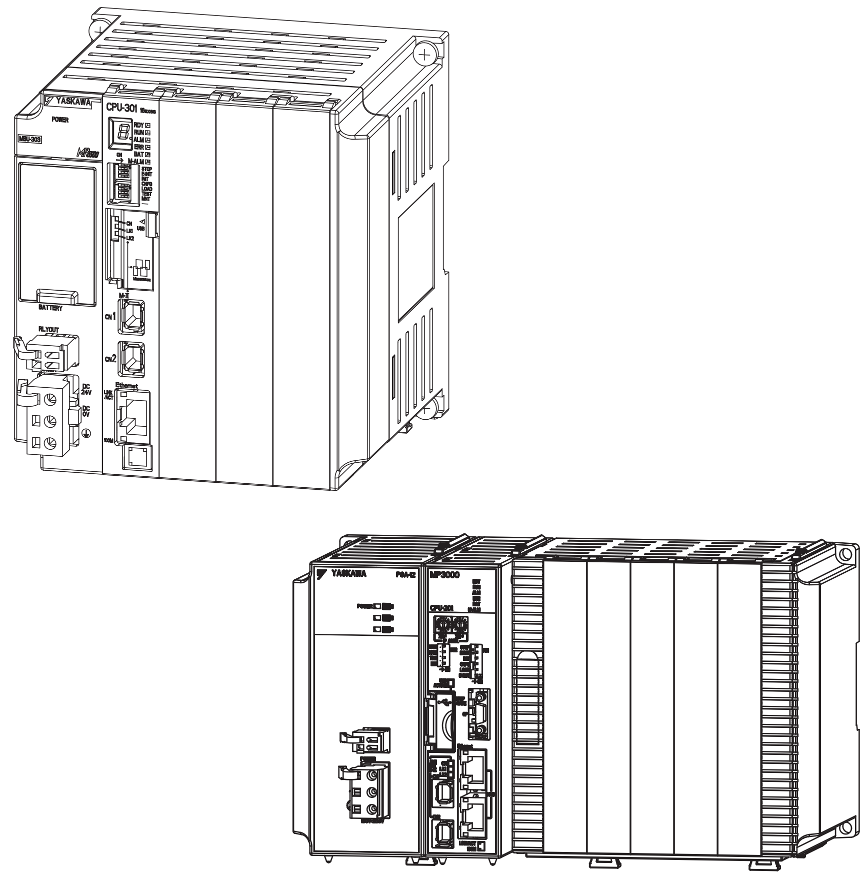
YASKAWA

Machine Controller MP3000 Series

Communications

USER'S MANUAL



MANUAL NO. SIEP C880725 12B

About this Manual

This manual describes the specifications, system configuration, and communications connection methods for the Ethernet communications that are used with an MP3000-series Machine Controller.

Read this manual carefully to ensure the correct usage of the Machine Controller and apply the Machine Controller to control your manufacturing system.

Keep this manual in a safe place so that it can be referred to whenever necessary.

Using this Manual

◆ Basic Terms

Unless otherwise specified, the following definitions are used:

- MP3000: A Machine Controller in the MP3000 Series
- MPE720: The Engineering Tool or a personal computer running the Engineering Tool
- PLC: A Programmable Logic Controller

◆ MPE720 Engineering Tool Version Number

In this manual, the operation of MPE720 is described using screen captures of MPE720 version 7.

For this reason, the screen captures and some descriptions may differ for MPE720 version 6.

◆ Copyrights

- DeviceNet is a registered trademark of the ODVA (Open DeviceNet Venders Association).
- PROFIBUS is a trademark of the PROFIBUS User Organization.
- Ethernet is a registered trademark of the Xerox Corporation.
- Microsoft, Windows, Windows NT, and Internet Explorer are trademarks or registered trademarks of the Microsoft Corporation.
- MECHATROLINK is a trademark of the MECHATROLINK Members Association.
- Other product names and company names are the trademarks or registered trademarks of the respective company. “TM” and the ® mark do not appear with product or company names in this manual.

◆ Visual Aids

The following aids are used to indicate certain types of information for easier reference.

Important
Indicates precautions or restrictions that must be observed.
Indicates alarm displays and other precautions that will not result in machine damage.

Note
Indicates items for which caution is required or precautions to prevent operating mistakes.

Example
Indicates operating or setting examples.

Information
Indicates supplemental information to deepen understanding or useful information.

Terms
Indicates definitions of difficult terms or terms that have not been previously explained in this manual.

Related Manuals

The following table lists the manuals that are related to the MP2000/MP3000-series Machine Controllers. Refer to these manuals as required.

Function	Manual Name	Manual Number	Contents
Basic functionality	Machine Controller MP2000/MP3000 Series Machine Controller System Setup Manual	SIEP C880725 00	Describes the functions of the MP2000/ MP3000-series Machine Controllers and the procedures that are required to use the Machine Controller, from installation and connections to settings, programming, trial operation, and debugging.
	Machine Controller MP3000 Series MP3200/MP3300 Troubleshooting Manual	SIEP C880725 01	Describes troubleshooting an MP3000-series Machine Controller.
	Machine Controller MP3000 Series MP3200 User’s Manual	SIEP C880725 10	Describes the specifications and system configuration of the Basic Units in an MP3000-series Machine Controller and the functions of the CPU Unit.
	Machine Controller MP3000 Series MP3300 Product Manual	SIEP C880725 21	Describes the specifications and system configuration of an MP3000-series MP3300 Machine Controller and the functions of the CPU Module.
Communications functionality	Machine Controller MP2000 Series Communication Module User’s Manual	SIEP C880700 04	Provides information on the Communications Modules that can be connected to an MP2000-series Machine Controller and describes the communications methods.
Programming	Machine Controller MP3000 Series Ladder Programming Manual	SIEP C880725 13	Describes the ladder programming specifications and instructions of MP3000-series Machine Controller.

Continued on next page.

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Function	Manual Name	Manual Number	Contents
Engineering Tool	MPE720 Version 7 System Integrated Engineering Tool for MP2000/MP3000 Series Machine Controller User's Manual	SIEP C880761 03	Describes how to operate MPE720 version 7.

Safety Precautions

The following signal words and marks are used to indicate safety precautions in this manual.

Information marked as shown below is important for safety. Always read this information and heed the precautions that are provided.

⚠ DANGER Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.

⚠ CAUTION Indicates precautions that, if not heeded, could result in relatively serious or minor injury, or property damage.

If not heeded, even precautions classified as cautions (⚠ CAUTION) can lead to serious results depending on circumstances.

PROHIBITED Indicates prohibited actions. For example, indicates prohibition of open flame.

MANDATORY Indicates mandatory actions. For example, indicates that grounding is required.

The following precautions are for storage, transportation, installation, wiring, operation, maintenance, inspection, and disposal. These precautions are important and must be observed.

◆ General Precautions

⚠ WARNING

- The installation must be suitable and it must be performed only by an experienced technician.
  There is a risk of electrical shock or injury.
- Before connecting the machine and starting operation, make sure that an emergency stop procedure has been provided and is working correctly.
  There is a risk of injury.
- Do not approach the machine after a momentary interruption to the power supply. When power is restored, the Machine Controller and the device connected to it may start operation suddenly. Provide safety measures in advance to ensure human safety when operation restarts.
  There is a risk of injury.
- Do not touch anything inside the Machine Controller.
  There is a risk of electrical shock.
- Do not remove the front cover, cables, connector, or options while power is being supplied.
  There is a risk of electrical shock, malfunction, or damage.
- Do not damage, pull on, apply excessive force to, place heavy objects on, or pinch the cables.
  There is a risk of electrical shock, operational failure of the Machine Controller, or burning.
- Do not attempt to modify the Machine Controller in any way.
  There is a risk of injury or device damage.

◆ Storage and Transportation

⚠ CAUTION

- Do not store the Machine Controller in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed the storage conditions
  - Locations that are subject to ambient humidity that exceeds the storage conditions
  - Locations that are subject to rapid temperature changes and condensation
  - Locations that are subject to corrosive or inflammable gas
  - Locations that are subject to excessive dust, dirt, salt, or metallic powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock

  There is a risk of fire, electrical shock, or device damage.
- Hold onto the main body of the Machine Controller when transporting it.
  Holding the cables or connectors may damage them or result in injury.
- Do not overload the Machine Controller during transportation. (Follow all instructions.)
  There is a risk of injury or an accident.
- Never subject the Machine Controller to an atmosphere containing halogen (fluorine, chlorine, bromine, or iodine) during transportation.
  There is a risk of malfunction or damage.
- If disinfectants or insecticides must be used to treat packing materials such as wooden frames, pallets, or plywood, the packing materials must be treated before the product is packaged, and methods other than fumigation must be used.
  Example: Heat treatment, where materials are kiln-dried to a core temperature of 56°C for 30 minutes or more.
  If the electronic products, which include stand-alone products and products installed in machines, are packed with fumigated wooden materials, the electrical components may be greatly damaged by the gases or fumes resulting from the fumigation process. In particular, disinfectants containing halogen, which includes chlorine, fluorine, bromine, or iodine can contribute to the erosion of the capacitors.

◆ Installation

⚠ CAUTION

- Do not install the Machine Controller in any of the following locations.
  - Locations that are subject to direct sunlight
  - Locations that are subject to ambient temperatures that exceed the operating conditions
  - Locations that are subject to ambient humidity that exceeds the operating conditions
  - Locations that are subject to rapid temperature changes and condensation
  - Locations that are subject to corrosive or inflammable gas
  - Locations that are subject to excessive dust, dirt, salt, or metallic powder
  - Locations that are subject to water, oil, or chemicals
  - Locations that are subject to vibration or shock

  There is a risk of fire, electrical shock, or device damage.
- Never install the Machine Controller in an atmosphere containing halogen (fluorine, chlorine, bromine, or iodine).
  There is a risk of malfunction or damage.
- Do not step on the Machine Controller or place heavy objects on the Machine Controller.
  There is a risk of injury or an accident.
- Do not block the air exhaust ports on the Machine Controller. Do not allow foreign objects to enter the Machine Controller.
  There is a risk of internal element deterioration, malfunction, or fire.
- Always mount the Machine Controller in the specified orientation.
  There is a risk of malfunction.
- Leave the specified amount of space between the Machine Controller, and the interior surface of the control panel and other devices.
  There is a risk of fire or malfunction.
- Do not subject the Machine Controller to strong shock.
  There is a risk of malfunction.
- Suitable battery installation must be performed and it must be performed only by an experienced technician.
  There is a risk of electrical shock, injury, or device damage.
- Do not touch the electrodes when installing the Battery.
  Static electricity may damage the electrodes.

◆ Wiring

⚠ CAUTION

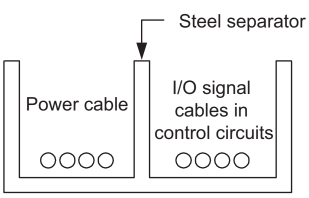
- Check the wiring to be sure it has been performed correctly.
  There is a risk of motor run-away, injury, or accidents.
- Always use a power supply of the specified voltage.
  There is a risk of fire or accident.
- In places with poor power supply conditions, ensure that the input power is supplied within the specified voltage range.
  There is a risk of device damage.
- Install breakers and other safety measures to provide protection against shorts in external wiring.
  There is a risk of fire.
- Provide sufficient shielding when using the Machine Controller in the following locations.
  - Locations that are subject to noise, such as from static electricity
  - Locations that are subject to strong electromagnetic or magnetic fields
  - Locations that are subject to radiation
  - Locations that are near power lines

  There is a risk of device damage.
- Configure the circuits to turn ON the power supply to the CPU Unit/CPU Module before the 24-V I/O power supply. Refer to the following manuals for details on circuits.

  MP3000 Series CPU Unit Instructions (Manual No.: TOBP C880725 16)
  MP3000 Series MP3300 CPU Module Instructions (Manual No.: TOBP C880725 23)

  If the power supply to the CPU Unit/CPU Module is turned ON after the external power supply, e.g., the 24-V I/O power supply, the outputs from the CPU Unit/CPU Module may momentarily turn ON when the power supply to the CPU Unit/CPU Module turns ON. This can result in unexpected operation that may cause injury or device damage.
- Provide emergency stop circuits, interlock circuits, limit circuits, and any other required safety measures in control circuits outside of the Machine Controller.
  There is a risk of injury or device damage.
- If you use MECHATROLINK I/O Modules, use the establishment of MECHATROLINK communications as an interlock output condition.
  There is a risk of device damage.
- Connect the Battery with the correct polarity.
  There is a risk of battery damage or explosion.
- Select the I/O signal wires for external wiring to connect the Machine Controller to external devices based on the following criteria:
  - Mechanical strength
  - Noise interference
  - Wiring distance
  - Signal voltage
- Separate the I/O signal cables for control circuits from the power cables both inside and outside the control panel to reduce the influence of noise from the power cables.
  If the I/O signal lines and power lines are not separated properly, malfunction may occur.

Example of Separated Cables



◆ Operation

⚠ CAUTION

- Follow the procedures and instructions in the user's manuals for the relevant Machine Controllers to perform normal operation and trial operation.
  Operating mistakes while the Servomotor and machine are connected may damage the machine or even cause accidents resulting in injury or death.
- Implement interlock signals and other safety circuits external to the Machine Controller to ensure safety in the overall system even if the following conditions occur.
  - Machine Controller failure or errors caused by external factors
  - Shutdown of operation due to Machine Controller detection of an error in self-diagnosis and the subsequent turning OFF or holding of output signals
  - Holding of the ON or OFF status of outputs from the Machine Controller due to fusing or burning of output relays or damage to output transistors
  - Voltage drops from overloads or short-circuits in the 24-V output from the Machine Controller and the subsequent inability to output signals
  - Unexpected outputs due to errors in the power supply, I/O, or memory that cannot be detected by the Machine Controller through self-diagnosis.

  There is a risk of injury, device damage, or burning.

◆ Maintenance and Inspection

⚠ CAUTION

- Do not attempt to disassemble or repair the Machine Controller.
  There is a risk of electrical shock, injury, or device damage.
- Do not change any wiring while power is being supplied.
  There is a risk of electrical shock, injury, or device damage.
- Suitable battery replacement must be performed and it must be performed only by an experienced technician.
  There is a risk of electrical shock, injury, or device damage.
- Do not forget to perform the following tasks when you replace the CPU Unit/CPU Module:
  - Back up all programs and parameters from the CPU Unit/CPU Module that is being replaced.
  - Transfer all saved programs and parameters to the new CPU Unit/CPU Module.

  If you operate the CPU Unit/CPU Module without transferring this data, unexpected operation may occur. There is a risk of injury or device damage.
- Do not touch the heat sink on the CPU Unit/CPU Module while the power supply is turned ON or for a sufficient period of time after the power supply is turned OFF.
  The heat sink may be very hot, and there is a risk of burn injury.

◆ Disposal

⚠ CAUTION

- Dispose of the Machine Controller as general industrial waste.
- Observe all local laws and ordinances when you dispose of used Batteries.

◆ Other General Precautions

Observe the following general precautions to ensure safe application.
• The products shown in the illustrations in this manual are sometimes shown without covers or protective guards. Always replace the cover or protective guard as specified first, and then operate the products in accordance with the manual. • The illustrations that are presented in this manual are typical examples and may not match the product you received. • If the manual must be ordered due to loss or damage, inform your nearest Yaskawa representative or one of the offices listed on the back of this manual.

Warranty

◆ Details of Warranty

■ Warranty Period

The warranty period for a product that was purchased (hereinafter called "delivered product") is one year from the time of delivery to the location specified by the customer or 18 months from the time of shipment from the Yaskawa factory, whichever is sooner.

■ Warranty Scope

Yaskawa shall replace or repair a defective product free of charge if a defect attributable to Yaskawa occurs during the warranty period above. This warranty does not cover defects caused by the delivered product reaching the end of its service life and replacement of parts that require replacement or that have a limited service life.

This warranty does not cover failures that result from any of the following causes.

- Improper handling, abuse, or use in unsuitable conditions or in environments not described in product catalogs or manuals, or in any separately agreed-upon specifications
- Causes not attributable to the delivered product itself
- Modifications or repairs not performed by Yaskawa
- Abuse of the delivered product in a manner in which it was not originally intended
- Causes that were not foreseeable with the scientific and technological understanding at the time of shipment from Yaskawa
- Events for which Yaskawa is not responsible, such as natural or human-made disasters

◆ Limitations of Liability

- Yaskawa shall in no event be responsible for any damage or loss of opportunity to the customer that arises due to failure of the delivered product.
- Yaskawa shall not be responsible for any programs (including parameter settings) or the results of program execution of the programs provided by the user or by a third party for use with programmable Yaskawa products.
- The information described in product catalogs or manuals is provided for the purpose of the customer purchasing the appropriate product for the intended application. The use thereof does not guarantee that there are no infringements of intellectual property rights or other proprietary rights of Yaskawa or third parties, nor does it construe a license.
- Yaskawa shall not be responsible for any damage arising from infringements of intellectual property rights or other proprietary rights of third parties as a result of using the information described in catalogs or manuals.

◆ Suitability for Use

- It is the customer's responsibility to confirm conformity with any standards, codes, or regulations that apply if the Yaskawa product is used in combination with any other products.
- The customer must confirm that the Yaskawa product is suitable for the systems, machines, and equipment used by the customer.
- Consult with Yaskawa to determine whether use in the following applications is acceptable. If use in the application is acceptable, use the product with extra allowance in ratings and specifications, and provide safety measures to minimize hazards in the event of failure.
  - Outdoor use, use involving potential chemical contamination or electrical interference, or use in conditions or environments not described in product catalogs or manuals
  - Nuclear energy control systems, combustion systems, railroad systems, aviation systems, vehicle systems, medical equipment, amusement machines, and installations subject to separate industry or government regulations
  - Systems, machines, and equipment that may present a risk to life or property
  - Systems that require a high degree of reliability, such as systems that supply gas, water, or electricity, or systems that operate continuously 24 hours a day
  - Other systems that require a similar high degree of safety
- Never use the product for an application involving serious risk to life or property without first ensuring that the system is designed to secure the required level of safety with risk warnings and redundancy, and that the Yaskawa product is properly rated and installed.
- The circuit examples and other application examples described in product catalogs and manuals are for reference. Check the functionality and safety of the actual devices and equipment to be used before using the product.
- Read and understand all use prohibitions and precautions, and operate the Yaskawa product correctly to prevent accidental harm to third parties.

◆ Specifications Change

The names, specifications, appearance, and accessories of products in product catalogs and manuals may be changed at any time based on improvements and other reasons. The next editions of the revised catalogs or manuals will be published with updated code numbers. Consult with your Yaskawa representative to confirm the actual specifications before purchasing a product.

Contents

Outline of Communications

1

This chapter describes the communications of the MP3000 Controller.

1.1 Overview

The MP3000 Controller provides engineering communications (used to connect to the MPE720) and additional support for an Ethernet connection to host devices.

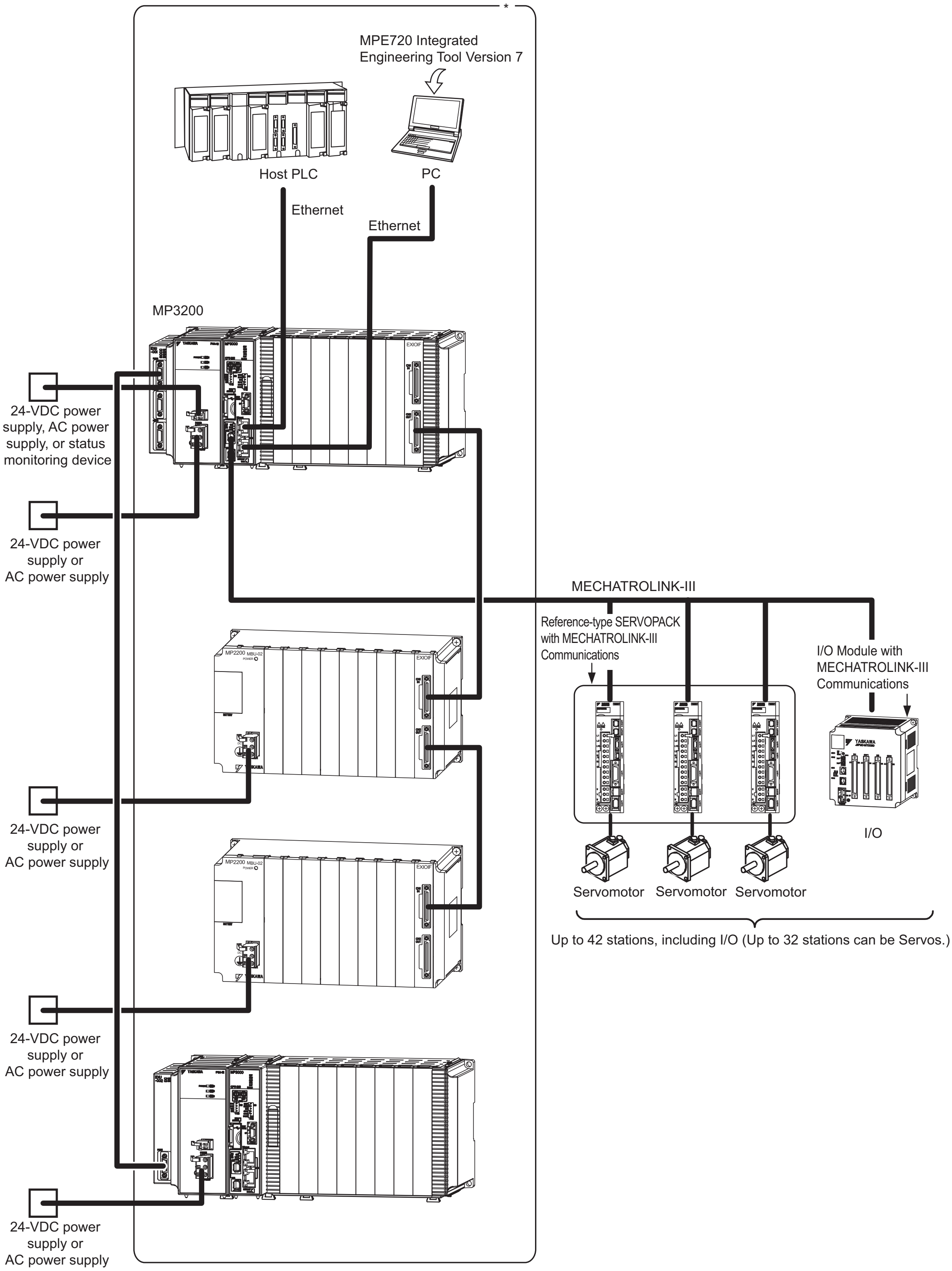
The following table describes the communication features.

Function	Features	Description
Ethernet	The MP3000 Controller supports multiple protocols to enable general-purpose Ethernet communications with PLCs and touch panels from various manufacturers without writing special applications.	• Protocols: MODBUS/TCP, FINS, A-compatible 1E/ QnA-compatible 3E, TOYOPUC, Extended MEMOBUS, and MEMOBUS

1.2 System Configuration Examples

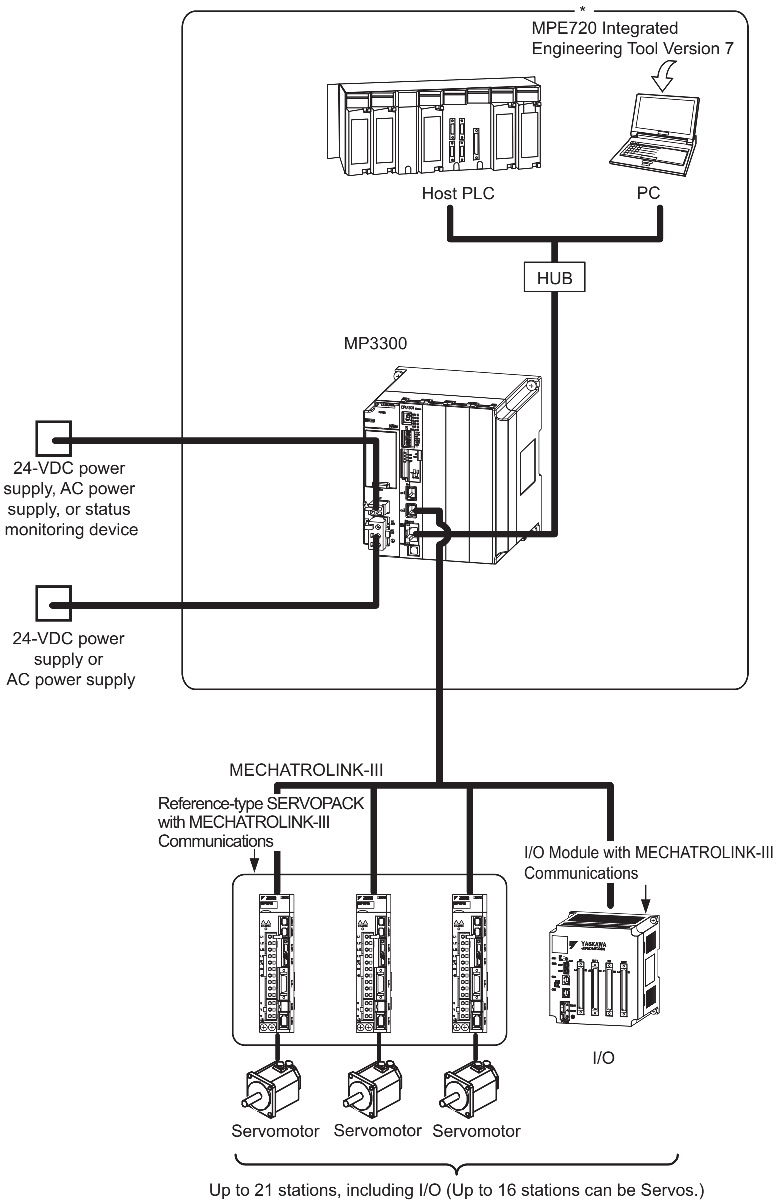
Configuration with the MP3200

The following figure shows a typical system configuration.



* This manual primarily describes this area.

Configuration with the MP3300



* This manual primarily describes this area.

Ethernet Communications

2

This chapter describes the Ethernet communications of the MP3000-series Controller.

2.1 Overview

Ethernet Communications

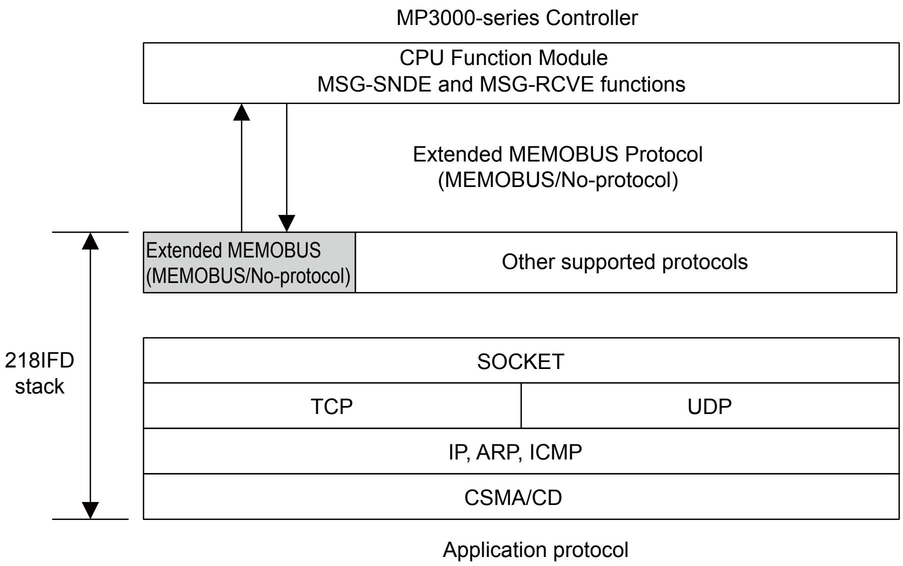
Ethernet communications connects the MP3000-series Controller to Ethernet devices. The MP3000-series Controller is equipped with one 100Base-TX Ethernet port that conforms to IEEE802.3u. It can be easily connected to controllers manufactured by other companies, personal computers, or other types of computers. By connecting a computer running the MPE720 Integrated Engineering Tool, you can perform engineering tasks on the MP3000-series Controller from the computer.

Ethernet communications can be used for message communications and engineering communications.

The MP3000-series Controller supports the following communications protocols.

Protocol	Description	Master/Slave
MEMOBUS	Yaskawa’s standard MEMOBUS protocol.	Master/Slave
Extended MEMOBUS	Yaskawa’s extended MEMOBUS protocol.	Master/Slave
A-compatible 1E frame	A protocol for Mitsubishi PLCs.	Master/Slave
QnA-compatible 3E frame	A protocol for Mitsubishi PLCs.	Master/Slave
FINS	A protocol for OMRON PLCs.	Master/Slave
MODBUS/TCP	An Ethernet protocol proposed by Modicon and used in industrial applications.	Master/Slave
TOYOPUC	A protocol for JTEKT PLCs.	Master/Slave
No-protocol	A protocol provided to implement general-purpose message communications.	Master/Slave

The Extended MEMOBUS protocol is used for all message communications between the CPU Function Module and the 218IFD Function Module in the CPU Unit or the CPU Module of the MP3000-series Machine Controllers.



Important

This manual describes message communications using the MSG-SNDE and MSG-RCVE functions. If you use the MSG-SND and MSG-RCV functions, substitute the corresponding information for the MSG-SND and MSG-RCV functions. These functions are slightly different when used in ladder programs. Refer to the following manual for information on using the MSG-SND and MSG-RCV functions in ladder programs.

MP2000-series Communication Module User’s Manual (Manual No.: SIEP C880700 04)

Communications Specifications

The following table lists the communications specifications of the MP3000-series Controller.

Item			Specification	Remarks
Abbreviation			218IFD	–
Common Items	Communications Interface		10Base-T or 100Base-TX	–
	Number of Communications Ports (Connectors)		2	2-port hub
	Communications Protocols		TCP, UDP, IP, ARP, or ICMP	–
Ethernet Communications	Maximum Number of Communications Connections		20 + 2 (I/O message communications)	–
	Maximum Number of Communications Channels		10 + 2 (I/O message communications)	–
	Automatic Reception		Supported.	Not supported for no-protocol communications.
	Number of Automatic Reception Connections		10	–
	Maximum Size of Message Communications	MEMOBUS	Write: 100 words Read: 125 words	–
		Extended MEMOBUS	Write: 2,043 words Read: 2,044 words	–
		MELSEC (A-compatible 1E)	Write: 256 words Read: 256 words	–
		MELSEC (QnA-compatible 3E)	Write: 960 words Read: 960 words	–
		MODBUS/TCP	Write: 100 words Read: 125 words	–
		OMRON	Write: 996 words Read: 999 words	–
		TOYOPUC	Write: 1,022 words	–
		No-protocol	Write: 2,046 words	–
	Maximum Size of I/O Message Communications	MEMOBUS	Write: 100 words Read: 125 words	–
		Extended MEMOBUS	Write: 1,024 words Read: 1,024 words	–
		MELSEC (A-compatible 1E)	Write: 256 words Read: 256 words	–
		MELSEC (QnA-compatible 3E)	Write: 256 words Read: 256 words	–
		MODBUS/TCP	Write: 100 words Read: 125 words	–
		OMRON	Write: 996 words Read: 999 words	–
		Execution Conditions	After the power is turned ON, cyclic communications, or start/stop control from ladder programs.	Currently under development.
		Execution Status Monitoring	Supported.	Currently under development.
	Receive Buffer Mode Selection for No-protocol Communications		Supported.	–
	Communications Platform		Ethernet	–
	Controller Searches with Engineering Tool		Supported.	–

2.2 Detail Definition Setting Procedures

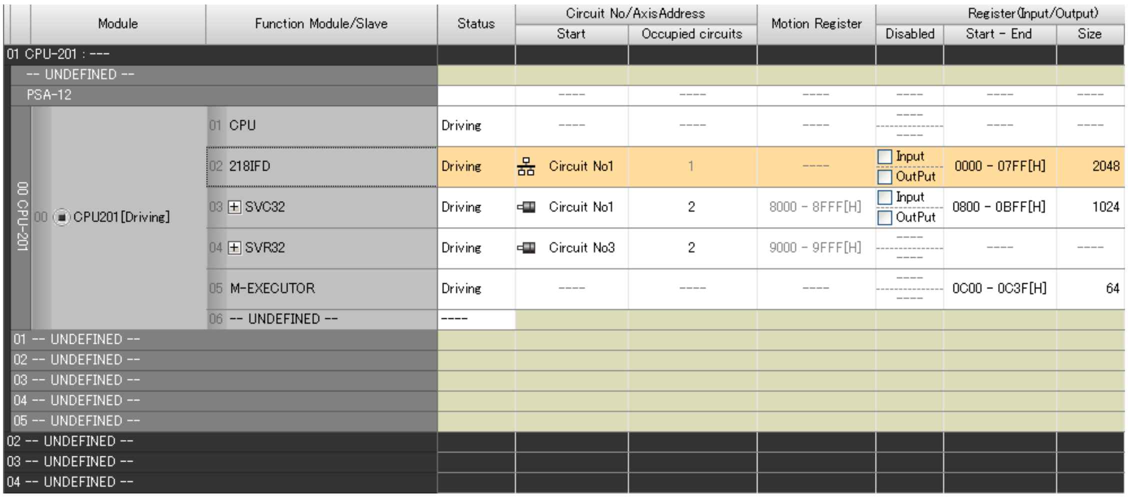
The 218IFD Detail Definition Dialog Box is used to make detailed definitions for Ethernet communications.

Displaying the 218IFD Detail Definition Dialog Box

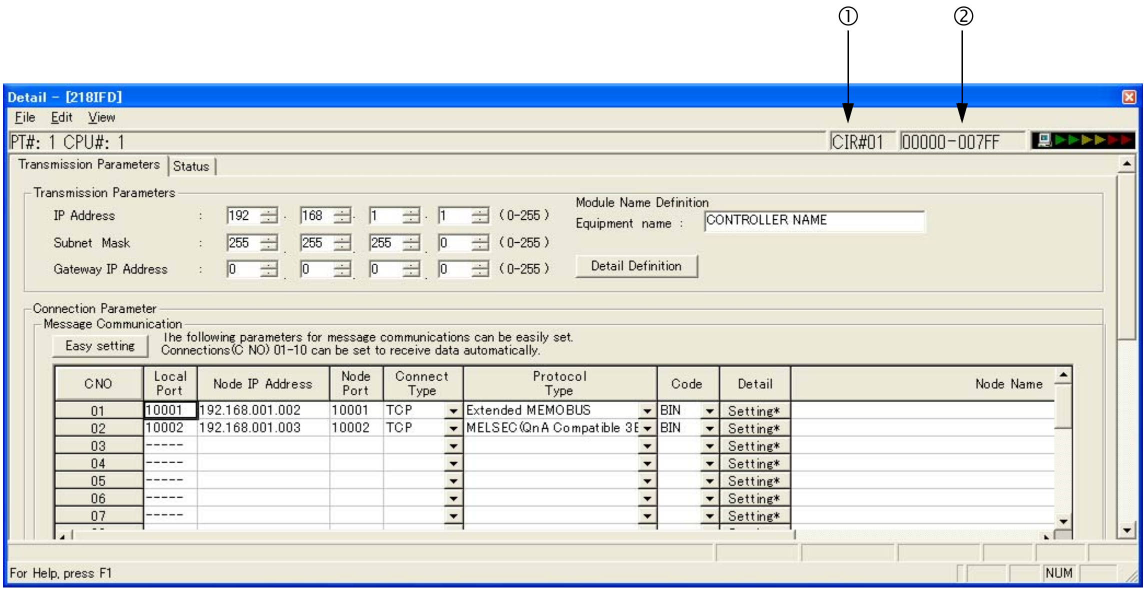
Follow these steps to display the 218IFD Detail Definition Dialog Box.

1. Open the Module Configuration Definition Tab Page.

2. Double-click the cell for the 218IFD.



The 218IFD Detail Definition Dialog Box will be displayed.



Items 1 and 2 display the configuration information for the 218IFD Function Module. This is the same configuration information that appears in the Module Configuration Definition Tab Page.

① Circuit No.

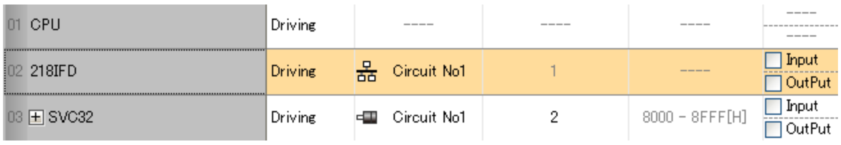
The circuit number of the Ethernet port on the 218IFD is displayed here.

② Start - End Register Range for the I/O Registers

The I/O register range of the 218IFD Function Module is displayed here.

Note

1. The module configuration information can also be changed in the Module Configuration Definition Tab Page. If you do so, specify a circuit number that is not in use by other Ethernet Modules (218IF/218IFB).



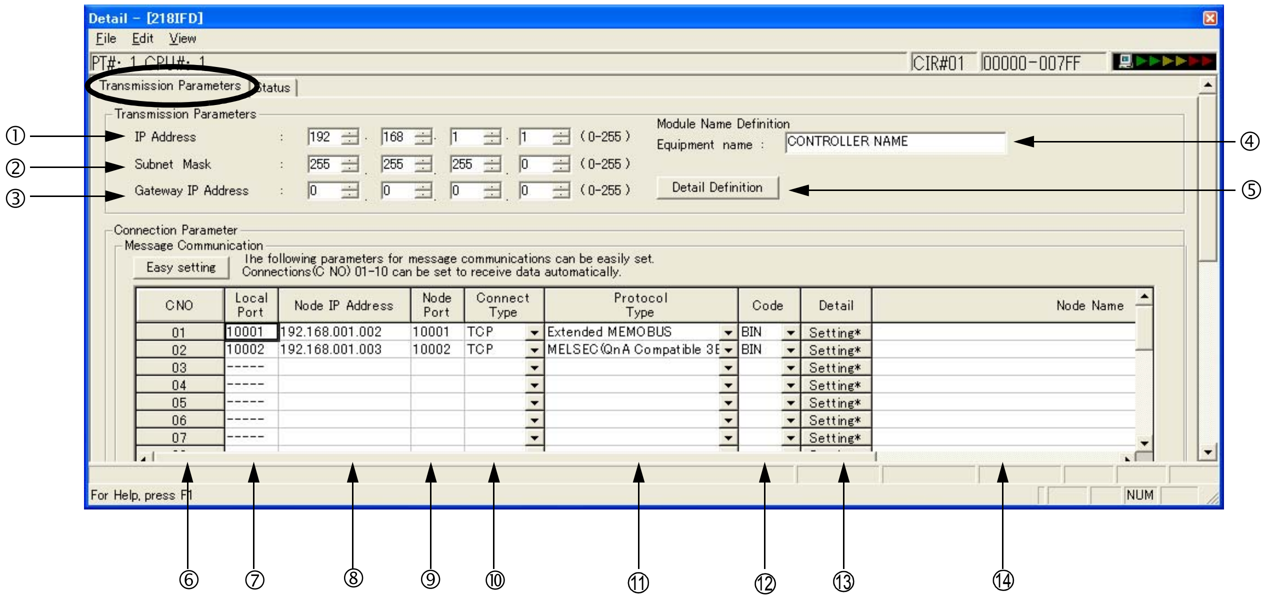
2. If you use the MSG-SNDE or MSG-RCVE function, set the circuit number input parameter (CIR#) to the circuit number that is displayed here.

218IFD Detail Definition Dialog Box Details

The 218IFD Detail Definition Dialog Box has two tab pages, Transmission Parameters and Status. Each tab page is displayed by clicking the corresponding tab.

Transmission Parameters Tab Page

This tab page is used to set the parameters that are required to use Ethernet communications.



◆ Display Items

The following table lists the items that are displayed on the Transmission Parameters Tab Page.

For the valid setting ranges and setting precautions, refer to the descriptions of the items on the following pages.

Number	Item	Description
①	IP Address	Sets the IP address of the local station.
②	Subnet Mask	Sets the subnet mask for the IP address of the local station.
③	Gateway IP Address	Sets the IP address of the gateway.
④	Module Name Definition	Sets the name for the 218IFD.
⑤	Detail Definition Button	Click to set details for the local station.
⑥	Connection Number (CNO)	Displays the connection number.
⑦	Local Port	Sets the local port number.
⑧	Node IP Address	Sets the remote IP address.
⑨	Node Port	Sets the port number for the remote station.
⑩	Connect Type	Sets the transport layer protocol.
⑪	Protocol Type	Sets the application layer protocol.
⑫	Code	Sets the code type.
⑬	Detail	Used to set automatic reception and the local station for the FINS protocol.
⑭	Node Name (Remote Station Name)	Used to enter a comment for the connection.

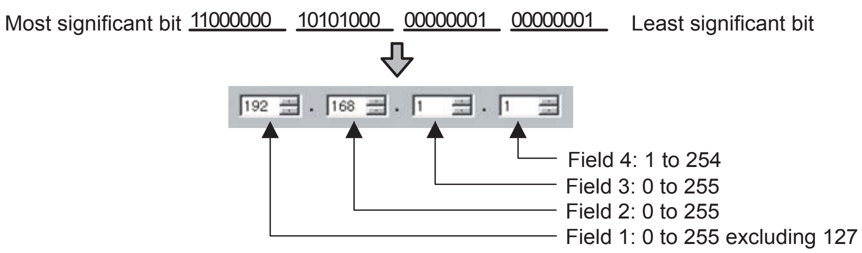
◆ Display Item Details

This section provides details on the items that are displayed on the Transmission Parameters Tab Page.

> Note
>
> Always save all settings to the flash memory after changing them.

① IP Address

Enter the IP address of the local station.
There are four 8-bit fields delimited by periods. Input a decimal number in each field.



Note: 1. Enter an IP address that is not in use by another node on the Ethernet.
2. IP addresses 192.168.1.1 to 192.168.1.254 are recommended as private addresses. Check with your network administrator for unused IP addresses.

② Subnet Mask

Enter the subnet mask for the IP address of the local station.

Fields 1 to 3 can be set to 0 to 255. Field 4 can be set to 1 to 254. When a subnet mask is not being used, enter 0 in fields 1 to 4.

③ Gateway IP Address

Enter the IP address of the gateway.
If a gateway is not being used, enter 0 in fields 1 to 4 for the gateway IP address.
The data input range for the gateway IP address depends on the field as shown below.

Setting Example

192. 168. 100. 200

- Field 4: 1 to 254
- Field 3: 0 to 255
- Field 2: 0 to 255
- Field 1: 0 to 255 excluding 127

Note: Enter different addresses for the IP address and gateway IP address.

④ Module Name Definition

Set the name for the 218IFD.
Enter a comment of up to 16 characters.

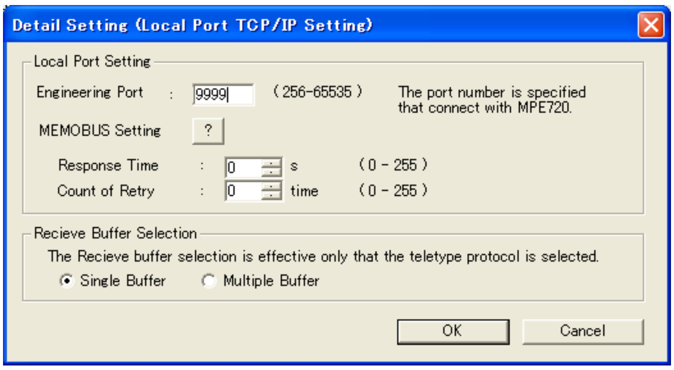
Terms

Subnet Mask
A subnet mask is a mask used to derive the network address of the subnet from the IP address. The result of an AND operation of the IP address and the subnet mask produces the subnet address. Check with your network administrator for unused subnet mask values.

Gateway IP Address
The gateway IP address identifies the gateway device (i.e., router) through which communications are performed between multiple network segments. Check with your network administrator when setting a gateway device.

⑤ Detail Definition Button

The button displays the *Detail Setting (Local Port TCP/IP Setting)* Dialog Box to set the engineering port, response time, number of retries (Count of Retry), and receive buffer.



Engineering Port

Enter the Ethernet port number (between 256 and 65535) for the 218IFD to use for engineering communications with the MPE720. The default is 9999.

Note: 1. If this value is changed, also change the port set in the **Engineering Port** Box in the Detail Setting Dialog Box of the Communications Port Setting Tab Page on the MPE720 communications platform.
2. Do not use the port number assigned to the local port number.
3. Do not set 9998 or 10000. These are used by the system.

Response Time

Enter the time (between 0 and 255) to wait for a response after sending a command using the MSG-SNDE function. If a response is not returned, causing a timeout, the transmission will be retried as many times as set in the **Count of Retry** Box.

The **Count of Retry** Box is disabled if 0 is set for the response time.

Note: Enter 0 for the response time if 0 is set for the **Count of Retry** Box and MEMOBUS is selected in the **Protocol Type** Column in the **Connection Parameter** Area.

Count of Retry

Enter the number of retries (0 to 255) to be attempted if a timeout is detected after sending a command with the MSG-SNDE function. An error is returned for the MSG-SNDE function if a response is not returned after the set number of retries.

Note: If the TCP is the only protocol set for the connect type, it is not necessary to set the number of retries. Enter 0.

Receive Buffer Selection

This parameter selects the buffer type when no-protocol communications is selected in the **Protocol Type** Column.

⑥ Connection Number (CNO)

This column displays the connection numbers between 1 and 20.

With Ethernet communications, the connection number is used to identify remote stations.

The connection number corresponds to parameter 10 (Remote Connection Number) in the MSG-SNDE and MSG-RCVE functions.

⑦ Local Port

Enter the local port number (between 256 and 65535) for each connection.

Do not enter a port number that is used for another connection, a system port number, or a diagnostics port number. If 0 is entered for the local port number, the data for that connection number will be cleared and "-----" will be displayed in the **Local Port** Column.

Note: The port number that is set for the system port, as well as 9998 and 10000, cannot be used if the connect type is UDP.

⑧ Node IP Address

Enter the IP address of the remote station for each connection.

The data input range depends on the field of the remote IP address.

Field 1: 0 to 255 excluding 127
Field 2: 0 to 255
Field 3: 0 to 255
Field 4: 1 to 254

Enter 0 in all four fields to connect in Unpassive Open Mode.

⑨ Node Port

Enter the port number (0 or 256 to 65535) of the remote station for the connection.

Note: The combination of the node IP address and node port must not be in use for any other connection.

⑩ Connect Type

Select the transport layer protocol.

TCP: Communications is performed using TCP (Transmission Control Protocol).
UDP: Communications is performed using UDP (User Datagram Protocol).

Note

If an error occurs during message communications with UDP (connectionless protocol), the following may occur.

- The LINK/ACT indicator on the Ethernet connector may light or flash, communications data may be lost, and communications may stop.

If this occurs, implement the following countermeasures.

1. Use Ethernet cables that meet the following requirements.
   100Base-TX category 5 or better straight or cross twisted-pair cable with RJ-45 connectors
2. Separate the Ethernet cables from power cables.

If the problem persists even after implementing the above countermeasures, implement the following countermeasures.

1. Change to TCP (connection protocol).
2. If you continue to use UDP, add the following retry programming.
   Retry programming: If processing does not end within a specific time after sending a command, implement a timeout and execute the send execution command again.
   Refer to the ladder program in the following section for a programming example.
   ☞ *2.4 Communications with MP-series Controllers - Using the MSG-SNDE Function with the MP3000 as the Master*

⑪ Protocol Type

Select the application layer protocol for each connection according to the protocol supported by the remote station.

The following table lists the protocols.

Refer to the following section for details on the protocols.

☞ *2.1 Overview (page 2-4)*

Protocol	Description
MEMOBUS	Yaskawa’s standard MEMOBUS protocol.
Extended MEMOBUS	Yaskawa’s extended MEMOBUS protocol.
A-compatible 1E frame	A protocol for Mitsubishi PLCs.
QnA-compatible 3E frame	A protocol for Mitsubishi PLCs.
FINS	A protocol for OMRON PLCs.
MODBUS/TCP	An Ethernet protocol proposed by Modicon and used in industrial applications.
TOYOPUC	A protocol for JTEKT PLCs.
No-protocol	A protocol provided to implement general-purpose message communications.

Terms

Connections

A connection is a series of operations to confirm communications and transfer data in one-to-one communications between a local station program and a remote station program.

Port Numbers

A port number is used to identify the target program in the remote station. There is a one-to-one correspondence between port numbers and communications programs. A port number is entered in the header section of the data, together with the IP address and other information. The remote station transfers the data to the target program identified by the destination port number.

The port number, including the one for the local station, is used to identify the communications service program at both the local and remote stations.

Unpassive Open Mode

If the remote station's address is set to 000.000.000.000 and the remote station's port number is set to 0, the connection is set in the Unpassive Open Mode.

In Unpassive Open Mode, the MP3000 connects to any station that accesses its connection number. If multiple stations access this connection number, the connection will be established with the station to which the connection request was sent first. If a connection request is sent from a station while a connection is established with another station in Unpassive Open Mode, the connection that was established first is disconnected and a connection will be established with the station for which the connection request was sent later.

TCP and UDP

TCP is a connection protocol and UDP is a connectionless protocol.

A connection protocol ensures reliable communications because it performs various steps of communications control, such as arrival checks, error detection and correction, sequence number checks, and send data size control.

In contrast, a connectionless protocol does not provide the procedures that ensure the quality of communications, and data transmissions are performed in only one direction. Connectionless protocols thus provide high-speed communications, but less communications reliability.

The selection of TCP or UDP depends on the requirements for communications. Select TCP if reliability is important and select UDP if speed is important.

⑫ Code

Select the code of the data to be transmitted for each connection according to the code to set at the remote station.

RTU: Specifies RTU Mode when the MEMOBUS protocol is being used.
ASCII: Specifies ASCII Mode.
BIN: Specifies Binary Mode.

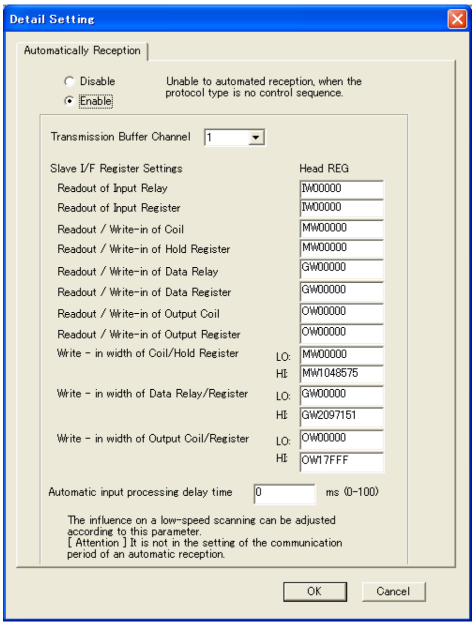
The code that can be selected is restricted by the selection of the protocol type in the **Protocol Type** Box as shown in the following table.

Protocol Type	Code		
	RTU	ASCII	BIN
MEMOBUS	○	○	×
Extended MEMOBUS	×	○	○
A-compatible 1E frame	×	○	○
QnA-compatible 3E frame	×	○	○
FINS	×	×	○
MODBUS/TCP	×	×	○
TOYOPUC	×	×	○
No-protocol	×	○	○

○: Can be selected.
×: Cannot be selected.

⑬ Detail

This button displays the Detail Setting Dialog Box to set the automatic reception settings. If the FINS protocol is selected, set the local station for the FINS protocol.



Item	Setting Range	Description	Default
Disable/Enable	Enable or Disable	Sets whether to enable automatic reception.	Disable
Communications Buffer Channel (Transmission Buffer Channel)	1 to 10	Sets the buffer channel for Ethernet communications to use when automatic reception is executed. Connections and channel numbers may be used in any combination. Note: Do not assign a number that is already used for another connection.	Same as the connection number
Readout of Input Relay	IW00000 to IW17FFF	Sets the first register for the input relays that are used with automatic reception.	IW00000
Readout of Input Register	IW00000 to IW17FFF	Sets the first register for input registers that are used with automatic reception.	IW00000
Readout/Write-in of Coil	MW00000 to MW1048576	Sets the first register for reading/writing coils that are used with automatic reception.	MW00000
Readout/Write-in of Hold Register	MW00000 to MW1048576	Sets the first register for reading/writing hold registers that are used with automatic reception.	MW00000
Readout/Write-in of Data Relay	GW00000 to GW2097151	Sets the first register for reading/writing data relays that are used with automatic reception.	GW00000
Readout/Write-in of Data Register	GW00000 to GW2097151	Sets the first register for reading/writing data registers that are used with automatic reception.	GW00000
Readout/Write-in of Output Coil	OW00000 to OW17FFF	Sets the first register for reading/writing output coils that are used with automatic reception.	OW00000
Readout/Write-in of Output Register	OW00000 to OW17FFF	Sets the first register for reading/writing output registers that are used with automatic reception.	OW00000

Continued on next page.

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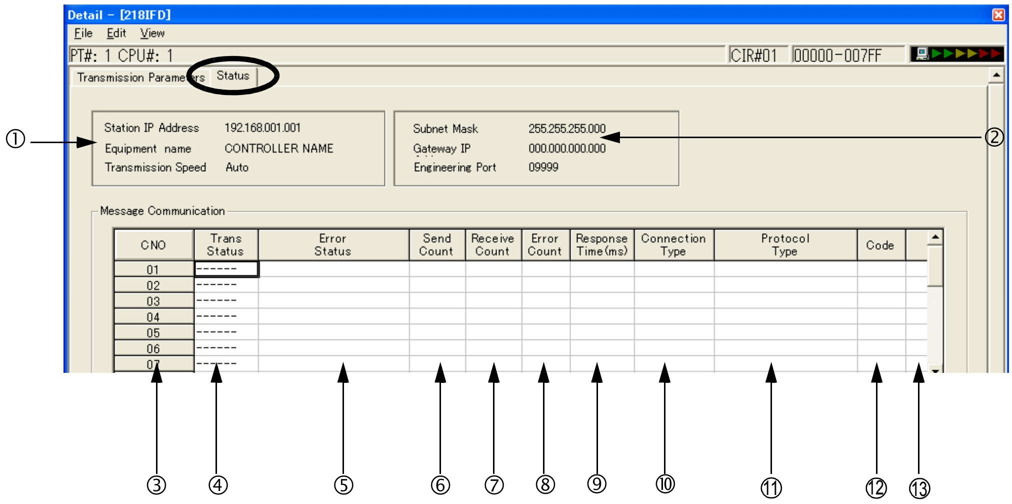
Item	Setting Range	Description	Default
Write-in width of Coil/Hold Register, LO	MW00000 to MW1048576	Sets the low end of the range for writing hold registers (coils) that are used with automatic reception.	MW00000
Write-in width of Coil/Hold Register, HI	MW00000 to MW1048576	Sets the high end of the range for writing hold registers (coils) that are used with automatic reception.	MW1048575
Write-in width of Data Relay/ Register, LO	GW00000 to GW2097151	Sets the low end of the range for writing data registers (data relays) that are used with automatic reception.	GW00000
Write-in width of Data Relay/ Register, HI	GW00000 to GW2097151	Sets the high end of the range for writing data registers (data relays) that are used with automatic reception.	GW2097151
Write-in width of Output Coil/ Register, LO	OW00000 to OW17FFF	Sets the low end of the range for writing output registers (output coils) that are used with automatic reception.	OW00000
Write-in width of Output Coil/ Register, HI	OW00000 to OW17FFF	Sets the high end of the range for writing output registers (output coils) that are used with automatic reception.	OW17FFF
Automatic input processing delay time	0 to 100 (ms)	Sets the delay time for sending responses to adjust the influence on the low-speed scan during automatic reception processing.	0

⑭ Node Name (Remote Station Name)

Used to enter a comment for the connection.
Enter a comment of up to 32 characters.

Status Tab Page

The Status Tab Page displays the communications status and detail definition settings for the 218IFD. The settings cannot be changed.



Note

1. If the **Status** Tab is clicked without saving the 218IFD detail definition data, a confirmation message to save the data or an error message (if inconsistencies exist in the data) will appear. If a confirmation message to save the data is displayed, click the **Yes** Button to save the detail definition data and display the Status Tab Page. If an error message is displayed, click the **OK** Button, enter the correct parameters, and save the data. Then, click the **Status** Tab.
2. The data on the Status Tab Page is displayed only in online mode. Nothing is displayed in offline mode.

◆ Display Item Details

This section provides details on the items that are displayed on the Status Tab Page.

① Station IP Address, Equipment Name, and Baud Rate (Transmission Speed)

The local station's IP address and equipment name that are set on the Transmission Parameters Tab Page are displayed here.

② Subnet Mask, Gateway IP Address, and Engineering Port

The subnet mask, gateway (router) IP address, and engineering port that are set on the Transmission Parameters Tab Page are displayed here.

③ CNO

The connection numbers from 1 to 20 are displayed.

④ Trans Status (Transmission Status)

The status of each connection is displayed.

Status	Description
IDLE	Standby mode for executing message functions.
WAIT	Waiting for the TCP connection to be established with the remote station (only if the connection type is set to TCP).
CONNECT	Ready to send/receive data to the remote station.
–	Unused connection.

⑤ Error Status

Details on the error are displayed if an error has occurred in the communications status.

Status Display	Description	Remarks
No error	Normal	–
Socket Creation Error	System error	A socket could not be created.
Local Port Number Error	Setting error in local station port number (The same address is bound during disconnection of the TCP connection.)	Binding error (port number duplication)
		When a MSG function was aborted, a binding error occurred during disconnection. This error occurs if the Execute Bit is turned ON within 1 minute after completion of abortion processing.
		A command was sent to the same remote station for another function before the completion of connection processing.
Changing Socket Attribute Error	System error (for TCP)	An error occurred while setting the socket attribute.
M-SND Connection Error	Connection error (The connection was rejected by the remote station when establishing a connection with an unpassive open for TCP.)	The command was reset because the remote station rejected the connection that was attempted for the MSG-SNDE function.
		Connection failed even after retrying 1 minute (default) after the cable was disconnected.
M-RCV Connection Error	Connection error (connection passive open for TCP)	MSG-RCVE function connection acceptance error
System Error	System error	Socket polling error (using SELECT) when receiving data.
TCP Data Send Error	Data sending error (The remote station does not exist or has not started when using TCP.)	A response transmission error occurred for the MSG-RCVE function. The same error occurred for the MSG-SNDE function. This error occurs when the target remote station for sending the data does not exist, or has rebooted (only with a TCP connection).
UDP Data Send Error	Data sending error (for UDP)	The data send request was sent to a socket that does not exist.
TCP Data Receive Error	Data reception error (The MP3000 received a request to disconnect from the remote station for TCP.)	This error occurs when the connection is disconnected by the remote station. The error occurs even if close processing is performed normally.
UDP Data Receive Error	Data reception error (for UDP)	A data reception instruction was executed for a socket that does not exist.
Changing Socket Option Error	System error	An error occurred when changing the socket option.
Data Conversion Error	Error in converting data	Error in protocol conversion.

Note: The last error in the error status will be retained until the power is turned OFF, even if communications recover. To clear the error, cycle the power to the Controller.

⑥ Send Count

The number of data packets that were sent to the remote station is displayed.

⑦ Receive Count

The number of data packets that were received from the remote station is displayed.

⑧ Error Count

The number of times an error has occurred for each connection is displayed.

⑨ Response Time

The time (ms) that was required to receive a response for a command that was sent using the MSG-SNDE function is displayed.

⑩ Connection Type

The connect type (TCP or UDP) that is set in the connection parameters on the Transmission Parameters Tab Page is displayed here.

⑪ Protocol Type

The protocol type that is set in the connection parameters on the Transmission Parameters Tab Page is displayed here.

⑫ Code

The code (ASCII, binary, or RTU) that is set in the connection parameters on the Transmission Parameters Tab Page is displayed here.

⑬ Node Name (Remote Station Name)

The remote node name that is set in the connection parameters on the Transmission Parameters Tab Page is displayed here.

2.3 Communications Protocols

The following table lists the communications protocols according to the remote device and purpose.

Remote Device	Communi-cations Protocol	Communications Interface		Function used by the MP3000	Reference
		Master	Slave		
MP Series	Extended MEMOBUS	Other MP-series Controller	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-20)*
				MSG-RCVE function	*Using the MSG-RCVE Function with the MP3000 as a Slave (page 2-30)*
		MP3000	Other MP-series Controller	I/O message communications	*Using I/O Message Communications with the MP3000 as the Master (page 2-42)*
				MSG-SNDE function	*Using the MSG-SNDE Function with the MP3000 as the Master (page 2-51)*
Touch Panel	Extended MEMOBUS	Touch Panel	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-90)*
Mitsubishi PLCs, Q/A Series	A-compatible 1E frame	Mitsubishi PLCs, Q/A Series	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-98)*
		MP3000	Mitsubishi PLCs, Q/A Series	I/O message communications	*Using I/O Message Communications with the MP3000 as the Master (page 2-105)*
Mitsubishi PLCs, Q/QnA Series	QnA-compatible 3E frame	MP3000	Mitsubishi PLCs, Q/QnA Series	I/O message communications	*Using I/O Message Communications with the MP3000 as the Master (page 2-139)*
				MSG-SNDE function	*Using the MSG-SNDE Function with the MP3000 as the Master (page 2-146)*
OMRON PLCs	FINS	OMRON PLCs	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-186)*
				MSG-RCVE function	*Using the MSG-RCVE Function with the MP3000 as a Slave (page 2-195)*
		MP3000	OMRON PLCs	I/O message communications	*Using I/O Message Communications with the MP3000 as the Master (page 2-204)*
				MSG-SNDE function	*Using the MSG-SNDE Function with the MP3000 as the Master (page 2-211)*
KOYO PLCs	MODBUS/TCP	KOYO PLCs	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-250)*
		MP3000	KOYO PLCs	I/O message communications	*Using I/O Message Communications with the MP3000 as the Master (page 2-257)*

Continued on next page.

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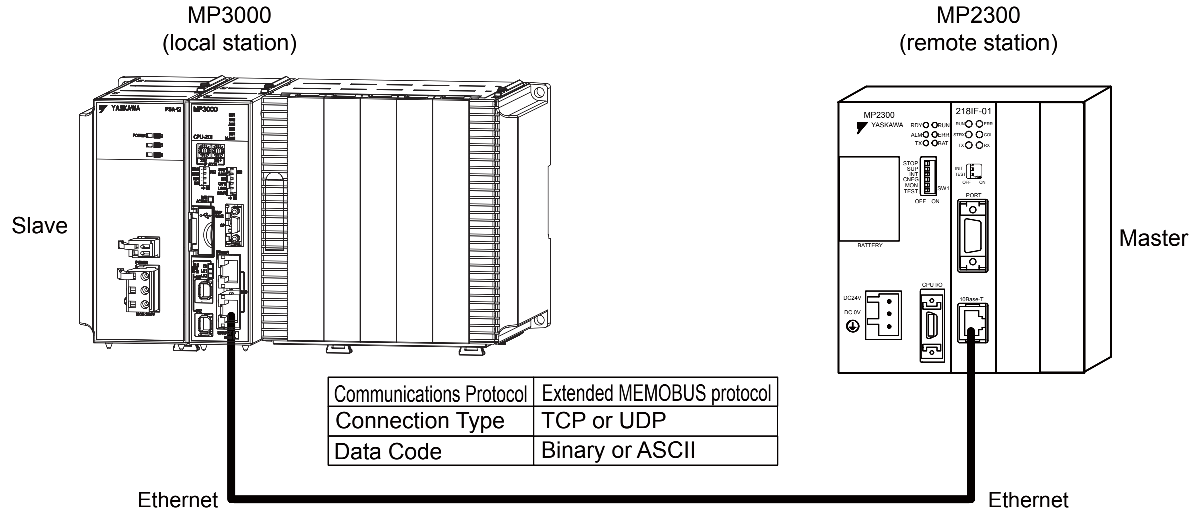
Remote Device	Communi-cations Protocol	Communications Interface		Function used by the MP3000	Reference
		Master	Slave		
JTEKT PLCs	TOYOPUC	JTEKT PLCs	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-262)*
				MSG-RCVE function	*Using the MSG-RCVE Function with the MP3000 as a Slave (page 2-270)*
		MP3000	JTEKT PLCs	MSG-SNDE function	*Using the MSG-SNDE Function with the MP3000 as the Master (page 2-280)*
Windows PC, FA-Server	Extended MEMOBUS	Windows PC, FA-Server	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-316)*
Windows PC, Visual Basic Application	Extended MEMOBUS	Windows PC, Visual Basic Appli-cation	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-324)*
Windows PC, Visual C++ Application	Extended MEMOBUS	Windows PC, Visual C++ Appli-cation	MP3000	Automatic reception	*Using Automatic Reception with the MP3000 as a Slave (page 2-340)*

2.4 Communications with MP-series Controllers

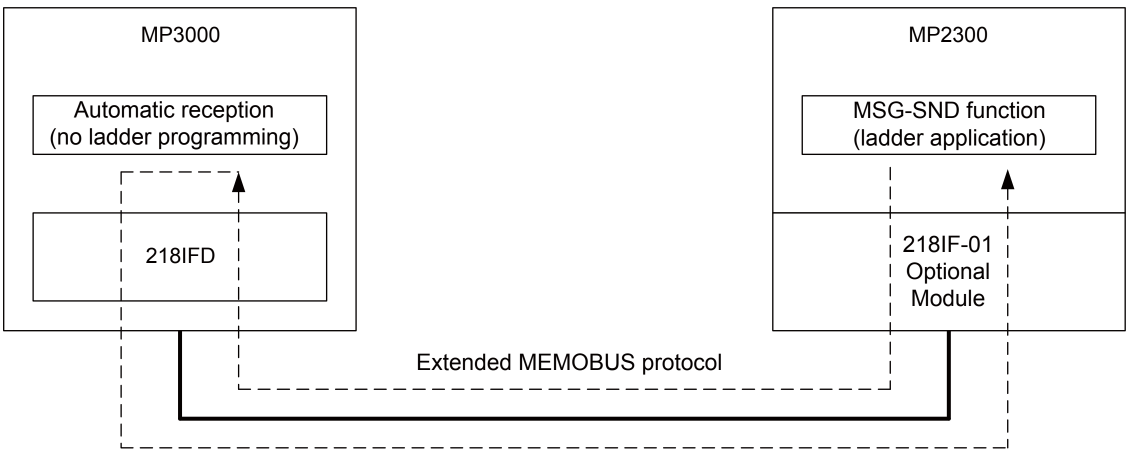
When using Ethernet communications between the MP3000 and other MP-series Controllers, use the Extended MEMOBUS protocol as the communications protocol. The Extended MEMOBUS protocol allows the master to read and write the slave registers.
This section describes communications when the MP3000 acts as a slave and as the master.
When the MP3000 acts as a slave, communications can take place using automatic reception or using the MSG-RCVE function.
When the MP3000 acts as the master, communications can take place using I/O message communications or the MSG-SNDE function.

Using Automatic Reception with the MP3000 as a Slave

This section describes how to communicate with the MP2300 by using automatic reception.

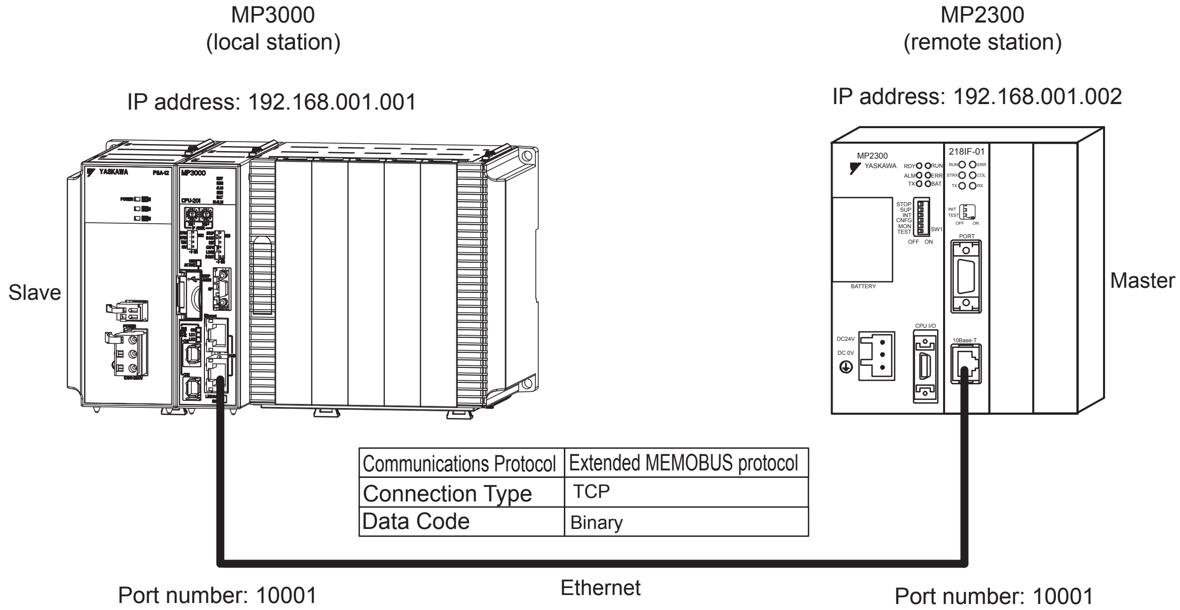


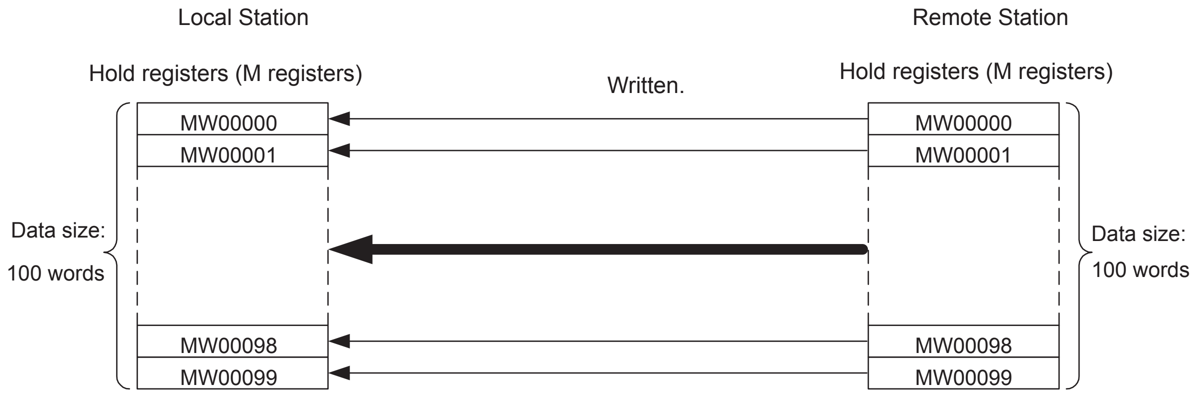
Communications Protocol	Extended MEMOBUS protocol
Connection Type	TCP or UDP
Data Code	Binary or ASCII



Setting Example

The following figure illustrates how the contents of the MW00000 to MW00099 hold registers in the MP2300 master are written to the MW00000 to MW00099 hold registers in the MP3000 slave.



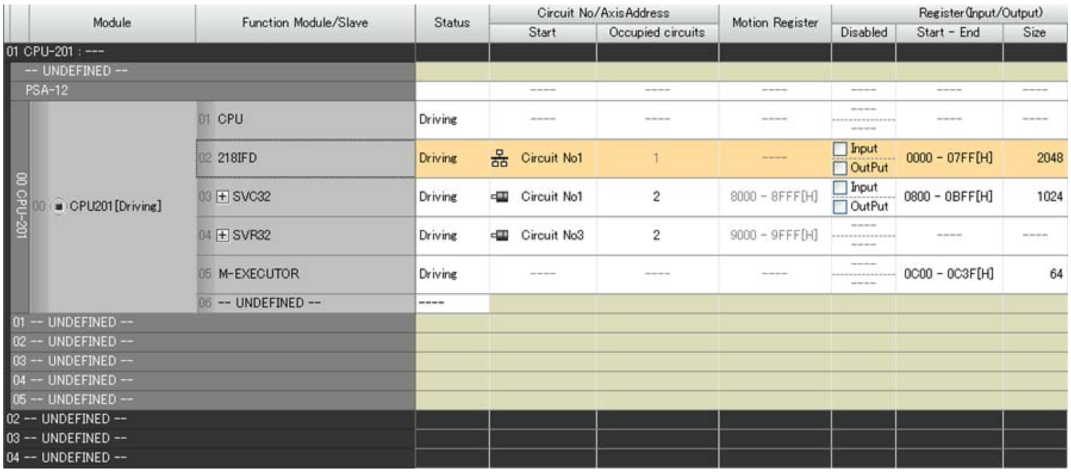


MP3000 Setup

Use the following procedure to set up the MP3000.

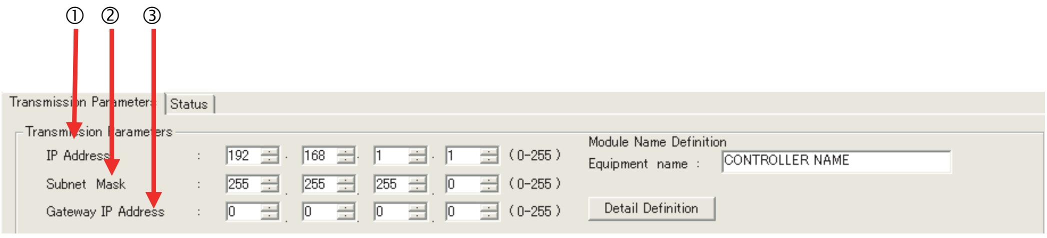
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



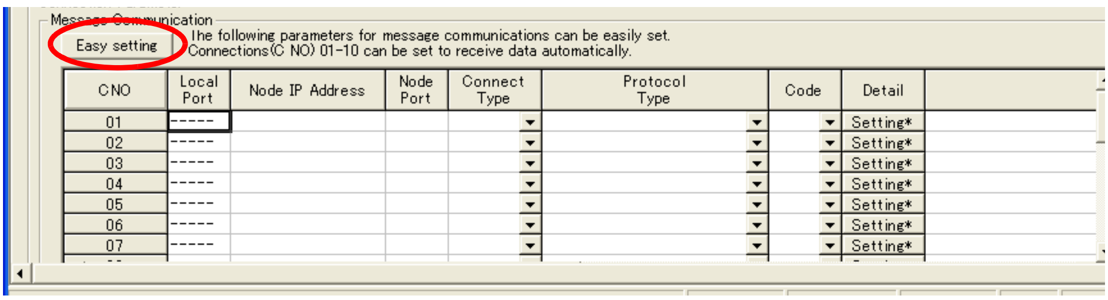
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



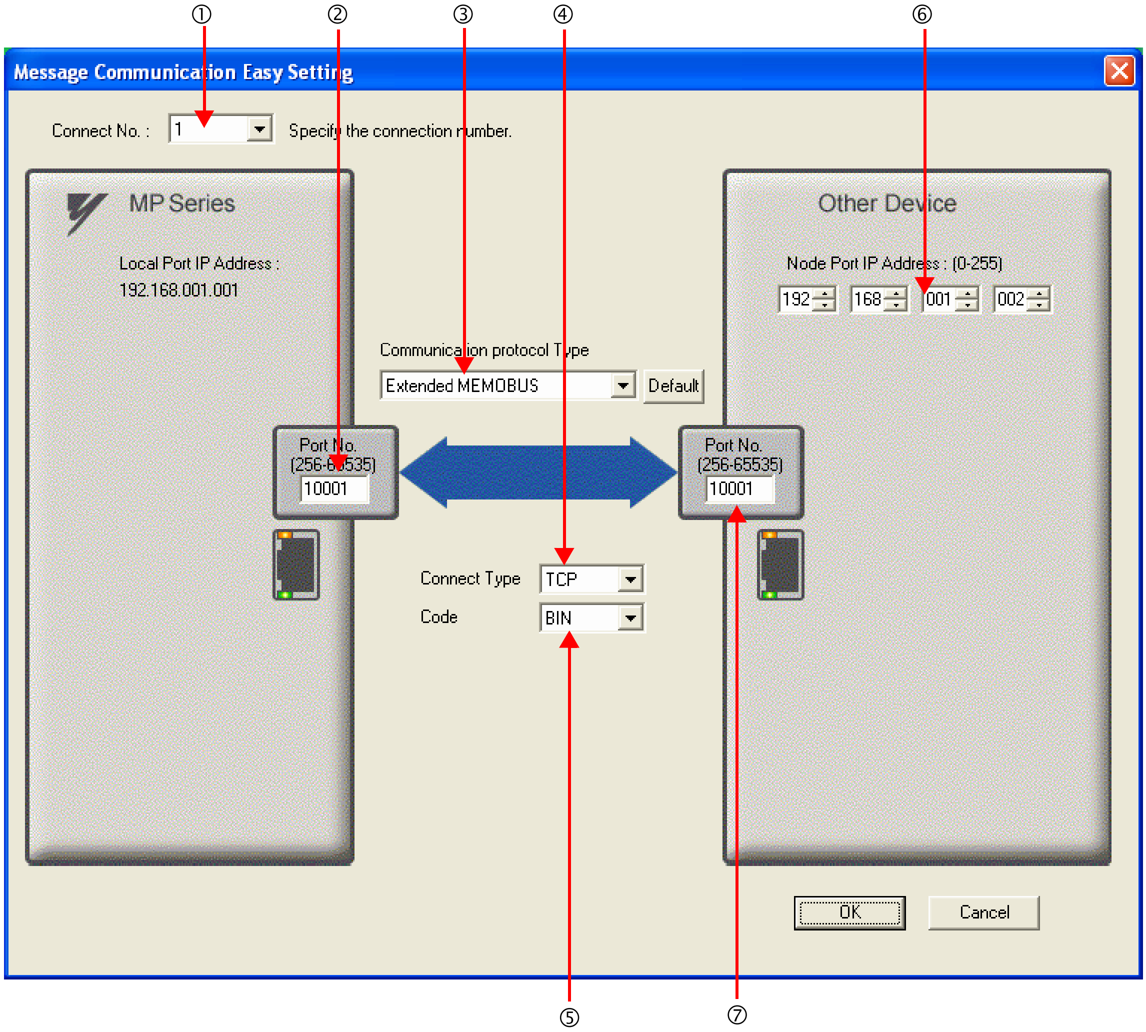
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communications** Area in the **Connection Parameters** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



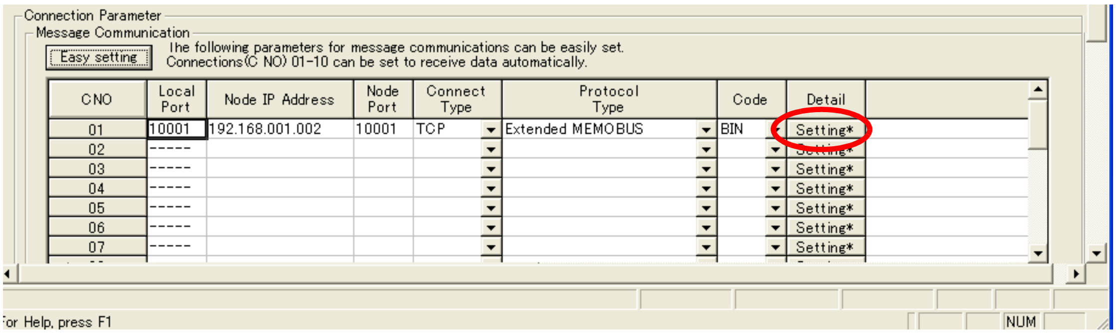
①Select **1** in the **Connect No.** Box.
②Enter "10001" in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter "10001" in the **Port No.** Box for the other device.

5. Click the **OK** Button.

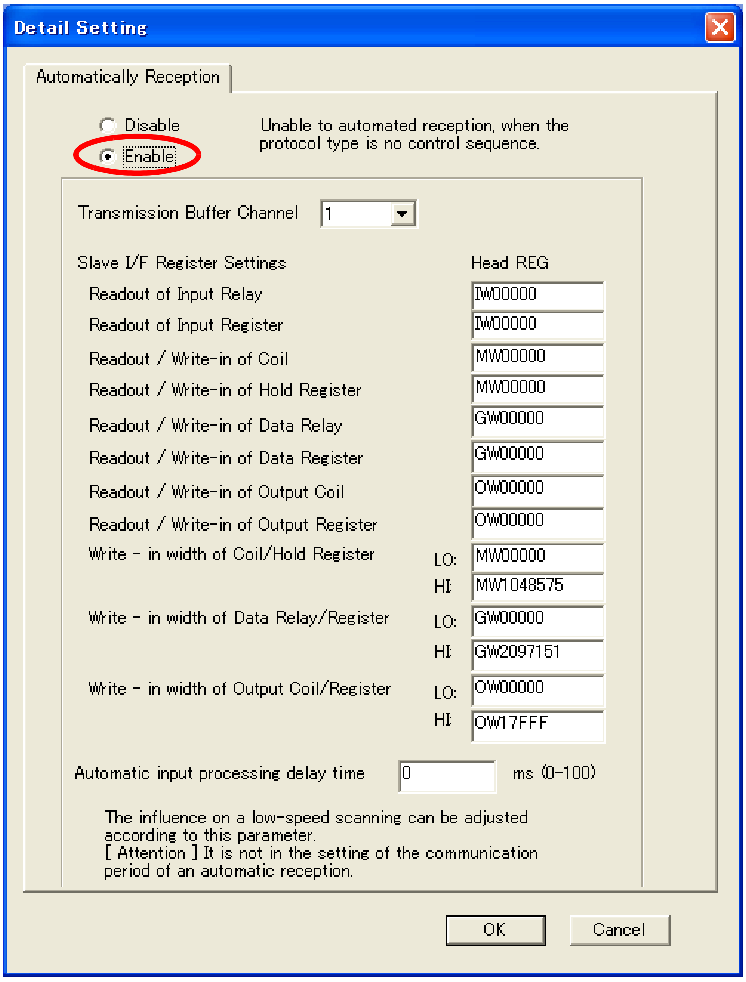
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transfer Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option on the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

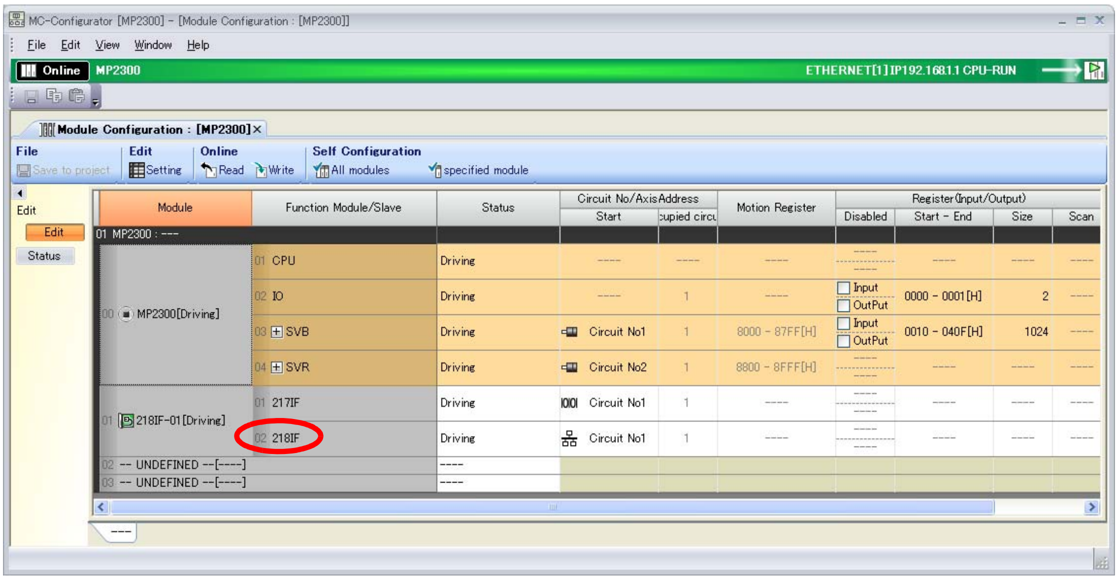
This concludes the settings for using the MP3000 as a slave.

◆ Setting Up the Other Device (MP2300) to Connect

Use the following procedure to set up the MP2300.

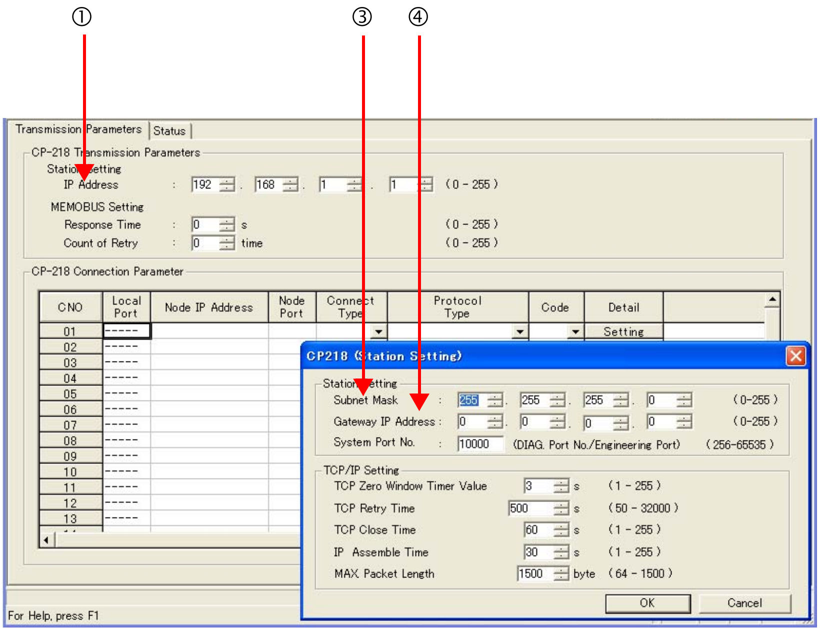
> Note: If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for **218IF** in the **Module Details** Area of the Module Configuration Definition Tab Page.



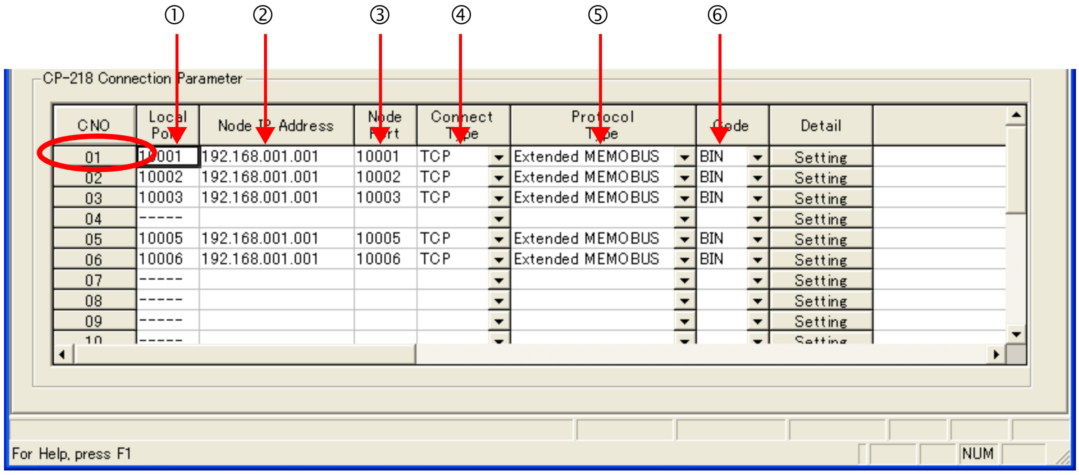
The 218IF Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.002.
②Select ***Edit - Local Station: TCP/IP Setting*** in the Engineering Manager Window.
③In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
④In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Set the connection parameters.

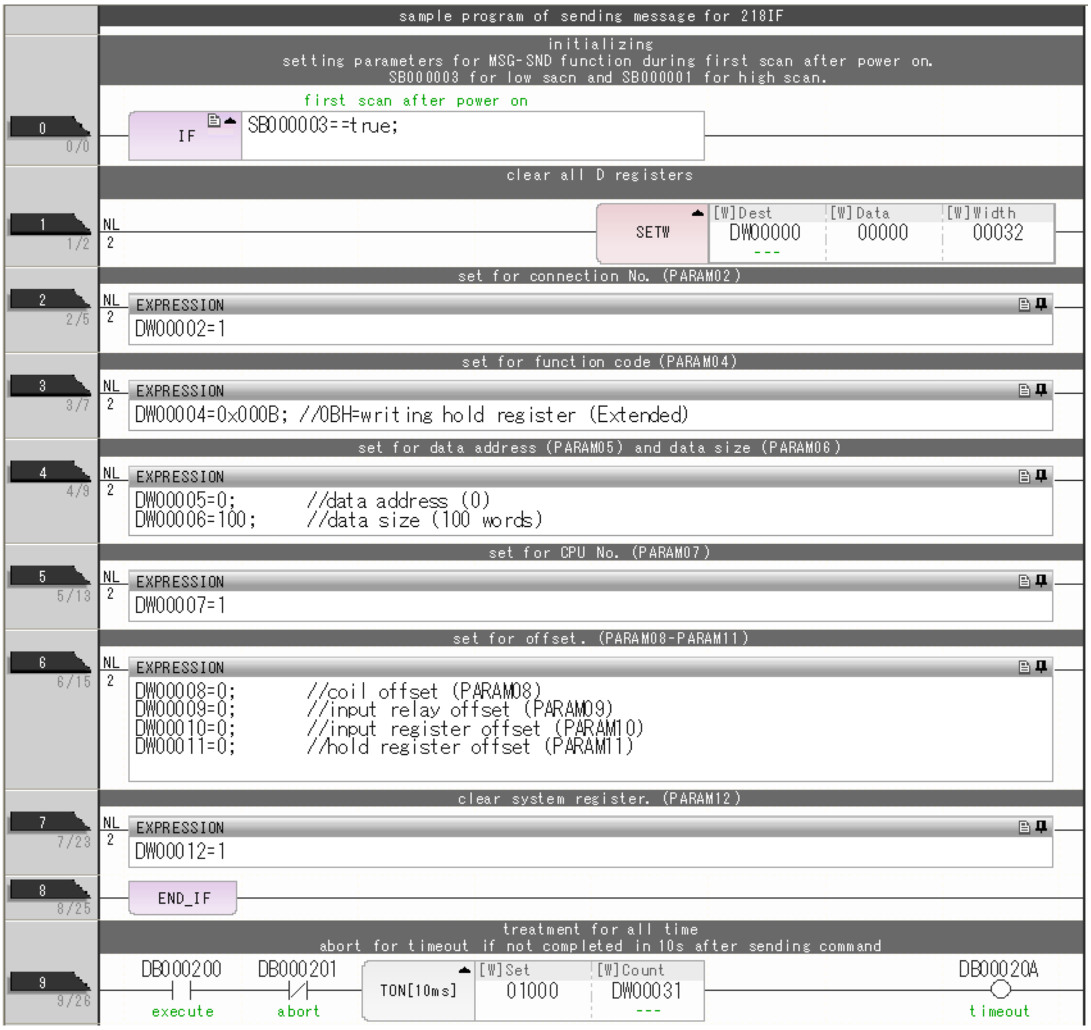


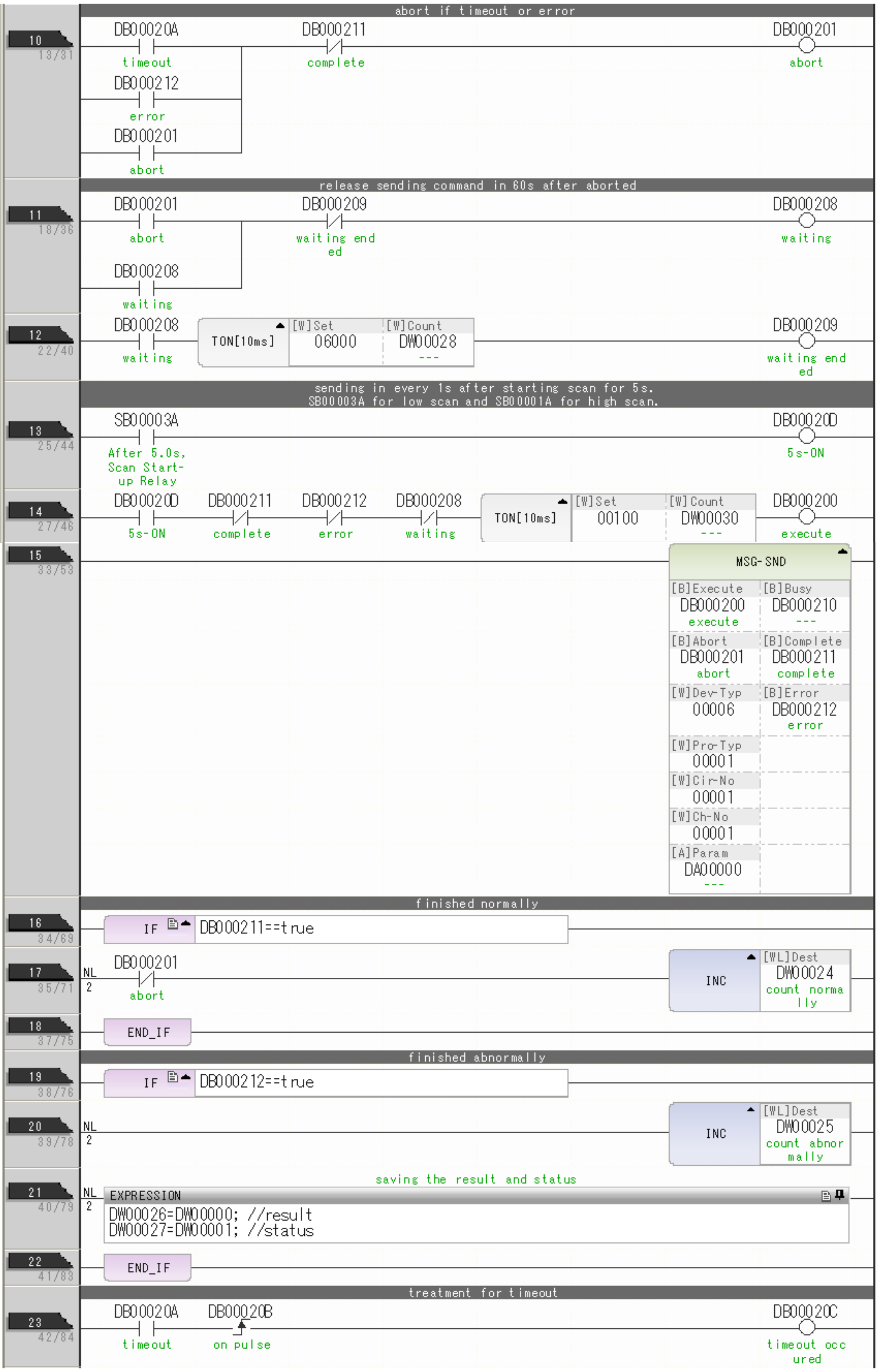
①Enter “10001” in the **Local Port** Box.
②Enter the following address in the **Node IP Address** Boxes: 192.168.001.001.
③Enter “10001” in the **Node Port** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **Extended MEMOBUS** in the **Protocol Type** Box.
⑥Select **BIN** in the **Code** Box.

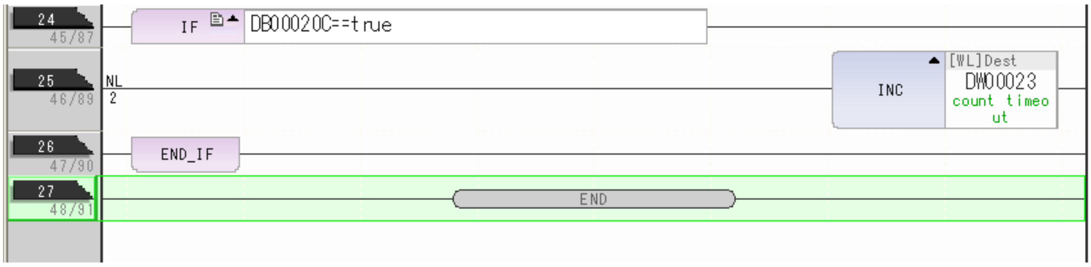
Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

4. Create a ladder program for the MSG-SND function.

A ladder program example is shown below.




abort if timeout or error
DB00020A timeout
DB000211 complete
DB000201 abort
DB000212 error
DB000201 abort
release sending command in 60s after aborted
DB000201 abort
DB000209 waiting ended
DB000208 waiting
DB000208 waiting
DB000208 waiting
TON[10ms]
[W]Set 06000
[W]Count DW00028
DB000209 waiting ended
sending in every 1s after starting scan for 5s.
SB00003A for low scan and SB00001A for high scan.
SB00003A After 5.0s, Scan Start-up Relay
DB00020D 5s-ON
DB00020D 5s-ON
DB000211 complete
DB000212 error
DB000208 waiting
TON[10ms]
[W]Set 00100
[W]Count DW00030
DB000200 execute
MSG-SND
[B]Execute DB000200 execute
[B]Busy DB000210
[B]Abort DB000201 abort
[B]Complete DB000211 complete
[W]Dev-Typ 00006
[B]Error DB000212 error
[W]Pro-Typ 00001
[W]Cir-No 00001
[W]Ch-No 00001
[A]Param DA00000
finished normally
IF DB000211==true
DB000201 abort
INC
[WL]Dest DW00024 count normally
END_IF
finished abnormally
IF DB000212==true
INC
[WL]Dest DW00025 count abnormally
saving the result and status
EXPRESSION
DW00026=DW00000; //result
DW00027=DW00001; //status
END_IF
treatment for timeout
DB00020A timeout
DB00020B on pulse
DB00020C timeout occured



5. Save the data to flash memory.

This concludes the setup.

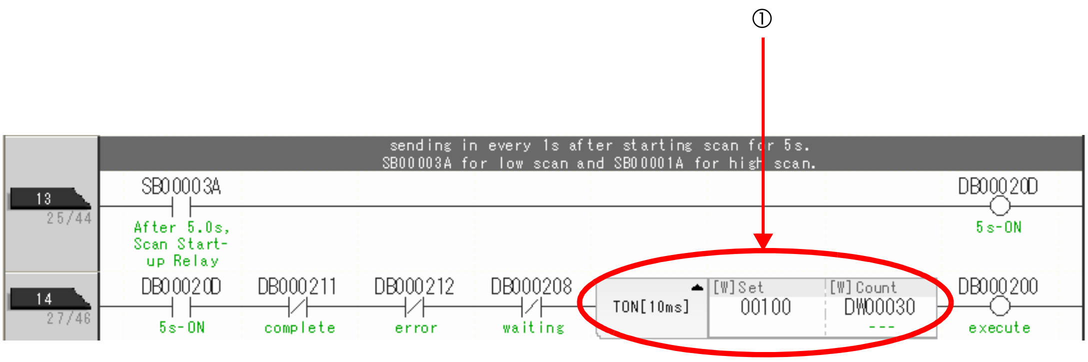
◆ Starting Communications

1. Turn ON the power to the MP3000 to start receiving messages.

The system will automatically start the message reception operation. No further operation is required.

2. Turn ON the Execute Bit (e.g., DB000200) for the MSG-SND function in the MP2300 to start sending messages.

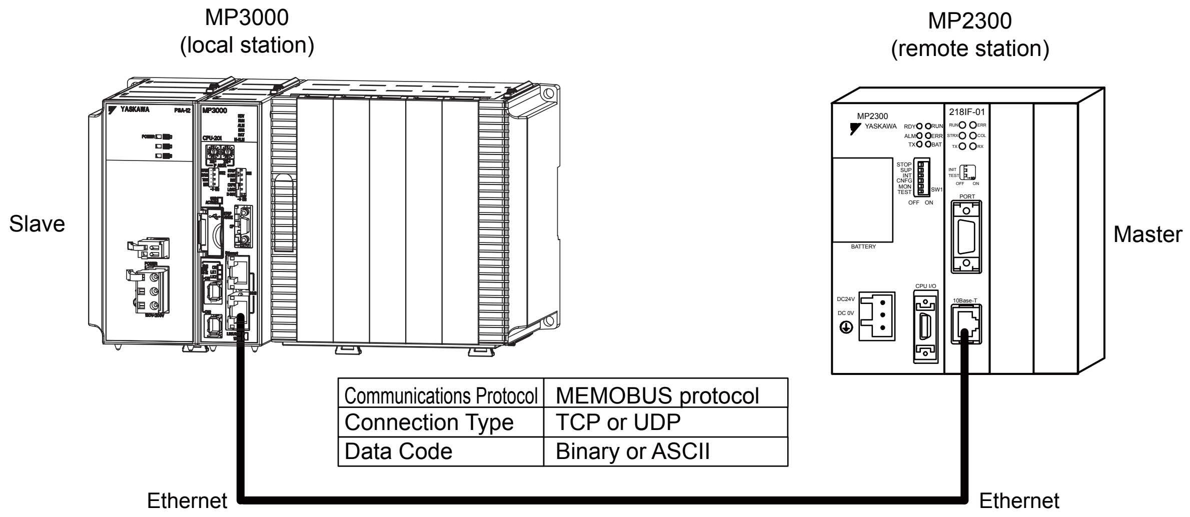
The ladder program example is designed to send a message every second after five seconds have elapsed from when the low-speed scan (or high-speed scan) starts.
To change the message transmission interval, change the timer value ①.



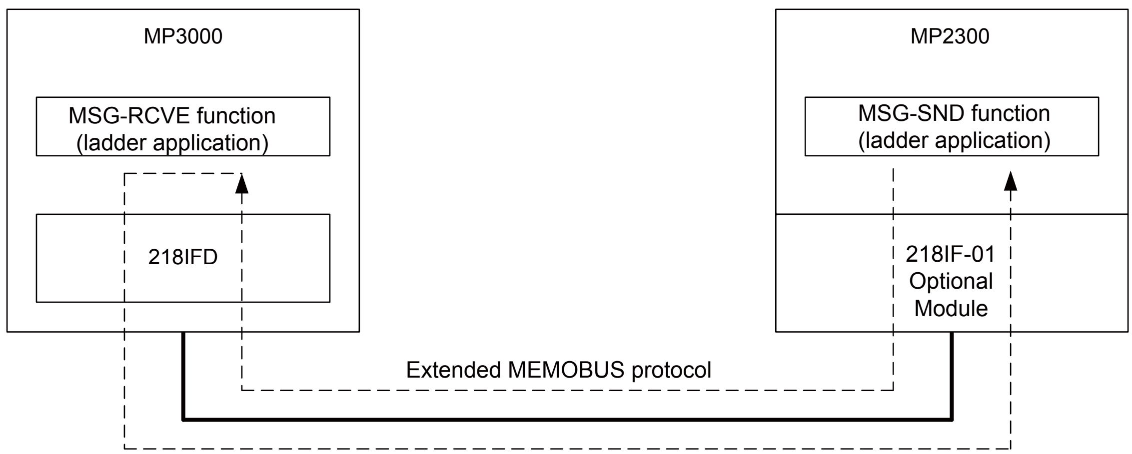
Using the MSG-RCVE Function with the MP3000 as a Slave

You can use the MSG-RCVE function together with automatic reception by maintaining a separate connection.

This section describes how to communicate with an MP2300-series Controller by using the MSG-RCVE function.

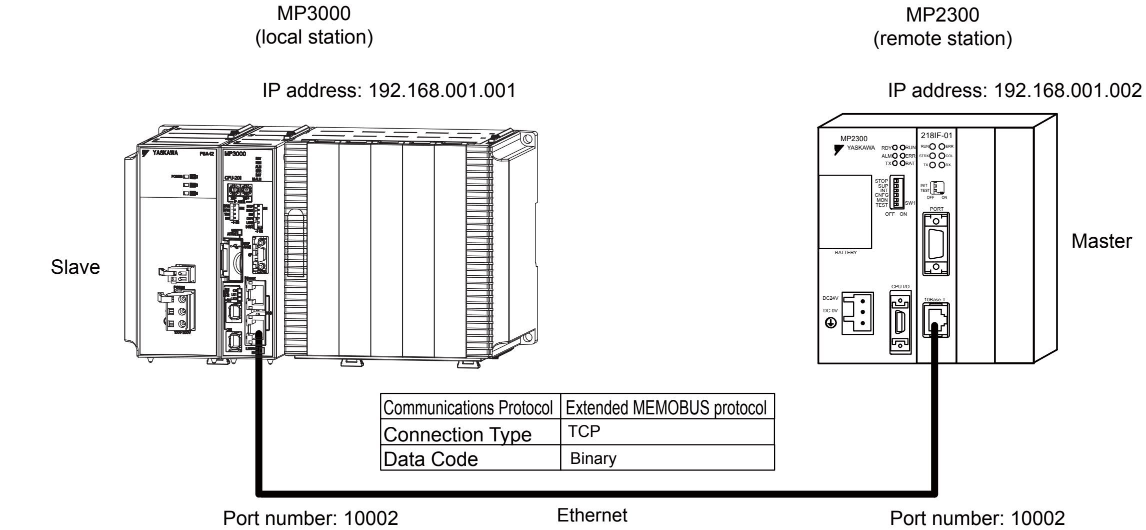


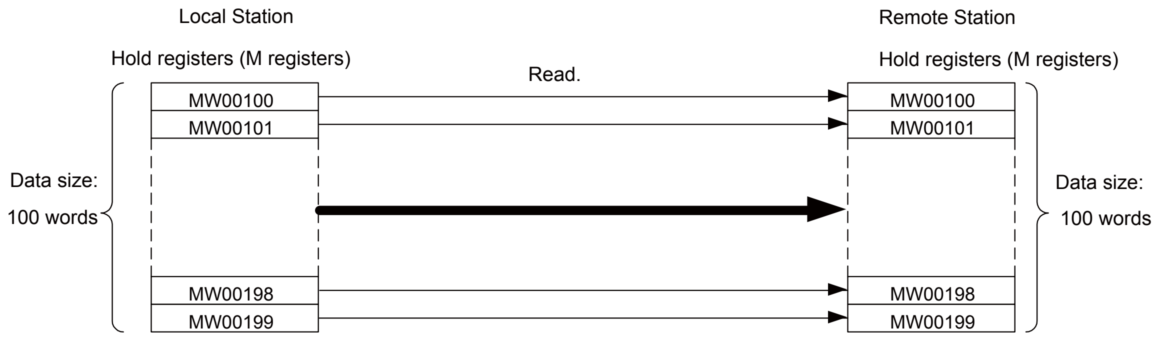
Communications Protocol	MEMOBUS protocol
Connection Type	TCP or UDP
Data Code	Binary or ASCII



Setting Example

The following figure illustrates how the contents of the MW00100 to MW00199 hold registers in the MP2300 master are written to the MW00100 to MW00199 hold registers in the MP3000 slave.



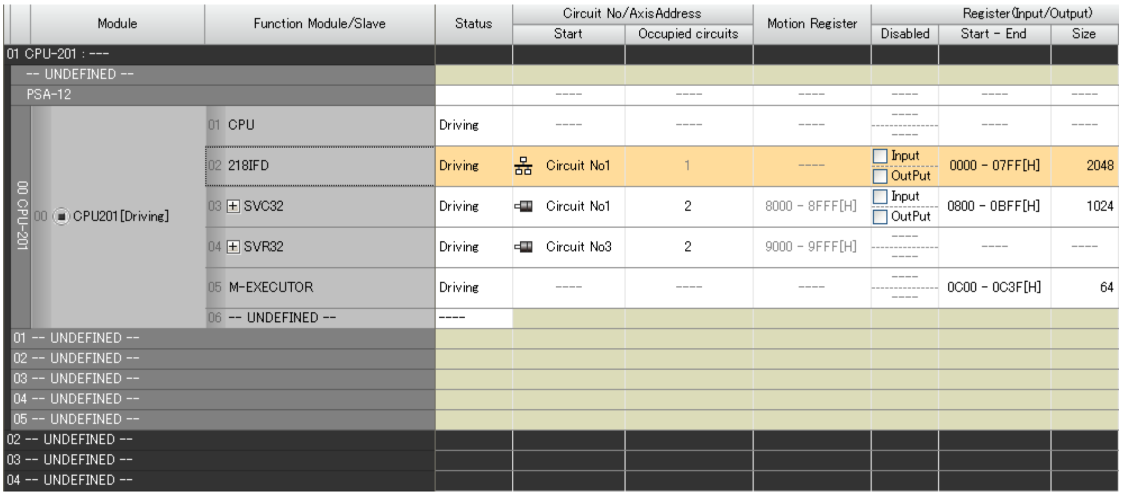


MP3000 Setup

Use the following procedure to set up the MP3000.

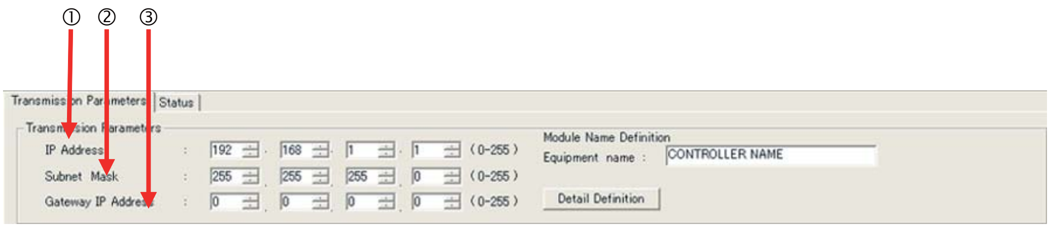
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



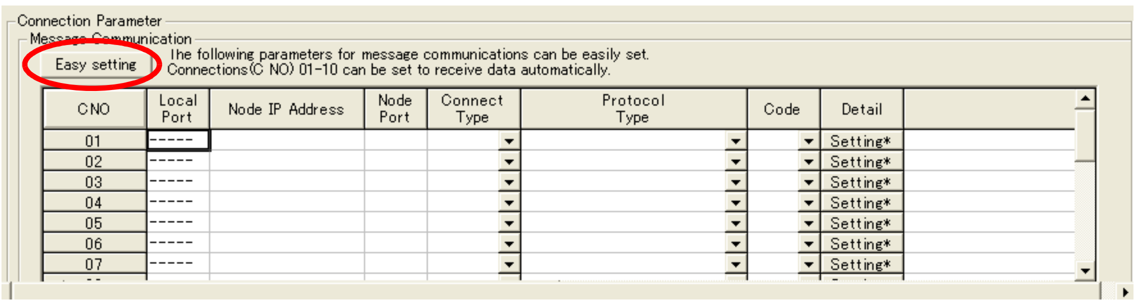
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



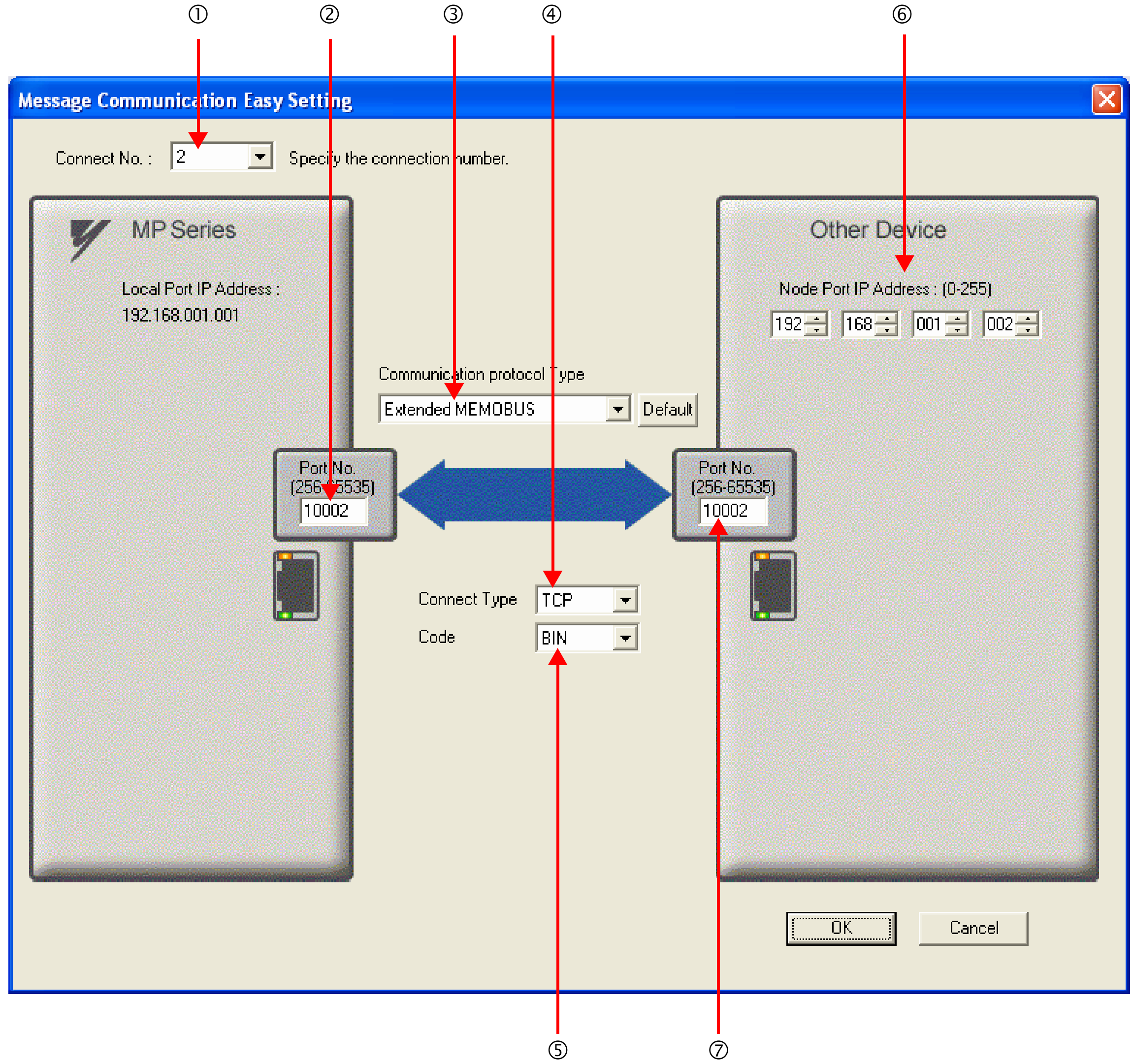
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communications** Area in the **Connection Parameters** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



①Select **2** in the **Connect No.** Box.
②Enter “10002” in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter “10002” in the **Port No.** Box for the other device.

Note: Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

5. Click the **OK** Button.

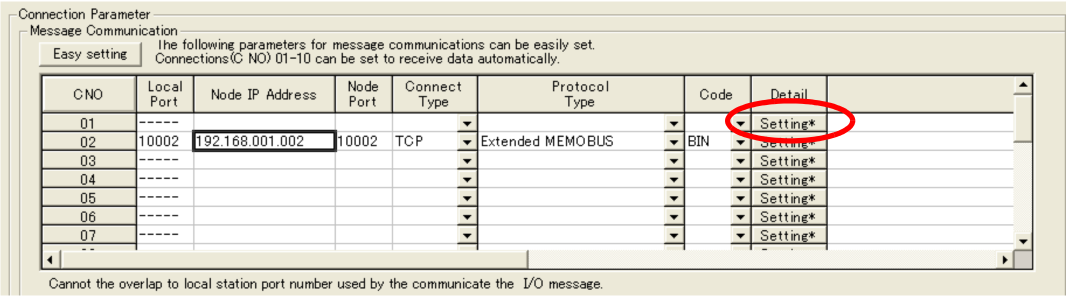
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transfer Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

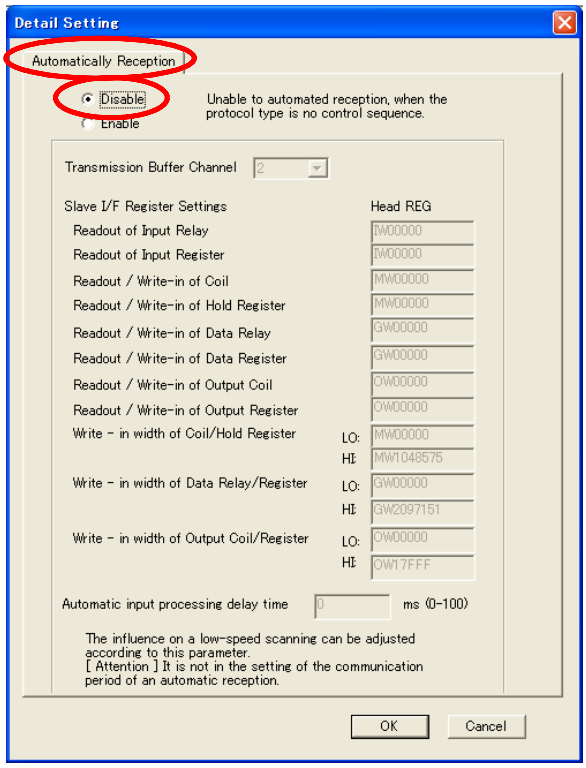
Ethernet Communications

2

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



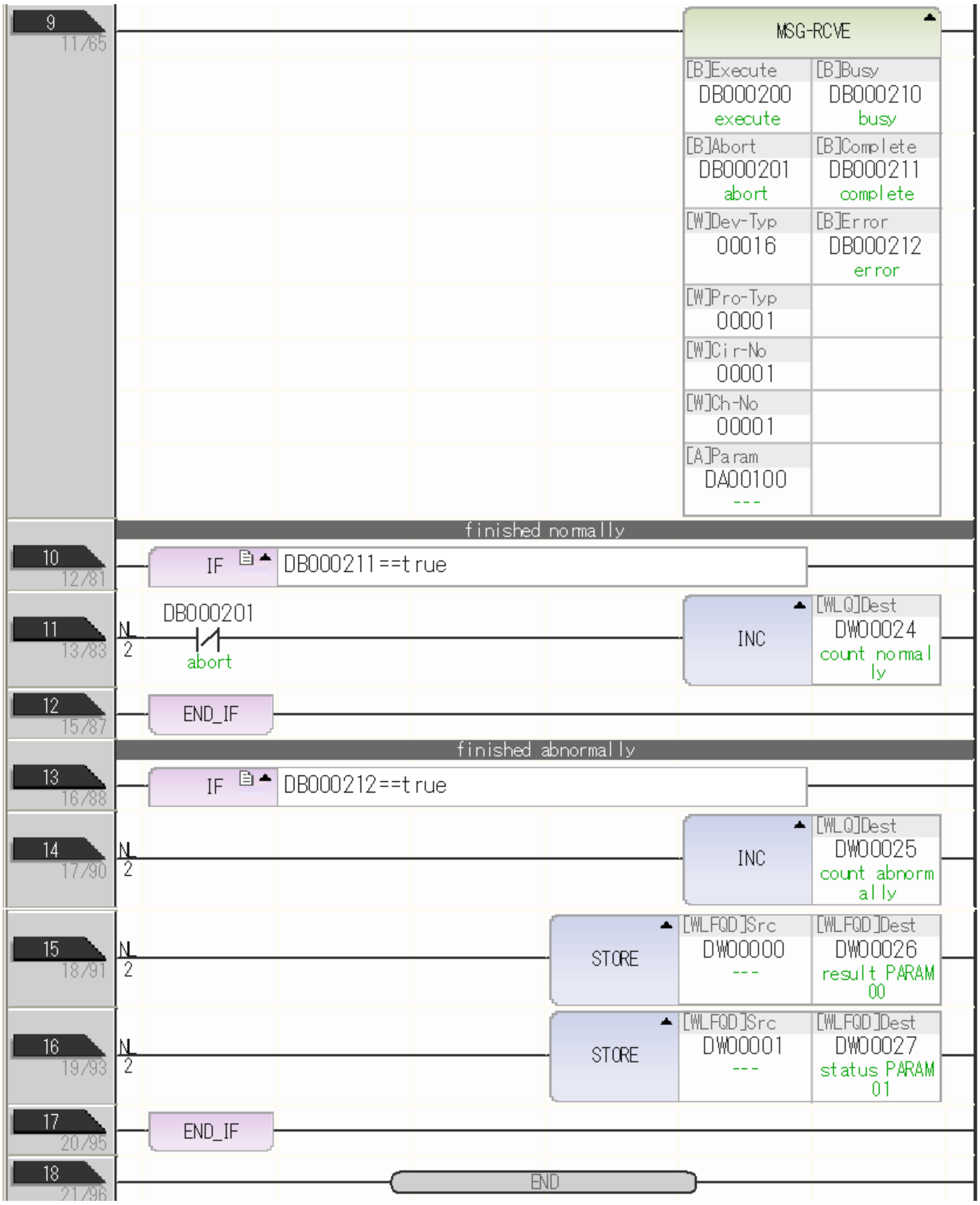
8. Select the **Disable** Option on the Automatically Reception Tab Page and then click the **OK** Button.



Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

9. Create a ladder program for the MSG-RCVE function.

A ladder program example is shown below.



10. Save the data to flash memory.

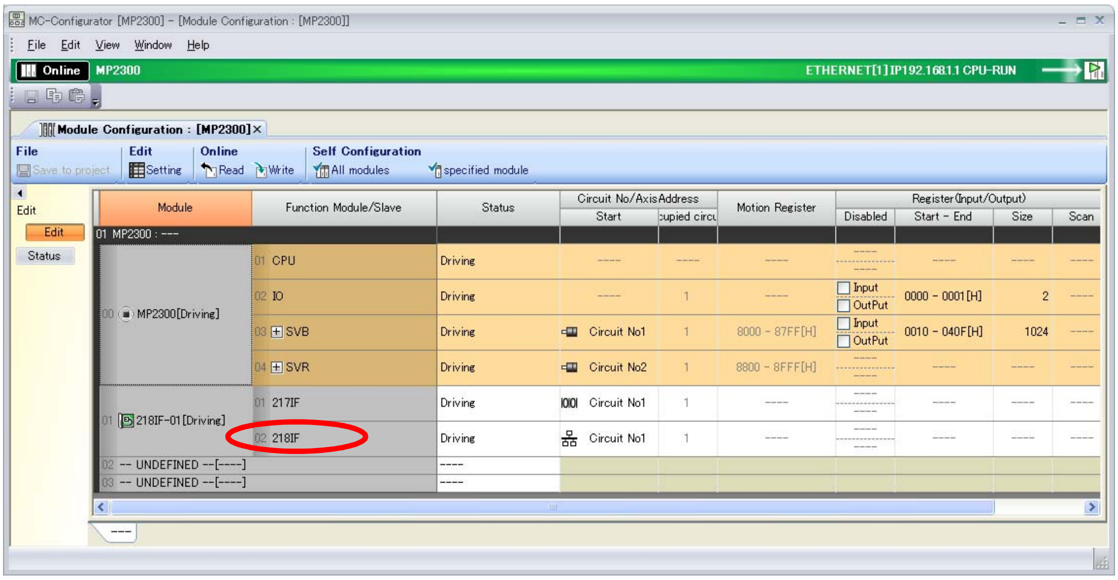
This concludes the settings for using the MP3000 as a slave.

◆ Setting Up the Other Device (MP2300) to Connect

Use the following procedure to set up the MP2300.

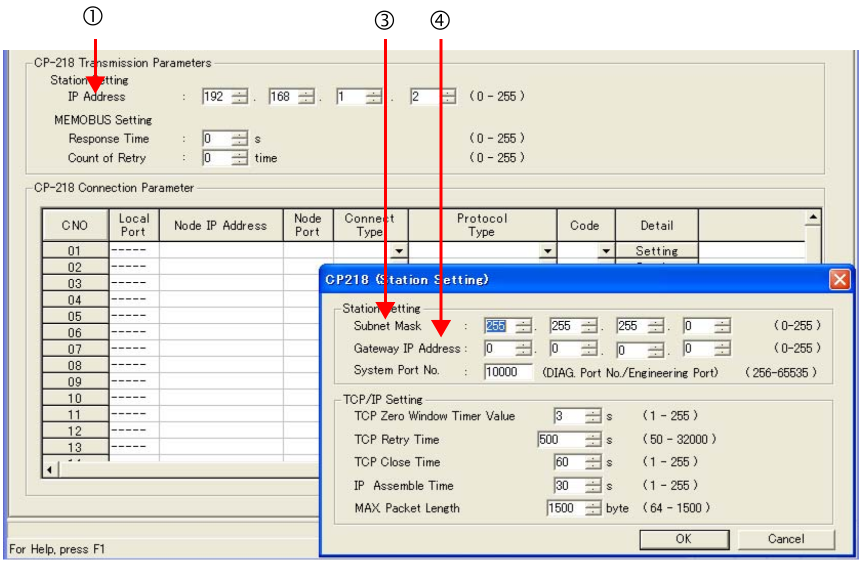
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for **218IF** in the **Module Details** Area of the Module Configuration Definition Tab Page.



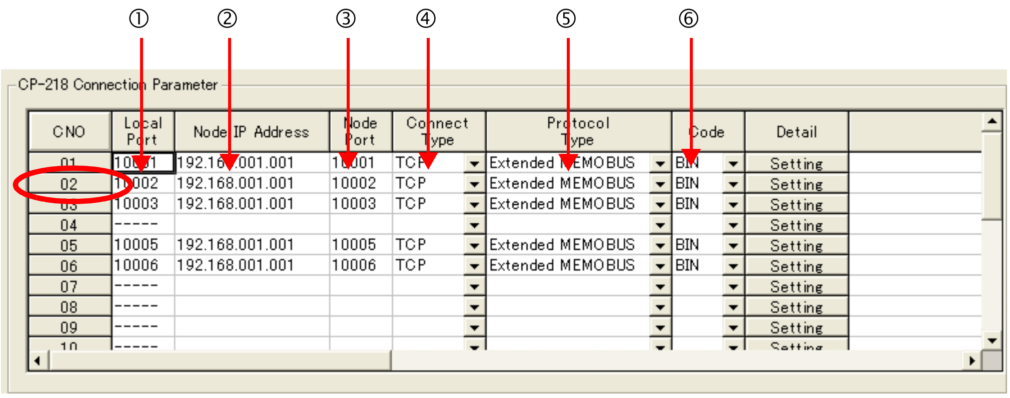
The 218IF Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.002.
②Select ***Edit* – *Local Station: TCP/IP Setting*** in the Engineering Manager Window.
③In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
④In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Set the connection parameters.

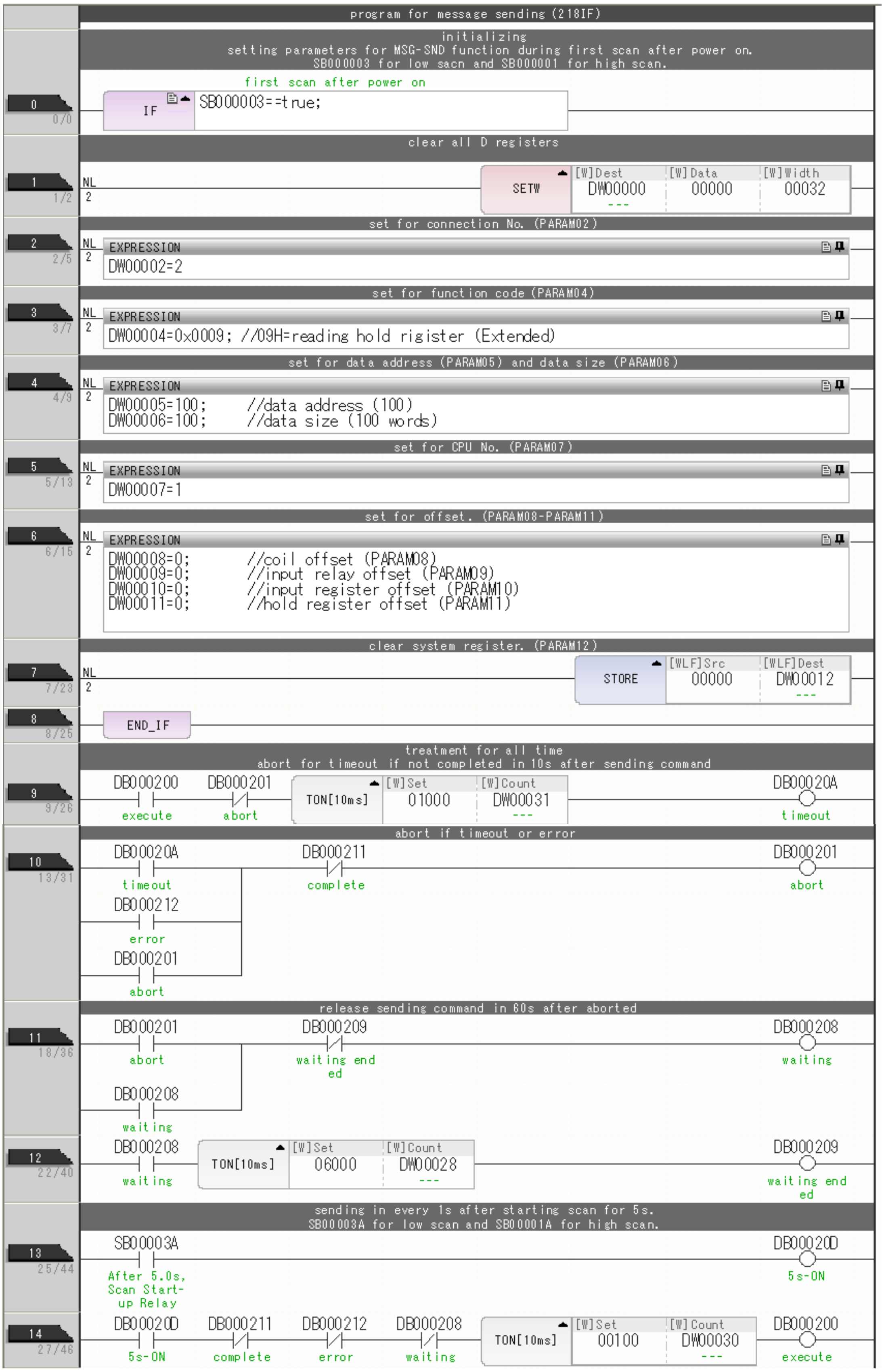


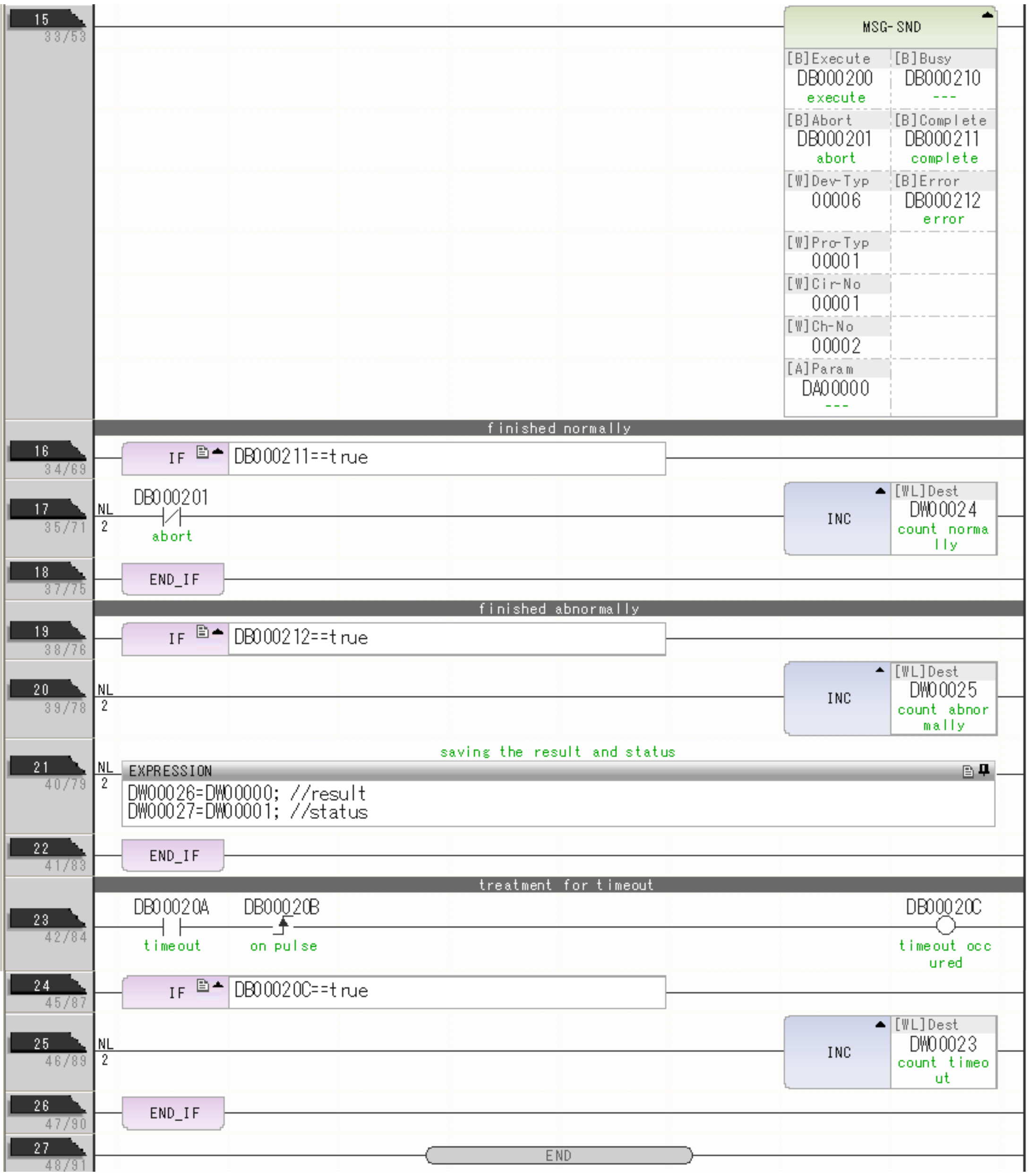
①Enter “10002” in the **Local Port** Box.
②Enter the following address in the **Node IP Address** Boxes: 192.168.001.001.
③Enter “10002” in the **Node Port** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **Extended MEMOBUS** in the **Protocol Type** Box.
⑥Select **BIN** in the **Code** Box.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

4. Create a ladder program for the MSG-SND function.

A ladder program example is shown below.





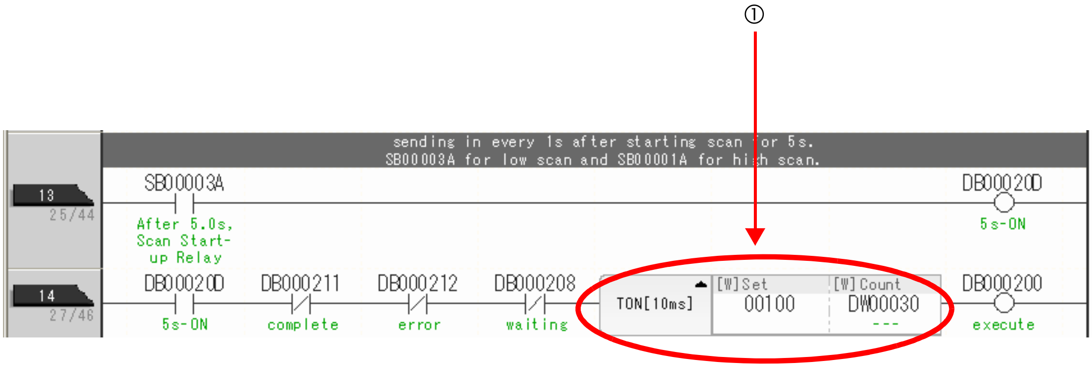
5. Save the data to flash memory.

This concludes the setup.

◆ Starting Communications

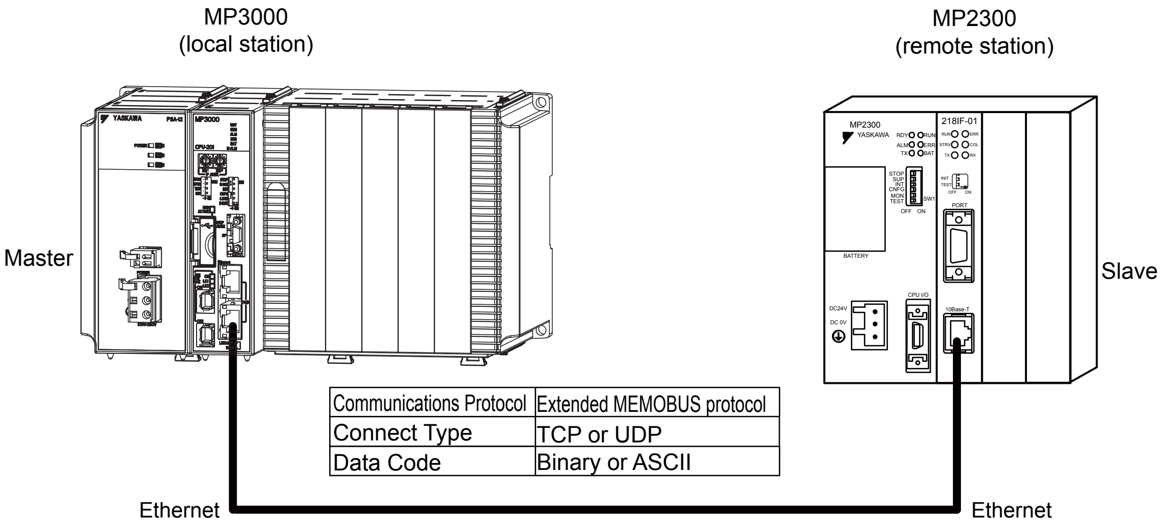
1. **Turn ON the power to the MP3000 to start receiving messages.**
In the ladder program example, message reception starts immediately after the system starts. No further operation is required.

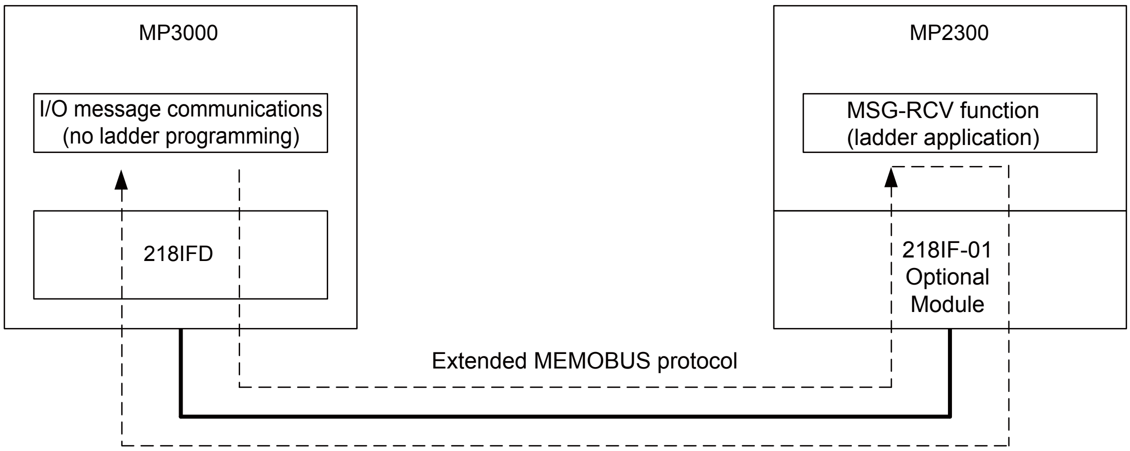
2. **Turn ON the Execute Bit (e.g., DB000200) for the MSG-SND function in the MP2300 to start sending messages.**
The ladder program example is designed to send a message every second after five seconds have elapsed from when the low-speed scan (or high-speed scan) starts.
To change the message transmission interval, change the timer value ①.



Using I/O Message Communications with the MP3000 as the Master

This section describes how to communicate with an MP2300-series Controller by using I/O message communications.

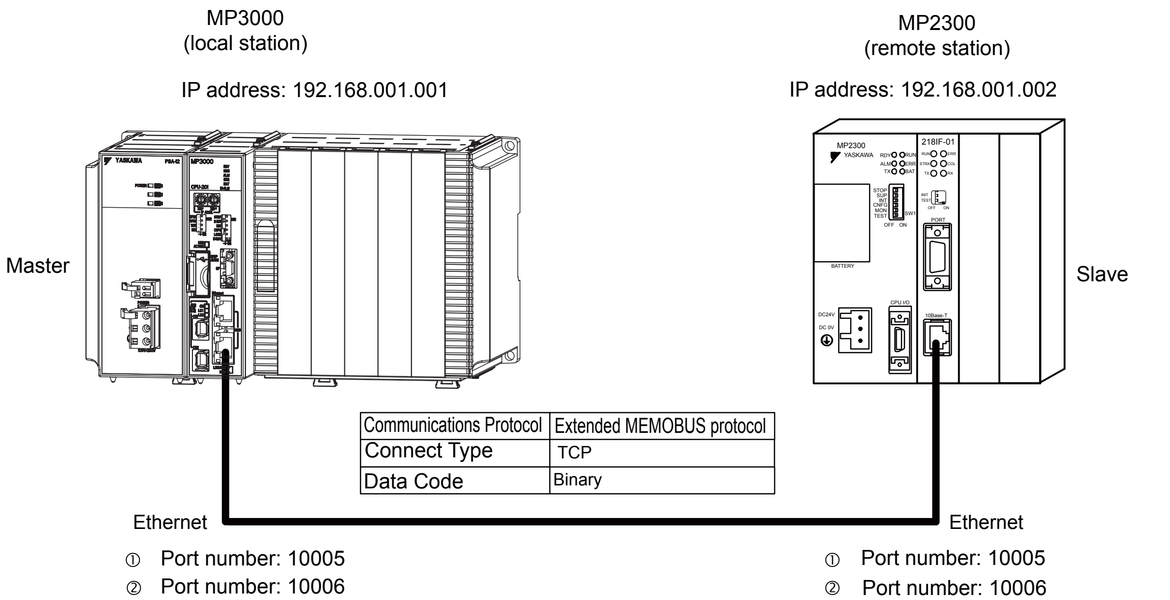




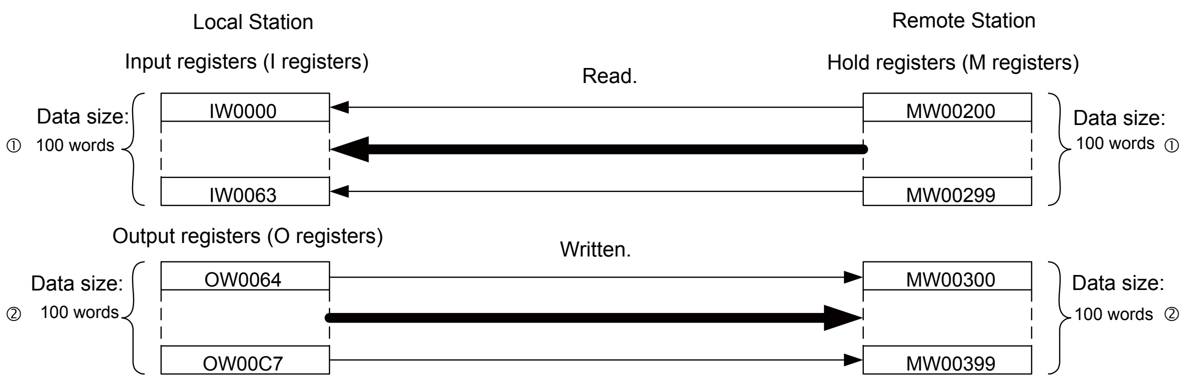
Note: 1. I/O message communications use 1-to-1 communications.
2. When using the Extended MEMOBUS protocol to communicate with an MP-series Controller, you can only read and write hold registers.
3. When communicating with multiple remote devices or when you need to perform any operations other than reading or writing to hold registers, use the Send Message function (MSG-SNDE).

Setting Example

The following figure illustrates how the contents of the MW00200 to MW00299 hold registers in the MP2300 slave are read to the IW0000 to IW0063 input registers in the MP3000 master and how the contents of the OW0064 to OW00C7 output registers in the MP3000 master are written to the MW00300 to MW00399 hold registers in the MP2000 slave.



Communications Protocol	Extended MEMOBUS protocol
Connect Type	TCP
Data Code	Binary

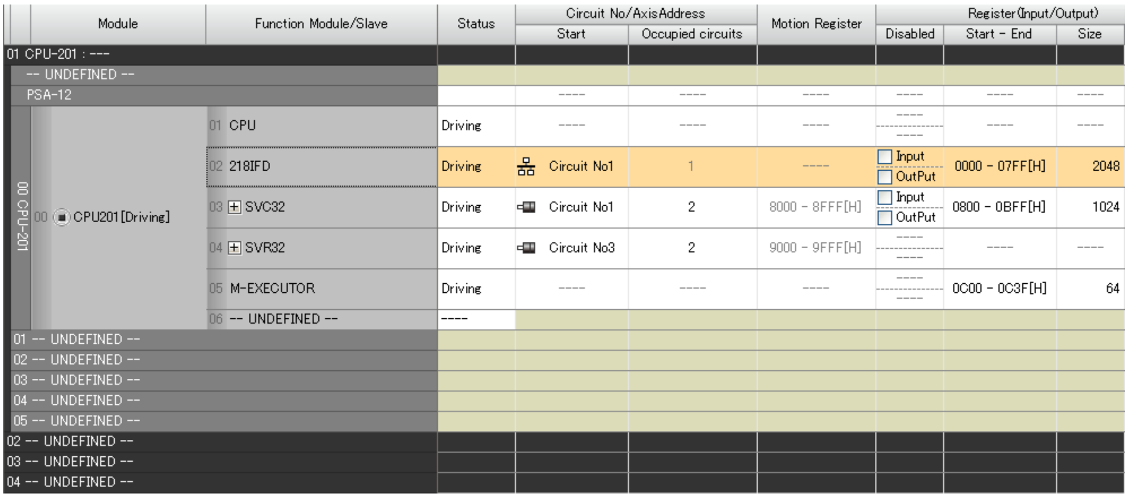


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

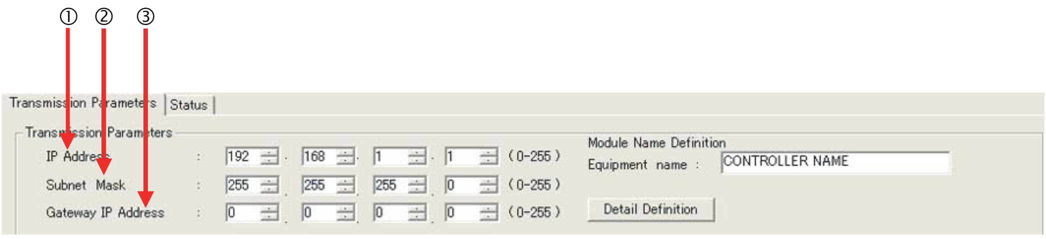
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



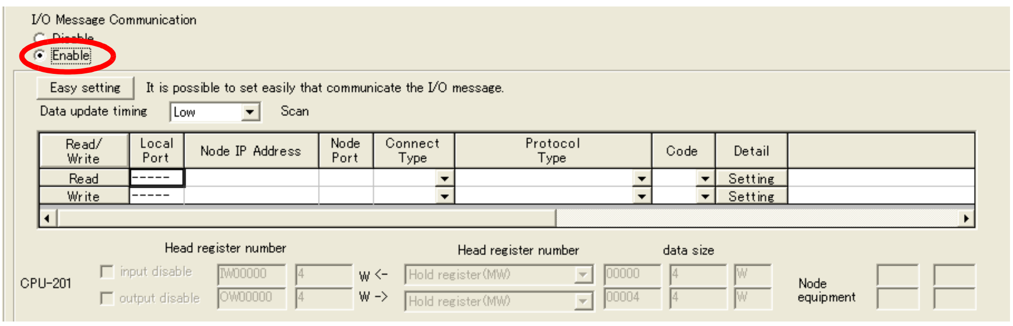
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



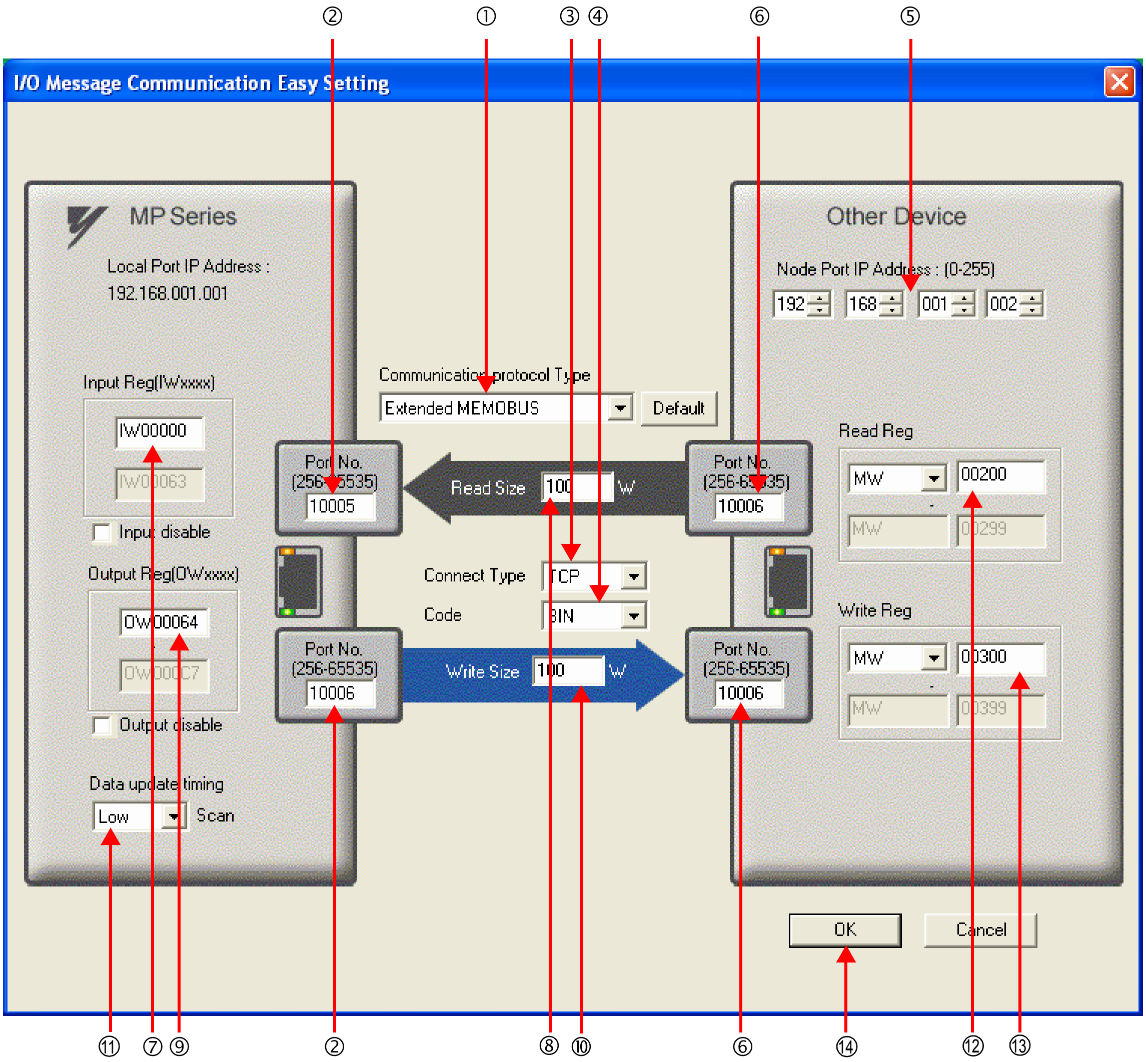
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Select the **Enable** Option in the **I/O Message Communications** Area of the **Connection Parameter** settings.



4. Click the **Easy setting** Button.
The Message Communications Easy Setting Dialog Box will be displayed.

5. Set the connection parameters.



①Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.

Note: If you select the Extended MEMOBUS communications protocol, you will be able to read and write only hold registers (MW).

②Enter "10005" and "10006" in the **Port No.** Boxes for the MP-series Controller.

③Select **TCP** in the **Connect Type** Box.

④Select **BIN** in the **Code** Box.

⑤Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.

⑥Enter "10005" and "10006" in the **Port No.** Boxes for the other devices.

Note: In I/O message communications, a message is transmitted from each port for which a register read/write is initiated. Therefore, for this example, the connected remote device must support a message reception function to receive two messages.

⑦Enter "IW0000" in the **Input Reg** Box as the read data destination.

⑧Enter "100" in the **Read Size** Box as the size of data to read.

⑨Enter "OW0064" in the **Output Reg** Box as the write data destination.

⑩Enter "100" in the **Write Size** Box as the size of data to write.

⑪ Select **Low** in the **Data update timing** Box as the timing to update input and output data between the CPU Function Module and 218IFD.

Note: The data update timing is the timing at which the CPU Function Module and 218IFD exchange data. Communications with the remote device are performed asynchronously. The data update timing therefore does not necessarily mean that the messages are sent to the remote device.

⑫ Enter "MW00200" in the **Read Reg** Box as the register type and first address to read from on the remote device.

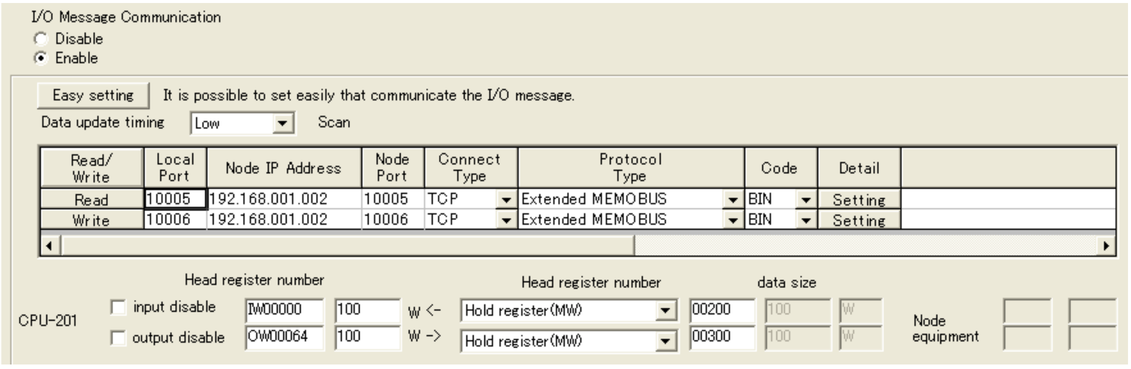
⑬ Enter "MW00300" in the **Write Reg** Box as the register type and first address to write to on the remote device.

6. Click the **OK** Button.

7. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transfer Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

8. Check the settings.



9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

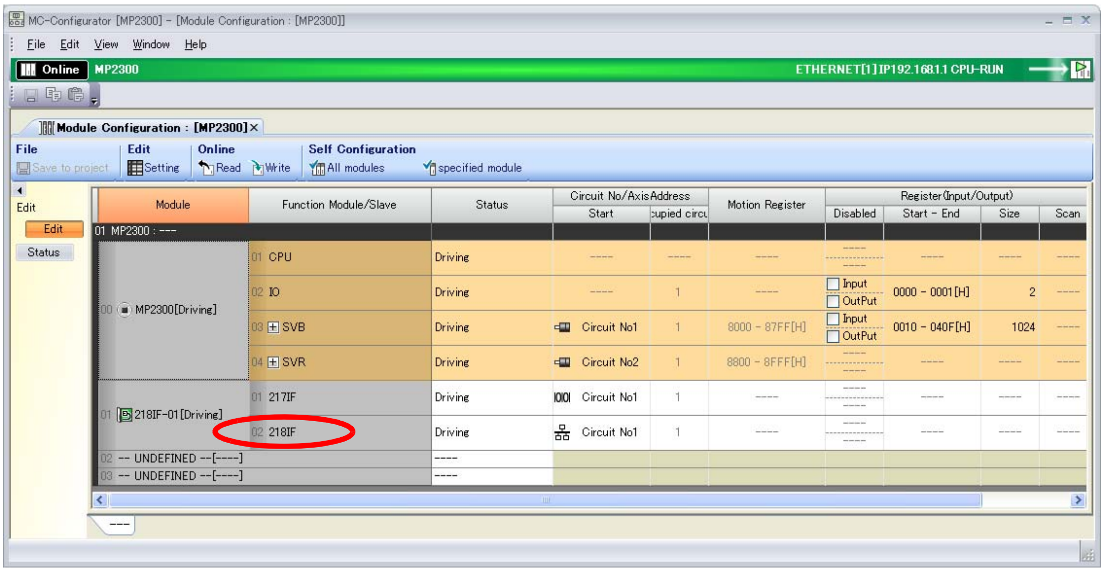
This concludes the settings for using the MP3000 as the master.

◆ Setting Up the Other Device (MP2300) to Connect

Use the following procedure to set up the MP2300.

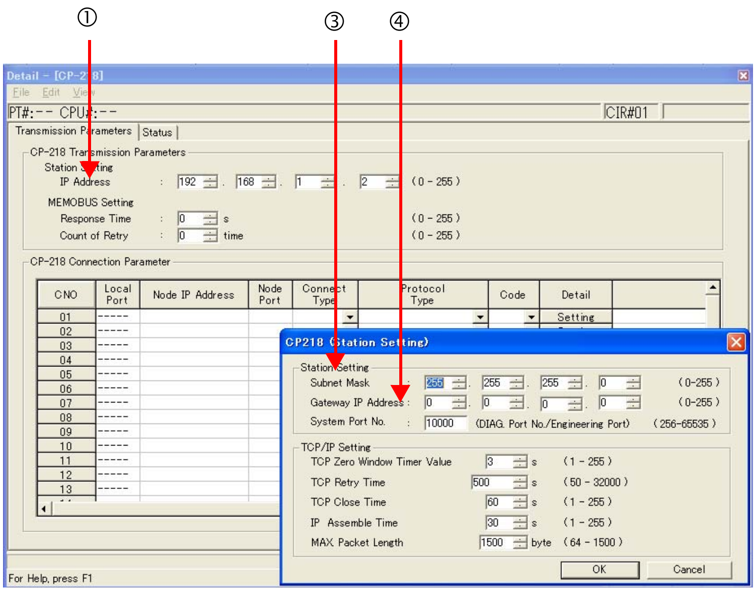
> Note
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for **218IF** in the **Module Details** Area of the Module Configuration Definition Tab Page.



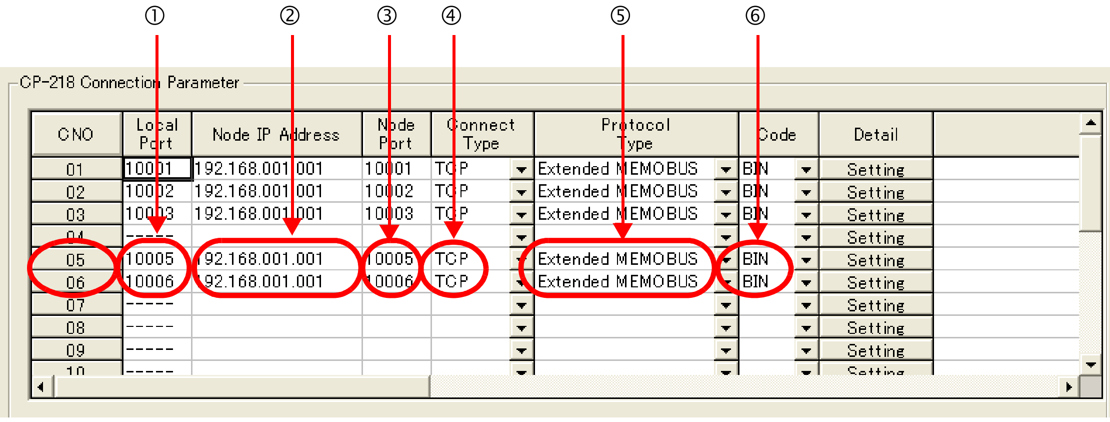
The 218IF Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.002.
②Select ***Edit – Local Station: TCP/IP Setting*** in the Engineering Manager Window.
③In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
④In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Set the connection parameters.



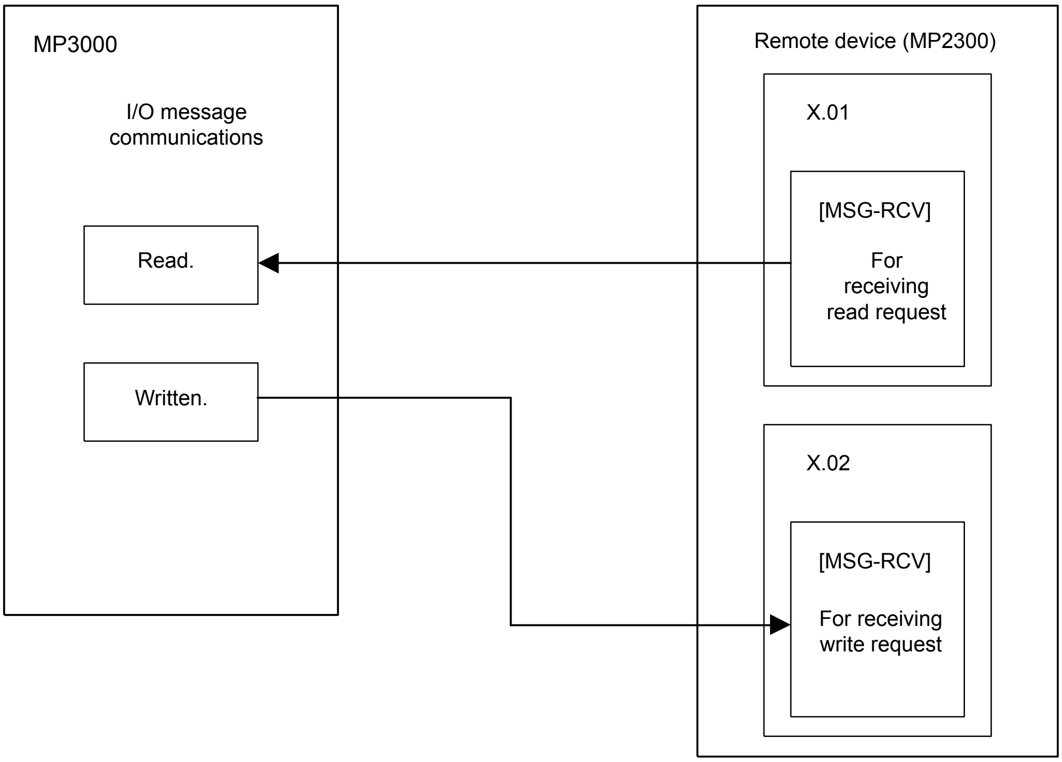
①Enter “10005” and “10006” in the **Local Port** Boxes.
②Enter the following address in the **Node IP Address** Boxes: 192.168.001.001.
③Enter “10005” and “10006” in the **Node Port** Boxes.
④Select **TCP** in the **Connect Type** Box.
⑤Select **Extended MEMOBUS** in the **Protocol Type** Box.
⑥Select **BIN** in the **Code** Box.

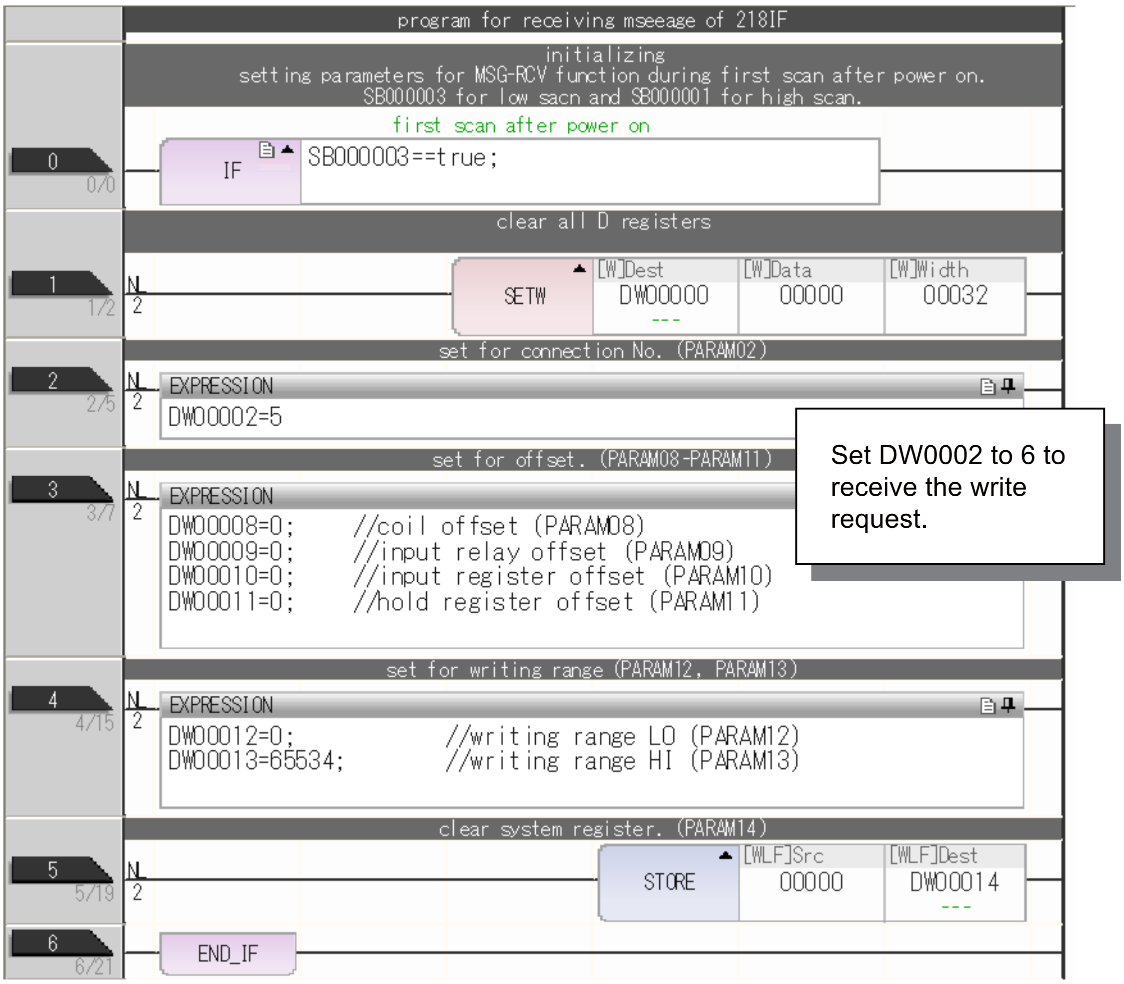
Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

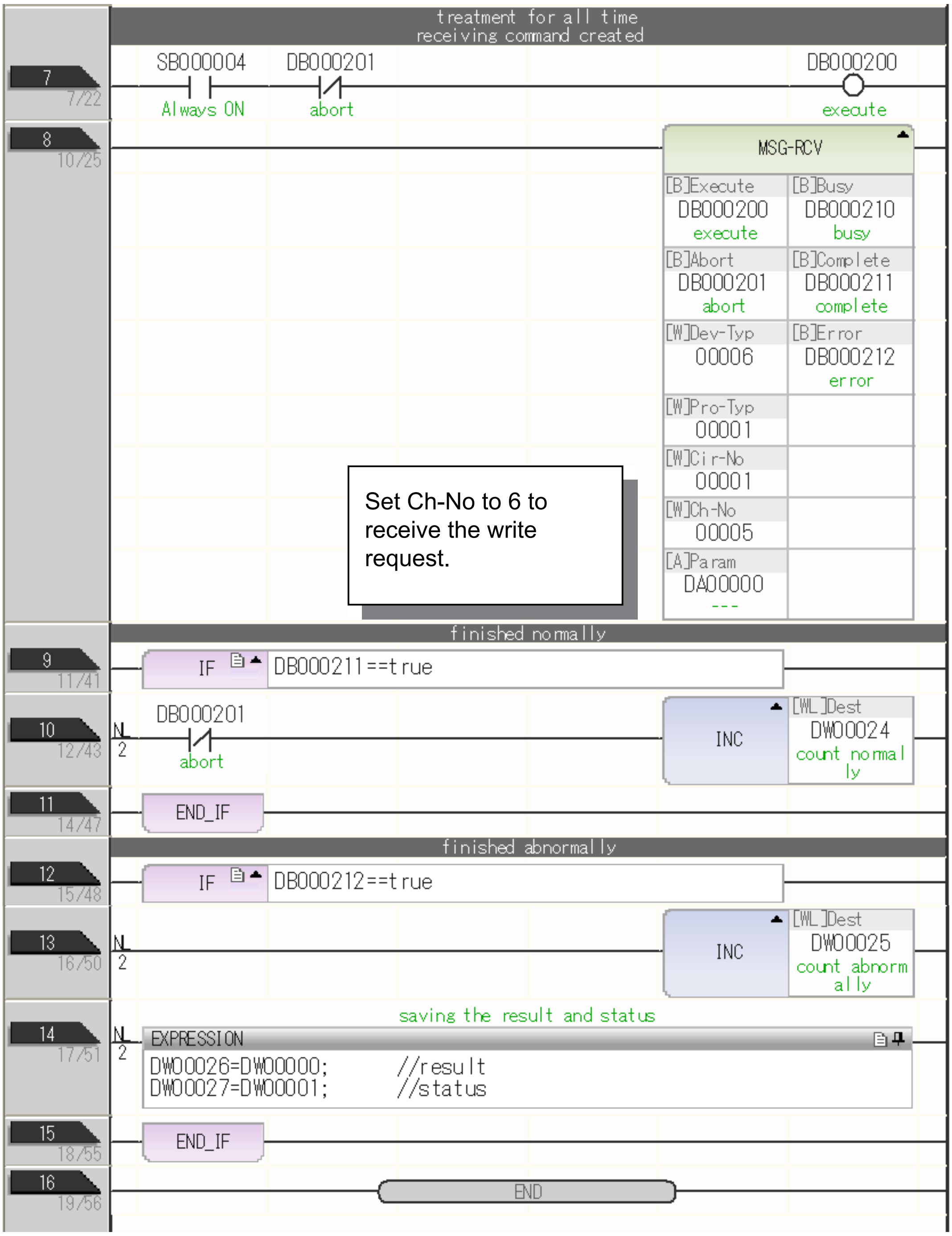
4. **Create a ladder program for the MSG-RCV function.**

A ladder program example is shown below.

This ladder program example is for receiving the read request. Ladder programming for receiving the write request is required separately.







5. Save the data to flash memory.

This concludes the setup.

◆ Starting Communications

1. Turn ON the power to the MP2300 to start receiving messages.

In the ladder program example, message reception starts immediately after the system starts. No further operation is required.

2. Turn ON the power to the MP3000 to send the messages.

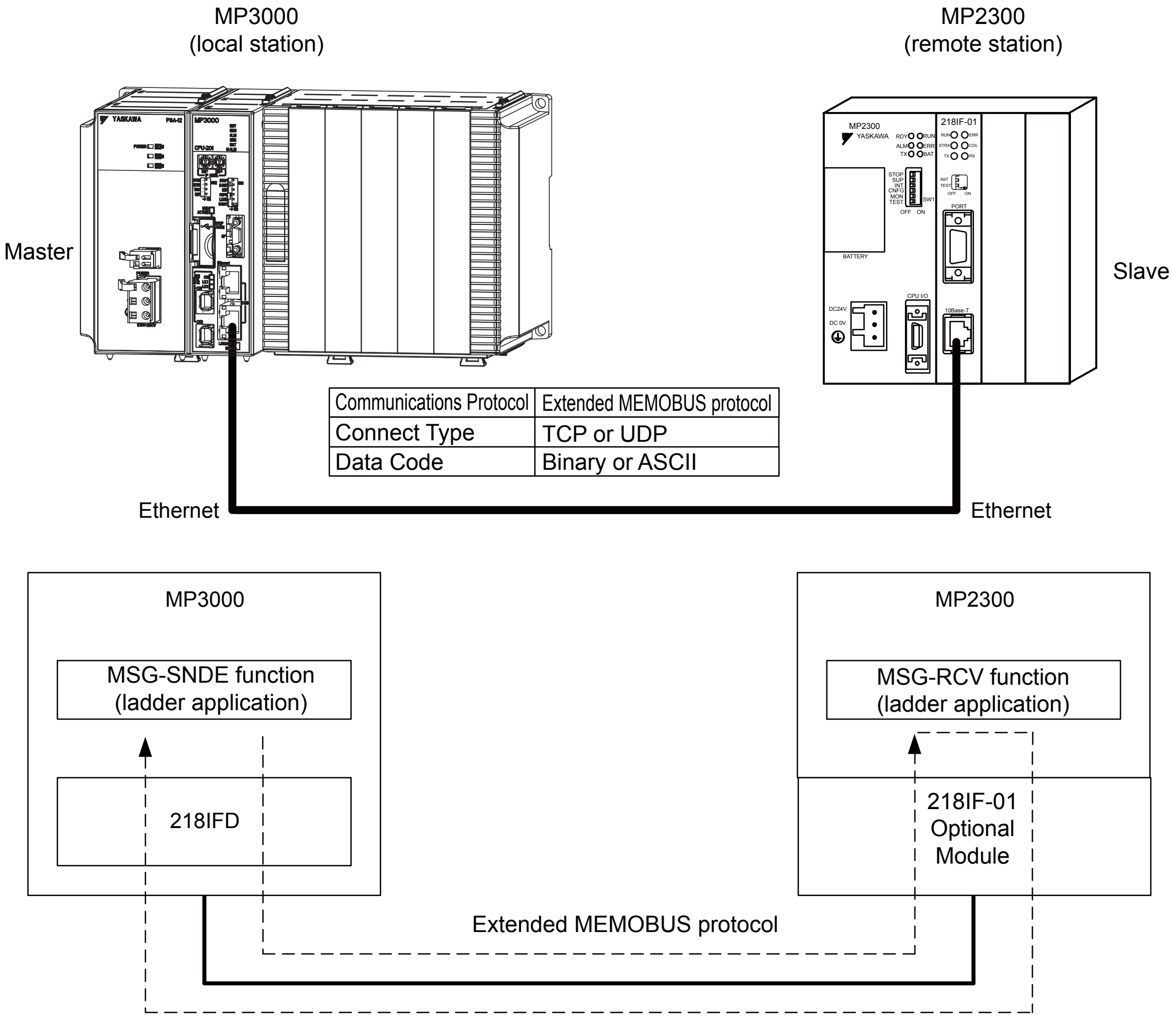
The system will automatically start the message transmission operation. No further operation is required.

Using the MSG-SNDE Function with the MP3000 as the Master

In I/O message communications, operations can be performed only on hold registers (M registers). No other register types are supported. Additionally, this protocol supports communications with only one slave.

To communicate with two or more slaves, you must use the MSG-SNDE function. You can use the MSG-SNDE function together with I/O message communications by maintaining a separate connection.

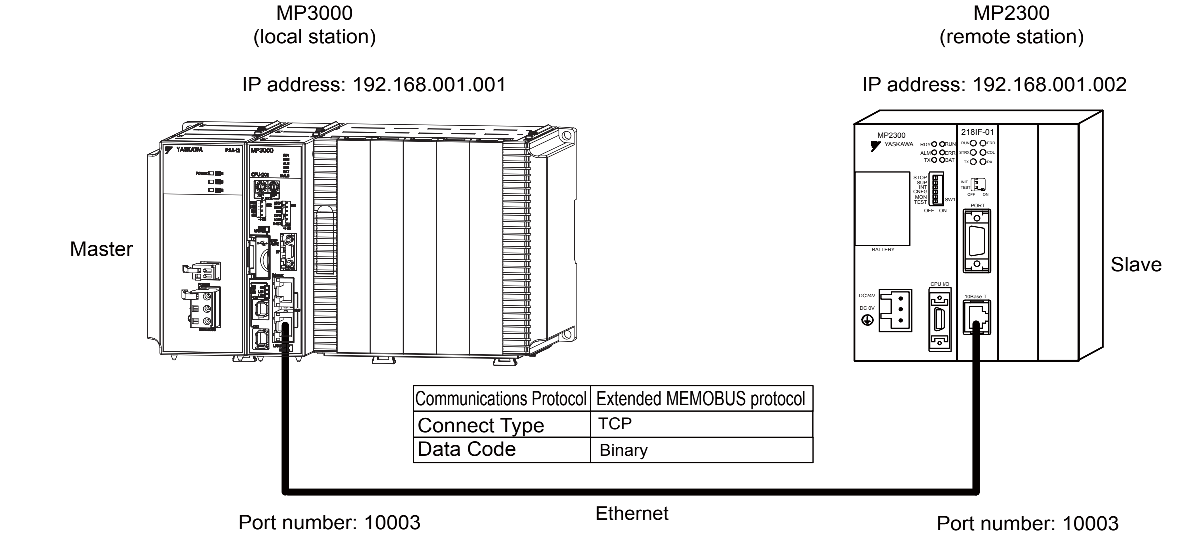
This section describes how to communicate with an MP2300-series Controller by using the MSG-SNDE function.

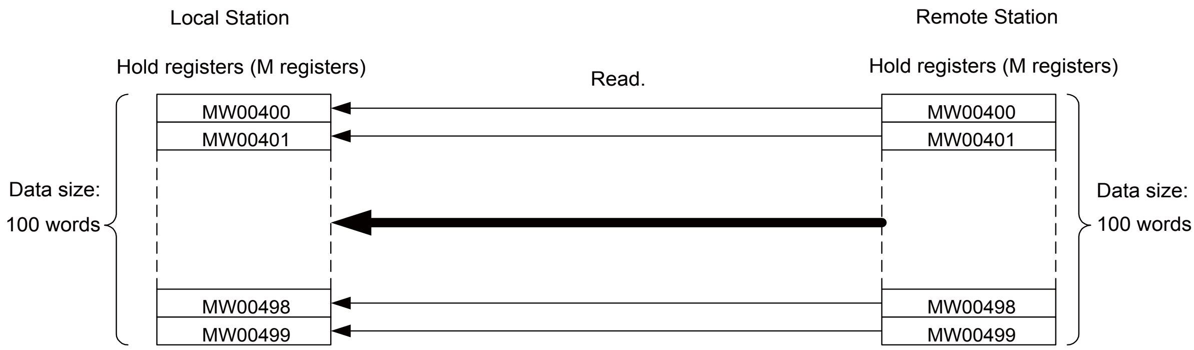


Communications Protocol	Extended MEMOBUS protocol
Connect Type	TCP or UDP
Data Code	Binary or ASCII

Setting Example

The following figure illustrates how the contents of the MW00400 to MW00499 hold registers in the MP2300 slave are written to the MW00400 to MW00499 hold registers in the MP3000 master.



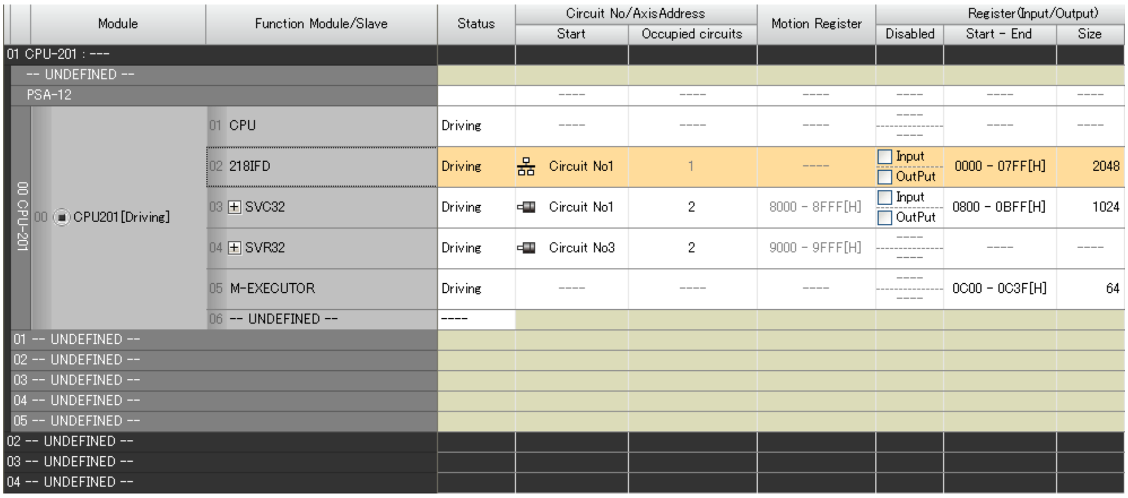


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

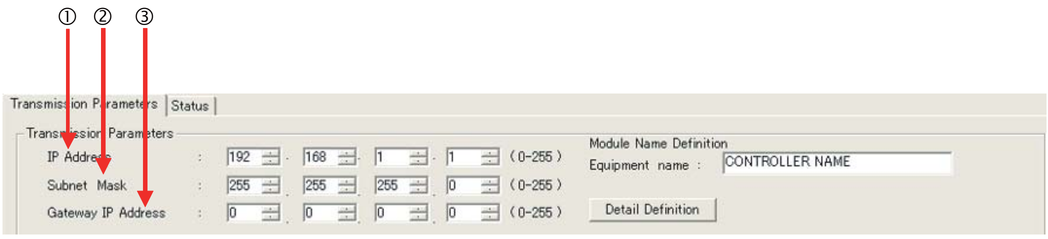
> Note
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



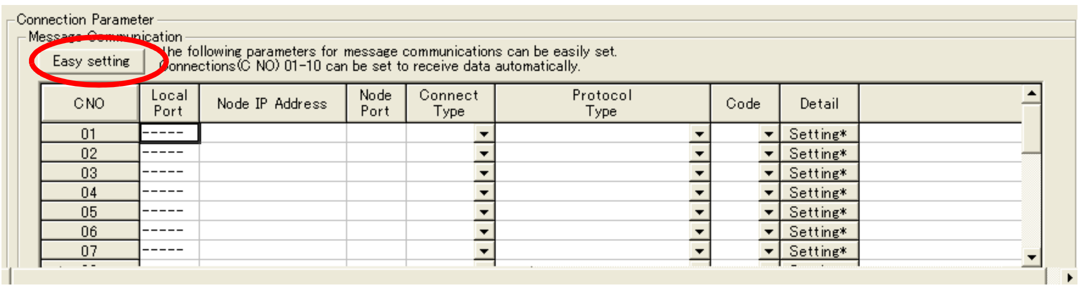
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



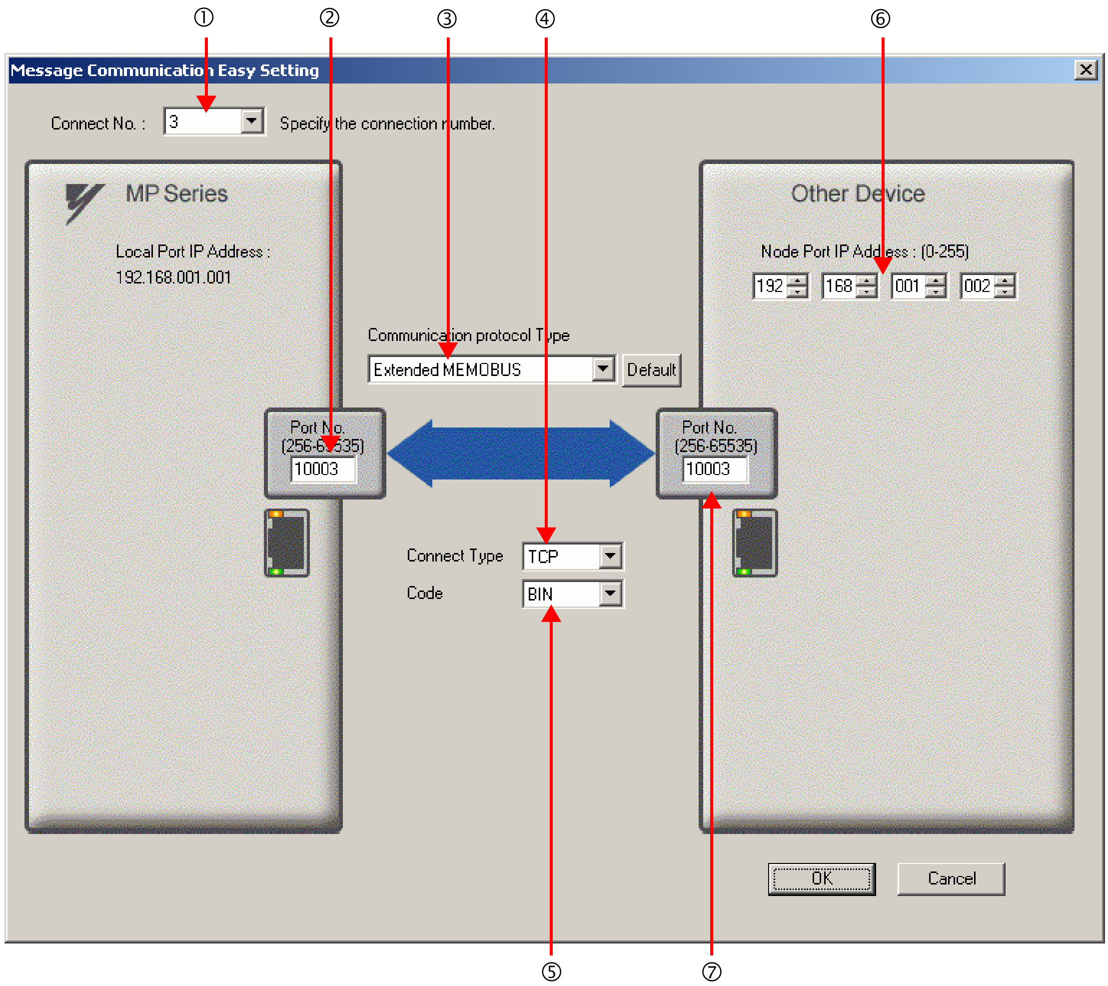
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communications** Area in the **Connection Parameters** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



①Select **3** in the **Connect No.** Box.
②Enter "10003" in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter "10003" in the **Port No.** Box for the other device.

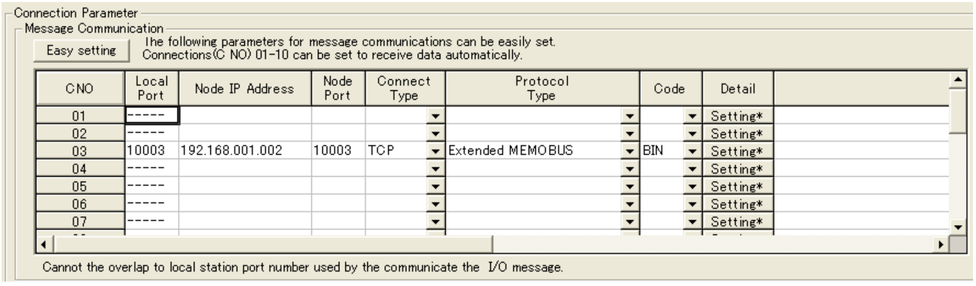
Note: Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

5. Click the **OK** Button.

6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transfer Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings.


Connection Parameter
Message Communication
Easy setting
The following parameters for message communications can be easily set.
Connections(C NO) 01-10 can be set to receive data automatically.

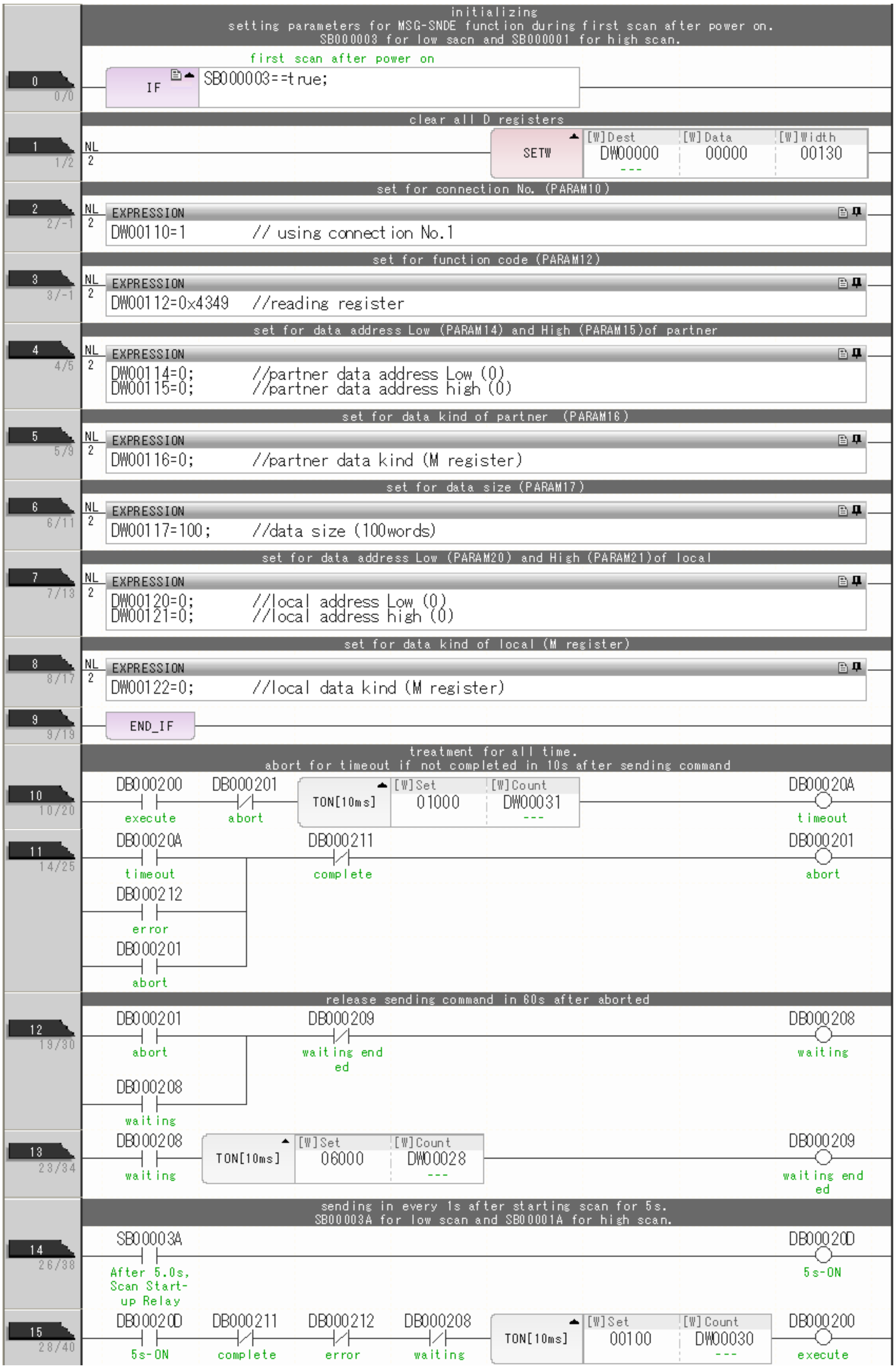
CNO	Local Port	Node IP Address	Node Port	Connect Type	Protocol Type	Code	Detail
01	-----						Setting*
02	-----						Setting*
03	10003	192.168.001.002	10003	TCP	Extended MEMOBUS	BIN	Setting*
04	-----						Setting*
05	-----						Setting*
06	-----						Setting*
07	-----						Setting*

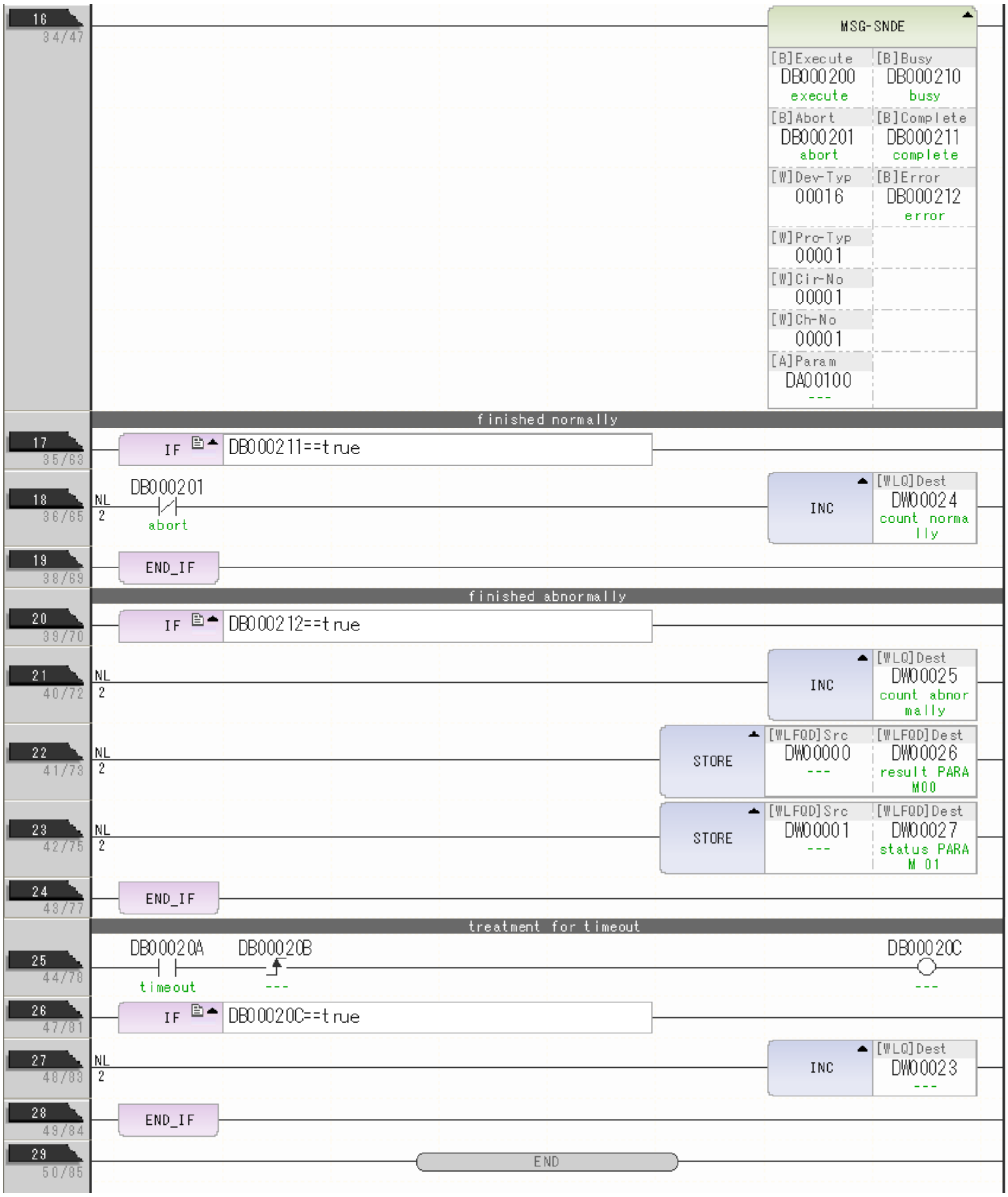
Cannot the overlap to local station port number used by the communicate the I/O message.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

8. Create a ladder program for the MSG-SNDE function.

A ladder program example is shown below.





9. Save the data to flash memory.

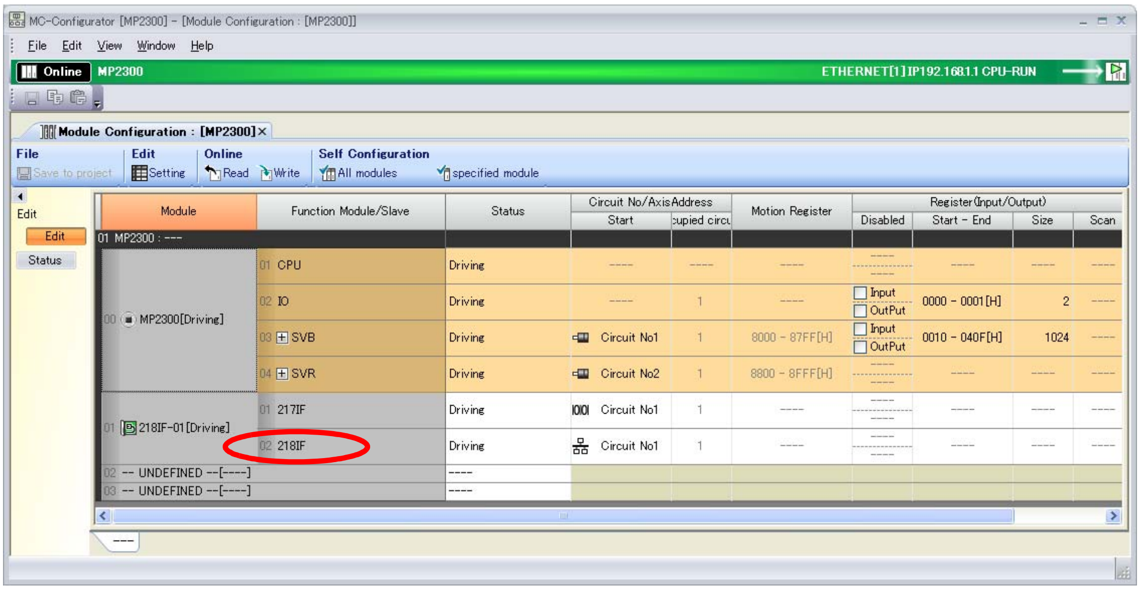
This concludes the settings for using the MP3000 as the master.

◆ Setting Up the Other Device (MP2300) to Connect

Use the following procedure to set up the MP2300.

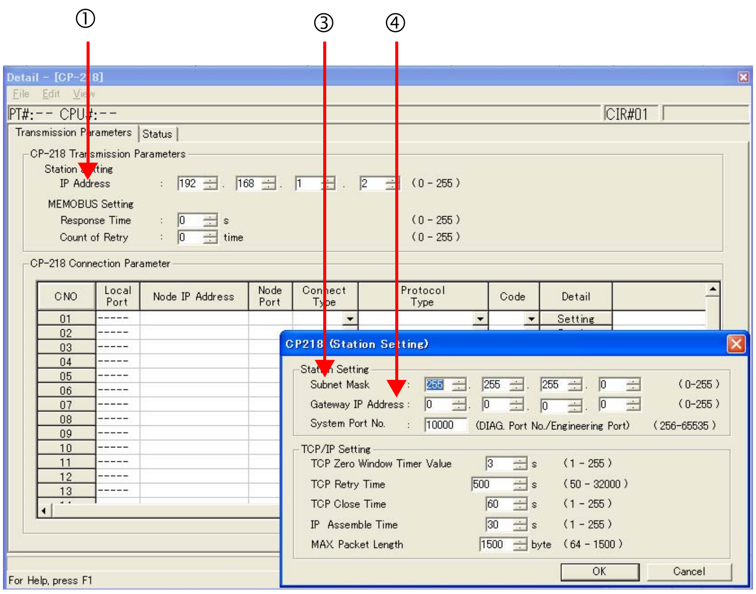
> Note
>
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for **218IF** in the **Module Details** Area of the Module Configuration Definition Tab Page.



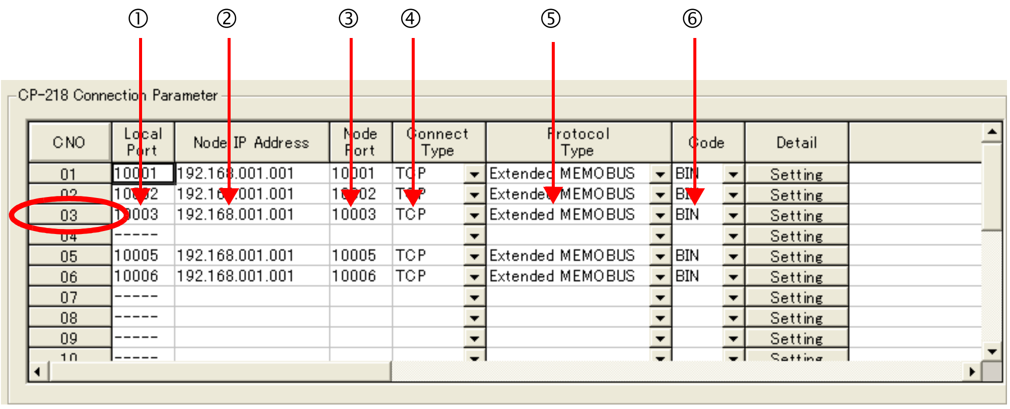
The 218IF Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.002.
②Select ***Edit*** – ***Local Station: TCP/IP Setting*** in the Engineering Manager Window.
③In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
④In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Set the connection parameters.



①Enter "10003" in the **Local Port** Box.
②Enter the following address in the **Node IP Address** Boxes: 192.168.001.001.
③Enter "10003" in the **Node Port** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **Extended MEMOBUS** in the **Protocol Type** Box.
⑥Select **BIN** in the **Code** Box.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

4. Create a ladder program for the MSG-RCV function.
Refer to the following section for a ladder program example.
The sample uses a different communications buffer channel and connection number.

☞ ◆ *Setting Up the Other Device (MP2300) to Connect (page 2-47)*

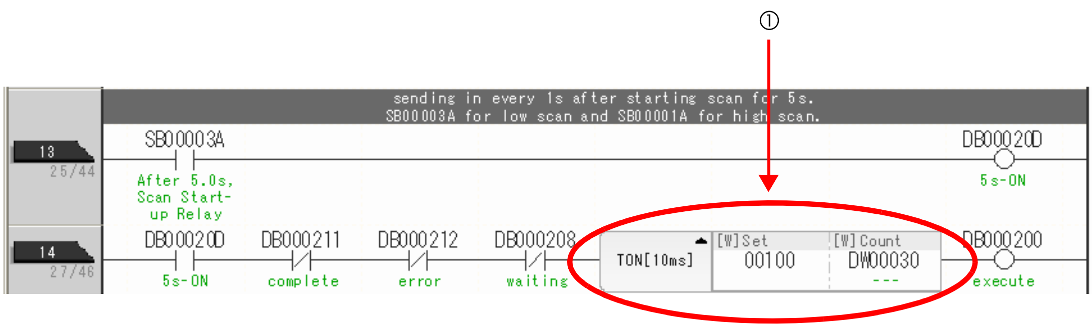
5. Save the data to flash memory.

This concludes the setup.

◆ Starting Communications

1. Turn ON the power to the MP2300 to start receiving messages.
In the ladder program example, message reception starts immediately after the system starts. No further operation is required.

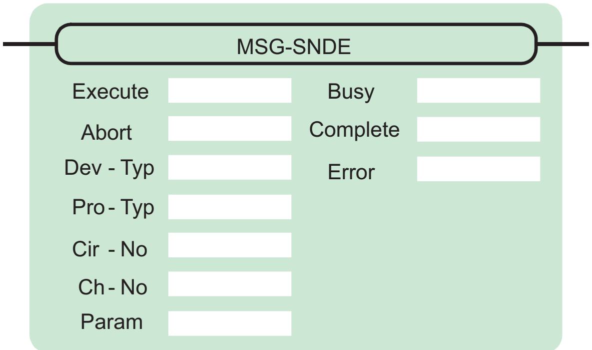
2. Turn ON the Execute Bit (e.g., DB000200) for the MSG-SNDE function in the MP3000 to start sending messages.
The ladder program example is designed to send a message every second after five seconds have elapsed from when the low-speed scan (or high-speed scan) starts.
To change the message transmission interval, change the timer value ①.



Message Functions

The message functions are used in user communications applications for the Extended MEMOBUS protocol. You can send and receive message data by setting the necessary input items and parameters for the message functions.

Inputs and Outputs for the MSG-SNDE Function

Function Name	MSG-SNDE			
Function	Sends a message to a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the transmission.
	2	Abort	B-VAL	Forces the transmission to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocols MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message transmission.

When the Execute Bit turns ON, the message will be sent.

> Note
>
> Keep the Execute Bit ON until the Complete or Error Bit turns ON. To send another message, turn OFF the Execute Bit for at least one scan and then turn it ON again.

◆ Abort

Specify the bit to use to abort the message transmission.

When the Abort Bit turns ON, the message transmission will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Communications Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

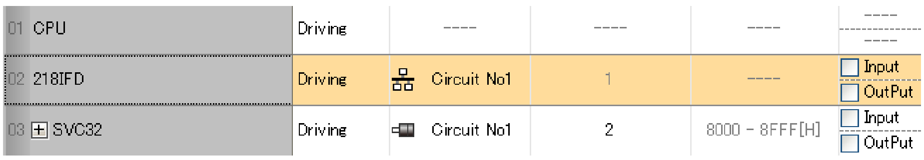
Specify the type code of the communications protocol.

Type Code	Communications Protocols	Remarks
1	MEMOBUS	Select this protocol when using the Extended MEMOBUS protocol. MEMOBUS is automatically converted to Extended MEMOBUS inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the Extended MEMOBUS protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the Extended MEMOBUS protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> **Note** When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> **Note** There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 29 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting function codes and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00023	PARAM23
DW00024	PARAM24
DW00025	PARAM25
DW00026	PARAM26
DW00027	PARAM27
DW00028	PARAM28

◆ Busy

Specify the bit that shows that the message transmission is in progress.

The Busy Bit is ON while a message transmission or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message transmission has been completed.

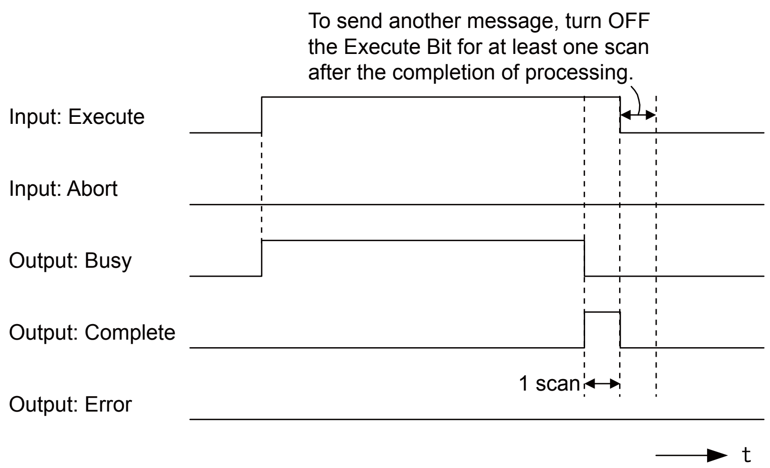
The Complete Bit turns ON only for one scan when message transmission or forced abort processing has been completed normally.

◆ Error

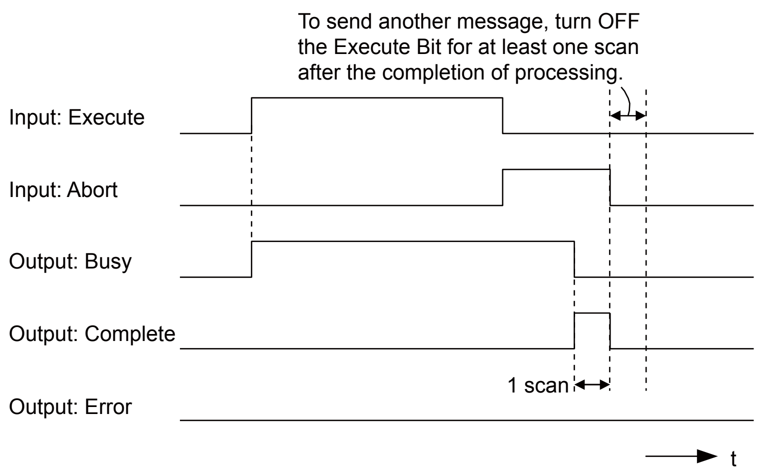
Specify the bit that shows if an error occurred when sending the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-SNDE function.

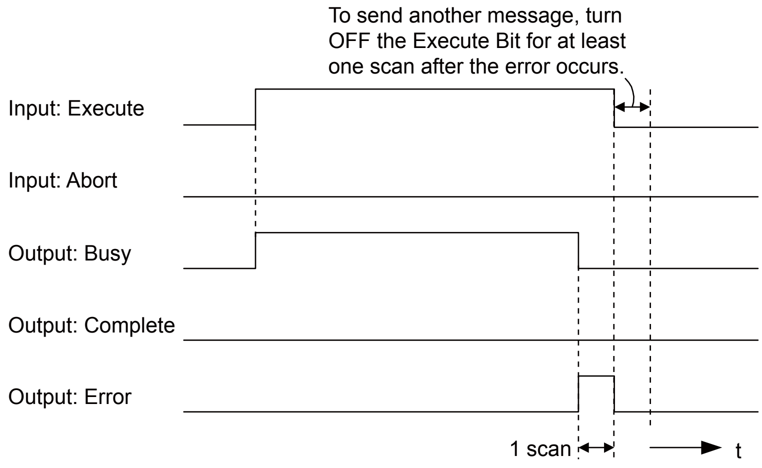
- Normal Execution



- When Execution Is Aborted



• Execution When an Error Occurs



MSG-SNDE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-SNDE function.

<table>
<tr><th colspan="2">No.</th><th>I/O</th><th>Meaning</th><th>Description</th></tr>
<tr><td rowspan="10">Status</td><td>00</td><td rowspan="10">Outputs</td><td>Processing Result</td><td>Gives the processing status.</td></tr>
<tr><td>01</td><td>Status</td><td>Gives the status of the current function.</td></tr>
<tr><td>02</td><td>Detail Error Code, Lower Word</td><td rowspan="2">Gives the details of an error.</td></tr>
<tr><td>03</td><td>Detail Error Code, Upper Word</td></tr>
<tr><td>04</td><td>Status 1</td><td>Gives the communications status.</td></tr>
<tr><td>05</td><td>Status 2</td><td>Gives status information on the most recent error.</td></tr>
<tr><td>06</td><td>Status 3</td><td>Gives the value of the send pass counter.</td></tr>
<tr><td>07</td><td>Status 4</td><td>Gives the value of the receive pass counter.</td></tr>
<tr><td>08</td><td>Status 5</td><td>Gives the value of the error counter.</td></tr>
<tr><td>09</td><td>Status 6</td><td>Reserved for system.</td></tr>
<tr><td rowspan="14">Parameters</td><td>10</td><td rowspan="14">Inputs</td><td>Connection Number</td><td>Sets the connection number used to determine the remote station.</td></tr>
<tr><td>11</td><td>Option</td><td>Not used for the Extended MEMOBUS protocol.</td></tr>
<tr><td>12</td><td>Function Code</td><td>Sets the code of the function in the Extended MEMOBUS protocol.</td></tr>
<tr><td>13</td><td>Reserved for system.</td><td>–</td></tr>
<tr><td>14</td><td>Remote Station Data Address, Lower Word</td><td rowspan="2">Sets the data address to read/write at the remote station. (Use word addresses for registers, bit addresses for relays or coils.)</td></tr>
<tr><td>15</td><td>Remote Station Data Address, Upper Word</td></tr>
<tr><td>16</td><td>Remote Station Register Type</td><td>Sets the register type to read/write at the remote station.</td></tr>
<tr><td>17</td><td>Data Size</td><td>Sets the size of the data to read/write. (Use word sizes for registers, bit sizes for relays or coils.)</td></tr>
<tr><td>18</td><td>Remote CPU Module Number</td><td>Sets the CPU number at the remote station.</td></tr>
<tr><td>19</td><td>Reserved for system.</td><td>–</td></tr>
<tr><td>20</td><td>Local Station Data Address, Lower Word</td><td rowspan="2">Sets the data address to store read/write data in the local station. (Use word addresses for registers, bit addresses for relays or coils.)</td></tr>
<tr><td>21</td><td>Local Station Data Address, Upper Word</td></tr>
<tr><td>22</td><td>Local Station Register Type</td><td>Sets the register type of the read/write data to store in the local station.</td></tr>
<tr><td>23</td><td>Reserved for system.</td><td>–</td></tr>
</table>

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No.		I/O	Meaning	Description
System	24	–	For system use	–
	25		Reserved for system.	–
	26		Reserved for system.	–
	27		Reserved for system.	–
	28		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

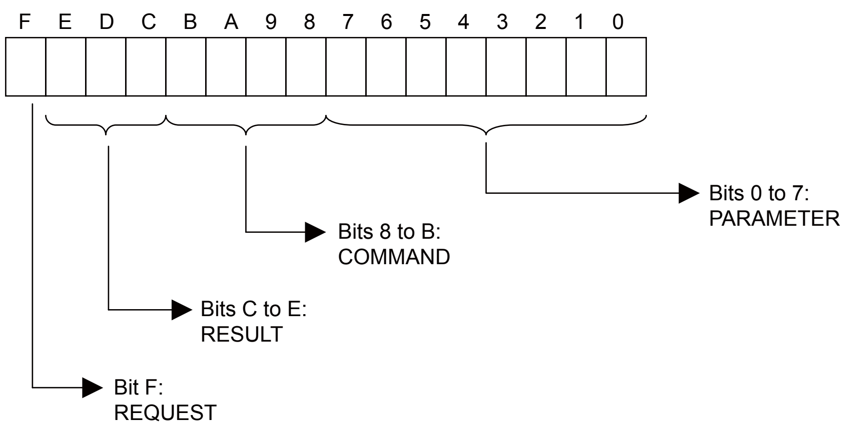
Refer to the following section for details on errors.

☞ *◆ Detail Error Code (PARAM02 and PARAM03) (page 2-66)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-SNDE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution result of the MSG-SNDE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-SNDE function.

Code	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT = 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was sent or received. Check PARAM12 (Function Code).
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Remote Station Data Address) PARAM20 and PARAM21 (Local Station Data Address)
83□□ hex	3	Data size error	The data size for sending or receiving is out of range. Check PARAM17 (Data Size).
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-SNDE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-SNDE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-SNDE function.
C0□□ hex	40 hex	Register type error	The register type for the remote station is out of range. Check PARAM16 (Remote Station Register Type).
C1□□ hex	41 hex	Data type error	The data type is out of range. Check the address table at the remote station. This error occurs when using function code 434D hex or 434E hex.
C2□□ hex	42 hex	Local station register type error	The register type for the local station is out of range. Check PARAM22 (Local Station Register Type).

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

Note: The status is updated when the function is executed in each scan.

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.

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Status 2 Value	Meaning	Description
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

Note: The status is updated when the function is executed in each scan.

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

Note: The status is updated when the function is executed in each scan.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

Note: The status is updated when the function is executed in each scan.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

Note: The status is updated when the function is executed in each scan.

◆ Status 6 (PARAM09)

This parameter is not used for the Extended MEMOBUS protocol.

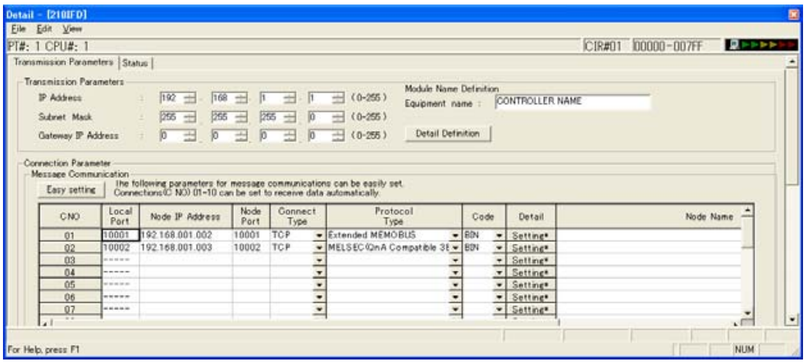
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Description
218IFD	1 to 20	Specifies the connection number of the remote station to send the message to.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the Extended MEMOBUS protocol.

◆ Function Code (PARAM12)

Set the function code to send.

You can use the functions that are registered to the function codes.

Function Code	Target Data Type	Function	Registers When Acting as the Master: Send Registers	Registers When Acting as the Master: Receive Registers
00 hex	–	Not used for the Extended MEMOBUS protocol.	M	M
01 hex	B	Reads the states of coils.		
02 hex	B	Reads the states of input relays.		
03 hex	W	Reads the contents of hold registers.		
04 hex	W	Reads the contents of input registers.		
05 hex	B	Changes the state of a single coil.		
06 hex	W	Writes to a single hold register.		
07 hex	–	Not used for the Extended MEMOBUS protocol.		
08 hex	–	Performs a loopback test.		
09 hex	W	Reads the contents of hold registers (extended).		
0A hex	W	Reads the contents of input registers (extended).		
0B hex	W	Writes to hold registers (extended).		
0C hex	–	Not used for the Extended MEMOBUS protocol.		
0D hex	W	Reads the contents of non-consecutive hold registers (extended).		
0E hex	W	Writes to non-consecutive hold registers (extended).		
0F hex	B	Changes the states of multiple coils.		
10 hex	W	Writes to multiple hold registers.		

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Function Code	Target Data Type	Function	Registers When Acting as the Master	
			Send Registers	Receive Registers
4341 hex	B	Reads the states of bits.	S, M, G, I, or O	M or G
4345 hex	B	Changes the state of a single bit.		
4346 hex	W	Writes to a single register.		
4349 hex	W	Reads the contents of registers.		
434B hex	W	Writes to multiple registers.		
434D hex	W	Reads the contents of non-consecutive registers.		
434E hex	W	Writes to non-consecutive registers.		
434F hex	B	Changes the states of multiple bits.		

Note: B: Bit data, W: Integer data

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Remote Station Data Address (PARAM14 and PARAM15)

Set the first address for data in the remote station.

Enter the first address as a decimal or hexadecimal number.

Example If the first address is MW01000, enter “1000” (decimal) or “3E8” (hexadecimal).

Function Code	Target Data Type	Function	Data Address Setting Range
00 hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
01 hex	B	Reads the states of coils.*1	0 to 65535 (0 to FFFF hex)
02 hex	B	Reads the states of input relays.*1	0 to 65535 (0 to FFFF hex)
03 hex	W	Reads the contents of hold registers.*2	0 to 65534 (0 to FFFE hex)
04 hex	W	Reads the contents of input registers.*2	0 to 65535 (0 to FFFF hex)
05 hex	B	Changes the state of a single coil.*1	0 to 65535 (0 to FFFF hex)
06 hex	W	Writes to a single hold register.*2	0 to 65534 (0 to FFFE hex)
07 hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
08 hex	–	Performs a loopback test.	Disabled.
09 hex	W	Reads the contents of hold registers (extended).*2	0 to 65534 (0 to FFFE hex)
0A hex	W	Reads the contents of input registers (extended).*2	0 to 65535 (0 to FFFF hex)
0B hex	W	Writes to hold registers (extended).*2	0 to 65534 (0 to FFFE hex)

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Function Code	Target Data Type	Function	Data Address Setting Range
0C hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
0D hex	W	Reads the contents of non-consecutive hold registers (extended).*3	0 to 65534 (0 to FFFE hex)
0E hex	W	Writes to non-consecutive hold registers (extended).*3	0 to 65534 (0 to FFFE hex)
0F hex	B	Changes the states of multiple coils.*1	0 to 65535 (0 to FFFF hex)
10 hex	W	Writes to multiple hold registers.*2	0 to 65534 (0 to FFFE hex)
4341 hex	B	Reads the states of bits.*1	0 to 4294967295 (0 to FFFFFFFF hex) Adjust the address to the remote device's address range. Refer to the following section for the address ranges of an MP3000-series Controller. ☞ *Details on Protocols (page 2-378)*
4345 hex	B	Changes the state of a single bit.*1	
4346 hex	W	Writes to a single register.*2	
4349 hex	W	Reads the contents of registers.*2	
434B hex	W	Writes to multiple registers.*2	
434D hex	W	Reads the contents of non-consecutive registers.*3	
434E hex	W	Writes to non-consecutive registers.*3	
434F hex	B	Changes the states of multiple bits.*1	

*1. Coil or input relay read/write requests: Enter the address of the first bit of the data.
*2. Continuous register read/write requests: Enter the address of the first word of the data.
*3. Non-consecutive register read/write requests: Enter the address of the first M register of the address table.

◆ Remote Station Register Type (PARAM16)

Set the register type in the remote station. This parameter is valid when using function codes 43□□ hex.

Enter the register type as a decimal or hexadecimal number.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 or higher	–	Not used for the Extended MEMOBUS protocol.

The register types that can be used depend on whether you are reading or writing.

The following table lists the combinations of register types.

Function Code	Applicable Register Types
4341 or 4349 hex	M, G, I, O, or S
4345, 4346, 434B, or 434F hex	M, G, O, or S
434D hex*	M or G
434E hex*	M or G

* The address table at the remote station is stored in registers in the local station. The contents of the M, G, I, O, and S registers in the remote station can be read by specifying the register type in the address table at the remote station.
For more information on remote station address tables, refer to the following sections.
☞ *2.15 Using Message Functions – Function Code: 434D Hex (page 2-369)*
☞ *2.15 Using Message Functions – Function Code: 434E Hex (page 2-371)*

◆ Data Size (PARAM17)

Set the data size for the read/write request as the number of bits or words.

Be sure that the last data address that is determined by the offset, data address, and data size does not exceed the valid data address range.

The range that is allowed for the data size depends on the function code and data area.

Function Code	Target Data Type	Function	Data Size Setting Range
00 hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
01 hex	B	Reads the states of coils.	1 to 2000
02 hex	B	Reads the states of input relays.	1 to 2000
03 hex	W	Reads the contents of hold registers.	1 to 125
04 hex	W	Reads the contents of input registers.	1 to 125
05 hex	B	Changes the state of a single coil.	Disabled.
06 hex	W	Writes to a single hold register.	Disabled.
07 hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
08 hex	–	Performs a loopback test.	Disabled.
09 hex	W	Reads the contents of hold registers (extended).	1 to 2044 (binary) or 1 to 1020 (ASCII)
0A hex	W	Reads the contents of input registers (extended).	1 to 2044 (binary) or 1 to 1020 (ASCII)
0B hex	W	Writes to hold registers (extended).	1 to 2043 (binary) or 1 to 1019 (ASCII)
0C hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
0D hex	W	Reads the contents of non-consecutive hold registers (extended).	1 to 2044 (binary) or 1 to 1020 (ASCII)
0E hex	W	Writes to non-consecutive hold registers (extended).	1 to 1022 (binary) or 1 to 510 (ASCII)
0F hex	B	Changes the states of multiple coils.	1 to 800
10 hex	W	Writes to multiple hold registers.	1 to 100
4341 hex	B	Reads the states of bits.	1 to 32704
4345 hex	B	Changes the state of a single bit.	Disabled.
4346 hex	W	Writes to a single register.	Disabled.
4349 hex	W	Reads the contents of registers.	1 to 2044
434B hex	W	Writes to multiple registers.	1 to 2041
434D hex	W	Reads the contents of non-consecutive registers.	1 to 681
434E hex	W	Writes to non-consecutive registers.	1 to 511
434F hex	B	Changes the states of multiple bits.	1 to 32640

Note: 1. The data sizes in the table are in decimal notation.
2. B: Bit data, W: Integer data

◆ Remote CPU Module Number (PARAM18)

Set the CPU Module number at the remote station.

Specify 1 if the remote device is an MP2000-series Controller.

If the remote device is a Yaskawa Controller that is not part of the MP2000 Series and it is comprised of multiple CPU Modules, specify the destination CPU Module number.

For all other devices, specify 0.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Local Station Data Address (PARAM20 and PARAM21)

Set the address of the read data destination or write data source in the MP3000-series Controller.

The address is set as the word offset from address 0.

◆ Local Station Register Type (PARAM22)

Set the register type of the read data destination or write data source in the MP3000.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 or higher	–	Not used for the Extended MEMOBUS protocol.

The register types that can be used depend on whether you are reading or writing.

The following table lists the combinations of register types.

Function Code	Applicable Register Types
01, 02, 03, 04, 09, or 0A hex	M, G, or O
05, 06, 0B, 0F, or 10 hex	M, G, I, O, or S
0D hex	M
0E hex	M
4341 or 4349 hex	M, G, or O
4345, 4346, 434B, or 434F hex	M, G, I, O, or S
434D hex	M or G
434E hex*	M or G
No-protocol Communications (No function code)	M, G, I, O, or S

* You can store the write data address table in registers in the local station. The data stored in the M, G, I, O, and S registers in the local station can be read from or written to the remote station by specifying the register type in the write data address table.

◆ Reserved for System (PARAM23)

This parameter is used by the system.

Note

Do not change the value of PARAM23 from a user program or by any other means.

◆ For System Use (PARAM24)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM24 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM24 from a user program or any other means. PARAM24 will be used by the system.

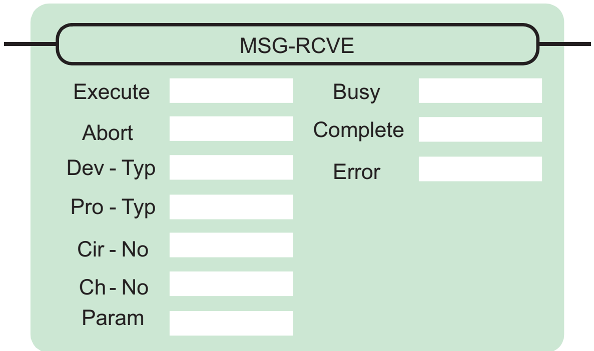
◆ Reserved for System (PARAM25 to PARAM28)

This parameter is used by the system.

Note

Do not change the values of PARAM25 to PARAM28 from a user program or any other means.

Inputs and Outputs for the MSG-RCVE Function

Function Name	MSG-RCVE			
Function	Receives a message from a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the reception.
	2	Abort	B-VAL	Forces the reception to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocols MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message reception.

When the Execute Bit turns ON, the message will be received.

◆ Abort

Specify the bit to use to abort the message reception.

When the Abort Bit turns ON, the message reception will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Type (Communications Device Type)

Specify the type code of the communications device.

Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

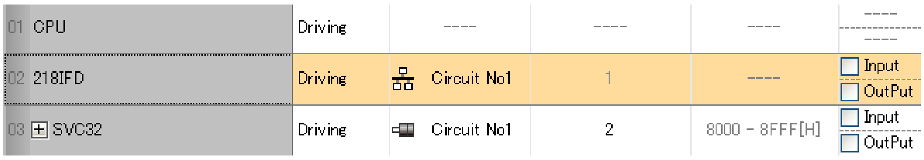
Specify the type code of the communications protocol.

Type Code	Communications Protocols	Remarks
1	MEMOBUS	Select this protocol when using the Extended MEMOBUS protocol. MEMOBUS is automatically converted to Extended MEMOBUS inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the Extended MEMOBUS protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the Extended MEMOBUS protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

Note

When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

Note

There must be as many MSG-RCVE or MSG-SNDE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 52 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting the connection number and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00046	PARAM46
DW00047	PARAM47
DW00048	PARAM48
DW00049	PARAM49
DW00050	PARAM50
DW00051	PARAM51

◆ Busy

Specify the bit that shows that the message reception is in progress.

The Busy Bit is ON while a message reception or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message reception has been completed.

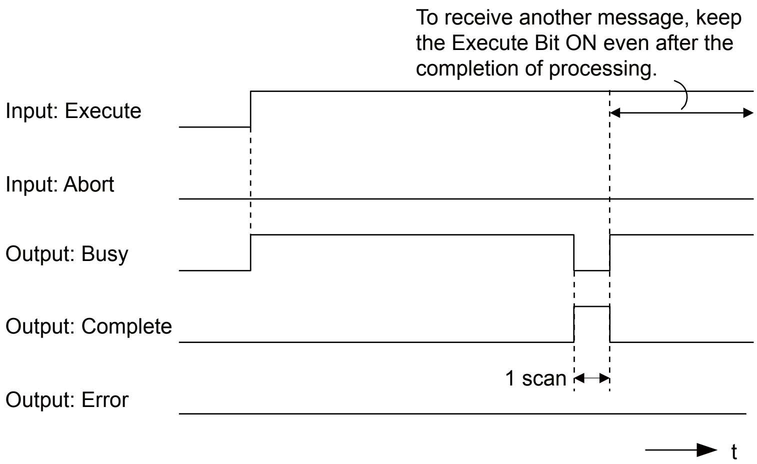
The Complete Bit turns ON only for one scan when message reception or forced abort processing has been completed normally.

◆ Error

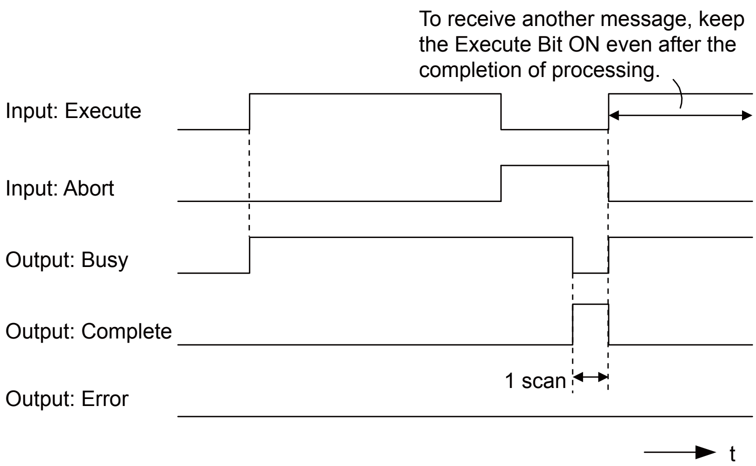
Specify the bit that shows if an error occurred when receiving the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-RCVE function.

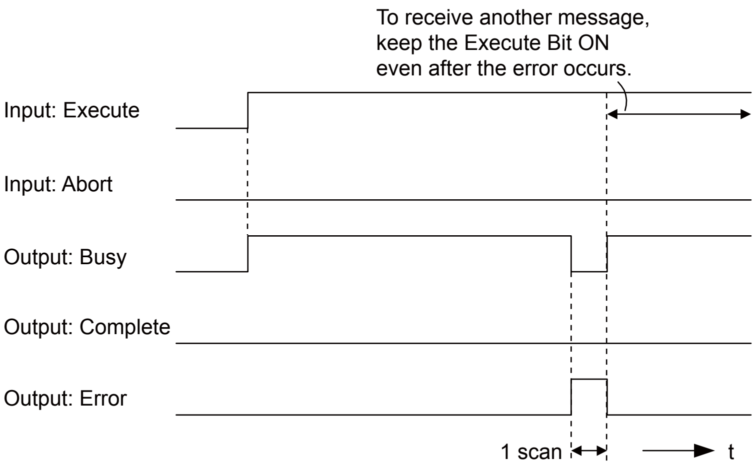
- Normal Execution



- When Execution Is Aborted



- Execution When an Error Occurs



MSG-RCVE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-RCVE function.

No.		I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.

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	No.	I/O	Meaning	Description
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11	I/O	Option	Not used for the Extended MEMOBUS protocol.
	12	Outputs	Function Code	Gives the function code requested by the remote station.
	13	I/O	Reserved for system.	–
	14	Outputs	Data address, lower word	Gives the first address of the data that was requested by the remote station.
	15		Data address, upper word	
	16		Register type	Gives the register type that was requested by the remote station.
	17		Data Size	Gives the data size that was requested by the remote station.
	18		Remote CPU Module Number	Not used for the Extended MEMOBUS protocol.
	19	I/O	Reserved for system.	–
	20	Inputs	Coil offset, lower word	Sets the offset word address for a coil (MB).
	21		Coil offset, upper word	
	22		Input relay offset, lower word	Sets the offset word address for an input relay (IB).
	23		Input relay offset, upper word	
	24		Input register offset, lower word	Sets the offset word address for an input register (IW).
	25		Input register offset, upper word	
	26		Hold register offset, lower word	Sets the offset word address for a hold register (MW).
	27		Hold register offset, upper word	
	28		Data relay offset, lower word	Sets the offset word address for a data relay (GB).
	29		Data relay offset, upper word	
	30		Data register offset, lower word	Sets the offset word address for a data register (GW).
	31		Data register offset, upper word	
	32		Output coil offset, lower word	Sets the offset word address for an output coil (OB).
	33		Output coil offset, upper word	
	34		Output register offset, lower word	Sets the offset address for an output register (OW).
	35		Output register offset, upper word	
	36		M register writing range LO, lower word	Sets the first address of the writing range for hold register coils.
	37		M register writing range LO, upper word	
	38		M register writing range HI, lower word	Sets the last address of the writing range for hold register coils.
	39		M register writing range HI, upper word	
	40		G register writing range LO, lower word	Sets the first address of the writing range for data register data relays.
	41		G register writing range LO, upper word	
	42		G register writing range HI, lower word	Sets the last address of the writing range for data register data relays.
	43		G register writing range HI, upper word	
	44		O register writing range LO, lower word	Sets the first address of the writing range for out-put registers.
	45		O register writing range LO, upper word	
	46		O register writing range HI, lower word	Sets the last address of the writing range for output registers.
	47		O register writing range HI, upper word	
System	48	–	For system use	–
	49		Reserved for system.	–
	50		Reserved for system.	–
	51		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

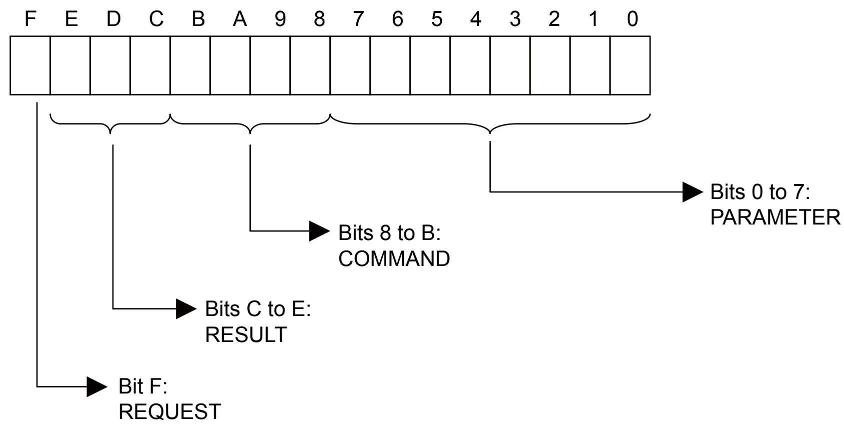
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-81)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-RCVE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution result of the MSG-RCVE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-RCVE function.

Code (Hex)	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT = 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was received. Check the function code of the remote station.
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Data Address) PARAM20 and PARAM21 (Coil Offset) PARAM26 and PARAM27 (Hold Register Offset)
83□□ hex	3	Data size error	The data size for receiving is out of range. Check the data size at the remote station.
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-RCVE function.

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Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-RCVE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-RCVE function.
C0□□ hex	40 hex	Register type error	The register type specified by the sending node is out of range. Check the remote station register type setting at the sending node.
C1□□ hex	41 hex	Data type error	The data type is out of range. Check the remote station address table at the sending node. This error occurs when using function code 434D hex or 434E hex.

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

◆ Status 6 (PARAM09)

This parameter is not used for the Extended MEMOBUS protocol.

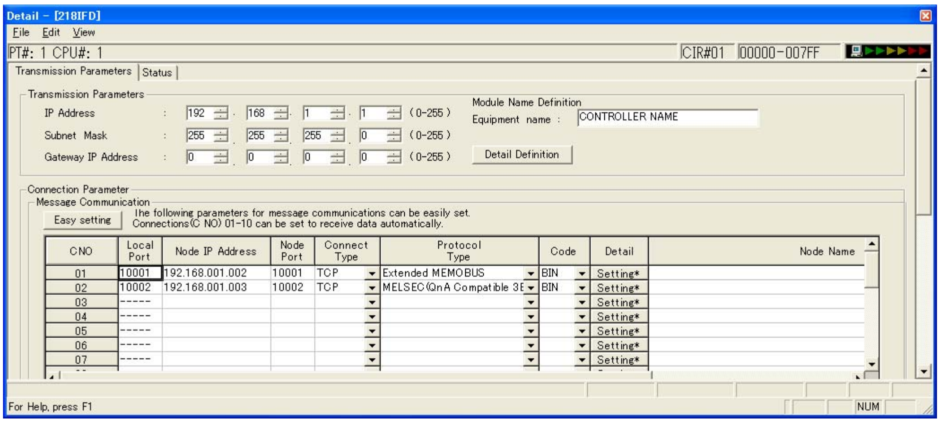
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Remarks
218IFD	1 to 20	Specifies the connection number of the remote station to receive the message from.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Option (PARAM11)

This code is not used for the Extended MEMOBUS protocol.

◆ Function Code (PARAM12)

This parameter gives the function code that was received.

<table>
<tr><th rowspan="2">Function Code</th><th rowspan="2">Target Data Type</th><th rowspan="2">Function</th><th colspan="2">Registers When Acting as the Master</th></tr>
<tr><th>Send Registers</th><th>Receive Registers</th></tr>
<tr><td>00 hex</td><td>–</td><td>Not used for the Extended MEMOBUS protocol.</td><td rowspan="17">M</td><td rowspan="17">M</td></tr>
<tr><td>01 hex</td><td>B</td><td>Reads the states of coils.</td></tr>
<tr><td>02 hex</td><td>B</td><td>Reads the states of input relays.</td></tr>
<tr><td>03 hex</td><td>W</td><td>Reads the contents of hold registers.</td></tr>
<tr><td>04 hex</td><td>W</td><td>Reads the contents of input registers.</td></tr>
<tr><td>05 hex</td><td>B</td><td>Changes the state of a single coil.</td></tr>
<tr><td>06 hex</td><td>W</td><td>Writes to a single hold register.</td></tr>
<tr><td>07 hex</td><td>–</td><td>Not used for the Extended MEMOBUS protocol.</td></tr>
<tr><td>08 hex</td><td>–</td><td>Performs a loopback test.</td></tr>
<tr><td>09 hex</td><td>W</td><td>Reads the contents of hold registers (extended).</td></tr>
<tr><td>0A hex</td><td>W</td><td>Reads the contents of input registers (extended).</td></tr>
<tr><td>0B hex</td><td>W</td><td>Writes to hold registers (extended).</td></tr>
<tr><td>0C hex</td><td>–</td><td>Not used for the Extended MEMOBUS protocol.</td></tr>
<tr><td>0D hex</td><td>W</td><td>Reads the contents of non-consecutive hold registers (extended).</td></tr>
<tr><td>0E hex</td><td>W</td><td>Writes to non-consecutive hold registers (extended).</td></tr>
<tr><td>0F hex</td><td>B</td><td>Changes the states of multiple coils.</td></tr>
<tr><td>10 hex</td><td>W</td><td>Writes to multiple hold registers.</td></tr>
<tr><td>4341 hex</td><td>B</td><td>Reads the states of bits.</td><td rowspan="8">S, M, G, I, or O</td><td rowspan="8">M or G</td></tr>
<tr><td>4345 hex</td><td>B</td><td>Changes the state of a single bit.</td></tr>
<tr><td>4346 hex</td><td>W</td><td>Writes to a single register.</td></tr>
<tr><td>4349 hex</td><td>W</td><td>Reads the contents of registers.</td></tr>
<tr><td>434B hex</td><td>W</td><td>Writes to multiple registers.</td></tr>
<tr><td>434D hex</td><td>W</td><td>Reads the contents of non-consecutive registers.</td></tr>
<tr><td>434E hex</td><td>W</td><td>Writes to non-consecutive registers.</td></tr>
<tr><td>434F hex</td><td>B</td><td>Changes the states of multiple bits.</td></tr>
</table>

Note: B: Bit data, W: Integer data

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Data Address (PARAM14 and PARAM15)

These parameters give the data address that was requested by the remote station.

