MODBUS®/TCP Interface Module

# MITSUBISHI

### **User's Manual**



Mitsubishi Programmable Controller



QJ71MT91 GX Configurator-MB (SW1D5C-QMBU-E)

## • SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.

The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the user's manual of the CPU module to use. In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".



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

Please save this manual to make it accessible when required and always forward it to the end user.

### [Design Precautions]

## 

- When controlling a running programmable controller (modifying data) by connecting peripheral devices to the CPU module or connecting a personal computer to the intelligent function module, configure an interlocking circuit in a sequence program so that the safety of the overall system is always maintained. Also, before performing other control operations (program modifications and operation status modifications (status control)) on the running programmable controller, be sure to read the manual carefully and thoroughly confirm the safety.
  Especially in the above mentioned control operations that are performed from an external device to a remote programmable controller, any problems on the programmable controller side may not be dealt with promptly due to a data communication error. In addition to configuring an interlocking circuit in a sequence program, determine how the system handles data communication errors, etc. between the devices and the programmable controller CPU.
- Do not write any data in the "system area (Use prohibited)" of the buffer memory of the intelligent function module. Also, do not output (turn on) the "use prohibited" signal, which is one of the output signals from the programmable controller CPU to the intelligent function module. If data is written to the "system area (Use prohibited)" or the "use prohibited" signal is output, there is a risk that the programmable controller system may malfunction.

## 

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

### [Installation Precautions]

## 

- Use the programmable controller in the operating environment that meets the general specifications described in the user's manual of the CPU Module to use. Using the programmable controller in any other operating environments may cause electric shocks, fires or malfunctions, or may damage or degrade the module.
- While pressing the installation lever located at the bottom of the module, insert the module fixing projection into the fixing hole in the base unit to mount the module.
   Incorrect module mounting may cause a malfunction, failure, or drop of the module.
   In an environment of frequent vibrations, secure the module with the screw.
- Be sure to tighten the screws using the specified torque. If the screws are loose, it may cause the module to short-circuit, malfunction or fall off. If the screws are tightened excessively, it may damage the screws and cause the module to short-circuit, malfunction or fall off.
- Do not directly touch any conductive part or electronic component of the module. Doing so may cause a malfunction or failure of the module.

## 

• Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.

Failure to do so may damage the module.

### [Wiring Precautions]

## 

• Be sure to shut off all phases of the external power supply before installation or wiring. Failure to do so may result in an electric shock or damage to the product.

Use crimp-contact, pressure-displacement or soldering to wire the connectors for external connections properly using the manufacturer-specified tools.
 If the connection is incomplete, it may cause the module to short circuit, catch fire, or malfunction.

## 

- Securely connect the connector to the module.
- Make sure to place the communication and power cables to be connected to the module in a duct or fasten them using a clamp. If the cables are not placed in a duct or fastened with a clamp, their positions may be unstable or moved, and they may be pulled inadvertently. This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- Wire the module correctly after confirming the type of the connected interface. If the cable is connected to a different interface or wired incorrectly, it may cause a fire or breakdown.
- When disconnecting the communication and power cables from the module, do not pull the cables by hand. When disconnecting a cable with a connector, hold the connector to the module by hand and pull it out to remove the cable. If the cable is pulled while being connected to the module, it may damage the module and/or cable or make cable contact improper, causing a malfunction.
- Be careful not to let any foreign matter such as wire chips get inside the module. They may cause fire, as well as breakdowns and malfunctions of the module.
- A protective sheet is pasted on the upper part of the module in order to prevent foreign matter such as wire chips to get inside the module while wiring.
   Do not remove this protective sheet during wiring work. However, be sure to remove the protective sheet before operating the module to allow heat radiation during operation.

### [Setup and Maintenance Precautions]

### 

- Do not touch the terminals while the power is on. Doing so may cause electric shocks or malfunctions.
- Before cleaning the module or retightening the module mounting screws, make sure to shut off all phases of the external power supply used by the system. Failure to do so may cause the module to electric shocks, breakdown or malfunction. If the screws are loose, it may cause the module to short-circuit, malfunction or fall off. If the screws are tightened excessively, it may damage the screws and cause the module to short circuit, malfunction or fall off.

## 

- Before performing online operations (especially, program modification, forced output or operating status change) by connecting a peripheral device to a running CPU, read the manual carefully and ensure the safety. Incorrect operation will cause mechanical damage or accidents.
- Never disassemble or modify the module. This may cause breakdowns, malfunctions, injuries or fire.
- When using a wireless communication device such as a cellular phone, keep a distance of 25cm (9.85 inch) or more from the programmable controller in all directions. Failure to do so can cause a malfunction.
- Before mounting/dismounting the module, be sure to shut off all phases of the external power supply used by the system. Failure to do so may cause module failure or malfunctions.
- Do not install/remove the module to/from the base unit more than 50 times after the first use of the product. (IEC 61131-2 compliant)
  - Failure to do so may cause malfunction.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.
  - Failure to do so may cause a failure or malfunctions of the module.

### [Operating Precautions]

## 

• Please read the manual carefully and confirm the safety thoroughly before performing control operations (especially, modifications of data, programs and operation status (status control)) of the programmable controller that is running.

Incorrect modifications of data, programs and operating status may cause system malfunctions, damages to the machines, or accidents.

### [Disposal Precautions]

## 

• Dispose of this product as an industrial waste.

#### REVISIONS

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

Print Date	* Manual Number	Revision
1	SH (NA) -080446ENG-A SH (NA) -080446ENG-B	
Ivial., 2004	SH (INA) -000440ENG-D	
		Section 7.2.2, 8.3.2, 8.4, 8.6, 8.7, 9.2.2, 11.1, 11.4, 11.5
Nov., 2005	SH (NA) -080446ENG-C	Modifications
		Section 4.3.10, 5.2.1, 6.1, 6.2, 6.6, 7.1, 7.3.1, 7.4.1 to 7.4.5, 8.2.2, 8.3.1, 8.3.3, 8.7.2, 9.1, 10.2, 10.3, 11.1, 11.2, 11.3.2, 11.3.3, 11.4
Feb., 2006	SH (NA) -080446ENG-D	Modifications
		Section 2.1, 2.4, 10.1
Jan., 2008	SH (NA) -080446ENG-E	Modifications
		SAFETY PRECAUTIONS, Conformation to the EMC Directive and Low Voltage Instruction, About the Generic Terms and Abbreviations, Section 2.1, 2.5, 3.1, 3.2.1, 5.1, 5.2.1, 5.5, 6.1, 6.4, 6.6, 7.2.2, 7.4.1, 7.4.2, 7.4.4, Chapter 8, Section 9.1.3, 9.3.1, 9.3.2, 9.3.3, 10.2, 10.3, 11.1, 11.2, 11.3.1, 11.3.3, 11.4.1, 11.4.2, 11.5.1 Addition
		Section 2.4
May, 2008	SH (NA) -080446ENG-F	Change of a term
		"PLC" was changed to "programmable controller".
		Modifications
		SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directives, About the Generic Terms and Abbreviations, Section 2.1, 3.1, 6.1, 6.6, 7.4.2, 8.2.1, 8.3.1, 8.3.3, 8.6, 10.2, 10.3, 11.2, 11.3.3, Appendix 3

Japanese Manual Version SH(NA)-080445-G

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

© 2004 MITSUBISHI ELECTRIC CORPORATION

#### INTRODUCTION

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

#### CONTENTS

SAFETY PRECAUTIONS	A- 1
REVISIONS	A- 5
INTRODUCTION	A- 6
CONTENTS	A- 6
Compliance with the EMC and Low Voltage Directives	A-10
The Manual's Usage and Structure	A-11
About the Generic Terms and Abbreviations	A-13
Meanings and Definitions of Terms	A-14
Product Configuration	A-14
1 OVERVIEW	1- 1 to 1- 5
1.1 Features	1- 1
2 SYSTEM CONFIGURATION	2- 1 to 2- 9
2.1 Applicable Systems	
2.2 Devices Necessary for Network Configuration	
2.3 System Configuration and Access Range	
2.4 Precautions for System Configuration	
2.5 How to Check the Function Version and Software Version	
3 SPECIFICATIONS	3- 1 to 3- 9
3 SPECIFICATIONS 3.1 Performance Specifications	
3.1 Performance Specifications	
3.1 Performance Specifications 3.2 I/O Signals for Programmable Controller CPU	
<ul><li>3.1 Performance Specifications</li><li>3.2 I/O Signals for Programmable Controller CPU</li><li>3.2.1 I/O signal list</li></ul>	3- 1 3- 2 3- 2 3- 2 3- 4
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> </ul>	3- 1 3- 2 3- 2 3- 2 3- 4 3- 4 4- 1 to 4-20
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS<sup>®</sup> STANDARD FUNCTIONS</li> </ul>	3- 1 3- 2 3- 2 3- 2 3- 4 3- 4 3- 4 4- 1 to 4-20
<ul> <li>3.1 Performance Specifications</li></ul>	3- 1 3- 2 3- 2 3- 4 3- 4 3- 4 4- 1 to 4-20 4- 1
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS® STANDARD FUNCTIONS</li> <li>4.1 MODBUS® Standard Function Support List</li> </ul>	3- 1 3- 2 3- 2 3- 4 3- 4 3- 4 4- 1 to 4-20 4- 1 4- 3
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS<sup>®</sup> STANDARD FUNCTIONS</li> <li>4.1 MODBUS<sup>®</sup> Standard Function Support List</li> <li>4.2 Frame Specifications</li> </ul>	3- 1 3- 2 3- 2 3- 2 3- 4 3- 4 4- 1 to 4-20 4- 1 4- 3 4- 3 4- 4
<ul> <li>3.1 Performance Specifications</li></ul>	3- 1 3- 2 3- 2 3- 4 3- 4 3- 4 4- 1 to 4-20 4- 1 4- 3 4- 3 4- 4 4- 6
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS® STANDARD FUNCTIONS</li> <li>4.1 MODBUS® Standard Function Support List</li> <li>4.2 Frame Specifications</li> <li>4.3 PDU Formats by Functions</li> <li>4.3.1 Read coils (FC: 01)</li> </ul>	3- 1 3- 2 3- 2 3- 4 3- 4 4- 1 to 4-20 4- 1 to 4-20 4- 1 4- 3 4- 4 4- 4 4- 6 4- 7
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS® STANDARD FUNCTIONS</li> <li>4.1 MODBUS® Standard Function Support List</li> <li>4.2 Frame Specifications</li> <li>4.3 PDU Formats by Functions</li> <li>4.3.1 Read coils (FC: 01)</li> <li>4.3.2 Read discrete inputs (FC: 02)</li> </ul>	3- 1 3- 2 3- 2 3- 4 3- 4 4- 1 to 4-20 4- 1 4- 1 4- 3 4- 3 4- 4 4- 6 4- 7 4- 8
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS® STANDARD FUNCTIONS</li> <li>4.1 MODBUS® Standard Function Support List</li> <li>4.2 Frame Specifications</li> <li>4.3 PDU Formats by Functions</li> <li>4.3.1 Read coils (FC: 01)</li> <li>4.3.2 Read discrete inputs (FC: 02)</li> <li>4.3.3 Read holding registers (FC: 03)</li> </ul>	3- 1 3- 2 3- 2 3- 4 3- 4 3- 4 4- 1 to 4-20 4- 1 4- 3 4- 3 4- 4 4- 6 4- 7 4- 8 4- 9
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS® STANDARD FUNCTIONS</li> <li>4.1 MODBUS® Standard Function Support List</li> <li>4.2 Frame Specifications</li> <li>4.3 PDU Formats by Functions</li> <li>4.3.1 Read coils (FC: 01)</li> <li>4.3.2 Read discrete inputs (FC: 02)</li> <li>4.3.3 Read holding registers (FC: 03)</li> <li>4.3.4 Read input registers (FC: 04)</li> </ul>	3- 1 3- 2 3- 2 3- 4 3- 4 4- 1 to 4-20 4- 1 to 4-20 4- 1 4- 3 4- 3 4- 4 4- 6 4- 7 4- 8 4- 9 4-10
<ul> <li>3.1 Performance Specifications</li> <li>3.2 I/O Signals for Programmable Controller CPU</li> <li>3.2.1 I/O signal list</li> <li>3.3 Applications and Assignment of Buffer Memory</li> <li>3.3.1 Buffer memory list</li> <li>4 MODBUS® STANDARD FUNCTIONS</li> <li>4.1 MODBUS® Standard Function Support List</li> <li>4.2 Frame Specifications</li> <li>4.3 PDU Formats by Functions</li> <li>4.3.1 Read coils (FC: 01)</li> <li>4.3.2 Read discrete inputs (FC: 02)</li> <li>4.3.3 Read holding registers (FC: 03)</li> <li>4.3.4 Read input registers (FC: 04)</li> <li>4.3.5 Write single coil (FC: 05)</li> </ul>	$\begin{array}{c} 3-1\\ 3-2\\ 3-2\\ 3-4\\ 3-4\\ \hline \\ 4-1 to 4-20\\ \hline \\ 4-1 to 4-20\\ \hline \\ 4-7\\ -4-8\\ -4-6\\ -4-7\\ -4-8\\ -4-9\\ -4-10\\ -4-11\\ -4-12\\ \end{array}$

4.3.9 Read file record (FC: 20) (SC: 06)	
4.3.10 Write file record (FC: 21) (SC: 06)	4-17
4.3.11 Mask write register (FC: 22)	
4.3.12 Read/Write multiple registers (FC: 23)	

5 FUNCTIONS	5- 1 to 5-15
5.1 Function List	
5.2 Master Function	5- 3
5.2.1 Automatic communication function	5- 3
5.2.2 Dedicated instructions	5- 9
5.3 Slave Function	5-10
5.3.1 Automatic response function	5-10
5.3.2 MODBUS <sup>®</sup> device assignment function	5-11
5.4 KeepAlive Function	
5.5 Router Relay Function	5-14
5.6 GX Developer Connection Function	5-15

6 PRE-OPERATIONAL PROCEDURES AND SETTING	6- 1 to 6-19
6.1 Handling Precautions	6- 1
6.2 Pre-Operational Procedures and Setting	6- 2
6.3 Part Names	6- 4
6.4 Connection to Ethernet	6- 6
6.5 Unit Tests	6- 8
6.5.1 Hardware test	6- 8
6.5.2 Self-loopback test	6- 9
6.6 Intelligent Function Module Switch Setting	6-10
6.6.1 Communication starting conditions depending on basic parameter/MODBUS® device	e assignment
parameter starting method setting	6-15

### 7 PARAMETER SETTING

7.1 Parameter Settings and Setting Procedure	7- 1
7.2 Basic Parameters	
7.2.1 Basic parameters details	
7.2.2 TCP/UDP/IP setting	7- 8
7.2.3 GX Developer connection information setting	7-16
7.2.4 MODBUS <sup>®</sup> /TCP setting	7-17
7.3 Automatic Communication Parameters	7-19
7.3.1 Automatic communication parameters details	7-19
7.4 MODBUS® Device Assignment Parameters	7-23
7.4.1 MODBUS <sup>®</sup> device sizes	7-25
7.4.2 MODBUS <sup>®</sup> device assignment parameters details	
7.4.3 Default assignment parameters	7-29
7.4.4 MODBUS <sup>®</sup> extended file register assignment	7-31
7.4.5 QJ71MT91 buffer memory assignment	

8 UTILITY PACKAGE (GX Configurator-MB)	
--	--

7- 1 to 7-33

8.2 Installing and Uninstalling the Utility Package	
8.2.1 Handling precautions	
8.2.2 Operating environment	
8.3 Utility Package Operation	
8.3.1 Common utility package operations	
8.3.2 Operation overview	
8.3.3 Starting the Intelligent function module utility	
8.4 Initial Setting	
8.5 Auto Refresh Setting	
8.6 Monitor/Test	
8.6.1 X/Y Monitor/test	
8.6.2 Basic/MODBUS <sup>®</sup> device assignment parameter status	
8.6.3 Automatic communication status	
8.6.4 Error log	
8.6.5 Communication status	
8.6.6 PING test	
8.7 Parameter Setting Using GX Configurator-MB	
8.7.1 Basic parameters	
8.7.2 Automatic communication parameters	
8.7.3 MODBUS <sup>®</sup> device assignment parameters	
9 PROGRAMMING	9- 1 to 9-49

a	PR	$\cap$	٦D	٨٨	<i>۸</i> ۸	/11	JC
		C AC	70	ΜIN	/110		V U 3

)_	1	to	9-4	19

9.1 Parameter Setting 9.1.1 Basic parameter setting	
9.1.2 Automatic communication parameter setting	
9.1.3 MODBUS <sup>®</sup> device assignment parameter setting	
9.2 Program Example for Normal System Configuration	9-11
9.2.1 System configuration and program conditions	
9.2.2 Program using utility package	9-18
9.2.3 Program without using utility package	
9.3 Program Example for Use in MELSECNET/H Remote I/O Network	
9.3.1 System configuration and program conditions	
9.3.2 Program using utility package	
9.3.3 Program without using utility package	

10 DEDICATED INSTRUCTIONS	10- 1 to 10-18
10.1 Dedicated Instruction List and Available Devices	
10.2 Z(P).MBRW	
10.3 Z(P).MBREQ	

11 TROUBLESHOOTING	11- 1 to 11-48
11.1 Troubleshooting	
11.2 Confirming QJ71MT91 Status	
11.3 Error Codes	
11.3.1 Error code storage areas	
11.3.2 Exception code list	
11.3.3 Error code list	

11.4 Turning Off the COM.ERR. LED 11.4.1 From GX Configurator-MB	
11.4.2 Program example for use of sequence program	
11.5 Conducting PING Test to Check QJ71MT91 Connection	
11.5.1 From GX Configurator-MB	
11.5.2 Program example for use of sequence program	
APPENDICES	App- 1 to App- 7
APPENDICES Appendix 1 External Dimensions	•• ••
	App- 1
Appendix 1 External Dimensions	App- 1 App- 2
Appendix 1 External Dimensions Appendix 2 Processing Time	App- 1 App- 2

### Compliance with the EMC and Low Voltage Directives

(1) For programmable controller system

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

(2) For the product

Note the following when making this product to conform to the EMC and Low Voltage directives.

(a) Twisted pair cable

Use shielded twisted pair cables for connecting to the 10BASE-

T/100BASE-TX connectors. For the shielded twisted pair cables, strip a part of the outer cover and ground the exposed shield section on the widest contact surface as shown below.



Refer to (b) for grounding of the shield.

- (b) Grounding of shield of shielded cable
  - 1) Ground the shield of the shielded cable as close to the module as possible to avoid the electromagnetic induction from ungrounded cables.
  - 2) Take an appropriate measure so that the stripped shield section can be grounded to the control panel in the largest area as possible. A clamp may be used as shown below. In this case, however, mask the contact part when painting the inner surface of the control panel to allow it to contact with the clamp.



Note) Grounding by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



#### The Manual's Usage and Structure

#### • How to use this manual

This manual describes the pre-operation procedure, functions, etc. by use of the MODBUS<sup>®</sup> /TCP interface module (QJ71MT91) on a purpose-by-purpose basis. Refer to the corresponding section when you need to know the following:

### (1) Features (Chapter 1)

Chapter 1 describes the features of the QJ71MT91.

- (2) System configuration (Chapter 2)
  - (a) Section 2.1 describes the applicable programmable controller CPUs and compatible software packages.
  - (b) Section 2.2 describes the devices necessary to configure a network.
  - (c) Section 2.3 describes the system configurations that use the QJ71MT91 and the accessible range.
- (3) Performance and specifications (Chapter 3)
  - (a) Section 3.1 provides the performance specifications of the QJ71MT91.
  - (b) Section 3.2 and 3.3 give the I/O signal and buffer memory lists of the QJ71MT91.
- (4) MODBUS<sup>®</sup> standard functions supported by the QJ71MT91 (Chapter 4)
  - (a) Section 4.1 gives a list of MODBUS  $^{\ensuremath{\circledast}}$  standard functions supported by the QJ71MT91.
  - (b) Section 4.2 and 4.3 provide the frame specifications of the MODBUS<sup>®</sup> standard functions supported by the QJ71MT91.

### (5) Usable functions (Chapter 5)

Chapter 5 describes the functions of the QJ71MT91.

(6) Settings and procedures necessary to operate the system (Chapter 6)

Chapter 6 describes the pre-operation settings and procedures.

- (7) Parameter setting of the QJ71MT91 (Chapter 7) Chapter 7 describes the parameter setting procedures and parameter details.
- (8) Parameter setting from the utility package (Chapter 8) Chapter 8 describes the utility package operation method.
- (9) Parameter setting from sequence programs (Chapter 9) Chapter 9 describes the I/O signals used for parameter setting, the I/O signal timing charts, and program examples.
- (10) Reading/Writing, etc. of MODBUS<sup>®</sup> device data with sequence programs (Chapter 10)

Chapter 10 describes the dedicated instructions designed to perform read/write, etc. of MODBUS<sup>®</sup> device data with sequence programs.

- (11) Error codes and corresponding corrective actions (Chapter 11)
  - (a) Section 11.1 describes the troubleshooting.
  - (b) Section 11.2 describes how to check the module condition.
  - (c) Section 11.3 describes the error code storage location and details.
  - (d) Section 11.4 describes how to turn OFF the COM.ERR. LED.
  - (e) Section 11.5 describes the PING test.
- About the notation of the numerical values used in this manual Among the numerical values used in this manual, "H" is placed to the right of the units place for hexadecimal notation.

(Example) 10 ..... Decimal 10H ... Hexadecimal

### About the Generic Terms and Abbreviations

Unless otherwise specified, this manual uses the following generic terms and abbreviations to explain the QJ71MT91 MODBUS  $^{\otimes}$  /TCP interface module.

Generic Term/Abbreviation	Description
QJ71MT91	Abbreviation for the QJ71MT91 MODBUS <sup>®</sup> /TCP interface module.
MODBUS <sup>®</sup> /TCP	Generic term for the protocol designed to use MODBUS <sup>®</sup> protocol messages on a TCP/IP network.
MODBUS <sup>®</sup> serial protocol	Generic term for the protocol designed to use MODBUS <sup>®</sup> protocol messages on a serial interface.
FC	Abbreviation for the function code.
SC	Abbreviation for the sub code.
Programmable controller CPU	Generic term for the Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q02PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU Q06UDHCPU, Q13UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q13UDEHCPU and Q26UDEHCPU.
GX Developer	Generic product name for SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV, and SWnD5C-GPPW-EVA. ("n" means version 4 or later.) "-A" and "-V" mean "volume license product" and "version-upgrade product" respectively.
Ethernet module	The QJ71E71-100 Ethernet interface module.
Ethernet Address	A machine-specific address that is also referred to as the MAC (Media Access Control) address. This is used to identify the addresses of external devices over a network. The Ethernet address of the QJ71MT91 can be verified on the MAC ADD column of the rating plate.
MELSECNET/H	The MELSECNET/H network system.
Master	The side from which a request is sent to execute a function.
Slave	The side where the execution request from the master is processed and its execution result is sent.
Master function	The function that allows communication with the MODBUS <sup>®</sup> /TCP compatible slave device as the master of MODBUS <sup>®</sup> /TCP.
Slave function	The function that allows communication with the MODBUS <sup>®</sup> /TCP compatible master device as the slave of MODBUS <sup>®</sup> /TCP.
Request message	The message used to give a function execution request to the slave In the MODBUS® protocol, a function execution request is given from the master to the slave. A function execution request cannot be given from the slave to the master.
Response message	The message with which the slave returns a function execution result to the master.
Target device	Generic term for the communication targets connected for data communication. (personal computer, other QJ71MT91 MODBUS <sup>®</sup> /TCP interface module, MODBUS <sup>®</sup> protocol compatible device, etc.)
Personal computer	The IBM PC/AT or compatible DOS/V-based personal computer.
MBRW	Abbreviation for Z.MBRW or ZP.MBRW.
MBREQ	Abbreviation for Z.MBREQ or ZP.MBREQ.

Generic Term/Abbreviation	Description
Windows Vista®	Generic term for the following: Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Home Basic Operating System, Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Home Premium Operating System, Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Business Operating System, Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Ultimate Operating System, Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Enterprise Operating System
Windows <sup>®</sup> XP	Generic term for the following: Microsoft <sup>®</sup> Windows <sup>®</sup> XP Professional Operating System, Microsoft <sup>®</sup> Windows <sup>®</sup> XP Home Edition Operating System

#### Meanings and Definitions of Terms

The following explains the meanings and definitions of the terms used in this manual.

Term	Meaning/Definition			
MODBUS <sup>®</sup> protocol	protocol Communication protocol developed for programmable controller by Schneider Electric SA			
MODBUS <sup>®</sup> device Device used for communication using the MODBUS <sup>®</sup> protocol.				
Sequence program	Programming system devised to make a contact type sequence compatible with the programmable controller language as-is. Draw two vertical control buses and describe contacts, etc. between the buses to perform programming.			
Device memory	Memory provided for the programmable controller CPU to record the data handled in sequence program operation.			

### Product Configuration

## The following indicates the product configuration of the QJ71MT91 MODBUS $^{\tiny (\! R \!)}$ /TCP interface module.

Model	Item name		Quantity
QJ71MT91	QJ71MT91 MODBUS <sup>®</sup> /TCP interface module		1
SW1D5C-QMBU-E	GX Configurator-MB Version 1 (1-license product)	(CD-ROM)	1
SW1D5C-QMBU-EA	GX Configurator-MB Version 1 (Multiple-license product)	(CD-ROM)	1

### 1 OVERVIEW

This manual explains the specifications, functions, programming, troubleshooting, etc. of the MELSEC-Q series QJ71MT91 MODBUS<sup>®</sup> /TCP interface module (hereafter abbreviated to the QJ71MT91).

The QJ71MT91 is used to connect the MELSEC-Q series programmable controller to a MODBUS<sup>®</sup> /TCP network.

MODBUS is a registered trademark of Schneider Electric SA.

### 1.1 Features

(1) Supporting master function of MODBUS<sup>®</sup> /TCP communication The QJ71MT91 supports the master function of MODBUS<sup>®</sup> /TCP communication, which is an open network system for factory automation, and it is compatible with various MODBUS<sup>®</sup> /TCP slave devices (hereafter abbreviated to the slaves) of other manufactures.
The master function supports the following two functions.

The master function supports the following two functions.

(a) Automatic communication function By setting the automatic communication parameters, MODBUS<sup>®</sup> device data can be automatically read from or written to the slaves at the specified intervals using the QJ71MT91 buffer memory. (\*1) Data can be transferred between the QJ71MT91 buffer memory and programmable controller CPU device memory by making the auto refresh setting with the utility package (GX Configurator-MB) or accessing a





\*1: The MODBUS<sup>®</sup> device indicates the device area of the slave where data can be read/written in response to a request from the master.

- (b) Communication using dedicated instruction
   Dedicated instructions can be used to make communication from a sequence program at any timing.
   The QJ71MT91 supports the following two dedicated instructions.
   1) MBRW instruction
   Reads/writes MODBLIS® device data from/to a slave
  - Reads/writes MODBUS<sup>®</sup> device data from/to a slave. This enables slave data to be read out to the programmable controller CPU device memory or programmable controller CPU data to be written to the slave.
  - 2) MBREQ instruction

Can issue user-desired request message format (function code \*1 + data unit) to a slave.

\*1: Refer to Chapter 4 for the function code.



(2) Supporting slave function of MODBUS<sup>®</sup> /TCP communication

The QJ71MT91 supports the slave function of MODBUS<sup>®</sup> /TCP communication, which is an open network system for factory automation, and it is compatible with various MODBUS<sup>®</sup> /TCP master devices (hereafter abbreviated to the masters) of other manufacturers.

The slave function supports the following two functions.

(a) Automatic response function

The QJ71MT91 can automatically respond to a request message received from the master.

A sequence program for the slave function is not needed.

(b) MODBUS<sup>®</sup> device assignment function Using MODBUS<sup>®</sup> device assignment parameters, the MODBUS<sup>®</sup> devices are correlated with the programmable controller CPU device memory. This enables direct access from the master to the programmable controller CPU device memory.

Supporting the MODBUS<sup>®</sup> devices of large capacity, the QJ71MT91 allows all device memories of the programmable controller CPU to be assigned.



(3) Concurrent operation of master and slave functions The master and slave functions can be operated concurrently.

This enables flexible construction of a MODBUS<sup>®</sup> /TCP communication-based system.

(a) Example of communication between QJ71MT91 and third party devices



- 1) In response to a request message from the master, the QJ71MT91 operates as a slave and returns a response message.
- 2) The QJ71MT91 operates as a master, and issues a request message to the slave.
- (b) Example of communication between QJ71MT91 and QJ71MT91

The both functions can be operated bi-directionally between QJ71MT91 and QJ71MT91.



(4) Support of GX Developer connection via Ethernet GX Developer can be connected to Ethernet via the QJ71MT91. This enables the maintenance of the programmable controller CPU via Ethernet.



- (5) Supporting Ethernet functions for more reliability, high speed communication and flexible system construction The following Ethernet functions are supported for more reliability, high speed communication and more flexible system construction.
  - (a) KeepAlive function
     The status of communication with the target device where a TCP connection has been established can be checked.
     When communication is not made for a given period of time between the QJ71MT91 and the open target device, the QJ71MT91 checks the target device for existence and cuts off unnecessary TCP connections.
  - (b) 100 Mbps high-speed communication Supporting 100BASE-TX, the QJ71MT91 can make 100Mbps high-speed communication.
  - (c) Router relay function Communication can be made with a MODBUS<sup>®</sup> /TCP device via a router.
- (6) Ease of setting with utility package

The optional utility package (GX Configurator-MB) is available. Though not required, the use of the utility package allows on-screen initial settings (basic parameters, automatic communication parameters, MODBUS<sup>®</sup> device assignment parameters) and auto refresh settings, reducing sequence programs and also facilitating the confirmation of the setting and operating statuses. (\*1)

 \*1: It is recommended to use the utility package with the QJ71MT91.
 By making various parameter settings with the utility package, communication can be made without sequence programs.

### **2 SYSTEM CONFIGURATION**

This chapter explains the system configuration of the QJ71MT91.

### 2.1 Applicable Systems

This section describes the applicable systems.

- (1) Applicable modules and base units, and No. of modules
  - (a) When mounted with a CPU module
     The table below shows the CPU modules and base units applicable to the QJ71MT91 and quantities for each CPU model.
     Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient.
     Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

	Applicable CPU mo	dule	No. of modules <sup>*1</sup>	Base	e unit <sup>*2</sup>	
CP	U type	CPU model	No. of modules	Main base unit	Extension base unit	
	Desis model	Q00JCPU	Up to 8			
	Basic model QCPU	Q00CPU		0	0	
	QCPU	Q01CPU	Up to 24			
		Q02CPU				
	High	Q02HCPU				
	Performance	Q06HCPU	Up to 64	0	0	
	model QCPU	Q12HCPU				
		Q25HCPU				
	Process CPU Redundant CPU	Q02PHCPU		0		
		Q06PHCPU	Up to 64		$\sim$	
		Q12PHCPU			0	
Programmable		Q25PHCPU				
controller CPU		Q12PRHCPU	Up to 53	×	$\bigcirc$	
		Q25PRHCPU	001033	^	0	
		Q02UCPU	Up to 36			
		Q03UDCPU				
		Q04UDHCPU	_			
		Q06UDHCPU	_			
	Universal model	Q13UDHCPU	_			
	QCPU	Q26UDHCPU	Up to 64	0	0	
		Q03UDECPU				
		Q04UDEHCPU				
		Q06UDEHCPU				
		Q13UDHCPU				
		Q26UDHCPU				

 $\bigcirc$ : Applicable,  $\times$ : N/A

\*1: Limited within the range of I/O points for the CPU module.

\*2: Can be installed to any I/O slot of a base unit.

(Continued on next page) 2 - 1

А	Applicable CPU module CPU type CPU model		No. of modulos <sup>*1</sup>	Base unit <sup>*2</sup>		
CPU			No. of modules <sup>*1</sup>	Main base unit	Extension base unit	
Programmable controller CPU	Safety CPU	QS001CPU	N/A	×	×	
		Q06CCPU-V				
C Controller modu	le	Q06CCPU-V-B N/A		×	×	

 $\bigcirc:$  Applicable,  $\times:$  N/A

- \*1: Limited within the range of I/O points for the CPU module.
- \*2: Can be installed to any I/O slot of a base unit.
- (b) Mounting to a MELSECNET/H remote I/O station The table below shows the network modules and base units applicable to the QJ71MT91 and quantities for each network module model. Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient. Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of the modules.

Appliable potwork		Base unit <sup>*2</sup>			
Applicable network module	No. of modules <sup>*1</sup>		Extension base unit of remote I/O station		
QJ72LP25-25					
QJ72LP25G	No. of modules <sup>*1</sup>		0		
QJ72LP25GE	001004	0	0		
QJ72BR15					

 $\bigcirc$ : Applicable,  $\times$ : N/A

\*1: Limited within the range of I/O points for the network module.

\*2: Can be installed to any I/O slot of a base unit.

### REMARK

The Basic model or C Controller module QCPU cannot create the MELSECNET/H remote I/O network.

### (2) Support of the multiple CPU system

When using the QJ71MT91 in a multiple CPU system, refer to the QCPU User's Manual (Multiple CPU System) first.

- (a) Compatible QJ71MT91 The function version of the first released QJ71MT91 is B, and it supports multiple CPU systems.
- (b) Intelligent function module parameters Write intelligent function module parameters to only the control CPU of the QJ71MT91.

### (3) Supported software packages

Relation between the system containing the QJ71MT91 and software package is shown in the following table.

		Software	e version	
		GX Developer * 1	GX Configurator-MB	
Q00J/Q00/Q01CPU	Single CPU system	Version 7 or later		
	Multiple CPU system	Version 8 or later	-	
Q02/Q02H/Q06H/	Single CPU system	Version 4 or later		
Q12H/Q25HCPU Multiple CPU system		Version 6 or later		
Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later	Varaian 1.00A ar latar	
	Multiple CPU system		Version 1.00A or later	
Q12PH/Q25PHCPU	Single CPU system	Version 7.10L or later	-	
	Multiple CPU system			
Q12PRH/Q25PRHCPU	Redundant system	Version 8.45X or later		
	Single CPU system		Version 1.08 Lor later	
Q13UDH/Q26UDHCPU	Multiple CPU system	Version 8.62Q or later		
Q03UDE/Q04UDEH/ Q06UDEH/Q13UDEH/	Single CPU system	Version 8.68W or later		
Q26UDEHCPU	Multiple CPU system			
Q02U/Q03UD/Q04UDH/	Single CPU system			
Q06UDHCPU	Multiple CPU system	Version 8.48A or later		
When mounted to MELS station	ECNET/H remote I/O	Version 6.01B or later	Version 1.00A or later	

GX Developer is required to start up the system that uses the QJ71MT91.

\*1: Refer to Section 2.3 for the accessible range of GX Developer.

### 2.2 Devices Necessary for Network Configuration

This section explains the devices that configure a network.

Please note that the network must be installed by qualified networking specialists to take sufficient safety measures.

The 10BASE-T or 100BASE-TX can be used to connect the QJ71MT91 to a network. The QJ71MT91 will distinguish between 10BASE-T and 100BASE-TX, and between the full duplex and half duplex communication mode according to the hub type. However, for connection with the hub that does not have the auto negotiation function, set the half duplex communication mode on the hub side.



Use the devices that comply with the IEEE802.3 100BASE-TX/10BASE-T Standard.

- (1) Hub and other equipment
  - (a) Shielded twisted pair cable
    - 1) For 100BASE-TX
      - Shielded twisted pair cable (STP cable), Category 5
    - 2) For 10BASE-T

Unshielded twisted pair cable (UTP cable), Category 3 (4, 5) A straight cable can be used.

(We do not guarantee proper operation if a crossing cable is used for the 100BASE-TX/10BASE-T connection between the QJ71MT91 and the target device.)

- (b) RJ45 jack
- (c) Hub for 100Mbps/10Mbps network

### POINT

In high-speed communication (100Mbps) by the 100BASE-TX connection, a communication error may occur under the influence of high frequency noise from devices other than the programmable controller in the installation environment. Take the following action on the QJ71MT91 side to prevent the influence of high frequency noise in the construction of a network system.

- (1) Wiring connection
  - Do not install a twisted pain cable together with the main circuit and power cables, etc.
- Place the twisted pair cable in a duct.
- (2) Communication system
  - Increase the number of communication retries if necessary.
  - Change the hub used for connection into a 10Mbps hub, and make
    - communication at a transmission speed of 10Mbps.

### 2.3 System Configuration and Access Range

This section provides the system configurations using the QJ71MT91. (\*1) The target devices available for communication with the QJ71MT91 are the following two kinds of devices.

- Master/slave device supporting the MODBUS® /TCP protocol
- · Personal computer running GX Developer
- \*1: Ethernet devices can also be installed on the Ethernet line where the MODBUS<sup>®</sup> /TCP system exists. (However, communication with the QJ71MT91 is not available.)



(1) Basic system configuration (MODBUS<sup>®</sup> /TCP communication)

### (2) GX Developer connection

(a) Accessible range of GX Developer Refer to Appendix 3 for the GX Developer connection setup examples.

[Access path via QJ71MT91]



### (b) Precautions for GX Developer connection

When the QJ71MT91 and Ethernet module exist together on the same Ethernet, access cannot be made between the QJ71MT91 and Ethernet module.



Ethernet and MODBUS<sup>®</sup>/TCP mixed network

2.4 Precautions for System Configuration

### (1) For Use with Q12PRH/Q25PRHCPU

- (a) About dedicated instructions
   Dedicated instructions cannot be used.
   Instead of the MBRW instruction, use the automatic communication function. (Refer to Section 9.2 and 9.3.)
   The MBREQ instruction cannot be used.
- (b) GX Configurator-MB GX Configurator-MB cannot be used when accessing the Q12PRH/Q25PRHCPU via an intelligent function module on an extension base unit from GX Developer.

Connect a personal computer with a communication path indicated below.



### 2.5 How to Check the Function Version and Software Version

Confirm the function version of the QJ71MT91 and the software version of GX Configurator-MB in the following methods.

- (1) Checking the function version of the QJ71MT91
  - (a) Checking at "the SERIAL field of the rating plate" located on the side of the module

The serial No. and function version of the module is shown in the SERIAL field of the rating plate.

MELSEC-Q	
MITSUBISHI	
MODEL MAC ADD.	Serial No.(first5 digits)
SERIAL 06011 000000000 (-B)	Function version
	Relevant regulation standards

#### (b) Checking by GX Developer

The serial No. and function version of the module are displayed on the "Production Info. List" and "Module's Detailed Information" screen of GX Developer.

The following explains how to check them on the "Production Info. List" screen.

(For the case of "Module's Detailed Information", refer to Section 11.2.)

[Operating procedure]

 $[Diagnostics] \rightarrow [System monitor] \rightarrow Product Inf. List$ 

Slot	Type PLC	Series 0	Hodel name QOGUDHCPU	Points	1/U No.	Master PLC	Serial No 090920000000000	Ver. B	Product No. 091013092955016-B	4
0-0		Q	0J71MT91	32pt		-	090720000000000	B	-	-
)-1	-	-	None	-	-	-	-	-	-	-
)-2	-	-	None	-	-	-	-	-	-	-
)-3	-	-	None	-	-	-	-	-	-	-
0-4	-	-	None	-	-	-	-	-	-	-
										-
										-
										-
										-
										- 1
										-
										-
										-
										-
								-		

[Serial No, Ver, and Product No.]

- Serial No. of the module is displayed in the Serial No. column.
- Function version of the module is displayed in the Ver. column.
- Serial No. printed on the rating plate is displayed in the Production No. column. \*1

Note that, because the QJ71MT91 does not support the production No. display, "-" is displayed.

\*1: The Production No. column display is active only when the CPU used is a Universal model QCPU.

### POINT

The serial No. on the rating plate may be different from the serial No. displayed on the product information screen of GX Developer.

- The serial No. on the rating plate indicates the management information of the product.
- The serial No. displayed on the product information screen of GX Developer indicates the function information of the product.

The function information of the product is updated when a new function is added.

### (2) Checking the software version of GX Configurator-MB

The software version of GX Configurator-MB can be checked in GX Developer's "Product information" screen.

[Operating procedure]

 $\mathsf{GX} \ \mathsf{Developer} \to [\mathsf{Help}] \to [\mathsf{Product} \ \mathsf{information}]$ 

Product information	×	
Programming and Maintenance tool GX Developer Version 8.12N (SW8D5C-GPPW-E) COPYRIGHT(C) 2002 MITSUBISHI ELECTRIC CORPORATION ALL RIGHTS RESERVED		
This Product is licensed to:		
Name: MITSUBISHI		
Company: MITSUBISHI ELECTRIC Co.		
ProductID		
List of version information on Add-in software		
GX Configurator-MB Version1.01B(SW1D5C-QMBU-E) COPYRIGHT(C) 2004 MITSUBISHI ELECTRIC CORPORATION ALL RIGHTS RESERVED	~	Software version
Warning :		
This product is protected by copyright law and international treaties. Unauthorized reproduction or distribution of this program or any portion of it may result in severe civil and criminal penalties, and will be prosecuted to the maximum extension possible under the law.		
<u> </u>		

### **3 SPECIFICATIONS**

This chapter explains the QJ71MT91's performance specifications, I/O signals for programmable controller CPU, and buffer memory.

For general specifications, refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection).

#### 3.1 Performance Specifications

#### This section provides the performance specifications of the QJ71MT91.

Item         10BASE-T         100BASE-TX         Section           Transmission method         Base band         Inomps         100Mbps         Inomps	Item		Specifi	cations	Reference	
Transmission method         Base band           Maximum node-to-node distance         200m (56: 16t)           Maximum node-to-node distance         200m (56: 16t)           Maximum number of connections %2         64 connections           Maximum number of connections %2         64 connections           Number of routers that can be set         1 default router + any 8 routers           Cable         Cable compliant with the IEEEB02 3 10BASE.TX Standard (unshielded twisted pair cable (UTP)         Section 2.2           Cable         Connector applicable for external wiring         Cable Compliant with the IEEEB02 3 10BASE.TX Standard (unshielded twisted pair cable (UTP)         Section 2.2           Master function         Number of slaves *3         64 slaves            Automatic communica- tion function         Input area size         4k words         Section 2.2           Master function         Number of instructions that can be executed         Up to 8 instructions            Dedicated instruction         Function (for send)         MBRW instruction: 9 functions         Chapter 4           Motomatic concurrently *4         MBRW instruction: 9 functions         Chapter 4           Maximum area size         Max.253 bytes per instruction         Chapter 4           Input area size         Max.253 bytes per instruction         Chapter 4		iter		10BASE-T	100BASE-TX	Section
Maximum node-to-node distance         200m (656.16ft.)         —           Maximum segment length *1         100m (22.08ft.)         —           Mumber of cascade connections stages         Max. 2 stages         Max. 2 stages           Maximum number of connections *2         64 connections         Cable compliant with the lEEE802.3 100BASE-T         Standard (unshielded thisted pair cable (UTP)         Cable compliant with the leetBa02.3 100BASE-TX         Standard (shielded Thiste pair cable (UTP)         Standard (shielded Thiste pair cable (UTP)         Standard (shielded Thiste pair cable (UTP)         Cable         —         —           Master         Connector applicable for external wining         RJ45         —         …         …         …		Data transmiss	ion rate	10Mbps	100Mbps	
Maximum segment length * 1         100m (328.08ft)         —           Number of cascade connection stages         Max. 4 stages         Max. 2 stages         Max. 2 stages           Maximum number of connections * 2         64 connections         Cable compliant with the IEEE802.3 10BASE-T         Cable compliant with the IEEE802.3 10BASE-T         Standard (shielded twisted pair cable (STP cable), Category 3 (4, 5))         Cable compliant with the IEEE802.3 10BASE-T         Section 2.2           Automatic communica- tion function         Number of slaves * 3         64 slaves         —           Automatic communica- tion function         Number of slaves * 3         64 slaves         —           Dedicated instruction         Number of instructions that can be executed         Up to 8 instructions         —           Master function         Function (for send)         MBRW instruction: 9 functions concurrently *4         —           Dedicated instruction         Input area size         Max. 253 bytes per instruction         Chapter 4           MoDBUS <sup>®</sup> device size         Coil         64k points         —           Output area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Output area size         Max. 253 bytes per instruction         Chapter 4           Input eg		Transmission r	nethod	Base		
Number of cascade connection stages         Max. 4 stages         Max. 2 stages           Transmission specifications         Number of concectons *2         64 connections           Number of routers that can be set         1 default router + any 8 routers         Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP cable), Category 5)         Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (STP cable), Category 5)         Section 2.2           Connector applicable for external wiring         RJ45         —           Connector applicable for external wiring         RJ45         —           Number of instructions that connuncia- tion function         Number of instructions that can be executed         Max. 253 bytes per instructions         —           Master function         Dedicated instruction         Number of instructions that can be executed         Up to 8 instructions         —           Max esting response function         Concurrently * 4         MBRW instruction: 9 functions         Chapter 4           MoDBUS®         Function (for receive)         12 functions         Chapter 4           Input rea size         Max. 253 bytes per instruction         Chapter 4           MoDBUS®         Colip G4k points         7.4.1           Motoratic response function         Input register         G4k points           Nor of simultaneously		Maximum node	e-to-node distance	200m (6	56.16ft.)	
Transmission specifications       Maximum number of connections *2       64 connections         Number of routers that can be set       1 default router + any 8 routers         Cable       Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (STP cable), Category 3 (4, 5))       Section 2.2         Connector applicable for external wiring       RJ45       —         Automatic communica- tion function       Number of slaves *3       64 slaves       —         Function function       Number of instructions that concurrently *4       4k words       Section 2.2         Master function       Number of instructions that concurrently *4       Up to 8 instructions       Chapter 4         Dedicated instruction       Number of instructions that concurrently *4       Wards       Section         Master function       Automatic response       Function (for send)       MBRW instructions       Chapter 4         MobBUS® function       Function (for receive)       12 functions       Chapter 4         Max 253 bytes per instruction       Chapter 4       Output area size       Max. 253 bytes per instruction         No. of simultaneously acceptable request messages       Coil       64k points       Function         No. of simultaneously acceptable request messages       GA       —       7.4.1         Number of simultaneously connec		Maximum segr	nent length * 1	100m (3	28.08ft.)	—
Number of routers that can be set         1 default router + any 8 routers           Specifications         Cable compliant with the IEEEE02.3 108ASE-T Standard (unshielded twisted pair cable (UTP cable), Category 3 (4, 5)         Cable compliant with the IEEEE02.3 108ASE-T Standard (unshielded twisted pair cable), Category 5)         Section 2.2           Master function         Number of slaves * 3         64 slaves            Number of instructions         Chapter 4 iton function         Number of slaves * 3         64 slaves            Dedicated instruction         Function (for send)         7 functions         Chapter 4 iton function         Section 2.2           Master function         Dedicated instruction         Function (for send)         7 functions         Chapter 4           Number of instructions that can be executed concurrently * 4         Up to 8 instructions             Dedicated instruction         Function (for send)         MBRW instruction: 9 functions MBREQ instruction: 9 functions         Chapter 4           MobBUS® device size         Function (for receive)         12 functions         Chapter 4           Number of simultaneously acceptable request function         GA4 points          Chapter 4           Not of simultaneously connectable GX bevelopers         GA4 points         7.4.1            Stave function function		Number of case	cade connection stages	Max. 4 stages	Max. 2 stages	
Specifications         Number of routers that can be set         1 default router + any 8 routers         Cable compliant with the IEEB02.3 10BASE-T Standard (unshielded Wisted pair cable) (DBASE-TX Standard (unshielded Wisted pair cable) (Category 5)         Section 2.2           Master function         Automatic communica- tion function         Number of slaves * 3         64 slaves            Master function         Automatic communica- tion function         Number of slaves * 3         64 slaves            Dedicated instruction         Number of instructions that can be executed         Quiput area size         4k words         Section 2           Dedicated instruction         Number of instructions that can be executed         Up to 8 instructions         Chapter 4           Mumber of instruction (for send)         MBRW instruction: 9 functions         Chapter 4           Input area size         Max 253 bytes per instruction         Chapter 4           Up to 8 instructions         Chapter 4         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Mutot of instructare         Coll         64k points         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Number of instructare         Coll         64k points         74.1           Input area si		Maximum num	ber of connections * 2	64 conr	nections	
Cable         Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP) cable), Category 3 (4, 5)         Cable compliant with the IEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP) cable), Category 5)         Section 2.2           Master function         Number of slaves *3         64 slaves         -           Master function         Number of slaves *3         64 slaves         -           Dedicated instruction         Number of slaves *3         64 slaves         -           Dedicated instruction         Number of instructions that can be executed         4k words         Section 2.2           Dedicated instruction         Number of instructions that can be executed         4k words         Section 2.2           Slave function         Function (for send)         MBRW instruction: 9 functions         Chapter 4           Input area size         Max.253 bytes per instruction (for send)         Chapter 4           MBRW instruction: 9 functions         Chapter 4           Mode size         Coil         64k points           Input register         64k points         Chapter 4           Number of simultaneously connectable GX messages         Max. 8 GX Developers         Section 7.2.3           Number of simultaneously connectable GX bevelopers         Max. 8 GX Developers         Section 7.2.3           Number of simultaneously conne		Number of rout	ters that can be set	1 default router	+ any 8 routers	
Automatic communica- tion function         Number of slaves *3         64 slaves            Master function         Automatic communica- tion function         Number of slaves *3         64 slaves            Master function         Input area size         4k words         Section           Dedicated instruction         Number of instructions that can be executed concurrently *4         Up to 8 instructions            Function (for send)         MBRW instruction: 9 functions         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Norber size         Function (for receive)         12 functions         Chapter 4           Input register         64k points		Cable		IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP	IEEE802.3 100BASE-TX Standard (shielded twisted pair cable (STP	Section 2.2
Master function         Function (for send)         7 functions         Chapter 4           Master function         Input area size         4k words         Section           Dedicated instruction         Dedicated instruction         Number of instructions that can be executed         Up to 8 instructions         -           Function (for send)         MBRW instruction: 9 functions         Chapter 4           Dedicated instruction         Function (for send)         MBREQ instruction: 9 functions         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           MoDBUS <sup>®</sup> function         Function (for receive)         12 functions         Chapter 4           MODBUS <sup>®</sup> device size         Coil         64k points         Input response         Section           No. of simultaneously acceptable request messages         64         -         -           GX Developer connection function         Number of simultaneously connectable GX bevelopers         Max. 8 GX Developers         Section 7.2.3           Number of simultaneously connectable GX bevelopers         98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×         Aneandix 4		Connector app	licable for external wiring		145	—
Master function         Communica- tion function         Function (for send)         / functions         Chapter 4 section           Master function         Dedicated instruction         Number of instructions that can be executed instruction         Up to 8 instructions            Dedicated instruction         Function (for send)         MBRW instruction: 9 functions MBREQ instruction: 9 functions         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Output area size         Max. 253 bytes per instruction         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           MoDBUS <sup>®</sup> function         Function (for receive)         12 functions         Chapter 4           MODBUS <sup>®</sup> device size         Coil         64k points         -           No. of simultaneously acceptable request messages         64         -         -           GX Developer connection function         Number of simultaneously connectable GX bevelopers         Max. 8 GX Developers         Section 7.2.3           Number of simultaneously connectable GX portered I/O points         98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×         Anagentix 1		Automotio	Number of slaves *3	64 s	aves	
Master function         Input area size         4k words         Section           Master function         Dedicated instruction         Input area size         4k words         3.3.1           Dedicated instruction         Mumber of instructions that can be executed concurrently * 4         Up to 8 instructions         -           Dedicated instruction         Function (for send)         MBRW instruction: 9 functions MBREQ instruction: 19 functions         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Output area size         Max. 253 bytes per instruction         Chapter 4           MoDBUS® function         Function (for receive)         12 functions         Chapter 4           MODBUS® device size         Coil         64k points         Chapter 4           Input register         64k points         7.4.1           Extended file register         Max. 4086k points         7.4.1           GX Developer connection function         Number of simultaneously connectable GX Developers         Max. 8 GX Developers         Section 7.2.3           Number of oscupied I/O points         32 points         -           SVDC internal current consumption         0.52A         -           SVDC internal current consumption         0.52A         -			Function (for send)	7 fun	ctions	Chapter 4
Master function         Output area size         4k words         3.3.1           Master function         Number of instructions that can be executed concurrently * 4         Up to 8 instructions            Dedicated instruction         Function (for send)         MBRW instruction: 9 functions MBREQ instruction: 19 functions         Chapter 4           Input area size         Max. 253 bytes per instruction Output area size         Max. 253 bytes per instruction         Chapter 4           Kernel         Function (for receive)         12 functions         Chapter 4           MODBUS® function         Function (for receive)         12 functions         Chapter 4           MODBUS® function         Function (for receive)         12 functions         Chapter 4           MODBUS® device size         Function (for receive)         12 functions         7.4.1           Slave function         No. of simultaneously acceptable request messages         64            GX Developer connection function         Number of simultaneously connectable GX Developers         Max. 8 GX Developers         Section 7.2.3           Number of occupied I/O points         32 points            SVDC internal current consumption         0.52A         -           SVDC internal current consumption         0.52A         -			Input area size	4k w	Section	
Master function         Dedicated instruction         can be executed concurrently *4         Up to 8 instructions            Dedicated instruction         Function (for send)         MBRW instruction: 9 functions MBREQ instruction: 19 functions         Chapter 4           Input area size         Max. 253 bytes per instruction         Chapter 4           Output area size         Max. 253 bytes per instruction         Chapter 4           Kerner         Function (for receive)         12 functions         Chapter 4           MODBUS® function         Coil         64k points         Chapter 4           MODBUS® device size         Input register         64k points         Section 7.4.1           Mode of simultaneously acceptable request messages         Kax. 8 GX Developers         Section 7.2.3           Number of simultaneously connectable GX Developers         Max. 8 GX Developers         Section 7.2.3           Subser of occupied I/O points         0.52A			Output area size	4k w	vords	3.3.1
Decidated instruction       Function (for send)       MBRW instruction: 9 functions MBREQ instruction: 19 functions       Chapter 4         Input area size       Max. 253 bytes per instruction       Chapter 4         Output area size       Max. 253 bytes per instruction       Chapter 4         Automatic response function       Function (for receive)       12 functions       Chapter 4         Slave function       Coil       64k points       Chapter 4         MODBUS® device size       Coil       64k points       Section         Holding register       64k points       7.4.1       -         So of simultaneously acceptable request messages       64       -       -         GX Developer connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         SVDC internal current consumption       0.52A       -       -         Staread dimensions       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Anneardir 1			can be executed	Up to 8 in	_	
Output area size         Max. 253 bytes per instruction         Chapter 4           Automatic response function         Function (for receive)         12 functions         Chapter 4           Slave function         Coil         64k points         Function         Section           MODBUS® device size         Coil         64k points         Function         Section           No. of simultaneously acceptable request messages         Max. 4086k points          Section           GX Developer connection function         Number of simultaneously connectable GX Developers         Max. 8 GX Developers         Section 7.2.3           Number of occupied I/O points         32 points            5VDC internal current consumption         0.52A            State internal dimensions         98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×         Appendix 1			Function (for send)		Chapter 4	
Output area size       Max. 253 bytes per instruction       Area of the size         Automatic response function       Function (for receive)       12 functions       Chapter 4         Slave function       Coil       64k points       64k points         MODBUS <sup>®</sup> Input register       64k points       54k points         MODBUS <sup>®</sup> Input register       64k points       7.4.1         No. of simultaneously acceptable request messages       Max. 4086k points          GX Developer connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points          5VDC internal current consumption       0.52A          98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1			Input area size	Max. 253 bytes	Objection 4	
Automatic response function         Function (for receive)         12 functions         Chapter 4           Slave function         Coil         64k points         Function         Funcerition<			Output area size			Chapter 4
Slave function       MODBUS® device size       Input megister       64k points       Section 7.4.1         MODBUS® device size       Input register       64k points       7.4.1         No. of simultaneously acceptable request messages       64       64         Number of simultaneously connectable GX Developers       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points       -         5VDC internal current consumption       0.52A       -         External dimensions       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1		response	Function (for receive)	12 fur	Chapter 4	
Slave function       MODBUS <sup>®</sup> device size       Input register       64k points       Section         No. of simultaneously acceptable reguest messages       No. of simultaneously acceptable request messages       64          GX Developer connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points          5VDC internal current consumption       0.52A          External dimensions       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1			Coil	64k p	points	
device size       Importegister       64k points       7.4.1         Holding register       64k points       7.4.1         No. of simultaneously acceptable request messages       64          GX Developer connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points          5VDC internal current consumption       0.52A          External dimensions       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1			Input	64k p	points	
GX Developer connection function       Number of simultaneously acceptable request messages       64       —         GX Developer connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points       —         5VDC internal current consumption       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1	Slave function		Input register	64k p		
Image: Constraint of the state of the s		device size	Holding register	64k p	points	7.4.1
messages       64       —         GX Developer connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points       —         5VDC internal current consumption       0.52A       —         External dimensions       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1			Extended file register	Max. 408	6k points	
connection function       Number of simultaneously connectable GX Developers       Max. 8 GX Developers       Section 7.2.3         Number of occupied I/O points       32 points       —         5VDC internal current consumption       0.52A       —         External dimensions       98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×       Appendix 1			eously acceptable request	6	_	
5VDC internal current consumption         0.52A         —           External dimensions         98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) ×         Appendix 1	connection	Number of simultaneously connectable GX		Max. 8 GX Developers		
External dimensions 98 (3.86 in.) (H) × 27.4 (1.08 in.) (W) × Appendix 1	Number of occupied I/O points		32 points		—	
						—
	External dimensions					Appendix 1
Weight 0.11kg -	Weight					

\*1: Length between a hub and a node.

