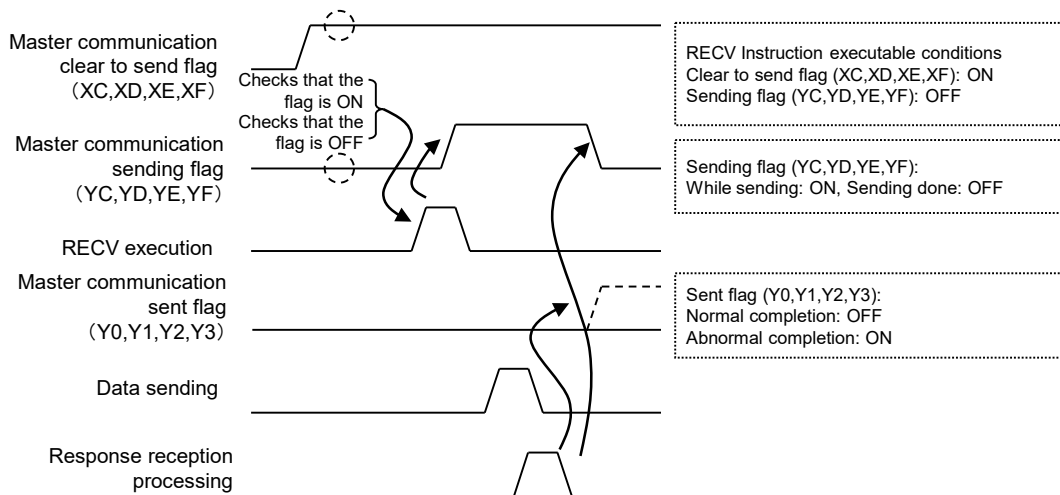
### ■ Sample program (in the case of SCU)

- This program sends the command from the COM1 port of the CPU unit, reads the data from the data areas DT400 to DT401 of the external device (station number 1), and writes the data into the data registers DT100 to DT101 of the PLC.
- This program checks that the master mode is on (XC) and that sending is not in progress in the same port (YC), and then starts up the RECV instruction.
- Using the UNITSEL instruction, specify the slot number (U0) and the COM. port number (U1).
- In the RECV instruction, specify and execute the partner station number (U1), starting address (DT400), data amount (U2), and PLC's starting address to store the data (DT100).



## 5.2 MEWTOCOL-COM Master Communication (RECV)

### Time chart (in the case of SCU)



### Info.

- The case of SCU shows the case that it is used in the following combination.
  - COM.0 port equipped in the CPU unit
  - Communication cassettes attached to the CPU unit (COM.1 to COM.2 ports)
  - Communication cassettes attached to the serial communication unit (COM.1 to COM.4 ports)
- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of the CPU with built-in SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN. The communication cassette (Ethernet type) does not support MODBUS.

### I/O allocation (in the case of CPU with built-in SCU)

COM Port No.			Name	Description
1	2	0		
XC	XD	XE	Master communication clear to send flag	Turns ON when MEWTOCOL-COM, MEWTOCOL7, or MODBUS-RTU is set for the communication mode, and the unit is in the RUN mode.
YC	YD	YE	Master communication sending flag	Turns ON during sending data based on SEND/RECV instruction. Turns OFF when the sending process is completed.
Y0	Y1	Y2	Sent flag	Reports completion result of sending data in genera-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

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

### ■ I/O allocation (in the case of Serial Communication Unit)

COM Port No.				Name	Description
1	2	3	4		
XC	XD	XE	XF	Master communication clear to send flag	Turns ON when MEWTOCOL-COM, MEWTOCOL7, or MODBUS-RTU is set for the communication mode, and the unit is in the RUN mode.
YC	YD	YE	YF	Master communication sending flag	Turns ON during sending data based on SEND/RECV instruction. Turns OFF when the sending process is completed.
Y0	Y1	Y2	Y3	Sent flag	Reports completion result of sending data in genera-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

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

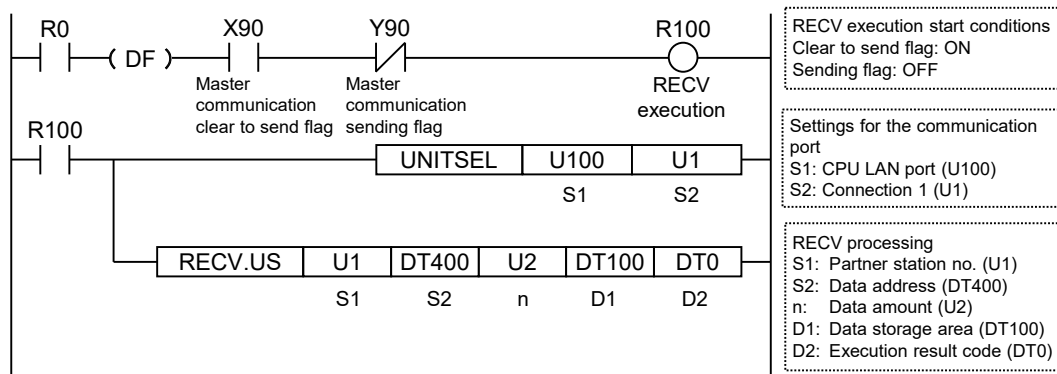
### ■ Precautions during programming (in the case of SCU)

- Use the UNITSEL instruction immediately before the SEND/RECV instruction to specify a target port for communication.
- Master communication is only enabled when MEWTOCOL or MODBUS is selected. Confirm that the "master communication clear to send flags" (XC to XF) are ON for the corresponding channel, and execute the SEND/RECV instruction.
- Another SEND/RECV instruction cannot be executed for a communication port where master communication is in progress. Confirm that the "master communication sending flags" (YC to YF) are OFF, and execute the instruction.
- A SEND/RECV instruction cannot be executed for a port where slave communication is in progress.
- If there is no response, the "master communication sending flags" (YC to YF) remain ON during the time-out period set in the CPU configuration.
- Up to 16 SEND/RECV instructions can be executed simultaneously for differing COM ports.

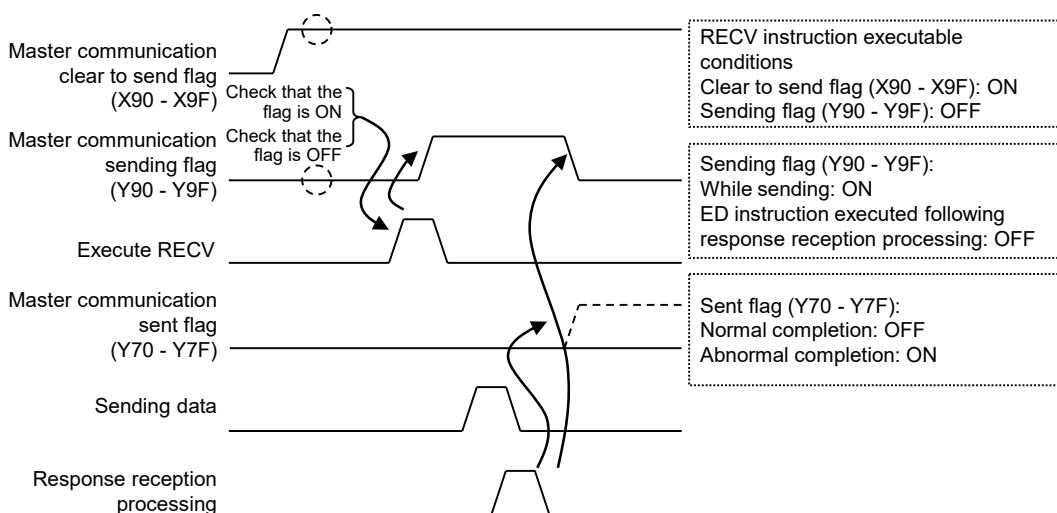
### ■ Sample program (in the case of CPU with built-in ET-LAN)

- This program sends the command from the LAN port of the CPU unit, reads the data from the data areas DT400 to DT401 of the external device, and writes the data into the data registers DT100 to DT101 of the PLC.
- After it is confirmed that connection 1 is established in master mode (X90) and no transmissions are currently being executed for the same port (Y90), the RECV instruction is started.
- The UNITSEL instruction is used to specify a slot number (LAN port: U100) and the connection number (U1).
- In the RECV instruction, specify and execute the partner station number (U1), starting address (DT400), data amount (U2), and PLC's starting address to store the data (DT100).

## 5.2 MEWTOCOL-COM Master Communication (RECV)



### ■ Time chart (in the case of CPU with built-in ET-LAN)



### ■ I/O allocation (in the case of CPU with built-in ET-LAN)

I/O number	Name	Description
X90 to X9F	Master communication clear to send flag	Turns ON when a connection is established in the master communication.
Y90 to Y9F	Master communication sending flag	Turns ON during sending data based on the SEND/RECV instruction. Turns OFF when the ED instruction is executed after the completion of the response receive processing.
Y70 to Y7F	Sent 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 state. Do not write over it with a user program.

### ■ Precautions during programming (in the case of CPU with built-in ET-LAN)

- Use the UNITSEL instruction immediately before the SEND/RECV instruction to specify a target connection number for communication.

## 5.2 MEWTOCOL-COM Master Communication (RECV)

- Master communication is only enabled when MEWTOCOL or MODBUS is selected. Confirm that the "master communication clear to send flags" (X90 to X9F) are ON for the corresponding connection, and execute the SEND/RECV instruction.
- The SEND or RECV instruction cannot be executed for the connection for which the master communication is in progress. Confirm that the "master communication sending flags" (Y90 to Y9F) are OFF, and execute the instruction.
- The SEND or RECV instruction cannot be executed for the connection for which the slave communication is in progress.
- Up to 16 SEND/RECV instructions can be executed simultaneously for differing connections.
- For communication between LAN ports of FP7, specify "U1" for the partner station number. The receiver is determined by the IP address.

### Info.

- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of the CPU with built-in SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN. Refer to the section describing the case of SCU.

### ■ Flag operations

Name	Description
SR7 SR8 (ER)	To be set in the case of out-of-range in indirect access (index modification).
	To be set when the destination range is outside the accessible range.
	COM port or connection specified by UNITSEL does not exist, or communication is not possible in the specified connection.
	Partner station number specified by [S1] is out of the range.
	Partner unit sender data device specified by [S2] is invalid.
	Sent data amount specified by [n] is invalid.
	Data device of the receiver data area in the master unit specified by [D1] is invalid, or exceeds the area.
	Result storage device specified by [D2] is invalid.
	Specified bit devices for [S2] and [D1], and/or specified 16-bit device, differ.
Integer specification for [S2] is only available for the MODBUS address direct specification type. It is invalid for other types.	

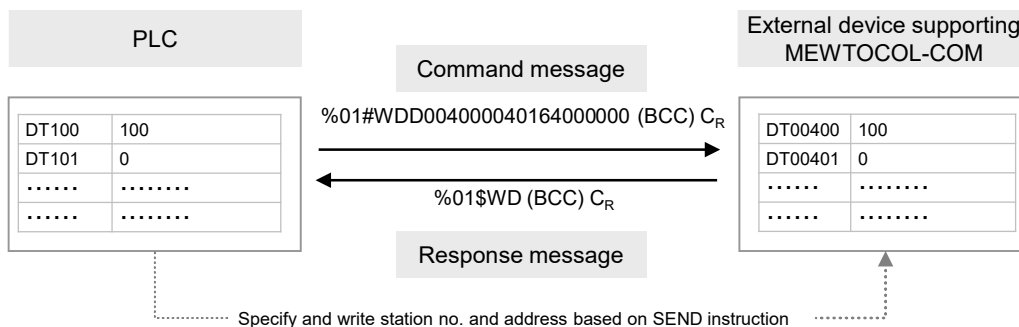
## 5.3 MEWTOCOL-COM Master Communication (SEND)

### 5.3 MEWTOCOL-COM Master Communication (SEND)

#### 5.3.1 Write Data into an External Device

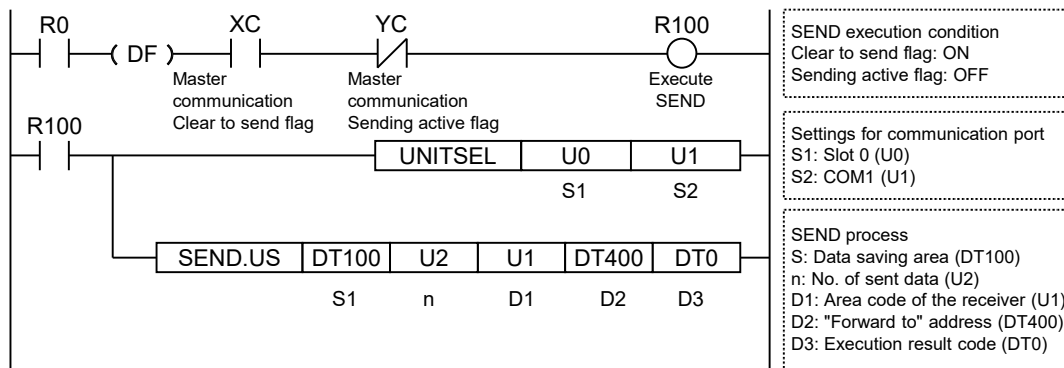
##### ■ Instructions

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/RCV instructions.



##### ■ Sample program

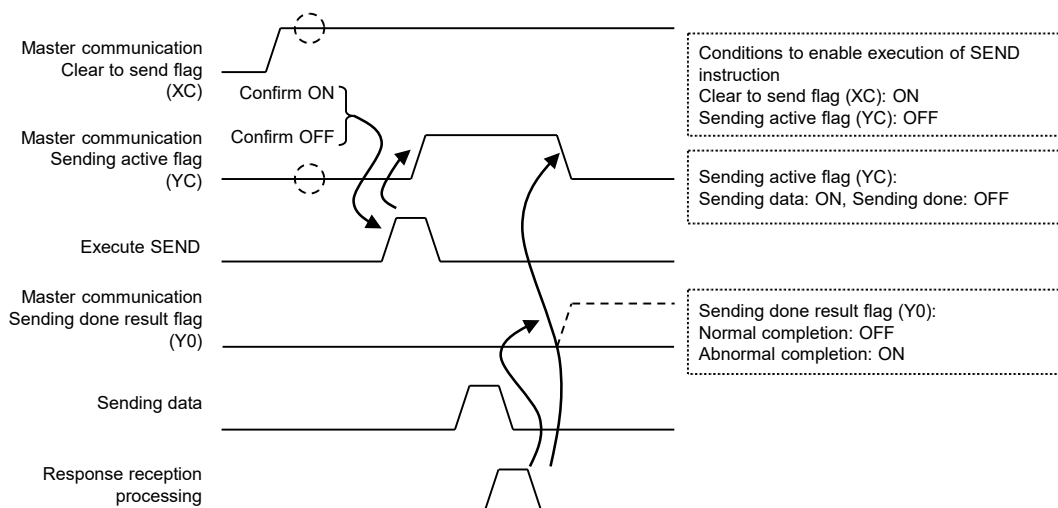
- Send commands from the COM1 port of the CPU unit, and write the content of PLC's data register DT100 - DT101 into the data area of an external device (station no. 1) DT400 - DT401.
- Confirm that the unit is in the master mode (XC), and that the sending process is not in progress for the same port (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).