For function codes 01 to 10 hex, the requested address is the word size address indicated only by PARAM14. If the function code is 43□□ hex, the requested address is the long-word size address given by PARAM14 and PARAM15.

Function Code	Target Data Type	Function	Data Address Request Range
00 hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
01 hex	B	Reads the states of coils.*1	0 to 65535 (0 to FFFF hex)
02 hex	B	Reads the states of input relays.*1	0 to 65535 (0 to FFFF hex)
03 hex	W	Reads the contents of hold registers.*2	0 to 65534 (0 to FFFE hex)
04 hex	W	Reads the contents of input registers.*2	0 to 65535 (0 to FFFF hex)
05 hex	B	Changes the state of a single coil.*1	0 to 65535 (0 to FFFF hex)
06 hex	W	Writes to a single hold register.*2	0 to 65534 (0 to FFFE hex)
07 hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
08 hex	–	Performs a loopback test.	Disabled.
09 hex	W	Reads the contents of hold registers (extended).*2	0 to 65534 (0 to FFFE hex)
0A hex	W	Reads the contents of input registers (extended).*2	0 to 65535 (0 to FFFF hex)
0B hex	W	Writes to hold registers (extended).*2	0 to 65534 (0 to FFFE hex)
0C hex	–	Not used for the Extended MEMOBUS protocol.	Disabled.
0D hex	W	Reads the contents of non-consecutive hold registers (extended).*3	0 to 65534 (0 to FFFE hex)
0E hex	W	Writes to non-consecutive hold registers (extended).*3	0 to 65534 (0 to FFFE hex)
0F hex	B	Changes the states of multiple coils.*1	0 to 65535 (0 to FFFF hex)
10 hex	W	Writes to multiple hold registers.*2	0 to 65534 (0 to FFFE hex)
4341 hex	B	Reads the states of bits.*1	0 to 4294967295 (0 to FFFFFFFF hex) Adjust the address to the remote device's address range. Refer to the following section for an MP3000-series Controller. ☞ *2.16 Details on Protocols (page 2-378)*
4345 hex	B	Changes the state of a single bit.*1	
4346 hex	W	Writes to a single register.*2	
4349 hex	W	Reads the contents of registers.*2	
434B hex	W	Writes to multiple registers.*2	
434D hex	W	Reads the contents of non-consecutive registers.*3	
434E hex	W	Writes to non-consecutive registers.*3	
434F hex	B	Changes the states of multiple bits.*1	

*1. Coil or input relay read/write requests: Enter the address of the first bit of the data.
*2. Continuous register read/write requests: Enter the address of the first word of the data.
*3. Non-consecutive register read/write requests: Enter the address of the first M register of the address table.

◆ Register Type (PARAM16)

Gives the register type that was requested by the remote station.

This parameter is valid when using function code 43□□ hex only. The target register type is defined for each function code from 01 to 10 hex.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 or higher	–	Not used for the Extended MEMOBUS protocol.

◆ Data Size (PARAM17)

This parameter gives the data size as the number of bits or words for read/write requests from the remote station.

◆ Remote CPU Module Number (PARAM18)

This parameter gives 1 if the remote device is an MP2000-series device.

This parameter indicates the remote CPU Module number if the remote device is a Yaskawa Controller that is not a part of the MP2000 Series and it is comprised of multiple CPU Modules.

A 0 will be given for all other devices.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Coil Offset (PARAM20 and PARAM21)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Coil Offset parameter is used when the function code is 01, 05, 0F, 4341, 4345, or 434F hex. The address is offset by the long-word offset in PARAM20 and PARAM21.

◆ Input Relay Offset (PARAM22 and PARAM23)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Input Relay Offset parameter is used when the function code is 02 or 4341 hex. The address is offset by the long-word offset in PARAM22 and PARAM23.

◆ Input Register Offset (PARAM24 and PARAM25)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Input Register Offset parameter is used when the function code is 04, 0A, 4346, 4349, 434D, or 434E hex. The address is offset by the long-word offset in PARAM24 and PARAM25.

◆ Hold Register Offset (PARAM26 and PARAM27)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Hold Register Offset parameter is used when the function code is 03, 06, 09, 0B, 0D, 0E, 10, 4346, 4349, 434B, 434D, or 434E hex. The address is offset by the long-word offset in PARAM26 and PARAM27.

◆ Data Relay Offset (PARAM28 and PARAM29)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Data Relay Offset parameter is used when the function code is 4341, 4345, or 434F hex. The address is offset by the long-word offset in PARAM28 and PARAM29.

◆ Data Register Offset (PARAM30 and PARAM31)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Data Register Offset parameter is used when the function code is 4346, 4349, 434B, 434D, or 434E hex. The address is offset by the long-word offset in PARAM30 and PARAM31.

◆ Output Coil Offset (PARAM32 and PARAM33)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Output Coil Offset parameter is used when the function code is 4341, 4345, or 434F hex. The address is offset by the long-word offset in PARAM32 and PARAM33.

◆ Output Register Offset (PARAM34 and PARAM35)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address back by the number of words specified by the offset. The data address cannot be offset in the forward direction.

The Output Register Offset parameter is used when the function code is 4346, 4349, 434B, 434D, or 434E hex. The address is offset by the long-word offset in PARAM34 and PARAM35.

◆ M Register Writing Range LO (PARAM36 and PARAM37)

These parameters set the lower limit of the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the writing range with word addresses.

◆ M Register Writing Range HI (PARAM38 and PARAM39)

These parameters set the upper limit of the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the writing range with word addresses.

Set the writing range so that it satisfies the following condition:

0 ≤ M register writing range LO ≤ M register writing range HI ≤ Maximum M register address

Example

Use the following settings to set the allowable writing range of M register addresses to MW0001000 to MW0001999:

PARAM36 = 03E8 hex (1000)
PARAM37 = 0000 hex (0000)
PARAM38 = 07CF hex (1999)
PARAM39 = 0000 hex (0000)

The MP3000 will return an error if a write request is received for addresses outside the range from MW01000 to MW01999, and will not perform the writing operation.

◆ G Register Writing Range LO (PARAM40 and PARAM41)

These parameters set the lower limit of the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the writing range with word addresses.

◆ G Register Writing Range HI (PARAM42 and PARAM43)

These parameters set the upper limit of the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the writing range with word addresses.

Set the writing range so that it satisfies the following condition:

0 ≤ G register writing range LO ≤ G register writing range HI ≤ Maximum G register address

Example

Use the following settings to set the allowable writing range of G register addresses to 120000 to 136000:

PARAM40 = D4C0 hex (lower word for 120000)
PARAM42 = 0001 hex (upper word for 120000)
PARAM41 = 1340 hex (lower word for 136000)
PARAM43 = 0002 hex (upper word for 136000)

The MP3000 will return an error if a write request is received for an address outside the range from GW0120000 to GW0136000, and will not perform the writing operation.

◆ O Register Writing Range LO (PARAM44 and PARAM45)

These parameters set the lower limit of the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the writing range with word addresses.

◆ O Register Writing Range HI (PARAM46 and PARAM47)

These parameters set the upper limit of the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the writing range with word addresses.

Set the writing range so that it satisfies the following condition:

0 ≤ O register writing range LO ≤ O register writing range HI ≤ Maximum O register address

Example

Use the following settings to set the allowable writing range of O register addresses to 00100 to 27FFF:

PARAM44 = 0100 hex (lower word for 00100)
PARAM46 = 0000 hex (upper word for 00100)
PARAM45 = 7FFF hex (lower word for 17FFF)
PARAM47 = 0001 hex (upper word for 17FFF)

The MP3000 will return an error if a write request is received for an address outside the range from OW00100 to OW17FFF, and will not perform the writing operation.

◆ For System Use (PARAM48)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

> Note
>
> A user program must set PARAM48 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM48 from a user program or any other means. PARAM48 will be used by the system.

◆ Reserved for System (PARAM49 to PARAM51)

This parameter is used by the system.

> Note
>
> Do not change the values of PARAM49 to PARAM51 from a user program or any other means.

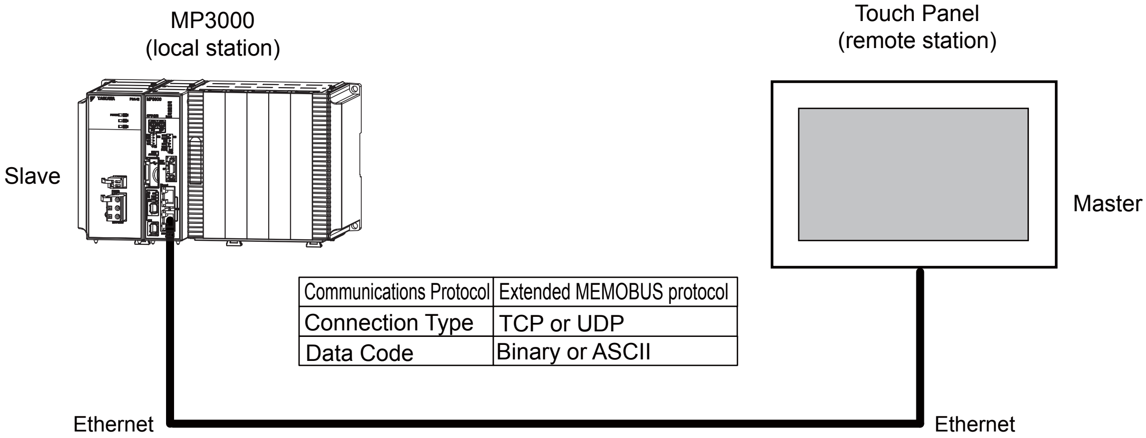
2.5 Communications with a Touch Panel

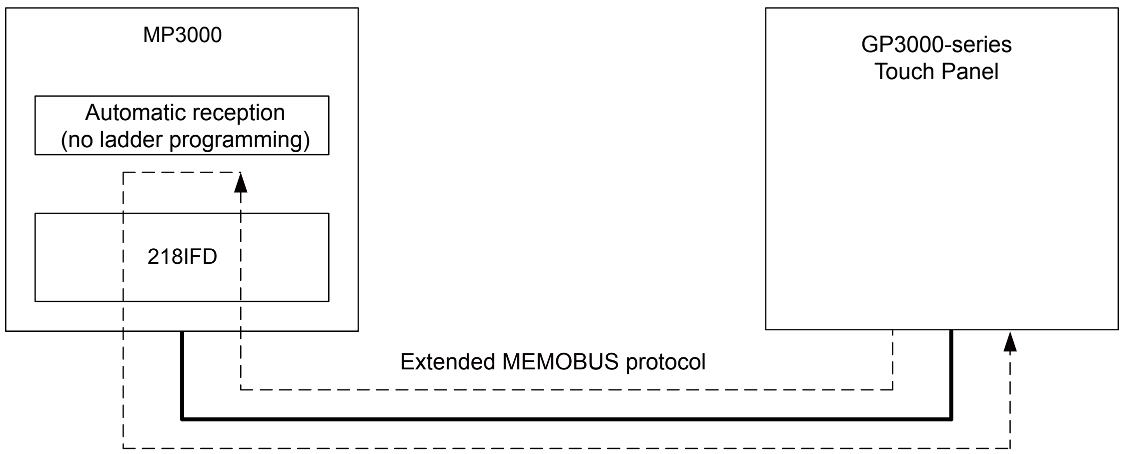
When using Ethernet communications between the MP3000 and a Touch Panel from Digital Electronics Corporation, use the Extended MEMOBUS protocol as the communications protocol. The Extended MEMOBUS protocol allows the master to read and write the slave registers.

This section describes communications when the MP3000 acts as a slave.

Using Automatic Reception with the MP3000 as a Slave

This section describes how to communicate with a Touch Panel from Digital Electronics Corporation by using automatic reception.



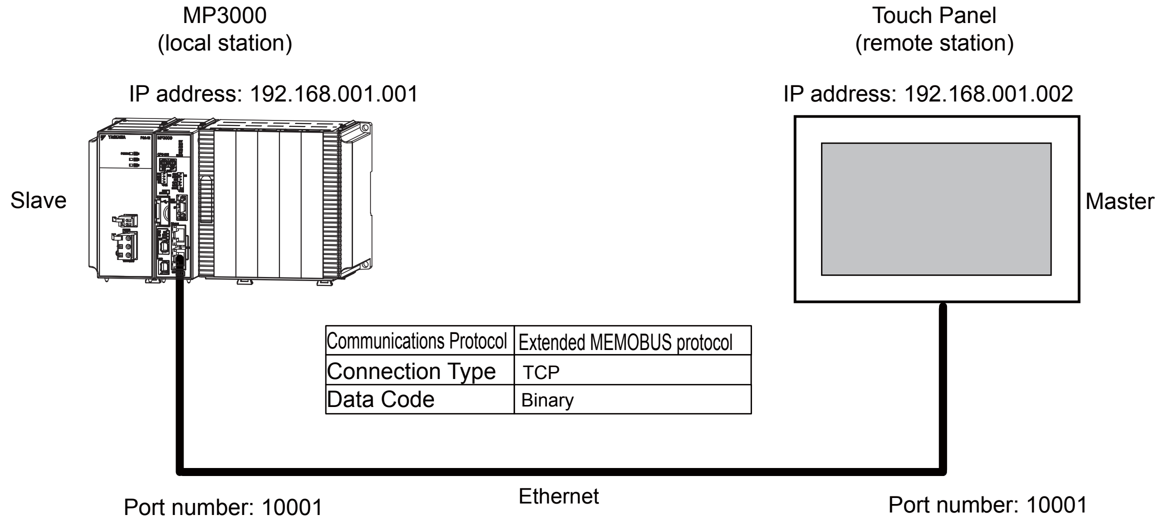


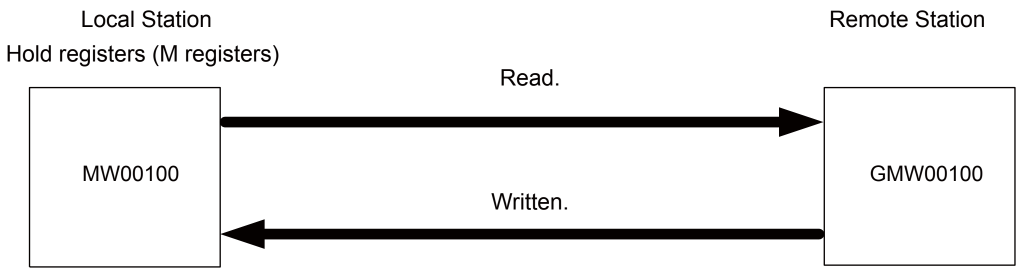
Note: You can also use the MSG-RCVE function to communicate.
For information on the communications settings for using the MSG-RCVE function, refer to the following section.

☞ *2.4 Communications with MP-series Controllers – Using the MSG-SNDE Function with the MP3000 as the Master (page 2-51)*

Setting Example

The following figure illustrates how the contents of the MW00100 hold register in the MP3000 slave is displayed on the Touch Panel, and written from the Touch Panel to the same register.



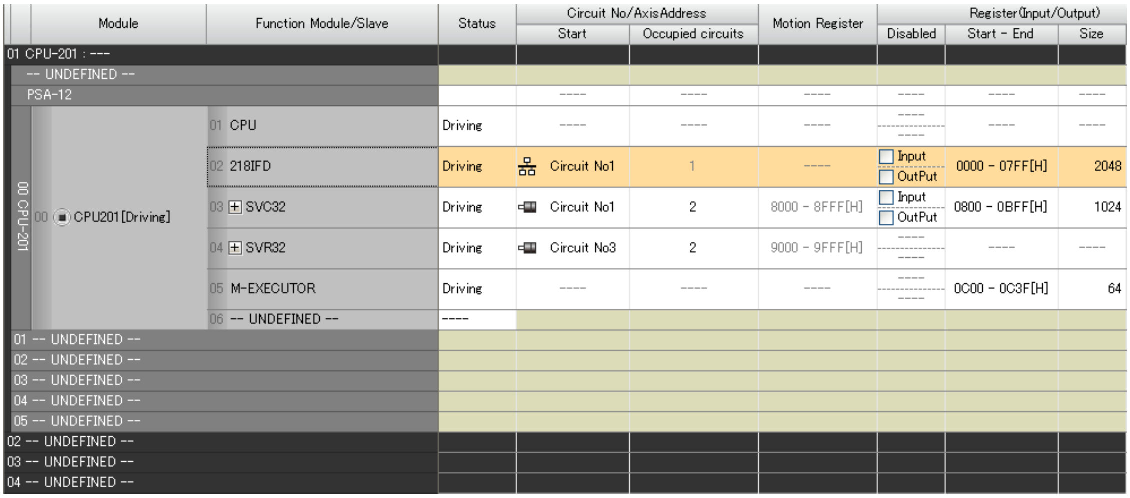


MP3000 Setup

Use the following procedure to set up the MP3000.

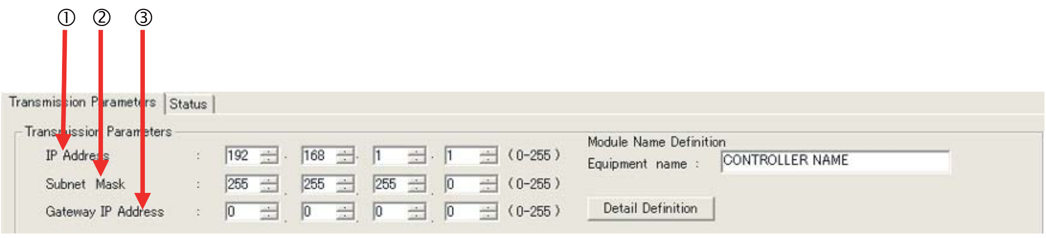
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



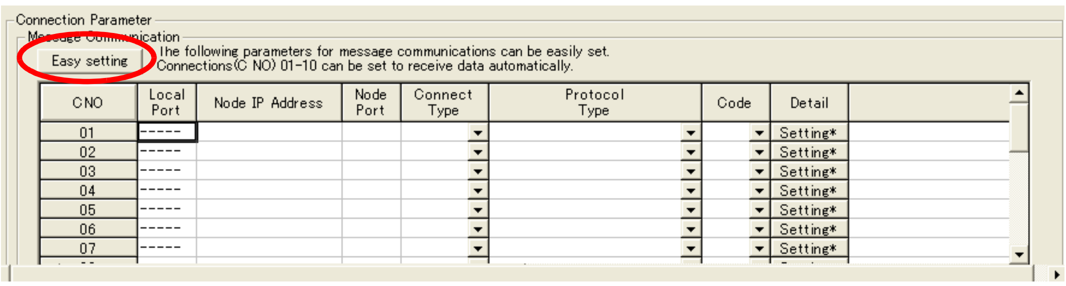
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



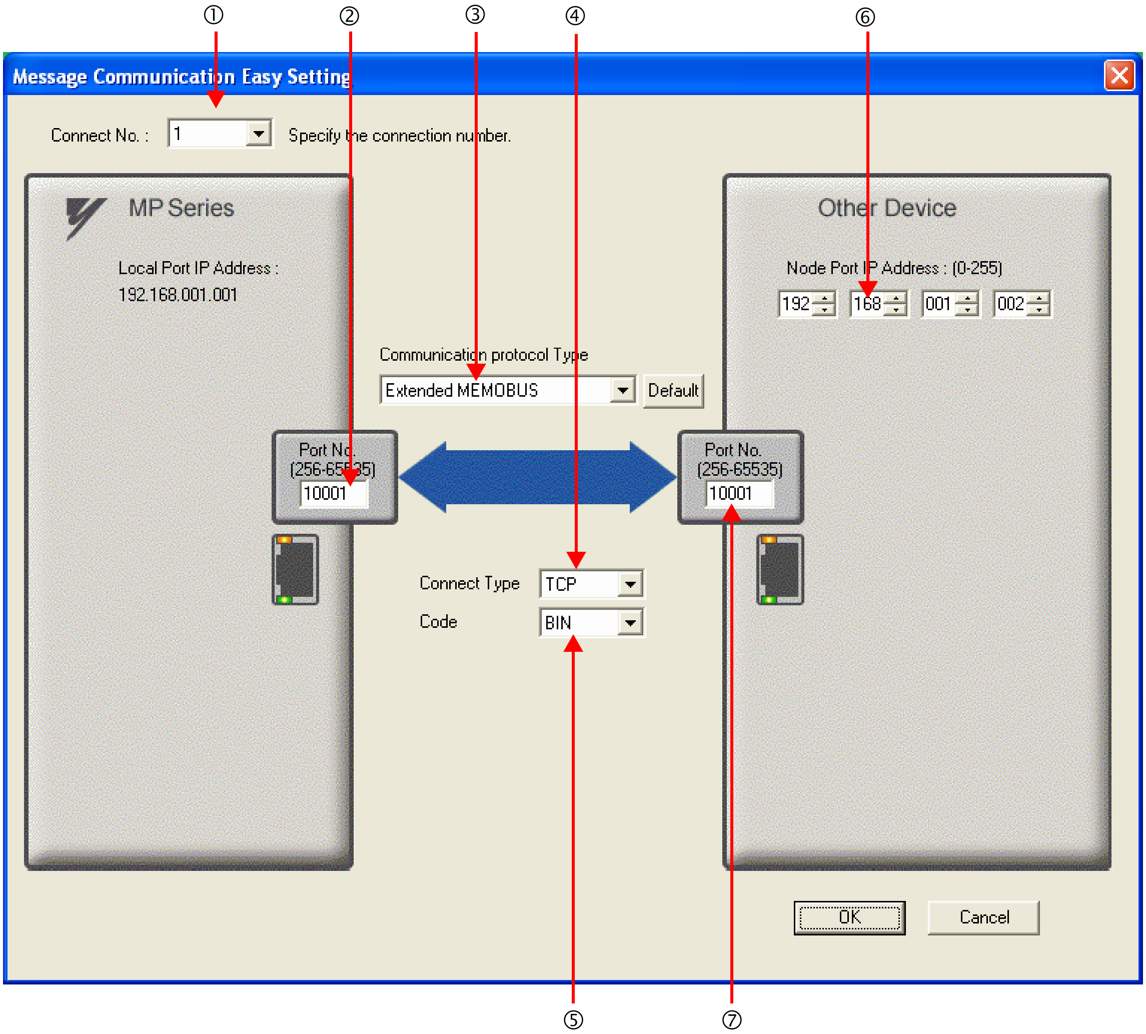
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②Enter “10001” in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter “10001” in the **Port No.** Box for the other device.

5. Click the **OK** Button.

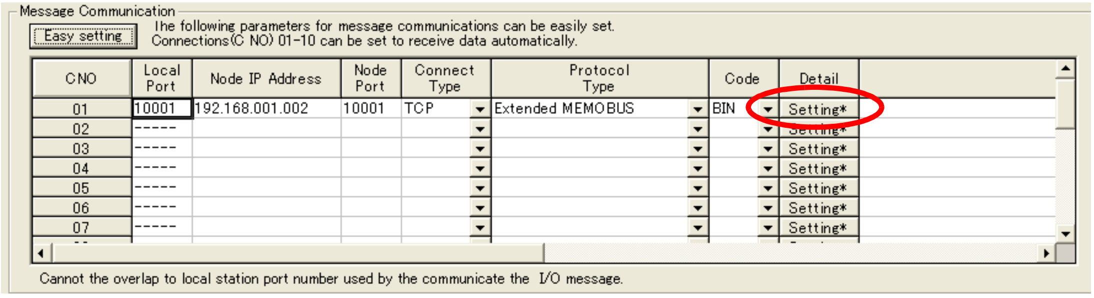
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

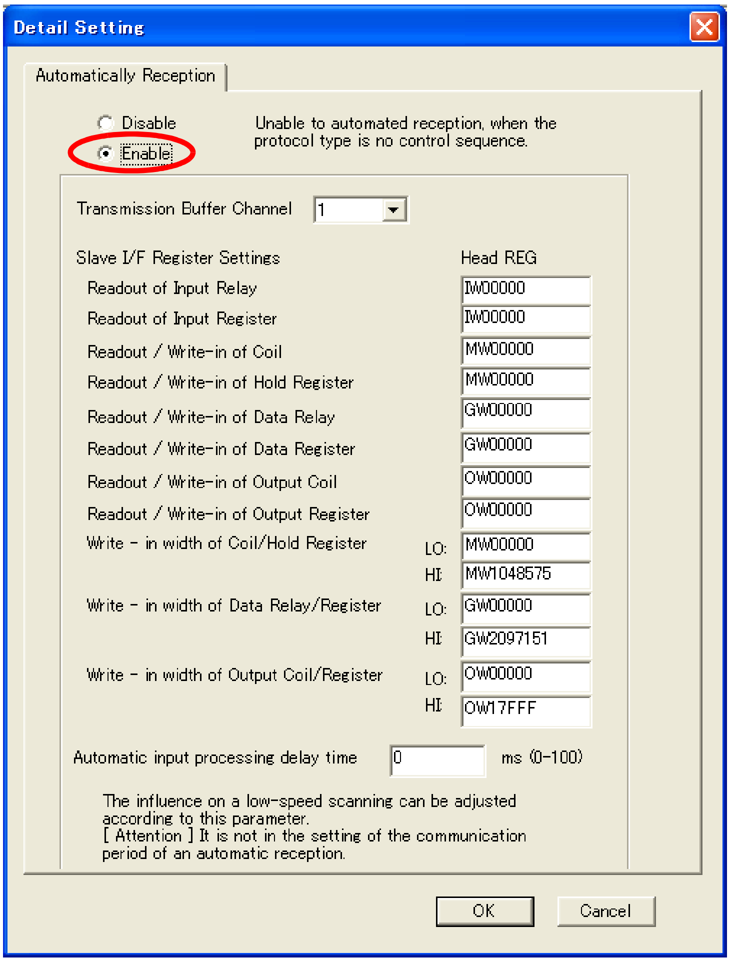
Ethernet Communications

2

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception,

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting Up the Touch Panel

This section describes the procedures to perform in GP-Pro EX to connect the MP3000 to a GP3000-series Touch Panel from Digital Electronics Corporation, and provides a screen creation example.

> Note
> The GP3000 Series and GP-Pro EX are manufactured by Digital Electronics Corporation.
> Contact Digital Electronics Corporation for further information.

■ GP-Pro EX Setup

1. Start GP-Pro EX.
2. Create a project.
3. Specify the Display Unit. Set the actual model that will be used for the Display Unit.
   This procedure is described for the AGP-3600T.

Series	GP3000 Series
	AGP33** Series
Model	AGP-3600T
Orientation	Landscape

4. Specify the device or PLC connected.

Manufacturer	YASKAWA Electric Corporation
Series	MEMOBUS Ethernet

5. Specify the connection method.

Port	Ethernet (TCP)

6. Select **Device/PLC** under **Peripheral Settings** on the System Settings Sidebar to display the Connected Equipment Setting Tab Page.
7. Specify the communications settings.

Port Number	10001
Timeout	3 (sec)
Retry	0
Wait to Send	00 (ms)

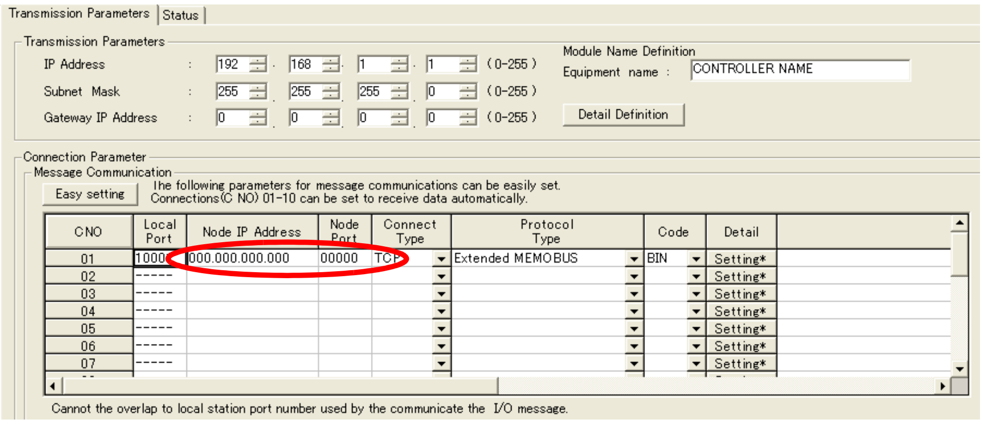
- Port Numbers
- If you disable the automatic assignment option by clearing the selection of the **Auto** Check Box next to the **Port No.** Box on the Communication Setting Dialog Box, the port number for the GP3000-series Touch Panel will be set to the user-specified setting.
- If you enable the automatic assignment option by selecting the **Auto** Check Box next to the **Port No.** Box on the Communication Setting Dialog Box, the port number for the GP3000-series Touch Panel will be assigned each time the connection is made.
  If the automatic assignment option is selected, set the connection to the Unpassive Open Mode in the 218IFD Detail Definition Dialog Box in the MPE 720.
  Refer to the following section for details on Unpassive Open Mode.
  ☞ *2.2 Detail Definition Setting Procedures – Displaying the 218IFD Detail Definition Dialog Box (page 2-6)*

The following table shows the relationship of the settings in GP-Pro EX and MPE720.

MPE720 setting / GP-Pro EX Setup	Unpassive Open Mode	Fixed Value Setting
Automatic assignment enabled.	Yes	No
Automatic assignment disabled.	Yes	Yes

Note: Yes: Connection allowed, No: Connection not allowed

- Setting the MP3000 to Unpassive Open Mode
  If the remote station's address is set to 000.000.000.000 and the remote station's port number is set to 0, the connection is set to the Unpassive Open Mode.



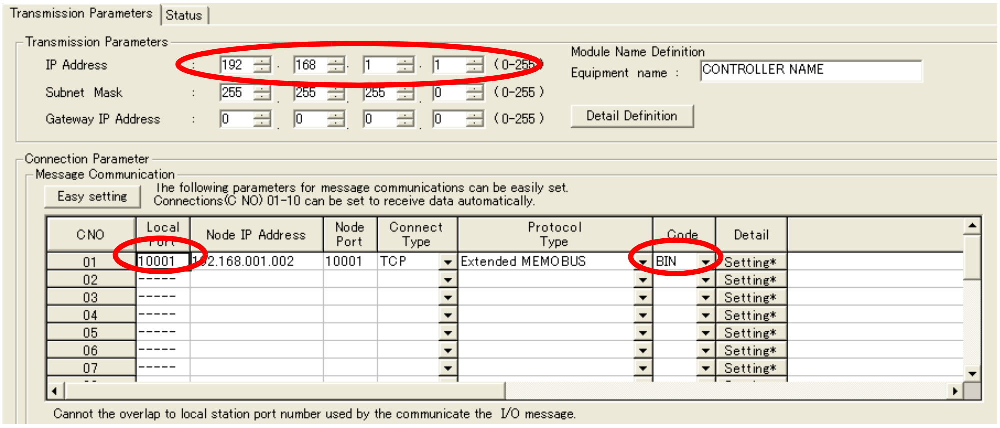
8. Click the **Settings** Button for PLC1 in the **Device-Specific Settings** Area to display the Individual Device Settings Dialog Box.

9. Specify the device or PLC connected.

The Individual Device Settings Dialog Box is used to specify the MP3000-series Controller to connect to. Set the IP address, port number, and data code to the same values set in the 218IFD Detail Definition Dialog Box for the MP3000.

IP Address	192.168.001.001
Port Number	10001
Data Code	BINARY

- 218IFD Detail Definition Dialog Box



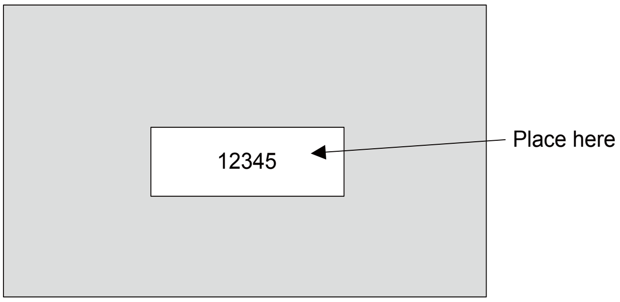
Note: 1. Specify an IP address that is not in use by any other device on the same network.
2. The IP address for the MP3000 will be automatically set to 192.168.1.1.
Check with your network administrator for unused IP addresses.
3. Place the GP3000-series Touch Panel in offline mode when setting the IP address.
Contact Digital Electronics Corporation for further information.

This concludes the setup for the touch panel.

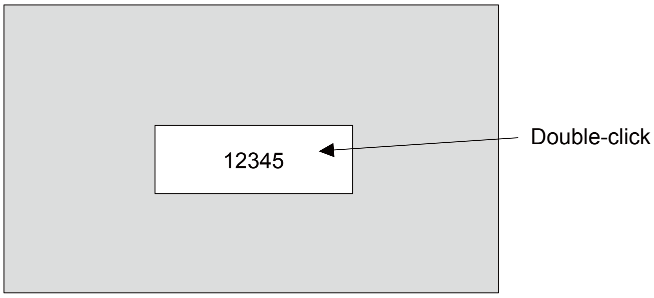
Create a screen and transfer the project to the touch panel as necessary.

■ Screen Creation Example

1. Create a base screen.
2. From the tool bar, select **Data Display** and place the object on the screen.



3. Double-click the Data Display placed on the screen.



4. Enter the following settings in the **Data Display** Dialog Box and click the **OK** Button.

Display Data	Numeric Display
Monitor Word Address	GMW00100

- The following table shows the relationship between the address display in GP-Pro EX and registers in the MP3000.

Device	Address Display in GP-Pro EX	Registers in MP3000
Coils as bits	GMB□□□□□□□	MB□□□□□□□
Coils as words	GMW□□□□□□	MW□□□□□□
Input relays as bits	GIB□□□□□□	IB□□□□□□
Input relays as words	GIW□□□□□	IW□□□□□

◆ Starting Communications

1. Turn ON the power to the MP3000 to start receiving messages.
   The system will automatically start the message reception operation. No further operation is required.
2. Start the GP3000-series Touch Panel to display the main screen.
   Communications with the MP3000 will start after the touch panel operating system starts.
   Note: Contact Digital Electronics Corporation for further information.

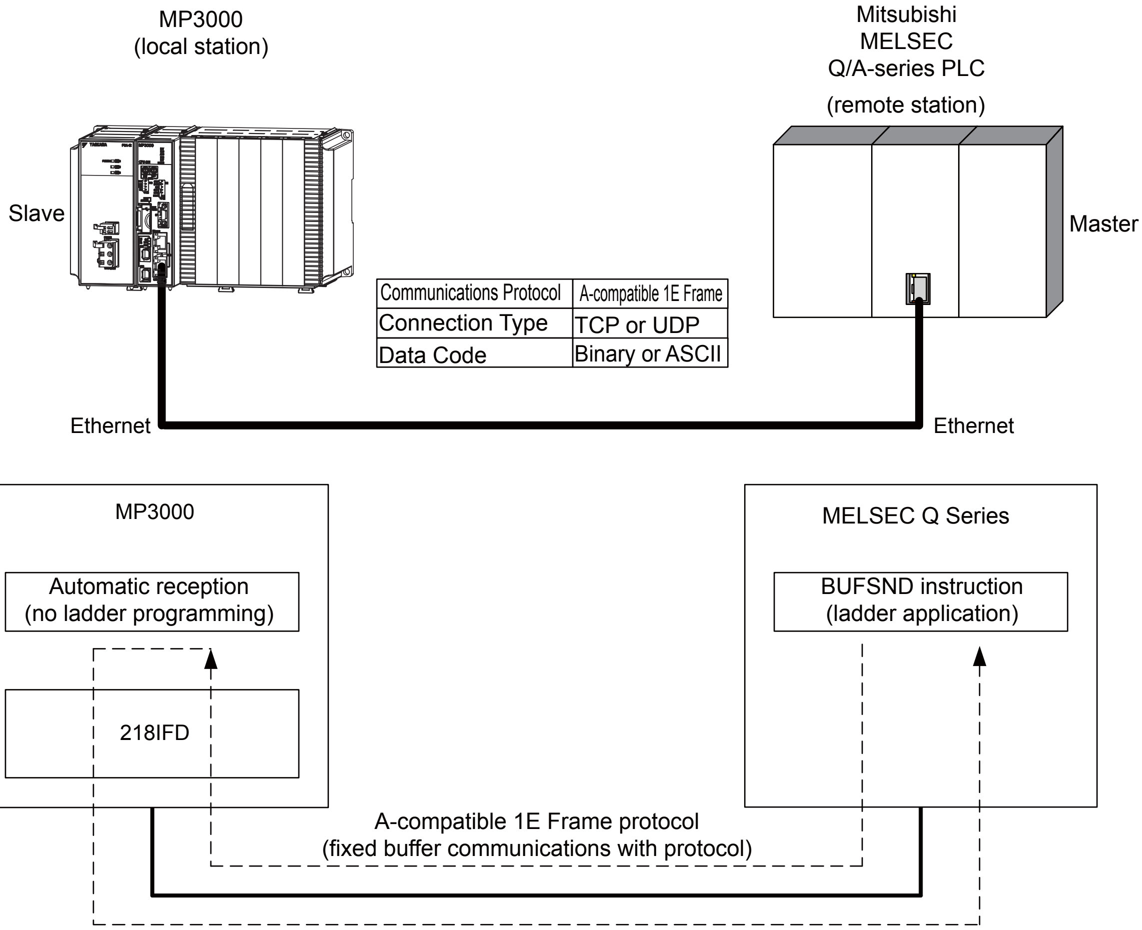
2.6 Communications with a Mitsubishi PLC (A-compatible 1E Frame protocol)

When using Ethernet communications between the MP3000 and a Mitsubishi Q/A-series PLC, use the A-compatible 1E Frame protocol as the communications protocol. The A-compatible 1E Frame protocol allows the master to read and write the contents of slave registers.

This section describes communications when the MP3000 acts as a slave and as the master.

Using Automatic Reception with the MP3000 as a Slave

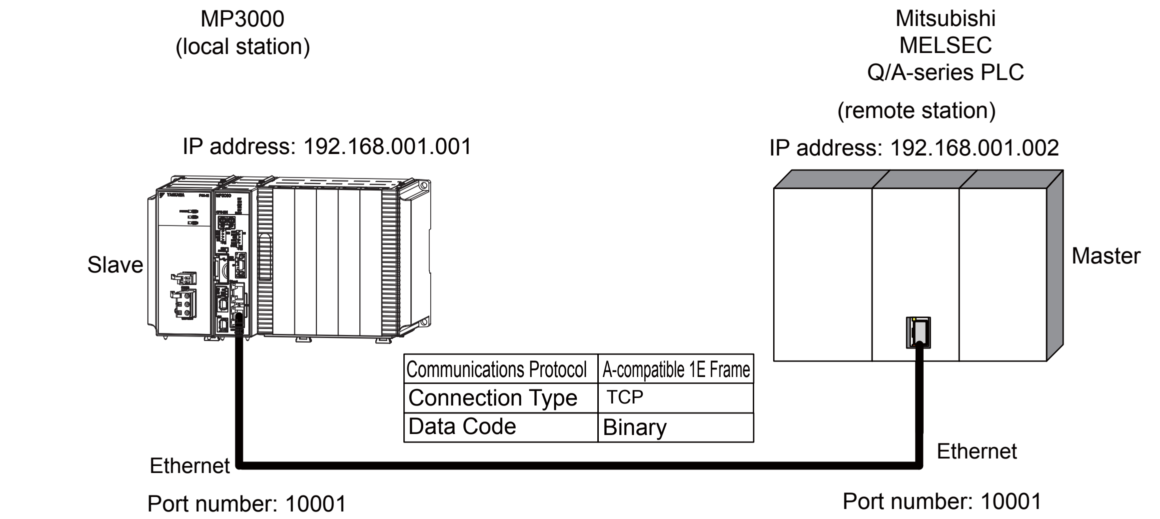
This section describes how to communicate with a Mitsubishi Q/A-series PLC by using automatic reception.

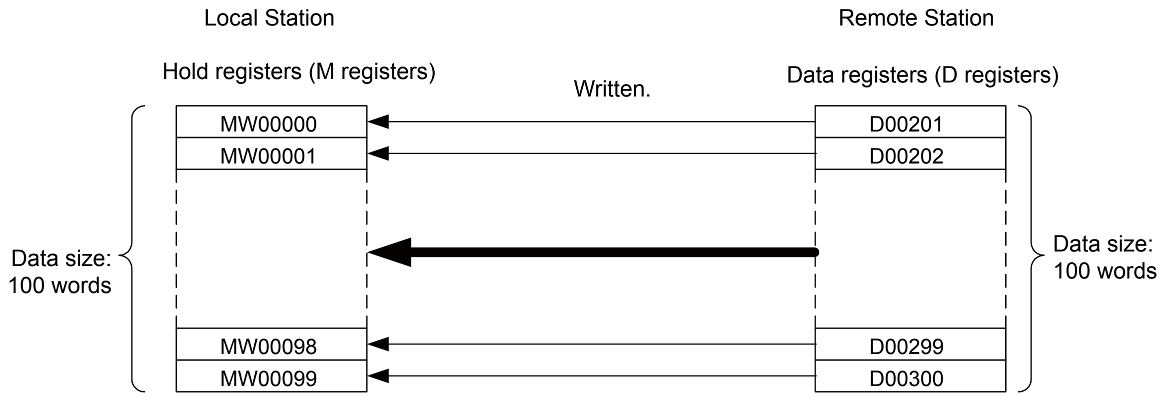


Note: When using the A-compatible 1E Frame protocol to communicate with a Mitsubishi PLC, the PLC can read from and write to hold registers in the MP3000 by using fixed buffer communications. Due to the specifications of the A-compatible 1E Frame protocol, inter-CPU Module communications and random-access communications cannot be used if the MP3000 is acting as a slave.

Setting Example

The following figure illustrates how the contents of the D00201 to D00300 data registers in the Mitsubishi Q/A-series PLC master are written to the MW00000 to MW00099 hold registers in the MP3000 slave.



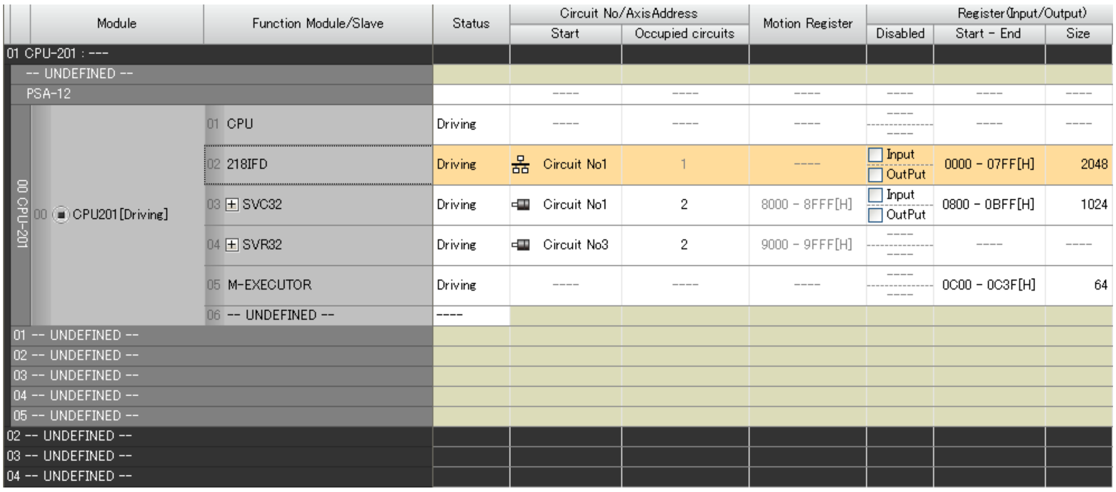


MP3000 Setup

Use the following procedure to set up the MP3000.

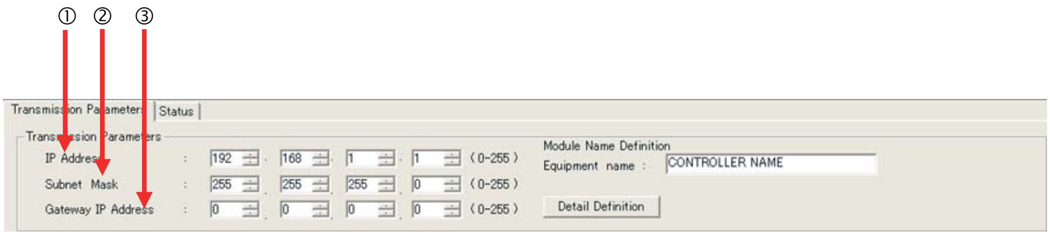
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



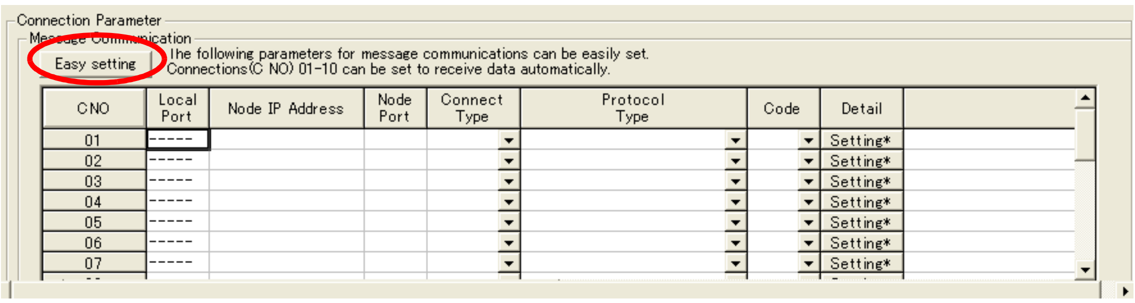
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



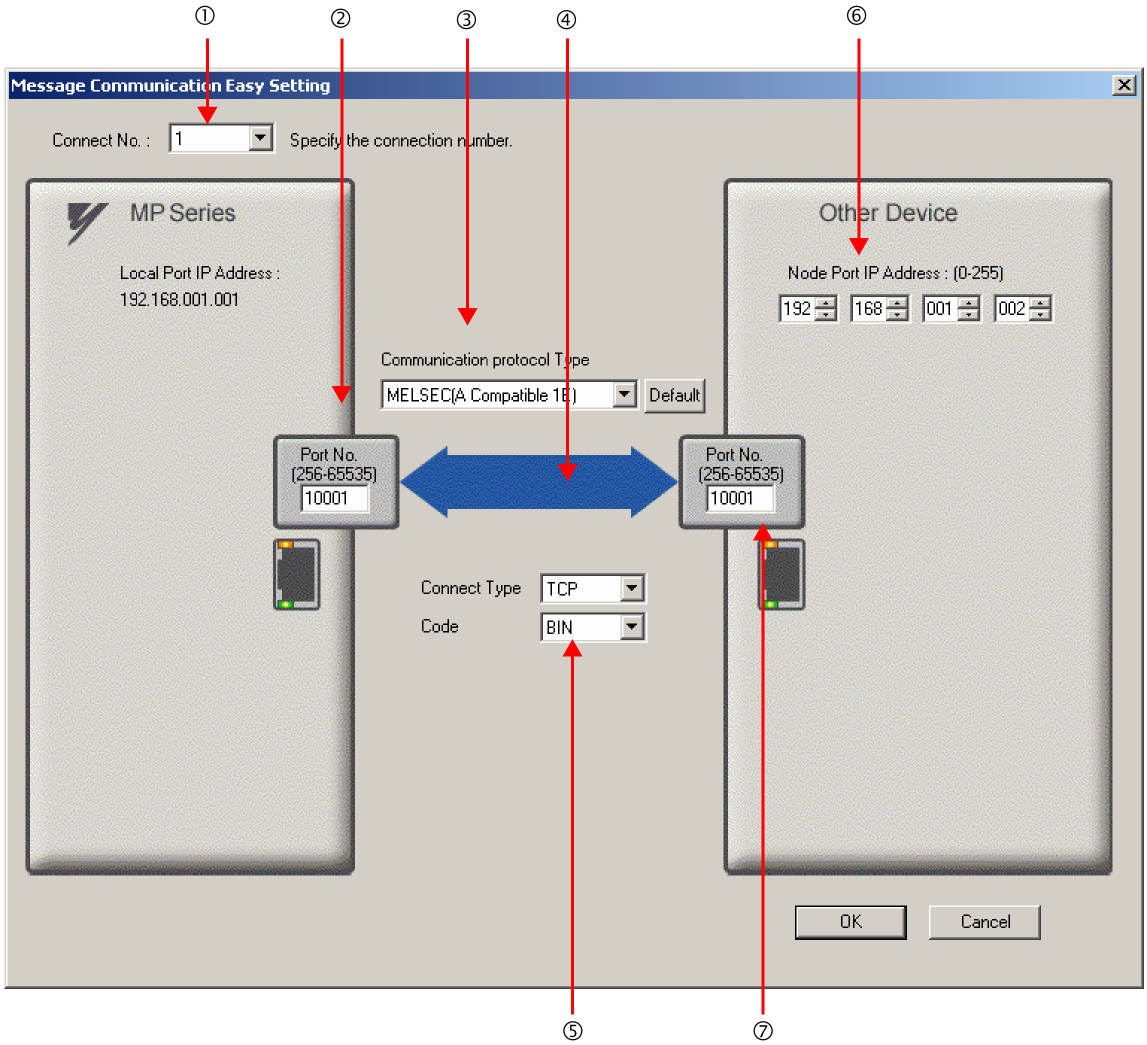
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



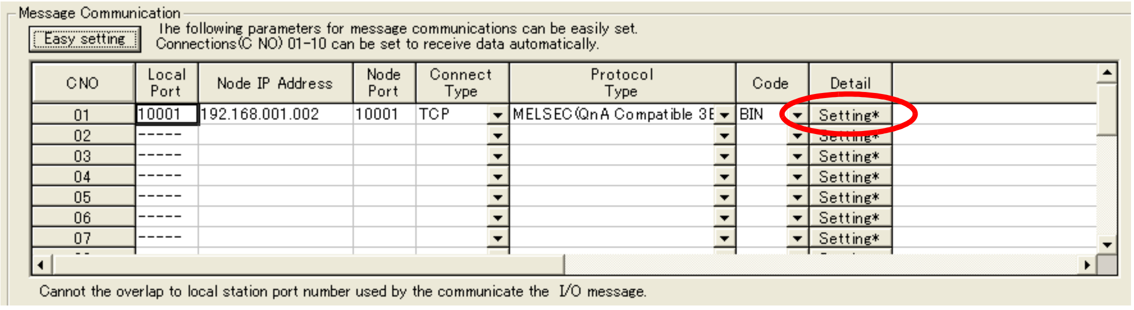
①Select **1** in the **Connect No.** Box.
②Enter “10001” in the **Port No.** Box for the MP-series Controller.
③Select **MELSEC (A-compatible 1E)** in the **Communication Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter “10001” in the **Port No.** Box for the other device.

5. Click the **OK** Button.

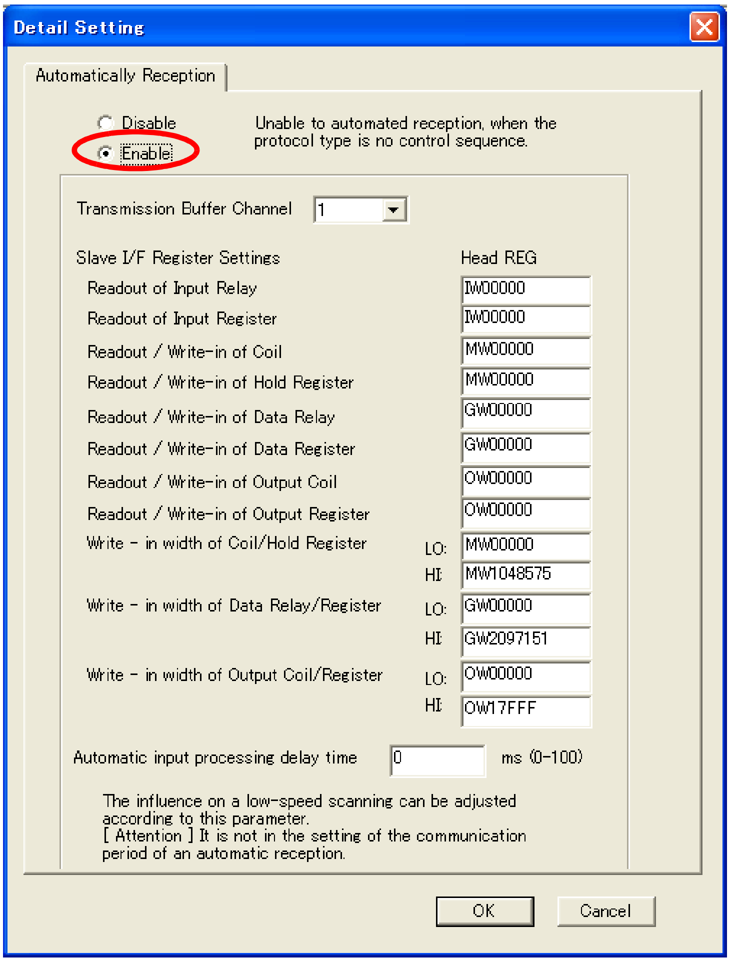
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception,

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting Up the Remote Device (Mitsubishi Q/A-series PLC)

Use the following procedure to set up the Mitsubishi Q/A-series PLC (MELSEC device).

Note

MELSEC devices are manufactured by Mitsubishi Electric Corporation.
Contact Mitsubishi Electric Corporation for further information on MELSEC devices.

1. Start GX Developer.
2. Create a project.
3. Set the MELSECNET/Ethernet network parameters.

Parameter	Description
Network type	Ethernet
Starting I/O No.	As required.
Network No.	As required.
Group No.	As required.
Station No.	As required.
Mode	Online

4. Set the Ethernet operation settings.

Parameter	Description
Communications data code	Binary code
Initial timing	As required.
IP Address	192.168.001.002
Send frame setting	Ethernet (V2.0)
TCP existence confirmation setting	As required.
Enable Write at RUN time	Enable

5. Specify the open settings.

Parameter	Description
Protocol	TCP
Open system	Active
Fixed buffer	Send
Fixed buffer communication	Procedure exist
Pairing open	As required.
Existence confirmation	As required.
Local station port No.	2711 hex (10001)
Destination IP address	192.168.1.1
Destination port No.	2711 hex (10001)

Setting Example to Open the Built-in Ethernet Port in a MELSEC Device

Parameter	Description
Protocol	TCP
Open system	MC protocol
TCP connection	–
Local station port No.	1389 hex (5001)
Destination IP address	–
Destination port No.	–

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

Information

Set the initial settings and router relay parameters as necessary.

- Initial Settings
  These settings apply to the timers when TCP is the selected protocol. In most cases, accept the default. Set these settings only when necessary, for example, to shorten the time set for the TCP resend timer.
- Router Relay Parameters
  Set these parameters if you are using a subnet mask pattern or default gateway.

6. Create a ladder program for communications.

①Use the OPEN instruction to establish a connection with the remote device.

②Use the BUFSND instruction to write the contents of the registers specified by the parameters listed below to the MP3000 hold registers (M registers).

Example

In this example, the start address of the device containing the data to send using the BUFSND instruction is set to D00200.
D00200 (send data length):100 words
D00201 to D00300 (send data): Data to be written into MW00000 to MW00099

③If necessary, add close processing by programming a CLOSE or similar instruction.

Note: Contact Mitsubishi Electric Corporation for further information on ladder programming.

This concludes the setup. Set any other parameters as necessary, then transfer the data to the PLC.

◆ Starting Communications

1. Turn ON the power to the MP3000 to start receiving messages.

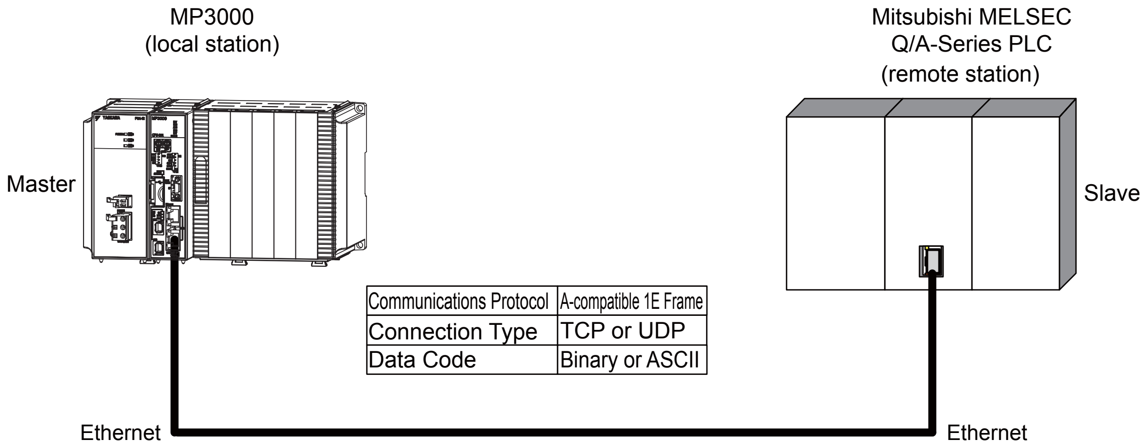
The system will automatically start the message reception operation. No further operation is required.

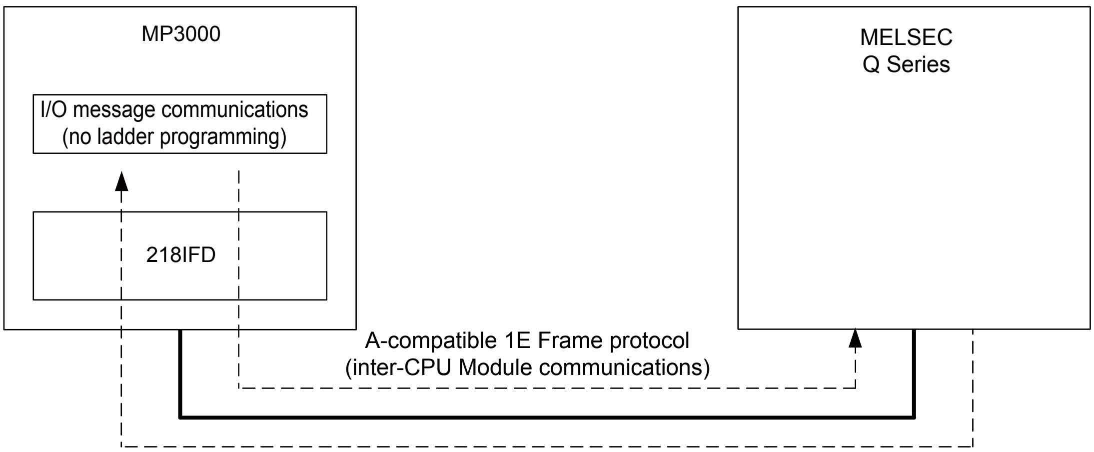
2. Use an OPEN instruction in the MELSEC Q/A-series PLC to establish a connection with the MP3000, then use a BUFSND instruction to send messages.

When the Mitsubishi Q/A-series PLC starts sending messages, communications with the MP3000 will start.

Using I/O Message Communications with the MP3000 as the Master

This section describes how to perform inter-CPU Module communications with a Mitsubishi Q/A-series PLC by using I/O message communications.

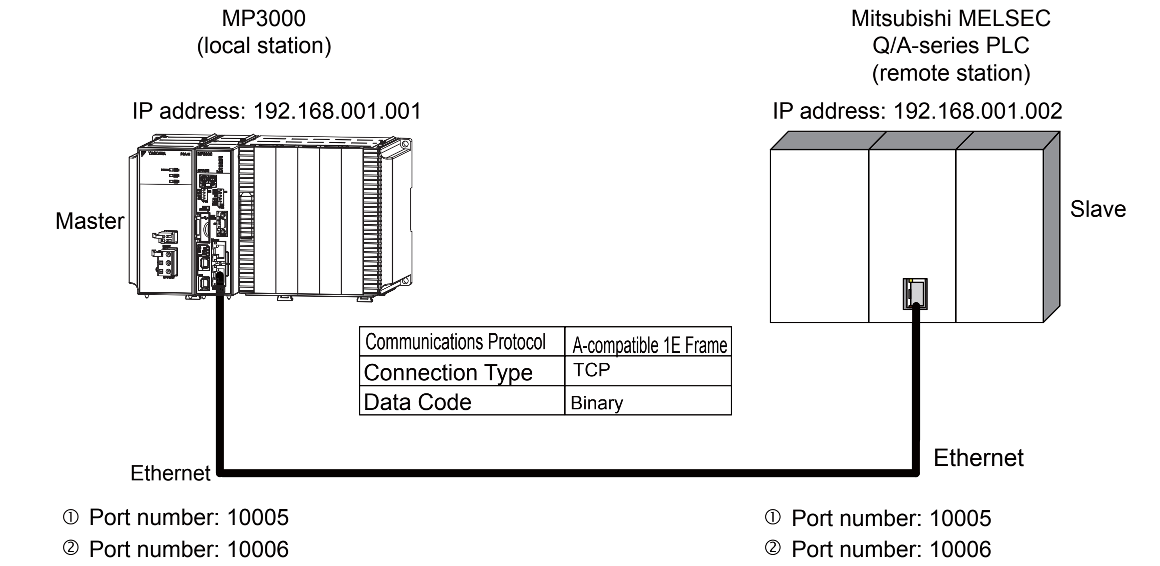


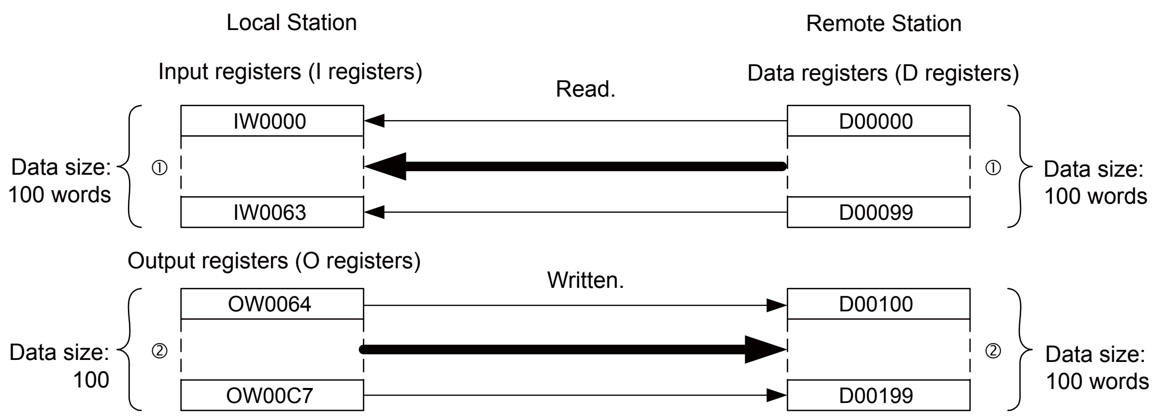


Note: 1. I/O message communications use 1-to-1 communications.
2. When using the A-compatible 1E Frame protocol to communicate with a Mitsubishi Q/A-series PLC, the PLC can read from and write to the following registers by using inter-CPU Module communications.
   • Bit device registers: X, Y read only, M, and B
   • Word device registers: D, W, and R
   A bit device register is read or written in units of 16-bit words.
3. Use the MSG-SNDE function if you need to read from or write to registers other than those listed above, to use fixed or random access buffer communications, or to communicate with multiple remote devices.

Setting Example

The following figure illustrates how the contents of the D00000 to D00099 data registers in the Mitsubishi Q/A-series PLC slave can be read into the IW0000 to IW0063 input registers in the MP3000 master and how the contents of the OW0064 to OW00C7 output registers in the MP3000 master are written to the D00100 to D00199 data registers in the Mitsubishi Q/A-series PLC slave.



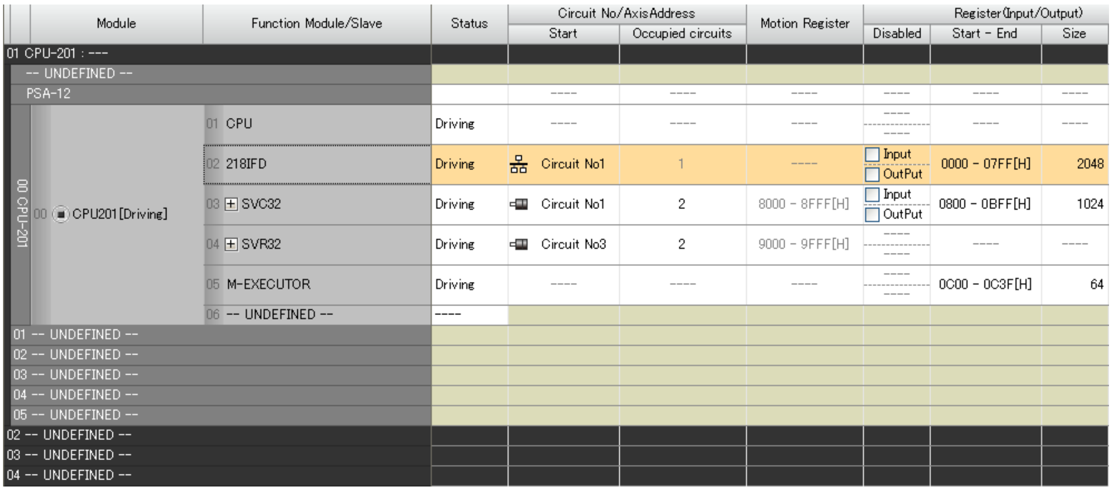


MP3000 Setup

Use the following procedure to set up the MP3000.

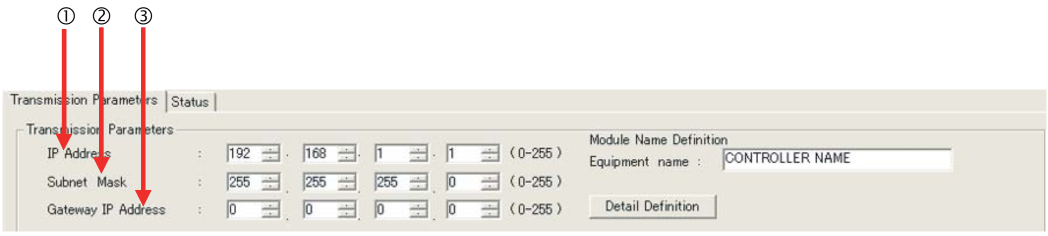
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



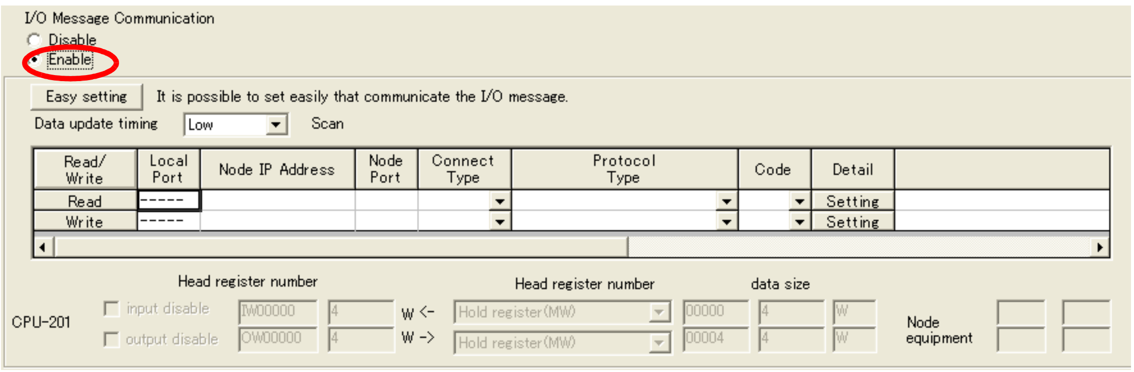
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

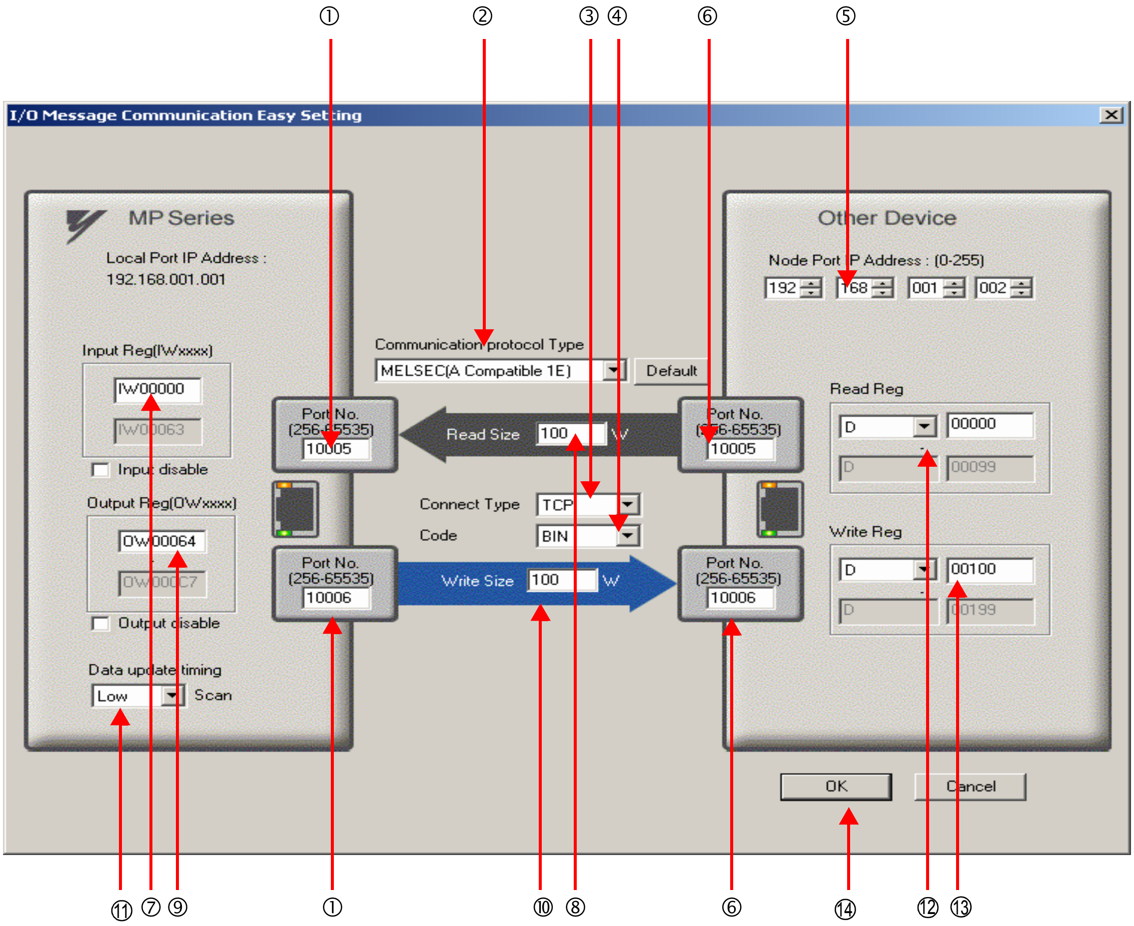
3. Select the **Enable** Option in the **I/O Message Communication** Area of the **Connection Parameter** settings.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Click the **Easy setting** Button.

5. Set the connection parameters.



①Enter "10005" and "10006" in the **Port No.** Box for the MP-series Controller.

②Select **MELSEC (A-compatible 1E)** in the **Communication Protocol Type** Box, and then click the **Default** Button.

Note: If you are using the MELSEC (A-compatible 1E) communications protocol, the read and write register type will be set to D (word device) registers by default.

③Select **TCP** in the **Connect Type** Box.

④Select **BIN** in the **Code** Box.

⑤Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.

⑥Enter “10005” and “10006” in the **Port No.** Boxes for the other devices.

Note: In I/O message communications, a message is transmitted from each port for which a register read/write is initiated. Therefore, for this example, the connected remote device must support a message reception function to receive two messages.

⑦Enter “IW0000” in the **Input Reg** Box as the read data destination.

⑧Enter “100” in the **Read Size** Box as the size of data to read.

⑨Enter “OW0064” in the **Output Reg** Box as the write data destination.

⑩Enter “100” in the **Write Size** Box as the size of data to write.

⑪Select **Low** in the **Data update timing** Box as the timing to update input and output data between the CPU Function Module and 218FD.

Note: The data update timing is the timing at which the CPU Function Module and 218IFD exchange data. Communications with the remote device are performed asynchronously. The data update timing therefore does not necessarily mean that the messages are sent to the remote device.

⑫Enter “D00000” in the **Read Reg** Box as the register type and first address to read from on the remote device.

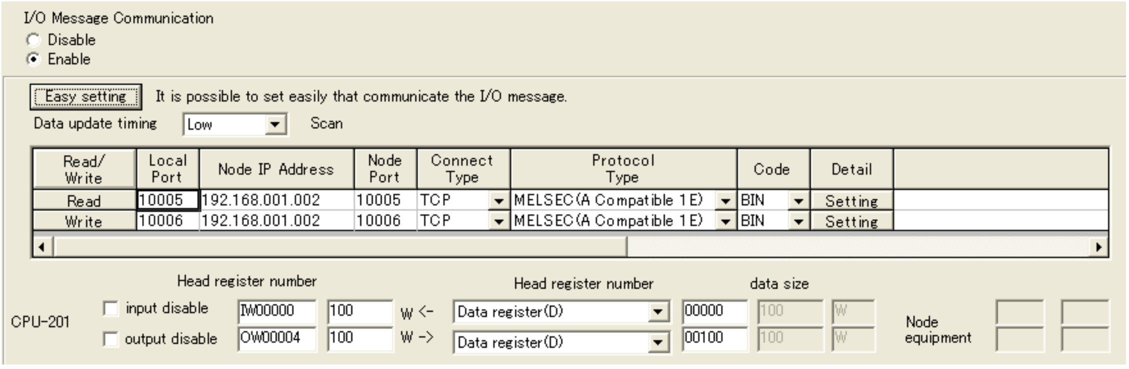
⑬Enter “D00100” in the **Write Reg** Box as the register type and first address to write to on the remote device.

6. Click the **OK** Button.

7. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

8. Check the settings.



9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as the master.

◆ Setting Up the Remote Device (Mitsubishi Q/A-series PLC)

Use the following procedure to set up the Mitsubishi Q/A-series PLC (MELSEC device).

> Note
> MELSEC devices are manufactured by Mitsubishi Electric Corporation.
> Contact Mitsubishi Electric Corporation for further information on MELSEC devices.

1. Start GX Developer.

2. Create a project.

3. Set the MELSECNET/Ethernet network parameters.

Parameter	Description
Network type	Ethernet
Starting I/O No.	As required.
Network No.	As required.
Group No.	As required.
Station No.	As required.
Mode	Online

4. Set the Ethernet operation settings.

Parameter	Description
Communications data code	Binary code
Initial timing	Always wait for OPEN
IP address	192.168.001.002
Send frame setting	Ethernet (V2.0)
TCP existence confirmation setting	As required.
Enable Write at RUN time	Enable

5. Specify the open settings.

Parameter	Setting (Connection Number 1)	Setting (Connection Number 2)
Protocol	TCP	TCP
Open system	Full passive	Full passive
Fixed buffer	As required.	As required.
Fixed buffer communication	As required.	As required.
Pairing open	As required.	As required.
Existence confirmation	As required.	As required.
Local station port No.	2715 hex (10005)	2716 hex (10006)
Destination IP address	192.168.1.1	192.168.1.1
Destination port No.	2715 hex (10005)	2716 hex (10006)

Setting Example to Open the Built-in Ethernet Port in a MELSEC Device

Parameter	Description
Protocol	TCP
Open system	MC protocol
TCP connection	–
Local station port No.	1389 hex (5001)
Destination IP address	–
Destination port No.	–

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

Information

Set the initial settings and router relay parameters as necessary.

- Initial Settings
  These settings apply to the timers when TCP is the selected protocol. In most cases, accept the default. Set these settings only when necessary, for example, to shorten the time set for the TCP resend timer.
- Router Relay Parameters
  Set these parameters if you are using a subnet mask pattern or default gateway.

This concludes the setup.

◆ Starting Communications

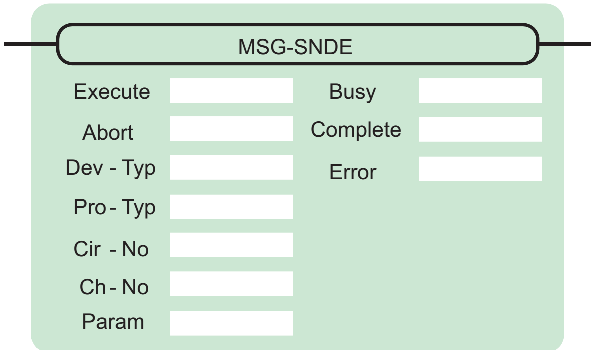
1. Start receiving messages on the Mitsubishi Q/A-series PLC.
The system will automatically start the message reception operation. No further operation is required.

2. Turn ON the power to the MP3000 to start transmitting messages.
The system will automatically start the message transmission operation. No further operation is required.

Message Functions

The message functions are used in user communications applications for the A-compatible 1E Frame protocol. You can send and receive message data by setting the necessary input items and parameters for the message functions. Message communications using the A-compatible 1E Frame protocol can be carried out with the same settings used for MEMOBUS messages.

Inputs and Outputs for the MSG-SNDE Function

Function Name	MSG-SNDE			
Function	Sends a message to a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the transmission.
	2	Abort	B-VAL	Forces the transmission to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message transmission.

When the Execute Bit turns ON, the message will be sent.

Note

Keep the Execute Bit ON until the Complete or Error Bit turns ON. To send another message, turn OFF the Execute Bit for at least one scan and then turn it ON again.

◆ Abort

Specify the bit to use to abort the message transmission.

When the Abort Bit turns ON, the message transmission will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Communications Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

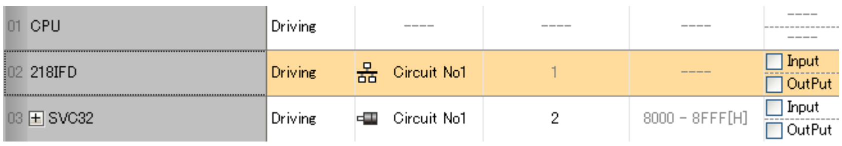
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the A-compatible 1E Frame protocol. MEMOBUS is automatically converted to the A-compatible 1E Frame protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the A-compatible 1E Frame protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the A-compatible 1E Frame protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> Note
>
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> Note
>
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 29 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting function codes and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00023	PARAM23
DW00024	PARAM24
DW00025	PARAM25
DW00026	PARAM26
DW00027	PARAM27
DW00028	PARAM28

◆ Busy

Specify the bit that shows that the message transmission is in progress.

The Busy Bit is ON while a message transmission or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message transmission has been completed.

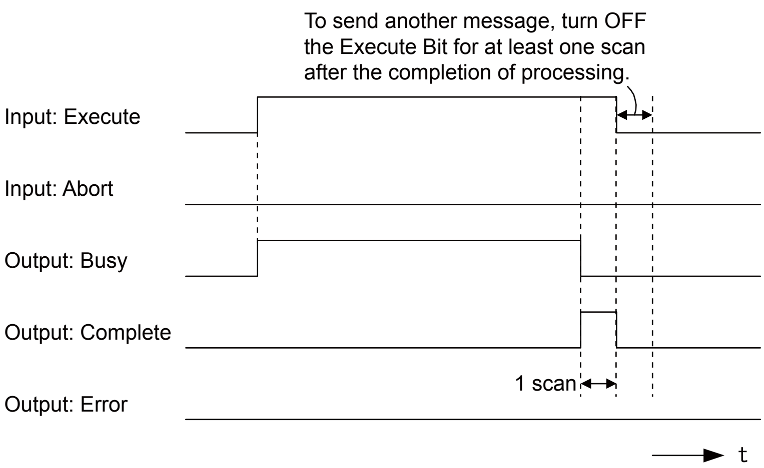
The Complete Bit turns ON only for one scan when message transmission or forced abort processing has been completed normally.

◆ Error

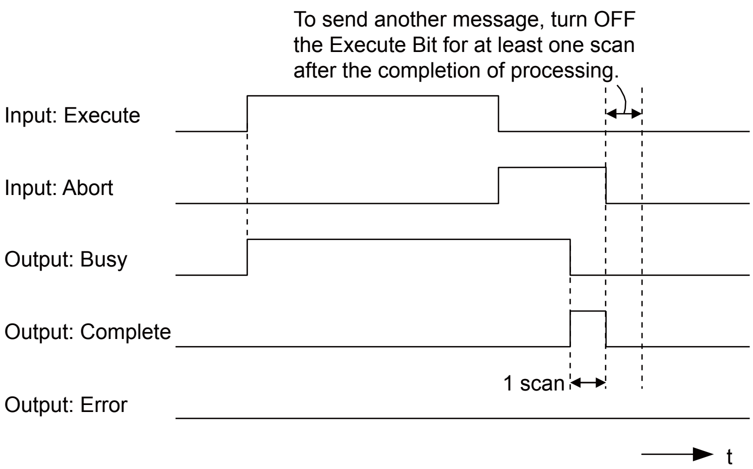
Specify the bit that shows if an error occurred while sending the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-SNDE function.

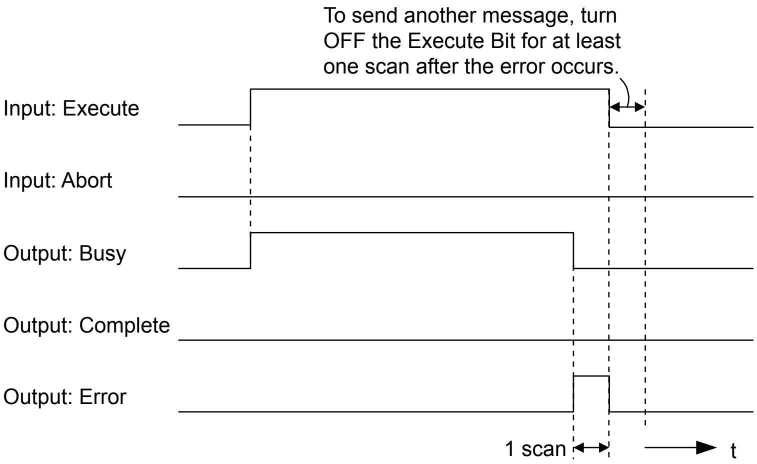
• Normal Execution



• When Execution Is Aborted



- Execution When an Error Occurs



MSG-SNDE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-SNDE function.

No.		I/O	Meaning	Description
Status	00	Out-puts	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.

Continued on next page.

Continued from previous page.

No.		I/O	Meaning	Description
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11		Option	Not used for the A-compatible 1E Frame protocol.
	12		Function Code	Sets the code of the function in the A-compatible 1E Frame protocol.
	13		Reserved for system.	–
	14		Remote Station Data Address, Lower Word	Sets the data address to read/write at the remote station. (Use word addresses for registers, bit addresses for relays or coils.)
	15		Remote Station Data Address, Upper Word	
	16		Remote Station Register Type	Sets the register type to read/write at the remote station.
	17		Data Size	Sets the size of the data to read/write. (Use word sizes for registers, bit sizes for relays or coils.)
	18		Remote CPU Module Number	Not used for the A-compatible 1E Frame protocol.
	19		Reserved for system.	–
	20		Local Station Data Address, Lower Word	Sets the data address to store read/write data in the local station. (Use word addresses for registers, bit addresses for relays or coils.)
	21		Local Station Data Address, Upper Word	
	22		Local Station Register Type	Sets the register type of the read/write data to store in the local station.
	23		Reserved for system.	–
System	24	–	For system use	–
	25		Reserved for system.	–
	26		Reserved for system.	–
	27		Reserved for system.	–
	28		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

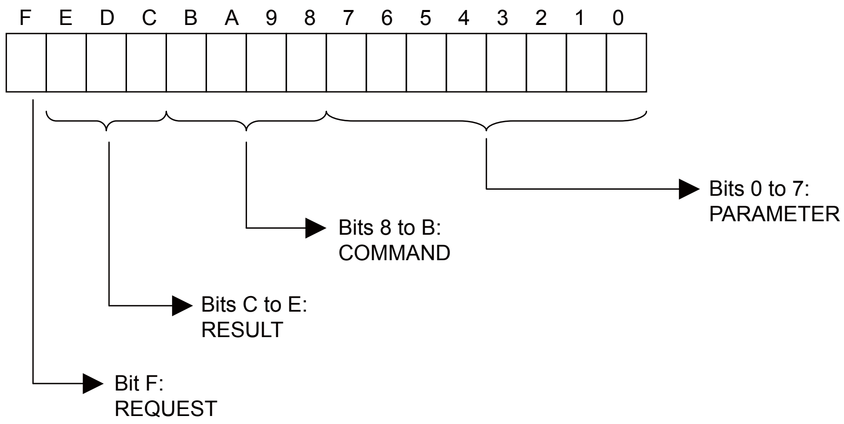
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-66)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-SNDE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution results of the MSG-SNDE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-SNDE function.

Code	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT is 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was sent or received. Check PARAM12 (Function Code).
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Remote Station Data Address) PARAM20 and PARAM21 (Local Station Data Address)
83□□ hex	3	Data size error	The data size for sending or receiving is out of range. Check PARAM17 (Data Size).
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-SNDE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-SNDE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-SNDE function.
C245 hex	–	Local station register type error	The register type for the local station is out of range. Check PARAM22 (Local Station Register Type).
8072 hex to FF72 hex	–	Remote device error*	An error response was received from the remote station. Check the error code and remove the cause.

* An error response received from the remote device will be formatted in PARAM00 (Processing Result) as follows.
Processing Result (PARAM00): □□72 hex (where □□ is the error code)
□□ contains the sum of the completion code sent from the Mitsubishi PLC and 80 hex.
Refer to the following manual for details on completion codes.
Ethernet Unit Manual from Mitsubishi Electric Corporation

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

Note: The status is updated when the function is executed in each scan.

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

Note: The status is updated when the function is executed in each scan.

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

Note: The status is updated when the function is executed in each scan.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

Note: The status is updated when the function is executed in each scan.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

Note: The status is updated when the function is executed in each scan.

◆ Status 6 (PARAM09)

This parameter is not used for the A-compatible 1E Frame protocol.

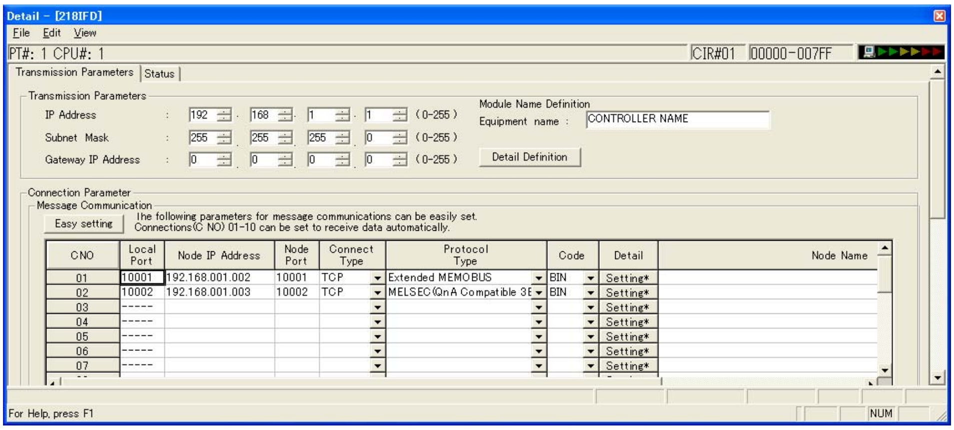
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Description
218IFD	1 to 20	Specifies the connection number of the remote station to send the message to.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Function Code (PARAM12)

Set the function code to send.

You can use the functions that are registered to the function codes.

Function Code	Common Instructions for MELSEC ACPUs	Target Data Type	Function
01 or 02 hex	00 hex	B	Reads bit devices in units of one point.
03, 04, 09, or 0A hex	01 hex	W	Reads word devices in units of one point.
05 or 0F hex	02 hex	B	Writes bit devices in units of one point.
06, 0B, or 10 hex	03 hex	W	Writes word devices in units of one point.
08 hex	16 hex	–	Performs a loopback test.

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Function Code	Common Instructions for MELSEC ACPUs	Target Data Type	Function
0E hex	05 hex	B	Sets/resets word devices in units of one point by specifying a device number.
31 hex	60 hex	W	Writes to a fixed buffer in units of one word.
32 hex	61 hex	W	Reads from the random access buffer in units of one word.
33 hex	62 hex	W	Writes to the random access buffer in units of one word.

Note: 1. B: Bit data, W: Integer data
2. AnCPU special instructions cannot be used. Use the ACPU common instructions to access the AnCPU. The extended file registers in the AnCPU cannot be accessed either.

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Remote Station Data Address (PARAM14 and PARAM15)

Set the first address for data in the remote station.

Enter the first address as a decimal or hexadecimal number.

Example If the first address is MW01000, enter “1000” (decimal) or “3E8” (hexadecimal).

The applicable function codes and valid range of data addresses depend on the device type and device range of the Mitsubishi Q/A-series PLC.

Bit Device Conversion Table

Device	Device Range for ACPU Common Instructions	Notation	Function Code	Data Address Setting Range	Correspond-ing Register Addresses
X	X0000 to X07FF	Hexadeci-mal	02 hex: Input relays	0 to 2047	MB000000 to MB00127F
Y	Y0000 to Y07FF	Hexadeci-mal	01 and 0F hex: Coils	0 to 2047	MB000000 to MB00127F
M	M0000 to M2047	Decimal	01, 05, and 0F hex: Coils	2048 to 4095	MB001280 to MB00255F
M	M9000 to M9255	Decimal	01, 05, and 0F hex: Coils	4096 to 4351	MB002560 to MB00271F
B	B0000 to B03FF	Hexadeci-mal	01, 05, and 0F hex: Coils	4352 to 5375	MB002720 to MB00335F
F	F0000 to F0255	Decimal	01, 05, and 0F hex: Coils	5376 to 5631	MB003360 to MB00351F
TS	TS000 to TS255	Decimal	02 hex: Input relays	2048 to 2303	MB001280 to MB00143F
TC	TC000 to TC255	Decimal	02 hex: Input relays	2304 to 2559	MB001440 to MB00159F
CS	CS000 to CS255	Decimal	02 hex: Input relays	2560 to 2815	MB001660 to MB00175F

Bit Device Conversion Table

Device	Device Range for ACPU Common Instructions	Notation	Function Code	Data Address Setting Range	Correspond-ing Register Addresses
CC	CC000 to CC255	Decimal	02 hex: Input relays	2816 to 3071	MB001760 to MB00191F
M	M2048 to M8191	Decimal	01, 05, and 0F hex: Coils	8192 to 14335	MB005120 to MB00895F

Word Device Conversion Table

Device	Device Range for ACPU Common Instructions	Notation	Function Code	Data Address Setting Range	Correspond-ing Register Addresses
TN	TN000 to TN255	Decimal	04 and 0A hex: Input registers	0 to 255	MW00000 to MW00255
CN	CN000 to CN255	Decimal	04 and 0A hex: Input registers	256 to 511	MW00256 to MW00511
D	D0000 to D1023	Decimal	03, 06, 09, 0B, 0E, and 10 hex: Hold registers	0 to 1023	MW00000 to MW01023
D (Special)	D9000 to D9255	Decimal	03, 06, 09, 0B, 0E, and 10 hex: Hold registers	1024 to 1279	MW01024 to MW01279
W	W0000 to W03FF	Hexadecimal	03, 06, 09, 0B, 0E, and 10 hex: Hold registers	1280 to 2303	MW01280 to MW02303
R	R0000 to R8191	Decimal	03, 06, 09, 0B, 0E, and 10 hex: Hold registers	2304 to 10495	MW02304 to MW10495
D	D1024 to D6143	Decimal	03, 06, 09, 0B, 0E, and 10 hex: Hold registers	10496 to 15615	MW10496 to MW15615

Note: 1. Even if addresses are within the given device range, they may exceed the range of the device area depending on the model of the Mitsubishi Q/A-series PLC.
Refer to the following manual for details.
Programmable Controller Manual from Mitsubishi Electric Corporation

2. The corresponding register address in the MP3000 can be adjusted by using the offset setting of the MSG-SNDE function.

◆ Remote Station Register Type (PARAM16)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Data Size (PARAM17)

Set the data size for the read/write request as the number of bits or words.

Be sure that the last data address that is determined by the offset, data address, and data size does not exceed the valid data address range.

The range that is allowed for the data size depends on the function code and data area.

Function Code	Common Instructions for MELSEC ACPUs	Function	Data Size Setting Range
01 or 02 hex	00 hex	Reads bit devices in units of one point.	1 to 256 points
03, 04, 09, or 0A hex	01 hex	Reads word devices in units of one point.	1 to 256 points
05 or 0F hex	02 hex	Writes bit devices in units of one point.	1 to 256 points
06, 0B, or 10 hex	03 hex	Writes word devices in units of one point.	1 to 256 points

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Function Code	Common Instructions for MELSEC ACPUs	Function	Data Size Setting Range
08 hex	16 hex	Performs a loopback test.	–
0E hex	05 hex	Sets/resets word devices in units of one point by specifying a device number.	1 to 40 points
31 hex	60 hex	Writes to a fixed buffer in units of one word.	See the following table.
32 hex	61 hex	Reads from the random access buffer in units of one word.	
33 hex	62 hex	Writes to the random access buffer in units of one word.	

Function	Connection Type	Code	Data Size Setting Range
Writing to a fixed buffer in units of one word	TCP	BIN	1 to 727 words
		ASCII	1 to 362 words
	UDP	BIN	1 to 1,017 words
		ASCII	1 to 508 words
Reading from the random access buffer in units of one word	TCP	BIN	1 to 728 words
		ASCII	1 to 363 words
	UDP	BIN	1 to 1,017 words
		ASCII	1 to 508 words
Writing to the random access buffer in units of one word	TCP	BIN	1 to 726 words
		ASCII	1 to 361 words
	UDP	BIN	1 to 1,017 words
		ASCII	1 to 508 words

Note: When communicating with TCP, the data size limit is the maximum size of data that can be sent in a single segment.
A segment is the unit for data transfer in TCP and is determined by the MTU (maximum transfer unit).
The data size setting ranges given above are for an MTU of 1,500 bytes.

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Local Station Data Address (PARAM20 and PARAM21)

Set the address of the read data destination or write data source in the MP3000-series Controller.

The address is set as the word offset from address 0.

◆ Local Station Register Type (PARAM22)

Set the register type of the read data destination or write data source in the MP3000.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 and higher	–	These settings are not used for the A-compatible 1E Frame protocol.

The register types that can be used depend on whether you are reading or writing.

The following table lists the combinations of register types.

Function Code	Applicable Register Types
01, 02, 03, 04, 09, 0A, or 32 hex	M, G, or O
05, 06, 0B, 0F, 10, 31, or 33 hex	M, G, I, O, or S
0E hex	M

◆ Reserved for System (PARAM23)

This parameter is used by the system.

Note

Do not change the value of PARAM23 from a user program or by any other means.

◆ For System Use (PARAM24)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM24 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM24 from a user program or by any other means. PARAM24 will be used by the system.

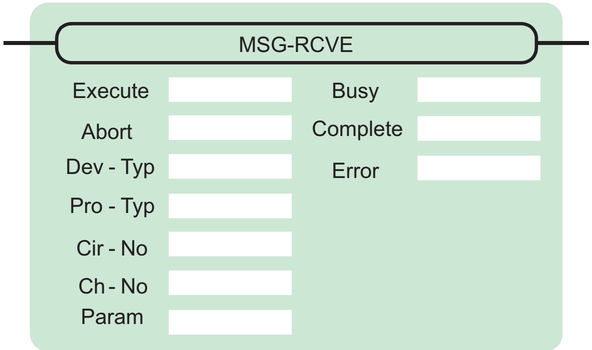
◆ Reserved for System (PARAM25 to PARAM28)

This parameter is used by the system.

Note

Do not change the values of PARAM25 to PARAM28 from a user program or by any other means.

Inputs and Outputs for the MSG-RCVE Function

Function Name	MSG-RCVE			
Function	Receives a message from a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the reception.
	2	Abort	B-VAL	Forces the reception to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message reception.

When the Execute Bit turns ON, the message will be received.

◆ Abort

Specify the bit to use to abort the message reception.

When the Abort Bit turns ON, the message reception will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

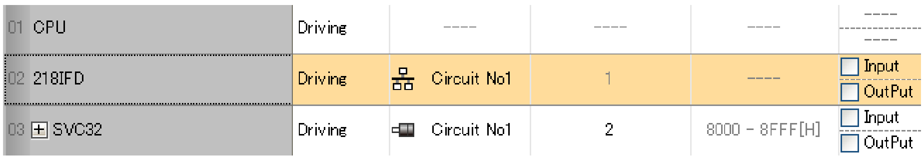
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the A-compatible 1E Frame protocol. MEMOBUS is automatically converted to the A-compatible 1E Frame protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the A-compatible 1E Frame protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the A-compatible 1E Frame protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> **Note**
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> **Note**
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 52 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting the connection number and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00046	PARAM46
DW00047	PARAM47
DW00048	PARAM48
DW00049	PARAM49
DW00050	PARAM50
DW00051	PARAM51

◆ Busy

Specify the bit that shows that the message reception is in progress.

The Busy Bit is ON while a message reception or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message reception has been completed.

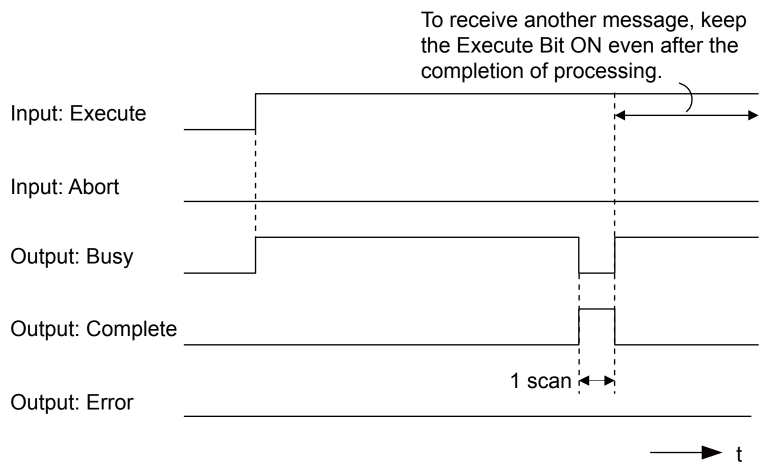
The Complete Bit turns ON only for one scan when message reception or forced abort processing has been completed normally.

◆ Error

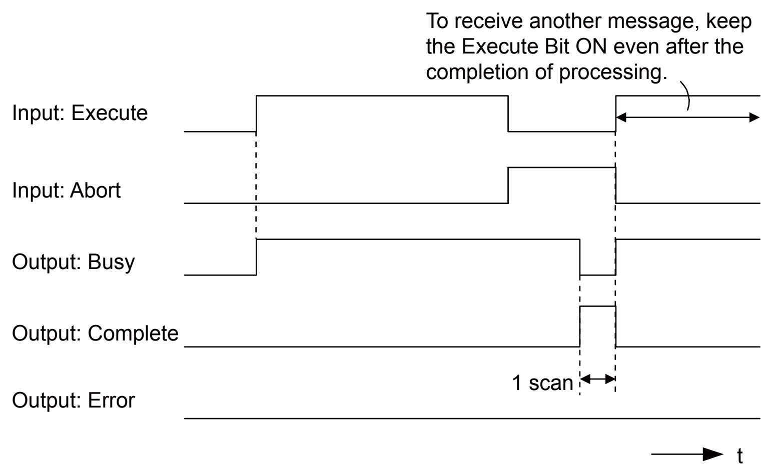
Specify the bit that shows if an error occurred while receiving the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-RCVE function.

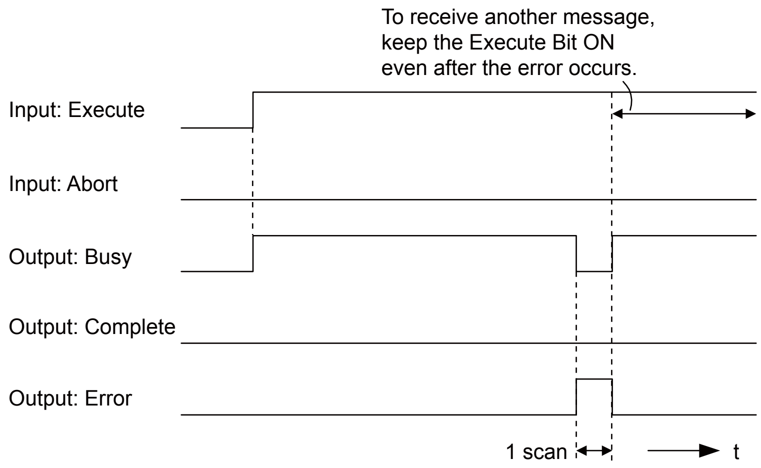
- Normal Execution



- When Execution Is Aborted



• Execution When an Error Occurs



MSG-RCVE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-RCVE function.

No.		I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.

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	No.	I/O	Meaning	Description
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11	I/O	Option	Not used for the A-compatible 1E Frame protocol.
	12	Outputs	Function Code	Gives the function code requested by the remote station.
	13	I/O	Reserved for system.	–
	14	Outputs	Data Address, Lower Word	Gives the first address of the data that was requested by the remote station.
	15		Data Address, Upper Word	
	16		Register type	Gives the register type that was requested by the remote station.
	17		Data Size	Gives the data size that was requested by the remote station.
	18		Remote CPU Module Number	Not used for the A-compatible 1E Frame protocol.
	19	I/O	Reserved for system.	–
	20	Inputs	Coil Offset, Lower Word	Sets the offset word address for a coil (MB).
	21		Coil Offset, Upper Word	
	22		Input Relay Offset, Lower Word	Sets the offset word address for an input relay (IB).
	23		Input Relay Offset, Upper Word	
	24		Input Register Offset, Lower Word	Sets the offset word address for an input register (IW).
	25		Input Register Offset, Upper Word	
	26		Hold Register Offset, Lower Word	Sets the offset word address for a hold register (MW).
	27		Hold Register Offset, Upper Word	
	28		Data Relay Offset, Lower Word	Sets the offset word address for a data relay (GB).
	29		Data Relay Offset, Upper Word	
	30		Data Register Offset, Lower Word	Sets the offset word address for a data register (GW).
	31		Data Register Offset, Upper Word	
	32		Output Coil Offset, Lower Word	Sets the offset word address for an output coil (OB).
	33		Output Coil Offset, Upper Word	
	34		Output Register Offset, Lower Word	Sets the offset address for an output register (OW).
	35		Output Register Offset, Upper Word	
	36		M register Writing Range LO, Lower Word	Sets the first address of the writing range for hold register coils.
	37		M register Writing Range LO, Upper Word	
	38		M register Writing Range HI, Lower Word	Sets the last address of the writing range for hold register coils.
	39		M register Writing Range HI, Upper Word	
	40		G register Writing Range LO, Lower Word	Sets the first address of the writing range for data register data relays.
	41		G register Writing Range LO, Upper Word	
	42		G register Writing Range HI, Lower Word	Sets the last address of the writing range for data register data relays.
	43		G register Writing Range HI, Upper Word	
	44		O register Writing Range LO, Lower Word	Sets the first address of the writing range for output registers.
	45		O register Writing Range LO, Upper Word	
	46		O register Writing Range HI, Lower Word	Sets the last address of the writing range for output registers.
	47		O register Writing Range HI, Upper Word	
System	48	–	For system use	–
	49		Reserved for system.	–
	50		Reserved for system.	–
	51		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

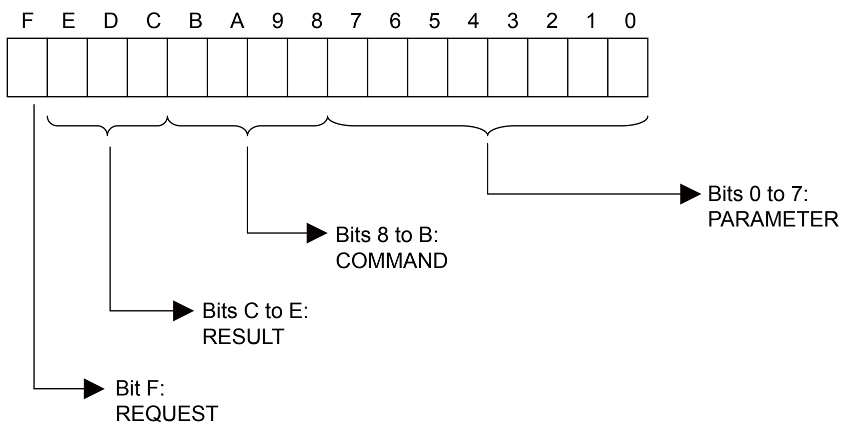
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-81)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-RCVE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution results of the MSG-RCVE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.

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Code	Abbreviation	Meaning
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-RCVE function.

Code (Hex)	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT is 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was received. Check the function code of the remote station.
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Data Address) PARAM20 and PARAM21 (Coil Offset) PARAM26 and PARAM27 (Hold Register Offset)
83□□ hex	3	Data size error	The data size for receiving is out of range. Check the data size at the remote station.

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Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-RCVE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-RCVE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-RCVE function.

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

◆ Status 6 (PARAM09)

This parameter is not used for the A-compatible 1E Frame protocol.

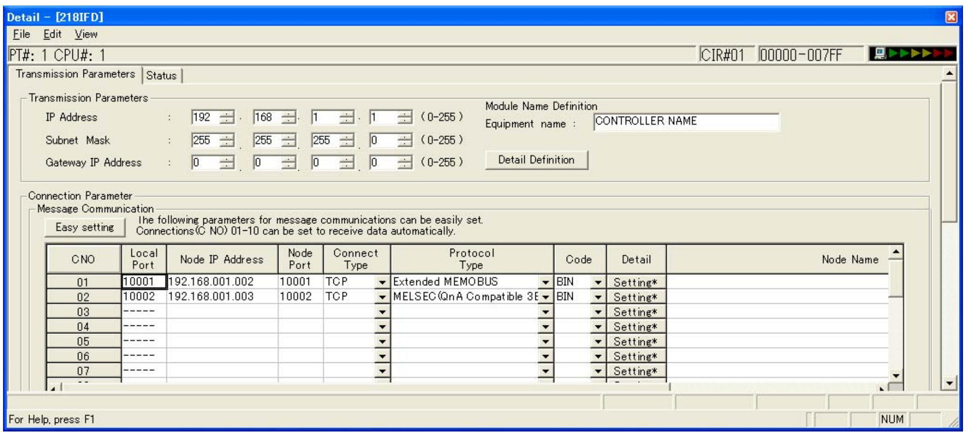
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Remarks
218IFD	1 to 20	Specifies the connection number of the remote station to receive the message from.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Function Code (PARAM12)

This parameter gives the function code that was received.

Function Code	Common Instructions for MELSEC ACPUs	Target Data Type	Function
01 or 02 hex	00 hex	B	Reads bit devices in units of one point.
03, 04, 09, or 0A hex	01 hex	W	Reads word devices in units of one point.
05 or 0F hex	02 hex	B	Writes bit devices in units of one point.
06, 0B, or 10 hex	03 hex	W	Writes word devices in units of one point.
08 hex	16 hex	–	Performs a loopback test.
0E hex	05 hex	B	Sets/resets word devices in units of one point by specifying a device number.
31 hex	60 hex	W	Writes to a fixed buffer in units of one word.
32 hex	61 hex	W	Reads from the random access buffer in units of one word.
33 hex	62 hex	W	Writes to the random access buffer in units of one word.

Note: 1. B: Bit data, W: Integer data
2. AnCPU special instructions cannot be used. Use the ACPU common instructions to access the AnCPU. The extended file registers in the AnCPU cannot be accessed either.

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note
Do not change the value of PARAM13 from a user program or by any other means.

◆ Data Address (PARAM14 and PARAM15)

These parameters give the data address that was requested by the remote station.

◆ Register Type (PARAM16)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Data Size (PARAM17)

This parameter gives the data size as the number of bits or words for read/write requests from the remote station.

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note
Do not change the value of PARAM19 from a user program or by any other means.

◆ Offsets (PARAM20 to PARAM27)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address by the number of words specified by the offset.

Note: An offset cannot be a negative value.

Offset parameters are provided for each of the target register types.

The following table lists the offset parameters.

Parameters	Meaning	Description
PARAM20 and PARAM21	Coil Offset	Sets the offset to the word address for a coil.
PARAM22 and PARAM23	Input Relay Offset	Sets the offset to the word address for an input relay.
PARAM24 and PARAM25	Input Register Offset	Sets the offset to the word address for an input register.
PARAM26 and PARAM27	Hold Register Offset	Sets the offset to the word address for a hold register.

The offset parameters that can be used depend on the function code.

The following table lists the valid parameters for each function code.

Function Code	Function	Applicable Offset Parameters
01 hex	Reads the states of coils.	PARAM20 and PARAM21
02 hex	Reads the states of input relays.	PARAM22 and PARAM23
03 hex	Reads the contents of hold registers.	PARAM26 and PARAM27
04 hex	Reads the contents of input registers.	PARAM24 and PARAM25
05 hex	Changes the state of a single coil.	PARAM20 and PARAM21
06 hex	Writes to a single hold register.	PARAM26 and PARAM27
09 hex	Reads the contents of hold registers (extended).	PARAM26 and PARAM27
0A hex	Reads the contents of input registers (extended).	PARAM24 and PARAM25
0B hex	Writes to hold registers (extended).	PARAM26 and PARAM27
0D hex	Reads the contents of non-consecutive hold registers (extended).	PARAM26 and PARAM27
0E hex	Writes to non-consecutive hold registers (extended).	PARAM26 and PARAM27
0F hex	Changes the states of multiple coils.	PARAM20 and PARAM21
10 hex	Writes to multiple hold registers.	PARAM26 and PARAM27
31 hex	Writes to the fixed buffer.	PARAM26 and PARAM27
32 hex	Reads from the random access buffer.	Cannot be received.
33 hex	Writes to the random access buffer.	PARAM26 and PARAM27

◆ Data Relay Offset (PARAM28 and PARAM29)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Data Register Offset (PARAM30 and PARAM31)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Output Coil Offset (PARAM32 and PARAM33)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ Output Register Offset (PARAM34 and PARAM35)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ M Register Writing Range (PARAM36 to PARAM39)

These parameters set the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the M Register Writing Range (PARAM36 to PARAM39) with word addresses.

Note: 1. M registers are always used as the destination in the MP3000 for data write requests from the remote station.
2. The writing range parameters allow you to specify the range of M registers that messages are allowed to write to.

The following table lists the writing range parameters.

Parameters	Meaning	Description
PARAM36 and PARAM37	M Register Writing Range LO	First address of the writing range
PARAM38 and PARAM39	M Register Writing Range HI	Last address of the writing range

Set the writing range so that it satisfies the following condition:

0 ≤ M register writing range LO ≤ M register writing range HI ≤ Maximum M register address

The writing range applies when using the following function codes.

05 hex: Changes the state of a single coil.

06 hex: Writes to a single hold register.

0B hex: Writes to hold registers (extended).

0E hex: Writes to non-consecutive hold registers (extended).

0F hex: Changes the states of multiple coils.

10 hex: Writes to multiple hold registers.

31 hex: Writes to the fixed buffer.

33 hex: Writes to the random access buffer.

Example

Use the following settings to set the allowable writing range of M register addresses to MW0001000 to MW0001999:

PARAM36 = 03E8 hex (1000)
PARAM37 = 0000 hex (0000)
PARAM38 = 07CF hex(1999)
PARAM39 = 0000 hex (0000)

The MP3000 will return an error if a write request is received for an address outside the range from MW01000 to MW01999, and will not perform the writing operation.

◆ G Register Writing Range LO (PARAM40 and PARAM41)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ G Register Writing Range HI (PARAM42 and PARAM43)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ O Register Writing Range LO (PARAM44 and PARAM45)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ O Register Writing Range HI (PARAM46 and PARAM47)

This parameter is not used for the A-compatible 1E Frame protocol.

◆ For System Use (PARAM48)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM48 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM48 from a user program or by any other means. PARAM48 will be used by the system.

◆ Reserved for System (PARAM49 to PARAM51)

This parameter is used by the system.

Note

Do not change the values of PARAM49 to PARAM51 from a user program or by any other means.

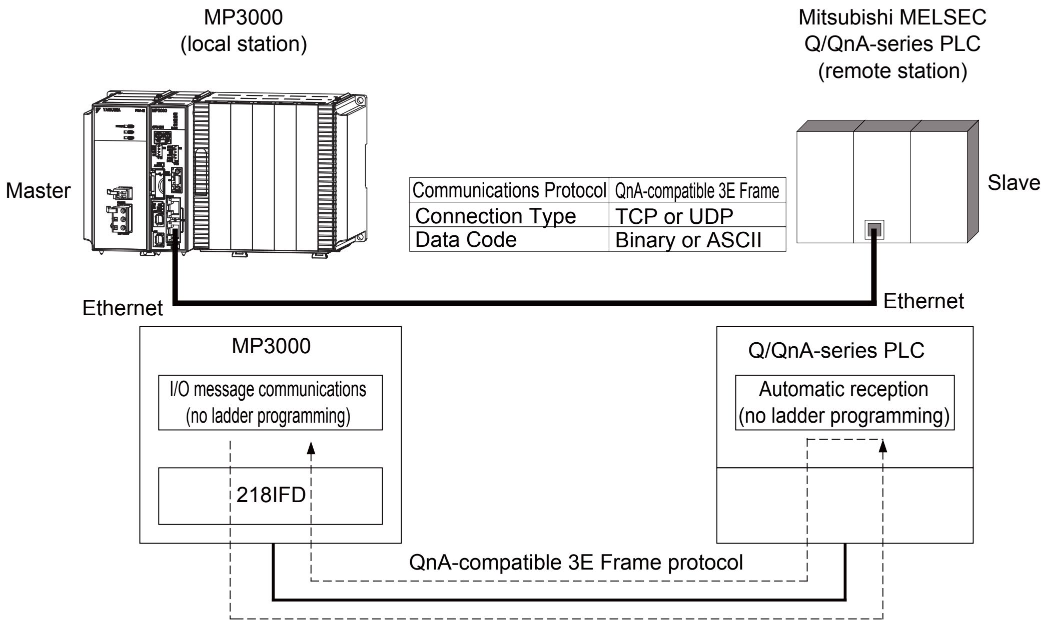
2.7 Communications with a Mitsubishi PLC (QnA-compatible 3E Frame Protocol)

When using Ethernet communications between the MP3000 and a Mitsubishi Q/QnA-series PLC, use the QnA-compatible 3E Frame protocol as the communications protocol. The QnA-compatible 3E Frame protocol allows the master to read and write the contents of slave registers.

This section describes communications when the MP3000 acts as the master. When the MP3000 acts as the master, communications can take place using I/O message communications or the MSG-SNDE function.

Using I/O Message Communications with the MP3000 as the Master

This section describes how to perform communications with a Mitsubishi Q/QnA-series PLC by using I/O message communications.



QnA-compatible 3E Frame Commands

The commands that are used with I/O message communications on the MP3000 are given below.

Function	QnA-compatible 3E Frame (Hex)		Meaning
	Command	Subcommand	
Batch read from the device memory	0401	0000	Reads bit devices in units of 16 points.
			Reads word devices in units of one point.
Batch write to the device memory	1401	0000	Writes bit devices in units of 16 points.
			Writes word devices in units of one point.

Device Memory and Corresponding Registers in the MP3000

The following tables show the relationship between registers in the MP3000 and device memory in the Mitsubishi Q/QnA-series PLC. Use device addresses within the ranges listed in the tables below according to the conditions of the Mitsubishi Q/QnA-series PLC slave.

When reading data from or writing data to the I/O memory in the Mitsubishi Q/QnA-series PLC, the read or write commands are automatically generated by assigning I/O registers to the MP3000.

- Reading
  Set the input registers in the MP3000 as follows:
  - Set the first address of the IW registers and the size of the read data that is to be stored in the MP3000.
  - Set the address of the first register of the device memory to read from in the remote device.
- Writing
  Set the output register in the MP3000 as follows:
  - Set the first address of the OW registers and the size of the data in the MP3000 to be written to the I/O memory in the Mitsubishi Q/QnA-series PLC.
  - Set the first register address in the remote device of the device memory to be written to.

Bit Device Conversion Table

Device Name	Data Range		
	Notation	Mitsubishi PLC	MP3000
Input Relays	Hexadecimal	X000000 to X001FFF	Read: IW0000 to IW7FFF hex Write: OW0000 to OW7FFF hex
Output Relays	Hexadecimal	Y000000 to Y001FFF	
Internal Relays	Decimal	M000000 to M008191	
Latch Relays	Decimal	L000000 to L008191	
Step Relays	Decimal	S000000 to S008191	
Link Relays	Hexadecimal	B000000 to B001FFF	
Link Special Relays	Decimal	SM000000 to SM002047	

Word Device Conversion Table

Device Name	Data Range		
	Notation	Mitsubishi PLC	MP3000
Data Registers	Decimal	D000000 to D012287	Read: IW0000 to IW7FFF hex Write: OW0000 to OW7FFF hex
Link Registers	Hexadecimal	W000000 to W001FFF	
Link Special Registers	Decimal	SD000000 to SD002047	
File Registers	Hexadecimal	ZR000000 to ZR007FFF*	

* Access file registers by using the notation for accessing continuous file registers: ZR for ASCII data and B0 hex for binary data. The normal access notation (R* for ASCII data and AF hex for binary data) cannot be used.

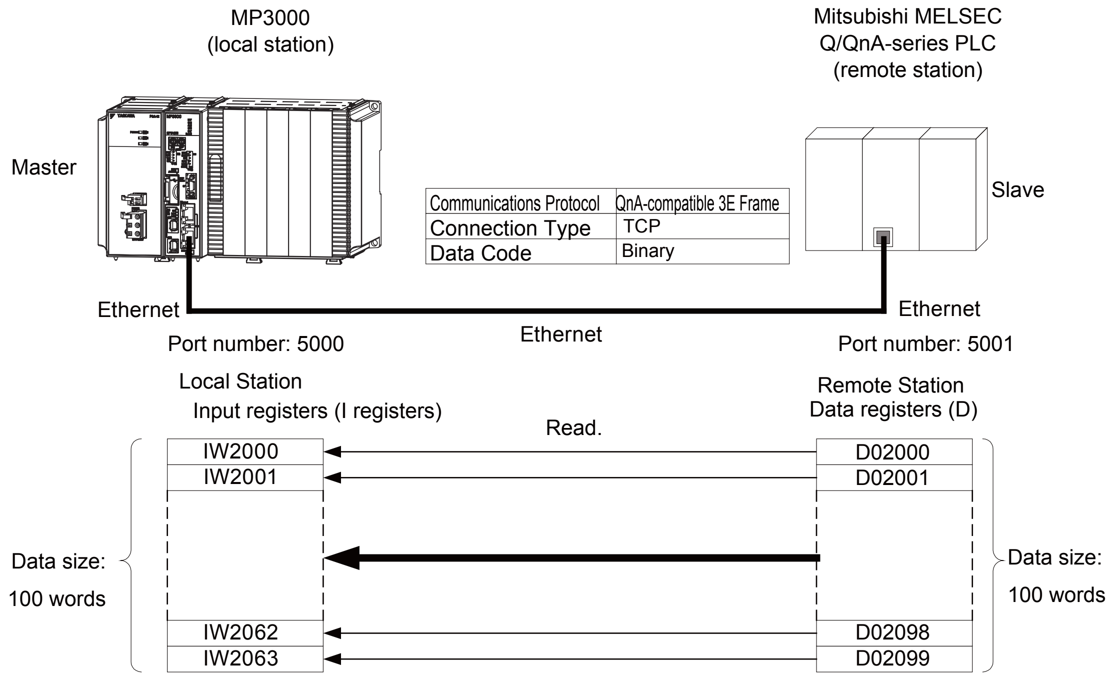
Transfer Size

The following table lists the size of data that can be transferred using I/O message communications. Use the data size within the ranges listed in the following table according to the conditions of the Mitsubishi Q/QnA-series PLC slave.