<sup>\*2:</sup> Indicates the number of TCP connections that can be established simultaneously.
\*3: Indicates the maximum number of slaves that can be communication targets.

<sup>\*4:</sup> Indicates the maximum number of dedicated instructions that can be started simultaneously from a sequence program.

### 3.2 I/O Signals for Programmable Controller CPU

This section explains the I/O signals of the QJ71MT91 for the programmable controller CPU.

#### 3.2.1 I/O signal list

The following table shows the I/O signals of the QJ71MT91. The following I/O signal assignment is based on the case where the start I/O No. of the QJ71MT91 is "0000" (installed to slot 0 of the main base unit). Device X represents an input signal from the QJ71MT91 to the programmable controller CPU. Device Y shows an output signal from the programmable controller CPU to the QJ71MT91.

Refer to the corres	nondina reference	sections for details.
	ponuling releasence	

Signa	al Direction QJ71MT91 $\rightarrow$ Programmable contra	oller CPU	Signal Direction Programmable controller CPU $\rightarrow$ QJ71MT91				
Device No.	Signal name	Reference section	Device No.	Signal name	Reference section		
X0	Module READY * 1 ON : Accessible OFF: Inaccessible	Section 11.1	Y0	Use prohibited	_		
X1	Basic parameter setting, normally completed ON : Normally completed OFF: —		Y1	Basic parameter setting request ON : Being requested OFF: Not requested	Section 9.1.1		
X2	Basic parameter setting, error completed ON : Error completed OFF: —	Section 9.1.1	Y2	Use prohibited	_		
Х3	Basic parameter setting existence ON : Parameters set OFF: No parameters set		Y3		_		
X4	Automatic communication parameter setting, normally completed ON : Normally completed OFF: —	Section 5.2.1,	Y4	Automatic communication parameter setting request/automatic communication start request ON : Parameter setting being requested/start being requested OFF: No parameter setting requested/no start requested	Section 5.2.1, 9.1.2		
X5	Automatic communication parameter setting, error completed ON : Error completed OFF: —	9.1.2		Y5	Use prohibited	_	
X6	Automatic communication operation status ON : Operating OFF: Stopped		Y6	Automatic communication stop request ON : Being requested OFF: Not requested	Section 5.2.1		
X7	Automatic communication error status ON : Error occurred OFF: No error	Section 5.2.1	Y7	Use prohibited	—		
X8	MODBUS <sup>®</sup> device assignment parameter setting, normally completed ON : Normally completed OFF: —	Section	Y8	MODBUS <sup>®</sup> device assignment parameter setting request ON : Being requested OFF: Not requested	Section 9.1.3		
Х9	MODBUS <sup>®</sup> device assignment parameter setting, error completed ON : Error completed OFF: —	9.1.3	Y9	Use prohibited	_		

\*1: Turns ON when the QJ71MT91 is ready after the programmable controller is turned ON from OFF or after the programmable controller CPU is reset.

(Continued on next page)

-	I Direction QJ71MT91 $\rightarrow$ Programmable con			Direction Programmable controller CPU $\rightarrow$	
Device No.	Signal name	Reference section	Device No.	Signal name	Reference section
ХА	MODBUS <sup>®</sup> device assignment parameter setting existence ON : Parameters set OFF: No parameters set	Section 9.1.3	YA		_
XB		_	YB		_
XC	-	_	YC		_
XD		_	YD		_
XE		_	YE		_
XF			YF		_
X10			Y10		_
X11			Y11	Use prohibited	
X12	Use prohibited	_	Y12		_
X13		_	Y13		
X14		_	Y14		-
X15		_	Y15		_
X16		_	Y16		
X17		_	Y17		_
X18		_	Y18		_
X19		_	Y19		_
X1A		_	Y1A		_
X1B	COM.ERR.LED status ON : Lit OFF: Not lit	Section 11.4.2	Y1B	COM. ERR. LED OFF request ON : Being requested OFF: Not requested	Section 11.4.2
X1C	PING test completed ON : PING test completed OFF: —	Section 11.5.2	Y1C	PING test execution request ON : PING test execution being requested OFF: PING test execution not request	Section 11.5.2
X1D	Use prohibited	_	Y1D		_
X1E		_	Y1E	Use prohibited	_
X1F	Watch dog timer error ON : Module error occurred OFF: Module operating normally	Section 11.1	Y1F		_

ImportantAmong the I/O signals for the programmable controller CPU, do not output (turn<br/>ON) the "Use prohibited" signals.<br/>Doing so may cause the programmable controller system malfunction.

### 3.3 Applications and Assignment of Buffer Memory

### 3.3.1 Buffer memory list

### A buffer memory list is given below.

Address	Appli	cation		Name		Initial Value	Read/ Write (*1)	Initial Setting (*2)	Reference Section					
0000 <sub>H</sub> (0)				TCP ULP timer val Set time = set val	m ue imes 500ms	3C <sub>H</sub> (60)	R/W							
0001 <sub>H</sub> (1)				TCP zero window t Set time = set value		14 <sub>H</sub> (20)	R/W							
0002 <sub>H</sub> (2)			TCP/UDP/	TCP resend timer v Set time = set value		14 <sub>H</sub> (20)	R/W							
0003 <sub>H</sub> (3)	-		IP monitoring timer	TCP end timer valu Set time = set valu	ie	28 <sub>H</sub> (40)	R/W							
0004 <sub>H</sub> (4)	-		une	IP reassembly time Set time = set value	er value	A <sub>H</sub> (10)	R/W							
0005 <sub>H</sub> (5)				Split reception mor value Set time = set value	itoring timer	3C <sub>H</sub> (60)	R/W							
0006 <sub>H</sub> (6)				KeepAlive		1 <sub>H</sub>	R/W							
0007 <sub>H</sub> (7)						KeepAlive start tim Set time = set value		4B0 <sub>H</sub> (1200)	R/W					
0008 <sub>H</sub> (8)						KeepAlive	KeepAlive interval Set time = set value	timer value	14 <sub>H</sub> (20)	R/W	1	Section		
0009 <sub>H</sub> (9)		TCP/UDP/ IP setting		KeepAlive resend count		3 <sub>H</sub>	R/W	0	Section 7.2					
000A <sub>H</sub> (10)	Desis			Router relay function		0 <sub>H</sub>	R/W							
000B <sub>H</sub> to 000C <sub>H</sub> (11 to 12)	Basic parameter						Subnet mask pattern		FFFFFF00 <sub>H</sub>	R/W				
000D <sub>H</sub> to 000E <sub>H</sub> (13 to 14)				Default router IP ac	ldress	0 <sub>H</sub>	R/W							
000F <sub>H</sub> (15)			Routing information			0 <sub>H</sub>	R/W							
0010 <sub>H</sub> to 0011 <sub>H</sub> (16 to 17)								mornation	Router	Subnet address	0 <sub>H</sub>	R/W		
0012 <sub>H</sub> to 0013 <sub>H</sub> (18 to 19)								information 1	Router IP address	0 <sub>H</sub>	R/W			
0014 <sub>H</sub> to 002F <sub>H</sub> (20 to 47)				Router information 2 to 8 (Same as re		uter informatior	า 1)							
0030 <sub>H</sub> (48)		GX Developer connection information setting	Number of T Developer c	CP connections for GX onnection		1 <sub>H</sub>	R/W	0	Section 7.2					
0031 <sub>H</sub> to 010F <sub>H</sub> (49 to 271)		System area	(use prohibited)			—	_	_	—					

(Continued on next page)

\*1: Indicates whether the address is readable and/or writable from/to a sequence program.R: ReadableW: Writable

\*2: Indicates whether setting on GX Configurator-MB is enabled or disabled.

 $\bigcirc$ : Setting enabled  $\times$ : Setting disabled

Address	Appli	cation		Name		Initial Value Read Write (*1)		Initial Setting (*2)	Reference Section	
0110 <sub>H</sub>			Local slave station port No.			502	R/W		Section	
(272) 0111 <sub>H</sub>	-		Target slave po	ort No. for automa	itic	500		0	7.2	
(273)	-		communication	n function		502	R/W			
0112 <sub>н</sub> to 0113 <sub>н</sub>			System area (u	use prohibited)		_	_	_	_	
(274 to 275) 0114 <sub>H</sub>		MODBUS®	CPU rosponso	monitoring timer	valuo					
(276)	Basic parameter	/TCP		value $\times$ 500ms	value	A <sub>H</sub> (10)	R/W			
0115 <sub>H</sub> to	parameter	setting				0				
0116 <sub>H</sub> (277 to 278)			Preferred node	specification 1	IP address	0 <sub>H</sub>	R/W		Section	
0117 <sub>H</sub>	-		1 Tololica Hode		Number of	0 <sub>H</sub>	R/W	0	7.2	
(279)	-				connections	0 <sub>H</sub>				
0118 <sub>H</sub> to 01D4 <sub>H</sub>				specification 2	(Same as pre					
(280 to 468)			to 64		specification	1)				
01D5 <sub>H</sub> to	Custom and									
01FF <sub>H</sub> (469 to 511)	System area	a (use prohibit	ea)			_		-	_	
0200 <sub>H</sub> to			Target station IP address			R/W				
0201 <sub>H</sub>					00000000		-			
(512 to 513) 0202 <sub>H</sub>										
(514)			Module ID			255 <sub>H</sub>			R/W	
0203 <sub>H</sub>			Repeat interval timer value			0			R/W	
(515) 0204 <sub>H</sub>	-			Set time = set value $\times$ 10ms Response check timer value				-		
(516)				Set time = set value $\times$ 500ms		0	R/W			
0205 <sub>H</sub> (517)		Automatic communi-	Target MODBU	arget MODBUS <sup>®</sup> device type specification		0000 <sub>H</sub>	R/W			
0206 <sub>H</sub> (518)	Automatic	cation parameter		Head buffer me	mory address	0000 <sub>H</sub>	R/W			
0207 <sub>H</sub>	communi- cation	1	Read setting	Target MODBL head number	IS <sup>®</sup> device	0	R/W	0	Section 7.3	
(519) 0208 <sub>H</sub>	parameter			Access points		0	R/W		7.5	
(520) 0209 <sub>H</sub>	-							1000		
(521)				Head buffer me	mory address	0000 <sub>H</sub>	R/W			
020Å <sub>H</sub>	1		Write setting	Target MODBL	IS <sup>®</sup> device	0	R/W	1		
(522) 020B	-		Trite Setting	head number		0	1.7.1.1			
020B <sub>H</sub> (523)				Access points		0	R/W			
020C <sub>H</sub> to 04FF <sub>H</sub> (524 to 1279)		Automatic communi- cation parameter 2 to 64	(Same as automatic communication parameter			1)				
0500 <sub>H</sub> to 08FF <sub>H</sub> (1280 to 2303)	System area	a (use prohibit						_	_	

(Continued on next page)

### **3 SPECIFICATIONS**

Address	Application		Name	Initial Value	Read/ Write (*1)	Initial Setting (*2)	Reference Section	
0900 <sub>H</sub> (2304)			Device code	0 <sub>H</sub>	R/W			
0901 <sub>H</sub> (2305)	-	Coil assignment 1	Head device number	0 <sub>H</sub>	R/W			
0902 <sub>H</sub> (2306)			Head coil number	0 <sub>H</sub>	R/W	0		
0903 <sub>H</sub> (2307)			Assignment points	0 <sub>H</sub>	R/W			
0904 <sub>H</sub> to 093F <sub>H</sub> (2308 to 2367)		Coil assignment 2 to 16	(Same as coil assignment 1)	1	I			
0940 <sub>H</sub> (2368)			Device code	0 <sub>H</sub>	R/W			
0941 <sub>H</sub> (2369)		Input	Head device number	0 <sub>H</sub>	R/W			
0942 <sub>H</sub> (2370)		assignment 1	Head input number	0 <sub>H</sub>	R/W	0		
0943 <sub>H</sub> (2371)			Assignment points	0 <sub>H</sub>	R/W			
0944 <sub>H</sub> to 097F <sub>H</sub> (2372 to 2431)	MODBUS®	Input assignment 2 to 16	(Same as input assignment 1)				Section 7.4	
0980 <sub>H</sub> (2432)	device assignment		Device code	0 <sub>H</sub>	R/W R/W R/W			
0981 <sub>H</sub> (2433)	parameter	Input register	Head device number	0 <sub>H</sub>				
0982 <sub>H</sub> (2434)		assignment 1	Head input register number	0 <sub>H</sub>		0		
0983 <sub>H</sub> (2435)			Assignment points	0 <sub>H</sub>	R/W			
0984 <sub>H</sub> to 09BF <sub>H</sub> (2436 to 2495)	Input register assignment 2 to 16	(Same as input register assignment 1)						
09C0 <sub>H</sub> (2496)			Device code	0 <sub>H</sub>	R/W			
09C1 <sub>H</sub> (2497)		Holding register	Head device number	0 <sub>H</sub>	R/W			
09C2 <sub>H</sub> (2498)		assignment	Head holding register number	0 <sub>H</sub>	R/W			
09C3 <sub>H</sub> (2499)			Assignment points	0 <sub>H</sub>	R/W	0		
$09C4_{H}$ to $09FF_{H}$ (2500 to 2559)		Holding register assignment 2 to 16	(Same as holding register assignment 1)					
0A00 <sub>H</sub> to 0BFF <sub>H</sub> (2560 to 3071)	System area	a (use prohibite	ed)	_	—	_	_	
0C00 <sub>H</sub> (3072)		Intelligent S function tting module S	Switch 1: Operation mode setting status	Intollizant	R			
0C01 <sub>H</sub> (3073)					Intelligent function	R		Section 6.6
0C02 <sub>H</sub> (3074)	Setting status		Switch 3: Local station IP address setting status	- module switch	R	- ×	Section 11.2	
0C03 <sub>H</sub> (3075)		setting status	Switch 4: Local station IP address setting status	- status	R			
0C04 <sub>H</sub> (3076)			System area (use prohibited)	_		-	_	

(Continued on next page)
# **3 SPECIFICATIONS**

Address	Appli	cation	N	ame	Initial Value	Read/ Write (*1)	Initial Setting (*2)	Reference Section
0C05 <sub>H</sub> (3077)		Module status	LED ON status		LED ON status	R		Section 6.3 Section 11.2
0C06 <sub>H</sub> to 0C0F <sub>H</sub> (3078 to 3087)		System area	a (use prohibited)		_	_	_	—
0C10 <sub>H</sub> (3088)			Basic parameter erro	r code storage area	0 <sub>H</sub>	R		
0C11 <sub>H</sub> (3089)			Automatic communic code storage area	ation parameter error	0 <sub>H</sub>	R		
0C12 <sub>H</sub> (3090)		Parameter		ation parameter setting	0 <sub>H</sub>	R		Conting
0C13 <sub>H</sub> (3091)		error information	MODBUS <sup>®</sup> device as error code storage an	ssignment parameter	0 <sub>H</sub>	R	×	Section 11.3.1
0C14 <sub>H</sub> (3092)			MODBUS <sup>®</sup> device assignment	Error, device type	0 <sub>H</sub>	R		
0C15 <sub>H</sub> (3093)			parameter setting result storage area	Error, assigned group No.	0 <sub>H</sub>	R		
0C16 <sub>H</sub> to 0C1F <sub>H</sub> (3094 to 3103)		System area	a (use prohibited)		-	_	_	_
0C20 <sub>H</sub> to 0C23 <sub>H</sub> (3104 to 3107)			Automatic communic storage area (parame	ation operation status eters 1 to 64)	0 <sub>H</sub>	R	×	Section 11.3.1
0C24 <sub>H</sub> to 0C27 <sub>H</sub> (3108 to 3111)		Communi- cation	System area (use pro	hibited)	-	_	_	_
0C28 <sub>H</sub> to 0C67 <sub>H</sub> (3112 to 3175)	Operating status	status monitor area	Automatic communic area (parameters 1 to	ation error code storage 0 64)	0 <sub>H</sub>	R	×	Section 11.3.1
0C68 <sub>H</sub> to 0CA7 <sub>H</sub> (3176 to 3239)			System area (use pro	hibited)	_		_	_
0CA8 <sub>H</sub> to 0CFD <sub>H</sub> (3240 to 3325)		System area	a (use prohibited)		_	_	_	_
0CFE <sub>H</sub> (3326)			Number of errors occ	urred	0 <sub>H</sub>	R		
0CFF <sub>H</sub> (3327)			Error log write pointer		0 <sub>H</sub>	R		
0D00 <sub>H</sub> (3328)				Detailed error code	0 <sub>H</sub>	R		
0D01 <sub>H</sub> (3329)				Exception code	0 <sub>H</sub>	R		
0D02 <sub>H</sub> (3330)				Function code	0 <sub>H</sub>	R	×	Section 11.3.1
0D03 <sub>H</sub> (3331)		Error log	Error log 1	Local station port No.	0 <sub>H</sub>	R	İ	
0D04 <sub>H</sub> to 0D05 <sub>H</sub> (3332 to 3333)				Target IP address	0 <sub>H</sub>	R	†	
0D06 <sub>H</sub> (3334)				Target device port No.	0 <sub>H</sub>	R	İ	
0D07 <sub>H</sub> (3335)				System area (use prohibited)	_	_	-	_
0D08 <sub>H</sub> to 0DFF <sub>H</sub> (3336 to 3583)			Error log 2 to 32	(Same as error log 1)		·	×	Section 11.3.1

(Continued on next page)

## **3 SPECIFICATIONS**

Address	Appli	cation		Name	Initial Value	Read /Write (*1)	Initial Setting (*2)	Reference Section
0E00 <sub>H</sub> to 0E02 <sub>H</sub> (3584 to 3586)	H / W information	Ethernet address	Local station	e Ethernet address	Ethernet address	R	×	_
0E03 <sub>H</sub> to 0E0F <sub>H</sub> (3587 to 3599)	System area	a (use prohibite	ed)		_	_	_	_
0E10 <sub>H</sub> to 0E11 <sub>H</sub> (3600 to 3601)				IP packet reception count	0 <sub>H</sub>	R		
0E12 <sub>H</sub> to 0E13 <sub>H</sub> (3602 to 3603)				Count of IP packet reception discarded due to sum check error	0 <sub>H</sub>	R	×	Section 11.3.1
0E14 <sub>H</sub> to 0E15 <sub>H</sub> (3604 to 3605)			IP	Total number of sent IP packets	0 <sub>H</sub>	R		
0E16 <sub>H</sub> to 0E29 <sub>H</sub> (3606 to 3625)				System area (use prohibited)	_	_	_	_
0E2A <sub>H</sub> to 0E2B <sub>H</sub> (3626 to 3627)				Simultaneous transmission error detection count	0 <sub>H</sub>	R	×	Section 11.3.1
0E2C <sub>H</sub> to 0E2F <sub>H</sub> (3628 to 3631)				System area (use prohibited)	_	_	_	_
0E30 <sub>H</sub> to 0E31 <sub>H</sub> (3632 to 3633)				ICMP packet reception count	0 <sub>H</sub>	R		
0E32 <sub>H</sub> to 0E33 <sub>H</sub> (3634 to 3635)				Count of ICMP packet reception discarded due to sum check error	0 <sub>H</sub>	R		
0E34 <sub>H</sub> to 0E35 <sub>H</sub> (3636 to 3637)	Communi- cation	Communi- cation status by		Total number of sent ICMP packets	0 <sub>H</sub>	R		
0E36 <sub>H</sub> to 0E37 <sub>H</sub> (3638 to 3639)	status	protocol type	ICMP	Total number of ICMP echo request received	0 <sub>H</sub>	R	×	Section 11.3.1
0E38 <sub>H</sub> to 0E39 <sub>H</sub> (3640 to 3641)			ICIVIE	Total number of ICMP echo reply sent	0 <sub>H</sub>	R		
0E3A <sub>H</sub> to 0E3B <sub>H</sub> (3642 to 3643)				Total number of ICMP echo request sent	0 <sub>H</sub>	R		
0E3C <sub>H</sub> to 0E3D <sub>H</sub> (3644 to 3645)				Total number of ICMP echo reply received	0 <sub>H</sub>	R		
0E3E <sub>H</sub> to 0E4F <sub>H</sub> (3646 to 3663)				System area (use prohibited)	_	_	_	_
0E50 <sub>H</sub> to 0E51 <sub>H</sub> (3664 to 3665)				TCP packet reception count	0 <sub>H</sub>	R		
0E52 <sub>H</sub> to 0E53 <sub>H</sub> (3666 to 3667)			ТСР	Count of TCP packet reception discarded due to sum check error	0 <sub>H</sub>	R	×	Section 11.3.1
0E54 <sub>H</sub> to 0E55 <sub>H</sub> (3668 to 3669)				Total number of sent TCP packets	0 <sub>H</sub>	R		
0E56 <sub>H</sub> to 0E6F <sub>H</sub> (3670 to 3695)				System area (use prohibited)	_		_	_

(Continued on next page)

Address	Applio	cation		Name	Initial Value	Read/ Write (*1)	Initial Setting (*2)	Reference Section	
0E70 <sub>H</sub> to 0E71 <sub>H</sub> (3696 to 3697)				UDP packet reception count	0 <sub>H</sub>	R			
0E72 <sub>H</sub> to 0E73 <sub>H</sub> (3698 to 3699)			UDP	Count of UDP packet reception discarded due to sum check error	0 <sub>H</sub>	R	×	Section 11.3.1	
0E74 <sub>H</sub> to 0E75 <sub>H</sub> (3700 to 3701)			UDP	Total number of sent UDP packets	0 <sub>H</sub>	R			
0E76 <sub>H</sub> to 0E79 <sub>H</sub> (3702 to 3705)		Communi-		System area (use prohibited)	_	_	_	_	
0E7A <sub>H</sub> to 0E83 <sub>H</sub> (3706 to 3715)	Communi- cation status	cation status by protocol	System area	a (use prohibited)	_	_	_	_	
0E84 <sub>H</sub> to 0E85 <sub>H</sub> (3716 to 3717)		type		Framing error count	0 <sub>H</sub>	R			
0E86 <sub>H</sub> to 0E87 <sub>H</sub> (3718 to 3719)			Receive	Overflow count	0 <sub>H</sub>	R	×	Section 11.3	
0E88 <sub>H</sub> to 0E89 <sub>H</sub> (3720 to 3721)			error	CRC error count	0 <sub>H</sub>	R			
0E8A <sub>H</sub> to 0E8F <sub>H</sub> (3722 to 3727)				System area (use prohibited)	_			_	
0E90 <sub>H</sub> to 0FDF <sub>H</sub> (3728 to 4063)	System area	a (use prohibite	ed)		_	_	_	_	
0FE0 <sub>H</sub> (4064)			Communica	tion time check	2 <sub>H</sub>	R/W			
0FE1 <sub>H</sub> (4065)			Transmission count		4 <sub>H</sub>	R/W			
0FE2 <sub>H</sub> to 0FE3 <sub>H</sub> (4066 to 4067)			IP address		0 <sub>H</sub>	R/W		Continu	
0FE4 <sub>H</sub> (4068)	PING test			Execution result	0 <sub>H</sub>	R	×	Section 11.5	
0FE5 <sub>H</sub> (4069)					Total packet transmission count	0 <sub>H</sub>	R		
0FE6 <sub>H</sub> (4070)				Re	Result	Success count	0 <sub>H</sub>	R	-
0FE7 <sub>H</sub> (4071)				Failure count	0 <sub>H</sub>	R			
0FE8 <sub>H</sub> to 0FFF <sub>H</sub> (4072 to 4095)	System area	ı (use prohibite	ed)	I	_	_	_		
1000 <sub>H</sub> to 1FFF <sub>H</sub> (4096 to 8191)			Automatic c input area	ommunication function buffer	0 <sub>H</sub>	R	×	Section 5.2.1	
2000 <sub>H</sub> to 2FFF <sub>H</sub> (8192 to 12287)	Automatic	communication function		a (use prohibited)	_	_	_	_	
3000 <sub>H</sub> to 3FFF <sub>H</sub> (12288 to 16383)	communicat buffer			Automatic communication function buffer output area		R/W	×	Section 5.2.1	
4000 <sub>H</sub> to 4FFF <sub>H</sub> (16384 to 20479)			System area	a (use prohibited)	_	_	_	_	
$5000_{\rm H}$ to 5FFF <sub>H</sub> (20480 to 24575)	User free are	ea			0 <sub>H</sub>	R/W	×	Section 7.4.5	

# 4 MODBUS® STANDARD FUNCTIONS

This chapter explains the MODBUS® standard functions supported by the QJ71MT91.

#### 4.1 MODBUS® Standard Function Support List

## (1) MODBUS® standard function support list

The following table indicates a list of the MODBUS<sup>®</sup> standard functions supported by the QJ71MT91.

Function Code (Sub Code)	Function	Processing	Reference
01	Read coils	Reads the statuses (ON/OFF) of one or more coils.	Section 4.3.1
02	Read discrete inputs	Reads the statuses (ON/OFF) of one or more inputs.	Section 4.3.2
03	Read holding registers	Reads the values of one or more holding registers.	Section 4.3.3
04	Read input registers	Reads the values of one or more input registers.	Section 4.3.4
05	Write single coil	Writes a value (ON/OFF) to one coil.	Section 4.3.5
06	Write single register	Writes a value to one holding register.	Section 4.3.6
07 *1 *2	Read exception status	Reads error statuses indicated by eight coils.	_
08 *1 *2	Diagnostics	Executes various diagnostics. The diagnostics results are returned to the master.	_
11 *1 *2	Get communications event counter	Gets the communication event counter.	_
12 *1 *2	Get communications event log	Gets the communication event log.	_
15	Write multiple coils	Writes values (ON/OFF) to multiple coils.	Section 4.3.7
16	Write multiple registers	Writes values to multiple holding registers.	Section 4.3.8
17 *1 *2	Report slave I.D	Reads the type, status, etc. of the slave device to the master.	_
20(6)	Read file record	Reads the values of one or more extended file registers.	Section 4.3.9
21(6)	Write file record	Writes values to one or more extended file registers.	Section 4.3.10
22	Mask write register	Masks the value stored in one holding register with AND or OR, and writes a value.	Section 4.3.11
23	Read/write multiple registers	Reads and writes values from and to multiple holding registers.	Section 4.3.12
24 *1	Read FIFO queue	Reads values from the holding registers in FIFO queue structure.	_
43 * 1	Read device identification	Reads the module identification information of the slave.	_

\*1: The QJ71MT91 slave function does not support this function.

However, it can be issued from the master (QJ71MT91) by use of the MBREQ instruction.

\*2: The function codes 07, 08, 11, 12 and 17 are the functions dedicated to the MODBUS<sup>®</sup> serial protocol.

			Master Function *3		
Function Code (Sub Code)	Function	Automatic communication function	MBRW instruction *4	MBREQ instruction *4	Slave Function
01	Read coils	0	0	0	○*5
02	Read discrete inputs	0	0	0	○*5
03	Read holding registers	0	0	0	○*5
04	Read input registers	0	0	0	○*5
05	Write single coil	×	×	0	○*5
06	Write single register	×	×	0	○*5
07 *1 *2	Read exception status	×	×	0	×
08 *1 *2	Diagnostics	×	×	0	×
11 *1 *2	Get communications event counter	×	×	0	×
12 *1 *2	Get communications event log	×	×	0	×
15	Write multiple coils	0	0	0	○*5
16	Write multiple registers	0	0	0	○*5
17 *1 *2	Report slave I.D	×	×	0	×
20(6)	Read file record	×	0	0	○*6
21(6)	Write file record	×	0	0	○*6
22	Mask write register	×	×	0	○*5
23	Read/write multiple registers	0	0	0	○*5
24 *1	Read FIFO queue	×	×	0	×
43 *1	Read device identification	×	×	0	×

(2) Standard function support list by master and slave functions The following table indicates a standard function support list classified by the master and slave functions of the QJ71MT91.

 $\bigcirc$ : Supported  $\times$ :Not supported

- \* 1: The QJ71MT91 slave function does not support this function.
  - However, it can be issued from the master (QJ71MT91) by use of the MBREQ instruction.
- \*2: The function codes 07, 08, 11, 12 and 17 are the functions dedicated to the MODBUS<sup>®</sup> serial protocol.
- \*3: For details of the function codes for the master function, refer to the explanation of the corresponding function.
- \*4: The dedicated instructions are unavailable for the QJ71MT91 mounted on a MELSECNET/H remote I/O station.
- \*5: This function has a limit in the slave function when the QJ71MT91 is mounted on a MELSECNET/H remote I/O station.

An exception response will result if a device unsupported by the MELSECNET/H remote I/O station is assigned as a MODBUS<sup>®</sup> device and an access request is made from the master station.

In this case, an error code will be stored into the error log of the QJ71MT91, and an exception code will be returned to the master.

\*6: This function is not supported when the QJ71MT91 is mounted on a MELSECNET/H remote I/O station.

# 4.2 Frame Specifications

The frame specifications of MODBUS  $^{\ensuremath{\tiny \mathbb{R}}}$  /TCP are indicated below.

Ethernet frame	Ethernet header	IP header	TCP header		Application da	ita	FCS (Error check)
				MODBU	/IODBUS <sup>®</sup> /TCP / IS <sup>®</sup> /TCP applicati	ADU on data unit)	
			*****				
	(M		header plication hea	der)		PDU (Protocol data u	unit)
	Transaction ID	Protocol ID	Message length	Module ID	Function code	C	Data
			$\underbrace{}$	4	(N	lessage length)	
							-1

Area Na	ime	Area Size	Description
	Transaction ID	2 bytes	Used by the master for matching of the response message from the slave.
MBAP header	Protocol ID	2 bytes	Indicates the protocol of the PDU (protocol data unit). Stores 0 in the case of MODBUS <sup>®</sup> /TCP.
(MODBUS <sup>®</sup> application header)	Message length	2 bytes	Stores the message size in byte unit. The message length after this field is stored. (See the above figure.)
	Module ID	1 byte	Used to specify the slave connected to the other line, e.g. MODBUS <sup>®</sup> serial protocol.
	Function code	1 byte	The master specifies the processing to be performed for the slave.
PDU (Protocol data unit)	Data	1 to 252 bytes	[When master sends request message to slave] Stores the requested processing. [When slave sends response message to master] Stores the result of processing execution.

#### 4.3 PDU Formats by Functions

This section explains the PDU (protocol data unit) formats of the MODBUS<sup>®</sup> standard functions.

 Precautions for specifying device number in message When specifying a device number in a message, specify "(device number) - 1". However, it does not apply to the file number and device number specified for Read/Write file record.

(Example) When the status of input 32 (100032) is read with Read discrete inputs (FC: 02)



The device number stored in the response message is "(actually read/written device number) - 1".

(2) Overview of request/response message format given in this section(a) Request/response message format diagram

The following indicates the overview of the request/response message format diagram given in Section 4.3.1 to 4.3.12.



(b) Response message format

The format of a response message issued by the slave to the master differs depending on whether the processing in the slave has been completed normally or not.

In Section 4.3.1 to 4.3.12, the formats for normal completion and error completion are provided.

(3) Storage location of exception code and error code

On error completion of processing in the slave (QJ71MT91), an exception code is sent to the master. (Refer to the "Response message format (when completed with an error)" given in Section 4.3.1 to 4.3.12.)

The exception code is also stored into the QJ71MT91 buffer memory. Further, to allow the cause to be indentified in more detail, the error code is stored into the QJ71MT91 buffer memory.

The exception code and error code can be confirmed in the error log area (address: CFE $_{\rm H}$  to DFF  $_{\rm H}$ ) of the buffer memory.

# REMARK

- (1) Refer to Section 11.3 for the confirmation method and details of the exception code and error code.
- (2) Refer to Section 4.2 for details of the PDU (protocol data unit).

## 4.3.1 Read coils (FC: 01)

Reads the statuses (ON/OFF) of one or more coils.

Number of accessible devices with one message 1 to 2000 points

(1) Request message format (Master  $\rightarrow$  Slave)

Function code	Data			
Function code (01 <sub>H</sub> )		Head coil number (0000н to FFFFн)		points o 07D0⊦)
	(H)	(L)	(H)	(L)

 (2) Response message format (Slave → Master) (When completed normally)



(When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

#### 4.3.2 Read discrete inputs (FC: 02)

Reads the statuses (ON/OFF) of one or more inputs.

Number of accessible devices with one message 1 to 2000 points

(1) Request message format (Master  $\rightarrow$  Slave)

Function code	Data			
Function code (02 <sub>H</sub> )	Head inpu (0000⊬ to		Read (0001⊬ te	points o 07D0н)
	(H)	(L)	(H)	(L)

 (2) Response message format (Slave → Master) (When completed normally)



(When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

## 4.3.3 Read holding registers (FC: 03)

Reads the values of one or more holding registers.

Number of accessible devices with one message 1 to 125 points

#### (1) Request message format (Master $\rightarrow$ Slave)

Function code	Data			
Function code (03 <sub>H</sub> )	Head holding r (0000⊦ to	egister number o FFFF⊬)		points o 007D⊦)
	(H)	(L)	(H)	(L)

#### (2) Response message format (Slave → Master) (When completed normally)



\*1: For example, when n = 4, the number of read bytes is 4 × 2 = 8 bytes.

#### (When completed with an error)



\*2: When completed with an error, the exception code and error code are stored into the buffer memory.

## 4.3.4 Read input registers (FC: 04)

Reads the values of one or more input registers.

Number of accessible devices with one message 1 to 125 points

(1) Request message format (Master  $\rightarrow$  Slave)

Function code		Da	ata	
Function code (04 <sub>H</sub> )	Head input rea (0000 <sub>H</sub> to	-		points o 007Dн)
	(H)	(L)	(H)	(L)

# (2) Response message format (Slave $\rightarrow$ Master) (When completed normally)



\*1: For example, when n = 4, the number of read bytes is 4 × 2 = 8 bytes.

(When completed with an error)

Function code	Data
Function code	Exception
(84н)	code*

\*2: When completed with an error, the exception code and error code are stored into the buffer memory.

## 4.3.5 Write single coil (FC: 05)

Writes a value (ON/OFF) to one coil.

Number of accessible devices with one message 1 point

(1) Request message format (Master  $\rightarrow$  Slave)

Function code	Data			
Function code (05 <sub>H</sub> )		Coil number (0000н to FFFFн)		pecification : OFF : ON
	(H)	(L)	(H)	(L)

(2) Response message format (Slave → Master)
 (When completed normally)

The slave returns the request message received from the master as it is.

(When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

## 4.3.6 Write single register (FC: 06)

Writes a value to one holding register.

Number of accessible devices with one message 1 point

(1) Request message format (Master  $\rightarrow$  Slave)

Function code	Data			
Function code (06н)	Holding regi (0000⊦ to	ster number o FFFF <sub>H</sub> )		e data o FFFF⊬)
	(H)	(L)	(H)	(L)

# (2) Response message format (Slave → Master) (When completed normally)

The slave returns the request message received from the master as it is.

(When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

#### 4.3.7 Write multiple coils (FC: 15)

Writes values (ON/OFF) to multiple coils.

Number of accessible devices with one message 1 to 1968 points



#### (1) Request message format (Master $\rightarrow$ Slave)

\*: The number of points specified as the write points must be matched with the number of bits specified as the number of bytes.

For example, when the write points are 16, set the number of bytes to 2 bytes (= 16 bits).

#### (2) Response message format (Slave → Master) (When completed normally)

Function code	Data			
Function code (0F <sub>H</sub> )	coil number i	l number e as in the head n the request is stored.)	Write (The value sa write points in message is	the request
	(H)	<b>J</b>		(L)

MELSEC-Q

#### (When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

Writes values to multiple holding registers.

Number of accessible devices with one message 1 to 123 points



\*1: The number of points specified as the write points must be matched with the number of bytes.

# (2) Response message format (Slave $\rightarrow$ Master)

#### (When completed normally)

Function code	Data				
Function code (10 <sub>H</sub> )	· ·	egister number ame as in the age is stored.)	Write points (The value same as in the request message is stored.)		
	(H)	(L)	(H)	(L)	

#### (When completed with an error)

Function code	Data
Function code	Exception
(90н)	code*2

- \*2: When completed with an error, the exception code and error code are stored into the buffer memory.
  - Refer to Section 11.3 for the storage location, confirmation method and more details.

Reads the values of one or more extended file registers.

Number of accessible devices with one message 1 to 124 points



#### (1) Request message format (Master $\rightarrow$ Slave)



- \*: The upper limit of the file number available for the QJ71MT91 slave function is equal to the file register size of the mounted programmable controller CPU. (Refer to Section 7.4.4.)
- (a) Specify the number of sub-requests "m" so that the PDU (protocol data unit) size in the request message does not exceed 253 bytes.

 $2 + m \times 7 \le 253$ 

If the above condition is not satisfied, the request message is discarded.

(b) Specify the total read points of all the sub-requests, "N (n1 + • • • + nm)" so that the PDU (protocol data unit) size in the request message does not exceed 253 bytes.

2 + m  $\times$  2 + N  $\times$  2  $\leq$  253

If the above condition is not satisfied, the slave returns an exception response.

4 - 15



## (2) Response message format (Slave $\rightarrow$ Master)

(When completed normally)

"N" in the above diagram represents the total  $(n1 + \cdots + nm)$  of the device data.

(When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

Writes values to one or more extended file registers.

Number of accessible devices with one message 1 to 122 points



#### (1) Request message format (Master $\rightarrow$ Slave)

- \*: The upper limit of the file number available for the QJ71MT91 slave function is equal to the file register size of the mounted programmable controller CPU. (Refer to Section 7.4.4.)
- (a) Specify the total write points of all the sub-requests, N (n1 + • + nm) so that the size of the PDU (protocol data unit) in the request message does not exceed 253 bytes.

 $2 + m \times 7 + N \times 2 \le 253$ 

If the above condition is not satisfied, the request message is discarded.

## (2) Response message format (Slave $\rightarrow$ Master)

(When completed normally)

The slave returns the request message received from the master as it is.

#### (When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

Refer to Section 11.3 for the storage location, confirmation method and more details.

#### POINT

Even if the slave (QJ71MT91) receives this function with the programmable controller CPU file register (ZR) set as read only (for example, the storage location of the file register [ZR] is a Flash card), the slave responds normally. In this case, however, the Write file record is not performed. When performing the Write file record, previously confirm whether the programmable controller CPU file register (ZR) is writable.

#### 4.3.11 Mask write register (FC: 22)

Masks the value stored in one holding register with AND or OR, and writes the masked value.

Number of accessible devices with one message 1 point

The masked value is written to the holding register as described below. (Target register's current value ∩ AND mask value)∪(OR mask value ∩ AND mask value) = write value

When the OR mask value is 0000H, only the AND processing of the AND mask value is performed.

When the AND mask value is 0000H, the OR mask value becomes the write value.

#### (1) Request message format (Master $\rightarrow$ Slave)

	Function code	Data					
1	Function code (16н)	Target holding register number (0000н to FFFFн)		AND mas (0000н to		OR mask value (0000н to FFFFн)	
		(H)	(L)	(H)	(L)	(H)	(L)

#### (2) Response message format (Slave $\rightarrow$ Master)

(When completed normally)

The slave returns the request message received from the master as it is.

#### (When completed with an error)



\*: When completed with an error, the exception code and error code are stored into the buffer memory.

Refer to Section 11.3 for the storage location, confirmation method and more details.

#### POINT

This function code reads the value stored in the holding register from the slave, and after AND/OR processing in the master, writes the masked value to the holding register of the slave.

Therefore, when the holding register value is changed during AND/OR processing, the new value is overwritten.

## 4.3.12 Read/Write multiple registers (FC:23)

Reads and writes data from and to multiple holding registers. Write is executed first and read is then executed.

Number of accessible devices with one message				
Read: 1 to 125 points				
Write: 1 to 121 points				

Function code		Data												
Function code (17H)	register	ad holding number p FFFFн)	Read r (0001н to		register	id holding number p FFFFн)	Write m' (0001н to	<b>'1</b>	Number of bytes m × 2*1 (0000н	Write de	vice data 1		Write dev m	
	(H)	(L)	(H)	(L)	(H)	(L)	(H)	(L)	to 00F2H)	(H)	(L)		(H)	(L)
										•	(Numbe	er of byte	s m × 2)	

## (1) Request message format (Master $\rightarrow$ Slave)

\*1: The number of points specified as the write points must be matched with the number of bytes.

#### (2) Response message format (Slave → Master) (When completed normally)



#### (When completed with an error)

Function code	Data
Function code (97н)	Exception code *2

\*2: When completed with an error, the exception code and error code are stored into the buffer memory.

# **5 FUNCTIONS**

This chapter explains the functions of the QJ71MT91.

#### 5.1 Function List

	Function	Description	Reference
Automatic communication		Automatically issues device read/write request matic communication messages from the master (QJ71MT91) to the MODBUS <sup>®</sup> /TCP-compatible slave device.	
	Dedicated instruction (*1)	Allows reading/writing of the MODBUS <sup>®</sup> device at any timing with a sequence program.	Chapter 10
	Automatic response function(*2)	Automatically performs the processing corresponding to the function code in the request message received from the master, and automatically sends a response message.	Section 5.3.1
Slave function MODBUS device assignment function(*3)		Automatically converts access from the slave (QJ71MT91) to the MODBUS <sup>®</sup> device into access to the programmable controller CPU device. Users can assign it as desired. This enables direct access from the MODBUS <sup>®</sup> /TCP- compatible master device to the programmable controller CPU device memory.	Section 5.3.2
	KeepAlive function	Confirms the status of communication with the target device where a TCP connection has been established. When communication is not made for a given period of time between the QJ71MT91 and the open target device, the QJ71MT91 checks the target device for existence and cuts off unnecessary TCP connections.	Section 5.4
Ethernet function	Router relay function	Exchanges data with the device connected to other Ethernet via router(s) and/or gateway(s). (This is not a function with which the QJ71MT91 operates as a router.)	Section 5.5
	IEEE802.3 frame	Allows connection with the device that uses the IEEE802.3 frame.	Section 6.6

The function list of the QJ71MT91 is indicated below.

\*1: Dedicated instructions are not available when the QJ71MT91 is installed to a MELSECNET/H remote I/O station or a redundant system.

\*2: When the QJ71MT91 is mounted on a MELSECNET/H remote I/O station, there is a restriction on the function code supported by the automatic response function.

Refer to Section 4.1 for details.

\*3: When the QJ71MT91 is mounted on a MELSECNET/H remote I/O station, there is a restriction on the assignment range of the MODBUS<sup>®</sup> device assignment function.

Refer to Section 7.4.2 for details.

	Function	Description	Reference
GX Developer connection function		Allows connection of up to eight GX Developers via the QJ71MT91.	Section 5.6
QJ71MT91 status check function		Checks the operations of the QJ71MT91 and send/receive functions.	_
Hardware test		Tests the RAM and ROM of the QJ71MT91.	Section 6.5.1
Self-loopback test		Tests the send/receive functions and hardware of the QJ71MT91.	Section 6.5.2
Various settings using utility package		Use of the utility package (GX Configurator-MB) allows easy parameter settings (the basic parameters and automatic communication parameters) and status monitoring.	Chapter 8

#### 5.2 Master Function

This section explains the functions of the QJ71MT91 as a master of MODBUS® /TCP.

#### 5.2.1 Automatic communication function

The automatic communication function allows device read/write request messages to be automatically issued from the QJ71MT91 to the MODBUS<sup>®</sup> /TCP-compatible slave devices.



#### To use automatic communication function Set the automatic communication parameters to use this function. Refer to Section 7.3 for details of the automatic communication parameters.

#### (2) Start and stop of automatic communication function

(a) When the automatic communication parameters are set from the utility package (GX Configurator-MB), the automatic communication function is activated by powering ON the programmable controller from OFF or by resetting the programmable controller CPU (with the programmable controller CPU's RUN/STOP switch set to RUN).

The automatic communication will not start if the programmable controller is powered ON from OFF or if the programmable controller CPU is reset (with the programmable controller CPU's RUN/STOP switch set to STOP).

If the QJ71MT91 is mounted on a MELSECNET/H remote I/O station, the automatic communication function is activated when the remote I/O station receives the information notifying the status change (from STOP to RUN) of the remote master station's programmable controller CPU. Setting the automatic communication parameters from GX Configurator-MB eliminates the need of a sequence program for start.

- (b) When the QJ71MT91 starts communication with the slave device with the automatic communication function, the SD and RD LEDs turn ON. (Only when communicating)
- (c) On the "Automatic communication status" screen of GX Configurator-MB, the start/stop test of the automatic communication function can be performed. (Refer to Section 8.6.3.)
- (d) To start or stop the automatic communication function from a sequence program, turn on/off Automatic communication parameter setting request/Automatic communication start request (Y4) and Automatic communication stop request (Y6).



(e) Automatic communication start/stop timing chart

- (f) Precautions for starting/stopping the automatic communication function
  - Be sure to turn on Automatic communication parameter setting request/Automatic communication start request (Y4) after Module READY (X0) and Basic parameter setting existence (X3) have turned on.
  - 2) When using Automatic communication stop request (Y6) to stop the automatic communication function, satisfy all of the following conditions.
    - Condition 1: Module READY (X0) is on.
    - Condition 2: Basic parameter setting existence (X3) is on.
    - Condition 3: Automatic communication operation status (X6) is on.
  - An error will occur if Automatic communication stop request (Y6) is executed when the automatic communication function has stopped (Automatic communication operation status (X6) is off).

- 4) Even if no response is sent from the communication target slave, the automatic communication function does not stop until Automatic communication stop request (Y6) turns on.
- 5) When the automatic communication function stops, the TCP connections used by the automatic communication function are all disconnected.
- 6) When the automatic communication parameters are set on GX Configurator-MB

When the automatic communication parameters are set on GX Configurator-MB, the automatic communication function will be automatically started at the timing shown in (2) (a) of this section. When the automatic communication function is active, and when the target slave device is not in normal condition (disconnected, down, not ready for communication, etc.), perform either of the following:

- After the target slave device is recovered, set automatic communication parameters on the sequence program and start the automatic communication function.
- Ignore the error (Exception message reception (error code: 7360н) or Response monitoring timer time-out error (error code: 7378н), etc.)

#### (3) Automatic communication operation status

- (a) Confirming automatic communication operation status
   Use Automatic communication operation status (X6) to confirm the automatic communication operation status.
- (b) When an error occurs in the automatic communication, Automatic communication error status (X7) turns ON.

Also, any erroneous part of the parameters and error details can be identified by the following:

 Acquisition of automatic communication parameter number during error occurrence Acquisition of the automatic communication parameter number for the

Acquisition of the automatic communication parameter number for the error Check the operation status storage area (0C20H to 0C23H) in the buffer memory to identify the error. (Refer to Section 11.3.1)

2) Error code confirmation
 In the automatic communication error code storage area (0C28H to 0C67H) of the buffer memory, check the error code stored in the area corresponding to the automatic communication parameter number identified in the above 1). (Refer to Section 11.3.1 (7))
 Refer to Section 11.3.3 for the error code.

#### POINT

- (1) On the "Automatic communication status" screen of GX Configurator-MB, the operation status and error code for each automatic communication parameter can be confirmed. (Refer to Section 8.6.3)
- (2) The QJ71MT91 guarantees the data between the programmable controller devices and the network line in units of one word (16 bits).







# (4) Automatic communication function buffer areas

(a) Automatic communication function buffer areas

The automatic communication function uses the following buffer memory areas.

Name	Application	Buffer Memory Address
Automatic communication function	Stores data read from the	1000н to 1FFFн
buffer input area	slave	
Automatic communication function	Stores data to be written	3000н to 3FFFн
buffer output area	to the slave	

(b) Transfer direction of automatic communication function buffer input/output area

The following shows the transfer directions of data stored into the buffer memory by the automatic communication function.

1) Transfer direction in automatic communication function buffer input area

When receiving a response message from the slave, the QJ71MT91 writes data to the automatic communication function buffer input area in descending order of the addresses in 1 word (16 bits) unit.

2) Transfer direction in automatic communication function buffer output area

When sending a request message to the slave, the QJ71MT91 creates it by reading data from the automatic communication function buffer output area in descending order of the addresses in 1 word (16 bits) unit.



(c) Data transfer between automatic communication function buffer areas and programmable controller CPU device memory

Data can be transferred between the automatic communication buffer area and programmable controller CPU device memory by either of the following methods.

Transfer Method	Transfer by auto refresh setting	
Transfer by auto refresh	Make the auto refresh setting with GX Configurator-MB. (Refer	
setting	to Section 8.5.)	
Transfer using the	Specify the intelligent function module device $(Un\G^{\square})$ * in a	
sequence program	sequence program to make transfer.	

\*: For details of the intelligent function module device, refer to the QCPU User's Manual (Function Explanation, Program Fundamentals).

## 5.2.2 Dedicated instructions

Used in a sequence program to read/write the MODBUS<sup>®</sup> device data, etc. at any timing.



## Dedicated instruction list

The list of the dedicated instructions supported by the QJ71MT91 is indicated below.

Dedicated Instruction	Description	Reference
MBRW	Issues a MODBUS <sup>®</sup> device read/write request message to the slave.	Section 10.2
MBREQ	Communicates with the slave in the request message format of any PDU (protocol data unit).	Section 10.3

## 5.3 Slave Function

This section explains the functions of the QJ71MT91 as a slave of MODBUS<sup>®</sup> /TCP.

#### 5.3.1 Automatic response function

The automatic response function allows the QJ71MT91 (slave function) to automatically execute the processing requested by the function code of a request message from the master and return a response message to the master. The automatic response function uses the MODBUS<sup>®</sup> device assignment function. Refer to Section 5.3.2 for the MODBUS<sup>®</sup> device assignment function. Refer to Section 4.1 for the function codes supported by the slave function of the QJ71MT91.



## 5.3.2 MODBUS® device assignment function

- (1) MODBUS<sup>®</sup> device assignment function
  - (a) The MODBUS<sup>®</sup> device assignment function automatically converts access to a slave (QJ71MT91) MODBUS<sup>®</sup> device into access to a programmable controller CPU device.
  - (b) Using MODBUS<sup>®</sup> device assignment parameters, the MODBUS<sup>®</sup> devices are correlated with the programmable controller CPU device memory. This allows direct access from the MODBUS<sup>®</sup> /TCP-compatible master device to the programmable controller CPU device memory.
  - (c) Since the QJ71MT91 supports large capacities of MODBUS<sup>®</sup> devices, all the device memories of the programmable controller CPU can be assigned. Refer to Section 7.4.1 for the MODBUS<sup>®</sup> device sizes.
- (2) MODBUS® device assignment parameter setting
  - (a) Set the MODBUS<sup>®</sup> device assignment parameters from the utility package (GX Configurator-MB).
     (Setting from a sequence program is also available. (Refer to Section

9.1.3.))

Refer to Section 7.4 for details of the MODBUS<sup>®</sup> device assignment parameters.

(b) As the MODBUS<sup>®</sup> device assignment parameters, the default assignment parameters are available.

Refer to Section 7.4.3 for the default assignment parameters.



#### 5.4 KeepAlive Function

#### (1) KeepAlive function

When communication with the target device whose TCP connection is open is not made for a predetermined period of time, a KeepAlive ACK message is sent from the QJ71MT91 to the target device. The alive status of the target device can be checked by whether a response message is returned or not to that ACK message. (\*1)

\*1: The connection may be disconnected if the target device does not support the TCP KeepAlive function (unable to respond to the KeepAlive ACK message).

#### (2) To use KeepAlive function

To use the KeepAlive function, set the KeepAlive of the basic parameter to "Used". (Default: Used)

The following basic parameters are available for the KeepAlive function.

- KeepAlive start timer value
- KeepAlive interval timer value
- KeepAlive resend count

Change the default values set to the basic parameters as necessary. Refer to Section 7.2 for details of the basic parameters.

#### (3) Operation of KeepAlive function

- (a) The QJ71MT91 starts the KeepAlive start timer when it receives the last message from the target device whose TCP connection is open.
- (b) The QJ71MT91 sends the KeepAlive message for alive check to the target device and starts the KeepAlive interval timer when the KeepAlive start timer expires.
- (c) The QJ71MT91 resends the KeepAlive message for alive check to the target device when ACK is not returned from the target device and the KeepAlive interval timer expires. The QJ71MT91 sends the KeepAlive message for alive check by the

number of times set as the KeepAlive resend count until it receives ACK from the target device.

(d) An alive check error occurs if the QJ71MT91 cannot receive ACK from the target device after it has sent the KeepAlive message for alive check by the number of times set as the KeepAlive resend count. At that time, the QJ71MT91 forcibly closes the TCP connection and issues an error code.

#### <Operation of KeepAlive function>


## 5.5 Router Relay Function

(1) Router relay function

The router relay function enables data communications with slave devices connected to other Ethernets via routers and gateways.

(2) To use router relay function

To use the router relay function, set the router relay function of the basic parameter to "Used". (Default: Not used)

The following basic parameters are available for the router relay function.

- Subnet mask pattern
- Default router IP address
- Number of routers set
- Router information

Change the default values set to the basic parameters as necessary. Refer to Section 7.2 for details of the routing information.



- POINT
- (1) When the slave function of the QJ71MT91 is used to communicate with the master device on another Ethernet, communication can be made without use of the router relay function.

(2) A system using a Proxy router need not use the router relay function.

(3) The router relay function is not the function that operates the QJ71MT91 as a router.