## 5.3 MEWTOCOL-COM Master Communication (SEND)

### ■ Timing chart



### ■ I/O allocation

COM port no. 1	Name	Description
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 state. Do not write over it with a user program.

### **i** Info.

- 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.

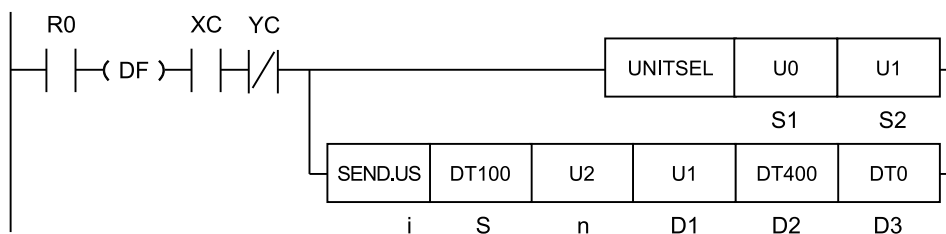
## 5.3 MEWTOCOL-COM Master Communication (SEND)

### 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 (MEWTOCOL Master / MODBUS Master)

#### ■ Ladder diagram



(Note 1) The above figure shows the case that S1=U0 (CPU unit with built-in SCU) and S2=U1 (port number 1) are specified by the UNITSEL instruction.

#### ■ Available operation units (●: Available)

Operation unit	bit	US	SS	UL	SL	SF	DF
i		●	●				

#### ■ List of operands

Operand	Description
S	Starting address of the sender data area
n	Amount of sent data
D1	Partner station number
D2	Starting address of the device in the receiver data area of the partner unit
D3	Starting address of the device area of the master unit that stores the execution result code (1 word)

## 5.3 MEWTOCOL-COM Master Communication (SEND)

### ■ Available word devices (●: Available)

Operand	16-Bit device:											32-Bit device:			Integer			Real number		String	Index modifier	
	WX	WY	WR	WL	WS	SD	DT	LD	UM	WI	WO	TSCS	TECE	IX	K	U	H	SF	DF	""		
S	●	●	●	●			●	●														●
n	●	●	●	●			●	●								●	●					●
D1	●	●	●	●			●	●								●	●					●
D2(Note 1)	(Note 2)	●	●	(Note 2)			●	(Note 2)														●
D3	●	●	●	●			●	●														●

(Note 1) When the destination unit is FP7, only global devices can be specified. (Local devices cannot be specified.)

(Note 2) In the MODBUS mode, this cannot be specified as the receiver.

### ■ Available bit devices (●: Available)

Operand	Bit device											Specification of bit of word device		Index modifier
	X	Y	R	L	T	C	P	E	SR	IN	OT	DT.n	LD.n	
S	●	●	●	●								●	●	●
n														
D1														
D2(Note 1)	(Note 2)	●	●	(Note 2)										●
D3														

(Note 1) When the receiver is FP7, only global devices can be specified. (A local device cannot be specified.)

(Note 2) In the case of MODBUS and MEWTOCOL-COM, a bit device cannot be specified.

### ■ Outline of operation

- Commands are sent from the communication port of the unit to perform the data transmission with external devices. Message in accordance with the protocol is automatically formulated by PLC. The user program only has to specify the station number and the memory address, and execute the SEND/RECV instruction, to carry out reading and writing.
- Select **communication mode** in the configuration menu of the tool software FPWIN GR7.
- When the SEND instruction is executed, data are read from the device in the master unit, starting with [S], and stored in the address starting with [D2] of the partner unit.
- The transfer method (register transfer/bit transfer) varies according to the device types that are specified by [S] and [D2].
- The amount of sent data [n] is specified in words for the register transfer, and in the number of bits for the bit transfer.

## 5.3 MEWTOCOL-COM Master Communication (SEND)

- The execution result code is stored in the one-word area of the master unit that is specified by [D3].

### ■ Setting the amount of sent data [n]

Transfer method	Communication Mode	Amount of sent data n	Note
Register transfer	MEWTOCOL-COM	1 to 507 words	
	MEWTOCOL-DAT	1 to 1020 words	Connection setting: MEWTOCOL Communication type setting: Connect with FP2 ET-LAN
		1 to 2038 words	Connection setting: MEWTOCOL Communication type setting: Do not connect with FP2 ET-LAN
	MODBUS	1 to 127 words	Use MODBUS command 15 (to write to WY or WR) and command 16 (to write multiple words to DT).
Bit transfer	MEWTOCOL-COM	Fixed at 1 bit	During MEWTOCOL-COM, WCS command is used.
	MEWTOCOL-DAT	Fixed at 1 bit	During MEWTOCOL-DAT, contact information write 52H is used.
	MODBUS	1 to 2040	Use the force multiple coils command 15.

(Note 1) The transfer method varies according to the device type specified for operands [S] and [D2]. The register transfer is used for 16-bit devices and the bit transfer is used for 1-bit devices.

(Note 2) The amount of sent data is specified in words for the register transfer and in bits for the bit transfer.

### ■ Specification of partner unit station number [D1]

Communication Mode	When SCU is used	When ET-LAN is used
MEWTOCOL-COM	1 to 99, 238 (decimal) = EE (hexadecimal)	1 to 64, 238 (decimal) = EE (hexadecimal)
MEWTOCOL-DAT	Non-SCU-compliant	
MODBUS	0 to 255	0 to 255

(Note 1) In the case of SCU, when "0" is specified for the partner station number, global transfer is selected. In this case, there is no response message from the destination.

(Note 2) For connection between FP7 and FP7, specify "1". Destination is determined by the IP address.

### ■ Specification of destination address [D2]

Transfer method	Communication Mode	Address range
Register transfer	MEWTOCOL-COM	0 to 99999
	MEWTOCOL-DAT	0 to 65535F
	MODBUS	0 to 65535 (H FFFF)
Bit transfer	MEWTOCOL-COM	0 to 999F
	MEWTOCOL-DAT	0 to 65535 (H FFFF)
	MODBUS	0 to 65535 (H FFFF)

(Note 1) When the receiver is the file register FL, specify a constant. Example) For FL100, specify U100. For the file register, only bank 0 can be specified.

### ■ Execution result code [D3]

Code	Description	Code	Description
H0	Normal end	H7	I/O allocation shortage error <sup>(Note 2)</sup>
H1	The communication port is being used in the master communication.	H8	The send buffer is being used. <sup>(Note 3)</sup>
H2	The communication port is being used in the slave communication.	H41	Format error
H3	The number of master communication instructions simultaneously used is exceeded.	H60	Parameter error
H4	Transmission timeout	H61	Data error
H5	Response reception timeout	H91	Missing expansion slave unit error
H6	Reception error <sup>(Note 1)</sup>		

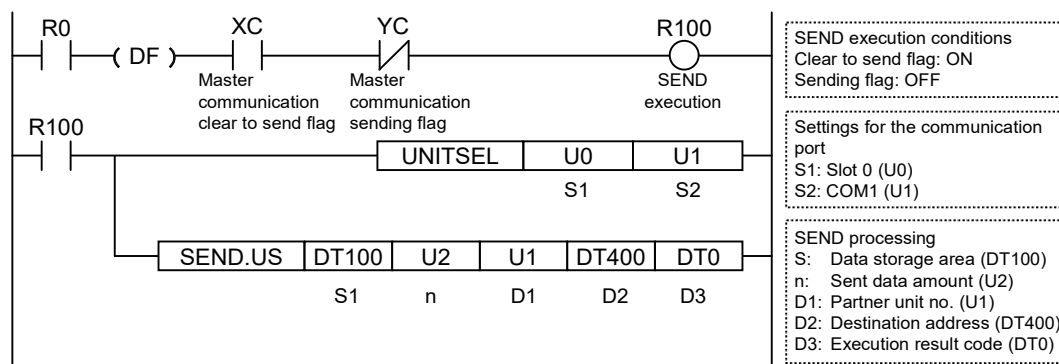
(Note 1) It occurs when an abnormal telegram is received. When there is a format error in the header of an individual protocol, the communication discards the received data and a response reception timeout occurs.

(Note 2) It occurs when the communication control I/O relays corresponding to the communication port (master communication clear to send flag, master communication send active flag, master communication send done result relay) are not allocated as I/O words of the CPU unit in the I/O map. It occurs only when the number of user connections of ET-LAN is expanded and this instruction is executed specifying the expanded connections.

(Note 3) Effective when the version is 4.57 or later.

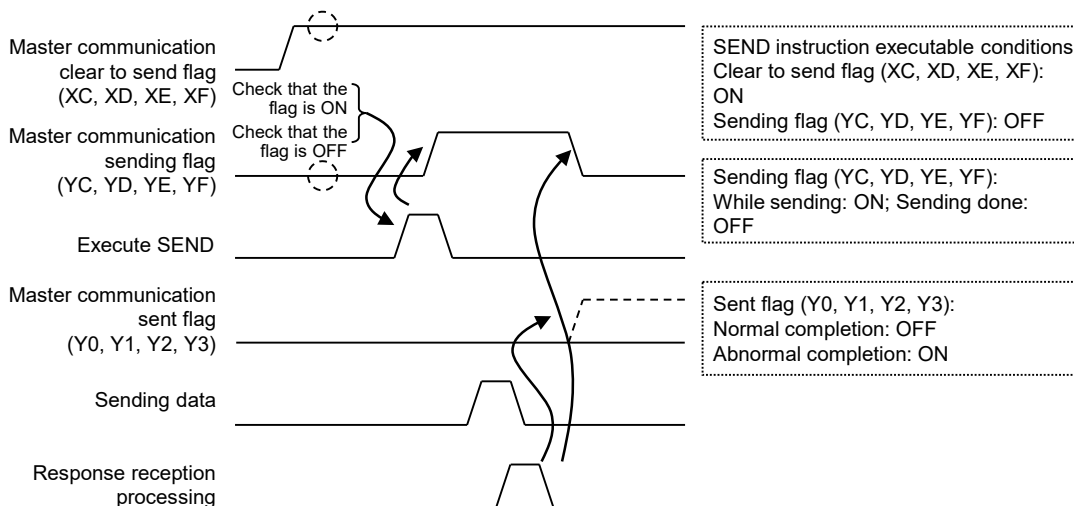
### ■ Sample program (in the case of SCU)

- This program sends the command from the COM1 port of the CPU unit to write the content of PLC's data registers DT100 to DT101 into the data areas DT400 to DT401 of the external device (station number 1).
- This program checks that the master mode is on (XC) and that sending is not in progress in the same port (YC), and then starts up the SEND instruction.
- Using the UNITSEL instruction, specify the slot number (U0) and the COM. port number (U1).
- In the SEND instruction, specify and execute the source's starting address (DT100) and data amount (U2), the destination's station number (U1) and starting address (DT400).



## 5.3 MEWTOCOL-COM Master Communication (SEND)

### Time chart (in the case of SCU)



### Info.

- The case of SCU shows the case that it is used in the following combination.
  - COM.0 port equipped in the CPU unit
  - Communication cassettes attached to the CPU unit (COM.1 to COM.2 ports)
  - Communication cassettes attached to the serial communication unit (COM.1 to COM.4 ports)
- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of the CPU with built-in SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN. The communication cassette (Ethernet type) does not support MODBUS.

### I/O allocation (in the case of CPU with built-in SCU)

COM Port No.			Name	Description
1	2	0		
XC	XD	XE	Master communication clear to send flag	Turns ON when MEWTOCOL-COM, MEWTOCOL7, or MODBUS-RTU is set for the communication mode, and the unit is in the RUN mode.
YC	YD	YE	Master communication sending flag	Turns ON during sending data based on SEND/RCV instruction. Turns OFF when the sending process is completed.
Y0	Y1	Y2	Sent flag	Reports completion result of sending data in genera-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

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

## 5.3 MEWTOCOL-COM Master Communication (SEND)

### ■ I/O allocation (in the case of Serial Communication Unit)

COM Port No.				Name	Description
1	2	3	4		
XC	XD	XE	XF	Master communication clear to send flag	Turns ON when MEWTOCOL-COM, MEWTOCOL7, or MODBUS-RTU is set for the communication mode, and the unit is in the RUN mode.
YC	YD	YE	YF	Master communication sending flag	Turns ON during sending data based on SEND/RECV instruction. Turns OFF when the sending process is completed.
Y0	Y1	Y2	Y3	Sent flag	Reports completion result of sending data in genera-purpose communication or master communication. (Normal completion: 0, Abnormal completion: 1)

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

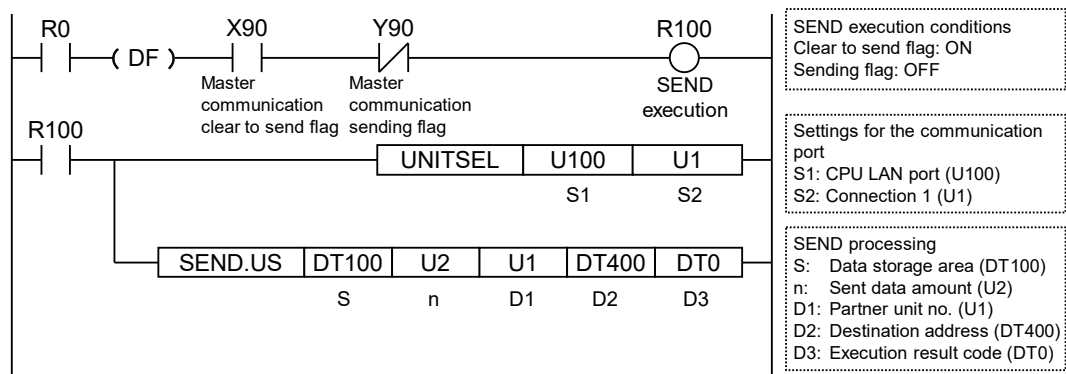
### ■ Precautions during programming (in the case of SCU)

- Use the UNITSEL instruction immediately before the SEND/RECV instruction to specify a target port for communication.
- Master communication is only enabled when MEWTOCOL or MODBUS is selected. Confirm that the "master communication clear to send flags" (XC to XF) are ON for the corresponding channel, and execute the SEND/RECV instruction.
- Another SEND/RECV instruction cannot be executed for a communication port where master communication is in progress. Confirm that the "master communication sending flags" (YC to YF) are OFF, and execute the instruction.
- A SEND/RECV instruction cannot be executed for a port where slave communication is in progress.
- If there is no response, the "master communication sending flags" (YC to YF) remain ON during the time-out period set in the CPU configuration.
- Up to 16 SEND/RECV instructions can be executed simultaneously for differing COM ports.