QnA-compatible 3E Frame (Hex)		Meaning	Data Size
Command	Subcommand		
0401	0000	Reads bit devices in units of 16 points.	16 to 4,096 points (256 words)
		Reads word devices in units of one point.	1 to 256 points
1401	0000	Writes bit devices in units of 16 points.	16 to 4,096 points (256 words)
		Writes word devices in units of one point.	1 to 256 points

Setting Example

The following figure illustrates how the contents of the D02000 to D02099 data (D) registers in the CPU Unit of Mitsubishi Q/QnA-series PLC slave are read into the IW2000 to IW2063 input registers in the MP3000 master.

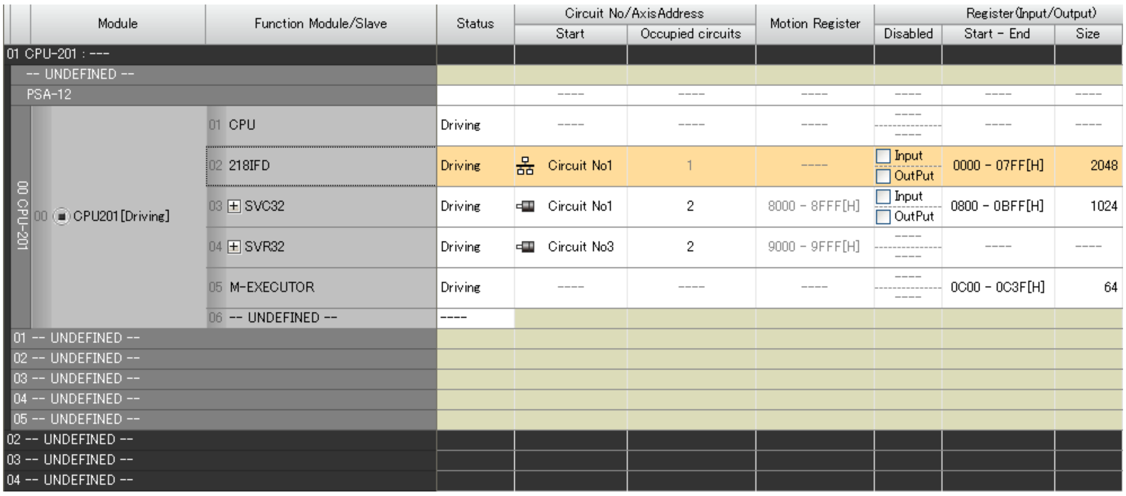


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

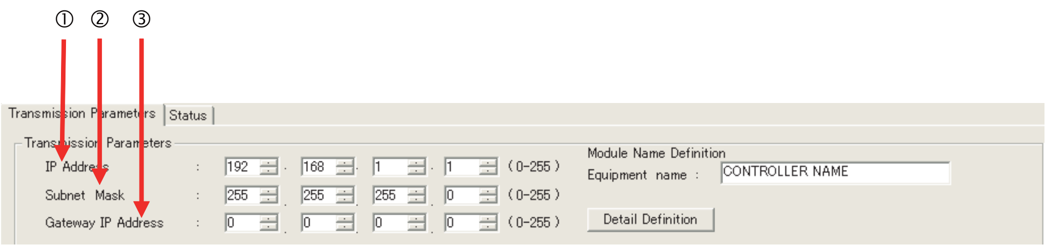
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



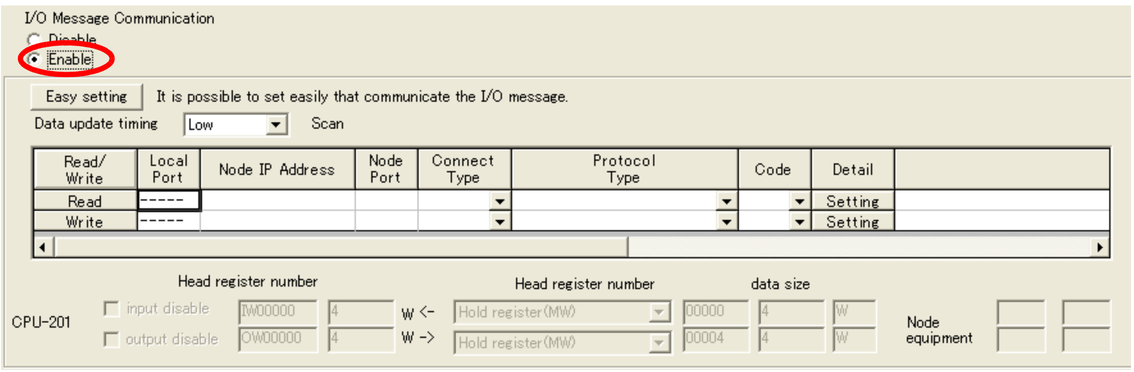
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.

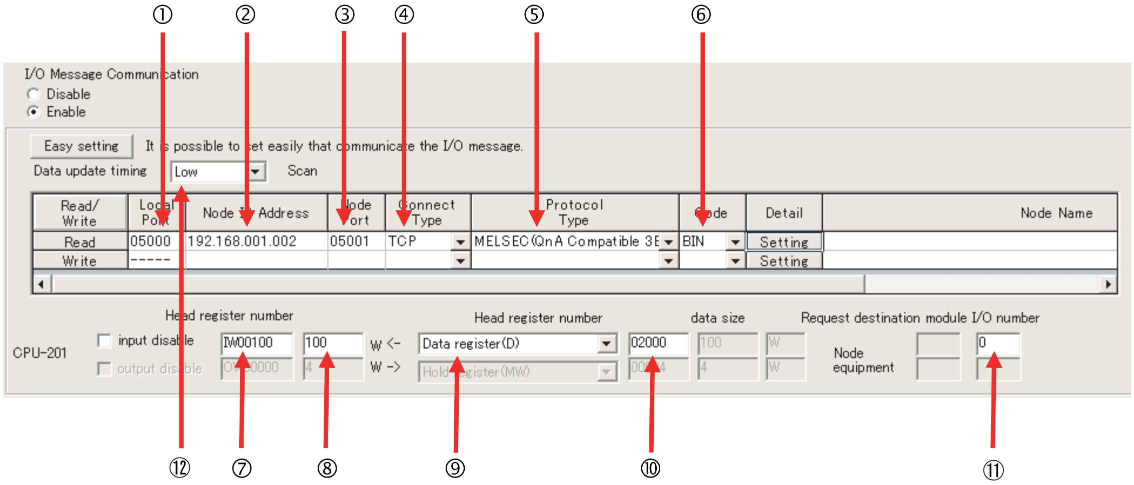


①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Select the **Enable** Option in the **I/O Message Communication** Area of the **Connection Parameter** settings.



4. Set the connection parameters.



① Enter “5000” in the MP3000 **Local Port** Box.
② Enter the following address for the remote device in the **Node IP Address** Box: 192.168.001.002.
③ Enter “5001” in the remote device **Node Port** Box.
④ Select **TCP** in the **Connect Type** Box.
⑤ Select **MELSEC (QnA-compatible 3E)** in the **Protocol Type** Box.
⑥ Select **BIN** in the **Code** Box.
⑦ Enter “IW0100” in the **Head register number** Box as the read data destination.
⑧ Enter “100” in the next box as the size of data to read.
⑨ Select **Data register (D)** as the device type in the **Head register number** box.
⑩ Enter “02000” as the first address in the remote device.
⑪ Enter “0” in the **Request destination module I/O number** Box for the remote device.
The values and meanings of the request destination Module I/O number setting are listed below.

Request Destination Module I/O Number in I/O Message Communications	Request Destination Module I/O Number for Transmission to a Mitsubishi PLC	
	Module I/O Number	Meaning
0	03FF hex	Local station CPU, control CPU, and own system CPU
1	03D0 hex	Control system CPU
2	03D1 hex	Standby system CPU
3	03D2 hex	System A CPU
4	03D3 hex	System B CPU
5	03E0 hex	Multi-CPU No.1
6	03E1 hex	Multi-CPU No. 2
7	03E2 hex	Multi-CPU No. 3
8	03E3 hex	Multi-CPU No. 4

⑫ Select **Low** in the **Data update timing** Box as the timing to update I/O data between the CPU Function Module and 218FD.

Note: The data update timing is the timing at which the CPU Function Module and 218IFD exchange data. Communications with the remote device are performed asynchronously. The data update timing therefore does not necessarily mean that the messages are sent to the remote device.

Note: In I/O message communications, a message is transmitted from separate ports if registers are both read and written. Therefore, the connected remote device must have two connections to receive both messages.

5. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as the master.

◆ Setting Up the Remote Device (Mitsubishi Q/QnA-series PLC)

Use the following procedure to set up the Mitsubishi Q/QnA-series PLC (MELSEC device).

Note

MELSEC devices are manufactured by Mitsubishi Electric Corporation.
Contact Mitsubishi Electric Corporation for further information on MELSEC devices.

1. Start GX Developer.

2. Create a project.

3. Set the MELSECNET/Ethernet network parameters.

Parameter	Description
Network type	Ethernet
Starting I/O No.	As required.
Network No.	As required.
Group No.	As required.
Station No.	As required.
Mode	Online

4. Set the Ethernet operation settings.

Parameter	Description
Communications data code	Binary code
Initial timing	Always wait for OPEN
IP Address	192.168.001.002
Send frame setting	Ethernet (V2.0)
TCP existence confirmation setting	As required.
Enable Write at RUN time	Enable

5. Specify the open settings.

Open Settings Example

Parameter	Description
Protocol	TCP
Open system	Full passive
Fixed buffer	As required.
Fixed buffer communication	As required.
Pairing open	As required.
Existence confirmation	As required.
Local station port No.	1389 hex (5001)
Destination IP address	192.168.1.1
Destination port No.	1388 hex (5000)

Setting Example to Open the Built-in Ethernet Port in a MELSEC Device

Parameter	Description
Protocol	TCP
Open system	MC protocol
TCP connection	–
Local station port No.	1389 hex (5001)
Destination IP address	–
Destination port No.	–

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

This concludes the setup. Set any other parameters as necessary, then transfer the data to the PLC.

Information
Set the initial settings and router relay parameters as necessary.

- Initial Settings
  These settings apply to the timers when TCP is the selected protocol. In most cases, accept the default. Set these settings only when necessary, for example, to shorten the time set for the TCP resend timer.
- Router Relay Parameters
  Set these parameters if you are using a subnet mask pattern or default gateway.

◆ Starting Communications

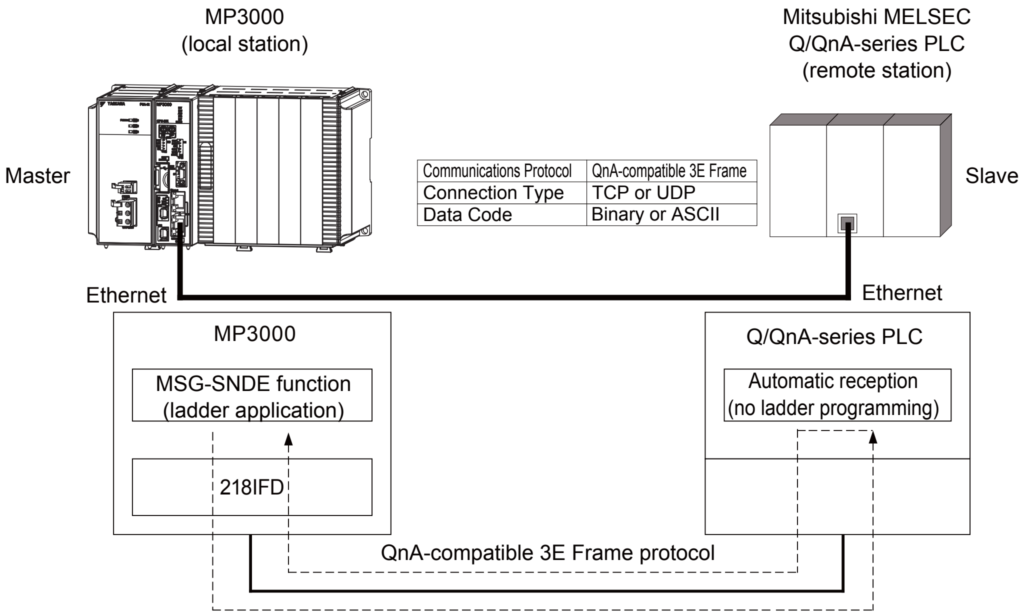
Use the following procedure to write the data in the data registers in the Mitsubishi Q/QnA-series PLC to the input registers in the MP3000.

1. Start receiving messages on the Mitsubishi Q/QnA-series PLC.
The system will automatically start the message reception operation. No further operation is required.

2. Turn ON the power to the MP3000 to start transmitting messages.
The system will automatically start the message transmission operation. No further operation is required.
Note: The MP3000 will establish the TCP connection when it starts execution of I/O message communications.

Using the MSG-SNDE Function with the MP3000 as the Master

This section describes how to communicate with a Mitsubishi Q/QnA-series PLC by using the MSG-SNDE function in the MP3000.



QnA-compatible 3E Frame Commands

The commands that are used with the MSG-SNDE function are listed below.

Function	QnA-compatible 3E Frame (Hex)		Meaning
	Command	Subcommand	
Batch read from the device memory	0401	0001	Reads bit devices in units of one point.
	0401	0000	Reads word devices in units of one point.
Batch write to the device memory	1401	0001	Writes bit devices in units of one point.
	1401	0000	Writes word devices in units of one point.
Random read from the device memory	0403	0000	Reads word devices in units of one point.
Random write to the device memory	1402	0000	Writes word devices in units of one point.

Device Memory and Corresponding Registers in the MP3000

The following tables show the relationship between registers in the MP3000 and device memory in the Mitsubishi Q/QnA-series PLC. Use device addresses within the ranges listed in the tables below according to the conditions of the Mitsubishi Q/QnA-series PLC slave.

A read or write command is automatically generated by specifying the address in the MP3000 that corresponds to the device to be read from or written to in the Mitsubishi Q/QnA-series PLC.

To read data from or write data to the address specified in PARAM14 and PARAM15 of the MSG-SNDE function, specify the register address in the MP3000 that corresponds to the device address in the Mitsubishi Q/QnA-series PLC. Select whether to read or write by setting the function code in parameter PARAM12 for the MSG-SNDE function.

Example **Writing Data into D10000**
Set PARAM14 and PARAM15 to the MW10000 register in the MP3000 that corresponds to D10000, and set PARAM12 to 0B or 10 hex.

Example **Reading Data from M001000**
Set PARAM14 and PARAM15 to the MB005748 register in the MP3000 that corresponds to M001000, and set PARAM12 to 01 hex.

Note: To access a relay, specify a bit address in PARAM14 and PARAM15. For MB005748, this would be 9192 decimal.

Bit Device Conversion Table

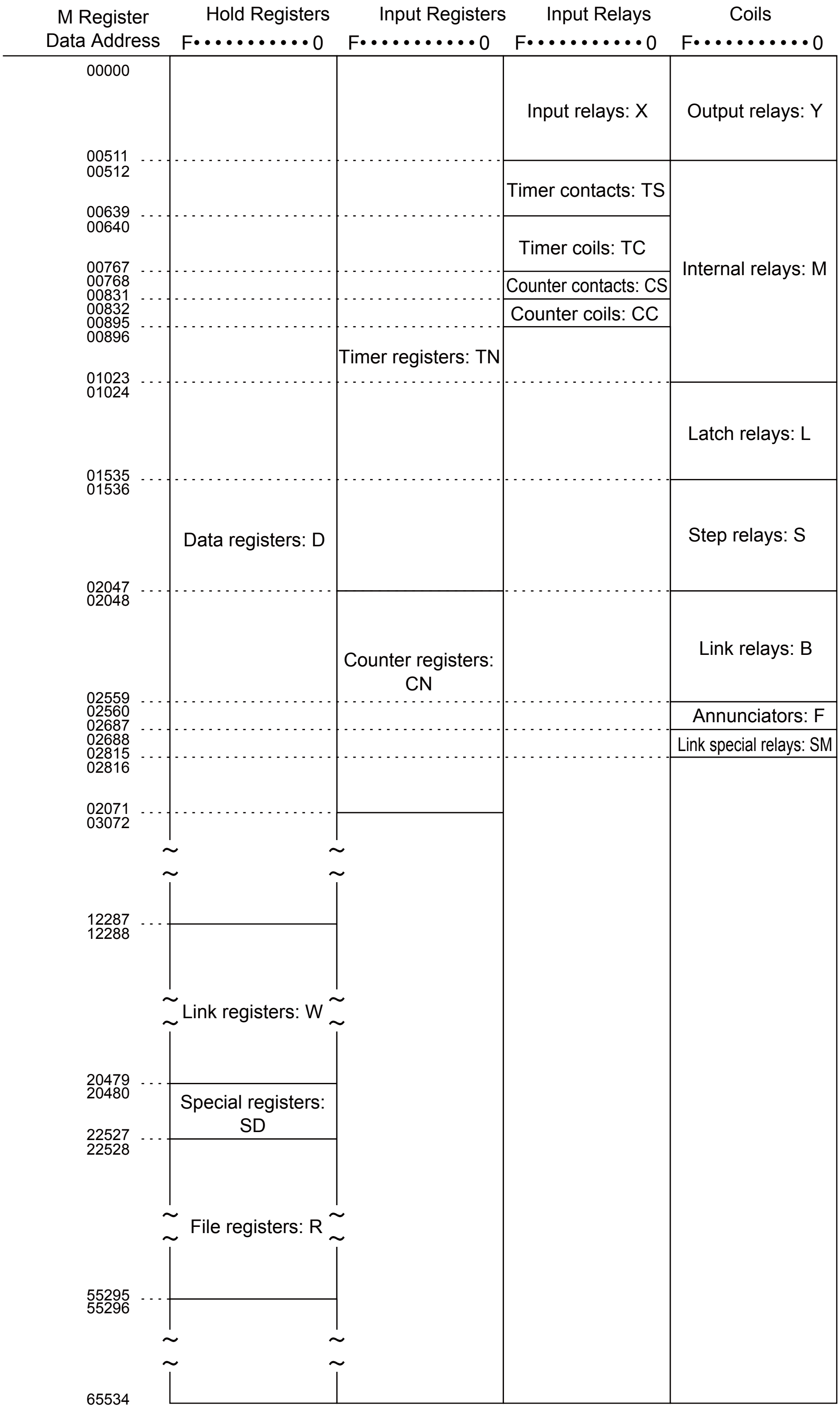
Device Name	Data Range		
	Notation	Mitsubishi PLC	MP3000
Input Relays	Hexadecimal	X000000 to X001FFF	MB000000 to MB00511F
Output Relays	Hexadecimal	Y000000 to Y001FFF	MB000000 to MB00511F
Internal Relays	Decimal	M000000 to M008191	MB005120 to MB01023F
Latch Relays	Decimal	L000000 to L008191	MB010240 to MB01535F
Step Relays	Decimal	S000000 to S008191	MB015360 to MB02047F
Link Relays	Hexadecimal	B000000 to B001FFF	MB020480 to MB02559F
Annunciators	Decimal	F000000 to F002047	MB025600 to MB02687F
Link Special Relays	Decimal	SM000000 to SM002047	MB026880 to MB02815F
Timer Contacts	Decimal	TS000000 to TS002047	MB005120 to MB00639F
Timer Coils	Decimal	TC000000 to TC002047	MB006400 to MB00767F
Counter Contacts	Decimal	CS000000 to CS001023	MB007680 to MB00831F
Counter Coils	Decimal	CC000000 to CC001023	MB008320 to MB00895F

Word Device Conversion Table

Device Name	Data Range		
	Notation	Mitsubishi PLC	MP3000
Data Registers	Decimal	D000000 to D012287	MW00000 to MW12287
Link Registers	Hexadecimal	W000000 to W001FFF	MW12288 to MW20479
Link Special Registers	Decimal	SD000000 to SD002047	MW20480 to MW22527
File Registers	Hexadecimal	ZR000000 to ZR007FFF*	MW22528 to MW55295
Timer Registers	Decimal	TN000000 to TN002047	MW00000 to MW02047
Counter Registers	Decimal	CN000000 to CN001023	MW02048 to MW03071

* Access file registers by using the ZR notation for accessing continuous file registers. The R* notation cannot be used.

The following map, based on bit and word device conversion tables, shows how M registers in the MP3000 correspond to devices in the Mitsubishi Q/QnA-series PLCs. All devices in a Mitsubishi Q/QnA-series PLC are assigned to hold registers, input registers, input relays, and coils so that the MP3000 can read and write to them by using MEMOBUS commands as an interface. Data read from a device in the Mitsubishi Q/QnA-series PLC is stored in the corresponding M register in the map. The data that is written to the device in the Mitsubishi Q/QnA-series PLC is sent by forming a message that contains the contents of the corresponding M register in the map.



Transfer Size

The following table lists the size of data that can be transferred using the MSG-SNDE function. Use the data size within the ranges listed in the following table according to the conditions of the Mitsubishi Q/QnA-series PLC slave.

The upper limit on the data size will also depend on the MEMOBUS function code that is specified in the MSG-SNDE function.

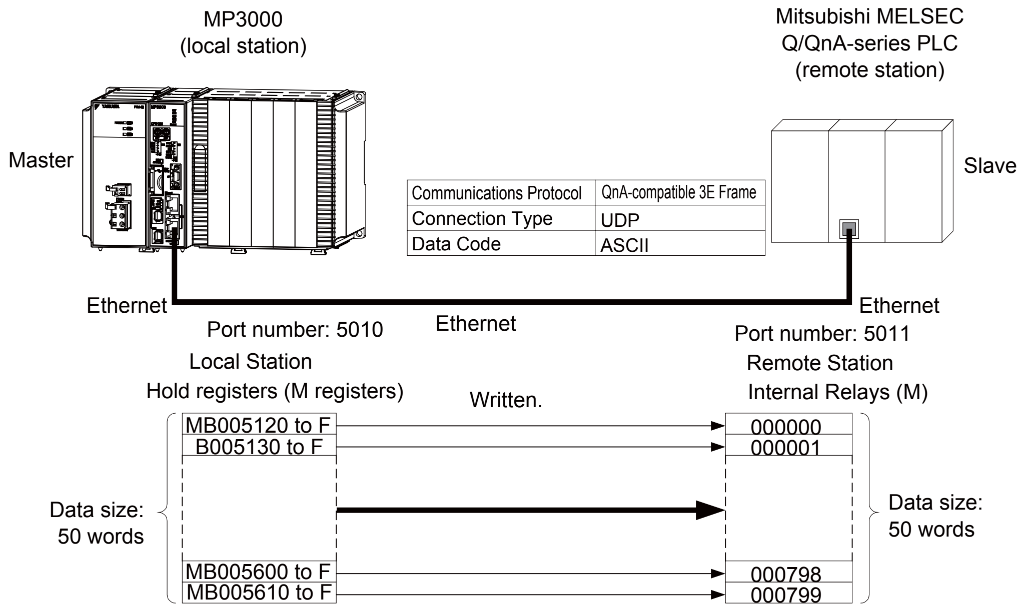
Refer to the following section for details on the data size parameter in the MSG-SNDE function.

☞ ◆ *Data Size (PARAM17) (page 2-169)*

QnA-compatible 3E Frame (Hex)		Meaning	Data Size
Command	Subcommand		218IFD
0401	0001	Reads bit devices in units of one point.	1 to 2,000 points
0401	0000	Reads word devices in units of one point.	1 to 960 points
1401	0001	Writes bit devices in units of one point.	1 to 800 points
1401	0000	Writes word devices in units of one point.	1 to 960 points
0403	0000	Reads word devices in units of one point.	1 to 192 points
1402	0000	Writes word devices in units of one point.	1 to 160 points

Setting Example

The following figure illustrates how the contents of 800 bits (50 words) from the MB005120 to MB00561F hold registers in the MP3000 master are written to the 000000 to 000799 internal M relays in the CPU Unit of the Mitsubishi Q/QnA-series PLC slave.

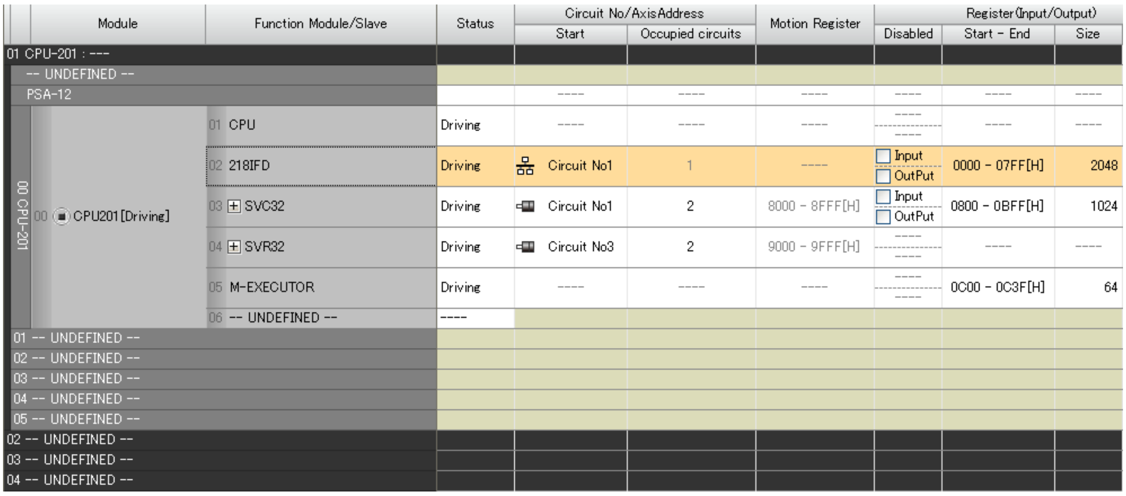


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

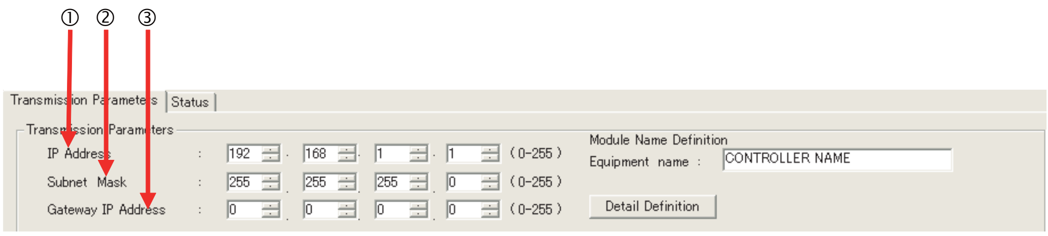
> **Note**: If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



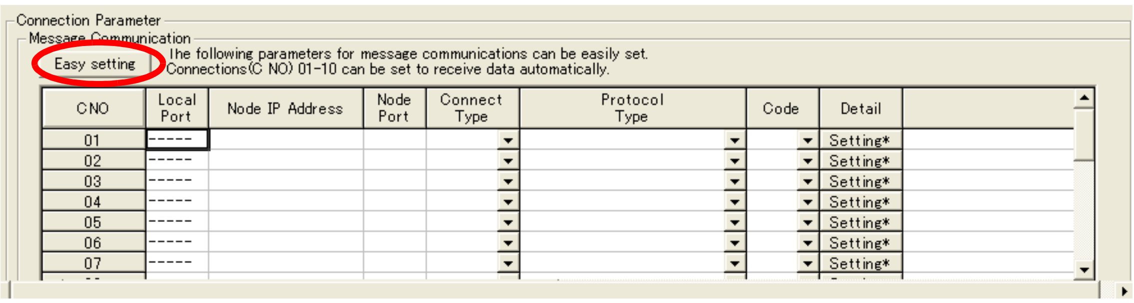
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



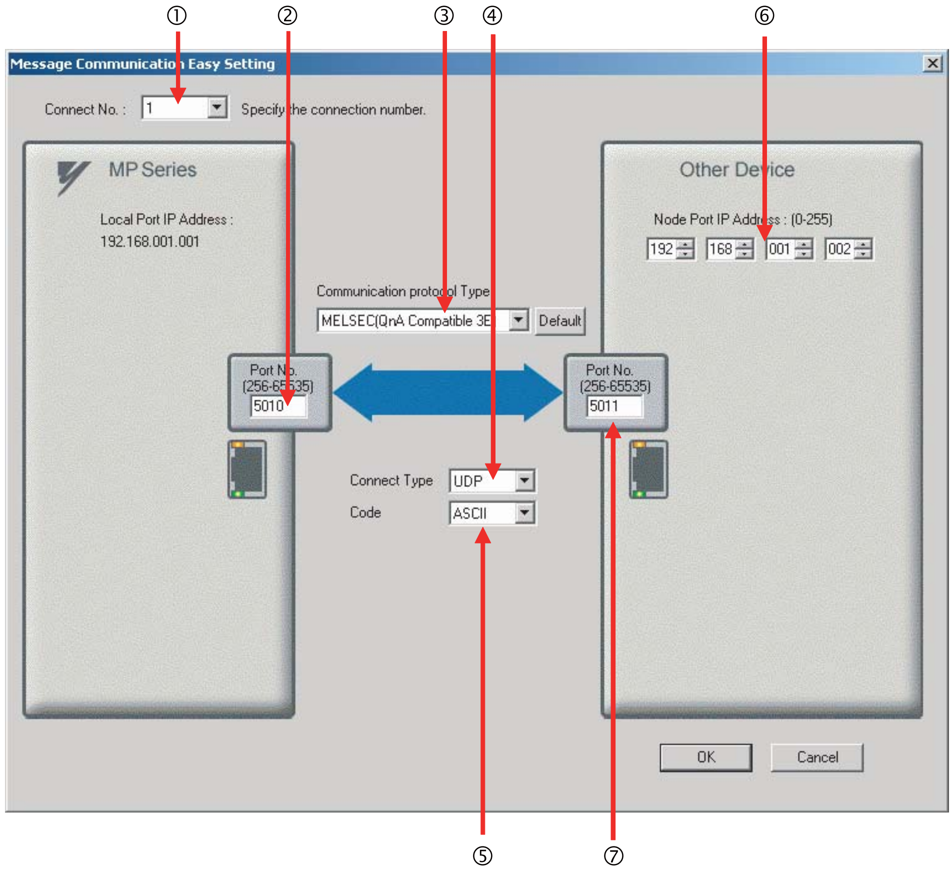
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



① Select **1** in the **Connect No.** Box.
② Enter "5010" in the **Port No.** Box for the MP-series Controller.
③ Select **MELSEC (QnA-compatible 3E)** in the **Communication protocol Type** Box.
④ Select **UDP** in the **Connect Type** Box.
⑤ Select **ASCII** in the **Code** Box.
⑥ Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦ Enter "5011" in the **Port No.** Box for the other device.

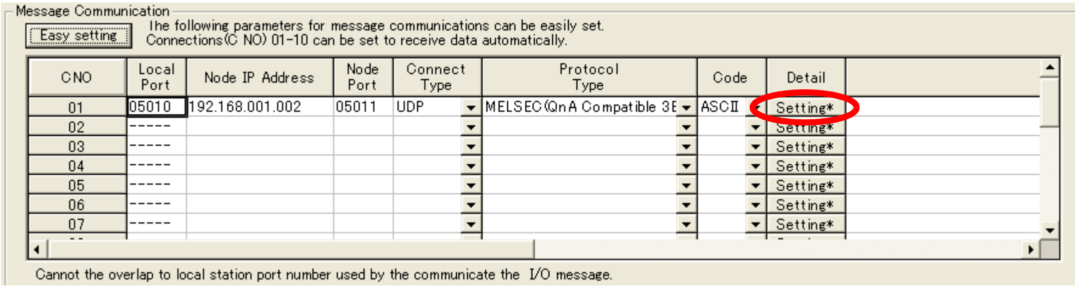
Note: Disable automatic reception for any connection for which message functions (MSG-SNDE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

5. Click the **OK** Button.

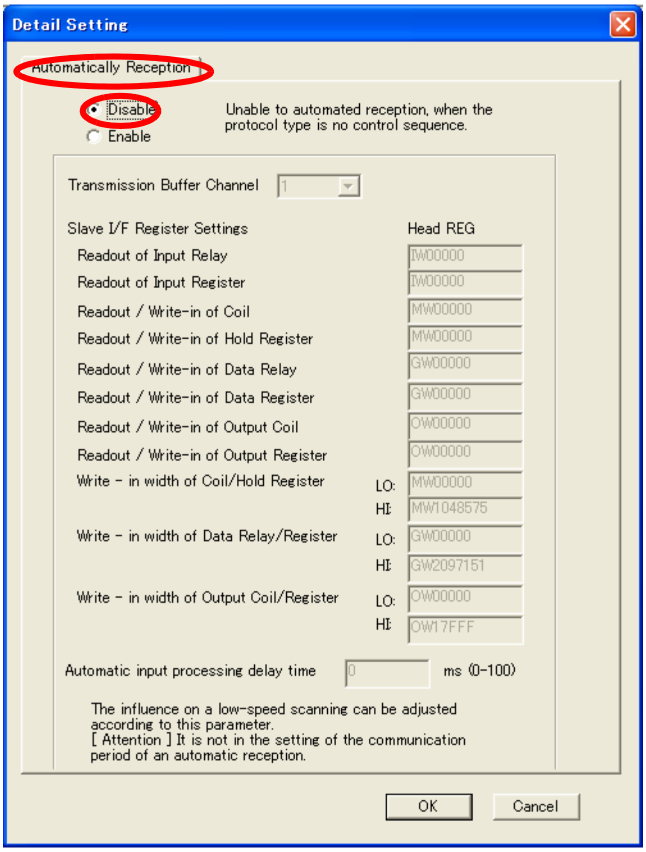
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



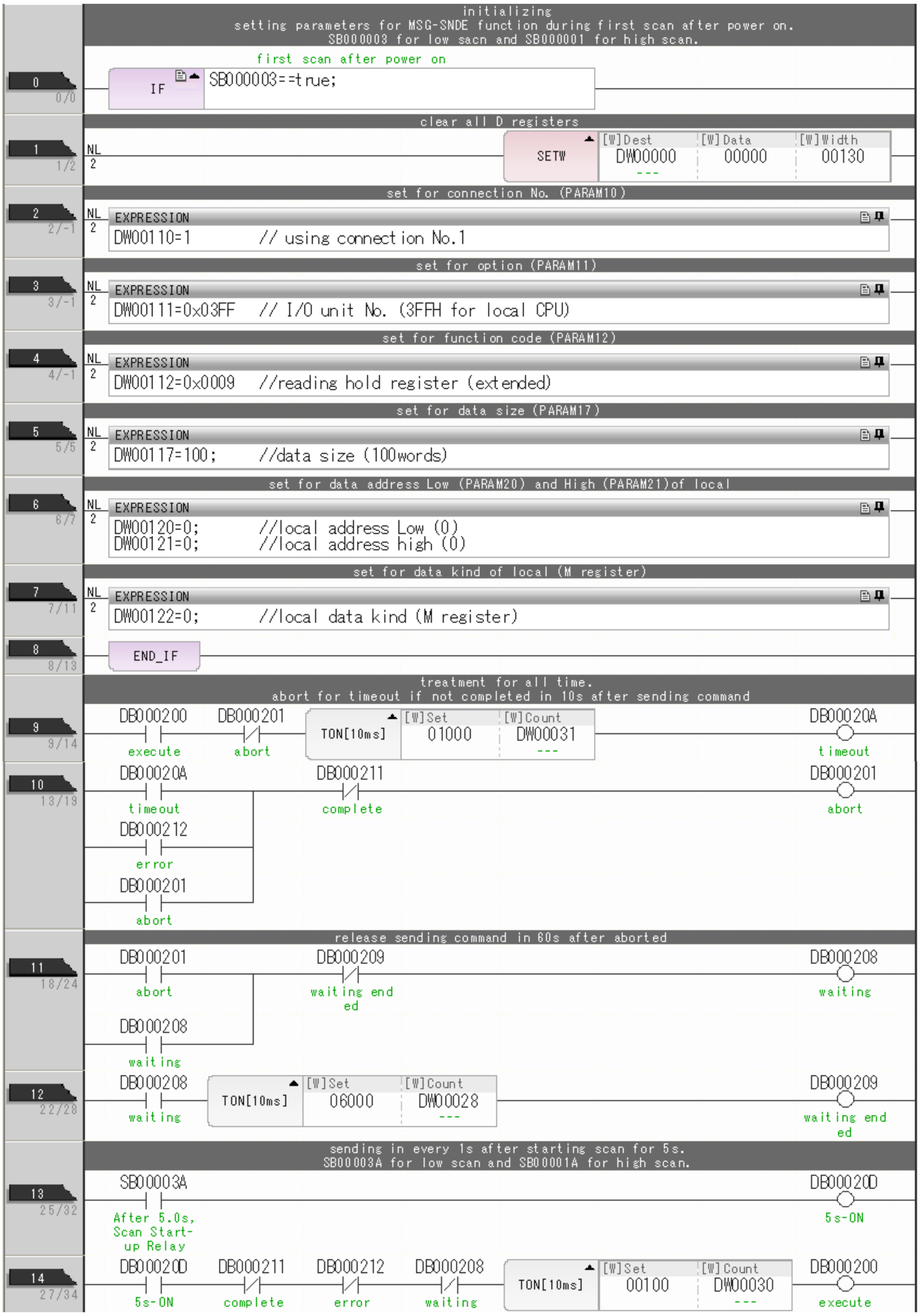
8. Click the **Disable** Option on the Automatically Reception Tab Page.

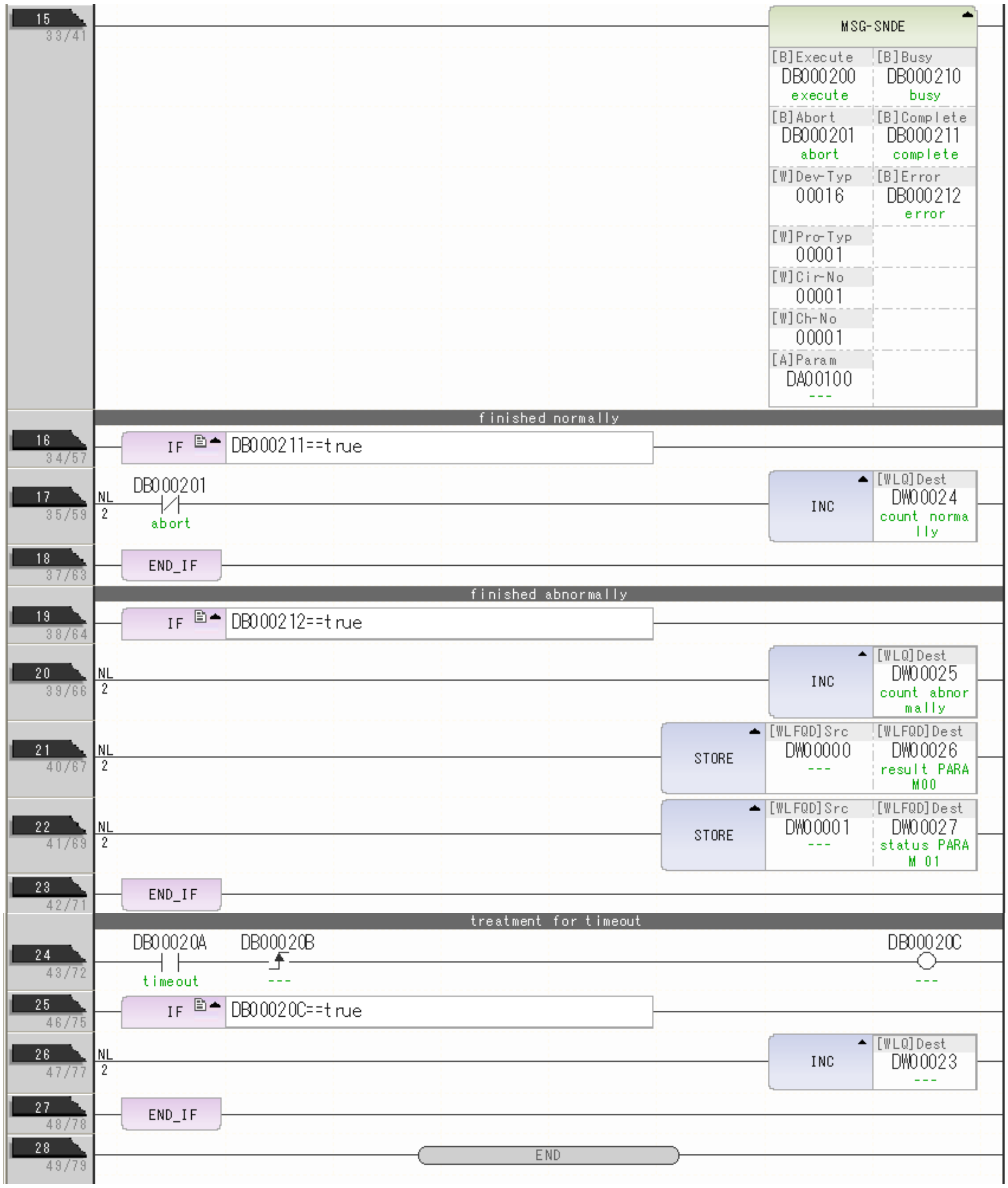


Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

9. Create a ladder program for the MSG-SNDE function.

A ladder program example is shown below.





10. Save the data to flash memory.

This concludes the settings for using the MP3000 as the master.

◆ Setting Up the Remote Device (Mitsubishi Q/QnA-series PLC)

Use the following procedure to set up the Mitsubishi Q/QnA-series PLC (MELSEC device).

> Note
> MELSEC devices are manufactured by Mitsubishi Electric Corporation.
> Contact Mitsubishi Electric Corporation for further information on MELSEC devices.

1. Start GX Developer.
2. Create a project.
3. Set the MELSECNET/Ethernet network parameters.

Parameter	Description
Network type	Ethernet
Starting I/O No.	As required.
Network No.	As required.
Group No.	As required.
Station No.	As required.
Mode	Online

4. Set the Ethernet operation settings.

Parameter	Description
Communications data code	Binary code
Initial timing	Always wait for OPEN
IP address	192.168.001.002
Send frame setting	Ethernet (V2.0)
TCP existence confirmation setting	As required.
Enable Write at RUN time	Enable

5. Specify the open settings.

Open Settings Example

Parameter	Description
Protocol	UDP
Open system	Full passive
Fixed buffer	As required.
Fixed buffer communication	As required.
Pairing open	As required.
Existence confirmation	As required.
Local station port No.	1393 hex (5011)
Destination IP address	192.168.1.1
Destination port No.	1392 hex (5010)

Setting Example to Open the Built-in Ethernet Port in a MELSEC Device

Parameter	Description
Protocol	UDP
Open system	MC protocol
TCP connection	–
Local station port No.	1393 hex (5011)
Destination IP address	–
Destination port No.	–

Note: Specify an IP address that is not in use by any other devices on the same network.
Check with your network administrator for unused IP addresses.

This concludes the setup. Set any other parameters as necessary, then transfer the data to the PLC.

Information Set the initial settings and router relay parameters as necessary.

- Initial Settings
  These settings apply to the timers when TCP is the selected protocol. In most cases, accept the default. Set these settings only when necessary, for example, to shorten the time set for the TCP resend timer.
- Router Relay Parameters
  Set these parameters if you are using a subnet mask pattern or default gateway.

◆ Starting Communications

Use the following procedure to write the data in the hold registers in the MP3000 to the internal relays in the CPU Unit of the Mitsubishi Q/QnA-series PLC.

1. Start receiving messages on the Mitsubishi Q/QnA-series PLC.

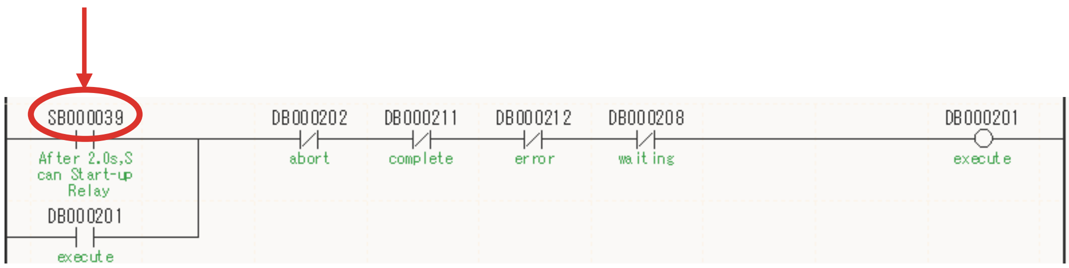
The system will automatically start the message reception operation. No further operation is required.

2. Turn ON the power to the MP3000 to start transmitting messages.

The ladder program example is designed to turn ON the Execute Bit (DB000201) in the message send function after two seconds has elapsed from when the low-speed scan (or high-speed scan) starts. Thereafter, the message send function is executed continuously by alternating the Execute Bit (DB000201) between OFF and ON each time the message send function completes execution normally or with an error.

Note: The MP3000 will establish the TCP connection when it starts execution of the MSG-SNDE function.

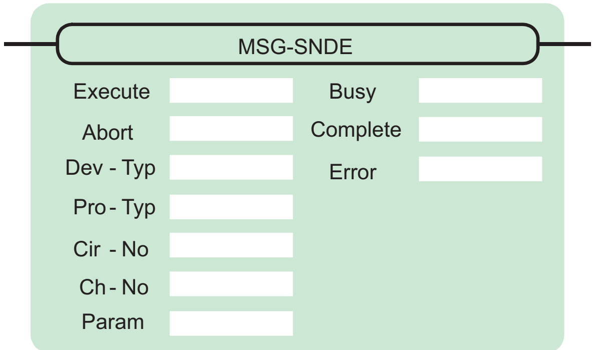
Turns ON 2 seconds after SB000039 starts.



Message Functions

The message functions are used in user communications applications for the QnA-compatible 3E Frame protocol. You can send and receive message data by setting the necessary input items and parameters for the message functions. Message communications using the QnA-compatible 3E Frame protocol can be carried out with the same settings used for MEMOBUS messages.

Inputs and Outputs for the MSG-SNDE Function

Function Name	MSG-SNDE
Function	Sends a message to a remote station on the specified circuit of the communications device type. This function can be used with various protocols.
Function Definition	

I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the transmission.
	2	Abort	B-VAL	Forces the transmission to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message transmission.

When the Execute Bit turns ON, the message will be sent.

Note

Keep the Execute Bit ON until the Complete or Error Bit turns ON. To send another message, turn OFF the Execute Bit for at least one scan and then turn it ON again.

◆ Abort

Specify the bit to use to abort the message transmission.

When the Abort Bit turns ON, the message transmission will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Communications Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

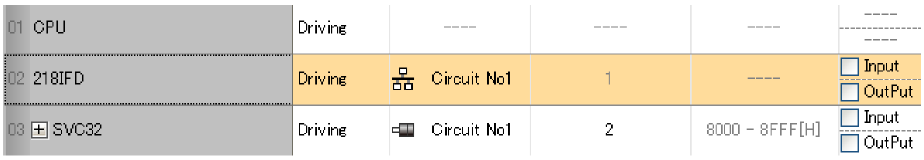
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the QnA-compatible 3E Frame protocol. MEMOBUS is automatically converted to the QnA-compatible 3E Frame protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the QnA-compatible 3E Frame protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the QnA-compatible 3E Frame protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> Note
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> Note
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 29 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting function codes and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00023	PARAM23
DW00024	PARAM24
DW00025	PARAM25
DW00026	PARAM26
DW00027	PARAM27
DW00028	PARAM28

◆ Busy

Specify the bit that shows that the message transmission is in progress.

The Busy Bit is ON while a message transmission or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message transmission has been completed.

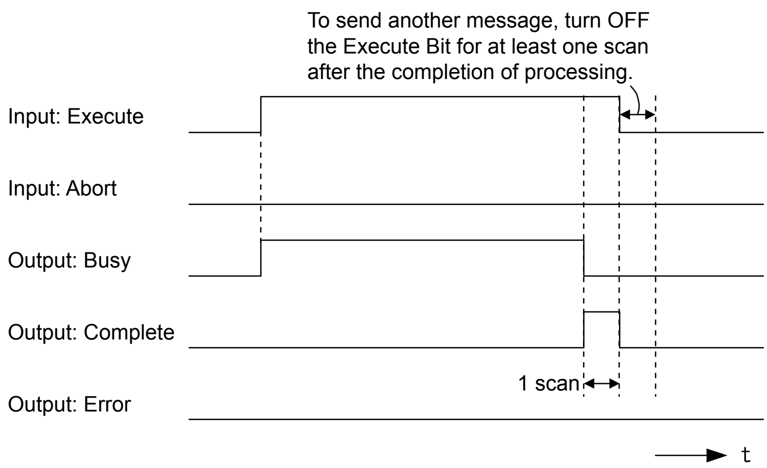
The Complete Bit turns ON only for one scan when message transmission or forced abort processing has been completed normally.

◆ Error

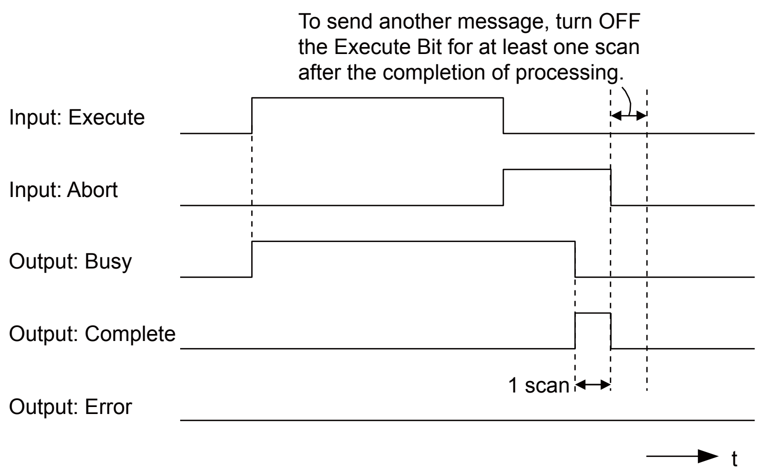
Specify the bit that shows if an error occurred while sending the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-SNDE function.

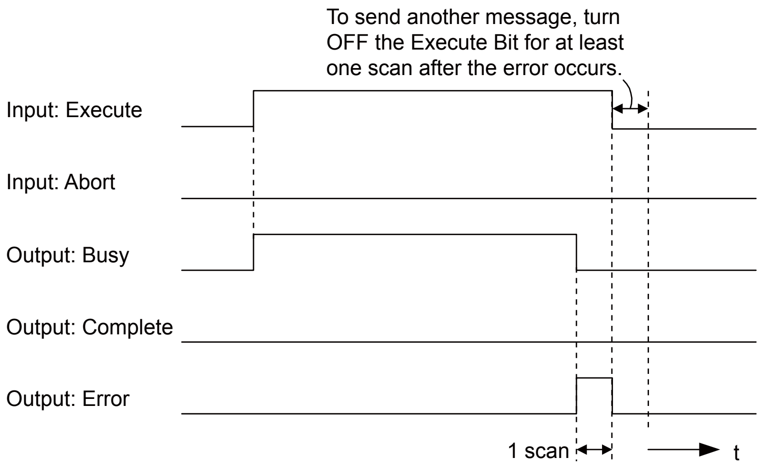
- Normal Execution



- When Execution Is Aborted



• Execution When an Error Occurs



MSG-SNDE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-SNDE function.

No.		I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.

Continued on next page.

Continued from previous page.

No.		I/O	Meaning	Description
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11		Option	Sets the I/O unit number for the remote station.
	12		Function Code	Sets the code of the function in the QnA-compatible 3E Frame protocol.
	13		Reserved for system.	–
	14		Remote Station Data Address, Lower Word	Sets the data address to read/write at the remote station. (Use word addresses for registers, bit addresses for relays or coils.)
	15		Remote Station Data Address, Upper Word	
	16		Remote Station Register Type	Sets the register type to read/write at the remote station.
	17		Data Size	Sets the size of the data to read/write. (Use word sizes for registers, bit sizes for relays or coils.)
	18		Remote CPU Module Number	Not used for the QnA-compatible 3E Frame protocol.
	19		Reserved for system.	–
	20		Local Station Data Address, Lower Word	Sets the data address to store read/write data in the local station. (Use word addresses for registers, bit addresses for relays or coils.)
	21		Local Station Data Address, Upper Word	
	22		Local Station Register Type	Sets the register type of the read/write data to store in the local station.
	23		Reserved for system.	–
System	24	–	For system use	–
	25		Reserved for system.	–
	26		Reserved for system.	–
	27		Reserved for system.	–
	28		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

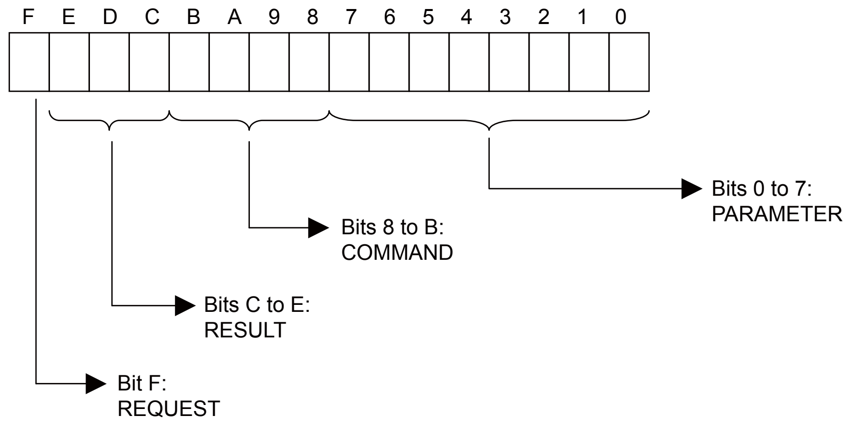
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-164)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-SNDE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution results of the MSG-SNDE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-SNDE function.

Code	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT is 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was sent or received. Check PARAM12 (Function Code).
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Remote Station Data Address) PARAM20 and PARAM21 (Local Station Data Address)
83□□ hex	3	Data size error	The data size for sending or receiving is out of range. Check PARAM17 (Data Size).
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-SNDE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-SNDE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-SNDE function.
C245 hex	–	Local station register type error	The register type for the local station is out of range. Check PARAM22 (Local Station Register Type).
8072 hex to FF72 hex		Remote device error*	An error response was received from the remote station. Check the error code and remove the cause.

* An error response received from the remote device will be formatted in PARAM00 (Processing Result) as follows.
Processing Result (PARAM00): □□72 hex (where □□ is the error code)
□□ contains the sum of the completion code sent from the Mitsubishi PLC and 80 hex.
Refer to the following manual for details on completion codes.
Ethernet Unit Manual from Mitsubishi Electric Corporation

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

Note: The status is updated when the function is executed in each scan.

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

Note: The status is updated when the function is executed in each scan.

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

Note: The status is updated when the function is executed in each scan.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

Note: The status is updated when the function is executed in each scan.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

Note: The status is updated when the function is executed in each scan.

◆ Status 6 (PARAM09)

This parameter is not used for the QnA-compatible 3E Frame protocol.

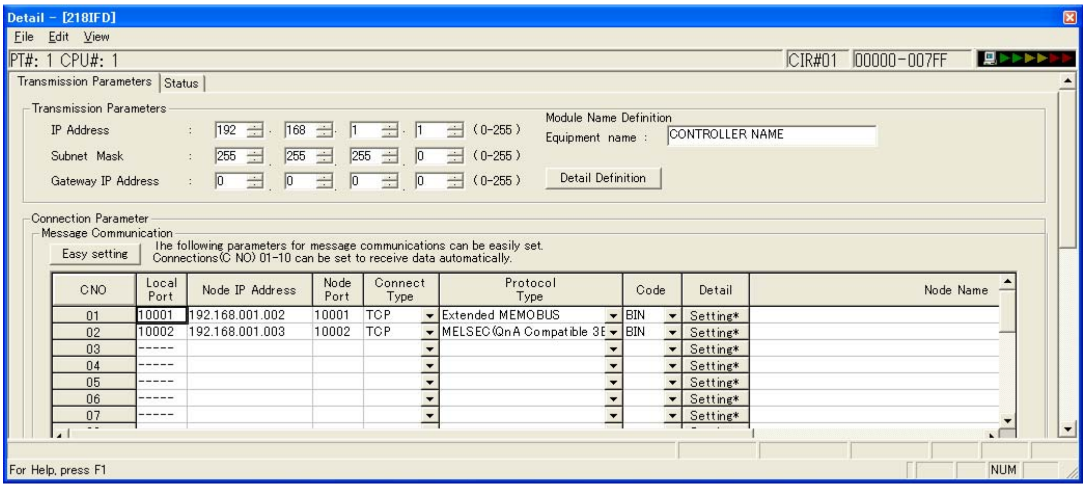
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Description
218IFD	1 to 20	Specifies the connection number of the remote station to send the message to.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

Set the I/O unit number for the Mitsubishi PLC.

The value you set will be sent as the unit number as is, even if it is not listed below.

Unit Number	Name
03FF hex	Local station CPU, control CPU, and own system CPU
03D0 hex	Control system CPU
03D1 hex	Standby system CPU
03D2 hex	System A CPU
03D3 hex	System B CPU
03E0 hex	Multi-CPU No.1
03E1 hex	Multi-CPU No. 2
03E2 hex	Multi-CPU No. 3
03E3 hex	Multi-CPU No. 4

◆ Function Code (PARAM12)

Set the function code to send.

You can use the functions that are registered to the function codes.

QnA-compatible 3E Frame Commands		MEMOBUS Function Code	Target Data Type	Function
Command	Subcommand			
0401 hex	0001 hex	01 or 02 hex	B	Reads bit devices in units of one point.
	0000 hex	03, 04, 09, or 0A hex	W	Reads word devices in units of one point.
1401 hex	0001 hex	05 or 0F hex	B	Writes bit devices in units of one point.
	0000 hex	06, 0B, or 10 hex	W	Writes word devices in units of one point.
1402 hex	0000 hex	0E hex	W	Writes word devices in units of one point.
0403 hex	0000 hex	0D hex	W	Reads word devices in units of one point.
0619 hex	0000 hex	08 hex	W	Performs a loopback test.

Note: B: Bit data, W: Word (channel) data

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Remote Station Data Address (PARAM14 and PARAM15)

Set the first address for data in the remote station.

Enter the first address as a decimal or hexadecimal number.

Example If the first address is MW01000, enter “1000” (decimal) or “3E8” (hexadecimal).

The applicable function codes and valid range of data addresses depend on the device type and device range of the Mitsubishi Q/QnA-series PLC.

Bit Device Conversion Table

Device	QnA-compatible 3E Device Range	Notation	MEMOBUS Command	First Address	Register Address
Input Relays	X000000 to X001FFF	Hexadecimal	02 hex: Relays	00000 to 08191	MB000000 to MB00511F
Output Relays	Y000000 to Y001FFF	Hexadecimal	01, 05, and 0F hex: Coils	00000 to 08191	MB000000 to MB00511F
Internal Relays	M000000 to M008191	Decimal	01, 05, and 0F hex: Coils	08192 to 16383	MB005120 to MB01023F
Latch Relays	L000000 to L008191	Decimal	01, 05, and 0F hex: Coils	16384 to 24575	MB010240 to MB01535F
Step Relays	S000000 to S008191	Decimal	01, 05, and 0F hex: Coils	24576 to 32767	MB015360 to MB02047F
Link Relays	B000000 to B001FFF	Hexadecimal	01, 05, and 0F hex: Coils	32768 to 40959	MB020480 to MB02559F
Annunciators	F000000 to F002047	Decimal	01, 05, and 0F hex: Coils	40960 to 43007	MB025600 to MB02687F

Bit Device Conversion Table

Device	QnA-compatible 3E Device Range	Notation	MEMOBUS Command	First Address	Register Address
Link Special Relays	SM000000 to SM002047	Decimal	01, 05, and 0F hex: Coils	43008 to 45055	MB026880 to MB02815F
Timer Contacts	TS000000 to TS002047	Decimal	02 hex: Relays	08192 to 10239	MB005120 to MB00639F
Timer Coils	TC000000 to TC002047	Decimal	02 hex: Relays	10240 to 12287	MB006400 to MB00767F
Counter Contacts	CS000000 to CS001023	Decimal	02 hex: Relays	12288 to 13311	MB007680 to MB00831F
Counter Coils	CC000000 to CC001023	Decimal	02 hex: Relays	13312 to 14335	MB008320 to MB00895F

Word Device Conversion Table

Device	QnA-compatible 3E Device Range	Notation	MEMOBUS Command	First Address	Register Address
Data Registers	D000000 to D012287	Decimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	00000 to 12287	MW00000 to MW12287
Link Registers	W000000 to W001FFF	Hexadecimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	12288 to 20479	MW12288 to MW20479
Link Special Registers	SD000000 to SD002047	Decimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	20480 to 22527	MW20480 to MW22527
File Registers	ZR000000 to ZR007FFF	Hexadecimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	22528 to 55295	MW22528 to MW55295
Timer Registers	TN000000 to TN002047	Decimal	04 and 0A hex: Input registers	00000 to 02047	MW00000 to MW02047
Counter Registers	CN000000 to CN001023	Decimal	04 and 0A hex: Input registers	02048 to 03071	MW02048 to MW03071

Note: 1. Even if addresses are within the given device range, they may exceed the range of the device area depending on the model of the Mitsubishi PLC.
Refer to the following manual for details.
Programmable Controller Manual from Mitsubishi Electric Corporation
2. Access file registers by using the notation for accessing continuous file registers: ZR for ASCII data and B0 hex for binary data. The normal access notation (R* for ASCII data and AF hex for binary data) cannot be used.
3. The corresponding register address in the MP3000 can be adjusted by using the offset setting of the MSG-SNDE function.

◆ Remote Station Register Type (PARAM16)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Data Size (PARAM17)

Set the data size for the read/write request as the number of bits or words.

Be sure that the last data address that is determined by the offset, data address, and data size does not exceed the valid data address range.

The range that is allowed for the data size depends on the function code and data area.

QnA-compatible 3E Frame Commands		MEMOBUS Command	Function	Points
Command	Subcommand			
0401 hex	0001 hex	01 or 02 hex	Reads bit devices in units of one point.	1 to 2,000 points
	0000 hex	03 hex/04 hex	Reads word devices in units of one point.	1 to 125 points
		09 or 0A hex		1 to 960 points*2
1401 hex	0001 hex	05 hex	Writes bit devices in units of one point.	1 point
		0F hex		1 to 800 points
	0000 hex	06 hex	Writes word devices in units of one point.	1 point
		0B hex		1 to 960 points*2
		10 hex		1 to 100 points
1402 hex	0000 hex	0E hex	Writes word devices in units of one point.	1 to 160 points
0403 hex	0000 hex	0D hex	Reads word devices in units of one point.	1 to 192 points
0619 hex	0000 hex	08 hex	Performs a loopback test *1 (word data loop)*1	2 points

*1. In the loopback test, the message sends two words (4 bytes) of data that must be returned.
*2. When using TCP communications, the upper limit is restricted by the MTU size. When communicating with TCP, the maximum size is the size of data that can be sent in a single segment.

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Local Station Data Address (PARAM20 and PARAM21)

Set the address of the read data destination or write data source in the MP3000-series Controller.

The address is set as the word offset from address 0.

◆ Local Station Register Type (PARAM22)

Set the register type of the read data destination or write data source in the MP3000.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 or higher	–	These setting are not used for the QnA-compatible 3E Frame protocol.

The register types that can be used depend on whether you are reading or writing.

The following table lists the combinations of register types.

Function Code	Applicable Register Types
01, 02, 03, 04, 09, or 0A hex	M, G, or O
05, 06, 0B, 0F, or 10 hex	M, G, I, O, or S
0D hex	M
0E hex	M

◆ Reserved for System (PARAM23)

This parameter is used by the system.

Note

Do not change the value of PARAM23 from a user program or by any other means.

◆ For System Use (PARAM24)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM24 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM24 from a user program or by any other means. PARAM24 will be used by the system.

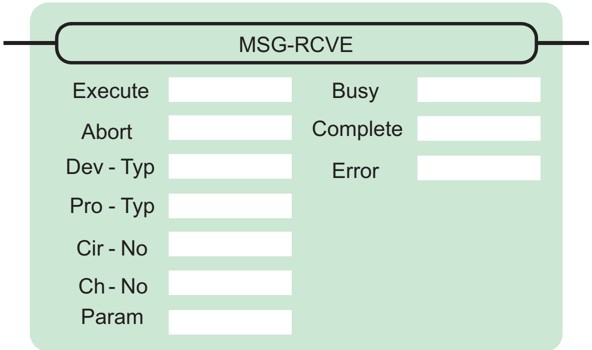
◆ Reserved for System (PARAM25 to PARAM28)

This parameter is used by the system.

Note

Do not change the values of PARAM25 to PARAM28 from a user program or by any other means.

Inputs and Outputs for the MSG-RCVE Function

Function Name	MSG-RCVE			
Function	Receives a message from a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition	 			
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the reception.
	2	Abort	B-VAL	Forces the reception to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message reception.

When the Execute Bit turns ON, the message will be received.

◆ Abort

Specify the bit to use to abort the message reception.

When the Abort Bit turns ON, the message reception will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

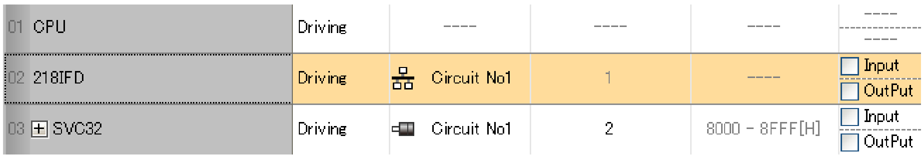
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the QnA-compatible 3E Frame protocol. MEMOBUS is automatically converted to QnA-compatible 3E Frame protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the QnA-compatible 3E Frame protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the QnA-compatible 3E Frame protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> Note
>
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> Note
>
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 52 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting the connection number and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List (F ⋯ ⋯ ⋯ ⋯ 0)
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00046	PARAM46
DW00047	PARAM47
DW00048	PARAM48
DW00049	PARAM49
DW00050	PARAM50
DW00051	PARAM51

◆ Busy

Specify the bit that shows that the message reception is in progress.

The Busy Bit is ON while a message reception or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message reception has been completed.

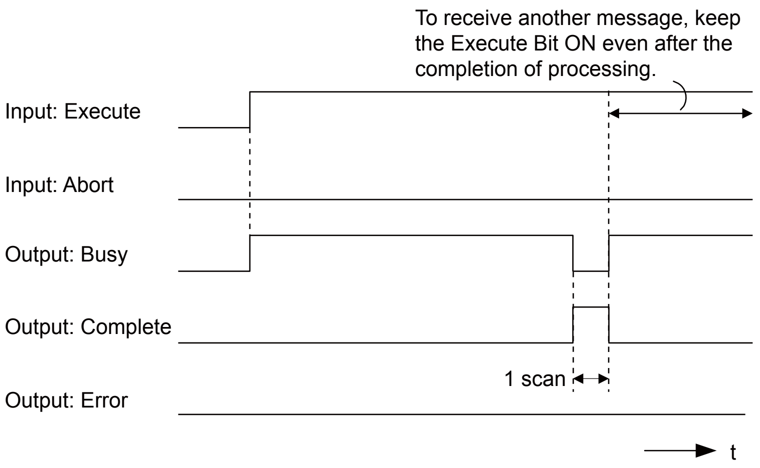
The Complete Bit turns ON only for one cycle when message reception or forced abort processing has been completed normally.

◆ Error

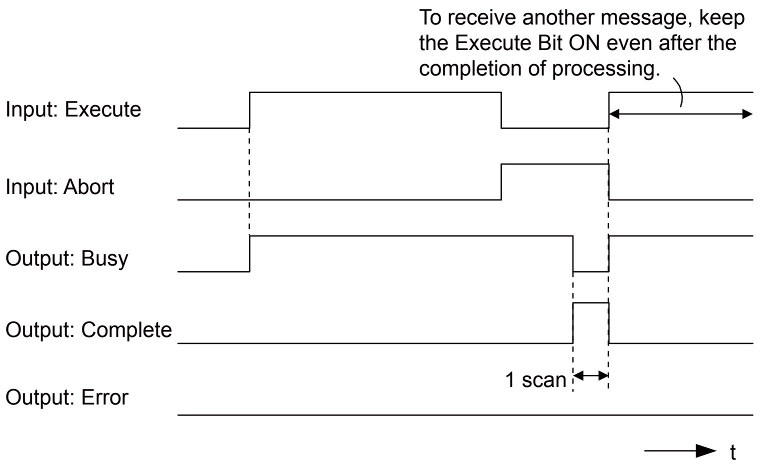
Specify the bit that shows if an error occurred during message processing.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-RCVE function.

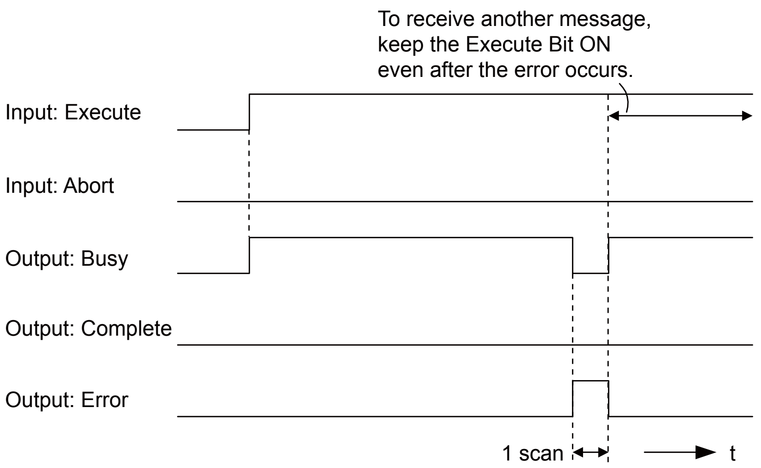
• Normal Execution



• When Execution Is Aborted



• Execution When an Error Occurs



MSG-RCVE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-RCVE function.

	No.	I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11	I/O	Option	Not used for the QnA-compatible 3E Frame protocol.
	12	Outputs	Function Code	Gives the function code requested by the remote station.
	13	I/O	Reserved for system.	–
	14	Outputs	Data Address, Lower Word	Gives the first address of the data that was requested by the remote station.
	15		Data Address, Upper Word	
	16		Register type	Gives the register type that was requested by the remote station.
	17		Data Size	Gives the data size that was requested by the remote station.
	18		Remote CPU Module Number	Not used for the QnA-compatible 3E Frame protocol.
	19	I/O	Reserved for system.	–

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No.		I/O	Meaning	Description
Parameters	20	Inputs	Coil Offset, Lower Word	Sets the offset word address for a coil (MB).
	21		Coil Offset, Upper Word	
	22		Input Relay Offset, Lower Word	Sets the offset word address for an input relay (IB).
	23		Input Relay Offset, Upper Word	
	24		Input Register Offset, Lower Word	Sets the offset word address for an input register (IW).
	25		Input Register Offset, Upper Word	
	26		Hold Register Offset, Lower Word	Sets the offset word address for a hold register (MW).
	27		Hold Register Offset, Upper Word	
	28		Data Relay Offset, Lower Word	Sets the offset word address for a data relay (GB).
	29		Data Relay Offset, Upper Word	
	30		Data Register Offset, Lower Word	Sets the offset word address for a data register (GW).
	31		Data Register Offset, Upper Word	
	32		Output Coil Offset, Lower Word	Sets the offset word address for an output coil (OB).
	33		Output Coil Offset, Upper Word	
	34		Output Register Offset, Lower Word	Sets the offset address for an output register (OW).
	35		Output Register Offset, Upper Word	
	36		M register Writing Range LO, Lower Word	Sets the first address of the writing range for hold register coils.
	37		M register Writing Range LO, Upper Word	
	38		M register Writing Range HI, Lower Word	Sets the last address of the writing range for hold register coils.
	39		M register Writing Range HI, Upper Word	
	40		G register Writing Range LO, Lower Word	Sets the first address of the writing range for data register data relays.
	41		G register Writing Range LO, Upper Word	
	42		G register Writing Range HI, Lower Word	Sets the last address of the writing range for data register data relays.
	43		G register Writing Range HI, Upper Word	
	44		O register Writing Range LO, Lower Word	Sets the first address of the writing range for output registers.
	45		O register Writing Range LO, Upper Word	
	46		O register Writing Range HI, Lower Word	Sets the last address of the writing range for output registers.
	47		O register Writing Range HI, Upper Word	
System	48	–	For system use	–
	49		Reserved for system.	–
	50		Reserved for system.	–
	51		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

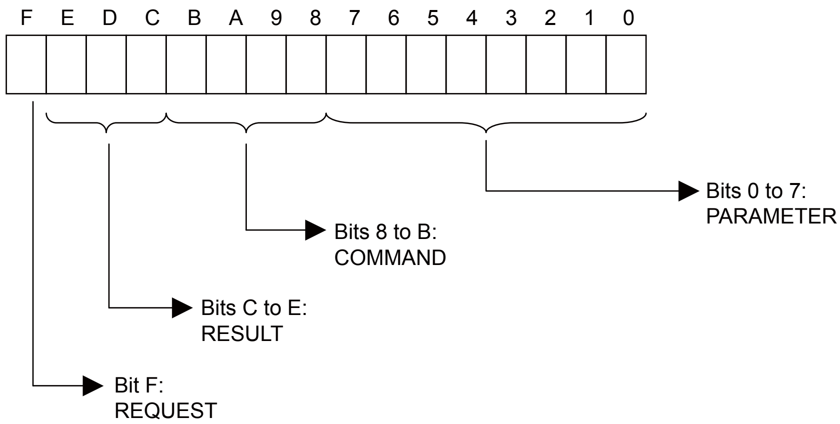
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-178)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-RCVE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution results of the MSG-RCVE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-RCVE function.

Code (Hex)	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT is 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was received. Check the function code of the remote station.
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Data Address) PARAM20 and PARAM21 (Coil Offset) PARAM26 and PARAM27 (Hold Register Offset)
83□□ hex	3	Data size error	The data size for receiving is out of range. Check the data size at the remote station.
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-RCVE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-RCVE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).

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Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-RCVE function.

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

◆ Status 6 (PARAM09)

This parameter is not used for the QnA-compatible 3E Frame protocol.

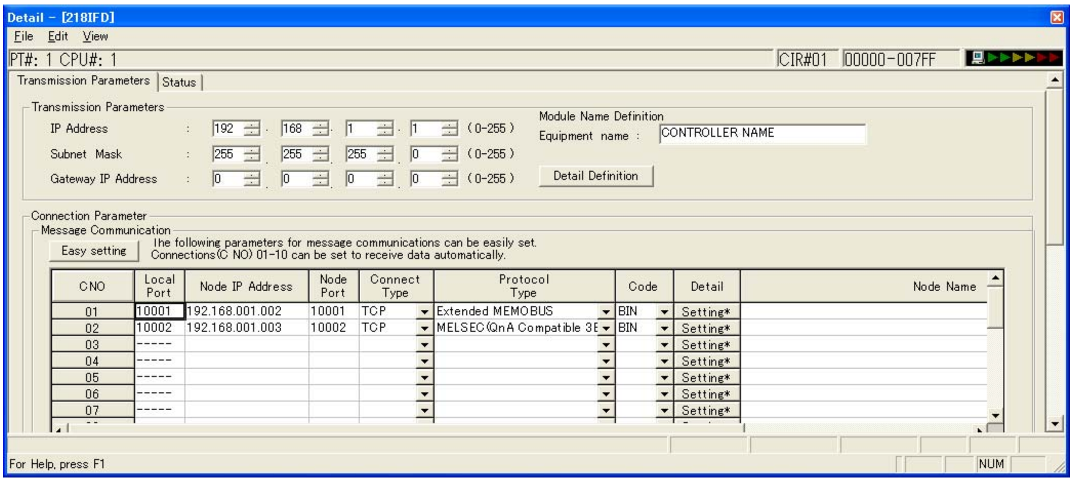
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Remarks
218IFD	1 to 20	Specifies the connection number of the remote station to receive the message from.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Function Code (PARAM12)

This parameter gives the function code that was received.

QnA-compatible 3E Frame Commands		MEMOBUS Function Code	Target Data Type	Function
Command	Subcommand			
0401 hex	0001 hex	01 or 02 hex	B	Reads bit devices in units of one point.
	0000 hex	03, 04, 09, or 0A hex	W	Reads word devices in units of one point.
1401 hex	0001 hex	05 or 0F hex	B	Writes bit devices in units of one point.
	0000 hex	06, 0B, or 10 hex	W	Writes word devices in units of one point.
1402 hex	0000 hex	0E hex	W	Writes word devices in units of one point.
0403 hex	0000 hex	0D hex	W	Reads word devices in units of one point.
0619 hex	0000 hex	08 hex	W	Performs a loopback test.

Note: B: Bit data, W: Word (channel) data

◆ Reserved for System (PARAM13)

This parameter is used by the system.

> Note
>
> Do not change the value of PARAM13 from a user program or by any other means.

◆ Data Address (PARAM14 and PARAM15)

These parameters give the data address that was requested by the remote station.

The type of device and device range determine the data area.

Bit Device Conversion Table

Device	QnA-compatible 3E Frame Device Range	Notation	MEMOBUS Command	First Address	Register Address
Input Relays	X000000 to X001FFF	Hexadecimal	02 hex: Relays	00000 to 08191	MB000000 to MB00511F
Output Relays	Y000000 to Y001FFF	Hexadecimal	01, 05, and 0F hex: Coils	00000 to 08191	MB000000 to MB00511F
Internal Relays	M000000 to M008191	Decimal	01, 05, and 0F hex: Coils	08192 to 16383	MB005120 to MB01023F
Latch Relays	L000000 to L008191	Decimal	01, 05, and 0F hex: Coils	16384 to 24575	MB010240 to MB01535F
Step Relays	S000000 to S008191	Decimal	01, 05, and 0F hex: Coils	24576 to 32767	MB015360 to MB02047F
Link Relays	B000000 to B001FFF	Hexadecimal	01, 05, and 0F hex: Coils	32768 to 40959	MB020480 to MB02559F
Annunciators	F000000 to F002047	Decimal	01, 05, and 0F hex: Coils	40960 to 43007	MB025600 to MB02687F
Link Special Relays	SM000000 to SM002047	Decimal	01, 05, and 0F hex: Coils	43008 to 45055	MB026880 to MB02815F
Timer Contacts	TS000000 to TS002047	Decimal	02 hex: Relays	08192 to 10239	MB005120 to MB00639F
Timer Coils	TC000000 to TC002047	Decimal	02 hex: Relays	10240 to 12287	MB006400 to MB00767F
Counter Contacts	CS000000 to CS001023	Decimal	02 hex: Relays	12288 to 13311	MB007680 to MB00831F
Counter Coils	CC000000 to CC001023	Decimal	02 hex: Relays	13312 to 14335	MB008320 to MB00895F

Word Device Conversion Table

Device	QnA-compatible 3E Frame Device Range	Notation	MEMOBUS Command	First Address	Register Address
Data Registers	D000000 to D012287	Decimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	00000 to 12287	MW00000 to MW12287
Link Registers	W000000 to W001FFF	Hexadecimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	12288 to 20479	MW12288 to MW20479
Link Special Registers	SD000000 to SD002047	Decimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	20480 to 22527	MW20480 to MW22527
File Registers	ZR000000 to ZR007FFF	Hexadecimal	03, 06, 09, 0B, 0D, 0E, and 10 hex: Hold registers	22528 to 55295	MW22528 to MW55295
Timer Registers	TN000000 to TN002047	Decimal	04 and 0A hex: Input registers	00000 to 02047	MW00000 to MW02047
Counter Registers	CN000000 to CN001023	Decimal	04 and 0A hex: Input registers	02048 to 03071	MW02048 to MW03071

Note: 1. Even if addresses are within the given device range, they may exceed the range of the device area depending on the model of the Mitsubishi Q/QnA-series PLC.
Refer to the following manual for details.
Programmable Controller Manual from Mitsubishi Electric Corporation
2. Access file registers by using the notation for accessing continuous file registers: ZR for ASCII data and B0 hex for binary data. The normal access notation (R* for ASCII data and AF hex for binary data) cannot be used.
3. The corresponding register address in the MP3000 can be adjusted by using the offset setting of the MSG-RCVE function.

◆ Register Type (PARAM16)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Data Size (PARAM17)

This parameter gives the data size as the number of bits or words for read/write requests from the remote station.

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Offsets (PARAM20 to PARAM27)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address by the number of words specified by the offset.

Note: An offset cannot be a negative value.

Offset parameters are provided for each of the target register types.

The following table lists the offset parameters.

Parameters	Meaning	Description
PARAM20 and PARAM21	Coil Offset	Sets the offset to the word address for a coil.
PARAM22 and PARAM23	Input Relay Offset	Sets the offset to the word address for an input relay.
PARAM24 and PARAM25	Input Register Offset	Sets the offset to the word address for an input register.
PARAM26 and PARAM27	Hold Register Offset	Sets the offset to the word address for a hold register.

The offset parameters that can be used depend on the function code.

The following table lists the valid parameters for each function code.

Function Code	Function	Applicable Offset Parameters
01 hex	Reads the states of coils.	PARAM20 and PARAM21
02 hex	Reads the states of input relays.	PARAM22 and PARAM23
03 hex	Reads the contents of hold registers.	PARAM26 and PARAM27
04 hex	Reads the contents of input registers.	PARAM24 and PARAM25
05 hex	Changes the state of a single coil.	PARAM20 and PARAM21
06 hex	Writes to a single hold register.	PARAM26 and PARAM27
09 hex	Reads the contents of hold registers (extended).	PARAM26 and PARAM27
0A hex	Reads the contents of input registers (extended).	PARAM24 and PARAM25
0B hex	Writes to hold registers (extended).	PARAM26 and PARAM27
0D hex	Reads the contents of non-consecutive hold registers (extended).	PARAM26 and PARAM27
0E hex	Writes to non-consecutive hold registers (extended).	PARAM26 and PARAM27
0F hex	Changes the states of multiple coils.	PARAM20 and PARAM21
10 hex	Writes to multiple hold registers.	PARAM26 and PARAM27

◆ Data Relay Offset (PARAM28 and PARAM29)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Data Register Offset (PARAM30 and PARAM31)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Output Coil Offset (PARAM32 and PARAM33)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ Output Register Offset (PARAM34 and PARAM35)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ M Register Writing Range (PARAM36 to PARAM39)

These parameters set the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the M Register Writing Range (PARAM36 to PARAM39) with word addresses.

Note: 1. M registers are always used as the destination in the MP3000 for data write requests from the remote station.
2. The writing range parameters allow you to specify the range of M registers that messages are allowed to write to.

The following table lists the writing range parameters.

Parameters	Meaning	Description
PARAM36 and PARAM37	M Register Writing Range LO	First address of the writing range
PARAM38 and PARAM39	M Register Writing Range HI	Last address of the writing range

Set the writing range so that it satisfies the following condition:

0 ≤ M register writing range LO ≤ M register writing range HI ≤ Maximum M register address

The writing range applies when using the following function codes.

0B hex: Writes to hold registers (extended).

0F hex: Changes the states of multiple coils.

10 hex: Writes to multiple hold registers.

Example
Use the following settings to set the allowable writing range of M register addresses to MW0001000 to MW0001999:

PARAM36 = 03E8 hex (1000)
PARAM37 = 0000 hex (0000)
PARAM38 = 07CF hex(1999)
PARAM39 = 0000 hex (0000)

The MP3000 will return an error if a write request is received for an address outside the range from MW01000 to MW01999, and will not perform the writing operation.

◆ G Register Writing Range LO (PARAM40 and PARAM41)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ G Register Writing Range HI (PARAM42 and PARAM43)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ O Register Writing Range LO (PARAM44 and PARAM45)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ O Register Writing Range HI (PARAM46 and PARAM47)

This parameter is not used for the QnA-compatible 3E Frame protocol.

◆ For System Use (PARAM48)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM48 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM48 from a user program or by any other means. PARAM48 will be used by the system.

◆ Reserved for System (PARAM49 to PARAM51)

This parameter is used by the system.

Note

Do not change the values of PARAM49 to PARAM51 from a user program or by any other means.

2.8 Communications with an OMRON PLC (FINS Communications Service)

When using Ethernet communications between the MP3000 and an OMRON PLC, use the FINS protocol as the communications protocol. The FINS protocol allows the master to read and write the slave registers.

This section describes communications when the MP3000 acts as a slave and as the master.

When the MP3000 acts as a slave, communications can take place using automatic reception or using the MSG-RCVE function.

When the MP3000 acts as the master, communications can take place using I/O message communications or the MSG-SNDE function.

Using Automatic Reception with the MP3000 as a Slave

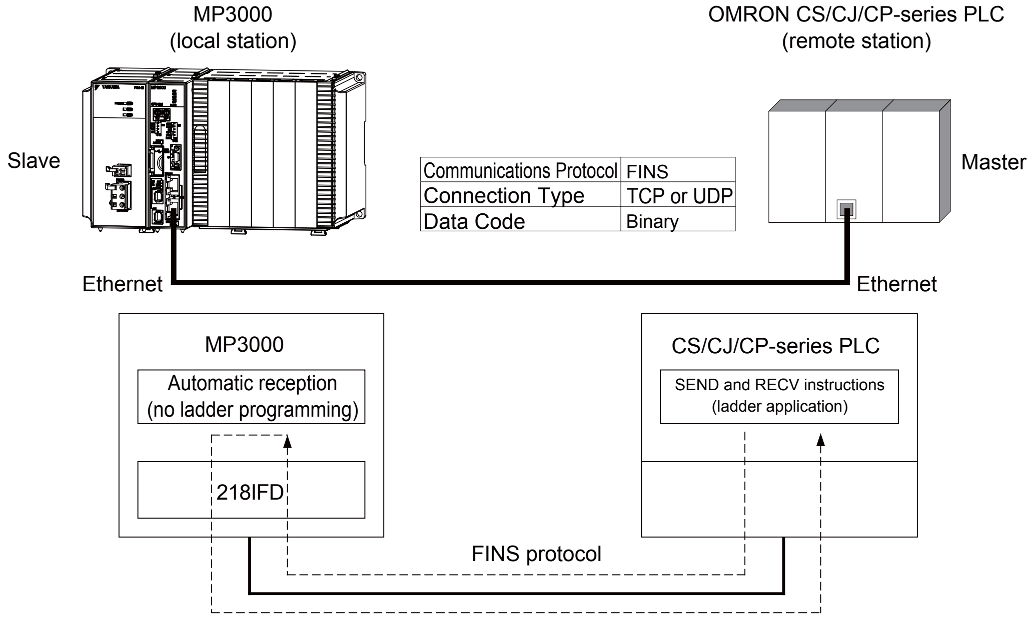
This section describes how to communicate with an OMRON PLC by using automatic reception.

When an OMRON PLC is used as the master to execute FINS commands, it will need a ladder application that uses the following commands.

- SEND instruction: Writes I/O memory data from the OMRON PLC to the MP3000.
- RECV instruction: Reads register data from the MP3000 into the OMRON PLC.
- CMND instruction: Used to create any FINS command, including I/O memory read and write commands.

Note

The CMND instruction sends FINS commands directly. The FINS commands must be created in the ladder application.



FINS Commands

The FINS commands that can be used with automatic reception in the MP3000 are listed below. When executing FINS commands on an OMRON PLC that is acting as the master, use the command codes and I/O memory types that are given in the following table.

Name	Command Code (Hex)		I/O Memory Type (Hex)	Meaning	Remarks
	MR	SR			
Reading data from an I/O memory area	01	01	B0	Reads CIO Area words.	Use the RECV instruction.
			B1	Reads Work Area words.	
			B2	Reads Holding Area words.	
			B3	Reads Auxiliary Area words.	
			82	Reads DM Area words.	
Writing data to an I/O memory area	01	02	B0	Writes to CIO Area words.	Use the SEND instruction.
			B1	Writes to Work Area words.	
			B2	Writes to Holding Area words.	
			B3	Writes to Auxiliary Area words.	
			82	Writes to DM Area words.	
Reading non-consecutive data from the I/O memory area	01	04	82	Reads non-consecutive words from the DM Area.	Create a FINS command and use the CMND instruction to send it. This command can only read from the DM Area.

I/O Memory Data Areas and Corresponding Registers in the MP3000

The following table shows the relationship between registers in the MP3000 and the I/O memory data areas.

In an OMRON PLC, FINS commands are used to specify the address and I/O memory area that correspond to the registers to read or write to in the MP3000.

- Writing
  In the First Destination Word operand of the SEND instruction, specify the address in the OMRON CPU Unit that corresponds to the register address to write to in the MP3000.

Example **Writing Data into MW10000**
Enter D10000 in the First Destination Word operand as the corresponding address in the OMRON CPU Unit.

- Reading
  In the First Source Word operand of the RECV instruction, specify the address in the OMRON CPU Unit that corresponds to the register address to read from in the MP3000.

Example **Reading Data from M02048**
Enter D02048 or W000 in the First Source Word operand as the corresponding address in the OMRON CPU Unit.

<table>
<tr><th rowspan="3">Data Area Name</th><th rowspan="3">Data Type</th><th colspan="3">Data Range</th></tr>
<tr><th colspan="2">OMRON CPU Unit</th><th rowspan="2">MP3000</th></tr>
<tr><th>Addresses</th><th>I/O Memory Addresses</th></tr>
<tr><td>CIO Area</td><td>Word</td><td>0000 to 2047</td><td>000000 to 07FF00</td><td>Word notation: MW00000 to MW02047
Bit notation: MB000000 to MB02047F</td></tr>
<tr><td>Work Area</td><td>Word</td><td>W000 to W511</td><td>00000 to 01FF00</td><td>Word notation: MW02048 to MW02559
Bit notation: MB020480 to MB02559F</td></tr>
<tr><td>Holding Area</td><td>Word</td><td>H000 to H511</td><td>00000 to 01FF00</td><td>Word notation: MW02560 to MW03071
Bit notation: MB025600 to MB03071F</td></tr>
<tr><td>Auxiliary Area</td><td>Word</td><td>A000 to A959</td><td>00000 to 03BF00</td><td>Word notation: MW03072 to MW04031
Bit notation: MB030720 to MB04031F</td></tr>
<tr><td>DM Area</td><td>Word</td><td>D00000 to D32767</td><td>00000 to 7FFF00</td><td>MW00000 to MW32767</td></tr>
</table>

Note: Word: Specify word addresses.

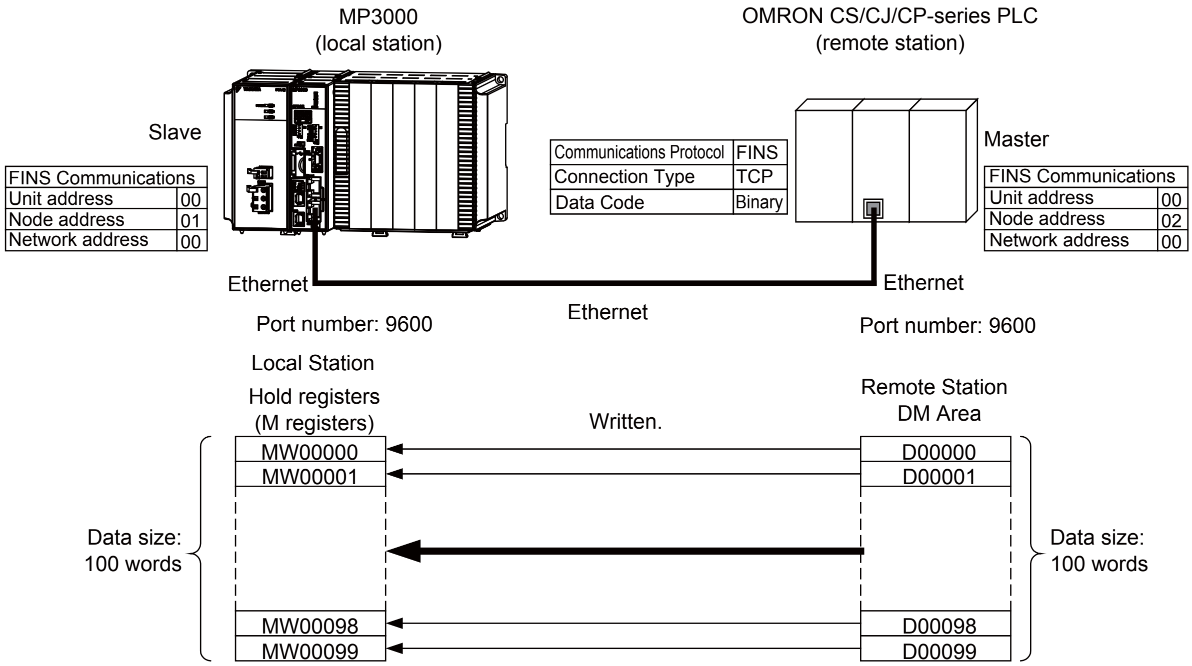
Transfer Size

The following table lists the data sizes that can be received in a single FINS command by using automatic reception in the MP3000. When executing SEND, RECV, and CMND instructions on an OMRON PLC that is acting as the master, keep the data size within the ranges that are given in the following table.

<table>
<tr><th colspan="2">Command Code (Hex)</th><th rowspan="2">I/O Memory Type (Hex)</th><th rowspan="2">Meaning</th><th rowspan="2">Data Size</th></tr>
<tr><th>MR</th><th>SR</th></tr>
<tr><td rowspan="5">01</td><td rowspan="5">01</td><td>B0</td><td>Reads CIO Area words.</td><td rowspan="4">1 to 125 words
(16 to 2,000 bits)</td></tr>
<tr><td>B1</td><td>Reads Work Area words.</td></tr>
<tr><td>B2</td><td>Reads Holding Area words.</td></tr>
<tr><td>B3</td><td>Reads Auxiliary Area words.</td></tr>
<tr><td>82</td><td>Reads DM Area words.</td><td>1 to 999 words</td></tr>
<tr><td rowspan="5">01</td><td rowspan="5">02</td><td>B0</td><td>Writes to CIO Area words.</td><td rowspan="4">1 to 50 words
(16 to 800 bits)</td></tr>
<tr><td>B1</td><td>Writes to Work Area words.</td></tr>
<tr><td>B2</td><td>Writes to Holding Area words.</td></tr>
<tr><td>B3</td><td>Writes to Auxiliary Area words.</td></tr>
<tr><td>82</td><td>Writes to DM Area words.</td><td>1 to 996 words</td></tr>
<tr><td>01</td><td>04</td><td>82</td><td>Reads non-consecutive words from the DM Area.</td><td>1 to 167 words</td></tr>
</table>

Setting Example

The following figure illustrates how the contents of the D00000 to D00099 in the DM Area in the CPU Unit of the OMRON master are written to the MW00000 to MW00099 hold registers in the MP3000 slave.

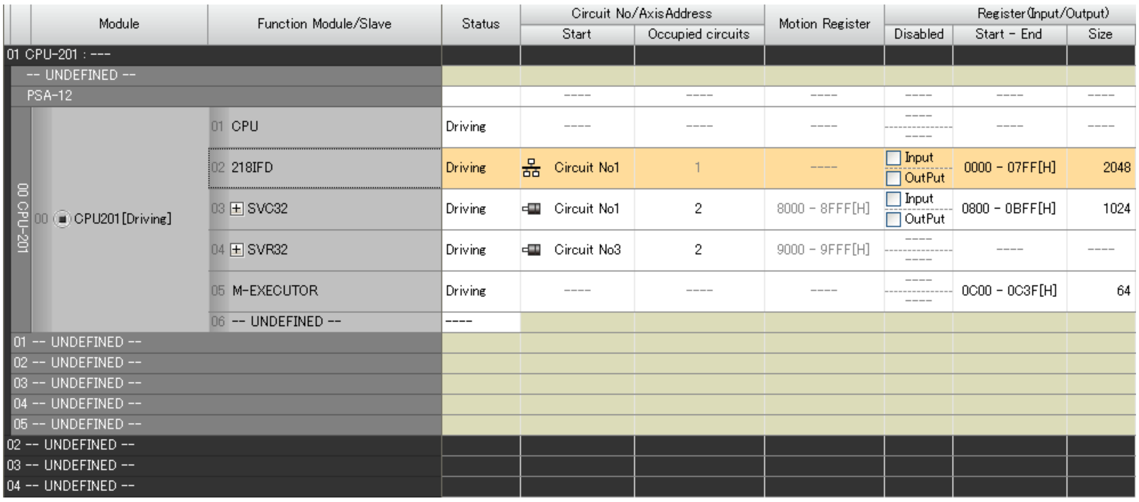


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

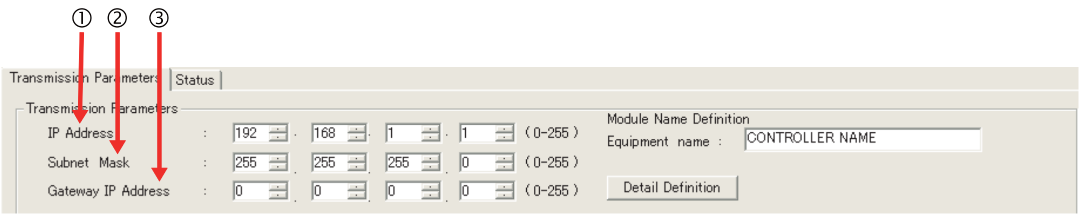
Note: If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



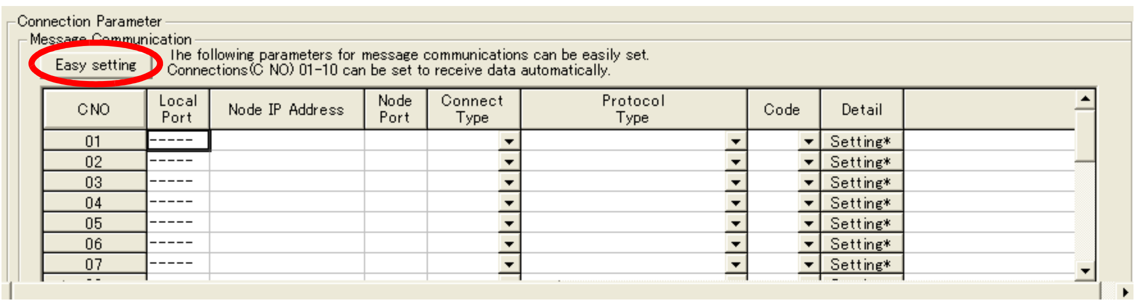
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



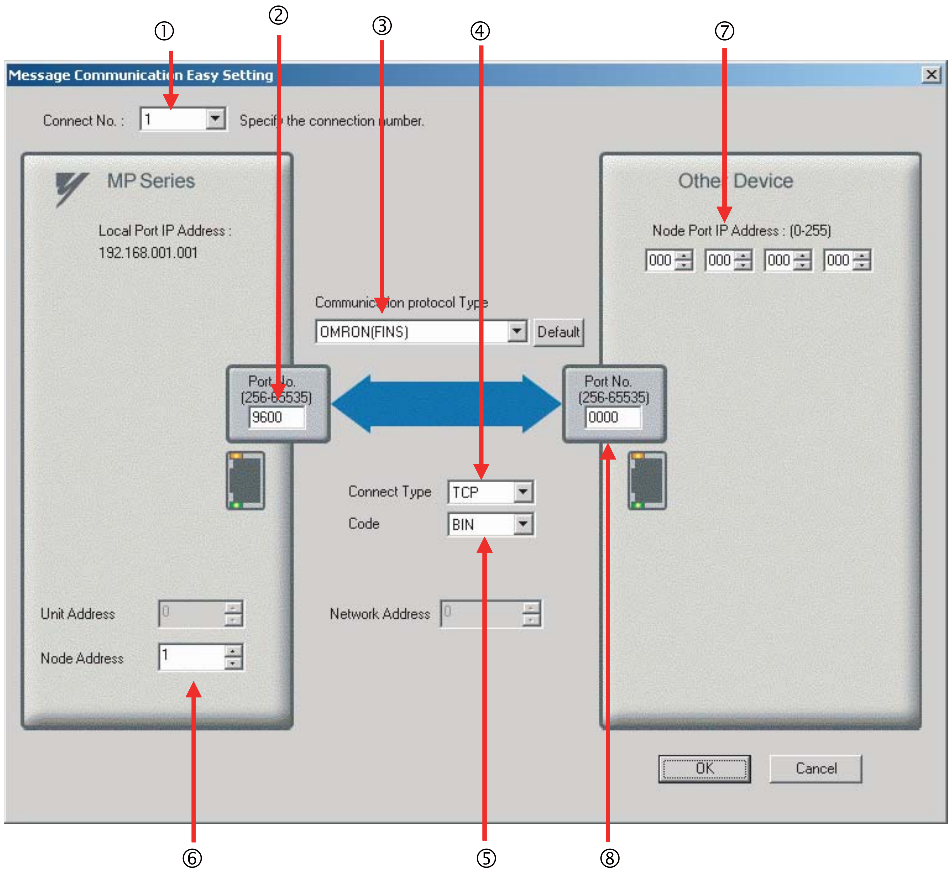
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②Enter “9600” in the **Port No.** Box for the MP-series Machine Controller.
③Select **OMRON (FINS)** in the **Communication Protocol Type** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter “1” in the **Node Address** Box for the MP-series Machine Controller.
⑦Enter the following address in the **Node Port IP Address** Boxes for the other device: 000.000.000.000.
⑧Enter “0000” in the **Port No.** Box for the other device.

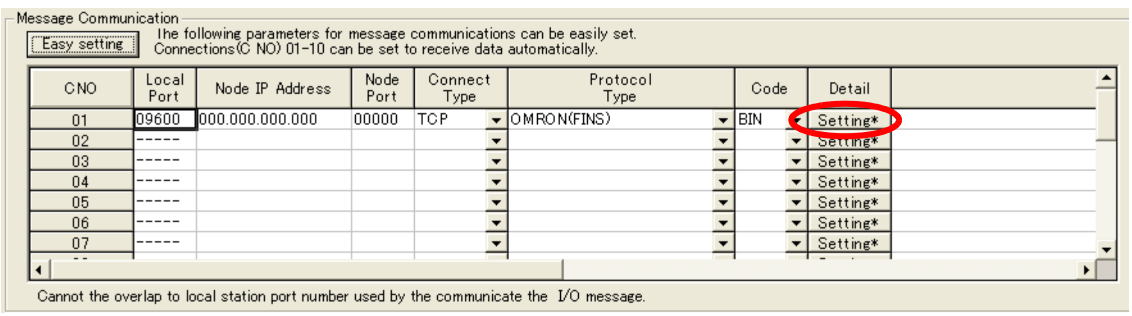
Note: The unit address and network address of the MP-series Machine Controller are always 00 hex.
If communicating with FINS/UDP, select **UDP** in the **Connect Type** Box.

5. Click the **OK** Button.

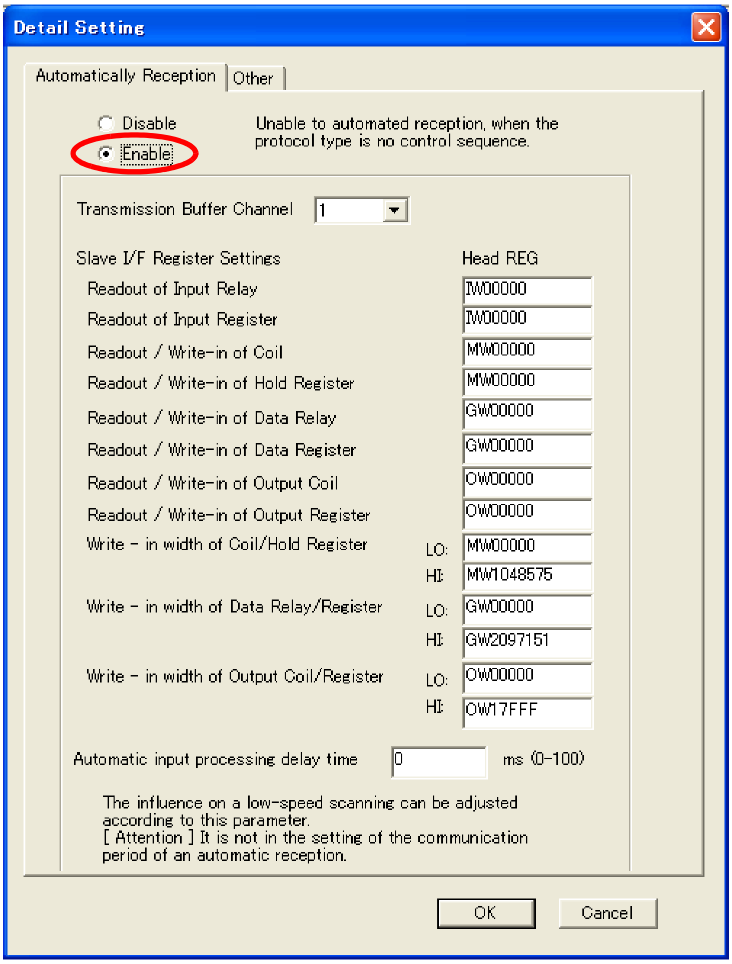
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



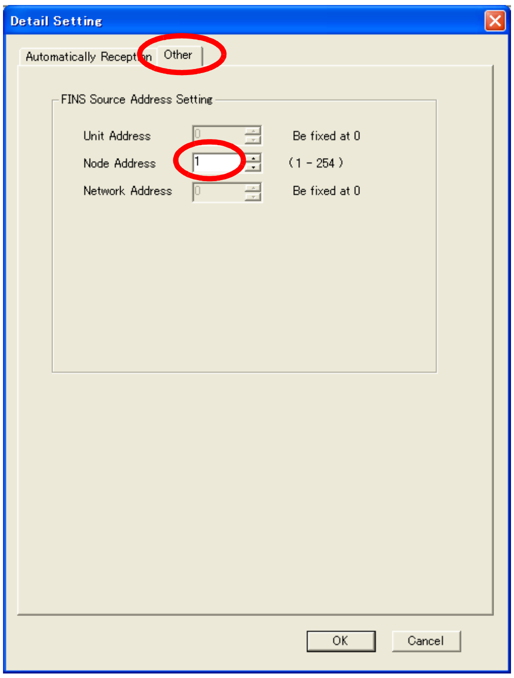
8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: Refer to the following section for details on automatic reception.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

The setting in the **Node Address** Box on the *Other* Tab Page will contain the value that is set in the Message Communication Easy Setting Dialog Box.



Note: Specify a node address that is not in use by any other device on the same network.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Remote Device (OMRON PLC)

Use the following procedure to set up the OMRON CJ-series PLC.

Note

The CJ Series is manufactured by OMRON Corporation.
Contact OMRON Corporation for further information.

1. Set the node address of the Ethernet Unit. In this example, the node address is set to 02 hex.

2. Start the CX-Programmer.

3. Create a project.

4. Set the network parameters.

Parameter	Description
Broadcasting	As required.
FINS/UDP Port	As required.
FINS/TCP Port	Default (9,600)
TCP/IP keep-alive	As required.
IP Address	192.168.1.2
Subnet Mask	255.255.255.000
IP Address Conversion	Combined method
Baud Rate	Automatic detection
Dynamic Change the Target IP Addresses	As required.

Note: When using an OMRON PLC, set the node address of the Ethernet Unit so that it matches the last digit of the IP address (2 in the case of 192.168.001.002). If the node address does not match the last digit, an error may occur in the Ethernet Unit of the OMRON PLC.
When communicating with FINS/UDP, set the FINS/UDP port setting to the same number as the remote station port number of the MP3000.

5. Set the FINS/TCP connection parameters. Use the following settings for FINS/TCP connection number 1.

Note: The FINS/TCP connection settings are not required when communicating with FINS/UDP.

Parameter	Description
FINS/TCP Server/Client	Client
Target IP Address	192.168.1.1
Automatically Allocated FINS Node Address for Server	Do not set.
Keep-alive	As required.

6. Create routing tables if required.

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

7. Create ladder programming for network transmissions.

To write data to a node on the network, use the SEND instruction. The following is an example of the settings for a SEND instruction.

SEND	
D00000	· Set the first word in the OMRON PLC local node. Example: Sending 100 words from D00000.
D00000	· Set the first destination word in the MP3000. Example: “D00000” causes the MP3000 to start receiving from MW00000.
D10000	· Set the first word of the control data. Example: The settings in the following table are set as the control data from D10000.

Word	Meaning	Meaning
D10000	0064 hex	Number of words to send = 100 words
D10001	0000 hex	Destination network address = 00 (local)
D10002	0100 hex	Destination node address = 1 Destination unit address = 00
D10003	0701 hex	Response = Required. Communications port number used = 7, Number of retries = 1
D10004	0014 hex	Response monitor time = 20 (2 seconds)

When using the SEND instruction, create any logic necessary to interlock with other processes and to adjust the timing of the execution.

Note: Refer to the following manuals for details on ladder programming with the SEND, RECV, and CMND instructions for network communications.

SYSMAC CS/CJ-series Ethernet Units Operation Manual from OMRON Corporation
SYSMAC CS/CJ/NSJ-series Programmable Controllers Instructions Reference Manual from OMRON Corporation

This concludes the setup.

◆ Starting Communications

Use the following procedure to write the data in the DM Area in the OMRON PLC to the hold registers in the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.

The system will automatically start the message reception operation. No further operation is required.

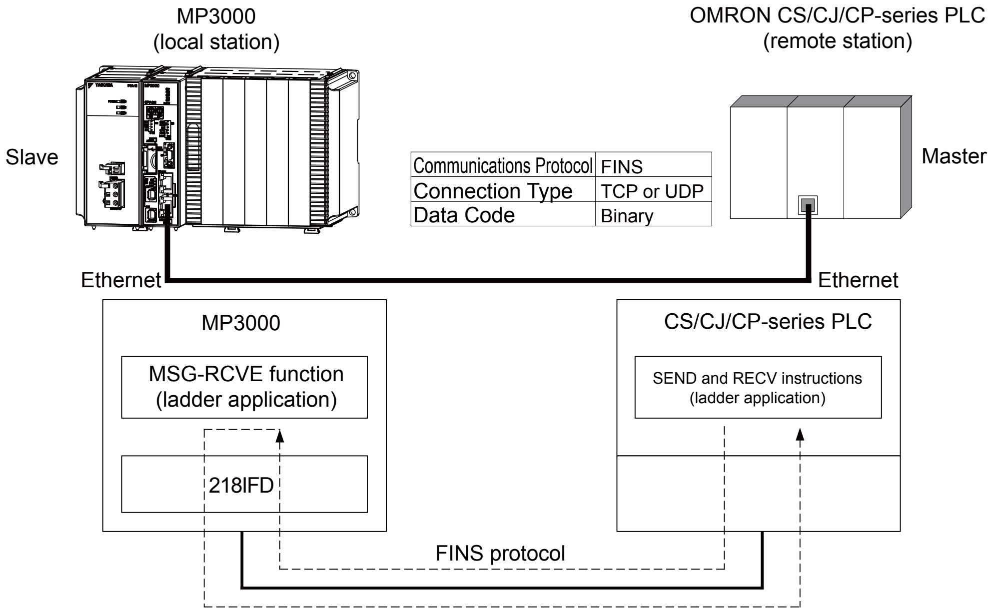
2. Start the message send operation on the OMRON PLC.

Note: The MP3000 will wait for the TCP connection after it starts the automatic reception operation. Therefore, the power supply to the MP3000 must be turned ON before the power supply to the OMRON PLC.

Using the MSG-RCVE Function with the MP3000 as a Slave

This section describes how to communicate with an OMRON PLC by using the MSG-RCVE function.

When an OMRON PLC is used as the master to execute FINS commands, it will need a ladder application that uses the SEND and RECV instructions.



FINS Commands

Refer to the following section for details on the FINS commands that are used with the MSG-RCVE function.

☞ *Using Automatic Reception with the MP3000 as a Slave – FINS Commands (page 2-187)*

I/O Memory Data Areas and Corresponding Registers in the MP3000

Refer to the following section for details on the relationship between registers in the MP3000 and the I/O memory data areas.

☞ *Using Automatic Reception with the MP3000 as a Slave – I/O Memory Data Areas and Corresponding Registers in the MP3000 (page 2-187)*

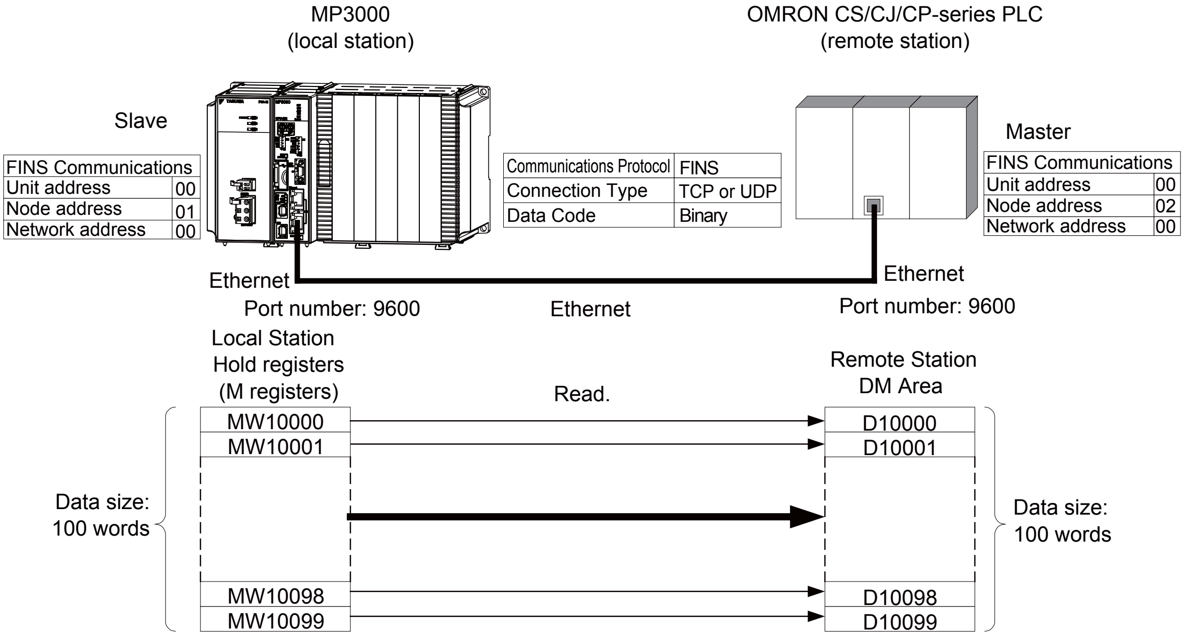
Transfer Size

The following table lists the data sizes that can be received in a single FINS command when using the MSG-RCVE function. When executing SEND, RECV, and CMND instructions on an OMRON PLC that is acting as the master, keep the data size within the ranges that are given in the following table.

Command Code (Hex)		I/O Memory Type (Hex)	Meaning	Data Size
MR	SR			
01	01	B0	Reads CIO Area words.	1 to 125 words (16 to 2,000 bits)
		B1	Reads Work Area words.	
		B2	Reads Holding Area words.	
		B3	Reads Auxiliary Area words.	
		82	Reads DM Area words.	1 to 999 words
01	02	B0	Writes to CIO Area words.	1 to 50 words (16 to 800 bits)
		B1	Writes to Work Area words.	
		B2	Writes to Holding Area words.	
		B3	Writes to Auxiliary Area words.	
		82	Writes to DM Area words.	1 to 996 words
01	04	82	Reads non-consecutive words from the DM Area.	1 to 167 words

Setting Example

The following figure illustrates how the contents of the MW10000 to MW10099 hold registers in the MP3000 slave are read into D10000 to D10099 in the DM Area in the CPU Unit of the OMRON PLC master.

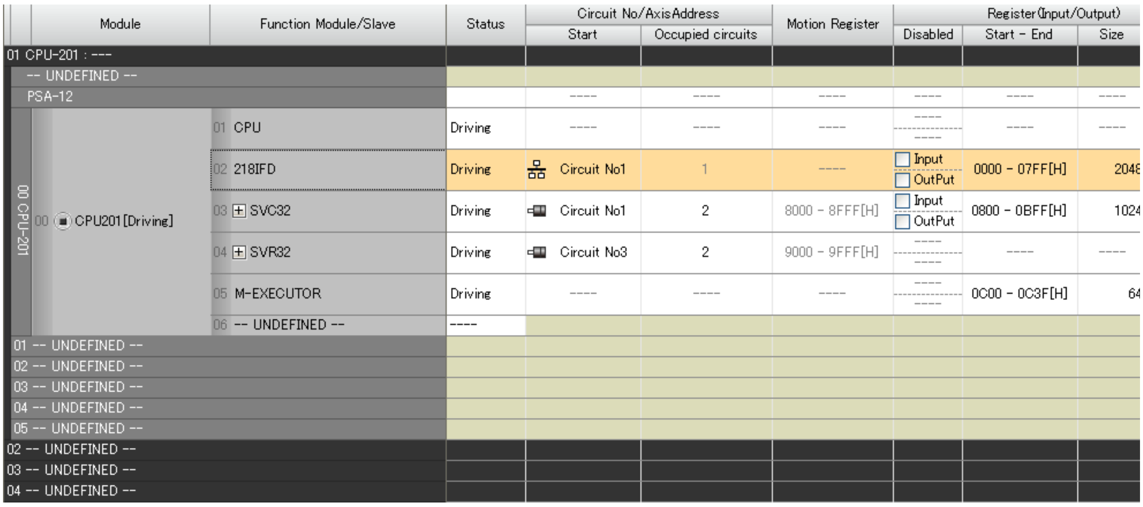


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

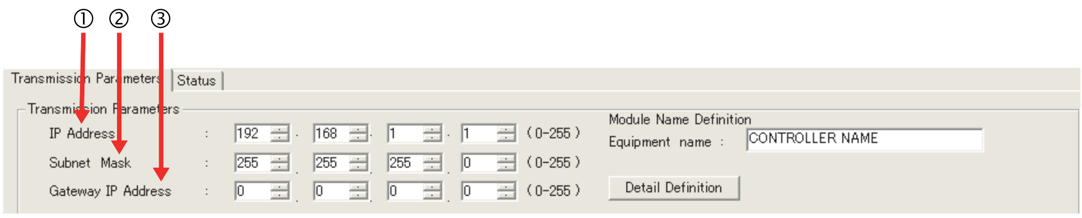
Note: If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



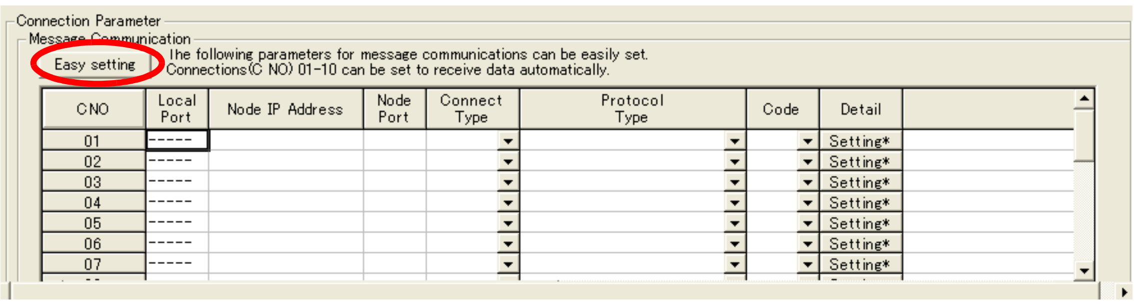
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.