5.6 GX Developer Connection Function

- (1) GX Developer connection function
  - (a) The GX Developer connection function allows connection to GX Developer via the QJ71MT91.
  - (b) The QJ71MT91 can connect a maximum of eight GX Developer.
  - (c) Refer to Section 7.2.3 for the GX Developer connection setting.

## (2) Accessible range

Refer to Section 2.3 for details of the accessible range.

(3) GX Developer connection setup Refer to Appendix 3 for the method of GX Developer connection setup.

GX Developer



QJ71MT91

# 6 PRE-OPERATIONAL PROCEDURES AND SETTING

This chapter explains the procedures and setting method for operating the QJ71MT91 in a system.

## POINT

- (1) For use of the QJ71MT91, read the safety precautions provided in the first pages of this manual.
- (2) The mounting and installation environment of the QJ71MT91 are the same as those of the programmable controller CPU.
   For details, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

#### 6.1 Handling Precautions

This section explains the precautions for handling the QJ71MT91.

- (1) Since the case of the QJ71MT91 is made of resin, do not drop or give it hard impact.
- (2) Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module. Failure to do so may cause a failure or malfunctions of the module.
- (3) Tighten the screws such as module fixing screws within the following ranges.

-	
Screw Location	Tightening Torque Range
Module fixing screw	0.36 to 0.48N • m
(normally not required) (M3 screw) *1	0.30 10 0.4811 - 111

\*1: The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

## 6.2 Pre-Operational Procedures and Setting

A rough procedure for operation is shown below.





\*1: If parameters are set at the GX Configurator-MB, power OFF and then ON or reset the programmable controller CPU with the CPU RUN/STOP switch set at RUN.

## IMPORTANT

- (1) When setting parameters, do not write any data to the "System area (use prohibited)" among the QJ71MT91 buffer memory addresses.
   Doing so may cause malfunction of the programmable controller system.
- (2) When making any parameter setting request, etc., do not output (turn ON) the
  - "Use prohibited" signal among the output signals. Doing so may cause malfunction of the programmable controller system.
- (3) When having replaced the QJ71MT91, reset the other device of communication target.

If the device holds the Ethernet address of the communication target, communication may not be continued since the Ethernet address is changed by the replacement of the QJ71MT91.

Similarly, after replacing the target device (personal computer, etc.), redo the QJ71MT91 basic parameter setting or restart the QJ71MT91.

### POINT

- (1) Use GX Developer to make I/O assignment and intelligent function module switch setting.
   Use GX Configurator-MB or sequence programs to set the basic parameters
  - (refer to Section 7.2), automatic communication parameters (refer to Section 7.3), etc. of the QJ71MT91.
- (2) To update the parameter settings added/changed on GX Developer, write the parameters to the programmable controller CPU, and then reset the programmable controller CPU.

## 6.3 Part Names

Г QJ71MT91 RUN INIT. OPEN SD ERR. COM.ERR. 100M RD 1)-10BASE-T/100BASE-TX Π 2)-QJ71MT91

This section indicates the names of the QJ71MT91 parts.

	Name	Description
1)	Indicator LEDs	Refer to the following section, (1) Indications of indicator LEDs.
		Connector for connection of the QJ71MT91 to 10BASE-
	10BASE/T/100BASE-TX	T/100BASE-TX.
2)	connector (RJ45) *1	(The QJ71MT91 detects whether 10BASE-T or 100BASE-TX is
		used according to the hub.)

\*1: The LED on the connector is not lit.



# (1) Indications of indicator LEDs \*1

QJ71MT91
RUN 🗖 🗖 ERR.
INIT. 🗖 🗖 COM.ERR.
OPEN 🗖 🗖 100M
SD 🗖 🗖 RD

LED Name	Indication	ON	OFF
RUN	Operation status	Normal	Error
INIT.	Initial processing status	Normal completion of basic parameter setting	Basic parameter setting in progress or nonexistent
OPEN	TCP connection open status	Presence of open TCP connection	Absence of open TCP connection
SD	Send status	Data send in progress	Data not yet sent
ERR.	Setting error status	Error	Normal setting
COM.ERR.	Communication error status	Communication error occurrence *2	Normal communication in progress
100M	Transmission speed	100Mbps	10Mbps or not connected
RD	Receive status	Data receive in progress	Data not yet received

\*1: For troubleshooting, refer to Section 11.1.

\*2: When the COM. ERR. LED has turned off, refer to Section 11.4.

## 6.4 Connection to Ethernet

This section explains how to connect the QJ71MT91 to the 100BASE-TX or 10BASE-T network.

(1) Connection precautions
 The following are the precautions for connection of the QJ71MT91.
 Handle the QJ71MT91 correctly, paying full attention to safety.

r	
	<ul> <li>Sufficient safety measures must be taken for 100BASE-TX or 10BASE-T installation work.</li> </ul>
	Consult a specialist when connecting cable terminals or installing trunk line cables, etc.
	<ul> <li>Use the connection cable, which complies with the corresponding standard given in Section 3.1.</li> </ul>
	<ul> <li>Do not install the control and communication cables together with the main circuit and power cables, etc.</li> </ul>
	Keep a distance of at least 100mm between them.
	Failure to do so can cause a malfunction due to noise.
	<ul> <li>The communication and power cables connected to the module must be placed in a duct or secured with clamps.</li> </ul>
	If the cables are not secured, inadvertent tripping can cause damage to the module or cables or a malfunction.
	<ul> <li>When disconnecting any of the communication and power cables connected to the module, do not pull it by holding the cable part.</li> </ul>
	Disconnect the cable by holding the connector connected to the module.
	Failure to do so can cause a malfunction or damage to the module or cable.

## (2) Connection to 10BASE-T/100BASE-TX

This section explains how to connect the QJ71MT91 to the 10BASE-T/100BASE-TX network.

A twisted pair cable connection diagram is shown below.



<Operation procedures>

(Step 1) Connect the twisted pair cable to the hub.

(Step 2) Connect the twisted pair cable to the QJ71MT91.

## POINT

- (1) The QJ71MT91 detects whether 10BASE-T or 100BASE-TX, and the full or half duplex communication mode is used according to the hub.
  - For connection with the hub that does not support the auto negotiation function, set the half duplex communication mode on the hub side.
- (2) Refer to Section 2.2 for the devices necessary for connection to 10BASE-T/100BASE-TX and a system configuration example.

## 6.5 Unit Tests

This section explains the unit tests conducted to check the send/receive functions and hardware of the QJ71MT91.

The unit tests can be run by changing the intelligent function module switch setting of the QJ71MT91 (Refer to Section 6.6).

## 6.5.1 Hardware test

The RAM and ROM of the QJ71MT91 are tested in the following steps. The test result can be checked with the LEDs on the front of the QJ71MT91.

Chan	Operation		L	ED Status	6
Step	Operation		[RUN]	[OPEN]	[ERR.]
1	STOP the programmable controller CPU.				
I	Disconnect the network cable from the QJ71	IMT91.		_	_
	In the intelligent function module switch setti	ng of GX			
2	Developer, set Switch 1 to 000DH to select the	ne hardware	—	_	—
	test mode. (Refer to Section 6.6.)				
3	Reset the programmable controller CPU. (To	est start)	$\bullet$	•	0
4	After 5 seconds, check the status of each	Normal		0	0
4	LED.	Error *		0	
	When the hardware test is completed, chang	ge the			
5	operation mode to "Online" or another mode	in the	—	_	—
	intelligent function module switch setting.				
6	Reset the programmable controller CPU.		_	_	_

<sup>•:</sup> ON O: OFF

\*: A possible cause of error is the RAM/ROM fault of the QJ71MT91.

When an error occurs, the error code is stored into the error log area (address:  $CFE_H$  to  $DFF_H$ ) of the buffer memory in the QJ71MT91.

Using GX Developer, confirm the error code and take corrective action. (Refer to Section 11.2 and 11.3.)

## POINT

When the hardware test results in an error, check the mounting status of the module and run the test again.

If the error occurs again, its possible cause is the hardware fault of the QJ71MT91. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

## 6.5.2 Self-loopback test

This section explains the self-loopback test conducted to check the QJ71MT91 hardware including the send/receive circuits.

The procedure for the self-loopback test is shown below.

This test is run for about 5 seconds.

The test result can be checked with the LEDs on the front of the QJ71MT91.

Stop	Operation		I	ED Statu	IS
Step				[OPEN]	[ERR.]
4	STOP the programmable controller CPU.				
I	Disconnect the network cable from the QJ7	1MT91.	_	—	_
	In the intelligent function module switch sett				
2	Developer, set Switch 1 to 000E⊢ to select t	he self-	_	—	_
	loopback test mode. (Refer to Section 6.6.)				
3	Reset the programmable controller CPU. (T	est start)			0
	After 5 seconds, check the status of each	Normal		0	0
4	LED.	Error *		0	•
	When the self-loopback test is completed, c	hange the			
5	operation mode to "Online" or another mode	e in the	_	—	_
	intelligent function module switch setting.				
6	Reset the programmable controller CPU.			_	_
				•: ON	O: OFF

\*: A possible cause of error is the hardware fault of the QJ71MT91.

When an error occurs, the error code is stored into the error log area (address:  $CFE_H$  to  $CFF_H$ ) of the buffer memory in the QJ71MT91.

Using GX Developer, confirm the error code and take corrective action. (Refer to Section 11.2 and 11.3.)

## POINT

When the self-loopback test results in an error, run the test again. If the error occurs again, its possible cause is the hardware fault of the QJ71MT91. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.

## 6.6 Intelligent Function Module Switch Setting

[Setting purpose]

Set the operation mode, communication condition and IP address.

[Starting procedure for intelligent function module switch setting screen]

- 1. Start GX Developer.
- 2. Double-click "Parameter" in the project window of GX Developer, and double-click "PLC parameter".
- Click the <<I/O assignment>> tab and click the [Switch setting] button.
   The "Switch seting for I/O and intelligent function module" screen is displayed.

Sw	Switch setting for I/O and intelligent function module								×	
					Input	format	HEX.	•		
									_	
	Slot	Туре	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	٠	
0	PLC	PLC								
1	0(*-0)	Intelli.	QJ71MT91	0000	0000	COA8	0001			
2	1(*-1)									

[Operation pro	cedurej
	$\overline{\mathbf{X}}$
Device Program Boot file SFC 1/0 assignment	

Operation precedurel

/0	Assign	ment(") lot		_	Model nam		Points	_	StartXY +	1				
0	PLC	IOK .	Type PLC	Ŧ	Model han	18	Points	Ŧ	Start/1 -	Switch set	8000 I			
1	0[*-0]	1	Intelli.		QJ71MT91		32points	Ŧ	0000	ESWICH SE				
2	1(*-1)			-				*		Detailed se	tting			
3	2["-2]			•				*			_			
4	3(×-3)			•				•						
5	4(*-4)			•				•						
6 7				• •				* *						
L		this se			it necessary as the of cause an error I		oes it autor	iatica	ily.	- Base mode				
h	fain	Base	model name	P	ower model name	Exten	sion cable	S	lots T	<ul> <li>Auto</li> <li>○ Detail</li> </ul>				
	Base1			+				+	÷	, Derai				
	Base2			t				+	+					
	Base3								*	8 Slot Defa	ik 🛛			
	Base4								-	12 Slot Defa	uel			
	Base5			+				+	-	12 0101 0 010				
	Base6 Base7			+				+						
	using r	s snou nultiple	ld be set as : CPU.	sam	e whenIm	iport Mul	iple CPU F	'aram	eter F	Read PLC da	a			
	using r	s snou nultiple	CPU.		e whenIm √Y assignmenth			_	eter f	Read PLC da	aEnd	Cancel		
	using r	nultiple	CPU.	ge>		Aultiple C	PU setting	8	Default			Cancel	]	
ito	ch se	ttin	CPU. Acknowled g for I/O	ge>	h	ilutiple (	PU setting	°   no d	Default	Check	End	•		
to	ch se Sla	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5 •	
t o	slic Slic Slic Slic Slic Slic Slic	ttin	CPU. Acknowled g for I/O	ge>	√ assignment ) nd intelliger	ilutiple (	PU setting	°   no d	Default   ule Inpul	Check	End	•	5	
t o	Sla Sla PLC (*-0) (*-1)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5	
t o	slic Slic Slic Slic Slic Slic Slic	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5	
to	Sla Sla PLC (*-0) (*-1)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5	
to	using n ch se Sla PLC (*.0) (*.0) (*.1) 2(*.2)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5	
F () 1 2 3 2	Using n Ch se Sla PLC (*-0) (*-1) 2(*-2) 3(*-3)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		
to	Using n Ch se PLC 0(*0) 1(*1) 2(*2) 3(*3) 4(*4) 5(*5)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		
	Using n Ch se Sla Ch se Sla Sla Sla Sla Sla Sla Sla Sla Sla Sla	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		
	using n Ch se Sla PLC D(*-0) (*-1) 1(*-1) 2(*-2) 3(*-3) 4(*-4) 5(*-5) 5(*-6) 7(*-7)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		
ito F 0 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	using n Ch se Sla PLC 0(*-0) 1(*-1) 1(*-1) 1(*-2) 3(*-3) 1(*-5) 5(*-5) 5(*-6) 7(*-7) 3(*-8)	ttin	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5	
ito F 2 3 2 2 2 2 3 3 2 2 3 3 2 2 3 3 2 2 3 3 2 2 3 3 3 2 2 3 3 3 2 3	Using n Ch se Slo DLC D(*-0) [(*-1) [(*-1) [(*-2) 3(*-3) 3(*-3) 3(*-5) 3(*-6) 7(*-7) 3(*-8) 9(*-9)	sttin:	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•	5	
ito F 0 1 2 2 3 2 5 6 7 8 9 1	Using n Ch se Slo PLC 0(*-0) 1(*-1) 2(*-2) 3(*-3) 3(*-3) 5(*-6) 7(*-7) 3(*-8) 9(*-9) 0(*-10)	ot	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		
ita F 0 2 3 4 8 8 9 1 1	Using n Ch se Slot PLC D(*-0) [(*-1) [(*-1) [(*-1) [(*-5) [(*-5) [(*-7) [(*-7) [(*-7) [(*-7) [(*-9) [(*-9) [(*-10) [(*-10) [(*-11) [(*-11)] [(*-11)	etting	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		
to F 0 1 2 2 2 2 2 2 2 2 2 1 1 1 1 1	Using n Ch se Slo PLC 0(*-0) 1(*-1) 2(*-2) 3(*-3) 3(*-3) 5(*-6) 7(*-7) 3(*-8) 9(*-9) 0(*-10)	ot	CPU. Acknowled g for I/O Type PLC	ge>	¶ assignment    nd intelligen 	ilutiple (	PU setting	s   nod	Default   ule Inpul	Check	End	•		

End

Cancel

1. I/O assignment setting screen Set the following to the slot where the QJ71MT91 is mounted.

Туре	: Select "Intelli".
Model name	: Enter the model name of the
	module.
Points	: Select 32 points.
Start-XY	: Enter the head I/O number of the
	QJ71MT91.
Detailed setting	: Specify the control CPU of the
	QJ71MT91 in a multiple CPU
	system.

2. Intelligent function module switch setting screen Click the [Switch setting] button on the I/O assignment setting screen to display the screen shown on the left.

Referring to (1) to (3) in this section, make switch setting.

Entering the values in hexadecimal makes the setting easy. Change the input format into HEX before entering the values.

3. After setting, write the data to the programmable controller, and power the programmable controller OFF, then ON or reset the programmable controller CPU.

Q parameter setting

[Intelligent function	module swite	ch setting items]
Lincolligon ranotion		

Switch No.	Description	Initial Value	Reference
Switch 1	Operation mode setting	0000н	(1) in this section
Switch 2	Communication condition setting	0000н	(2) in this section
Switch 3	IP address setting (high order)	С001н	(3) in this
Switch 4	IP address setting (low order)	00FEн	section
Switch 5	No setting (blank)	_	—

## POINT

(1) The settings made with the intelligent function module switches become effective after power is switched OFF, then ON or the programmable controller CPU is reset.

Setting change during operation is also not available.

(2) When the intelligent function module switch setting has not been made, the initial values of each switch are used for operation.

# REMARK

For the operation method of GX Developer, refer to the GX Developer Operating Manual.

#### (1) Operation mode setting (Switch 1)

Set the operation mode of the QJ71MT91, such as the online or offline mode.

Set value *	Item	Description
0000н	Online	Normal operation mode. Communicates with the target device.
0001H	Offline	Disconnects the local station from the network. In the offline mode, parameter setting cannot be executed. Communication with the other station is not available, either.
000Dн	Hardware test	Tests the RAM and ROM of the QJ71MT91. (Refer to Section 6.5.1)
000Eн	Self-loopback test	Checks the hardware including the send/receive circuits of the QJ71MT91. (Refer to Section 6.5.2.)

\*: A switch 1 error (error code: 7301<sub>H</sub>) will occur if the set value is other than the value indicated in the table.

If the switch error has occurred, correct the switch setting and then switch the power OFF and ON or reset the programmable controller CPU.

## (2) Communication condition setting (Switch 2) Specify the starting methods, the send frame, and the online change enable/disable setting.

<Switch 2>



\*1 : The information in this area is ignored.

However, if the setting in this area is other than 0, a switch 2 error (error code: 7302<sub>H</sub>) occurs. If the switch error has occurred, correct the switch setting and then switch the power OFF then ON or reset the programmable controller CPU.

\*2 When setting parameters by GX Configurator-MB, set 1 to both b0 and b1.

#### (a) Basic parameter starting method (Bit 0)

Set the basic parameters for the time when the power is turned ON from OFF.

[When corresponding bit is OFF]

The QJ71MT91 starts up with its default basic parameters, and starts communication.

[When corresponding bit is ON]

The QJ71MT91 starts up with the basic parameters set using a sequence program or GX Configurator-MB, and starts communication.

However, the user-set basic parameters are not registered to the QJ71MT91 until the following operation is performed.

- When a sequence program was used to set the basic parameters Turn ON "Basic parameter setting request (Y1)".
- When GX Configurator-MB was used to set the basic parameters After the intelligent function module parameters have been written to the programmable controller CPU, the initial setting is updated when the programmable controller is powered ON from OFF or the programmable controller CPU is reset (with the programmable controller CPU's RUN/STOP switch set to RUN).

## POINT

- (1) Make this setting ON when a sequence program or GX Configurator-MB is used to set the basic parameters.
- (2) If no basic parameters have been set with this setting ON, the master function, slave function and GX Developer connection function do not operate. Refer to Section 6.6.1 for details of the communication starting conditions of this switch setting and each function.

(b) MODBUS<sup>®</sup> device assignment parameter starting method (Bit 1) Set the MODBUS<sup>®</sup> device assignment parameters for the time when the power is turned OFF and then ON.

[When corresponding bit is OFF]

The QJ71MT91 starts up with its default MODBUS  $^{\ensuremath{\scriptscriptstyle \odot}}$  device assignment parameters.

[When corresponding bit is ON]

The QJ71MT91 starts up with the MODBUS<sup>®</sup> device assignment parameters set using a sequence program or GX Configurator-MB. However, the user-set MODBUS<sup>®</sup> device assignment parameters are not registered to the QJ71MT91 until the following operation is performed.

 When a sequence program was used to set the MODBUS<sup>®</sup> device assignment parameters

Turn ON "MODBUS<sup>®</sup> device assignment parameter setting request (Y8)".

 When GX Configurator-MB was used to set the MODBUS<sup>®</sup> device assignment parameters

After the intelligent function module parameters have been written to the programmable controller CPU, the initial setting is updated when the programmable controller is powered ON from OFF or the programmable controller CPU is reset (with the programmable controller CPU's RUN/STOP switch set to RUN).

## POINT

- (1) Make this setting ON when a sequence program or GX Configurator-MB is used to set the MODBUS<sup>®</sup> device assignment parameters.
- (2) If no MODBUS<sup>®</sup> device assignment parameters have been set with this setting ON, the slave function does not operate.

Refer to Section 6.6.1 for details of the communication starting conditions of this switch setting and each function.

### (c) Online change enable/disable setting (Bit 2)

Set whether to enable or disable the slave (QJ71MT91) to write data to the programmable controller CPU while the programmable controller CPU is in RUN status.

[When corresponding bit is OFF]

Data write is disabled while the programmable controller CPU is in RUN status.

When the slave (QJ71MT91) receives a write request message from the master in this setting, the slave (QJ71MT91) issues the exception code (04H).

[When corresponding bit is ON]

Data write is enabled while the programmable controller CPU is in RUN status.

- (d) Send frame specification (Bit 3) Specify the frame format in which the QJ71MT91 will send data to the target device.
  [When corresponding bit is OFF] Data are sent in the Ethernet (V2.0)-compliant frame.
  [When corresponding bit is ON] Data are sent in the IEEE802.3-compliant frame.
- (3) IP address setting (Switch 3, Switch 4) Set the IP address of the QJ71MT91 on the local station.



\*: Set the value that satisfies the following conditions.

- Condition 1: The IP address class is any of A, B and C.
- Condition 2: All the host address bits are not "0" or "1".

If the conditions are not satisfied, a switch 3, 4 error (7303<sub>H</sub>) will occur.

In such a case, correct the switch setting and then switch the power OFF then ON or reset the programmable controller CPU.

# 6.6.1 Communication starting conditions depending on basic parameter/MODBUS® device assignment parameter starting method setting

The communication starting conditions change depending on the combination of the basic parameter and MODBUS<sup>®</sup> device assignment parameter starting methods in Switch 2 of the intelligent function module switch setting.

(1) When GX Configurator-MB is used for parameter setting When GX Configurator-MB is used to make parameter setting, set the basic parameter and MODBUS<sup>®</sup> device assignment parameter starting methods to ON.

## [Intelligent function module switch setting]



	QJ71MT91 operation Module READY	X0 -	_	Default parameter setting not made Parameter setting processing by GX Configurator-MB	)
	Basic parameter setting request	Y1	_		
ы	Basic parameter setting, normally completed Basic parameter	X1	Power		
Parameter setting operation	MODBUS <sup>®</sup> device assignment parameter setting request	X3 - Y8 -	OFF, then ON/ Pro- gram- mable		
Paramete	MODBUS <sup>®</sup> device assignment parameter setting, normally completed MODBUS <sup>®</sup> device	X8 -	control- ler CPU reset		
	assignment parameter setting existence	XA			
bility	Automatic communicat function (Master function		-	Not startable	Startable
Function executability	Dedicated instruction (Master function)	-	-		Executable
ction e:	Slave function	-	-	Request message not acceptable	Request message acceptable
Func	GX Developer connect	ion –	-	GX Developer not connectable	GX Developer connectable

- (2) When sequence program is used for parameter setting
  - (a) When the basic parameter starting method is OFF (start with the default parameters) and the MODBUS<sup>®</sup> device assignment parameter starting method is OFF (start with the default parameters)

#### [Intelligent function module switch setting]



	QJ71MT91 operation	_	_	Default parameter setting •Basic parameters •MODBUS <sup>®</sup> device assignment parameters	
	Module READY	×0 –	-		
	Basic parameter setting request	Y1			
	Basic parameter setting, normally	×1 –	_		
oeration		кз –	Power OFF, then		
Parameter setting operation	MODBUS <sup>®</sup> device assignment parameter setting request	Y8 -	ON/ Pro- gram- mable		
Paramete	MODBUS <sup>®</sup> device assignment parameter setting, normally	×8 –	control- ler CPU		
	completed MODBUS <sup>®</sup> device assignment parameter setting existence	KA –	reset		
ility	Automatic communication function (Master function		-	Not startable	Startable
Function executability	Dedicated instruction (Master function)	+	-	Not executable	Executable
tion e)	Slave function	┢	-	Request message not acceptable	Request message acceptable
Func	GX Developer connection	on –	-	GX Developer not connectable	GX Developer connectable

(b) When the basic parameter starting method is ON (start with the user-set parameters) and the MODBUS<sup>®</sup> device assignment parameter starting method is OFF (start with the default parameters)

#### [Intelligent function module switch setting]

<Switch 2> b1 b0 b1 b0 1 MODBUS®device assignment parameter starting method 0: Start with the default parameters. 5 Start with the default parameters.

	QJ71MT91 operation		-	Default parameter setting • MODBUS <sup>®</sup> device assignment parameters			
	Module READY X	.0	-				
	Basic parameter setting request Y Basic parameter				Basic parameter creation		
eration	setting, normally X completed Basic parameter X existence		Power				
Parameter setting operation	MODBUS <sup>®</sup> device	′8 <del>-</del>	OFF, then ON/				
Parameter	MODBUS <sup>®</sup> device	.8	Pro- gram- mable control-				
	completed MODBUS®device	A-	ler CPU reset				
llity	Automatic communication function (Master function)		-		Not s	startable	Startable
Function executability	Dedicated instruction (Master function)	+		 	Not exe	ecutable	Executable
tion ex	Slave function	+			Request message not acc	ceptable	Request message acceptable
Func	GX Developer connection	י <del> </del> -			GX Developer not con	nectable	GX Developer connectable

(c) When the basic parameter starting method is OFF (start with the default parameters) and the MODBUS<sup>®</sup> device assignment parameter starting method is ON (start with the user-set parameters)

#### [Intelligent function module switch setting]

<Switch 2>



	QJ71MT91 operation	_	_	Default parameter setting • Basic parameters		
	Module READY	X0 -	-			
	Basic parameter setting request	Y1 -	_			
	Basic parameter setting, normally completed	X1 -	_			
peration	Basic parameter existence	хз -	Power OFF,			
Parameter setting operation	MODBUS <sup>®</sup> device assignment parameter setting request	Y8 -	then ON/ Pro- gram-	I/ MODBUS <sup>®</sup> device p- assignment parameter	assignment parameter	
Paramet	MODBUS <sup>®</sup> device assignment parameter setting, normally completed	X8 -	mable _ control- ler CPU			
	MODBUS <sup>®</sup> device assignment parameter setting existence	XA-	reset		<b>_</b>	
2	Automatic communicat function (Master functio		-	Not startable	Startable	
Function executability	Dedicated instruction (Master function)	-	_	Not executable	Executable	
ion ex	Slave function	-	-	Request message not acceptable	Exception response (without assignment parameters)	Request message acceptable
Funct	GX Developer connect	ion -	-	GX Developer not connectable	GX Developer connectable	

(d) When the basic parameter starting method is ON (start with the user-set parameters) and the MODBUS<sup>®</sup> device assignment parameter starting method is ON (start with the user-set parameters)

#### [Intelligent function module switch setting]

<Switch 2> b1 b0 1 1 MODBUS®device assignment parameter starting method 1: Start with the user-set parameters. 1: Start with the user-set parameters.

	QJ71MT91 operation		Default parameter setting not made			
	Module READY X	0	[			
Parameter setting operation	Basic parameter       Y         Basic parameter       Y         Basic parameter       X         setting, normally       X         completed       X         Basic parameter       X         existence       X         MODBUS <sup>®</sup> device       A         assignment parameter       Y         MODBUS <sup>®</sup> device       A         assignment parameter       Y         MODBUS <sup>®</sup> device       A         modelse       Modelse         with output       X         modelse       Modelse         MODBUS <sup>®</sup> device       A         assignment parameter       X         setting, normally       X         completed       MODBUS <sup>®</sup> device         modelse       A         modelse       X         setting existence       X	1 - 3 - Power OFF, then ON/ 8 - Pro- gram- mable control ler CPU reset		Basic parameter creation	MODBUS <sup>®</sup> device assignment parameter creation	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Function executability	Automatic communication function (Master function Dedicated instruction (Master function)			Not startable Not executable		Request message
Function	Slave function GX Developer connection			eloper not connectable	Exception response (no assignment parameters)	acceptable

# 7 PARAMETER SETTING

This chapter explains the settings of the parameters.

## 7.1 Parameter Settings and Setting Procedure

- (1) Parameter types
  - To use the QJ71MT91, set the following parameters as necessary.
    - (a) Basic parameters
      - Set the basic information necessary for the QJ71MT91. When using the preset initial values of the QJ71MT91, no setting is required. Refer to Section 7.2 for details

Refer to Section 7.2 for details.

(b) Automatic communication parameters Set the automatic communication parameters when using the automatic communication function with the QJ71MT91 acting as the master. Refer to Section 7.3 for details. If the automatic communication function is not to be used, softing of theory

If the automatic communication function is not to be used, setting of these parameters are not required.

#### (c) MODBUS<sup>®</sup> device assignment parameters

Set the MODBUS<sup>®</sup> device assignment parameters when using the MODBUS<sup>®</sup> device assignment function with the QJ71MT91 acting as a slave.

When using the initial values preset to the QJ71MT91, no setting is required for these parameters. Refer to Section 7.4 for details.

## (2) Parameter setting method

Set the parameters to the QJ71MT91 by any of the following methods.

- Setting from utility package Set the parameters from the GX Configurator-MB utility package. Refer to Chapter 8 for details.
- (b) Setting from sequence program
   Set the parameters from the sequence program.
   Refer to Chapter 9 for details.

# (3) Parameter setting procedures

Set the parameters in the following procedures.



7

## 7 PARAMETER SETTING



\*1: The X signal status can be confirmed using GX Configurator-MB. (Refer to Section 8.6.)



# 7 PARAMETER SETTING



## 7.2 Basic Parameters

## 7.2.1 Basic parameters details

The basic parameters are classified into the following three types.

Address		Parameter Name	Setting Range	Initial Value		
0000н		TCP ULP timer value		2 to 2400	60	
(0)		Set time = set value $\times$ 50	2 10 2400	60		
0001н		TCP zero window timer valu	2 45 2400	20		
(1)		Set time = set value $ imes$ 50	00ms	2 to 2400	20	
0002н	TCP/UDP/IP	TCP resend timer value		2 to 2400	20	
(2)	monitoring	Set time = set value $\times$ 50	00ms	2 to 2400	20	
0003н	timer	TCP end timer value		2 to 2400	40	
(3)	umen	Set time = set value $\times$ 50	00ms	2 10 2400	40	
0004н		IP reassembly timer value		1 to 2200	10	
(4)		Set time = set value $\times$ 50	00ms	1 to 2399	10	
0005н		Split reception monitoring ti	mer value	2 45 2400	<u> </u>	
(5)		Set time = set value $\times$ 50	00ms	2 to 2400	60	
0006н		KaanAliya		0: Not used	1	
(6)		KeepAlive		1: Used	1	
0007н		KeepAlive start timer value	KeepAlive start timer value			
(7)	KoonAliyo	Set time = set value $\times$ 50	00ms	1 to 32767	1200	
0008н	KeepAlive	KeepAlive interval timer val	1 to 20707	20		
(8)		Set time = set value $\times$ 50	1 to 32767	20		
0009н		Keen Alive record count		1 to 10	2	
(9)		KeepAlive resend count		1 to 10	3	
000Ан		Doutor roley function		0: Not used	0	
(10)		Router relay function		1: Used	0	
000Вн to 000Сн		Subact maak pattern		С000000н to		
(11 to 12)		Subnet mask pattern		FFFFFFCH	FFFFF00H	
000Dн to 000Eн		Default router ID address		Refer to Section	0000000н	
(13 to 14)		Default router IP address		7.2.2 (3) (c)	0000000H	
000Fн	Routing	Number of reuters act		0 to 9	0	
(15)	information	Number of routers set		0 to 8	0	
0010н to 0011н			Subpot oddroco	Refer to Section	0000000н	
(16 to 17)		Doutor information 1	Subnet address	7.2.2 (3) (e)	UUUUUUUUH	
0012н to 0013н		Router information 1	Doutor ID oddroo-	Refer to Section	0000000	
(18 to 19)		Router IP address		7.2.2 (3) (f)	0000000н	
0014н to 002Fн		Doutor information 0 to 0				
(20 to 47)		Router information 2 to 8	(Same as router infor	mation 1)		

## (1) TCP/UDP/IP setting

	(=) = = = = = = = = = = = = = = = = = =									
Address	Parameter Name	Setting Range	Initial Value							
0030н (48)	Number of TCP connections for GX Developer connection	0 to 8	1							

## (2) GX Developer connection information setting

# (3) MODBUS® /TCP setting

Address	Parameter Name		Setting Range	Initial Value			
0110⊦ (272)	Local slave station port No.	1 to 4999, 5020 to 65535 <sup>(*1)</sup>	502				
0111н (273)	Target slave port No. for automatic commun	Farget slave port No. for automatic communication function					
0114н (276)	CPU response monitoring timer value Set time = set value $ imes$ 500ms						
0115н to 0116н (277 to 278)		IP address	Refer to Section 7.2.4 (4) (b)	0000000н			
0117н (279)	Preferred node specification 1	Number of connections	0 to 64	0			
0118н to 01D4н (280 to 468)	Preferred node specification 2 to 64	ode specification 1)					

\*1: When specifying a value of 32768 (8000H) or more in a sequence program, set the value in hexadecimal.

## 7.2.2 TCP/UDP/IP setting

- (1) TCP/UDP/IP monitoring timer
  - (a) TCP ULP timer value
    - Set the ACK monitoring time for opening TCP connection and sending data. If no ACK has been received from the target device for a predetermined period of time, the connection is forcibly closed.
    - 2) No setting is required when the default value is used.
  - (b) TCP zero window timer value
    - 1) The window indicates the receive buffer on the receiving side.
    - When the receive buffer on the receiving side becomes full (window size = 0), data transmission is held until the receive buffer has free space.

In such a case, the sender sends a window check packet to the receiver according to the TCP zero window timer value to check whether data can be received or not.

- 3) No setting is required when the default value is used.
- (c) TCP resend timer value
  - Set the resend time for the case where ACK is not returned when TCP connection is opened and TCP data are transmitted. This timer is also used for the time for resending an ARP request in the case where a response is not returned in reply to the sent ARP request. (ARP is resent at the TCP resend timer value/2.)
  - 2) No setting is required when the default value is used.
- (d) TCP end timer value
  - When TCP connection is closed from the local station, the local station sends FIN to the target device, and receives ACK and then FIN from the target device. Set the monitoring time for which the station will wait for FIN from the target device.
  - If FIN is not received from the target device when the TCP end timer is expired, RST is sent to the target device, forcing the connection to close.
  - 3) No setting is required when the default value is used.
- (e) IP reassembly timer value
  - 1) In data communications, a block of data may be split into segments on an IP level due to the send/receive station buffer limitations.
  - 2) Set the time for waiting for the next split data segment in the case where the QJ71MT91 receives and restores the split data.
  - 3) No setting is required when the initial value is used.

## (f) Split reception monitoring timer value

- 1) Set the time from the receipt of the first message segment until the receipt of the last message segment in the case where messages split on a TCP/UDP level are received.
- 2) No setting is required when the default value is used.

# REMARK

(1) Specify the QJ71MT91 side timer values that will satisfy the following conditions.

•	Automatic communication response monitoring timer value	)*1 ≧	Split reception monitoring timer value	≧	TCP ULP timer value	≧	TCP end timer value	≧	TCP resend timer value	>	IP reassembly timer value	J
•	Response monitoring timer value for dedicated instruction	*2 ≧	Split reception monitoring timer value		TCP ULP timer value	≧	TCP end timer value	)≧	TCP resend timer value	) >	IP reassembly timer value	)

- \*1: Automatic communication response monitoring timer value is a response monitoring timer value for the automatic communication function. Refer to Section 7.3 for details.
- \*2: Refer to Section 10.2 or 10.3 for details.

When making communication between two QJ71MT91s, perform the same settings to both modules.

(2) Specify the target device side timer values that will satisfy the following conditions.

If the timer values are not as indicated below, communication errors, such as send time-out, may occur frequently.



\*2: Refer to Section 7.3 for the CPU response monitoring timer value.

(Example 1) TCP split transmission count for communication on the same line The Maximum Segment size is 1460 bytes on the same line (with no router relayed) and the TCP split transmission count is as described below.

When QJ71MT91 send message size  $\leq$  1460 bytes, n = 1 When 1460 bytes < QJ71MT91 send message size, n = 2

- (Example 2) TCP split transmission count for communication on the other line The Maximum Segment size is a minimum of 536 bytes on the other line (e.g. via a dial-up router) and the TCP split transmission count is as described below. When QJ71MT91 transmission message size ≤ 536 bytes, n = 1 When 536 bytes < QJ71MT91 transmission message size ≤ 1072 bytes, n = 2 When 1072 bytes < QJ71MT91 transmission message size ≤ 1608 bytes, n = 3
- (3) When a communication error occurs due to noise, etc., change the setting to increase the retry count. The retry count is determined by the following expression.

(In the case of the default value, 2 = (60 / 20) - 1)

	Retry	ſ	ſ	TCP ULP timer value		
•	count	=1	l	TCP resend timer value	J	-1}

# (2) KeepAlive function

- (a) KeepAlive
  - 1) Set whether the KeepAlive function will be used or not.

Setting name	Setting
Not used	KeepAlive function is not used
Used	KeepAlive function is used

- 2) No setting is required when the default value is used.
- (b) KeepAlive start timer value
  - 1) Set the time interval from the stop of communication with the target device to the start of alive check for the TCP connection opened with KeepAlive valid.
  - 2) No setting is required when the default value is used.
- (c) KeepAlive interval timer value
  - 1) Set the alive recheck interval time for the case that no response from the target device can be received through the TCP connection opened with KeepAlive valid.
  - 2) No setting is required when the default value is used.
- (d) KeepAlive resend count
  - Set how many times the KeepAlive check message will be resent to the target device when no response can be received through the TCP connection opened with KeepAlive valid.
  - 2) No setting is required when the default value is used.

# (3) Routing information

- (a) Router relay function
  - Set whether the router relay function will be used or not. The router relay function is not needed when the QJ71MT91 communicates with the target device on the same Ethernet (the subnet address of the IP address is the same).
  - 2) The router relay function allows communication with devices on other Ethernets via routers and gateways.(The router relay function does not mean a function with which the QJ71MT91 acts as a router.)
  - 3) One default router and a maximum of any eight routers can be set for the router relay function.
- (b) Subnet mask pattern
  - 1) Set the subnet mask. \*1 (Setting range: C0000000н to FFFFFFCн) Consult the network administrator for the setting.
  - 2) When not using the subnet mask, set any of the following table values according to the class.

Class	Mask value
Class A	FF000000н
Class B	FFFF0000H
Class C	FFFFF600H

\*1 Networks constructed by Ethernet include small-scaled network systems where multiple devices are connected to one Ethernet, and medium- and large-scaled network systems where multiple small-scaled networks are connected by routers, etc.

The subnet mask logically divides one network, where many devices are connected, into multiple sub-networks to facilitate administration.



POINT
(1) All devices on the same sub-network must have common subnet masks.
(2) When not administrated by the sub-network, the connected devices need not have subnet masks. (Set the network address of the corresponding class.)

## (c) Default router IP address

Set the IP address of the router (default router) to be used when the QJ71MT91 communicates with the target device on another Ethernet via other than the router specified in the router information (refer to (e) below). Set the value that satisfies the following conditions.

- Condition 1: The IP address class is any of A, B and C.
- Condition 2: The subnet address of the default router is the same as that of the local station QJ71MT91.
- Condition 3: The host address bits are not all "0" or all "1".

## POINT

The default router is used for communication if the corresponding subnet address does not exist in the router information (refer to (e) below) at data transmission.

- (d) Number of routers set
  - Set the number of routers (within the allowable range) according to (e) Subnet address and (f) Router IP address below when the QJ71MT91 communicates with the target device on another Ethernet via other than the default router.
  - 2) Set the necessary number of subnet addresses and router IP addresses to the areas of (e) and (f) below.
- (e) Router information: Subnet address
  - Set the network address (\*1) or subnet address (\*2) of the target device when the QJ71MT91 communicates with the target device on another Ethernet via other than the default router.
     Set the value that satisfies the following conditions.
     Condition 1: The IP address class is any of A, B and C.
     Condition 2: All the host address bits are "0".
  - 2) Set the router information in order, starting from the first target device.
  - \*1 Set the network address of the target device when the class (network address) of the local station QJ71MT91 differs from that of the target device.
  - \*2 Set the subnet address of the target device when the class (network address) of the local station QJ71MT91 is the same as that of the target device.



#### 3) Subnet address setting examples

(Setting example 1) When the network addresses of the local station QJ71MT91 and target device differ



#### (Setting example 2) When the classes of the local station QJ71MT91 and target device differ



(Setting example 3) When the network addresses of the local station QJ71MT91 and target device are the same



device on another Ethernet.

(2) The router relay function is not needed in a system that uses the Proxy router.
# 7.2.3 GX Developer connection information setting

- (1) Number of TCP connections for GX Developer connection
  - (a) TCP connections for GX Developer connection represents connections for connecting GX Developer using the TCP protocol.
     Set the desired number to the Number of TCP connections for GX Developer connection.
  - (b) TCP connections for GX Developer connection are handled as preferred connections.
  - (c) When GX Developer is connected using the UDP protocol, no setting is required for the Number of TCP connections for GX Developer connection.

# 7.2.4 MODBUS®/TCP setting

(1) Local slave station port No.

Set the port No. on the QJ71MT91 side for receiving a request message from the master using the slave function of the QJ71MT91.

#### POINT

- (1) The specifications of the MODBUS<sup>®</sup> /TCP protocol define that "502" should be used as the port No. for the slave.
- In this setting, the default value is "502" and normally need not be changed.
- (2) When specifying a value of 32768 (8000H) or more in a sequence program, set the value in hexadecimal.
- (2) Target slave port No. for automatic communication function Set the target slave port No. for issuing a request message using the automatic communication function (master function) of the QJ71MT91.

#### POINT

(1) The specifications of the MODBUS<sup>®</sup> /TCP protocol define that "502" should be used as the port No. for the slave.

In this setting, the default value is "502" and normally need not be changed. (2) When specifying a value of 32768 (8000H) or more in a sequence program, set

the value in hexadecimal.

- (3) CPU response monitoring timer value
  - (a) When the QJ71MT91 receives a request message from the master and the programmable controller CPU starts its processing, the QJ71MT91 waits for the response from the programmable controller CPU. The time allowed for the QJ71MT91 to wait is set by the CPU response monitoring timer value.

This timer allows the QJ71MT91 to cancel the wait status on the master side when a response to the master is not available due to an error occurred in the programmable controller CPU.



- (b) The QJ71MT91 starts the CPU response monitoring timer when it receives a request message from the master. (1) in the figure) The CPU response monitoring timer monitors the programmable controller CPU processing until the QJ71MT91 starts sending a response message to the master. (2) in the figure)
- (c) When the CPU response monitoring timer reaches the preset time, the QJ71MT91 performs the following processings. (3) in the figure)
  - 1) Issues the error code: 7380H. \*1
  - 2) Issues the exception code: 04H to the master side. \*2
    - \*1: Refer to Section 11.3.3 for details of the error code.
    - \*2: Refer to Section 11.3.2 for details of the exception code.

#### POINT

When the CPU response monitoring timer value is "0ms", the QJ71MT91 waits until the programmable controller CPU completes processing. (Limitless waiting)

- (4) Preferred node specification
  - (a) Relationship between preferred node specification and TCP connection opening and closing
    - 1) The QJ71MT91 opens and closes TCP connections automatically.
    - 2) The QJ71MT91 can open up to 64 TCP connections simultaneously.
    - Before opening a new TCP connection in addition to already open 64 TCP connections, the QJ71MT91 automatically closes the TCP connection that has not communicated for the longest time among the non-communicating ones.

At this time, the TCP connections with the target devices specified as the preferred nodes are not closed.

- If the number of TCP connections used by the QJ71MT91 exceeds 64, specify the preferred nodes for the target devices that must keep the TCP connections open.
- 5) Up to 64 preferred nodes can be specified.
- (b) Preferred node specification: IP address
  - 1) Set the IP address of the target device to be specified for the preferred node.
  - Set the value that satisfies the following conditions. Condition 1: The IP address class is any of A, B and C. Condition 2: The host address bits are not all "0" or all "1".
- (c) Preferred node specification: TCP connection
  - 1) Specify the number of TCP connections used for communication with the specified preferred nodes.
  - Set the value that satisfies the following condition. (Preferred node specification 1: TCP connection + ... + preferred node specification 64: TCP connection) + number of TCP connections for GX Developer connection ≤ 64

#### POINT

It is not necessary to use the preferred node specification when the total number of TCP connections used by the QJ71MT91 is not more than 64.

# 7.3 Automatic Communication Parameters

# 7.3.1 Automatic communication parameters details

Address		Para	ameter Name	Setting Range	Default Value
0200н to 0201н (512 to 513)		Targe	et station IP address	Refer to (1) in this section. (00000000∺ Automatic communication parameter not set)	0000000н
0202н (514)		Modu	ıle ID	0 to 255 Target device 1) MODBUS <sup>®</sup> /Serial 0: Broadcast 1 to 247: MODBUS <sup>®</sup> /Serial device station No. 2) MODBUS <sup>®</sup> /TCP: 255	255
0203н (515)			eat interval timer value $mean mean mean mean mean mean mean mean $	0 to 65535	0
0204н (516)	Re		ponse monitoring timer value ime = set value $\times$ 500ms	0,2 to 2400 When the set value is 0, the QJ71MT91 operates at 60 (30s).	0
0205н (517)	Automatic communication parameter 1	Type specification of the target MODBUS <sup>®</sup> device		0000н: Not specified 0100н: Read coils 0200н: Read discrete inputs 0400н: Read input registers 0500н: Read holding registers 0001н: Write coils 0005н: Write multiple registers 0505н: Read/Write multiple registers	0000н
0206н (518)		Ď	Head buffer memory address	1000н to 1FFFн	0000н
0207н (519)		Read setting	Target MODBUS <sup>®</sup> device head number	0 to 65535 (*1)	0
0208н (520)		Å	Access points (*2)	0 to 2000	0
0209н (521)		бu	Head buffer memory address	3000н to 3FFFн	0000н
020Ан (522)		Write setting	Target MODBUS <sup>®</sup> device head number	0 to 65535 (*1)	0
020Bн (523)		Ŵ	Access points (*2)	0 to 1968	0
020Сн to 04FFн (524 to 1279)	Automatic communication parameter 2 to 64	(Sarr	ne as in automatic communication pa	arameter 1)	

\*1: When specifying a value of 32768 (8000<sub>H</sub>) or more in a sequence program, set the value in hexadecimal.

\*2: The setting range and default value of the access points change depending on the target MODBUS<sup>®</sup> device type. Refer to (8) in this section.

- (1) Target station IP address
  - (a) Set the IP address of the target slave device.
  - (b) When the target slave device is on another Ethernet and an access is to be made via a router, set the router relay function of the basic parameter to "1: Used" and set the routing information of the basic parameter. Refer to Section 7.2 for the routing information.
  - (c) Set the value that satisfies the following conditions.
     Condition 1: The IP address class is any of A, B and C.
     Condition 2: The host address bits are not all "0" or all "1".
- (2) Module ID
  - (a) Set the module ID when specifying the slave connected to the other line, such as a line using the MODBUS<sup>®</sup> Serial protocol.
  - (b) The module ID is embedde into a request message to be sent to a target slave device.

Refer to Section 4.2 for the frame specifications of the request message.

- (3) Repeat interval timer value
  - (a) The repeat interval timer value represents the time from when the QJ71MT91 receives a response message from the slave until it sends a next message to the slave.
  - (b) Overlap of send and receive processings may cause delay and take more time than the interval time set to the repeat interval timer.
  - (c) When the repeat interval timer value is 0, the QJ71MT91 will issue a next request message immediately after it has received a response message from the slave.
  - (d) The accuracy of the repeat interval timer is "0 to -10ms".
- (4) Response monitoring timer value
  - (a) The response monitoring timer value represents the time from when the QJ71MT91 issues a request message to the slave until it receives a response message from the slave.
  - (b) If the QJ71MT91 does not receive a response message from the slave before the response monitoring timer expires, it judges the target slave as faulty.

When an error status occurs, the corresponding automatic communication operation status storage area in the buffer memory turns on in the QJ71MT91.

Also, the error code is stored in the automatic communication error code storage area.

Refer to Section 11.3.1 for details of the automatic communication operation status storage area and automatic communication error code storage area.

(c) When the response monitoring timer value is 0, the QJ71MT91 operates at "60" (30s).

# (5) Type specification of the target MODBUS<sup>®</sup> device (a) Set the type of the read/write target MODBUS<sup>®</sup> device.

<u>b15</u>	b8	b7 b0
Read target		Write target
Set Value	Targ	et MODBUS <sup>®</sup> Device Type
00н	Not sp	pecified
01н	Coil	
02н	Input	
04н	Input	register
05н	Holdir	ng register

#### (b) Setting range

The following table gives the combinations of read and write targets available for the target MODBUS<sup>®</sup> device type setting. Any other combinations are not available.

Тур	e Specification of the Targe	Issued Function Code			
Set value	Read target	Write target	Issued Function Code		
0100н	Coil		01	Read coils	
0200н	Input	Not appoified (*1)	02	Read discrete inputs	
0400н	Input device	Not specified (*1)		Read input registers	
0500н	Holding register			Read holding registers	
0001н	Not aposified (*1)	Coil	15	Write multiple coils	
0005н	Not specified (*1)	Holding register	16	Write multiple registers	
0505н	Holding register (*2)	Holding register	23	Read/Write multiple registers	

\* 1: To perform only read or write, set "0" to each of the following:

- Head buffer memory address
- Target MODBUS<sup>®</sup> device head number
- Access points
- \* 2: Reading and writing can be performed simultaneously with one instruction only when 0505н (Read/write multiple registers) is set.
- (6) Head buffer memory address (Read setting/Write setting)
  - (a) As the head buffer memory address, specify the head address of the buffer memory that will store the data read from or written to the slave.
  - (b) The head buffer memory address must not be duplicated in the automatic communication parameters 1 to 64. Set different head buffer memory addresses to each of the automatic communication parameters.

# (7) Target MODBUS<sup>®</sup> device head number (Read setting/Write setting)

- (a) As the target MODBUS<sup>®</sup> device head number, specify the head number of the read or write target MODBUS<sup>®</sup> device.
- (b) As the target MODBUS<sup>®</sup> device head number, set "(last 5 digits of actual device number) - 1". Example: Set "17" when the head number of the holding register is 400018.
- (c) When specifying a value of 32768 (8000H) or more in a sequence program, set the value in hexadecimal.

#### (8) Access points (Read setting/Write setting)

- (a) Set the number of points to be written to the MODBUS<sup>®</sup> device and the number of points to be read from the MODBUS<sup>®</sup> device.
- (b) The access points change depending on the type specification of the target MODBUS<sup>®</sup> device.

Type Specification of the Target MODBUS <sup>®</sup> Device			Access Points Setting Range		
Set value	Read target	Write target	Points to be read	Points to be written	
0100н	Coil		1 to 2000 points	_	
0200н	Input	Not appoified	1 to 2000 points	_	
0400н	Input register	Not specified	1 to 125 points	—	
0500н	Holding register		1 to 125 points	—	
0001н	Not appoified	Coil	—	1 to 1968 points	
0005н	Not specified	Holding register	—	1 to 123 points	
0505н	Holding register	Holding register	1 to 125 points	1 to 121 points	

#### POINT

In the access to the bit device (coil/input) of the slave, the fraction bits are handled as described below.

1) Bit device read



# 7.4 MODBUS<sup>®</sup> Device Assignment Parameters

Using MODBUS<sup>®</sup> device assignment parameters, the MODBUS<sup>®</sup> devices are correlated with the programmable controller CPU device memory. This allows direct access from the MODBUS<sup>®</sup> compatible master device to the programmable controller CPU device memory.



Program	mable controller CPU device		MODBUS® device	ce	(	MODBUS <sup>®</sup> device assignment parameter setting example
	Internal relay (M)		Coil			Protection () - Protection
M0 M1201			3500	000001		Coil assignment 1
	3500			003500		Device codeM(0090H)Head device number1201
M4700	•			004000		Head coil number0Assignment points3500
M8191			8192			
Y0	Output (Y)					Coil assignment 2 Device code Y(009DH)
				012191		Head device number0Head coil number3999
	8192					Assignment points 8192
Y1FFF						Coil assignment 3
	Latch relay (L)					Device code L(0092H) Head device number 0
L0 L4			5	065000		Head coil number64999Assignment points5
				065536		
L8191						
SD0	Special register (SD)		Holding register	- 400001		
	2048		1000			Holding register assignment 1
SD2047	Data register (D)	$\searrow$		402000		Device code SD(00A9H) Head device number 0 Head holding register 1000
D0	1000		2048	404047		Head holding register         1999           number         2048
D999						
D6000						Holding register assignment 2 Device code D(00A8H)
	6288			430000		Head device number 0 Head holding register 0 number 0
D12287	L		6288			Assignment points 1000
				436287	$\searrow$	
						Holding register assignment 3 Device code D(00A8H)
						Head device number 6000 Head holding register 29999
				465536		Assignment points 6288
						,
L		1	L			

[Schematic image of MODBUS® device assignment parameter setting]

# 7.4.1 MODBUS<sup>®</sup> device sizes

The MODBUS® devices available for the QJ71MT91 are given in the following table.

MODBUS <sup>®</sup> Device Type	Read/Write	Access Points	MODBUS <sup>®</sup> Device Number
Coil	Read/Write	65536 points	000001 to 065536
Input	Read	65536 points	100001 to 165536
Input register	Read	65536 points	300001 to 365536
Holding register	Read/Write	65536 points	400001 to 465536
Extended file register	(*1)	1191061 points (*2)	File number: 0 to 418 (*2)
Extended file register	(*1)	4184064 points (*2)	600000 to 609999

\*1: The availability of extended file register read/write depends on that of the file register (ZR) read/write to the programmable controller CPU. For example, if the file register (ZR) is stored on a Flash card, the extended file register is

read only because the file register (ZR) is read only.

For details, refer to the QCPU user's manual (explanation, program fundamentals).

\*2: The maximum access points and maximum file number of the extended file register depend on the file register (ZR) assignment size of the programmable controller CPU. For details, refer to the QCPU user's manual (explanation, program fundamentals).

\*3: Refer to Section 7.4.4 for the extended file register assignment.

# 7.4.2 MODBUS® device assignment parameters details

Address		Parameter Nam	e	Setting Range	Default Value	
0900н (2304)			Device code	0000н: Device code not assigned Other than 0000н: Device code		
0901н (2305)			Head device number	0000н to FFFн	(*1)	
0902н (2306)	Coil	Coil assignment 1	Head coil number	0000н to FFFFн	(1)	
0903н (2307)			Assignment points	0000н to FFFFн		
0904н to 093Fн (2308 to 2367)		Coil assignment 2 to 16	(Same as in coil assigr	nment 1)	·	
0940н (2368)			Device code	0000н: Device code not assigned Other than 0000н: Device code		
0941н (2369)		lanut and successful t	Head device number	0000н to FFFн	(+4)	
0942н (2370)	Input	Input assignment 1	Head input number	0000н to FFFFн	(*1)	
0943н (2371)			Assignment points	0000н to FFFFн		
0944н to 097Fн (2372 to 2431)		Input assignment 2 to 16	(Same as in input assi	ignment 1)		
0980н (2432)			Device code	0000н: Device code not assigned Other than 0000н: Device code		
0981н (2433)		Input register	Head device number	0000н to FFFн	(*1)	
0982н (2434)	Input register	assignment 1	Head input register number	0000н to FFFн	(1)	
0983н (2435)			Assignment points	0000н to FFFн		
0984н to 09BFн (2436 to 2495)		Input register assignment 2 to 16	(Same as in input regis	ster assignment 1)		
09C0н (2496)			Device code	0000н: Device code not assigned Other than 0000н: Device code		
09С1н (2497)		Holding register	Head device number	0000н to FFFн	(*1)	
09С2н (2498)	Holding register	assignment 1	Head holding register number	0000н to FFFFн	(*1)	
09С3н (2499)			Assignment points	0000н to FFFн		
09C4н to 09FFн (2500 to 2559)		Holding register assignment 2 to 16	(Same as in holding re	gister assignment 1)		

\*1: When the intelligent function switch 2 - MODBUS<sup>®</sup> device assignment parameter starting method (Bit 1) setting is "Start with the default parameters" (OFF), the default assignment parameters are used. The default parameter values are displayed on the MODBUS<sup>®</sup> device assignment parameter setting screen of GX Configurator-MB.