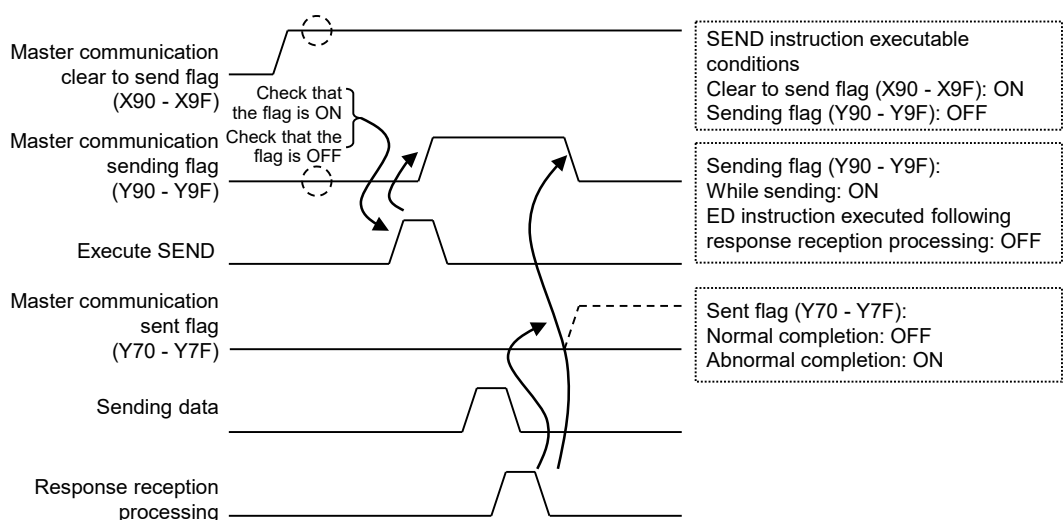
### ■ Sample program (in the case of CPU with built-in ET-LAN)

- This program sends the command from the LAN port of the CPU unit to write the content of PLC's data registers DT100 to DT101 into the data areas DT400 to DT401 of the external device.
- After it is confirmed that connection 1 is established in master mode (X90) and no transmissions are currently being executed for the same port (Y90), the SEND instruction is started.
- The UNITSEL instruction is used to specify a slot number (LAN port: U100) and the connection number (U1).
- In the SEND instruction, specify and execute the source's starting address (DT100) and data amount (U2), the destination's station number (U1) and starting address (DT400).

### 5.3 MEWTOCOL-COM Master Communication (SEND)



#### ■ Time chart (in the case of CPU with built-in ET-LAN)



#### ■ I/O allocation (in the case of CPU with built-in ET-LAN)

I/O number	Name	Description
X90 to X9F	Master communication clear to send flag	Turns ON when a connection is established in the master communication.
Y90 to Y9F	Master communication sending flag	Turns ON during sending data based on the SEND/RECV instruction. Turns OFF when the ED instruction is executed after the completion of the response receive processing.
Y70 to Y7F	Sent 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 state. Do not write over it with a user program.

#### ■ Precautions during programming (in the case of CPU with built-in ET-LAN)

- Use the UNITSEL instruction immediately before the SEND/RECV instruction to specify a target connection number for communication.



## 5.3 MEWTOCOL-COM Master Communication (SEND)

- Master communication is only enabled when MEWTOCOL or MODBUS is selected. Confirm that the "master communication clear to send flags" (X90 to X9F) are ON for the corresponding connection, and execute the SEND/RECV instruction.
- The SEND or RECV instruction cannot be executed for the connection for which the master communication is in progress. Confirm that the "master communication sending flags" (Y90 to Y9F) are OFF, and execute the instruction.
- The SEND or RECV instruction cannot be executed for the connection for which the slave communication is in progress.
- Up to 16 SEND/RECV instructions can be executed simultaneously for differing connections.
- For communication between LAN ports of FP7, specify "U1" for the partner station number. The receiver is determined by the IP address.

### Info.

- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of the CPU with built-in SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN. Refer to the section describing the case of SCU.

### ■ Flag operations

Name	Description
SR7 SR8 (ER)	To be set in the case of out-of-range in indirect access (index modification).
	To be set when the source range is outside the accessible range.
	COM port or connection specified by UNITSEL does not exist, or communication is not possible in the specified connection.
	Data device specified by [S] is invalid, or exceeds the area.
	Sent data amount specified by [n] is invalid.
	Station number specified by [D1] is out of the range.
	Data device specified by [D2] is invalid, or exceeds the area.
	Result storage device specified by [D3] is invalid.
	Integer specification for [D2] is only available for the MODBUS direct address specification type. It is invalid for other types.
	Specified bit devices for [S] and [D2], and/or specified 16-bit device, differ.

(MEMO)

# 6 General-purpose Communication

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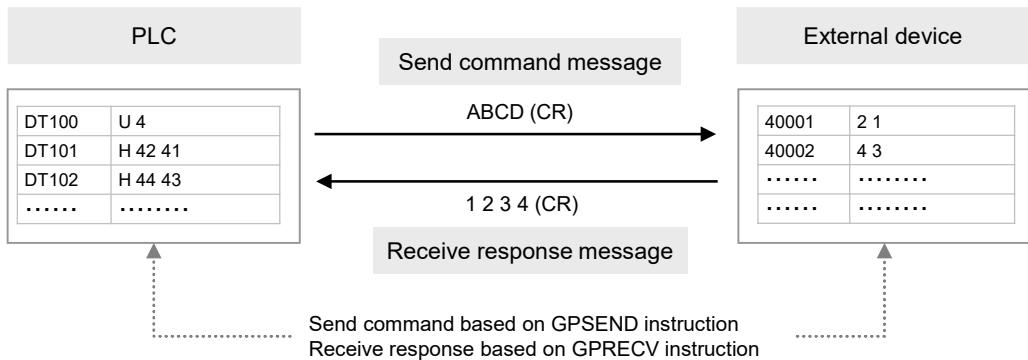
## 6.1 Operation of General-Purpose Communication

### 6.1 Operation of General-Purpose Communication

#### 6.1.1 Read Data from an External Device

##### ■ Read data from a partner device

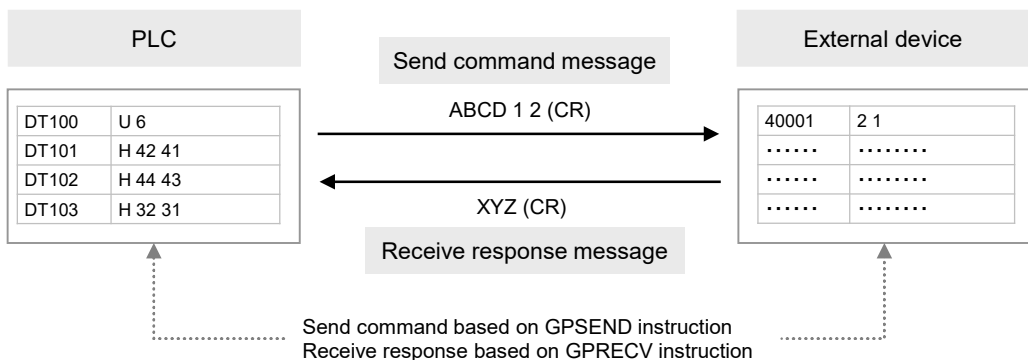
In general-purpose communication, communication is executed by sending commands that suit the partner device, and receiving responses. Command messages are sent by formulating a data table for message in accordance with the protocol, on the given data register, and subsequently executing GPSEND instruction.



#### 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.



**i Info.**

- 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.

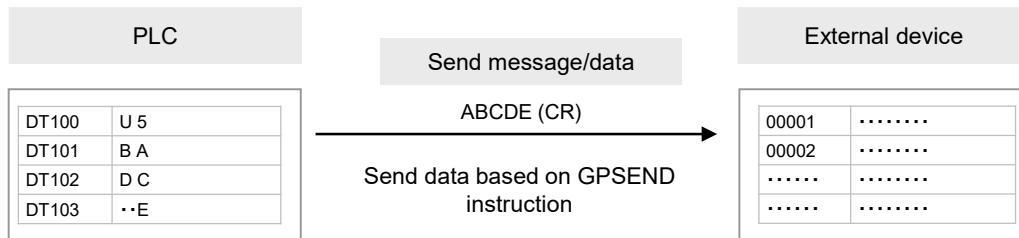
## 6.2 Sending Operation

### 6.2 Sending Operation

#### 6.2.1 Overview of Sending Operation

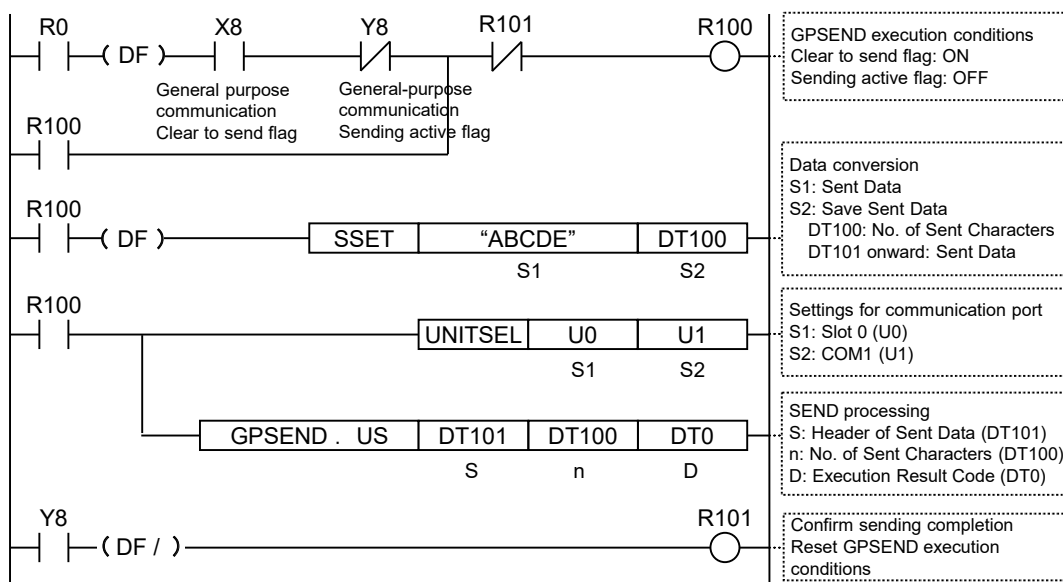
##### ■ Instructions

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.



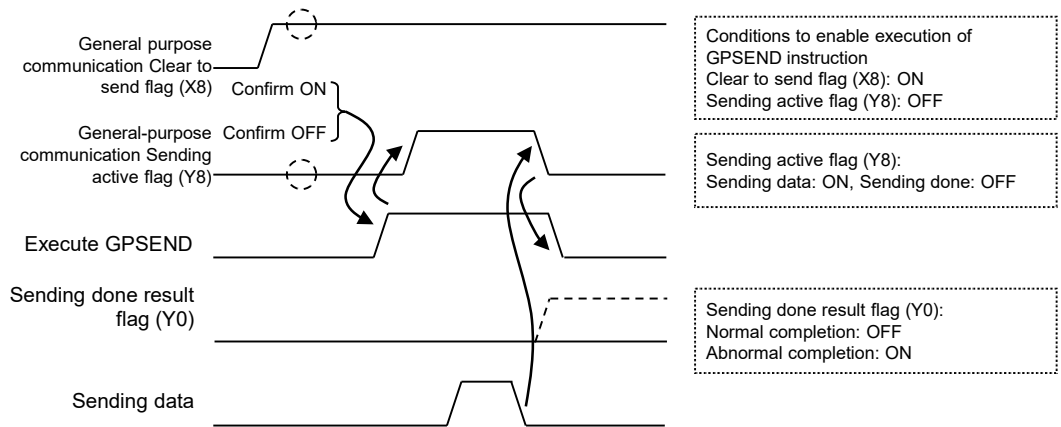
##### ■ Sample program

- Confirm that it is in 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. 1	Name	Description
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 state. Do not write over it with a user program.

(Note 2) If the sending time is shorter than the scan time, the "General-purpose communication sending active" flag (Y8) will turn OFF when the GPSEND instruction is executed for the next scan after the data sending is complete. In all cases, it is turned ON for at least one scan time.

### **i** Info.

- 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.

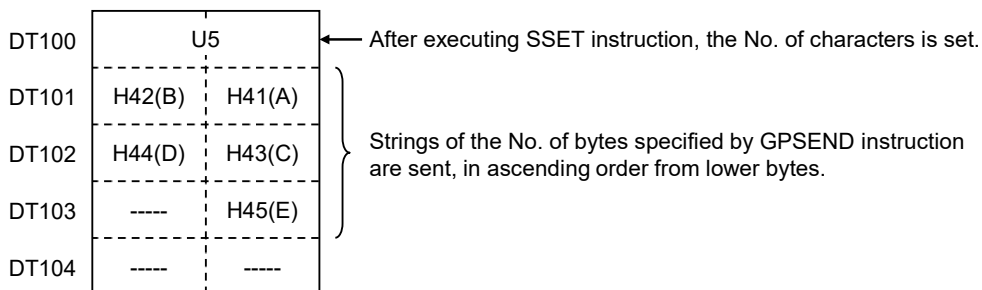
## 6.2 Sending Operation

### 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.

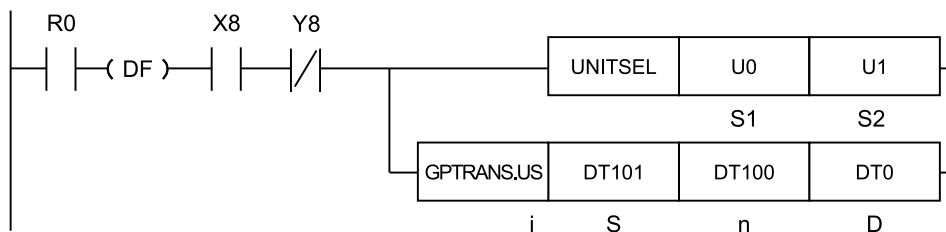


#### **i** Info.

- 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.

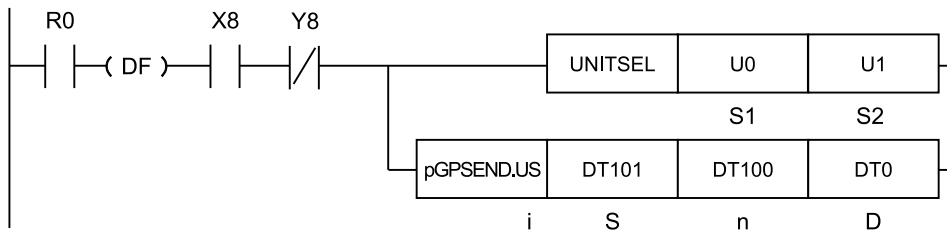
### 6.2.3 GPTRNS / pGPSEND /GPSEND (General-Purpose Communication Send Instruction)

#### ■ Ladder diagram (GPTRNS)

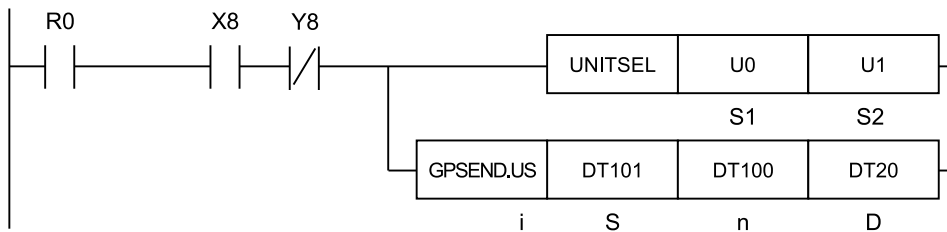




■ Ladder diagram (pGPSEND)



■ Ladder diagram (GPSEND)



(Note 1) The above figure shows the case that S1=U0 (CPU unit with built-in SCU) and S2=U1 (port number 1) are specified by the UNITSEL instruction.