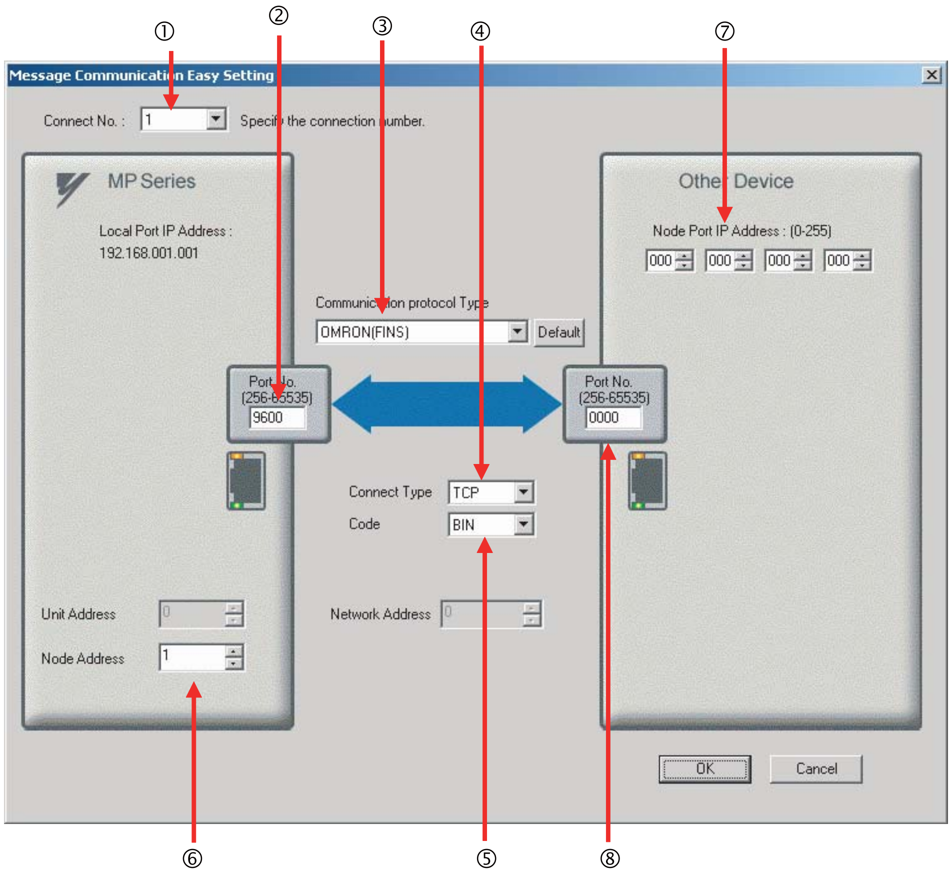


The Message Communication Easy Setting Dialog Box will be displayed.

Ethernet Communications

2

4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②Enter "9600" in the **Port No.** Box for the MP-series Machine Controller.
③Select **OMRON (FINS)** in the **Communication Protocol Type** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter "1" in the **Node Address** Box for the MP-series Machine Controller.
⑦Enter the following address in the **Node Port IP Address** Boxes for the other device:
000.000.000.000.
⑧Enter "0000" in the **Port No.** Box for the other device.

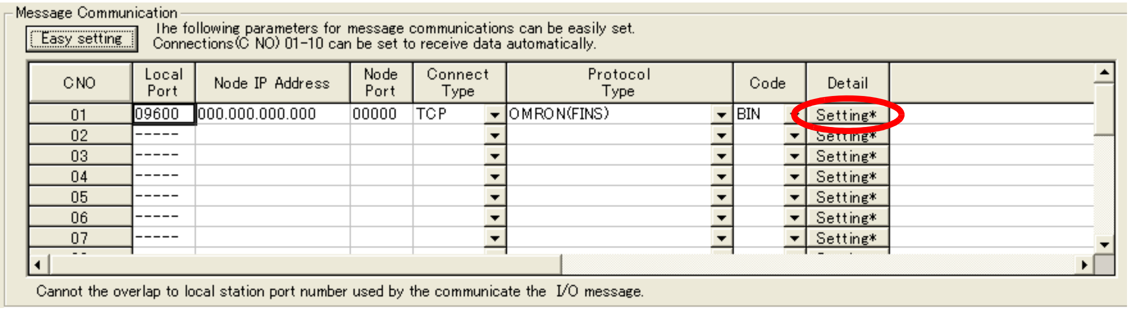
Note: Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.
The unit address and network address of the MP-series Machine Controller are always 00 hex.
If communicating with FINS/UDP, select **UDP** in the **Connect Type** Box.

5. Click the **OK** Button.

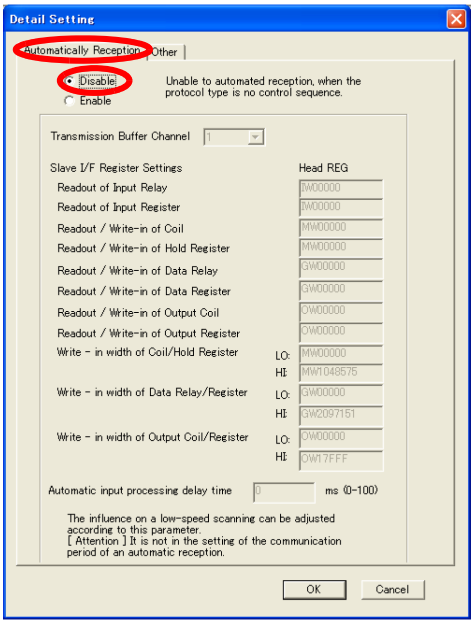
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

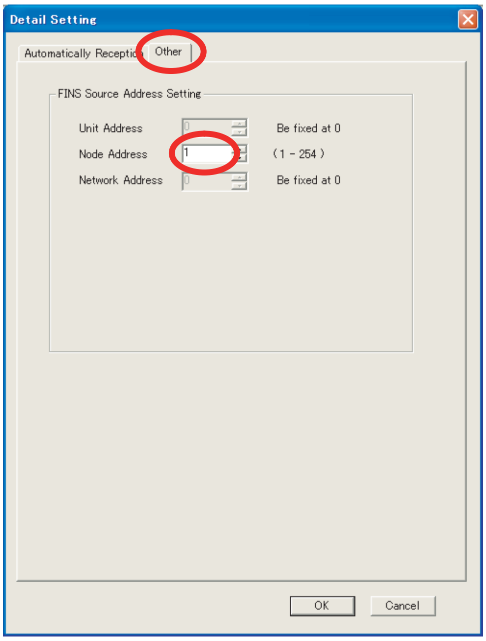
7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Click the **Disable** Option on the Automatically Reception Tab Page.



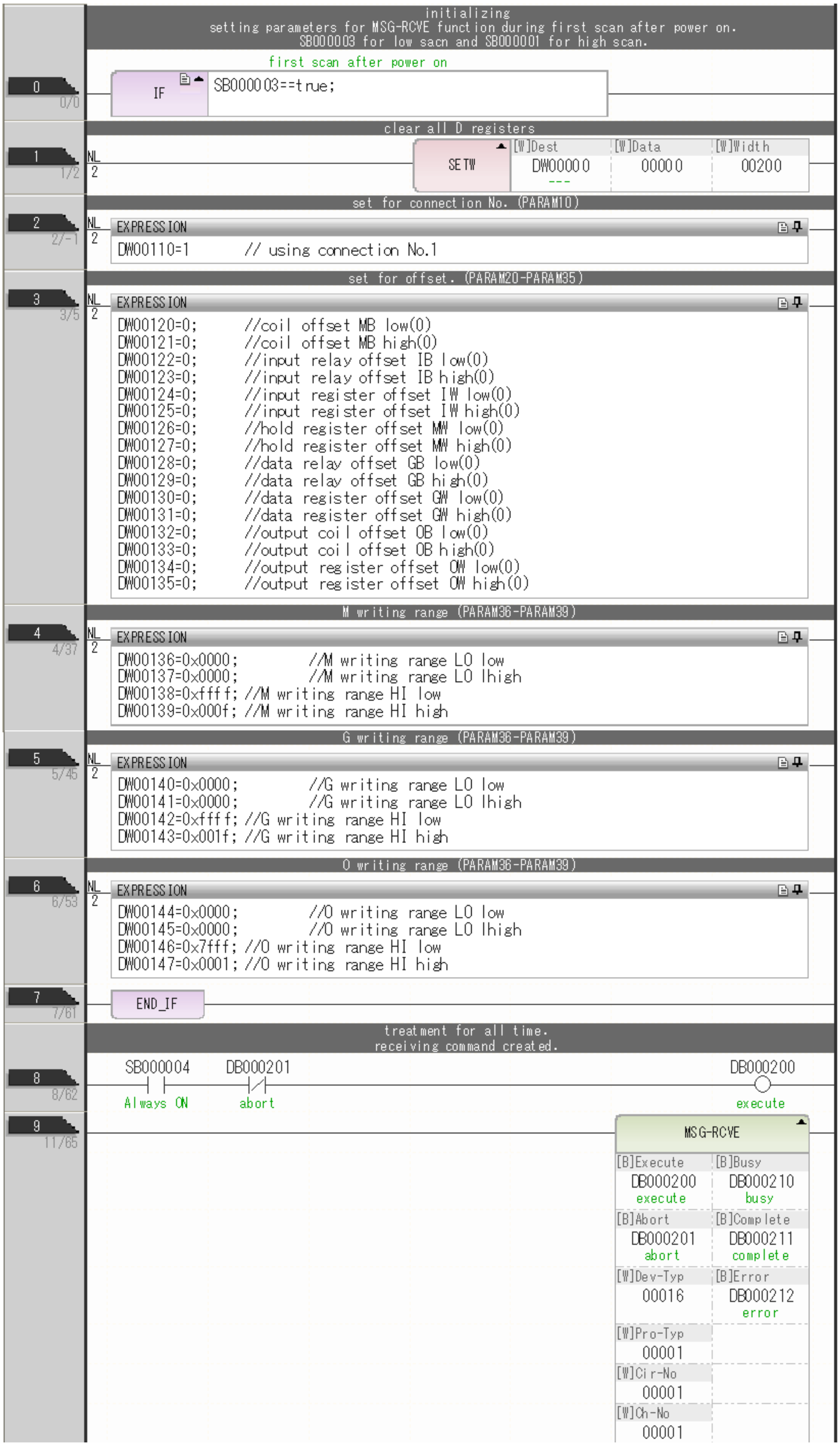
9. Click the **Other** Tab and enter “1” in the **Node Address** Box.

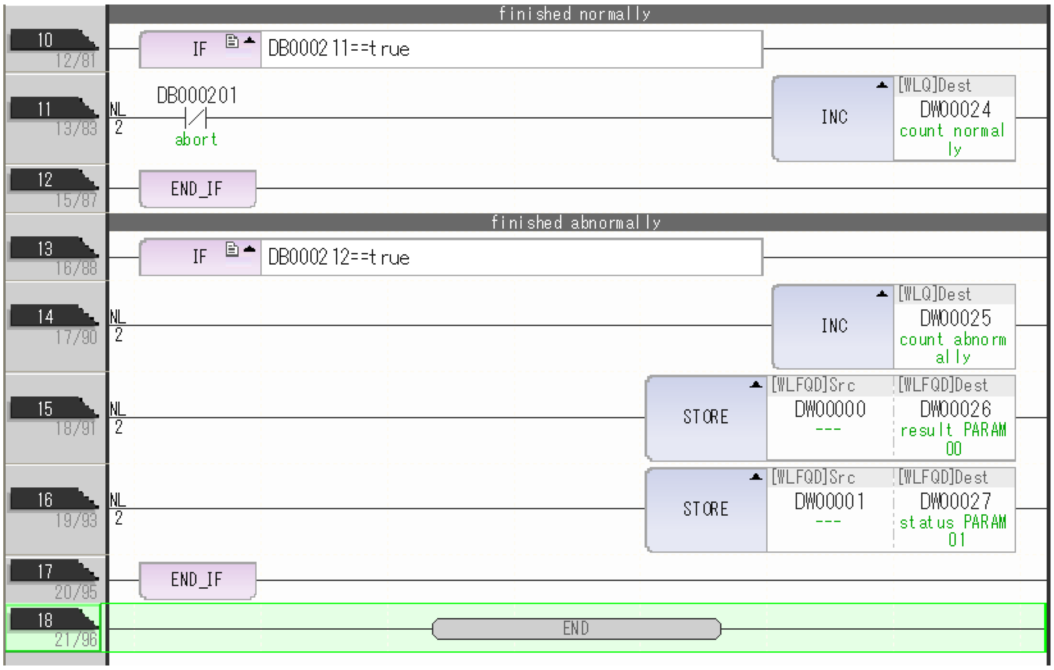


Note: 1. Specify a node address that is not in use by any other device on the same network.
2. Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

10. Create a ladder program for the MSG-RCVE function.

A ladder program example is shown below.





11. Save the data to flash memory.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Remote Device (OMRON PLC)

Use the following procedure to set up the OMRON CJ-series PLC.

Note

The CJ Series is manufactured by OMRON Corporation.
Contact OMRON Corporation for further information.

1. Set the node address of the Ethernet Unit. In this example, the node address is set to 02 hex.

2. Start the CX-Programmer.

3. Create a project.

4. Set the network parameters.

Parameter	Description
Broadcasting	As required.
FINS/UDP Port	As required.
FINS/TCP Port	Default (9,600)
TCP/IP Keep-alive	As required.
IP address	192.168.1.2
Subnet Mask	255.255.255.000
IP Address Conversion	Combined method
Baud Rate	Automatic detection
Dynamic Change the Target IP Addresses	As required.

Note: When using an OMRON PLC, set the node address of the Ethernet Unit so that it matches the last digit of the IP address (2 in the case of 192.168.001.002). If the node address does not match the last digit, an error may occur in the Ethernet Unit of the OMRON PLC.
When communicating with FINS/UDP, set the FINS/UDP port setting to the same number as the remote station port number of the MP3000.

5. Set the FINS/TCP connection parameters. Use the following settings for FINS/TCP connection number 1.

Note: The FINS/TCP connection settings are not required when communicating with FINS/UDP.

Parameter	Description
FINS/TCP Server/Client	Client
Target IP Address	192.168.1.1
Automatically Allocated FINS Node Address for Server	Do not set.
Keep-alive	As required.

6. Create routing tables if required.

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

7. Create ladder programming for network transmissions.

To read data from a node on the network, use the RECV instruction. The following is an example of the settings for a RECV instruction.

RECV	
D10000	・Set the first word in the MP3000 remote node. Example: "D10000" causes the MP3000 to start sending from MW10000.
D10000	・Set the first destination word in the OMRON PLC. Example: Reception starts from D10000.
D10100	・Set the first word of the control data. Example: The settings in the following table are set as the control data from D10100.

Word	Meaning	Meaning
D10100	0064 hex	Number of words to send = 100 words
D10101	0000 hex	Destination network address = 00 (local)
D10102	0100 hex	Destination node address = 1 Destination unit address = 00
D10103	0701 hex	Response = Required. Communications port number used = 7, Number of retries = 1
D10104	0014 hex	Response monitor time = 20 (2 seconds)

When using the RECV instruction, create any logic necessary to interlock with other processes and to adjust the timing of the execution.

Note: Refer to the following manuals for details on ladder programming with the SEND, RECV, and CMND instructions for network communications.

SYSMAC CS/CJ-series Ethernet Units Operation Manual from OMRON Corporation
SYSMAC CS/CJ/NSJ-series Programmable Controllers Instructions Reference Manual from OMRON Corporation

This concludes the setup.

◆ Starting Communications

Use the following procedure to write the data in the hold registers in the MP3000 to the DM Area in the CPU Unit of the OMRON PLC.

1. Turn ON the power to the MP3000 to start receiving messages.

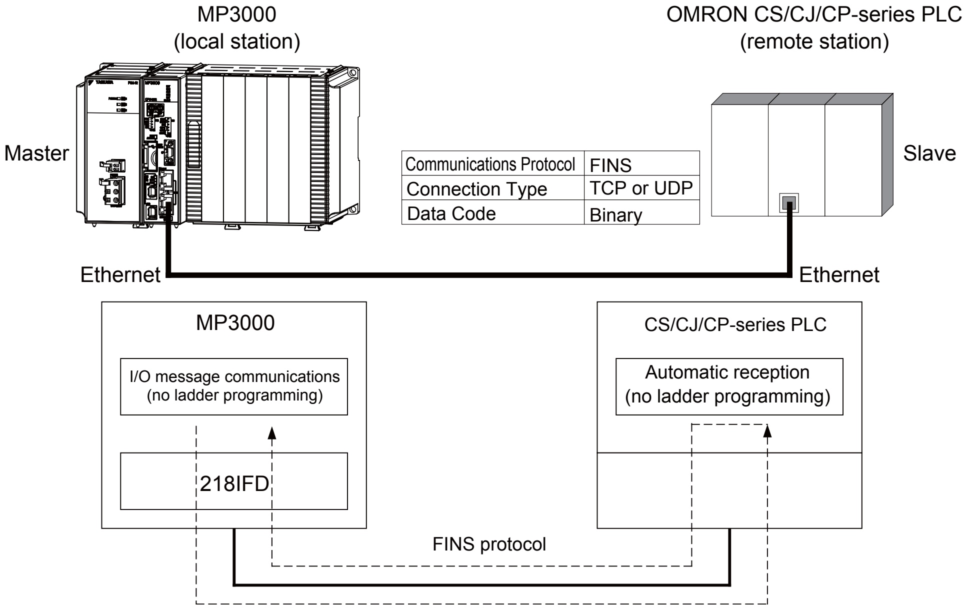
In the ladder programming example, the message receive function starts immediately after the scan starts in the MP3000. While the Machine Controller is operating, a normally ON coil is used to keep the message receive function executing.

2. Start the message send operation on the OMRON PLC.

Note: The MP3000 will wait for the TCP connection after it starts execution of the MSG-RCVE function. Therefore, the power supply to the MP3000 must be turned ON before the power supply to the OMRON PLC.

Using I/O Message Communications with the MP3000 as the Master

This section describes how to communicate with an OMRON PLC by using I/O message communications.



FINS Commands

The FINS commands that are used with I/O message communications on the MP3000 are given below. Check that the command codes and I/O memory types that are listed in the following table are usable with the OMRON PLC slave.

Name	Command Code (Hex)		I/O Memory Type (Hex)	Meaning
	MR	SR		
Reading data from an I/O memory area	01	01	B0	Reads CIO Area words.
			B1	Reads Work Area words.
			B2	Reads Holding Area words.
			B3	Reads Auxiliary Area words.
			82	Reads DM Area words.
Writing data to an I/O memory area	01	02	B0	Writes to CIO Area words.
			B1	Writes to Work Area words.
			B2	Writes to Holding Area words.
			B3	Writes to Auxiliary Area words.
			82	Writes to DM Area words.

I/O Memory Data Areas and Corresponding Registers in the MP3000

The following table shows the relationship between registers in the MP3000 and the I/O memory data areas.

When reading from or writing to the I/O memory in the OMRON PLC, the FINS commands for reading or writing are automatically generated by assigning I/O registers in the MP3000.

- Writing
  Set the output register in the MP3000 as follows:
  - Set the first address of the OW registers and the size of the data stored in the MP3000 that is to be written to the OMRON PLC.
  - Set the first word to the first register address to write to in the OMRON PLC.
- Reading
  Set the input registers in the MP3000 as follows:
  - Set the first address of the IW registers and the size of the read data that is to be stored in the MP3000.
  - Set the first word to the first register address to read from in the OMRON PLC.

Data Area Name	Data Type	Data Range		
		OMRON CPU Unit		MP3000
		Addresses	I/O Memory Addresses	
CIO Area	Word	0000 to 6143	000000 to 17FF00	Read: IW0000 to IW7FFF hex Write: OW0000 to OW7FFF hex
Work Area	Word	W000 to W511	00000 to 01FF00	
Holding Area	Word	H000 to H511	00000 to 01FF00	
Auxiliary Area	Word	A000 to A959	00000 to 03BF00	
DM Area	Word	D00000 to D32767	00000 to 7FFF00	

Note: Word: Specify word addresses.

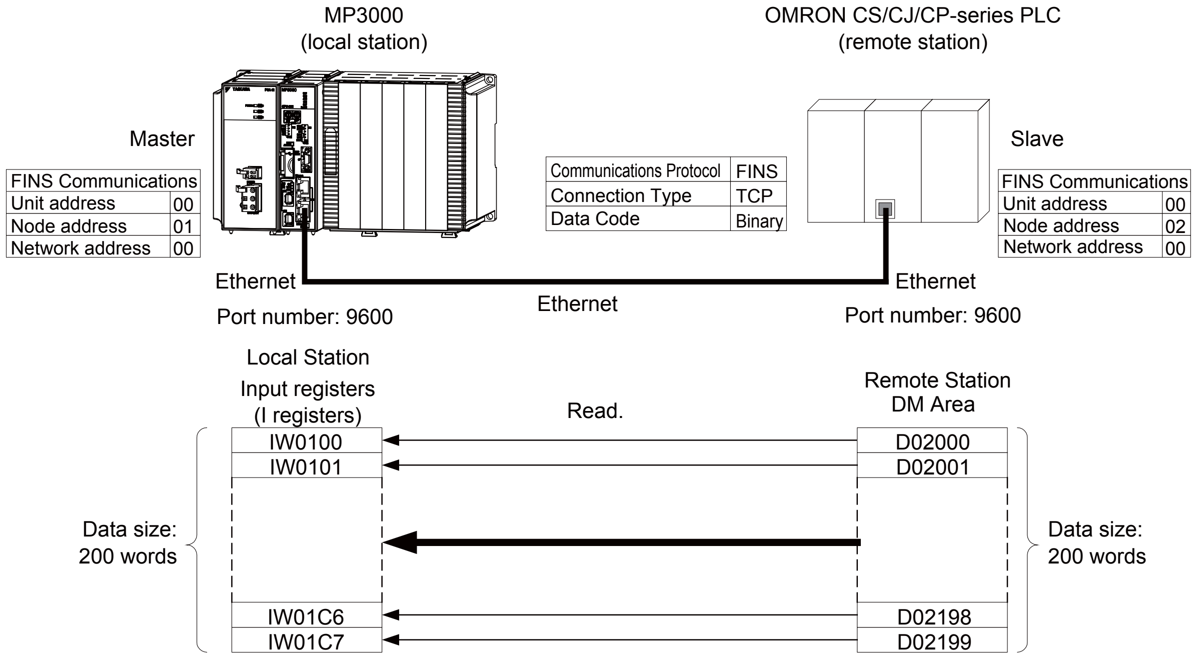
Transfer Size

The following table lists the size of data that can be transferred using I/O message communications. Use the data size within the ranges that are listed in the following table according to the conditions of the OMRON PLC slave.

Command Code (Hex)		I/O Memory Type (Hex)	Meaning	Data Size
MR	SR			
01	01	B0	Reads CIO Area words.	1 to 999 words
		B1	Reads Work Area words.	1 to 512 words
		B2	Reads Holding Area words.	1 to 512 words
		B3	Reads Auxiliary Area words.	1 to 960 words
		82	Reads DM Area words.	1 to 999 words
01	02	B0	Writes to CIO Area words.	1 to 996 words
		B1	Writes to Work Area words.	1 to 512 words
		B2	Writes to Holding Area words.	1 to 512 words
		B3	Writes to Auxiliary Area words.	1 to 960 words
		82	Writes to DM Area words.	1 to 996 words

Setting Example

The following figure illustrates how the contents of the D02000 to D02199 in the DM Area in the CPU Unit of the OMRON PLC slave are read into the IW0100 to IW01C7 input registers in the MP3000 master.

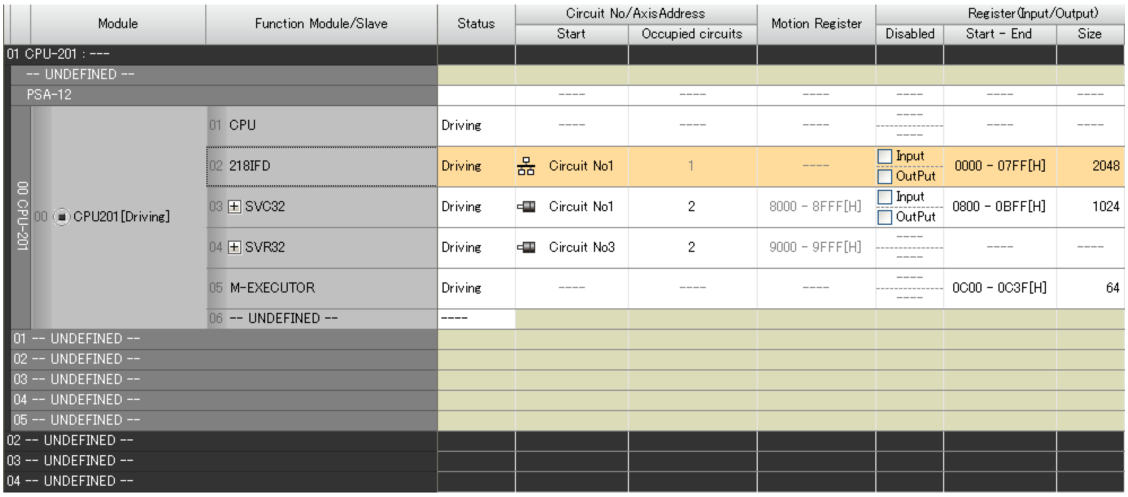


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

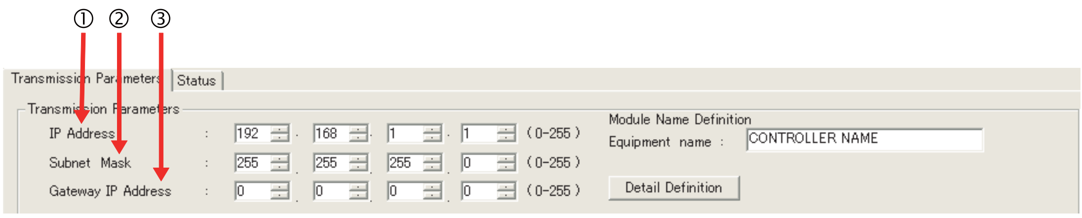
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



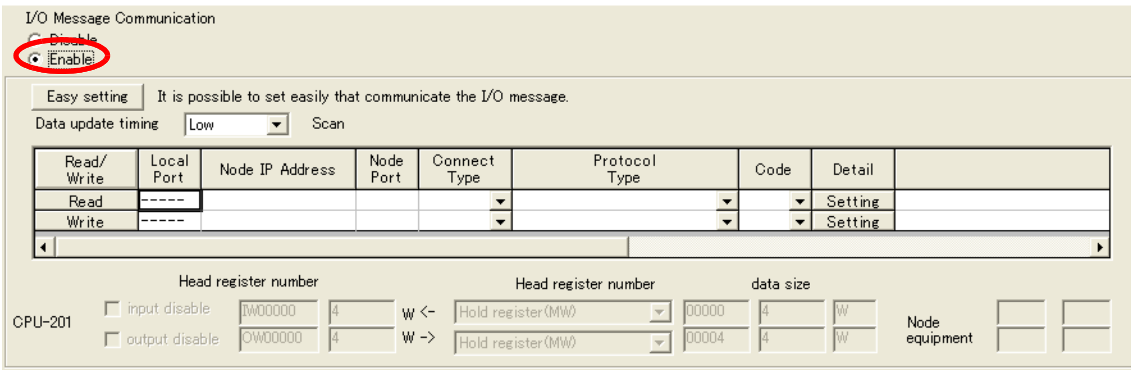
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.

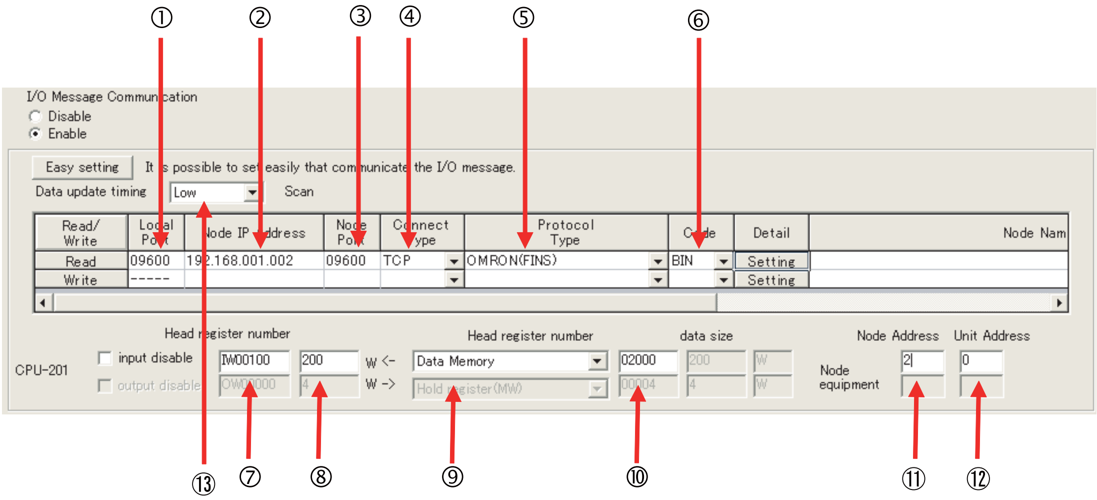


①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Select the **Enable** Option in the **I/O Message Communication** Area of the **Connection Parameter** settings.



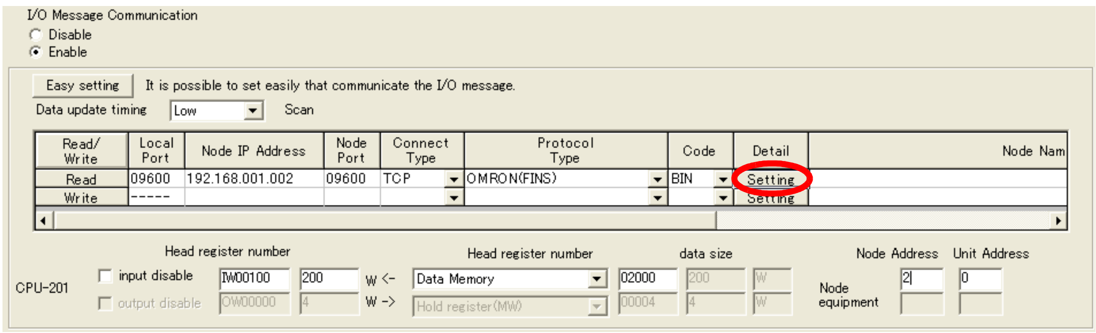
4. Set the connection parameters.



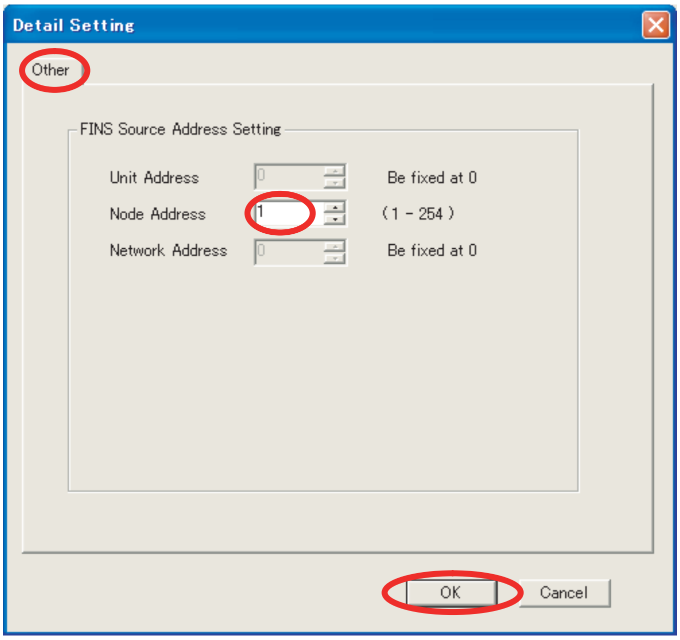
①Enter “9600” in the MP3000 **Local Port** Box.
②Enter the following address for the remote device in the **Node IP Address** Box: 192.168.001.002.
③Enter “9600” in the **Node Port** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **OMRON (FINS)** in the **Protocol Type** Box.
⑥Select **BIN** in the **Code** Box.
⑦Enter “IW0000” in the **Head register number** Box as the read data destination.
⑧Enter “200” in the next box as the size of data to read.
⑨Select **Data Memory** as the I/O memory type in the **Head register number** box.
⑩Enter “02000” as the first address in the remote device.
⑪Enter “2” in the **Node Address** Box for the other device.
⑫Enter “00” in the **Unit Address** Box for the other device.
⑬Select **Low** in the **Data update timing** Box as the timing to update I/O data between the CPU Function Module and 218IFD.

Note: 1. In I/O message communications, a message is transmitted from separate ports if registers are both read and written. Therefore, the connected remote device must have two connections to receive both messages.
If communicating with FINS/UDP, select **UDP** in the **Connect Type** Box.
2. The network address cannot be set from the MP3000. The network address is always 00 hex. This means that messages cannot be sent to nodes on another network.
To reference registers in the CPU Unit of the OMRON PLC, enter “00” in the **Unit Address** Box. “00” indicates the CPU Unit of the PLC at the specified node address.
3. The data update timing is the timing at which the CPU Function Module and 218IFD exchange data. Communications with the remote device are performed asynchronously. The data update timing therefore does not necessarily mean that the messages are sent to the remote device.

5. Double-click the **Setting** Button in the **Detail** Box.



6. Click the **Other** Tab and enter “1” in the **Node Address** Box.



Note: 1. The unit address and network address of the MP3000 are always 00 hex.
2. The node address must be set for each connection. Specify a node address that is not in use by any other device on the same network.

7. Click the **OK** Button.

8. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as the master.

◆ Setting the Remote Device (OMRON PLC)

Use the following procedure to set up the OMRON CJ-series PLC.

Note
The CJ Series is manufactured by OMRON Corporation.
Contact OMRON Corporation for further information.

1. Set the node address of the Ethernet Unit. In this example, the node address is set to 02 hex.

2. Start the CX-Programmer.

3. Create a project.

4. Set the network parameters.

Parameter	Description
Broadcasting	As required.
FINS/UDP Port	As required.
FINS/TCP Port	Default (9,600)
TCP/IP Keep-alive	As required.
IP Address	192.168.1.2
Subnet Mask	255.255.255.000
IP Address Conversion	Combined method
Baud Rate	Automatic detection
Dynamic Change the Target IP Addresses	As required.

Note: When using an OMRON PLC, set the node address of the Ethernet Unit so that it matches the last digit of the IP address (2 in the case of 192.168.001.002). If the node address does not match the last digit, an error may occur in the Ethernet Unit of the OMRON PLC.
When communicating with FINS/UDP, set the FINS/UDP port setting to the same number as the remote station port number of the MP3000.

5. Set the FINS/TCP connection parameters. Use the following settings for FINS/TCP connection number 1.

Note: The FINS/TCP connection settings are not required when communicating with FINS/UDP.

Parameter	Description
FINS/TCP Server/Client	Client
Target IP Address	192.168.1.1
Automatically Allocated FINS Node Address for Server	Do not set.
Keep-alive	As required.

6. Create routing tables if required.

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

This concludes the setup.

◆ Starting Communications

Use the following procedure to write the data in the DM Area in the CPU Unit of the OMRON PLC to the hold registers in the MP3000.

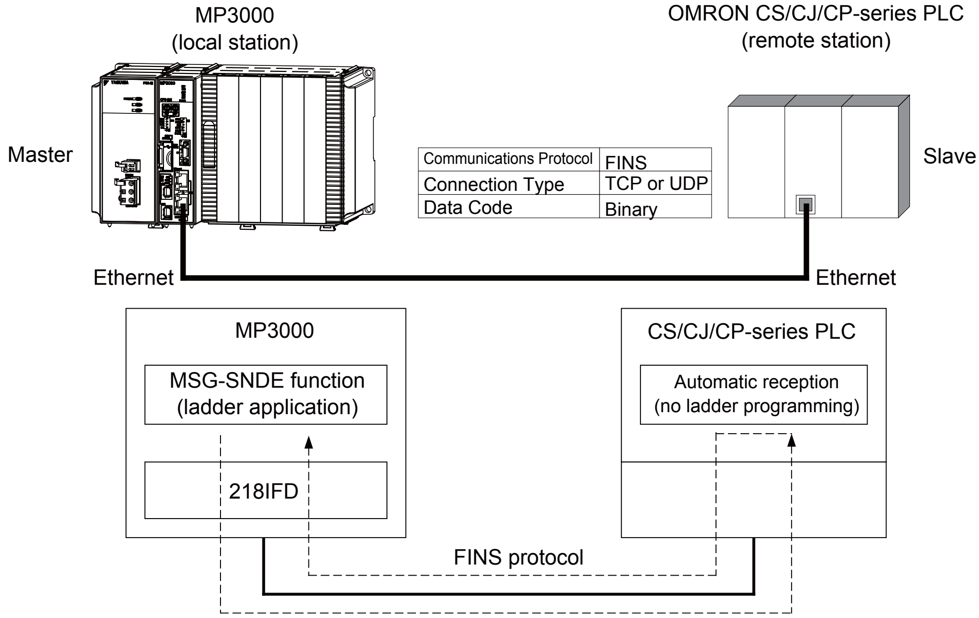
1. Start the message receive operation on the OMRON PLC.
The system will automatically start the message reception operation. No further operation is required.

2. Turn ON the power to the MP3000 to start transmitting messages.
The system will automatically start the message transmission operation. No further operation is required.

Note: The MP3000 will establish the TCP connection when it starts execution of I/O message communications.

Using the MSG-SNDE Function with the MP3000 as the Master

This section describes how to communicate with an OMRON PLC by using the MSG-SNDE function.



FINS Commands

The FINS commands that are used with the MSG-SNDE function are listed below. Check that the command codes and I/O memory types that are listed in the following table are usable with the OMRON PLC slave.

Name	Command Code (Hex)		I/O Memory Type (Hex)	Meaning
	MR	SR		
Reading data from an I/O memory area	01	01	B0	Reads CIO Area words.
			B1	Reads Work Area words.
			B2	Reads Holding Area words.
			B3	Reads Auxiliary Area words.
			82	Reads DM Area words.
Writing data to an I/O memory area	01	02	B0	Writes to CIO Area words.
			B1	Writes to Work Area words.
			B2	Writes to Holding Area words.
			B3	Writes to Auxiliary Area words.
			82	Writes to DM Area words.
Reading non-consecutive data from the I/O memory area	01	04	82	Reads non-consecutive words from the DM Area.

I/O Memory Data Areas and Corresponding Registers in the MP3000

The following table shows the relationship between registers in the MP3000 and the I/O memory data areas.

A read or write command is automatically generated by specifying the address in the MP3000 that corresponds to the I/O memory to be read from or written to in the OMRON PLC.

Set PARAM14 and PARAM15 of the MSG-SNDE function to the register address in the MP3000 that corresponds to the address to read from or write to in the OMRON CPU Unit. Select whether to read or write by setting the function code in parameter PARAM12 for the MSG-SNDE function.

Example

Writing Data into D10000

Set PARAM14 and PARAM15 to the MW10000 register in the MP3000 that corresponds to D10000, and set PARAM12 to 0B or 10 hex.

Example

Reading Data from W511

Set PARAM14 and PARAM15 to the MB025590 register in the MP3000 that corresponds to W511, and set PARAM12 to 01 hex.

Note

To access a relay, specify a bit address in PARAM14 and PARAM15.

Data Area Name	Data Type	Data Range		
		OMRON CPU Unit		MP3000
		Addresses	I/O Memory Addresses	
CIO Area	Word	000000 to 002047	000000 to 07FF00	Word notation: MW00000 to MW02047 Bit notation: MB000000 to MB02047F
Work Area	Word	W00000 to W00511	00000 to 01FF00	Word notation: MW02048 to MW02559 Bit notation: MB020480 to MB02559F
Holding Area	Word	H00000 to H00511	00000 to 01FF00	Word notation: MW02560 to MW03071 Bit notation: MB025600 to MB03071F
Auxiliary Area	Word	A00000 to A00959	00000 to 03BF00	Word notation: MW03072 to MW04031 Bit notation: MB030720 to MB04031F
DM Area	Word	D00000 to D32767	00000 to 7FFF00	MW00000 to MW32767

Note: Word: Specify word addresses.

Transfer Size

The following table lists the size of data that can be transferred using the MSG-SNDE function. Use the data size within the ranges that are listed in the following table according to the conditions of the OMRON PLC slave.

The upper limit to the data size will also depend on the MEMOBUS function code that is specified in the MSG-SNDE function.

Refer to the following section for details on the data size parameter in the MSG-SNDE function.

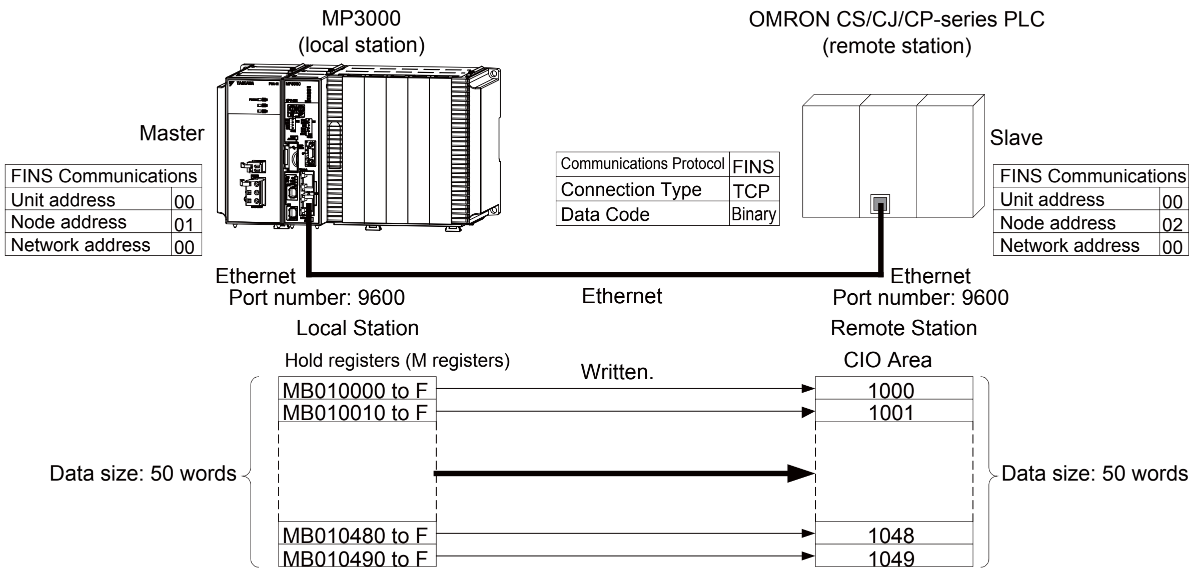
☞ ◆ *Data Size (PARAM17) (page 2-234)*

Command Code (Hex) MR	Command Code (Hex) SR	I/O Memory Type (Hex)	Meaning	Data Size
01	01	B0	Reads CIO Area words.	1 to 125 words (16 to 2,000 bits)
		B1	Reads Work Area words.	
		B2	Reads Holding Area words.	
		B3	Reads Auxiliary Area words.	
		82	Reads DM Area words.	1 to 999 words
01	02	B0	Writes to CIO Area words.	1 to 50 words (16 to 800 bits)
		B1	Writes to Work Area words.	
		B2	Writes to Holding Area words.	
		B3	Writes to Auxiliary Area words.	
		82	Writes to DM Area words.	1 to 996 words
01	04	82	Reads non-consecutive words from the DM Area.	1 to 167 words

Setting Example

The following figure illustrates how the contents of 800 bits (50 words) from the MB010000 to MB01049F hold registers in the MP3000 master are written to the I/O bits in CIO 1000 to CIO 1049 in the CPU Unit of the OMRON PLC slave.

On the MP3000, bits are written and read in word units. It is not possible to write or read less than whole words.

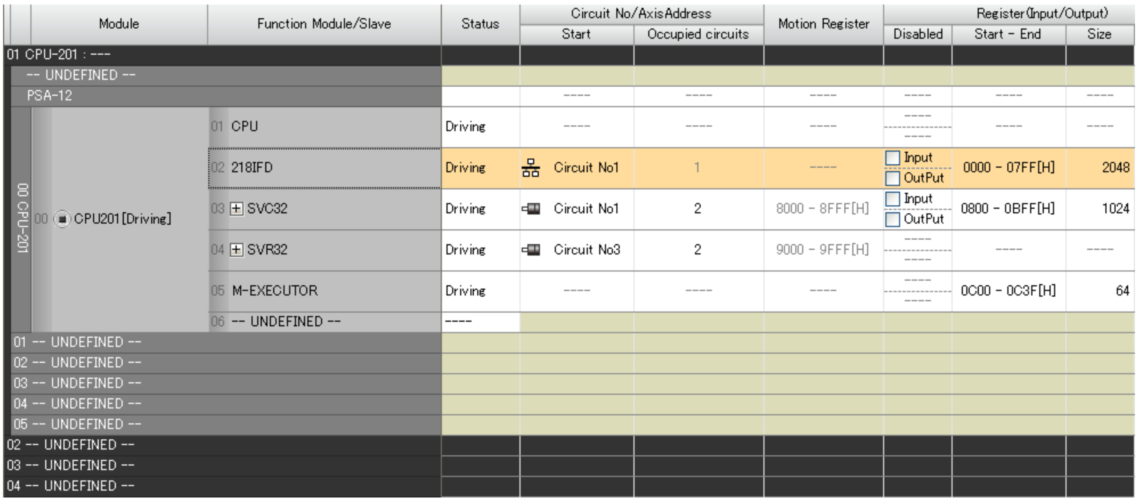


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

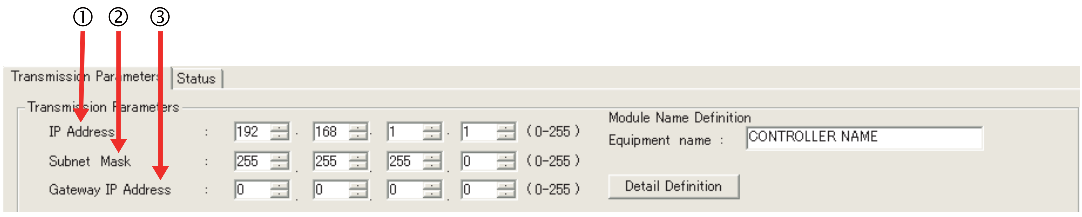
> Note
>
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



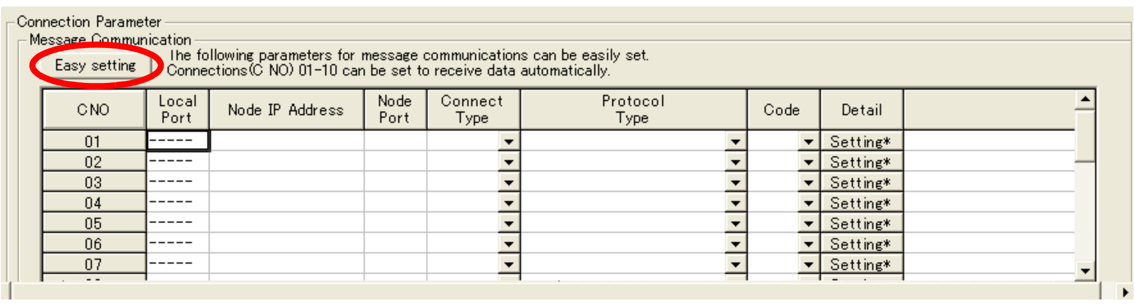
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



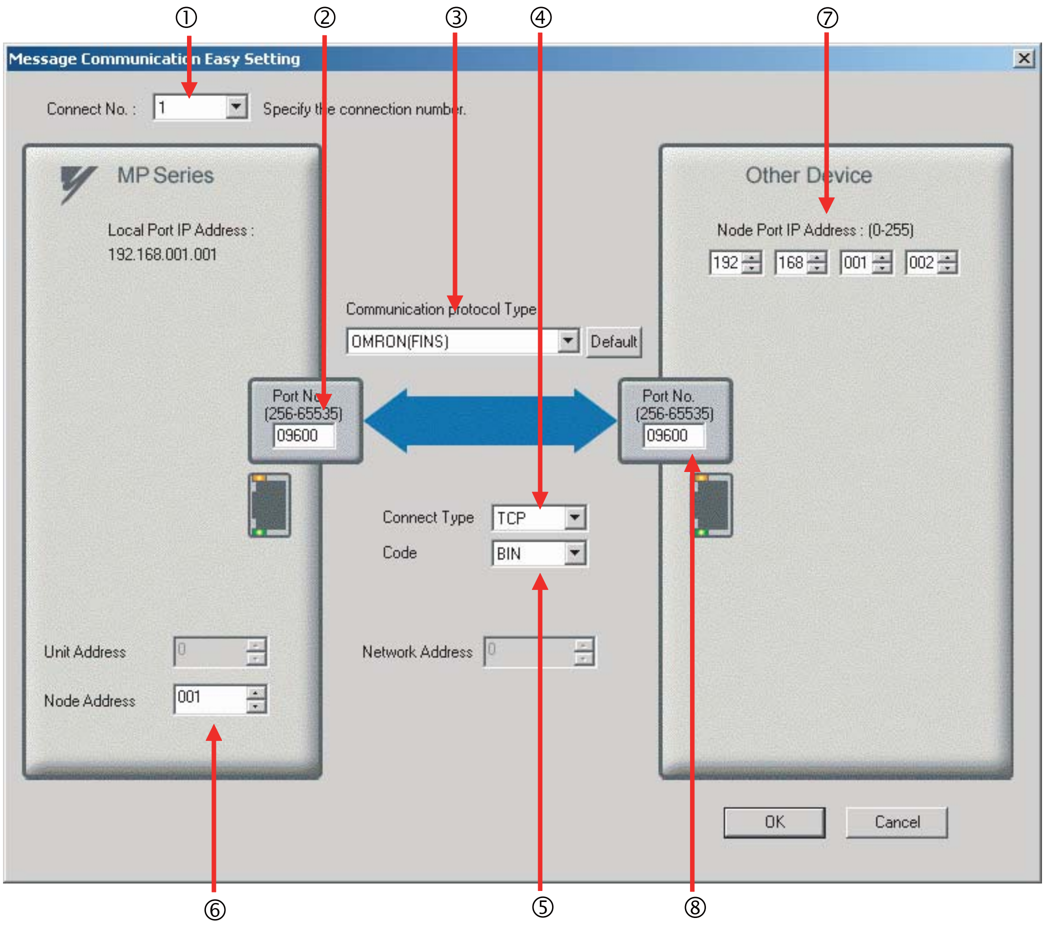
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②MPEnter "9600" in the **Port No.** Box for the MP-series Machine Controller.
③Select **OMRON (FINS)** in the **Communication Protocol Type** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥MPEnter "001" in the **Node Address** Box for the MP-series Machine Controller.
⑦Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑧Enter "9600" in the **Port No.** Box for the other device.

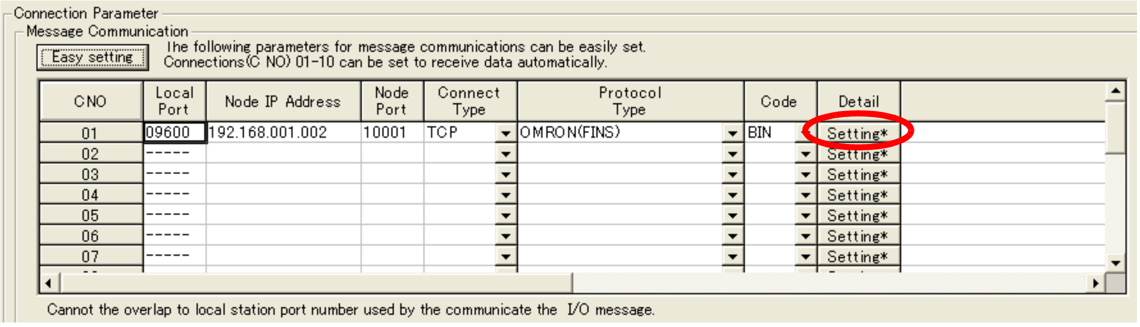
Note: Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.
The unit address and network address of the MP-series Machine Controller are always 00 hex.
If communicating with FINS/UDP, select **UDP** in the **Connect Type** Box.

5. Click the **OK** Button.

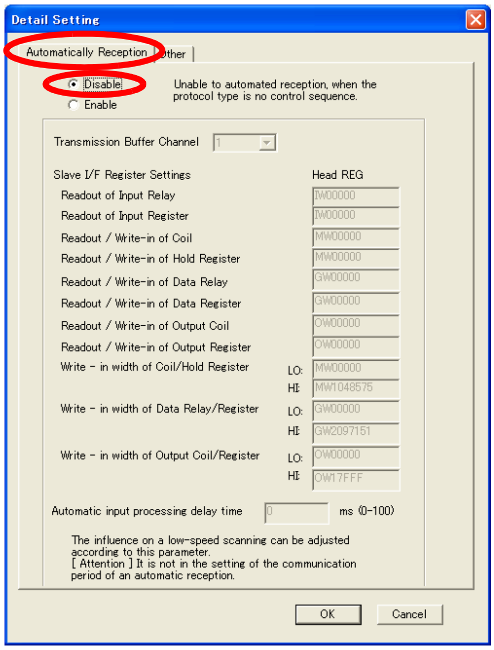
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

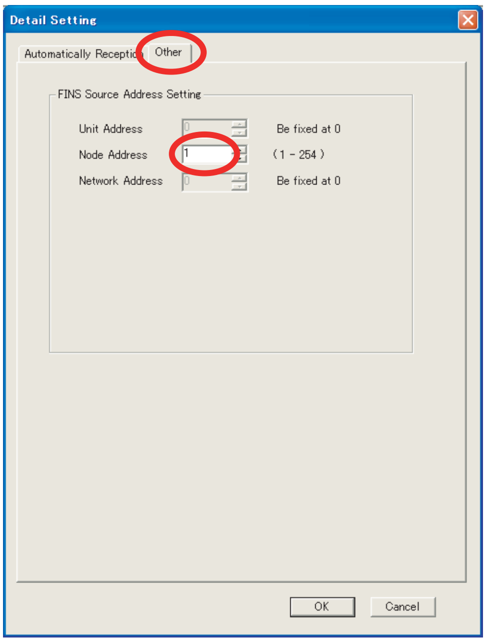
7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Click the **Disable** Option on the Automatically Reception Tab Page.



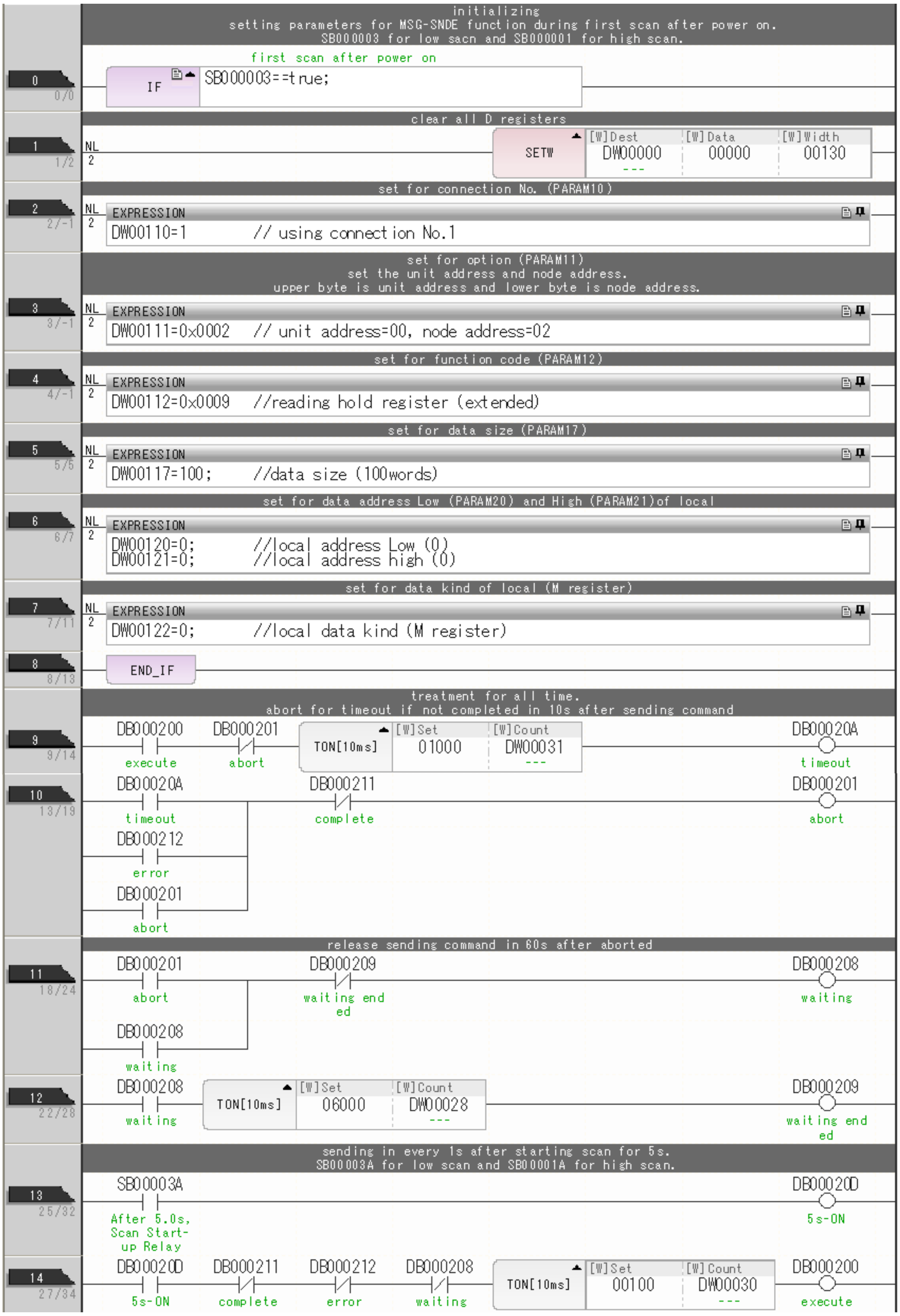
9. Click the **Other** Tab and enter "1" in the **Node Address** Box.

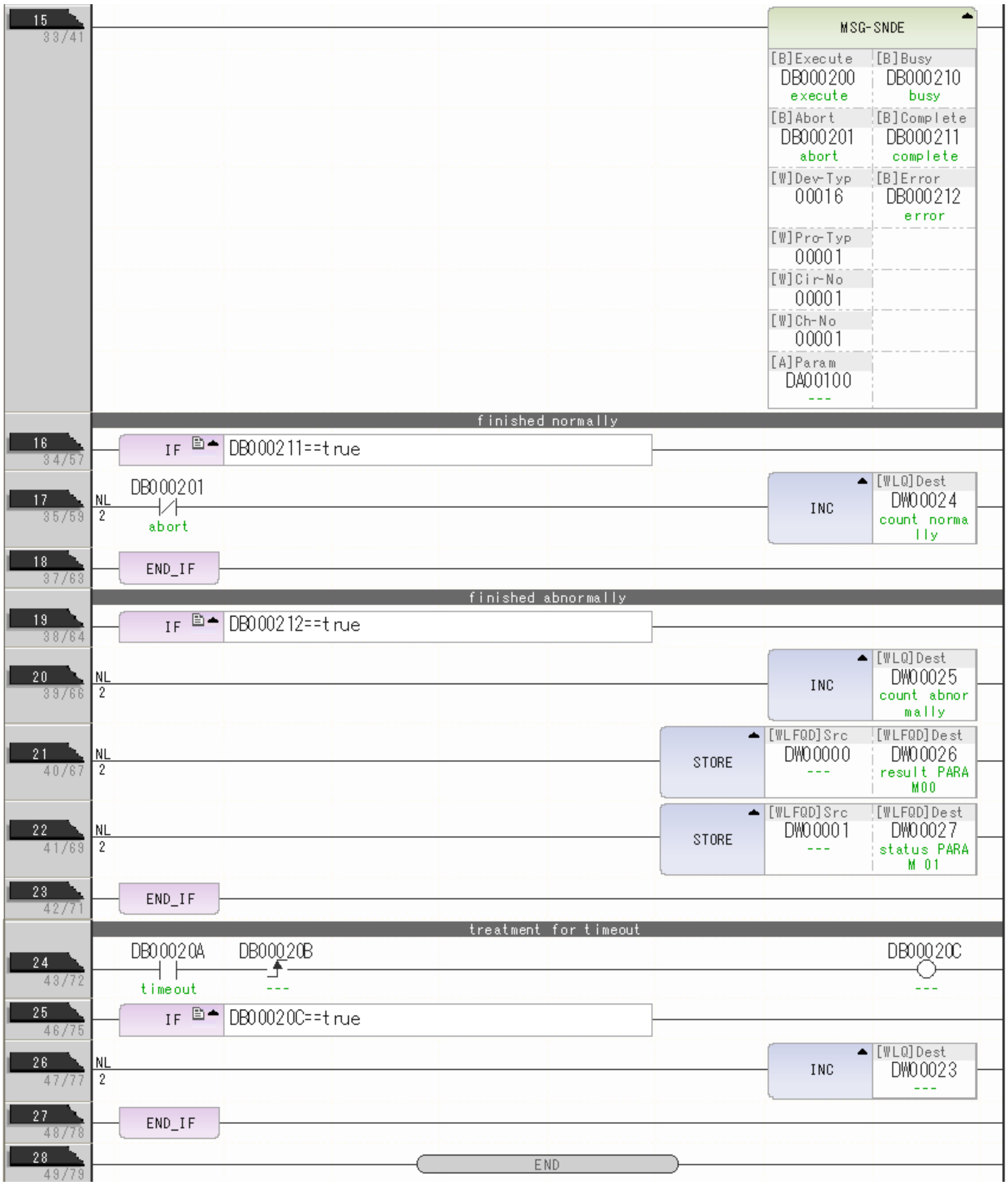


Note: 1. Specify a node address that is not in use by any other device on the same network.
2. Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

10. Create a ladder program for the MSG-SNDE function.

A ladder program example is shown below.





11. Save the data to flash memory.

This concludes the settings for using the MP3000 as the master.

◆ Setting the Remote Device (OMRON PLC)

Use the following procedure to set up the OMRON CJ-series PLC.

> Note
> The CJ Series is manufactured by OMRON Corporation.
> Contact OMRON Corporation for further information.

1. Set the node address of the Ethernet Unit. In this example, the node address is set to 02 hex.

2. Start the CX-Programmer.

3. Create a project.

4. Set the network parameters.

Parameter	Description
Broadcasting	As required.
FINS/UDP Port	As required.
FINS/TCP Port	Default (9,600)
TCP/IP Keep-alive	As required.
IP address	192.168.1.2
Subnet Mask	255.255.255.000
IP Address Conversion	Combined method
Baud Rate	Automatic detection
Dynamic Change the Target IP Addresses	As required.

Note: When using an OMRON PLC, set the node address of the Ethernet Unit so that it matches the last digit of the IP address (2 in the case of 192.168.001.002). If the node address does not match the last digit, an error may occur in the Ethernet Unit of the OMRON PLC.
When communicating with FINS/UDP, set the FINS/UDP port setting to the same number as the remote station port number of the MP3000.

5. Set the FINS/TCP connection parameters. Use the following settings for FINS/TCP connection number 1.

Note: The FINS/TCP connection settings are not required when communicating with FINS/UDP.

Parameter	Description
FINS/TCP Server/Client	Client
Target IP Address	192.168.1.1
Automatically Allocated FINS Node Address for Server	Do not set.
Keep-alive	As required.

6. Create routing tables if required.

Note: 1. Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.
2. If the MP3000 performs message communications using multiple connections, set up the same number of FINS/TCP connections in the OMRON PLC.
3. The FINS/TCP connection settings are not required when communicating with FINS/UDP.

This concludes the setup.

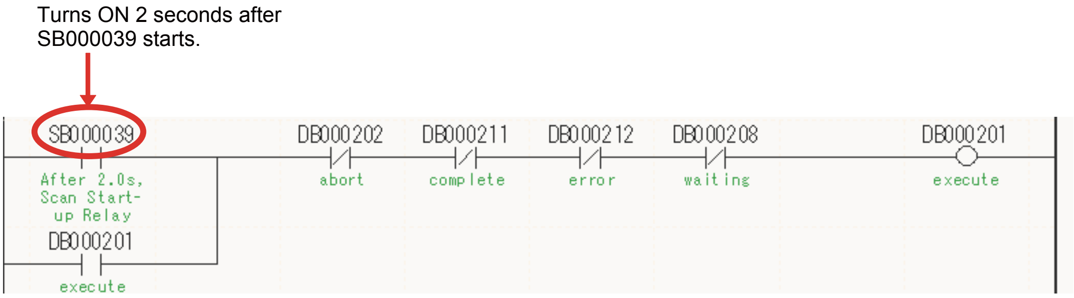
◆ Starting Communications

Use the following procedure to write the data in the hold registers in the MP3000 to the I/O bits in the CPU Unit of the OMRON PLC.

1. Start the message receive operation on the OMRON PLC.
The system will automatically start the message reception operation. No further operation is required.

2. Turn ON the power to the MP3000 to start transmitting messages.
The ladder program example is designed to turn ON the Execute Bit (DB000201) in the message send function after two seconds has elapsed from when the low-speed scan (or high-speed scan) starts. Thereafter, the message send function is executed continuously by alternating the Execute Bit (DB000201) between OFF and ON each time execution of the message send function is completed normally or with an error.

Note: The MP3000 will establish the TCP connection when it starts execution of the MSG-SNDE function.

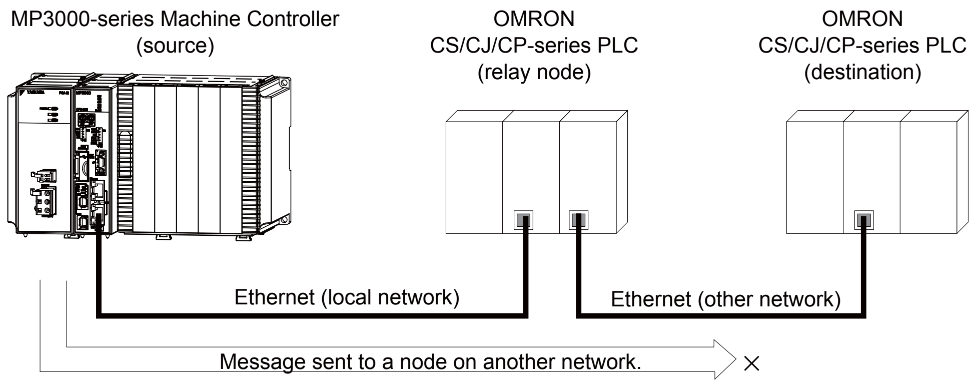


Routing

This section describes the restrictions that apply when sending and receiving I/O messages, and when using the MSG-SNDE and MSG-RCVE functions between the MP3000 and OMRON PLCs connected across different networks.

Using the MP3000 as the Master

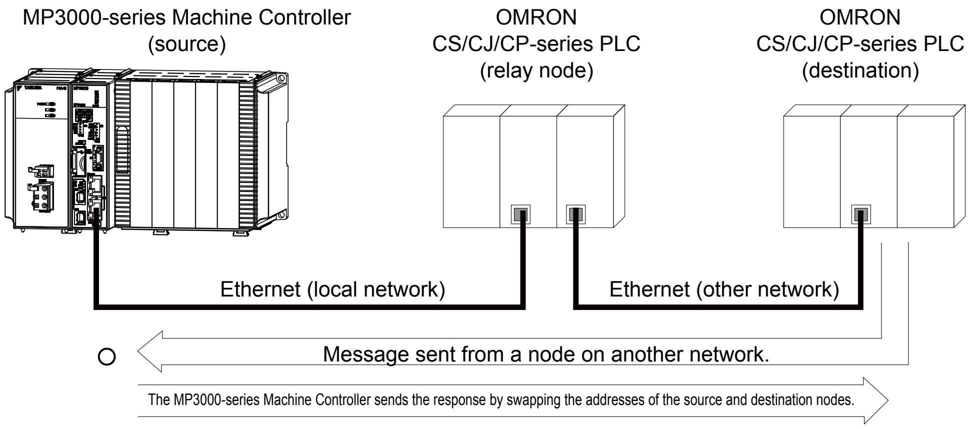
When the MP3000 master sends messages using I/O message communications or the MSG-SNDE function, the destination node must be connected to the local network. A node connected to another network cannot be specified as the destination.



The local network (00 hex) is always used when sending from the MP3000-series Machine Controller.

Using the MP3000 as a Slave

When the MP3000 acts as a slave and uses automatic reception or the MSG-RCVE function to receive messages that are routed, it can also receive messages from a node on another network. The MP3000 slave can also return responses to the source.

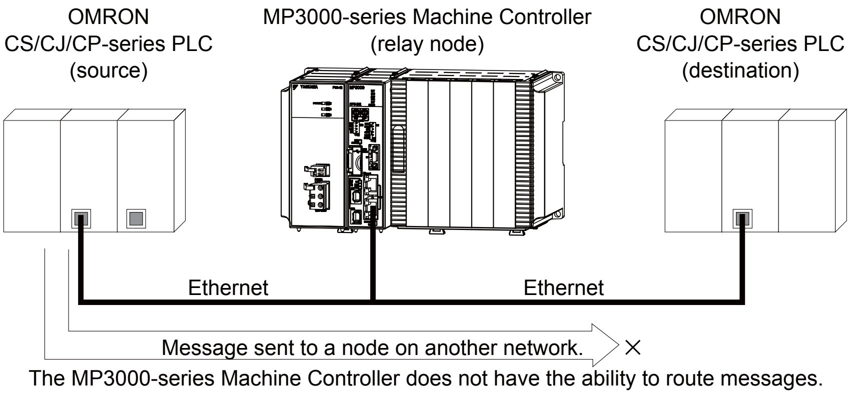


Ethernet Communications

2

Using the MP3000 as a Router

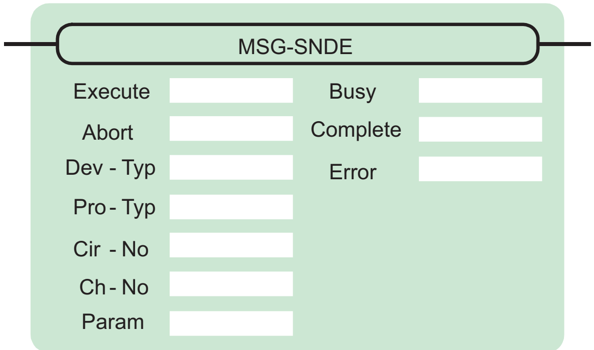
The MP3000 cannot route messages between different networks.



Message Functions

The message functions are used in user communications applications for the FINS protocol. You can send and receive message data by setting the necessary input items and parameters for the message functions. Message communications using the FINS protocol can be performed with the same settings as those used for MEMOBUS messages.

Inputs and Outputs for the MSG-SNDE Function

Function Name	MSG-SNDE			
Function	Sends a message to a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the transmission.
	2	Abort	B-VAL	Forces the transmission to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message transmission.

When the Execute Bit turns ON, the message will be sent.

Note

Keep the Execute Bit ON until the Complete or Error Bit turns ON. To send another message, turn OFF the Execute Bit for at least one scan and then turn it ON again.

◆ Abort

Specify the bit to use to abort the message transmission.

When the Abort Bit turns ON, the message transmission will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Communications Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

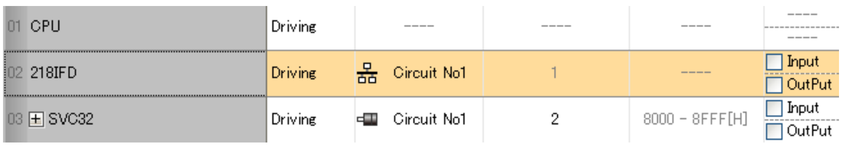
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the FINS protocol. MEMOBUS is automatically converted to the FINS protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the FINS protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the FINS protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> Note
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> Note
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 29 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting function codes and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List (F … 0)
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00023	PARAM23
DW00024	PARAM24
DW00025	PARAM25
DW00026	PARAM26
DW00027	PARAM27
DW00028	PARAM28

◆ Busy

Specify the bit that shows that the message transmission is in progress.

The Busy Bit is ON while a message transmission or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message transmission has been completed.

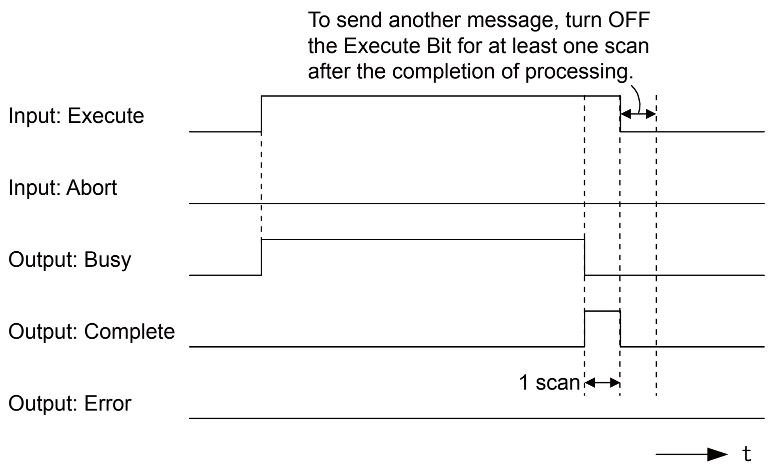
The Complete Bit turns ON only for one scan when message transmission or forced abort processing has been completed normally.

◆ Error

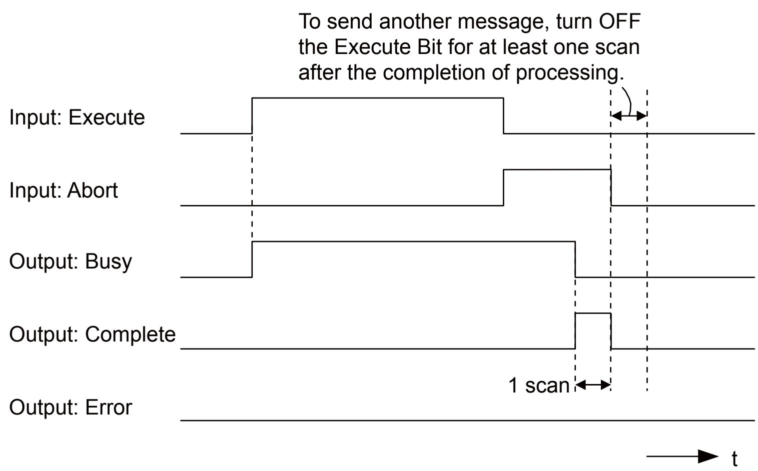
Specify the bit that shows if an error occurred when sending the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-SNDE function.

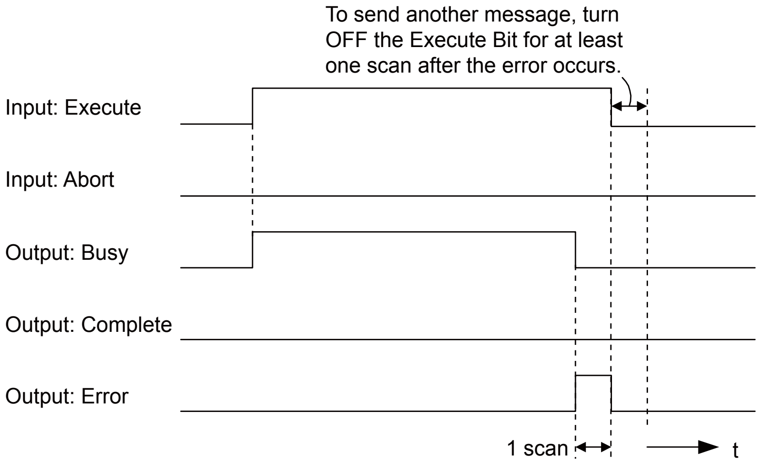
• Normal Execution



• When Execution Is Aborted



• Execution When an Error Occurs



MSG-SNDE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-SNDE function.

No.		I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11		Option	Sets the remote node address.
	12		Function Code	Sets the code of the function in the FINS protocol.
	13		Reserved for system.	–
	14		Remote Station Data Address, Lower Word	Sets the data address to read/write at the remote station. (Use word addresses for registers, bit addresses for relays or coils.)
	15		Remote Station Data Address, Upper Word	
	16		Remote Station Register Type	Sets the register type to read/write at the remote station.
	17		Data Size	Sets the size of the data to read/write. (Use word sizes for registers, bit sizes for relays or coils.)
	18		Remote CPU Module Number	Not used for the FINS protocol.
	19		Reserved for system.	–
	20		Local Station Data Address, Lower Word	Sets the data address to store read/write data in the local station. (Use word addresses for registers, bit addresses for relays or coils.)
	21		Local Station Data Address, Upper Word	
	22		Local Station Register Type	Sets the register type of the read/write data to store in the local station.
	23		Reserved for system.	–

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No.		I/O	Meaning	Description
System	24	–	For system use	–
	25		Reserved for system.	–
	26		Reserved for system.	–
	27		Reserved for system.	–
	28		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

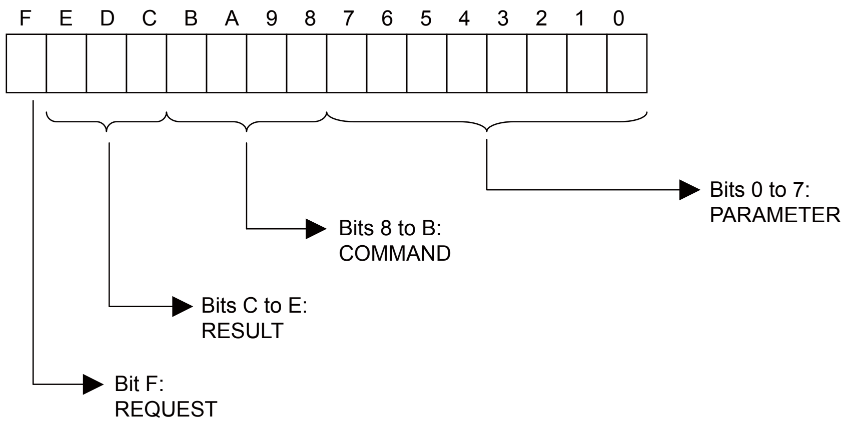
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-230)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-SNDE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution results of the MSG-SNDE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-SNDE function.

Code	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT is 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

<table>
<tr><th>RESULT</th><th>Code (Hex)</th><th>Meaning</th></tr>
<tr><td rowspan="9">When RESULT = 4 (FMT_NG: Parameter Formatting Error)</td><td>00</td><td>No error</td></tr>
<tr><td>01</td><td>Connection number out of range</td></tr>
<tr><td>02</td><td>Watchdog error for MEMOBUS response</td></tr>
<tr><td>03</td><td>Error in number of retries setting</td></tr>
<tr><td>04</td><td>Error in cyclic area setting</td></tr>
<tr><td>05</td><td>CPU number error</td></tr>
<tr><td>06</td><td>Data address error</td></tr>
<tr><td>07</td><td>Data size error</td></tr>
<tr><td>08</td><td>Function code error</td></tr>
<tr><td>Others</td><td>□□</td><td>Connection Number</td></tr>
</table>

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was sent or received. Check PARAM12 (Function Code).
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Remote Station Data Address) PARAM20 and PARAM21 (Local Station Data Address)
83□□ hex	3	Data size error	The data size for sending or receiving is out of range. Check PARAM17 (Data Size).
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-SNDE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-SNDE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-SNDE function.
C245 hex	–	Local station register type error	The register type for the local station is out of range. Check PARAM22 (Local Station Register Type).
8072 hex to C072 hex	–	Remote device error*	An error response was received from the remote station. Check the error code and remove the cause.

* An error response received from the remote device will be formatted in PARAM00 (Processing Result) as follows.
Processing Result (PARAM00): □□72 hex (where □□ is the error code)
□□ contains the sum of the completion code sent from the OMRON PLC and 80 hex.
Refer to the following manual for details on completion codes.
CS/CJ/CP/NS Series Communications Commands Reference Manual from OMRON Corporation

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

Note: The status is updated when the function is executed in each scan.

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

Note: The status is updated when the function is executed in each scan.

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

Note: The status is updated when the function is executed in each scan.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

Note: The status is updated when the function is executed in each scan.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

Note: The status is updated when the function is executed in each scan.

◆ Status 6 (PARAM09)

This parameter is not used for the FINS protocol.

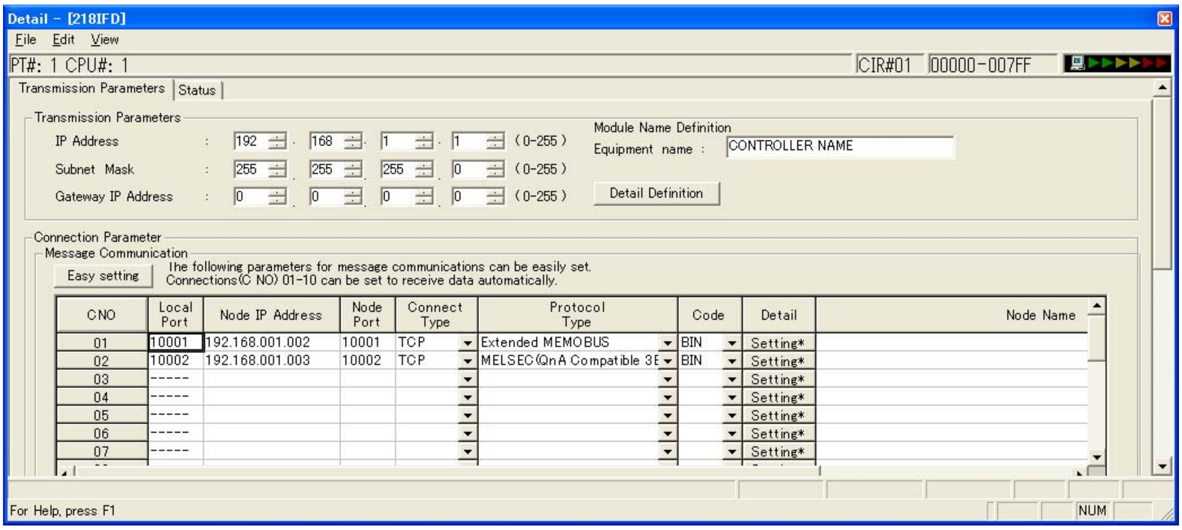
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Description
218IFD	1 to 20	Specifies the connection number of the remote station to send the message to.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

The upper byte of this parameter sets the unit address, and the lower byte sets the remote node address.

The valid setting range is given in the following table.

Option	Address Number	Description
XXYY hex	XX: Unit address	Sets the remote unit address.
	YY: Node address	Sets the remote node address. Sets the remote node address from 1 to FE hex (1 to 254).

Note: 1. The node address for the MP3000 is set with the Connection Parameter setting in the Module Detail Definition Dialog Box.
2. The MP3000 unit address is always 00 hex.

◆ Function Code (PARAM12)

Set the function code to send.

You can use the functions that are registered to the function codes.

MEMOBUS Function Code	FINS Command Code			Target Data Type	Function
	MR	SR	I/O Memory Type		
01 hex	01 hex	01 hex	B0 hex	W	Reads CIO Area words.
			B1 hex	W	Reads Work Area words.
			B2 hex	W	Reads Holding Area words.
			B3 hex	W	Reads Auxiliary Area words.
03 or 09 hex	01 hex	01 hex	82 hex	W	Reads DM Area words.

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MEMOBUS Function Code	FINS Command Code			Target Data Type	Function
	MR	SR	I/O Memory Type		
0F hex	01 hex	02 hex	B0 hex	W	Writes to CIO Area words.
			B1 hex	W	Writes to Work Area words.
			B2 hex	W	Writes to Holding Area words.
			B3 hex	W	Writes to Auxiliary Area words.
0B or 10 hex	01 hex	02 hex	82 hex	W	Writes to DM Area words.
0D hex	01 hex	04 hex	82 hex	W	Reads non-consecutive words from the DM Area.

Note: W: Word (channel) data

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Remote Station Data Address (PARAM14 and PARAM15)

Set the first address for data in the remote station.

Enter the first address as a decimal or hexadecimal number.

Example If the first address is MW01000, enter "1000" (decimal) or "3E8" (hexadecimal).

The applicable function codes and valid range of data addresses depend on the I/O memory type and the range of the OMRON PLC.

Bit Conversion Table

Data Area	Address Range	Notation	Function Code	Data Address Setting Range	Corresponding Register Addresses
CIO Area	0000 to 2047	Decimal	01 and 0F hex: Coils	0 to 32767	MB000000 to MB02047F
Work Area	W000 to W511	Decimal	01 and 0F hex: Coils	32768 to 40959	MB020480 to MB02559F
Holding Bits	H00000 to H51115	Decimal	01 and 0F hex: Coils	40960 to 49151	MB025600 to MB03071F
Auxiliary Bits	A000 to A447 (read only) A448 to A959 (read/write)	Decimal	01 and 0F hex: Coils	49152 to 56319 56320 to 64511	MB030720 to MB03519F MB035200 to MB04031F

DM Area Conversion Table

Data Area	Address Range	Notation	Function Code	Data Address Setting Range	Corresponding Register Addresses
DM Area	D00000 to D32767	Decimal	03, 09, 0B, 0D, and 10 hex: Hold registers	0 to 32767	MW00000 to MW32767

Note: 1. Even if addresses are within the given address range, they may exceed the range of the I/O memory area depending on the model of the OMRON PLC.
Refer to the following manual for details.
OMRON PLC manuals
2. The corresponding register address in the MP3000 can be adjusted by using the offset setting of the MSG-SNDE function.

◆ Remote Station Register Type (PARAM16)

This parameter is not used for the FINS protocol.

◆ Data Size (PARAM17)

Set the data size for the read/write request as the number of bits or words.

Be sure that the last data address that is determined by the offset, data address, and data size does not exceed the valid data address range.

The range that is allowed for the data size depends on the function code and data area.

MEMOBUS Function Code	FINS Command Code			Function	Data Size Setting Range
	MR	SR	I/O Memory Type		
01 hex	01 hex	01 hex	B0 hex	Reads CIO Area words.	16 to 2,000 bits
			B1 hex	Reads Work Area words.	16 to 2,000 bits
			B2 hex	Reads Holding Area words.	16 to 2,000 bits
01 hex	01 hex	01 hex	B3 hex	Reads Auxiliary Area words.	16 to 2,000 bits
03 hex	01 hex	01 hex	82 hex	Reads DM Area words.	1 to 125 words
09 hex	01 hex	01 hex	82 hex	Reads DM Area words.	1 to 999 words
0F hex	01 hex	02 hex	B0 hex	Writes to CIO Area words.	16 to 800 bits
			B1 hex	Writes to Work Area words.	16 to 800 bits
			B2 hex	Writes to Holding Area words.	16 to 800 bits
			B3 hex	Writes to Auxiliary Area words.	16 to 800 bits
0B hex	01 hex	02 hex	82 hex	Writes to DM Area words.	1 to 996 words
10 hex	01 hex	02 hex	82 hex	Writes to DM Area words.	1 to 100 words
0D hex	01 hex	04 hex	82 hex	Reads non-consecutive words from the DM Area.	1 to 167 words

Note: Bits are read and written in words. The data size is specified in units of 16 bits (16, 32, 48, ...).

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the FINS protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Local Station Data Address (PARAM20 and PARAM21)

Set the address of the read data destination or write data source in the MP3000-series Controller.

The address is set as the word offset from address 0.

◆ Local Station Register Type (PARAM22)

Set the register type of the read data destination or write data source in the MP3000.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 or higher	–	Not used for the FINS protocol.

The register types that can be used depend on whether you are reading or writing.

The following table lists the combinations of register types.

Function Code	Applicable Register Types
01, 03, or 09 hex	M, G, or O
0B, 0F, or 10 hex	M, G, I, O, or S
0D hex	M

◆ Reserved for System (PARAM23)

This parameter is used by the system.

Note

Do not change the value of PARAM23 from a user program or by any other means.

◆ For System Use (PARAM24)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM24 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM24 from a user program or by any other means. PARAM24 will be used by the system.

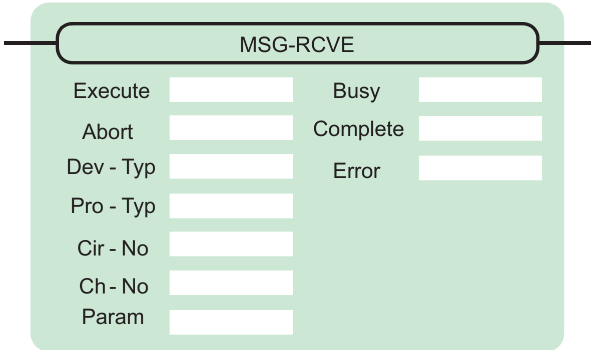
◆ Reserved for System (PARAM25 to PARAM28)

This parameter is used by the system.

Note

Do not change the values of PARAM25 to PARAM28 from a user program or by any other means.

Inputs and Outputs for the MSG-RCVE Function

Function Name	MSG-RCVE			
Function	Receives a message from a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Description
Input Items	1	Execute	B-VAL	Executes the reception.
	2	Abort	B-VAL	Forces the reception to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message reception.

When the Execute Bit turns ON, the message will be received.

◆ Abort

Specify the bit to use to abort the message reception.

When the Abort Bit turns ON, the message reception will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

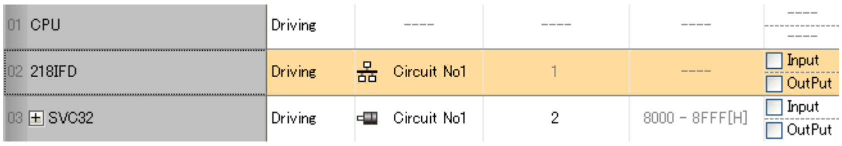
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the FINS protocol. MEMOBUS is automatically converted to the FINS protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the FINS protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the FINS protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> Note
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> Note
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 52 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting the connection number and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00046	PARAM46
DW00047	PARAM47
DW00048	PARAM48
DW00049	PARAM49
DW00050	PARAM50
DW00051	PARAM51

◆ Busy

Specify the bit that shows that the message reception is in progress.

The Busy Bit is ON while a message reception or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message reception has been completed.

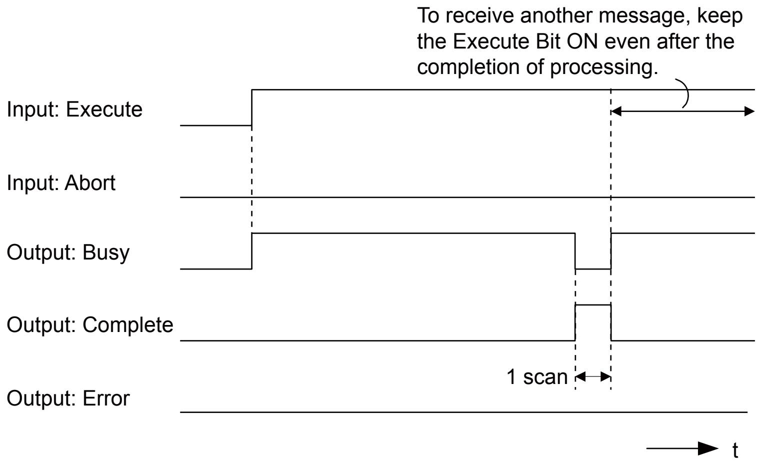
The Complete Bit turns ON only for one scan when message reception or forced abort processing has been completed normally.

◆ Error

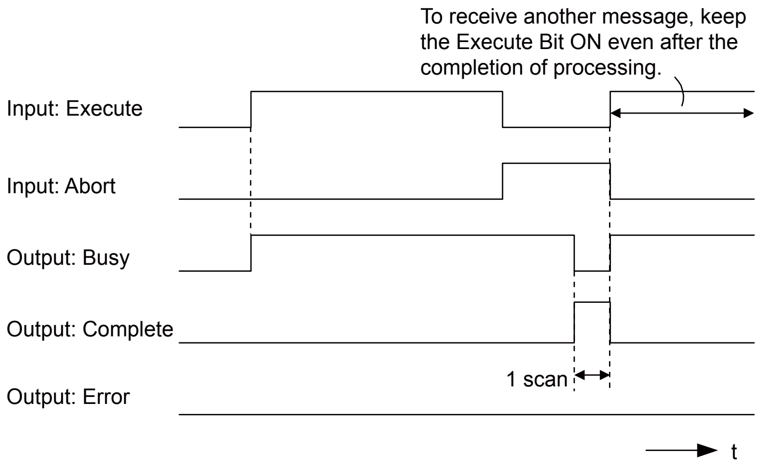
Specify the bit that shows if an error occurred while receiving the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-RCVE function.

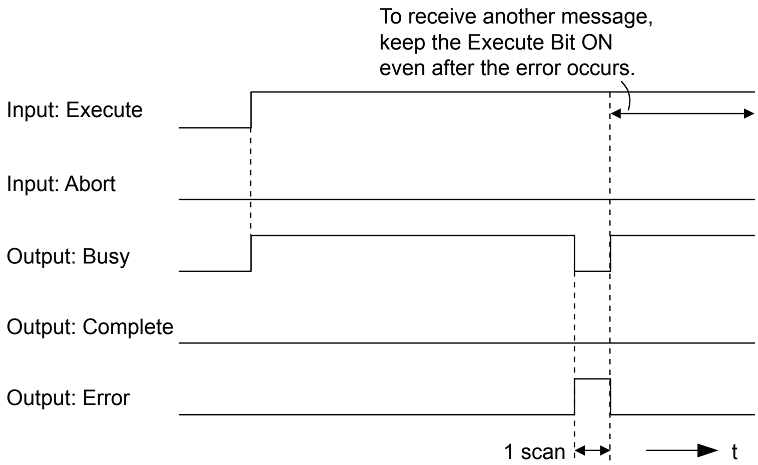
• Normal Execution



• When Execution Is Aborted



• Execution When an Error Occurs



MSG-RCVE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-RCVE function.

	No.	I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11	I/O	Option	Not used for the FINS protocol.
	12	Outputs	Function Code	Gives the function code requested by the remote station.
	13	I/O	Reserved for system.	–
	14	Outputs	Data Address, Lower Word	Gives the first address of the data that was requested by the remote station.
	15		Data Address, Upper Word	
	16		Register Type	Gives the register type that was requested by the remote station.
	17		Data Size	Gives the data size that was requested by the remote station.
	18		Remote CPU Module Number	Not used for the FINS protocol.
	19	I/O	Reserved for system.	–
	20	Inputs	Coil Offset, Lower Word	Sets the offset word address for a coil (MB).
	21		Coil Offset, Upper Word	
	22		Input Relay Offset, Lower Word	Sets the offset word address for an input relay (IB).
	23		Input Relay Offset, Upper Word	
	24		Input Register Offset, Lower Word	Sets the offset word address for an input register (IW).
	25		Input Register Offset, Upper Word	
	26		Hold Register Offset, Lower Word	Sets the offset word address for a hold register (MW).
	27		Hold Register Offset, Upper Word	
	28		Data Relay Offset, Lower Word	Sets the offset word address for a data relay (GB).
	29		Data Relay Offset, Upper Word	
	30		Data Register Offset, Lower Word	Sets the offset word address for a data register (GW).
	31		Data Register Offset, Upper Word	
	32		Output Coil Offset, Lower Word	Sets the offset word address for an output coil (OB).
	33		Output Coil Offset, Upper Word	
	34		Output Register Offset, Lower Word	Sets the offset address for an output register (OW).
	35		Output Register Offset, Upper Word	
	36		M Register Writing Range LO, Lower Word	Sets the first address of the writing range for hold register coils.
	37		M Register Writing Range LO, Upper Word	
	38		M Register Writing Range HI, Lower Word	Sets the last address of the writing range for hold register coils.
	39		M Register Writing Range HI, Upper Word	

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No.		I/O	Meaning	Description
Parameters	40	Inputs	G Register Writing Range LO, Lower Word	Sets the first address of the writing range for data register data relays.
	41		G Register Writing Range LO, Upper Word	
	42		G Register Writing Range HI, Lower Word	Sets the last address of the writing range for data register data relays.
	43		G Register Writing Range HI, Upper Word	
	44		O Register Writing Range LO, Lower Word	Sets the first address of the writing range for output registers.
	45		O Register Writing Range LO, Upper Word	
	46		O Register Writing Range HI, Lower Word	Sets the last address of the writing range for output registers.
	47		O Register Writing Range HI, Upper Word	
System	48	–	For system use	–
	49		Reserved for system.	–
	50		Reserved for system.	–
	51		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

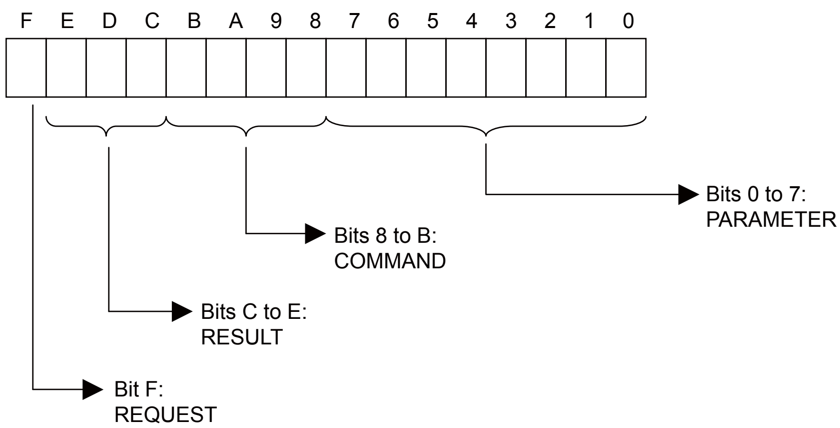
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-243)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-RCVE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution results of the MSG-RCVE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-RCVE function.

Code (Hex)	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT is 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was received. Check the function code of the remote station.
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Data Address) PARAM20 and PARAM21 (Coil Offset) PARAM26 and PARAM27 (Hold Register Offset)
83□□ hex	3	Data size error	The data size for receiving is out of range. Check the data size at the remote station.
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-RCVE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-RCVE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-RCVE function.

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.

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Status 2 Value	Meaning	Description
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

◆ Status 6 (PARAM09)

This parameter is not used for the FINS protocol.

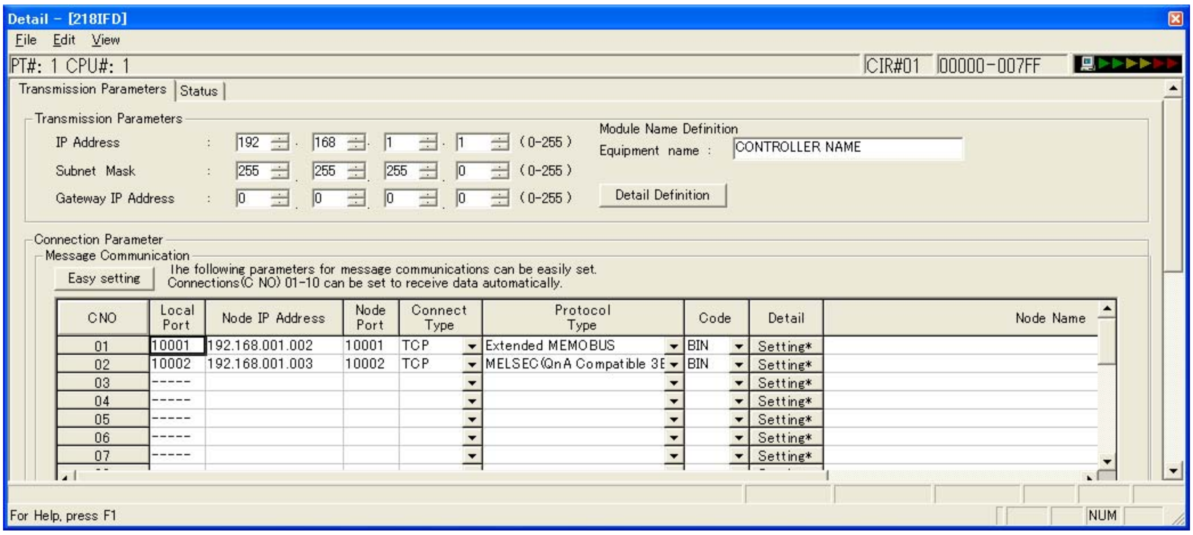
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Remarks
218IFD	1 to 20	Specifies the connection number of the remote station to receive the message from.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the FINS protocol.

◆ Function Code (PARAM12)

This parameter gives the function code that was received.

MEMOBUS Function Code	FINS Command Code			Target Data Type	Function
	MR	SR	I/O Memory Type		
01 hex	01 hex	01 hex	B0 hex	W	Reads CIO Area words.
			B1 hex	W	Reads Work Area words.
			B2 hex	W	Reads Holding Area words.
			B3 hex	W	Reads Auxiliary Area words.
03 or 09 hex	01 hex	01 hex	82 hex	W	Reads DM Area words.
0F hex	01 hex	02 hex	B0 hex	W	Writes to CIO Area words.
			B1 hex	W	Writes to Work Area words.
			B2 hex	W	Writes to Holding Area words.
			B3 hex	W	Writes to Auxiliary Area words.
0B or 10 hex	01 hex	02 hex	82 hex	W	Writes to DM Area words.
0D hex	01 hex	04 hex	82 hex	W	Reads non-consecutive words from the DM Area.

Note: W: Word (channel) data

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Data Address (PARAM14 and PARAM15)

These parameters give the data address that was requested by the remote station.

The type of device and device range determine the data area.

Bit Conversion Table

Data Area	Address Range	Notation	Function Code	Data Address Setting Range	Corresponding Register Addresses
CIO Area	0000 to 2047	Decimal	01 and 0F hex: Coils	0 to 32767	MB000000 to MB02047F
Work Area	W000 to W511	Decimal	01 and 0F hex: Coils	32768 to 40959	MB020480 to MB02559F
Holding Bits	H00000 to H51115	Decimal	01 and 0F hex: Coils	40960 to 49151	MB025600 to MB03071F
Auxiliary Bits	A000 to A447 (read only) A448 to A959 (read/write)	Decimal	01 and 0F hex: Coils	49152 to 56319 56320 to 64511	MB030720 to MB03519F MB035200 to MB04031F

DM Area Conversion Table

Data Area	Address Range	Notation	Function Code	Data Address Setting Range	Corresponding Register Addresses
DM Area	D00000 to D32767	Decimal	03, 09, 0B, 0D, and 10 hex: Hold registers	0 to 32767	MW00000 to MW32767

◆ Register Type (PARAM16)

This parameter is not used for the FINS protocol.

◆ Data Size (PARAM17)

This parameter gives the data size as the number of bits or words for read/write requests from the remote station.

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the FINS protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Offsets (PARAM20 to PARAM27)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address by the number of words specified by the offset.

Note: An offset cannot be a negative value.

Offset parameters are provided for each of the target register types.

The following table lists the offset parameters.

Parameters	Meaning	Description
PARAM20 and PARAM21	Coil Offset	Sets the offset to the word address for a coil.
PARAM22 and PARAM23	Input Relay Offset	These parameters are not used for the FINS protocol.
PARAM24 and PARAM25	Input Register Offset	These parameters are not used for the FINS protocol.
PARAM26 and PARAM27	Hold Register Offset	Sets the offset to the word address for a hold register.

The offset parameters that can be used depend on the function code.

The following table lists the valid parameters for each function code.

Function Code	Function	Applicable Offset Parameters
01 hex	Reads the states of coils.	PARAM20 and PARAM21
03 hex	Reads the contents of hold registers.	PARAM26 and PARAM27
09 hex	Reads the contents of hold registers (extended).	PARAM26 and PARAM27
0B hex	Writes to hold registers (extended).	PARAM26 and PARAM27
0D hex	Reads the contents of non-consecutive hold registers (extended).	PARAM26 and PARAM27
0F hex	Changes the states of multiple coils.	PARAM20 and PARAM21
10 hex	Writes to multiple hold registers.	PARAM26 and PARAM27

◆ Data Relay Offset (PARAM28 and PARAM29)

These parameters are not used for the FINS protocol.

◆ Data Register Offset (PARAM30 and PARAM31)

These parameters are not used for the FINS protocol.

◆ Output Coil Offset (PARAM32 and PARAM33)

These parameters are not used for the FINS protocol.

◆ Output Register Offset (PARAM34 and PARAM35)

These parameters are not used for the FINS protocol.

◆ M Register Writing Range (PARAM36 to PARAM39)

These parameters set the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the M Register Writing Range (PARAM36 to PARAM39) with word addresses.

Note: 1. M registers are always used as the destination in the MP3000 for data write requests from the remote station.
2. The writing range parameters allow you to specify the range of M registers that messages are allowed to write to.

The following table lists the writing range parameters.

Parameters	Meaning	Description
PARAM36 and PARAM37	M Register Writing Range LO	First address of the writing range
PARAM38 and PARAM39	M Register Writing Range HI	Last address of the writing range

Set the writing range so that it satisfies the following condition:

0 ≤ M register writing range LO ≤ M register writing range HI ≤ Maximum M register address

The writing range applies when using the following function codes.

0B hex: Writes to hold registers (extended).

0F hex: Changes the states of a multiple coil.

10 hex: Writes to multiple hold registers.

Example

Use the following settings to set the allowable writing range of M register addresses to MW0001000 to MW0001999:

PARAM36 = 03E8 hex (1000)
PARAM37 = 0000 hex (0000)
PARAM38 = 07CF hex (1999)
PARAM39 = 0000 hex (0000)

The MP3000 will return an error if a write request is received for an address outside the range from MW01000 to MW01999, and will not perform the writing operation.

◆ G Register Writing Range LO (PARAM40 and PARAM41)

These parameters are not used for the FINS protocol.

◆ G Register Writing Range HI (PARAM42 and PARAM43)

These parameters are not used for the FINS protocol.

◆ O Register Writing Range LO (PARAM44 and PARAM45)

These parameters are not used for the FINS protocol.

◆ O Register Writing Range HI (PARAM46 and PARAM47)

These parameters are not used for the FINS protocol.

◆ For System Use (PARAM48)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM48 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM48 from a user program or by any other means. PARAM48 will be used by the system.

◆ Reserved for System (PARAM49 to PARAM51)

This parameter is used by the system.

Note

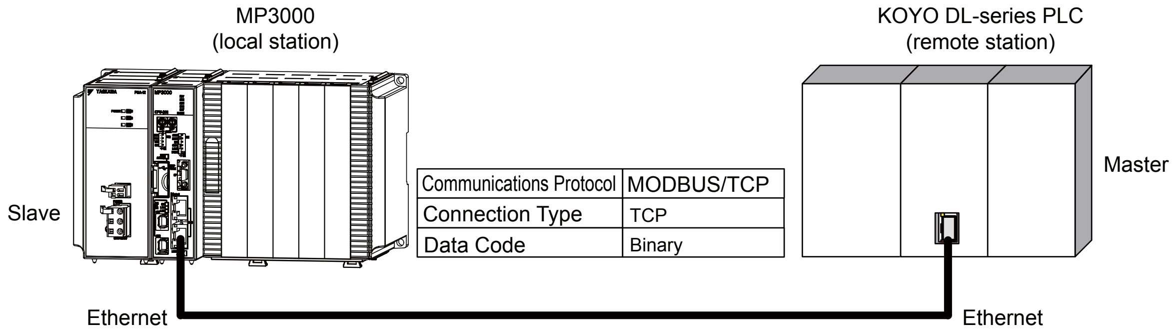
Do not change the values of PARAM49 to PARAM51 from a user program or by any other means.

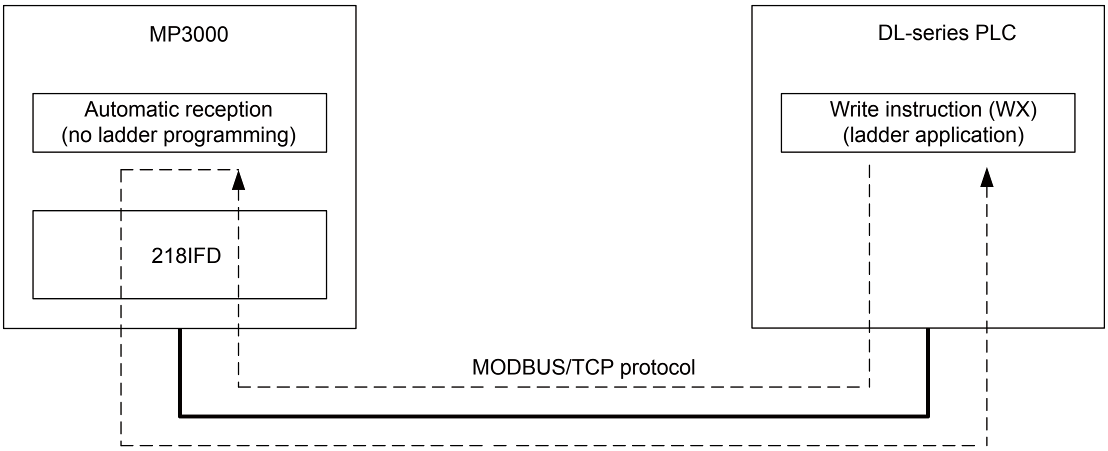
2.9 Communications with a KOYO PLC (MODBUS/TCP Protocol)

When using Ethernet communications between the MP3000 and a KOYO PLC, use the MODBUS/TCP protocol as the communications protocol. The MODBUS/TCP protocol allows the master to read and write to the slave registers.
This section describes communications when the MP3000 acts as a slave and as the master.

Using Automatic Reception with the MP3000 as a Slave

This section describes how to communicate with a KOYO PLC by using automatic reception.

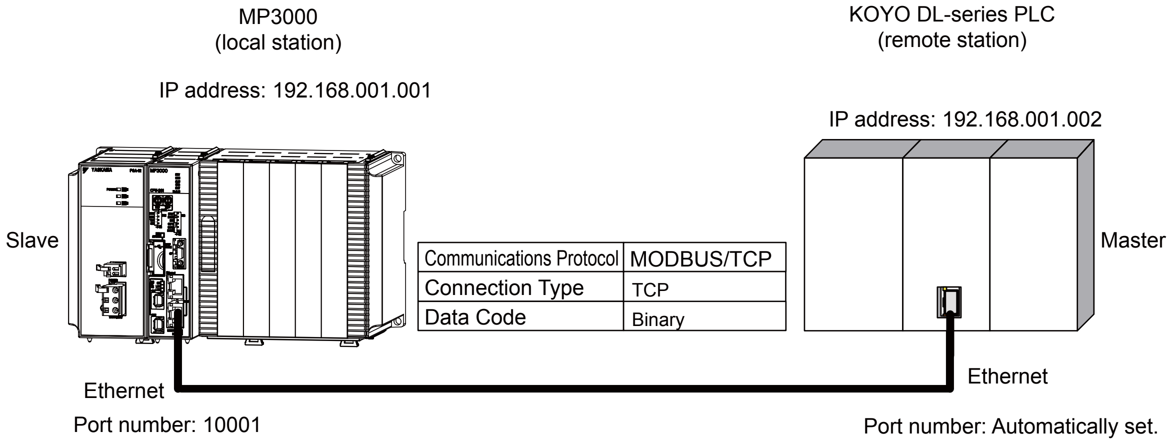


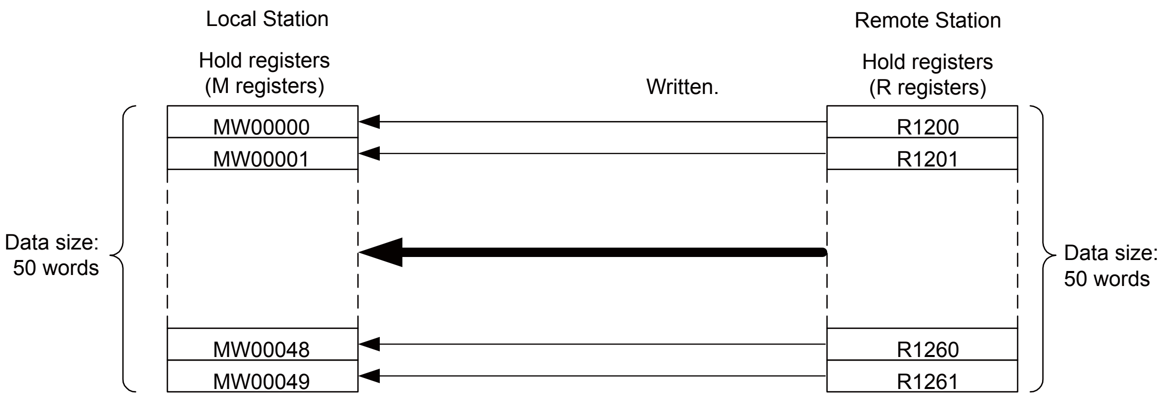


Note: 1. Automatic reception uses 1-to-1 communications.
2. If you need to communicate with multiple devices, use the MSG-RCVE function.

Setting Example

The following figure illustrates how the contents of the R1200 to R1261 hold registers in the KOYO PLC master are written to the MW00000 to MW00049 hold registers in the MP3000 slave.



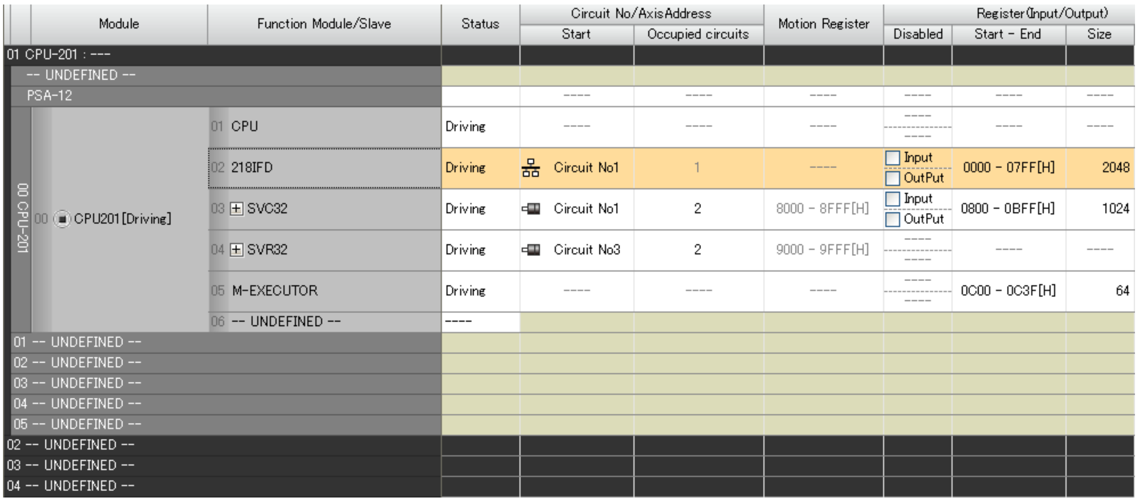


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

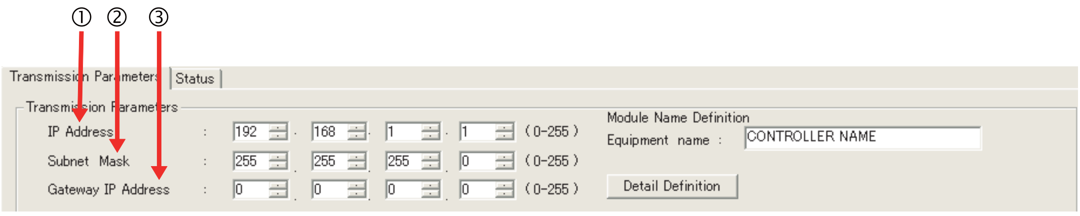
> Note
>
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



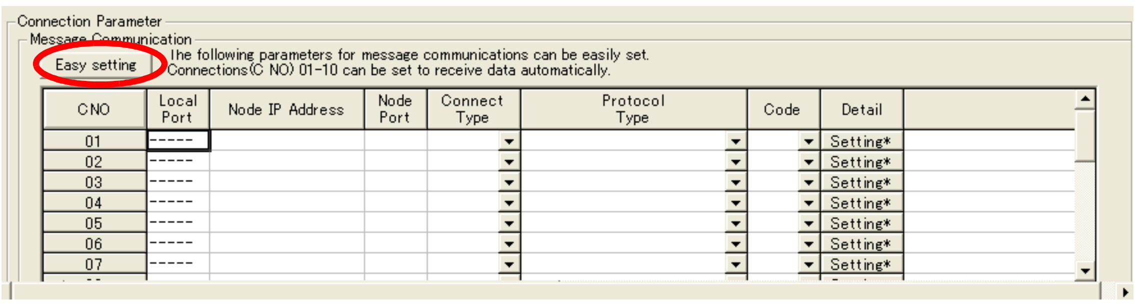
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



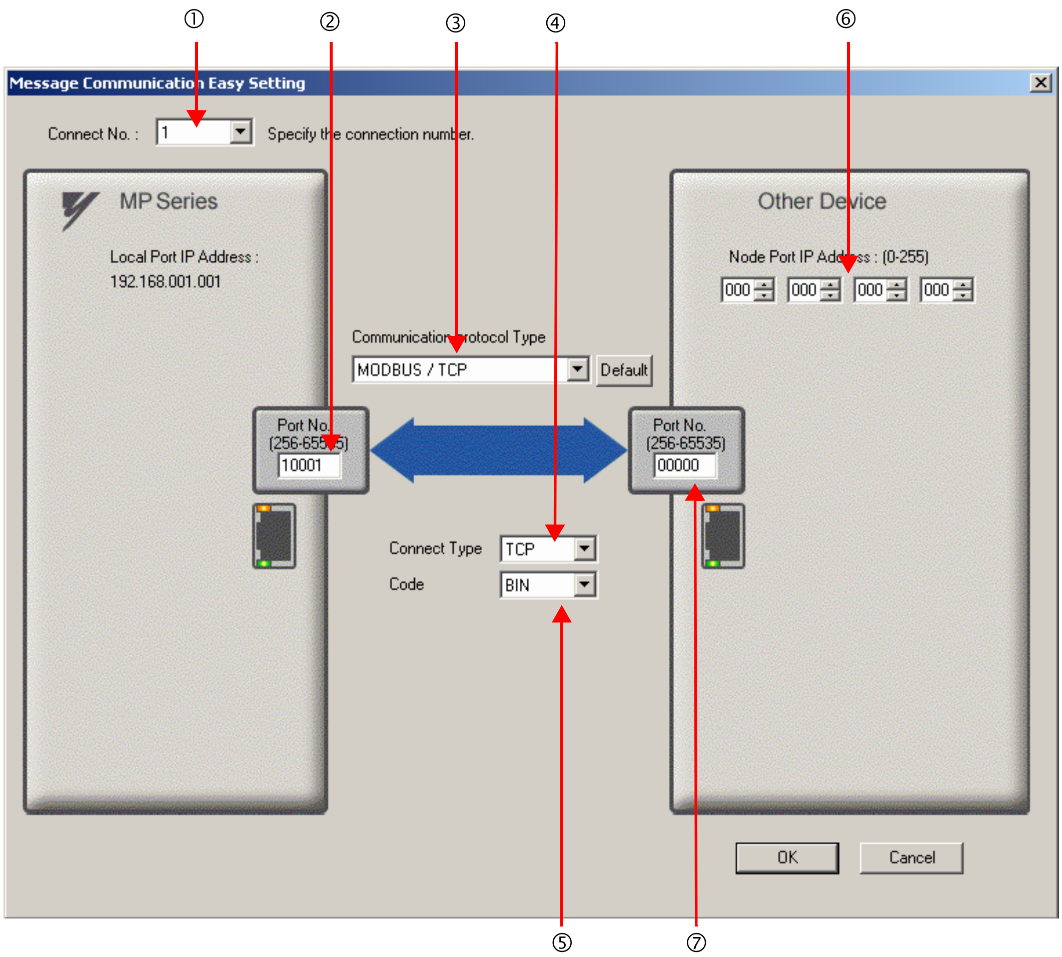
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communication Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



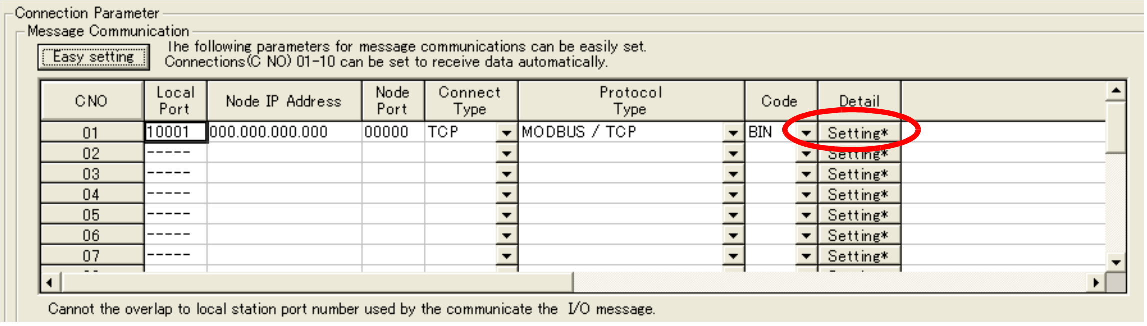
①Select **1** in the **Connect No.** Box.
②Enter “10001” in the **Port No.** Box for the MP-series Controller.
③Select **MODBUS/TCP protocol** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 000.000.000.000.
⑦Enter “00000” in the **Port No.** Box for the other device.