Refer to Section 7.4.3 for the default assignment parameters.

#### POINT

With the intelligent function module switch, turn ON the MODBUS® device assignment parameter starting method. (Refer to Section 6.6) If this switch is set to OFF, the operation will proceed based on the default assignment parameters. (Refer to Section 7.4.3)

# (1) Device codes

- (a) Set the device codes for the programmable controller CPU devices and QJ71MT91 buffer memory area assigned to the MODBUS® devices.
- (b) The device codes have different setting ranges depending on the MODBUS<sup>®</sup> devices.

Refer to the following table for the device code setting ranges.

	Device Name				Ass	ignable	MODBL	JS® De	vice
Classification			Device Symbol	Device Code(*5)	Coil	Input	Input register	Holding register	Extended file register
Internal system device	Special rela	ау	SM(*3)	0091н	0	0			
Internal system device	Special rec	ister	SD(*3)	00А9н			0	0	
	Input		X(*3)	009Сн	0	0			
	Output		Y(*3)	009Dн	0	0			
	Internal rel	ау	M(*3)	0090н	0	0			
	Latch relay		L	0092н	0	0			
	Annunciato	or	F	0093н	0	0			
	Edge relay		V	0094н	0	0			
	Link relay		B(*3)(*4)	00А0н	0	0			
	Data register		D(*3)(*6)	00А8н			0	0	
	Link register		W(*3)(*4) (*6)	00В4н			0	0	
latera el conservator de s	Timer	Coil	тс	00С0н	0	0			
Internal user device		Contact	TS	00C1н	0	0			
		Current value	TN	00С2н			0	0	
	Retentive timer	Coil	SC	00С6н	0	0			
		Contact	SS	00С7н	0	0			
		Current value	SN	00С8н			0	0	
		Coil	CC	00С3н	0	0			
	Counter	Contact	CS	00С4н	0	0			
		Current value	CN	00С5н			0	0	
	Link specia	ll relay	SB(*3)	00А1н	0	0			
	Link specia	Il register	SW(*3)	00В5н			0	0	
	Step relay		S	0098н	0	0			
Direct device	Direct inpu	t	DX	00А2н	0	0			
	Direct output		DY	00АЗн	0	0			
Index register	Index register		Z	00ССн			0	0	
File register	File registe	r	R	00AFн			0	0	
	, iic registe	•	ZR(*1)	00В0н					0
QJ71MT91 buffer memory (*2)(*3)	User free a	rea	_	<b>F000</b> н			0	0	

\*1: The device assigned to the extended file register is fixed to the file register (ZR).

Refer to Section 7.4.4 for the extended file register.

\*2: Refer to Section 7.4.5 for device assignment to the QJ71MT91 buffer memory.

\*3: Only this device is supported when the QJ71MT91 is mounted on a MELSECNET/H remote I/O station. An error will occur if an access request is received from the MODBUS<sup>®</sup> /TCP master with any other device assigned.

\*4: Corresponds to LB and LW on a MELSECNET/H remote I/O station.

- \*5: When setting with GX Configurator-MB, input the head device.
- \*6: The extended data register D65536 and higher area and extended link register W10000 and higher area cannot be allocated as input register or holding register.
  - Use file register (ZR) specification instead. For file register (ZR) specification of extended data register or extended link register, refer to the QCPU User's Manual (Function Explanation, Program Fundamentals). Use Read file record (FC: 20) or Write file record (FC: 21) in the above case.

#### (2) Head device number

As the head device number, set the head device number of the programmable controller CPU device memory or the head address of the QJ71MT91 buffer memory to be assigned to the MODBUS<sup>®</sup> device.

- (3) Head MODBUS<sup>®</sup> device number (Head coil number/Head input number/Head input register number/Head holding register number)
  - (a) As the head MODBUS<sup>®</sup> device number, set the head number of the MODBUS<sup>®</sup> device of the assignment target QJ71MT91.
  - (b) Use the following expression to find the set value of the head MODBUS<sup>®</sup> device number.
     Head MODBUS<sup>®</sup> device number = Last 5 digits of MODBUS<sup>®</sup> device number to be set 1

Example: Set "5139" when the MODBUS® device number is 105140.

(c) The head MODBUS<sup>®</sup> device number must not be duplicated in assignment 1 to 16.

Set different head MODBUS® device numbers.

The slave function of the QJ71MT91 is inactive if any of the device number settings are dupplicated.

#### (4) Assignment points

As the assignment points, set the device points of the programmable controller CPU CPU device memory or QJ71MT91 buffer memory to be assigned to the MODBUS<sup>®</sup> device.

#### POINT

The QJ71MT91 sends an exception response to the master if the master requests access to a device outside the programmable controller CPU range or to outside the user free area of the QJ71MT91 buffer memory.

# 7.4.3 Default assignment parameters

As the MODBUS<sup>®</sup> device assignment parameters, default assignment parameters are available as initial values.

To use the default assignment parameters, Bit 1 of the communication condition setting (switch 2) of the intelligent function module switches must be set to OFF. Refer to Section 6.6 for details of the intelligent function module switches. The following shows how the MODBUS<sup>®</sup> devices are assigned by the MODBUS<sup>®</sup> device assignment parameters and the default assignment parameter values set to the QJ71MT91 buffer memory.

#### [Assignment of MODBUS® devices by default assignment parameters]

Coil (000001 to 065536)		Input (100001 to 165536)		Input register (300001 to 365536)		Holding register (400001 to 465536)	
	000001	1	100001		300001	1	400001
Y 8192 (0 to 1FFF)		X 8192 (0 to 1FFF)					
Coil assignment 1	008192 008193	Input assignment 1	108192			<sup>12288</sup> (0 to 12287)	
M 8192 (0 to 8191)						Holding register assignment 1	412288
Coil assignment 2	016384					(Empty)	
(Empty)						(Empty)	
SM 2048 (0 to 2047) Coil assignment 3	020481 022528					SD SD	420481
	022529					2048 (0 to 2047) Holding register assignment 2	422528
L 8192 (0 to 8191)						QJ71MT91 4096 User free area (5000 to 5FFF)	422529
Coil assignment 4	030720 030721					Holding register assignment 3 (Empty)	
8192 (0 to 1FFF)						W 8192 (0 to 1555)	430721
Coil assignment 5	038912			(Empty)		(0 to 1FFF)	
F 2048 (0 to 2047) Coil assignment 6	038913 040960	(Empty)				Holding register assignment 4	438912
SB 2048 (0 to 7FF) Coil assignment 7	040961					(Empty)	
<b>A</b>	043008 043009					SW 2048 (0 to 7FF) Holding register assignment 5	440961 443008
2048 (0 to 2047) Coil assignment 8	045056 045057						
8192 (0 to 1FFF)						(Empty)	
Coil assignment 9	053248					A	
TC 2048 (0 to 2047) Coil assignment 10	053249 055296					TN 2048 (0 to 2047) Holding register assignment 6	453249 455296
TS 2048 (0 to 2047)	055297					(Empty)	
Coil assignment 11	057344 057345					1 SN	457345
2048 (0 to 2047) Coil assignment 12	059392					2048 (0 to 2047) Holding register assignment 7	459392
SS 2048 (0 to 2047) Coil assignment 13	059393 061440					(Empty)	
CC 2048 (0 to 2047)	061441					CN 2048 (0 to 2047)	461441
Coil assignment 14 CS 2048 (0 to 2047)	063488 063489					Holding register assignment 8	463488
Coil assignment 15	065536		165536		365536	(Empty)	465536

	Buffer Memory	Default Assignment Parameter Setting Items						
Assignment Name	Address	Device code		Head device	Head MODBUS®	Assignment		
	Address	(Device s	ymbol)	number	device number (*1)	points		
Coil assignment 1	0900н to 0903н	009DH	(Y)	0000н	0	8192		
Coil assignment 2	0904н to 0907н	0090н	(M)	0000н	8192	8192		
Coil assignment 3	0908н to 090Вн	0091н	(SM)	0000н	20480	2048		
Coil assignment 4	090Cн to 090Fн	0092н	(L)	0000н	22528	8192		
Coil assignment 5	0910н to 0913н	00А0н	(B)	0000н	30720	8192		
Coil assignment 6	0914н to 0917н	0093н	(F)	0000н	38912	2048		
Coil assignment 7	0918н to 091Вн	<b>00А1</b> н	(SB)	0000н	40960	2048		
Coil assignment 8	091Сн to 091Fн	0094н	(V)	0000н	43008	2048		
Coil assignment 9	0920н to 0923н	0098н	(S)	0000н	45056	8192		
Coil assignment 10	0924н to 0927н	00С0н	(TC)	0000н	53248	2048		
Coil assignment 11	0928н to 092Вн	00C1н	(TS)	0000н	55296	2048		
Coil assignment 12	092Cн to 092Fн	00С6н	(SC)	0000н	57344	2048		
Coil assignment 13	0930н to 0933н	<b>00С7</b> н	(SS)	0000н	59392	2048		
Coil assignment 14	0934н to 0937н	00C3н	(CC)	0000н	61440	2048		
Coil assignment 15	0938н to 093Вн	00C4н	(CS)	0000н	63488	2048		
Coil assignment 16	093Cн to 093Fн	0000н		0000н	0	0		
Input assignment 1	0940н to 0943н	009Сн	(X)	0000н	0	8192		
Input assignment 2 to 16	0944н to 097Fн	0000н		0000н	0	0		
Input register assignment 1 to 16	0980н to 09BFн	0000н		0000н	0	0		
Holding register assignment 1	09C0н to 09C3н	00А8н	(D)	0000н	0	12288		
Holding register assignment 2	09С4н to 09С7н	00А9н	(SD)	0000н	20480	2048		
Holding register assignment 3	09C8н to 09CBн	<b>F000</b> н		5000н	22528	4096		
Holding register assignment 4	09CCн to 09CFн	00B4н	(W)	0000н	30720	8192		
Holding register assignment 5	09D0н to 09D3н	00B5н	(SW)	0000н	40960	2048		
Holding register assignment 6	09D4н to 09D7н	00C2н	(TN)	0000н	53248	2048		
Holding register assignment 7	09D8н to 09DBн	00C8н	(SN)	0000н	57344	2048		
Holding register assignment 8	09DCн to 09DFн	00C5н	(CN)	0000н	61440	2048		
Holding register assignment 9 to 16	09E0н to 09FFн	0000н	_	0000н	0	0		

[Set values of default assignment parameters]

\*1: Use the following expression to find the set value of the head MODBUS<sup>®</sup> device number.

Head MODBUS® device number = Last 5 digits of MODBUS® device number to be set - 1

#### POINT

The programmable controller CPU device range varies depending on the programmable controller CPU.

(Refer to QCPU User's Manual (Function Explanation, Program Fundamentals)) Depending on the programmable controller CPU, some of the default assignment parameter range may not be usable.

In such a case, observe either of the following not to access the devices outside the allowable range.

- Set the MODBUS<sup>®</sup> device assignment parameters.(Refer to Section 7.4) Make the setting within the allowable programmable controller CPU device range.
- Do not access any device outside the allowable range when using the default assignment parameters.

# 7.4.4 MODBUS<sup>®</sup> extended file register assignment

(1) MODBUS<sup>®</sup> extended file register assignment

The MODBUS<sup>®</sup> extended file register assignment to the programmable controller CPU CPU is fixed to the file register (ZR).

The MODBUS<sup>®</sup> extended file register is assigned to the file register (ZR) of the programmable controller CPU as shown below.



# (2) Out-of-bounds read/write request

The QJ71MT91 sends an exception response when the master makes a request to the programmable controller CPU on the QJ71MT91-mounted station to read from or write to a nonexistent file register (ZR).

For the file register (ZR), refer to the QCPU user's manual (explanation, program fundamentals).

# (3) MODBUS<sup>®</sup> extended file register size

The MODBUS® extended file register size depends on the file register (ZR) size set to the programmable controller CPU on the QJ71MT91-mounted station. For details, refer to the QCPU user's manual (explanation, program fundamentals).

# POINT

Even if the slave (QJ71MT91) receives Write File Record (FC:21) when the programmable controller CPU's file register (ZR) is read-only (for example, when stored on a Flash card), it will issue a normal response. In this case, however, the action for Write File Record is not performed.

To write to the extended file register, check that the programmable controller CPU's file register (ZR) is writable or not in advance.

# 7.4.5 QJ71MT91 buffer memory assignment

(1) QJ71MT91 buffer memory assignment The QJ71MT91 can assign the MODBUS<sup>®</sup> devices to the QJ71MT91 buffer memory.

By making this assignment, access to the MODBUS  $^{\mbox{\tiny (B)}}$  devices will not be influenced by the sequence scan.

This enables the QJ71MT91 to respond faster to the master.

# (2) To assign the QJ71MT91 buffer memory to the MODBUS® device

- (a) When using the MODBUS<sup>®</sup> device assignment parameter When setting the MODBUS<sup>®</sup> device assignment parameter, set F000<sup>H</sup> for the device code. (Refer to Section 7.4.2)
- (b) When using the default assignment parameter Use any of the MODBUS<sup>®</sup> device, 422529 to 426624. (Refer to Section 7.4.3)
- (3) MODBUS<sup>®</sup> device assignment range The following QJ71MT91 buffer memory addresses can be assigned to the MODBUS<sup>®</sup> devices.

Buffer Memory Address	Size	Name	Auto Refresh Setting
5000н to 5FFFн	4096	User free area	Available



- 1) The QJ71MT91 receives a "holding register 400500 read" request message from the master.
- The QJ71MT91 reads data from its own buffer memory according to the value set to the MODBUS<sup>®</sup> device assignment parameter.
   Faster processing is executed as access is not influenced by the sequence scan.
- 3) The QJ71MT91 creates a response message and sends it to the master.

#### POINT

The programmable controller CPU device memory value can be stored in the QJ71MT91 buffer memory, and the QJ71MT91 buffer memory value can be stored in the programmable controller CPU device memory. Data can be stored by either of the following:

• Automatic refresh setting on GX Configurator-MB (Refer to Section 8.5)

- Transfer using intelligent function module devices (Un\G□)
- (Refer to QCPU User's Manual (Function Explanation, Program Fundamentals))

# 8 UTILITY PACKAGE (GX Configurator-MB)

GX Configurator-MB is a tool designed to support sequence program creation necessary for the parameter setting, auto refresh, and monitor/test of the QJ71MT91.

# 8.1 Functions of the Utility Package

Item	Description	Reference section
Initial setting	<ol> <li>The following items that require initial setting.         <ul> <li>Basic parameters</li> <li>Automatic communication parameters</li> <li>MODBUS<sup>®</sup> device assignment parameters</li> </ul> </li> <li>The initially set data are registered to the CPU module parameters, and automatically written to the QJ71MT91 when the CPU module enters the RUN status.</li> </ol>	Section 8.4
Auto refresh setting	<ul> <li>(1) The QJ71MT91's buffer memory is configured for automatic refresh.</li> <li>Automatic communication function buffer input area</li> <li>Automatic communication function buffer output area</li> <li>Automatic communication operation status storage area</li> <li>User free area</li> <li>(2) The data of the QJ71MT91 buffer memory areas set for auto refresh are automatically read from/written to the specified devices when the END instruction of the CPU module is executed.</li> </ul>	Section 8.5
Monitor/test	<ul> <li>(1) Monitor/test</li> <li>The buffer memory and I/O signals of the QJ71MT91 are monitored or tested.</li> <li>Various setting status, module status</li> <li>X/Y Monitor/test</li> <li>Basic/MODBUS<sup>®</sup> device assignment parameter status</li> <li>Automatic communication status</li> <li>Error log</li> <li>Communication status</li> <li>PING test</li> </ul>	Section 8.6

## The following table lists the GX Configurator-MB functions.

#### 8.2 Installing and Uninstalling the Utility Package

For how to install or uninstall the utility package, refer to "Method of installing the MELSOFT Series" included in the utility package.

#### 8.2.1 Handling precautions

The following explains the precautions on using the GX Configurator-MB.

#### (1) For safety

Since GX Configurator-MB is add-in software for GX Developer, read "Safety Precautions" and the basic operating procedures in the GX Developer Operating Manual.

#### (2) About installation

GX Configurator-MB is add-in software for GX Developer Version 4 or later. Therefore, GX Configurator-MB must be installed on the personal computer that has already GX Developer Version 4 or later installed.

#### (3) Screen error of Intelligent function module utility

Insufficient system resource may cause the screen to be displayed inappropriately while using the Intelligent function module utility. If this occurs, close the Intelligent function module utility, GX Developer (program, comments, etc.), and other applications, and then start GX Developer and Intelligent function module utility again.

#### (4) To start the Intelligent function module utility

- In GX Developer, select "QCPU (Q mode)" for PLC series and specify a project.
   If any PLC series other than "QCPU (Q mode)" is selected, or if no project is specified, the Intelligent function module utility will not start.
- (b) Multiple Intelligent function module utilities can be started. However, [Open parameters] and [Save parameters] operations under [Intelligent function module parameter] are allowed for one Intelligent function module utility only. Only the [Monitor/test] operation is allowed for the other utilities.
- (5) Switching between two or more Intelligent function module utilities When two or more Intelligent function module utility screens cannot be displayed side by side, select a screen to be displayed on the top of others using the task bar.

Start MELSOFT series GX D... 🖉 Intelligent function m... 🖉 Intelligent function m...

(6) Number of parameters that can be set in GX Configurator-MB When multiple intelligent function modules are mounted, the number of parameter settings must not exceed the following limit.

When intelligent function modules	Maximum number of parameter settings		
are installed to:	Initial setting	Auto refresh setting	
Q00J/Q00/Q01CPU	512	256	
Q02/Q02H/Q06H/Q12H/Q25HCPU	512	256	
Q02PH/Q06PH/Q12PH/Q25PHCPU	512	256	
Q12PRH/Q25PRHCPU	512	256	
Q02UCPU	2048	1024	
Q03UD/Q04UDH/Q06UDH/	4096	2048	
Q13UDH/Q26UDH/Q03UDE/			
Q04UDEH/Q06UDEH/Q13UDEH/			
Q26UDEHCPU			
MELSECNET/H remote I/O station	512	256	

For example, if multiple intelligent function modules are installed to the MELSECNET/H remote I/O station, configure the settings in GX Configurator so that the number of parameter settings for all the intelligent function modules does not exceed the limit of the MELSECNET/H remote I/O station.

Calculate the total number of parameter settings separately for the initial setting and for the auto refresh setting.

The number of parameters that can be set for one module in GX Configurator-MB is as shown below.

Target module	Initial setting	Auto refresh setting
QJ71MT91	3 (Fixed)	5 (Max.)

Example) Counting the number of parameter settings in Auto refresh setting



# 8.2.2 Operating environment

This section explains the operating environment of the personal computer that runs GX Configurator-MB.

	Item	Description		
Installation (Add-in) target * <sup>1</sup> Add		Add-in to GX Developer Version 4 (English version) or later. * <sup>2</sup>		
Computer		Windows <sup>®</sup> -based personal computer		
CPU Required memory		Refer to the next page "Operating system and performance required for personal		
		computer".		
Hard disk	For installation	65 MB or more		
space * <sup>3</sup>	For operation	10 MB or more		
Display		800 $ imes$ 600 dots or more resolution * <sup>4</sup>		
Operating s	system	Microsoft® Windows® 95 Operating System (English version) Microsoft® Windows® 98 Operating System (English version) Microsoft® Windows® Millennium Edition Operating System (English version) Microsoft® Windows NT® Workstation Operating System Version 4.0 (English version) Microsoft® Windows® 2000 Professional Operating System (English version) Microsoft® Windows® XP Professional Operating System (English version) Microsoft® Windows® XP Professional Operating System (English version) Microsoft® Windows® XP Home Edition Operating System (English version) Microsoft® Windows Vista® Home Basic Operating System (English version) Microsoft® Windows Vista® Home Premium Operating System (English version) Microsoft® Windows Vista® Business Operating System (English version)		
		Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Ultimate Operating System (English version) Microsoft <sup>®</sup> Windows Vista <sup>®</sup> Enterprise Operating System (English version)		

\*1: Install GX Configurator-MB in GX Developer Version 4 or higher in the same language. GX Developer (English version) and GX Configurator-MB (Japanese version) cannot be used in combination, and GX Developer (Japanese version) and GX Configurator-MB (English version) cannot be used in combination.

\*2: GX Configurator-MB is not applicable to GX Developer Version 3 or earlier.

\*3: At least 15GB is required for Windows  $\mathsf{Vista}^{\scriptscriptstyle{(\! R)\!}}$  .

\*4: Resolution of 1024  $\times$  768 dots or more is recommended for Windows Vista  $^{\scriptscriptstyle (\! 8\!)}$  .

Operating system	Performance required for personal computer			
Operating system	CPU	Memory		
Windows <sup>®</sup> 95 (Service Pack 1 or later)	Pentium <sup>®</sup> 133MHz or more	32MB or more		
Windows <sup>®</sup> 98	Pentium <sup>®</sup> 133MHz or more	32MB or more		
Windows® Me	Pentium <sup>®</sup> 150MHz or more	32MB or more		
Windows NT <sup>®</sup> Workstation 4.0 (Service Pack 3 or later)	Pentium <sup>®</sup> 133MHz or more	32MB or more		
Windows <sup>®</sup> 2000 Professional	Pentium <sup>®</sup> 133MHz or more	64MB or more		
Windows <sup>®</sup> XP Professional	Pentium <sup>®</sup> 300MHz or more	128MB or more		
Windows® XP Home Edition	Pentium <sup>®</sup> 300MHz or more	128MB or more		
Windows Vista <sup>®</sup> Home Basic	Pentium <sup>®</sup> 1GHz or more	1GB or more		
Windows Vista <sup>®</sup> Home Premium	Pentium <sup>®</sup> 1GHz or more	1GB or more		
Windows Vista <sup>®</sup> Business	Pentium <sup>®</sup> 1GHz or more	1GB or more		
Windows Vista <sup>®</sup> Ultimate	Pentium <sup>®</sup> 1GHz or more	1GB or more		
Windows Vista <sup>®</sup> Enterprise	Pentium <sup>®</sup> 1GHz or more	1GB or more		

<b>O</b>	<b>.</b>	
Operating system and	performance required	for personal computer

# POINT

The functions shown below are not available for Windows<sup>®</sup> XP and Windows Vista<sup>®</sup>. If any of the following functions is attempted, this product may not operate normally. Start of application in Windows<sup>®</sup> compatible mode Fast user switching Remote desktop Large fonts (Details setting of Display Properties) Also, 64-bit version Windows<sup>®</sup> XP and Windows Vista<sup>®</sup> are not supported.
Use a USER authorization or higher in Windows Vista<sup>®</sup>.

# 8.3 Utility Package Operation

# 8.3.1 Common utility package operations

(1) Control keys

Special keys that can be used for operation of the utility package and their applications are shown in the table below.

Key	Application
Esc	Cancels the current entry in a cell. Closes the window.
Tab	Moves between controls in the window.
Ctrl	Used in combination with the mouse operation to select multiple cells for test execution.
Delete	Deletes the character where the cursor is positioned. When a cell is selected, clears all of the setting contents in the cell.
Back Space	Deletes the character where the cursor is positioned.
$ \  \  \  \  \  \  \  \  \  \  \  \  \ $	Moves the cursor.
Page Up	Moves the cursor one page up.
Page Down	Moves the cursor one page down.
Enter	Completes the entry in the cell.

#### (2) Data created with the utility package

The following data or files that are created with the utility package can be also handled in GX Developer. Figure 8.1 shows respective data or files are handled in which operation.

#### <Intelligent function module parameter>

(a) Initial settings and auto refresh settings are saved in an intelligent function module parameter file in a project created with GX Developer.

Pro	oject	
	— Prog	ram
	— Para	meter
		— PLC parameter
		Network parameter
		— Intelligent function module parameter

- (b) Steps 1) to 3) shown in Figure 8.1 are performed as follows:
  - 1) From GX Developer, select:
    - $[Project] \rightarrow [Open \ project]/[Save]/[Save as]$
  - On the intelligent function module selection screen of the utility, select: [Intelligent function module parameter] → [Open parameters]/[Save parameters]
  - 3) From GX Developer, select:
    - [Online]  $\rightarrow$  [Read from PLC]/[Write to PLC]  $\rightarrow$  "Intelligent function module parameter"

Alternatively, from the intelligent function module selection screen of the utility, select:

 $[Online] \rightarrow [Read from PLC]/[Write to PLC]$ 

# <Text files>

A text file can be created by clicking the Make text file button on the initial setting, Auto refresh setting, or Monitor/Test screen. The text files can be utilized to create user documents.



Figure 8.1 Correlation chart for data created with the utility package

#### 8.3.2 Operation overview



Refer to Section 8.4

Refer to Section 8.5

1) —			[Online] -	[Monitor/T	est]
	Select	monitor/te	st module :	screen	
	Select monitor/t	est module			<
	Select monitor/te:	Module typ	JS(R) Module odel name	v V	
	Module implemen	tation status			
	Start I/O No. 0000	Mo QJ71MT91	dule model name		
	Monitor/Test			Exit	
			Select the monitored	module to /tested.	be
		Monitor/T	est screen		
	on MODBUS(R) Module ame: QJ71MT91	Start I/O	No.: 0000		
Switch 1: Operation Switch 2: Communi Basic parameter MODBUS(R) der	Setting item jstered trademark of ; SA. an mode setting status nication condition setting status starting method vice assignment parameter starting	Online Default paramete Default paramete		Setting va	
method Online change e Send frame spec Switch 3,4: Local Module READY Flash ROM settin	sification station IP address setting status	Disable Ethernet(V2.0) Accessible	192.1.0.254		
Write to module	Save file Current value display Load file Make text file		Cannot execute test		Monitoring
	Stop monitor	Execute jest			Close

Refer to Section 8.6

# 8.3.3 Starting the Intelligent function module utility

#### [Operating procedure]

Intelligent function module utility is started from GX Developer. [Tools]  $\rightarrow$  [Intelligent function utility]  $\rightarrow$  [Start]

[Setting Screen]

🖉 Intelligent fur	nction module	utility	C:WE	LSEC\GPPW	'VQJ 🔳	IX
Intelligent function m	odule <u>p</u> arameter	<u>O</u> nline	<u>T</u> ools	<u>H</u> elp		
-Select a target int	elligent function m	odule. —				
Start I/O No.		ule type				
0	000 M	ODBUS(P	R) Modu	le	•	·
	Mod	ule mode	Iname			
	Q	I71MT91			•	· .
Parameter setting	module					
Intelligent function	n module paramete	r 📄				
Start I/O No.	Module mo	del name		Initial setting	Auto refresh	
0000	QJ71MT91			Available	Unavailable	
						-
Initial setting	Auto refres	sh	D	elete	Exit	

[Explanation of items]

(1) Activation of other screens

Following screens can be displayed from the intelligent function module utility screen.

- (a) Initial setting screen
   "Start I/O No."<sup>\*1</sup> → "Module type" → "Module model name" →
   Initial setting
- (b) Auto refresh setting screen "Start I/O No."  $^{*1} \rightarrow$  "Module type"  $\rightarrow$  "Module model name"  $\rightarrow$ Auto refresh
- (c) Select monitor/test module screen [Online]  $\rightarrow$  [Monitor/Test]
- \*1: Enter the start I/O No. in hexadecimal.

#### (2) Command buttons

Deletes the initial setting and auto refresh setting of the selected module.

Exit Closes this screen.

telligent function module parameter	Online	
Open parameters	Ctrl+O	
Close parameters		
Save parameters	Ctrl+S	
Delete parameters		
Open FB support parameters		
Save as FB support parameters		

ent function module i	utility	C:WE	LSEC\
unction module parameter	Online	Tools	Help
it function module paramete t I/O No. Modi	Read	tor/Tesl I from P e to PLC	LC

(a) File menu

Intelligent function module parameters of the project opened by GX Developer are handled.

[Open parameters] : Reads a parameter file.

[Close parameters] : Closes the parameter file. If any data are modified, a
dialog asking for file saving will appear.
[Save parameters] : Saves the parameter file.
[Delete parameters] : Deletes the parameter file.

-	•	-	•
[Exit]		: Closes this	screen.

(b)	Online menu	
	[Monitor/Test]	: Activates the Select monitor/test module screen.
	[Read from PLC]	: Reads intelligent function module parameters from the CPU module.
	[Write to PLC]	: Writes intelligent function module parameters to the CPU module.

# POINT

- (1) Saving intelligent function module parameters in a file Since intelligent function module parameters cannot be saved in a file by the project saving operation of GX Developer, save them on the shown module selection screen.
- (2) Reading/writing intelligent function module parameters from/to a programmable controller using GX Developer
  - (a) Intelligent function module parameters can be read from and written into a programmable controller after having been saved in a file.
  - (b) Set a target programmable controller CPU in GX Developer
     [Online] → [Transfer Setup]
     Only use the control CPU for the QJ71MT91 to write the intelligent function module parameters for a multiple CPU system to the programmable controller.
  - (c) When the QJ71MT91 is mounted on a MELSECNET/H remote I/O station, [Read from PLC] and [Write to PLC] must be performed from GX Developer.
- (3) Checking the required utility
  While the start I/O is displayed on the Intelligent function module utility setting screen, "\*" may be displayed for the model name.
  This means that the required utility has not been installed or the utility cannot be started from GX Developer.
  Check the required utility, selecting [Tools] [Intelligent function utility] [Utility list...] in GX Developer.

# 8.4 Initial Setting

# [Purpose]

Set parameters on the initial setting screen.

This setting eliminates the need for parameter setting by sequence programs.

The initial setting are as follows.

- Basic parameters
- Automatic communication parameters
- MODBUS<sup>®</sup> device assignment parameters

# [Operating procedure]

```
"Start I/O No." \rightarrow "Module type" \rightarrow "Module model name" \rightarrow Initial setting
```

# [Setting Screen]

Initial setting	
Module information Module type: MDDBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000
Setting item	Setting value
MODBUS is a registered trademark of Schneider Electric SA.	
Basic parameter	Basic parameter
Automatic communication parameter	Automatic communication parameter
MODBUS(R) device assignment parameter	MODBUS(R) device assignment
– Details ––	
Make text file End s	etup Cancel

# [Explanation of items]

(1) Parameter settings

Select a button under the Setting value, and set the parameters on the corresponding screen.

- Basic parameter setting (refer to Section 8.7.1)
- Automatic communication parameter setting (refer to Section 8.7.2)
- MODBUS<sup>®</sup> device assignment parameter setting (refer to Section 8.7.3)

#### (2) Command buttons

Make text file	Creates a file containing the screen data in text file format.
End setup	Saves the set data and ends the operation.
Cancel	Cancels the setting and ends the operation.

#### POINT

(1)	When parameters are set on the initial setting screen, Basic parameter setting
	existence (X3) turns on after the programmable controller CPU is in RUN
	status.

(2) The initial settings are stored as the intelligent function module parameters. After the intelligent function module parameters have been written to the programmable controller CPU, the initial setting is updated when the programmable controller is powered ON from OFF or the programmable controller CPU is reset (with the programmable controller CPU's RUN/STOP switch set to RUN). If the QJ71MT91 is mounted on a MELSECNET/H remote I/O station, the initial

settings become effective when the remote I/O station, the initial notifying the status change (from STOP to RUN) of the remote master station's programmable controller CPU.

At this time, do not write data to the buffer memory using a sequence program and do not manipulate Y-signals until Basic parameter setting existence (X) turns on.

- (3) If the initial setting data are written using a sequence program, the initial setting values are written when the CPU module switches from STOP to RUN status. Therefore, perform programming so that the initial setting will be reexecuted in the sequence program.
- (4) The parameter setting by sequence program has priority over the parameter setting by initial setting when both of them are used.

# 8.5 Auto Refresh Setting

#### [Purpose]

Make this setting to store the QJ71MT91 buffer memory data into the specified devices of the programmable controller CPU or to store the programmable controller CPU device data into the QJ71MT91 buffer memory automatically.

#### [Operating procedure]

"Start I/O No."  $\rightarrow$  "Module type"  $\rightarrow$  "Module model name"  $\rightarrow$  Auto refresh

#### [Setting screen]

Module information Module type: MODBUS(R) Module	S	itart I/O No.:	0000			
Module model name: QJ71MT91						
Setting item	Module side Buffer size	Module side Transfer word count	Module side Buffer offset	Transfer direction	PLC side Device	•
MODBUS is a registered trademark of Schneider Electric SA.	4096	4096	0	->		
Automatic communication function buffer input area						
Automatic communication function buffer output area	4096	4096	0	<-		
Automatic communication operation status (1 to 64)	4	4	0	->		
User free area (input)	4096	4096	0	->		
User free area (output)	4096	4096	0	<-		•
Make text file	End setu	1			Cancel	

# [Explanation of items]

# (1) Display data

(a) Setting items

Setting Item	Buffer memory address	Reference section
Automatic communication function buffer input area	4096 to 8191	
Automatic communication function buffer input area	(1000н to 1FFFн)	
	12288 to 16383	Section 5.2.1
Automatic communication function buffer output area	(3000н to 3FFFн)	Section 5.2.1
	3104 to 3107	
Automatic communication operation status (1 to 64)	(0C20н to 0C23н)	
	20480 to 24575	
User free area (input/output)	(5000н to 5FFFн)	Section 7.4.5

- (b) Display items
  - Module side Buffer size Displays the buffer memory size of the setting item.
  - Module side Transfer word count Displays the number of words to be transferred.
  - Module side buffer offset
     Displays the offset value of the buffer memory data to be transferred.
  - Transfer direction

     -" indicates that data are written from the device to the buffer memory.

"- >" indicates that data are load from the buffer memory to the device.

5) PLC side Device

Enter a CPU module side device that is to be automatically refreshed. Applicable devices are X, Y, M, L, B, T, C, ST, D, W, R and ZR. When using bit devices X, Y, M, L or B, set a number that can be divided by 16 points (examples: X10, Y120, M16, etc.). Also, buffer memory data are stored in a 16-point area, starting from

the specified device number. For example, if X10 is entered, data are stored in X10 to X1F.

The devices available for MELSECNET/H remote I/O modules are X, Y, M, B, D and W.

# (2) Command buttons

Make text file	Creates a file containing the screen data in text file format.
End setup	Saves the set data and ends the operation.
Cancel	Cancels the setting and ends the operation.

#### POINT

(1) The auto refresh settings are stored in an intelligent function module parameter file.

After the intelligent function module parameters have been written to the programmable controller CPU, the automatic refresh setting is updated when the programmable controller is powered ON from OFF or the programmable controller CPU is reset (with the programmable controller CPU's RUN/STOP switch set to RUN).

(2) The auto refresh settings cannot be changed from the sequence programs. However, processing equivalent to auto refresh can be added using the FROM/TO instruction in the sequence program.

### 8.6 Monitor/Test

# [Monitor/Test Purpose]

From this screen, start the monitoring or test of the operating status, I/O signals, parameter setting status, automatic communication status, error log, communication status of the QJ71MT91 and perform PING test.

# [Operating procedure]

```
Select monitor/test module screen \rightarrow "Start I/O No. *" \rightarrow "Module type" \rightarrow "Module model name" \rightarrow Monitor/Test
```

\*: Enter the start I/O No. in hexadecimal.

The screen can also be started from System monitor of GX Developer Version 6 or later.

Refer to the GX Developer Operating Manual for details.

# [Monitor/Test Screen]

٨	Monitor/Test					
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91		Start I/D No.: 0000				
	Setting item	Current value	Setting value			
	MODBUS is a registered trademark of Schneider Electric SA.	Contra Value				
	Switch 1: Operation mode setting status	Online				
	Switch 2: Communication condition setting status Basic parameter starting method	Default parameter				
	MODBUS(R) device assignment parameter starting method	Default parameter				
	Online change enable/disable	Disable				
	Send frame specification	Ethernet(V2.0)				
	Switch 3,4: Local station IP address setting status	192.1.0.254				
	Module READY	Accessible	-			
	Flash ROM setting       Write to module     Save file       Bread from module     Load file   Make text file	Cannot execute test	Monitoring			
	Start monitor Stop monitor E	xecute <u>t</u> est	Close			

# [Monitor/Test Items]

	Monitor/Test Items				Reference section
	Switch 1 Operation mode setting status		etting status	0С00н (3072)	
Intelligent function module switch setting status	Switch 2	Communication condition setting status	Basic parameter starting method MODBUS <sup>®</sup> device assignment parameter starting method Online change enable/disable Send frame specification	0C01н (3073)	Section 6.6
	Switch 3, 4	Local station IP address setting status		0C02н to 0C03н (3074 to 3075)	
Module READY	Module READY				Section 11.1
Watch dog time	r error			_	

Monitor/Test Items		Buffer memory address	Reference section		
	LED ON status	INIT. status OPEN status	0C05⊦		
Module status		ERR. status	(3077)	Section 11.2	
		COM. ERR. status			
COM. ERR. LED OFF request (*1)		_	Section 11.4.1		
X/Y Monitor/test (*2)		_	Section 8.6.1		
Basic/MODBUS <sup>®</sup> device assignment parameter status (*2)			_	Section 8.6.2	
Automatic communication status (*2)			_	Section 8.6.3	
Error log (*2)			_	Section 8.6.4	
Communication status (*2)			_	Section 8.6.5	
PING test (*2)			_	Section 8.6.6	

\*1: For the COM. ERR. OFF request, select the corresponding request in the Setting value column.

Refer to Section 11.4.1 for details.

\*2: To move to each sub screen, click the button in the Setting value column.

# [Specifications common to Monitor and Test screens (including sub screens)]

The following explains the specifications common to respective screens.

#### (1) Display data

Setting item : Displays I/O signals and buffer memory names. Current value : Monitors the I/O signal states and present buffer memory values. Setting value : Enter or select the data to be written by test operation.

#### (2) Command buttons

Current value display	Displays the current value of the item selected.
	(This is used to check the text that cannot be
	displayed in the current value field. However, in
	this utility package, all items can be displayed in
	the display fields).
Make text file	Creates a file containing the screen data in text file
	format.
Start monitor Stop monitor	Selects whether or not to monitor current values.
Execute test	Performs a test on the selected items. To select
	more than one item, select them while holding
	down the Ctrl key.
Close	Closes the screen that is currently open and
	returns to the previous screen.
# 8 UTILITY PACKAGE (GX Configurator-MB)

# MELSEC-Q

[Monitor/Test screen - Sub screen shift]

Monitor/Test			Basic/MODBUS(R) devi	ce assignment parameter	er status	×
Module information			Module information			
Module type: MODBUS(R) Module	Start I/O No.: 0000		Module type: MODBU	S(B) Module	Start I/O No.: 0000	
	Star 1/0 No.: 0000				Start / D No 0000	
Module model name: QJ71MT91			Module model name: G	U71MT91		
Setting item	Current value	Setting value		tting item	Current value	Setting value
MODBUS is a registered trademark of Schneider Electric SA.			Basic parameter setting exi		Parameters set	
Switch 1: Operation mode setting status	Online	l	Basic parameter error code MODBUS(R) device assign		Parameters set	
Switch 2: Communication condition setting status	Default parameter		setting existence			
Basic parameter starting method			MODBUS(R) device assign error code storage area	nment parameter	0000	
MODBUS(R) device assignment parameter starting method	Default parameter		MODBUS(R) device assign	ment parameter		
Online change enable/disable	Disable		setting result storage area	interio paramotor		
Send frame specification	Ethemet(V2.0)		Error, device type			
Switch 3,4: Local station IP address setting status Module READY	192.1.0.254		Error, assigned group No.		0	<u> </u>
Module READY	Accessible					•
Flash ROM setting	Details		Flash ROM setting		Details	
Write to module Save file Current value display		Monitoring	ng Write to Save file	Current value display		Monitoring
	Cannot execute test				Cannot execute test	
Read from module Load file Make text file			Read from module Load file	Make text file		
	- 1					
Start monitor Stop monitor	Execute jest	Close	Start monitor St	top monitor	xecute test	Close
					•	
			Dofo	r to Section 8	oeo T	
			Rele	i lo section d		
					Basic/MO	DBUS(R) device
	X/Y Mor	nitor/test				c communication
	X/Y Mor	nitor/test				
	X/Y Mor	nitor/test				
	X/Y Mor	nitor/test				
X/Y Monitor/Rest	X/Y Mor	nitor/test	Automatic communica	tion status		
X/Y Monitor/test ← Module information	X/Y Mor	nitor/test	Automatic communica	tion status		
Module information	X/Y Mor	nitor/test	Module information		Automatio	
Module information Module type: MODBUS(R) Module		nitor/test	Module information Module type: MODBU	S(R) Madule		
Module information		nitor/test	Module information	S(R) Madule	Automatio	
Module information Module type: MDDBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000		Module information Module type: MDDBU Module model name: C	S(R) Madule	Automatio	
Module information Module type: MODBUS(R) Module Module model name: QJ71MT31 Setting item	Start I/O No.: 0000	nitor/test	Module information Module type: MODBUS Module model name: G	S(R) Module U/71MT91 ting item	Automatio	
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91 Setting item X000Module READY	Start //0 No.: 0000		Module information Module type: MDDBU Module model name: C	S(R) Module N71MT91 Iting item operation status	Start 1/2 No.: 0000	c communication
Module information Module type: MODBUS(R) Module Module model name: 0J/71M191 Setting item 5000 Module READY 5000 Module READY	Start I/O No: 0000 Current value Accessible OFF		Module information Module type: MDDBUS Module model name: C Automatic communication Automatic communication	S(R) Module N71MT91 Iting item operation status	Start 1/2 Na.: 0000	c communication
Module information Module type: MODBUS(R) Module Module model name: QJ71M151 Setting item 2000.Module READY X017.Batic parameter setting, monally completed X027.Batic parameter setting, and completed	Start I/O No.: 0000 Current value Accessible OFF OFF OFF		Module information Module type: MDDBU Module model name: C Automatic communication Automatic communication Automatic communication	S(R) Module W71MT91 ting item operation status peration status	Start 1/2 No.: 0000	c communication
Module information Module type: MODBUS(R) Module Module model name: QJ71M151 Setting item 2000 Module READY X017 Batic parameter setting, renormally completed X032 Batic parameter setting, renor completed X033 Batic parameter setting setting setternore X034 Automatic commiscion or gameter	Start I/O No: 0000 Current value Accessible OFF		Module Information Module type: MDDBU Module model name: C Automatic communication Automatic communication Automatic communication Automatic communication	S(R) Module (J2TIMT91 ting kem operation status operation status operation status operation status operation status operation status	Start I/O No:: 0000	c communication
Module information Module type: MODBUS(R) Module Module model name QJ/71M191 Setting item X00 Module READY X010 Basic parameter setting, removing completed X012 Basic parameter setting, removing completed X013 Basic parameter setting, removing completed X014 Automatic communication parameter setting, normally completed	Start I/O No.: 0000 Current value Accessible OFF Paramoters sot OFF OFF OFF		Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication Automatic communication alonge area Automatic communication	5(F) Module U71MT91 ting item avaneter error code avaneter error code	Start I/O No.: 0000 Current Value Stopped 0000 Not requested	C communication
Module information Module type: MODBUS(P) Module Module model name: QJ71M191 Setting item 2000 Module FEADY 2010 Bace parameter setting: non-completed 2022 Bace parameter setting: enco-completed 2023 Bace parameter setting: enco-completed 2023 Bace parameter setting: enco-completed 2024 Automatic completed setting: nonsity: completed setting: nonsity: completed	Start I/O No.: 0000 Current value Accessible OFF OF Paramoters sot		Module Information Module type: MDDBU Module model name: D Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication	S(F) Module W7IMT91 ting ken operation status operation status operation status operation status operation status ting reguest tati request top request	Stat I/O No: 0000 Current value Corrent valu	c communication
Module information Module information Module model name QJ/71M191 Setting item X000 Module READY X010 Basic parameter setting, removally completed X012 Basic parameter setting, removally completed X012 Basic parameter setting, removally completed X014 Automatic communication parameter setting, removally completed X055-Automatic communication parameter setting, removally completed	Start I/O No.: 0000 Current value Accessible OFF OFF OFF OFF OFF OFF OFF OFF OFF OF		Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication Automatic communication alonge area Automatic communication	S(R) Module U/21M131 ting item operation rature parameter entror code parameter setting recult data request https://www.communication.operation	Start I/O No.: 0000 Current Value Stopped 0000 Not requested	C communication
Module Information Module type: MODBUS(R) Module Module model name: Qu/TIMT91 Setting Item 3001 Module READY 3010 Batic parameter setting, normally completed 3012 Batic parameter setting, neuronally completed 3015 Automatic communication parameter setting, neurol completed 3016 Automatic communication generation status	Start I/O No.: 0000  Current value  Accessible  OFF  OFF  OFF  OFF  OFF  OFF  Shopped No error		Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Parameter 1 Automatic co Parameter 1 Automatic co	S(R) Module U/21M131 ting item operation rature parameter entror code parameter setting recult data request https://www.communication.operation	Stat I/O No: 0000 Current value Corrent valu	Seting value  Seting value  Being requested  Feng requested  V
Module information Module type: MODBUS(P) Module Module model name: QJ71M151 Setting item 2000 Module READY 2010 Bate parameter setting, normally completed 2013 Bate parameter setting, encorcorpleted 2013 Bate parameter setting, encorcorpleted 2013 Bate parameter setting, encorcorpleted 2013 Bate parameter setting, normally, completed 2015 Automatic communication parameter setting, normally, completed 2015 Automatic communication parameter setting, normally, completed	Start I/O No.: 0000 Current value Accessible OFF OFF OFF OFF OFF OFF Stopped		Module Information     Module Information     Module type: MDDBU     Module model name: 0     Automatic communication     Automatic communication     Automatic communication     Automatic communication     Automatic communication     Parameters T Automatics co	S(F) Module W71MT91 ting ken operation status operation status operation status operation status tati request tati request top request monumediation operation area	Start //2 No: 0000  Start //2 No: 0000  Current value Stopped 0000 Not requested Normal	Seting value  Seting value  Being requested  Feng requested  V
Module information Module type: MODBUS(R) Module Module model name: QJ/71M191 Setting item 2000 Module READY 2000 Module READY 2000 Module READY 2000 Back parameter setting, normally completed 2012 Back parameter setting, normally completed 2013 Back parameter setting, neuroscipation 2013 Back parameter setting, neuroscipation 2013 Back parameter setting, neuroscipation 2014 Automatic communication parameter setting, neuroscipatied 2015 Automatic communication generation tablus 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2016 Automatic communication setting settings 2017 Automatic communication setting settings 2017 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting settings 2016 Automatic communication setting setting	Start I/O No.: 0000  Current value  Accessible  OFF  OFF  OFF  OFF  OFF  OFF  Shopped No error		Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Parameter 1 Automatic co Parameter 1 Automatic co	S(F) Module W71MT91 ting ken operation status operation status operation status operation status tati request tati request top request monumediation operation area	Start //2 No: 0000  Start //2 No: 0000  Current value Stopped 0000 Not requested Normal	Seting value  Seting value  Being requested  Feng requested  V
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91 Setting item 2000 Module FEADY 2010 Basic parameter setting, namely completed 2012 Basic parameter setting, namely completed 2013 Basic parameter setting, namely completed 2013 Basic parameter setting, namely completed 2014 Automatic communication parameter setting, name completed 2016 Automatic communication parameter setting, name completed 2017 Automatic communication setting atalate 2018 MODBUS(R) device assignment parameter FIBAR FDM setting 2016 Current value	Stati/O No.: 0000  Current value  Accessible  OFF  OFF  OFF  OFF  Stoggad No enror  OFF  OFF		Module information     Module information     Module type: MDDBU:     Module model name: C     Automatic communication     Automatic communication     Automatic communication     Automatic communication     Parameters 1 Automatic co     Automatic communication     Automatic communication     Automatic co     Automatic	S(R) Module U/21M131 sprankon status avarameter error code avarameter recorde avarameter setting result top request top request araea area area area current value	Start I/O No: 0000  Current value  Stopped  O000  Not requested Normal  O000  O000  Not requested Normal  O000  O0	Seting value  Seting value  Being requested  Feng requested  V
Module type: MODBUS(R) Module Module model name: Q171M191 Setting item 3000 Module FEADY 2013 Bairs parameter setting, morsally completed 2023 Bairs parameter setting, encounsily completed 2023 Bairs parameter setting, encounsile 2024 Automatic communication parameter setting, nomally completed 2026 Automatic communication parameter setting, nomally completed 2026 Automatic communication parameter setting, housing and automatic and automatic 2026 Automatic communication parameter setting, automatic communication parameter setting, automatic communication parameter setting, automatic communication parameter setting, automatic communication parameter setting, automatic communication parameter Align MOBUSUB(3) device satigment parameter Flash ROM setting	Stat I/O No: 0000  Current value  Current value  Current value  OFF  Parameters set  OFF  Stopped No enro  OFF  Details	Setting value	Module Information Module type: MDDBU Module model name: C Automatic communication Automatic communication Automatic communication Automatic communication Parameters 1 Automatic co Parameters 1 Automatic co Status totage Automatic communication Parameters 1 Automatic co Parameters 1 Automatic co	S(F) Module U2TIMT31 ting Rem speration status as ameter error code saraneter settor code saraneter settor code stat request instruction operation area	Start I/O No.: 0000  Start I/O No.: 0000  Current value Stopped 0000  Not requested Norma 0000  Details	C communication
Module information Module information Module model name: QJ/TIMT91 Setting item 5000 Module READY 5000	Stati/O No.: 0000  Current value  Accessible  OFF  OFF  OFF  OFF  Stoggad No error  OFF  Current value  Current	Setting value	Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communic	S(R) Module U/71M131 ting item operation intolus operation intolus operation intolus operating operating operating ting regular ting re	Start I/O No: 0000  Current value  Stopped  O000  Not requested Normal  O000  O000  Not requested Normal  O000  O0	C communication
Module information Module information Module type: MODBUS(R) Module Module model name: QL71M191 Setting Rem 9000 Module READY 9011 Basic parameter setting, error completed 9032 Basic parameter setting, error completed 9033 Basic parameter setting, error completed 9033 Basic parameter setting, error completed 9033 Automatic communication parameter setting, incompleted 9056 Automatic communication parameter 1905 Automatic communication parameter 1905 Automatic communication parameter 9038 MODBUS(R) Revoce assignment parameter Flash ROM setting 90% Biological Server Flash 190% Biologi	Stat I/O No: 0000  Current value  Current value  Current value  OFF  Parameters set  OFF  Stopped No enro  OFF  Details	Setting value	Module information Module type: MDDBU Module type: MDDBU Module model name: C Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Automatic communication Flash RDM setting Sever file	S(R) Module U/21M131 sprankon status avarameter error code avarameter recorde avarameter setting result top request top request araea area area area current value	Start I/O No.: 0000  Start I/O No.: 0000  Current value Stopped 0000  Not requested Norma 0000  Details	C communication
Module information Module information Module model name: QJ/TIMT91 Setting item 5000 Module READY 5000	Stat I/O No: 0000  Current value  Current value  Current value  OFF  Parameters set  OFF  Stopped No enro  OFF  Details	Setting value	Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication atorage area Automatic communication Automatic communica	S(R) Module U/71M131 ting item operation intolus operation intolus operation intolus operating operating operating ting regular ting re	Start I/O No.: 0000  Start I/O No.: 0000  Current value Stopped 0000  Not requested Norma 0000  Details	C communication
Module information Module information Module model name: QJ/TIMT91 Setting item 5000 Module READY 5000	Stat I/O No: 0000  Current value  Current value  Current value  OFF  Parameters set  OFF  Stopped No enro  OFF  Details	Setting value	Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication atorage area Automatic communication Automatic communica	S(R) Module U/71M131 ting item operation intolus operation intolus operation intolus operating operating operating ting regular ting re	Start I/O No.: 0000  Start I/O No.: 0000  Current value Stopped 0000  Not requested Noma 0000  Details	C communication
Module information Module information Module model name: QJ/TMT91 Setting item 3003 Module READY 3013 Basic parameters setting, arronayly completed 3012 Basic parameters setting, arronayly completed 3012 Basic parameters setting, arronayle completed 3013 Basic parameters setting, arronayle completed 3013 Basic parameters setting, arronayle completed 3013 Basic parameters setting, arronayle completed 3015 Automatic communication parameters setting, arronagneted 3015 Automatic communication setting tables 3016 Automatic communication setting t	Stat I/O No: 0000  Current value  Current value  Current value  OFF  Parameters set  OFF  Stopped No enro  OFF  Details	Setting value	Module information Module type: MDDBU: Module model name: C Automatic communication Automatic communication atorage area Automatic communication Automatic communica	S(R) Module U/71M131 ting item operation intolus operation intolus operation intolus operating operating operating ting regular ting re	Start I/O No.: 0000  Start I/O No.: 0000  Current value Stopped 0000  Not requested Noma 0000  Details	C communication
Module information Module information Module model name: Q1/71M131 Setting item \$200 Module EEADY \$200	Stat I/O No: 0000  Current value  Current value  Current value  OFF  Parameters set  OFF  Stopped No enro  OFF  Details	Setting value	Module information Module type: MDDBU: Module model name: C Automatic communceition Automatic communceition Automatic communceition Automatic communceition Automatic communceition Automatic communceition Automatic communceition Automatic communceition Automatic communceition Automatic communceition Branetter Jutomatic co Branetter Jutomatic co Automatic communceition Automatic communceition Branetter Statumatic automatic Automatic communceition Automatic communceition Branetter Statumatic automatic Branetter Statumatic Automatic communceition Automatic communceition Automatic communceition Branetter Statumatic Automatic communceition Automatic co	S(R) Module U/21M131 ting item operation status operation status operation status operating operating operating status operating operation operation minunication error code	Start I/O No.: 0000  Start I/O No.: 0000  Current value Stopped 0000  Not requested Noma 0000  Details	C communication