■ Available operation units (●: Available)

Operation unit	bit	US	SS	UL	SL	SF	DF
i		●	●				

(Note 1) When a negative value is specified for operand [n], it is necessary to specify an SS operation unit.

■ List of operands

Operand	Description
S	Starting number for the device for storing the sent data
n	Number of bytes of the sent data, or starting number of the device where the amount of sent data is stored
D	Starting number of the device that stores the processing result (1 word)

■ Available devices (●: Available)

Operand	16-Bit device:											32-Bit device:			Integer			Real number	String	Index modifier	
	WX	WY	WR	WL	WS	SD	DT	LD	UM	WI	WO	TSCS	TECE	IX	K	U	H	SF	DF		""
S1	●	●	●	●			●	●													●

## 6.2 Sending Operation

Operan d	16-Bit device:											32-Bit device:			Integer			Real numbe r		St rin g	Index modifie r
	W X	W Y	W R	W L	W S	S D	D T	L D	U M	W I	W O	T S C S	T E C E	I X	K	U	H	S F	D F	""	
n(No te 1)	•	•	•	•			•	•							•	•	•				•
D (No te 1)	•	•	•	•			•	•													•

(Note 1) Always 16-bit data/device, regardless of the specification of operation units [i].

### ■ Outline of operation

- Data are sent from the communication port to external devices.
- Data of [n] bytes are sent from the unit / communication port set by the UNITSEL instruction, starting with the starting address (word address) of the sent data area specified by [S].
- Data to be sent are set by the user program, in the area starting with [S].
- The processing result is stored in the area specified by [D].

### ■ Processing

- The slot numbers and communication port numbers specified with UNITSEL instruction are obtained from the system data register (SD).
- This instruction confirms that the general-purpose communication clear to send flag of a specified communication port is ON and the general-purpose communication sending flag is OFF.
- When sending is enabled, sent data is transferred to the send buffer of a communication port and a request to send is executed.

### **i** Info.

- The case of SCU shows the case that it is used in the following combination.
  - COM.0 port equipped in the CPU unit
  - Communication cassettes attached to the CPU unit (COM.1 to COM.2 ports)
  - Communication cassettes attached to the serial communication unit (COM.1 to COM.4 ports)
- The case of ET-LAN shows the case that it is used in the following combination.
  - LAN port equipped in the CPU unit (Applicable models: CPU unit CPS4RE\* and CPS3RE\* only)
- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN.

### ■ Comparison of GPTRNS / pGPSEND / GPSEND instructions

Instruction	Characteristics	
GPTRNS	The data send confirmation process is performed on the completion of scan. (Note 2)	
pGPSEND (Note 1)	Adv anta ge	Data is sent only once by turning on execution conditions at the time of data send.

Instruction	Characteristics	
	Disadvantage	Up to 16 send operations can be performed simultaneously to different COM ports and connections. (The total of simultaneous usage of SEND, RECV, GPTRNS, pGPSEND, and pPMSET instructions)
GPSEND		The data send confirmation process is performed in the operation processing for the GPSEND instruction. (Note 2)
	Advantage	Data can be sent to different COM ports and connections simultaneously without limit.
	Disadvantage	It is necessary to turn ON the execution condition of the GPSEND instruction until the end of data sending, and turn OFF the execution condition at a scan in which the end of data transmission is confirmed.

(Note 1) As the result of executing an operation, the conditions under which an error is set for operand [D] will vary.

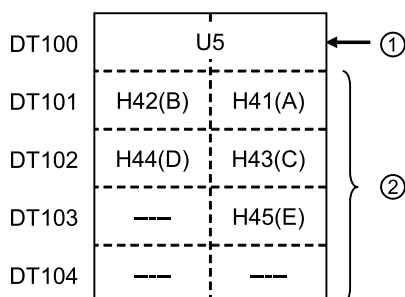
Condition in which errors occur	GPTRNS	pGPSEND	GPSEND
General-purpose communication clear to send flag is OFF.	(Note 2)	•	•
16 or more SEND, RECV, GPTRNS, pGPSEND, and pPMSET instructions are used simultaneously.	•	•	-
Communication error	•	•	•

(Note 2) Even when the same port is specified and the GPTRNS instruction is executed during the execution of the general-purpose communication transmission, an error does not occur and the result is not updated.

(Note 3) The data sending confirmation process indicates if the sending flag is cleared, if the send results flag is set, and if the processing results are stored in [D].

### ■ Creation of send data table [S]

- Data to be sent is stored from the low byte of a given area specified by [S].
- The figure below shows the case where the string "ABCDE" is converted with the SSET instruction.



- |     |  |
|-----|--|
| (1) | Once the SSET instruction is executed, the number of characters is set in the starting word. Then, the characters that are converted are stored in the following area. |
| (2) | DT101 is set for operand [S] of the GPTRNS / pGPSEND / GPSEND instruction, and when the instruction is executed the data is sent in ascending order from the low byte. |

## 6.2 Sending Operation

### ■ Setting the number of bytes in sent data [n]

Unit type	Set value	Description
SCU (Note 1)(Note 2)	1 to 4096	When the value is positive, an end code is automatically added according to the "Terminator setting" of COM settings.
	-1 to -4096	When the value is negative, an end code is not automatically added regardless of the "Terminator setting" of COM settings.
ET-LAN	1 to 16384	<ul style="list-style-type: none"> <li>When "Add no special header" is on (Default connection setting) (Note 3)</li> <li>Send data and the end code are not distinguished. It is not automatically added.</li> </ul>
	1 to 16372	<ul style="list-style-type: none"> <li>When specifying "Append a special header" (Note 3)</li> <li>Send data and the end code are not distinguished. It is not automatically added.</li> </ul>

(Note 1) For SCU, up to 4096 bytes can be sent, including a start code and an end code. The start code and end code are set from the configuration menu of the tool software or with the PMSET instruction. When "Start code STX" is set to "Enabled", the maximum amount of sent data that can be specified is decremented by one.

When "Terminator setting" is set to "ETX" or "CR", the maximum amount of sent data is decremented by one.

When "Terminator setting" is set to "CR+LF", the maximum amount of sent data is decremented by two.

When "Terminator setting" is set to "Time", the maximum amount of sent data is not decremented.

(Note 2) For specifying a negative value for [n] (signed integer K), specify SS for the operation units.

(Note 3) A "special header" is added when communicating with a conventional FP2 ET-LAN unit, and when communication is performed with MEWTOCOL. Normally, select "Add no special header" in the user connection setting.

### ■ Operand [D] settings

- Specify the device area of the master unit storing the processing result (1 word).
- The following values are stored depending on the state.

Status	Value that is set
When starting the transmission request	H0
When transmission is completed	Number of transmitted bytes
When an error occurs	HFFFF

### ■ Precautions for programming

- To perform communication, setup is required in the configuration menu of the tool software.
- For a CPU unit with a built-in SCU, select **General-purpose communication in FP7 Configuration>Built-in SCU>Communication mode**. For a Serial Communication Unit, also select "General-purpose communication" in "Communication mode".
- For a CPU unit with a built-in ET-LAN, use the FPWIN GR7 tool software to select "General-purpose communication" in **FP7 Configuration>Built-in ET-LAN>User connection information setting>Operation mode setting**.
- Before executing the GPTRNS instruction, pGPSEND instruction, or GPSEND instruction, describe the UNITSEL instruction and specify the target unit and communication port or connection.

- The GPTRNS, pGPSEND, and GPSEND instructions should be executed after confirming that the general-purpose communication clear to send flag for the target COM port and connection is ON and that the general-purpose communication sending flag is OFF.
- For the GPSEND instruction, be sure to keep the execution condition ON until the completion of the transmission that sets the general-purpose communication sending flag to OFF.
- The general-purpose communication sent flag in the WX area is used for confirming the completion of the transmission using the general-purpose communication.
- When data is sent to a communication port that is undergoing transmission, it results in no operation. No error occurs.
- Sending zero-byte data results in an error.
- For a GPTRNS instruction and a pGPSEND instruction, up to 16 instructions can be executed simultaneously for different COM ports and connections. (The total of simultaneous usage of SEND, RECV, GPTRNS, pGPSEND, and pPMSET instructions)
- The GPTRNS, pGPSEND, and GPSEND instructions are not available in interrupt programs.

### ■ Precautions during programming (in the case of SCU)

- If a positive number is specified for [n], the start code and end code that are specified in the configuration menu are automatically added to the data to be sent. Do not include a start code or an end code in the sent data.
- If an end code will not be added, specify a negative number for the amount of sent data [n]. In addition, select "SS" as the operation units.
- The maximum volume of data that can be sent with GPTRNS, pGPSEND, and GPSEND instructions is 4,096 bytes, including a start code and an end code.

### ■ Precautions during programming (in the case of CPU with built-in ET-LAN)

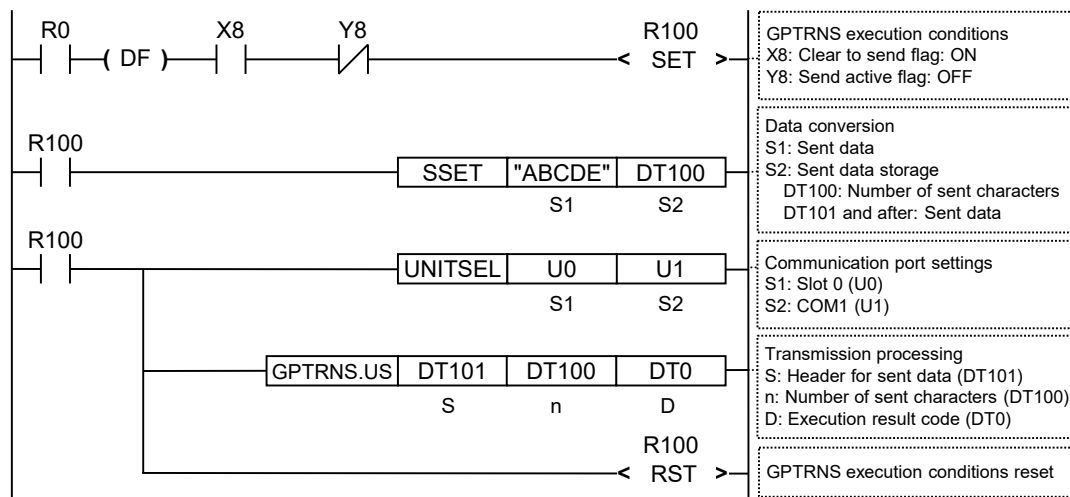
- General-purpose communication can use user connections 1 to 16. It cannot be used for the system connection and the expansion user connections 17 to 216.
- User connections should be in the "connected" state. We recommend using the FPWIN GR7 tool software to set "Open automatically" in **Built-in ET-LAN>User connection information setting>Open type**. The connections can also be connected with the OPEN instruction.
- No header or terminator is added to data to be sent. Store the start code and end code as part of the send data if they need to be sent to match the external device protocol.
- The maximum volume of data that can be sent in a single instance with GPTRNS, pGPSEND, and GPSEND instructions is 16,384 bytes.

### ■ Sample program (in the case of SCU)

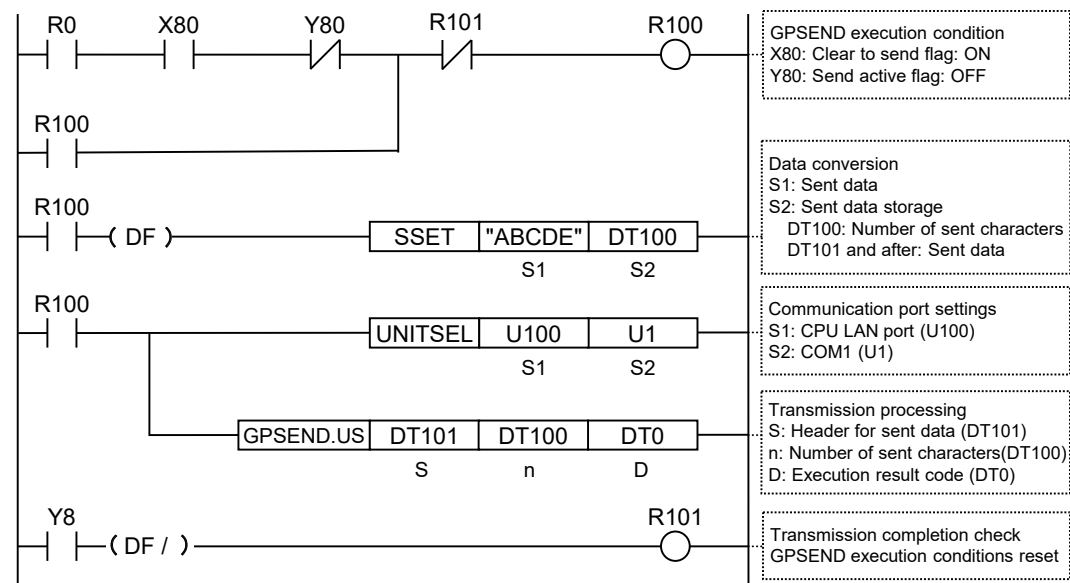
- This program checks that the general-purpose communication mode is on (X8:ON) and that general-purpose sending is not in progress in the same port (Y8:OFF), and then starts up the sending program.
- Using the SSET instruction, convert any given message into an ASCII string. Set the number of sent characters to the data register DT100, and the sent message to the data register DT101.
- Using the UNITSEL instruction, specify the slot number (U0) and the COM. port number (U1).
- In the GPTRNS / pGPSEND / GPSEND instruction, specify and execute the start of the table that stores the message to be sent (DT101) and the number of characters in the data (DT100).

## 6.2 Sending Operation

### GPTRNS instruction



### GPSEND instruction



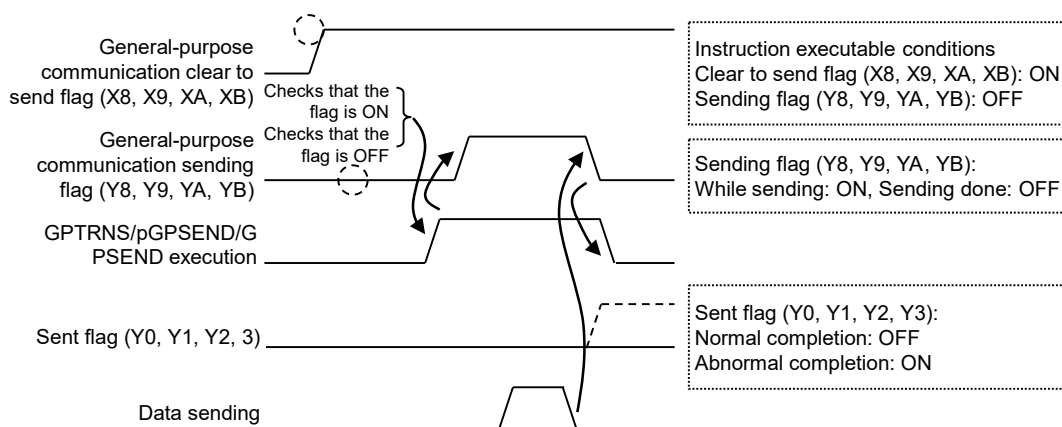
### Info.

- For the GPSEND instruction, it is necessary to turn ON the execution condition until the end of data sending, and turn OFF the execution condition at a scan in which the end of data sending is confirmed.

### Time chart (in the case of SCU)

- Data are sent in ascending order from low bytes of [S+1] in the table specified by the GPTRNS / pGPSEND / GPSEND instruction.
- During sending, the general-purpose communication sending flags (Y8, Y9, YA, YB) are turned ON. They turn OFF when sending is completed.

- The sending result (0: normal completion; 1: abnormal completion) is stored in the general-purpose communication sent flags (Y0, Y1, Y2, Y3).



#### ■ I/O allocation (in the case of CPU with built-in SCU)

COM Port No.			Name	Description
1	2	0		
X8	X9	XA	General-purpose communication clear to send flag	Turns ON when the unit is set to the general-purpose communication mode.
Y8	Y9	YA	General-purpose communication sending flag	Turns ON when sending with general-purpose communication mode. Turns OFF when the sending process is completed.
Y0	Y1	Y2	Sent 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 state. Do not write over it with a user program.

(Note 2) In the case of the GPTRNS and pGPSEND instructions, the sending flag and send results flag are updated after the scan is complete.

(Note 3) In the case of the GPSEND instruction, the sending flag and send results flag are updated after sending is completed when the next GPSEND instruction is executed. If sending time is shorter than scan time, the general-purpose communication sending flags (Y8, Y9, YA, YB) are turned OFF when the GPSEND instruction is executed in the subsequent scan following completion of data sending. The flags remain ON for at least one scan time.

#### ■ I/O allocation (in the case of Serial Communication Unit)

COM Port No.				Name	Description
1	2	3	4		
X8	X9	XA	XB	General-purpose communication clear to send flag	Turns ON when the unit is set to the general-purpose communication mode.
Y8	Y9	YA	YB	General-purpose communication sending flag	Turns ON when sending with general-purpose communication mode. Turns OFF when the sending process is completed.

## 6.2 Sending Operation

COM Port No.				Name	Description
1	2	3	4		
Y0	Y1	Y2	Y3	Sent 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 state. Do not write over it with a user program.

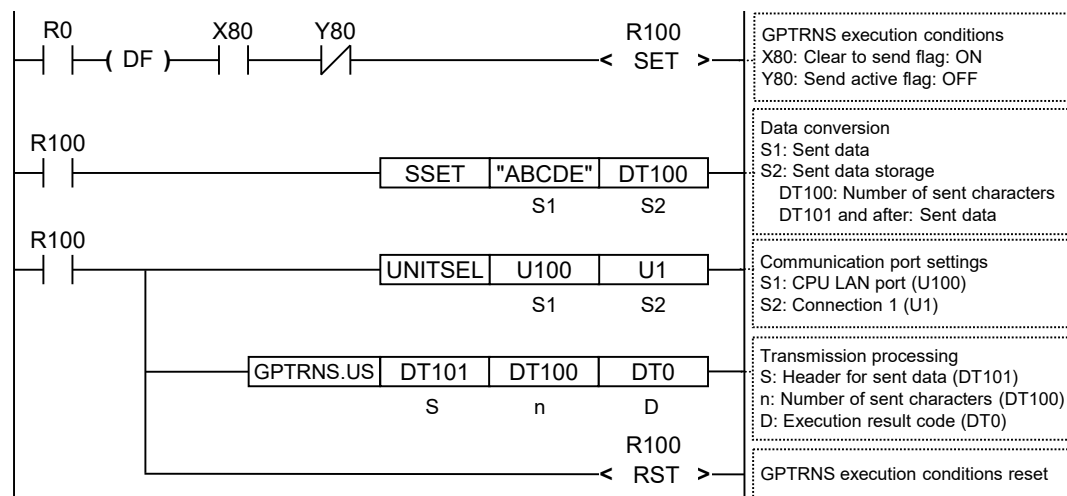
(Note 2) In the case of the GPTRNS and pGPSEND instructions, the sending flag and send results flag are updated after the scan is complete.

(Note 3) In the case of the GPSEND instruction, the sending flag and send results flag are updated after sending is completed when the next GPSEND instruction is executed. If sending time is shorter than scan time, the general-purpose communication sending flags (Y8, Y9, YA, YB) are turned OFF when the GPSEND instruction is executed in the subsequent scan following completion of data sending. The flags remain ON for at least one scan time.

### ■ Sample program (in the case of CPU with built-in ET-LAN)

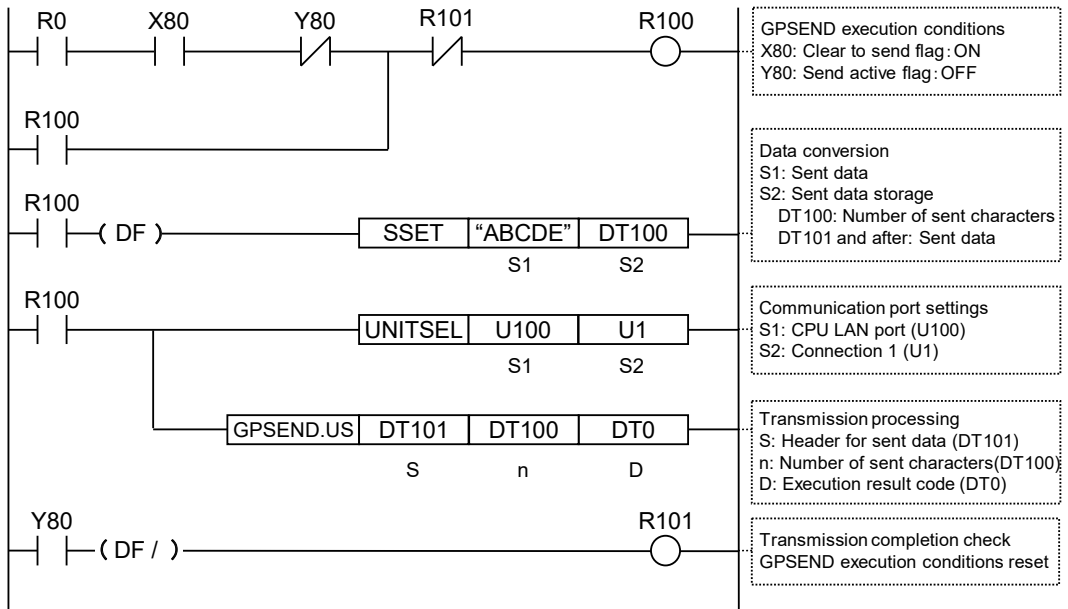
- This program checks that Connection 1 is established in the general-purpose communication mode (X80:ON) and that general-purpose sending is not in progress in the same port (Y80:OFF), and then starts up the sending program.
- Using the SSET instruction, convert any given message into an ASCII string. Set the number of sent characters to the data register DT100, and the sent message to the data register DT101.
- The UNITSEL instruction is used to specify a slot number (LAN port: U100) and the connection number (U1).
- In the GPTRNS / pGPSEND / GPSEND instruction, specify and execute the start of the table that stores the message to be sent (DT101) and the number of characters in the data (DT100).

#### GPTRNS instruction



#### GPSEND instruction



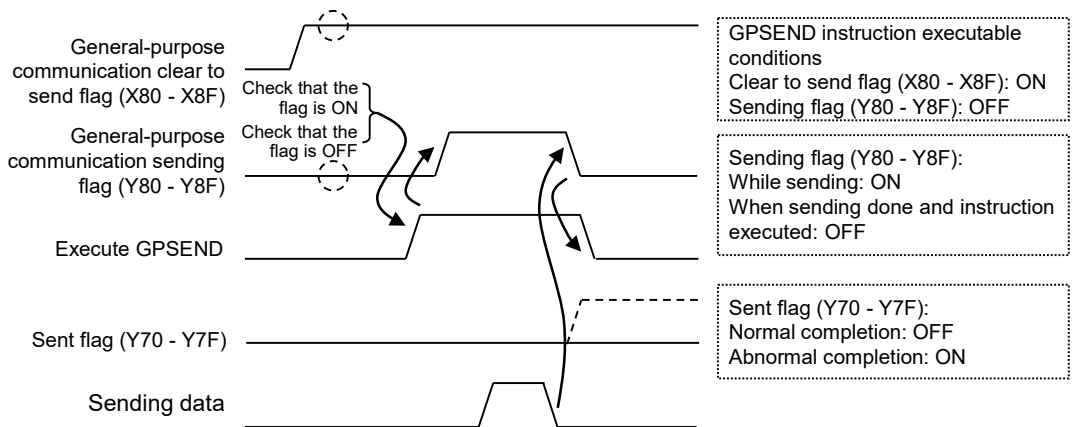


### Info.

- For the GPSEND instruction, it is necessary to turn ON the execution condition until the end of data sending, and turn OFF the execution condition at a scan in which the end of data sending is confirmed.

### Time chart (in the case of CPU with built-in ET-LAN)

- Data are sent in ascending order from low bytes of [S+1] in the table specified by the GPTRNS / pGPSEND / GPSEND instruction.
- During sending, the general-purpose communication sending flags that correspond to the connection (Y80 to Y8F) are turned ON. They turn OFF when sending is completed.
- The sending result (0: normal completion; 1: abnormal completion) is stored in the general-purpose communication sent flags (Y70 to Y7F).



## 6.2 Sending Operation

### ■ I/O allocation (in the case of CPU with built-in ET-LAN)

I/O number	Name	Description
X80 to X8F	General-purpose communication clear to send flag	Turns ON when general-purpose communication is in a connected status.
Y80 to Y8F	General-purpose communication sending flag	Turns ON when sending with general-purpose communication.
Y70 to Y7F	Sent 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 state. Do not write over it with a user program.

(Note 2) In the case of the GPTRNS and pGPSEND instructions, the sending flag and send results flag are updated after the scan is complete.

(Note 3) In the case of the GPSEND instruction, the sending flag and send results flag are updated after sending is completed when the next GPSEND instruction is executed.

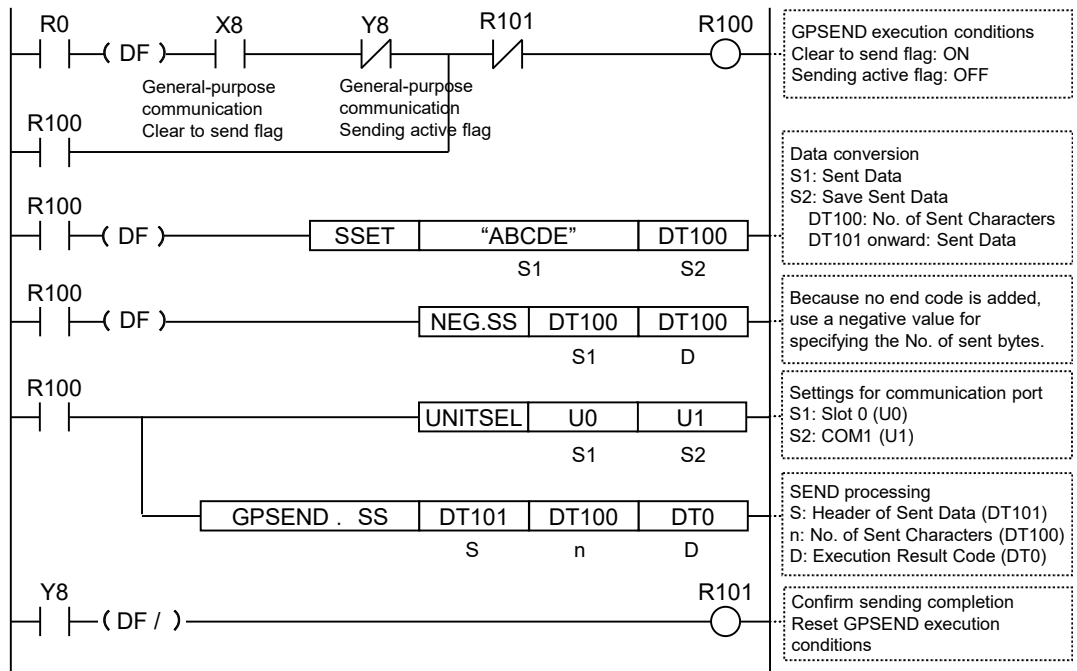
### ■ Flag operations

Name	Description
SR7 SR8 (ER)	To be set in the case of out-of-range in indirect access (index modification).
	The connection specified with UNITSEL is closed (other than "Connect").
	The communication mode of the communication port specified with UNITSEL is not "General-purpose communication."
	When the data device specified by [S] exceeds the area
	When the number of sent data specified by [n] is 0. The volume including a start code and an end code exceeds the specified maximum value.
	When the number of sent data specified by [n] exceeds the data area
	Either 0 or a negative value is set for [N] in the settings of sending to ET-LAN.
	Set when executed 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.



### **i** Info.

- 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.

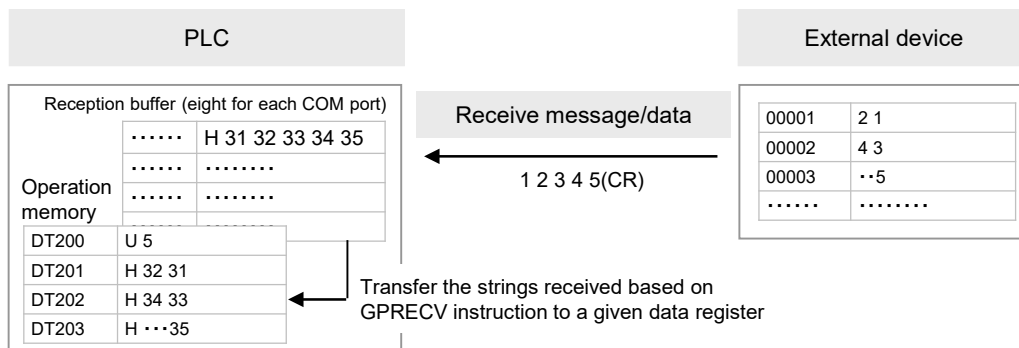
## 6.3 Receiving Operation

### 6.3 Receiving Operation

#### 6.3.1 Overview of Receiving Operation

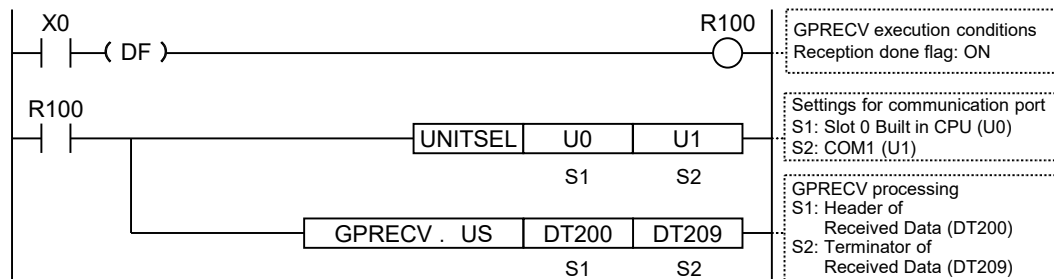
##### ■ Instructions

In the general-purpose communication mode, data received from the partner device are saved in eight reception buffers for each COM port. When the GPREC V 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 GPREC V instruction.
- In the UNITSEL instruction, specify the slot No. (U0) and the COM. port No. (U1).
- In the GPREC V instruction, specify and execute the header of the data table where the received message is saved (DT200) and the final address (DT209).

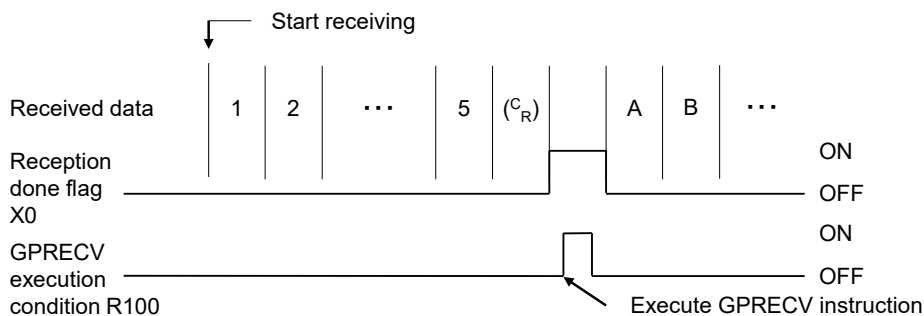


##### ■ I/O allocation

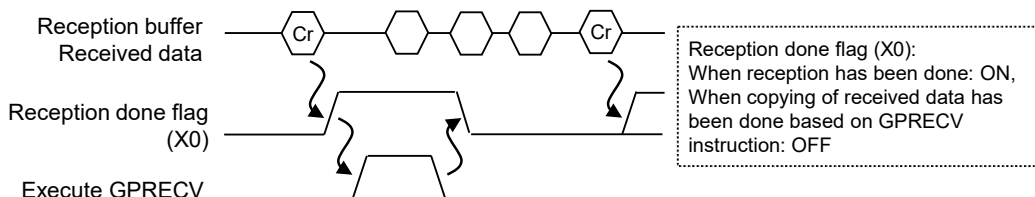
COM port no. 1	Name	Explanation
X0	General-purpose communication Reception done flag	Turns ON when the receiving process is completed in the general-purpose communication mode.
X4	General-purpose communication Reception copy done flag	Turns ON when the GPREC V instruction is executed and the received 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.

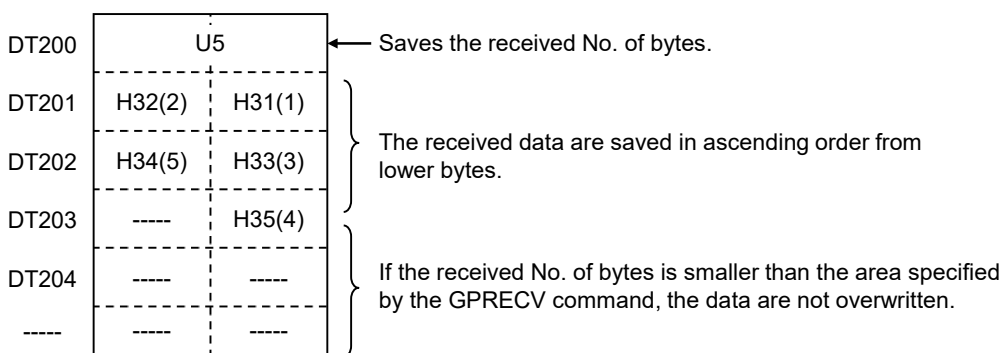


- When the GPRECV instruction is executed, data are copied into the specified area, and the reception done flag (X0) turns OFF. The reception done flag (X0) turns OFF when the I/O refresh is executed at the beginning of the subsequent scans.



■ **Saving method for received data**

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



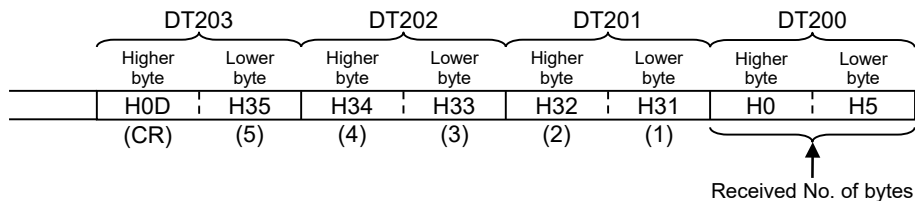
**6.3.2 Contents of Received Data**

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

## 6.3 Receiving Operation

**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.



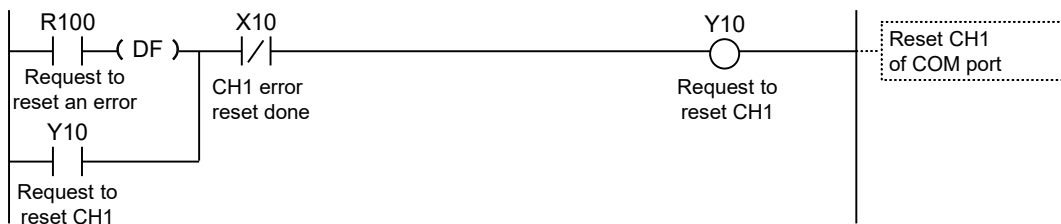
### **i** Info.

- The received data that are copied based on the GPREC V instruction do not include a start code or end code.
- It is also possible to receive binary data based on the GPREC V instruction. In this case, the end setting 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.
- The signals (X10) turns on when the reset is completed. Then, turn off the reset request signals (Y10).



#### ■ Procedure for repeated reception of data

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

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

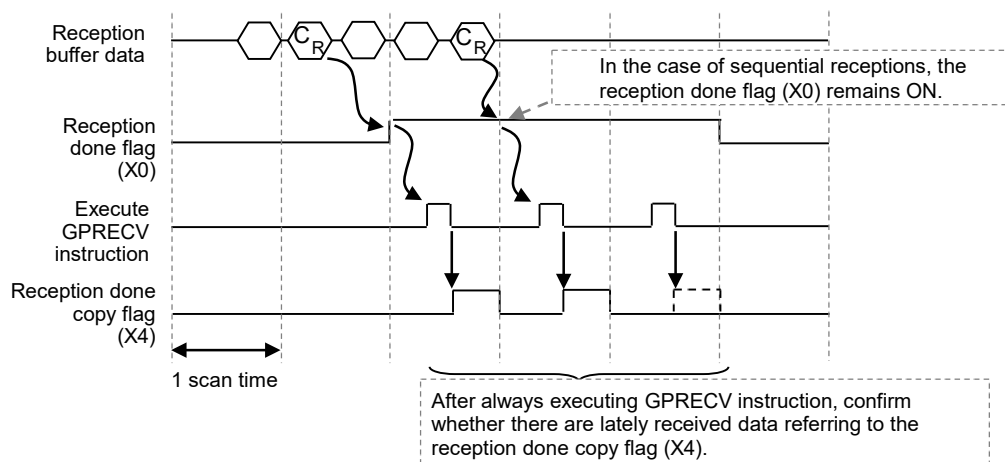
### 6.3.4 Operations of the "Reception done copy" flag and multiplex reception

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

- The "reception done copy" flag (X4) turns ON when the GPREC V 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.

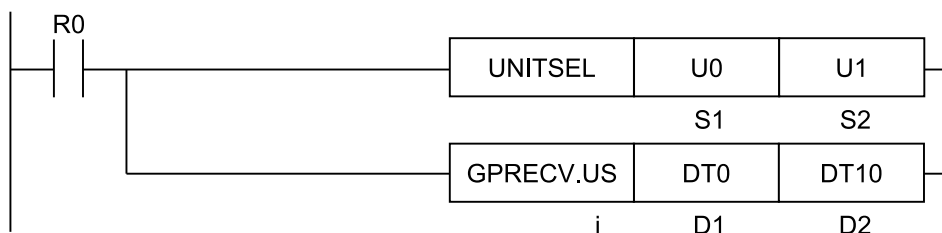
#### ■ Processing in the case of multiplex reception

- 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, set the GPREC V instruction to always execute, along 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 V (General-Purpose Communication Receive Instruction)

#### ■ Ladder diagram



(Note 1) The above figure shows the case that S1=U0 (CPU unit with built-in SCU) and S2=U1 (port number 1) are specified by the UNITSEL instruction.

## 6.3 Receiving Operation

### Available operation units (●: Available)

Operation unit	bit	US	SS	UL	SL	SF	DF
i		●	●				

### List of operands

Operand	Description
D1	Starting address of the received data storage data area
D2	Ending address of the received data storage data area

### Available devices (●: Available)

Operand	16-Bit device:											32-Bit device:			Integer			Real number		String	Index modifier	
	WX	WY	WR	WL	WS	SD	DT	LD	UM	WI	WO	TSCS	TECE	IX	K	U	H	SF	DF	""		
D1(Note 1)	●	●	●	●			●	●														●
D2(Note 1)	●	●	●	●			●	●														●

(Note 1) Always 16-bit data/device, regardless of the specification of operation units [i].

### Outline of operation

- This instruction reads data that is sent from an external device and received by the communication port of the unit.
- This instruction reads received data from the communication unit and the communication port set by the UNITSEL instruction, and stores the number of received bytes in the area specified by [D1] and the received data in the areas [D1+1] to [D2].
- In the case of SCU, data received from the partner are stored in 8 receive buffers for each COM port. By executing the GPRECV instruction, data in the receive buffer can be copied to a given operation memory.
- In the case of CPU with built-in ET-LAN, data received from the partner are stored in 1 receive buffer for each connection. By executing the GPRECV instruction, data in the receive buffer can be copied to a given operation memory.

### Amount of received data and end code

Items	SCU	In the case of CPU with built-in ET-LAN
Number of received data	0 to 4096(Note 1)	0 to 16384
End code identification	Yes (according to the SCU communication settings (end settings))	No identification

(Note 1) For SCU, up to 4096 bytes can be sent, including a start code and an end code. The start code and end code are set from the configuration menu of the tool software or with the PMSET instruction.



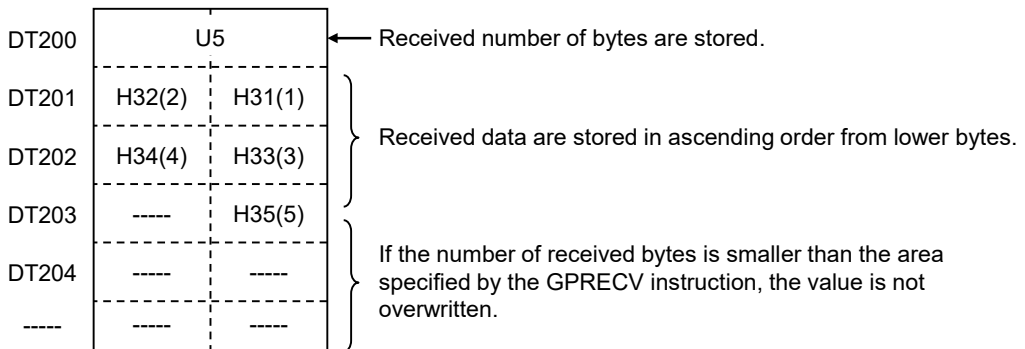
When "Start code STX" is set to "Enabled", the maximum amount of sent data that can be specified is decremented by one.

When "Terminator setting" is set to "ETX" or "CR", the maximum amount of sent data is decremented by one.

When "Terminator setting" is set to "CR+LF", the maximum amount of sent data is decremented by two.

When "Terminator setting" is set to "Time", the maximum amount of sent data is not decremented.

### ■ Storage method for received data

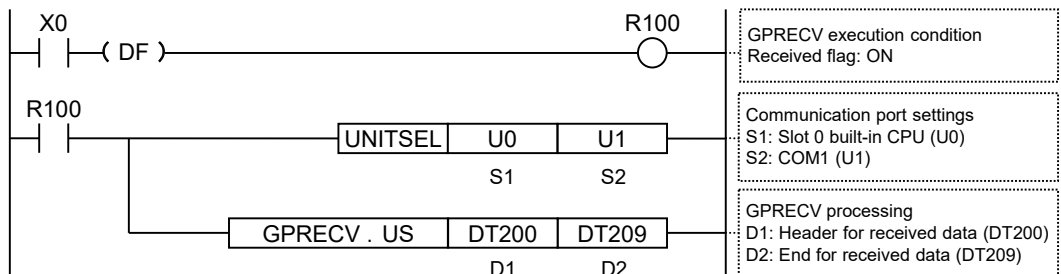


### **i** Info.

- The case of SCU shows the case that it is used in the following combination.
  - COM.0 port equipped in the CPU unit
  - Communication cassettes attached to the CPU unit (COM.1 to COM.2 ports)
  - Communication cassettes attached to the serial communication unit (COM.1 to COM.4 ports)
- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN.

### ■ Sample program (in the case of SCU)

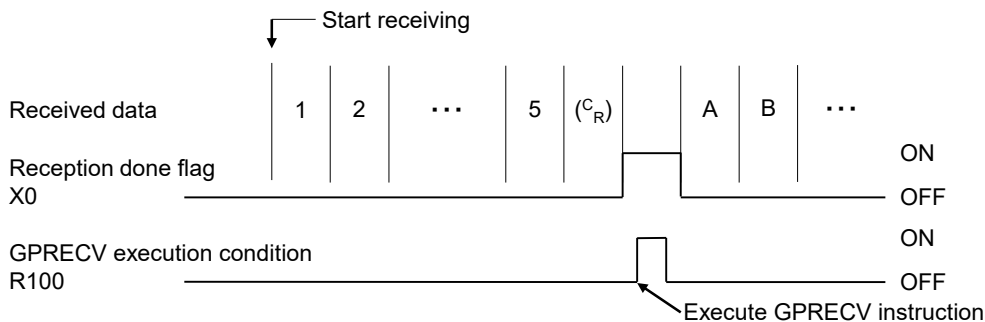
- When the received flag (X0) turns ON, the reception program is started up by the GPRECV instruction.
- Using the UNITSEL instruction, specify the slot number (U0) and the COM. port number (U1).
- In the GPRECV instruction, specify and execute the start of the data table that stores the received message (DT200) and the final address (DT209).



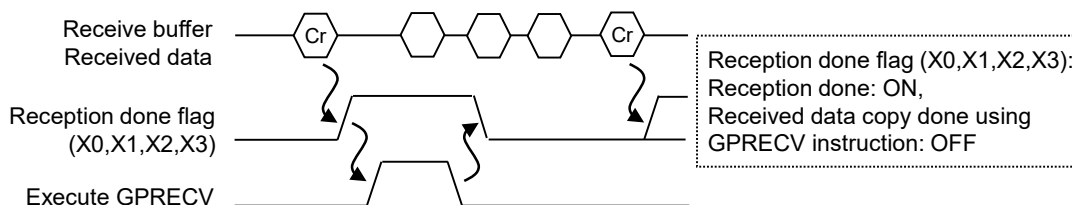
## 6.3 Receiving Operation

### ■ Time chart (in the case of SCU)

- Data received from an external device are stored in the receive buffer.
- When the end code is received, the received flag (X0, X1, X2, X3) turns ON. Subsequently, the following data are stored in the buffers upon reception. Data for 8 buffers can be received consecutively.



- When the GPREC V instruction is executed, data are copied to the specified area, and the received flags (X0, X1, X2, X3) are turned OFF. The received flags (X0, X1, X2, X3) are turned OFF when I/O refresh is executed at the start of the following scans.



### ■ I/O allocation (in the case of CPU with built-in SCU)

COM Port No.			Name	Description
1	2	0		
X0	X1	X2	General-purpose communication received flag	Turns ON when the receiving process is completed in the general-purpose communication mode.
X4	X5	X6	General-purpose communication received data copied flag	Turns ON when the GPREC V instruction is executed and the received data have been copied into the specified operation memory. Turns OFF when there are no applicable data.

### ■ I/O allocation (in the case of Serial Communication Unit)

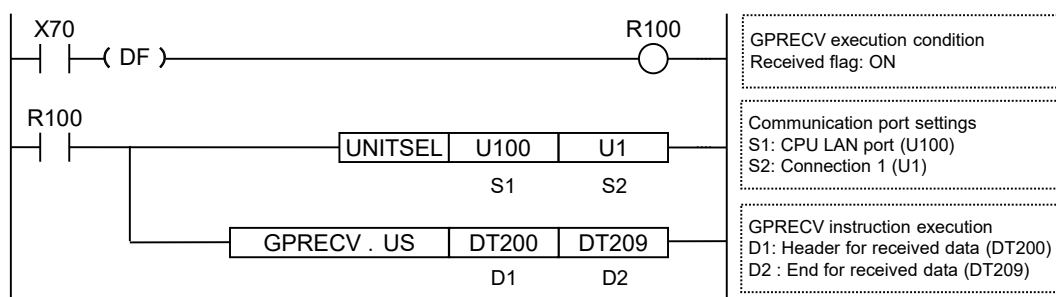
COM Port No.				Name	Description
1	2	3	4		
X0	X1	X2	X3	General-purpose communication received flag	Turns ON when the receiving process is completed in the general-purpose communication mode.
X4	X5	X6	X7	General-purpose communication received data copied flag	Turns ON when the GPREC V instruction is executed and the received data have been copied into the specified operation memory. Turns OFF when there are no applicable data.

### ■ Precautions during programming (in the case of SCU)

- Use the UNITSEL instruction immediately before the GPREC V instruction to specify a target port for communication.
- When the general-purpose communication received flag is ON for the targeted COM port, execute GPREC V.
- When multiplex reception is in progress, the received flag remains ON after the received data have been copied using the GPREC V instruction. The received data cannot be copied at the leading edge of the reception done signal.
- The received data copied by the GPREC V instruction do not include a start code or an end code.
- It is also possible to receive binary data using the GPREC V instruction. In this case, "time" should be used for the end setting.
- The received data or the received data amount do not include the end code. (It is stripped off.)
- In the case of SCU which has eight 4096-byte buffers inside, data equivalent to the eight buffers can be received consecutively.
- If the reception of the ninth datum of data is performed by SCU before the GPREC V instruction is executed to take out data from SCU's receive buffer, a buffer FULL error occurs in SCU, and the ninth datum is discarded.
- If the GPREC V instruction is executed when the receive buffer FULL error is on, the oldest received datum is taken out, and the receive buffer FULL error is canceled.
- When no data have been received, the general-purpose communication control flag (received copy flag) turns OFF.
- After data have been received, and copy to the operation memory of the CPU unit has been completed, the general-purpose communication control flag (received data copied flag) turns ON.
- In the case of a direct address and an index modification address, specify the same device for D1 and D2. At the same time, specify the addresses so that D1 is less than D2.

### ■ Sample program (in the case of CPU with built-in ET-LAN)

- When the received flag (X70) of Connection 1 turns ON, the reception program is started up by the GPREC V instruction.
- The UNITSEL instruction is used to specify a slot number (LAN port: U100) and the connection number (U1).
- In the GPREC V instruction, specify and execute the start of the data table that stores the received message (DT200) and the final address (DT209).

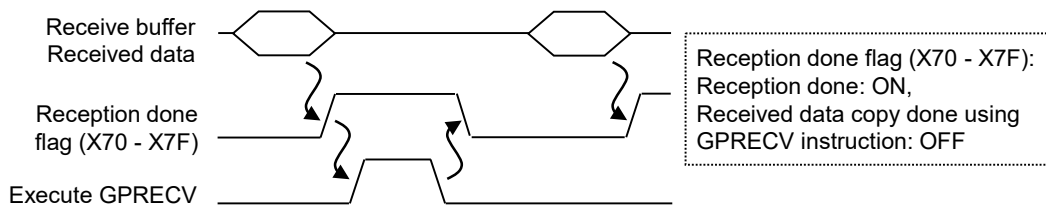


### ■ Time chart (in the case of CPU with built-in ET-LAN)

- Data received from an external device are stored in the receive buffer for each connection.

## 6.3 Receiving Operation

- When data are received, the received flag (X70 to X7F) turns ON.
- When the GPREC instruction is executed, data are copied to the specified area, and the received flags (X70 to X7F) are turned OFF. The received flags (X70 to X7F) are turned OFF when I/O refresh is executed at the start of the following scans.



### ■ I/O allocation (in the case of CPU with built-in ET-LAN)

I/O allocations	Name	Description
X70 to X7F	General-purpose communication received flag	Turns ON when receiving is completed in the general-purpose communication mode.

### ■ Precautions during programming (in the case of CPU with built-in ET-LAN)

- Use the UNITSEL instruction immediately before the GPREC instruction to specify a target connection for communication.
- When the general-purpose communication received flag is ON for the targeted connection, execute GPREC.
- The maximum volume of data that can be received in one session using the GPREC instruction, from the LAN port of the FP7 CPU unit, is 16,384 bytes.
- Depending on the communication format of an external device, if a header and a terminator are contained, they are stored in the operation memory as part of receive data. When necessary, insert a program to extract data content.
- In the case of a direct address and an index modification address, specify the same device for D1 and D2. At the same time, specify the addresses so that D1 is less than D2.

### **i** Info.

- As the communication cassette (Ethernet type) has an Ethernet-serial conversion function, the internal interface operates with similar programs as the case of SCU. The setting method and programming method are different from those for the CPU with built-in ET-LAN. Refer to the section describing the case of SCU.

### ■ Flag operations

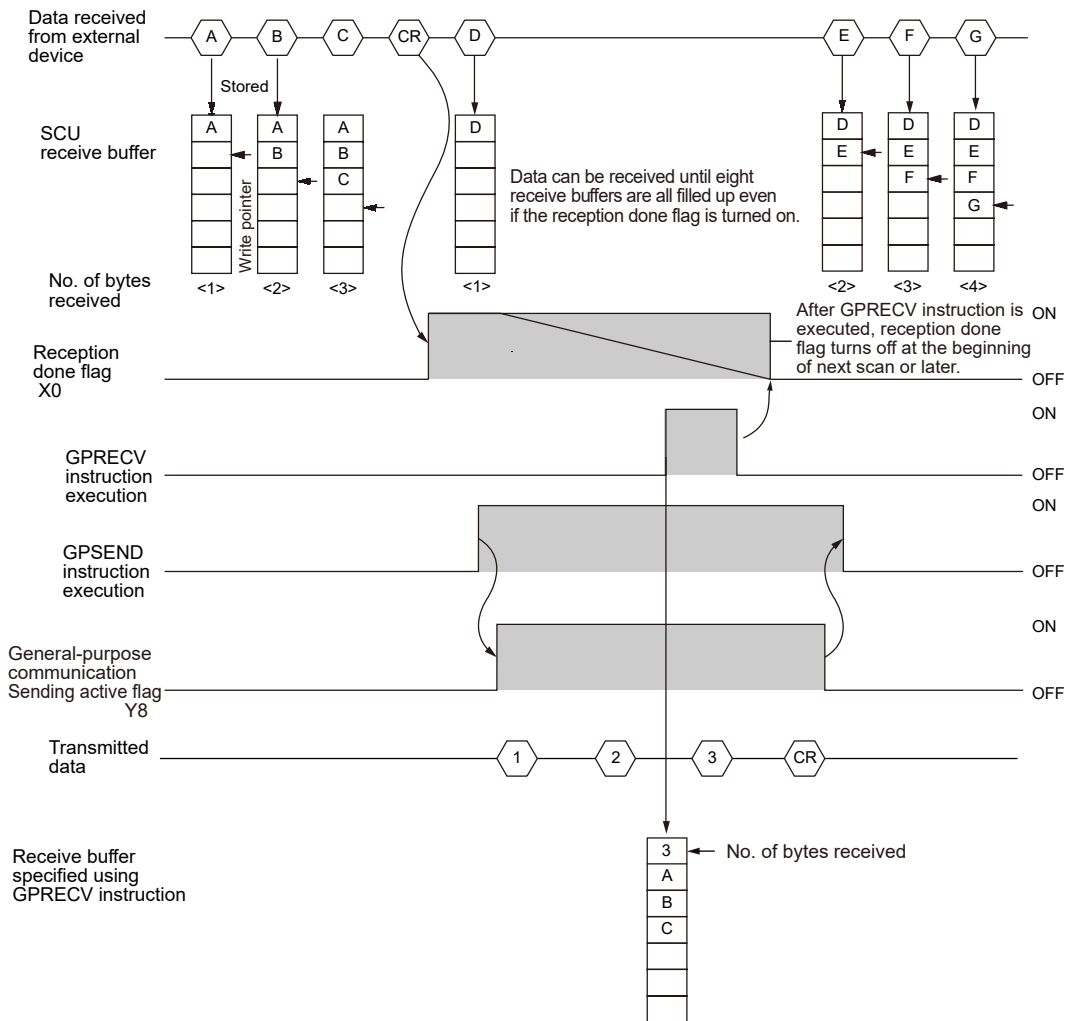
Name	Description
SR7 SR8 (ER)	To be set in the case of out-of-range in indirect access (index modification).
	To be set when the destination range is outside the accessible range.
	An SCU or ET-LAN unit does not exist in the slot specified by UNITSEL.
	The communication mode of the communication port specified with UNITSEL is not "General-purpose communication".
	The COM port specified by UNITSEL does not exist.

Name	Description
	Connection specified by UNITSEL is in a "reception done OFF" status, but not in a "connected" status.
	Data device specified by [D1] and/or [D2] exceeds the area.
	The specified [D1] is greater than or equal to [D2].
	The devices specified for [D1] and [D2] differ.

**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:

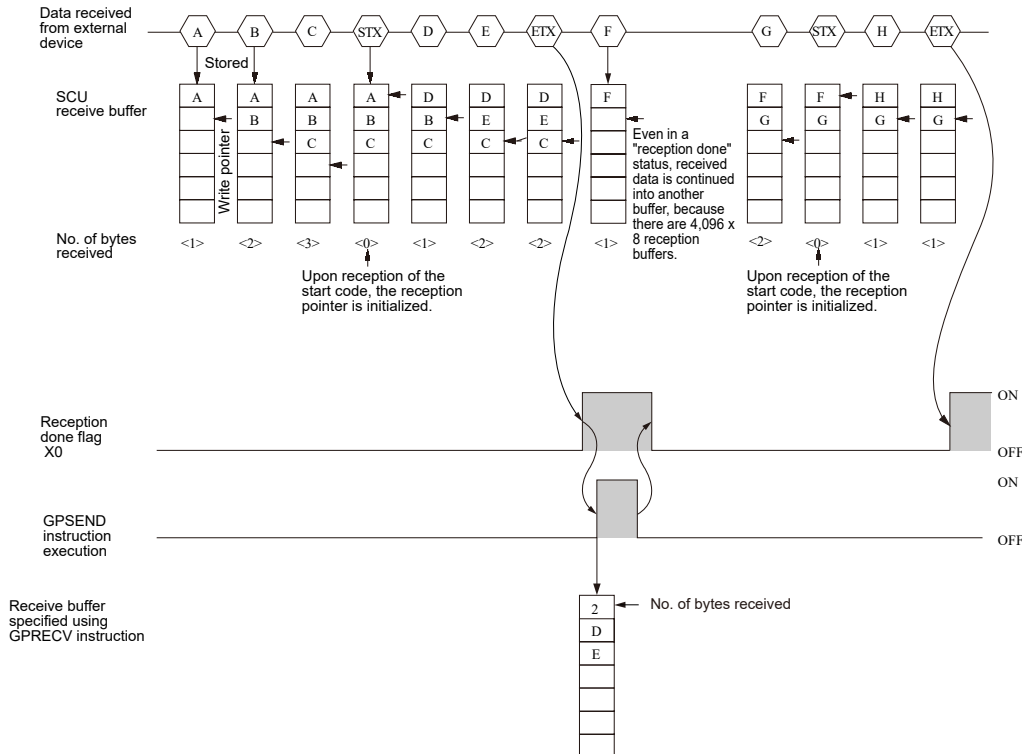


- The COM port has eight reception buffers. The reception process is continued after the reception done flag (X0) turns ON. The reception done flag (X0) does not turn OFF immediately following the execution of GPRECv instruction. It will be turned off at the beginning of the next scan or later.
- After GPSEND instruction is executed, data transmission is started in several μs 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 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 GPREC V instruction are related as follows:**



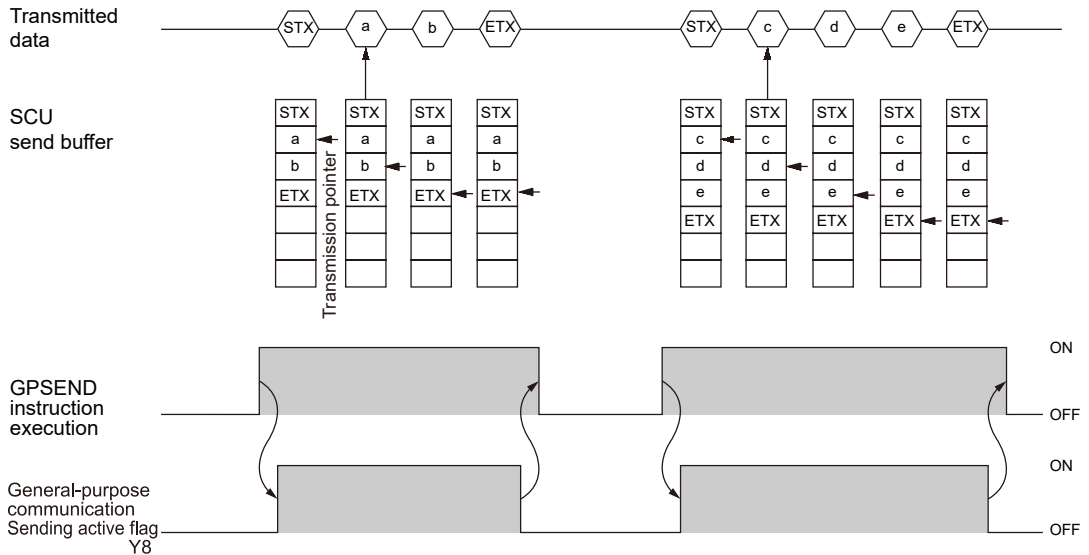
- When the start code is set to "STX", the data are saved in the reception buffer. When the start code is received, the receive pointer is initialized. If there are two headers, data following the second header overwrites the data in the reception buffer.
- The COM port has eight reception buffers. The 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 GPREC V instruction. It will be turned off at the beginning of the next scan or later.
- If there are no received data following execution of GPREC V instruction, the reception done copy flag (X4) turns OFF.

#### **i** Info.

- 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.

## 6.4 Sending/Receiving Flag Operation

**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  $\mu$ 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

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## 7.1 Specifications

### 7.1 Specifications

#### 7.1.1 Communication Specification

##### ■ 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
Transfer Format	Data length	8 bit	8 bit
	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		Invalid	Invalid
Send Waiting		0 to 100ms	0 ms
Modem initialization		Invalid	Invalid

(Note 1) Permissible communication conditions vary depending on the 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
Transmission format	Data length	8 bit	8 bit
	Parity	Odd	Odd
	Stop bit	1 bit	1 bit
	End code	CR	CR
	Start code	Without STX	Without STX
RS/CS controlled		Invalid	Invalid
Send Waiting		0 to 100ms	0 ms
Modem initialization		Invalid	Invalid

(Note 1) MEWTOCOL is the only permissible communication mode.

### ■ Communication cassette AFP7CCRET1

Items	Description	
Interface	100BASE-TX / 10BASE-T	
Baud rate	100 Mbps, 10 Mbps auto-negotiation <sup>(Note 1)</sup>	
Transmission system	Baseband	
Max. segment length	100 m <sup>(Note 2)</sup>	
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 connection <sup>(Note 3)</sup>
Communication protocol	TCP/IP, UDP/IP	TCP/IP
DHCP	Automatically acquire IP	
Communication functions and number of simultaneous connections	MEWTOCOL-COM Master: 1 connection MEWTOCOL-COM Slave: 3 connections <sup>(Note 4)</sup> MEWTOCOL7-COM Slave: 3 connection <sup>(Note 4)</sup> General Communication: 1 connection	MEWTOCOL-COMSlave : 1 connection MEWTOCOL7-COMSlave : 1 connection

(Note 1) Switching of speeds is done automatically by the 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 user environment. Also, it is recommended to position a hub near the control board, and limit the length within 10 m

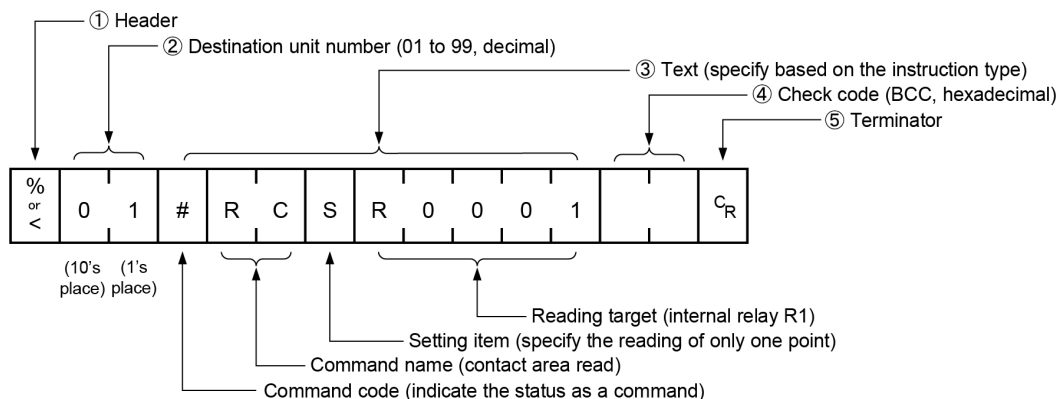
(Note 3) This is used when connecting tool software via LAN.

(Note 4) When communicating simultaneously with multiple devices, avoid communication in multiple command or response frames. Otherwise, a communication error occurs.

**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.

**i Info.**

- 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

**(2) Unit 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 1:1 communication, specify "01" (ASCII code: H3031) or "EE" (ASCII code: H4545). The connection destination is determined by an IP address.

**i Info.**

- When the PLC receives a command with "EE" specified for the station number, it will respond regardless of the station number setting.  
If “EE” is specified in the 1:1 communication, communication can be performed regardless of the unit number setting of the partner PLC.

**(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.
- BCC starts from the header and checks each character in sequence, using the exclusive OR operation, and replaces the final result with character text (ASCII code). It is normally part of the calculation program and is created automatically.
- BCC can be skipped by entering “\* \*” (ASCII code: H2A2A) in place of BCC.

**(5) Terminator (end code)**

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

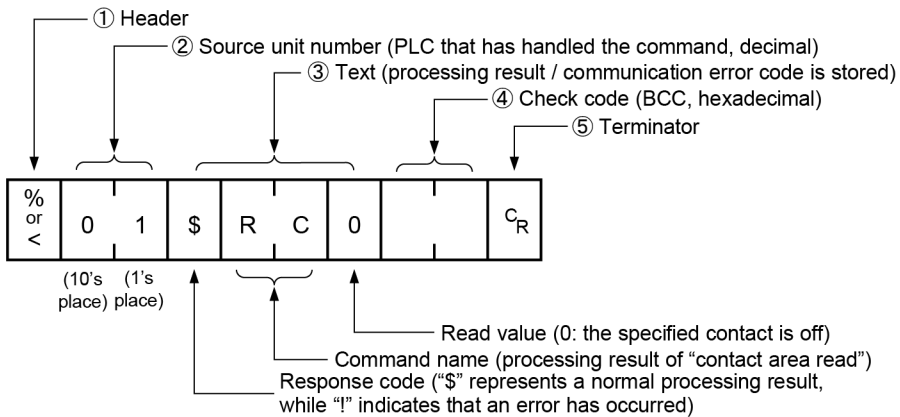
**!**

- 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.

**7.2.2 MEWTOCOL-COM Response Format**

■ **Response message**

The PLC that received the command returns the processing result.



**(1) Header (start code)**

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

**(2) Unit number**

- The unit number of the PLC that processed the command

**(3) Text**

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

## 7.2 MEWTOCOL-COM Format

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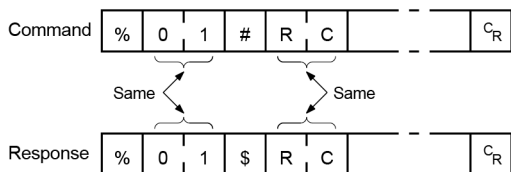
### (4) Check code

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

### (5) Terminator (end code)

- Messages must always end with a "CR" (ASCII code: H0D).

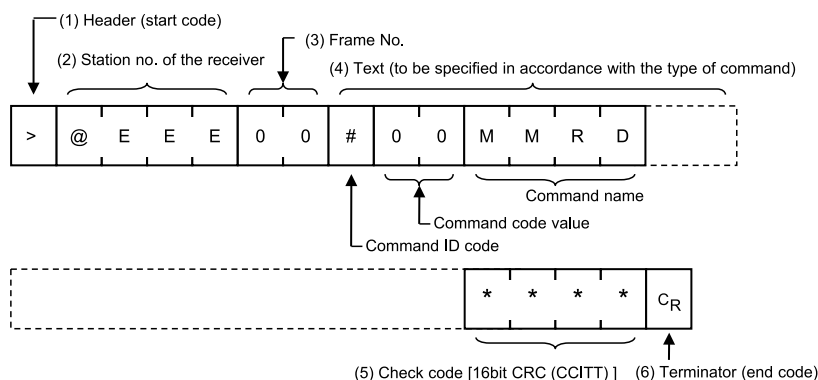
- If no response is returned, the transmission format may not be correct, the command may not have arrived at the PLC, or the PLC may not be functioning. Check to make sure all of the communication specifications (e.g. baud rate, data length, parity) are aligned.
- If the response contains an "!" instead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

#### **i** Info.

- 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-COM 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

#### (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: H454545).

The connection destination is determined by an IP address.

## 7.3 MEWTOCOL7-COM Format

### **i** Info.

- When the PLC receives a command with "EEE" specified for the station number, it will respond regardless of the station number setting.  
If "EEE" is specified in the 1:1 communication, communication can be performed regardless of the unit number setting of the partner PLC.

### (3) Frame No.

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

E.g. Commands for multiple frames

```
>@EEE0#00MMRDD001G0DT000000001000****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

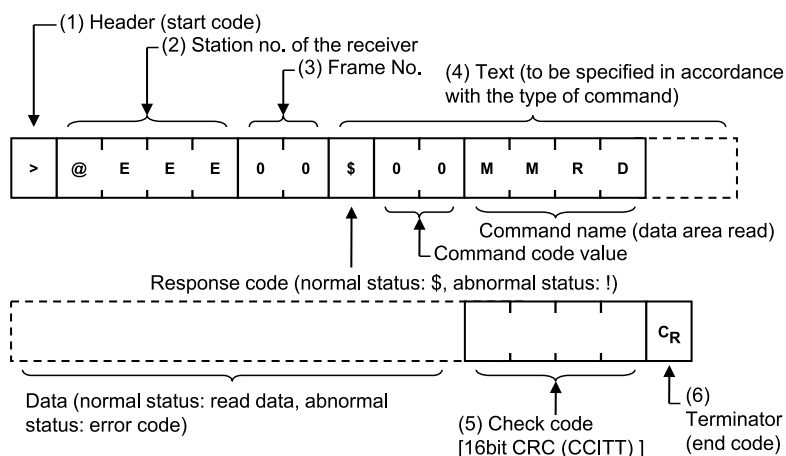
- This is a CRC (Cyclic Redundancy Check) to detect errors using a generating polynomial of hamming codes.
- This should be created so that it targets all of the text data from the header to the last text character.
- CRC is text information that is converted from the results of calculations made by CRC-16-CCITT. 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).

## 7.3.2 MEWTOCOL7-COM 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**

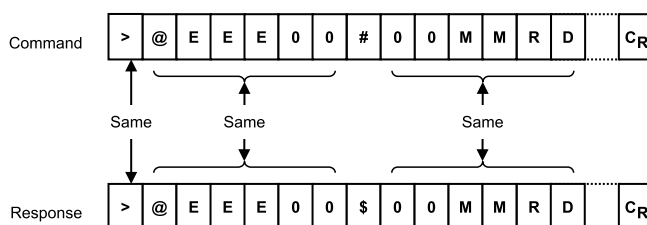
- This is a CRC (Cyclic Redundancy Check) to detect errors using a generating polynomial of hamming codes.
- This should be created so that it targets all of the text data from the header to the last text character.
- CRC is text information that is converted from the results of calculations made by CRC-16-CCITT. Normally, CRC is automatically generated by incorporating calculation programs or other similar programs.

**(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.



(MEMO)

## Record of changes

The manual number can be found at the bottom of the manual cover.

Date	Manual No.	Record of Changes
Sep. 2013	WUME-FP7CCET-01	1st Edition
Dec. 2022	WUME-FP7CCET-02	2nd Edition <ul style="list-style-type: none"><li>• Changed product type following FP7 update</li><li>• Added information about the MEWTOCOL-COM command and 1:1 communication.</li><li>• Changed manual formatting</li></ul>
Apr. 2024	WUME-FP7CCET-03	3rd Edition <ul style="list-style-type: none"><li>• Change in Corporate name</li></ul>

## Order Placement Recommendations and Considerations

The Products and Specifications listed in this document are subject to change (including specifications, manufacturing facility and discontinuing the Products) as occasioned by the improvements of Products. Consequently, when you place orders for these Products, Panasonic Industry Co., Ltd. asks you to contact one of our customer service representatives and check that the details listed in the document are commensurate with the most up-to-date information.

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Panasonic Industry Co., Ltd. is consistently striving to improve quality and reliability. However, the fact remains that electrical components and devices generally cause failures at a given statistical probability. Furthermore, their durability varies with use environments or use conditions. In this respect, check for actual electrical components and devices under actual conditions before use. Continued usage in a state of degraded condition may cause the deteriorated insulation. Thus, it may result in abnormal heat, smoke or fire. Carry out safety design and periodic maintenance including redundancy design, design for fire spread prevention, and design for malfunction prevention so that no accidents resulting in injury or death, fire accidents, or social damage will be caused as a result of failure of the Products or ending life of the Products.

The Products are designed and manufactured for the industrial indoor environment use. Make sure standards, laws and regulations in case the Products are incorporated to machinery, system, apparatus, and so forth. With regard to the mentioned above, confirm the conformity of the Products by yourself.

Do not use the Products for the application which breakdown or malfunction of Products may cause damage to the body or property.

- i) usage intended to protect the body and ensure security of life
- ii) application which the performance degradation or quality problems, such as breakdown, of the Products may directly result in damage to the body or property

It is not allowed the use of Products by incorporating into machinery and systems indicated below because the conformity, performance, and quality of Products are not guaranteed under such usage.

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- ii) control equipment for transportation
- iii) disaster-prevention equipment / security equipment
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- v) nuclear control system
- vi) aircraft equipment, aerospace equipment, and submarine repeater
- vii) burning appliances
- viii) military devices
- ix) medical devices (except for general controls)
- x) machinery and systems which especially require the high level of reliability and safety

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In connection with the Products you have purchased from us or with the Products delivered to your premises, please perform an acceptance inspection with all due speed and, in connection with the handling of our Products both before and during the acceptance inspection, please give full consideration to the control and preservation of our Products.

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However, the following failures and defects are not covered by warranty and we are not responsible for such failures and defects.

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- (3) When the failure or defect was caused by a phenomenon that could not be predicted by the technology at purchasing or contracted time.
- (4) When the use of our Products deviated from the scope of the conditions and environment set forth in the instruction manual and specifications.
- (5) When, after our Products were incorporated into your products or equipment for use, damage resulted which could have been avoided if your products or equipment had been equipped with the functions, construction, etc. the provision of which is accepted practice in the industry.
- (6) When the failure or defect was caused by a natural disaster or other force majeure.
- (7) When the equipment is damaged due to corrosion caused by corrosive gases etc. in the surroundings.

The above terms and conditions shall not cover any induced damages by the failure or defects of the Products, and not cover your production items which are produced or fabricated by using the Products. In any case, our responsibility for compensation is limited to the amount paid for the Products.

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The cost of delivered Products does not include the cost of dispatching an engineer, etc. In case any such service is needed, contact our sales representative.

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