5. Click the **OK** Button.

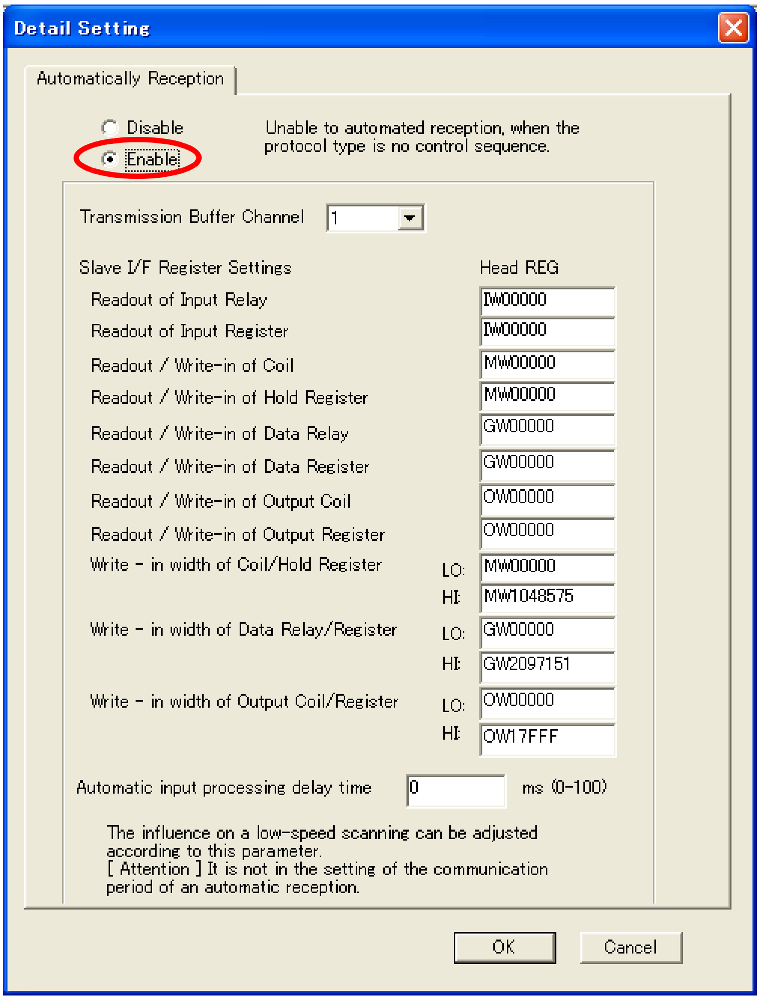
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communication Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Remote Device (KOYO PLC)

Use the following procedure to set the KOYO DL-series PLC.

Note

The DL-series PLCs are manufactured by KOYO Electronics Industries.
Contact KOYO Electronics Industries for further information.

1. Start DirectSoft32.
2. Create a project.
3. Start NetEdit3.
4. Click the **ECOM Settings** Tab followed by the **General** Button in the **Configuration** Area to set the network parameters.

Parameter	Description
Select the **Use the following IP settings** Option before setting the following items.	
IP Address	192.168.1.2
Subnet mask	255.255.255.0
Others	As required.

5. Click the **ECOM Settings** Tab followed by the **Peer to Peer Config** Button in the **Configuration** Area to set the MODBUS/TCP parameters.

Parameter	Description
RX/WX Device Number	1
Select the **Modbus-TCP** Option before setting the following items.	
IP Address	192.168.1.1
Port	10001
Unit ID	0

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

6. Create a ladder program for communications.

① Use the Load (LDS) instruction to specify the base number, ECOM slot number, and server node number.

Example LDS K301
Base number: 0 (CPU base), ECOM slot number: 1, Server node number: 01

② Use the Load instruction to specify the number of bytes to send.

Example LDS K100
Number of bytes: 100 (50 words)

③ Use the LDR instruction to specify the master memory area.

Example LDS O1200
Master memory area: 01200
Specify the first address to store the data to send in the DL-series PLC.

④ Use the Write (WX) instruction to specify the memory area in the slave and send the message.

Example WX TA0
Slave memory area: R0 (TA0)
Set the first address offset of the registers to write to in the MP3000.
If the MP3000 has not been set to use offset addressing, specifying R0 (TA0) will write the specified size of data in the MP3000 starting at address MW00000.

Note: Contact KOYO Electronics Industries for further information on ladder programming.

This concludes the setup. Set any other parameters as necessary, then transfer the data to the PLC.

◆ Starting Communications

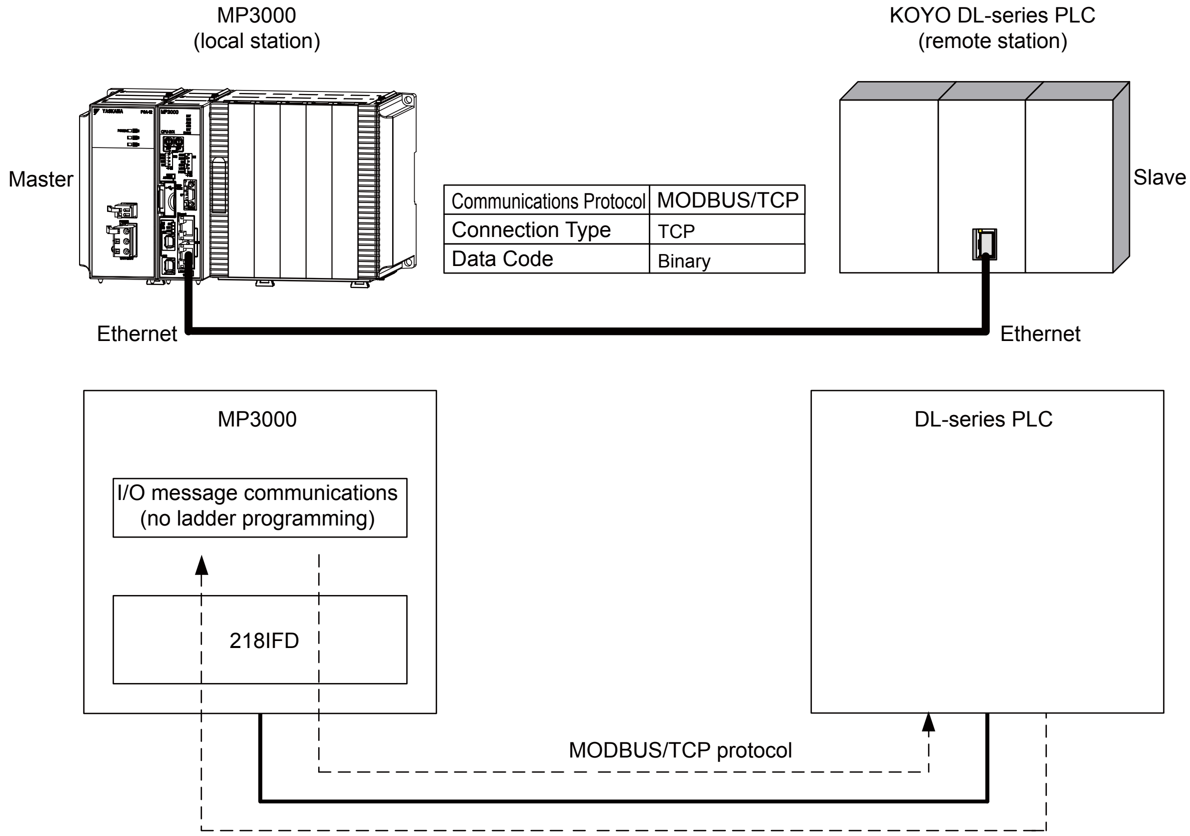
Use the following procedure to write the data in the holding registers in the KOYO PLC to the hold registers in the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.
The system will automatically start the message reception operation. No further operation is required.

2. Send the message by executing the WX instruction on the KOYO PLC.
The MP3000 will receive the message when the KOYO PLC sends it.

Using I/O Message Communications with the MP3000 as the Master

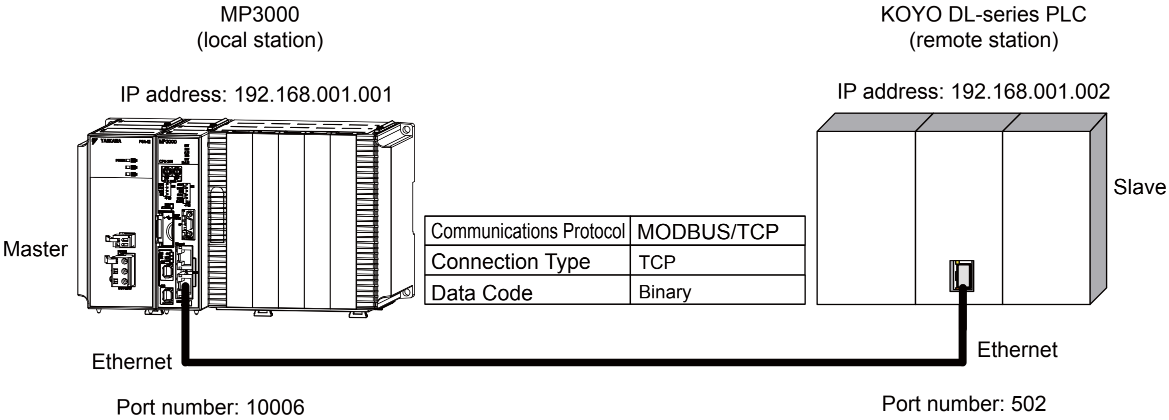
This section describes how to communicate with a KOYO PLC by using I/O message communications.

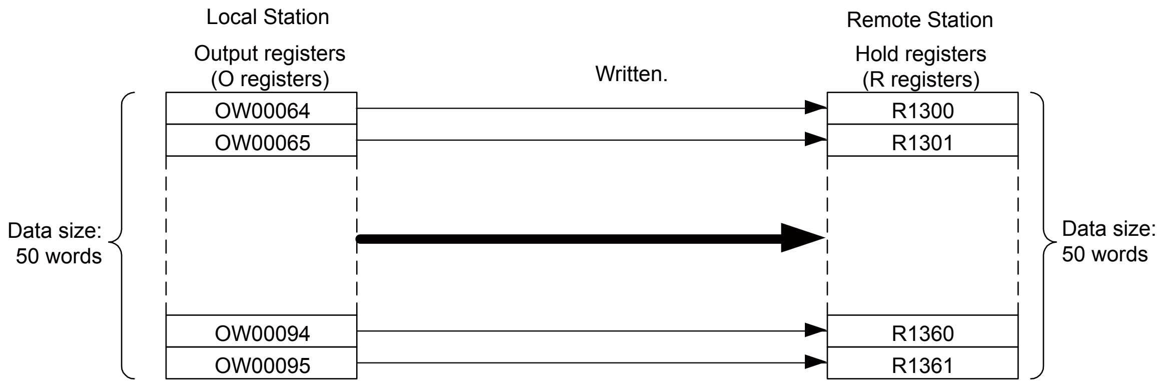


Note: 1. I/O message communications use 1-to-1 communications.
2. When using the MODBUS/TCP protocol to communicate with a KOYO DL-series PLC, you can only read and write holding registers.
3. When communicating with multiple remote devices or when you need to perform any operations other than reading and writing to holding registers, such as reading the states of coils and input relays, and changing the states of coils, use the Send Message function (MSG-SNDE).

Setting Example

The following figure illustrates how the contents of the OW00064 to OW00095 output registers in the MP3000 master are written to the R1300 to R1361 holding registers in the KOYO PLC slave.



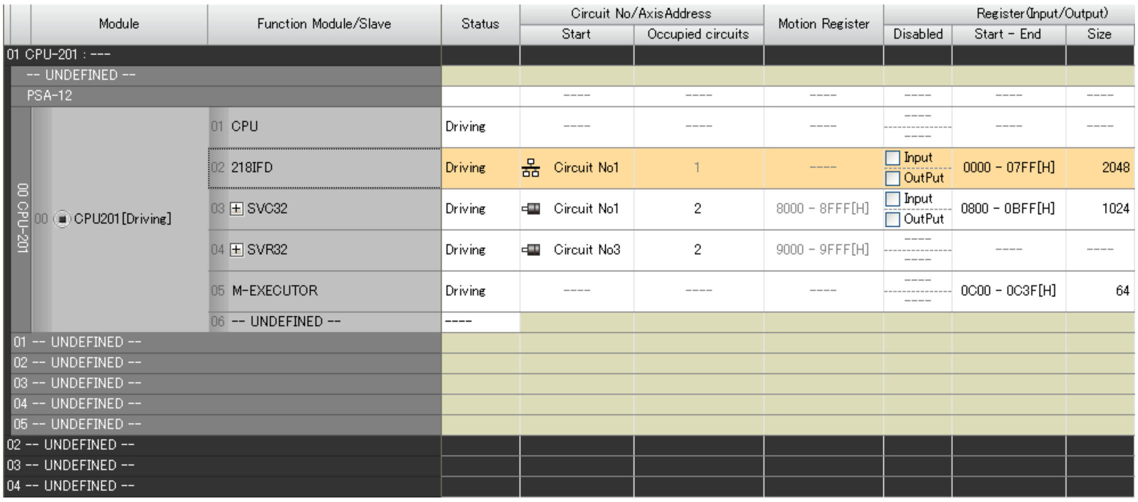


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

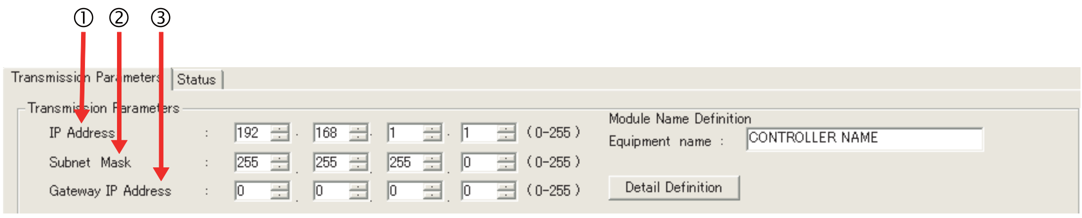
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



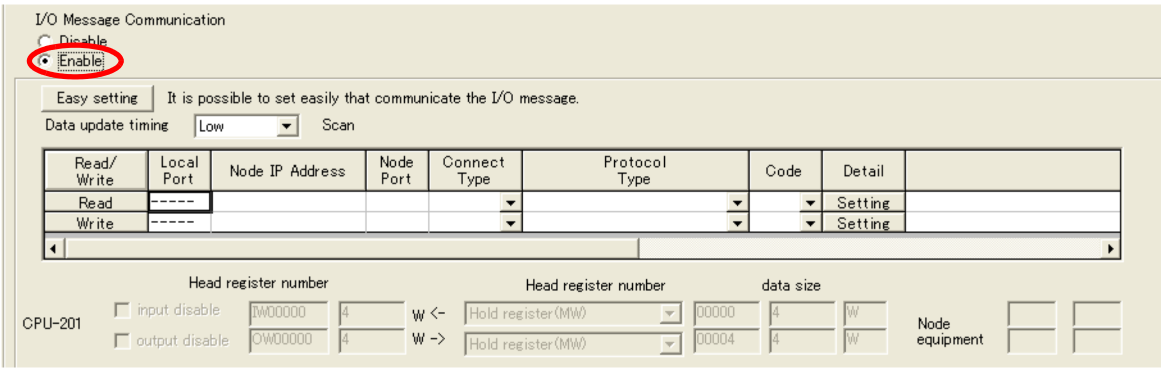
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.

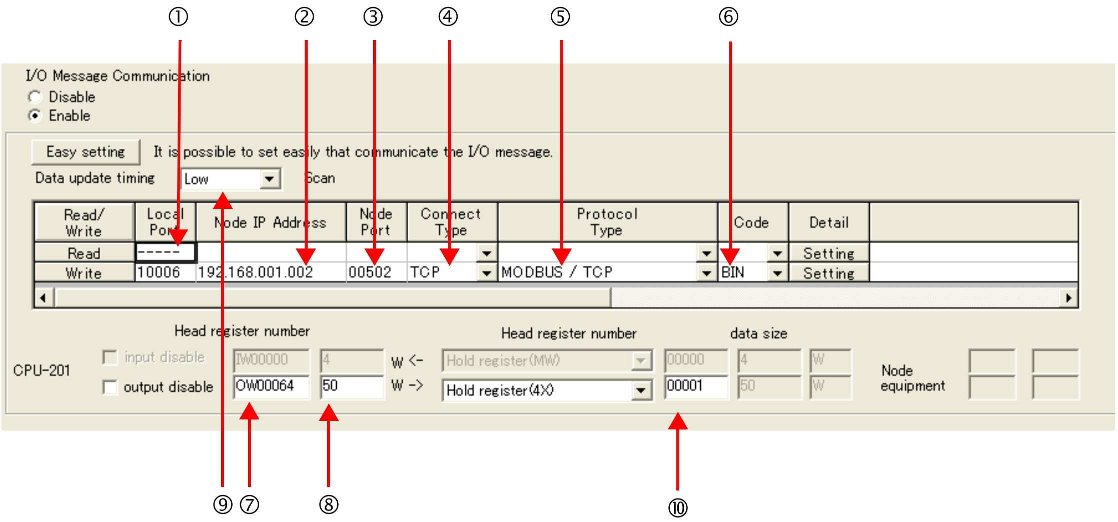


①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Select the **Enable** Option in the **I/O Message Communication** Area of the **Connection Parameter** settings.



4. Set the connection parameters.



①Enter “10006” in the MP3000 **Local Port** Box.
②Enter the following address for the remote device in the **Node IP Address** Box: 192.168.001.002.
③Enter “502” in the **Node Port** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **MODBUS/TCP** in the **Protocol Type** Box.
⑥Select **BIN** in the **Code** Box.
⑦Enter “OW0064” in the **Head register number** Box as the write data destination.
⑧Enter “50” in the **Data Size** Box as the size of data to write.
⑨Select **Low** in the **Data update timing** Box as the timing to update I/O data between the CPU Function Module and 218IFD.
⑩Enter “4X” as the register type and “00001” as the first address to write to on the remote device.

Note: 1. In I/O message communications, a message is transmitted from separate ports if registers are both read and written. Therefore, the connected remote device must have two connections to receive both messages.
2. The data update timing is the timing at which the CPU Function Module and 218IFD exchange data. Communications with the remote device are performed asynchronously. The data update timing therefore does not necessarily mean that the messages are sent to the remote device.

5. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as the master.

◆ Setting the Remote Device (KOYO PLC)

Use the following procedure to set the KOYO DL-series PLC.

Note

The DL-series PLCs are manufactured by KOYO Electronics Industries.
Contact KOYO Electronics Industries for further information.

1. Start DirectSoft32.
2. Create a project.
3. Start NetEdit3.
4. Click the **ECOM Settings** Tab followed by the **General** Button in the **Configuration** Area to set the network parameters.

Parameter	Description
Select the **Use the following IP settings** Option before setting the following items.	
IP Address	192.168.1.2
Subnet Mask	255.255.255.0
Others	As required.

5. Click the **ECOM Settings** Tab followed by the **Peer to Peer Config** Button in the **Configuration** Area to set the MODBUS/TCP parameters.

Parameter	Description
RX/WX Device Number	1
Select the **Modbus-TCP** Option before setting the following items.	
IP Address	192.168.1.1
Port	10006
Unit ID	0

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

This concludes the setup. Set any other parameters as necessary, then transfer the data to the PLC.

◆ Starting Communications

Use the following procedure to write the data in the output registers in the MP3000 to the holding registers in KOYO PLC.

1. Start receiving messages on the KOYO PLC.
   The system will automatically start the message reception operation. No further operation is required.
2. Turn ON the power to the MP3000 to start transmitting messages.
   The system will automatically start the message transmission operation. No further operation is required.

2.10 Communications with a JTEKT PLC (TOYOPUC Protocol)

When using Ethernet communications between the MP3000 and a JTEKT PLC, use the TOYOPUC protocol as the communications protocol. The TOYOPUC protocol allows the master to read and write to the slave registers.

This section describes communications when the MP3000 acts as a slave and as the master.

When the MP3000 acts as a slave, communications can take place using automatic reception or using the MSG-RCVE function.

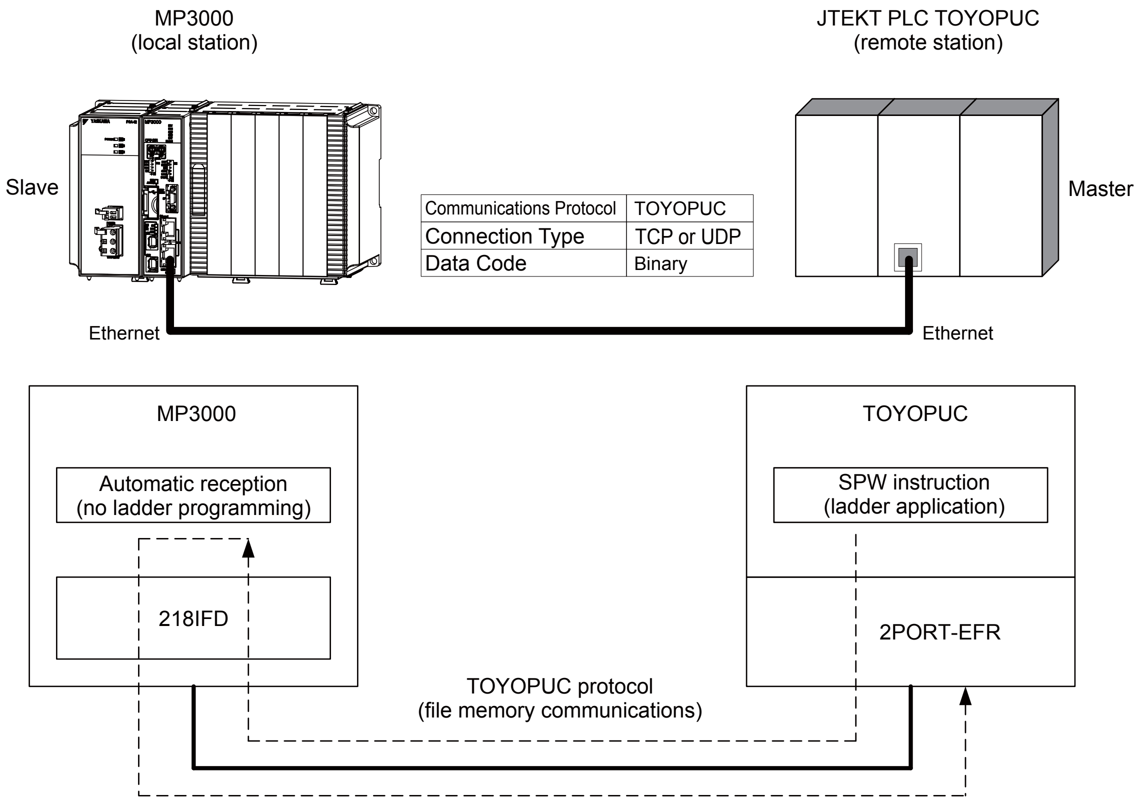
When the MP3000 acts as the master, communications can take place using the MSG-SNDE function.

Using Automatic Reception with the MP3000 as a Slave

This section describes how to communicate with a JTEKT PLC by using automatic reception.

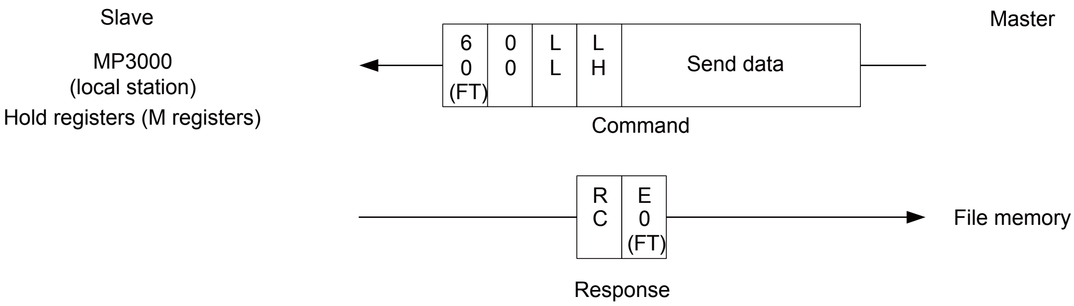
When a JTEKT PLC is used as the master to write data to the file memory in the 2PORT-EFR, you will need to create a ladder application that uses the SPW instruction.

> **Note**
> The SPW instruction is used to write data to the file memory in the 2PORT-EFR.
> Refer to the following manual for details.
> *Manual for the 2PORT-EFR Module* from JTEKT Corporation



Communications Format

The MP3000 acts as a slave and receives data and returns a response to the master by using the communications formats for file memory commands that are shown below. Execution of the MSG-RCVE function in the MP3000 ends when a response is returned.



Note: In the figure shown above, the Ethernet header, TCP/UDP header, FCS, and other items have been omitted. Only the data portion of the communications format is shown.

File Memory and Corresponding Registers in the MP3000

The following table shows the relationship between registers in the MP3000 and the send data area of file memory in the 2PORT-EFR.

Regardless of the connection number of the 2PORT-EFR, the MP3000 stores data from the first address (MW00000) of the hold registers by default. To store the data in a specific hold register, use the automatic reception offset setting.

Data Range		
2PORT-EFR Module		MP3000 Hold Register Data Area Addresses
File Memory Data Area	File Memory Send/ Receive Data Area Addresses	
Connection 1	1000: Data size, 1002 to 17FD: Send data	Storage area*: MW00000 to MW02043
Connection 2	2000: Data size, 2002 to 27FD: Send data	
Connection 3	3000: Data size, 3002 to 37FD: Send data	
Connection 4	4000: Data size, 4002 to 47FD: Send data	
Connection 5	5000: Data size, 5002 to 57FD: Send data	
Connection 6	6000: Data size, 6002 to 67FD: Send data	
Connection 7	7000: Data size, 7002 to 77FD: Send data	
Connection 8	8000: Data size, 8002 to 87FD: Send data	

* The automatic reception offset allows you to make any address between MW00000 and MW65534 the first address.

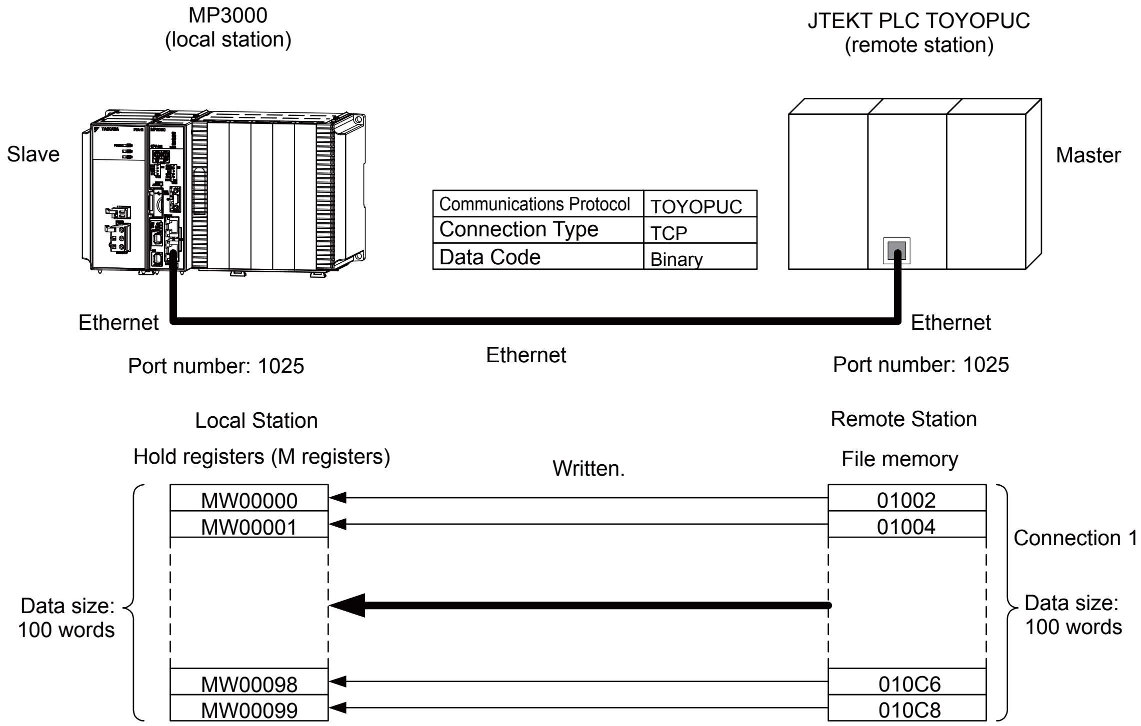
Transfer Size

The following table lists the data sizes that can be received in a single file memory command when using automatic reception.

Applicable Model	Data Size
MP3000	1 to 1,022 words Specify the number of whole words.

Setting Example

The following figure illustrates how the contents of the 1002 to 10C9 file memory addresses in the JTEKT PLC master are written to the MW00000 to MW00099 hold registers in the MP3000 slave.

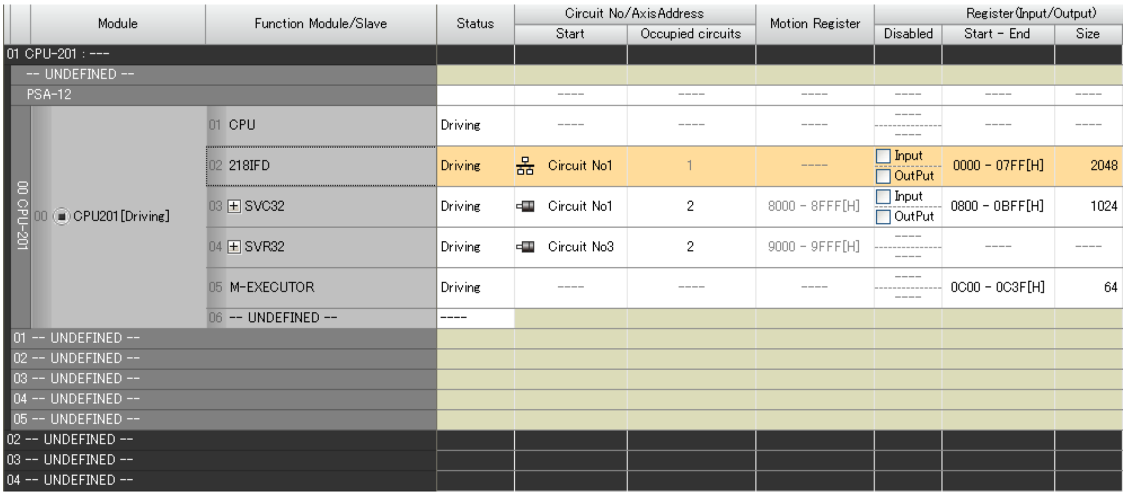


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

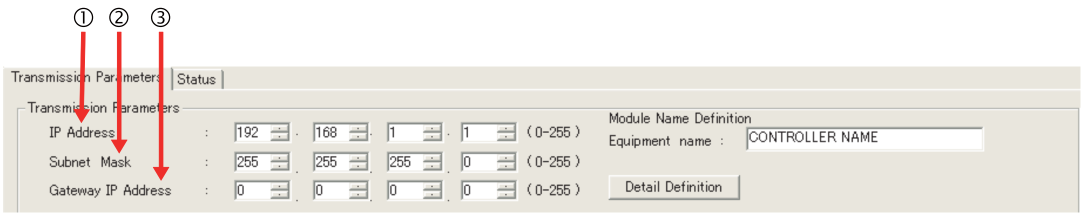
Note: If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



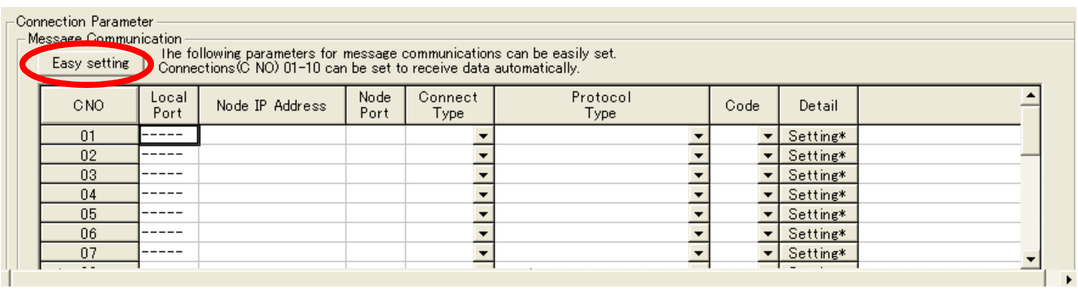
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

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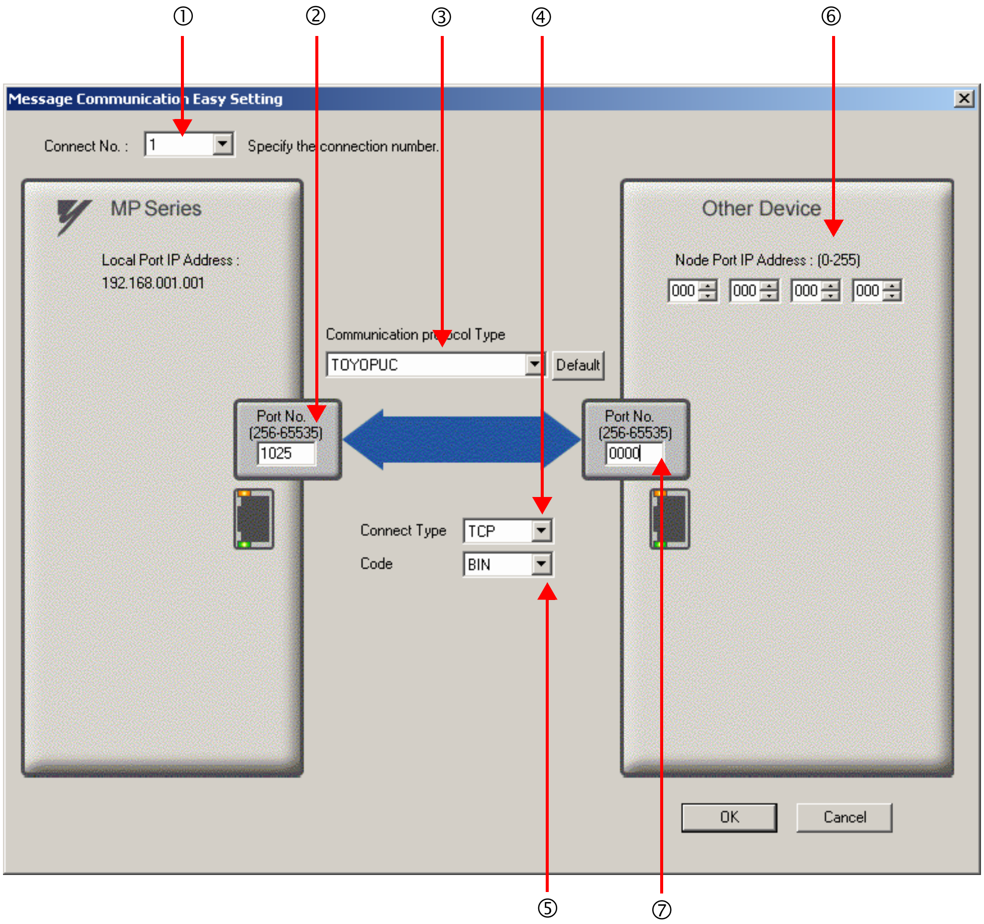
4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②Enter "1025" in the **Port No.** Box for the MP-series Controller.
③Select **TOYOPUC** in the **Communication Protocol Type** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 000.000.000.000.
⑦Enter "0000" in the **Port No.** Box for the other device.

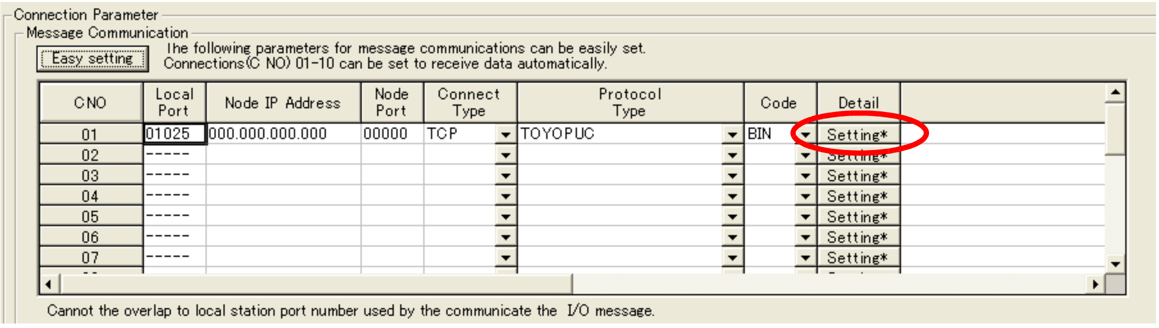
Note: 1. When using automatic reception, do not use the MSG-SNDE and MSG-RCVE functions on connection 01. Automatic reception for connection 01 is set to **Enable** by default.
2. The settings in the above screen capture will open an unpassive connection because the remote station port and IP address are set to 0. To open a full passive connection, enter a port number and IP address for the remote device in steps (6) and (7).
3. If communicating by UDP, select **UDP** in the **Connect Type** Box.

5. Click the **OK** Button.

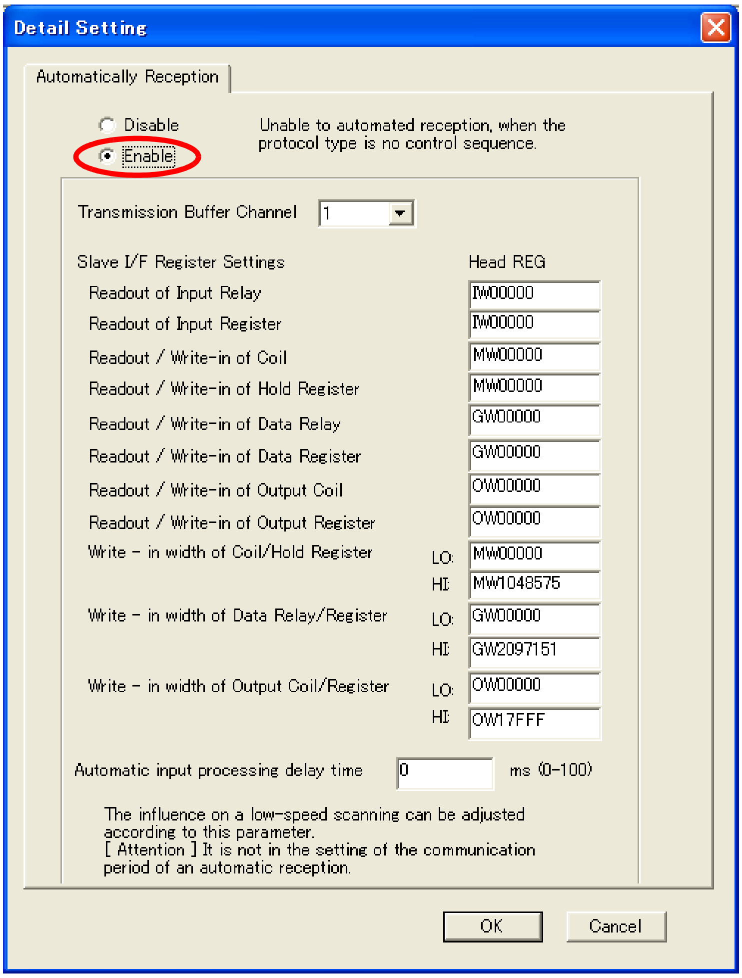
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Remote Device (JTEKT PLC)

Use the following procedure to set up the JTEKT TOYOPUC PLC.

Note

TOYOPUC PLCs are manufactured by JTEKT Corporation.
Refer to the following manual for details.
Manual for the 2PORT-EFR Module from JTEKT Corporation

1. Set the Ethernet settings and baud rate using the DIP switch on the 2PORT-EFR Module.
2. Start the PCWIN.
3. Set up the I/O Module. The identification code for a 2PORT-EFR Module that has been set to use Ethernet communications is “B3”.
4. Set the Link Module name. In the **Link Parameter** Dialog Box, select the rack number and slot number to assign to the 2PORT-EFR Module, and set the Link Module name to **Ethernet**.
5. Set the communications parameters.

Ethernet Settings Example

Parameter	Description
Own Node IP Address	192.168.1.2
Connection 1	Use
Open Protocol	TCP Active Open
Own Node Port No.	1025
Other Node Table No.	1

Other Node Table Settings Example

Parameter	Description
Table 1	Use
Other Node IP Address	192.168.1.1
Other Node Port No.	1025

Settings Example for Various Timers

Parameter	Description
Reset Wait Resending Times	As required.
Non-Reception Timer	As required.
Response Timer	As required.
Resending Timer (Data)	As required.
Resending Timer (SYN/FIN)	As required.
Close Timer	As required.
Packet Alive Time	As required.
IP Assembly Timer	As required.

Sub-Net Mask and Gateway IP Address Settings Example

Parameter	Description
Subnet Mask	255.255.255.0
Gateway IP Address	As required.

Note: When using automatic reception on a TCP connection, set the open protocol setting on the 2PORT-EFR module to **TCP Active Open**. The MP3000 is capable of opening a TCP connection as a specified passive node or a non-specified passive node.

6. Create a ladder program to send data to the send data area in the file memory on network connection 1.

Note: Refer to the following manual for information on ladder programming using the SPW instruction.
Manual for the 2PORT-EFR Module from JTEKT Corporation

This concludes the setup.

◆ Starting Communications

Use the following procedure to write the data in the file memory in the JTEKT PLC to the hold registers in the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.
The system will automatically start the message reception operation. No further operation is required.

2. Start the processing to open connection 1 from the JTEKT PLC to start data transmissions.

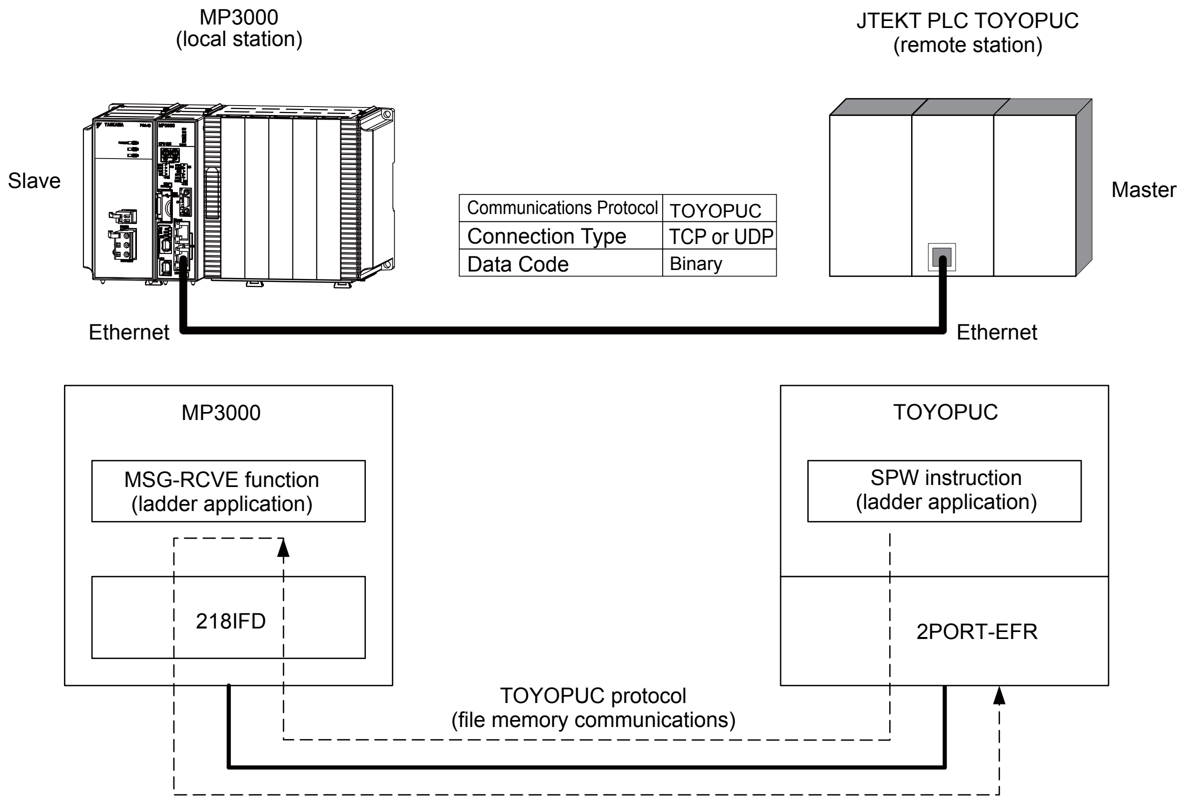
Note: The MP3000 will wait for the TCP connection after it starts the automatic reception operation. Therefore, the power supply to the MP3000 must be turned ON before the power supply to the JTEKT PLC.

Using the MSG-RCVE Function with the MP3000 as a Slave

This section describes how to communicate with a JTEKT PLC by using the MSG-RCVE function.

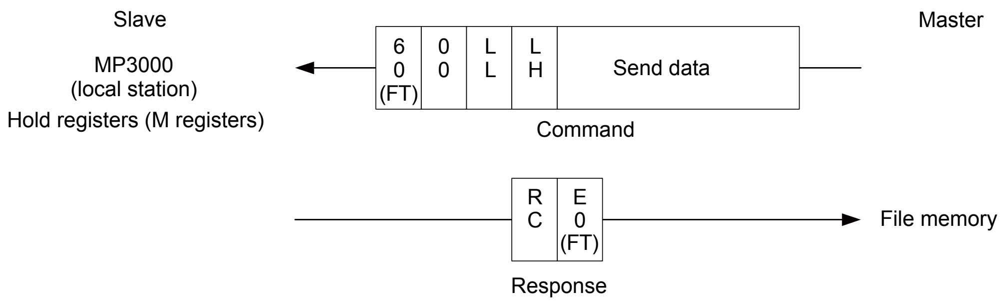
When a JTEKT PLC is used as the master to write data to the file memory in the 2PORT-EFR, you will need to create a ladder application that uses the SPW instruction.

> Note
> The SPW instruction is used to write data to the file memory in the 2PORT-EFR.
> Refer to the following manual for details.
> *Manual for the 2PORT-EFR Module* from JTEKT Corporation



Communications Format

The MP3000 acts as a slave and receives data and returns a response to the master by using the communications formats for file memory commands that are shown below. Execution of the MSG-RCVE function in the MP3000 ends when a response is returned.



Note: In the figure shown above, the Ethernet header, TCP/UDP header, FCS and other items have been omitted. Only the data portion of the communications format is shown.

File Memory and Corresponding Registers in the MP3000

The following table shows the relationship between registers in the MP3000 and the send data area of file memory in the 2PORT-EFR.

Regardless of the connection number of the 2PORT-EFR, the MP3000 stores data from the first address (MW00000) of the hold registers by default. To store the data in a specific hold register, use the hold register offset parameters (PARAM26 and PARAM27) in the MSG-RCVE function. Thus, if PARAM26 and PARAM27 are set to 10,000, the data sent from the 2PORT-EFR will be stored in the registers starting from MW10000.

Data Range		
2PORT-EFR Module		MP3000 Hold Register Data Area Addresses
File Memory Data Area	File Memory Sending/ Receiving Data Area Addresses	
Connection 1	1000: Data size, 1002 to 17FD: Send data	Storage area*: MW00000 to MW01021
Connection 2	2000: Data size, 2002 to 27FD: Send data	
Connection 3	3000: Data size, 3002 to 37FD: Send data	
Connection 4	4000: Data size, 4002 to 47FD: Send data	
Connection 5	5000: Data size, 5002 to 57FD: Send data	
Connection 6	6000: Data size, 6002 to 67FD: Send data	
Connection 7	7000: Data size, 7002 to 77FD: Send data	
Connection 8	8000: Data size, 8002 to 87FD: Send data	

* The hold register offset parameter in the MSG-RCVE function allows you to make any address between MW00000 and MW65534 the first address.

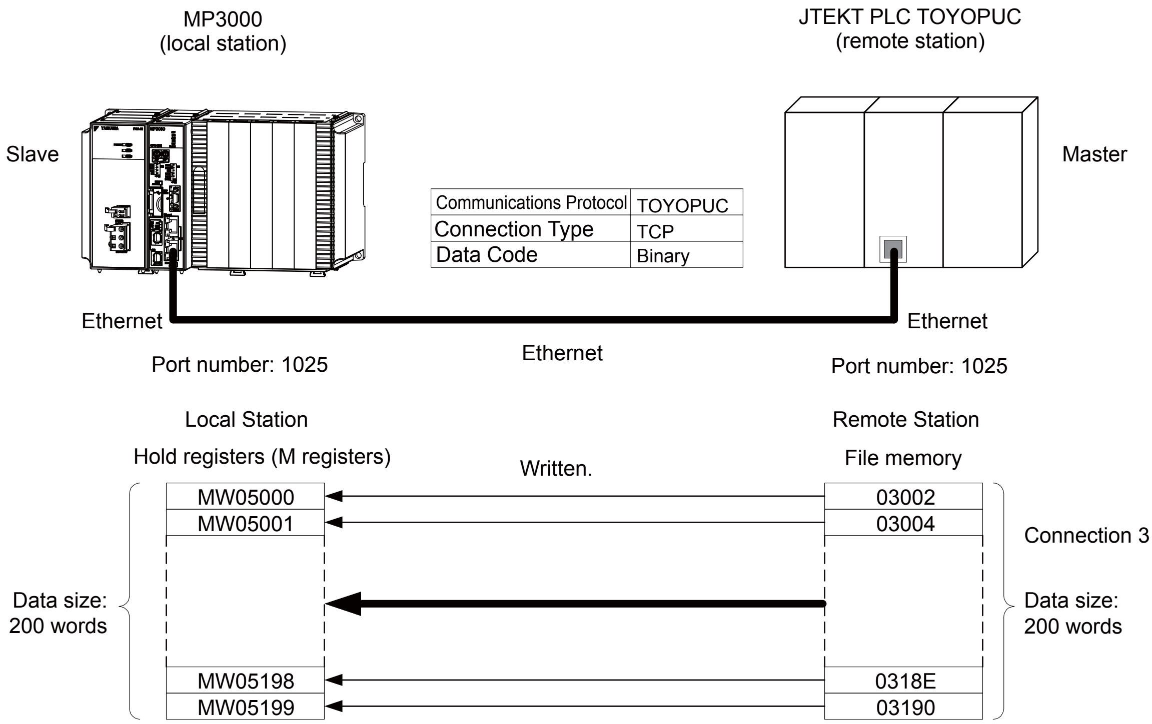
Transfer Size

The following table lists the data sizes that can be received in a single file memory command when using the MSG-RCVE function.

Applicable Model	Data Size
MP3000	1 to 1,022 words Specify the number of whole words.

Setting Example

The following figure illustrates how the contents of 200 words from the 3002 to 3191 file memory addresses in the JTEKT PLC master are written to the MW05000 to MW05199 hold registers in the MP3000 slave.

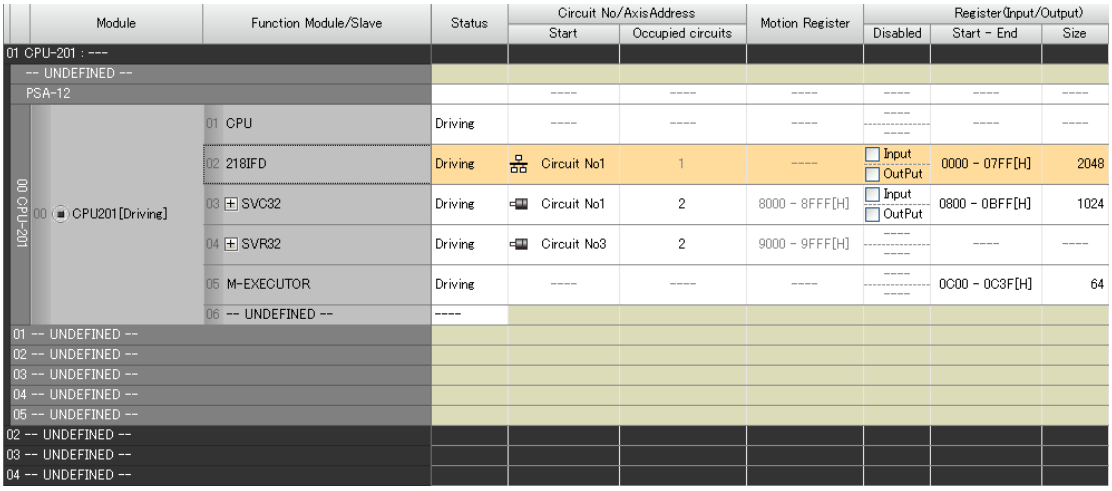


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

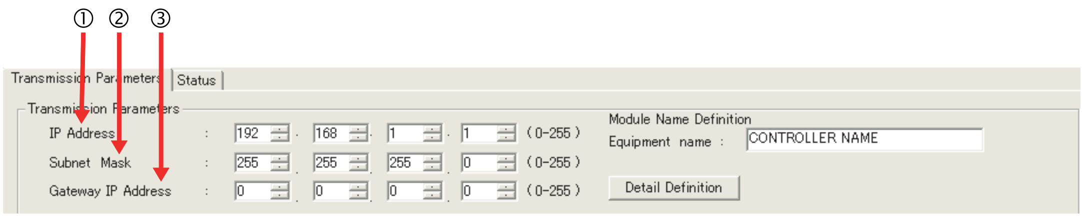
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



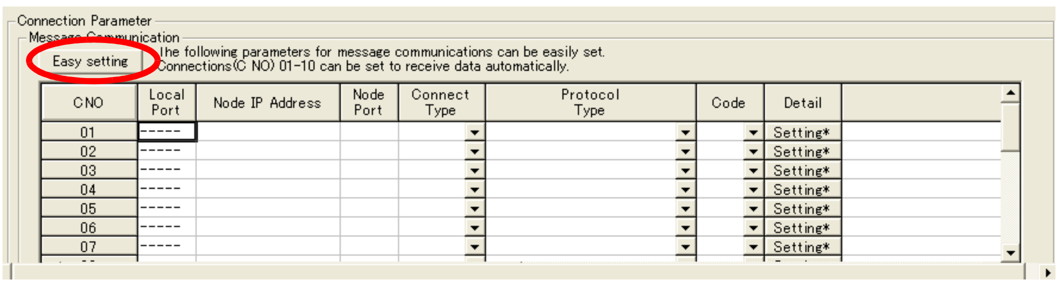
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

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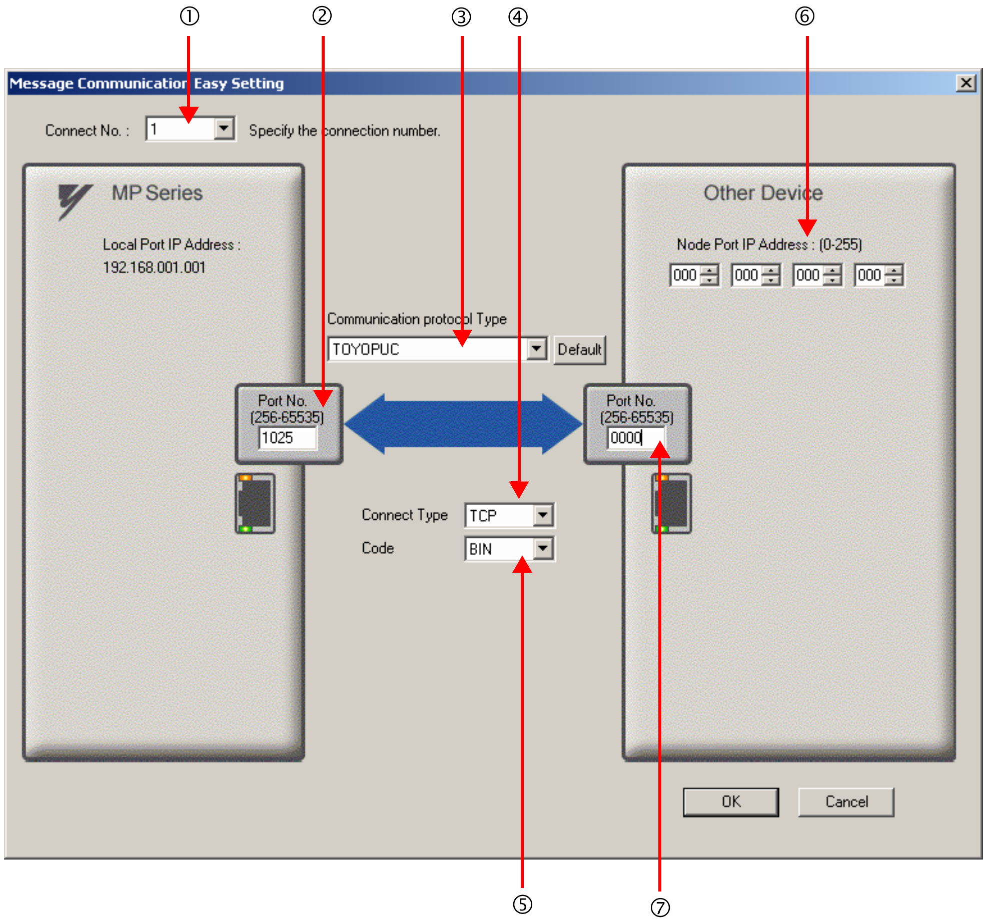
4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②Enter "1025" in the **Port No.** Box for the MP-series Controller.
③Select **TOYOPUC** in the **Communication Protocol Type** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 000.000.000.000.
⑦Enter "0000" in the **Port No.** Box for the other device.

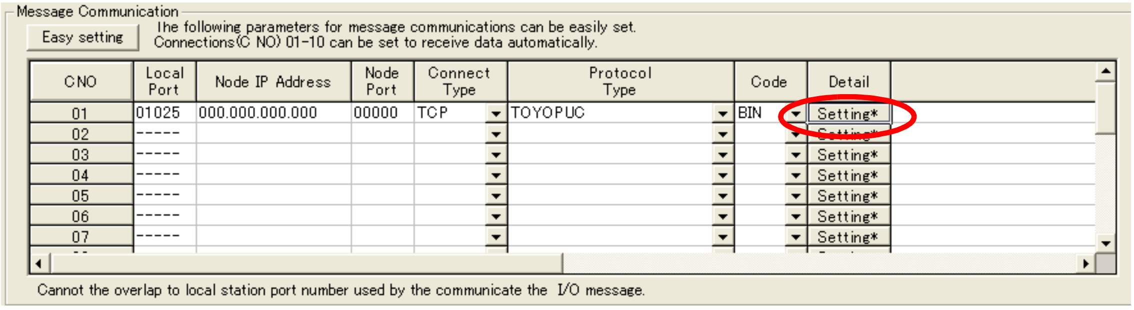
Note: 1. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.
2. The settings in the above screen capture will open an unpassive connection because the remote station port and IP address are set to 0. To open a full passive connection, enter a port number and IP address for the remote device in steps (6) and (7).
3. If communicating by UDP, select **UDP** in the **Connect Type** Box.

5. Click the **OK** Button.

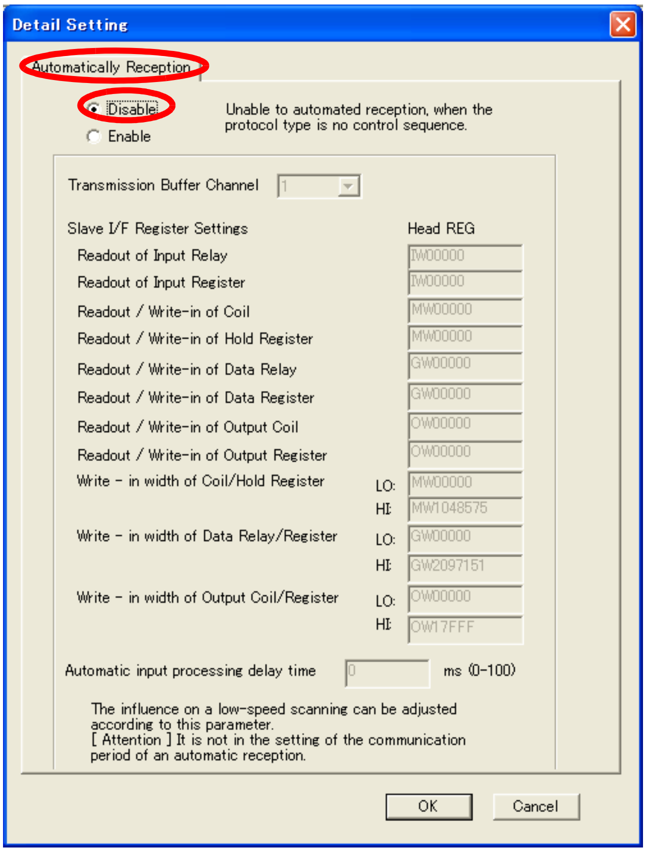
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



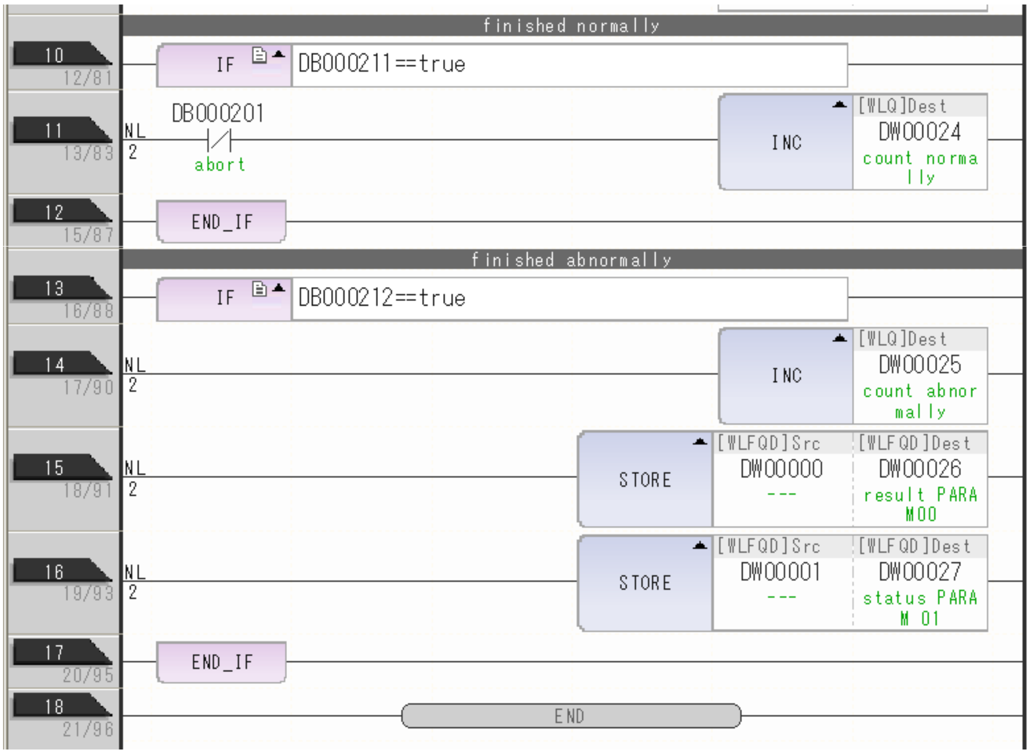
8. Click the **Disable** Option on the Automatically Reception Tab Page.



Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

9. Create a ladder program for the MSG-RCVE function.

A ladder program example is shown below.



10. Save the data to flash memory.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Remote Device (JTEKT PLC)

Use the following procedure to set up the JTEKT TOYOPUC PLC.

Note

TOYOPUC PLCs are manufactured by JTEKT Corporation.
Refer to the following manual for details.
Manual for the 2PORT-EFR Module from JTEKT Corporation

1. Set the Ethernet settings and baud rate using the DIP switch on the 2PORT-EFR Module.
2. Start the PCWIN.
3. Set up the I/O Module. The identification code for a 2PORT-EFR module that has been set up to use Ethernet communications is “B3”.
4. Set the link module name. In the **Link Parameter** Dialog Box, select the rack number and slot number to assign to the 2PORT-EFR module, and set the link module name to **Ethernet**.
5. Set the communication parameters.

Ethernet Settings Example

Parameter	Description
Own Node IP Address	192.168.1.2
Connection 3	Use
Open Protocol	TCP Active Open
Own Node Port No.	1025
Other Node Table No.	1

Other Node Table Settings Example

Parameter	Description
Table 1	Use
Other Node IP Address	192.168.1.1
Other Node Port No.	1025

Timers Settings Example

Parameter	Description
Reset Wait Resending Times	As required.
Non-Reception Timer	As required.
Response Timer	As required.
Resending Timer (Data)	As required.
Resending Timer (SYN/FIN)	As required.
Close Timer	As required.
Packet Alive Time	As required.
IP Assembly Timer	As required.

Subnet Mask and Gateway IP Address Settings Example

Parameter	Description
Subnet Mask	255.255.255.0
Gateway IP Address	As required.

Note: When communicating with TCP and the open protocol setting on the 2PORT-EFR is set to TCP Active Open, execute the MSG-RCVE function on the MP3000 to receive messages. If the open protocol setting on the 2PORT-EFR is set to **TCP Destination - Specified Passive**, or **TCP Non-Specified Passive**, execute the MSG-SNDE function in the MP3000. The MP3000 is capable of operating as a TCP active node when using the MSG-SNDE function, and as a TCP specified passive node or TCP non-specified passive node when using the MSG-RCVE function.

6. Create a ladder program for send data to the send data area in the file memory on network connection 1.

Note: Refer to the following manual for information on ladder programming using the SPW instruction.
Manual for the 2PORT-EFR Module from JTEKT Corporation

This concludes the setup.

◆ Starting Communications

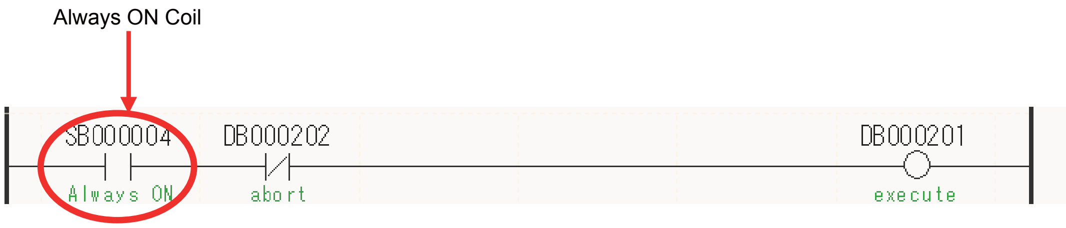
Use the following procedure to write the data in the file memory in the JTEKT PLC to the hold registers in the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.

In the ladder programming example, the message receive function is executed immediately after the scan starts in the MP3000. While the Machine Controller is operating, a normally ON coil is used to keep the message receive function executing.

2. Start the processing to open connection 3 from the JTEKT PLC to start data transmissions.

Note: The MP3000 will wait for the TCP connection after it starts execution of the MSG-RCVE function. Therefore, the power supply to the MP3000 must be turned ON before the power supply to the JTEKT PLC.

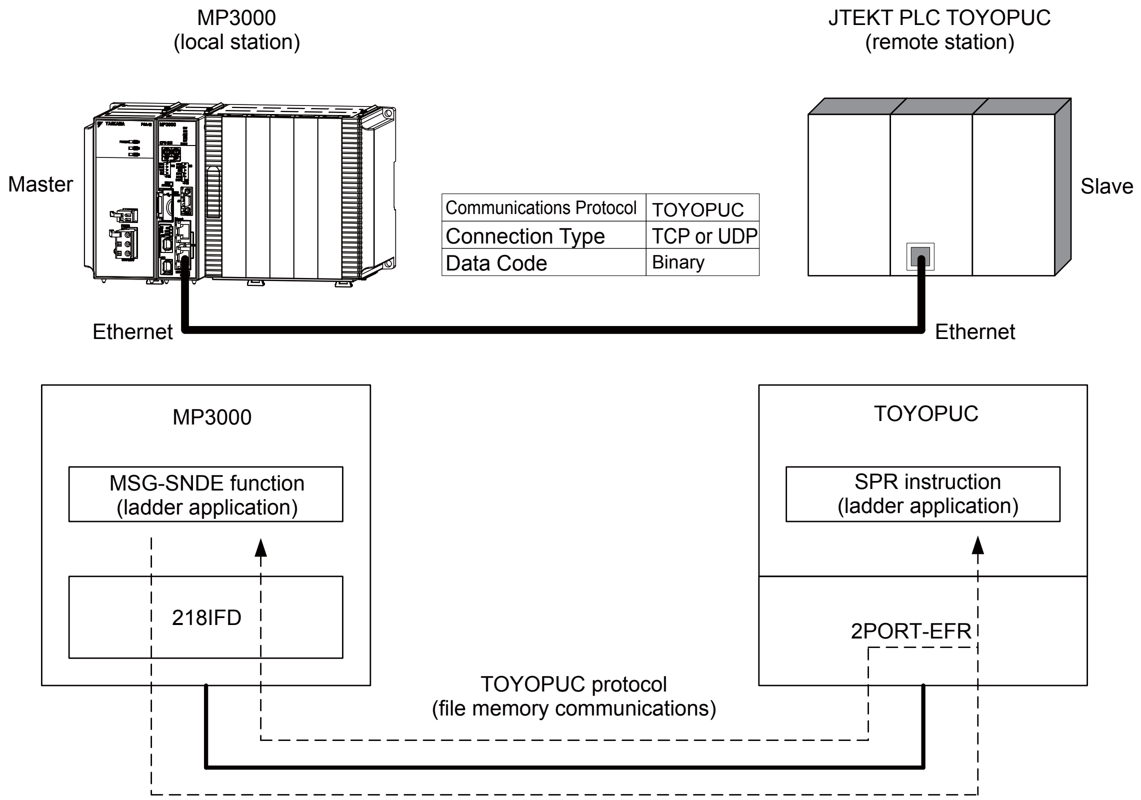


Using the MSG-SNDE Function with the MP3000 as the Master

This section describes how to communicate with a JTEKT PLC by using the MSG-SNDE function.

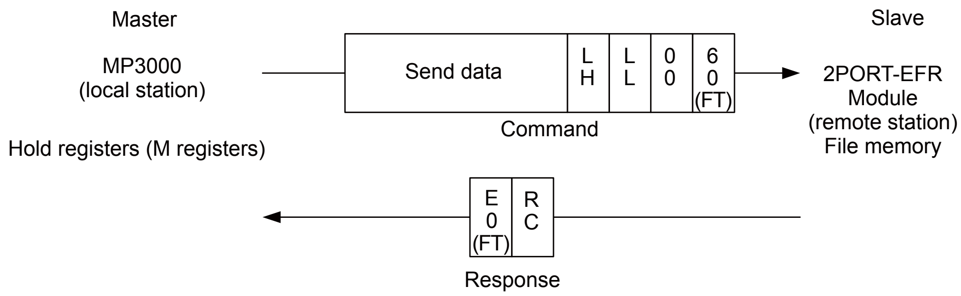
When a JTEKT PLC is used as the master to read data from the file memory in the 2PORT-EFR, you will need to create a ladder application that uses the SPR instruction.

> Note
> The SPR instruction is used to read data from the file memory in the 2PORT-EFR.
> Refer to the following manual for details.
> *Manual for the 2PORT-EFR Module* from JTEKT Corporation



Communications Format

The MP3000 acts as a master and sends data and receives responses using the communications formats for file memory commands that are shown below. Execution of the MSG-SNDE function ends when the response is received.



Note: In the figure shown above, the Ethernet header, TCP/UDP header, FCS and other items have been omitted. Only the data portion of the communications format is shown.

File Memory and Corresponding Registers in the MP3000

The following table shows the relationship between registers in the MP3000 and the receive data area of file memory in the 2PORT-EFR.

Regardless of the connection number of the 2PORT-EFR, the MP3000 can store the data from any hold registers into the receive data area in the file memory.

To specify the data to send, use the data address parameter (PARAM14 and PARAM15) and the hold register offset parameter (PARAM20, PARAM21 and PARAM22) of the MSG-SNDE function. Thus, if PARAM14 and PARAM15 are set to 10,000 and PARAM20 and PARAM21 are set to 20,000, and PARAM22 is set to 0, the data sent to the 2PORT-EFR will be read out of the registers from MW30000, which is the sum of MW10000 and MW20000.

Data Range		
2PORT-EFR Module		MP3000 Hold Register Data Area Addresses
File Memory Data Area	File Memory Sending/ Receiving Data Area Addresses	
Connection 1	1800: Data size, 1802 to 1FFD: Receive data	MW00000 to MW65534
Connection 2	2800: Data size, 2802 to 2FFD: Receive data	
Connection 3	3800: Data size, 3802 to 3FFD: Receive data	
Connection 4	4800: Data size, 4802 to 4FFD: Receive data	
Connection 5	5800: Data size, 5802 to 5FFD: Receive data	
Connection 6	6800: Data size, 6802 to 6FFD: Receive data	
Connection 7	7800: Data size, 7802 to 7FFD: Receive data	
Connection 8	8800: Data size, 8802 to 8FFD: Receive data	

Note: The data address setting and hold register offset setting in the MSG-SNDE function allow you to make any address between MW00000 and MW65534 the first address of the send data.

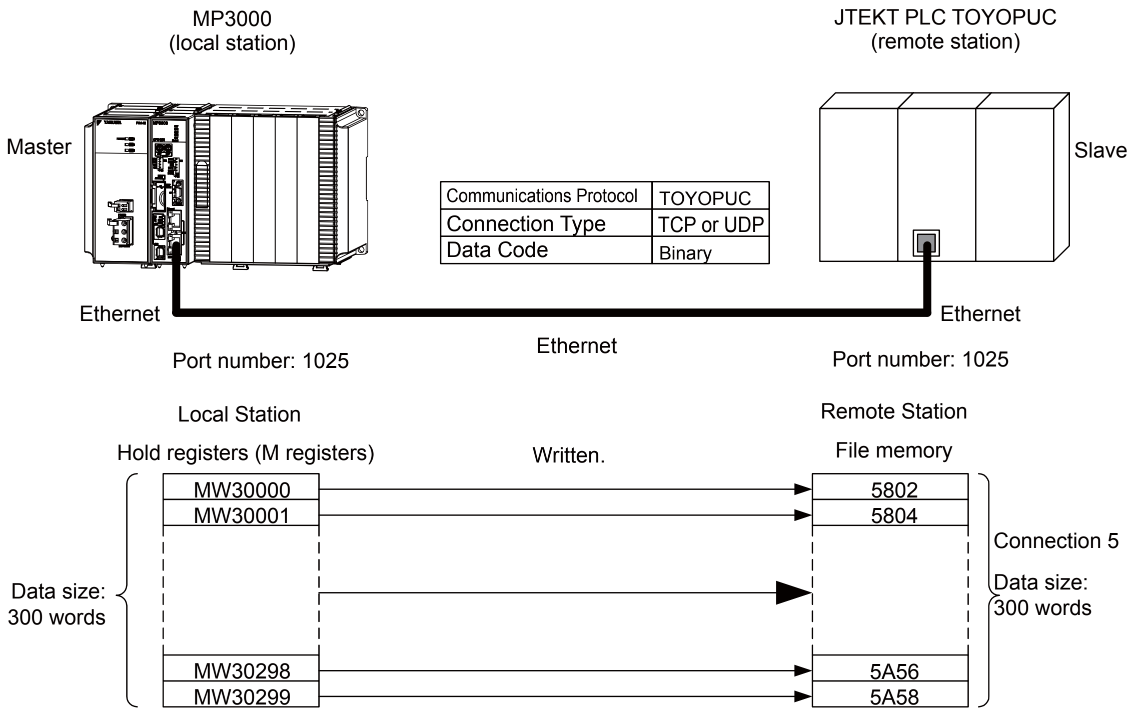
Transfer Size

The following table lists the size of data that can be transferred using the MSG-SNDE function.

Applicable Model	Data Size
MP3000	1 to 1,022 words Specify the number of whole words.

Setting Example

The following figure illustrates how the contents of the 300 words from the MW30000 to MW30299 hold registers in the MP3000 master are written to the 5802 to 5A59 file memory addresses in the JTEKT PLC slave.

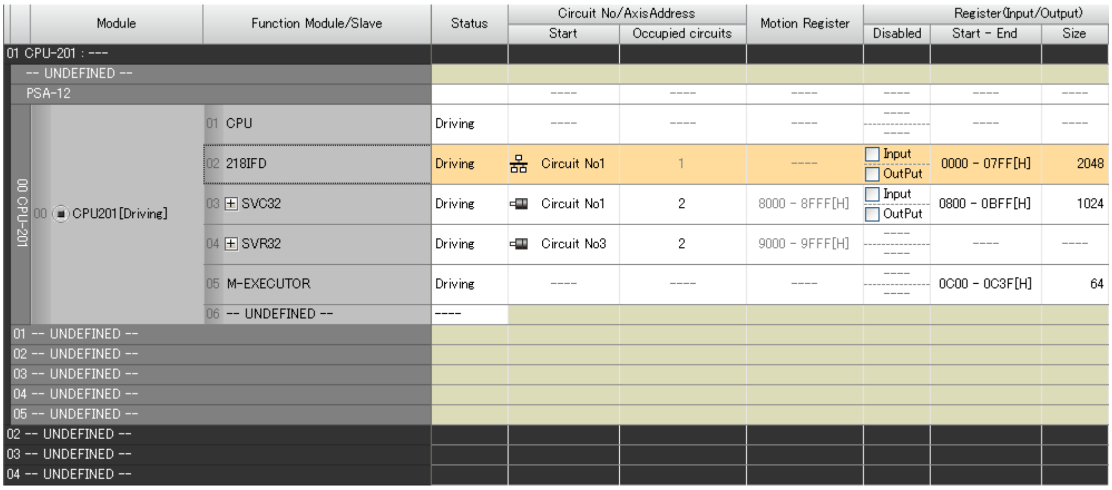


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

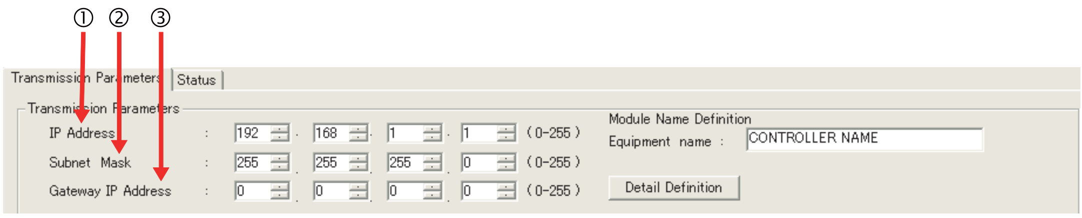
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



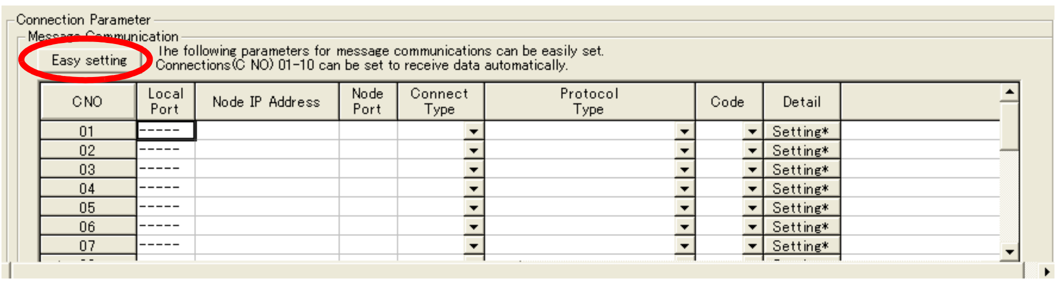
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



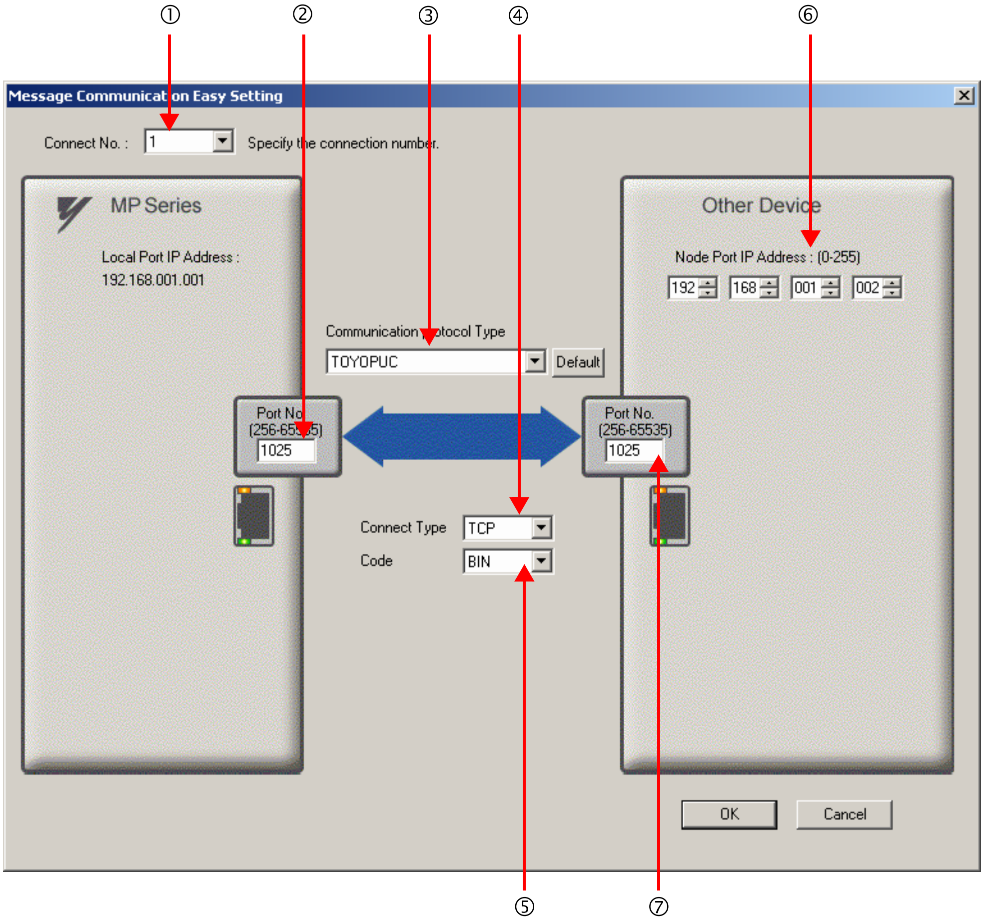
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



①Select **1** in the **Connect No.** Box.
②Enter “1025” in the **Port No.** Box for the MP-series Controller.
③Select **TOYOPUC** in the **Communication Protocol Type** Box.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter “1025” in the **Port No.** Box for the other device.

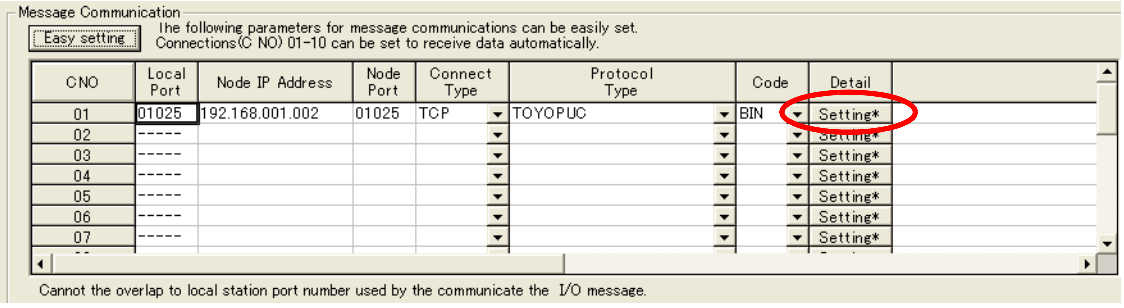
Note: 1. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.
2. If the MP3000 is the master, or the client in the connection, specify a full passive connection by setting the IP address and port number for the remote device to non-zero values.
3. If communicating by UDP, select **UDP** in the **Connect Type** Box.

5. Click the **OK** Button.

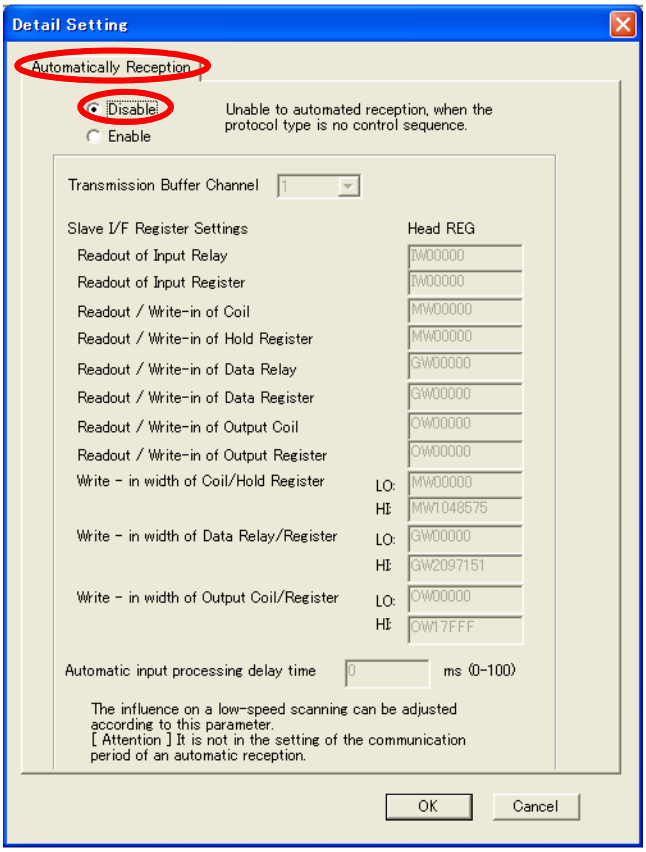
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



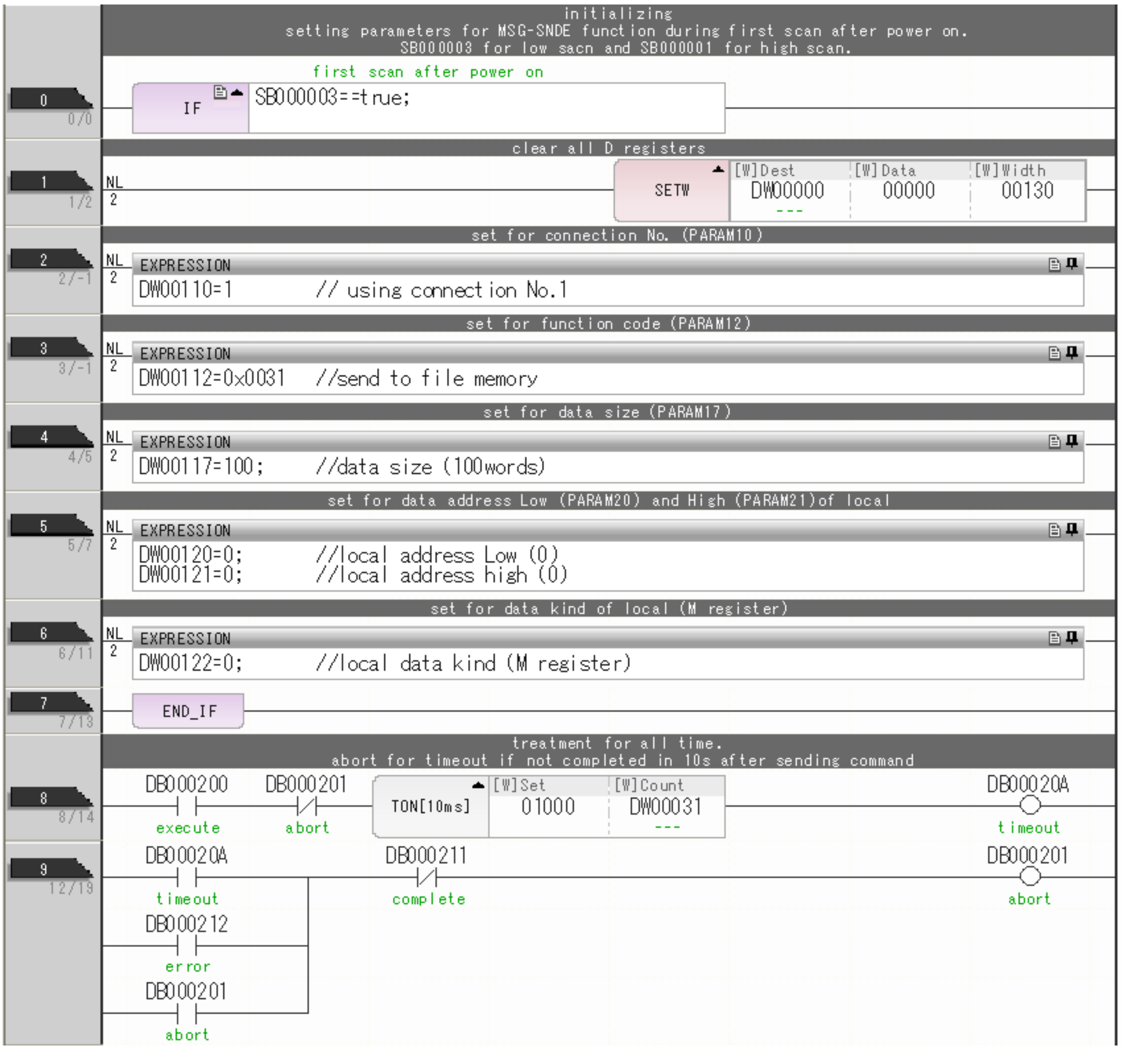
8. Click the **Disable** Option on the Automatically Reception Tab Page.

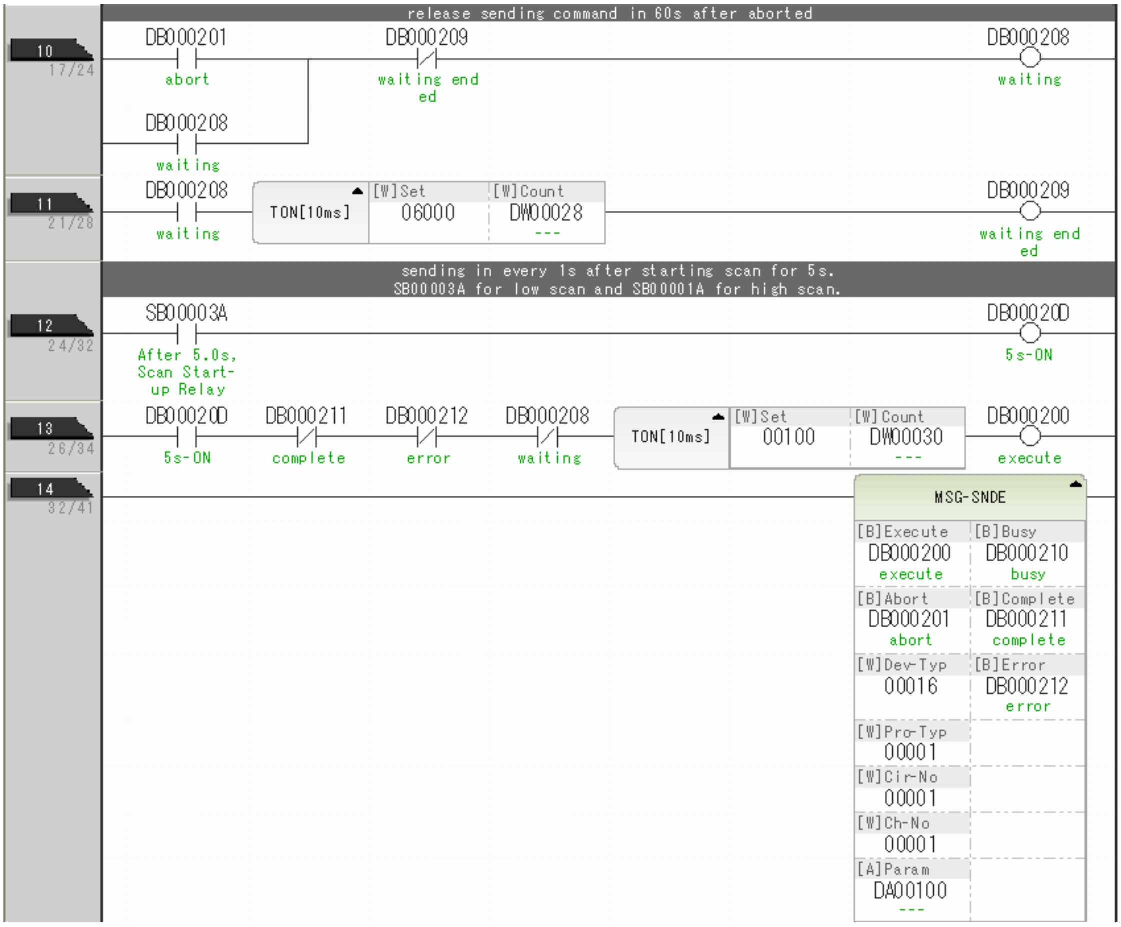


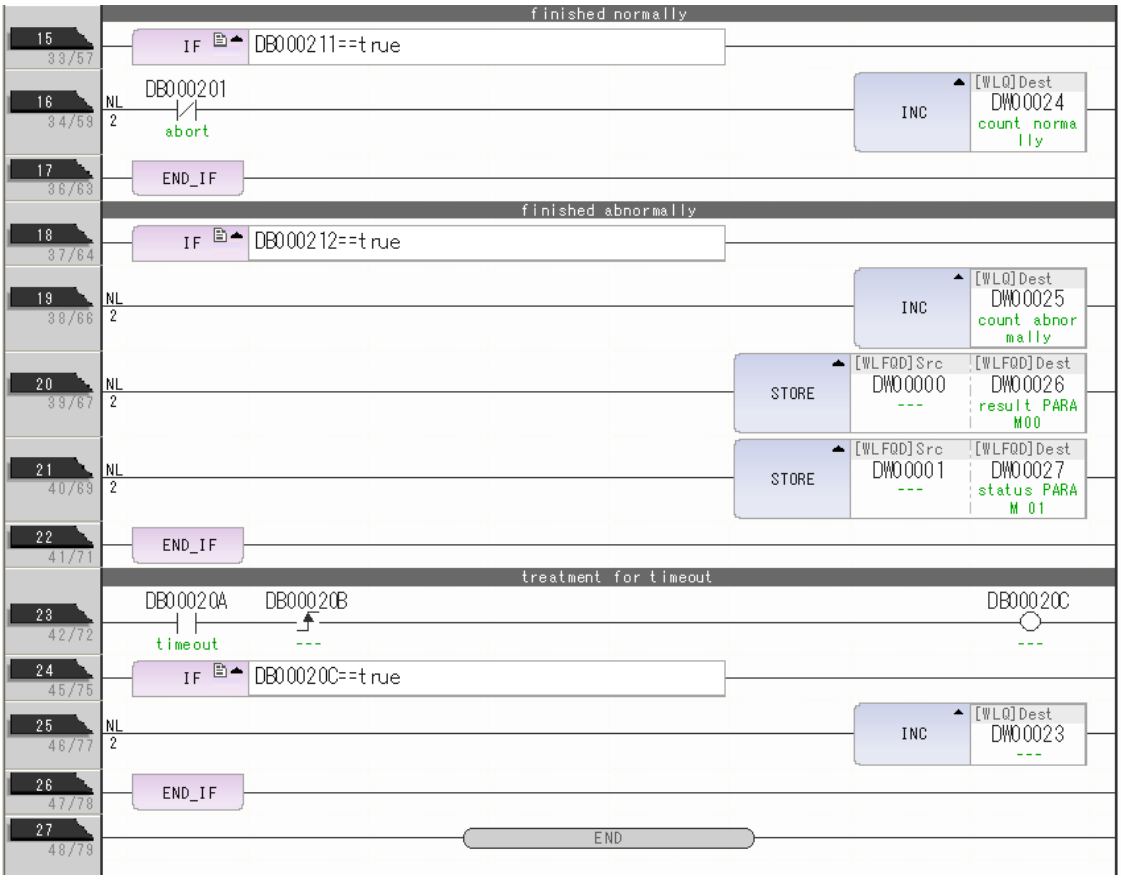
Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

9. Create a ladder program for the MSG-SNDE function.

A ladder program example is shown below.




release sending command in 60s after aborted
DB000201
abort
DB000209
waiting end ed
DB000208
waiting
DB000208
waiting
DB000208
waiting
TON[10ms]
[W]Set
06000
[W]Count
DW00028
DB000209
waiting end ed
sending in every 1s after starting scan for 5s.
SB00003A for low scan and SB00001A for high scan.
SB00003A
After 5.0s, Scan Start-up Relay
DB00020D
5s-ON
DB00020D
5s-ON
DB000211
complete
DB000212
error
DB000208
waiting
TON[10ms]
[W]Set
00100
[W]Count
DW00030
DB000200
execute
MSG-SNDE
[B]Execute
DB000200
execute
[B]Busy
DB000210
busy
[B]Abort
DB000201
abort
[B]Complete
DB000211
complete
[W]Dev-Typ
00016
[B]Error
DB000212
error
[W]Pro-Typ
00001
[W]Cir-No
00001
[W]Ch-No
00001
[A]Param
DA00100



10. Save the data to flash memory.

This concludes the settings for using the MP3000 as the master.

◆ Setting the Remote Device (JTEKT PLC)

Use the following procedure to set up the JTEKT TOYOPUC PLC.

Note

TOYOPUC PLCs are manufactured by JTEKT Corporation.
Refer to the following manual for details.
Manual for the 2PORT-EFR Module from JTEKT Corporation

1. Set the Ethernet settings and baud rate using the DIP switch on the 2PORT-EFR Module.
2. Start the PCWIN.
3. Set up the I/O Module. The identification code for a 2PORT-EFR module that has been set up to use Ethernet communications is “B3”.
4. Set the link module name. In the **Link Parameter** Dialog Box, select the rack number and slot number to assign to the 2PORT-EFR module, and set the link module name to **Ethernet**.
5. Set the communications parameters.

Ethernet Settings Example

Parameter	Description
Own Node IP Address	192.168.1.2
Connection 5	Use
Open Protocol	TCP Active Open
Own Node Port No.	1025
Other Node Table No.	1

Other Node Table Settings Example

Parameter	Description
Table 1	Use
Other Node IP Address	192.168.1.1
Other Node Port No.	1025

Timers Settings Example

Parameter	Description
Reset Wait Resending Times	As required.
Non-Reception Timer	As required.
Response Timer	As required.
Resending Timer (Data)	As required.
Resending Timer (SYN/FIN)	As required.
Close Timer	As required.
Packet Alive Time	As required.
IP Assembly Timer	As required.

Subnet Mask and Gateway IP Address Settings Example

Parameter	Description
Subnet Mask	255.255.255.0
Gateway IP Address	As required.

Note: When communicating with TCP and the open protocol setting on the 2PORT-EFR is set to TCP Active Open, execute the MSG-RCVE function on the MP3000 to receive messages. If the open protocol setting on the 2PORT-EFR is set to **TCP Destination** – **Specified Passive**, or **TCP Non-Specified Passive**, execute the MSG-SNDE function in the MP3000. The MP3000 is capable of operating as a TCP active node when using the MSG-SNDE function, and as a TCP specified passive node or TCP non-specified passive node when using the MSG-RCVE function.

6. Create a ladder program for receive data from the receive data area in the file memory on network connection 5.

Note: Refer to the following manual for information on ladder programming using the SPR instruction.
Manual for the 2PORT-EFR Module from JTEKT Corporation

This concludes the setup.

◆ Starting Communications

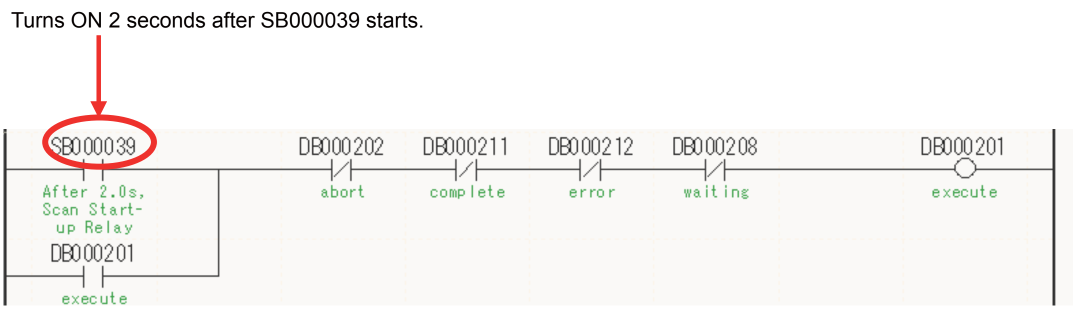
Use the following procedure to write the data in the hold registers in the MP3000 to the file memory of the JTEKT PLC.

1. Start the JTEKT PLC in **TCP Destination - Specified Passive** mode.

2. Turn ON the power to the MP3000 to start transmitting messages.

The ladder program example is designed to turn ON the Execute Bit (DB000201) in the message send function after two seconds has elapsed from when the low-speed scan (or high-speed scan) starts. Thereafter, the message send function is executed continuously by alternating the Execute Bit (DB000201) between OFF and ON each time the message send function completes execution normally or with an error.

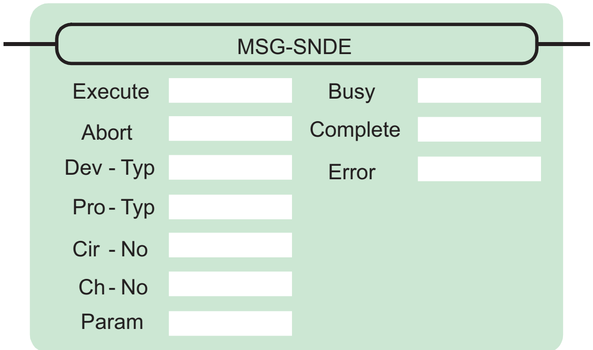
Note: The MP3000 will establish the TCP connection when it starts execution of the MSG-SNDE function.



Message Functions

The message functions are used in user communications applications for the TOYOPUC protocol. You can send and receive message data by setting the necessary input items and parameters for the message functions. Message communications using the TOYOPUC protocol can be carried out with the same settings used for MEMOBUS messages.

Inputs and Outputs for the MSG-SNDE Function

Function Name	MSG-SNDE			
Function	Sends a message to a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Meaning
Input Items	1	Execute	B-VAL	Executes the transmission.
	2	Abort	B-VAL	Forces the transmission to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message transmission.

When the Execute Bit turns ON, the message will be sent.

> **Note**
> Keep the Execute Bit ON until the Complete or Error Bit turns ON. To send another message, turn OFF the Execute Bit for at least one scan and then turn it ON again.

◆ Abort

Specify the bit to use to abort the message transmission.

When the Abort Bit turns ON, the message transmission will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Communications Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

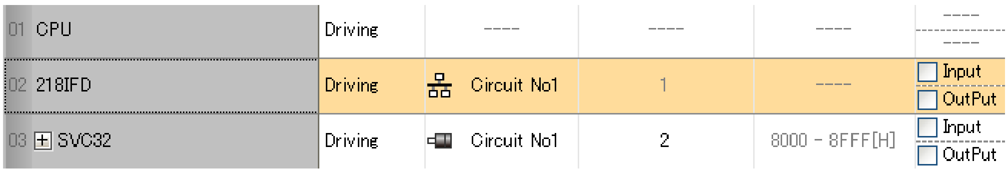
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the TOYOPUC protocol. MEMOBUS is automatically converted to the TOYOPUC protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the TOYOPUC protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the TOYOPUC protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> **Note**
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> **Note**
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 29 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting function codes and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List (F ··· ···· ···· ··· 0)
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00023	PARAM23
DW00024	PARAM24
DW00025	PARAM25
DW00026	PARAM26
DW00027	PARAM27
DW00028	PARAM28

◆ Busy

Specify the bit that shows that the message transmission is in progress.

The Busy Bit is ON while a message transmission or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message transmission has been completed.

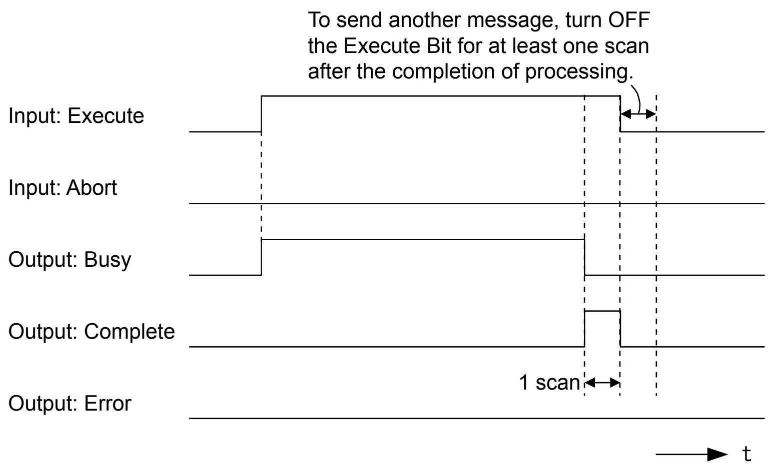
The Complete Bit turns ON only for one scan when message transmission or forced abort processing has been completed normally.

◆ Error

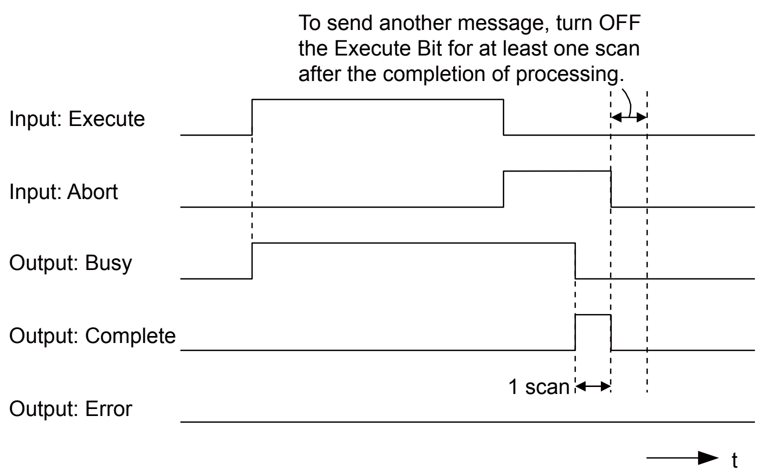
Specify the bit that shows if an error occurred when sending the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-SNDE function.

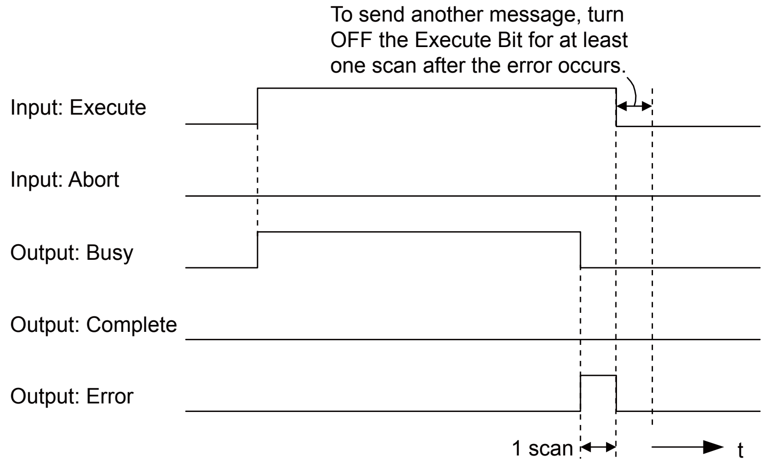
- Normal Execution



- When Execution Is Aborted



- Execution When an Error Occurs



MSG-SNDE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-SNDE function.

No.		I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11		Option	Not used for the TOYOPUC protocol.
	12		Function Code	Sets the code of the function in the TOYOPUC protocol.
	13		Reserved for system.	–
	14		Remote Station Data Address, Lower Word	Sets the data address to read/write at the remote station. (Use word addresses for registers, bit addresses for relays or coils.)
	15		Remote Station Data Address, Upper Word	
	16		Remote Station Register Type	Sets the register type to read/write at the remote station.
	17		Data Size	Sets the size of the data to read/write. (Use word sizes for registers, bit sizes for relays or coils.)
	18		Remote CPU Module Number	Not used for the TOYOPUC protocol.
	19		Reserved for system.	–
	20		Local Station Data Address, Lower Word	Sets the data address to store read/write data in the local station. (Use word addresses for registers, bit addresses for relays or coils.)
	21		Local Station Data Address, Upper Word	
	22		Local Station Register Type	Sets the register type of the read/write data to store in the local station.
	23		Reserved for system.	–

Continued on next page.

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No.		I/O	Meaning	Description
System	24	–	For system use	–
	25		Reserved for system.	–
	26		Reserved for system.	–
	27		Reserved for system.	–
	28		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

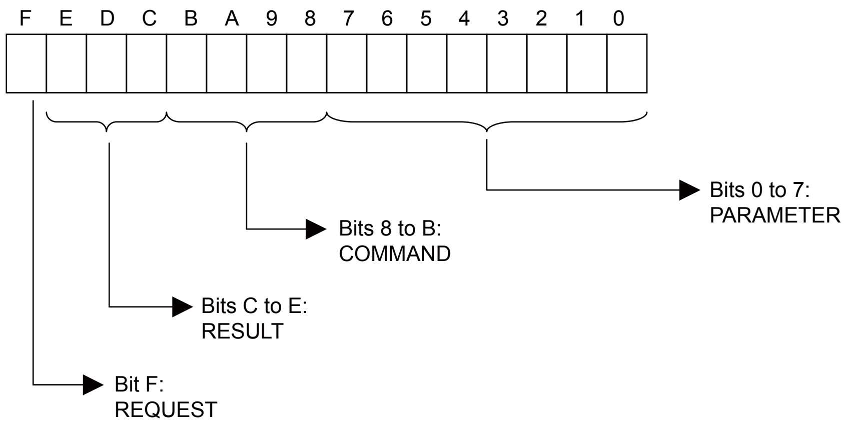
Refer to the following section for details on errors.

☞ *◆ Detail Error Code (PARAM02 and PARAM03) (page 2-298)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-SNDE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution result of the MSG-SNDE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-SNDE function.

Code	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT = 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was sent or received. Check PARAM12 (Function Code).
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Remote Station Data Address) PARAM20 and PARAM21 (Local Station Data Address)
83□□ hex	3	Data size error	The data size for sending or receiving is out of range. Check PARAM17 (Data Size).
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-SNDE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-SNDE function.
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-SNDE function.
C245 hex	–	Local station register type error	The register type for the local station is out of range. Check PARAM22 (Local Station Register Type).
8072 hex to FF72 hex		Remote device error*	An error response was received from the remote station. Check the error code and remove the cause.

* An error response received from the remote device will be formatted in PARAM00 (Processing Result) as follows.
Processing Result (PARAM00): □□72 hex (where □□ is the error code)
□□ contains the sum of the completion code sent from the JTEKT PLC and 80 hex.
Refer to the following manual for details on completion codes.
📖 *Manual for the 2PORT-EFR Module* from JTEKT Corporation

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

Note: The status is updated when the function is executed in each scan.

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number.
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

Note: The status is updated when the function is executed in each scan.

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

Note: The status is updated when the function is executed in each scan.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

Note: The status is updated when the function is executed in each scan.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

Note: The status is updated when the function is executed in each scan.

◆ Status 6 (PARAM09)

This parameter is not used for the TOYOPUC protocol.

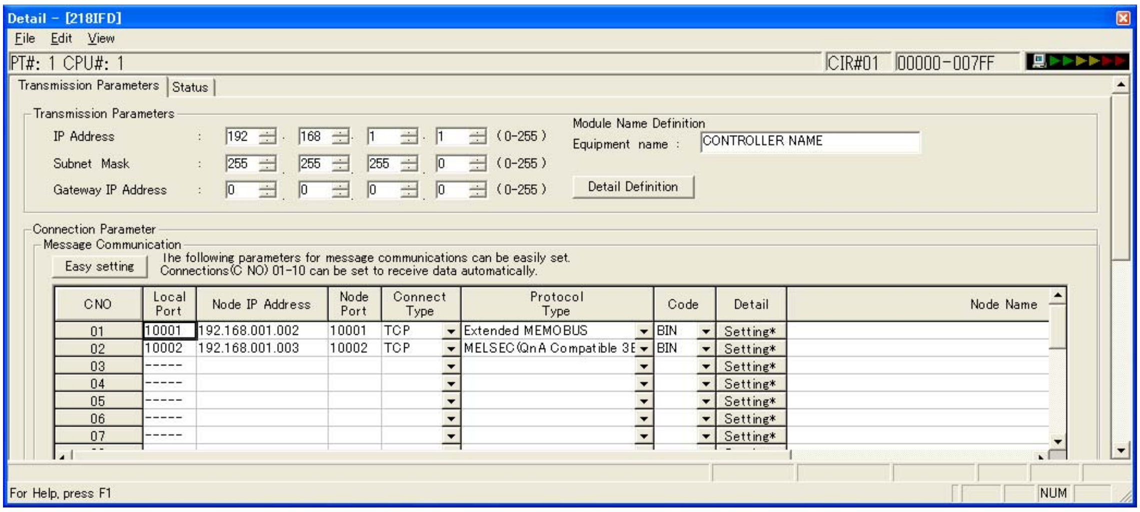
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Description
218IFD	1 to 20	Specifies the connection number of the remote station to send the message to.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the TOYOPUC protocol.

◆ Function Code (PARAM12)

Set the function code to send.

You can use the functions that are registered to the function codes.

MEMOBUS Function		File Memory Frame Type	
Code	Meaning	Code	Function
31 hex	Writes to a fixed buffer in units of one word.	60 hex: Command E0 hex: Response	Sends file memory data.

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Remote Station Data Address (PARAM14 and PARAM15)

Set the first address for data in the remote station.

Enter the first address as a decimal or hexadecimal number.

Example If the first address is MW01000, enter “1000” (decimal) or “3E8” (hexadecimal).

MP3000		2PORT-EFR	
Data Address Setting Range	Corresponding Register Addresses	Data Area	Address Range
0 to 65534	MW00000 to MW65534	File memory	Connection number: As required. Stores data from the first address in the receive data area.

Note: 1. The address in the file memory area in the 2PORT-EFR cannot be specified.
2. Specify the connection number to the 2PORT-EFR in the Connection Parameter Area in the 218IFD Detail Definition Dialog Box. This is the connection number that is assigned to the specified destination port number in the destination port number setting.

◆ Remote Station Register Type (PARAM16)

This parameter is not used for the TOYOPUC protocol.

◆ Data Size (PARAM17)

Set the data size for the read/write request as the number of bits or words.

Be sure that the last data address that is determined by the offset, data address, and data size does not exceed the valid data address range.

MEMOBUS Function Code	Function	Data Size Setting Range
31 hex	Sends data to the file memory.	1 to 1,022 words

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the TOYOPUC protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Local Station Data Address (PARAM20 and PARAM21)

These parameters set the first address where the write data is stored in the MP3000.

The address is set as the word offset from address 0.

◆ Local Station Register Type (PARAM22)

Set the register type of the read data destination or write data source in the MP3000.

Register Type Value	Type	Remarks
0	M	Sets the target data type to MB for bits and MW for words.
1	G	Sets the target data type to GB for bits and GW for words.
2	I	Sets the target data type to IB for bits and IW for words.
3	O	Sets the target data type to OB for bits and OW for words.
4	S	Sets the target data type to SB for bits and SW for words.
5 or higher	–	Not used for the TOYOPUC protocol.

The register types that can be used depend on whether you are reading or writing.

The following table lists the combinations of register types.

Function Code	Applicable Register Types
31H	M, G, I, O, or S

* You can store the write data address table in registers in the local station.
The data stored in the M, G, I, O, and S registers in the local station can be read from or written to the remote station by specifying the data type in the write data address table.

◆ Reserved for System (PARAM23)

This parameter is used by the system.

> Note
> Do not change the value of PARAM23 from a user program or by any other means.

◆ For System Use (PARAM24)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

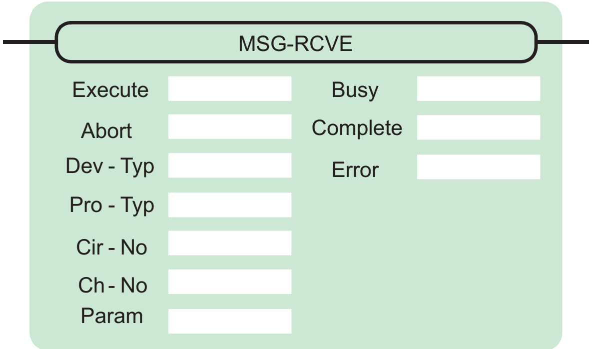
> Note
> A user program must set PARAM24 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM24 from a user program or by any other means. PARAM24 will be used by the system.

◆ Reserved for System Use (PARAM25 to PARAM28)

This parameter is used by the system.

> Note
> Do not change the values of PARAM25 to PARAM28 from a user program or by any other means.