Refer to Section 8.6.1

Refer to Section 8.6.3

Communication status PING test	Error log		
	Module information		
		Start I/D No : 0000	
		Star. NO 110. 0000	
The set of second of the formation           The set of the second of the secon	Module model name: QJ71MT91		
The set of second of the formation           The set of the second of the secon			
The set of second of the formation           The set of the second of the secon	Setting item	Current value Setting value	
Subdivision		Contrast, Yullion	
Excellence       Image: Read on the second of	Number of errors occurred	0	
Image: Control on the second of the secon	No.1 Detailed error code	0000	
Image: Design in the second		0	
The show       0.00         The show       0.00 <td< td=""><td>Function code</td><td></td><td></td></td<>	Function code		
Bit Detailes code       000         Bit Detailes code       000         Bit Detailes code       000         Bit Detailes code       000         Bit Detailes code       000         Bit Detailes code       000         Bit Detailes code       000         Bit Detailes code       000         Detailes code       000			
Image: Description of the service descriptio			
Pick Ideal       Deale       Monorry         Image: Diagramment       Deale       Monorry         Diagramment       Deale       Deale         Pick Ideal       Deale       Deale         Diagramment       Deale       Deale	Exception code		
Winder werden       Construction         Refer to Section 8.6.4       Error log         Communication status       PING test         Outcommunication status       PING test         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Pinker to Section 8.6.4       PING test         Made wind memory       Communication status         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Pinker to Section 8.6.4       Pinker test         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Pinker test       Section 8.	Function code	0	
Winder werden       Construction         Refer to Section 8.6.4       Error log         Communication status       PING test         Outcommunication status       PING test         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Pinker to Section 8.6.4       PING test         Made wind memory       Communication status         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Pinker to Section 8.6.4       Pinker test         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Made wind memory       Made wind memory         Made wind memory       Section 8.6.4         Pinker test       Section 8.	Flash ROM setting	Details	
Image: Image:	Write to Current value	Monitoring	
Water the finance       Main the finance         Image: the number       Image: the number         Refer to Section 8.6.4       Error log         Image: the number       Image: the number         Image: the number       Image: the number         Image: the number       Image: the number         Mode reformation       Start /D Image: the number of the n	module bave ne display	Connat every to test	
Refer to Section 8.6.4     Communication status        Communication status	Read from	Cannot execute (est	
Refer to Section 8.6.4       Error log         Communication status       PING test         Mode information       PING test         Mode information       Set 1/0 Na:       000         Mode information more more more more more more more more	module Load me Make text file		
Refer to Section 8.6.4       Error log         Communication status       PING test         Mode information       PING test         Mode information       Set 1/0 Na:       000         Mode information more more more more more more more more			
Refer to Section 8.6.4       Error log         Communication status       PING test         Mode information       PING test         Mode information       Set 1/0 Na:       000         Mode information more more more more more more more more			
Refer to Section 8.6.4       Error log         Communication status       PING test         Mode information       PING test         Mode information       Set 1/0 Na:       000         Mode information more more more more more more more more			
Refer to Section 8.6.4       Error log         Communication status       PING test         Mode information       PING test         Mode information       Set 1/0 Na:       000         Mode information more more more more more more more more			
Error log         Communication status         Communication status         Mode nominon	Start monitor Stop monitor Exe	ecute test Close	
Error log         Communication status         Communication status         Mode nominon			1
Error log         Communication status         Communication status         Mode nominon		0.04	
Image: control of the control of t	Refer to Section a	8.6.4	
Image: control of the control of t		Error log	
Communication status       PING test         communication status       Image: MOBBUSRI Models       Start I/D No:       000         Mode room image: MOBBUSRI Models       Start I/D No:       000       Mode room image: MOBBUSRI Models       Start I/D No:       000         Price Mode room image: MOBBUSRI Models       Start I/D No:       000       Mode room image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode Room image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Image: MOBBUSRI Model       Image: MOBBUSRI Model       Image: MOBBUSRI Model			
Communication status       PING test         communication status       Image: MOBBUSRI Models       Start I/D No:       000         Mode room image: MOBBUSRI Models       Start I/D No:       000       Mode room image: MOBBUSRI Models       Start I/D No:       000         Price Mode room image: MOBBUSRI Models       Start I/D No:       000       Mode room image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode Room image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Image: MOBBUSRI Model       Image: MOBBUSRI Model       Image: MOBBUSRI Model			
Communication status       PING test         communication status       Image: MOBBUSRI Models       Start I/D No:       000         Mode room image: MOBBUSRI Models       Start I/D No:       000       Mode room image: MOBBUSRI Models       Start I/D No:       000         Price Mode room image: MOBBUSRI Models       Start I/D No:       000       Mode room image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode room image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Start I/D No:       000       Image: MOBBUSRI Model       Image: MOBBUSRI Model       Start I/D No:       000         Price Mode Room image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Operation image: MOBBUSRI Model       Image: MOBBUSRI Model       Image: MOBBUSRI Model       Image: MOBBUSRI Model	1)		
Communication status       Image: Communication status       I	.)		
Communication status       Image: Communication status       I		O	
Modele information     Modele information       Modele information     Modele type:       Modele information     Modele information       PIP Decision count     O       Count of IDM product inception incound     O       Modele information     O       Simulation inclusion incended     O       Modele information     O       Modele information     O       Modele information     O       Simulation inclusion incended     O       Modele information incended     O       Total number of incended     O       Total number of incended     O       Mon		Communication status	PING test
Modele information     Modele information       Modele information     Modele type:       Modele information     Modele information       PIP Decision count     O       Count of IDM product inception incound     O       Modele information     O       Simulation inclusion incended     O       Modele information     O       Modele information     O       Modele information     O       Simulation inclusion incended     O       Modele information incended     O       Total number of incended     O       Total number of incended     O       Mon			
Modele information     Modele information       Modele information     Modele type:       Modele information     Modele information       PIP Decision count     O       Count of IDM product inception incound     O       Modele information     O       Simulation inclusion incended     O       Modele information     O       Modele information     O       Modele information     O       Simulation inclusion incended     O       Modele information incended     O       Total number of incended     O       Total number of incended     O       Mon			
Modele information     Modele information       Modele information     Modele type:       Modele information     Modele information       PIP Decision count     O       Count of IDM product inception incound     O       Modele information     O       Simulation inclusion incended     O       Modele information     O       Modele information     O       Modele information     O       Simulation inclusion incended     O       Modele information incended     O       Total number of incended     O       Total number of incended     O       Mon		¥	
Model type:       MDDBUSRI) Modele       Stati I/D No::       0000         Model mate:       0.171MT31         Image: Stating rate:       0         Control (Flow) for discussed       0         Table integet of the control in court       0         Control (Flow) for discussed       0         Table integet of the control in court       0         S	Communication status		PING test
Model type:       MDDBUSRI) Modele       Stati I/D No::       0000         Model mate:       0.171MT31         Image: Stating rate:       0         Control (Flow) for discussed       0         Table integet of the control in court       0         Control (Flow) for discussed       0         Table integet of the control in court       0         S			
Model model name:     Qi/TMT31       Image: Setting team     Current value:     Setting value:       Image: Setting value:     Setting value:     Setting value:			
Setting lem     Current value     Setting value            [P packet reception count Count of IP packet reception discarded de to sum check entor           Current value     Setting value (Demonstration time detaching value (Demonstrating value (Dem	Module type: MODBUS(R) Module	Start I/O No.: 0000	Module type: MDDBUS(R) Module Start I/O No.: 0000
Setting lem     Current value     Setting value            [P packet reception count Count of IP packet reception discarded de to sum check entor           Current value     Setting value (Demonstration time detaching value (Demonstrating value (Dem	Madula madel some 0.171MT91		Module model name: 0171MT91
IP P packet reception count     0       Count of LPA packet reception dicated     0       Carl of LPA packet reception dicated     0       Carl of LPA packet reception dicated     0       Total number of the count of packet     0       Simultaneous transmission count     0       CAR of LPA packet     0       Total number of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of the count of the count of count of the count of count of the count of th	mouse model hame: QU/TM131		Province model manage - GOVETINE OF
IP P packet reception count     0       Count of LPA packet reception dicated     0       Carl of LPA packet reception dicated     0       Carl of LPA packet reception dicated     0       Total number of the count of packet     0       Simultaneous transmission count     0       CAR of LPA packet     0       Total number of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of count of the count of the count of the count of count of the count of count of the count of th			
Control IP packet treception discarded     0       Total number of lare IP packets event     0       Simultaneous transition error detection count     0       Other ICMP packet sception discarded     0       Total number of tart (ICMP packet sception discarded     0       Total number of ICMP each sceptisted     0       T			
due to uncheck error     0       Todar nuche error Posobet     0       Smuthenesus transition error detection court     0       Court of (LMP pocket reception excepted     0       Court of (LMP pocket reception excepted     0       Court of (LMP pocket reception excepted     0       Todar nuche exception exc	IP IP packet reception count	-	
Total number of lend IP packets     0       Simulamenous information request     Not requested       OPING Flock pack reception discussed     0       Control (CMP packets completed)     0       Total number of lamber of annuber of tame of the completed in the completed in tame of tame of the completed in tame of tame of the completed in tame of tame o	Lount of IP packet reception discarded due to sum check error	0	IP addess 000000
Simulaneous transition encurt     0       Carnot execute test     0       PluG Hick Pack test exection exact     0       Carnot execute test     0       Total runber of IOMP echo reply sent     0       Pearlism     Carnot execute test       Monitoring     Sent risk       Monitoring     Sent risk       Pearlism     Make text risk       Make text risk     Sent risk       Pearlism     Make text risk		0	PING test execution request Not requested Being requested
IDMP ENDP sacket reception count     0       Cant of IDMP sacket reception count     0       Cant of IDMP sacket reception count     0       Total number of end IDMP sacket reception count     0       Total number of end IDMP sacket reception     0       Total number of end IDMP sacket     0       Total number of end IDMP sacket reception     0       Total number of end IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Total number of IDMP sacket request received     0       Path ROM setting     0       Write to module     Sever IB     Current value display       Make text Rife     Sever IB     Make text Rife       Pash ROM setting     0       Sever IB     Make text Rife		0	
due to sum check enor     0       Total number of LOMP codo requisite received     0       Flash ROM welling     0       Parto RM welling     0       Wite to     Sere file       Make text file     0       Bead from     Load file       Make text file     Sere file       Carnot execute text     0		0	Result Execution result 0000
Total number of tent IOMP packets     0       Total number of IOMP packets (received)     0       Total number of IOMP echo reply sent     0       Flash ROM setting     0       Pead form     Carnot execute test       Pead form     Losd file       Make text file     Save file       Carnot execute test     Monitoring	Count of ICMP packet reception discarded	0	Total packet transmission count 0
Total number of ICMP exho request received     0       Total number of ICMP exho requires received     0       Total number of ICMP exho requires received     0       Plank R0M setting     Declais       Write to Severife     Current value       Make text file     Declais       Make text file     Declais       Make text file     Declais       Severing range     Cornor table       Severing range     Cornor table			Success count 0
Total number of UDMP echo reply sent     D       Flash RDM setting module     Serve file     Current value display       Flash RDM setting module     Carnot execute test		0	Failure count D
Flack ROM setting     Current value     Details       Write b     Save file     Monitoring       Bread from     Load file       Make text file     Make text file	Total number of ICMP echo regulations and	0	
Write b     Sove file     Current value     Monitoring     Monitoring       Imodule     Load file     Make text file     Imodule     Load file     Make text file     Imodule     Load file     Imodule     Load file     Imodule     Load file     Imodule     Load file     Imodule     Load file     Imodule     Load file     Imodule     Load file     Imodule     Imodule     Load file     Imodule		•	
module     Service     digility       If ead from module     Load file     Make text file			
Incode     Underson     Decond input       Pread from mobile     Load //e     Make text file     Decond input	Write to Save file Current value	Monitoring	
Read from module     Load file     Make text file       Make text file     Setting range	display	Cannot execute test	Decimal input
	Read from Load file Make text file		Read from Load file Make text file Cetting range
	module		
Start monitor Stop monitor Execute (part Dose			
Start monitor         Stop monitor         Execute test         Close			
Stat monitor Stop monitor Execute test Close			
Stat montor Stop monitor Execute jest Close Stat montor Execute jest Ulose			
	Start monitor Stop monitor Exer	cute test Close	Diatrimentor Stop monitor Execute jest

Refer to Section 8.6.5

Refer to Section 8.6.6

#### 8.6.1 X/Y Monitor/test

#### [Monitor/Test Purpose]

Monitor I/O signals and performs tests on output signals.

### [Operating procedure]

Monitor/Test screen → X/Y Monitor/test

# [Monitor/Test Screen]

X/Y Monitor/test		
Module information		
Module type: MODBUS(R) Module	Start I/O No.: 0000	
Module model name: QJ71MT91		
Setting item	Current value	Setting value
X00:Module READY	Accessible	
X01:Basic parameter setting, normally completed	OFF	
X02:Basic parameter setting, error completed	OFF	
X03:Basic parameter setting existence	Parameters set	
X04:Automatic communication parameter setting, normally completed	OFF	
X05:Automatic communication parameter setting, error completed	OFF	
X06:Automatic communication operation status	Stopped	
X07:Automatic communication error status	No error	
X08:MODBUS(R) device assignment parameter	OFF	•
Flash ROM setting	Details	
Write to Save file Current value display	Cannot execute test	Monitoring
Read from Load file Make text file		
Start monitor Stop monitor	Execute <u>t</u> est	Close

#### [Monitor/Test Items] (1) X: Input signals

Monitor/Test Item	Buffer memory address	Reference section
X00: Module READY	_	
X01: Basic parameter setting, normally completed	_	
X02: Basic parameter setting, error completed	_	
X03: Basic parameter setting existence	_	
X04: Automatic communication parameter setting, normally completed	_	
X05: Automatic communication parameter setting, error completed	_	
X06: Automatic communication operation status	_	Section 3.2.1
X07: Automatic communication error status	_	Section 3.2.1
X08: MODBUS <sup>®</sup> device assignment parameter setting, normally completed	_	
X09: MODBUS <sup>®</sup> device assignment parameter setting, error completed	_	
X0A: MODBUS <sup>®</sup> device assignment parameter setting existence	_	
X1B: COM. ERR. LED status	_	
X1C: PING test completed		
X1F: Watch dog timer error	_	

# (2) Y: Output signals

To perform a test on output signals, select any item in the Setting value column and click the **Execute test** button.

Monitor/Test Item	Buffer memory address	Reference section
Y01: Basic parameter setting request	_	
Y04: Automatic communication parameter setting request/automatic communication start request	_	
Y06: Automatic communication stop request		Section 3.2.1
Y08: MODBUS® device assignment parameter setting request	_	
Y1B: COM. ERR. LED OFF request		
Y1C: PING test execution request		

# 8.6.2 Basic/MODBUS<sup>®</sup> device assignment parameter status

#### [Monitor Purpose]

Monitor the setting status of the basic parameters and MODBUS<sup>®</sup> device assignment parameters.

#### [Operating procedure]

Monitor/Test screen → Basic/MODBUS(R) device

### [Monitor Screen]

Basic/MODBUS(R) device assignment parameter status			
Module information			
Module type: MODBUS(R) Module	Start I/O No.: 0000		
Module model name: QJ71MT91			
Module model name: QJ71M131			
California	Current value	Catilization (a)	
Setting item		Setting value	
Basic parameter setting existence	Parameters set		
Basic parameter error code storage area	0000		
MODBUS(R) device assignment parameter setting existence	Parameters set		
MODBUS(R) device assignment parameter error code storage area	0000		
MDDBUS(R) device assignment parameter setting result storage area	-		
Error, device type			
Error, assigned group No.	0		
		•	
Flash ROM setting	Details		
Write to Save file Current value		Monitoring	
module Save ne display	Cannot execute test		
Read from module Load file Make text file			
Start monitor E	xecute <u>t</u> est	Close	

#### [Monitor Items]

Monitor Item		Buffer memory address	Reference section
Basic parameter setting existence		_	
Basic parameter error code storage area		0С10н (3088)	
MODBUS <sup>®</sup> device assignment parameter setting existence		_	
MODBUS <sup>®</sup> device assignment parameter error code storage area		0С13н (3091)	Section 11.3.1
MODBUS <sup>®</sup> device assignment parameter	Error, device type	0С14н (3092)	
setting result storage area	Error, assigned group No.	0С15н (3093)	

### 8.6.3 Automatic communication status

#### [Monitor/Test Purpose]

Monitor the communication status of the automatic communication function.

# [Operating procedure]

Monitor/Test screen → Automatic communication

# [Monitor/Test Screen]

	×
Start I/D No.: 0000	
Current value	Setting value
Stopped	
0000	
0000	
Not requested	Being requested 💌
Not requested	Being requested 🗾
Normal	
0000	•
Details	
Cannot execute test	Monitoring
cute <u>t</u> est	Close
	Current value topped 0000 0000 0000 0000 0000 0000 0000

#### [Monitor/Test Items]

	Monitor/Test Item	Buffer memory address	Reference section
Automatic commur	nication operation status	_	Section 5.2.1
Automatic commur	nication parameter error code storage area	0С11н (3089)	
Automatic commur	Automatic communication parameter setting result storage area		Section 11.3.1
Automatic commur	nication start request (*1)	_	<b>-</b>
Automatic communication stop request (*1)		_	This section
	Automatic communication operation status storage area	0C20н to 0C23н (3104 to 3107)	
Parameter 1 to 64	Automatic communication error code storage area	0C28н to 0C67н (3112 to 3175)	Section 11.3.1

\*1: To test the automatic communication start request or automatic communication stop request, select the corresponding item in the Setting value column and click the Execute test button.

#### POINT

When conducting a test on the automatic communication start request or automatic communication stop request with "Being requested" set in the Setting value column, make sure that "Not requested" is displayed in the Current value column. When the current value is "Being requested", the test for "Being requested" setting cannot be performed.

If the current value is "Being requested", change it to "Not requested" and start the test.

#### 8.6.4 Error log

[Monitor Purpose]

Display the errors that occurred in the QJ71MT91.

Error logs are displayed in reverse chronological order (the latest error is displayed as No.1).

For details of the monitoring items, refer to Section 11.3.1 (8), (b) Number of error occurred and (d) Error log (error log 1 to 32).

#### [Operating procedure]

 $\fbox{Monitor/Test} screen \rightarrow \fbox{Error log}$ 

# [Monitor Screen]

Module information         Module type:       MODBUS(R) Module         Setting item       Current value         Setting item       Current value         Setting item       Current value         Module error log is displayed in order of the latest error.       Image: Control of the latest error.         Number of errors occurred       0         No.1 Detailed error code       0         Exception code       0         Local station pont No.       0         Target IP address       0.0.00         Target IP address       0.0.00         No.2 Detailed error code       0         Function code       0         Function code       0         No.2 Detailed error code       0         Function code       0         Function code       0         Virite tor       0         Flash ROM setting       Monitoring         Monitoring       Make text file	Error log		
Module model name:     QJ71MT91       Image: Setting item     Current value     Setting value       The error log is displayed in order of the latest error.     Image: Setting value     Image: Setting value       Non 1 Detailed error code     0     Image: Setting value       Non 1 Detailed error code     0       Exception code     0       Local station port No.     0       Target Headress     0.0.0.0       No.2 Detailed error code     0       Exception code     0       Flash RDM setting     Current value       Write to     Save file       Medit bettile     Monitoring	Module information		
Module model name:     QJ71MT91       Image: Setting item     Current value     Setting value       The error log is displayed in order of the latest error.     Image: Setting value     Image: Setting value       Non 1 Detailed error code     0     Image: Setting value       Non 1 Detailed error code     0       Exception code     0       Local station port No.     0       Target Headress     0.0.0.0       No.2 Detailed error code     0       Exception code     0       Flash RDM setting     Current value       Write to     Save file       Medit bettile     Monitoring	Module tupe: MODBLIS(B) Module	Start I/O No : 0000	
Setting item     Current value     Setting value       The error log is displayed in order of the latest error.     0       Number of errors occurred     0       No.1 Detailed error code     0       Exception code     0       Exception code     0       Local station port No.     0       Target levice port No.     0       No.2 Detailed error code     0       Exception code     0       Function code     0       Target levice port No.     0       No.2 Detailed error code     0       Exception code     0       Function code     0       Virite lo     0       Write lo     Save file       Beed from     Current value       Monitoring     Cannot execute test		Star // 0 No 0000	
The error log is displayed in order of the latest error.     0       Number of errors occurred     0       No.1 Detailed error code     0       Exception code     0       Exception code     0       Local station port No.     0       Target Headress     0.0.0.0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Function code     0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Flash RDM setting     Current value       Monitoring     display       Read from     Local or       Hold Net Big     Monitoring	Module model name: QJ71MT91		
The error log is displayed in order of the latest error.     0       Number of errors occurred     0       No.1 Detailed error code     0       Exception code     0       Exception code     0       Local station port No.     0       Target Headress     0.0.0.0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Function code     0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Flash RDM setting     Current value       Monitoring     display       Read from     Local or       Hold Net Big     Monitoring			
Number of errors occurred     0       No.1 Detailed error code     00000       Exception code     0       Function code     0       Local station port No.     0       Target IP address     0.0.0.0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Flash ROM setting     0       Write to module     Garnot execute test	Setting item	Current value	Setting value
No.1 Detailed error code     0000       Exception code     0       Function code     0       Local station port No.     0       Target IP address     0.0.0.0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Flash RDM setting     Current value       Write to module     Save file       Current value     Cannot execute test			
Exception code     0       Function code     0       Local station port No.     0       Target IP address     0.0.0.0       Target device port No.     0       No.2 Detailed error code     00000       Exception code     0       Function code     0       Function code     0       Flash RDM setting     Current value       Write to module     Save file       Bead from     Local of the set of t		-	
Function code     0       Local station port No.     0       Target IP address     0.0.0.0       Flash ROM setting     0       Write to module     Save file       Write to module     Save file       Bead from     Lond Gr.       Monitoring     Cannot execute test			
Local station port No.     0       Target IP address     00.0.0       Target device port No.     0       No.2 Detailed error code     0       Exception code     0       Flash ROM setting     0       Write to module     Save file       Current value display     Details       Monitoring     Cannot execute test			
Target IP address     0.0.0.0       Target device port No.     0       No.2 Detailed error code     00000       Exception code     0       Flash RDM setting     Current value       Write to module     Save file       Bread from     Lourget       Hold North     Cannot execute test			
Target device port No.     0       No.2 Detailed error code     00000       Exception code     0       Function code     0       Flash ROM setting     0       Write to     Save file       Bread from     Lond G       Holds bard G     Monitoring			
No.2 Detailed error code     0000       Exception code     0       Flash ROM setting     0       Write to module     Save file       Bread from     Long Gr.       Hack back Bit     Monitoring			
Exception code     0       Flash ROM setting     0       Write to module     Save file       Current value display     Current value display       Read from     Location		-	
Function code     0       Flash ROM setting     Details       Write to module     Save file       Bead from     Located G       Holds hard G     Holds hard G			
Flash ROM setting     Details       Write to module     Save file     Current value display       Bead from     Look of the Look of the L		-	
Write to module         Save file         Current value display         Monitoring           Read from         Look of G         Monitoring         Cannot execute test			
module Save file display Read from Lond G. Lond G. Cannot execute test		Details	11 S. 1
Cannot execute test			Monitoring
		Cannot execute test	
Start monitor Stop monitor Execute test Close	Start monitor Stop monitor E	xecute <u>t</u> est	Close

#### [Monitor Items]

	Monitor Item		Reference section
Number of errors	occurred	0CFEн (3326)	
	Detailed error code Exception code		Section 11.3.1
Error log 1 to 32	Function code Local station port No.	0D00н to 0DFFн (3328 to 3583)	
	Target IP address Target device port No.		

#### 8.6.5 Communication status

[Monitor Purpose]

Monitor the communication status by communication protocol.

#### [Operating procedure]

Monitor/Test screen → Communication status

### [Monitor Screen]

Communication status		
Module information		
Module type: MODBUS(R) Module	Start I/O No.: 0000	
Module model name: QJ71MT91		
Setting item	Current value	Setting value
IP IP packet reception count	0	
Count of IP packet reception discarded due to sum check error	0	
Total number of sent IP packets	0	
Simultaneous transmission error detection count	0	
ICMP ICMP packet reception count	0	
Count of ICMP packet reception discarded due to sum check error	0	
Total number of sent ICMP packets	0	
Total number of ICMP echo request received	0	
Total number of ICMP echo reply sent	0	<b>•</b>
Flash ROM setting	Details	
Write to Save file Current value display	Cannot execute test	Monitoring
Read from Load file Make text file		
Start monitor Stop monitor Ex	ecute <u>t</u> est	Close

### [Monitor Items]

	Monitor Item	Buffer memory address	Reference section
	IP packet reception count	0E10н to 0E11н (3600 to 3601)	
15	Count of IP packet reception discarded due to sum check error	0E12н to 0E13н (3602 to 3603)	
IP	Total number of sent IP packets	0E14н to 0E15н (3604 to 3605)	Section 11.3.1
	Simultaneous transmission error detection count	0E2Aн to 0E2Bн (3626 to 3627)	

	Monitor Item		Reference
		address	section
	ICMP packet reception count	0E30н to 0E31н	
		(3632 to 3633)	
	Count of ICMP packet reception discarded due to sum check	0Е32н to 0Е33н	
	error	(3634 to 3635)	
	Total number of sent ICMP packets	0E34н to 0E35н	
		(3636 to 3637)	
ICMP	Total number of ICMP echo request received	0E36н to 0E37н	
		(3638 to 3639)	
	Total number of ICMP echo reply sent	0E38н to 0E39н	
		(3640 to 3641)	
	Total number of ICMD cobe request cont	0ЕЗАн to 0ЕЗВн	
	Total number of ICMP echo request sent	(3642 to 3643)	Section 11.3.1
	Total number of ICMP echo reply received	0E3Cн to 0E3Dн	
		(3644 to 3645)	
	TCD packet reportion count	0E50н to 0E51н	
	TCP packet reception count	(3664 to 3665)	
ТСР	Count of TCP packet reception discarded due to sum check error	0E52н to 0E53н	Section 11.5.1
ICF		(3666 to 3667)	
	Total number of sent TCP packets	0E54н to 0E55н	
		(3668 to 3669)	
	UDP packet reception count	0E70н to 0E71н	
		(3696 to 3697)	
UDP	Count of UDP packet reception discarded due to sum check error	0E72н to 0E73н	
001		(3698 to 3699)	
	Total number of cont LIDP packate	0E74н to 0E75н	
	Total number of sent UDP packets		
	Framing error count	0E84н to 0E85н	
		(3716 to 3717)	-
Receive	Overflow count	0E86н to 0E87н	
error		(3718 to 3719)	
	CPC error count	0E88н to 0E89н	
	CRC error count		

#### 8.6.6 PING test

#### [Monitor/Test Purpose]

Display the execution and result of a PING test. Refer to Section 11.5 for details.

#### [Operating procedure]

 $\boxed{\text{Monitor/Test}} \text{ screen} \rightarrow \boxed{\text{PING test}}$ 

### [Monitor/Test Screen]

PING test			
<ul> <li>Module information</li> <li>Module type: MODBUS(R) Module</li> <li>Module model name: QJ71MT91</li> </ul>	Start 1/0 No.: 0000		
Setting item	Current value	Setting value	<b></b>
Communication time check	2		2
Transmission count	4		4
IP address	0.0.0.0	0.0.0.0	
PING test execution request	Not requested	Being requested	-
PING test completed	OFF		
Result Execution result	0000		
Total packet transmission count	0		
Success count	0		
Failure count	0		
			•
Flash ROM setting       Write to module     Save file       Read from module     Load file   Make text file	Details Decimal input Setting range 2 - 60		Monitoring
Start monitor Stop monitor Ex	ecute <u>t</u> est		Close

#### [Monitor/Test Items]

	Monitor/Test Item	Buffer memory address	Reference section
Communic	cation time check	0FE0н (4064)	
Transmiss	ion count	0FE1н (4065)	
IP address	3	0FE2н to 0FE3н (4066 to 4067)	
PING test	PING test execution request		
PING test	completed		Section 11.5
	Execution result	0FE4н (4068)	36010111.3
Desult	Total packet transmission count	0FE5н (4069)	
Result	Success count	0FE6н (4070)	
	Failure count	0FE7н (4071)	

# 8.7 Parameter Setting Using GX Configurator-MB

#### 8.7.1 Basic parameters

#### [Purpose]

Set the basic parameters on the basic parameter screen.

# [Operating procedure]

Initial setting screen  $\rightarrow$  Basic parameter

#### [Setting screen]

Basic parameter				
Module information Module type: MDDBUS(R) Module Module model name: 0J71MT91		Start I/O No.:	0000	
Setting item		Settir	ng value	<b>^</b>
TCP/UDP/IP setting TCP ULP timer value(Units:500ms)				60
TCP zero window timer value(Units:500ms)				20
TCP resend timer value(Units:500ms)				20
TCP end timer value(Units:500ms)				40
IP reassembly timer value(Units:500ms)				10
Split reception monitoring timer value(Units:500	Jms)			60
KeepAlive		Used		• •
-	Details Decimal inpu Setting ra 2 - 2400			
Make text file	End set	up		Cancel

# [Setting items]

For the basic parameter setting, set the data format or setting range value of each item in the Setting value column, and click the End setup button to save the set values.

		Setting Item	Buffer memory	Reference
			address	section
		TCP ULP timer value	0000н	
			(0)	
		TCP zero window timer value	0001н	
			(1)	
		TCP resend timer value	0002н	
	monitoring		(2)	
	timer	TCP end timer value	0003н	
			(3)	
		IP reassembly timer value	0004н	
			(4)	
		Split reception monitoring timer value	0005н	
			(5)	
		KeepAlive	0006н	
	KeepAlive		(6)	Section 7.2
TCP/UDP/		KeepAlive start timer value	0007н	
IP setting			(7)	
ii setting		KeepAlive interval timer value     0008н (8)       KeepAlive resend count     0009н (9)	0008н	
			(8)	
			0009н	
			(9)	
		Doutor rolov function	000Ан	
		Router relay function	(10)	
		Cubrat mask nattorn	000Bн to 000Cн	
		Subnet mask pattern	(11 to 12)	
	Douting	Defeutit reuter ID eddress	000Dн to 000Eн	
	Routing information	Default router IP address	(13 to 14)	
	Information	Number of routons and	000Fн	
		Number of routers set	(15)	
	Router information 1 to 8	0010 to 0005		
		Subnet address	0010н to 002Fн (16 to 47)	
		Router IP address	(16 to 47)	
GX				
Developer			0030н	
connection	Number of T	CP connections for GX Developer connection	(48)	
information			(40)	
setting				

		Buffer memory address	Reference section	
		Local slave station port No.	0110⊦ (272)	
TCP/UDP/ MODBUS® /	Target slave port No. for automatic communication function	0111⊦ (273)		
		CPU response monitoring timer value	0114н (276)	Section 7.2
		Preferred node specification 1 to 64 IP address Number of connections	0115н to 01D4н (277 to 468)	

#### 8.7.2 Automatic communication parameters

#### [Purpose]

Set the automatic communication parameters on the Automatic communication parameter screen.

#### [Operating procedure]

Initial setting screen → Automatic communication parameter

# [Setting screen]

Automatic communication parameter	
Module Information Module type: MODBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000
Setting item	Setting value
Automatic communication parameter 1 Target station IP address	0.0.0.0
Module ID	255
Repeat interval timer value(Units:10ms)	0
Response monitoring timer value(Units:500ms)	0
Type specification of the target MODBUS(R) device	No select 🗸 🗸
Read setting Head buffer memory address	0000
Target MODBUS(R) device head number	0
Details IP Address Setting 0.0.0.0	
Make text file End s	etup Cancel

#### [Setting items]

For the automatic communication parameter setting, set the data format or setting range value of each item in the Setting value column, and click the End setup button to save the set values.

		Setting Item	Buffer memory address	Reference section	
	Target station IP address		0200н to 0201н (512 to 513)		
	Module	ID	0202н (514)	-	
	Repeat	nterval timer value	0203н (515)		
	Respons	se monitoring timer value	0204н (516)		
	Type specification of the target MODBUS <sup>®</sup> device		0205н (517)		
Automatic communication	unication Head buffer memory address	Head buffer memory address	0206н (518)		
parameter 1			Target MODBUS <sup>®</sup> device head number	0207н (519)	Section 7.3
		Access points	0208⊢ (520)		
		Head buffer memory address	0209н (521)		
			Target MODBUS <sup>®</sup> device head number	020Ан (522)	
		020Bн (523)			
Automatic communication parameter 2 to 64	(Same a	is in automatic communication parameter 1)	020Cн to 04FFн (524 to 1279)		

#### POINT

After the automatic communication parameters have been written to the programmable controller CPU, the automatic communication function is operated when the programmable controller is powered ON from OFF or the programmable controller CPU is reset (with the programmable controller CPU's RUN/STOP switch set to RUN).

# 8.7.3 MODBUS<sup>®</sup> device assignment parameters

#### [Purpose]

Set the MODBUS<sup>®</sup> device assignment parameters on the MODBUS<sup>®</sup> device assignment parameter screen.

#### [Operating procedure]

Initial setting screen  $\rightarrow$  MODBUS(R) device assignment

### [Setting screen]

Module information Module type: MODBUS(R) Module Module model name: QJ71MT91		Start I/O No.:	0000	
Setting item		Settin	g value	
Coil assignment 1 Device		YO		
Head coil number (Specify "Actual device No1".)	]			0
Assignment points			1	3192
Coil assignment 2 Device		мо		_
Head coil number (Specify "Actual device No1".)	)		(	3192
Assignment points			1	3192
Coil assignment 3 Device		SMO		
	Details Device inpu Setting r SM			~

### [Setting items]

For the MODBUS<sup>®</sup> device assignment parameter setting, set the data format or setting range value of each item in the Setting value column, and click the End setup button to save the set values.

	Setting Item			Reference section
			address 0900н	Section
		Device code	(2304)	
	Device		0901H	
		Head device number	(2305)	
Coil assignment 1			0902H	
	Head coil number		(2306)	
			0903н	
	Assignment points		(2307)	
Coil assignment 2 to		and the second the second seco	0904н to 093Fн	
16	(Same as in coil assig	gnment 1)	(2308 to 2367)	
		Device and	0940н	
	Device	Device code	(2368)	
	Device	Head device number	0941н	
Input assignment 1		Head device number	(2369)	
input assignment i	Hood input number		0942н	
	Head input number		(2370)	
	Assignment points		0943н	
	Assignment points			
Input assignment 2 to	(Samo as in input as	signmont 1)	0944н to 097Fн	
16	(Same as in input assignment 1)		(2372 to 2431)	Section 7.4
		(*1) Device code Head device number	0980н	
	Device (*1)		(2432)	
			0981н	
Input register	Head de		(2433)	
assignment 1	Head input register number		0982н (2434)	
		ad input register number		
	Assignment points		0983н	
			(2435)	
Input register	(Same as in input reg	uister assignment 1)	0984н to 09BFн	
assignment 2 to 16			(2436 to 2495)	
		Device code	09С0н	
	Device (*1)		(2496)	
		Head device number	<b>09С1</b> н	
Holding register			(2497)	
assignment 1	Head holding register	rnumber	09C2н	
			(2498)	
	Assignment points		09C3н	
	<b>U</b> - F - J <b>U</b>		(2499)	
Holding register	(Same as in holding r	register assignment 1)	09C4н to 09FFн	
assignment 2 to 16		,	(2500 to 2559)	

\*1: QJ71MT91 buffer memory (user free area: 5000н to 5FFFн) setting When the MODBUS<sup>®</sup> device is the input register or holding register, the QJ71MT91 buffer memory (user free area) setting is available. For setting, enter a value as a hexadecimal constant as shown below.

Example) 5000н

Enter a value "H5000".

# 9 PROGRAMMING

#### 9.1 Parameter Setting

This chapter explains how to set parameters with sequence programs. When applying the following program examples to the actual system, make sure to examine the applicability and confirm that it will not cause system control problems. On-screen parameter setting for the QJ71MT91 is available by use of the utility package (GX Configurator-MB), reducing sequence programs. Refer to Chapter 8 for details of the utility package (GX Configurator-MB) operation method.

#### 9.1.1 Basic parameter setting

# (1) Basic parameter setting method

Make basic parameter setting in the following procedure.

- Store the parameters into the basic parameter area (address: 0000 H to 01D4H) of the buffer memory.
- 2) Turn on Basic parameter setting request (Y1).

# (2) I/O signals used for basic parameter setting

Use the following I/O signals for basic parameter setting.

Signal	Signal Name
X0	Module READY ON : Accessible OFF: Inaccessible
X1	Basic parameter setting, normally completed ON : Normally completed OFF: —
X2	Basic parameter setting, error completed ON : Error completed OFF: —
Х3	Basic parameter settting existence ON : Parameters set OFF: No parameters set
Y1	Basic parameter setting request ON : Being requested OFF: Not requested



# (3) Timing charts for basic parameter setting(a) When setting is completed normally

#### (b) When setting is completed with an error



- (4) Precautions for basic parameter setting
  - (a) When setting the basic parameters with a sequence program, set the basic parameter starting method (b0) of the intelligent function module switch 2 (refer to Section 6.6) to ON (Start with the user-set parameters).
  - (b) Turn ON Basic parameter setting request (Y1) after Module READY (X0) has turned ON.
  - (c) After Basic parameter setting request (Y1) is turned ON to start the parameter setting processing, do not turn ON/OFF any other output signal (Y signal) until Basic parameter setting, normally completed (X1) or Basic parameter setting, error completed (X2) turns ON.
  - (d) When the basic parameter setting is completed with an error, an error code is stored into the basic parameter error code storage area (address: C10H (3088)) of the buffer memory.
     Check the stored error code, take corrective action, and make a parameter setting request again. Refer to Section 11.3 for details of the error code.
  - (e) Basic parameter setting existence (X3) turns ON when the default parameters exist.
  - (f) The basic parameter setting is not allowed in the offline mode (intelligent function module switch 1: 0001H).
     Set the basic parameters in the online mode (intelligent function module switch 1: 0000H).

# REMARK

Refer to Section 6.6.1 for details of whether each function can be executed or not depending on the basic parameter setting existence.

#### 9.1.2 Automatic communication parameter setting

- Automatic communication parameter setting method Make automatic communication parameter setting in the following procedure.
  - 1) Store the parameters into the automatic communication parameter area (address: 0200H to 04FFH) of the buffer memory.
  - 2) Turn ON Automatic communication parameter setting request/automatic communication start request (Y4).
- (2) I/O signals for automatic communication parameter setting Use the following I/O signals for automatic communication parameter setting.

Signal	Signal Name			
X0	Module READY ON : Accessible OFF: Inaccessible			
X3	Basic parameter setting existence ON : Parameter set OFF: No parameters set			
X4	Automatic communication parameter setting, normally completed ON : Normally completed OFF: —			
X5	Automatic communication parameter setting, error completed ON : Error completed OFF: —			
X6	Automatic communication operation status ON : Operating OFF: Stopped			
Y4	Automatic communication parameter setting request/automatic communication start request ON : Parameter setting being requested/start being requested OFF : No parameter setting requested/no start requested			



# (3) Timing charts for automatic communication parameter setting(a) When setting is completed normally

#### (b) When setting is completed with an error



Executed by sequence program

- (4) Precautions for automatic communication parameter setting
  - (a) Turn ON Automatic communication parameter setting request/automatic communication start request (Y4) after Module READY (X0) and Basic parameter setting existence (X3) have turned ON.
  - (b) When the automatic communication parameter setting is completed with an error, the erroneous parameter is stored into the automatic communication parameter setting result storage area (address: 0C12H (3090)) of the buffer memory, and an error code is stored into the automatic communication parameter error code storage area (address: 0C11H (3089)). Identify the stored parameter, check its error code, take corrective action, and make a parameter setting request again. Refer to Section 11.3 for details of the error code.
  - (c) The QJ71MT91 does not clear the automatic communication function buffer input area (address: 1000H to 1FFFH (4096 to 8191)) and automatic communication function buffer output area (address: 3000H to 3FFFH (12288 to 16383)), which are used for write/read setting of the buffer memory, when the automatic communication function is started in the status of Automatic communication parameter setting, normally completed (X4). Clear them as necessary using a sequence program.
  - (d) The automatic communication parameter setting is not allowed in the offline mode (intelligent function module switch 1: 0001H).
     Set the automatic communication parameters in the online mode (intelligent function module switch 1: 0000H).

9.1.3 MODBUS® device assignment parameter setting

- (1) MODBUS<sup>®</sup> device assignment parameter setting method Make MODBUS<sup>®</sup> device assignment parameter setting in the following procedure.
  - 1) Store the parameters into the MODBUS<sup>®</sup> device assignment parameter area (address: 0900H to 09FFH) of the buffer memory.
  - 2) Turn ON MODBUS® device assignment parameter setting request (Y8).
- (2) I/O signals for MODBUS<sup>®</sup> device assignment parameter setting Use the following I/O signals for MODBUS<sup>®</sup> device assignment parameter setting.

Signal	Signal Name
X0	Module READY ON : Accessible OFF : Inaccessible
X3	Basic parameter setting existence ON : Parameters set OFF: No parameters set
X8	MODBUS <sup>®</sup> device assignment parameter setting, normally completed ON : Normally completed OFF:
X9	MODBUS <sup>®</sup> device assignment parameter setting, error completed ON : Error completed OFF: -
ХА	MODBUS <sup>®</sup> device assignment parameter setting existence ON : Parameters set OFF: No parameters set
Y8	MODBUS <sup>®</sup> device assignment parameter setting request ON : Being requested OFF: Not requested



(3) Timing charts for MODBUS<sup>®</sup> device assignment parameter setting
 (a) When setting is completed normally



#### (b) When setting is completed with an error

9 - 9

- (4) Precautions for MODBUS<sup>®</sup> device assignment parameter setting
  - (a) When setting the MODBUS<sup>®</sup> device assignment parameters with a sequence program, set the MODBUS<sup>®</sup> device assignment parameter starting method of the intelligent function module switch setting (refer to Section 6.6) to ON (Start with the user-set parameters).
  - (b) Turn ON MODBUS<sup>®</sup> device assignment parameter setting request (Y8) after Module READY (X0) and Basic parameter setting existence (X3) have turned ON.
  - (c) When the MODBUS<sup>®</sup> device assignment parameter setting, error completed (X9) has turned ON, correct the corresponding parameter in the following procedure.
    - Refer to the MODBUS<sup>®</sup> device assignment parameter setting result storage area (address: 0C14H to 0C15H (3092 to 3093)) to identify the erroneous parameter.
    - Refer to the MODBUS<sup>®</sup> device assignment parameter error code storage area (address: 0C13H (3091)) to check the error details, and correct the parameter.
    - 3) Make a MODBUS<sup>®</sup> device assignment parameter setting request again. Refer to Section 11.3.1 for details of the MODBUS<sup>®</sup> device assignment parameter error code storage area and MODBUS<sup>®</sup> device assignment parameter setting result storage area.
  - (d) MODBUS<sup>®</sup> device assignment parameter setting existence (XA) turns ON also when the default parameters exist.
  - (e) The MODBUS<sup>®</sup> device assignment parameter setting is not allowed in the offline mode (intelligent function module switch 1: 0001<sub>H</sub>).
     Set the MODBUS<sup>®</sup> device assignment parameters in the online mode (intelligent function module switch 1: 0000<sub>H</sub>).
  - (f) The QJ71MT91 sends an exception response to the master if it receives a MODBUS<sup>®</sup> device data read/write request message from the master before the MODBUS<sup>®</sup> device assignment parameters are set normally.
  - (g) MODBUS<sup>®</sup> device assignment parameter setting via a sequence program can be made again at any time after power-up of the QJ71MT91.

# REMARK

Refer to Section 6.6.1 for details of whether each function can be executed or not depending on the MODBUS<sup>®</sup> device assignment parameter setting existence.

#### 9.2 Program Example for Normal System Configuration

- 9.2.1 System configuration and program conditions
  - (1) System configuration

A program will be explained as an example to realize the following specifications for the setting target QJ71MT91 (192.1.0.1).



\*1: This QJ71MT91 is assumed to be mounted in Slot 0 of the base unit with the head I/O No. set to 0.

#### (a) Automatic communication function

The setting target QJ71MT91 (192.1.0.1) and MODBUS<sup>®</sup> /TCP slave device (192.1.0.2) communicate with each other using the automatic communication function.

Set automatic communication parameters to the setting target QJ71MT91.



[Communication details]

# (b) MODBUS<sup>®</sup> device assignment function

The setting target QJ71MT91 (192.1.0.1) uses the MODBUS<sup>®</sup> device assignment function. Set the MODBUS<sup>®</sup> device assignment parameters to the setting target QJ71MT91.



[Assignment details]

# (2) Parameter setting details

The following table gives the setting details of the parameters set in the program example.

(a) Basic parameters

Setting Item			Buffer Memory Address	Set Value
	TCP ULP timer value		0000н (0)	60 (30s)
	TCP zero window	v timer value	0001н (1)	20 (10s)
TCP/UDP/IP	TCP resend time	r value	0002н (2)	20 (10s)
monitoring timer	TCP end timer va	alue	0003н (3)	40 (20s)
	IP reassembly tir	ner value	0004н (4)	10 (5s)
	Split reception m	onitoring timer value	0005н (5)	60 (30s)
	KeepAlive		0006н (6)	1 (Used)
KeenAlive	KeepAlive start ti	mer value	0007н (7)	1200 (600s)
KeepAlive	KeepAlive interva	al timer value	0008н (8)	20 (10s)
	KeepAlive resen	d count	0009н (9)	3
	Router relay fund	tion	000Ан (10)	0 (Not used)
	Subnet mask pat	tern	000Bн to 000Cн (11 to 12)	FFFFF00н (255.255.255.0)
	Default router IP	address	000Dн to 000Eн (13 to 14)	00000000н (0.0.0)
Routing information	Number of router	rs set	000Fн (15)	0
	Router	Subnet address	0010н to 0011н (16 to 17)	00000000н (0.0.0.0)
	information 1	Router IP address	0012н to 0013н (18 to 19)	00000000н (0.0.00)
GX Developer connection information setting	Number of TCP connectors for GX Developer connection		0030н (48)	1
	Local slave station port No.		0110н (272)	502
	Target slave port No. for automatic communication function		0111н (273)	502
MODBUS <sup>®</sup> /TCP	CPU response monitoring timer value		0114н (276)	10
setting	Preferred node	IP address	0115н to 0116н (277 to 278)	С0010002н (192.1.0.2)
	specification 1 Number of connections		0117н (279)	2

Setting Item			Buffer Memory Address	Set Value
	Target station IF	Paddress	0200н to 0201н (512 to 513)	С0010002н (192.1.0.2)
	Module ID		0202н (514)	255
	Repeat interval	timer value	0203н (515)	1200(120s)
Automatic	Response moni	toring timer value	0204н (516)	60(30s)
communication	Type specificati MODBUS <sup>®</sup> dev	•	0205н (517)	0100⊦ (Read coils)
parameter 1		Head buffer memory address	0206н (518)	1100н
	Read setting	Target MODBUS <sup>®</sup> device head number	0207 <sub>H</sub> (519)	15000
		Access points	0208н (520)	1024
	Target station IP address		020Cн to 020Dн (524 to 525)	С0010002н (192.1.0.2)
	Module ID		020Ен (526)	255
	Repeat interval timer value		020Fн (527)	10(100ms)
Automatic	Response monitoring timer value		0210н (528)	60(30s)
communication parameter 2	Type specification of the target MODBUS <sup>®</sup> device		0211н (529)	0005⊦ (Write holding registers)
	Write setting	Head buffer memory address	0215н (533)	3А00н
		Target MODBUS <sup>®</sup> device head number	0216н (534)	0
		Access points	0217н (535)	100

(b) Automatic communication parameters

# (c) MODBUS<sup>®</sup> device assignment parameters

Setting Item		Buffer Memory Address	Set Value
	Device code	0900H (2304)	009Dн (Y: Output)
Coil assignment 1	Head device number	0901н (2305)	0100н
	Head coil number	0902н (2306)	0 (000001)
	Assignment points	0903н (2307)	512 (points)
Input register assignment 1	Device code	0980н (2432)	00A8⊦ (D: Data register)
	Head device number	0981н (2433)	3500
	Head input register number	0982н (2434)	3499 (303500)
	Assignment points	0983н (2435)	5500 (points)
Holding register assignment 1	Device code	09C0н (2496)	F000н (User free area)
	Head device number	09C1н (2497)	5500н
	Head holding register number	09С2н (2498)	0 (400001)
	Assignment points	09C3н (2499)	1024 (points)

(3)	Devices used in program

Device Name		Device		Application
		X0	Module READY	
		X1	Basic parameter setting, normally completed	
		X2	Basic parameter setting, error completed	
		X3	Basic parameter setting existence	
	Input	X4	Automatic communication parameter setting, normally completed	
0 1741 1704		X5	Automatic communication parameter setting, error completed	
QJ71MT91		X6	Automatic communication operation status	
input/output		X8	MODBUS <sup>®</sup> device ass	signment parameter setting, normally completed
		X9	MODBUS <sup>®</sup> device ass	signment parameter setting, error completed
		Y1	Basic parameter settir	ig request
			Automatic communica	tion parameter setting request/automatic
	Output	Y4	communication start re	equest
		Y8	MODBUS <sup>®</sup> device ass	signment parameter setting request
External input (c	command)	X20	Parameter setting con	nmand
External output		Y40	Automatic communica	tion parameter 1 communication error
		Y41	Automatic communica	tion parameter 2 communication error
		D4000 to D4003	Automatic communication operation status storage area (parameter 1 to 6	
		D4008 to D4071	Automatic communication error code storage area (parameter 1 to 64)	
		D4002 to D4005	4092 to D4095 For auto refresh 4096 to D4159	Automatic communication operation status storage
		D4092 10 D4095		area (parameter 1 to 64)
		D4096 to D4159		Automatic communication function buffer input area
		D5000 to D5099		Automatic communication function buffer output area
		D9001	Basic parameter error code acquisition	
		D9002	Automatic communication parameter error code acquisition	
Data register		D9003	Automatic communication parameter setting result acquisition	
		D9004	MODBUS <sup>®</sup> device ass	signment parameter error code acquisition
		D9005	MODBUS <sup>®</sup> device assignment	Error, device type
Internal relay		D9006	parameter setting result acquisition	Error, assigned group No.
		D9100	Automatic	Automatic communication parameter 1
		D9101	communication error code	Automatic communication parameter 2
		M1	For automatic communication parameter setting command	
		M2	For MODBUS® device	assignment parameter setting command
		M401	Automatic communication	For automatic communication parameter 1
		M402	normal	For automatic communication parameter 2

(Continued on next page)

Device Name	Device	Appli	cation
	U0\G0 to U0\G19 U0\G48 U0\G272 to U0\G273 U0\G276 to U0\G279	Basic parameter setting area	
	U0\G512 to U0\G520 U0\G524 to U0\G529 U0\G533 to U0\G535	Automatic communication parameter setting area	
Intelligent function module device	U0\G2304 to U0\G2307 U0\G2432 to U0\G2435 U0\G2496 to U0\G2499	MODBUS <sup>®</sup> device assignment parame	eter setting area
	U0\G3088	Basic parameter error code storage area	
	U0\G3089	Automatic communication parameter error code storage area	
	U0\G3090	Automatic communication parameter setting result storage area	
	U0\G3091	MODBUS <sup>®</sup> device assignment parameter error code storage area	
	U0\G3092	MODBUS <sup>®</sup> device assignment	Error, device type
	U0\G3093	parameter setting result storage area	Error, assigned group No.
	U0\G3104 to U0\G3107	Automatic communication operation status storage area (parameter	
	U0\G3175	Automatic communication error code storage area (parameter 1 to 64)	
		Automatic communication function buffer input area	
	U0\G12288 to U0\G16383	Automatic communication function buf	fer output area

#### 9.2.2 Program using utility package

- (1) Intelligent function module switch setting
  - Set the intelligent function module switches by clicking <u>Switch setting</u> on <<I/O assignment>> of GX Developer.

For the program example, set intelligent function module switches as described below.

Intelligent Function Module Switch	Setting Details	Set Value
Switch 1	No need to set (initial value (online))	_
Switch 2	<ol> <li>Basic parameter starting method Start with the user-set parameters (b0: 1)</li> <li>MODBUS<sup>®</sup> device assignment parameter starting method Start with the user-set parameters (b1: 1)</li> <li>Online change enable/disable setting Online change enabled (b2: 1)</li> <li>Send frame specification Data are sent in Ethernet (V2.0)-compliant frame (b3: 0)</li> </ol>	0007н
Switch 3	Set the (upper half) of the IP address	С001н
Switch 4	Set the (lower half) of the IP address	<b>0001</b> н

#### (2) Parameter setting

Set the parameters from the [Initial setting] screen of GX Configurator-MB.

(a) Basic parameters

Set the basic parameters on the [Basic parameter] screen. Set the values shown in Section 9.2.1 (2) (a).

Basic parameter				
Module information				
Module type: MODBUS(R) Module	Start I/O No.: 0000			
Module model name: QJ71MT91				
Setting item	Setting value			
TCP/UDP/IP setting TCP ULP timer value(Units:500ms)	60			
TCP zero window timer value(Units:500ms)	20			
TCP resend timer value(Units:500ms)	20			
TCP end timer value(Units:500ms)	40			
IP reassembly timer value(Units:500ms)	10			
Split reception monitoring timer value(Units:500ms)	60			
KeepAlive	Used 🗸 🚽			
Details Decimal input Setting range 2 - 2400				
Make text file End se	Cancel			

# POINT When the basic parameter screen is displayed, it shows the initial values.
### (b) Automatic communication parameters

Set the automatic communication parameters on the [Automatic communication parameter] screen.

Set the values shown in Section 9.2.1 (2) (b).

Automatic communication parameter	
← Module information – Module type: MODBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000
Setting item	Setting value
Automatic communication parameter 1 Target station IP address	192.1.0.2
Module ID	255
Repeat interval timer value(Units:10ms)	1200
Response monitoring timer value(Units:500ms)	60
Type specification of the target MODBUS(R) device	Read coils 🗸 🗸
Read setting Head buffer memory address	1100
Target MODBUS(R) device head number	15000
Details IP Address Setting r 0.0.0 -	
Make text file End se	Cancel

# (c) MODBUS<sup>®</sup> device assignment parameters

Set the MODBUS<sup>®</sup> device assignment parameters on the [MODBUS(R) device assignment parameter] screen.

Set the values shown in Section 9.2.1 (2) (c).

Module information					
Module type: MODBUS(R) Module		Sta	art I/O No.:	0000	
Module model name: QJ71MT91					
Setting item			Sett	ing value	
Coil assignment 1 Device		Y100			
Head coil number (Specify "Actual device No1".)					(
Assignment points					51:
Coil assignment 2 Device					
Head coil number (Specify "Actual device No1".)					l
Assignment points					I
Coil assignment 3 Device					
	Details Device inpu Setting r SM X Y M				×

### POINT

When the MODBUS<sup>®</sup> device assignment parameter screen is displayed, it shows the initial values. Delete unnecessary initial values.

# (3) Auto refresh setting

Make auto refresh setting from the Auto refresh setting screen of GX Configurator-MB.

Set the following items for the program example.

Setting Item	Module side Transfer word count	Module side Buffer offset	PLC side Device
Automatic communication function buffer input area	64	256(100н)	D4096
Automatic communication function buffer output area	100	<b>2560(А00</b> н)	D5000
Automatic communication operation status	_	_	D4092

PLC side Device	direction	Buffer offset direct	tart I/O No.: Module side Transfer word count	o Module side Buffer size	Module type: MODBUS(R) Module Module model name: QJ71MT91
Device	direction	Buffer offset direct	Transfer word count		
D4096	-> D4	256 ->			Setting item
			64	4096	MDDBUS is a registered trademark of Schneider Electric SA. Automatic communication function buffer nput area
D5000	<- D5	2560 <-	100	4096	Automatic communication function buffer putput area
D4092	-> D4	0 ->	4	4	Automatic communication operation status 1 to 64)
	->	0 ->	4096	4096	Jser free area (input)
-	<-	0 <-	4096	4096	Jser free area (output)
			4096		

### (4) Automatic communication function

For a program example for error code acquisition at an automatic communication error, refer to <<Handling of automatic communication error>> in (5).

### POINT

The automatic communication error code can be monitored on the "Automatic communication status" screen of GX Configurator-MB.

# (5) Program example

Módule Aufomat READY commun operation	ication			——[мс	N1	M401	] When automatic communicat parameter 1 is normal
1M401 Pr	ogram for non	nal automatic co	mmunication parameter 1				
		communication:	For automatic communication	on parame	[MCR	N1	3
X0 X6 Module Automat READY commun operation	D4092. 1			[MC	N2	M402	] When automatic communicati parameter 2 is normal
2 _ M402							
Pr	ogram for nor	nal automatic co	mmunication parameter 2		[MCR	N2	3
Handling of automa X0 X6 Hodule Automatic READY comm. operation	X7 Automatic comm. error	ation error>>	Евмоч	U0\ G3104	D4000	K72	Acquires automatic communication operation stat and automatic communication error code at automatic communication error.
status	D40	00. 0			[Set	Y40	Turns ON External output (Y4 when automatic communicati parameter 1 is invalid.
				[MOV	D4008	D9100	Acquires error code when automatic communication parameter 1 is invalid.
		00. 1			[SET	Y41	Turns ON External output (Y4) when automatic communication parameter 2 is invalid.
				[MOV	D4009	D9101	Acquires error code when automatic communication
	X7 Automatic comm.				[RST	Y40	parameter 2 is invalid. Turns OFF External output (Y40) when automatic communication is normal.
	D4092. 0				[RST	D4000. 0	Turns OFF automatic communication operation sta for automatic communication parameter 1 (D4000.0).
	X7 Automatic comm.				[RST	Y41	Yurns OFF External output (Y41) when automatic communication is normal.
	error status D4092. 1				[RST	D4000. 1	Turns OFF automatic communication operation sta for automatic communication parameter 2 (D4000.1).

# 9.2.3 Program without using utility package

- (1) Intelligent function module switch setting
  - Set the intelligent function module switches by clicking Switch setting on <<I/O assignment>> of GX Developer.

For the program example, set intelligent function module switches as described below.

Intelligent Function Module Switch	Setting Details	Set Value
Switch 1	No need to set (initial value (online))	—
Switch 2	<ol> <li>Basic parameter starting method Start with the user-set parameters (b0: 1)</li> <li>MODBUS<sup>®</sup> device assignment parameter starting method Start with the user-set parameters (b1: 1)</li> <li>Online change enable/disable setting Online change enabled (b2: 1)</li> <li>Send frame specification Data are sent in Ethernet (V2.0)-compliant frame (b3: 0)</li> </ol>	0007н (*1) (*2) (*3)
Switch 3	Set the (upper half) of the IP address	С001н
Switch 4	Set the (lower half) of the IP address	<b>0001</b> н

\*2: Set 0005H to start with the default MODBUS<sup>®</sup> device assignment parameters.

\*3: Set 0004H to start with the default basic and MODBUS® device assignment parameters.

### (2) Parameter setting

Set the parameters using a sequence program.

Parameter setting can be omitted under the following conditions.

Parameter	Parameter Setting	Omitting Condition			
Farameter	Condition	Setting method			
Basic parameters	Use the default parameters. (*1)	With the intelligent function module switch 2 set the basic parameter starting method (bit 0) to "0: Start with the default parameters". (Refer to (1) in this section.)			
Automatic communication parameters	Do not use the automatic communication function (master function).	No need to set.			
MODBUS <sup>®</sup> device assignment parameters	Use the default parameters. (*2)	With the intelligent function module switch 2, set the MODBUS <sup>®</sup> device assignment parameter starting method (bit 1) to "0: Start with the default parameters". (Refer to (1) in this section.)			
	Do not use the MODBUS <sup>®</sup> device assignment function (slave function).	No need to set.			

\*1: To utilize the basic parameters with the initial values (refer to Section 7.2.1), it is recommended to use the default parameters.

\*2: When the device assignment of the CPU is not changed, it is recommended to use the default parameters.

- Basic parameters
   For a program example of the basic parameters, refer to <<Basic parameter setting>> in (5).
- (b) Automatic communication parameters For a program example of the automatic communication parameters, refer to <<Automatic communication parameter setting>> in (5).
- (c) MODBUS<sup>®</sup> device assignment parameters For a program example of the MODBUS<sup>®</sup> device assignment parameters, refer to <<MODBUS device assignment parameter setting>> in (5).
- (3) Auto refresh setting

For the processing equivalent to the auto refresh setting (GX Configurator-MB), refer to <<Refresh processing>> in (5).

- (4) Automatic communication function
  - (a) For a program example for normal automatic communication, refer to << Processing for normal automatic communication >> in (5).
  - (b) For a program example for error code acquisition at an automatic communication error, refer to <<Handling of automatic communication error>> in (5).

(5) Program example

ic parameter setting X20 X0 Parameter Module setting READY command	>>		[MOVP	K60	UO\ GO	} TCP ULP timer value
			[MOVP	K20	UO\ G1	] TCP zero window timer value
			-[MOVP	K20	UO\ G2	] TCP resend timer value
			[MOVP	К40	UO\ G3	] TCP end timer value
			[MOVP	K10	UO\ G4	] IP reassembly timer value
			[MOVP	K60	UO\ G5	] Split reception monitoring timer value
			[MOVP	<b>K</b> 1	UO\ G6	] KeepAlive
			[MOVP	K1200	UO\ G7	} KeepAlive start timer value
			-[MOVP	K20	U0\ G8	} KeepAlive interval timer value
			-[MOVP	К3	UO\ G9	] KeepAlive resend count
			-[MOVP	KO	UO\ G10	Router relay function
		[DMOVP	HOFFFFFF	00	UO\ G11	Subnet mask pattern
			-[DMOVP	HO	UO\ G13	Default router IP address
			[MOVP	КО	UO\ G15	] Number of routers set
			[DMCVP	HO	UO\ G16	] Subnet address
			-[DMOVP	HO	UO\ G18	Router IP address
			[MOVP	K1	UO\ G48	] Number of TCP connections for GX Developer connection
			[MOVP	K502	UO\ 6272	Local slave station port No.
			[MOVP	K502	UO\ G273	] Target slave port No. for automatic communication function
			[MOVP	K10	UO\ G276	CPU response monitoring timer value
		[DMCVP	H0C00100	02	UO\ G277	<ul> <li>Preferred node specification 1 (IP address)</li> </ul>
			[MOVP	K2	UO\ G279	<ul> <li>Preferred node specification 1 (Number of connections)</li> </ul>
				[set	Y1	Turns ON Basic parameter settir request (Y1).

# 9 PROGRAMMING



Parameter Modul setting READ command			[FMOVP	HO	U0\ G512	H300	Initializes automatic communication parameter sel area.
		Automatic communication parameter 1 <read coils=""></read>	[DMOVP	H0C0010	002	U0\ G512	Target station IP address
				-[movp	K255	UO\ G514	] Module ID
				[MOVP	K1200	UO\ G515	Repeat interval timer value
				[movp	K60	UO\ G516	] Response monitoring timer va
				[MOVP	H100	UO\ G517	] Type specification of the targe MODBUS <sup>®</sup> device
	ſ			[MOVP	H1100	UO\ G518	MODBUS <sup>®</sup> device Head buffer memory address
	Read setting {			[MOVP	K15000	UO\ G519	] Target MODBUS <sup>®</sup> device hea
	l			[MOVP	K1024	U0\ G520	Access points
		Automatic communication parameter 2	[DMOVP	H0C00104	)02	UO\ G524	] Target station IP address
		<pre><write holding="" registers=""></write></pre>		[MOVP	K255	UO\ G526	] Module ID
				[MOVP	K10	UO\ G527	Repeat interval timer value
				[MOVP	K60	UO\ G528	] Response monitoring timer va
				[MOVP	H5	UO\ G529	] Type specification of the targe MODBUS <sup>®</sup> device
	(			[MOVP	H3A00	UO\ G533	] Head buffer memory address
	Write setting {			[MOVP	КО	UO\ G534	] Target MODBUS <sup>®</sup> device hea number
				-[MOVP	K100	UO\ G535	Access points
	C				[SET	Y4	Turns ON Automatic communication parameter sel request/automatic communica start request (Y4).
					[rst	M1 Parameter setting command	Turns OFF automatic communication parameter set command.
X4 Automatic comm. parameter setting, normally					[RST	¥4	Turns OFF Automatic communication parameter set request/automatic communica start request (Y4) when settin completed normally.
completed					[SET	M2 Parameter setting command	] Turns ON MODBUS <sup>®</sup> device assignment parameter setting command.
X5 Automatic comm. parameter setting, error					[RST	Y4	Turns OFF Automatic communication parameter set request/automatic communica start request (Y4) and stores of code and parameter setting re when setting fails.
completed				[MOVP	UO\ G3089	D9002	]
				—Гмоур	UO\ G3090	D9003	1

	X0 dule EADY	X3 Basic parameter setting existence			——[FMOVP	HO	UO\ G2304	HOFF	3	Initializes MODBUS <sup>®</sup> devic assignment parameter sett area.
		-	For	coil assignment 1		[MOVP	H9D	U0\ G2304	3	Device code
		-				[MOVP	H100	U0\ G2305	]	Head device number
		-				[MOVP	KO	U0\ G2306	3	Head coil number
		-				[MOVP	K512	UO\ G2307	3	Assignment points
		_	For	input register assignment 1	]	[MOVP	HOA8	UO\ G2432		Device code
						[MOVP	K3500	UO\ G2433	3	Head device number
		-				[MOVP	K3499	UO\ G2434	]	Head input register numbe
						[MOVP	K5500	UO\ G2435	]	Assignment points
			For	holding register assignmer	nt 1	[MOVP	HOFOOO	UO\ G2496		Device code
		-				[MOVP	H5500	UO\ G2497	]	Head device number
		-				[MOVP	KO	UO\ G2498	3	Head holding register num
		ļ				[MOVP	K1024	UO\ G2499	3	Assignment points
		-		·			—[set	¥8	3	Turns ON MODBUS <sup>®</sup> devi assignment parameter sett request (Y8).
		L					[rst	M2 Parameter setting command	3	Turns OFF MODBUS <sup>®</sup> dev assignment parameter sett command.
X8 MODBUS device paramete setting, normally completed							[rst	Y8	3	Turns OFF MODBUS <sup>®</sup> dev assignment parameter sett request (Y8) when setting completed normally.
X9 MODBUS device parameter setting, error							[rst	Y8	3	Turns OFF MODBUS <sup>®</sup> dev assignment parameter sett request (Y8) and stores en code and parameter setting result when setting fails.
completed						[MOVP	U0\ G3091	D9004	]	
						[MOVP	U0\ G3092	D9005	]	
							U0\ G3093	D9006	_	

# 9 PROGRAMMING

< <pre>&lt;<pre>&lt;<pre>&lt;<pre>&lt;<pre>&lt;<pre>&lt;<pre>&lt;<pre>&lt;<pre></pre></pre></pre></pre></pre></pre></pre></pre></pre>	< <refresh a<br="" processing:="">X0 X6 Module Automatic READY communic operation</refresh>	cation	communicat	on function buffer in	put area>> [BMOV	UO\ G4352	D4096	K64	]	Refreshes automatic communication function buffer input area.
	X0 X6 Module Automatic READY communic operation	U0\G3104.		ation: For automatic	communication para			M401	3	
Model:       Automatic repersion source       (W N2       W402       When automatic communication parameter 2 is normal         N2       Model:       Automatic repersion source       (W N2       W102       W102         V       Program for normal automatic communication parameter 2       (W N2       Acquires automatic communication operation status and automatic communication       Acquires automatic communication operation status and automatic communication         V       A       A       (W N2       Acquires automatic communication operation status and automatic communication graameter 1 is invalid.       Acquires automatic communication graameter 1 is invalid.         V000, 1       (W N2       P4000       (W N2       P4000       Acquires automatic communication graameter 1 is invalid.         V000, 1       (W N2       P4000       (W N2       P4000       Acquires error code automatic communication parameter 1 is invalid.         V1       (W N2       P4000       (W N2       P4000       P4000       Acquires error code when automatic communication parameter 2 is normal         V1       (W N2       P4000       (W N2       P4000       P4000       Acquires error code when automatic communication parameter 2 is normal         V2       (W N2       P4000       (W N2       P4000       P4000       Acquires error code when automatic communication is normal.		Progra	m for norma	l automatic commun	ication parameter 1	]	—[mcr	N1	3	
N2_M02 (Program for normal automatic communication parameter 2] (URR N2 ] Acquires automatic communication error>> (URR N2 ] (URR N2 ] (URR N2 ] (URR N2 ] (URR N2 ] Acquires automatic communication error> (URR N2 ] (URR N2 ] (URR N2 ] (URR N2 ] (URR N2 ] Acquires automatic communication error Turns ON External output (Y40) when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication error code when automatic communication parameter 1 is invalid. Acquires error code when automatic communication error code when automatic communication parameter 2 is invalid. (INV pulse pulse) (INV pulse pulse) (INV pulse) <	X0 X6 Module Automatic READY communic	U0\G3104.		ation: For automatic	communication para			M402	3	
< <handling automatic="" communication="" error="" of="">       X0     X6     X7       Module     Automatic reaction     (BNV       Module     Automatic reaction     (BNV       Module     Automatic reaction     (BNV       Module     Automatic reaction     (BNV       Module     (MOV       Module     (MOV</handling>			m for norma	automatic commun	ication parameter 2	j				
X0       X6       X7       (BIO)       (BIO) <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>—[mcr</td> <td>N2</td> <td>]</td> <td></td>							—[mcr	N2	]	
	X0 X6 Module Automatic READY comm. operation	X7 Automatic comm. error	1	>	Emov		D4000	K72	3	communication operation status and automatic communication error code at automatic
X0       V600       P4008       D9100       J automatic communication parameter 1 is invalid.         V1000.1       CSET       Y41       Y41       Turns ON External output (Y41) when automatic communication parameter 2 is invalid.         X0       Automatic       CRST       Y40       Turns OFF automatic communication is normal.         X1       Automatic       Comm.       Communication operation status for automatic communication is normal.         00/03104.0       CRST       V400       Turns OFF automatic communication is normal.         X1       Turns OFF automatic communication is normal.       Turns OFF automatic communication is normal.         X1       Comm.       Communication operation status for automatic communication is normal.         X2       Comm.       Comm.         X3       Comm.       Communication operation status for automatic communication is normal.         X4       Comm.       Comm.       Communication operation status for automatic communication is normal.         X4       Comm.       Comm.       Communication operation status for automatic communication operation status for automatic communication operation status for automatic communication parameter 2 (D4000.1).         X6       Module Automatic       Communication function buffer output area>>         X0       X6       Module Automatic       Communication function buffer			D4000. 0				[SET	Y40	]	when automatic communication
CREFESH processing: Automatic communication function buffer output area>>          X0       K6       K100       K100       K100       K100       Furms OFF automatic communication parameter 2 is invalid.         X7						——[MOV	D4008	D9100	]	automatic communication
X7       [MOV p4009 perion       perion       Acquires error code when automatic communication parameter 2 is invalid.         X7       [RST Y40 ]       Turns OFF External output (Y40) when automatic communication is normal.         uo (G3104.0       [RST p400.0]       Image: Communication operation status for automatic communication parameter 1 (D4000.0)         X7       [RST p400.0]       Image: Communication operation status for automatic communication is normal.         X7       [RST p400.0]       Image: Communication operation status for automatic communication is normal.         X7       [RST p400.0]       Image: Communication operation status for automatic communication is normal.         uo (G3104.1       [RST p400.0]       Image: Communication operation status for automatic communication parameter 2 (D4000.0).         Via Mathematic communication function buffer output area>>       [RST p4000.1]       Turns OFF automatic communication parameter 2 (D4000.1).         <			D4000. 1				[SET	Y41	3	Turns ON External output (Y41) when automatic communication
Communication function buffer output areas          X0       X0       X1         X0       X1       X1         X0       X1       X1         X0       X2       X2         X0       X2       X2         X0       X2       X3         X0       X2       X3         X0       X2       X3						——[MOV	D4009	D9101	]	Acquires error code when automatic communication
Communication operation status for automatic communication parameter 1 (D4000.0).          X7       [RST       V41       Turns OFF External output (Y41) when automatic communication is normal.         Automatic       [RST       Y41       Turns OFF automatic communication is normal.         V0 V83104.1       [RST       D4000.1       [RST       Turns OFF automatic communication is normal.         << <refresh area="" automatic="" buffer="" communication="" function="" output="" processing:="">&gt;       [BM0V       D5000       G14848       K100       Refreshes automatic communication function buffer output area.         X0       X6       [BM0V       D5000       G14848       K100       Refreshes automatic communication function buffer output area.</refresh>		Automatic comm. error					[rst	Y40	]	Turns OFF External output (Y40) when automatic communication
Comm		- <i>\</i> /-	0				[RST	D4000. 0	]	communication operation status for automatic communication
<pre></pre>		Automatic comm. error					[RST	Y41	3	when automatic communication
Module       Automatic         READY       comm.         operation       status		∟∦–		on function buffer or	utput area>>		-	D4000. 1	]	communication operation status for automatic communication
	Module Automatic READY comm. operation				Ebmon	D5000		K100	]	communication function buffer
	status							-END	]	

### 9.3 Program Example for Use in MELSECNET/H Remote I/O Network

9.3.1 System configuration and program conditions

(1) System configuration

A program will be explained as an example to realize the following specifications for the setting target QJ71MT91 (192.1.0.1).



\*1: This QJ71MT91 is assumed to be mounted in Slot 0 of the base unit with the head I/O No. set to "0".

### (a) Automatic communication function

The setting target QJ71MT91 (192.1.0.1) and MODBUS® /TCP slave device (192.1.0.2) communicate with each other using the automatic communication function.

Set the automatic communication parameters to the setting target QJ71MT91.



[Communication details]



9 - 31

- (b) MODBUS<sup>®</sup> device assignment function The setting target QJ71MT91 (192.1.0.1) uses the MODBUS<sup>®</sup> device assignment function. Set the MODBUS<sup>®</sup> device assignment parameters to the setting target QJ71MT91. [Assignment details] Refer to Section 9.2.1 (1) (b) for the assignment details.
- (2) Parameter setting details
  - (a) Basic parameters Refer to Section 9.2.1 (2) (a) for the basic parameter setting details.
  - (b) Automatic communication parameters Refer to Section 9.2.1 (2) (b) for the automatic communication parameter setting details.
  - (c) MODBUS<sup>®</sup> device assignment parameters Refer to Section 9.2.1 (2) (c) for the MODBUS<sup>®</sup> device assignment parameter setting details.

Device Na	ame	Device		Appli	cation					
		X1000	Module READY							
		X1001	Basic parameter settin	g, normally com	pleted					
		X1002	Basic parameter settin	g, error complet	ted					
		X1003	Basic parameter set	Basic parameter setting existence						
	Input	X1004	Automatic communica	tion parameter s	setting, normally completed					
		X1005	Automatic communication parameter setting, error completed							
QJ71MT91		X1006	Automatic communication operation status							
input/output		X1008	MODBUS <sup>®</sup> device ass	ignment parame	eter setting, normally completed					
		X1009	MODBUS <sup>®</sup> device ass	ignment parame	eter setting, error completed					
		Y1001	Basic parameter settin							
	<b>.</b>		Automatic communica	tion parameter s	setting request/automatic					
	Output	Y1004	communication start request							
	Y1008		MODBUS <sup>®</sup> device ass		eter setting request					
External input (c	command)	X20	Parameter setting corr	mand						
		Y40	Automatic communica	tion parameter <sup>2</sup>	1 communication error					
External output		Y41	Automatic communica	tion parameter 2	2 communication error					
		D0 to D19								
		D48	Basic parameter setting area							
		D272 to D273	basic parameter settin	y area						
		D276 to D279								
		D512 to D520	5 MODBUS <sup>®</sup> device assignment parameter setting area							
		D524 to D529								
		D533 to D535								
		D2304 to D2307								
		D2432 to D2435								
		D2496 to D2499								
		D3088	Basic parameter error	code storage ar	ea					
		D3089	Automatic communica	tion parameter e	error code storage area					
Data register		D3090	Automatic communica	tion parameter s	setting result storage area					
		D3091	MODBUS <sup>®</sup> device ass	ignment parame	eter error code storage area					
		D3092	MODBUS <sup>®</sup> device ass	ignment	Error, device type					
		D3093	parameter setting resu	lt storage area	Error, assigned group No.					
		D4000 to D4003	Automatic communica	tion operation st	tatus storage area (parameter 1 to 64)					
		D4008 to D4071	Automatic communica	tion error code s	storage area (parameter 1 to 64)					
		D4092 to D4095		Automatic com area (paramete	munication operation status storage er 1 to 64)					
		D4096 to D4159	For auto refresh		munication function buffer input area					
		D5000 to D5099			munication function buffer output area					
		D9100	Automatic		munication parameter 1					
		D9101	communication error code	Automatic com	munication parameter 2					

(Continued on next page)

# 9 PROGRAMMING

Device Name	Device		Application
	SB20	Module status	
Link special relay	SB47	Baton pass status (host)	
	SB49	Host data link status	
	SW70.1	Baton pass status of eac	h station
Link special register	SW74.1	Cyclic transmission statu	s of each station
	SW78.1	Parameter communicatio	n status of each station
Timer	T0 to T4	For interlock between loc	al and other stations
	M1	For MC instruction	
	M10		REMTO instruction: For instruction completion
	M11		REMTO instruction: For instruction result
	M20		Basic parameter setting command
	M30		REMFR instruction: For instruction completion
	M31		REMFR instruction: For instruction result
	M40	setting	Basic parameter setting command
	M50		REMFR instruction: For instruction completion
	M51		REMFR instruction: For instruction result
	M60		REMFR instruction: For instruction completion
	M61		REMFR instruction: For instruction result
			Automatic communication parameter setting
	M100		command
	M101	For automatic communication	REMTO instruction: For instruction completion
	M102		REMTO instruction: For instruction result
	M111	parameter setting	REMFR instruction: For instruction completion
1.11.	M112		REMFR instruction: For instruction result
Internal relay	M200		MODBUS <sup>®</sup> device assignment parameter setting command
	M201	For MODBUS <sup>®</sup> device	REMTO instruction: For instruction completion
	M202	assignment parameter	REMTO instruction: For instruction result
	M211	setting	REMFR instruction: For instruction completion
	M212		REMFR instruction: For instruction result
	M300		REMFR instruction: For instruction completion
	M301		REMFR instruction: For instruction result
	M310		REMTO instruction: For instruction completion
	M311		REMTO instruction: For instruction result
	M320	For automatic	REMFR instruction: For instruction completion
	M321	communication function	REMFR instruction: For instruction result
	M322	1	For normal processing
	M330	7	REMFR instruction: For instruction completion
	M331	1	REMFR instruction: For instruction result
	M401	Automatic	For automatic communication parameter 1

### 9.3.2 Program using utility package

- (1) Intelligent function module switch setting Set the intelligent function module switches by clicking Switch setting on <<I/O assignment>> of GX Developer. Refer to Section 9.2.2 (1) for the intelligent function module switches.
- (2) Parameter setting

- (a) Basic parameters Refer to Section 9.2.2 (2) (a) for the basic parameter setting.
- (b) Automatic communication parameters Refer to Section 9.2.2 (2) (b) for the automatic communication parameter setting.
- (c) MODBUS<sup>®</sup> device assignment parameters Refer to Section 9.2.2 (2) (c) for the MODBUS<sup>®</sup> device assignment parameter setting.
- (3) Auto refresh setting Make auto refresh setting from the Auto refresh setting screen of GX Configurator-MB.

Set the following items for the program example.

Setting Item	Module side Transfer word count	Module side Buffer offset	PLC side Device
Automatic communication function buffer input area	64	256(100н)	W1000
Automatic communication function buffer output area	100	<b>2560(А00</b> н)	W1388
Automatic communication operation status	_	_	W0FFC

Module type: MODBUS(R) Module Module model name: QJ71MT91	S	tart I/O No :				
Module model name. 407 MIT 31			0000			
Setting item	Module side Buffer size	Module side Transfer word count	Module side Buffer offset	Transfer direction	PLC side Device	•
IODBUS is a registered trademark of Schneider Electric SA. Automatic communication function buffer nput area	4096	64	256	->	W1000	
Automatic communication function buffer output area	4096	100	2560	<-	W1388	=
Automatic communication operation status 1 to 64)	4	4	0	->	WOFFC	
Jser free area (input)	4096	4096	0	->		
Jser free area (output)	4096	4096	0	<-		

Set the parameters from the Initial setting screen of GX Configurator-MB.

### (4) Network parameter setting

Set the network parameters on "Network parameter" of GX Developer.

- 1) Network type : MNET/H (remote master)
- 2) Starting I/O No.
- : 0000н

: Online

- 3) Network No.
- :1
- 4) Total number of (slave) stations : 1
- 5) Mode
- 6) Network range assignment

XY setting

			M station	-> R statio	on				M station	<- R statio	n		
Station No.		Y			Y			Х			Х		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	32	1000	101F	32	0000	001F	32	1000	101F	32	0000	001F	-
4												•	

#### BW setting

		M stati	on -> R sta	ation	M stati	ion <- Rista	ation	M stati	on -> R sta	ation	M stati	on <- Rista	ation	
Station	n No.	В			В			W			W			
		Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1								100	1388	13EB	68	OFFC	103F	•
4													•	

#### 7) Refresh parameters

	Link side									PLC side		٠
	Dev. na	ame	Points	Start	End		Dev. na	me	Points	Start	End	
Transfer SB	SB		512	0000	01FF	+	SB		512	0000	01FF	
Transfer SW	SW		512	0000	01FF	+	SW		512	0000	01FF	
Random cyclic	LB					+		-				
Random cyclic	LW					+		-				
Transfer1	LW	Ŧ	8192	0000	1FFF	+	D	-	8192	0	8191	
Transfer2	LX	•	32	1000	101F	+	Х	-	32	1000	101F	
Transfer3	LY	4	32	1000	101F	+	Y	-	32	1000	101F	
Transfer4		+				+		-				
Transfer5		-				+		-				
Transfer6		-				+		•				•

### (5) Automatic communication function

- (a) For a program example for normal automatic communication, refer to << Processing for normal automatic communication >> in (6) (b).
- (b) For a program example for error code acquisition at an automatic communication error, refer to <<Handling of automatic communication error>> in (6) (b).

### POINT

The automatic communication error code can be monitored on the "Automatic communication status" screen of GX Configurator-MB.

# (6) Program example

(a) Interlock program example for remote master station and remote I/O station

Provide interlocks depending on the link status of the remote master station (local station) and remote I/O station (other station).

The following example shows communication program interlocks using the link status (SB47, SB49) of the remote master station and the link status (SW70 bit 0, SW74 bit 0, SW78 bit 0) of the remote I/O station (station No. 1).



#### Set the following value in the timer constant $K\Box$ .

Baton pass status (T0, T2)	(Sequence scan time $ imes$ 4) or more
Cyclic transmission status	
Parameter communication status	(Sequence scan time $ imes$ 3) or more
(T1, T3, T4)	

Reason: To prevent control from stopping even if the network detects an instantaneous error due to a cable problem, noise or other condition. Note that " $\times$  4" and " $\times$  3" represent standard values.

### POINT

For details of the interlock program for the remote master station and remote I/O station of MLESECNET/H, refer to the "Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O Network)".





### 9.3.3 Program without using utility package

- Intelligent function module switch setting Set the intelligent function module switches by clicking Switch setting on <<I/O assignment>> of GX Developer. Refer to Section 9.2.3 (1) for the intelligent function module switches.
- (2) Parameter setting

Set the parameters using a sequence program.

Parameter setting can be omitted under the following conditions.

Parameter	Parameter S	etting Omitting Condition
Farameter	Condition	Setting method
Basic parameters	Use the default parameters. (*1)	With the intelligent function module switch 2, set the basic parameter starting method (bit 0) to "0: Start with the default parameters". (Refer to Section 9.2.3 (1).)
Automatic communication parameters	Do not use the automatic communication function (master function).	No need to set.
MODBUS <sup>®</sup> device assignment parameters	Use the default parameters. (*2)	With the intelligent function module switch 2, set the MODBUS <sup>®</sup> device assignment parameter starting method (bit 1) to "0: Start with the default parameters". (Refer to 9.2.3 (1).)
	Do not use the MODBUS <sup>®</sup> device assignment function (slave function).	No need to set.

\*1: To utilize the basic parameters with the initial values (refer to Section 7.2.1), it is recommended to use the default parameters.

\*2: When the device assignment of the CPU is not changed, it is recommended to use the default parameters.

### (a) Basic parameters

Execute Basic parameter setting request (Y1001) after writing the basic parameters to the buffer memory by the REMOTO instruction. For a program example for basic parameter setting, refer to <<Basic parameter setting>> in (6) (b) in this section.

(b) Automatic communication parameters

Execute Automatic communication parameter setting request (Y1004) after writing the automatic communication parameters to the buffer memory by the REMOTO instruction.

For a program example for automatic communication parameter setting, refer to <<Automatic communication parameter setting>> in (6) (b) in this section.

(c) MODBUS<sup>®</sup> device assignment parameters

Execute MODBUS<sup>®</sup> device assignment parameter setting request (Y1008) after writing the MODBUS<sup>®</sup> device assignment parameters to the buffer memory by the REMOTO instruction.

For a program example for MODBUS<sup>®</sup> device assignment parameter setting, refer to <<MODBUS device assignment parameter setting>> in (6) (b) in this section.

### (3) Network parameter setting

Set the network parameters on "Network parameter" of GX Developer.

- 1) Network type : MNET/H (remote master)
- 2) Starting I/O No.
- : **0000**н

: Online

3) Network No.

5) Mode

- : 1
- 4) Total number of (slave) stations : 1
- 6) Network range assignment
  - XY setting

			M station	i -> R statio	n			M station <- R station					
Station No.	Y			Y			X			×			
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End	
1	32	1000	101F	32	0000	001F	32	1000	101F	32	0000	001F	-
4												•	

#### 7) Refresh parameters

	Link side								PLC side	
	Dev. n	name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB		512	0000	01FF	+	SB	512	0000	01FF
Transfer SW	SW		512	0000	01FF	+	SW	512	0000	01FF
Random cyclic	LB					+	+			
Random cyclic	LW					+	•			
Transfer1	LX	4	32	1000	101F	+	×	32	1000	101F
Transfer2	LY	÷	32	1000	101F	+	Y 🔸	32	1000	101F
Transfer3		٠				+	-			
Transfer4		-				+	•			
Transfer5		Ŧ				+	-			
Transfer6		-				+	-			

### (4) Refresh setting

For the processing equivalent to auto refresh setting (GX Configurator-MB), refer to <<Refresh processing>> in (6) (b).

### (5) Automatic communication function

- (a) For a program example for normal automatic communication, refer to << Processing for normal automatic communication>> in (6) (b).
- (b) For a program example for error code acquisition at an automatic communication error, refer to <<Handling of automatic communication error>> in (6) (b).

# (6) Program example

(a) Interlock program example for remote master station and remote I/O station

Provide interlocks depending on the link status of the remote master station (local station) and remote I/O station (other station).

The following example shows communication program interlocks using the link status (SB47, SB49) of the remote master station and the link status (SW70 bit 0, SW74 bit 0, SW78 bit 0) of the remote I/O station (station No. 1).



#### Set the following value in the timer constant $K\Box$ .

Baton pass status (T0, T2)	(Sequence scan time $ imes$ 4) or more
Cyclic transmission status	
Parameter communication status	(Sequence scan time $ imes$ 3) or more
(T1, T3, T4)	

Reason: To prevent control from stopping even if the network detects an instantaneous error due to a cable problem, noise or other condition. Note that " $\times$  4" and " $\times$  3" represent standard values.

### POINT

For details of the interlock program for the remote master station and remote I/O station of MLESECNET/H, refer to the "Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O Network)".

(b) Program example for parameter setting and automatic communication function

POINT After execution of the REMTO/REMFR instruction, it requires several scans until read/write of actual data is completed.

ic parameter sett X20 X1000 Parameter Modul setting READ command	) e					(FMOVP	НО	DO	H1D4	3	Initializes basic parameter creation area.
							[MOVP	K60	DO	]	TCP ULP timer value
							[MOVP	K20	D1	]	TCP zero window timer val
							[MOVP	K20	D2	3	TCP resend timer value
							[MOVP	K40	D3	3	TCP end timer value
							-[MOVP	<b>K</b> 10	D4	3	IP reassembly timer value
							[MOVP	K60	D5	]	Split reception monitoring t value
							[MOVP	<b>K</b> 1	D6	3	KeepAlive
							[MOVP	K1200	D7	3	KeepAlive start timer value
							[MOVP	K20	D8	3	KeepAlive interval timer va
							[MOVP	K3	D9	3	KeepAlive resend count
							[MOVP	ко	D10	3	Router relay function
						[DMOVP	HOFFFFF	F00	D11	3	Subnet mask pattern
							-[DMOVP	HO	D13	3	Default router IP address
							[MOVP	ко	D15	3	Number of routers set
							-EDMOVP	HO	D16	]	Subnet address
							-[DMOVP	HO	D18	3	Router IP address
							[MOVP	K1	D48	]	Number of TCP connection GX Developer connection
	ZP. REMTO	″J1″	<b>K</b> 1	<b>K</b> 1	HO	KO	DO	K49	M10 REMTO instruction completion	}	Transfers basic parameter QJ71MT91 buffer memory
M10 M11 REMTO instruction completion								[set	M20 Parameter setting command	}	Turns ON Basic paramete setting command (M200) v ZP.REMTO instruction is completed normally.
REMT instruc			Cor	respondi	ng MELS	n for error c ECNET/H I Network).	ompletion Network	n, referrin System F	ng to Q Reference		Handling of ZP.REMTO instruction error



Parameter Module setting READY command	Basic Automatic parameter comm. setting operation existence status			[FMOVP	HO	D512	H300	Initializes automatic communication parameter area.
			communication 1 <read coils=""></read>	[DMCVP	H0C0010	002	D512	] Target station IP address
					-[MOVP	K255	D514	] Module ID
					-[MOVP	K1200	D515	Repeat interval timer value
			       		-[MOVP	K60	D516	Besponse monitoring timer
	,				-[MOVP	H100	D517	Type specification of the ta MODBUS <sup>®</sup> device
	Deedeetting		       		-[MOVP	H1 100	D518	Head buffer memory addre
	Read setting {				-[MOVP	K15000	D519	Target MODBUS <sup>®</sup> device h
	(		i ! !		-[MOVP	K1024	D520	Access points
		- paramete	communication r 2 Iding registers>	[DMOVP	H0C0010	002	D524	] Target station IP address
					-[MOVP	K255	D526	] Module ID
					-[MOVP	K10	D527	] Repeat interval timer value
					-[MOVP	K60	D528	] Response monitoring timer
					-[MOVP	H5	D529	] Type specification of the ta MODBUS <sup>®</sup> device
					-[MOVP	H3A00	D533	] Head buffer memory addre
	Write setting {				[MOVP	KO	D534	Target MODBUS <sup>®</sup> device h
			     		-[MOVP	K100	D535	] Access points
						[rst	M100 Parameter setting command	Turns OFF Automatic communication parameter command (M100).
							—ко —>	<i>,</i>
-ко ->	-[ZP. REMTO	″J1″ K1	K1 H0	K512	D512	K24	M101 REMTO instruction completion	Transfers automatic communication parameters QJ71MT91 buffer memory.
M101 M102 REMTO instruction completion	n					[set	Y1004	Turns ON Automatic communication parameter request/automatic commun start request (Y1004) wher ZP.REMTO instruction is
M102			ake corrective ac Corresponding ME	tion for error c	ompletic Network	on, referrir System F	ng to Q Reference	completed normally. Handling of ZP.REMTO



Parameter Mo	dule Bas ADY para sett	ameter			[FMOVP	HO	D2304	HOFF	] Initializes MODBUS <sup>®</sup> device assignment parameter settir area.
			For coil a	assignment 1		[MOVP	H9D	D2304	] Device code
						[MOVP	H100	D2305	Head device number
						[MOVP	КО	D2306	Head coil number
				     		[MOVP	K512	D2307	Assignment points
			For inpu	t register assignmer	nt 1	[MOVP	HOA8	D2432	] Device code
						[MOVP	K3500	D2433	Head device number
						[MOVP	K3499	D2434	Head input register number
						[MOVP	K5500	D2435	] Assignment points
			For hold	ing register assignm	nent 1	[MOVP	HOF000	D2496	] Device code
						[MOVP	H5500	D2497	} Head device number
						—[MOVP	КО	D2498	] Head holding register numb
				 		-[MOVP	K1024	D2499	] Assignment points
							—[rst	M200 Parameter setting command	] Turns OFF MODBUS <sup>®</sup> devic assignment parameter settin command (M200).
								—ко -	<b>&gt;</b>
ко —	[ZP.	REMTO	"J1" K1	K1 HO	K2304	D2304	K255	M201 REMTO instruction completion	] Transfers MODBUS <sup>®</sup> device assignment parameters to QJ71MT91 buffer memory.
	02 Y MTO ruction ult						[Set	Y1008	Turns ON MODBUS <sup>®</sup> device assignment parameter settir request (Y1008) when ZP.REMTO instruction is
M2	02		1 I	Take corrective acti Corresponding MEI	ion for error o	completio	n, referrin System R	g to Q eference	Completed normally. ■ Handling of ZP.REMTO



<<Refresh processing: Automatic communication function buffer input area>> X1000 X1006 -TZ. REMFR "J1" **K**1 HO K4352 D4096 K64 M300 Refreshes automatic ΗH K1 + +Module Automatic REMFR communication function buffer READY communication instruction input area. operation status completion Take corrective action for error completion, referring to Q M300 M301 Corresponding MELSECNET/H Network System Reference Handling of Z.REMFR + +┥┝ REMFR instruction REMFR Manual (Remote I/O Network). instruction error instruction completion result <<Refresh processing: Automatic communication operation status>> X1000 X1006 ΗĤ -[Z. REMFR "J1" HO K3104 D4092 K4 M320 ΗF K2 **K**1 Refreshes automatic Automatic communication operation status REMFR instruction completion Module READY communication operation status storage area. M320 M321 -**F**SET M322 Turns ON Normal processing ┥┝ -14 REMFR REMFR Normal processing command command (M322) after instruction instruction acquiring automatic completion result communication operation status storage area data. Take corrective action for error completion, referring to Q M321 Handling of Z.REMFR REMFR Corresponding MELSECNET/H Network System Reference instruction error Manual (Remote I/O Network). result X1000 Module READY Turns OFF Normal processing RST M322 command (M322) when Module READY (X1000) or Automatic Normal processing command communication operation status (X1006) is OFF. X1006 ∦ Automatic communication operation status << Processing for normal automatic communication: For automatic communication parameter 1>> X1006 M322 D4092.0 X1000 Module READY -[MC 1 N1 M401 When automatic communication ┥┝ + F Automatic Normal parameter 1 is normal comm. processing operation status command N1 M401 Program for normal automatic communication parameter 1 MCR N1 << Processing for normal automatic communication: For automatic communication parameter 2>> D4092.1 M322 X1000 X1006 When automatic communication +ΗH +-FMC N2 M402 Module Normal Automatic parameter 2 is normal READY comm. processing operation status command N2 M402 Program for normal automatic communication parameter 2 -FMCR N2

X1000	X1006	X1007 ┳━━┥ ┝━━┓	_//								—КО	$\rightarrow$	
	Automatic comm. operation	Automatic comm. error	REMFR instruction completion									-	
	status	status											
			M330 REMFR instruction completion	M331 REMFR instruction result	D4000. 0					—[Set	¥40	}	Turns ON External output when automatic communi parameter 1 is invalid.
			M330	M331	<b>D4000</b> . 1				—[wov	D4008	D9100	}	Acquires error code when automatic communication parameter 1 is invalid.
			REMFR instruction completion	REMFR instruction	—					[set	Y41	}	Turns ON External output when automatic communi parameter 2 is invalid.
		X1007							—[MOV	D4009	D9101	}	Acquires error code when automatic communication parameter 2 is invalid.
		Automatic comm. error status								[RST	Y40	}	Turns OFF External outpu (Y40) when automatic communication is normal.
		D4000. 0								[RST	D4000. C	• }	Turns OFF automatic communication operation for automatic communicat parameter 1 (D4000.0).
		Automatic comm. error status								[rst	Y41	}	Turns OFF External outpu (Y41) when automatic communication is normal.
		D4000. 1								[RST	D4000. 1	}	Turns OFF automatic communication operation for automatic communicat parameter 2 (D4000.1).
-ко —>		-[ZP. REMFR	,	'J1″	К3	K1	HO	K3104	D4000	K72	M330 REMFR instructior completio		Acquires automatic communication operation and automatic communica error code at automatic communication error.
M330 REMFR instruction completion		1			Corres	sponding	e action f g MELSE ote I/O Ne	CNET/H I	ompletior Network \$	n, referring System Re	g to Q eference	     	Handling of Z.REMFR
fresh proces	ssing: Au X1006	tomatic co M310	mmunica	tion fund	ction buff	er outpu	it area>>						
Module READY	Automatic comm. operation status	_//_	1								—КО	→	
-ко —>		-[ZP. REMTO		'J1″	K4	K1	HO	K14848	D5000	K100	M310 REMTO instruction completion		Refreshes automatic communication function b output area.
M310	M311				Corres	sponding		CNET/H I		n, referring System Re	g to Q	'I L	Handling of Z.REMTO

# **10 DEDICATED INSTRUCTIONS**

The dedicated instructions make programming easy for use of the intelligent function module functions.

### 10.1 Dedicated Instruction List and Available Devices

#### (1) Dedicated instruction list

The following table indicates a list of dedicated instructions supported by the QJ71MT91.

Dedicated Instruction	Description	Reference
MBRW	Reads and writes the MODBUS <sup>®</sup> device data from and to the slave.	Section 10.2
MBREQ	Communicates with the slave in the request message format of any PDU (protocol data unit).	Section 10.3

#### Interlock for dedicated instruction execution

Execute the dedicated instruction with the I/O signals in the following status.



### POINT

Until completion of the dedicated instruction execution, do not change the data (control data, argument, etc.) specified for the dedicated instruction.

### (2) Available devices

The following devices are available for the dedicated instructions:

Internal	devices	File register		
Bit <sup>*1</sup>	Bit <sup>*1</sup> Word			
X, Y, M, L, F, V, B	T, ST, C, D, W	R, ZR		

\*1: Word device bit designation can be used as bit data.

Word device bit designation is done by designating Word device . Bit No. . (Designation of bit numbers is done in hexadecimal.)

For example, bit 10 of D0 is designated as D0.A.

However, there can be no bit designation for timers (T), retentive timers (ST) and counters (C).

### 10.2 Z(P).MBRW

With this instruction, the MODBUS  $^{\ensuremath{\$}}$  device data are read from and written to the slave.

					Usable Devices								
	Internal device			Link dire	ct device	Intelligent		Constant					
Set Data	(System	n, user)	File register	J		function module	Index register	Constant	Others				
	Bit	Word		Bit	Word	device U 🗌 \G 🗌	Zn	К, Н \$					
(S1)	_		0										
(D1)	_		0										
(S2)	-		0				_						
(D2)		$\bigcirc$					_						
	Instruction sy Z.MBRW ZP.MBRW	/mbol] [E:		on] Command		*1	S1) (D1) (S2 S1) (D1) (S2		-				

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

### Set data

Set data	Setting	Setting Side <sup>*2</sup>	Data Type
"Un"	Head I/O number of module (00н to FEн: Upper 2 digits of the I/O number in 3-digit notation)	User	
(S1)	Head number of device where control data are stored	User, system	BIN 16 bits
(D1) <sup>*3</sup>	Read data storing device	System	
(S2) <sup>*3</sup>	Write data storing device	User	
(D2)	Device turned ON one scan on completion of the instruction (D2)+1 also turns ON for error completion.	System	Bit

- \*2: The setting side is as described below.
  - User I bata are set by the user before dedicated instruction execution.
  - System : The programmable controller CPU stores the result of dedicated instruction execution.
- \*3: Specify a dummy device if "00H: No specification" is selected in the Type specification of the target MODBUS<sup>®</sup> device ((S1)+8).

The local device and program-based file register are not available as the devices used for set data.

# Control data

Device	Item	Set Data	Setting Range	Setting Side <sup>*2</sup>
(S1)+0	Execution type	b15     to     b1     b0       0     to     0     1)   1) Close option (Bit 0) Set whether a TCP connection will be closed or not after instruction completion. 0: TCP connection is not closed after instruction completion. 1: TCP connection is closed after instruction completion.	0, 1	User
(S1)+1	Complete condition	A condition when instruction is completed is stored. 0: Normal completion Other than 0: Error completion (error code) Refer to Section 11.3.3 for details of the error code.	_	System
(S1)+2	MODBUS <sup>®</sup> exception code	An exception code from the slave is stored. 0: Slave processing normally completed Other than 0: Slave processing completed with an error (exception code) Refer to Section 11.3.2 for details of the exception code.	_	System
(S1)+3 (S1)+4	Target IP address	Set the IP address of the target slave. IP address: <u>192. 1</u> . 0. 2 <u>b15 v b8 b7 v b0</u> <u>b15 v b8 b7 v b0</u>	Refer to *1	User
(S1)+5	Module ID	Set when a request message is sent to the slave without the MODBUS <sup>®</sup> /TCP interface via the MODBUS <sup>®</sup> serial gateway, etc. When the destination of the request message is the MODBUS <sup>®</sup> serial gateway, the set values are as described below. 0: Broadcast 1 to 247: Station number of MODBUS <sup>®</sup> serial slave *: Set "255" when the destination of the request message is the slave having the MODBUS <sup>®</sup> /TCP interface.	0 to 255	User
(S1)+6	Target slave port No.	Specify the port No. of the target slave. 0: Sent to No. 502 1 to 65535: Sent to the set port No.	0 1 to 65535 (*3)	User
(S1)+7	Response monitoring timer value	Specify the time for monitoring a response from the target device (slave). (500ms increments) 0: 60 (30s) 2 to 2400: Set value (Response monitoring timer value = set value × 500ms)	0 2 to 2400	User
(S1)+8	Type specification of the target MODBUS <sup>®</sup> device	Specify the types of the read/write target MODBUS® devices. *3         b15       b8       b7       b0         Read target         Write target         Set value       Target MODBUS® device type         00H       No specification         01H       Coil         02H       Input         04H       Input register         05H       Holding register         07H       Extended file register	0001н 0005н 0007н 0100н 0200н 0400н 0500н 0500н 0505н 0700н	User

# 10 DEDICATED INSTRUCTIONS

Device		Item	Set Data	Setting Range	Setting Side <sup>*2</sup>	
(S1)+9		Correspond- ing file number	Specify the file number when the target MODE register.	${\rm SUS}^{\circledast}\;$ device is the extended file	0 to 65535 (*3, *4)	User
(S1)+10		Target MODBUS <sup>®</sup> device head number	Specify the head number of the read target MC As the device head number, specify the lower - 1". (With the exception of the file number and dev register) (Example) Specify "31" when accessing the in	0 to 65535 (*3, *4)	User	
	Read setting		Set the read points of the MODBUS <sup>®</sup> device. Use the following unit to set the access points. Type specification of the target MODBUS <sup>®</sup> device unit	Access points that can be set		
(S1)+11	1     Access points       2     Read data storage size       Correspond-	01н: Coil     Bit       02н: Input     Bit       04н: Input register     05н: Holding register       05н: Holding register     Word       07н: Extended file register     Word	Refer to *6.	0 to 2000 (*4)	User	
(S1)+12			Set the word size of the read data stored in the	_	System	
(S1)+13		Correspond- ing file number	Specify the file number when the target MODE register.	0 to 65535 (*3, *5)	User	
(S1)+14		Target MODBUS <sup>®</sup> device head number	Specify the head number of the write target Me As the device head number, specify the lower - 1". (With the exception of the file number and dev register) (Example) Specify "31" when accessing the in	0 to 65535 (*3, *5)	User	
(S1)+15	Write setting	Access points	Set the write points of the MODBUS <sup>®</sup> device.         Use the following unit to set the access points.         Type specification of the target MODBUS <sup>®</sup> device       Setting         01н: Coil       Bit         02н: Input       Bit         04н: Input register       05н: Holding register         05н: Extended file register       Word	Access points that can be set Refer to *6.	0 to 1968 (*5)	User
(S1)+16		Write data storage size	Set the word size of the write data stored in the Set "1" when performing read only. When the access target MODBUS <sup>®</sup> device (t MODBUS <sup>®</sup> device) is "01H: Coil" or "02H: Inpu • Set the "access points/16 (rounded up to the • When the number of write points is a fraction (Refer to (3) in POINT on the next page.)	vpe specification of the target t", pay attention to the following. nearest integer)".	1 to 125	User

\*1: Set the value that satisfies the following conditions.

Condition 1: The IP address class is any of A, B and C.

Condition 2: The host address bits are not all "0" or all "1".

- \*2: The setting side is as described below. User: Data are set by the user before dedicated instruction execution. System: The programmable controller CPU stores the result of dedicated instruction execution.
- \*3: When specifying a value of 32768 (8000H) or more in a sequence program, set the value in hexadecimal.

- \*4: Set "0" for the case of write only.
- \*5: Set "0" for the case of read only.
- \*6: The combinations of the read and write targets that can be set in the target MODBUS<sup>®</sup> device type setting and the setting ranges of the access points are as indicated in the following table.

Туре	e Specification of the Target I	MODBUS <sup>®</sup> Device			Access Points	Setting Range
Set values	Read target	Write target		Function Code	Read points	Write point
0100н	Coil		01	Read coils	1 to 2000	_
0200н	Input	No specification	02	Read discrete inputs	1 to 2000	—
0400н	Input register		04	Read input registers	1 to 125	—
0500н	Holding register		03	Read holding registers	1 to 125	—
0700н	Extended file register		20	Read file record	1 to 124	—
0001н		Coil	15	Write multiple coils	—	1 to 1968
0005н	No specification	Holding register	16	Write multiple registers	—	1 to 123
0007н		Extended file register	21	Write file record	_	1 to 122
0505н	Holding register	Holding register	23	Read/write multiple registers	1 to 125	1 to 121

- 1) No combination setting other than the above is allowed for the type specification of the target MODBUS<sup>®</sup> device ((S1)+8).
- 2) Simultaneous execution of read and write with a single instruction is allowed only for 0505H (Read/Write Multiple Registers).
- Read file record (FC: 20) and Write file record (FC: 21) allows access to multiple areas in one communication, however, only one area is accessible in one communication when using this dedicated instruction.

### POINT

(1) When the close option setting of the execution type ((S1)+0) is "TCP connection is closed after instruction completion", TCP connection is closed after the dedicated instruction has been completed and the completion device (D2) has turned ON. If the dedicated instruction is executed again for the same target device during this TCP connection closing processing, it is completed with an error. When the execution interval of the dedicated instruction for the same target device is short, set the close option to "TCP connection is not closed after instruction completion". (2) Specify "(device number) - 1" as the device number. However, this does not apply to the file number and device number specified for the Read/write file record. (3) When access is made to the bit device (coil, input) of the slave, the fraction bit is handled as described below. [Read] When the read access points are 35 points <Read data storing device (D1)> <Target slave device area> to to Read D100 116640 to 116625 D101 116656 to 116641 D102 116672 to 116657 . Remaining area is masked by 0. [Write] When the write access points are 5 points <Write data storing device (S2)> bF to b0 Write bF Target slave device area> to to b0 D300 122544 to 122529 Remaining area is ignored.
#### Function

- (1) MODBUS<sup>®</sup> device data are read from and written to the slave specified in the target IP address of the control data.
- (2) The processing used in the automatic communication function can be performed from a sequence program at any timing.
- A maximum of eight MBRW instructions can be executed simultaneously. Any instructions attempted in excess of the limit are ignored. Create a sequence program carefully so that the number of simultaneously executed MBRW instructions does not exceed 8.
- (4) The QJ71MT91 automatically opens a TCP connection with a target slave when this instruction is executed.
- (5) Whether TCP connection closing processing is performed or not can be selected in "Execution type ((S1)+0)" of the control data. When communication with the same target device is made frequently using the dedicated instruction, setting "TCP connection is not closed after instruction completion" saves the time required for TCP connection opening for the subsequent instruction execution.
- (6) Whether the MBRW instruction is being executed or not and whether it is completed normally or not can be confirmed in the MODBUS<sup>®</sup> exception code ((S1)+2), and the completion device (D2) and completion status indication flag ((D2)+1) specified in the set data.
  - (a) MODBUS<sup>®</sup> exception code Stores the exception code when the processing in the slave is completed with an error.
  - (b) Completion device (D2) Turns ON in the END processing of the scan where the MBRW instruction is completed, and turns OFF in the next END processing.

in the next END processing.

the MBRW instruction is completed, and turns OFF

 (c) Completion status indication device ((D2)+1) Turns ON/OFF depending on the status of the MBRW instruction completion. Normal completion: Remains OFF. Error completion : Turns ON in the END processing of the scan where

#### END END END END processing processing processing processing Sequence program Completion of MBRW ON instruction execution OFF MBRW instruction ON Completion device OFF Error (D2) ON completion Normal Completion status completion OFF indication device 1 scan (D2)+1

### [Operation for MBRW instruction execution]

Error

- (1) When the dedicated instruction is completed with an error, the completion status indication device (D2)+1 turns ON and the error code is stored into the complete condition (S1)+1. When the processing in the slave is completed with an error, the exception code is stored into (S1)+2. According to the error code and exception code, check the error and take corrective action, referring to the following manual.
  <Error code>
  03E8H to 4FFFH : QCPU User's Manual (Hardware Design, Maintenance and Inspection)
  7300H or more : Section 11.3.3 in this manual
  <Exception code>
  Section 11.3.2 in this manual
- (2) If Basic parameter setting request (Y1) turns ON during execution of the MBRW instruction, the dedicated instruction is completed with an error.

### Program example

The following program is designed to read and write the device data in the holding register of the slave (IP address: 192.1.0.2).

When the I/O signals of the QJ71MT91 are X/Y00 to X/Y1F



MELSEC-Q

X20 X0 X3 Dedicated Module Basic instruction READY start command existence		[mov	H1	DO ]	Execution type
		-[mov	HO	D1 ]	Clears the complete condition to 0.
		-[mov	HO	D2 ]	Clears the MODBUS <sup>®</sup> exception code to 0.
	[DMOV	H0C00100	02	D3 ]	Target IP address
		[wov	K255	D5 ]	Module ID (Station No.)
		-[mov	HO	D6 ]	Target slave port No.
		-[mov	HO	D7 ]	Response monitoring timer value
		-[мол	H505	D8 ]	Type specification of the target MODBUS <sup>®</sup> device
		-[mov	КО	D9 ]	Corresponding file number
		-[mov	K10999	D10 ]	Target MODBUS <sup>®</sup> device head number
		-[mov	K100	D11 ]	Access points
		-Ewon	КО	D12 ]	Clears read data storage size to 0.
		-[mov	ко	D13 ]	Corresponding file number
		[wov	K499	D14 ]	Target MODBUS <sup>®</sup> device head number
		[mov	K32	D15 ]	Access points
		-[mov	K32	D16 ]	Write data storage size
	Z. MBRW "UO" DO	D100	WO	MO } MBRW instruction completed	Dedicated instruction (Z.MBRW)
MO M1 MBRW MBRW instruction completed result	Processing program	n for norr	 mal comp 	 letion   	
M1 MBRW instruction result	Processing program	m for err	 or comple 	etion _ I I	
				-[END ]	

# REMARK

The MODBUS<sup>®</sup> /TCP frames used in communication with the slave in this sample program are as shown below.