Inputs and Outputs for the MSG-RCVE Function

Function Name	MSG-RCVE			
Function	Receives a message from a remote station on the specified circuit of the communications device type. This function can be used with various protocols.			
Function Definition				
I/O Definitions	No.	Name	I/O Designation	Meaning
Input Items	1	Execute	B-VAL	Executes the reception.
	2	Abort	B-VAL	Forces the reception to end.
	3	Dev-Typ	I-REG	Communications device type 218IFD = 16
	4	Pro-Typ	I-REG	Communications Protocol MEMOBUS = 1, No-protocol communications 1 = 2, No-protocol communications 2 = 3
	5	Cir-No	I-REG	Circuit number 218IFD = 1 to 8
	6	Ch-No	I-REG	Communications buffer channel number 218IFD = 1 to 10
	7	Param	Address input	First address of parameter list (MA or DA)
Output Items	1	Busy	B-VAL	Processing.
	2	Complete	B-VAL	Process completed.
	3	Error	B-VAL	Error occurred.

◆ Execute

Specify the bit to use to execute the message reception.

When the Execute Bit turns ON, the message will be received.

◆ Abort

Specify the bit to use to abort the message reception.

When the Abort Bit turns ON, the message reception will be stopped unconditionally. The Abort Bit takes precedence over the Execute Bit.

◆ Dev-Typ (Communications Device Type)

Specify the type code of the communications device.

Device	Type Code
218IFD	16

◆ Pro-Typ (Communications Protocol)

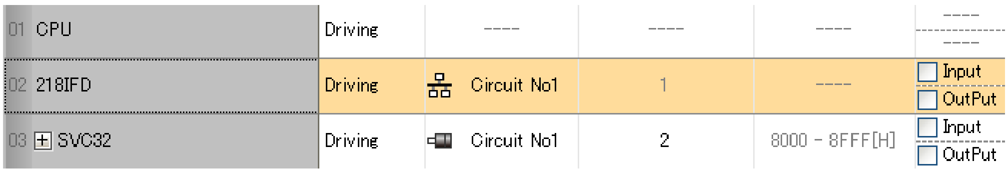
Specify the type code of the communications protocol.

Type Code	Communications Protocol	Remarks
1	MEMOBUS	Select this protocol when using the TOYOPUC protocol. MEMOBUS is automatically converted to the TOYOPUC protocol inside the 218IFD.
2	No-protocol communications 1 (unit: words)	This code is not used for the TOYOPUC protocol.
3	No-protocol communications 2 (unit: bytes)	This code is not used for the TOYOPUC protocol.

◆ Cir-No (Circuit Number)

Specify the circuit number for the communications device.

Specify the same circuit number as displayed in the MPE720 Module Configuration Definition Tab Page.



The following table gives the valid circuit numbers.

Communications Device	Valid Circuit Numbers
218IFD	1 to 8

◆ Ch-No (Communications Buffer Channel Number)

Specify the channel number of the communications buffer.

You can specify any channel number provided it is within the valid range.

> Note
>
> When executing more than one function at the same time, do not use the same channel number for the same connection. You can use the same channel number as long as multiple functions are not executed at the same time.

The following table gives the valid channel numbers.

Communications Device	Valid Channel Numbers
218IFD	1 to 10

If the communications device is the 218IFD, there are 10 channels of communications buffers available for both transmission and reception. Therefore, 10 connections may be used for sending and receiving at the same time by using channels 1 to 10.

> Note
>
> There must be as many MSG-SNDE or MSG-RCVE functions as the number of connections used at the same time.

◆ Param (First Address of Parameter List)

Specify the first address of the parameter list.

A total of 52 words starting from the specified first word are automatically used for the parameter list. The parameter list is used by inputting the connection number and relevant parameter data. It is also where the process results and status are output.

Example A parameter list with the first address set to DA00000 is shown below.

Registers	Parameter List F ··· ···· ···· ··· 0
DW00000	PARAM00
DW00001	PARAM01
DW00002	PARAM02
DW00003	PARAM03
DW00004	PARAM04
DW00005	PARAM05
DW00006	PARAM06
DW00007	PARAM07
⋮	⋮
DW00046	PARAM46
DW00047	PARAM47
DW00048	PARAM48
DW00049	PARAM49
DW00050	PARAM50
DW00051	PARAM51

◆ Busy

Specify the bit that shows that the message reception is in progress.

The Busy Bit is ON while a message reception or abort is in progress.

Keep the Execute Bit or Abort Bit turned ON while the Busy Bit is ON.

◆ Complete

Specify the bit that shows when the message reception has been completed.

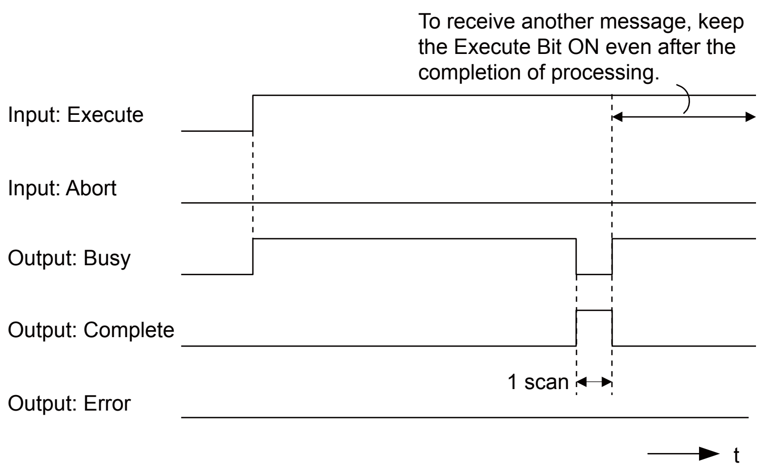
The Complete Bit turns ON only for one scan when message reception or forced abort processing has been completed normally.

◆ Error

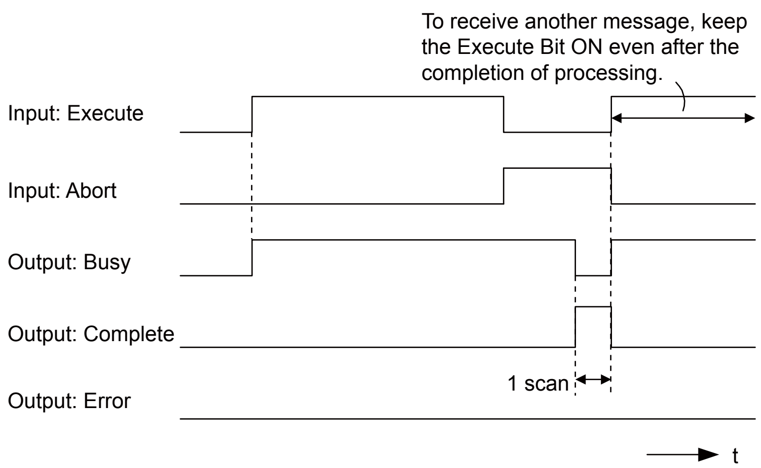
Specify the bit that shows if an error occurred while receiving the message.
When an error occurs, the Error Bit will turn ON only for one scan.

The following diagrams show timing charts for the bit I/O items in the MSG-RCVE function.

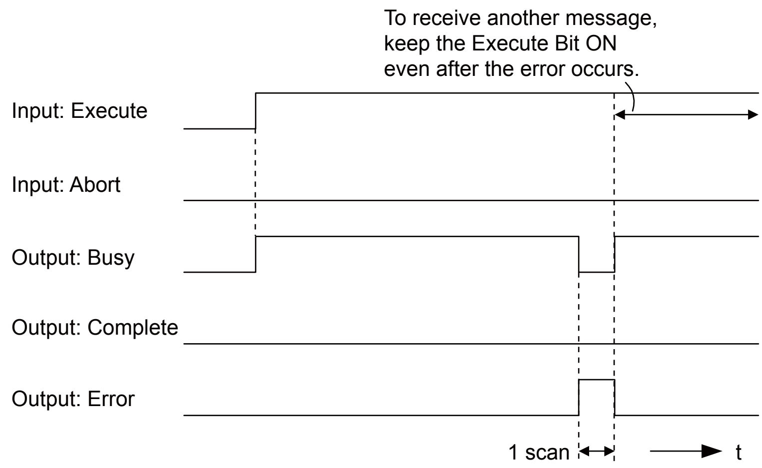
- Normal Execution



- When Execution Is Aborted



• Execution When an Error Occurs



MSG-RCVE Function Parameters

The following table describes the contents of the addresses specified by the PARAM input parameter to the MSG-RCVE function.

No.		I/O	Meaning	Description
Status	00	Outputs	Processing Result	Gives the processing status.
	01		Status	Gives the status of the current function.
	02		Detail Error Code, Lower Word	Gives the details of an error.
	03		Detail Error Code, Upper Word	
	04		Status 1	Gives the communications status.
	05		Status 2	Gives status information on the most recent error.
	06		Status 3	Gives the value of the send pass counter.
	07		Status 4	Gives the value of the receive pass counter.
	08		Status 5	Gives the value of the error counter.
	09		Status 6	Reserved for system.

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No.		I/O	Meaning	Description
Parameters	10	Inputs	Connection Number	Sets the connection number used to determine the remote station.
	11	I/O	Option	Not used for the TOYOPUC protocol.
	12	Outputs	Function Code	Gives the function code requested by the remote station.
	13	I/O	Reserved for system.	–
	14	Outputs	Data Address, Lower Word	Gives the first address of the data that was requested by the remote station.
	15		Data Address, Upper Word	
	16		Register Type	Gives the register type that was requested by the remote station.
	17		Data Size	Gives the data size that was requested by the remote station.
	18		Remote CPU Module Number	Not used for the TOYOPUC protocol.
	19	I/O	Reserved for system.	–
	20	Inputs	Coil Offset, Lower Word	Sets the offset word address for a coil (MB).
	21		Coil Offset, Upper Word	
	22		Input Relay Offset, Lower Word	Sets the offset word address for an input relay (IB).
	23		Input Relay Offset, Upper Word	
	24		Input Register Offset, Lower Word	Sets the offset word address for an input register (IW).
	25		Input Register Offset, Upper Word	
	26		Hold Register Offset, Lower Word	Sets the offset word address for a hold register (MW).
	27		Hold Register Offset, Upper Word	
	28		Data Relay Offset, Lower Word	Sets the offset word address for a data relay (GB).
	29		Data Relay Offset, Upper Word	
	30		Data Register Offset, Lower Word	Sets the offset word address for a data register (GW).
	31		Data Register Offset, Upper Word	
	32		Output Coil Offset, Lower Word	Sets the offset word address for an output coil (OB).
	33		Output Coil Offset, Upper Word	
	34		Output Register Offset, Lower Word	Sets the offset address for an output register (OW).
	35		Output Register Offset, Upper Word	
	36		M Register Writing Range LO, Lower Word	Sets the first address of the writing range for hold register coils.
	37		M Register Writing Range LO, Upper Word	
	38		M Register Writing Range HI, Lower Word	Sets the last address of the writing range for hold register coils.
	39		M Register Writing Range HI, Upper Word	
	40		G Register Writing Range LO, Lower Word	Sets the first address of the writing range for data register data relays.
	41		G Register Writing Range LO, Upper Word	
	42		G Register Writing Range HI, Lower Word	Sets the last address of the writing range for data register data relays.
	43		G Register Writing Range HI, Upper Word	
	44		O Register Writing Range LO, Lower Word	Sets the first address of the writing range for output registers.
	45		O Register Writing Range LO, Upper Word	
	46		O Register Writing Range HI, Lower Word	Sets the last address of the writing range for output registers.
	47		O Register Writing Range HI, Upper Word	
System	48	–	For system use	–
	49		Reserved for system.	–
	50		Reserved for system.	–
	51		Reserved for system.	–

◆ Processing Result (PARAM00)

This parameter gives the processing result.

Processing Result Value	Meaning
00xx hex	Busy
10xx hex	Complete
8yxx hex	Error

Note: The lower byte is used for system analysis.

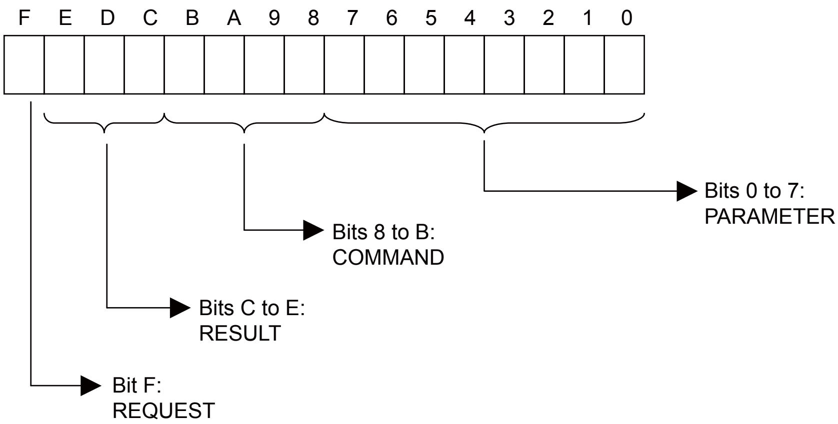
Refer to the following section for details on errors.

☞ ◆ *Detail Error Code (PARAM02 and PARAM03) (page 2-310)*

◆ Status (PARAM01)

This parameter gives the status of the communications device.

The following figure shows the bit assignments and it is followed by a detailed description of each assignment.



■ REQUEST

This bit gives the status of the processing request for the MSG-RCVE function.

Bit Status	Meaning
1	Processing is being requested.
0	Processing request has ended.

■ RESULT

These bits give the execution result of the MSG-RCVE function.

Code	Abbreviation	Meaning
0	CONN_NG	The message send failed or connection ended with an error in Ethernet communications.
1	SEND_OK	The message was sent normally.
2	REC_OK	The message was received normally.
3	ABORT_OK	The request to abort execution was completed.
4	FMT_NG	A parameter formatting error occurred.
5	SEQ_NG	A command sequence error occurred.
6	RESET_NG	A reset occurred.
7	REC_NG	A data reception error (error detected in the lower-layer program) occurred.

■ COMMAND

These bits indicate the processing command of the MSG-RCVE function.

Code (Hex)	Abbreviation	Meaning
1	U_SEND	General-purpose message transmission (for no-protocol communications)
2	U_REC	General-purpose message reception (for no-protocol communications)
3	ABORT	Forced abort
8	M_SEND	MEMOBUS command transmission: Completed when response is received.
9	M_REC*	MEMOBUS command reception
C	MR_SEND*	MEMOBUS response transmission

* MR_SEND is executed after M_REC is executed.

■ PARAMETER

When RESULT = 4 (FMT_NG: parameter formatting error), these bits will indicate an error code from the following table. For any other value, the bits will contain the connection number.

RESULT	Code (Hex)	Meaning
When RESULT = 4 (FMT_NG: Parameter Formatting Error)	00	No error
	01	Connection number out of range
	02	Watchdog error for MEMOBUS response
	03	Error in number of retries setting
	04	Error in cyclic area setting
	05	CPU number error
	06	Data address error
	07	Data size error
	08	Function code error
Others	□□	Connection Number

◆ Detail Error Code (PARAM02 and PARAM03)

These parameters give the detail error code.

Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
81□□ hex	1	Function code error	An unused function code was received. Check the function code of the remote station.
82□□ hex	2	Address setting error	The setting of one or more of the following parameters is out of range. Check the settings. PARAM14 and PARAM15 (Data Address) PARAM20 and PARAM21 (Coil Offset) PARAM26 and PARAM27 (Hold Register Offset)
83□□ hex	3	Data size error	The data size for receiving is out of range. Check the data size at the remote station.
84□□ hex	4	Circuit number setting error	The circuit number is out of range. Check the circuit number (Cir-No) in the MSG-RCVE function.
85□□ hex	5	Channel number setting error	The channel number for the communications buffer is out of range. Check the communications buffer channel number (Ch-No) in the MSG-RCVE function.

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Processing Result Value (PARAM00)	Detail Error Code	Error Description	Description
86□□ hex	6	Connection number error	The connection number is out of range. Check PARAM10 (Connection Number).
88□□ hex	8	Communications device error	An error response was received from the communications device. Check the connections to the device. Also check to see if the remote device is ready to communicate.
89□□ hex	9	Device select error	A device that cannot be used was selected. Check the communications device type (Dev-Typ) in the MSG-RCVE function.

◆ Status 1 (PARAM04)

This parameter gives status information.

Status 1 Value	Meaning	Description
1	IDLE	The connection is idle.
2	WAIT	The connection is waiting to be made.
3	CONNECT	The connection is established.
–	–	–

◆ Status 2 (PARAM05)

This parameter gives information on the most recent error.

Status 2 Value	Meaning	Description
0	No error	Normal
1	Socket Creation Error	A socket could not be created.
2	Local Port Number Error	Setting error in local station port number.
3	Changing Socket Attribute Error	A system error occurred while setting the socket attribute.
4	Connection Error	M-SND: The remote station rejected an attempt to open a TCP connection.
5	Connection Error	M-RCV: An error occurred while passively opening a TCP connection.
6	System Error	A socket polling error occurred while receiving data.
7	TCP Data Send Error	The remote station does not exist.
8	UDP Data Send Error	The data send request command was sent to a socket that does not exist.
9	TCP Data Receive Error	A disconnection request was received from the remote station.
10	UDP Data Receive Error	A data receive request was executed for a socket that does not exist.
11	Changing Socket Option Error	A system error occurred while changing the socket options.
12	Data Conversion Error	Error in protocol conversion

◆ Status 3 (PARAM06)

This parameter gives the value of the send pass counter.

Status 3 Value	Meaning	Description
0 to 65535	Send Count	Counts the number of times a message was sent.

◆ Status 4 (PARAM07)

This parameter gives the value of the receive pass counter.

Status 4 Value	Meaning	Description
0 to 65535	Receive Count	Counts the number of times a message was received.

◆ Status 5 (PARAM08)

This parameter gives the value of the error counter.

Status 5 Value	Meaning	Description
0 to 65535	Error Count	Counts the number of errors that occurred during message processing.

◆ Status 6 (PARAM09)

This parameter is not used for the TOYOPUC protocol.

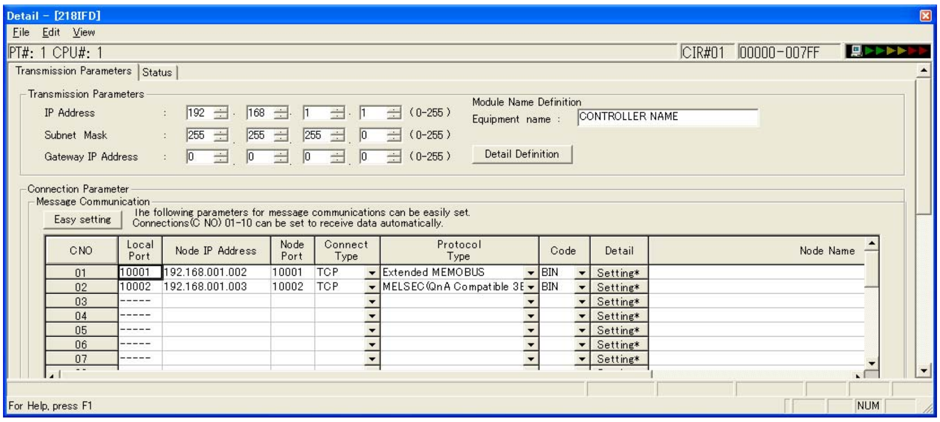
◆ Connection Number (PARAM10)

Specify the remote station.

If the communications device is the 218IFD, enter the connection number. The valid setting range is given in the following table.

Communications Device	Connection Number	Remarks
218IFD	1 to 20	Specifies the connection number of the remote station to receive the message from.

Note: Enter the same connection number as displayed in the 218IFD Detail Definition Dialog Box in the MPE720.



◆ Options (PARAM11)

This parameter is not used for the TOYOPUC protocol.

◆ Function Code (PARAM12)

This parameter gives the function code that was received.

When the MP3000 receives the file memory data sent from the 2PORT-EFR, the data is converted to the format specified in MEMOBUS command 31 hex and sent to the CPU Module.

File Memory Frame Type		MEMOBUS Function	
Code	Function	Code	Meaning
60 hex: Command E0 hex: Response	Sends file memory data.	31 hex	Writes to a fixed buffer in units of one word.

◆ Reserved for System (PARAM13)

This parameter is used by the system.

Note

Do not change the value of PARAM13 from a user program or by any other means.

◆ Data Address (PARAM14 and PARAM15)

These parameters are not used for the TOYOPUC protocol.

◆ Register Type (PARAM16)

This parameter is not used for the TOYOPUC protocol.

◆ Data Size (PARAM17)

This parameter gives the data size as the number of words to write as requested by the remote station.

◆ Remote CPU Module Number (PARAM18)

This parameter is not used for the TOYOPUC protocol.

◆ Reserved for System (PARAM19)

This parameter is used by the system.

Note

Do not change the value of PARAM19 from a user program or by any other means.

◆ Offsets (PARAM20 to PARAM27)

These parameters set the offset for the data address in the MP3000.

The MP3000 will offset the address by the number of words specified by the offset.

Note: An offset cannot be a negative value.

Offset parameters are provided for each of the target register types.

The following table lists the offset parameters.

Parameters	Meaning	Description
PARAM20 and PARAM21	Coil Offset	These parameters are not used for the TOYOPUC protocol.
PARAM22 and PARAM23	Input Relay Offset	These parameters are not used for the TOYOPUC protocol.
PARAM24 and PARAM25	Input Register Offset	These parameters are not used for the TOYOPUC protocol.
PARAM26 and PARAM27	Hold Register Offset	Sets the offset to the word address for a hold register.

◆ Data Relay Offset (PARAM28 and PARAM29)

These parameters are not used for the TOYOPUC protocol.

◆ Data Register Offset (PARAM30 and PARAM31)

These parameters are not used for the TOYOPUC protocol.

◆ Output Coil Offset (PARAM32 and PARAM33)

These parameters are not used for the TOYOPUC protocol.

◆ Output Register Offset (PARAM34 and PARAM35)

These parameters are not used for the TOYOPUC protocol.

◆ M Register Writing Range (PARAM36 to PARAM39)

These parameters set the allowable address range for write requests from the remote station. An error will occur if the write request is outside this allowable range.

Specify the M Register Writing Range (PARAM36 to PARAM39) with word addresses.

Note: 1. M registers are always used as the destination in the MP3000 for data write requests from the remote station.
2. The writing range parameters allow you to specify the range of M registers that messages are allowed to write to.

The following table lists the writing range parameters.

Parameters	Meaning	Description
PARAM36 and PARAM37	M Register Writing Range LO	First address of the writing range
PARAM38 and PARAM39	M Register Writing Range HI	Last address of the writing range

Set the writing range so that it satisfies the following condition:

0 ≤ M register writing range LO ≤ M register writing range HI ≤ Maximum M register address

◆ G Register Writing Range LO (PARAM40 and PARAM41)

These parameters are not used for the TOYOPUC protocol.

◆ G Register Writing Range HI (PARAM42 and PARAM43)

These parameters are not used for the TOYOPUC protocol.

◆ O Register Writing Range LO (PARAM44 and PARAM45)

These parameters are not used for the TOYOPUC protocol.

◆ O Register Writing Range HI (PARAM46 and PARAM47)

These parameters are not used for the TOYOPUC protocol.

◆ For System Use (PARAM48)

This parameter is used by the system. It contains the channel number of the communications buffer that is currently in use.

Note

A user program must set PARAM48 to 0 on the first scan after startup. Thereafter, do not change the value of PARAM48 from a user program or by any other means. PARAM48 will be used by the system.

◆ Reserved for System Use (PARAM49 to PARAM51)

These parameters are used by the system.

Note

Do not change the values of PARAM49 to PARAM51 from a user program or by any other means.

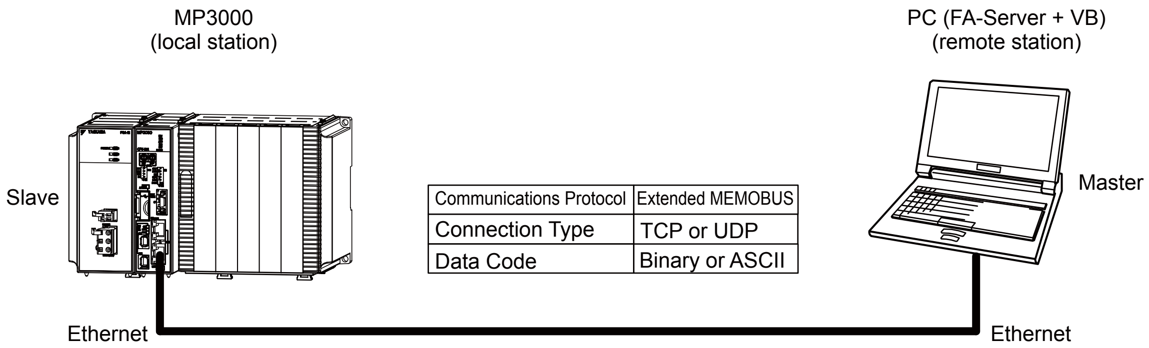
2.11 Communications with a Windows PC (FA-Server)

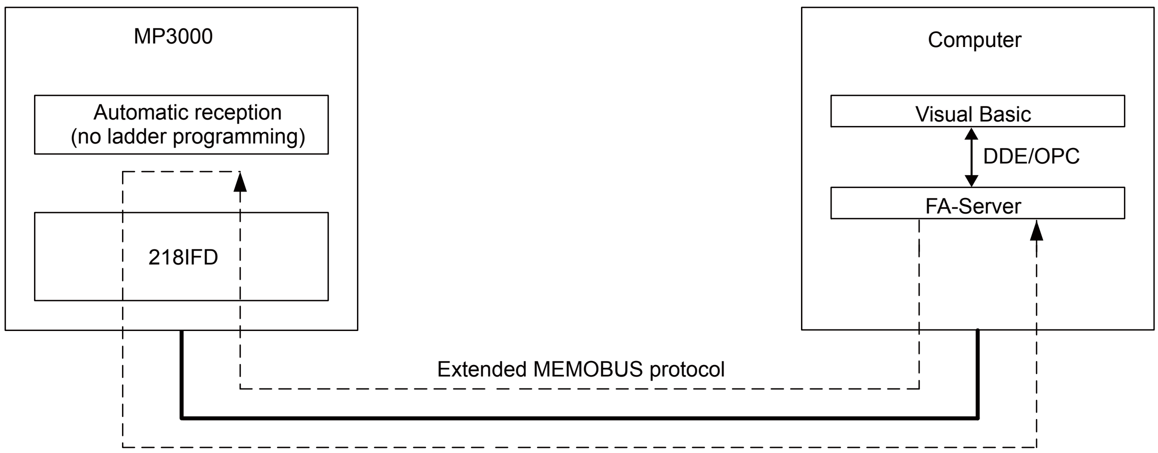
The MP3000 can communicate with a Windows PC running FA-Server over an Ethernet connection by using automatic reception.

This section describes communications when the MP3000 acts as a slave.

Using Automatic Reception with the MP3000 as a Slave

This section describes how to communicate with a Microsoft Visual Basic 6.0 application on a PC running FA-Server 4.0 (FA Series by Roboticsware, Inc) by using automatic reception. FA-Server 4.0 supports the Extended MEMOBUS protocol.

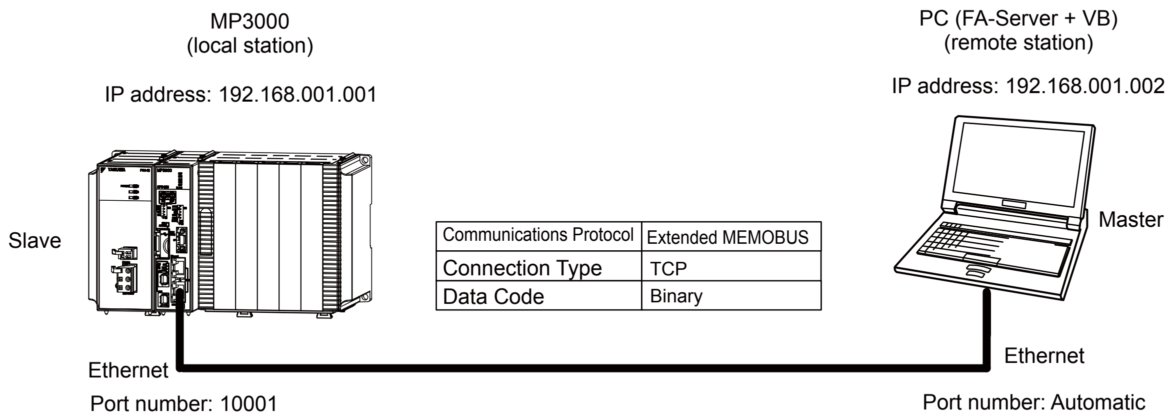


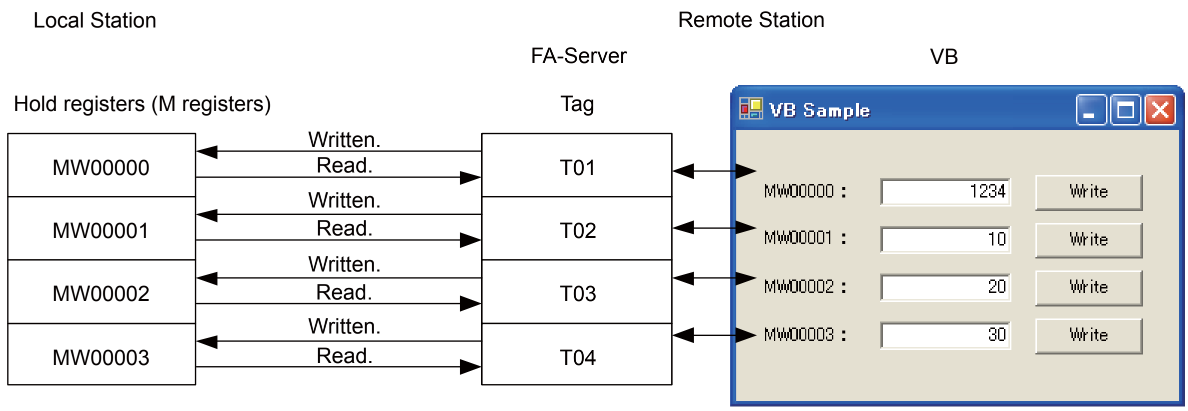


Note: 1. Automatic reception uses 1-to-1 communications.
2. If you need to communicate with multiple devices, use the MSG-RCVE function.

Setting Example

The following figure illustrates how the contents of the MW00000 to MW00003 hold registers in the MP3000 slave are displayed on a form created in Microsoft Visual Basic 6.0 via FA-Server, and how to write values to the same registers by pressing the corresponding Write Button on the same form.





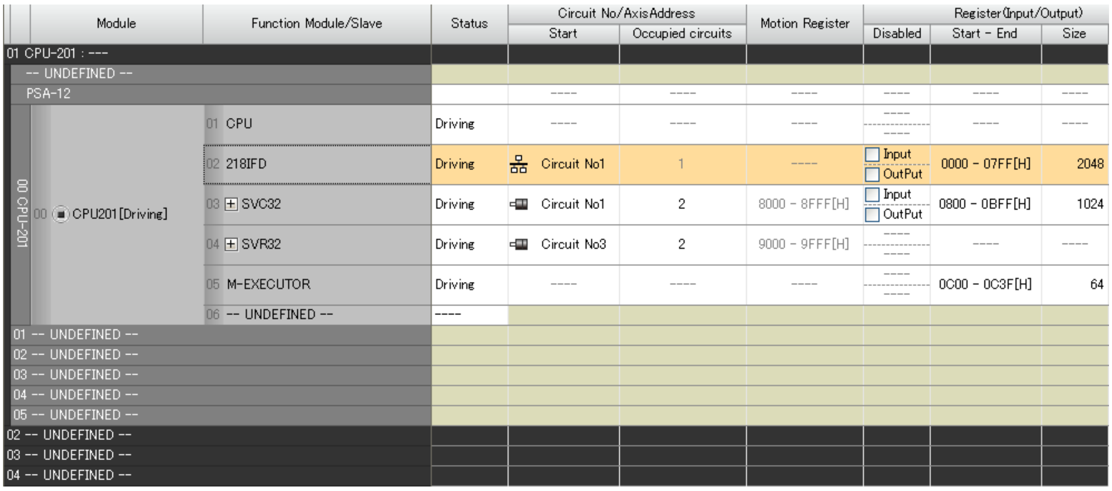
◆ MP3000 Setup

Use the following procedure to set up the MP3000.

Note

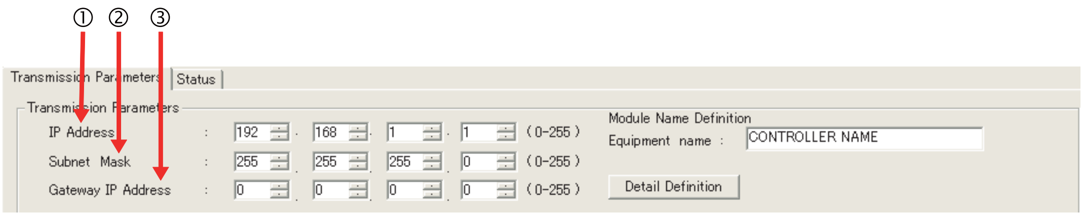
If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



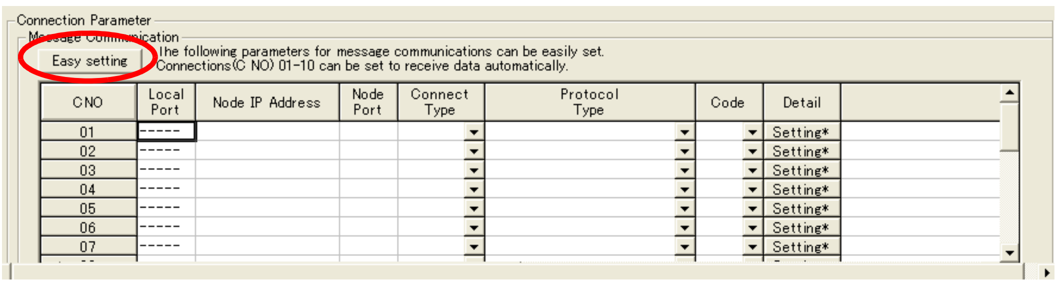
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



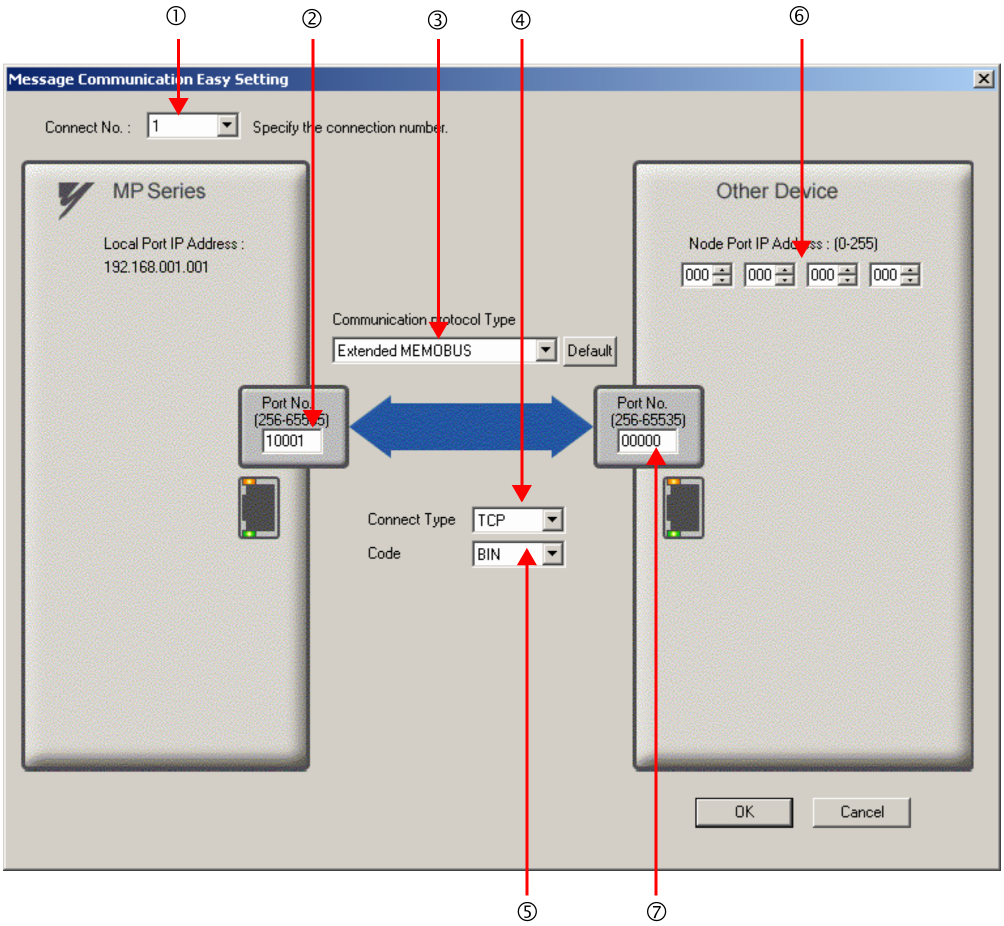
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



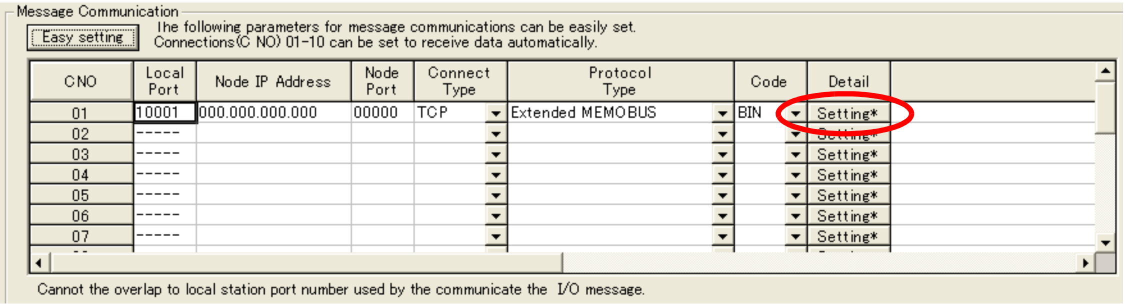
①Select **1** in the **Connect No.** Box.
②Enter “10001” in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 000.000.000.000.
⑦Enter “00000” in the **Port No.** Box for the other device.

5. Click the **OK** Button.

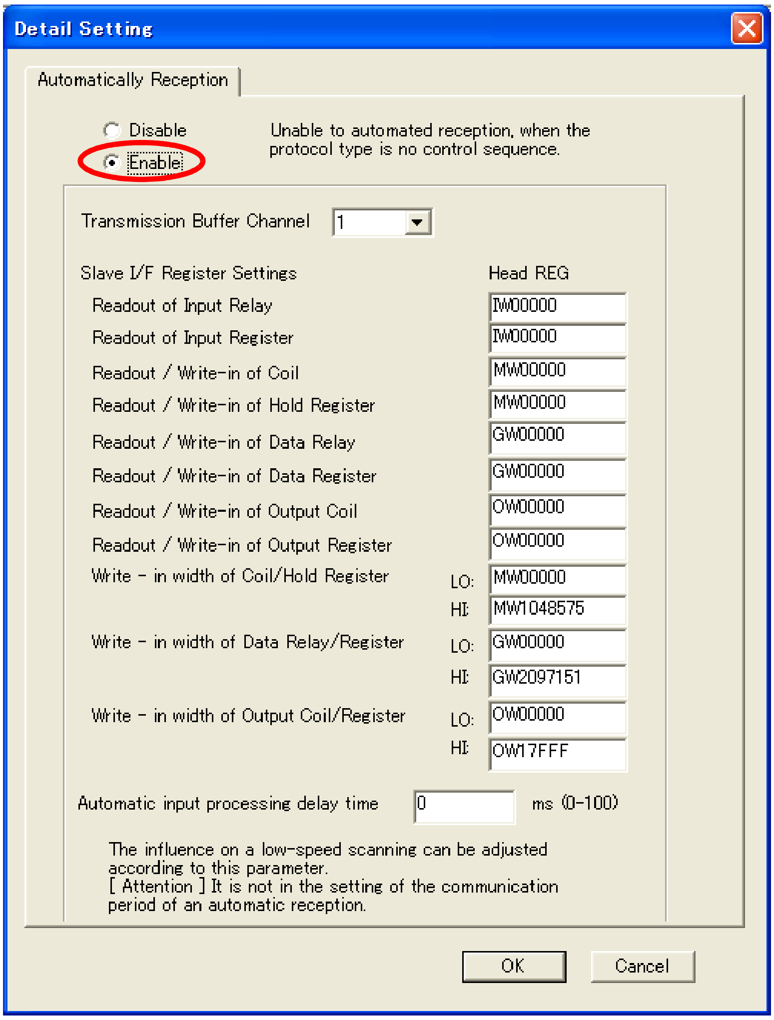
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Other Device (Windows PC Running FA-Server and Visual Basic)

Use the following procedure to set up FA-Server and Visual Basic.

> Note
> FA-Server is manufactured by Robotisware, Inc.
> Contact the Roboticsware, Inc. for further information on setting up FA-Server and Visual Basic.

■ FA-Server Setup

1. Start the FA-Server.
2. From the tree view on the left side, right-click **Driver** just below **Tag**, and select ***Add unit***.
3. From the list of drivers, select **Yaskawa Electric Corporation** – **Ethernet - CP9200SH/MP920*** 218IF**.
4. Right-click the Unit added by clicking **Add unit**, in this example **U01**, and select ***Property***.
5. Click the **Communications Setting** Button on the **Basic Setting** Tab Page in the **Property** Dialog Box, and then set the communications settings.

Parameter		Description
PC Settings	PC IP address	192.168.1.2
	PC port number	(Automatic)
Unit Settings	Unit IP address	192.168.1.1
	Unit port number	10001
Communications Details	Wait time	As required.
	Number of retries	As required.
	Protocol	TCP/IP
	Minimum communications interval	As required.

Note: Specify an IP address that is not in use by any other device on the same network.
Check with your network administrator for unused IP addresses.

6. Right-click **U01** and select ***Add folder***, and then right-click the resulting **F01** folder and select ***Add tag***. Add the remaining three tags in the same way.
7. Right-click the **T01** to **T04** Tags created using **Add tag**, and select ***Property*** for each tag.
8. Set the target registers to read and write in the MP3000 on the **Address Settings** Tab Page in the **Property** Dialog Box.

Tag Names	Parameter	Description
Same for T01 to T04	Device	03 (MW hold register)
	Type	3 (integer binary)
	Size	2 (bytes) (= 16 bits)
T01	Address	00000
T02		00001
T03		00002
T04		00003

9. In addition to the connection method, set up the **DDE*** or **OPC** properties just below **Interface** in the tree view on the left side.

* For DDE, make sure that the **Topic Name** check box is selected on the **Basic Setting** Tab Page of the **Property** Dialog Box.

This concludes the setup for the FA-Server. Set any other parameters as necessary, and then save the settings.

> Note
>
> In addition to DDE and OPC, IPLink can also be used to interface the Visual Basic and FA-Server. Contact the Roboticsware, Inc. for further information.

■ Visual Basic Setup

Use the following procedure to create a Visual Basic program to access registers in the MP3000 via the FA-Server.

A Visual Basic program can access FA-Server using either DDE (Dynamic Data Exchange) or OPC (OLE for processing control).

- Using DDE in Visual Basic

①Turn ON the power to the MP3000 that you set up. Place the FA-Server that you set up in online status.
②Start Visual Basic 6.0 and select ***New*** – ***Standard EXE***.
③Place four TextBox controls from the toolbar onto the form.
④Set the TextBox properties in the following order.
The current values of the device will be displayed.

Example TextBox Settings to Read the Value of T01 (MW00000)

```
Link Topic FASERVER|U01.F01
Link Item   T01
Link Mode  1 - Automatic
```

⑤Place four CommandButton controls from the toolbar onto the form.
⑥Double-click the **CommandButton** Control and enter the following code.

Example **CommandButton** Settings to Write the Value in **TextBox** to T01 (MW00000)

```
Private Sub Command1_Click()
        Text1.LinkPoke
End Sub
```

• Using OPC in Visual Basic

①Turn ON the power to the MP3000 that you set up. Place the FA-Server that you set up in online status.
②Start Visual Basic 6.0 and select ***New*** – ***Standard EXE***.
③Select ***Project*** – ***References*** from the menu bar and select ***OPC Automation2.0***.
④Place four TextBox controls from the toolbar onto the form.
⑤Add processing code for the Form Load and Unload events.
  • Add processing to connect to the server, access path settings (“U01.F01.”).
  • Add DDE items such as “T01”.
⑥Place four **CommandButton** controls from the toolbar onto the form.
⑦Double-click the **CommandButton** Control and enter the following code.

Example **CommandButton** Settings to Write the Value in **TextBox** to T01 (MW00000)

In this example, T01 is set as the first handler in step 5.

```
Private Sub Command1_Click()
    Dim vntValue(1) As Variant
    Dim IngltemServerError() As Long
    VntValue(1) = CDbl(Text1.Text)
    gobjMyOpcGroup.SyncWrite 1, glngItemServerHandles, vntValue, lngItemServerErrors
End Sub
```

This concludes the program creation in Visual Basic. Change the program as necessary and save it (create an EXE file).

◆ Starting Communications

Use the following procedure to communicate between the Visual Basic application on the PC via the FA-Server and the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.
The system will automatically start the message reception operation. No further operation is required.

2. Start the FA-Server and place it online.

3. Start the Visual Basic application.
This starts communications with the MP3000.

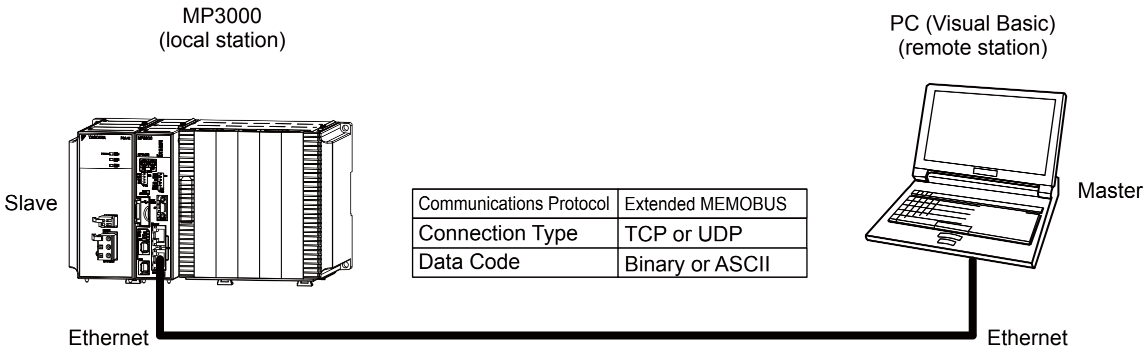
2.12 Communications with a Windows PC (Visual Basic Application)

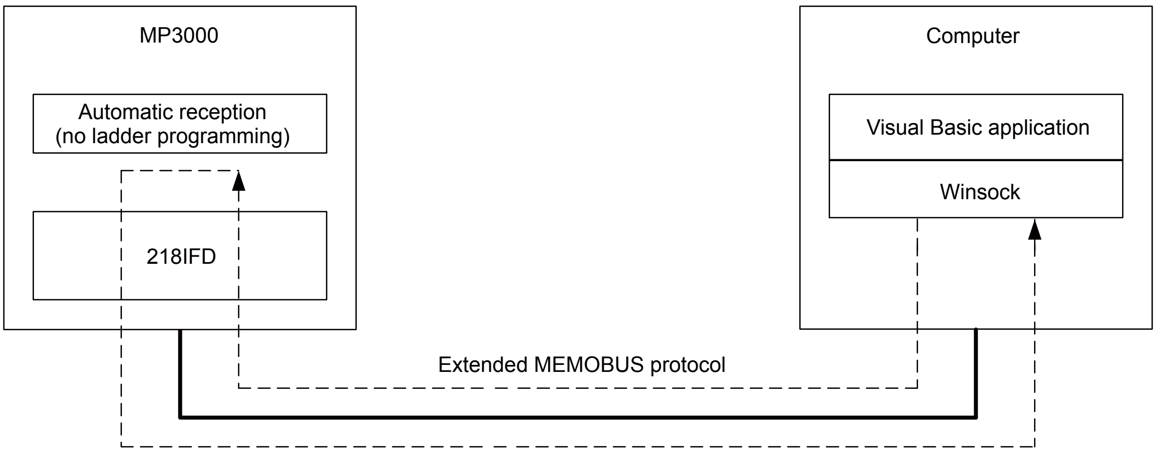
The MP3000 can communicate with a Windows PC running a Visual Basic application over an Ethernet connection by using automatic reception.

This section describes communications when the MP3000 acts a the slave.

Using Automatic Reception with the MP3000 as a Slave

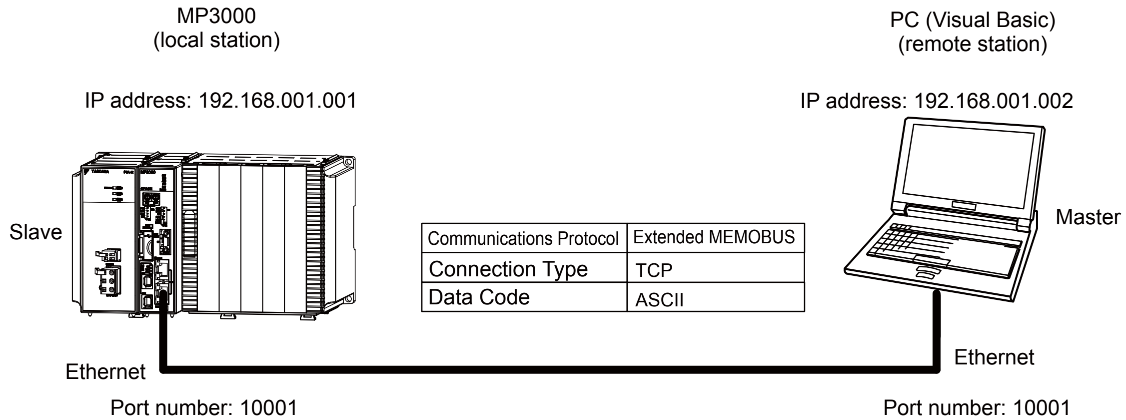
This section describes how to communicate with a PC running Microsoft Visual Basic.Net 2003, by using automatic reception with the Extended MEMOBUS protocol.

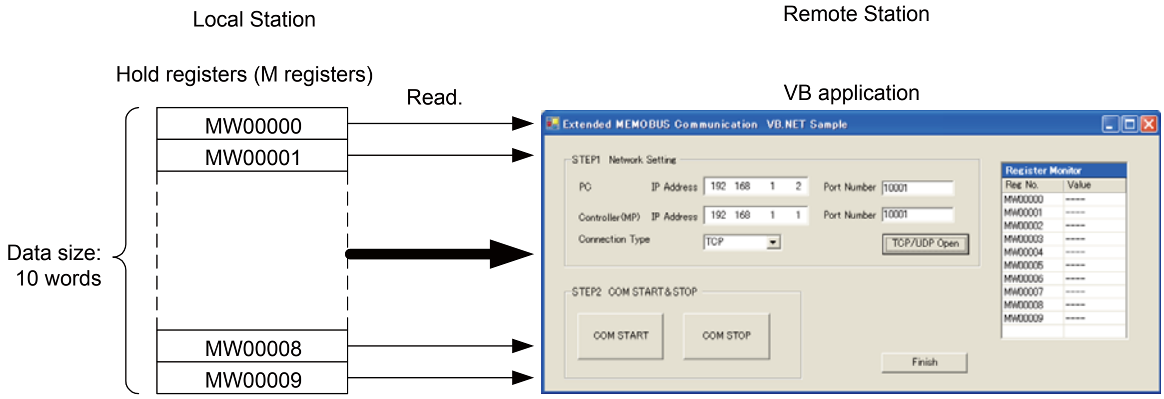




Setting Example

The following figure illustrates how the contents of the MW00000 to MW00009 hold registers in the MP3000 slave are displayed on an application form created in Microsoft Visual Basic.NET 2003.



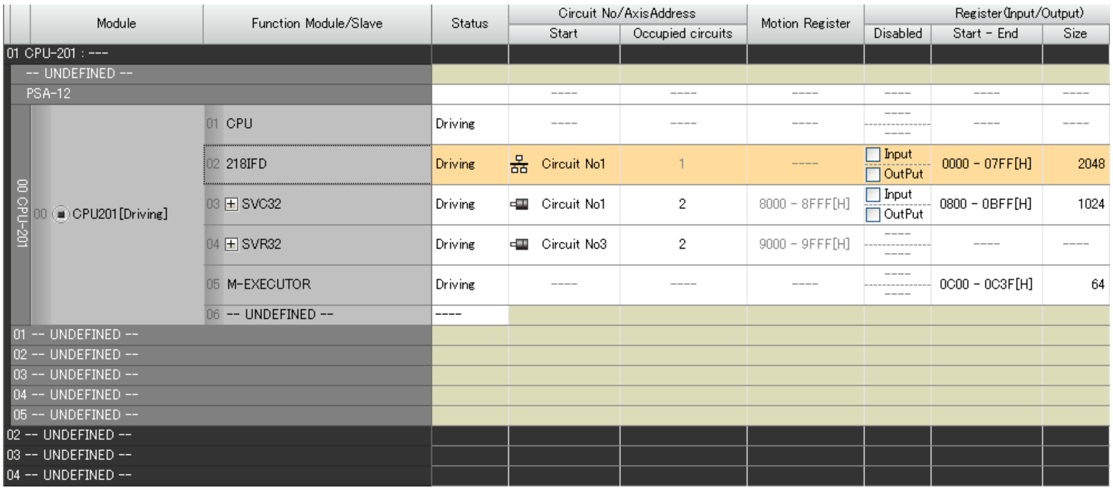


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

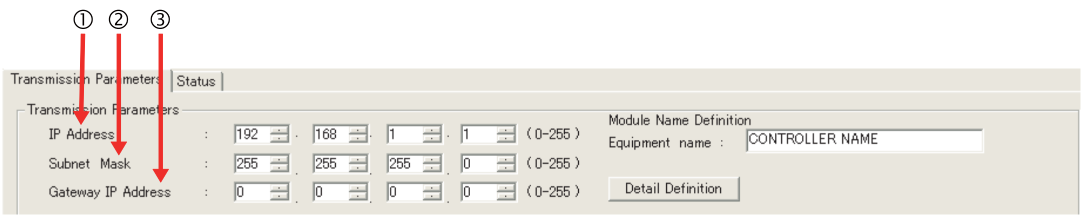
> **Note**
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



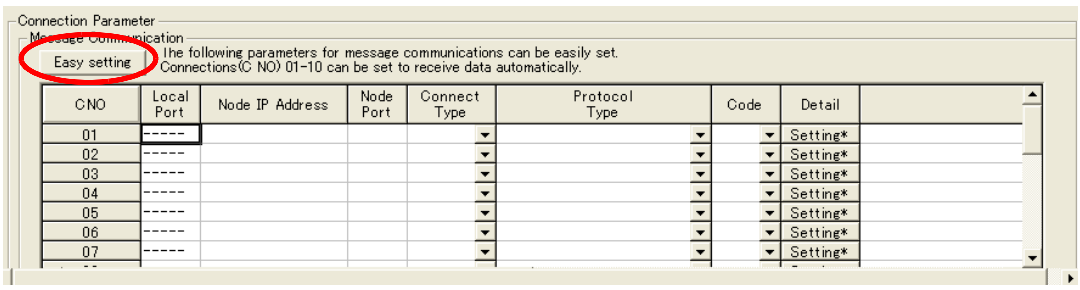
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



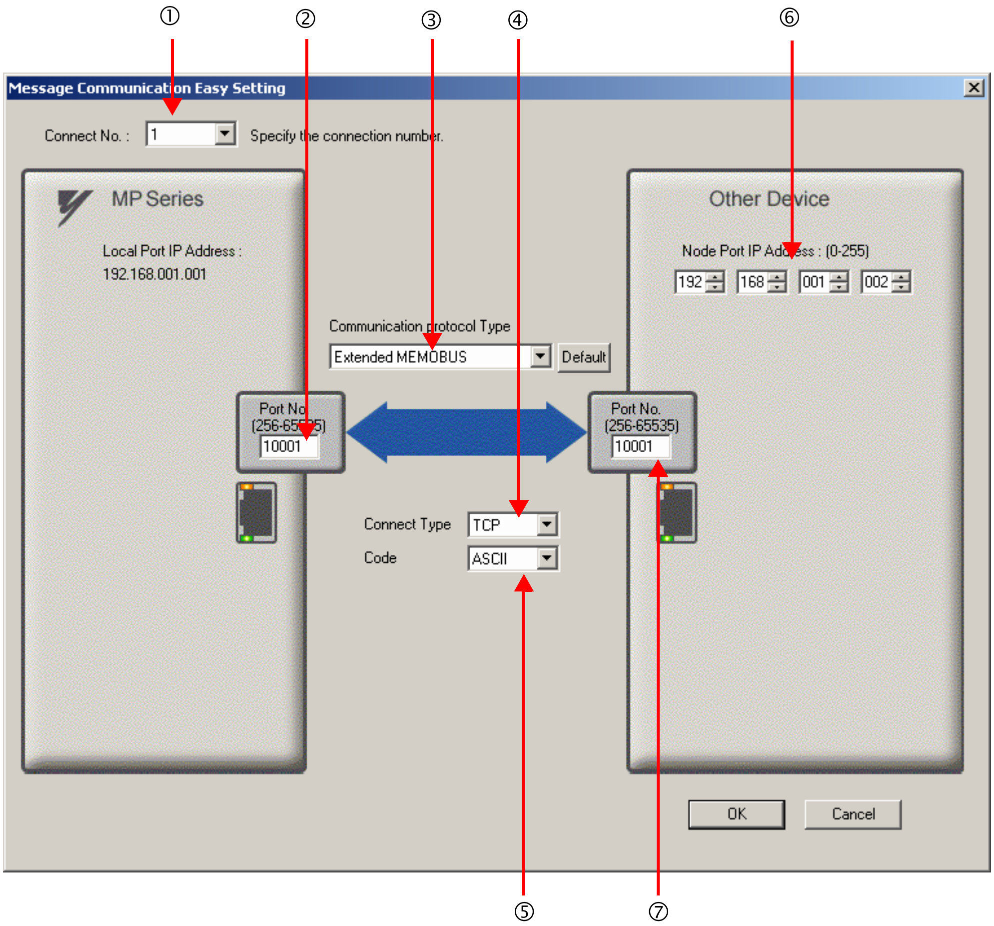
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



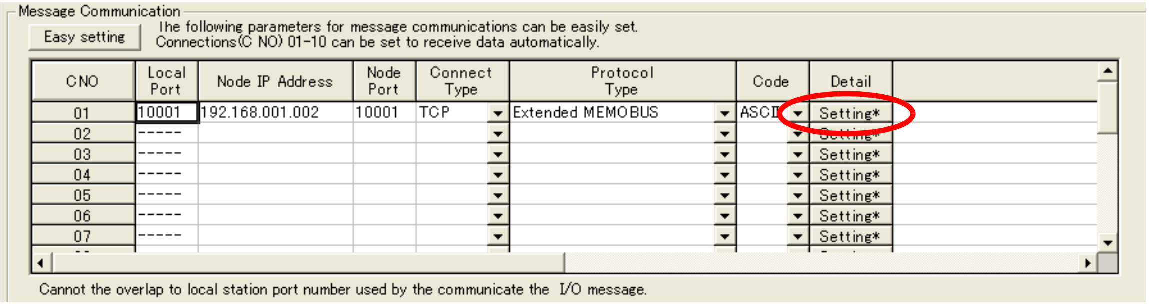
①Select **1** in the **Connect No.** Box.
②Enter "10001" in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **ASCII** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter "10001" in the **Port No.** Box for the other device.

5. Click the **OK** Button.

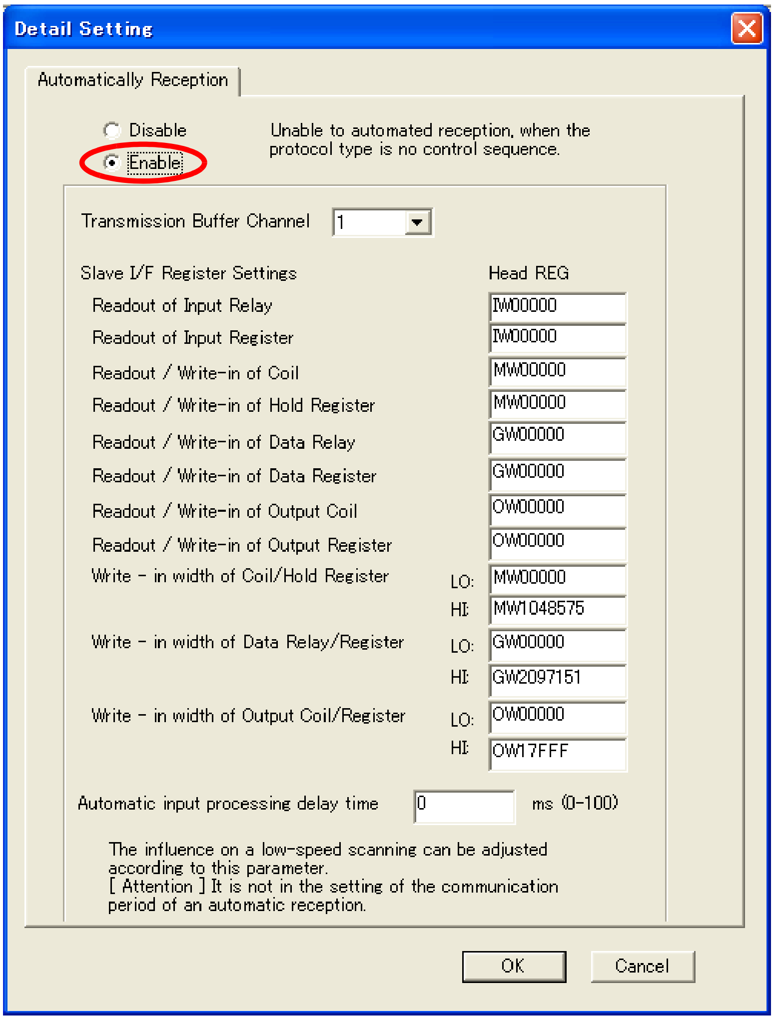
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. Refer to the following section for details on automatic reception.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Other Device (Windows PC Running a Visual Basic Application)

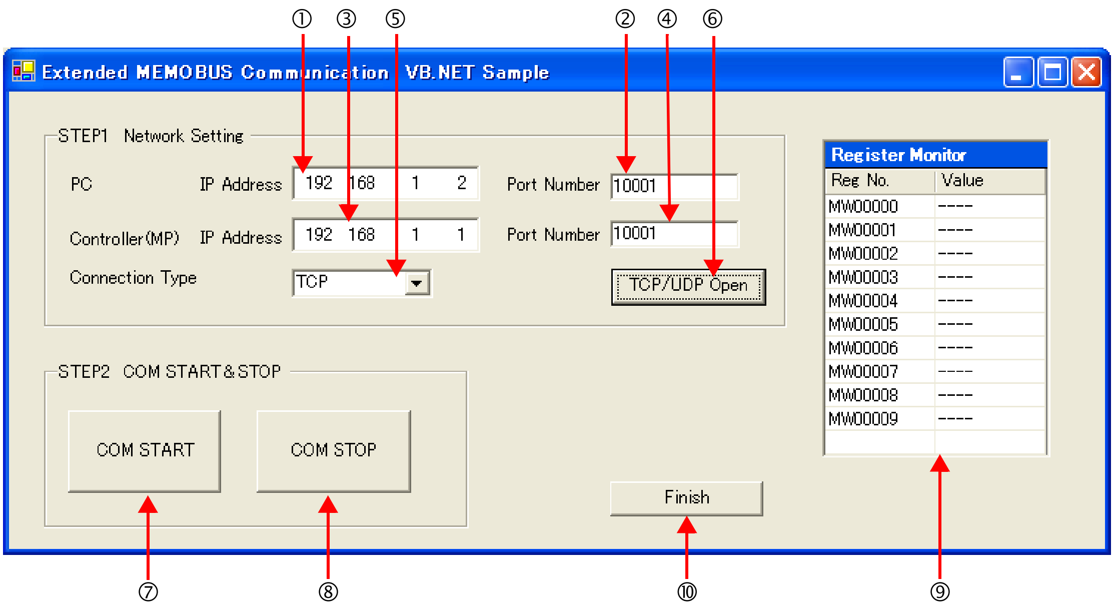
The following section outlines a Visual Basic application for connecting the MP3000 and a PC, and describes a sample program.

> **Note**
> The sample program that is listed here is provided as a programming example and it may not work in all situations. In addition, Visual Basic must be installed on your PC.

■ Overview of the Visual Basic Application

The following figure shows an example of a Visual Basic application for connecting the MP3000 to a PC.

When communications starts, the sample application reads 10 words from the MW00000 to MW00009 hold registers in the MP3000 and displays the current values on the screen.



①Set the PC's IP address.
②Set the PC's port number.
③Set the MP3000's IP address.
④Set the MP3000's port number.
⑤Select the connection type.
⑥Start the processing to open a TCP/UDP connection.
When this button is clicked, a socket is created based on the settings from 1 to 6 and the TCP connection opening procedure is executed.
⑦Start the message communications process of reading register values in the MP3000.
When this button is clicked, a 100-ms cyclic timer starts that triggers execution of the message send/receive process.
The register values read from the MP3000 are displayed in the register monitor.
⑧Stop the message communications process of reading register values in the MP3000.
When this button is clicked, the 100-ms cyclic timer stops and causes the message send/receive process to stop.
⑨The register values read from the MP3000 are displayed.
⑩Close the application.
When this button is clicked, processing to close the socket is executed and the application is closed.

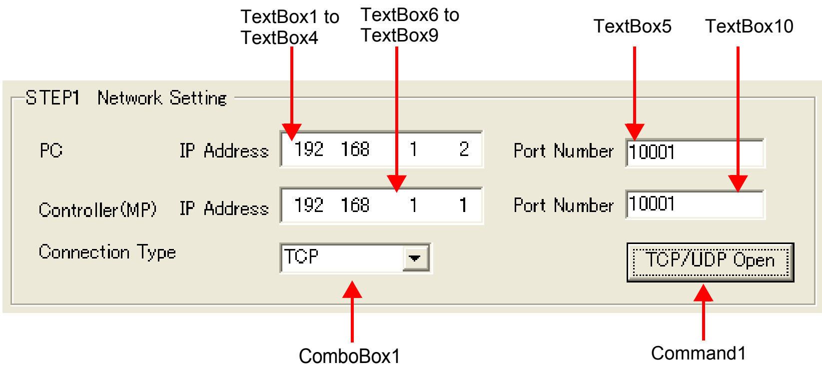
■ Visual Basic Application Example

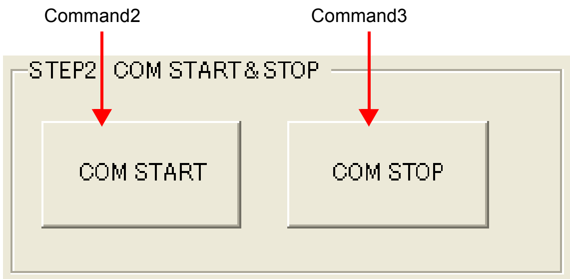
A program example is shown below.

> Note
> The Winsock socket library is required to run this program.

• Form Programming Example

In the programming example that is given below, a **Timer** must be placed on the **Form** from the Components in the toolbox. Initialize the **Timer** in the handler function for Form Load event.






```
Public Class Form1
    Inherits System.Windows.Forms.Form
                                        *
                                        *
    Dim TransPort As Short
    Dim SFC, CPUNum As Byte
    Dim DataNum, Adr As Short
    Dim Ssbuf, Srbuf As String
    Private Sub Command1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles
    Command1.Click
        Dim MyIP, DstIP As String
        Dim MyPort, DstPort As Short
        Dim rc As Short

        '---- Get the PC's IP address ----
        MyIP = TextBox1.Text & "." & TextBox2.Text & "." & _
            TextBox3.Text & "." & TextBox4.Text
        '---- Get the PC's port number ----
        MyPort = Val(TextBox5.Text)
        '---- Get the MP3000's IP address ----
        DstIP = TextBox6.Text & "." & TextBox7.Text & "." & _
            TextBox8.Text & "." & TextBox9.Text
```

```
'---- Get the MP3000's IP address. ----
    DstPort = Val(TextBox10.Text)
    '---- Get the connection type ----
    TransPort = ComboBox1. SelectedIndex ' 0:TCP 1:UDP
    '---- Open a TCP/UDP port ----
    rc = MemobusMasterMain(TransPort, MyIP, MyPort, DstIP, DstPort)
    If rc = 0 Then
        MsgBox ("Socket created")
    Else
        MsgBox ("Socket creation failed")
    End If
 End Sub

Private Sub Command2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Han-
dles Command2.Click
    'Timer processing --- Start
    Timer1.Interval = 100   '100ms
    Timer1.Enabled = True
End Sub

 Private Sub Command3_Click(ByVal sender As System.Object, ByVal e As System.EventArgs) Han-
dles
 Command3.Click
    'Timer processing --- Stop
    Timer1.Enabled = False
 End Sub

 'The following process starts the Timer and executes every 100 ms
 Private Sub Timer1_Tick(ByVal sender As System.Object, ByVal e As System.EventArgs) Handles
 Timer1.Tick
    Dim rc As Short

    SFC = &H9 'Read contents of hold registers (extended)
    CPUNum = 1 'Set the remote device as CPU1
    Adr = 0 'Set the first address to MW00000
    DataNum = 10 'Read 10 words from the first address
    '---- Create Extended MEMOBUS send data ----
    MkCmdData(SFC, CPUNum, Adr, DataNum, Ssbuf)
    '---- Send Extended MEMOBUS command and receive response ----
    rc = MemobusMsg(TransPort, Ssbuf, Srbuf)
    If rc <> 0 Then
        Timer1.Enabled = False 'Timer processing --- Stop
        closesocket(0) 'Close the socket
        WSACleanup() 'Release the Winsock.DLL
    End If
    '---- Reflect values in the register monitor ----
    'Add code to display the read register values
  End Sub
                                                  *
                                                  *
End Class
```

• Programming Example for Extended MEMOBUS Protocol Message Communications

The programming example that is given below demonstrates how to manage sockets and perform message communications using the Extended MEMOBUS protocol.

> Note: The name of the template specified when creating this program example will be used as the name of the target Windows-based application.

```
Module Memobus
    Dim sock As Integer
    Dim PC_addr, MP_addr As sockaddr_in
    Dim from_addr As sockaddr_in
    Dim sbuf(4095) As Byte
    Dim rbuf(4095) As Byte
    Dim DATAi, MDATAi As Short
    Dim iSerial As Short

    '-------------------------------------------------------------------------------
    ' 'Open a TCP/UDP port
    '-------------------------------------------------------------------------------
    Function MemobusMasterMain(ByVal TransPort As Short, _
                            ByVal MyIP As String, ByVal MyPort As Short, _
                            ByVal DstIP As String, ByVal DstPort As Short) As Short
        Dim rc As Short
        Dim ws_data As WSADATA

        '---- Declaration to use Winsock.dll (must be declared before calling routines) ----
        rc = WSAStartup(&H101S, ws_data)
        If (rc <> 0) Then
            MsgBox("Init error" & rc)
        End If

        '---- Initialize serial number setting ----
        iSerial = 0

        '---- Declare the PC's IP address and port number ----
        PC_addr.sin_family = AF_INET
        PC_addr.sin_addr.s_addr = inet_addr(MyIP)
        PC_addr.sin_port = htons(MyPort)

        '---- Declare the MP3000's IP address and port number ----
        MP_addr.sin_family = AF_INET
        MP_addr.sin_addr.s_addr = inet_addr(DstIP)
        MP_addr.sin_port = htons(DstPort)

        '---- Create the TCP or UDP socket ----
        If (TransPort = 0) Then
           sock = socket(AF_INET, SOCK_STREAM, 0)
        Else
           sock = socket(AF_INET, SOCK_DGRAM, 0)
        End If
```

```
If (sock < 0) Then
        MsgBox("Socket error " & WSAGetLastError())
        Return -1
    End If

    '---- Bind the local port number and socket ----
    rc = bind(sock, PC_addr, Len(PC_addr))
    If (rc <> 0) Then
        MsgBox("Bind error " & WSAGetLastError())
        closesocket(0)
        WSACleanup() 'Release the Winsock.DLL
        Return -1
    End If

    '---- Establish connection ----
    If (TransPort = 0) Then
        rc = connect(sock, MP_addr, Len(MP_addr))
        If (rc <> 0) Then
            MsgBox("Connect error " & WSAGetLastError())
            closesocket(0)
            WSACleanup() 'Release the Winsock.DLL
            Return -1
        End If
    End If
    Return 0
End Function

'-----------------------------------------------------------------------------
Send command data, receive response data
'-----------------------------------------------------------------------------
Function MemobusMsg(ByVal TransPort As Short, ByRef Ssbuf As String, ByRef Srbuf As String) As Short
    Dim rc As Short

    If TransPort = 0 Then
        rc = TcpMsg(Ssbuf, Srbuf)
    Else
        rc = UdpMsg(Ssbuf, Srbuf)
    End If

    Return rc
End Function

'-----------------------------------------------------------------------------
Send command data, receive response data (TCP)
'-----------------------------------------------------------------------------
Function TcpMsg(ByRef Ssbuf As String, ByRef Srbuf As String) As Short
    Dim rc, slen As Integer
    Dim rlen As Short
```

```
    rc = 0

    '---- Send command data ----
    slen = send(sock, Ssbuf, DATAi * 2, 0)
    If (slen <> DATAi * 2) Then
        MsgBox("send error " & WSAGetLastError())
        closesocket(0)
        WSACleanup() 'Release the Winsock.DLL
        Return -1
    End If

    '---- Receive response data ----
    Srbuf = Space(4096)
    rlen = recv(sock, Srbuf, 4096, 0)
    If (rlen <= 0) Then
        MsgBox("recieve error " & WSAGetLastError())
       closesocket(0)
        WSACleanup() 'Release the Winsock.DLL
        Return -1
    End If

    '---- Check response data ----
    rc = ChkRspData(rlen, Srbuf)
    If (rc <> 0) Then
        MsgBox("recieve data format error")
    End If

    Return rc
End Function

'----------------------------------------------------------------------------
Send command data, receive response data (UDP)
'----------------------------------------------------------------------------
Function UdpMsg(ByRef Ssbuf As String, ByRef Srbuf As String) As Short
    Dim rc, slen As Integer
    Dim rlen As Short
    Dim from_len As Short

    rc = 0

    '---- Send command data ----
    slen = sendto(sock, Ssbuf, DATAi * 2, 0, MP_addr, Len(MP_addr))
    If (slen <> DATAi * 2) Then
        MsgBox("send error " & WSAGetLastError())
    End If
```

```
'---- Receive response data ----
    Srbuf = Space(4096)
    from_len = Len(PC_addr)
    rlen = recvfrom(sock, Srbuf, 4096, 0, PC_addr, from_len)
    If (rlen <= 0) Then
        MsgBox("recieve error " & WSAGetLastError())
        closesocket(0)
        WSACleanup() 'Release the Winsock.DLL
        Return -1
    End If

    '---- Check response data ----
    rc = ChkRspData(rlen, Srbuf)
    If (rc <> 0) Then
        MsgBox("recieve data format error")
        closesocket(0)
        WSACleanup() 'Release the Winsock.DLL
        Return -1
    End If

    Return rc
End Function

'-----------------------------------------------------------------------------
'Create Extended MEMOBUS protocol command
'-----------------------------------------------------------------------------
Function MkCmdData(ByVal SFC As Byte,  ByVal CPUNum As Byte, _
                    ByVal Adr As Short,  ByVal DataNum As Short, _
                    ByRef Ssbuf As String) As Object
    Dim i As Integer
    Dim Swork As String

    '---- Calculate number of data items ----
    '---- MEMOBUS data length from MFC to end of data ----
    Select Case SFC
        Case &H9
            MDATAi = 8
        Case Else
            MsgBox ("Function code error")
                Return -1
    End Select

    '---- Calculate total number of data items ----
    DATAi = MDATAi + 14 '218 header (12 bytes) + Length part (2 bytes) + MEMOBUS data length
    (variable)
    If DATAi > 4096 Then
      MsgBox ("Register size error")
        Return -1
    End If
```

```
'---- Clear buffers to zero ----
For i = 0 To 4095
    sbuf(i) = 0
Next

'---- Create the 218 header part ----
'---- Set the register type. ----
sbuf(0) = &H11 'Extended MEMOBUS command

'---- Set the serial number and increment for every transmission ----
sbuf(1) = (iSerial + 1) Mod 256

'---- Set the destination channel number ----
sbuf(2) = &H0 'Always 0 hex because the PLC channel is undefined

'---- Set the source channel number ----
sbuf(3) = &H0 'Always 0 hex because channel numbers do not apply to PCs

sbuf(4) = &H0 'Reserved
sbuf(5) = &H0 'Reserved

'---- Set the total number of data items from the start of the 218 header to the end of MEMOBUS
data ----
'---- When SFC contains 09, 22 bytes = 218 header (12 bytes) + MEMOBUS data (10 bytes) ----
sbuf(6) = DATAi 'Data length (L)
sbuf(7) = DATAi \ 256 'Data length (L)

sbuf(8) = &H0 'Reserved
sbuf(9) = &H0 'Reserved
sbuf(10) = &H0 'Reserved
sbuf(11) = &H0 'Reserved

'---- Create the MEMOBUS data part ----
'---- Length from MFC to end of data ----
sbuf(12) = CByte(MDATAi And &HFF) 'Data length (L)
sbuf(13) = CByte((MDATAi And &HFF00)\256) 'Data length (H)

'---- MFC is always 20 hex ----
sbuf(14) = &H20

'---- SFC ----
sbuf(15) = SFC
'---- Set the CPU number ----
sbuf(16) = CPUNum * 16

sbuf(17) = &H0 'Spare is always 0 hex
```

```
'---- Set the reference number ----
    sbuf(18) = CByte(Adr And &HFF)  'Adr(L)
    sbuf(19) = CByte((Adr And &HFF00)\256)     'Adr(H)

    '---- Set the number of registers ----
    sbuf(20) = CByte(DataNum And &HFF)  'DataNum(L)
    sbuf(21) = CByte((DataNum And &HFF00) \256)     'DataNum(H)

    '---- Convert from Byte to String ----
    For i = 0 To 21
        Swork = Hex(sbuf(i))
        If Len(Swork) = 1 Then
            Swork = "0" + Swork
        End If
        Ssbuf = Ssbuf + Swork
    Next

    Return 0
End Function

'-------------------------------------------------------------------------------
'Check response data
'-------------------------------------------------------------------------------
Function ChkRspData(ByVal rlen As Short, ByRef Srbuf As String) As Short
    Dim i, j As Integer
    Dim rcvDATAi As Short
    Dim rc As Short

    rc = 0
    '---- Convert from String to Byte ----
    j = 0
    For i = 0 To rlen - 1
        rbuf(i) = Val("&H" & Mid(Srbuf, j + 1, 2))
        j = j + 2
    Next

    '---- Check the total data length ----
    If rlen = (18 + sbuf(20) * 2) * 2 Then
        rc = -1
        Return (rc)
    End If

    '---- Check the packet type ----
    If (rbuf(0) <> &H19) Then
        rc = -2
        Return (rc)
    End If
```

```
        '---- Check the serial number ----
            If (sbuf(1) <> rbuf(1)) Then
                rc = -3
                Return (rc)
            End If

            '---- Check the total data length of the message ----
            Select Case sbuf(15)
                Case &H9
                    rcvDATAi = Val(Str(sbuf(21)) & Str(sbuf(20))) * 2 + 20
                    If ((rbuf(6) <> rcvDATAi) And (rbuf(7) <> (rcvDATAi \256))) Then
                        rc = -4
                        Return (rc)
                    End If
                Case Else
                    rc = -10
                    Return (rc)
            End Select

            '---- Check the MFC ----
            If (rbuf(14) <> &H20) Then
                rc = -6
                Return (rc)
            End If

            '---- Check the SFC ----
            If (rbuf(15) <> sbuf(15)) Then
                rc = -7
                Return (rc)
            End If

            '---- Check the number of registers ----
            Select Case sbuf(15)
                Case &H9S
                    If ((rbuf(18) <> sbuf(20)) Or (rbuf(19) <> sbuf(21))) Then
                        rc = -8
                        Return (rc)
                    End If
                Case Else
                    rc = -10
                    Return (rc)
            End Select

            '---- Reads the register data from rbuf(21) and on ----

            Return (rc)
        End Function
    End Module
```

◆ Starting Communications

Use the following procedure to communicate between the Visual Basic application on the PC and the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.
The system will automatically start the message reception operation. No further operation is required.

2. Start the application created in Visual Basic and follow these steps to start communicating with the MP3000.
①Enter the PC's IP address. (Example: 192.168.1.2)
②Set the PC's port number. (Example: 10001)
③Set the MP3000's IP address. (Example: 192.168.1.1)
④Set the MP3000's port number. (Example: 10001)
⑤Select the connection type. (Example: TCP)
⑥Click the **TCP/UDP Open** Button.
⑦Click the **Communications START** Button.
Note: Click the **Communications STOP** Button. This pauses message communications.

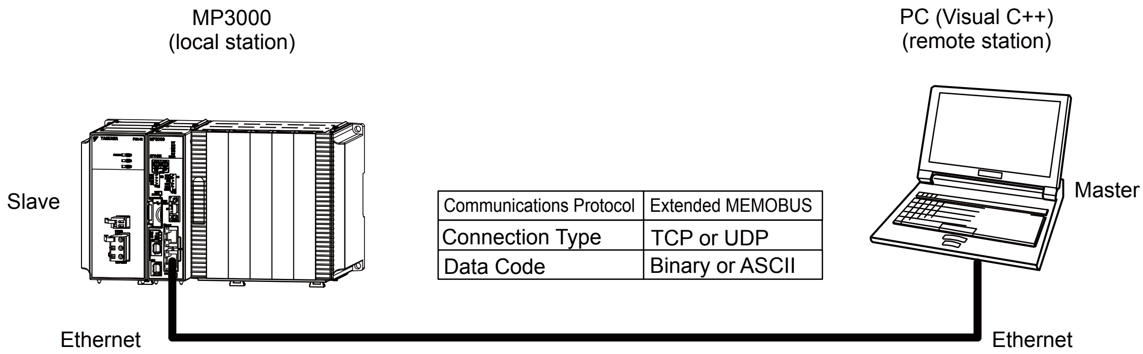
2.13 Communications with a Windows PC (Visual C++ Application)

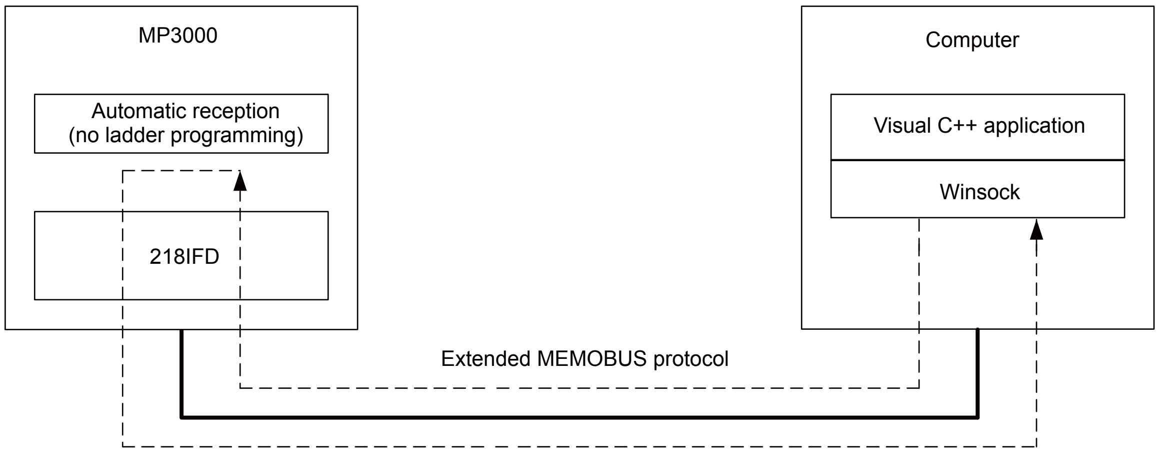
The MP3000 can communicate with a Windows PC running a Visual C++ application over an Ethernet connection by using automatic reception.

This section describes communications when the MP3000 acts as a slave.

Using Automatic Reception with the MP3000 as a Slave

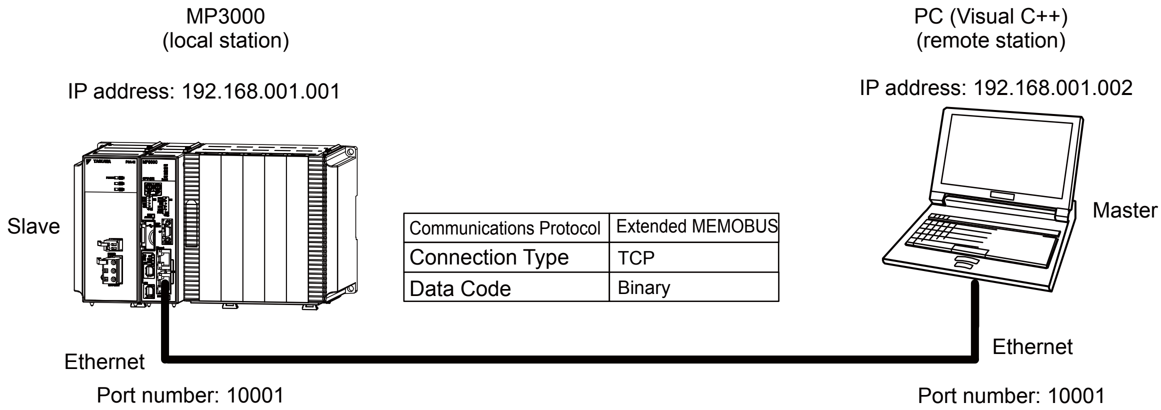
This section describes how to communicate with a PC running a Microsoft Visual C++.NET application by using automatic reception with the Extended MEMOBUS protocol.

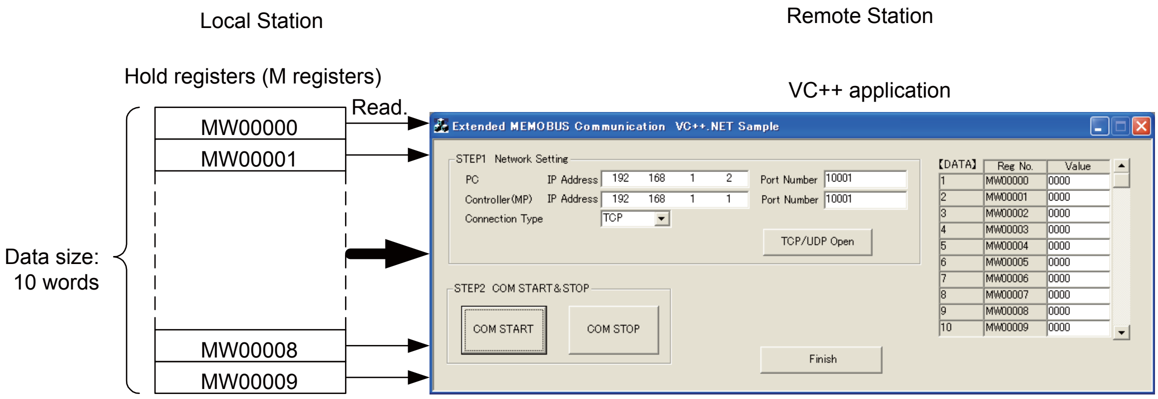




Setting Example

The following figure illustrates how the contents of the MW00000 to MW00009 hold registers in the MP3000 slave are displayed on a form created in Microsoft Visual C++.



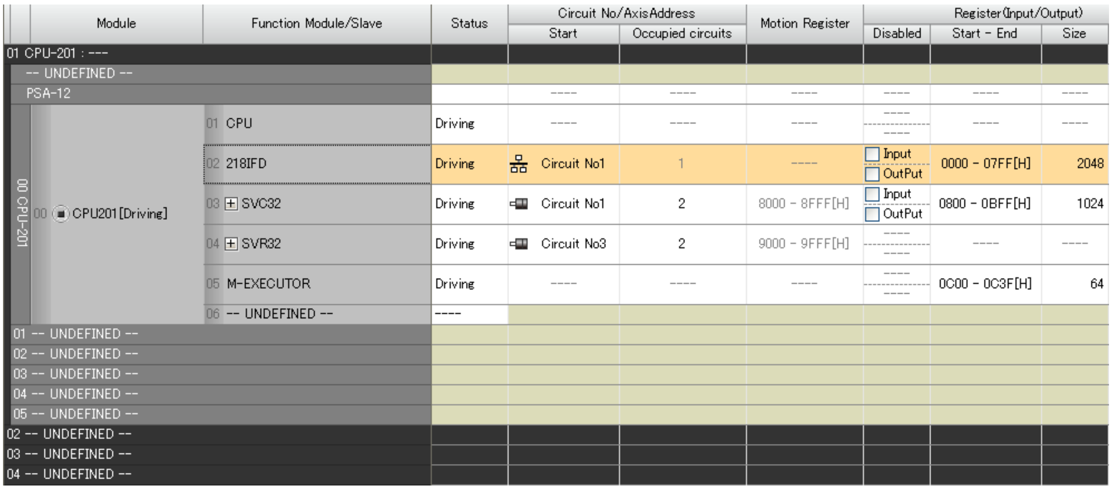


◆ MP3000 Setup

Use the following procedure to set up the MP3000.

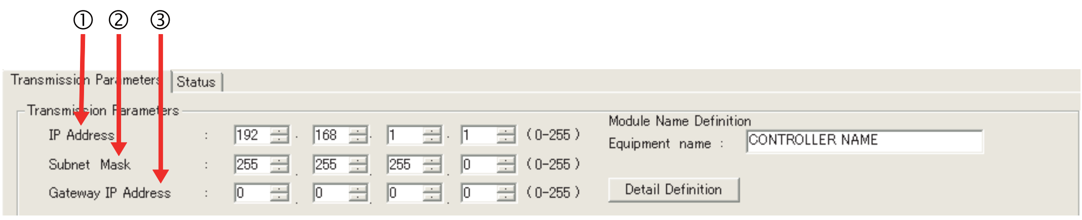
> Note
>
> If the communications parameters (IP address and subnet mask) have already been set, skip to step 3.

1. Double-click the cell for 218IFD in the Module Configuration Definition Tab Page.



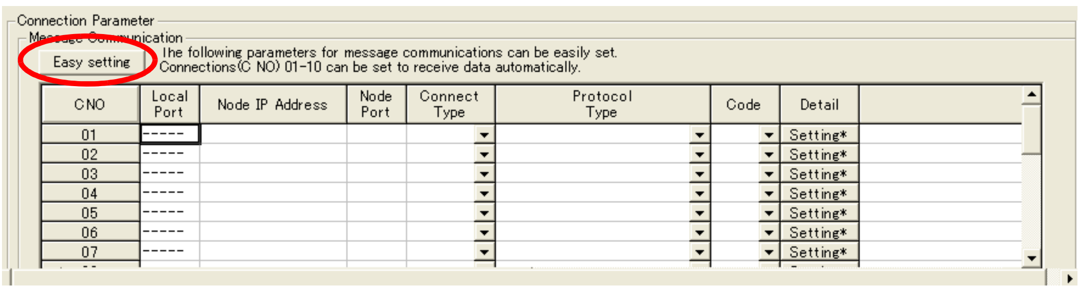
The 218IFD Detail Definition Dialog Box will be displayed.

2. Set the communications parameters.



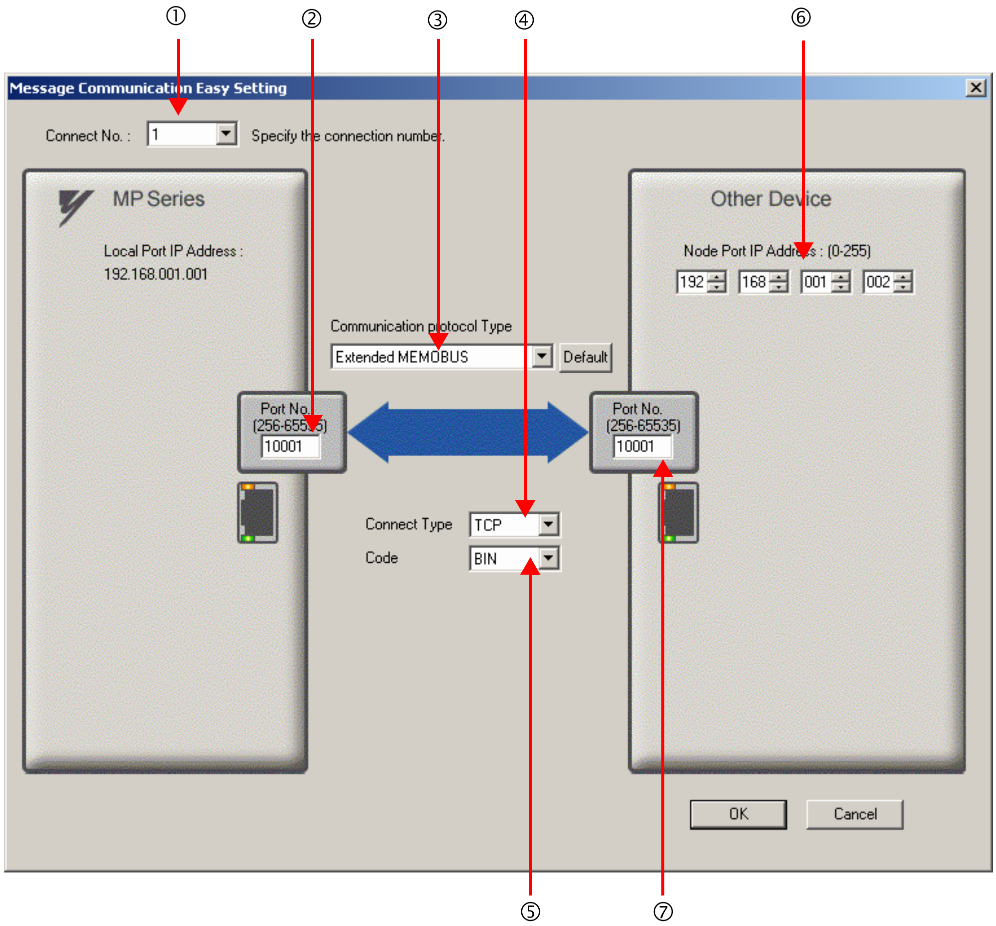
①In the **IP Address** Boxes, enter the following address: 192.168.001.001.
②In the **Subnet Mask** Boxes, enter the following mask: 255.255.255.000.
③In the **Gateway IP Address** Boxes, enter the following address: 000.000.000.000.

3. Click the **Easy Setting** Button in the **Message Communication** Area in the **Connection Parameter** Area.



The Message Communications Easy Setting Dialog Box will be displayed.

4. Set the connection parameters.



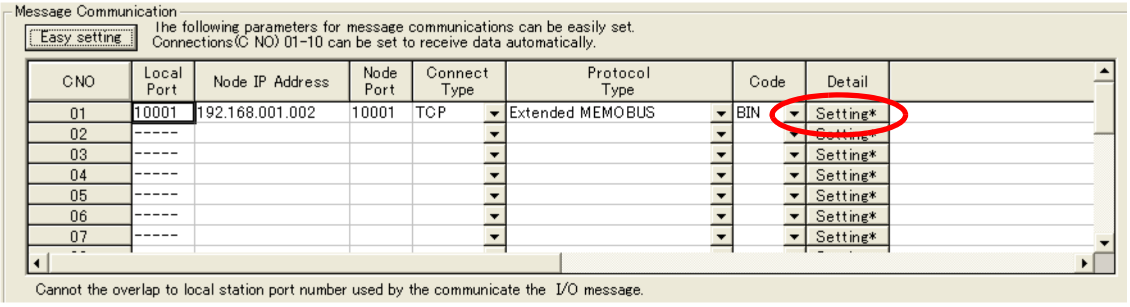
①Select **1** in the **Connect No.** Box.
②Enter "10001" in the **Port No.** Box for the MP-series Controller.
③Select **Extended MEMOBUS** in the **Communications Protocol Type** Box, and then click the **Default** Button.
④Select **TCP** in the **Connect Type** Box.
⑤Select **BIN** in the **Code** Box.
⑥Enter the following address in the **Node Port IP Address** Boxes for the other device: 192.168.001.002.
⑦Enter "10001" in the **Port No.** Box for the other device.

5. Click the **OK** Button.

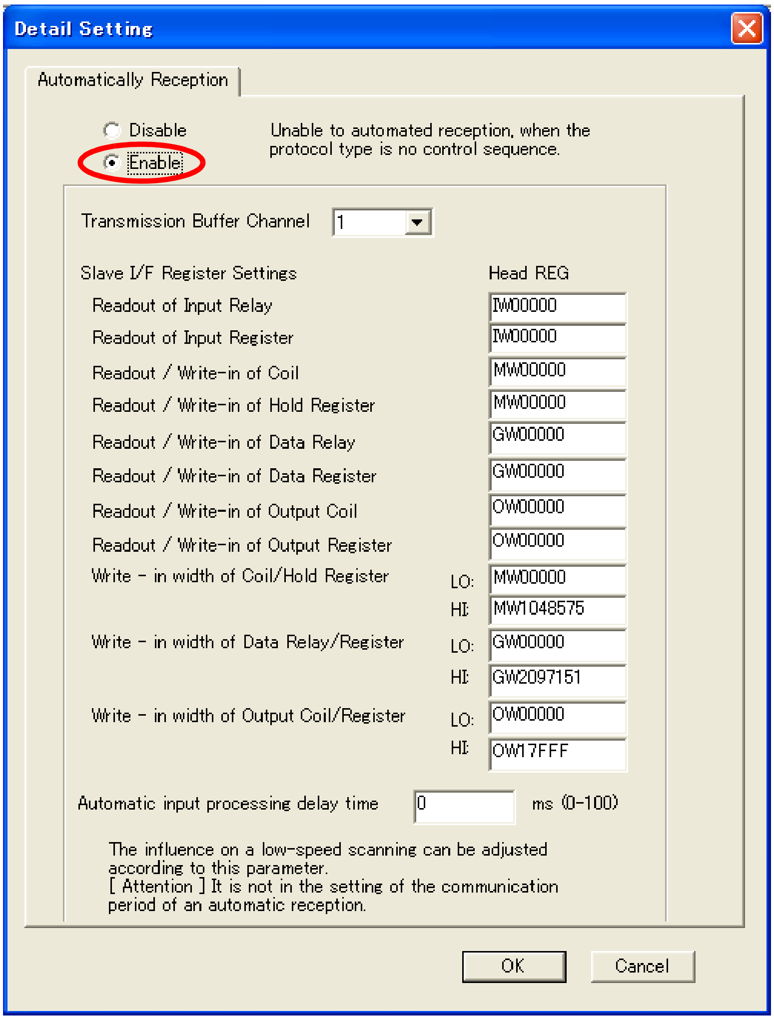
6. Click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box.

Note: If parameters have already been set for the same connection number and you click the **Yes** Button in the Transmission Parameters Confirmation Dialog Box, the settings will be overwritten by the parameters that are set in the Message Communications Easy Setting Dialog Box.

7. Check the settings and double-click the **Setting** Button in the **Detail** Column.



8. Select the **Enable** Option in the Automatically Reception Tab Page and then click the **OK** Button.



Note: 1. For more information on automatic reception, refer to the following section.

☞ *2.2 Detail Definition Setting Procedures (page 2-6)*

2. Disable automatic reception for any connection for which message functions (MSG-SNDE and MSG-RCVE) are used. If message functions are used while automatic reception is enabled, the communications will not function properly.

9. Save the data to flash memory.

Note: Changes made to the communications or connection parameters will become effective only after the changes have been saved to flash memory and the power supply has been cycled.

This concludes the settings for using the MP3000 as a slave.

◆ Setting the Other Device (Windows PC Running a Visual C++ Application)

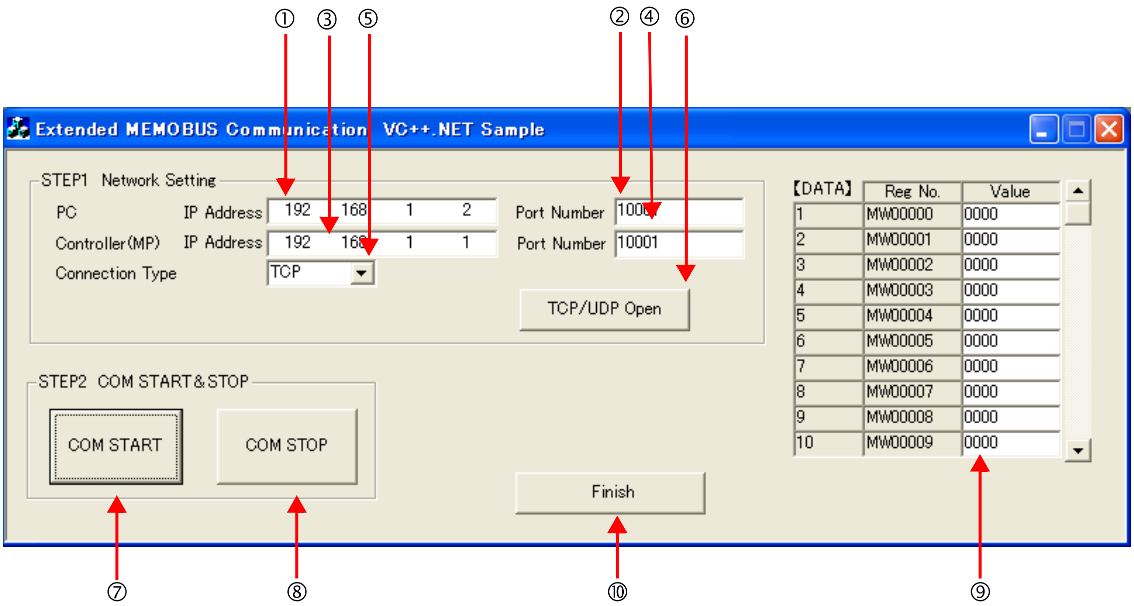
The following section outlines a Visual C++ application for connecting the MP3000 and a PC, and describes a sample program.

> Note
>
> The sample program that is listed here is provided as a programming example and it may not work in all situations. In addition, Visual C++ must be installed on your PC.

■ Overview of the Visual C++ Application

The following figure shows an example of a Visual C++ application for connecting the MP3000 to a PC.

When communications starts, the sample application reads 10 words from the MW00000 to MW00009 hold registers in the MP3000 and displays the current values on the screen.



①Set the PC's IP address.
②Set the PC's port number.
③Set the MP3000's IP address.
④Set the MP3000's port number.
⑤Select the connection type.
⑥Start the processing to open a TCP/UDP connection.
When this button is clicked, a socket is created based on the settings from 1 to 6 and the TCP connection opening procedure is executed.
⑦Start the message communications process of reading register values in the MP3000.
When this button is clicked, a 100-ms cyclic timer starts that triggers execution of the message send/receive process.
The register values read from the MP3000 are displayed in the register monitor.
⑧Stop the message communications process of reading register values in the MP3000.
When this button is clicked, the 100-ms cyclic timer stops and causes the message send/receive process to stop.
⑨The register values read from the MP3000 are displayed.
⑩Close the application.
When this button is clicked, processing to close the socket is executed and the application is closed.

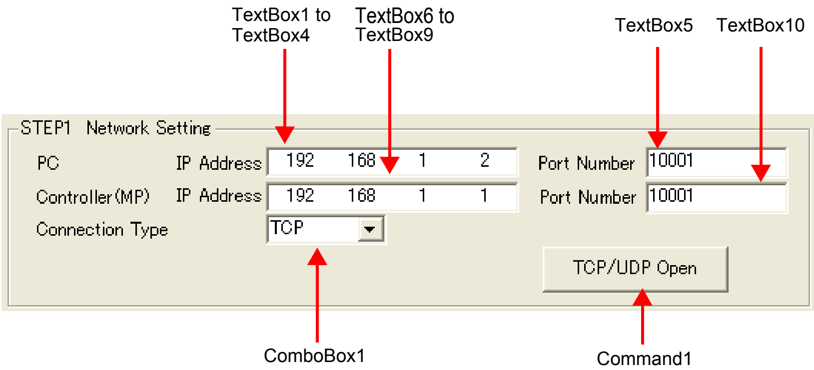
■ Visual C++ Application Example

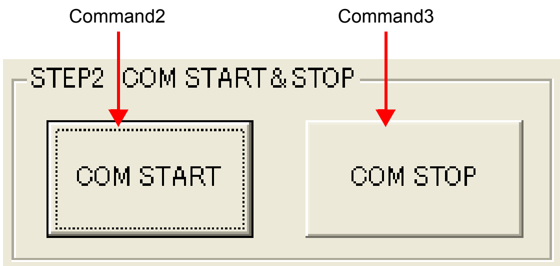
A program example is shown below.

> Note
>
> The Winsock socket library is required to run this program.

• Form Programming Example

In the programming example that is given below, a **Timer** must be placed on the **Form** from the Components in the toolbox. Initialize the **Timer** in the handler function for Form Load event.





```
namespace VC_SAMPLE
{
                                    *
                                    *
// Functions and variables referenced from external files
extern "C"{
        extern int memobus_master_main( unsigned short trans_prt, unsigned long myip,
                                            unsigned short myport, unsigned long dstip, unsigned
                                              short dstport );
        extern int memobus_msg( unsigned short trans_prt, unsigned char* sbuf, unsigned char* rbuf
);
        extern void mk_cmd_data( unsigned char SFC, unsigned char CPUNum, unsigned short
Adr,
                                                      unsigned short DataNum, unsigned char*
sbuf );
}

private: System::Void Command1_Click(System::Object *  sender, System::EventArgs *  e)
{
            unsigned long MyIP, DstIP;
            unsigned short MyPort, DstPort;
            int rc;
            // Get the PC's IP address
              // Add code to get the IP address from TextBox1, TextBox2, TextBox3, and TextBox4.
              // Example: MyIP: 0x0501A8C0 (192.168.1.5)
```

```
                        // Get the PC's port number.
                           // Add code to get the port number from TextBox5.      Example: MyPort: 10001
                        // Get the MP3000's IP address
                           // Add code to get the IP address from TextBox6, TextBox7, TextBox8, and TextBox9.
Example: DstIP: 0x0101A8C0
                        // Get the MP3000's port number.
                                   // Add code to get the port number from TextBox10.      Example: DstPort:
10001
                        // Get the connection type
                           // Add code to process the connection type selected in ComboBox1.
                           // Example: TransPort: TCP (0) *UDP (1)

                        // Open a TCP/UDP port
                        rc = memobus_master_main(TransPort, MyIP, MyPort, DstIP, DstPort)
                                   *
                                   *
}

private: System::Void Command2_Click(System::Object * sender, System::EventArgs * e)
{
            // Add code to start a 100-ms timer
}

private: System::Void Command3_Click(System::Object * sender, System::EventArgs * e)
{
            // Add code to stop the timer
}

// The following process starts the Timer and executes every 100 ms
private:System::XXXXX( )
{
            unsigned char SFC = &H9    // Reads the contents of hold registers (extended).
            unsigned char CPUNum = 1   // Set the remote device as CPU1
            unsigned short Adr = 0        // Set the first address to MW00000
            unsigned short DataNum = 10  // Read 10 words from the first address
            // Create Extended MEMOBUS send data
            MkCmdData(SFC, CPUNum, Adr, DataNum, Ssbuf)
            // Send Extended MEMOBUS command and receive response
            rc = MemobusMsg(TransPort, Ssbuf, Srbuf)
                                   *
                                   *
            // Reflect values in the register monitor
               // Add code to display the read register values
}
                                                       *
                                                       *
                                                       *
}
```

- Programming Example for Extended MEMOBUS Protocol Message Communications
  The programming example that is given below demonstrates how to manage sockets and perform message communications using the Extended MEMOBUS protocol.
  This program example is written in C language so it must declare extern "C" to make calls from C++.

```
#include <stdio.h>
#include <winsock.h>
#include <winioctl.h>

#define TCP_PRT    0
#define UDP_PRT    1
#define DATA_SIZE   4096

int sd;      /* Socket Discripter */
struct sockaddr_in my;
struct sockaddr_in dst;
struct sockaddr_in from;

short DATAi;               // Number of data items to send
short MDATAi;              // MEMOBUS data length
unsigned char iSerial;     // Serial number

// Protocol declaration
int memobus_master_main( unsigned short trans_prt, unsigned long myip,
                         unsigned short myport, unsigned long dstip, unsigned short dstport );
int memobus_msg( unsigned short trans_prt, char* sbuf, char* rbuf );
int tcp_msg( char* sbuf, char* rbuf );
int udp_msg( char* sbuf, char* rbuf );
void mk_cmd_data( unsigned char SFC, unsigned char CPUNum,
                  unsigned short Adr, unsigned short DataNum, char* sbuf );
int chk_rsp_data( int rlen, char* sbuf, char* rbuf );


/******************************************************************/
/* Open a TCP/UDP port                                             */
/******************************************************************/
int memobus_master_main( unsigned short trans_prt,
                         unsigned long myip, unsigned short myport,
                         unsigned long dstip, unsigned short dstport )
{
    WSADATA   wsadata;
    int rc;

    // Declaration to use Winsock.dll (must be declared before calling routines)
    rc = WSAStartup( 0x0101, &wsadata );
    if ( rc != 0 )
    {
        exit(0);
    }
```

```
// Initialize serial number setting
iSerial = 0x00;

// Clear the sockaddr structure (IP address, port number, etc.) with zeros.
memset( (char *)&my, 0, sizeof(struct sockaddr));
memset( (char *)&dst, 0, sizeof(struct sockaddr));

// Declare the PC's IP address and port number
my.sin_family = AF_INET;
my.sin_addr.s_addr = myip;
my.sin_port = htons( myport );

// Declare the MP3000's IP address and port number
dst.sin_family = AF_INET;
dst.sin_addr.s_addr = dstip;
dst.sin_port = htons( dstport );

// Create the TCP or UDP socket
if( trans_prt == TCP_PRT )
{  //TCP
    sd = socket( AF_INET, SOCK_STREAM, 0 );
}
else
{  //UDP
    sd = socket( AF_INET, SOCK_DGRAM, 0 );
}
if ( sd <= 0 )
{
    rc = -1;
    return( rc );
}

// Bind the local port number and socket
rc = bind( sd, ( struct sockaddr *)&my, sizeof(struct sockaddr_in));
if ( rc == -1 )
{
    closesocket( sd );
    rc = -2;
    return( rc );
}

// Establish connection
if( trans_prt == TCP_PRT )
{   //TCP
    rc = connect( sd, ( struct sockaddr *)&dst, sizeof(struct sockaddr_in));
    if( rc == -1 )
    {   //TCP
        closesocket( sd );
```

```
            rc = -3;
            return( rc );
        }
    }

    return(rc);
}

/*********************************************************************/
/* Send command data, receive response data                          */
/*********************************************************************/
int memobus_msg( unsigned short trans_prt, char* sbuf, char* rbuf )
{
    int rc;

    if( trans_prt == TCP_PRT)
    {
        rc = tcp_msg(sbuf, rbuf);
    }
    else
    {
        rc = udp_msg(sbuf, rbuf);
    }
    return(rc);
}

/*********************************************************************/
/* Send command data, receive response data (TCP)                    */
/*********************************************************************/
int tcp_msg( char* sbuf, char* rbuf )
{
    int slen, rlen;
    int rc = 0;

    // Send command data
    slen = send( sd, sbuf, DATAi, 0  );
    if ( slen != DATAi )  // Returns the number of bytes sent if sending was successful
    {
        closesocket(sd);
        rc = -1;
        return ( rc );
    }
    // Receive response data
    rlen = recv( sd, rbuf, DATA_SIZE, 0 );
    if ( rlen <= 0 )      //A 0 or less value is returned if receiving failed
    {
        closesocket(sd);
```

```
        rc = -2;
        return ( rc );
    }
    // Check response data
    rc = chk_rsp_data( rlen, sbuf, rbuf );
    if ( rc != 0 )      //Error in received data
    {
        closesocket(sd);
        return ( rc );
    }

    iSerial++;    // Increment the serial number of the 218 header

    return ( rc );
}

/*****************************************************************/
/* Send command data, receive response data (UDP)                */
/*****************************************************************/
int udp_msg( char* sbuf, char* rbuf )
{
    int slen, rlen, fromlen;
    int rc = 0;

    // Send command data
    slen = sendto( sd, sbuf, DATAi, 0, (struct sockaddr *)&dst, sizeof(struct sockaddr));
    if ( slen != DATAi )    // Returns the number of bytes sent if sending was successful
    {
        closesocket(sd);
        rc = -1;
        return ( rc );
    }

    // Receive response data
    fromlen = sizeof(struct sockaddr);
    rlen = recvfrom( sd, rbuf, DATA_SIZE, 0, (struct sockaddr *)&from, &fromlen );
    if ( rlen <= 0 )      //A 0 or less value is returned if receiving failed
    {
        closesocket(sd);
        rc = -2;
        return ( rc );
    }

    // Check response data
    rc = chk_rsp_data( rlen, sbuf, rbuf );
    if ( rc != 0 )      //Error in received data
    {
        closesocket(sd);
```

```
        return ( rc );
    }

    iSerial++;    // Increment the serial number of the 218 header

    return ( rc );
}

/*************************************************************************/
/* Create Extended MEMOBUS protocol command                              */
/*************************************************************************/
void mk_cmd_data( unsigned char SFC, unsigned char CPUNum,
                  unsigned short Adr, unsigned short DataNum, char* sbuf )
{
    //Calculate number of data items
    //MEMOBUS data length from MFC to end of data
    switch(SFC)
    {
        case 0x09:
            MDATAi = 8;
            break;
        default:
            break;
    }

    //Calculate total number of data items
    DATAi = MDATAi +14;  //218 header (12 bytes) + Length part (2 bytes) + MEMOBUS data length
    (variable)

    // Create the 218 header part
    // Initialize the send/receive buffers
    memset( sbuf, 0x00, DATA_SIZE );

    // Set the register type.
    sbuf[0] = 0x11;    // Extended MEMOBUS command

    // Set the serial number and increment for every transmission
    sbuf[1] = iSerial;

    // Set the destination channel number
    sbuf[2] = 0x00;    // Always 0 hex because the PLC channel is undefined

    // Set the source channel number
    sbuf[3] = 0x00;    // Always 0 hex because channel numbers do not apply to PCs

    sbuf[4] = 0x00;    // Reserved.
    sbuf[5] = 0x00;    // Reserved.
```

```
    // Set the total number of data items from the start of the 218 header to the end of MEMOBUS data
    sbuf[6] = (unsigned char)(DATAi & 0x00FF);          // Data length (L)
    sbuf[7] = (unsigned char)((DATAi & 0xFF00) >> 8);   // Data length (H)

    sbuf[8] = 0x00;    // Reserved.
    sbuf[9] = 0x00;    // Reserved.
    sbuf[10] = 0x00;   // Reserved.
    sbuf[11] = 0x00;   // Reserved.

    // Create the MEMOBUS data part
    // Length from MFC to end of data
    sbuf[12] = (unsigned char)(MDATAi & 0x00FF);        // MEMOBUS data length (L)
    sbuf[13] = (unsigned char)((MDATAi & 0xFF00) >> 8); // MEMOBUS data length (H)

    // MFC is always 20 hex
    sbuf[14] = 0x20;

    // SFC
    sbuf[15] = SFC;

    // Set the CPU number
    sbuf[16] = (unsigned char)(CPUNum << 4); // The local CPU number is always 0 hex

    sbuf[17] = 0x00;   // The spare is always 0 hex

    // Set the reference number
    sbuf[18] = (unsigned char)(Adr & 0x00FF);          // Adr(L)
    sbuf[19] = (unsigned char)((Adr & 0xFF00) >> 8);   // Adr(H)

    // Set the number of registers
    sbuf[20] = (unsigned char)(DataNum & 0x00FF);       // DataNum(L)
    sbuf[21] = (unsigned char)((DataNum & 0xFF00) >> 8); // DataNum(H)

}

/*****************************************************************/
/* Check response data                                           */
/*****************************************************************/
int chk_rsp_data(int rlen, char* sbuf, char* rbuf)
{
    short rcvDATAi;    // Total number of data items to receive
    int rc = 0;

    // Check the total data length
    switch ( sbuf[15] )
    {
        case 0x09:
```

```
        rcvDATAi = 20 + ( (sbuf[21] << 8)|sbuf[20] ) * 2;
        if ( rlen != rcvDATAi )
        {
            rc = -3;
            return( rc );
        }
        break;
    default:
        break;
}

// Check the packet type
if ( rbuf[0] != 0x19 )    // Not a MEMOBUS response
{
    rc = -4;
    return( rc );
}

// Check the serial number
if ( sbuf[1] != rbuf[1] ) // Do not match the serial number of the command
{
    rc = -5;
    return( rc );
}

//Check the total data length of the message
if ( (rbuf[6] != (rcvDATAi & 0x00FF)) &&
     (rbuf[7] != (rcvDATAi & 0xFF00) >> 8) )   // ? bytes = 218 header (12 bytes)
{                                     //          + MEMOBUS data (always 8 bytes + variable DataNum * 2 bytes)
    rc = -6;
    return( rc );
}

// Check the total MEMOBUS data length

// Check the MFC
if ( rbuf[14] != 0x20 )// MFC is always 20 hex
{
    rc = -7;
    return( rc );
}

// Check the SFC
if ( rbuf[15] != sbuf[15] )
{
    rc = -8;
    return( rc );
}
```

```
// Check the number of registers
switch ( sbuf[15] )
{
    case 0x09:
        if (( rbuf[18] != sbuf[20] ) || (rbuf[19] != sbuf[21] ))
        {
            rc = -9;
            return( rc );
        }
        break;
    default:
        break;
}

return( rc );
```

◆ Starting Communications

Use the following procedure to communicate between the Visual C++ application on the PC and the MP3000.

1. Turn ON the power to the MP3000 to start receiving messages.
The system will automatically start the message reception operation. No further operation is required.

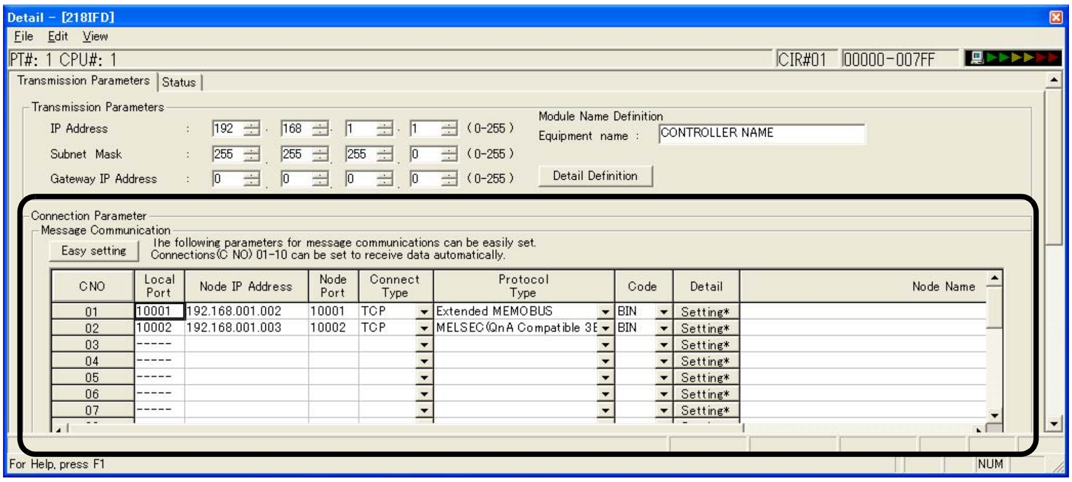
2. Start the application created in Visual C++ and follow these steps to start communicating with the MP3000.
①Enter the PC's IP address. (Example: 192.168.1.2)
②Set the PC's port number. (Example: 10001)
③Set the MP3000's IP address. (Example: 192.168.1.1)
④Set the MP3000's port number. (Example: 10001)
⑤Select the connection type. (Example: TCP)
⑥Click the **TCP/UDP Open** Button.
⑦Click the **Communications START** Button.
Note: Click the **Communications STOP** Button. This pauses message communications.

2.14 Communications Buffer Channels

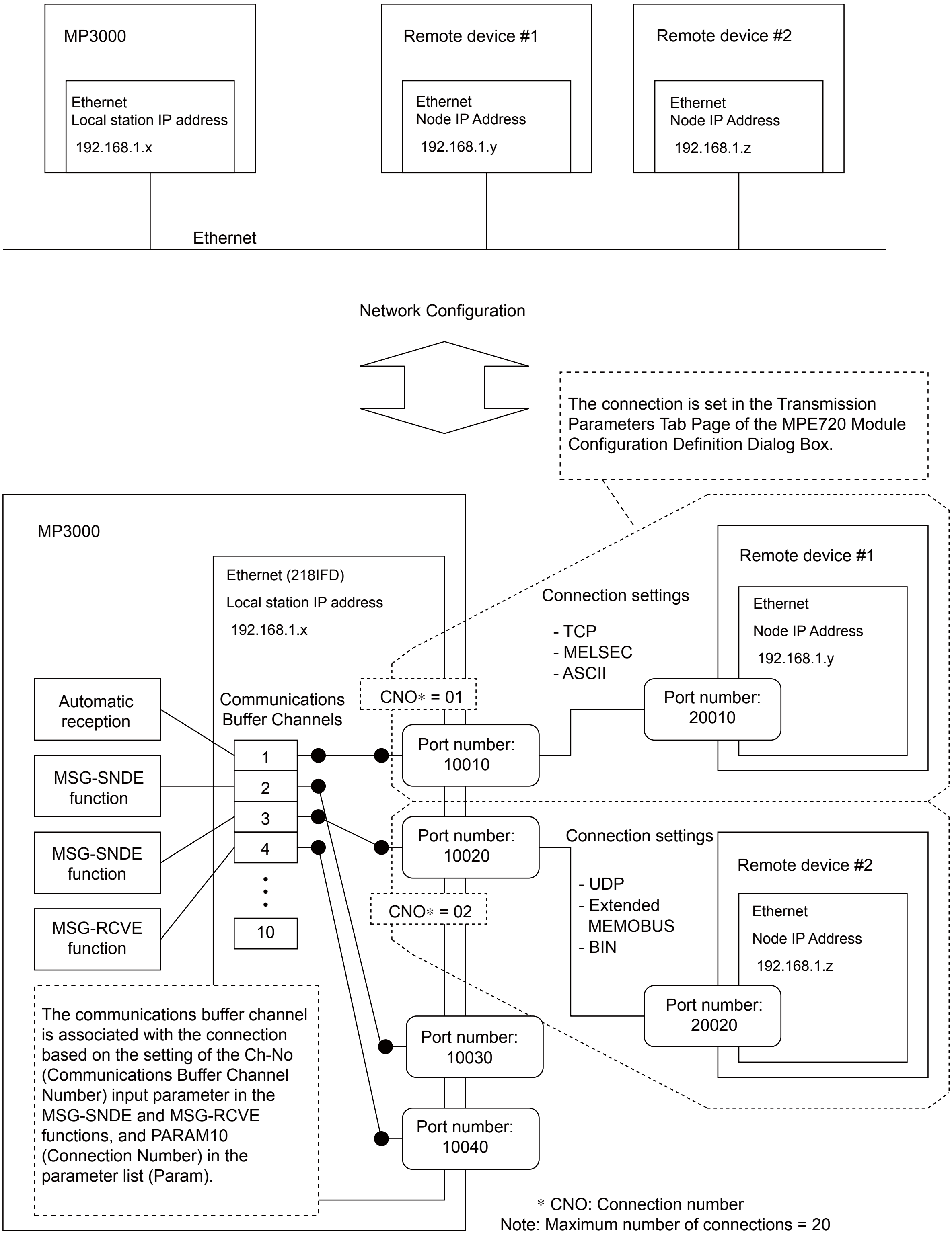
A communications buffer channel is a data buffer that interfaces the MSG-SNDE or MSG-RCVE function with the communications device. This data buffer consists of one or more channels. Each channel is identified by a communications buffer channel number.

The communications buffer channel is associated with the connection based on the setting of the Ch-No (Communications Buffer Channel Number) input parameter in the MSG-SNDE and MSG-RCVE functions, and PARAM10 (Connection Number) in the parameter list (Param).

A connection refers to communications settings between the local station and a remote station. These settings are set in the Transmission Parameters Tab Page of the MPE720 Module Configuration Definition Dialog Box.



The following figure illustrates the concept of the communications buffer channels.


MP3000
Ethernet
Local station IP address
192.168.1.x
Remote device #1
Ethernet
Node IP Address
192.168.1.y
Remote device #2
Ethernet
Node IP Address
192.168.1.z
Ethernet
Network Configuration
The connection is set in the Transmission Parameters Tab Page of the MPE720 Module Configuration Definition Dialog Box.
MP3000
Ethernet (218IFD)
Local station IP address
192.168.1.x
Automatic reception
MSG-SNDE function
MSG-SNDE function
MSG-RCVE function
Communications Buffer Channels
1
2
3
4
10
CNO* = 01
CNO* = 02
Port number: 10010
Port number: 10020
Port number: 10030
Port number: 10040
Connection settings
- TCP
- MELSEC
- ASCII
Remote device #1
Ethernet
Node IP Address
192.168.1.y
Port number: 20010
Connection settings
- UDP
- Extended MEMOBUS
- BIN
Remote device #2
Ethernet
Node IP Address
192.168.1.z
Port number: 20020
The communications buffer channel is associated with the connection based on the setting of the Ch-No (Communications Buffer Channel Number) input parameter in the MSG-SNDE and MSG-RCVE functions, and PARAM10 (Connection Number) in the parameter list (Param).
* CNO: Connection number
Note: Maximum number of connections = 20

2.15 Using Message Functions

You can use any registered function by specifying the corresponding function code in the message function.

This section describes the function codes and how to use them.

Function Codes

The following tables list the function codes for each protocol.

Function Codes for the Extended MEMOBUS Protocol

Function Code	Function
00 hex	Not used.
01 hex	Reads the states of coils.
02 hex	Reads the states of input relays.
03 hex	Reads the contents of hold registers.
04 hex	Reads the contents of input registers.
05 hex	Changes the state of a single coil.
06 hex	Writes to a single hold register.
07 hex	Not used.
08 hex	Performs a loopback test.
09 hex	Reads the contents of hold registers (extended).
0A hex	Reads the contents of input registers (extended).
0B hex	Writes to hold registers (extended).
0C hex	Not used.
0D hex	Reads the contents of non-consecutive hold registers (extended).
0E hex	Writes the contents of non-consecutive hold registers (extended).
0F hex	Changes the states of multiple coils.
10 hex	Writes to multiple hold registers.
4341 hex	Reads the states of bits.
4345 hex	Changes the state of a single bit.
4346 hex	Writes to a single register.
4349 hex	Reads the contents of registers.
434B hex	Writes to multiple registers.
434D hex	Reads the contents of non-consecutive registers.
434E hex	Writes the contents of non-consecutive registers.
434F hex	Changes the states of multiple bits.

Function Codes for the A-compatible 1E Frame Protocol

Function Code	Function
01 or 02 hex	Reads bit devices in units of one point.
03, 04, 09, or 0A hex	Reads word devices in units of one point.
05 or 0F hex	Writes bit devices in units of one point.
06, 0B, or 10 hex	Writes word devices in units of one point.
08 hex	Performs a loopback test.
0E hex	Sets/resets word devices in units of one point by specifying a device number.
31 hex	Writes to a fixed buffer in units of one word.
32 hex	Reads from the random access buffer in units of one word.
33 hex	Writes to the random access buffer in units of one word.

Function Codes for the QnA-compatible 3E Frame Protocol

Function Code	Function
01 or 02 hex	Reads bit devices in units of one point.
03, 04, 09, or 0A hex	Reads word devices in units of one point.
05 or 0F hex	Writes bit devices in units of one point.
06, 0B, or 10 hex	Writes word devices in units of one point.
0E hex	Writes word devices in units of one point.
0D hex	Reads word devices in units of one point.
08 hex	Performs a loopback test.

Function Codes for the FINS Protocol

Function Code	Function
01 hex	Reads CIO Area bits, Work Area bits, Holding Area bits, and Auxiliary Area bits by word.
03 or 09 hex	Reads from the DM Area in units of one word.
0F hex	Writes to CIO Area bits, Work Area bits, Holding Area bits, and Auxiliary Area bits by word.
0B or 10 hex	Writes to the DM data memory in units of one word.
0D hex	Reads non-consecutive words from the DM Area.

Function Codes for the TOYOPUC Protocol

Function Code	Function
31 hex	Writes to the file memory by word.

Using Function Codes

This section describes the use of the message function for each function code.

Function Codes: 01, 02, 03, 04, 09, and 0A Hex

Function: Reads data.

The specified size of data is read from specified registers in the remote station and stored in registers in the local station.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	This parameter is used with the QnA-compatible 3E Frame protocol and the FINS protocol. Refer to the section for each protocol for details.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to read from in the remote station. Specify a bit address for function codes 01 and 02 hex, and a word address for function codes 03, 04, 09, and 0A hex.
PARAM15	Remote Station Data Address, Upper Word	Not used.
PARAM16	Remote Station Register Type	Not used.
PARAM17	Data Size	Set the size of the data to read. Specify the size in bits for function codes 01 and 02 hex, and in words for function codes 03, 04, 09, and 0A hex.

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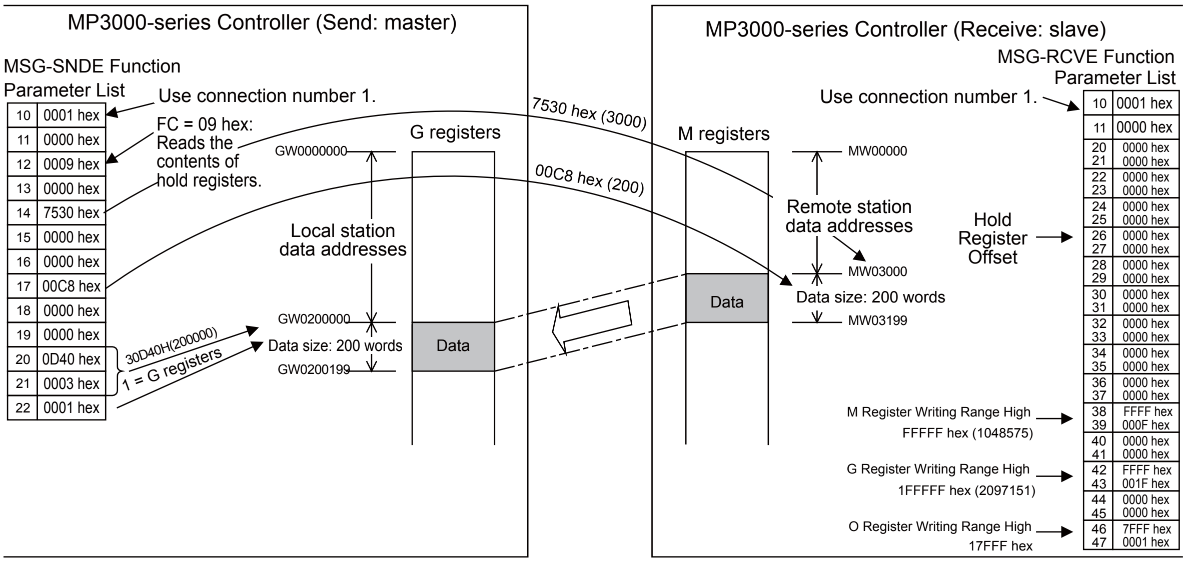
MSG-SNDE Function Parameter		Description
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	Set the first register address to store the read data in the local station. Specify a bit address for function codes 01 and 02 hex, and a word address for function codes 03, 04, 09, and 0A hex.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, or O) to store the read data in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of hold registers are read by using function code 09 hex. In this example, 200 words of data are read from register MW0030000 in the remote station and stored in registers in the local station starting at address GW0200000.



Example of Addressing and Offset Addressing with Function Codes 01, 02, 03, 04, 09, or 0A Hex

> **Note**
> If the hold register offset parameters in the MSG-RCVE function are set to a non-zero value, the actual addresses that are read in the remote station will be the sum of the remote station data addresses and the value in the hold register offset parameters.

Ethernet Communications

2

Function Codes: 05, 06, 0B, 0F, and 10 Hex

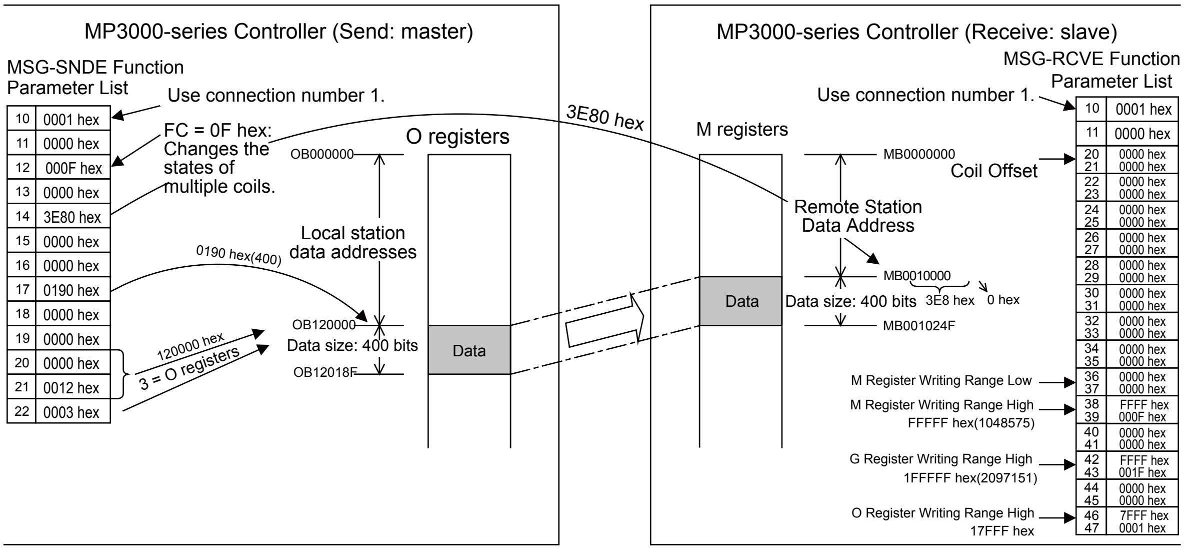
Function: Writes data.

The specified size of data is read from registers in the local station and written to specified registers in the remote station.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	This parameter is used with the QnA-compatible 3E Frame protocol and the FINS protocol. Refer to the section for each protocol for details.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to write to in the remote station. Specify a bit address for function codes 05 and 0F hex, and a word address for function codes 06, 0B, and 10 hex.
PARAM15	Remote Station Data Address, Upper Word	Not used.
PARAM16	Remote Station Register Type	Not used.
PARAM17	Data Size	Set the size of the data to write. Specify the size in bits for function code 0F hex, and in words for function codes 0B and 10 hex. This parameter is not used for function codes 05 and 06 hex.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	Set the first register address in the local station where the data to be written is stored. Specify a bit address for function codes 05 and 0F hex, and a word address for function codes 06, 0B, and 10 hex.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, I, O, or S) of the data to be written that is stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the states of multiple coils are changed by using function code 0F hex. In this example, 400 bits of data starting from register OB120000 in the local station are written to registers starting at MB00010000 in the remote station.



Example of Addressing and Offset Addressing with Function Codes 05, 06, 0B, 0F, or 10 Hex

Note

1. If the coil offset parameters in the MSG-RCVE function are set to a non-zero value, the actual addresses that are written to in the remote station will be the sum of the remote station data addresses and the word offset value in the coil offset parameters.
2. Set the address of the registers to write to within the range specified by the M Register Writing Range Low and M Register Writing Range High parameters in the MSG-RCVE function. Data will not be written if an address exceeds the valid setting range.

Function Code: 0D Hex

Function: Reads data from multiple specified registers, one point at a time.

Data is read one word at a time from registers in the remote station as specified in the remote station address table that is stored in registers in the local station. This function reads the number of data items that is specified in the data size parameter.

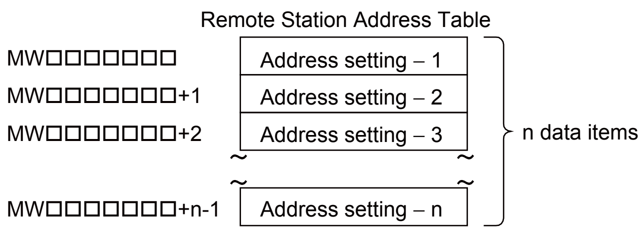
The applicable registers that can be read from the remote station are the M registers. The register addresses to store the data in the local station are set to the sum of each address specified in the remote station address table and the local station data address.

The following parameters need to be set in the MSG-SNDE function.

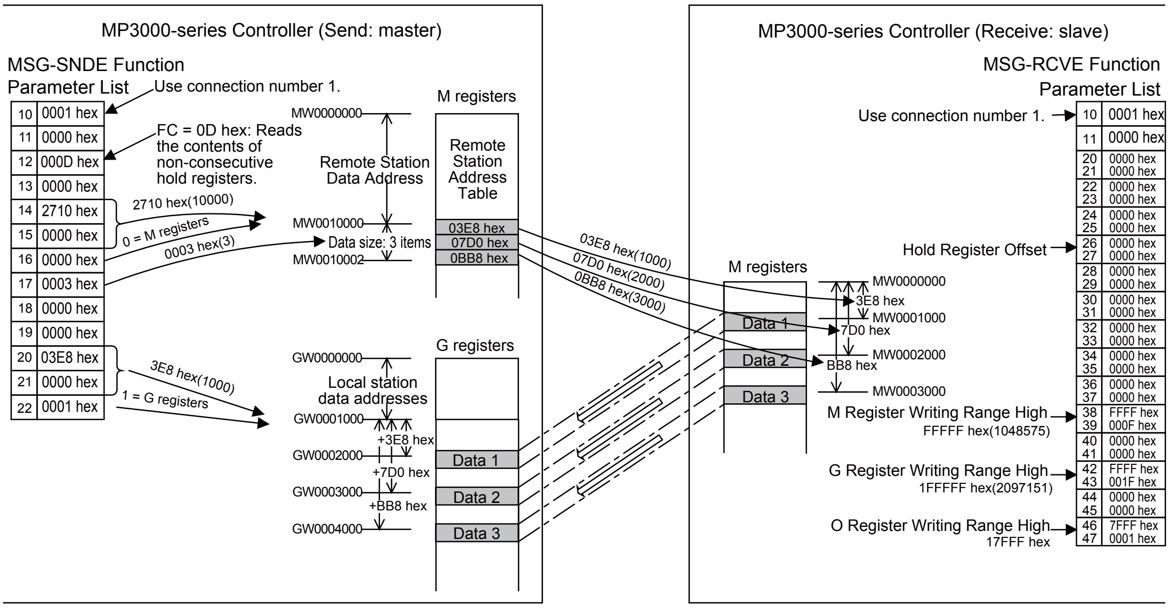
MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	This parameter is used with the QnA-compatible 3E Frame protocol and the FINS protocol. Refer to the section for each protocol for details.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first register address where the remote station address table is stored.
PARAM15	Remote Station Data Address, Upper Word	
PARAM16	Remote Station Register Type	Set the register type (M, G, I, O, or S) in the local station where the remote station address table is stored.
PARAM17	Data Size	Set the number of data items to read.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	These parameters are used to offset the address for writing data in registers in the local station that have been read from the remote station. Data will be written to the addresses that are the sum of each address specified in the remote station address table and the local station data address.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, or O) to store the read data in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of non-consecutive hold registers are read by using function code 0D hex. In this example, the contents of registers MW0001000, MW0002000, and MW0003000 in the remote station are read and stored in registers GW0002000, GW0003000, and GW0004000 in the local station. The remote station address table starts at register MW0010000 in the local station.

The remote station address table contains a one-word address specifier for each data item, as illustrated below.



Remote Station Address Table When Using Function Code 0D Hex



Example of Addressing and Offset Addressing with Function Code 0D Hex

> Note
>
> If the hold register offset parameters in the MSG-RCVE function are set to a non-zero value, the actual addresses that are read in the remote station will be the sum of the specified data addresses and the value in the hold register offset parameters.

Function Code: 0E Hex

Function: Writes data to multiple specified registers, one point at a time.

Data is written one word at a time in registers in the remote station as specified in the remote station address table that is stored in registers in the local station. This function writes the number of data items specified by the data size parameter.

The applicable registers that can be written to in the remote station are the M registers. The register addresses to store the data to be written in the local station are set to the sum of each address specified in the remote station address table and the local station data address.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	This parameter is used with the QnA-compatible 3E Frame protocol. Refer to the section for each protocol for details.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first register address where the remote station address table is stored.
PARAM15	Remote Station Data Address, Upper Word	
PARAM16	Remote Station Register Type	Set the register type (M, G, I, O, or S) in the local station where the remote station address table is stored.
PARAM17	Data Size	Set the number of data items to write.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.

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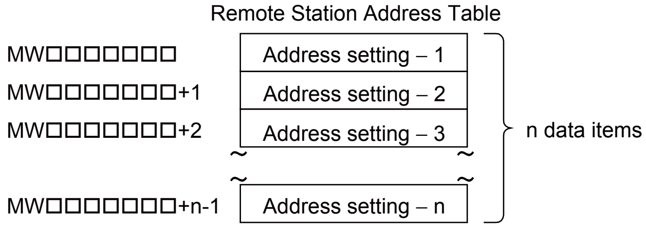
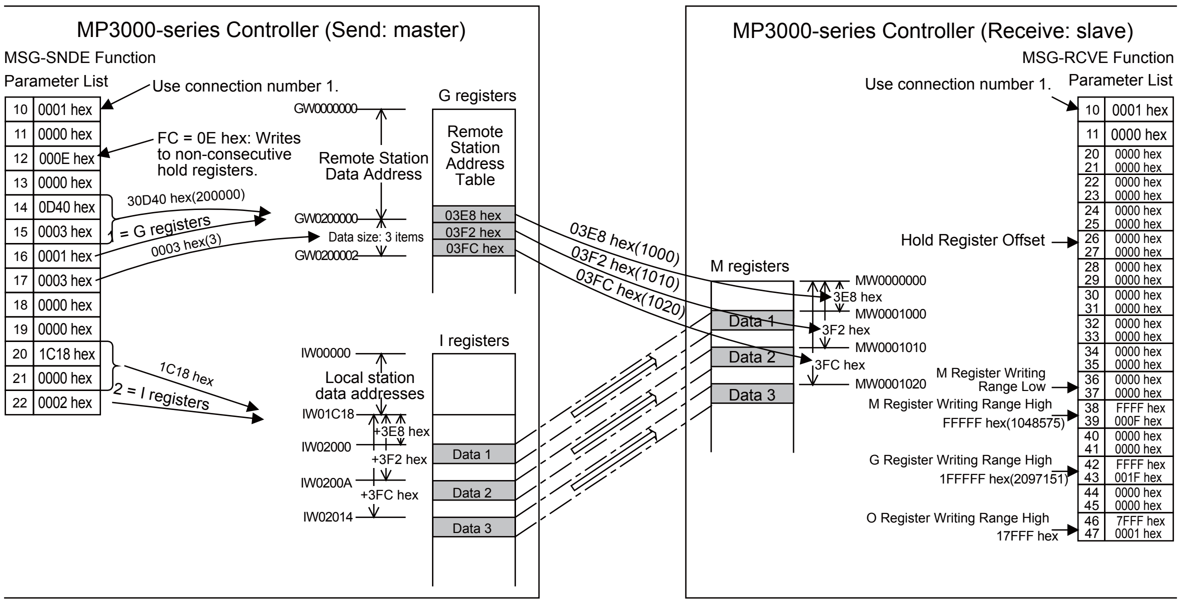
MSG-SNDE Function Parameter		Description
PARAM20	Local Station Data Address, Lower Word	These parameters are used to offset the address for reading data from registers in the local station for writing in the remote station. Data will be read from the addresses that are the sum of each address specified in the remote station address table and the local station data address.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, I, O, or S) of the data to be written that is stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of non-consecutive hold registers are written by using function code 0E hex. In this example, data stored in registers IW0002000, IW000200A, and IW0002014 in the local station are written to registers MW0001000, MW0001010, and MW0001020 in the remote station. The remote station address table starts at register GW0200000 in the local station.

The remote station address table contains a one-word address specifier for each data item, as illustrated below.



Remote Station Address Table When Using Function Code 0E Hex



Example of Addressing and Offset Addressing with Function Code 0E Hex

Note

If the hold register offset parameters in the MSG-RCVE function are set to a non-zero value, the actual addresses that are written to in the remote station will be the sum of the specified data addresses and the value in the hold register offset parameters.

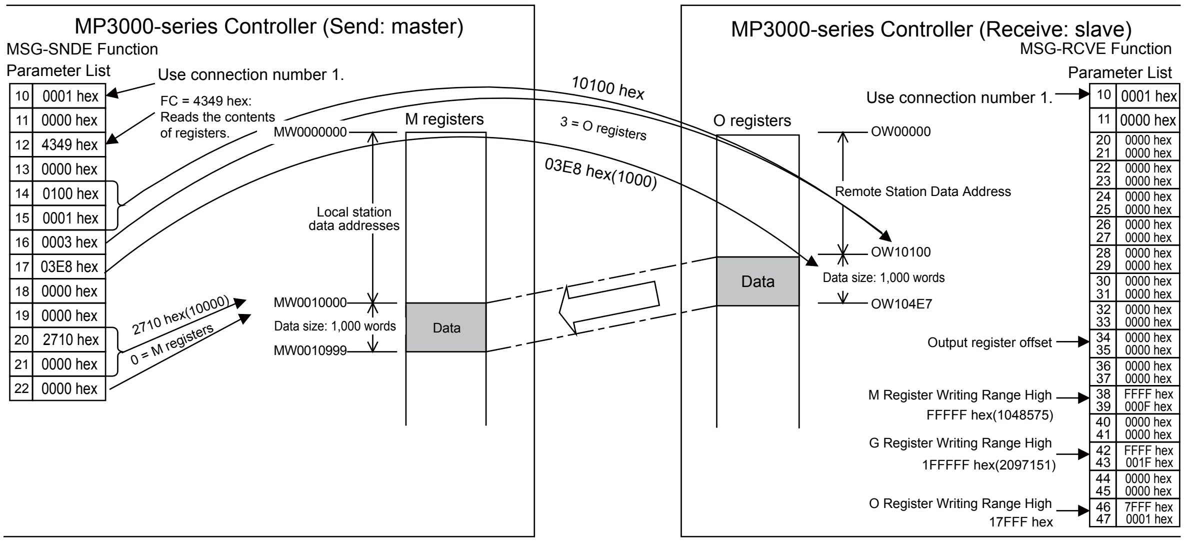
Function Codes: 4341 and 4349 Hex

Function: Reads data from a data address in the remote station specified with a 32-bit address.
The specified size of data is read from specified registers in the remote station and stored in registers in the local station.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number that determines the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to read from in the remote station. Specify a bit address for function code 4341 hex, and a word address for function code 4349 hex.
PARAM15	Remote Station Data Address, Upper Word	
PARAM16	Remote Station Register Type	Set the register type (M, G, I, O, or S) to read from in the remote station.
PARAM17	Data Size	Set the size of the data to read. Specify the size in bits for function code 4341 hex, and in words for function code 4349 hex.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	Set the first register address to store the read data in the local station. Specify a bit address for function code 4341 hex, and a word address for function code 4349 hex.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, or O) to store the read data in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of multiple registers are read by using function code 4349 hex. In this example, 1,000 words of data are read starting from register OW10100 in the remote station and stored in registers in the local station starting at address MW0010000.



Example of Addressing and Offset Addressing with Function Code 4314 or 4349 Hex

Note

If the output register offset parameters in the MSG-RCVE function are set to a non-zero value, the actual addresses that are read in the remote station will be the sum of the remote station data addresses and the value in the output register offset parameters.

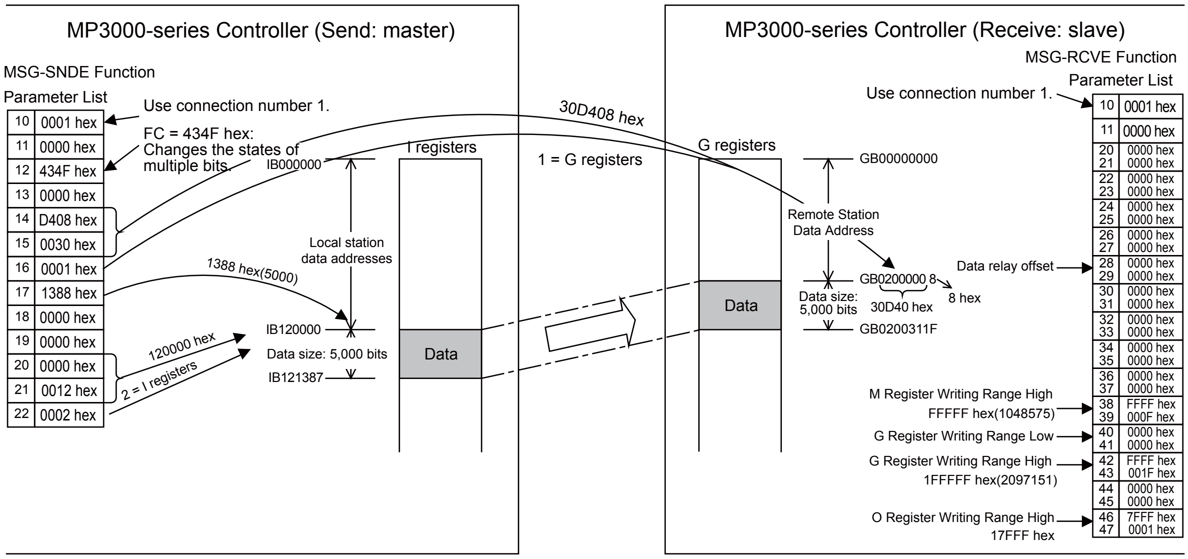
Function Codes: 4345, 4346, 434B, and 434F Hex

Function: Writes data to a data address in the remote station specified by a 32-bit address.
The specified size of data is read from registers in the local station and written to specified registers in the remote station.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to write to in the remote station. Specify a bit address for function code 4345 or 434F hex, and a word address for function code 4346 or 434B hex.
PARAM15	Remote Station Data Address, Upper Word	
PARAM16	Remote Station Register Type	Set the register type (M, G, O, or S) to write to in the remote station.
PARAM17	Data Size	Set the size of the data to write. Specify the size in bits for function code 434F hex, and in words for function code 434B hex. This parameter is not used for function codes 4345 and 4346 hex.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	Set the first register address in the local station where the data to be written is stored. Specify a bit address for function code 4345 or 434F hex, and a word address for function code 4346 or 434B hex.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, I, O, or S) of the data to be written that is stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the states of multiple bits are changed by using function code 434F hex. In this example, 5,000 bits of data starting from register IB120000 in the local station are written to registers starting at GB02000008 in the remote station.



Example of Addressing and Offset Addressing with Function Code 4345, 4346, 434B, or 434F Hex

> Note
>
> 1. If the data relay offset parameters in the MSG-RCVE function are set to a non-zero value, the actual addresses that are written to in the remote station will be the sum of the remote station data addresses and the word offset value in the data relay offset parameters.
> 2. Set the address of the registers to write to within the range specified by the G Register Writing Range Low and G Register Writing Range High parameters in the MSG-RCVE function. Data will not be written if an address exceeds the valid setting range.

Function Code: 434D Hex

Function: Reads data from multiple registers specified by a 32-bit address, one point at a time.

Data is read one or two words at a time from registers in the remote station as specified in the remote station address table that is stored in registers in the local station. This function reads the number of data items that is specified in the data size parameter.

The register to read from in the remote station is listed in the remote station address table.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first register address where the remote station address table is stored.
PARAM15	Remote Station Data Address, Upper Word	
PARAM16	Remote Station Register Type	Set the register type (M or G) in the local station where the remote station address table is stored.
PARAM17	Data Size	Set the number of data items to read.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	Set the first register address to store the read data in the local station.
PARAM21	Local Station Data Address, Upper Word	

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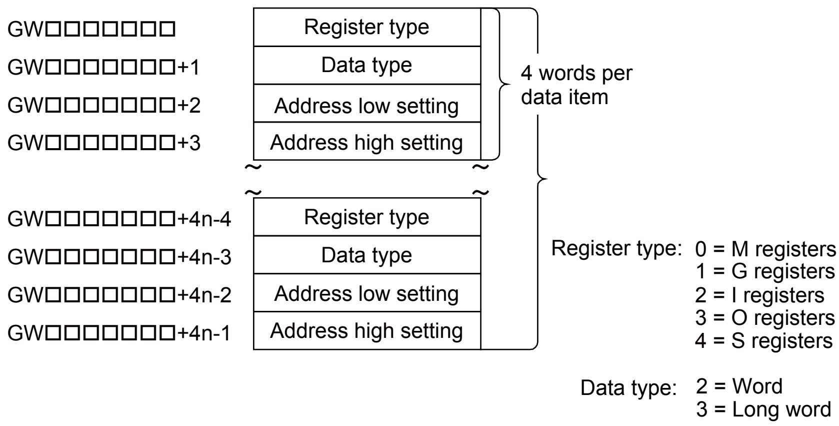
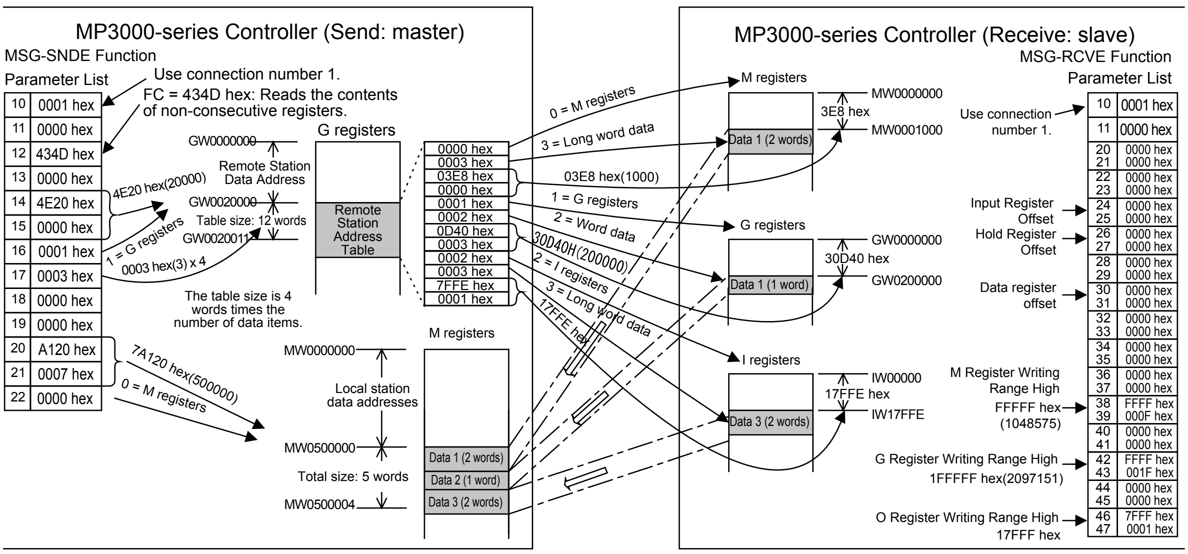
MSG-SNDE Function Parameter		Description
PARAM22	Local Station Register Type	Set the register type (M or G) where the read data is to be stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of non-consecutive registers are read by using function code 434D hex. In this example, 2 words of data are read from register MW0001000, 1 word from register GW0200000, and 2 words from register IW17FFE in the remote station. These words are stored in the same order in registers in the local station starting at address MW0500000. The remote station address table starts at register GW0020000 in the local station.

The remote station address table consists of 4 words per data item, as illustrated below.



Remote Station Address Table When Using Function Code 434D Hex



Example of Addressing and Offset Addressing with Function Code 434D Hex

Note

If the various offset parameters in the MSG-RCVE function are set to non-zero values, the actual addresses that are read in the remote station will be the sum of the specified data addresses and the values in the offset parameters.

Function Code: 434E Hex

Function: Writes data to multiple registers specified by a 32-bit address, one point at a time.

Data is written one or two words at a time in registers in the remote station as specified in the remote station address table that is stored in registers in the local station. This function writes the number of data items specified by the data size parameter.

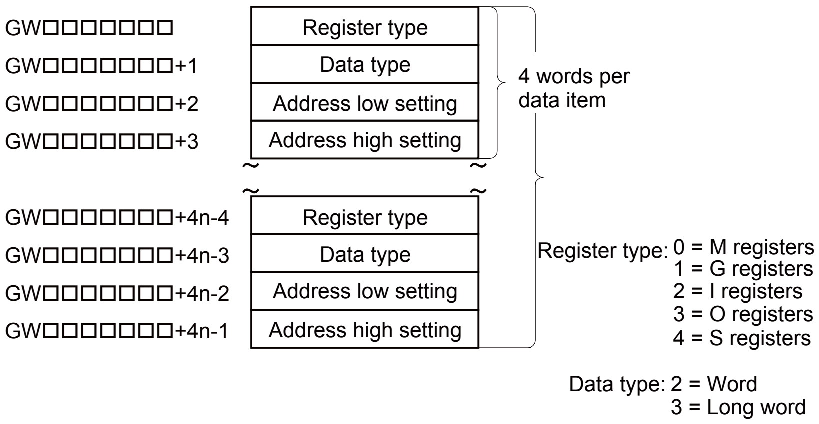
The register type and data address that are specified in the remote station address table determine the registers in the remote station.

The following parameters need to be set in the MSG-SNDE function.

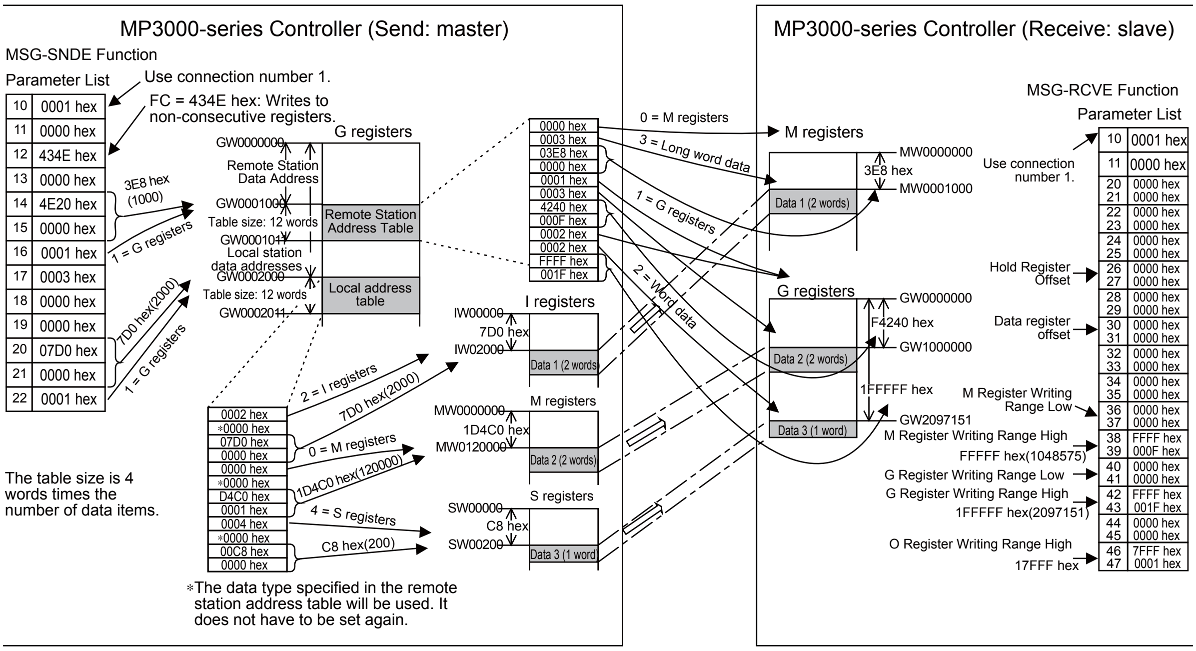
MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first register address where the remote station address table is stored.
PARAM15	Remote Station Data Address, Upper Word	
PARAM16	Remote Station Register Type	Set the register type (M or G) in the local station where the remote station address table is stored.
PARAM17	Data Size	Set the number of data items to write.
PARAM18	Remote CPU Module Number	This parameter is used with the Extended MEMOBUS protocol. Set the CPU number at the remote station.
PARAM20	Local Station Data Address, Lower Word	Set the register address that points to the first address of the local station address table that lists where the data to be written is stored.
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M or G) in the local station where the local station address table is stored.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of non-consecutive registers are written by using function code 434E hex. In this example, 2 words of data are read from register IW0002000, 2 words from register MW0120000, and 1 word from register SW00200 in the local station. These words are written to registers MW0001000, GW1000000, and GW2097151 in the remote station. The remote station address table starts at register GW0001000 and the local station address table starts at register GW0002000 in the local station.

The remote station address table and local station address table consist of 4 words per data item, as illustrated below.



Remote Station Address Table When Using Function Code 434E Hex



Example of Addressing and Offset Addressing with Function Code 434E Hex

Note

1. If the various register offset parameters in the MSG-RCVE function are set to non-zero values, the actual addresses that are written to in the remote station will be the sum of the remote station data addresses and the word offset values in the register offset parameters.
2. Set the address of the registers to write to within the range specified by the Register Writing Range Low and Register Writing Range High parameters in the MSG-RCVE function. Data will not be written if an address exceeds the valid setting range.

Function Code: 31 Hex

Function: Writes to the fixed buffer in a Mitsubishi PLC, or to the file memory in a TEKT PLC.

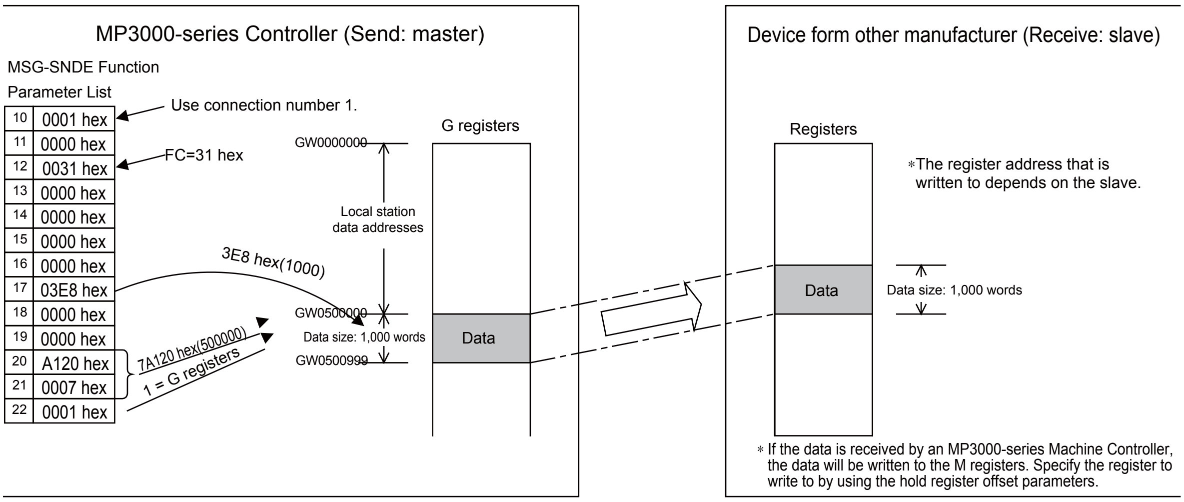
The specified size of data is read from registers in the local station and written to registers in the remote station.

The register address in the remote station cannot be specified.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to write to in the remote station.
PARAM15	Remote Station Data Address, Upper Word	Not used.
PARAM16	Remote Station Register Type	Not used.
PARAM17	Data Size	Set the size of the data to write. (Specify the size in words.)
PARAM18	Remote CPU Module Number	Not used.
PARAM20	Local Station Data Address, Lower Word	Set the first register address in the local station where the data to be written is stored. (Set the word address.)
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, I, O, or S) of the data to be written that is stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how data is written to fixed buffers by using function code 31 hex. In this example, 1,000 bits of data starting from register GW0500000 in the local station are written to fixed buffers in the remote station.



Example of Addressing and Offset Addressing with Function Code 31 Hex

Note

1. If the data is being received by an MP3000 slave, the data will be written to the addresses that are specified by the hold register offset parameters in the MSG-RCVE function.
2. Set the address of the register to write to within the range specified by the M Register Writing Range Low and M Register Writing Range High parameters in the MSG-RCVE function. Data will not be written if an address exceeds the valid setting range.

Function Code: 32 Hex

Function: Reads from the random access buffer in a Mitsubishi PLC.

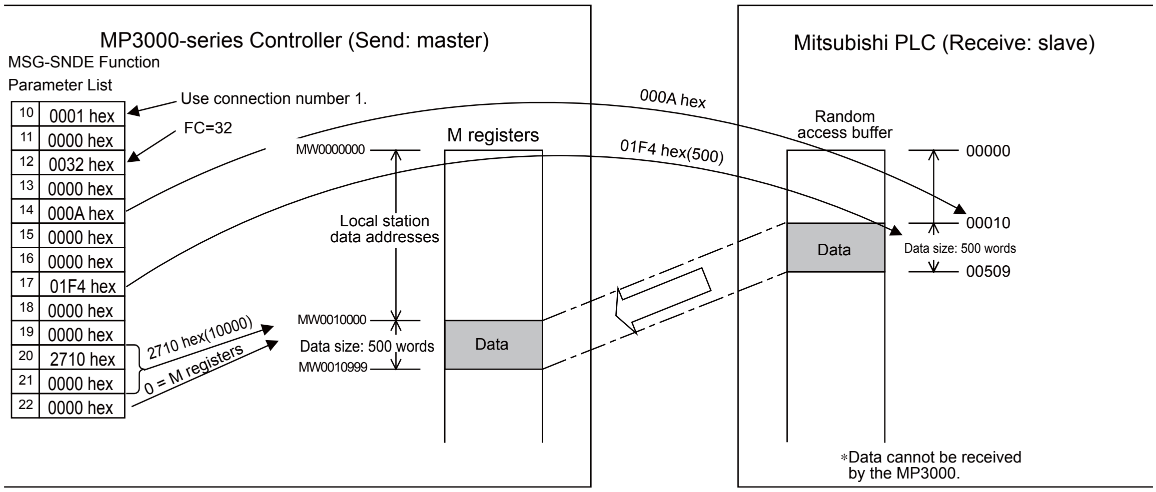
The specified size of data is read from specified registers in the remote station and stored in registers in the local station.

The read works only with the random access buffer in the remote station.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to read from in the remote station. (Set the word address.)
PARAM15	Remote Station Data Address, Upper Word	Not used.
PARAM16	Remote Station Register Type	Not used.
PARAM17	Data Size	Set the size of the data to read. (Specify the size in words.)
PARAM18	Remote CPU Module Number	Not used.
PARAM20	Local Station Data Address, Lower Word	Set the first register address to store the read data in the local station. (Set the word address.)
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, or O) to store the read data in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how the contents of the random access buffer is read by using function code 32 hex. In this example, 500 words of data are read starting from register 00010 in the remote station and stored in registers in the local station starting at address MW0010000.



Example of Addressing and Offset Addressing with Function Code 32 Hex

Note

When the MP3000 acts as a slave, function command 32 hex cannot be used to receive data.

Function Code: 33 Hex

Function: Writes to the random access buffer in a Mitsubishi PLC.

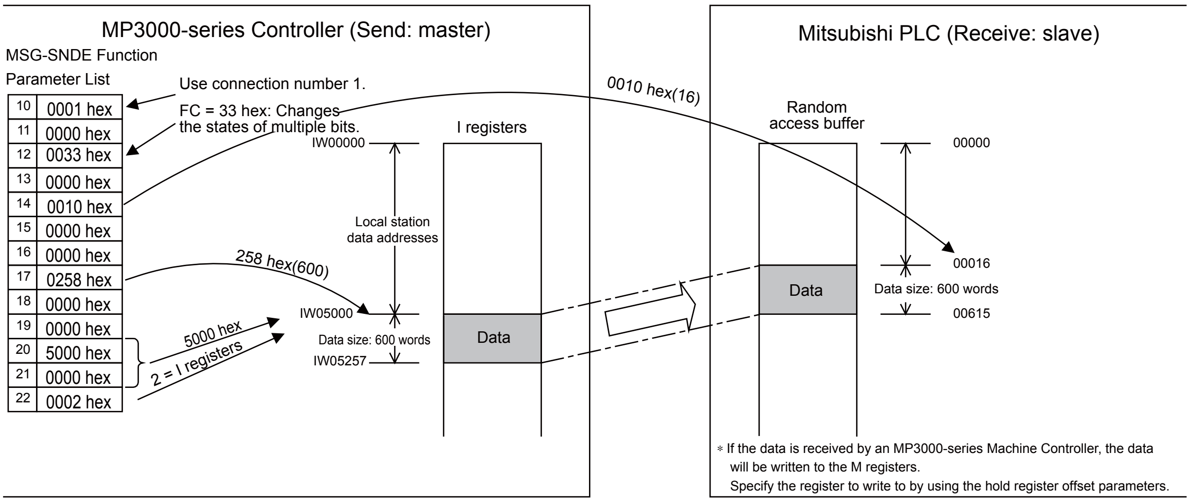
The specified size of data is read from registers in the local station and written to the remote station starting from the specified register.

The read works only with the random access buffer in the remote station.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Set the function code for the function to use.
PARAM14	Remote Station Data Address, Lower Word	Set the first address to write to in the remote station. (Set the word address.)
PARAM15	Remote Station Data Address, Upper Word	Not used.
PARAM16	Remote Station Register Type	Not used.
PARAM17	Data Size	Set the size of the data to write. (Specify the size in words.)
PARAM18	Remote CPU Module Number	Not used.
PARAM20	Local Station Data Address, Lower Word	Set the first register address in the local station where the data to be written is stored. (Set the word address.)
PARAM21	Local Station Data Address, Upper Word	
PARAM22	Local Station Register Type	Set the register type (M, G, I, O, or S) of the data to be written that is stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how to write to the random access buffer by using function code 33 hex. In this example, 600 words of data starting from register IW05000 in the local station are written to registers starting at 00016 in the remote station.



Example of Addressing and Offset Addressing with Function Code 33 Hex

Note

1. If the data is being received by an MP3000 slave, the data will be written to the addresses that are specified by the hold register offset parameters in the MSG-RCVE function.
2. Set the address of the register to write to within the range specified by the M Register Writing Range Low and M Register Writing Range High parameters in the MSG-RCVE function. Data will not be written if an address exceeds the valid setting range.

No-protocol Communications (No Function Code)

Function: Writes data.

The specified size of data is read from registers in the local station and written to M registers in the remote station.

The applicable registers in the remote station are the M registers.

The following parameters need to be set in the MSG-SNDE function.

MSG-SNDE Function Parameter		Description
PARAM10	Connection Number	Set the connection number used to determine the remote station.
PARAM11	Option	Not used.
PARAM12	Function Code	Not used.
PARAM14	Remote Station Data Address, Lower Word	Not used.
PARAM15	Remote Station Data Address, Upper Word	Not used.
PARAM16	Remote Station Register Type	Not used.
PARAM17	Data Size	Set the size of the data to write. Specify the size in words for No-protocol 1, and in bytes for No-protocol 2.
PARAM18	Remote CPU Module Number	Not used.
PARAM20	Local Station Data Address, Lower Word	Set the first register address in the local station where the data to be written is stored.
PARAM21	Local Station Data Address, Upper Word	

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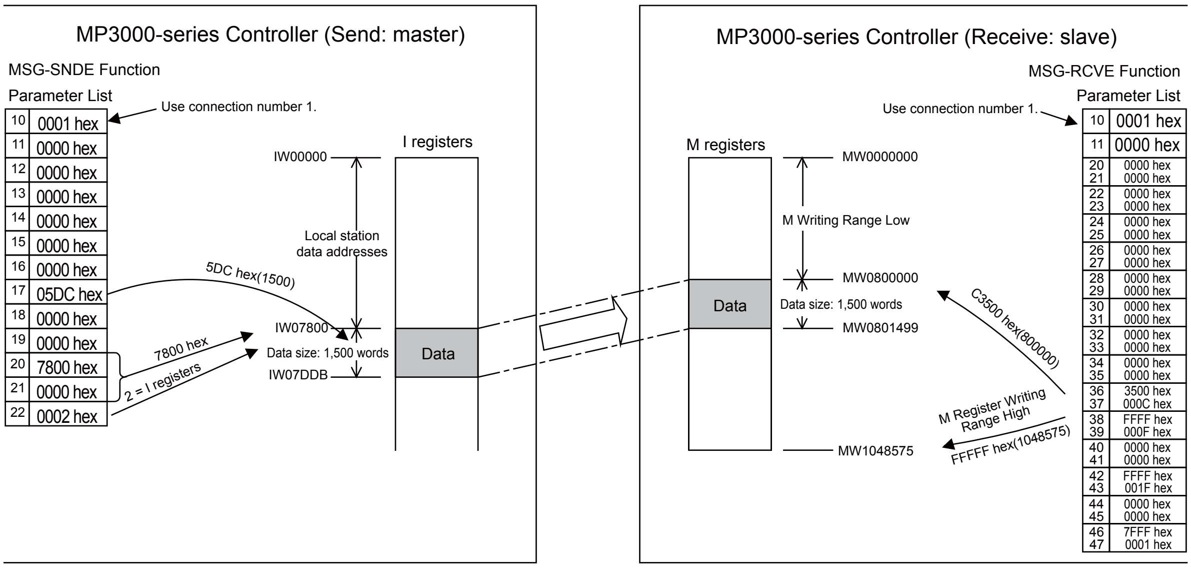
MSG-SNDE Function Parameter		Description
PARAM22	Local Station Register Type	Set the register type (M, G, I, O, or S) of the data to be written that is stored in the local station.
PARAM24	For system use	Set this parameter to 0 from a user program or by other means in the first scan after the power is turned ON. Thereafter, do not change the value of this parameter. This parameter is used by the system.

The following example illustrates how data is written using no-protocol communications. In this example, 1,500 words of data starting from register IW07800 in the local station are written to registers starting at MW0800000 in the remote station.



Example of Addressing and Offset Addressing with No-Protocol Communications

Note

1. The registers in the remote station are specified by the M Register Writing Range Low parameter in the MSG-RCVE function.
2. Set the address of the registers to write to within the range specified by the M Register Writing Range Low and M Register Writing Range High parameters in the MSG-RCVE function. Data will not be written if an address exceeds the valid setting range.

2.16 Details on Protocols

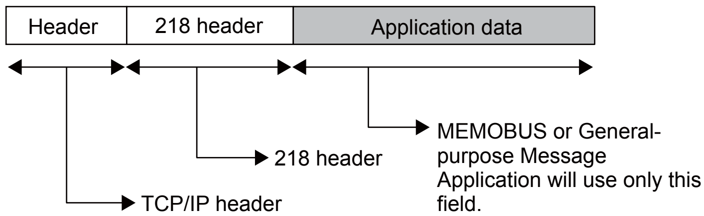
This section provides details on the Extended MEMOBUS protocol, MEMOBUS protocol, and no-protocol communications.

Extended MEMOBUS Protocol

Message Structure

The following message structure is used in Ethernet communications. Use this as reference when developing a PC-based application.

When the Extended MEMOBUS protocol is used to send and receive data, each message consists of three fields: a header field, a 218 header field, and the application data field.



The header is used for TCP/IP and UDP/IP. User programs do not need to be aware of this header because it is automatically appended and removed in the 218IFD.

The 218 header is required when using the Extended MEMOBUS protocol for Ethernet communications. User programs also do not need to be aware of the 218 header because it is automatically appended and removed in the 218IFD.

The actual data for the Extended MEMOBUS protocol is stored in the application data field.

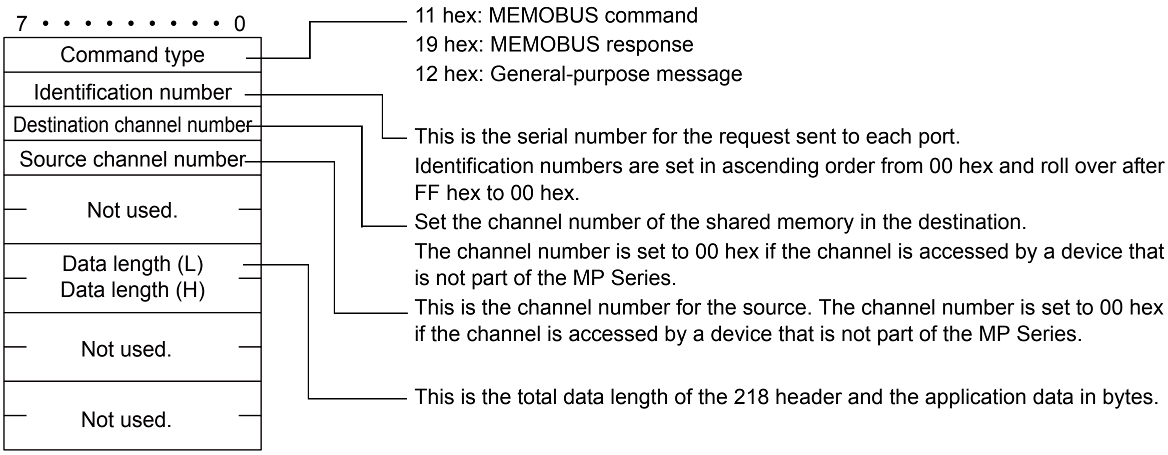
When communicating between a 218IFD and a host computer, the application on the host computer must append and remove the 218 header.

The application data field contains the following parameter structure based on the combination of communications protocol and the code that is specified.

Communications Protocol	Code	Reference
MEMOBUS message communications	BIN	*MEMOBUS Binary Mode (page 2-381)*
MEMOBUS message communications	ASCII	*MEMOBUS ASCII Mode (page 2-400)*
General-purpose message communications (no-protocol)	BIN	*General-purpose Message Binary Mode (page 2-400)*
General-purpose message communications (no-protocol)	ASCII	*General-purpose Message ASCII Mode (page 2-401)*

◆ 218 Header

When communicating with the Extended MEMOBUS protocol, a 12-byte header called the 218 header is appended before the application data. The following figure describes the elements of the 218 header.



◆ Extended MEMOBUS Commands

The commands that make up the Extended MEMOBUS messages are identified by function codes and provide the functions given in the following table.

Major Function Code	Sub Function Code	Function
20 hex	01 hex	Reads the states of coils.
	02 hex	Reads the states of input relays.
	03 hex	Reads the contents of hold registers.
	04 hex	Reads the contents of input registers.
	05 hex	Changes the state of a single coil.
	06 hex	Writes to a single hold register or one word.
	08 hex	Performs a loopback test.
	09 hex	Reads the contents of hold registers (extended).
	0A hex	Reads the contents of input registers (extended).
	0B hex	Writes to hold registers (extended).
	0D hex	Reads the contents of non-consecutive hold registers (extended).
	0E hex	Writes to non-consecutive hold registers (extended).
	0F hex	Changes the states of multiple coils.
	10 hex	Writes to multiple hold registers.
43 hex (extended function for accessing registers using 32-bit addresses)	41 hex	Reads the states of bits.
	45 hex	Changes the state of a single bit.
	46 hex	Writes to a single register.
	49 hex	Reads the contents of registers.
	4B hex	Writes to multiple registers.
	4D hex	Reads the contents of non-consecutive registers.
	4E hex	Writes to non-consecutive registers.
	4F hex	Changes the states of multiple bits.

◆ Register Types

When the major function code is 43 hex and the function specified by the sub function code references the contents of a register, such as a read, write, or change of state, specify the target register type in the slave. The codes for register types are given below.

Register Type	Code	Sub Function Codes
Hold Registers (M)	4D hex	41, 45, 46, 49, 4B, 4D, 4E, or 4F hex
Data registers (G)	47 hex	41, 45, 46, 49, 4B, 4D, 4E, or 4F hex
Input Registers (I)	49 hex	41, 49, or 4D hex
Output Registers (O)	4F hex	41, 45, 46, 49, 4B, 4D, 4E, or 4F hex
System Registers (S)	53 hex	41, 45, 46, 49, 4B, 4D, 4E, or 4F hex

◆ Data Types

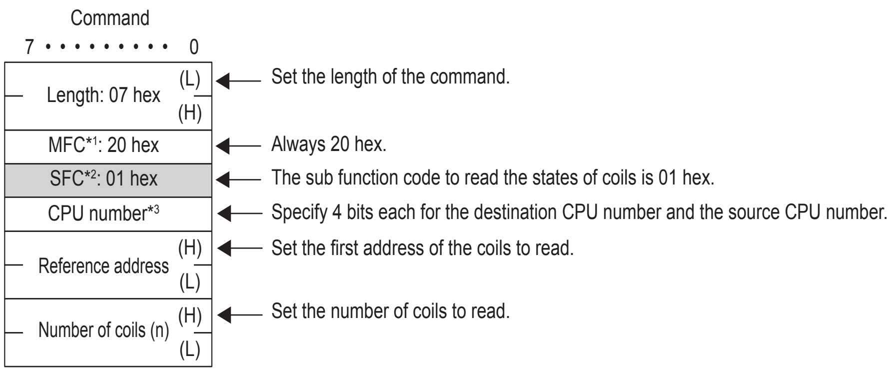
When the major function code is 43 hex and the function specified by the sub function code reads or writes to non-consecutive registers, specify the type of the target data. The codes for data types are given below.

Data type	Code	Sub Function Codes
Word (2 bytes)	2	4D or 4E hex
Long word (4 bytes)	3	4D or 4E hex

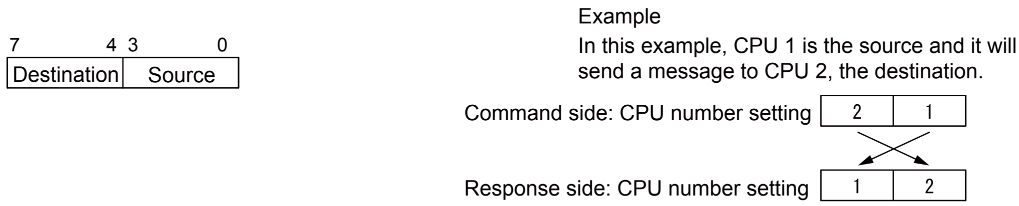
MEMOBUS Binary Mode

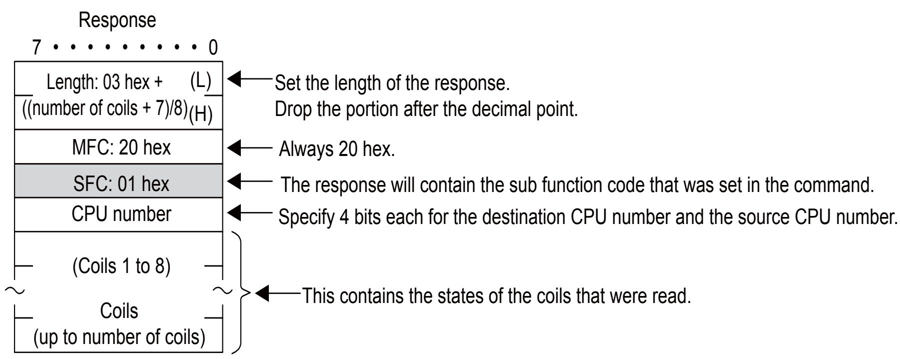
The following formats are used for MEMOBUS message communications in Binary Mode.

◆ Reading the States of Coils



*1. MFC: Major function code
*2. SFC: Sub function code
*3. The CPU number is arranged as follows:





◆ Reading the States of Input Relays

Command

7 • • • • • • • • • • 0

Length: 07 hex	(L)	Set the length of the command.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 02 hex		The sub function code to read the states of relays is 02 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Reference address	(H)	Set the first address of the relays to read.
	(L)	
Number of relays (n)	(H)	Set the number of relays to read.
	(L)	

Response

7 • • • • • • • • • • 0

Length: 03 hex + ((number of relays + 7)/8)	(L)	Set the length of the response. Drop the portion after the decimal point.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 02 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
(Relays 1 to 8)	(H)	This contains the states of the relays that were read.
	(L)	
~		
Relays (up to number of relays)	(H)	
	(L)	

◆ Reading the Contents of Hold Registers

Command

7 • • • • • • • • • • 0

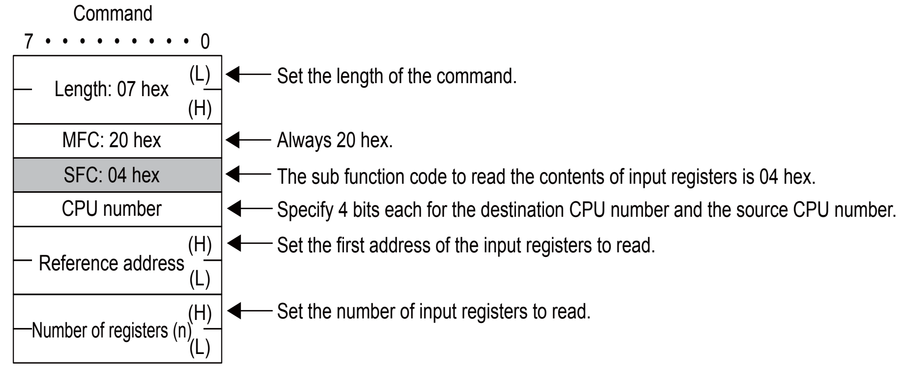
Length: 07 hex	(L)	Set the length of the command.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 03 hex		The sub function code to read the contents of hold registers is 03 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Reference address	(H)	Set the first address of the hold registers to read.
	(L)	
Number of registers (n)	(H)	Set the number of hold registers to read.
	(L)	

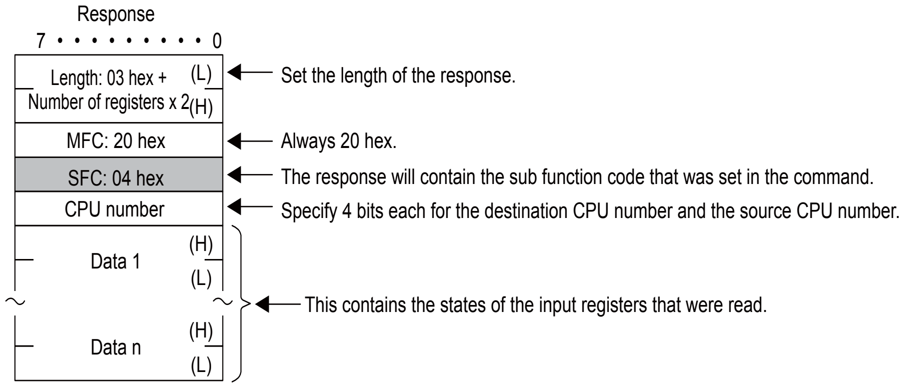
Response

7 • • • • • • • • • • 0

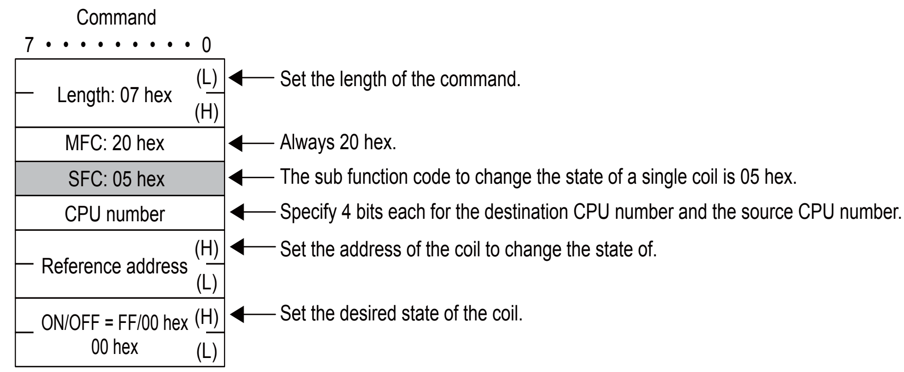
Length: 03 hex + Number of registers x 2	(L)	Set the length of the response.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 03 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Data 1	(H)	This contains the states of the hold registers that were read.
	(L)	
~		
Data n	(H)	
	(L)	

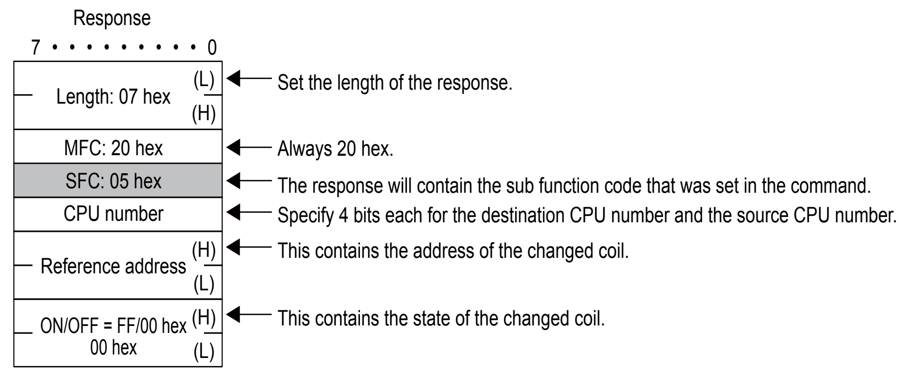
◆ Reading the Contents of Input Registers





◆ Changing the State of a Single Coil





◆ Writing to a Single Hold Register

Command

7 • • • • • • • • • 0		
Length: 07 hex	(L)	← Set the length of the command.
	(H)	
MFC: 20 hex		← Always 20 hex.
SFC: 06 hex		← The sub function code to change the contents of a single hold register is 06 hex.
CPU number		← Specify 4 bits each for the destination CPU number and the source CPU number.
Reference address	(H)	← Set the address of the single hold register to change.
	(L)	
Register data	(H)	← Set the contents of the single hold register to change.
	(L)	

Response

7 • • • • • • • • • 0		
Length: 07 hex	(L)	← Set the length of the response.
	(H)	
MFC: 20 hex		← Always 20 hex.
SFC: 06 hex		← The response will contain the sub function code that was set in the command.
CPU number		← Specify 4 bits each for the destination CPU number and the source CPU number.
Reference address	(H)	← This contains the address of the changed single hold register.
	(L)	
Register data	(H)	← This contains the state of the changed single hold register.
	(L)	

◆ Performing a Loopback Test

Command

7 • • • • • • • • • 0		
Length: 07 hex	(L)	← Set the length of the command.
	(H)	
MFC: 20 hex		← Always 20 hex.
SFC: 08 hex		← The sub function code to perform a loopback test is 08 hex.
CPU number		← Specify 4 bits each for the destination CPU number and the source CPU number.
Test code: 0000 hex		← Set the data for the test.
Data AAAA hex		

Response

7 • • • • • • • • • 0		
Length: 07 hex	(L)	← Set the length of the response.
	(H)	
MFC: 20 hex		← Always 20 hex.
SFC: 08 hex		← The response will contain the sub function code that was set in the command.
CPU number		← Specify 4 bits each for the destination CPU number and the source CPU number.
Test code: 0000 hex		← If the test is successful, the response will contain the same data that was sent in the command.
Data AAAA hex		

◆ Reading the Contents of Hold Registers (Extended)

Command

7 • • • • • • • • • • 0		
Length: 08 hex	(L)	Set the length of the command.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 09 hex		The sub function code to read the contents of hold registers is 09 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Reference address	(L)	Set the first address of the hold registers to read.
	(H)	
Number of registers (n)	(L)	Set the number of hold registers to read.
	(H)	

Response

7 • • • • • • • • • • 0		
Length: 06 hex + Number of registers x 2	(L)	Set the length of the response.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 09 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Number of registers (n)	(L)	This contains the number of the registers that were read.
	(H)	
Data 1	(L)	This contains the contents of the hold registers that were read.
	(H)	
~		
Data n	(L)	
	(H)	

◆ Reading the Contents of Input Registers (Extended)

Command

7 • • • • • • • • • • 0		
Length: 08 hex	(L)	Set the length of the command.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 0A hex		The sub function code to read the contents of input registers is 0A hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Reference address	(L)	Set the first address of the input registers to read.
	(H)	
Number of registers (n)	(L)	Set the number of input registers to read.
	(H)	

Response

7 • • • • • • • • • • 0		
Length: 06 hex + Number of registers x 2	(L)	Set the length of the response.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 0A hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Number of registers (n)	(L)	This contains the number of the input registers that were read.
	(H)	
Data 1	(L)	This contains the contents of the input registers that were read.
	(H)	
~		
Data n	(L)	
	(H)	

◆ Writing to Hold Registers (Extended)

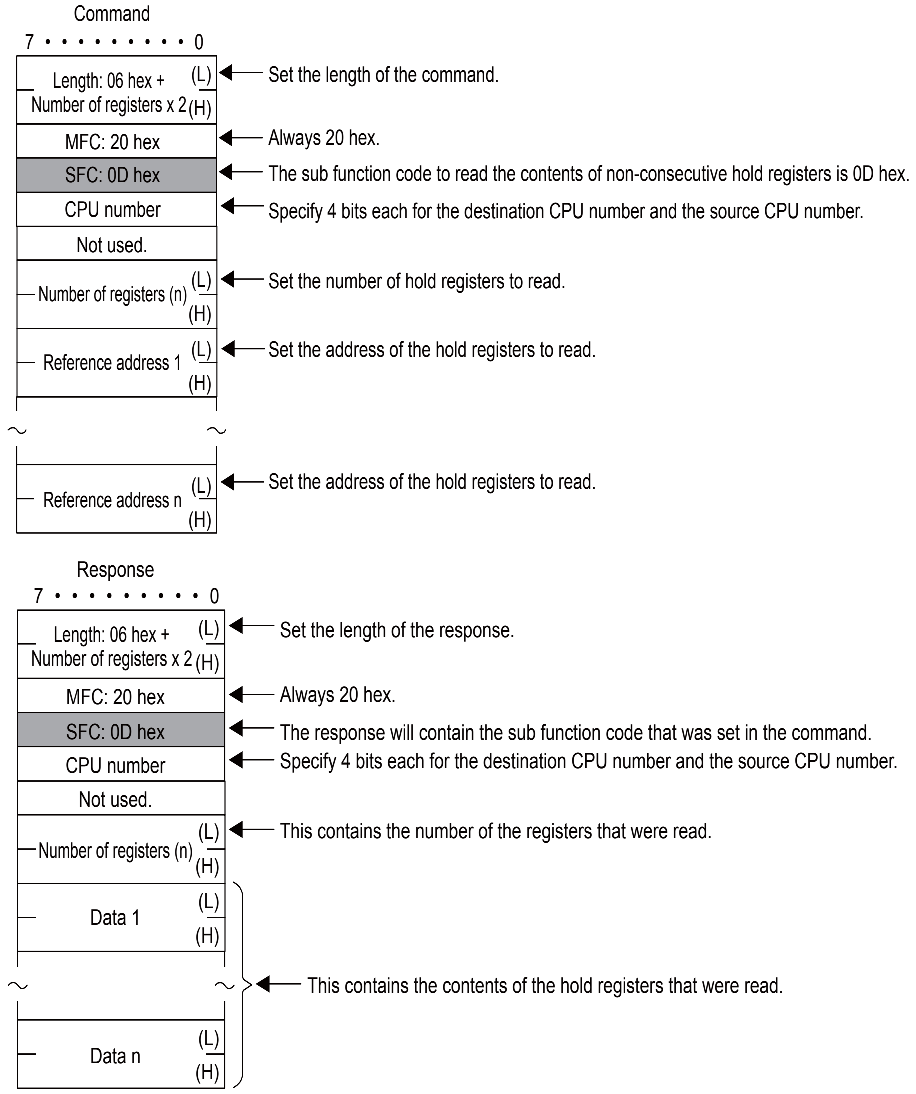
Command

7 • • • • • • • • • • 0		
Length: 08 hex + Number of registers x 2	(L)	Set the length of the command.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 0B hex		The sub function code to write data into hold registers is 0B hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Reference address	(L)	Set the first address of the hold registers to write.
	(H)	
Number of registers (n)	(L)	Set the number of hold registers to write.
	(H)	
Data 1	(L)	Set the data to write into the hold registers.
	(H)	
~		
Data n	(L)	
	(H)	

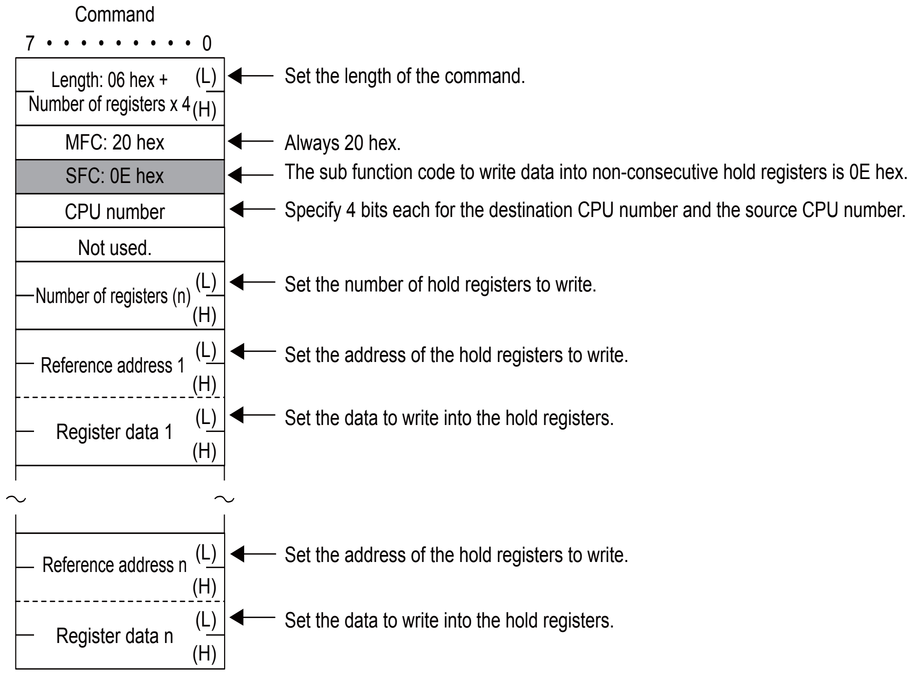
Response

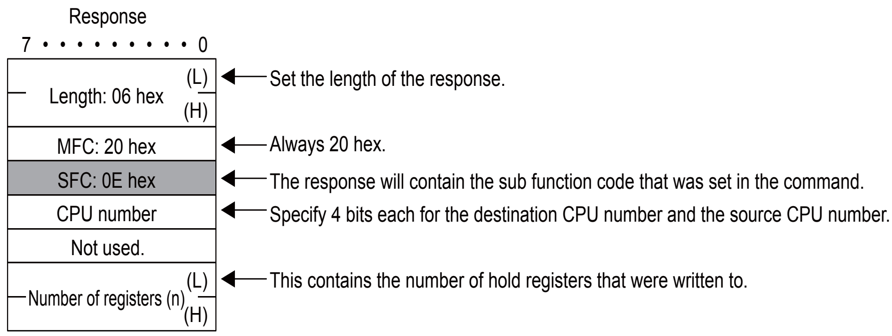
7 • • • • • • • • • • 0		
Length: 08 hex	(L)	Set the length of the response.
	(H)	
MFC: 20 hex		Always 20 hex.
SFC: 0B hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Reference address	(L)	This contains the first address of the hold registers that were written to.
	(H)	
Number of registers (n)	(L)	This contains the number of hold registers that were written to.
	(H)	

◆ Reading the Contents of Non-consecutive Hold Registers (Extended)

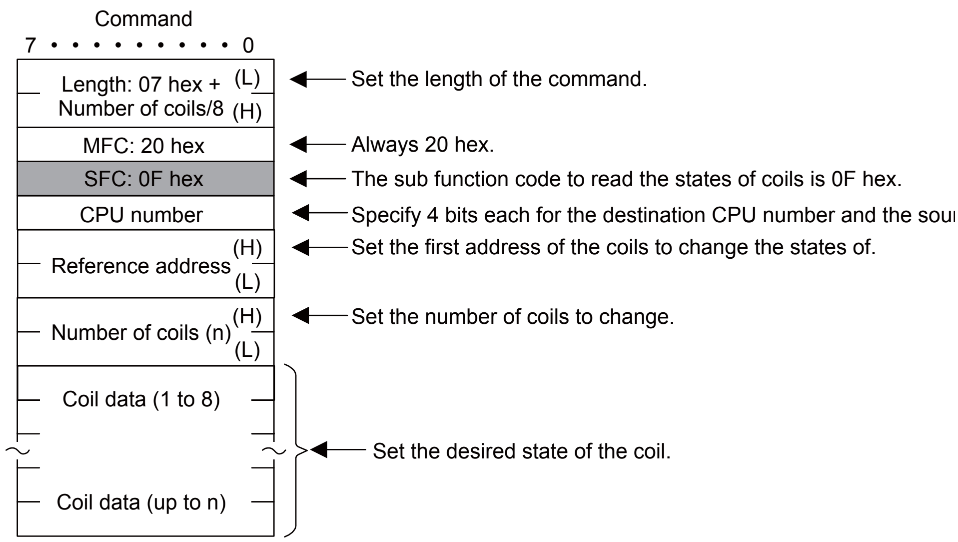


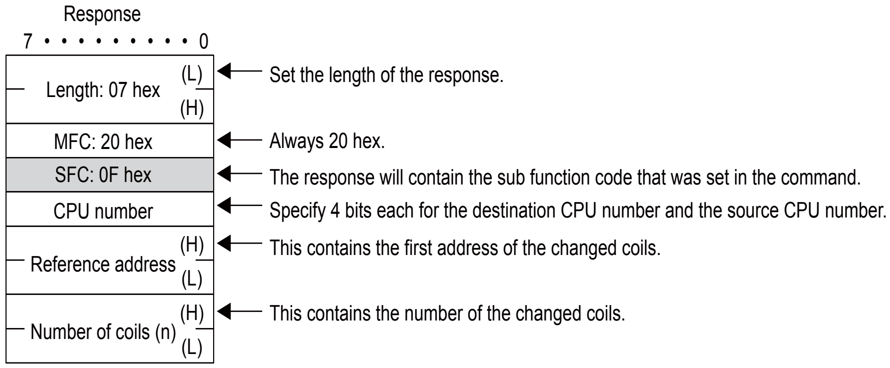
◆ Writing to Non-consecutive Hold Registers (Extended)



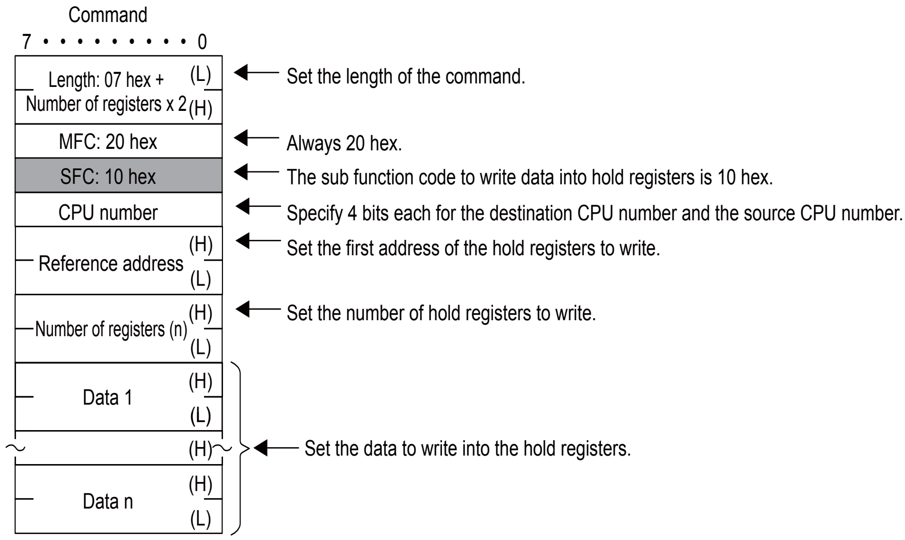


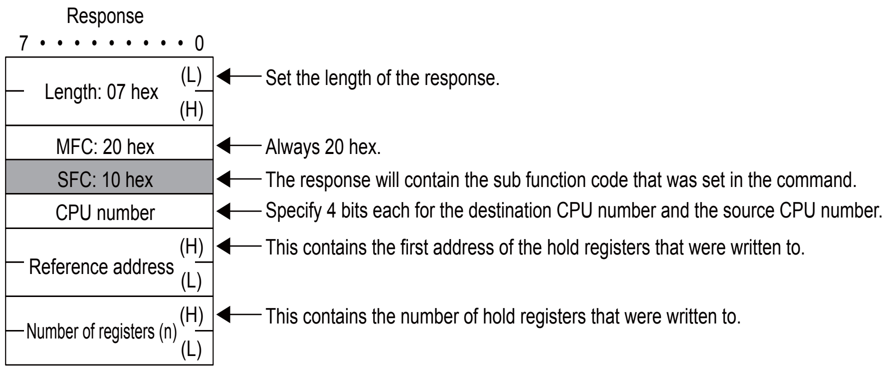
◆ Changing the States of Multiple Coils





◆ Writing to Multiple Hold Registers





◆ Reading the States of Bits Using 32-bit Addressing

Command

7• • • • • • • • • • • 0

Length: 0C hex	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 41 hex		The sub function code to read the states of bits is 01 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
First address	(LL)	Set the first address of the bits to read.
	(LH)	
	(HL)	
	(HH)	
Number of bits	(LL)	Set the number of bits to read.
	(LH)	
	(HL)	
	(HH)	

Response

7• • • • • • • • • • • 0

Length: 06 hex + ((number of bits + 7)/8)	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 41 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
States of first 8 bits		This contains the states of the bits that were read.
States of next 8 bits		
States of next 8 bits		
States of next 8 bits		

◆ Changing the State of a Single Bit Using 32-bit Addressing

Command

7 … 0		
Length: 0C hex	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 45 hex		The sub function code to change the state of a single bit is 05 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
Coil address	(LL)	Set the address of the coil to change.
	(LH)	
	(HL)	
	(HH)	
Specified state	(L)	Set the desired state of the coil. ON = 00FF hex OFF = 0000 hex
	(H)	

Response

7 … 0		
Length: 0C hex	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 45 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
Coil address	(LL)	This contains the address of the changed coil.
	(LH)	
	(HL)	
	(HH)	
Specified state	(L)	This contains the state of the changed coil.
	(H)	

◆ Writing to a Single Register Using 32-bit Addressing

Command

7• • • • • • • • • • • 0

Length: 0C hex	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 46 hex		The sub function code to write to a single register is 06 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
Register address	(LL)	Set the address of the register to write.
	(LH)	
	(HL)	
	(HH)	
Write data	(L)	Set the data to write into the register.
	(H)	

Response

7• • • • • • • • • • • 0

Length: 0C hex	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 46 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
Register address	(LL)	This contains the address of the register that was written to.
	(LH)	
	(HL)	
	(HH)	
Write data	(L)	This contains the data in the register that was written to.
	(H)	

◆ Reading the Contents of Registers Using 32-bit Addressing

Command

7• • • • • • • • • • • 0

Length: 0C hex	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 49 hex		The sub function code to read the contents of registers is 09 hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
First address	(LL)	Set the first address of the registers to read.
	(LH)	
	(HL)	
	(HH)	
Number of words	(L)	Set the number of registers to read.
	(H)	

Response

7• • • • • • • • • • • 0

Length: 08 hex + Number of registers x 2	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 49 hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
Number of words	(L)	This contains the number of words that were read.
	(H)	
Data 1	(L)	This contains the contents that were read.
	(H)	
Data 2	(L)	
	(H)	
Data 3	(L)	
	(H)	

◆ Writing to Multiple Registers Using 32-bit Addressing

Command

7• • • • • • • • • • • 0		
Length: 0C hex + Number of registers x 2	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4B hex		The sub function code to write to multiple registers is 0B hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
First address	(LL)	Set the first address of the registers to write.
	(LH)	
	(HL)	
	(HH)	
Number of words	(L)	Set the number of registers to write.
	(H)	
Data 1	(L)	Set the data to write into the register.
	(H)	
Data 2	(L)	
	(H)	
Data 3	(L)	
	(H)	

Response

7• • • • • • • • • • • 0		
Length: 0C hex	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4B hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
First address	(LL)	This contains the first address of the registers that were written to.
	(LH)	
	(HL)	
	(HH)	
Number of words	(L)	This contains the number of registers that were written to.
	(H)	

◆ Reading the Contents of Non-consecutive Registers Using 32-bit Addressing

Command

7• • • • • • • • • • 0		
Length: 06 hex + Number of registers x 6	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4D hex		The sub function code to read the contents of non-consecutive registers is 0D hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Number of data items	(L)	Set the number of data items to read.
	(H)	
Register type of first item to read		Set the type of the first register to read.
Data type of first item to read		Set the data type of the first register to read.
Address of first register to read	(LL)	Set the address of the first register to read.
	(LH)	
	(HL)	
	(HH)	
Register type of next item to read		
Data type of next item to read		
Address of next register to read	(LL)	
	(LH)	
	(HL)	
	(HH)	
Register type of next item to read		
Data type of next item to read		
Address of next register to read	(LL)	
	(LH)	
	(HL)	
	(HH)	

Response

7• • • • • • • • • • 0		
Length: 06 hex + Number of word registers x 2 + Number of long word registers x 4	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4D hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Number of data items	(L)	This contains the number of data items that were read.
	(H)	
Contents of first word register	(L)	This contains the contents of the first data item that was read.
	(H)	
Contents of next word register	(L)	
	(H)	
Contents of next long word register	(LL)	
	(LH)	
	(HL)	
	(HH)	

◆ Writing to Non-consecutive Registers Using 32-bit Addressing

Command

7• • • • • • • • • • • 0		Description
Length: 06 hex + Number of word registers x 8 + Number of long word registers x 10	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4E hex		The sub function code to write data into non-consecutive registers is 0E hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Number of data items	(L)	Set the number of data items to write.
	(H)	
Type of first register to write		Set the type of the first register to write.
Data type of first item to write		Set the data type of the first register to write.
Address of first register to write	(LL)	Set the address of the first register to write.
	(LH)	
	(HL)	
	(HH)	
Data to write to first register	(L)	Set the contents to write into the first register.
	(H)	
Type of next register to write		
Data type of next item to write		
Address of next register to write	(LL)	
	(LH)	
	(HL)	
	(HH)	
Data to write to next register	(L)	
	(H)	

Response

7• • • • • • • • • • • 0		Description
Length: 06 hex	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4E hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Number of data items	(L)	This contains the number of data items that were written.
	(H)	

◆ Changing the States of Multiple Bits Using 32-bit Addressing

Command

7 • • • • • • • • • • 0		
Length: 0E hex + ((number of bits + 7)/8)	(L)	Set the length of the command.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4F hex		The sub function code to change the states of multiple bits is 0F hex.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
First address	(LL)	Set the first address of the bits to change.
	(LH)	
	(HL)	
	(HH)	
Number of bits	(LL)	Set the number of bits to change.
	(LH)	
	(HL)	
	(HH)	
States of first 8 bits		Set the state to change the bits to.
States of next 8 bits		
States of next 8 bits		
States of next 8 bits		

Response

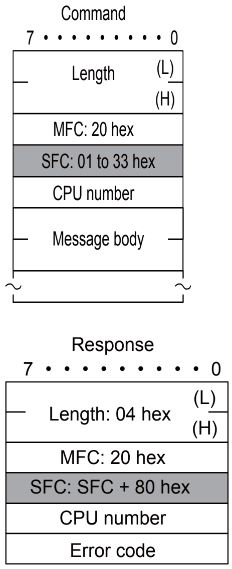
7 • • • • • • • • • • 0		
Length: 0E hex	(L)	Set the length of the response.
	(H)	
MFC: 43 hex		Always 43 hex.
SFC: 4F hex		The response will contain the sub function code that was set in the command.
CPU number		Specify 4 bits each for the destination CPU number and the source CPU number.
Not used.		
Register type		
Not used.		
First address	(LL)	This contains the first address of the changed bits.
	(LH)	
	(HL)	
	(HH)	
Number of bits	(LL)	This contains the number of the changed bits.
	(LH)	
	(HL)	
	(HH)	

◆ Error Responses

■ Major Function Code of 20 Hex

The following message is returned.

- The sub function code in the command message is illegal.
- The reference address is illegal.
- The number of data items is incorrect.



Error code
01: SFC error
02: Reference address error
03: Number of data items error

■ Major Function Code of 43 Hex

The following message is returned.

- The register type is incorrect.
- The command is incorrect for the data type to be accessed.
- The local register type is incorrect.

Command

7• • • • • • • • • • • 0	
Length	(L)
	(H)
MFC: 43 hex	
SFC: 41 to 4F hex	
CPU number	
Not used.	
Message body	

Response

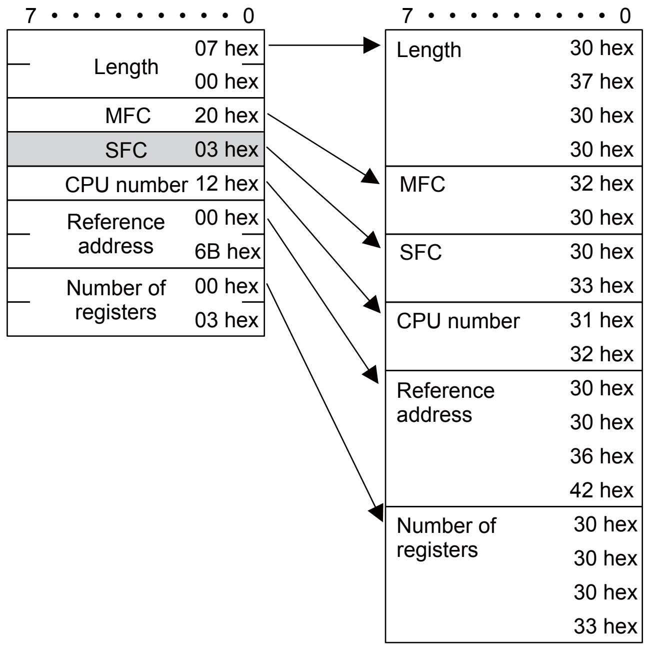
7• • • • • • • • • • • 0	
Length: 04 hex	(L)
	(H)
MFC: 43 hex	
SFC: SFC + 80 hex	
CPU number	
Error code	

Error code
01 hex: SFC error
02 hex: Reference address error
03 hex: Number of data items error
40 hex: Register type error
41 hex: Data type error
42 hex: Local station register type error

MEMOBUS ASCII Mode

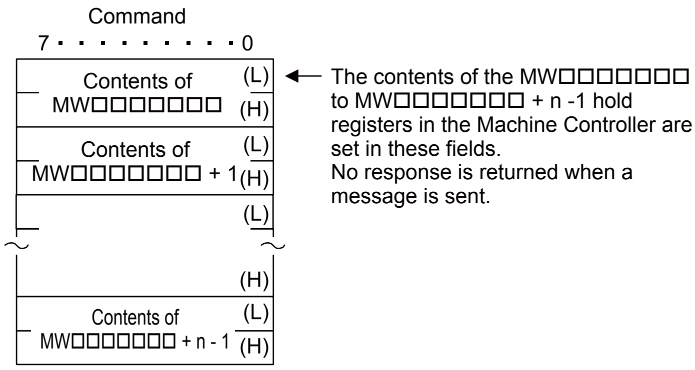
In ASCII Mode, binary data is converted to ASCII before being sent or received.

The following diagram illustrates the conversion from binary to ASCII. As shown in the example, 8-bit data is converted into two 7-bit ASCII characters. The example shows the conversion of only the application data field. In actual conversion, however, the EIF header is also converted to ASCII.



General-purpose Message Binary Mode

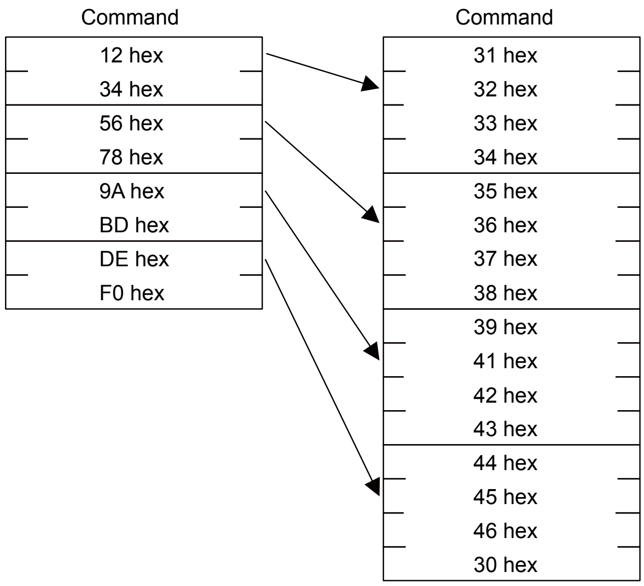
In the general-purpose message mode, the values of the MW hold registers in the Machine Controller are sent and received in the application data field that follows the EIF header.



General-purpose Message ASCII Mode

In ASCII Mode, binary data is converted to ASCII before being sent or received.

The following diagram illustrates the conversion from binary to ASCII. As shown in the example, 8-bit data is converted into two 7-bit ASCII characters. The example shows the conversion of only the application data field. In actual conversion, however, the EIF header is also converted to ASCII.



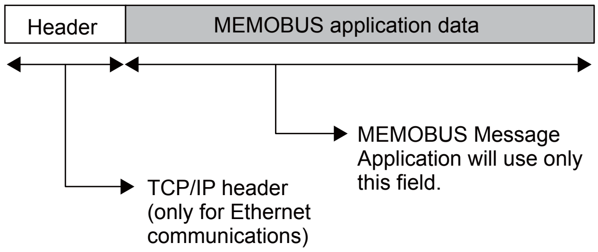
MEMOBUS Protocol

Message Structure

The following message structure is used in communications with 217IF and 218IF Modules. Refer to the following manual for details.

MEMOBUS Descriptive Information Industrial Communication System (Manual No. SIE-C815-13.60)

When the MEMOBUS protocol is used to send and receive data, each message consists of two fields: a header field and the application data field. The 218 header that is used for the Extended MEMOBUS protocol is not used.



The header is for TCP/IP and UDP/IP connections and is used only for Ethernet communications. User programs do not need to be aware of this header because it is automatically appended and removed in the 218IFD.

When communicating using the 217IF, only the MEMOBUS application data field is sent and received.

The structure for parameters in the application data field is given below. The actual data for the MEMOBUS protocol is stored in the application data field.

Communications Protocol	Code	Reference
MEMOBUS message communications	RTU	*MEMOBUS RTU Mode (page 2-404)*
MEMOBUS message communications	ASCII	*MEMOBUS ASCII Mode (page 2-409)*

Note

Whether RTU or ASCII is used for Ethernet communications depends on the code setting for the remote station in the connection parameters. When communicating with a 217IF Module, this is determined by the communications mode setting in the communications parameters.
When a message is received in Ethernet communications, neither the CRC-16 in RTU Mode nor the LRC in ASCII Mode are checked. Error checking for received messages is performed using error detection in the TCP, UDP, and IP headers. It is therefore not necessary to calculate the CRC-16 or LRC when sending a message.

◆ MEMOBUS Command

The commands that make up the MEMOBUS messages are identified by function codes and provide the functions given in the following table.

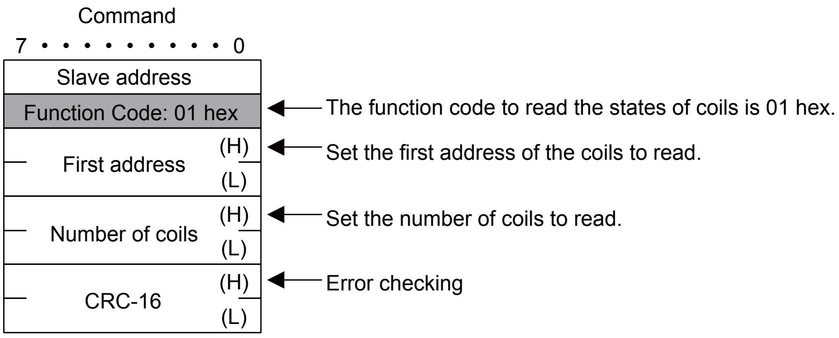
Function Code	Sub Function Code	Function
01 hex	–	Reads the states of coils.
02 hex	–	Reads the states of input relays.
03 hex	–	Reads the contents of hold registers.
04 hex	–	Reads the contents of input registers.
05 hex	–	Changes the state of a single coil.
06 hex	–	Writes to a single hold register or one word.
08 hex	–	Performs a loopback test.
0F hex	–	Changes the states of multiple coils.
10 hex	–	Writes to multiple hold registers.

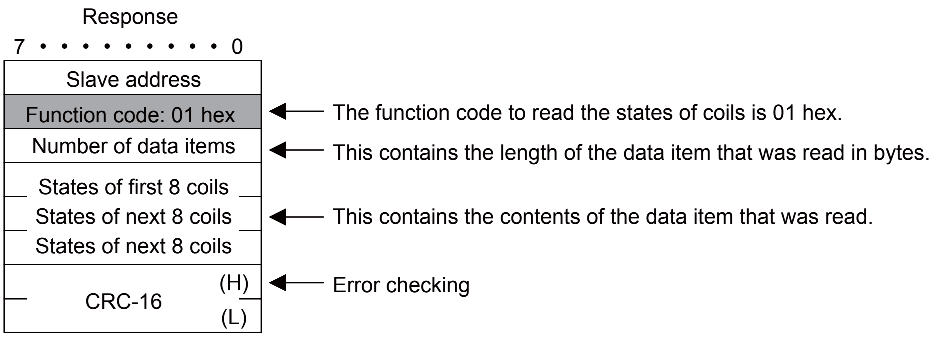
MEMOBUS RTU Mode

Note

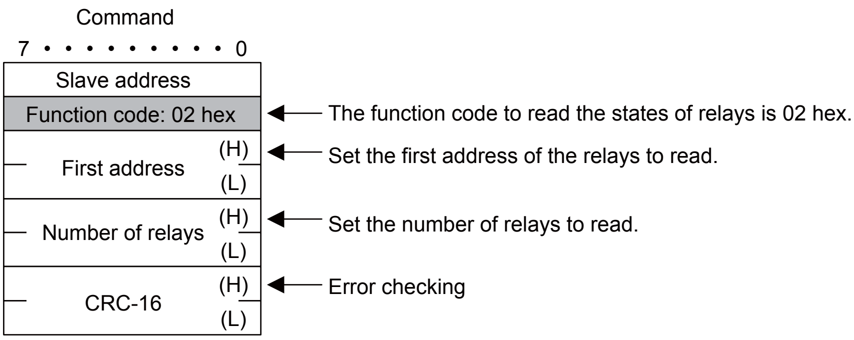
When a message is received on a 218IFD Module using the MEMOBUS protocol, the CRC-16 is not checked.

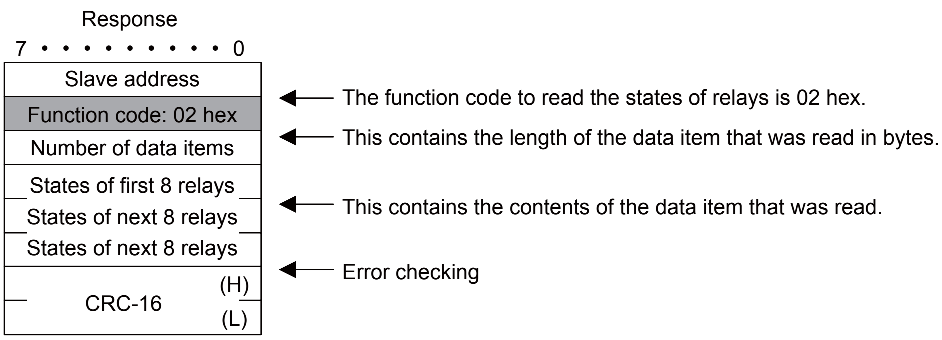
◆ Reading the States of Coils





◆ Reading the States of Input Relays





◆ Reading the Contents of Hold Registers

Command

7 • • • • • • • • • 0		
Slave address		
Function code: 03 hex		The function code to read the contents of hold registers is 03 hex.
First address	(H)	Set the first address of the hold registers to read.
	(L)	
Number of registers	(H)	Set the number of hold registers to read.
	(L)	
CRC-16	(H)	Error checking
	(L)	

Response

7 • • • • • • • • • 0		
Slave address		
Function code: 03 hex		The function code to read the contents of hold registers is 03 hex.
Number of data items		This contains the length of the data item that was read in bytes.
Contents of the first hold register	(H)	This contains the contents of the first data item that was read.
	(L)	
Contents of the next hold register	(H)	
	(L)	
Contents of the next hold register	(H)	
	(L)	
CRC-16	(H)	Error checking
	(L)	

◆ Reading the Contents of Input Registers

Command

7 • • • • • • • • • 0		
Slave address		
Function code: 04 hex		The function code to read the contents of input registers is 04 hex.
First address	(H)	Set the first address of the input registers to read.
	(L)	
Number of registers	(H)	Set the number of input registers to read.
	(L)	
CRC-16	(H)	Error checking
	(L)	

Response

7 • • • • • • • • • 0		
Slave address		
Function code: 04 hex		The function code to read the contents of input registers is 04 hex.
Number of data items		This contains the length of the data item that was read in bytes.
Contents of the first input register	(H)	This contains the contents of the first data item that was read.
	(L)	
Contents of the next input register	(H)	
	(L)	
Contents of the next input register	(H)	
	(L)	
CRC-16	(H)	Error checking
	(L)	

◆ Changing the State of a Single Coil

Command

7 • • • • • • • • • 0	
Slave address	
Function code: 05 hex	The function code to change the state of a single coil is 05 hex.
Coil address (H)	Set the address of the coil to change the state of.
Coil address (L)	
Specified state (H)	Set the state to change the coil to.
Specified state (L)	
CRC-16 (H)	Error checking
CRC-16 (L)	

Response

7 • • • • • • • • • 0	
Slave address	
Function code: 05 hex	The function code to change the state of a single coil is 05 hex.
Coil address (H)	This contains the address of the changed coil.
Coil address (L)	
Specified state (H)	This contains the state of the changed coil.
Specified state (L)	
CRC-16 (H)	Error checking
CRC-16 (L)	

◆ Changing the Contents of a Single Hold Register

Command

7 • • • • • • • • • 0	
Slave address	
Function code: 06 hex	The function code to write to a single hold register is 06 hex.
Hold register address (H)	Set the address of the hold register to change.
Hold register address (L)	
Write data (H)	Set the data to change the contents to.
Write data (L)	
CRC-16 (H)	Error checking
CRC-16 (L)	

Response

7 • • • • • • • • • 0	
Slave address	
Function code: 06 hex	The function code to write to a single hold register is 06 hex.
Hold register address (H)	This contains the address of the changed hold register.
Hold register address (L)	
Write data (H)	This contains the contents of the changed data.
Write data (L)	
CRC-16 (H)	Error checking
CRC-16 (L)	

◆ Performing a Loopback Test

Command

7 • • • • • • • • • • 0		
Slave address		
Function code: 08 hex		The function code to perform a loopback test is 08 hex.
Test code	(H)	Set the test code.
	(L)	
Data	(H)	Set the data for the test.
	(L)	
CRC-16	(H)	Error checking
	(L)	

Response

7 • • • • • • • • • • 0		
Slave address		
Function code: 08 hex		The function code to perform a loopback test is 08 hex.
Test code	(H)	This will contain the same value in the command if the test ends successfully.
	(L)	
Data	(H)	This will contain the same value in the command if the test ends successfully.
	(L)	
CRC-16	(H)	Error checking
	(L)	

◆ Changing the States of Multiple Coils

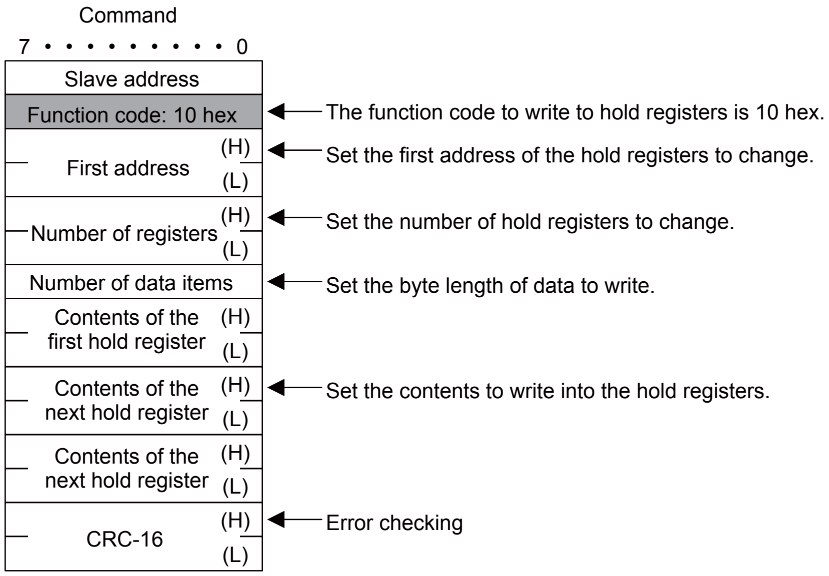
Command

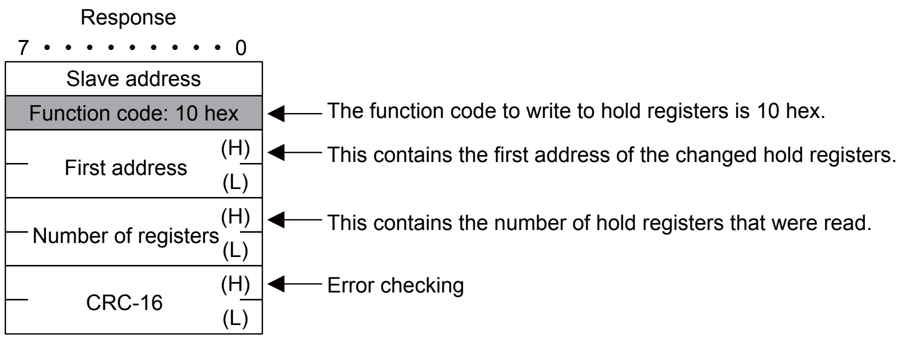
7 • • • • • • • • • • 0		
Slave address		
Function code: 0F hex		The function code to change the states of coils is 0F hex.
First address	(H)	Set the first address of the coil to change.
	(L)	
Number of coils	(H)	Set the number of coils to change.
	(L)	
Number of data items		Set the byte length of data to write.
States of first 8 coils		
States of next 8 coils		Set the state to change the coil to.
States of next 8 coils		
CRC-16	(H)	Error checking
	(L)	

Response

7 • • • • • • • • • • 0		
Slave address		
Function code: 0F hex		The function code to change the states of coils is 0F hex.
First address	(H)	This contains the first address of the changed coils.
	(L)	
Number of coils	(H)	This contains the number of changed coils.
	(L)	
CRC-16	(H)	Error checking
	(L)	

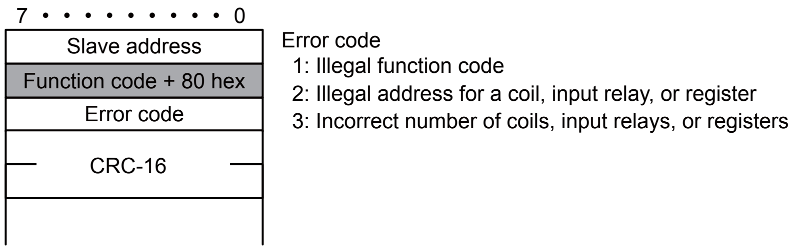
◆ Writing to Multiple Hold Registers





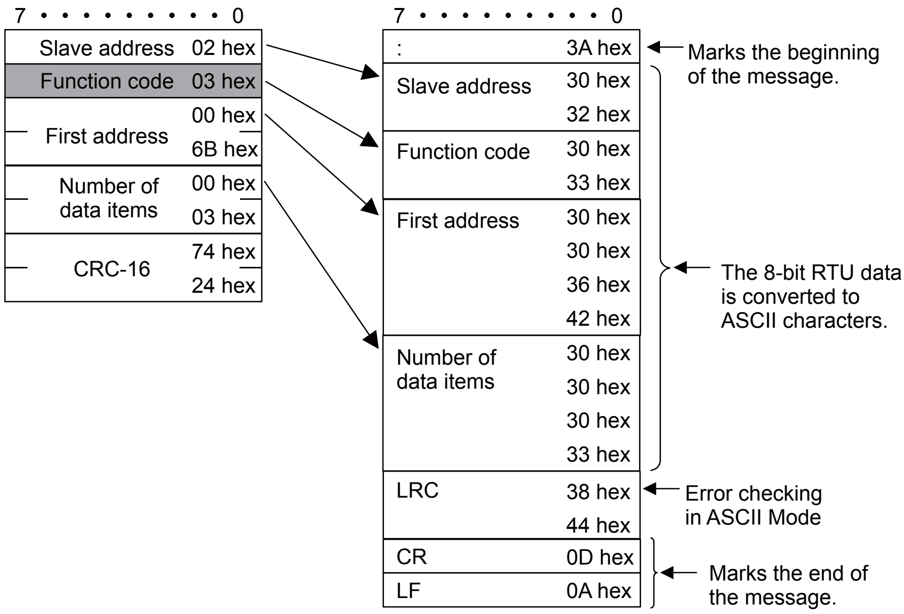
◆ Error Description

If the command message contains an error, the slave will ignore the requested function and return an error response message.



MEMOBUS ASCII Mode

In ASCII Mode, RTU data is converted to ASCII before being sent or received.
The following diagram illustrates the conversion from RTU to ASCII. As shown in the example, 8-bit data in the application data field is converted into two 7-bit ASCII characters. In the MEMOBUS format, the code for a ":" is added to the beginning of the data to indicate where the data starts, and the codes CR and LF are added to the end of the data to indicate where it ends. Error checking is done with the LRC.



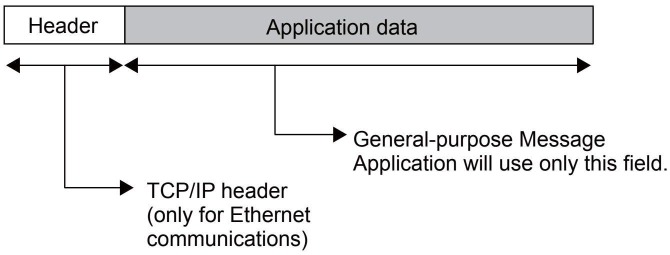
Note

When a message is received on a 218IFD Module using the MEMOBUS protocol, the LRC is not checked.

No-protocol Communications

Message Structure

When no-protocol communications is set as the communications protocol, application data is handled as a general-purpose message. When sending and receiving data, each message consists of two fields: a header and the application data field.



The header is for TCP/IP and UDP/IP connections and is used only for Ethernet communications. User programs do not need to be aware of this header because it is automatically appended and removed in the 218IFD.

The application data field can be formatted as required by the application. The application data field has the following message structure.

Communications Protocol	Code	Reference
No-protocol	BIN	*General-purpose Binary Mode (page 2-410)*
No-protocol	ASCII	*General-purpose ASCII Mode (page 2-411)*

Note

Ethernet communications will use either binary or ASCII data based on the code setting in the connection parameters.

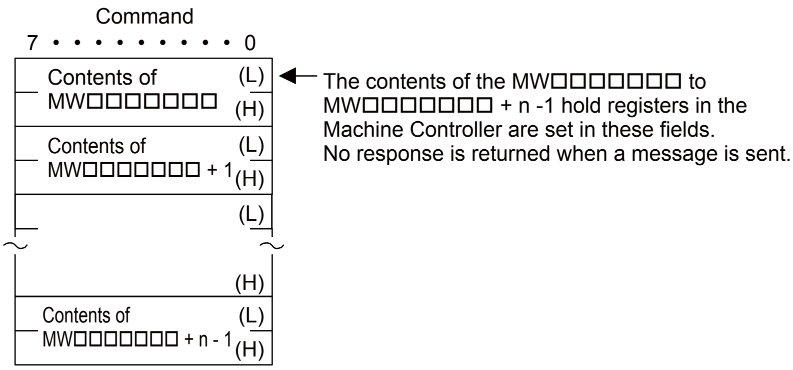
The difference compared to using the general-purpose messaging mode with the Extended MEMOBUS protocol is that the 218 header is not appended before the application data.

◆ General-purpose Message Commands

General-purpose message commands can be set as required by the application.

General-purpose Binary Mode

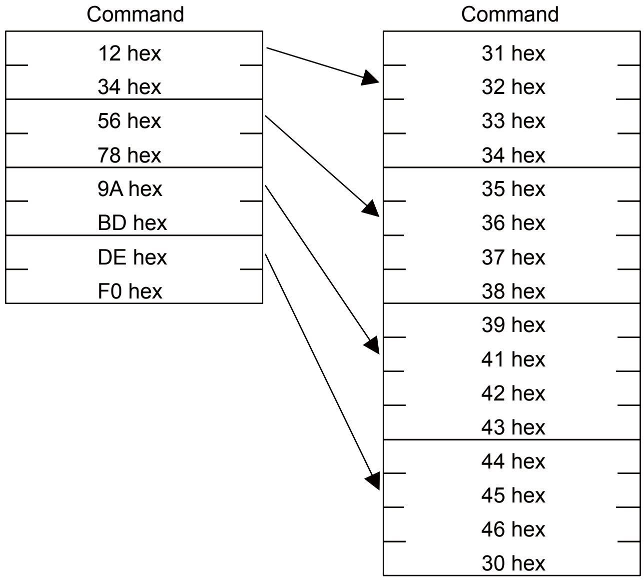
In no-protocol communications, the values of the MW hold registers in the Machine Controller are sent and received in the application data field.



General-purpose ASCII Mode

In ASCII Mode, binary data is converted to ASCII before being sent or received.

The following diagram illustrates the conversion from binary to ASCII. As shown in the example, 8-bit data is converted into two 7-bit ASCII characters.



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Numerics

Revision History

The revision dates and numbers of the revised manuals are given on the bottom of the back cover.

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Date of publication

Date of original publication

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			1.2	Revision: System Configuration Examples
			Back cover	Revision: Address
March 2012	◇0	1	1.2	Deletion: Description of Rack Expansion Interface Unit and Optional Modules
			Back cover	Revision: Address
December 2011	–	–	–	First edition

Machine Controller MP3000 Series

Communications

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