		Request mes	sage format (ivi	aster (QJ711V	II91) →	Slave)		
Function code	+	ı 	· · · ·	Data	, 	r	ı ı	· · ·
Function code (17н)	Read head holding register number (2AF7н)	Read points n (0064н)	Write head holding register number (01F3н)	Write points m (0020н)	Number of bytes m×2 (0040н)	Write device data 1 (W0000 value)		Write device data m (W001F value)
	(H) (L)	(H) (L)	(H) (L)	(H) (L)		(H) (L)		(H) (L)
						(Numbe)	er of byte	es m×2)

#### Request message format (Master (QJ71MT91) $\rightarrow$ Slave)

#### Response message format (Slave $\rightarrow$ Master (QJ71MT91))

Function code			Data	1		
Function code (17н)	Number of bytes n×2 (С8н)		vice data 1 0 value)			vice data n 9 value)
		(H)	(L)		(H)	(L)
		•	(Nu	mber of bytes	n×2)	

### 10.3 Z(P).MBREQ

					Usable	Devices				
Set Data	Internal (System		File vegister	Link dire J 🗌	ct device ∖□	Intelligent function module	Index register	Cons	stant	Others
	Bit	Word	File register	Bit	Word	device U 🗌 \G 🗌	Zn	К, Н	\$	Others
(S1)	_		0	_						
(S2)	_		0	_						
(D1)	_		0							
(D2)	0					-				

With this instruction, a request message can be sent to the slave in any given PDU (protocol data unit) format.



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

#### Set data

Set data	Setting	Setting Side *2	Data Type
"Un"	Head I/O number of module (00н to FEн: upper 2 digits of the I/O number in 3-digit notation)	User	
(S1)	Head number of device where control data are stored	User, system	BIN 16 bits
(S2)	Request message storing head device	User	
(D1)	Response message storing head device	System	
(D2)	Device turned ON one scan on completion of the instruction (D2)+1 also turns ON for error completion.	System	Bit

\*2: The setting side is as described below.

- User: Data are set by the user before dedicated instruction execution.
- System: The programmable controller CPU stores the result of dedicated instruction execution.

The local device and program-based file register are not available as the devices used for set data.

### REMARK

Refer to Section 4.2 for details of the PDU (protocol data unit).

### 10 DEDICATED INSTRUCTIONS

### Control data

Device	Item	Set Data	Setting Range	Setting Side <sup>*2</sup>
(S1)+0	Execution type	b15     to     b1     b0       0     to     0     1)   1) Close option (Bit 0) Set whether a TCP connection will be closed or not after instruction completion. 0: TCP connection is not closed after instruction completion. 1: TCP connection is closed after instruction completion.	0, 1	User
(S1)+1	Complete condition	A condition when instruction is completed is stored. 0: Normal completion Other than 0: Error completion (error code) Refer to Section 11.3.3 for details of the error code.	_	System
(S1)+2	—	(Fixed value)	0	User
(S1)+3 (S1)+4	-Target IP address	Set the IP address of the target slave. IP address: <u>192</u> . <u>1</u> . <u>0</u> . <u>2</u> <u>b15</u> <u>b8</u> <u>b7</u> <u>b0</u> <u>b15</u> <u>b8</u> <u>b7</u> <u>b0</u> <(S1) + 4> $<(S1) + 3>$	Refer to *1	User
(S1)+5	Module ID	Set when a request message is sent to the slave without the MODBUS <sup>®</sup> /TCP interface via the MODBUS <sup>®</sup> serial gateway, etc. When the destination of the request message is the MODBUS <sup>®</sup> serial gateway, the set values are as described below. 0: Broadcast 1 to 247: Station number of MODBUS <sup>®</sup> serial slave * : Set "255" when the destination of the request message is the slave having the MODBUS <sup>®</sup> /TCP interface.	0 to 255	User
(S1)+6	Target slave port No.	Specify the port No. of the target slave. 0: Sent to No. 502 1 to 65535: Sent to the set port No.	0 1 to 65535 (*3)	User
(S1)+7	Response monitoring timer value	Specify the time for monitoring a response from the target device (slave). (500ms increments) 0: 60 (30s) 2 to 2400: Set value (Response monitoring timer value = Set value × 500ms)	0 2 to 2400	User
		<ul> <li>*1: Set the value that satisfies the following conditions. Condition 1: The IP address class is any of A, B and C. Condition 2: The host address bits are not all "0" or all "1".</li> <li>*2: The setting side is as described below. User: Data are set by the user before dedicated instruction of System: The programmable controller CPU stores the result instruction execution.</li> <li>*3: When specifying a value of 32768 (8000H) or more in a seque the value in hexadecimal.</li> </ul>	t of dedicate	
		POINT When the close option setting of the execution type ((S1)+0) is " closed after instruction completion", TCP connection is closed a instruction has been completed and the completion device (D2) If the dedicated instruction is executed again for the same targe TCP connection closing processing, it is completed with an error When the execution interval of the dedicated instruction for the s is short, set the close option to "TCP connection is not closed after completion".	fter the dedic has turned ( t device duri r. same target	cated DN. ng this device

#### Request message storing devices

Device	Item			Set Data			Setting Range	Setting Side <sup>*1</sup>
(S2)+0	Request message size [byte]	Set the size of the	e request mess	age to be sent ir	n byte units.		1 to 253	User
(S2)+0 (S2)+1 to (S2)+n		Set the contents ( (Example) Wher 44000 <frame of="" reques<br=""/> Function code 03н <contents stored<br="">&lt;(S2) + 0&gt; &lt;(S2) + 1&gt; &lt;(S2) + 2&gt; b</contents>	(function code - n a request mes 01 to 440002 is st message to b Head holding 9CH (H) in request mes 15 b8 00H	+ data) of the rec ssage to read the sent by Read h be sent> register number 40H Sending order (L) 5 bytes ssage storing der b7 bi 05H b7 bi 03H b7 bi	quest message e data of holding olding registers ata Read 00н (H) vices and their of C Request r (= 5 bytes C C C C C C C C C C C C C C C C C C C	g registers (FC: 03) points 03H (L) porder> message size s)	As described on the left	User
		(Request	Send dat t message is se rder bytes, star	a storage order ent in order of lo ting at the lower				

\*1: The setting side is as described below.

User: Data are set by the user before dedicated instruction execution. System: The programmable controller CPU stores the result of dedicated instruction execution.

### POINT

- (1) The request message data stored in the request message storing devices
   "(S2)+1 to (S2)+n" are sent in order of L (low-order) to H (high-order) bytes, starting at the lowest device number.
- (2) When the request message size is an odd number, the last high byte of the request message storing device is ignored. (The data are not sent.)

#### Response message storing devices

Device	Item	Set Data	Setting Range	Setting Side <sup>*1</sup>
(D1)+0	Response message size [byte]	Set the size of the received response message in byte units.	0 to 253	System
(D1)+1 to (D1)+n	Response message	Set the contents (function code + data) of the received response message. (Example) When the response message with Read holding registers (FC: 03) is received < <u>Received response message frame&gt;</u> Function code Number of read bytes 03H 04H *2 00H 05H 12H 34H Receiving order (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (H) (L) (Eaceiving order) (C) (D1) + 0> 00H 06H (C) (D1) + 1> 04H 03H (D1) + 1> 04H 03H (C) (D1) + 2> 05H 00H (D1) + 3> 34H 12H Response message is stored in order of low- order to high-order bytes, starting at the lowest device number.) (Response message is stored in order of low- order to high-order bytes, starting at the lowest device number.)	As described on the left	System

- \*1: The setting side is as described below. User: Data are set by the user before dedicated instruction execution. System: The programmable controller CPU stores the result of dedicated instruction execution.
- \*2: The number of read bytes is 4 from "2 (Read points)  $\times$  2 = 4".

#### POINT

- (1) The received response message data are stored in order of L (low-order) to H (high-order) bytes, starting at the lowest device number of the response message storing devices "(D1)+1 to (D1)+n".
- (2) When the response message size is an odd number, the last high byte of the response message storing device is overwritten by 0.

Function

- (1) To the slave specified by the Target IP address of the control data, the request message can be sent using any given PDU (protocol data unit) format.
- A maximum of eight MBREQ instructions can be executed simultaneously. Any instructions attempted in excess of the limit are ignored. Create a sequence program so that the number of simultaneously executed MBREQ instructions does not exceed 8.
- (3) The QJ71MT91 automatically opens a TCP connection with a target slave when this instruction is executed.
- (4) Whether TCP connection closing processing is performed or not can be selected in "Execution type ((S1)+0)" of the control data. When communication with the same target device is made frequently using the dedicated instruction, setting "TCP connection is not closed after instruction completion" saves the time required for TCP connection opening for the subsequent instruction execution.
- (5) Whether the MBREQ instruction is being executed or not and whether it is completed normally or not can be confirmed in the completion device (D2) and completion status indication device ((D2)+1) specified in the set data.
  - (a) Completion device (D2)
     Turns ON in the END processing of the scan where the MBREQ instruction is completed, and turns OFF in the next END processing.
  - (b) Completion status indication device ((D2)+1) Turns ON/OFF depending on the status of the MBREQ instruction completion.
     Normal completion: Remains OFF.
     Error completion : Turns ON in the END processing of the sca

Turns ON in the END processing of the scan where the MBREQ instruction is completed, and turns OFF in the next END processing.

### [Operation for MBREQ instruction execution]



Error

(1) When the dedicated instruction is completed with an error, the completion status indication device (D2)+1 turns ON and the error code is stored into the complete condition (S1)+1.

According to the error code, check the error and take corrective action, referring to the following manual.

<Error code>

```
03E8н to 4FFFн : QCPU User's Manual (Hardware Design, Maintenance and
Inspection)
7300н or more : Section 11.3.3 in this manual
```

(2) If Basic parameter setting request (Y1) turns ON during execution of the MBREQ instruction, the dedicated instruction is completed with an error.

#### POINT

- In the case of the MBREQ instruction, exception codes and function codes are not stored in the Error log (address: 0CFEH to 0DFFH) of the buffer memory. Check the exception and function codes by the response message that is stored in the response message storage device.
   This instruction is completed normally even if the target slave device gives an
- (2) This instruction is completed normally even if the target slave device gives an exception response. When the instruction is completed normally, check the highest-order bit of the function code in the response message to determine whether the response is normal or not. (For an exception response, the highest-order bit in the first byte of the receive data turns ON.) For an exception response, check the exception code (the second byte of the receive data) in the response message and take corrective action. (Refer to

Section 11.3.2.)

#### Program example

The following program is designed to send the request message to write the value ORmasked with 0008<sub>H</sub> to the holding register 400003 (Mask write register (FC: 22) of the slave (IP address: 192.1.0.2).

When the I/O signals of the QJ71MT91 are X/Y00 to X/Y1F







# (2) Frames sent and received by MBREQ instruction (a) Request message format (Master (QJ71MT91) → Slave)

Function code		Data				
Function code	Target holding	register number	AND mask	< value	OR mask value (0008н)	
16н	00н	02н	00н Sending order	00н	00н	08н
	(H)	(L)	(H)	(L)	(H)	(L)

#### (b) Response message format <When completed normally>







\*: Refer to Section 11.3.2 for details of the exception code.



This chapter explains the error details and corrective actions.

#### 11.1 Troubleshooting

11

#### Reference No. Symptom Check Item **Corrective Action** Section RUN LED turned 1 Check the mounting status of the Switch the power off and remount the Section 6.1 off. QJ71MT91. QJ71MT91. Section 3.1 Check the power supply capacity. Change the power supply module. Check the programmable controller If the programmable controller CPU is CPU. faulty, take corrective action according to the QCPU User's Manual (Hardware Design, Maintenance and Inspection). Check for a watch dog timer error (X1F). · Reset the programmable controller CPU or power the programmable controller off and then on. If the problem still persists after resetting it again, the possible cause is a hardware fault. Perform a hardware test, and replace the QJ71MT91. 2 ERR. LED turned Check the intelligent function module Check the setting range of each on. switch 1 (operation mode setting) value. intelligent function module switch, and Check the intelligent function module correct the value. Section 6.6 switch 2 (communication condition setting) value. Check the intelligent function module switch 3, 4 (IP address setting) value. Check if the QJ71MT91 is not mounted Mount the QJ71MT91 with the Q mode Section 2.1 with the A mode QCPU. QCPU. Check if the module is in the hardware · Restart the test after checking the or self-loopback test mode. mounting status of the QJ71MT91. Section 6.5.1 If the ERR. LED turns on again, the Section 6.5.2 possible cause is a hardware fault. Change the QJ71MT91. Refer to "RUN LED turned off." This section (1)-1 COM. ERR. LED 3 This section Check if the basic parameter setting, Refer to "Basic parameter setting, error turned on. error completed (X2) is on. completed (X2) turned on." (2)-3 Check if the automatic communication Refer to "Automatic communication This section parameter setting, error completed (X5) parameter setting, error completed (X5) (2)-5 is on. turned on."

#### (1) Troubleshooting of errors indicated by LEDs

No.	Symptom	Check Item	Corrective Action	Reference Section
3	COM. ERR. LED turned on.	Check if the MODBUS <sup>®</sup> device assignment parameter setting, error completed (X9) is on.	Refer to "MODBUS <sup>®</sup> device assignment parameter setting, error completed (X9) turned on."	This section (2)-6
		Check if the automatic communication error status (X7) is on.	Refer to the automatic communication operation status storage area [ $0C20H$ to 0C23H], identify the parameter number where the error occurred, confirm the error code stored in the corresponding automatic communication error code storage area [ $0C28H$ to $0C67H$ ] or the exception code from the target slave, and take corrective action. Turn off the COM. ERR. LED.	Section 11.3.1
		When the dedicated instruction is used, check it for an error.	Refer to "Dedicated instruction failed.". Turn off the COM. ERR. LED.	This section (3)-2
		Check the error code in the error log.	Take the corresponding corrective action. Turn off the COM. ERR. LED.	Section 11.3
		Refer to "Communication with target dev parameter setting is completed.".	ice cannot be made even though each	This section (3)-6
4	INIT. LED does not turn on.	Check the basic parameter setting.	Set the basic parameters from GX Configurator-MB or from the sequence program. In the setting of intelligent function module switch 2 (communication condition setting) - b0: Basic parameter	Chapter 7 Chapter 8 Section 9.1.1 Section 6.6
		Check if the basic parameter setting, error completed (X2) is on.	starting method, select "OFF: Start with the default parameters". Refer to "Basic parameter setting, error completed (X2) turned on.".	This section (2)-3
5	OPEN LED does not turn on. The SD LED does not flicker during data transmission.	When using the automatic communication function	Refer to "Automatic communication parameter setting, error completed (X5) turned on." or "Automatic communication operation status (X6) does not turn on.".	This section (2)-5, (2)-7
	The RD LED does not flicker during	When using dedicated instruction	Refer to "Dedicated instruction is not executed.".	This section (3)-1
	data reception.	When using slave function	Refer to "Slave function of QJ71MT91 does not return response message to request message.".	This section (3)-3
		When using GX Developer connection	Refer to "GX Developer cannot be connected.".	This section (3)-4

11

(2)	Troubleshooting	of errors	indicated	by X signals
-----	-----------------	-----------	-----------	--------------

No.	Symptom	Check Item	Corrective Action	Reference Section
1	Module READY (X0) turned off. Watch dog timer error (X1F) turned on.	Refer to "RUN LED turned off.".		This section (1)-1
3	Basic parameter setting, error completed (X2) turned on.	Refer to the basic parameter error code storage area (0C10н) and confirm the error code.	Take the corresponding corrective action and retry.	Section 7.2 Section 11.3
4	Basic parameter setting existence (X3) does not turn	Check if basic parameter setting has been completed.	Set the basic parameters from GX Configurator-MB or from the sequence program.	Section 7.2 Section 9.1.1
	on.		In the setting of intelligent function module switch 2 (communication condition setting) - b0: Basic parameter starting method, select "OFF: Start with the default parameters".	Section 6.6
		Refer to the basic parameter error code storage area (0C10н) and confirm the error code.	Take the corresponding corrective action and retry.	Section 7.4 Section 11.3
5	Automatic communication parameter setting, error completed (X5) turned on.	Refer to the automatic communication parameter error code storage area (0C11H) and confirm the error code, and refer to the automatic communication parameter setting result storage area (0C12H) and identify the parameter number where the error occurred.	Take the corresponding corrective action and retry.	Section 7.3 Section 11.3
6	MODBUS <sup>®</sup> device assignment parameter setting, error completed (X9) turned on.	Confirm the error code in the MODBUS <sup>®</sup> device assignment parameter error code storage area.	Take the corresponding corrective action and retry.	Section 7.4 Section 11.3
7	Automatic communication operation status (X6) does not turn	Check if the automatic communication function is active.	Set the automatic communication parameters and activate it from GX Configurator-MB or from the sequence program.	Section 7.3 Section 9.1.2
	on.	Check if the automatic communication parameter setting, error completed (X5) is on.	Refer to "Automatic communication parameter setting, error completed (X5) turned on."	This section (2)-5
		Check if the INIT. LED is on.	Refer to "INIT. LED does not turn on.".	This section (1)-4
		Check if the basic parameter setting, error completed (X2) is on.	Refer to "Basic parameter setting, error completed (X2) turned on."	This section (2)-3

No.	Symptom	Check Item	Corrective Action	Reference Section
8	Automatic communication	Check the automatic communication stop request.	Restart the automatic communication function.	Section 7.3 Section 5.2.1
	operation status (X6) turned off.	Check whether the basic parameters were re-set while the automatic communication function was active. (The automatic communication is stopped when the basic parameters are re-set.)	Restart the automatic communication function after completing basic parameter re-setting.	Section 7.2 Section 7.3 Section 5.2.1
9	Automatic communication error status (X7) turned on.	Check if the communication with the target device is possible.	Check the Automatic communication operation status storage area (0C20н to 0C23н) in the buffer memory and identify the parameter number of the error cause. Take corrective actions according to the error code currently stored in the Automatic communication error code storage area (0C28н to 0C67н) or the exception code sent from the target slave.	Section 11.3.1
10	COM. ERR. LED status (X1B) turned on.	Refer to "COM. ERR. LED turned on.".		This section (1)-3
11		Check whether the slave function is used or not?	When the slave function is not used, the MODBUS <sup>®</sup> device assignment parameter setting existence (XA) may be off.	_
	does not turn on.	Check if the MODBUS <sup>®</sup> device assignment parameter setting has been completed.	Set the MODBUS <sup>®</sup> device assignment parameters from GX Configurator-MB or from the sequence program.	Section 7.4 Section 9.1.3
			In the setting of intelligent function module switch 2 (communication condition setting) - b1: MODBUS <sup>®</sup> device assignment parameter starting method, select "OFF: Start with the default parameters".	Section 6.6
		Check if the MODBUS <sup>®</sup> device assignment parameter setting, error completed (X9) is on.	Refer to "MODBUS <sup>®</sup> device assignment parameter setting, error completed (X9) turned on.".	This section (2)-6

No.	Symptom	Check Item	Corrective Action	Reference Section
1	Dedicated instruction is not	Check if the dedicated instruction is active.	Start the dedicated instruction.	-
	executed. (Complete device (D2) does not turn	Check whether the programmable controller CPU is in the RUN status or not.	RUN the programmable controller CPU.	_
	on.)	While the dedicated instruction is executed, the related starting contact was turned on. (When a starting contact is turned on with the related dedicated instruction being executed, the start instruction is ignored.)	Retry after the dedicated instruction is completed.	_
		Check whether more than the executable dedicated instructions (8 instructions) were started.	Retry after the dedicated instructions being executed are completed.	Chapter 10
		Check whether the dedicated instruction failed or not.	Refer to "Dedicated instruction failed.".	This section (3)-2
		Check whether the module is waiting for a response from the target device with the dedicated instruction already being executed.	<ul> <li>Wait for the response monitoring timer to expire.</li> <li>Check the target device status.</li> <li>If an error occurs, refer to "Dedicated instruction failed.".</li> </ul>	Section 7.2 This section (3)-2
2	Dedicated instruction failed.	Check if the INIT. LED is on.	Refer to "INIT. LED does not turn on.".	This section (1)-4
		Confirm the error code or exception code stored in the control data of the dedicated instruction.	Take the corresponding corrective action and retry.	Chapter 10 Section 11.3
		Check whether the target device supports the corresponding function code.	<mbrw instruction=""> Change the device type of the control data so that the function code supported by the target device is issued.</mbrw>	Section 10.2
			<mbreq instruction=""> Change the send data so that the function code supported by the target device is issued.</mbreq>	Section 10.3
		When the MBREQ dedicated instruction is used, check the created request message.	Correct the request message and retry.	Chapter 4 Section 10.3
		Refer to "Communication with target devi setting is completed.".	ce cannot be made if each parameter	This section (3)-6

(3)	Troubleshooting for other symptoms	

No.	Symptom	Check Item	Corrective Action	Reference Section
3	Slave function of QJ71MT91 does	Check if the INIT. LED is on.	Refer to "INIT. LED does not turn on.".	This section (1)-4
	not return response message to	Check if the MODBUS <sup>®</sup> device assignment parameter setting existence (XA) is on.	Refer to "MODBUS <sup>®</sup> device assignment parameter setting existence (XA) does not turn on.".	This section (2)-11
	request message.	Check whether the basic parameters were re-set during reception of a request message. (The slave function stops when the basic parameters are re-set.)	is completed.	Section 7.2
		Check whether the QJ71MT91 has returned an exception code or not.	Confirm the exception code and take corrective action.	Section 11.3.2
		Refer to the error log area (0CFEн to 0DFFн) and confirm the error code.	Take the corresponding corrective action.	Section 11.3
	Is the request message sent to the QJ71MT91 correct? Check the following for the message length. • The application data unit length in Ethernet frame is 6 or more (From "Transaction ID" to "Message length" in MBAP header). • The MBAP header length + 6 equals the application data unit length in Ethernet frame.		Correct the request message issued by the master.	Chapter 4
		Refer to "Communication with target devi parameter setting is completed.".	ce cannot be made even though each	This section (3)-6
4	GX Developer cannot be	Check if the INIT. LED is on.	Refer to "INIT. LED does not turn on.".	This section (1)-4
	connected.	When using the TCP protocol, check whether the set number of TCP connections for GX Developer connection is 0 or not.	Set the necessary number of TCP connections for GX Developer connection (0030H), and re-set the basic parameter.	Section 7.2.3
		Check the GX Developer connection setup screen settings.	Correct the GX Developer connection setup screen settings if it has a problem.	_
		Refer to "Communication with target devi parameter setting is completed.".	ce cannot be made even though each	This section (3)-6
5	Error log has errors.	Refer to the error log area (0CFEн to 0DFFн) and confirm the error code.	Take the corresponding corrective action.	Section 11.3
	Refer to "Communication with target device cannot be made even the parameter setting is completed.".			This section (3)-6

No.	Symptom	Check Item	Corrective Action	Reference Section
6			If necessary, correct the setting and reset the CPU.	Section 6.6
	even though each parameter setting is completed.	Check the intelligent function module switch 2 (communication condition setting) -b3: Send frame specification selection.	If necessary, correct the setting and reset the CPU.	Section 6.6
		Check the network cable connection.	Connect the network cable correctly.	Section 6.4
		Check the network cable specifications.	Confirm the specifications of the used network cable.	Section 3.1
		Check whether data has reached the target device.	<ul> <li>Conduct a PING test to check the target device status and line status. If the data has not reached the target device, check the route and line status, and take corrective action if necessary.</li> <li>When data is sent via a router, check the routing information settings of the QJ71MT91 and target device.</li> </ul>	Section 7.2 Section 11.5
		<ul> <li>Check the target device.</li> <li>Check for errors.</li> <li>Check whether the target device is ready for operation.</li> <li>Check whether the target device is attempting to communicate with the QJ71MT91.</li> </ul>	Take corrective action if the target device has any problem.	-
		Check the line status.	Correct the line status if it has any problem in traffic.	_
		Check for any TCP connection disconnected automatically by the KeepAlive function.	<ul> <li>Check that the target device is operating normally.</li> <li>Adjust the KeepAlive start timer value and KeepAlive interval timer value.</li> </ul>	Section 5.4 Section 7.2
		When the QJ71MT91 is the master, check if the communication target device is a MODBUS <sup>®</sup> /TCP slave device.	Set a MODBUS <sup>®</sup> /TCP slave device as	_
		When the QJ71MT91 is a slave, check if the communication target device is a MODBUS <sup>®</sup> /TCP master device.	Set a MODBUS <sup>®</sup> /TCP master device as the communication target device.	_
		Check if the number of TCP connections connected simultaneously is within 64.	<ul> <li>Retry as TCP connections may fail temporarily.</li> <li>TCP connections with the nodes not specified as preferred ones may be disconnected automatically when the connection resources become insufficient. Specify the nodes as preferred ones when necessary.</li> <li>Reduce the number of simultaneously connected connections.</li> </ul>	Section 3.1 Section 7.2

No.	Symptom	Check Item	Corrective Action	Reference Section
6	Communication with target device cannot be made even though each parameter setting is completed.	Check if the total number of TCP connections specified for use with preferred nodes is within 64.	As the connection resources are all assigned to the preferred nodes, the other nodes cannot communicate. Delete the unnecessary preferred node specifications.	Section 7.2
7	Communication interval time with the slave by the automatic	<ul><li>Check the target device.</li><li>Check for errors.</li><li>Check whether the target device is ready for operation.</li></ul>	Take corrective action if the target device has any problem.	_
	communication function is longer	Check the line status.	Correct the line status if it has any problem in traffic.	_
	than time set to the repeat interval timer. Dedicated	Check for any TCP connection disconnected automatically by the KeepAlive function.	<ul> <li>Check that the target device is operating normally.</li> <li>Adjust the KeepAlive start timer value and KeepAlive interval timer value.</li> </ul>	Section 5.4 Section 7.2
	instruction requires a long time to be completed.	Check if the number of TCP connections connected simultaneously is within 64.	<ul> <li>Retry as TCP connections may fail temporarily.</li> <li>TCP connections with the nodes not specified as preferred ones may be closed automatically when the connection resources become insufficient. Specify the nodes as preferred ones when necessary.</li> <li>Reduce the number of simultaneously connected connections.</li> </ul>	Section 3.1 Section 7.2
		Check whether the QJ71MT91 has issued two or more send requests concurrently.	If two or more send requests are issued, long time is required as they are processed in due order. Reduce the QJ71MT91 loads.	_
		Check whether the target device requires a long time to respond.	<ul> <li>Confirm the processing performance of the target device.</li> <li>If the target device has any problem, check and take corrective action.</li> </ul>	_
8	QJ71MT91 responds slowly.	Check the specifications using the processing time performance expression of the QJ71MT91 slave function.	Reduce the processing time to within the range of the performance expression.	Appendix 2
		Check whether the QJ71MT91 has issued two or more send requests concurrently.	If two or more send requests are issued, long time is required as they are processed in due order. Reduce the QJ71MT91 loads.	_
		Check the line status.	Correct the line status if it has any problem in traffic.	_

No.	Symptom	Check Item	Corrective Action	Reference Section
8	QJ71MT91 responds slowly.	When accessing the programmable controller CPU device in the slave function, check if access to the programmable controller CPU from the other modules and sequence program is too often.	Reduce the programmable controller CPU loads.	-
		Check for any TCP connection disconnected automatically by the KeepAlive function.	<ul> <li>Check that the target device is operating normally.</li> <li>Adjust the KeepAlive start timer value and KeepAlive interval timer value.</li> </ul>	Section 5.4 Section 7.2
		Check if the number of TCP connections connected simultaneously is within 64.		Section 7.2
9	Normal communication is not available after replacement of QJ71MT91 or target device.	Check if the power was reapplied after replacement of the QJ71MT91 or target device.	Reapply the power of the QJ71MT91 or target device. (When the target device has the Ethernet address of the communication target, continued communication may be disabled since the Ethernet address changed due to the replacement of the QJ71MT91.)	_

### 11.2 Confirming QJ71MT91 Status

This section explains how to confirm the QJ71MT91 status.

Method	Reference Section
Monitor/Test screen of GX Configurator-MB	This section (1)
System monitor screen of GX Developer	This section (2)

 Monitoring/testing from GX Configurator-MB GX Configurator-MB has a Monitor/Test screen for the status display and test of the QJ71MT91.

Refer to Section 8.6 for the Monitor/Test screen.

(2) System monitor of GX Developer

The module status of the QJ71MT91 can be confirmed from the system monitor.

(a) When confirming the module status and error code on the Module's Detailed Information screen of the diagnostic function

[Starting Procedure]

 $\begin{array}{l} \text{GX Developer} \rightarrow [\text{Diagnostics}] \rightarrow [\text{System monitor}] \rightarrow \\ \hline \text{Module's Detailed Information} \end{array}$ 

Module's Detailed Inf	ormation		×
Module			
Module Name	QJ71MT91	Product information 060110000000	DOO - B
I/O Address	0		
Implementation Position	Main Base OSlot		
Module Information			
Module access	Possible	I/O Clear / Hold Settings	
Status of External Powe	er Supply	Noise Filter Setting	
Fuse Status		Input Type	
Status of I/O Address V	'erify Agree	Remote password setting status	
setting) is in	The display sequence The latest error is dis sal or ng of the intelligent function correct.	or History  Display format  HEX  HEX  To HEX T	DEC error.
H/W Information	Start monitor	Stop monitor	Close

[Display Data]

Module

The following data are displayed.

Module Name : Mounted module model name

I/O Address : Head I/O signal number of the target module Implementation Position

: Slot position where the module is mounted

- Product information : Product information
- \* The alphabet at the end of the production information indicates the function version of the module.

Function version of the QJ71MT91 is available from B.

(Example) The product information that ends with "B" indicates that the module is of function version B.

Module access

Displays Enable when Module READY (X0) is on and Watch dog timer error (X1F) is off.

- Status of I/O Address Verify

Displays whether the module parameter-set by the user matches the actually mounted module or not.

Error Display

Displays the 16 latest error codes stored in the error log area of the buffer memory.

Present Error

Displays the error code of the latest error.

Refer to Section 11.3 for the error code.

Error contents-Disposal

Displays the error contents and disposal for the error code selected in Error Display.

Display of the contents and disposal is available on GX Developer Version 8.29F or later.

(b) When confirming the LED status and switch setting status on the H/W Information screen of the diagnostics function

The H/W Information screen can be confirmed on GX Developer 8.29F or later.

#### [Starting Procedure]

 $\begin{array}{l} \text{GX Developer} \rightarrow [\text{Diagnostics}] \rightarrow [\text{System monitor}] \rightarrow \\ \hline \text{Module's Detailed Information} \rightarrow \hline \text{H/W Information} \end{array}$ 

H/W Informa	tion							$\mathbf{\times}$
Module							— Display forn	nat
Module Name	QJ71MT91	Proc	duct informal	tion	060110000000	000 - B	HEX	C DEC
H/W LED Info	rmation			16	H/W SW Inform	ation		
Item	Value	Item	Value		Item	Value	Item	Value
INIT.	0001						MODE	0000
OPEN	0000						SETTING	0000
ERR.	0000						IP ADD.H	C001
COM.ERR.	0000						IP ADD.L	OOFE
								0000
					Start monitor	Stop mor	nitor	Close

#### [Display Data]

The QJ71MT91 data stored in the following buffer memory areas are displayed.

Display Data Co		Co	prresponding Buffer Memory Area	Address
Left side of H/W LED Information Module state (*1) (*2)			: LED status (*1) (*2) (*3)	
Right side of H/W SW	MODE	Intelligent function	Switch 1: Operation mode setting status	0С00н(3072)
Information	SETTING	module switch (*4)	Switch 2: Communication condition setting status	0С01н(3073)
	IP ADD.H		Switch 3: Local station IP address setting status	0С02н(3074)
	IP ADD.L		Switch 4: Local station IP address setting status	0С03н(3075)

#### \*1: LED status structure



- \*2: Refer to Section 11.1 for troubleshooting of the H/W LED.
- \*3: Refer to Section 11.4 for how to turn off the COM. ERR. LED.
- \*4: Refer to Section 6.6 for details of the intelligent function module switches.

### 11.3 Error Codes

### 11.3.1 Error code storage areas

The error code of each error is stored into	any of the following buffer memory areas.

E	Error Type	Storage Area	Name	Address	
Parameter error information	Basic parameter	Basic parameter error code stora	0С10н (3088)		
	Automatic	Automatic communication param storage area	0C11н (3089)		
	communication parameter	Automatic communication param storage area	eter setting result	0C12н (3090)	
		MODBUS <sup>®</sup> device assignment p storage area	arameter error code	0C13H (3091)	
	MODBUS <sup>®</sup> device assignment	MODBUS <sup>®</sup> device assignment	Error, device type	0С14н (3092)	
	parameter	parameter setting result storage area	Error, assigned group No.	0С15н (3093)	
	Automotic	Automatic communication operation area (parameter 1 to 64)	0C20н to 0C23н (3104 to 3107)		
Master	Automatic communication	Automatic communication error of (parameter 1 to 64)	0C28н to 0C67н (3112 to 3175)		
function	function	Error log area	0CFEн to 0DFFн (3326 to 3583)		
	Dedicated instruction	Error log area		0CFEн to 0DFFн (3326 to 3583)	
Slave function		Error log area	0CFEн to 0DFFн (3326 to 3583)		
GX Developer	connection	Error log area	0CFEн to 0DFFн (3326 to 3583)		
Communicatio	n status	Communication status of each p	0E10н to 0E8Fн (3600 to 3727)		

#### (1) Basic parameter error code storage area

- (a) When an error occurs with the basic parameter setting request (Y1) ON, the corresponding error code is stored in this area.
- (b) The error code is stored when the basic parameter setting, error completed (X2) turns ON.
- (c) The error code is cleared when the basic parameter setting, normally completed (X1) turns ON.

- (2) Automatic communication parameter error code storage area
  - (a) When an error occurs with the automatic communication parameter setting request/automatic communication start request (Y4) ON, the corresponding error code is stored in this area.
  - (b) The error code is stored when the automatic communication parameter setting, error completed (X5) turns ON.
  - (c) The error code is cleared when the automatic communication parameter setting, normally completed (X4) turns ON.
- (3) Automatic communication parameter setting result storage area
  - (a) When an automatic communication parameter error occurs with the automatic communication parameter setting request/automatic communication start request (Y4) ON, the automatic communication parameter number corresponding to the error is stored in this area.
  - (b) The automatic communication parameter number is stored when the automatic communication parameter setting, error completed (X5) turns ON.
  - (c) The automatic communication parameter number is cleared when the automatic communication parameter setting, normally completed (X4) turns ON.
- (4) MODBUS<sup>®</sup> device assignment parameter error code storage area
  - (a) When a MODBUS<sup>®</sup> device assignment parameter error occurs while the MODBUS<sup>®</sup> device assignment parameter setting request (Y8) is ON, the corresponding error code is stored in this area.
  - (b) The error code is stored when the MODBUS<sup>®</sup> device assignment parameter setting, error completed (X9) turns ON.
  - (c) The error code is cleared when the MODBUS<sup>®</sup> device assignment parameter setting, normally completed (X8) turns ON.
- (5) MODBUS<sup>®</sup> device assignment parameter setting result storage area
  - (a) When a MODBUS<sup>®</sup> device assignment parameter error occurs with the MODBUS<sup>®</sup> device assignment parameter setting request (Y8) ON, the device type and assigned group No. of the error device is stored in this area.
  - (b) The device type and assigned group No. are stored when the the MODBUS<sup>®</sup> device assignment parameter setting, error completed (X9) turns ON.
  - (c) The device type and assigned group No. are cleared when the MODBUS<sup>®</sup> device assignment parameter setting, normally completed (X8) turns ON.
  - (d) The following values are stored to show the erroneous device type when the MODBUS<sup>®</sup> device assignment parameter setting, error completed (X9) is ON.

<Error devices and corresponding values>

- Coil : 0001н
- Input : 0002н
- Input register : 0004н
- Holding register : 0005н

#### (6) Automatic communication operation status storage area

- (a) The operation statuses of the automatic communication function are stored in bit format in correspondence with the automatic communication parameters 1 to 64.
  - 0: Operating normally (OFF) The case where the automatic communication parameters are not set is also included.
  - 1: Error occurred (ON)
- (b) The operation statuses are stored into the bit positions, from low-order to high-order bits, in order of the automatic communication parameters 1 to 64.

	bF	bE	bD	bC	bB	bA	•••	b5	b4	b3	b2	b1	b0
0C20н	16	15	14	13	12	11	• • •	6	5	4	3	2	1
0C21⊦	32	31	30	29	28	27	•••	22	21	20	19	18	17
0C22 <sub>H</sub>	48	47	46	45	44	43	•••	38	37	36	35	34	33
0C23н	64	63	62	61	60	59	•••	54	53	52	51	50	49

The numbers indicate the automatic communication parameter numbers.

- (c) The operation status is set at the following timing.
  - 1) When a response message (error completion) is received from a slave. (Only the corresponding bit turns ON.)
  - 2) When a communication error occurs. (Only the corresponding bit turns ON.)
- (d) The operation status is cleared at the following timing.
  - 1) When a response message (normal completion) is received from a slave. (Only the corresponding bit turns ON.)
  - 2) When the automatic communication function stops. (All bits turn OFF.)
  - 3) When the power is turned off and then on again, or when the programmable controller CPU is reset. (All bits turn OFF.)
- Interlock with a target device The automatic communication operation status storage area can be used as an interlock signal for a target device error. Here is a program example.
  - Program condition
     The QJ71MT91 is mounted in slot 0 of the base unit with the head I/O No. set to "0" and the automatic communication parameter 1 is used.
  - 2) Program example



#### (7) Automatic communication function error code storage area

- (a) When an error occurs in the automatic communication function, the error code corresponding to the automatic communication parameter 1 to 64 is stored in this area.
- (b) When the automatic communication function operation status bit turns ON, the error code is stored into the corresponding area.
- (c) The automatic communication function error code storage area is not cleared.

The error code is overwritten when a new error occurs.

#### (8) Error log area

(a) Up to 32 latest errors are stored into the error log area as an error history.

E	Error Log Area Name	Address
Number of errors o	courred	0CFEH
		(3326)
Error log write poin	0CFFH	
Ending white point		(3327)
	Error code	0D00н
	Ellor code	(3328)
	Evention and	0D01н
	Exception code	(3329)
	Function code	0D02н
Error log 1	Function code	(3330)
	Local station part No	0D03н
	Local station port No.	(3331)
	Torget ID address	0D04н to 0D05н
	Target IP address	(3332 to 3333)
	Torget device part No	0D06н
	Target device port No.	(3334)
Error log 2 to 22 (a	a in array log 1)	0D08H to 0DFFH
Error log 2 to 32 (a		(3336 to 3583)

- (b) Number of errors occurred
  - 1) The number of errors entered into the error log is stored.
  - If 65536 or more errors have occurred, the count stops at FFFH (65535).
- (c) Error log write pointer

The number of the latest error log is stored.

- 0 : No error (no entry of error log)
- 1 to 32 : Error long number where the latest error log is entered

- (d) Error log (error log 1 to 32)
  - The error log area stores the 32 latest errors.
  - The error log area stores the errors in order of occurrence, starting from the error log 1.
  - If 33 or more errors have occurred, the error logs are overwritten, starting from the area of the error log 1.

	Function								
Contents	Master	function							
Contents	Automatic Dedicated instruction Slave function		GX Developer connection	Others					
Error code	request message from assignment parameter	tores a code corresponding to the error occurred at any timing such as during processing of a equest message from the master, at power-on or when changing a MODBUS <sup>®</sup> device ssignment parameter. efer to Section 11.3.3 for the error codes.							
Exception code	Stores an exception co slave in reply to a requ automatic communica dedicated instruction.	lest sent by the	When an error occurs for a request from the master, stores an exception code returned to the master.						
Function code	Stores the function co	de with which the error	originated.	Stores "0".					
Local station port No.	Stores the local statior Stores "0" for an error	-	rrence. P/UDP level, at power-or	n or in paramete	r setting.				
Target IP address	Stores an IP address of Stores "0" for an error	-	error occurrence. level, at power-on or in pa	arameter setting	l.				
Target device port No.	Stores the port No. of Stores "0" for an error		or occurrence. P/UDP level, at power-or	n or in paramete	r setting.				

### (9) Communication status of each protocol

(a) The numbers of corresponding events of each protocol are stored.

	Error Name of Each Protocol	Address
	IP packet reception count	0E10н to 0E11н (3600 to 3601)
15	Count of IP packet reception discarded due to sum check error	0E12н to 0E13н (3602 to 3603)
IP	Total number of sent IP packets	0E14н to 0E15н (3604 to 3605)
	Simultaneous transmission error detection count	0E2Aн to 0E2Bн (3626 to 3627)
	ICMP packet reception count	0E30н to 0E31н (3632 to 3633)
	Count of ICMP packet reception discarded due to sum check error	0E32н to 0E33н (3634 to 3635)
ICMP	Total number of sent ICMP packets	0E34н to 0E35н (3636 to 3637)
	Total number of ICMP echo request received	0E36н to 0E37н (3638 to 3639)
	Total number of ICMP echo reply sent	0E38н to 0E39н (3640 to 3641)
	Total number of ICMP echo request sent	0E3Aн to 0E3Bн (3642 to 3643)
	Total number of ICMP echo reply received	0E3Cн to 0E3Dн (3644 to 3645)
	TCP packet reception count	0E50н to 0E51н (3664 to 3665)
TCP	Count of TCP packet reception discarded due to sum check error	0E52н to 0E53н (3666 to 3667)
	Total number of sent TCP packets	0E54н to 0E55н (3668 to 3669)
	UDP packet reception count	0E70н to 0E71н (3696 to 3697)
UDP	Count of UDP packet reception discarded due to sum check error	0E72н to 0E73н (3698 to 3699)
	Total number of sent UDP packets	0E74н to 0E75н (3700 to 3701)
	Framing error count	0E84н to 0E85н (3716 to 3717)
Receive error	Overflow count	0E86н to 0E87н (3718 to 3719)
	CRC error count	0E88н to 0E89н (3720 to 3721)

(b) When 2 words are exceeded, a count stops at FFFFFFFH (4294967295).

#### 11.3.2 Exception code list

An exception code is an error code commonly used for the MODBUS<sup>®</sup> protocols, which is embeded into a response message when the slave returns an exception response in reply to a request message from the master.

#### (1) When the QJ71MT91 is a master

When the QJ71MT91 (master) has received an exception code from the target device (slave), take corrective actions referring to the manual for the target device (slave).

#### (2) When the QJ71MT91 is a slave

When the target device (master) has received an exception code from the QJ71MT91 (slave), take corrective actions referring to the following.

(a) Exception code storage location If the processing in the slave results in error completion, the exception code can be confirmed in the error log area (address: CFEн to DFFн) of the buffer memory.

#### (b) Exception code list

The following is a list of exception codes used when the QJ71MT91 is a slave.

Exception	Error Name	Description	Corrective Action			
Code	Enormame	Description	Target device (Master side)	QJ71MT91 (Slave side)		
01н	Illegal function	The slave (QJ71MT91) received an unsupported function code.	Confirm the function code supported by QJ71MT91, and review the request message to be sent.	_		
02н	Illegal data address	The specified address of the MODBUS <sup>®</sup> device is abnormal.	Confirm the MODBUS <sup>®</sup> device type and size supported by QJ71MT91, and review the specified address of the request message to be sent.	_		
03н	lllegal data value	The contents of the data part of the request message are abnormal.	Review the data part of the request message.	_		
04н	Slave device failure	A fatal error occurred while the slave (QJ71MT91) was attempting to perform the requested action and the processing was impossible.	Review the data part of the request message.	Remove the error factor in the QJ71MT91. If the QJ71MT91 issued this code, confirm the error code stored in the error log area (Refer to Section 11.3.1 (8)) and take corrective action.		
05н	Acknowledge	As the slave is executing other processing, a long duration of time is required for completion of the request message processing.	Not issued by the slave function o	f the QJ71MT91.		
06н	Slave busy	As the slave is executing other processing, the request message processing cannot be executed.	Retry after a little while.	If the QJ71MT91 issued this code, the number of simultaneously acceptable request message (64) is exceeded.		

Exception	Error Name	Description	Corrective Action				
Code		Description	Target device (Master side)	QJ71MT91 (Slave side)			
08н	Memory parity error	In the slave, a parity error was detected at access to the extended file register.					
0Ан	Gateway unusable	The gateway device (MODBUS <sup>®</sup> /TCP $\rightarrow$ MODBUS <sup>®</sup> serial protocol) is not available for use.	Not issued by the slave function o	f the QJ71MT91.			
0Вн	Gateway response failure	No response is given from the slave device connected ahead of the gateway device.					

(3) Error code for error completion of processing in slave (QJ71MT91) If the processing in the slave (QJ71MT91) results in error completion, an exception code is stored into the buffer memory. In the QJ71MT91, an error code is also stored into the buffer memory to identify the cause in detail. The error code can be confirmed in the error log area (address: CFEH to DFFH) of the buffer memory.

## REMARK

- Refer to Section 11.3.1 (8) for details of the error log area.
- Refer to Section 11.3.3 for details of the error codes.

### 11.3.3 Error code list

When an error occurs in any processing of the QJ71MT91, the error code is stored into its buffer memory.

This section explains the error details and corrective actions to be taken at error occurrence.

The "Occurrence" field of the following error code table indicates that each of the errors may occur when:

- 1) The programmable controller is powered ON or the basic parameters are set
- 2) Master function is on
- 3) Slave function is on
- 4) GX Developer connection function is on or
- 5) During PING test or unit test.

Error	Error Name	Error Name Description Lit LED Corrective Action		Corrective Action		Oc	Occurrence			
Code	LITOI Marile	Description		Conective Action	1)	2)	3)	4)	5)	
3E8н to 4FFFн	Error code issued by programmable controller CPU.		_	Refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).	0	0	0	0	0	
<b>7301</b> н	Switch 1 error	The setting of the intelligent function module switch 1 (operation mode setting) is incorrect.	ERR.	Review the setting of the intelligent function module switch 1.	0					
7302н	Switch 2 error	The setting of the intelligent function module switch 2 (communication condition setting) is incorrect.	ERR.	Review the setting of the intelligent function module switch 2.	0					
<b>7303</b> ⊦	Switch 3, 4 error	The setting of the intelligent function module switch 3, 4 (IP address setting) is incorrect.	ERR.	Review the setting of the intelligent function module switch 3, 4.	0					
<b>7</b> 305⊦	Switch 5 error	The setting of the intelligent function module switch 5 (not used) is incorrect.	ERR.	Delete the setting of the intelligent function module switch 5.	0					
7306н	ROM check error	An error was detected by the ROM check made at power- on.	ERR.	It is a QJ71MT91 hardware fault. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.	0					
7307н	RAM check error	An error was detected by the RAM check made at power-on.	ERR.	It is a QJ71MT91, programmable controller CPU or base unit failure. Please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.	0					
730Ан	Parameter starting method error	Parameter setting using GX Configurator-MB was made to the programmable controller CPU while b0, b1 of the intelligent function module switch 2 (communication condition setting) was preset to "Start with the default parameters".	COM.ERR.	<ul> <li>When using the default parameter setting, delete the QJ71MT91 parameters set to the programmable controller CPU.</li> <li>When starting the QJ71MT91 with user setting parameters set from GX Configurator-MB or sequence program, turn ON b0, b1 of the intelligent function module switch 2.</li> </ul>	0					

Error	Error Name	r Name Description Lit LED Corrective Action				nce			
Code					1)	2)	3)	4)	5)
730Вн	Parameter starting method error	After power-on with parameters preset by GX Configurator-MB, before Basic parameter setting existence (X3) turns on, parameter settings were done by any of the following: • Basic parameter setting request (Y1) • Automatic communication parameter setting request /automatic communication start request (Y4) • MODBUS <sup>®</sup> device assignment parameter setting request (Y8)	COM.ERR.	When using parameters set by GX Configurator-MB, do not make parameter settings by Y-signals before Basic parameter setting existence (X3) turns on after power-up.	0				
7310 <sub>H</sub>	Monitoring timer setting error	Any of the monitoring timer setting in the basic parameter is incorrect.	COM.ERR.	Review the monitoring timer setting.	0				
<b>7</b> 311⊦	Preferred node specification setting error	The setting of the preferred node specification in the basic parameter is incorrect.	COM.ERR.	Review the setting of the preferred node specification.	0				
<b>7312</b> н	Subnet mask pattern setting error	The setting of the subnet mask pattern in the basic parameter is incorrect.	COM.ERR.	Review the setting of the subnet mask pattern.	0				
7313н	Default router IP address setting error	The setting of the default router IP address in the basic parameter is incorrect.	COM.ERR.	Review the setting of the default router IP address.	0				
7314н	Subnet address setting error	The setting of the subnet address in the basic parameter is incorrect.	COM.ERR.	Review the setting of the subnet address.	0				
7315 <sub>H</sub>	Router IP address setting error	<ul> <li>The setting of the router IP address in the basic parameter is incorrect.</li> <li>The net ID of the local station differs from the net ID of the router IP address.</li> </ul>	COM.ERR.	Review the setting of the router IP address.	0				
7316н	Number of routers setting error	The setting of the number of routers set in the basic parameter is incorrect.	COM.ERR.	Review the setting of the number of routers set.	0				
<b>7317</b> ⊦	KeepAlive setting error	The KeepAlive-related setting in the basic parameter is incorrect.	COM.ERR.	Review the KeepAlive-related setting.	0				
7318 <sub>H</sub>	Number of TCP connections for GX Developer connection setting error	The setting of the number of TCP connections for GX Developer connection in the basic parameter is incorrect.	COM.ERR.	Review the setting of the number of TCP connections for GX Developer connection.	0				
7319 <sub>H</sub>	Local slave station port No. error	The setting of the local slave station port No. in the basic parameter is incorrect.	COM.ERR.	Review the setting of the local slave station port No.	0				

(Continued on next page)

Error	Error Name	Name Description Lit LED Corrective Action			Occurrenc			ce		
Code					1)	2)	3)	4)	5)	
731Ан	Number of TCP connections setting error	The number of TCP connections for GX Developer connection or the total number of TCP connections set in the preferred node specification in the basic parameter is greater than 64.	COM.ERR.	Review the setting of the number of TCP connections for GX Developer connection and preferred node specification.	0					
731Bн	Timer setting magnitude relationship error	The magnitude relationships between various monitoring timer values and CPU response monitoring timer value set in the basic parameters (Refer to Section 7.2.2 (1)) are incorrect.	COM.ERR.	Review the settings of various monitoring timer values and CPU response monitoring timer value.	0					
7320н	Port No. setting error for automatic communication function	The setting of the port No. for automatic communication function in the basic parameter is incorrect.	COM.ERR.	Review the setting of the port No. for automatic communication function.	0					
7321 <sub>H</sub>	Target slave port No. setting error for automatic communication function	The setting of the target slave port No. for automatic communication function in the basic parameter is incorrect.	COM.ERR.	Review the setting of the target slave port No. for automatic communication function.	0					
<b>7324</b> н	System area setting error	Erroneous data have been written to the system area (0031 <sub>H</sub> to 00F1 <sub>H</sub> ) of the buffer memory.	COM.ERR.	Do not write data to the system area (0031н to 00F1н) of the buffer memory.	0					
7327н	CPU response monitoring timer setting error	The setting of the CPU response monitoring timer in the basic parameter is incorrect.	COM.ERR.	Review the setting of the CPU response monitoring timer.	0					
732Ан	Basic parameter setting failure	Failed in basic parameter setting because the GX Configurator-MB parameters were being set at power-on.	COM.ERR.	When using GX Configurator- MB, switch the power on and then turn on Basic parameter setting request (Y1) after Basic parameter setting existence (X3) has turned on.	0					
<b>732Е</b> н	Port No. setting error for dedicated instruction	The setting of the port No. for dedicated instruction in the basic parameter is incorrect.	COM.ERR.	Review the setting of the port No. for dedicated instruction.	0					
732Fн	Dedicated instruction interruption	The dedicated instruction being executed was interrupted by the basic parameter setting.	COM.ERR.	Perform the basic parameter setting after completion of the dedicated instruction.	0					
7330н	Device code error	The device code value specified in MODBUS <sup>®</sup> device assignment parameter is incorrect.	COM.ERR.	Review the setting of the device code.			0			

(Continued on next page)
Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code		Description		Conective Action	1)	2)	3)	4)	5)
7331н	MODBUS <sup>®</sup> device upper limit value over error	The head MODBUS <sup>®</sup> device number + assignment points in the MODBUS <sup>®</sup> device assignment parameter exceeds the maximum (65535) of the MODBUS <sup>®</sup> device.	COM.ERR.	Review the setting of the head MODBUS <sup>®</sup> device number and assignment points.			0		
<b>7332</b> ⊦	MODBUS <sup>®</sup> device assigned range overlap error	MODBUS <sup>®</sup> device ranges set with the MODBUS <sup>®</sup> device assignment parameters are overlapped.	COM.ERR.	Review the setting of the head MODBUS <sup>®</sup> device number and assignment points.			0		
7333н	Buffer memory assigned range error	The assigned range of the QJ71MT91 buffer memory set with the MODBUS <sup>®</sup> device assignment parameters exceeds the set range of the user free area.	COM.ERR.	Review the setting of the head device number and assignment points.			0		
7334н	Device upper limit value over error	The head device number + assignment points in the MODBUS <sup>®</sup> device assignment parameter exceeds the maximum (65535) of the CPU device.	COM.ERR.	Review the setting of the head device number and assignment points.			0		
7340н	Target MODBUS <sup>®</sup> devic e type specification error	The setting of the target MODBUS <sup>®</sup> device type specification in the automatic communication parameter is incorrect.	COM.ERR.	Review the setting of the target MODBUS <sup>®</sup> device type specification.		0			
7343н	Response	The setting of the response monitoring timer in the automatic communication parameter is outside the setting range.	COM.ERR.	Review the setting of the response monitoring timer so that it falls within the setting range.		0			
7344н	monitoring timer setting error	The setting of the response monitoring timer in the automatic communication parameter is less than the setting of the split reception monitoring timer value.	COM.ERR.	Make the response monitoring timer greater than the split reception monitoring timer value.		0			
7345н	Buffer memory address overlap error	The setting ranges of the buffer memory in the automatic communication parameter overlap between multiple parameters.	COM.ERR.	Correct the overlapping buffer memory settings.		0			

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code		Besonption			1)	2)	3)	4)	5)
7346н	Buffer memory address range error	The setting range of the buffer memory in the automatic communication parameter is outside the range of the automatic communication function buffer input/output area.	COM.ERR.	Correct the buffer memory setting outside the range.		0			
7347н	IP address setting error	The setting of the target IP address set in the automatic communication parameter or dedicated instruction's control data is incorrect.	COM.ERR.	Review the setting of the IP address.		0			
7348н	MODBUS <sup>®</sup> device number setting range error	The MODBUS <sup>®</sup> device range of the read/write target set in the automatic communication parameter or dedicated instruction's control data is greater than the maximum value (65536).	COM.ERR.	Review the setting range of the MODBUS <sup>®</sup> device.		0			
7349н	MODBUS <sup>®</sup> device points setting error	The MODBUS <sup>®</sup> device range of the read/write target set in the automatic communication parameter or dedicated instruction's control data is outside the setting range.	COM.ERR.	Review the setting range of the MODBUS <sup>®</sup> device.		0			
734Ан	Module ID setting error	The setting of the module ID set in the automatic communication parameter or dedicated instruction's control data is incorrect.	COM.ERR.	Review the setting of the module ID.		0			
734Вн	Execution type setting error	The setting of the execution type set in the dedicated instruction's control data is incorrect.	COM.ERR.	Review the setting of the execution type.		0			
734Сн	Response	The setting of the response monitoring timer in the dedicated instruction's control data is outside the setting range.	COM.ERR.	Review the setting of the response monitoring timer so that it falls within the setting range.		0			
734Dı	monitoring timer setting error	The setting of the response monitoring timer in the dedicated instruction's control data is less than the setting of the split reception monitoring timer value.	COM.ERR.	Make the response monitoring timer greater than the split reception monitoring timer value.		0			
734Ен	Write data storage size setting error	The setting of the write data storage size in the dedicated instruction's control data is incorrect.	COM.ERR.	Review the setting of the write data storage size.		0			

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code					1)	2)	3)	4)	5)
734Fн	Request message size setting error	The request message size specified in the argument ((S2)+0) of the MBREQ instruction is incorrect.	COM.ERR.	Review the setting of the request message size.		0			
7351 <sub>H</sub>	Automatic communication function start interruption	The start of the automatic communication function was interrupted due to the processing of the basic parameter setting.	COM.ERR.	After turning ON the Automatic communication parameter setting request/Automatic communication start request (Y4), do not turn ON the Basic parameter setting request (Y1) until the Automatic communication operation status (X6) turns ON.		0			
		The automatic communication function was started or stopped without the basic parameter being set.	COM.ERR.	Start or stop the automatic communication function with Basic parameter setting existence (X3) on.		0			
7352H	Basic parameter not set	The automatic communication function was started when parameter setting was being made on GX Configurator-MB at power-on.	COM.ERR.	When using GX Configurator-MB, switch the power on and then turn on Automatic communication parameter setting request/Automatic communication start request (Y4) after Basic parameter setting existence (X3) has turned on.		0			
7360н	Exception message reception	When the automatic communication function or dedicated instruction is used, the target slave device returned an exception code in reply to the request message sent by the QJ71MT91.	COM.ERR.	<ul> <li>Refer to the exception code returned from the target slave device, and resolve the problem.</li> <li>Resolve the problem that occurred in the target slave device.</li> </ul>		0			
7361 <sub>H</sub>	Byte count error	In the automatic communication function or dedicated instruction, the number of bytes in the received response message is less or more than necessary.	COM.ERR.			0			
7362н	Reference number error	The value of the reference number in the response message received by the dedicated instruction is incorrect.	COM.ERR.	On the target slave side, check whether the contents of the returned response message are correct or not.		0			
7363н	Protocol ID error	In the automatic communication function or dedicated instruction, the protocol ID of the received response message is other than "0: MODBUS <sup>®</sup> protocol".	COM.ERR.			0			

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code					1)	2)	3)	4)	5)
7365н	Module ID mismatch error	In the automatic communication function or dedicated instruction, the "module ID" in the MBAP header of the received response message does not match the request message.	COM.ERR.			0			
7366н	Function code mismatch error	In the automatic communication function or dedicated instruction, the function code of the received response message does not match the request message.	COM.ERR.	On the target slave side, check whether the contents of the returned response message are correct or not.		0			
<b>7367</b> н	Response message contents mismatch error	In the automatic communication function or dedicated instruction, the contents of the received response message does not match the request message. (FC: 15, FC: 16, FC: 21)	COM.ERR.			0			
7370н	Automatic communication function stop request error	The automatic communication stop request (Y6) was made with the automatic communication function stopped.	COM.ERR.	When the automatic communication function is stopped, do not make the automatic communication stop request (Y6).		0			
7371н	Automatic communication parameter setting request error	The automatic communication parameter setting request/automatic communication start request (Y4) was made with the automatic communication function ON.	COM.ERR.	After stopping the automatic communication function, make the automatic communication parameter setting request/automatic communication start request (Y4).		0			
7378н	Response	The response monitoring timer timed out in the automatic communication function.	COM.ERR.	Conduct a PING test, etc. to check whether the target device exists or not.		0			
7379н	timer time-out error	The response monitoring timer timed out in the dedicated instruction.	COM.ERR.	<ul> <li>If an error has occurred in the target device, remove the error.</li> <li>Set a larger response monitoring timer value.</li> </ul>		0			
737Ан	Dedicated instruction execution impossible	<ul> <li>Since the basic parameters have not yet been set, the dedicated instruction cannot be executed.</li> <li>The dedicated instruction cannot be executed due to the offline mode.</li> </ul>	COM.ERR.	<ul> <li>Execute the dedicated instruction after setting the basic parameters.</li> <li>Execute the dedicated instruction in the online mode.</li> </ul>		0			
7380н	CPU response monitoring timer time-out	The CPU response monitoring timer timed out in the slave function.	COM.ERR.	<ul> <li>If an error has occurred in the programmable controller CPU, remove the error.</li> <li>Set a larger CPU response monitoring timer value.</li> </ul>			0		
7381н	Function code error	The request message of the function code not supported by the QJ71MT91 slave function was received.	COM.ERR.	Confirm the function code supported by the QJ71MT91 slave function, and review the request message to be sent.			0		

Error	Error Name	Description	Lit LED	Corrective Action		Oc	currer	nce	
Code		Description			1)	2)	3)	4)	5)
7382н	Sub-code error	The request message of the sub-code not supported by the QJ71MT91 slave function was received.	COM.ERR.	Confirm the sub-code supported by the QJ71MT91 slave function, and review the request message to be sent.			0		
<b>7383</b> ⊦		The MODBUS <sup>®</sup> device assignment parameters have not been set for the MODBUS <sup>®</sup> device specified in the received request message. The MODBUS <sup>®</sup> device assignment parameter setting is in process.	COM.ERR.	<ul> <li>Set the MODBUS<sup>®</sup> device assignment parameters for the MODBUS<sup>®</sup> device specified in the received request message.</li> <li>Adjust the timing for the request message transmission on the master side so that communication is started after the MODBUS<sup>®</sup> device assignment parameter setting existence (XA) turns ON.</li> </ul>			0		
<b>7384</b> н	MODBUS <sup>®</sup> device	The range of the MODBUS <sup>®</sup> device specified in the received request message is outside the MODBUS <sup>®</sup> device assignment parameter setting range.	COM.ERR.	Set the MODBUS <sup>®</sup> device assignment parameter so that the MODBUS <sup>®</sup> device specified in the received request message is within the range.			0		
7385⊦	specification entri	The range of the MODBUS <sup>®</sup> device specified in the received request message exceeds the maximum value* of the MODBUS <sup>®</sup> device. *: The maximum value of the extended file register is "10000", and that of any other MODBUS <sup>®</sup> device is "65536".	COM.ERR.	Review the specified data of the MODBUS <sup>®</sup> device on the master side from which the request message was sent.			0		
7386н		The access points of the MODBUS <sup>®</sup> device specified in the received request is greater than the maximum access points of the corresponding function.	COM.ERR.	Review the specified data of the MODBUS <sup>®</sup> device on the master side from which the request message was sent.			0		
7390 <sub>H</sub>	Byte count specification error	The write points of the received request message does not match the specified byte count.	COM.ERR.	Review the specified data of the write points and byte count on the master side from which the request message was sent.			0		
7391 <sub>H</sub>	Received data size error	The write device data size of the received request message does not match the specified byte count.	COM.ERR.	Review the specified data of the write device data size and byte count on the master side from which the request message was sent.			0		
7392н	Reference type error	The reference number value specified in the received request message (FC:20, FC:21) is incorrect.	COM.ERR.	Review the specified reference number value on the master side from which the request message was sent.			0		

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code		-			1)	2)	3)	4)	5)
7393н	Data unit error	<ul> <li>The contents of the data unit in the received request message are incorrect.</li> <li>The size of the received request message is smaller than the minimum size or greater than the maximum size required for the relevant function code.</li> </ul>	COM.ERR.	Review the contents of the request message on the master side from which the request message was sent.			0		
7394н	Online change error	A write request message was received in an online change disable status.	COM.ERR.	<ul> <li>While online change is disabled, do not issue a write request message.</li> <li>Turn ON b2 of the intelligent function module switch 2 (communication condition setting) to enable the online change.</li> </ul>			0		
7395 <b>⊦</b>	MBAP header error	The contents of the MBAP header in the received request message are incorrect.	COM.ERR.	Review the contents of the request message on the master side from which the request message was sent.			0		
7396н	Slave function busy	The QJ71MT91 received request messages that exceed the number of simultaneously receivable request messages (64).	COM.ERR.	Retry after a little while on the master side from which the request message was sent.			0		
739Сн to 739Ен	System error	The OS of the QJ71MT91 detected error.	COM.ERR.	<ul> <li>Counter the problem in the following procedure.</li> <li>Check whether or not the QJ71MT91, power supply module and CPU module are mounted correctly on the base unit.</li> <li>Check whether or not the operating environment of the system is within the range of general specifications of the CPU module.</li> <li>Check whether the power capacity is sufficient or not.</li> <li>Check the QJ71MT91, CPU module and base unit to see if the hardware is normal according to the manual of each module.</li> <li>If the module is faulty, please contact your local Mitsubishi service center or representative for repair.</li> <li>If the problem cannot be resolved in the above steps, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.</li> </ul>	0	0	0	0	0

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code					1)	2)	3)	4)	5)
<b>73</b> В1н	PING test setting error	The settings (communication time check, transmission count, IP address) of the PING test are incorrect.	COM.ERR.	Review the settings of the PING test.					0
73С0н	RAM error	An error was detected in the RAM test.	ERR.	<ul> <li>Counter the problem in the following procedure.</li> <li>Check whether or not the QJ71MT91, power supply module and CPU module are mounted correctly on the base unit.</li> <li>Check whether or not the operating environment of the</li> </ul>					0
<b>73C1</b> ⊦	ROM error	An error was detected in the ROM test.	ERR.	<ul> <li>system is within the range of general specifications of the CPU module.</li> <li>Check whether the power capacity is sufficient or not.</li> <li>Perform the test again.</li> <li>If the above does not solve the problem, a probable cause is a hardware error.</li> <li>Check if the programmable</li> </ul>					0
73C2H	Self-loopback test error	An error was detected in the self-loopback test.	COM.ERR.	controller CPU and base unit are normal referring to the manual for each module. Or, replace either of the modules to check the operation. In case of failure, please consult your local Mitsubishi system service center or representative, explaining a detailed description of the problem.					0
<b>73С8</b> н		In the offline mode, parameters were set by GX Configurator- MB.	COM.ERR.	In the offline mode, delete GX Configurator-MB parameters set in the programmable controller CPU.	0				
<b>73С9</b> н	Office and	In the offline mode, Basic parameter setting request (Y1) was turned on.	COM.ERR.	Do not turn on Basic parameter setting request (Y1) in the offline mode.	0				
73САн	Offline mode error	In the offline mode, Automatic communication parameter setting request/Automatic communication start request (Y4) was turned on.	COM.ERR.	Do not turn on Automatic communication parameter setting request/Automatic communication start request (Y4) in the offline mode.		0			
73СВн		In the offline mode, Automatic communication stop request (Y6) was turned on.	COM.ERR.	Do not turn on Automatic communication stop request (Y6) in the offline mode.		0			

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code		Description			1)	2)	3)	4)	5)
73ССн	Offline mode error	In the offline mode, MODBUS <sup>®</sup> device assignment parameter setting request (Y8) was turned on.	COM.ERR.	Do not turn on MODBUS <sup>®</sup> device assignment parameter setting request (Y8) in the offline mode.			0		
73CDH		In the offline mode, PING test execution request (Y1C) was turned on.	COM.ERR.	Do not turn on PING test execution request (Y1C) in the offline mode.					0
73D0н	Response message	As the TCP connection was cut off from the target device, the slave function of the QJ71MT91 could not send a response message.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>			0		
73D1⊦	transmission failure	As the TCP connection was cut off from the target device, the response message could not be returned via GX Developer connection.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>				0	
73D2н	Preferred connection count over error	TCP connections exceeding the number preset in the preferred node specification was attempted to be established.	COM.ERR.	<ul> <li>Increase the maximum number of TCP connections with the target node in the preferred node specification.</li> <li>Decrease the number of connections simultaneously used with the target node.</li> </ul>		0	0	0	
73D3н	Response message transmission failure	As the TCP connection was cut off from the target device, the response message via GX Developer connection could not be returned.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>				0	
		The send/receive processing was forcibly interrupted by the basic parameter setting processing.	COM.ERR.	Perform the basic parameter setting processing after the send/receive processing is over.	0	0	0	0	
73D4н		An error occurred in the TCP connection and the send/receive processing was forcibly interrupted.	COM.ERR.	<ul> <li>Retry after a little while.</li> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>	0	0	0	0	
73D5H	Send/receive processing interruption	As the TCP connection was being closed, the send/receive processing was interrupted.	COM.ERR.	<ul> <li>If this occurs at execution of the dedicated instruction, set "TCP connection is not closed after instruction completion" in the close option of the execution type.</li> <li>If the number of connections used exceeds the maximum (64), bring it within the range.</li> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>Retry after a little while.</li> </ul>	0	0	0	0	

Error		Description		Corrective Action		Oc	curre	nce	
Code	Error Name	Description	Lit LED	Corrective Action	1)	2)	3)	4)	5)
73D6н	Send/receive processing interruption	The send/receive processing was forcibly interrupted by the basic parameter setting processing.	COM.ERR.	Perform the basic parameter setting processing after the send/receive processing is over.	0	0	0	0	
73D7н	Error during close processing	Transmission through the connection being closed was attempted.	COM.ERR.	<ul> <li>Retry after a little while.</li> <li>If this error occurs at execution of the dedicated instruction, set "TCP connection is not closed after instruction completion" in the close option of the control data.</li> </ul>		0	0	0	
73D8н	Open failure	Failed to open the TCP connection for the request message transmission.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the open status of the target device.</li> <li>Review the IP address, port No. setting and other parameters of the target device.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	
73D9н		Since the normal connection resources were all being used, a new TCP connection could not be opened.	COM.ERR.	<ul> <li>Retry after a little while.</li> <li>Decrease the number of TCP connections used simultaneously.</li> </ul>		0	0	0	
73DAH	Alive check failure (KeepAlive function)	Since the existence of the target device could not be confirmed by the KeepAlive function, the TCP connection was disconnected.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	
7400н	Target device port No. error	The port number setting of the target device is erroneous.	COM.ERR.	Review the port number setting of the target device at the time of transmission.		0	0	0	
7401 <sub>H</sub>	Target device IP address error	The IP address setting of the target device is erroneous.	COM.ERR.	Review the IP address setting of the target device at the time of transmission.		0	0	0	0
7402H	Open failure	A TCP connection was not established in the open processing.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the open status of the target device.</li> <li>Review the IP address, port No. setting and other parameters of the target device.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	
7403н	Send error	A send error occurred.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> <li>Hardware fault.</li> </ul>		0	0	0	0

Error	Error Name	Description	Lit LED	Corrective Action			curre	nce	
Code					1)	2)	3)	4)	5)
7404 <sub>H</sub>		A receive error occurred.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>Hardware fault.</li> </ul>		0	0	0	0
7405н	Receive error	The internal receive buffer has no free space.	COM.ERR.	<ul> <li>Retry after a little while.</li> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>Hardware fault.</li> </ul>		0	0	0	0
7410н	Send error	A send error occurred.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> <li>Hardware fault.</li> </ul>		0	0	0	0
<b>7420</b> н	Broadcast address specification error	The broadcast address was specified in TCP-based transmission.	COM.ERR.	Review the IP address setting of the target device at the time of transmission.		0		0	
7421 <sub>H</sub>	Ethernet address error	The Ethernet address of the target device is unknown.	COM.ERR.	<ul> <li>Review the IP address of the target device at the time of transmission.</li> <li>Check whether the target device with the specified IP address exists on the line or not.</li> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> <li>Replace the target device with the one having the ARP function.</li> </ul>		0	0	0	0
7422н	IP check sum error	A check sum error was detected in the IP protocol.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	0

Error	Error Name	Description	Lit LED	Corrective Action		Oc	curre	nce	
Code		Besonption			1)	2)	3)	4)	5)
7423н 7424н 7425н 7426н 7426н 7427н 7428н 7429н	ICMP error packet reception	The error packet of ICMP was received.	COM.ERR.	<ul> <li>Review the setting of the router information.</li> <li>Check whether the router operates normally.</li> <li>Check the router communication path for any error.</li> <li>Check the communication path ahead of the router for any error.</li> <li>Review the IP address of the target device at the time of transmission.</li> <li>Check whether the target device with the specified IP address</li> </ul>		0	0	0	0
742Ан				exists on the line or not.					
742Вн				<ul> <li>As the line may be busy, retry after a little while.</li> <li>Review the IP reassembly timer</li> </ul>					
742Сн				value of the target device.					
742DH	Router relay function error	<ul> <li>Without the routing information setting of the basic parameter, data were attempted to be sent to the target device that has a different IP address class or net ID.</li> <li>The routing information setting of the basic parameter is erroneous.</li> </ul>	COM.ERR.	<ul> <li>Review the IP address of the target device at the time of transmission.</li> <li>Review the setting of the routing information.</li> <li>Review the setting of the subnet mask pattern.</li> </ul>		0		0	
7440н	UDP check sum error	A check sum error was detected in the UDP protocol.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>				0	
7450н	TCP ULP time- out error	<ul> <li>The TCP ULP timer timed out.</li> <li>ACK is not returned from the target device.</li> </ul>	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> <li>Review the TCP ULP timer value of the basic parameter.</li> </ul>		0	0	0	
7451 <b>⊦</b>	TCP check sum error	A check sum error was detected in the TCP protocol.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	

Error	Error Name	Description		Corroctivo Action		Oc	curre	nce	
Code	Error Name	Description	Lit LED	Corrective Action	1)	2)	3)	4)	5)
<b>7452</b> н	Connection not open	<ul> <li>Transmission was attempted using the connection not open.</li> <li>The connection used to send data was already closed.</li> </ul>	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>Retry after a little while.</li> </ul>		0	0	0	
7453н		The connection being closed was used to send data.		Retry after a little while.					
7454н	Connection being closed	The connection not open was used to send data.	COM.ERR.	Retry after a little while.		0	0	0	
7455 <sub>H</sub>	TCP receive data size error	The message greater than the TCP maximum size was received.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	
7460н	TCP ULP time- out error	As the TCP ULP timer timed out, the TCP connection was forcibly disconnected from the local station.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> <li>Review the TCP ULP timer value of the basic parameter.</li> </ul>		0	0	0	
7461 <sub>H</sub>	TCP connection forcibly disconnected	The TCP connection was disconnected forcibly from the target device. (This error may be ignored when no problems arise from this error.)	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> </ul>		0	0	0	
7462H	TCP connection forcibly disconnected	<ul> <li>The TCP connection was closed forcibly from the local station.</li> <li>The local station uses 64 or more TCP connections. Hence, the TCP connection was closed forcibly to maintain the TCP connections available for simultaneous opening under frequently opened and closed conditions. (This error may be ignored when no problems arise from this error.)</li> </ul>	COM.ERR.	<ul> <li>In the preferred node specification, specify the target device with which communication is made frequently.</li> <li>Decrease the number of TCP connections used simultaneously.</li> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> </ul>		0	0	0	
7463н	TCP protocol error	As a TCP protocol error was detected, the TCP connection was closed forcibly.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>		0	0	0	
7471 <sub>H</sub>	UDP receive data size error	The message greater than the UDP maximum size was received.	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> </ul>				0	0

Error	Error Name	e Description Lit LED Corrective Action		Corrective Action		Oc	curre	nce	
Code				1)	2)	3)	4)	5)	
7472н	IP address setting error	The host address bits of the IP address of the request message transmission destination are all "0" or all "1".	COM.ERR.	Correct the target IP address set to the dedicated instruction's control data or automatic communication parameter.		0	0	0	
7473н	Connection not open	<ul> <li>The connection not open was used to send data.</li> <li>The connection used to send data was already closed.</li> </ul>	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>Retry after a little while.</li> </ul>		0	0	0	
7474н 7475н	TCP connection forcibly disconnected	The TCP connection was disconnected forcibly from the target device. (This error may be ignored when no problems arise from this error.)	COM.ERR.	<ul> <li>Check whether the operation status of the target device is normal or not.</li> <li>Check the line status for an error.</li> <li>As the line may be busy, retry after a little while.</li> </ul>		0	0	0	
7480н to 75FFн	System error	The OS of the QJ71MT91 detected error.	COM.ERR.	Counter the problem in the following procedure. • Check whether or not the QJ71MT91, power supply module and CPU module are mounted correctly on the base unit. • Check whether or not the operating environment of the system is within the range of general specifications of the CPU module. • Check whether the power capacity is sufficient or not. • Check the QJ71MT91, CPU module and base unit to see if the hardware is normal according to the manual of each module. If the module is faulty, please contact your local Mitsubishi service center or representative for repair. • If the problem cannot be resolved in the above steps, please consult your local Mitsubishi service center or representative, explaining a detailed description of the problem.	0	0	0	0	0

### REMARK

- (1) Refer to Section 11.3.1 for the error code storage areas.
- (2) Refer to Chapter 7 for details of the parameter setting ranges, etc.

#### 11.4 Turning Off the COM. ERR. LED

This section explains how to turn off the COM. ERR. LED of the QJ71MT91 when it is lit.

 Remove possible error cause before turning off the COM.ERR. LED. (Refer to Section 11.1, 11.3)

If not, the following operation will not turn off the COM.ERR. LED.

(2) The COM. ERR. LED turns on when an error occurs.

Once the COM. ERR. LED has turned on, it does not turn off automatically even if the status returns to normal.

Use the following method to turn off the COM. ERR. LED.

Method	Reference Section
From GX Configurator-MB	Section 11.4.1
From sequence program	Section 11.4.2

#### 11.4.1 From GX Configurator-MB

This section explains how to turn off the COM. ERR. LED from GX Configurator-MB.

(1) Display the Monitor/Test screen. (Refer to Section 8.6)

Monitor/Test		
Module information Module type: MODBUS(R) Module Module model name: QJ71MTS1	Start I/O No.: 0000	
Setting item	Current value	Setting value
LED ON status INIT, status	Lit	
OPEN status	Not lit	
ERR. status	Not lit	
COM.ERR. status	Not lit	
COM.ERR.LED OFF request	Not requested	Not requested 👻
X/Y Monitor/test		X/Y Monitor/test
Basic/MODBUS(R) device assignment parameter status		Basic/MODBUS(R) device
Automatic communication status		Automatic communication
Error log		Error log 🗸 🗸
Flash RDM setting     Current value       Write to module     Save file     Current value       Read from module     Load file     Make text file	Details	Monitoring
Start monitor Stop monitor Ex	ecute <u>t</u> est	Close

(2) Turn off the COM. ERR. LED.

In the Setting value field of the "COM. ERR. LED OFF request", select "Being requested" and click the Execute test button.

Monitor/Test	_	
Module information		
Module type: MODBUS(R) Module	Start I/O No.: 0000	
Module model name: QJ71MT91		
Setting item	Current value	Setting value
LED ON status INIT. status	Lit	
OPEN status	Not lit	
ERR. status	Not lit	
COM.ERR. status	Lit	
COM.ERR.LED OFF request	Not requested	Being requested 🔹
X/Y Monitor/test		X/Y Monitor/tost
Basic/MODBUS(R) device assignment parameter status		Basic/MODBUS(R) device
Automatic communication status		Automatic communication
Error log		Error log 🗸
Flash ROM setting	Details	·
Write to module Save file Current value display		Monitoring
uispiay	Select input	
Read from Load file Make text file	Continentia	
module	Setting range Not requested	
	Being requested	
Start monitor Stop monitor Ex	ecute test	Close

(3) Confirm the COM. ERR. LED is turned off.

When the processing is completed, a "Completed." message appears. Confirm that the Current value field of "COM. ERR. status" has changed from "Lit" to "Not lit".

Monitor/Test			_ <b>_ _ _ ×</b>
Module information			
Module type: MODBUS(R) Module	Start I/O No.:	0000	
Module model name: QJ71MT91			
Module model name: QJ71M191			
Setting item	Current valu	s Sattin	g value
LED ON status	Lit	30001	g value
INIT. status	LK		
OPEN status	Not lit		
EBB status	Not lit		
COM.ERR. status	Not lit		
COM.ERR.LED OFF request	Boing requested	Being requested	•
X/Y Monitor/test		X/Y Mc	onitor/test
Basic/MODBUS(R) device assignment parameter status		Basic/MODE	BUS(R) device
Automatic communication status		Automatic c	ommunication
Error log		Erro	or log 👻 👻
Flash ROM setting	– Detail		
Sylden te			Monitoring
module Save file display			
Read from	Selec	input	
module Load file Make text file		ng range	
		equested	
	Bein	) requested	
Start monitor Stop monitor	xecute test		Close
Coop monitor	2000		

(4) Change the Current value field of the "COM. ERR. LED OFF request" back to "Not requested".

Because the "COM. ERR. LED OFF request" current value does not return to "Not requested" automatically after turn-off of the COM. ERR. LED, it must be manually returned to "Not requested" after the COM. ERR. LED has turned off. After confirming "Not lit", select "Not requested" in the "COM. ERR. LED OFF request" setting value field and click the Execute test button.

When the processing is completed, a "Completed." message appears.

٨	Aonitor/Test		
	Module information		
	Module type: MODBUS(R) Module	Start I/O No.: 0000	
	Module model name: QJ71MT91		
	Setting item	Current value	Setting value
	LED ON status INIT. status	Lit	Jetting value
	OPEN status	Not lit	
	ERR. status	Not lit	
Ь	COM.ERR. status	Not lit	
μ	COM.ERR.LED OFF request	Being requested	Not requested
	X77 Monitor/test Basic/MODBUS(R) device assignment parameter status		Basic/MODBUS(R) device
	Automatic communication status		Automatic communication
	Error log		Error log 🗸
	Flash RDM setting         Current value           Write to module         Save file         Current value display           Read from module         Load file         Make text file	Details Select input Setting range Not requested Being requested	Monitoring
	Start monitor Stop monitor Ex	ecute test	Close

(5) Confirm the "COM. ERR. LED OFF request" current value.

The "COM. ERR. LED OFF request" current value must be as shown below. • "COM. ERR. LED OFF request" current value → "Not requested"

Monitor/Test		
Module information		
Module type: MODBUS(R) Module	Start I/O No.: 0000	
Module model name: QJ71MT91		
Setting item	Current value	Setting value
LED ON status INIT. status	Lit	
OPEN status	Not lit	
ERR. status	Not lit	
COM.ERR. status	Not lit	
COM.ERR.LED OFF request	Not requested	Not requested 🗸
Ar MonitorAest		X/1 Monitor/test
Basic/MODBUS(R) device assignment parameter status		Basic/MODBUS(R) device
Automatic communication status		Automatic communication
Error log		Error log 🗸 🗸
Flash ROM setting	Details	
Write to module Save file Current value display		Monitoring
Read from Load file Make text file	Select input	
module Load ne Make text ne	Setting range Not requested	
	Being requested	
Start monitor Stop monitor	ecute test	Close

#### 11.4.2 Program example for use of sequence program

This section explains how to turn off the COM. ERR. LED from a sequence program.

Relationship between COM.ERR. LED and I/O signals
 Upon occurrence of a communication error, the COM.ERR. LED (COM.ERR. LED status (X1B): ON) on the front of the QJ71MT91 turns ON. (1) in the figure)
 (a) Turn ON the COM ERR. LED OFF request (V1D) to turn OFF the





- (b) While the COM.ERR. LED OFF request (Y1B) is ON, OFF request processing is performed continuously. (3) in the figure)
- (c) The error information in the error log area of the buffer memory is not cleared (erased) by turning ON the COM.ERR. LED OFF request (Y1B).
- (2) Program conditions

In this program, COM. ERR. LED OFF request (Y1B) is turned on to turn off the COM. ERR. LED.

Device Name		Device	Application
	lanut	X0	Module READY
QJ71MT91 input/output	Input	X1B	COM. ERR. LED status
	Output	Y1B	COM. ERR. LED OFF request
External input (command)		X20	COM. ERR. LED OFF command

#### (3) Program example



#### 11.5 Conducting PING Test to Check QJ71MT91 Connection

This section explains how to conduct a PING test in the QJ71MT91.

Method	Reference Section
From GX Configurator-MB	Section 11.5.1
From sequence program	Section 11.5.2

#### (1) PING test

- (a) A PING test checks whether the other QJ71MT91 or MODBUS<sup>®</sup> /CP device exists or not on Ethernet (same subnet address) where the QJ71MT91 is connected, or if a target device (personal computer) having the specified IP address exists or not.
- (b) Perform a PING test to check the following.
  - 1) Whether the QJ71MT91 is correctly connected to the other device on the line.
  - 2) Whether the basic parameter setting of the QJ71MT91 is correct.

#### (2) Buffer memory addresses used for PING test

The following buffer memory addresses are used for a PING test.

Address	Par	ameter Name	Setting	Setting Range	Default
0FE0н (4064)	Communication time check		Specify the waiting time for completion of the PING test. Set time = set value $\times$ 500ms	2 to 60	2
0FE1н (4065)	Transmission count		Specify the number of transmissions.	1 to 10	4
0FE2н to 0FE3н (4066 to 4067)	IP address		Specify the IP address of the PING test target device.	Refer to *1	0000000н
0FE4н (4068)	PING test	Execution result	<ul> <li>The execution result of the PING test is stored.</li> <li>When completed with an error, the error code is stored. (Refer to Section 11.3.3)</li> </ul>	0000н: Normal completion 0001н to : Error completion (Error code)	0000н
0FE5н (4069)	execution results	Total packet transmission count	The total packet transmission	_	-
0FE6н (4070)	]	Success count	count, success count and failure count for the PING test	_	_
0FE7н (4071)		Failure count	execution are stored.	_	_

\*1: Set the value that satisfies the following conditions.

Condition 1: The IP address class is any of A, B and C.

Condition 2: The host address bits are not all "0" or all "1".

### 11.5.1 From GX Configurator-MB

This section explains how to conduct a PING test from GX Configurator-MB.

(1) Display the PING test screen. (Refer to Section 8.6)

PING test		
Module information		
Module type: MODBUS(R) Module	Start I/O No.: 0000	
Module model name: QJ71MT91		
Setting item	Current value	Setting value
Communication time check	2	2
Transmission count	4	4
IP address	0.0.0.0	0.0.0.0
PING test execution request	Not requested	Being requested 🔹
PING test completed	OFF	
Result Execution result	0000	
Total packet transmission count	0	
Success count	0	
Failure count	0	
		-
Flash ROM setting	Details	
Write to Save file Current value		Monitoring
module Save ne display		
Read from	Decimal input	
module Load file Make text file	Setting range	
	2.60	
	1	
Start monitor Stop monitor Ex	ecute test	Close

(2) Set the PING test conditions.

Set the "Communication time check", "Transmission count" and "IP address" in the Setting value field, and click the Execute test button with the values selected.

PING test			- • ×
Module information Module type: MODBUS(R) Module	Start I/O No.: 0000		
Module model name: QJ71MT91			
Setting item	Current value	Setting value	<b></b>
Communication time check	2		2
Transmission count	4		4
IP address		192.1.0.2	
PING test execution request	Not requested	Being requested	
PING test completed	OFF		
Result Execution result	0000		
Total packet transmission count	0		
Success count	0		
Failure count	0		
			-
Flash ROM setting	Details		
Write to module Save file Current value display		м	onitoring
	IP Address input		
Read from Load file Make text file	Setting range	1	
	0.0.0.0 - 255.255.255	5.254	
	1		
Start monitor Es	ecute <u>t</u> est		Close

(3) Confirm the conditions set in (2).

When the processing is completed, a "Completed." message appears, and the data set in (2) are displayed in the Current value field. Redo the settings if changing the conditions.

PING test		
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000	
Setting item	Current value	Setting value
Lommunication time check Transmission count IP address	2 4 192102	4
PING test execution request PING test completed	Not requested	Being requested
Result Execution result Total packet transmission count	0000	
Success count Failure count	0	
Flash ROM setting Write to module Save file display	Details IP Address input	Monitoring
Read from Load file Make text file	Setting range 0.0.0.0 - 255.255.255	5.254
Start monitor Stop monitor	xecute test	Close

(4) Conduct a PING test.

Select "Being requested" in the "PING test execution request" setting value field, and click the Execute test button.

When the processing is completed, a "Completed." message appears and the PING test is executed.

PING test			
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000		
Setting item	Current value	Setting value	<b></b>
Communication time check	2		2
Transmission count	4		4
IP address	192.1.0.2	192.1.0.2	
PING test execution request	Being requested	Being requested	-
PING test completed	PING test completed		
Result Execution result	0000		
Total packet transmission count	4		
Success count	4		
Failure count	0		
			_
			•
Flash ROM setting Write to Save file Current value module Save file display	Details		Monitoring
Read from Load file Make text file	Select input Setting range Not requested Being requested		
Start monitor Stop monitor	ecute test		Close

- (5) Check the status during PING test execution.
  - "PING test execution request" current value  $\rightarrow$  "Being requested"
  - "PING test completed" current value  $\rightarrow$  "OFF"

P	VING test			- IX
	Module information Module type: MODBUS(R) Module Module model name: QJ/71MT91	Start I/O No.: 0000		
	Setting item	Current value	Setting value	2
	Transmission count	4		4
	IP address PING test execution request PING test completed	Being requested OFF	192.1.0.2 Eeing requested	-
	Result Execution result Total packet transmission count Success count	0000 3 3	J	
	Failure count	0		
	Flash ROM setting Write to module Save file Current value display	Details Select input		Monitoring
	Read from Load file Make text file	Setting range Not requested Being requested		<u> </u>
	Start monitor Stop monitor	vecute test		Close

- (6) Check the status when the PING test is completed.
  - "PING test execution request" current value  $\rightarrow$  "Being requested"
  - "PING test completed" current value  $\rightarrow$  "PING test completed"
  - "Result" current value  $\rightarrow$  Result is displayed for each.

PING test			- IX
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000		
Setting item	Current value	Setting value	
Communication time check Transmission count	2		2
I ransmission count IP address	4 192.1.0.2	192102	
PING test execution request	Being requested	Being requested	
PING test completed	PING test completed		
Result Execution result	0000		
Total packet transmission count	4		
Success count	4		
Failure count	0		
			•
Flash ROM setting Write to Save file Current value display	Details Select input		Monitoring
Read from Load file Make text file	Setting range Not requested Being requested		
Start monitor Stop monitor	xecute_test		Close

(7) Change the "PING test execution request" current value back to "Not requested". Because the "PING test execution request" current value does not automatically return to "Not requested" on completion of the PING test, it must be manually changed to "Not requested" after the PING test is completed,.

Select "Not requested" in the "PING test execution request" setting field and click the Execute test button.

When the processing is completed, a "Completed." message appears.

PING test			- • ×
Module information Module type: MODBUS(R) Module Module model name: QJ71MT91	Start I/O No.: 0000		
Setting item	Current value	Setting value	<b></b>
Communication time check	2	-	2
Transmission count	4	-	4
IP address	192.1.0	192.1.0.2	
PING test execution request	Being requested	Not requested	-
PING test completed	PING test completed		
Result Execution result	0000		
Total packet transmission count	4		
Success count	4		
Failure count	(		
			•
Flash ROM setting	Details		
Write to module Save file Current value display			Monitoring
Read from	Select input		
module Load file Make text file	Setting range		
	Not requested Being requested		
	being requested		
Start monitor Stop monitor Es	ecute test	E	Close

- (8) Confirm the "PING test execution request" current value.
  - The "PING test execution request" current value must be as shown below.
  - "PING test execution request" current value  $\rightarrow$  "Not requested"
  - "PING test completed" current value  $\rightarrow$  "OFF"

PING test	_		
Module information Module type: MODBUS(R) Module	Start 1/0 No.: 0000		
Module model name: QJ71MT91			
Setting item	Current value	Setting value	
Communication time check	2	2	
Transmission count	4	4	
IP address	192.1.0.2	192.1.0.2	
PING test execution request	Not requested	Not requested 👻	
PING test completed	OFF		
Result Execution result	0000		
Total packet transmission count	4		
Success count	4		
Failure count	0		
		<b>•</b>	
Flash ROM setting	Details		
Write to Save file Current value display	Select input	Monitoring	
Read from Load file Make text file	Setting range Not requested		
	Being requested		
Start monitor Stop monitor	ecute test	Close	

#### 11.5.2 Program example for use of sequence program

This section explains how to perform a PING test from a sequence program.

- (1) Relationship between PING test and I/O signals
  - (a) Turn ON the PING test execution request (Y1C) to execute the PING test.(1) in the figure)



- (b) On completion of the PING test, the PING test completion (X1C) turns ON.(2) in the figure)
- (c) Turn OFF the PING test execution request (Y1C) to turn OFF the PING test completion (X1C). (3) in the figure)
- (2) Error completion of PING test
  - (a) The execution result of the PING test is stored into the execution result area (0FE5H).
     When error completion arises, the error code is stored.
     For the corrective actions to be taken at error completion, refer to Section 11.3.3
  - (b) If the basic parameter setting request (Y1) is turned ON during execution of the PING test, the PING test results in error completion.
  - (c) If the PING test is executed with the basic parameter setting request (Y1) ON, the PING test results in error completion.

### (3) Program example

- An example of the PING test performed with a sequence program is given below.
- (a) System configuration



- \*1: The QJ71MT91 is mounted on Slot 0 of the base unit, and the head I/O No. is 0.
  - (b) Program conditions

This program executes a PING test when PING test execution request (Y1C) is turned on after the PING test conditions are set.

1) PING test condition settings

Setting Item	Buffer Memory Address	Set Value
Communication time check	0FE0н (4064)	2 (1s)
Transmission count	0FE1н (4065)	4 (4 times)
IP address	0FE2н to 0FE3н (4066 to 4067)	C0010001н (192.1.0.1)

2) Devices available for user

Device Name		Device	Application	
		X0	Module READY	
QJ71MT91 input/output	Input	Х3	Basic parameter setting existence	
		X1C	PING test completed	
	Output	Y1C	PING test execution request	
External input (command	d)	X20	PING test execution command	
		D10000	For getting execution result	
Data register		D10001	For getting total packet transmission count	
Data register		D10002	For getting success count	
		D10003	For getting failure count	
		U0\G4064	Communication time check	
		U0\G4065	Transmission count	
Intelligent function modu	le	U0\G4066 to U0\G4067	IP address	
device	-		Execution result	
		U0\G4069	Total packet transmission count	
		U0\G4070	Success count	
		U0\G4071	Failure count	



(c) Program example

# APPENDICES

Appendix 1 External Dimensions



(Unit: mm (in.))

#### Appendix 2 Processing Time

This section explains the processing time of the QJ71MT91 by function. The processing time of the QJ71MT91 may become longer than that calculated in this section depending on the network load factor (line congestion), number of TCP connections used simultaneously, and GX Developer connection existence. Refer to the processing time calculated by the expression in this section when having the QJ71MT91 communicate with one target device using an already established TCP connection.

- (1) Master function performance
  - (a) Automatic communication function performance
    - 1) Automatic communication function communication time [Unit: ms]

The automatic communication function communication time is the time from when the repeat interval timer expires until the repeat interval timer is started again after completion of communication with the slave.

- Tac = 7 + Ts
- 2) Calculation items

Setting Item	tem Description	
Tac Automatic communication function communication time		ms
Ts	Target slave device processing time	ms



- (b) Dedicated instruction performance (MBRW/MBREQ instruction)
  - Dedicated instruction processing time [Unit: ms] The dedicated instruction processing time is the time from when the dedicated instruction is started until the completed device turns on. Trc = 7 + St + (St or Ts, whichever is greater)
  - 2) Calculation items

Setting Item	Description	Unit
Trc	Dedicated instruction processing time	ms
St	Local station scan time	
Ts Message processing time at destination slave device		ms

### (2) Slave function performance

- 1) Request message processing time [Unit: ms] The request message processing time is the time from when the QJ71MT91 receives a request message from the master until it sends a response message after completion of processing. Tsl =  $5 + 7 \times n1 + St \times n2$
- 2) Calculation items

Setting Item		Unit			
Tsl	Request messa	age process	ing time		ms
St	Local station so	can time			ms
	Any of the following values is applied depending on the function code and assignment status.				
	Function code	controller C	grammable CPU device igned	When buffer memory is assigned	
	01		1	0	
	02		1	0	
	03		1	0	
n1	04		1	0	—
	05		1	0	
	06		1	0	
	15		1	0	
	16		1	0	
	20		1	0	
	21	1		0	
	22	2		0	
	23		2	0	
	Any of the following values is applied depending on the function code and assignment status.				
	Function code	controller C	grammable CPU device igned	When buffer memory is assigned	
		Normal	Worst	is assigned	
		case	case		
	01	1	2	0	
	02	1	2	0	
n2	03	1	2	0	—
	04	1	2	0	
	05	1	2	0	
	06	1	2	0	
	15	1	2	0	
	16	1	2	0	
	20	1	2	0	
	21	1	2	0	
	22	2	4	0	
	23	2	4	0	

### Appendix 3 GX Developer Connection Setup Example

This section explains the setting of the GX Developer connection setup window when access is made from GX Developer to the programmable controller CPU via the QJ71MT91.

For details of GX Developer, refer to the GX Developer Operating Manual.

(1) Access route



Transfer Se		$\mathbf{X}$
PC side I/F	Serial <u>CC Le Cont</u> NET(II) <u>CC Link</u> <u>Ethernet</u> PLC <u>board</u> <u>board</u> <u>board</u>	AF SSC board net
	Network No. 1 Station No. 1 Protocol	TCP
PLC side I/F	PLC CC IE Cont MNET(II) CC-Link MET/10(H) module CC-Link module C24	G4 Bus module
	Network No 1 Station No 1	
	Computer type QJ71E71 IP address / Host 0.0.0.0	
	Routing parameter transfer method Automatic transfer method	
Other station		Connection channel list
	No specification Other station(Single network) Other station(Co-existence network)	PLC direct coupled setting
	Time out (Sec.) 30 Retry times 0	Connection test
Network route		
iouto	C24 CC IE Cont NET(II) CC-Link Ethernet	PLC type
	NET/10(H) Multiple CPU setting	Detail
	Network No. 1 Station No. 1	Custom incom
Co-existence		System image
network route		Line Connected (Q/A6TEL,C24)
	C24 CC IE Cont NET(II) CC-Link Ethernet NET/10(H) Target PLC	ОК
	Accessing other station Not specified	Close

(2) Connection setup window

- (a) PC side I/F
  - 1) Select "Ethernet board" and double-click it to display the "PC side I/F Ethernet board setting" screen.
  - Set "Protocol" on the "PC side I/F Ethernet board setting" screen.
     Protocol • • Select "TCP" or "UDP".
  - 3) Since "Network No." and "Station No." are not used, leave them as displayed on the screen.

PC side I/F	Ethernet board setting	$\mathbf{X}$
Network No.	1	ОК
Station No.	1	Cancel
This is the layout setting layout for the Ethernet board. Please execute the following setting.		
Network No: Network No. of Ethernet unit set in parameter. Station No.: Station No. that does not overlap on the same loop.		
Protocol	TCP •	

- (b) PLC side I/F
  - 1) Select "Ethernet module" and double-click it to display the "PLC side I/F detailed setting of Ethernet module" screen.
  - 2) Set "PLC" and "IP address" on the "PLC side I/F detailed setting of Ethernet module" screen.
    - PLC •••••• Select "QJ71E71".
    - IP address • • Set the IP address of the QJ71MT91 to be connected.
    - IP input format • Select "DEC." or "HEX.".
  - 3) Since "Station No." and "Routing parameter transfer method" are not used, leave them as displayed on the screen.

PLC side I/F detailed :	setting of Ethernet module	×
PLC C	QJ71E71 Cancel	
IP address     Host Name	128 0 0 2 IP input format DEC.	>
Routing parameter transfer	method Automatic response system	·

(c) Other station

Select "Other station (Single network)".

- (d) Network route
  - 1) Select "Ethernet" and double-click it to display the "Network communication route Detailed setting of Ethernet" screen.
  - Select "Access to Ethernet module set on PLC side I/F" on the "Network communication route Detailed setting of Ethernet" screen.

Network communication route Detailed setting of Ethernet		
Access to Ethernet module set on PLC side I/F	ОК	
O Other station in the same loop or access to multilevel system	Cancel	
Network No 1 Station No		

### INDEX

[5]
-----

[*]	
5VDC internal current consumption	ı 3- 1

# [A]

-	
Access points	7-22
Applicable system	2- 1
Assignment points	7-28
Auto refresh setting	8-15
Automatic communication status	8-24
Automatic communication function	5- 3
Automatic communication function buf	fer
areas	5- 7
Automatic communication function	
communication time	App- 2
Automatic communication function error	or
code storage area	11-16
Automatic communication function	
performance	App- 2
Automatic communication operation	
flowchart	5- 6
Automatic communication operation st	atus
·	
Automatic communication operation st	
storage area	
Automatic communication start/stop tin	
chart	•
Precautions for starting/stopping the	
automatic communication function	5- 4
Start and stop of automatic communication	ation
function	
Target slave port No. for automatic	
communication function	7-17
Automatic communication parameter error	or
code storage area	11-14
Automatic communication parameter scr	
·	
Automatic communication parameter set	
· · · · · · · · · · · · · · · · · · ·	-
I/O signals for setting	9- 4
Setting method	
Setting precautions	
Timing charts for setting	
Automatic communication parameter set	
result storage area	-
Automatic communication parameters	
Automatic response function	
• • • • • • • • • • • • • • • • • • • •	-

ſΕ	31
ь.	

<u> </u>	
Basic parameter setting	9- 1
I/O signals for setting	9- 1
Setting method	9- 1
Setting precautions	9- 3
Timing charts for setting	9- 2
Basic parameters	7- 6
Basic parameter error code storage are	а
	11-13
Basic parameter screen	8-30
Basic parameter starting method	6-12
Basic/MODBUS® device assignment	
parameter status	8-23
Buffer memory	3-4
Buffer memory addresses used for PING	
test	11-41

# [C]

Coil	7-25
Coil assignment 1	7-26
COM.ERR. LED turn-off	11-37
Common utility package operations	8-6
Communication condition setting	6-12
Communication status	8-27
Connection precautions	6-6
Connection to 10BASE-T/100BASE-TX	6-6
Connection to Ethernet	6-6
Connector applicable for external wiring	3- 1
Control keys	8-6
CPU response monitoring timer value	7-17
e. e respense mentering americane	

### [D]

Data transmission rate	3- 1
Dedicated instructions	5-9
Dedicated instruction list	10- 1
Dedicated instruction performance	App- 3
Dedicated instruction processing time	App- 3
MBREQ Instruction	10-11
MBRW Instruction	10- 2
Default assignment parameters	7-29
Default router IP address	7-13
Device code	7-27
Device symbol	7-27

# Ind

[E]	
Error code list	11-21
Error code storage areas	11-13
Error codes	11-13
Error log	8-26,11-16
Error log area	11-16
Error log write pointer	11-16
Ethernet function	5- 1
Exception code list	11-19
Extended file register	7-25
External dimensions	App- 1

# [F]

Features	1- 1
Fraction bits	7-22
Frame specifications	4- 3
Application data	4- 3
Ethernet header	4- 3
FCS	4- 3
IP header	4- 3
MBAP header	4- 3
Message length	4- 3
MODBUS <sup>®</sup> /TCP application data unit	4- 3
MODBUS <sup>®</sup> application header	4- 3
MODBUS® /TCP ADU	4- 3
Module ID	4- 3
PDU	4- 3
Protocol data unit	4- 3
Protocol ID	4- 3
TCP header	4- 3
Transaction ID	4- 3
Function list	5- 1
Function version	2- 8

# [G]

GX Configurator-MB	8- 1
GX Developer	
Accessible range	. 5-15
GX Developer connection function	. 5-15
GX Developer connection information	
setting	. 7-16
GX Developer connection setup	. 5-15
GX Developer connection setup	
exampleA	App- 5
Number of TCP connections for GX	
Developer connection	. 7-16
System monitor of GX Developer	11-10

# [H]

3	
Handling precautions	6- 1
Hardware test	6- 8
Head buffer memory address	7-21
Head coil number	7-28
Head device number	7-28
Head holding register number	7-28
Head input number	7-28
Head input register number	7-28
Head MODBUS® device number	7-28
Holding register	7-25
Holding register assignment 1	7-26

### [I]

I/O signals	3-2
Indications of indicator LEDs	6- 5
Initial setting	.8-13
Input	.7-25
Input assignment 1	.7-26
Input register	.7-25
Input register assignment 1	.7-26
Intelligent function module parameters	8-7
Intelligent function module switch setting	.6-10
Intelligent function module switch setting	
items	.6-11
Starting procedure for intelligent function	
module switch setting screen	.6-10
IP address setting	.6-14
IP reassembly timer value	7- 8

# [K]

KeepAlive function	5-12,7-11
KeepAlive interval timer value	7-11
KeepAlive resend count	7-11
KeepAlive start timer value	7-11
Operation of KeepAlive function	5-12
To use KeepAlive function	5-12

### [L] LED

=D	
100M	6- 5
COM.ERR.	
ERR	6- 5
INIT	6- 5
OPEN	6- 5
RD	6- 5
RUN	6- 5

SD	6- 5
Local slave station port No	. 7-17

### [M]

Master function	5- 1
Master function performance	App- 2
Max. number of modules	2- 1
Maximum node-to-node distance	3- 1
Maximum number of connections	3- 1
Maximum number of parameter settings	8- 3
Maximum segment length	3- 1
MODBUS <sup>®</sup> device	
MODBUS <sup>®</sup> device assignment function .	5-11
MODBUS <sup>®</sup> device assignment paramete	er
error code storage area	11-14
MODBUS <sup>®</sup> device assignment paramete	er
setting result storage area	11-14
MODBUS <sup>®</sup> device assignment paramete	er
starting method	6-13
MODBUS <sup>®</sup> device assignment paramete	ers
	7-23
MODBUS <sup>®</sup> device assignment paramete	ers
details	
MODBUS <sup>®</sup> device sizes	
MODBUS(R) device assignment parame	eter
screen	8-35
MODBUS <sup>®</sup> device assignment parameter	
setting	9- 7
I/O signals for setting	
Setting method	9- 7
Setting precautions	
Timing charts for setting	
MODBUS® extended file register assignme	
MODBUS <sup>®</sup> extended file register size	7-31
MODBUS <sup>®</sup> extended file register size MODBUS <sup>®</sup> standard functions	7-31 4- 1
MODBUS <sup>®</sup> extended file register size MODBUS <sup>®</sup> standard functions Mask write register	7-31 4- 1 4-19
MODBUS <sup>®</sup> extended file register size MODBUS <sup>®</sup> standard functions Mask write register Read coils	7-31 4- 1 4-19 4- 6
MODBUS <sup>®</sup> extended file register size MODBUS <sup>®</sup> standard functions Mask write register Read coils Read discrete inputs	7-31 4- 1 4-19 4- 6 4- 7
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record	7-31 4- 1 4-19 4- 6 4- 7 4-15
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers	7-31 4- 1 4-19 4- 6 4- 7 4-15 4- 8
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers Read input registers	7-31 4- 1 4- 19 4- 6 4- 7 4-15 4- 8 4- 9
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers Read input registers Read/Write multiple registers	7-31 4- 1 4-19 4- 6 4- 7 4-7 4-8 4- 9 4-20
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers Read input registers Read/Write multiple registers Write file record	7-31 4- 1 4-19 4- 6 4- 7 4-7 4-15 4-8 4-9 4-20 4-17
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers Read input registers Read/Write multiple registers Write file record Write multiple coils	7-31 4- 1 4-19 4- 6 4- 7 4-15 4- 8 4- 9 4-20 4-17 4-12
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers Read holding registers Read input registers Read/Write multiple registers Write file record Write multiple coils Write multiple registers	7-31 4- 1 4-19 4- 6 4- 7 4-15 4-15 4-9 4-20 4-20 4-12 4-12 4-14
MODBUS® extended file register size MODBUS® standard functions Mask write register Read coils Read discrete inputs Read file record Read holding registers Read input registers Read/Write multiple registers Write file record Write multiple coils	7-31 4- 1 4-19 4- 6 4- 7 4-7 4-15 4-8 4-9 4-20 4-20 4-12 4-14 4-10

MODBUS <sup>®</sup> /TCP setting	7-17
Module ID	7-20
Monitor/test	8-17
Multiple CPU system	2- 3

# [N]

Network configuration	2- 4
Number of cascade connection stages	3- 1
Number of errors occurred	11-16
Number of occupied I/O points	3- 1
Number of routers set	7-13
Number of routers that can be set	3- 1

# [O]

Online change enable/disable setting	.6-13
Operating environment	8-4
Operation mode setting	.6-11

# [P]

Parameter setting method7-	- 1
Parameter setting procedures7-	- 2
Parameter types7-	- 1
Part names	- 4
PDU formats4-	- 4
Performance specifications3-	- 1
PING test	41
Preferred node specification7-	18
Preferred node specification: IP address7-	18
Preferred node specification: TCP	
connection7-	18
Pre-operational procedures and setting6-	- 2
Processing time App-	- 2
Program example	
Program example for use in normal	
system configuration9-	11
Program example for use in MELSECNET/H	
remote I/O network9-2	29

# [Q]

QJ71MT91	buffer	memory assig	gnment	7-32
QJ71MT91	status	confirmation		.11-10

# [R]

Relationship between COM.ERR. LED and		
I/O signals12	1-40	
Relationship between PING test and I/O		
signals11	1-46	
Repeat interval timer value	7-20	

Request message format 4-4
Request message processing timeApp- 4
Response message format 4-4
Response monitoring timer value
Router information: Router IP address7-15
Router information: Subnet address
Router relay function5-14,7-12
To use router relay function 5-14
Routing information

### [S]

-	
Self-loopback test	6- 9
Send frame specification	6-12,6-13
Set values of default assignment para	meters
	7-30
Slave function	5- 1
Slave function performance	Арр- 4
Software packages	2- 3
Software version	2- 9
Split reception monitoring timer value	
Starting the Intelligent function module	e utility
	8-11
Subnet mask pattern	
Switch 1	6-11
Switch 2	6-12
Switch 3	6-14
Switch 4	6-14
System configuration	2- 1,2- 5

# [T]

Target MODBUS® device head number 7-21			
Target station IP address			
TCP end timer value 7-8			
TCP resend timer value 7-8			
TCP ULP timer value 7-8			
TCP zero window timer value 7-8			
TCP/UDP/IP monitoring timer7-8			
TCP/UDP/IP setting 7-8			
Text file 8-8			
Transmission method 3-1			
Troubleshooting 11-1			
Troubleshooting for other symptoms 11-5			
Troubleshooting of errors indicated by			
LEDs 11- 1			
Troubleshooting of errors indicated by X			
signals 11- 3			
Type specification of the target MODBUS®			
device 7-21			

# [U]

Utility Package	8- 1
GX Configurator-MB functions	8- 1
Installation of utility package	8- 2
Uninstallation of utility package	8-2
[W]	
Watch dog timer error	3- 3
Weight	3- 1

# [X]

X/Y Monitor/test	
X/ T WOIIII0//ICSt	

## WARRANTY

Please confirm the following product warranty details before using this product.

#### 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing onsite that involves replacement of the failed module.

#### [Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

#### [Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
  - 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
  - 2. Failure caused by unapproved modifications, etc., to the product by the user.
  - 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
  - 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
  - 5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
  - 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
  - 7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

#### 2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

#### 3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

#### 4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

#### 5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

#### 6. Product application

- (1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.

In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.

However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

Microsoft, Windows, Windows NT, and Windows Vista are registered trademarks of Microsoft Corporation in the United States and other countries.

Pentium and Celeron are trademarks of Intel Corporation in the United States and other countries.

Ethernet is a registered trademarks of Xerox Corporation in the United States.

MODBUS is the registered trademark of Schneider Electric SA.

Other company names and product names used in this document are trademarks or registered trademarks of respective companies.

SPREAD

Copyright (c) 1996 FarPoint Technologies, Inc.

# MODBUS®/TCP Interface Module

# User's Manual

MODEL QJ71MT91-U-SY-E

1

MODEL CODE

13JR71

SH(NA)-080446ENG-F(0805)MEE

# MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission.