# YASKAWA

## YRC1000 OPTIONS **INSTRUCTIONS**

FOR ETHERNET FUNCTION

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS

MOTOMAN-YRC1000 INSTRUCTIONS YRC1000 OPERATOR'S MANUAL (GENERAL) (SUBJECT SPECIFIC) YRC1000 MAINTENANCE MANUAL YRC1000 ALARM CODES (MAJOR ALARMS) (MINOR ALARMS)

The YRC1000 operator's manual above corresponds to specific usage. Be sure to use the appropriate manual. The YRC1000 operator's manual above consists of "GENERAL" and "SUBJECT SPECIFIC". The YRC1000 alarm codes above consists of "MAJOR ALARMS" and "MINOR ALARMS".

Please have the following information available when contacting Yaskawa Customer Support:

System

- Primary Application
- Software Version (Located on Programming Pendant by selecting: {Main Menu} - {System Info} - {Version}) Robot Serial Number (Located on robot data plate) Robot Sales Order Number (Located on controller data plate)

Use for urgent or emergency needs for technical support, service Routine Technical Inquiries: techsupport@motoman.com 24-hour Telephone Number: (937) 847-3200 Allow up to 36 hours for response and/or replacement parts

Part Number: 178942-1CD **Revision:** 4

> MANUAL NO. HW1483358 4 1/293



- This manual explains the Ethernet function of the YRC1000 system. Read this manual carefully and be sure to understand its contents before handling the YRC1000. Any matter, including operation, usage, measures, and an item to use, not described in this manual must be regarded as "prohibited" or "improper".
- General information related to safety are described in "Chapter 1. Safety" of the YRC1000 INSTRUCTIONS. To ensure correct and safe operation, carefully read "Chapter 1. Safety" of the YRC1000 INSTRUCTIONS.



- In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place before operating this product.
- YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids the product warranty.

## NOTICE

- The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.
- YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.
- If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

### **NOTES FOR SAFE OPERATION**

Read this manual carefully before installation, operation, maintenance, or inspection of the YRC1000.

In this manual, the Notes for Safe Operation are classified as "DANGER", "WARNING", "CAUTION", or "NOTICE".



Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards. Indicates a potentially hazardous situation which, if not avoided, will

Indicates an imminently hazardous

Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to "NOTICE".

NOTICE

NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to "NOTICE", the word "CAUTION" without the safety alert symbol may be used to indicate a message not related to personal injury.

Even items described as "CAUTION" may result in a serious accident in some situations.

At any rate, be sure to follow these important items.

iii



To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as "DAN-GER", "WARNING" and "CAUTION".



- Before operating the manipulator, make sure the servo power is turned OFF by performing the following operations. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.
  - Press the emergency stop buttons on the front door of the YRC1000, on the programming pendant, on the external control device, etc.
  - Disconnect the safety plug of the safety fence. (when in the play mode or in the remote mode)

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Fig. : Emergency Stop Button



 Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Failure to observe this instruction may cause unintended movement of the manipulator, which may result in personal injury.

Fig. : Release of Emergency Stop



- Observe the following precautions when performing a teaching operation within the manipulator's operating range:
  - Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
  - View the manipulator from the front whenever possible.
  - Always follow the predetermined operating procedure.
  - Always keep in mind emergency response measures against the manipulator's unexpected movement toward a person.
  - Ensure a safe place to retreat in case of emergency.

Failure to observe this instruction may cause improper or unintended movement of the manipulator, which may result in personal injury.

- Confirm that no person is present in the manipulator's operating range and that the operator is in a safe location before:
  - Turning ON the YRC1000 power
  - Moving the manipulator by using the programming pendant
  - Running the system in the check mode
  - Performing automatic operations

Personal injury may result if a person enters the manipulator's operating range during operation. Immediately press an emergency stop button whenever there is a problem. The emergency stop buttons are located on the front panel of the YRC1000 and on the right of the programming pendant.

• Read and understand the Explanation of the Warning Labels before operating the manipulator.

4/293



### **Definition of Terms Used Often in This Manual**

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows.

Equipment	Manual Designation
YRC1000 controller	YRC1000
YRC1000 programming pendant	Programming pendant
Cable between the manipulator and the controller	Manipulator cable

Equipment		Manual Designation
Programming Pendant	Character Keys /Symbol Keys	The keys which have characters or its symbol printed on them are denoted with []. ex. [ENTER]
	Axis Keys /Numeric Keys	[Axis Key] and [Numeric Key] are generic names for the keys for axis operation and number input.
	Keys pressed simultaneously	When two keys are to be pressed simultaneously, the keys are shown with a "+" sign between them, ex. [SHIFT]+[COORD]
	Displays	The menu displayed in the programming pendant is denoted with { }. ex. {JOB}

Descriptions of the programming pendant keys, buttons, and displays are shown as follows:

### **Description of the Operation Procedure**

In the explanation of the operation procedure, the expression "Select •••" means that the cursor is moved to the object item and [SELECT] is pressed, or that the item is directly selected by touching the screen.

### **Registered Trademark**

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and  $^{\mathsf{TM}}$  are omitted.

1	Outline			1-1
	1.1	Outline		1-1
	1.2	Comma	and Remote Setting for YRC1000	1-4
		1.2.1	Remote Mode and Local Mode	
		1.2.2	Switching the Function by Command Remote Setting	1-5
		1.2.3	Command Remote Setting Method	1-7
		1.2.4	Command Remote State Displayed Window	1-8
	1.3	Etherne	et Cable Connections	1-9
	1.4	Notes \	When Loading the Data	1-10
2	LAN Int	terface S	Setting and Network Communication Confirmation	2-1
	2.1	LAN Int	terface Setting	2-1
		2.1.1	Setting procedure	2-1
		2.1.2	LAN Interface Setting Item	2-5
			2.1.2.1 Host Setting	2-5
			2.1.2.2 Setting the Domain	
			2.1.2.3 IP Address (LAN2)	
			2.1.2.4 IP Address (LAN3)	
			2.1.2.5 Default Gateway	
			2.1.2.6 Static Route (LAN2)	
			2.1.2.7 Static Route (LAN3)	
			2.1.2.8 DNS Setting	
			2.1.2.9 SNTP Setting	2-9
	2.2	Dayligh	nt Saving Time Setting	2-10
	2.3	LAN Int	terface Setting Confirmation	2-14
		2.3.1	LAN Interface Setting Confirmation Method	2-14
		2.3.2	Information Displayed on the Network Service Window	
			2.3.2.1 Host Setting	2-14
			2.3.2.2 Domain Setting	2-14
			2.3.2.3 IP Address (LAN2)	
			2.3.2.4 IP ADDRESS (LAN3)	
			2.3.2.5 Default Gateway	
			2.3.2.6 Static Route (LAN2)	
			2.3.2.7 STATIC KOUTE (LAN3)	
			2.3.2.0 DN3 Setting	2-1/ 0 17
	2.4	Networ	k Communication Confirmation	
		2.4.1	Network Communication Confirmation from Windows PC	
		2.4.2	Network Communication Confirmation from the YRC1000	

Contents
----------

3	High-S	peed Eth	ernet Server Function	3-1
	3.1	Outline		3-1
		3.1.1	System Configuration	3-1
		3.1.2	Communication Target	3-2
		3.1.3	Restriction	3-2
	32	Setting		3-3
	0.2	octang		
		3.2.1	Basic Setting	3-3
		3.2.2	Batch Data Back-up Function Setting	3-3
		3.2.3	Command Remote Setting	3-4
	3.3	Commu	inication Method	3-5
		3.3.1	Packet Format	3-5
		3.3.2	Transmission Procedure	3-9
			3.3.2.1 Robot Control/Status Reading	3-9
			3.3.2.2 Robot Control/Data Writing to Register	. 3-10
			3.3.2.3 File Control (File Saving)	. 3-11
			3.3.2.4 File Control (File Loading)	. 3-14
			3.3.2.5 File Control (File List)	. 3-17
			3.3.2.6 File Control (Deleting of file)	. 3-21
		3.3.3	Robot Control Command	. 3-22
			3.3.3.1 Alarm Data Reading Command	. 3-24
			3.3.3.2 Alarm History Reading Command	. 3-27
			3.3.3.3 Status Information Reading Command	. 3-30
			3.3.3.4 Executing Job Information Reading Command	. 3-31
			3.3.3.5 Axis Configuration Information Reading Command	. 3-33
			3.3.3.6 Robot Position Data Reading Command	. 3-35
			3.3.3.7 Position Error Reading Command	. 3-38
			3.3.3.8 Torque Data Reading Data	. 3-39
			3.3.3.9 I/O Data Reading / Writing Command	. 3-40
			3.3.3.10 Register Data Reading / Writing Command	. 3-41
			3.3.3.11 Byte Variable (B) Reading / Writing Command	. 3-42
			3.3.3.12 Integer Type Variable (I) Reading / Writing Command	. 3-43
			3.3.3.13 Double Precision Integer Type Variable (D) Reading / Writing Command	. 3-44
			3.3.3.14 Real Type Variable (R) Reading / Writing Command	. 3-45
			3.3.3.15 16 Byte Character Type Variable (S) Reading Writing Command	. 3-46
			3.3.3.16 Robot Position Type Variable (P) Reading / Writing Command	. 3-47
			3.3.3.17 Base Position Type Variable (BP) Reading / Writing Command	. 3-50
			3.3.3.18 External Axis Type Variable (EX) Reading / Writing Command	. 3-52
			3.3.3.19 Alarm Reset / Error Cancel Command	. 3-54
			3.3.3.20 Hold / Servo On/off Command	. 3-55
			3.3.3.21 Step / Cycle / Auto Switching Command	. 3-56
			3.3.3.22 Character String Display Command To The Programming Pendant	. 3-57
			3.3.3.23 Start-up (Job Start) Command	. 3-58

			3.3.3.24 Job Select Command	3-59
			3.3.3.25 Management Time Acquiring Command	3-61
			3.3.3.26 System Information Acquiring Command	3-62
			3.3.3.27 Plural I/O Data Reading / Writing Command	3-63
			3.3.3.28 Plural Register Data Reading / Writing Command	3-65
			3.3.3.29 Plural Byte Type Variable (B) Reading / Writing Command	3-66
			3.3.3.30 Plural Integer Type Variable (I) Reading / Writing Command	3-68
			3.3.3.31 Plural Double Precision Integer Type Variable (D) Reading / Write Command	ing 3-69
			3.3.3.32 Plural Real Type Variable (R) Reading / Writing Command	3-70
			3.3.3.3 Plural 16 Byte Character Type Variable (S) Reading / Writing Command	3-71
			3.3.3.34 Plural Robot Position Type Variable (P) Reading / Writing Command	3-73
			3.3.3.35 Plural Base Position Type Variable (BP) Reading / Writing Command	3-75
			3.3.3.36 Plural Station Type Variable (EX) Reading / Writing Command	3-77
			3.3.3.37 Alarm Data Reading Command (for Applying the Sub Code Character String)	3-79
			3.3.3.38 Alarm History Reading Command (for Applying the Sub Code Character String)	3-82
			3.3.3.39 Move instruction command (Type Cartesian Coordinate)	3-85
			3.3.3.40 Move Instruction Command (Type Pulse)	3-88
			3.3.3.41 32 Byte Character Type Variable (S) Reading Writing Command	3-91
			3.3.3.42 Plural 32 Byte Character Type Variable (S) Reading / Writing Command	3-92
		3.3.4	File Control Command	3-94
			3.3.4.1 File Deleting Command	3-95
			3.3.4.2 File Loading Command	3-96
			3.3.4.3 File Saving Command	3-97
			3.3.4.4 File List Acquiring Command	3-98
			3.3.4.5 File Saving Command (Batch Data Backup)	3-100
	3.4	Respor	nse Code	3-101
		3.4.1	Status Code	3-101
		3.4.2	Added Status Code	3-102
	3.5	Trouble	eshooting	3-107
		3.5.1	Network Communication Confirmation	3-107
		3.5.2	Communication Setting Confirmation for Firewall and Security Software	3-107
		3.5.3	Error Log Confirmation of High-speed Ethernet Server Communication	3-107
4	FTP Se	erver Fur	nction	4-1
	4.1	Outline		4-1
		4.1.1	System Configuration	4-1
		4.1.2	Communication Target	4-1
		4.1.3	Function Mode	4-2

ix

## HW1483358

10/293
10/293

		Contents	
	4.1.4	CMOS Saving Function via FTP	4-2
	4.1.5	Restriction	4-3
4.2	Setting		4-4
	4.2.1	Enabling Setting for the FTP Function	4-4
	4.2.2	Enabling the CMOS Saving Function via FTP	4-6
	4.2.3	Command Remote Setting	4-11
4.3	Specifi	cation	4-12
	4.3.1	Account	4-12
4.4	Commu	unication Method	4-13
	4.4.1	Example of Communication Procedure in Normal Operation Mode (When Using the Windows 7 Command Prompt)	4-13
	4.4.2	Example of Communication Procedure in Expand Mode (When Using FileZilla)	4-14
	4.4.3	Saving CMOS Data by Using CMOS Saving Function via FTP	4-20
4.5	Trouble	eshooting	4-21
	4.5.1	Network Communication Confirmation	4-21
	4.5.2	Confirming the Communication Setting for Firewall and Security Software	4-21
	4.5.3	Confirming the Function Mode	4-21
4.6	FTP Jo	b Overwrite Function	4-22
	4.6.1	Outline of Function	4-22
	4.6.2	Parameter for Setting Function	4-22
	4.6.3	FTP command	4-22
	4.6.4	RFLCTJOB Instruction	4-22
	4.6.5	Specific Output Signal	4-22
DCI Fu	inction		5-1
5.1	Outline		5-1
	5.1.1	System Configuration	5-1
	5.1.2	Communication Target	5-1
5.2	Setting		5-2
	5.2.1	Communication Target Setting	5-2
	5.2.2	Command Remote OFF Setting	5-2
5.3	Prepara	ation at the YRC1000 Side	5-3
	5.3.1	Command for Job Transmission	5-3
		5.3.1.1 LOADJ	5-3
		5.3.1.2 SAVEJ	5-4

			5.3.1.4 SWAIT	5-5
		5.3.2	Command for Variable Transmission	5-5
			5.3.2.1 LOADV	5-5
		522	5.3.2.2 SAVEV	5-5 5 6
		5.3.5	Concurrent Task from Multiple Job	5-0
		535		5 10
		0.0.0	5.3.5.1 Parallel Execution Using NWAIT	5-10
			5.3.5.2 Parallel Execution Using PSTART (Optional)	5-11
		5.3.6	Axis Data Transmission Format	5-11
	5.4	Prepar	ation at the PC Side	5-13
	5.5	Execut	ing the DCI Function	5-14
	5.6	Alarm	Code	5-15
	5.7	Trouble	eshooting	5-17
		5.7.1	Network Communication Confirmation	5-17
		5.7.2	Communication Setting Confirmation for Firewall and Security Software	5-17
		5.7.3	Confirming the Operation of the PC-side Application	5-17
		5.7.4	Confirming That the Remote Setting is OFF	5-17
6	FTP Cli	ient Fun	ction	6-1
6	FTP Cli 6.1	ient Fun Outline	ction	6-1 6-1
6	FTP Cli 6.1	ient Fun Outline 6.1.1	ction System Configuration	6-1 6-1 6-1
6	FTP Cli 6.1	ient Fun Outline 6.1.1 6.1.2	ction System Configuration Communication Target	6-1 6-1 6-1 6-2
6	FTP Cli 6.1	ient Fun Outline 6.1.1 6.1.2 6.1.3	ction System Configuration Communication Target Restriction	6-1 6-1 6-2 6-2
6	FTP Cli 6.1 6.2	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepar	ction System Configuration Communication Target Restriction ation at the PC Side	6-1 6-1 6-2 6-2 6-3
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepar	ction	6-1 6-1 6-2 6-2 6-3 6-4
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepar YRC10 6.3.1	ction System Configuration Communication Target Restriction ation at the PC Side 000-side Setting and Operation Enabling Setting for the FTP Function	6-1 6-1 6-2 6-2 6-3 6-4 6-4
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepar YRC10 6.3.1 6.3.2	ction System Configuration Communication Target Restriction ation at the PC Side 000-side Setting and Operation Enabling Setting for the FTP Function Setting for the FTP Connection Condition	6-1 6-1 6-2 6-2 6-3 6-4 6-4 6-4
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepar YRC10 6.3.1 6.3.2 6.3.3	ction System Configuration Communication Target Restriction ation at the PC Side 000-side Setting and Operation Enabling Setting for the FTP Function Setting for the FTP Connection Condition Selecting the FTP Function	6-1 6-1 6-2 6-2 6-3 6-4 6-4 6-4 6-7
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepara YRC10 6.3.1 6.3.2 6.3.3 6.3.4	ction	6-1 6-1 6-2 6-2 6-3 6-4 6-4 6-4 6-7 6-7
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepara YRC10 6.3.1 6.3.2 6.3.3 6.3.4	ction	6-1 6-1 6-2 6-2 6-3 6-3 6-4 6-4 6-7 6-7 6-8
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepara YRC10 6.3.1 6.3.2 6.3.3 6.3.4	ction	6-1 6-1 6-2 6-2 6-3 6-3 6-4 6-4 6-4 6-7 6-7 6-8 6-9 6-9
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepart YRC10 6.3.1 6.3.2 6.3.3 6.3.4	ction	6-1 6-1 6-2 6-2 6-3 6-3 6-4 6-4 6-4 6-7 6-7 6-7 6-8 6-9 6-10 6-10
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepare YRC10 6.3.1 6.3.2 6.3.3 6.3.4	ction	6-1 6-1 6-2 6-2 6-2 6-3 6-3 6-4 6-4 6-4 6-7 6-7 6-7 6-10 6-10 6-10
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepare YRC10 6.3.1 6.3.2 6.3.3 6.3.4 6.3.5	ction	6-1 6-1 6-2 6-2 6-2 6-3 6-4 6-4 6-4 6-4 6-7 6-7 6-7 6-10 6-10 6-10 6-11
6	FTP Cli 6.1 6.2 6.3	ient Fun Outline 6.1.1 6.1.2 6.1.3 Prepar YRC10 6.3.1 6.3.2 6.3.3 6.3.4 6.3.5 6.3.6	ction	6-1 6-1 6-2 6-2 6-2 6-3 6-4 6-4 6-4 6-4 6-7 6-7 6-7 6-10 6-10 6-11 6-11

## HW1483358

	6.3.7	Selecting Job and Data File	6-12
6.4	Trouble	shooting	6-18
	6.4.1	Network Communication Confirmation	6-18
	6.4.2	Communication Setting Confirmation for Firewall and Security Software	6-18
	6.4.3	Confirming the FTP Server Operation	6-18
	6.4.4	Confirming That the Remote Setting is OFF	6-18
Intowno			7.4
		owsing Function by Using a web Browser	
7.1	Outline		7-1
	7.1.1	System Configuration	7-1
	7.1.2	Communication Target	7-1
	7.1.3	Restriction	7-1
7.2	Setting	Method	7-2
	7.2.1	Function Setting	7-2
	7.2.2	Command Remote Setting	7-4
7.3	Transm	nission Procedure Example	7-5
7.4	Trouble	shooting	7-7
	7.4.1	Network Communication Confirmation	
	7.4.2	Communication Setting Confirmation for Firewall and Security Software	
	1.0	- Frankfar	0.4
Etherne	et Servei	Function	8-1
8.1	Outline		8-1
	8.1.1	System Configuration	8-1
	8.1.2	Communication Target	8-1
	8.1.3	General Information for When Using the Ethernet Server Function	8-2
	8.1.4	Restriction	8-2
8.2	Setting		8-4
	8.2.1	Function Setting	8-4
	8.2.2	Command Remote Setting	8-6
8.3	Commu	unication Method	8-7
	8.3.1	Transmission procedure	8-7
		8.3.1.1 Socket Connection	8-7
		8.3.1.2 START Request	8-8
		8.3.1.3 Response to START Request	8-8
		8.3.1.4 Command	8-8
		8.3.1.5 Response to Command	8-8
		8.3.1.6 Command Data	8-9

7

8

			8.3.1.7 Answer	8-9 8-9
		832	Command Detail	8 10
		0.0.2	8.3.2.1 Status Read Function	8-10
			8.3.2.2 System Control Function	8-23
			8.3.2.3 I/O Read/Write Function	8-44
		8.3.3	Transmission Example	8-46
			8.3.3.1 Read-Out of Status for Mode, Cycle, etc	8-46
			8.3.3.2 Read-Out of I/O Signals for the YRC1000	8-46
			8.3.3.3 Write-In of I/O Signals for the YRC1000	8-47
			8.3.3.4 Continuous Execution of Multiple Command	8-48
	8.4	Trouble	shooting	8-49
		8.4.1	Network Communication Confirmation	8-49
		8.4.2	Communication Setting Confirmation for Firewall and Security Software	8-49
		8.4.3	Confirming the connection of the Ethernet Server Function	8-49
9	Host Co	ontrol Fu	nction	9-1
	9.1	Outline		9-1
		9.1.1	System Configuration	9-1
		9.1.2	Communication Target	9-1
		9.1.3	General Information When Using the Host Control Function	9-1
		9.1.4	Restriction	
	9.2	Setting		9-3
		9.2.1	Command Remote Setting	9-3
	9.3	Transm	ission Procedure	
		9.3.1	File Data Transmission Function	9-4
		9.3.2	Manipulator Control Function	9-4
	9.4	Trouble	shooting	9-5
		9.4.1	Network Communication Confirmation	9-5
		9.4.2	Communication Setting Confirmation of Firewall and Security Software	9-5
10	Standa	alone Fu	nction	10-1
	10.1	Outlin	e	10-1
		10.1.1	System Configuration	10-1
		10.1.2	Communication Target	10-2
	10.2	Setting	]	10-3
		10.2.1	Communication Target Setting	10-3
		10.2.2	Command Remote to OFF Setting	10-4

## HW1483358

HW1483358	14/293

10.3	Preparation at the PC Side	10-5
10.4	Executing the Standalone Function	10-6
	10.4.1 Selecting the Standalone Function	10-6
	10.4.2 Save	10-6
	10.4.2.1 Save Job	10-6
	10.4.2.2 Save a File Other Than Job	10-8
	10.4.3 Load	10-8
	10.4.3.1 Load the Job	10-8
	10.4.3.2 Load a File Other Than Job	10-9
	10.4.4 Verification	10-10
	10.4.4.1 Verifying the Job	10-10
	10.4.4.2 Verifying the File Other Than the Job	10-11
	10.4.5 Selection Mode of the Job	10-11
	10.4.5.1 Single Selection Mode	10-11
	10.4.5.3 Switching the Selection Mode	10-12
	10.4.6. Selecting a Joh or Data Filo	10 12
	10.4.0 Selecting a Job of Data File	10-12
	10.4.6.2 SELECT ALL	10-12
10.5	Troubleshooting	10-13
	10.5.1 Network Communication Confirmation	10-13
	10.5.2 Communication Setting Confirmation for Firewall and Security Software	10-13
	10.5.3 Confirming the Operation of the PC-side Application	10-13
	10.5.4 Confirming That the Remote Setting is OFF	10-13
11 Relate	d Information	11-1
11.1	General Information About the Host Control System Function	11-1
	11.1.1 List of Interlock for Command of Host Control Function	11-1
	11.1.2 Command that Handle Axis Data	11-2
	11.1.3 Response to MOV-type Command	11-3
	11.1.4 Command for Multi-control Group and Independent Control Function	11-3
	11.1.4.1 Command for Multi-control Group	11-3
	11.1.4.2 Command for Independent Control Function	11-4
	11.1.5 Interpreter Message	11-5
	11.1.6 Alarm Code	11-7
11.2	Related Parameter	11-8
11.3	Communication Specification	11-10
11.4	Recommended Cable and Switching Hub	11-11

- 1 Outline
- 1.1 Outline

#### 1 Outline

The YRC1000 can perform data communication through Ethernet. Using this communication, monitoring, controlling, and saving / loading internal data of the YRC1000 can be performed. This instruction manual describes the required settings and related information to use this communication function.

The YRC1000 is installed with a LAN port (RJ45 connector) as standard, thus, no additional hardware when using this function is required.



The data communication in this instruction manual is the best effort type. Thus, the communication interval and response time cannot be guaranteed. Especially, when operating the function which uses a lot of the YRC1000's internal resources, compared with the status where such functions are not operating, the communication time may be longer.



When data communication in this manual is enabled, the transmission function by using the RS232C (the data transmission function) cannot be used.



This communication function is a charged software option.

#### 1.1 Outline

The YRC1000 can use the following functions as data communication through the Ethernet.

- High-speed Ethernet server communication function
- FTP server function
- DCI function
- FTP client function
- Internal data browsing function by using a Web browser.
- Ethernet server function
- Host control function
- Standalone function

These functions are categorized as follows, in accordance with the client of the communication, the remote settings, the communication target, etc.

For details about each function, refer to the descriptions in each chapter.

The functions highlighted grey in Table 1-1 are for maintaining compatibility with the old type controller. Do not use these functions for a newly constructed system communication.

#### 1 Outline

#### 1.1 Outline

Table 1-1: Function	Comparison
---------------------	------------

Function	Communication client	Communication application	Command remote settings	Transmission target
High-speed Ethernet server	PC	MOTOCOM ES User-created application Panel computer supported this function	File: Necessary Non-file and move operation: Necessary Non-file and non-move operation: Not necessary	File Non-file
FTP server	PC	FTP client	Necessary	File (text data)
				File (batch data)
DCI	YRC1000 (job)	МОТОСОМ	Not possible	File (text data)
FTP client	YRC1000 (external memory)	FTP server	Not possible	File (text data)
Internal data browsing by using a Web browser.	PC	WEB browser	Necessary	File (text data)
Ethernet server	PC	MOTOCOM User created application	Necessary	File (text data) Non-file
Host control	PC	МОТОСОМ	Necessary	File (text data) Non-file
Standalone	YRC1000 (external memory)	МОТОСОМ	Not possible	File (text data)

#### [Details]

## Communication client: Shows whether the communication is started from either the PC or the YRC1000.

- PC: The PC application starts the communication.
- YRC1000: The YRC1000 starts the communication. There are two ways of communication in this case.
  - Job: A job transmission command starts the communication (LOADV, SAVEV, etc.).
  - External memory: Operation at the external memory menu starts the communication.

# Communication application: Shows the device or the PC application software which communicates with the YRC1000.

- MOTOCOM ES: Charged option The PC software which is included in the sub-package of MOTO-COM, YASKAWA off-line software, or the PC software which is created by the customers by using the communication library included in this package.
- MOTOCOM: Charged option The PC software which is included in the MOTOCOM package, YAS-KAWA off-line software, or the PC software which is created by the customers by using the communication library included in this package.
- Panel computer supported this function: Must be purchased separately. The high-speed Ethernet server function can communicate with a panel computer manufactured by Digital Electronics Corporation.

- 1 Outline
- 1.1 Outline
  - FTP client:

PC software (client software) that can communicate via FTP (general file transfer protocol).

FTP server:

PC software (server software) that can communicate via FTP (general file transfer protocol).

- WEB browser: PC software (client software) to browse Web pages.
- User created application: PC software for communication created by the customer in accordance with each communication procedure.

#### Command remote settings: Shows the availability in accordance with the command remote settings status of the YRC1000.

For details about the command remote settings and the confirmation method of the YRC1000, refer to *chapter 1.2 "Command Remote Setting for YRC1000"*.

- Necessary: To use this function, enable the command remote settings.
- Not necessary: This function can be used regardless of the command remote settings.
- Not possible: To use this function, disable the command remote settings.

#### Transmission target: Shows the target for transmission processing.

- File: Sends and receives files (job, condition file, etc.).
- Non-file and move operation: Executes the move operation or job of the YRC1000.
- Non-file and non-move operation: Performs the control or the state monitoring of the YRC1000 without move operation.

### HW1483358 17/293

1 Outline

1.2 Command Remote Setting for YRC1000

#### 1.2 Command Remote Setting for YRC1000

#### 1.2.1 Remote Mode and Local Mode

For the YRC1000, there are two modes depending on the operation location: the remote mode and the local mode. Performing operations using the YRC1000 is called the local mode, and performing operations using equipment other than the YRC1000 (host PLC or PC) is called the remote mode.

In the local mode, there are the teach mode which enables the operation of setting/editing, and the play mode which enables to perform the automatic operation. In the remote mode, there are the IO remote which is controlled by IO, and the command remote which is controlled using communication messages.

Fig. 1-1: Remote Mode and Local Mode



- 1 Outline
- 1.2 Command Remote Setting for YRC1000

Operation-Mode		Operation- Location	Condition to Enable the Operation
Local Mode		Programming pendant	The key switch of the programming pendant is set to "TEACH" or "PLAY", or "INHIBIT PP/PANEL" in the pseudo input window is set to invalid.
Remote I/O remote Mode enabled		PLC	The key switch of the programming pendant is set to "REMOTE", and "INHBIT IO" in the pseudo input window is set to invalid.
	Command remote enabled	PC or Panel computer	The key switch of the programming pendant is set to "REMOTE", and "CMD REMOTE SEL" in the pseudo input display is set to valid.

• In the remote mode, usually operations of the programming pendant is disabled, but they can be also enabled.



- To enable all operations, refer to chapter 1.2.4 "Command Remote State Displayed Window".
- To enable each operation by selecting, change the setting of the parameter S2C230. For details, refer to *chapter 11.2 "Related Parameter"*.

In the remote mode, even if the input from the programming pendant operation is prohibited, other operations are available.

This holds true in "I/O remote enable" and "Command remote enable" submodes. The concept is based on the conventional I/O control introduced to command control.

Note that the edit-related operations cannot be entered from more than one operating device.

#### 1.2.2 Switching the Function by Command Remote Setting

Availability of each function of data transmission differs depending on the command remote setting (Enabled / Disabled).

When the command remote is set invalid, the read/monitor system commands (hereinafter called read-only function) in the host control function in addition to the DCI function and standalone function can be used.



For the details of read/monitor system commands, refer to chapter 11.1.1 "List of Interlock for Command of Host Control Function".

- 1 Outline
- 1.2 Command Remote Setting for YRC1000

Command Remote Setting	Function Availability
Invalid	DCI function available FTP client function available Standalone function available Host control function (only read-only function) available
Valid	Host control function (all commands) available

When the read-only function is enabled, set the pendant key switch to "REMOTE", and if the command remote mode is enabled, it becomes the command remote status and all commands can be used. Also, set the programming pendant key switch to "PLAY" or "TEACH", and if the command remote is disabled, it is returned to the read-only function enabled status.

Parameter	Contents and Set Value	Initial Value
RS005	BSC port function specification when the command remote is invalidated 0 : DCI or standalone function 1 : Read-only function in host control	0



Read-only is a restricted command remote status. In the read-only status, following functions cannot be used by the remote settings, such as the DCI function, the FTP client function, and the standalone function.

- 1 Outline
- 1.2 Command Remote Setting for YRC1000

#### 1.2.3 Command Remote Setting Method

Whether I/O remote control or command remote control should be enabled can be set in the pseudo input display when selecting the remote mode in the management mode.

- 1. Select {IN/OUT} under the Main Menu.
- 2. Select {PSEUDO INPUT SIG}.
- 3. Select an item.
  - Select "INHIBIT IO" or "CMD REMOTE SEL".
    The item enabled is marked with "●" while the item disabled is marked with "O".

DATA	EDIT	DISPLAY	UTILITY	12 🖳 📶 🔞	10 📑 👘	Þ
PSEUDO INI SYSTEM : #87010 #87012 #87013 #87014 #87015 #87016 #87017	PUT SIGNAL SECTION	) ) ) ) CMD RE INHIBI	T IO MOTE SEL T PP/PANEL			
				PAGE		
Main Men	u Simp	le Menu				

- When INHIBIT IO is marked with O (disabled), the I/O remote function is enabled. When CMD REMOTE SEL is marked with • (enabled), the command remote function is enabled.
- When INHIBIT IO is marked with O (disabled), the I/O remote function is enabled, and by setting [REMOTE] of the mode key for the programming pendant, the operation from external I/O is enabled.
- When INHIBIT IO is marked with (enabled), the operation from external I/O is disabled.
- When CMD REMOTE SEL is marked with (enabled), the host control function is enabled, and by setting [REMOTE] of the mode key for the programming pendant, the host control is enabled.
- When CMD REMOTE SEL is marked with O (disabled), the host control function is disabled.
- When INHIBIT P.P/PANEL is marked with O (disabled), the operation from P.P/PANEL is enabled even in the remote mode.
  When INHIBIT P.P/PANEL is marked with (enabled), the operation from P.P/PANEL is disabled.
  However, the emergency stop button, the hold key, and the mode key can be operated while inhibit.

## HW1483358 21/293

- 1 Outline
- 1.2 Command Remote Setting for YRC1000
- 4. Set the mode key on the programming pendant to [REMOTE].



#### 1.2.4 Command Remote State Displayed Window

When the command remote is enabled, the operation from the YRC1000 can be performed, therefore, the command remote display window does not automatically to be shown.

To call the command remote window, select "REMOTE" from {IN/OUT} under the Main Menu.

This window is used in common with the I/O remote mode window.

The message of the remote window changes according to the remote function select status as shown following.

(Refer to chapter 1.2.3 "Command Remote Setting Method".)

DATA	EDIT	DISPLAY	UTILITY	12 📝 📶 🚳		
REMOTE	-					
	I/0 and	Command mo	de 🗲		A message sho the table below	wn in is displayed.
CURR PREV						
DISP						
Main Men	u Simp	le Menu				

Remote Select Status		Message	Remarks		
I/O Remote	Command Remote				
×	×	"Remote mode not specified"			
0	×	"I/O mode"			
×	0	"Command mode"			
0	0	"I/O and Command mode"			
Read-only Function Valid		"Remote mode not specified"	"CURR" and "PREV" are displayed.		

O : Valid,  $\times$  : Invalid

- 1 Outline
- 1.3 Ethernet Cable Connections

#### 1.3 Ethernet Cable Connections

Connect the Ethernet cable (shielded cable: category 5 or more) to the LAN connector, CN106 (LAN2) or CN107 (LAN3) which are located on the front panel of the ACP01 board inside the CPU rack. For the details of the recommended Ethernet cable and the switching hub, refer to *chapter 11.4 "Recommended Cable and Switching Hub"*.



There are three LAN connectors (RJ45) in front of the ACP01 board, and CN106 (LAN2) or CN107 (LAN3) are the connectors for the Ethernet communication function. Do not connect the connector to or disconnect the connector from CN105 (LAN1) since it is exclusively used for the programming pendant.



To the enabled interface (LAN2 or OAN3), the YRC1000 confirms the presence or the type of the connected cable when starting. To avoid performing an unnecessary check process, enable only the interface that is actually connected over an Ethernet cable. Note that LAN3 cannot be enabled by itself. To enable

LAN3, make sure that LAN2 is also enabled.



Fig. 1-2: Front Face of the CPU Rack

- 1 Outline
- 1.4 Notes When Loading the Data

#### 1.4 Notes When Loading the Data

When loading the data, take extra care about the following notes.

PARAMETER, SYSTEM DATA, I/O DATA, and SYSTEM BACKUP (CMOS.BIN), which includes the data of the former three data, have inherent information of each controller. These data are prepared for the backups which are loaded to the saved controller.

If those data which are saved from other controllers are loaded, unintended data overwriting, unexpected operation, or abnormal system startup may occur.



Do not load those backup data into other controllers.

If two controllers are loaded with the same job, paths of the two manipulators are different due to the home positions or mechanical error of the component parts.

Be sure to check the operation instruction before operation.

Take extra care for the saved data.



• When the system ladder program is changed, the ladder program cannot be loaded.

- When the ladder program used in DX100/DX200 is tried to be loaded, the confirmation dialog "Load the CIOPRG of past product?" is displayed. Select "YES" to load the ladder program of DX100/DX200. If the [CANCEL] is pressed or "NO" is selected while this dialog is displayed, the ladder program is not loaded.
  - When the ladder program used in DX100/DX200 is loaded, make sure to confirm that DX100/DX200 used and YRC1000 to be loaded have the same usages. Do not load the ladder program which has a different usage. When they have different numbers of usages (ex. "Arc" and "Arc + Arc"), it is considered as "a different usage".
  - If the ladder program used for DX100/DX200 arc is loaded, the new functions added in YRC1000 cannot be used. In order to use the new functions added in YRC1000, reflect the content edited in DX100/DX200 to the YRC1000 ladder program without loading the ladder program of DX100/DX200.

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting

### 2 LAN Interface Setting and Network Communication Confirmation

#### 2.1 LAN Interface Setting

#### 2.1.1 Setting procedure

For performing the data communication by using the Ethernet, first perform the LAN interface settings. These settings are required for using the data communication described in this manual.



1. Turn ON the power supply while pressing {Main Menu}. Maintenance mode starts.

			3	
SYSTEM FILE EX. MEMORY SS DISPLAY SETUP	Please select	a Main Menu.		
Main Menu	Simple Menu	Maintenance m	ode	

2. Set the security mode to the "MANAGEMENT MODE".

			V	8	
SYSTEM FILE EX. MEMORY SD DISPLAY SETUP	SECURITY MODE	MANAGEMENT	MODE		
Main Menu	Simple Menu	Maintena	ince mode		

HW1483358 25/293

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting
- 3. Select {SYSTEM} under the Main Menu. Sub menu appears.

			-	
SYSTEM	SETUP	JAGEMENT MODE		
FILE	VERSION			
EX. MEMORY	CONTROLLER INFORMATION			
DISPLAY SETUP	CPU RESET			
	ALARM HISTORY			
	QR CODE			
	SECURITY			
Main Menu	Simple Menu	Maintenance mode		

4. Select {SETUP}.

The SETUP window appears.

			<b>(3)</b>	
FILE FILE EX. WEMORY DISPLAY SETUP	SETUP CONTROL GROU APPLICATION DOPTION BOAR IO MODULE CMOS MEMORY DATE/TIME DOPTION FUNCT	P ) TION		
Main Menu	Simple Menu	Maintenance mo	de	

5. Select "OPTION FUNCTION". The OPTION FUNCTION window appears.

			1	
SYSTEM FILE EX. MEMORY SD DISPLAY SETUP	OPTION FUNCTION ARC WELDING UNELD.PULSE ( LAN INTERFAN INTWORK FUNN EtherNet/IP DAYLIGHT SAN LIMITS CUST TOOL NO. SW SI UNIT IND DISPLAY IO DISPLAY IO UVARIABLE ALI UVARIABLE ALI UNELDCOM FUNN MotoPlus FUT	COND.TRANS. SETTING SETTING (CPU Board) VING TIME MIZATION ITCHING ICATION SETUP CATION C. (ARC DIGITAL 1/F) VC.	STANDARD NOT USED DETAIL DETAIL DETAIL DETAIL DETAIL NOT USED NOT USED NOT USED DETAIL DETAIL DETAIL NOT USED	
Main Menu	Simple Menu	Maintenance mod	e	

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting
- 6. Select "DETAIL" of the "LAN INTERFACE SETTING". The LAN INTERFACE SETTING window appears.



 Select "IP ADDRESS SETTING(LAN2)". The pull-down menu appears, and then select either "MANUAL SETTING" or "DHCP SETTING".



- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting
- Select the communication parameter which requires changing. After "IP ADDRESS SETTING(LAN2)" is enabled, select other communication parameters that require changing. If using the pull-down menu, the parameters can be selected. For direct input, the virtual keyboard can be used.



9. Press [Enter].

The confirmation dialog box appears.



#### 10. Select {YES}.

Select {YES} to return to the OPTION FUNCTION window.

			1	
SYSTEM FILE FILE EX. MEMORY SO DISPLAY SETUP A3	OPTION FUNCTION ARC WELDING WELD.PULSE CON LAN INTERFACE 3 INETWORK FUNCTION EtherNet/IP(CP) DAYLIGHT SAVIN LIMITS CUSTOMI: TOOL NO. SWITCI SI UNIT INDICA DISPLAY IO NAM EXTERNAL IO SE UVARIABLE ALLOC. WELDCOM FUNC. ( MotoPlus FUNC.	D.TRANS. SETTING ON SETTING U Board) G TIME ZATION HING TION E IN JOB TUP ARC DIGITAL 1/F)	STANDARD NOT USED DETAIL DETAIL DETAIL DETAIL DETAIL NOT USED NOT USED NOT USED NOT USED DETAIL DETAIL DETAIL NOT USED	
Main Menu	Simple Menu	Maintenance mod	e	

- 2 LAN Interface Setting and Network Communication Confirmation 2.1 LAN Interface Setting
- 11. Turn OFF/ON the power supply again. Turn OFF/ON the power supply again to start the normal operation mode.

#### 2.1.2 LAN Interface Setting Item

In the LAN interface settings, perform the following settings.

#### 2.1.2.1 Host Setting

Select the host name setting method of the YRC1000 from the pull-down menu.

MANUAL SETTING: The character string set in the following item is used as the host name.

DCHP SETTING (LAN2): The host name is acquired from the LAN2 DCHP server.

DCHP SETTING (LAN3): The host name is acquired from the LAN3 DCHP server.

#### HOST NAME

If "MANUAL SETTING" is set for host setting method, enter the host name by using the character string.

Characters which can be used for the host name are half-width alphanumeric characters, hyphens (-) and underscores (\_).

Include one or more alphabetic character, and set the name to within 32 characters.

#### 2.1.2.2 Setting the Domain

Select the domain name of the YRC1000 setting method from the pulldown menu.

MANUAL SETTING: The character string set in the following item is used as the domain name.

DCHP SETTING (LAN2): The domain name is acquired from the LAN2 DCHP server.

DCHP SETTING (LAN3): The domain name is acquired from the LAN3 DCHP server.

#### **DOMAIN NAME**

If "MANUAL SETTING" is set for domain setting method, enter the domain name by using the character string.

Characters which can be used for the domain name are half-width alphanumeric characters, hyphens (-) and underscores (\_).

Include one or more alphabetic character, and set the name to within 32 characters.

#### 2.1.2.3 IP Address (LAN2)

Select the LAN2 IP address setting method from the pull-down menu.

NOT USED: LAN2 is not used. Thus, LAN3 cannot be used either.

MANUAL SETTING: The value set in the following item is used as the LAN2 IP address/subnet mask.

DCHP SETTING: The IP address (LAN2) is acquired from the DCHP server.



2-5

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting

#### IP ADDRESS

If "MANUAL SETTING" is set for IP address (LAN2) setting method, set the LAN2 IP address to this item. Use half-width numbers and periods (.) for the IP address, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

(Example) 192.168.255.1



YRC1000 supports only IPv4 and does not support IPv6.

[10.0.0.xx] (xx: 0 to 255) cannot be used for the IP address of the LAN2.

#### SUBNET MASK

If "MANUAL SETTING" is set for IP address (LAN2) setting method, set the LAN2 subnet mask to this item. Use half-width numbers and periods (.) for the subnet mask, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

(Example) 255.255.255.0

#### 2.1.2.4 IP Address (LAN3)

Select the LAN3 IP address setting method from the pull-down menu.

NOT USED: LAN3 is not used.

MANUAL SETTING: The value set in the following item is used as the LAN3 IP address/subnet mask.

DCHP SETTING: The IP address (LAN3) is acquired from the DCHP server.



When using LAN3, valid LAN 2 first.

LAN3 cannot be used without using LAN2.

#### IP ADDRESS

If "MANUAL SETTING" is set for IP address (LAN3) setting method, set the LAN3 IP address to this item. Use half-width numbers and periods (.) for the IP address, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

(Example) 172.16.0.1



YRC1000 supports only IPv4, does not support IPv6.

[10.0.0.xx] (xx: 0 to 255) and the address of the same network as LAN2 cannot be used for the IP address of LAN3.

#### SUBNET MASK

If "MANUAL SETTING" is set for IP address (LAN3) setting method, set the LAN3 subnet mask to this item. Use half-width numbers and periods (.) for the subnet mask, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

(Example) 255.255.255.0

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting

#### 2.1.2.5 Default Gateway

Select the default gateway of the YRC1000 setting method from the pulldown menu.

NOT USED: The default gateway is not used.

MANUAL SETTING: The value set in the following item is used as the default gateway.

DCHP SETTING (LAN2): The default gateway is acquired from the LAN2 DCHP server.

DCHP SETTING (LAN3): The default gateway is acquired from the LAN3 DCHP server.

#### DEFAULT GATEWAY

If "MANUAL SETTING" is set for default gateway setting method, set the default gateway to this item. Use half-width numbers and periods (.) for the default gateway, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

(Example) 192.168.255.200

#### 2.1.2.6 Static Route (LAN2)

Select whether to perform the static route control via LAN2 from the pulldown menu.

NOT USED: The static route control via LAN2 is not performed.

MANUAL SETTING: Perform the static route control using the value set in the following item.

#### NETWORK DESTINATION

If "MANUAL SETTING" is set for static route (LAN2) setting method, set the network destination to perform static route control via LAN2 to this item. Use half-width numbers and periods (.) for the network destination, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

#### SUBNET MASK

If "MANUAL SETTING" is set for static route (LAN2) setting method, set the subnet mask to perform static route control via LAN2 to this item. Use half-width numbers and periods (.) for the subnet mask, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

#### GATEWAY

If "MANUAL SETTING" is set for static route (LAN2) setting method, set the gateway to perform static route control via LAN2 to this item. Use halfwidth numbers and periods (.) for the gateway, and set "xx.xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

## HW1483358 31/293

2 LAN Interface Setting and Network Communication Confirmation

2.1 LAN Interface Setting

#### 2.1.2.7 Static Route (LAN3)

Select whether to perform the static route control via LAN3 from the pulldown menu.

NOT USED: The static route control via LAN3 is not performed.

MANUAL SETTING: Perform the static route control using the value set in the following item.

#### NETWORK DESTINATION

If "MANUAL SETTING" is set for static route (LAN3) setting method, set the network destination to perform static route control via LAN3 to this item. Use half-width numbers and periods (.) for the network destination, and set "xx.xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

#### SUBNET MASK

If "MANUAL SETTING" is set for static route (LAN3) setting method, set the subnet mask to perform static route control via LAN3 to this item. Use half-width numbers and periods (.) for the subnet mask, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

#### GATEWAY

If "MANUAL SETTING" is set for static route (LAN3) setting method, set the gateway to perform static route control via LAN3 to this item. Use halfwidth numbers and periods (.) for the gateway, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

2.1.2.8 DNS Setting

For using the DNS (Domain Name System) client function, and for the setting method of DNS server when using the DNS client function, select from the pull-down menu.

NOT USED: The DNS is not used.

MANUAL SETTING: The value set in the following item is used as the DNS server.

DCHP SETTING (LAN2): The DNS Server is acquired from the LAN2 DCHP server.

DCHP SETTING (LAN3): The DNS Server is acquired from the LAN3 DCHP server.

#### DNS SERVER

If "MANUAL SETTING" is set for DNS setting method, set the IP address of the DNS server to this item. Use half-width numbers and periods (.) for the IP address of the DNS server, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.1 LAN Interface Setting

#### 2.1.2.9 SNTP Setting

For using the SNTP (Simple Network Time Protocol) client function, and for the setting method of SNTP server when using the SNTP client function, select from the pull-down menu.

NOT USED: The SNTP is not used.

MANUAL SETTING: The value set in the following item is used as the SNTP server.

DCHP SETTING (LAN2): The SNTP Server is acquired from the LAN2 DCHP server.

DCHP SETTING (LAN3): The SNTP Server is acquired from the LAN3 DCHP server.

#### SNTP SERVER

If "MANUAL SETTING" is set for SNTP setting method, set the SNTP setting to this item. Use half-width numbers and periods (.) for the SNTP server IP address, and set "xx.xx.xx" using the following format: xx is decimal number from 0 to 255.

Note that if the DNS client function is enabled, the FQDN (Fully Qualified Domain Name: "Hostname@domainname" name format) can also be set. Characters which can be used for the FQDN are half-width alphanumeric characters, hyphens (-), underscores (\_) and the at-sign (@) which is the character boundary between the host name and the domain name. Set it within 128 characters or less.

#### TIME DIFFERENCE FROM UTC

The time that can be acquired by using SNTP is UTC (Coordinated Universal Time). To calculate the local time from UTC, enter the time difference between UTC and the local time.

Every time a symbol is selected, "+" and "-" switches. Enter half-width numeric characters for each hour and minute. The settable range is from -12:00 to +14:00.

#### ■ INQUIRY INTERVAL (H)

Enter a time interval for making an inquiry to the SNTP server. Enter the hour (H) using half-width numeric characters. The settable range is 10 to 99.

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.2 Daylight Saving Time Setting

### 2.2 Daylight Saving Time Setting

If the SNTP client function is enabled, Daylight Savings Time can be used. When performing the Daylight Savings Time settings, in continuation from the LAN interface settings, perform the following settings in maintenance mode.

1. Select {SYSTEM} under the Main Menu. Sub menu appears.

SYSTEM	SETUP	AGEMENT MODE
FILE	VERSION	
EX. MEMORY SD DISPLAY SETUP	CONTROLLER INFORMATION	
	CPU RESET	
	ALARM HISTORY	
	QR CODE	
	SECURITY	
Main Menu	Simple Menu	Maintenance mode

2. Select {SETUP}

The SETUP window appears.

			8	
SYSTEM FILE EX. MEMORY SS DISPLAY SETUP	SETUP CONTROL GROUP OPPLICATION OPPLICATION OPTION BOARD IO MODULE CMOS MEMORY DATE/TIME OPTION FUNCTI			
Main Menu	Simple Menu	Maintenance mo	ode	

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.2 Daylight Saving Time Setting
- Select "OPTION FUNCTION". The OPTION FUNCTION window appears.



4. Select "DETAIL" of the "DAYLIGHT SAVING TIME". The DAYLIGHT SAVING TIME setting window appears.



 Select "NOT USED" of the "DAYLIGHT SAVING TIME". Every time this item is selected, "USED" and "NOT USED(SNTP)" switches.

## HW1483358 35/293

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.2 Daylight Saving Time Setting
- Select "MANUAL SETTING" of the "SELECTED AREA". The pull-down menu appears, then select either MANUAL SETTING or the area to apply.

When selecting the manual setting, also set "START" / "END" / "DST TIME DIFF" / "PREFERENCE TIME".



 Select "Confirm" of the "CURRENT SETTING". The results of the setting are displayed, confirm that the items are selected correctly.

	67
FILE FILE EX. MEMORY DISPLAY SETUP	DAYLIGHT SAVING TIME DAYLIGHT SAVING TIME USED(SNTP) SELECTED AREA NORTH AMERICA DST RULE START Mar 2nd Sun 02:00 END Nov 1st Sun 02:00 DST TIME DIFF +01:00 REFFERENCE TIME CURRENT SETTING Confirm FROM 2016/03/13 02:00 TO 2016/11/06 02:00
Main Menu	Simple Menu Maintenance mode
- 2 LAN Interface Setting and Network Communication Confirmation
- 2.2 Daylight Saving Time Setting
- 8. Press [ENTER].

The confirmation dialog box appears.



# 9. Select {YES}.

Return to the OPTION FUNCTION window.

	<i>B</i>
SYSTEM FILE EX. MEMORY DISPLAY SETUP	OPTION FUNCTION            □ARC WELDING         □WELD.PULSE COND.TRANS.         NOT USED         □LAN INTERFACE SETTING         DETAIL         □LAN INTERFACE SETTING         DETAIL         □LAN INTERFACE         SETTING         DETAIL         □ANUTION SETTING         DETAIL         □DAYLIGHT SAVING TIME         DETAIL         □LIMITS CUSTOMIZATION         DETAIL         □TOOL NO. SWITCHING         NOT USED         □LINITS OUSTOMIZATION         DETAIL         □TOOL NO. SWITCHING         NOT USED         □DISPLAY IO NAME IN JOB         NOT USED         □EXTERNAL IO SETUP         DETAIL         □VARIABLE ALLOCATION         DETAIL         □VARIABLE ALLOCATION         NOT USED         □ANUTION         ANUTION         ANUTION
Main Menu	Sianla Henu Maintananca acda

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.3 LAN Interface Setting Confirmation

# 2.3 LAN Interface Setting Confirmation

LAN interface setting content and operation state can be confirmed on the network service window of the normal operation mode.

#### 2.3.1 LAN Interface Setting Confirmation Method

- 1. Set the security mode to the "MANAGEMENT MODE".
- 2. Select {SYSTEM INFO} {NETWORK SERVICE}. The following window appears.

DATA	E	DIT	DISPLAY	UTILITY	12	2 🖌 😣	1	<b>2</b> 砲
JOB		NETWO	ORK SERVICE	S				
ARC WELDI	NG	HOST HC	SETTING DST NAME	MANUAL SE MY-HOST	FTING			
VARIABLE		DOMA J DO	IN SETTING DMAIN NAME	MANUAL SE	IT I NG A I N			
B001	_	IP AD	DRESS SETT	ING(LAN2)	MANU/	AL SETTING	2	
		IF SL	P ADDRESS JBNET MASK		192.1	68.255. 1 55.255. 0	)	
ROBOT		١١	IPUT PACKET	S		0 packet	ts/sec	:
SYSTEM IN	FO	IN OL	IPUT BYTES JTPUT PACKE	TS		0 bytes 0 packet	/sec ts/sec	
Main Men	u	Simp	le Menu					

#### 2.3.2 Information Displayed on the Network Service Window

On the network service window, the following information appears.

#### 2.3.2.1 Host Setting

Shows the setting method of the current host name.

### HOST NAME

Shows the current host name.

In case failed to acquire the host name from the specified DHCP server, the previous setting value appears.

#### 2.3.2.2 Domain Setting

Shows the setting method of the current domain name.

#### DOMAIN NAME

Shows the current domain name.

In case failed to acquire the domain name from the specified DHCP server, this item is not displayed.

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.3 LAN Interface Setting Confirmation

#### 2.3.2.3 IP Address (LAN2)

Shows the setting method of the current LAN2 IP address.

#### MAC ADDRESS

Shows the LAN2 interface MAC address.

If "NOT USED" is set for the LAN 2 interface, "00:00:00:00:00:00" is displayed.

#### IP ADDRESS

Shows the current LAN2 interface IP address.

#### SUBNET MASK

Shows the current LAN2 interface subnet mask.

#### INPUT PACKETS

Shows the number of received packets of the LAN2 interface during the latest one second period.

#### INPUT BYTES

Shows the number of received bytes from the LAN2 interface during the latest one second period.

#### OUTPUT PACKETS

Shows the number of sent packets of the LAN2 interface during the latest one second period.

#### OUTPUT BYTES

Shows the number of sent bytes from the LAN2 interface during the latest one second period.

#### LEASE OBTAINED

If the DHCP resource is assigned to the LAN2 interface, shows the start date and time of the lease for the resource.

#### LEASE EXPIRES

If the DHCP resource is assigned to the LAN2 interface, shows the duration of that lease for the resource.

#### 2.3.2.4 IP ADDRESS (LAN3)

Shows the setting method of the current LAN3 IP address.

#### MAC ADDRESS

Shows the LAN3 interface MAC address.

If "NOT USED" is set for the LAN 3 interface, "00:00:00:00:00:00" is displayed.

#### IP ADDRESS

Shows the current LAN3 interface IP address.

#### SUBNET MASK

Shows the current LAN3 interface subnet mask.

#### INPUT PACKETS

Shows the number of received packets of the LAN3 interface during the latest one second period.

39/293

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.3 LAN Interface Setting Confirmation

#### INPUT BYTES

Shows the number of received bytes from the LAN3 interface during the latest one second period.

#### OUTPUT PACKETS

Shows the number of sent packets of the LAN2 interface during the latest one second period.

#### OUTPUT BYTES

Shows the number of sent bytes from the LAN3 interface during the latest one second period.

#### LEASE OBTAINED

If the DHCP resource is assigned to the LAN3 interface, shows the start date and time of the lease for the resource.

#### LEASE EXPIRES

If the DHCP resource is assigned to the LAN3 interface, shows the duration of that lease for the resource.

#### 2.3.2.5 Default Gateway

Shows the setting method of the current default gateway.

#### DEFAULT GATEWAY

Shows the current default gateway.

#### 2.3.2.6 Static Route (LAN2)

Shows the setting method of the current static route of the LAN2 interface.

### NETWORK DESTINATION Shows the network destination of the current static route of the LAN2 interface.

- SUBNET MASK Shows the subnet mask of the current static route of the LAN2 interface.
- **GATEWAY** Shows the gateway of the current static route of the LAN2 interface.

#### 2.3.2.7 Static Route (LAN3)

Shows the setting method of the current static route of the LAN3 interface.

#### NETWORK DESTINATION

Shows the network destination of the current static route of the LAN3 interface.

#### SUBNET MASK

Shows the subnet mask of the current static route of the LAN3 interface.

#### GATEWAY

Shows the gateway of the current static route of the LAN3 interface.

# HW1483358 40/293

2 LAN Interface Setting and Network Communication Confirmation 2.3 LAN Interface Setting Confirmation 2.3.2.8 DNS Setting Shows the setting method of the current DNS. **DNS SERVER** Shows the current DNS server. 2.3.2.9 SNTP Setting Shows the setting method of the current SNTP. **SNTP SERVER** Shows the current SNTP server. TIME DIFFERENCE FROM UTC Shows the time difference from UTC.

**INQUIRY INTERVAL (H)** 

Shows the inquiry interval.

# HW1483358 41/293

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.4 Network Communication Confirmation

# 2.4 Network Communication Confirmation

The device that supports the TCP/IP network usually supports "ping" commands. By using this command, the fundamental network communication can be confirmed. If there is no response to the "ping" command, or the response is extremely slow, there is a possibility that either a wiring problem, a hardware defect, or a network setting error is occurring. Thus investigate the cause and take measures.

#### 2.4.1 Network Communication Confirmation from Windows PC

For a Windows PC, at the command prompt, "ping" command can be executed with "ping 'communication target IP address".

Fig. 2-1: Ping Execution Example

C:/>ping 192.168.255.100

Pinging 192.168.255.100 with 32 bytes of data:

Reply from 192.168.255.100: bytes=32 time=1ms TTL=254 Reply from 192.168.255.100: bytes=32 time=1ms TTL=254 Reply from 192.168.255.100: bytes=32 time=1ms TTL=254 Reply from 192.168.255.100: bytes=32 time=1ms TTL=254

Ping statistics for 192.168.255.100:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:/>

#### 2.4.2 Network Communication Confirmation from the YRC1000

For the YRC1000, a "ping" command can be executed in accordance with the following procedure.

 Select {SYSTEM INFO} - {NETWORK UTILITY} under the Main Menu. The following window appears.

DATA	EDIT DISPLAY	UTILITY	12 🗷 📶 😣	🗃 🖳 🙌
NETWORK UTILI PING HOST TEST TIMES 1st 2nd 3rd 4th	TY STOP 127.0.0.1 4 			
EXECUTE				
Main Menu	Simple Menu	i) Turn on	servo power	

- 2 LAN Interface Setting and Network Communication Confirmation
- 2.4 Network Communication Confirmation
- 2. Set the IP address of the communication target in "HOST", and set the number of ping command sending times (1 to 4) in "TEST TIMES", and then select {EXECUTE}.
- 3. If a ping command response is received, "OK" appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 😣	🔞 🖵 🙌
NETWORK UTI PING HOST TEST TIMES 1st 2nd 3rd 4th	LITY STOP 127.0 (4) OK OK OK	0.0.1			
EXECUT	E				
Main Menu	Simp	le Menu	i Turn o	n servo power	

- 4. If sending or receiving fails, a comment appears in response to the situation.
  - The connection timed out: "TIME OUT"
  - DNS error: "HOST NAME ERROR"
  - Other error: "OTHER ERROR"
  - Suspended: "-"

DATA	EDIT DISPLAY	UTILITY	12 🗹 🖌 😣	🗃 🖵 🙌
NETWORK UTIL:				
PING	STOP			
TEST TIMES	4			
1st	TIME OUT			
2nd	TIME OUT			
3rd 4th	TIME OUT	_		
401	ITTME OUT			
EXECUTE				
EXECUTE				
Main Menu	Simple Menu	i) Turn on	servo power	

- 3 High-Speed Ethernet Server Function
- 3.1 Outline

# 3.1 Outline

The high-speed Ethernet server function, by using a simple and highspeed YASKAWA original communication protocol, can send / receive the YRC1000 internal data, monitor the manipulator status, and control the manipulator, by operating from the PC, etc. The YRC1000 internal data batch file (CMOSBK.BIN) can also be saved.

#### 3.1.1 System Configuration

The high-speed Ethernet server function can be used with the following configuration.

#### Fig. 3-1: System Configuration When Using the High-speed Ethernet Server Function



- 3 High-Speed Ethernet Server Function
- 3.1 Outline

#### 3.1.2 Communication Target

The following can be used as a communication target of the high-speed Ethernet server function.

Table 3-1: High-speed Ethernet Server Function Communication Target

Device	Software	Details	
Windows PC	Host control ES	Application software included with the MOTOCOM32 which is an optional function.	
	MOTOCOMES application	Customer-created communication application software by using the communication DLL included in the MOTOCOM32 which is an optional function.	
	Customer-created application	A communication application software created by customer by referring to the procedures described later.	
Panel computer manufactured by Digital Electronics Corporation	YRC1000 cockpit parts, etc.	For details, contact Digital Electronics Corporation.	
Device with which Ethernet communication is available	Customer-created application	By referring the communication procedure described later, a customer-created communication application software	

#### 3.1.3 Restriction

① Restriction of the function by the remote mode

Sending and Receiving of the file can be executed only when the command remote is enabled.

For command remote, refer to *chapter 1.2* "Command Remote Setting for YRC1000".

<sup>(2)</sup> Restriction of the function by parameters

If inputting the variables and I/O during the play mode and the edit-lock status, permission from the parameter is required. For details, refer to *chapter 11.2 "Related Parameter"*.

③ Simultaneous use with other transmission functions

No error may occur when other communication function is performed simultaneously with the High Speed Ethernet Server function, however it would not be performed until the process of other communication function is completed.

3.2 Setting

# 3.2 Setting

#### 3.2.1 Basic Setting

The YRC1000 purchased with the Ethernet function is shipped after the basic settings of the high-speed Ethernet server function is completed.

#### 3.2.2 Batch Data Back-up Function Setting

Batch data backup is a function which backs up the data saved in the YRC1000 such as system settings or operation conditions via the highspeed Ethernet server function's commands by using the YRC1000 automatic backup function.

When using this function, perform the following settings.

- 1. Set the security mode to the "MANAGEMENT MODE".
- Select {SETUP} {AUTO BACKUP SET}. The AUTO BACKUP SET window appears.
- 3. Set the "DEVICE" to "RAMDISK".





3.2 Setting



When performing this setting, the automatic backup to the SD Card is not performed. Also, this setting cannot be used together with the CMOS saving function via FTP, which is described later.

When using this function, the maximum number of files to be saved is one. (The saved file name must be "CMOSBK.BIN".)

#### 3.2.3 Command Remote Setting

When sending and receiving files, set the command remote to "VALID".

For procedures to enable the command remote, refer to chapter 1.2.3 "Command Remote Setting Method".

# HW1483358 47/293

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

# 3.3 Communication Method

#### 3.3.1 Packet Format

Transmission packet of the high-speed Ethernet server function is composed of header part (32 Byte) + data part (changeable: 479 Byte at max.)

The transmission packet consists of "request", which transmits the data from the PC to the YRC1000, and "answer", which transmits the data from the YRC1000 to the PC.

The sub-header setting composition of "request" and "answer" are different. And the setting value of the "answer" varies in accordance with the replying contents.

Followings are the format of each packet.

	4 Byte					
Туре	Byte 0	Byte 1	Byte 2	Byte 3		
Identifier	Fixed character	strings for identifi	ication (YERC)	l		
Data size	Header part size (fixed to 0x20)	9	Data part size (variable value)			
Reserve 1 / processing division	Reserve 1 (fixed to "3")	Processing division	ACK	Request ID		
Block No.						
Reserve 2	Reserve2 (fixed	to "99999999")				
Sub-header	Command No.		Instance			
	Attribute	Service (when requested)	Padding			
Data division	Data division (va	ariable:479Byte a	t maximum)			

#### Request (the PC to the YRC1000)

Header part (fixed to 32Byte)

3.3 Communication Method

	4 Byte					
Туре	Byte 0	Byte 1	Byte 2	Byte 3		
Identifier	Fixed character	strings for identifi	cation (YERC)	l		
Data size	Header part sizeData part size(fixed to 0x20)(variable value)					
Reserve 1 / processing division	Reserve 1 (fixed to "3")	Processing division	ACK	Request ID		
Block No.	Allocate the block number from 0 to0x7fff_ffff Add 0x8000_0000 to the last block					
Reserve 2	Reserve 2 (fixed	to "99999999")				
Sub-header	Service (when replying)	Status: When normal operation:0x00 When abnor- mal opera- tion:0x1f other than 0x1f <sup>1</sup> )	Added status size	Padding		
	Added status size Padding					
Data division	Data division (variable:479Byte at maximum)					

Answer (the YRC1000 to the PC)

Header part (fixed to 32Byte)

1 For details of the status and the added status, refer to chapter 3.4 "Response Code".

3.3

	De	tails of the Se	ttings for the Header	
Item		Data size	Settings	
Identifier		4Byte	Fixed to "YERC"	
Header part siz	e	2Byte	Size of header part (fixed to 0x20)	
Data part size		2Byte	Size of data part (variable)	
Reserve 1		1Byte	Fixed to "3"	
Processing divi	sion	1Byte	1: robot control 2: file control	
ACK		1Byte	0: Request 1: Other than request	
Request ID		1Byte	Identifying ID for command session (increment this ID every time the client side outputs a new command. In reply to this, server side answers the received value.)	
Block No.		4Byte	Request: 0 Answer: add 0x8000_0000 to the last packet. Data transmission other than above: add 1 (max: 0x7fff_ffff)	
Reserve 2		8Byte	Fixed to "99999999"	
Sub-header (request)	Command No.	2Byte	Execute processing by this command. (conforms to "Class" of CIP communication protocol)	
	Instance	2Byte	Define SECTION to execute a command. (conforms to "Instance" of CIP communication protocol)	
	Attribute	1Byte	Define SUB SECTION for executing a command. Attribute: (conforms to "Attribute" of CIP communication protocol)	
	Service (request)	1Byte	Define data accessing method.	
Sub-header	Service (answer)	1Byte	Add 0x80 to service (request).	
(answer)	Status	1Byte	0x00: normal reply 0x1f: abnormal reply (size of added status: 1 or 2) Other than 0x1f: abnormal reply (size of added status: 0) Refer to <i>chapter 3.4.1 "Status Code</i> "	
	Added status size	1Byte	Size of added status (0: not specified / 1: 1 WORD data / 2: 2 WORD data)	
	Added status	2Byte	Error code specified by added status size For details, refer to <i>chapter 3.4.2 "Added Status Code"</i>	
Padding		Variable	Reserve area	

**Communication Method** 3.3

Details of sub-header

· Sub header (request)

Sub header (request)	Command No.		Instance
	Attribute	Service (request)	Padding

#### Sub header (answer/ normal)

Sub header (answer)	Service (answer)	Status: normal: 0x00	Added status: size: 0x00	Padding
	For details, refer to chapter 3.4.2 "Add	ed Status Code".	Padding	

#### Sub header (answer/ with added status at abnormal)

Sub header (answer)	Service (answer)	Status: abnormal: 0x1f	Added status: size:0x01	Padding
	For details, refer to chapter 3.4.2 "Add	ed Status Code".	Padding	

#### Sub header (answer/ no added status at abnormal)

Sub header (answer)	Service (answer)	Status: abnormal: other than 0x1f	Added status: size: 0x00	Padding	
	Added status:0x0000	00000	Padding		

In the following cases, even though the YRC1000 replies normal, there might be an added status.

① Added status 0xE2A7: the requested file does not exist.



② Added status 0xE29C: the requested file size is "0". For example; as for the 1 and 2, the YRC1000 returns the

 The file list of the JOB data is requested even though there is no JOB data.

There is no requested JOB.

added status by the following cases.



- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

#### 3.3.2 Transmission Procedure

The sending/receiving flow of the transmission packet is divided into robot control and file control. Please refer to *chapter 3.3.3 "Robot Control Command*" for the details of respective robot control commands (request/answer) and *chapter 3.3.4 "File Control Command*" for the details of respective file control commands.

#### [Ex. When Reading]

### 3.3.2.1 Robot Control/Status Reading



Request		<format></format>							
	"YER	C"			Iden	tifier			
0x0	020	0x0000		Header	Header part size		oart size		
0x03	0x01	0x00	0x00	Reserve 1	Processing division	ACK	Request ID		
	0x0000_0000				Block	k No.			
	"999999	999"			Rese	erve 2			
0x0	072	0x000	0x0001 Command No. Insta		ance				
0x00	0x01	0x000	00	Attribute	Service	Padding			

Answer <format></format>							
	"YE	RC"		Identifier			
0x0	020	0x0	000	Header	part size	Data p	art size
0x03	0x01	0x01	0x00	Reserve 1	Processing division	ACK	Request ID
	0x8000	0000_0		Block No.			
	"9999	9999"		Reserve 2			
0x81	0x00	0x00	0x00	Service	Status	Added status size	Padding
0x0	000	0x0	000	Added	status	Pad	ding
Status data 1			Reading value 1				
	Status	data 2			Reading	y value 2	

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

# [Ex. When Writing]

# 3.3.2.2 Robot Control/Data Writing to Register



Request		<format></format>						
	"YE	RC"			Iden	tifier		
0x0	020	0x0	002	Header part size		Data p	art size	
0x03	0x01	0x00	0x01	Reserve 1 Processing ACK division			Request ID	
	0x000	0000_0			Block No.			
	·99999999				Rese	erve 2		
0x0	0x0079 Register No.		ter No.	Comma	and No.	Inst	Instance	
0x00	0x02	0x0	0000	Attribute	Service	vice Padding		
Regist	er data			Writing value				

Answer	wer <pre></pre> <pre></pre> <pre></pre>							
	'YE	RC'			Iden	itifier		
0x0	020	0x0	000	Header	part size	Data part size		
0x03	0x01	0x01	0x01	Reserve 1	Processing division	ACK	Request ID	
	0x8000	0000_0		Block No.				
	<b>'9999</b>	9999'		Reserve 2				
0x82	0x00	0x00	0x00	Service	Status	Added status size	Padding	
0x0	000	0x0	0x0000 Added status		Padding			

# HW1483358 53/293

3.3 Communication Method

# 3.3.2.3 File Control (File Saving)



Request 1	lequest 1 <pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>								
	"YE	RC"		Identifier					
0x0	020	0x000B		x000B Header part size Data p		oart size			
0x03	0x02	0x00	0x02	Reserve 1 Processing AC division			Request ID		
	0x0000	0000_0	•	Block No.					
	"9999	99999"			Reserve 2				
0x	:00	0x0	000	Command No.		Instance			
0x00	0x16	0x	.00	Attribute	Service	Pa	dding		
Т	E	S	Т	File name					
J	0	В							
J	В	I							

HW1483358

# High-Speed Ethernet Server Function Communication Method 3

3.3

Data 1	<format></format>						
	"YE	RC"			Iden	ıtifier	
0x0	020	0x0	1d f	Header	part size	Data p	art size
0x03	0x02	0x01	0x02	Reserve 1	Processing division	ACK	Request ID
	0x0000_0001 Block No.			Block N			
	"9999	9999"		Reserve 2			
0x96	0x00	0x00	0x00	Service	Status	Added status size	Padding
0x0	0000	0x0	000	Added status Paddir		ding	
	File c	lata 1		File data 1			

ACK1		<format></format>						
	"YE	RC"			Iden	tifier		
0x0	020	0x0000		Header	part size	size Data part size		
0x03	0x02	0x01	0x02	Reserve 1	Processing division	ACK	Request ID	
	0x0000_0001			Block No.				
	"9999999"				Rese	erve 2		
0x	0x00		0x0000		Command No. Insta		ance	
0x00	0x16	0x	(00	Attribute	Service	vice Padding		

Data 2				<format></format>					
	"YE	RC"			Iden	tifier			
0x0	020	0x0	)1df	Header	part size	Data p	art size		
0x03	0x02	0x01	0x02	Reserve 1	Processing division	ACK	Request ID		
	0x0000_0002				Block No.				
	"9999	9999"		Reserve 2					
0x96	0x00	0x00	0x00	Service	Status	Added status size	Padding		
0x0	0000	0x0	000	Added status Padding		ding			
File data 2			File data 2						

3.3

ACK2	<format></format>							
	"YE	RC"		Identifier				
0x00	)20	0x0	0x0000 Header pa		part size	Data p	art size	
0x03	0x02	0x01	0x02	Reserve 1	Processing division	ACK	Request ID	
	0x0000_0002				Bloc	k No.		
	"9999999"				Rese	erve 2		
0x0	00	0x0	0x0000 Command No. Instance		Command No.		ance	
0x00	0x16	0x00		Attribute	Service	Pac	lding	

The last data	(N)			<format></format>			
	"YE	RC"			Iden	ntifier	
0x0	020	0x0	800	Header	part size	Data p	art size
0x03	0x02	0x01	0x02	Reserve 1	Processing division	ACK	Request ID
	0x8000_000N			Block No.			
	"9999	9999"		Reserve 2			
0x96	0x00	0x00	0x00	Service	status	Added status size	Padding
0x0	0000	0x0	0000	Added status Padding			ding
	File d	lata N		File data N			

The last ACK	(N)			<format></format>				
	"YE	RC"			Iden	tifier		
0x0	x0020 0x0000		000	Header part size		Data part size		
0x03	0x02	0x01	0x02	Reserve 1 Processing ACK Requ				
	0x8000	000N_			Block	k No.		
"9999999"					Rese	rve 2		
0x	:00	0x0	000	Command No. Instance			ance	
0x00	0x16	0x	.00	Attribute	Service	Pad	lding	

#### HW1483358

3 High-Speed Ethernet Server Function

3.3 Communication Method

# 3.3.2.4 File Control (File Loading)



Request 1				<format></format>				
	"YE	RC"		Identifier				
0x0	020	0x0	00B	Header part size Data part size			art size	
0x03	0x02	0x00	0x03	Reserve 1 Processing ACK Requ				
	0x0000	0000_0	•	Block No.				
	"9999	9999"			Rese	erve 2		
0x	.00	0x0	000	Comma	and No.	Inst	ance	
0x0000	0x15	0x	:00	Attribute	Service	Pad	lding	
Т	E	S	Т		File r	name		
J	0	В	•					
J	В	I						

ACK (to request) <pre><format></format></pre>							
	"YE	RC"			Iden	tifier	
0x0	020	0x0	0x0000 Header part size Data pa		Header part size Data part s		art size
0x03	0x02	0x01	0x03	Reserve 1	Request ID		
	0x0000	0000_0			Bloc	k No.	
	"9999	9999"		Reserve 2			
0x95	0x00	0x00	0x00	Service	Status	Added status size	Padding
0x0	000	0x0	000	Added status Paddin			ding

# HW1483358 57/293

3.3

Data 1	1 <format></format>						
	"YE	RC"			lden	tifier	
0x0	020	0x0	)1df	Header	Header part size Data part size		
0x03	0x02	0x01	0x03	Reserve 1 Processing ACK Req division			
	0x0000	0_0001			Block	k No.	
	"9999	9999"		Reserve 2			
0x	:00	0x0	000	Command No. Instance			ance
0x0000	0x15	0x	:00	Attribute Service Padding			ding
File data 1			File data 1				

ACK1	<format></format>							
	"YE	RC"		Identifier				
0x0	020	0x0000 Header part		part size	Data p	art size		
0x03	0x02	0x01	0x03	Reserve 1	Request ID			
	0x000	0_0001			Bloc	k No.		
	"9999	9999"		Reserve 2				
0x95	0x00	0x00	0x00	Service	Padding			
0x0	0000	0x0000 Added status Padding			ding			

The last data	(N)			<format></format>				
	"YE	RC"			Iden	tifier		
0x0020 0x0008			Header part size Data part size					
0x03	0x02	0x01	0x03	Reserve 1 Processing ACK Requ				
	0x8000	000N_		Block No.				
	"9999	9999"		Reserve 2				
0x00 0x0000			000	Command No. Instance			ance	
0x0000 0x15 0x00				Attribute Service Padding			lding	
File data N				File data N				

HW1483358

# High-Speed Ethernet Server Function Communication Method 3

3.3

The last ACK	(N)		<format></format>					
	"YE	RC"		Identifier				
0x0	0x0020 0x0000			Header	Header part size Data part size			
0x03	0x02	0x01	0x03	Reserve 1 Processing ACK Re division				
	0x8000	000N_			Bloc	k No.		
	"9999	9999"		Reserve 2				
0x95	0x00	0x00	0x00	Service Status Added status size			Padding	
0x0000 0x0000				Added status Padding				

#### HW1483358 59/293

3.3 Communication Method

### 3.3.2.5 File Control (File List)



Request 1				<format></format>				
	"YE	RC"			Iden	tifier		
0x0	020	0x0	0005	Header part size Data part size			art size	
0x03	0x02	0x00	0x04	Reserve 1 Processing ACK division				
0x0000_0000				Block No.				
	"9999	9999"			Rese	erve 2		
0×	:00	0x0	0000	Command No. Instance			ance	
0x00	0x32	0x0	0000	Attribute	Service	Pac	lding	
*	•	J	В	File i	identification (r	efer to data de	etails)	
I								

Data 1	ata 1 <format></format>							
	"YE	RC"			Ider	ntifier		
0x0	020	0x0	)1df	Header	part size	Data p	art size	
0x03	0x02	0x01	0x04	Reserve 1 Processing ACK Re division				
0x0000_0001				Block No.				
	"9999	9999"		Reserve 2				
0xB2	0x00	0x00	0x00	Service Status Added status F size				
0x0000 0x0000 Added status Paddir				ding				
File list 1				File list 1 (refer to "Details of data")				

3.3

ACK1	1 <format></format>							
	"YE	RC"			Iden	tifier		
0x0	0x0020 0x0000		000	Header part size		Data p	art size	
0x03	0x02	0x01	0x04	Reserve 1 Processing ACK Required division				
	0x0000	0001	• •	Block No.				
"99999999"					Rese	erve 2		
0x	:00	0x0	000	Command No. Instan			ance	
0x00	0x32	0x0	0000	Attribute	Service	Pad	ding	

Data 2	a 2 <format></format>								
	"YE	RC"		Identifier					
0x0	020	0x0	)1df	Header	part size	Data p	art size		
0x03	0x02	0x01	0x04	Reserve 1 Processing ACK Req division					
	0x0000_0002				Block No.				
	"9999	9999"		Reserve 2					
0xB2	0x00	0x00	0x00	Service Status Added F status size					
0x0	0x0000 0x0000			Added status Padding					
File list 2				File list 2					

ACK2	<format></format>							
	"YE	RC"			Ider	tifier		
0x0	020	0x0000		Header part size		Data part size		
0x03	0x02	0x01	0x04	Reserve 1 Processing ACK Reque				
	0x0000	0_0002			Bloc	k No.		
"9999999"				Rese	erve 2			
0x	:00	0x0	000	Command No.			ance	
0x00	0x32	0x0	000	Attribute Service Padding			ding	

#### HW1483358 61/293

3.3

The last data	(N)			<format></format>				
	"YE	RC"		Identifier				
0x0	020	0x0	800	Header	Header part size		art size	
0x03	0x02	0x01 0x04		Reserve 1	Processing division	ACK	Request ID	
	0x8000_000N				Block No.			
	"9999	9999"		Reserve 2				
0xB2	0x00	0x00 0x00		Service	Status	Added status size	Padding	
0x0000 0x0000			Added status Padding					
File list N					File	list N		

The last ACK (N) <format></format>								
	"YE	RC"			Identifier			
0x0	020	0x0000		Header part size		Data part size		
0x03	0x02	0x01	0x04	Reserve 1	Processing division	ACK	Request ID	
0x8000_000N				Block No.				
	"9999999"				Rese	erve 2		
0x	:00	0x0000		Command No. Insta		ance		
0x00	0x32	0x0000		Attribute	Service	Pad	lding	

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

Detail of data

Not specified	JBI list
* *	JBI list
*.JBI	JBI list
*.DAT	DAT file list
*.CND	CND file list
*.PRM	PRM file list
*.SYS	SYS file list
*.LST	LST file list

Output form of the list

The list is described in the form of "file name" +  $\langle CR \rangle$  +  $\langle LF \rangle$  consecutively.

<ex.></ex.>			
<b>'1'</b>	، ، •	'J'	'B'
ʻľ	<cr></cr>	<lf></lf>	'2'
'2'	· ·	'J'	'B'
ʻľ	<cr></cr>	<lf></lf>	'3'
ʻ3'	'3'	. ,	'J'
'B'	ʻľ'	<cr></cr>	<lf></lf>
'4'	'4'	<b>'4'</b>	'4'
· ·	'J'	'B'	ʻl'
<cr></cr>	<lf></lf>		

<CR><LF> means end-of -line <CR> : Carriage Return <LF> : Line Feed

# HW1483358 63/293

3.3 Communication Method

# 3.3.2.6 File Control (Deleting of file)



Request 1				<format></format>				
	"YE	RC"			Identifier			
0x0	020	0x0	00B	Header	part size	Data part size		
0x03	0x02	0x00	0x05	Reserve 1	Processing division	ACK	Request ID	
	0x0000_0000				Block No.			
	"9999	9999"		Reserve 2				
0x	0x00 0x0000 Command No. Instance			ance				
0x00	0x09	0x00		Attribute	Service	Pad	ding	
Т	E	S	Т		File r	name		
J	0	В.						
J	В	I						

ACK 1				<format></format>			
	ΎE	RC'		Identifier			
0x0	020	0x0	000	Header part size Data part s			art size
0x03	0x02	0x01	0x05	Reserve 1	Processing division	ACK	Request ID
	0x800	0_000		Block No.			
"99999999"				Reserve 2			
0x89	0x00	0x00	0x00	Service	Status	Added status size	Padding
0x0	0000	0x0	000	Added status Padding			

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

#### 3.3.3 Robot Control Command

Follows are robot controlling commands which can use in the high-speed Ethernet communication.

No.	Command	Name	Reference chapter			
	No.					
1	0x70	Alarm data reading command	Refer to chapter 3.3.3.1 .			
2	0x71	Alarm history reading command	Refer to chapter 3.3.3.2 .			
3	0x72	Status information reading command	Refer to chapter 3.3.3.3 .			
4	0x73	Executing job information reading command	Refer to chapter 3.3.3.4 .			
5	0x74	Axis configuration information reading command	Refer to chapter 3.3.3.5 .			
6	0x75	Robot position data reading command	Refer to chapter 3.3.3.6 .			
7	0x76	Position error reading command	Refer to chapter 3.3.3.7 .			
8	0x77	Torque data reading command	Refer to chapter 3.3.3.8 .			
9	0x78	I/O data reading / writing command	Refer to chapter 3.3.3.9 .			
10	0x79	Register data reading / writing command	Refer to chapter 3.3.3.10 .			
11	0x7A	Byte type variable (B) reading / writing command	Refer to chapter 3.3.3.11 .			
12	0x7B	Integer type variable (I) reading / writing command	Refer to chapter 3.3.3.12 .			
13	0x7C	Double precision integer type variable (D) reading / writing command	Refer to chapter 3.3.3.13 .			
14	0x7D	Real type variable (R) reading / writing command	Refer to chapter 3.3.3.14 .			
15	0x7E	16-byte character type variable (S) reading / writing command <sup>1)</sup>	Refer to <i>chapter 3.3.3.15</i> .			
16	0x7F	Robot position type variable (P) reading / writing command	Refer to chapter 3.3.3.16 .			
17	0x80	Base position type variable (BP) reading / writing command	Refer to chapter 3.3.3.17 .			
18	0x81	Station type variable (EX) reading / writing command	Refer to chapter 3.3.3.18 .			
19	0x82	Alarm reset / error cancel command	Refer to chapter 3.3.3.19 .			
20	0x83	HOLD / servo ON/OFF command	Refer to chapter 3.3.3.20 .			
21	0x84	Step / cycle / Auto switching command	Refer to chapter 3.3.3.21 .			
22	0x85	Character string display command to the programming pendant	Refer to chapter 3.3.3.22 .			
23	0x86	Start-up (job START) command	Refer to chapter 3.3.3.23 .			
24	0x87	Job select command	Refer to chapter 3.3.3.24 .			
25	0x88	Management time acquiring command	Refer to chapter 3.3.3.25 .			
26	0x89	System information acquiring command	Refer to chapter 3.3.3.26 .			
27	0x300	Plural I/O data reading / writing command	Refer to chapter 3.3.3.27 .			
28	0x301	Plural register data reading / writing command	Refer to chapter 3.3.3.28 .			
29	0x302	Plural byte type variable (B) reading / writing command	Refer to chapter 3.3.3.29 .			
30	0x303	Plural integer type variable (I) reading / writing command	Refer to chapter 3.3.3.30 .			
31	0x304	Plural double precision integer type variable (D) reading / writing command	Refer to chapter 3.3.3.31			
32	0x305	Plural real type variable (R) reading / writing command	Refer to chapter 3.3.3.32 .			
33	0x306	Plural 16byte character type variable (S) reading / writing command <sup>1)</sup>	Refer to chapter 3.3.3.33			
34	0x307	Plural robot position type variable (P) reading / writing command	Refer to chapter 3.3.3.34 .			

Table 3-2: List of Robot Control Command

3.3 Communication Method

No.	Command	Name	Reference chapter
	No.		
35	0x308	Plural base position type variable (BP) reading / writing command	Refer to chapter 3.3.3.35
36	0x309	Plural station type variable (EX) reading / writing command	Refer to chapter 3.3.3.36 .
37	0x30A	Alarm data reading command (for applying the sub code character strings)	Refer to chapter 3.3.3.37
38	0x30B	Alarm history reading command (for applying the sub character strings)	Refer to chapter 3.3.3.38
39	0x8A	Move instruction command (Type Cartesian coordinates)	Refer to chapter 3.3.3.39
40	0x8B	Move instruction command (Type Pulse)	Refer to chapter 3.3.3.40
41	0x8C	32-byte character type variable (S) reading / writing command <sup>2)</sup>	Refer to chapter 3.3.3.41
42	0x30C	Plural 32-byte character type variable (S) reading / writing command <sup>2)</sup>	Refer to chapter 3.3.3.42

#### Table 3-2: List of Robot Control Command

1 The command for S variable 16byte.

2 The command for S variable 32byte.



The size of the S variable is expanded to 32byte from 16byte in the DX200 and the YRC1000. Use the 32byte character type variable (S) reading / writing command or the plural 32byte character type variable (S) reading / writing command. If use the 16byte character type variable (S) reading / writing command or the plural 16byte character type variable (S) reading / writing command, the robot controller returns by 16byte.

3.3 Communication Method

### 3.3.3.1 Alarm Data Reading Command

### Request

#### Sub header part

#### <Details>

Command No.	0x70	
Instance	<ul> <li>Specify one out of followings</li> <li>1: The latest alarm</li> <li>2: The second alarm from the latest</li> <li>3: The third alarm from the latest</li> <li>4: The fourth alarm from the latest</li> </ul>	Up to four alarms are displayed on the P.P display at the same time. Specify one out of them.
Attribute	Specify one out of followings 1: Alarm code 2: Alarm data 3: Alarm type 4: Alarm occurring time 5: Alarm character string name	Alarm code means the alarm No. Alarm data means the sub code which supports the alarm contents. Some alarms may not appear as the sub code.
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify 0 to the element number.)

### Data part

### No data part

#### Answer

### Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	• 0: not specified     • 1: 1 WORD     • 2: 2 WORD	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	Error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

3.3

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Alarm code				Range is from 0x0001 to 0x270F(decimal value: 9999)
2	Alarm da	ita			For sub code, setting values vary in accordance with the contents of the alarm type. Also, some alarms are not displayed with the sub code. In this case, the value is zero (0x0).
3	Alarm typ	De			<ul> <li>0 : No alarm</li> <li>1 : Decimal UNSIGNED SHORT type (display example: [1])</li> <li>2 : UNSIGNED CHAR bit pattern (display example: [0000_0001])</li> <li>3 : User axis type (display example: [SLURBT])</li> <li>4 : Spacial coordinate type (display example: [XYZRxRyRz])</li> <li>5 : Robot coordinate type (display example: [XYZRxRyRz])</li> <li>6 : Conveyor characteristic file (display example: [123])</li> <li>8 : Control group type (display example: [R1R2S1S2]) robot &amp; station</li> <li>9 : Decimal SHORT type (display example: [-1])</li> <li>10 : UNSIGNED SHORT bit pattern (display example: [0000_0000_0000_0001])</li> <li>11 : Control group type (display example: [R1]) for robot only</li> <li>12 : Control group type (display example: [R1]) for robot only</li> <li>12 : Control group type (display example: [R1S1B1]) for robot, station and base</li> <li>20 : Control group LOW/HIGH logical axis (display example: [R1:LOW SLURBT, HIGH SLURBT])</li> <li>21 : Control group MIN/MAX logical axis (display example: [R1: MIN SLURBT, MAX SLURBT])</li> <li>22 : Control group MIN/MAX spacial coordinate (display example: [R1: MIN XYZ, MAX XYZ])</li> <li>23 : Logical axis of both control group 1 and control group 2 (display example: [R1: SLURBT, R2: SLURBT])</li> <li>24 : Logical axis 1 and 2 of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis 1 and 2 of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis 1 and 2 of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis 1 and 2 of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>26 : Logical axis 1 and 2 of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>27 : Control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> <li>27 : Control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> </ul>
4	Alarm oc	curring tin	ne		
5	(Charact	er strings	of 16 lette	rs)	
6	Ex.2011/	10/10 15:4	49		
7					
. 8	Alarm ch	aracter st	rings name	e	It is transmitted in the form of the character strings
9	(characte	er strings:	32 letters)	)	whose language code was selected by the programming
10	-	-	,		pendant and half- and full-width characters are mixed.
11					
12					
13					
13					
14					
15					

3.3 Communication Method



For the alarm character strings name, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.

3.3 Communication Method

### 3.3.3.2 Alarm History Reading Command

# Request

### Sub header part

Command No.	0x71	
Instance	Specify one out of followings • 1 to 100 • 1001 to 1100 • 2001 to 2100 • 3001 to 3100 • 4001 to 4100	Specify the alarm number 1 to 100 : Major failure 1001 to 1100: Minor alarm 2001 to 2100: User alarm (system) 3001 to 3100: User alarm (user) 4001 to 4100: OFF line alarm
Attribute	Specify one out of followings 1: Alarm code 2: Alarm data 3: Alarm type 4: Alarm occurring time 5: Alarm character strings name	Alarm code means the alarm No. Alarm data means the sub code which supports the alarm content. There are some cases that the sub code for the occurring alarm would not appear.
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify 0 to the element number.)

### Data part

### No data part

Answer

### Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: not specified</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	Error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

3.3

32bit Integer	Byte 0 Byte 1	Byte 2	Byte3	<details></details>
1	Alarm code			Range is from 0x0001 to 0x270F(decimal value: 9999)
2	Alarm data			Setting values vary in accordance with the contents of the alarm type. Also, some alarm are not displayed with the sub code. In this case, the value is 0 :0x0).
3	Alarm type			<ul> <li>0 : No alarm</li> <li>1 : Decimal UNSIGNED SHORT type (display example: [1])</li> <li>2 : UNSIGNED CHAR bit pattern (display example: [0000_0001])</li> <li>3 : User axis type (display example: [SLURBT])</li> <li>4 : Spacial coordinate type (display example: [XYZ])</li> <li>5 : Robot coordinate type (display example: [XYZRxRyRZ])</li> <li>6 : Conveyor characteristic file (display example: [123])</li> <li>8 : Control group type (display example: [R1R2S1S2]) robot &amp; station</li> <li>9 : Decimal SHORT type (display example: [-1])</li> <li>10 : UNSIGNED SHORT bit pattern (display example: [0000_0000_0000_0001])</li> <li>11 : Control group type (display example: [R1]) for robot only</li> <li>12 : Control group type (display example: [R1S1B1]) for robot, station and base</li> <li>20 : Control group LOW/HIGH logical axis (display example: [R1: LOW SLURBT, HIGH SLURBT])</li> <li>21 : Control group MIN/MAX logical axis (display example: [R1: MIN SLURBT, MAX SLURBT])</li> <li>22 : Control group MIN/MAX spacial coordinate (display example: [R1: MIN XYZ, MAX XYZ])</li> <li>23 : Logical axis of both control group 1 and control group 2 (display example: [R1: SLURBT, R2: SLURBT])</li> <li>24 : Logical axis of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis of the control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> <li>27 : Control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> <li>27 : Control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> </ul>
4	Alarm occurring ti	me		
5	(Character strings	of 16 lette	ers)	
6	- EX.2011/10/10 15:	49		
7				
8	Alarm character st	trings nam	e	It is transmitted in the form of the character strings
9	(character strings:	32 letters	)	whose language code was selected by the programming
10	1			pendant and half- and full-width characters are mixed.
11	4			
12	1			
13	-			
14	-			
14	4			
15				

# Data part

3.3 Communication Method



For the alarm character strings name, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.
3.3 Communication Method

# 3.3.3.3 Status Information Reading Command

# Request

## Sub header part

## <Details>

Command No.	0x72	
Instance	Fixed to "1".	Specify "1".
Attribute	Specify one out of followings 1: Data 1 2: Data 2	Specify the status data number. For the details of Data1 and Data 2, refer to "Details of data".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify 0 to the element number.)

# Data part

# No data part

## Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	• 0: not specified     • 1: 1 WORD     • 2: 2 WORD	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status		The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data 1				Refer to "Details of data".
2	Data 2				Refer to "Details of data".

# Details of data

Data 1	bit0	Step	Data 2	bit0	
	bit1	1 cycle		bit1	In hold status (by programming pendant)
	bit2	Automatic and continuous		bit2	In hold status (externally)
	bit3	Running		bit3	In hold status (by command)
	bit4	In-guard safe operation		bit4	Alarming
	bit5	Teach		bit5	Error occurring
	bit6	Play		bit6	Servo ON
	bit7	Command remote		bit7	



- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

# 3.3.3.4 Executing Job Information Reading Command

## Request

# Sub header part

Command No.	0x73	
Instance	Specify one out of followings 1: Master task 2: Sub task 1 3: Sub task 2 4: Sub task 3 5: Sub task 4 6: Sub task 5 7: Sub task 6 8: Sub task 7 9: Sub task 8 10: Sub task 9 11: Sub task 10 12: Sub task 11 13: Sub task 12 14: Sub task 13 15: Sub task 14 16: Sub task 15	
Attribute	Specify one out of followings 1: Job name 2: Line number 3: Step number 4: Speed override value	Specify the status data number of the executing job information.
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify 0 to the element number)

## Data part

# No data part

#### Answer

# Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 :respond normally • Other than 0x00 : respond abnormally	
Added status size	• 0: not specified     • 1: 1 WORD     • 2: 2 WORD	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

3.3 Communication Method

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Job nam	e			Job name
2	(characte	er strings:	32 letters)	)	Half-width character: 32 characters
3					
4					
5					
6					
7					
8					
9	Line No.	(0 to 9999	9)		Job line number
10	Step No.	(1 to 999	8)		Job step number
11	Speed or	verride va	lue		Speed override value

# Data part



For the alarm character strings name, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.

3.3 Communication Method

# 3.3.3.5 Axis Configuration Information Reading Command

# Request

## Sub header part

		<details></details>
Command No.	0x74	
Instance	Specify one out of followings • 1 to 8 • 11 to 18 • 21 to 44 • 101 to 108 • 111 to 118	Specify the control group1: R1 to 8: R8Robot (pulse value)11: B1 to 18: B8Base (pulse value)21: S1 to 44: S24Station (pulse value)101: R1 to 108: R8Robot101: B1 to 118: B8Base111: B1 to 118: B8Base(cartesian value)
Attribute	Specify one out of followings 1: "Axis name" of the first axis 2: "Axis name" of the second axis 3: "Axis name" of the third axis 4: "Axis name" of the fourth axis 5: "Axis name" of the fifth axis 6: "Axis name" of the sixth axis 7: "Axis name" of the seventh axis 8: "Axis name" of the eighth axis	Specify the data number of axis information. Each axis name is set from Byte 0. "0" is set to nonexistent axis.
Service	•Get_Attribute_Single:0x0E •Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number. 0x01: Read out data of all the element number. (In this case, specify 0 to the element number.)

# Data part

No data part

## Answer

# Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 :respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: not specified</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	First coordinate name				"S" (R*: pulse)/"X" (R*/B*: cartesian value)/ "1" (B*/S*: pulse)
2	Second	coordinate	name		"L" (R*: pulse)/"Y" (R*/B*: cartesian value)/ "2" (B*/S*: pulse)
3	Third coordinate name				"U" (R*: pulse)/"Z" (R*/B*: cartesian value) "3" (B*/S*: pulse)
4	Fourth coordinate name				"R" (R*: pulse)/"Rx" (R*: cartesian value)/ "4" (B*/S*: pulse)
5	Fifth coordinate name				"B" (R*: pulse)/"Ry" (R*: cartesian value)/ "5" (B*/S*: pulse)
6	Sixth coordinate name				"T" (R*: pulse)/"Rz" (R*: cartesian value)/ "6" (B*/S*: pulse)
7	Seventh	Seventh coordinate name			"E" (R*: pulse)/"Rz" (R*: cartesian value)/ "7" (B*/S*: pulse)
8	Eighth coordinate name				

# Data part

- \*: Each control group number. R: Robot (R1 to R8)
- S: Station (S1 to s24)
- B: Base (B1 to b8)

#### HW1483358 77/293

3.3 Communication Method

## 3.3.3.6 Robot Position Data Reading Command

Only the base coordinate can be used as cartesian value. (robot, user and tool coordinates can not be used.)

# Request

Sub header part

		<details></details>
Command No.	0x75	
Instance	Specify one out of followings • 1 to 8 • 11 to 18 • 21 to 44 • 101 to 108	Specify the control group 1 : R1 to 8 : R8 Robot (pulse value) 11 : B1 to 18 : B8 Base (pulse value) 21 : S1 to 44 : S24 Station (pulse value) 101 : R1 to 108 : R8 Robot (cartesian coordinate)
Attribute	Specify one out of followings 1: Data type 2: Type 3: Tool number 4: User coordinate number 5: Extended type 6: First axis data 7: Second axis data 8: Third axis data 9: Fourth axis data 10: Fifth axis data 11: Sixth axis data 12: Seventh axis data 13: Eighth axis data	<ul> <li>Specify the position information data number.</li> <li>1 0: pulse value/16: base coordinate value</li> <li>2 As for the form, refer to the "Details of data".</li> <li>3 Tool number</li> <li>4 User coordinate number</li> <li>5 As for the extended form, refer to the "Details of data".</li> <li>6 First axis data</li> <li>7 Second axis data</li> <li>8 Third axis data</li> <li>9 Fourth axis data</li> <li>10 Fifth axis data</li> <li>11 Sixth axis data</li> <li>12 Seventh axis data</li> <li>13 Eighth axis data</li> <li>13 Eighth axis data</li> <li>14 Each axis data is output by the same order as mentioned in <i>chapter 3.3.3.5 "Axis Configuration Information Reading Command"</i>, and "0" is set to nonexistent axis.</li> </ul>
Service	•Get_Attribute_Single: 0x0E •Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify0 to the element number.)

HW1483358

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

### Data part

No data part

## Detail of data

# Please refer "Chap.3.9.4.12 Flip/ No flip" in "YRC1000 GENERAL OPERATOR'S MANUAL(RE-CSO-A051)" prepared for each application.

Туре	bit0	0: Front	1: Back	Extended type	bit0	0: <b>Ə</b> L<180,	1: <b>⊖</b> L ≥180
	bit1	0: Upper arm	1: Lower arm		bit1	0: <b>⊖</b> U<180,	1: <del>O</del> U ≥180
	bit2	0: Flip	1:No flip		bit2	0: <b>0</b> B<180,	1: <del>0</del> B ≥180
	bit3	0: <del>O</del> R < 180,	1: <b>Θ</b> R ≥180		bit3	0: <b>Ə</b> E<180,	1: <del>0</del> E ≥180
	bit4	0: <del>O</del> T<180,	1: <b>⊖</b> T ≥180		bit4	0: <b>⊖</b> W<180,	1: <del>O</del> W ≥180
	bit5	0: <del>O</del> S<180,	1: <del>O</del> S ≥180		bit5	Reserve	
	bit6	0: Redundant front	1: Redundant back		bit6	Reserve	
	bit7	0: Previous step re conversion spec 1: Type regarded r specified	egarded reverse cified everse conversion		bit7	Reserve	

## Answer

## Sub header part

<det< th=""><th>ails&gt;</th></det<>	ails>
--------------------------------------	-------

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

3.3 Communication Method

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data typ	e			0: Pulse value/ 16: Base coordinate value
2	Туре				For the type, refer to "Details of data".
3	Tool num	nber			Tool number
4	User coo	ordinate nu	umber		User coordinate number
5	Extende	d type			For the extended form, refer to "Details of data".
6	First axis	s data			
7	Second	axis data			
8	Third ax	is data			
9	Fourth a	xis data			
10	Fifth axis	s data			
11	Sixth axi	s data			
12	Seventh	axis data			
13	Eighth a	xis data			

## Details of data

Please refer "Chap.3.9.4.12 Flip/ No flip" in "YRC1000 GENERAL OPERATOR'S MANUAL(RE-CSO-A051)" prepared for each application.

Form	bit0	0: Front	1: Back	Extended form	bit0	0: <b>Ə</b> L<180,	1: <b>⊖</b> L ≥180
	bit1	0: Upper arm	1: Lower arm		bit1	0: <del>0</del> U<180,	1: <del>O</del> U ≥180
	bit2	0: Flip	1: No flip		bit2	0: <b>0</b> B<180,	1: <del>0</del> B ≥180
	bit3	0: <b> </b>	1: <b>θ</b> R ≥180		bit3	0: <b>⊖</b> E<180,	1: <del>0</del> E ≥180
	bit4	0: <b>Ə</b> T<180,	1: <b>Ө</b> Т ≥180		bit4	0: <b>⊖</b> W<180,	1: <del>0</del> W ≥180
	bit5	0: <b> </b>	1: <b>ፀ</b> S ≥180		bit5	Reserve	
	bit6	0: Redundant front	1: Redundant back		bit6	Reserve	
	bit7	0: Previous step regarde conversion specified 1: Form regarded revers specified	ed reverse se conversion		bit7	Reserve	

3.3 Communication Method

# 3.3.3.7 Position Error Reading Command

# Request

Sub header part

		<details></details>
Command No.	0x76	
Instance	Specify one out of followings • 1 to 8 • 11 to 18 • 21 to 44	Specify the control group 1 : R1 to 8 : R8 Robot axis 11 : B1 to 18 : B8 Base axis 21 : S1 to 44 : S24 Station axis
Attribute	Specify one out of followings 1: First axis data 2: Second axis data 3: Third axis data 4: Fourth axis data 5: Fifth axis data 6: Sixth axis data 7: Seventh axis data 8: Eighth axis data	Specify the axis number. Each axis data is output by the same order as mentioned in <i>chapter 3.3.3.5 "Axis Configuration Information</i> <i>Reading Command"</i> , and "0" is set to nonexistent axis.
Service	Get_Attribute_Singlel: 0x0E     Get_Attribute_All:0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify0 to the element number.)

# Data part

## No data part

## Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	First axis	data			Position variable data of each axis can be read out
2	Second axis data				
3	Third axi	s data			
4	Fourth axis data				
5	Fifth axis	s data			
6	Sixth axi	s data			
7	Seventh	axis data			
8	Eighth a	xis data			]

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

# 3.3.3.8 Torque Data Reading Data

# Request

## Sub header part

#### <Details>

Command No.	0x77	
Instance	Specify one out of followings • 1 to 8 • 11 to 18 • 21 to 44	Specify the control group 1 : R1 to 8 : R8 Robot axis 11 : B1 to 18 : B8 Base axis 21 : S1 to 44 : S24 Station axis
Attribute	Specify one out of followings 1: First axis data 2: Second axis data 3: Third axis data 4: Fourth axis data 5: Fifth axis data 6: Sixth axis data 7: Seventh axis data 8: Eighth axis data	Specify the axis number. Each axis data is output by the same order as mentioned in <i>chapter</i> 3.3.3.5 <i>"Axis Configuration Information</i> <i>Reading Command"</i> , and "0" is set to nonexistent axis.
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All:0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify 0 to the element number.)

# Data part

## No data part

## Answer

# Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	First axis	data		-	Torque data of each axis can be read out.
2	Second a	axis data			
3	Third axi	s data			
4	Fourth a	xis data			
5	Fifth axis	s data			
6	Sixth axis data				
7	Seventh axis data				
8	Eighth axis data				

3.3 Communication Method

# 3.3.3.9 I/O Data Reading / Writing Command

# Request

Sub header part

		<details></details>
Command No.	0x78	
Instance	Specify one out of followings • 1 to 512 • 1001 to 1512 • 2001 to 2512 • 2701 to 2956 • 3001 to 3512 • 3701 to 3956 • 4001 to 4256 • 5001 to 5512 • 6001 to 6064 • 7001 to 7999 • 8001 to 8512 • 8701 to 8720	Specify logical number /10 • 1 to 512 : Robot general input signal • 1001 to 1512: Robot general output signal • 2001 to 2512: External input signal • 2701 to 2956: Network input signal • 3001 to 3512: External output signal • 3701 to 3956: Network output signal • 4001 to 4256: Robot specific input signal • 5001 to 5512: Robot specific output signal • 6001 to 6064: Interface panel input signal • 7001 to 7999: Auxiliary relay signal • 8001 to 8512: Robot control status signal • 8701 to 8720: Pseudo input signal
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x0E: Read out of all I/O data is enabler 0x01: Only network input signal is writable.

# Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	IO data				-

Answer

Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	IO data				I/O data exists only when requested by the client

3.3 Communication Method

# 3.3.3.10 Register Data Reading / Writing Command

Request

Sub header part

		<details></details>
Command No.	0x79	
Instance	Specify one out of followings • 0 to 999	Specify the register number 0 to 999 (writable register: 0 to 559)
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x0E: Read out the specified register data 0x01: Register 0 to 599 is writable

Data part

(Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Register d	lata			-

Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Register of	data			Register data exists only when requested by the client.

3.3 Communication Method

# 3.3.3.11 Byte Variable (B) Reading / Writing Command

## Request

## Sub header part

## <Details>

Command No.	0x7A	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01     Set_Attribute_Single: 0x10     Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

## Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	B variable				Set the data when writing.

## Answer

## Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	B variable				The data exists only when requested by the client.

3.3 Communication Method

# 3.3.3.12 Integer Type Variable (I) Reading / Writing Command

## Request

## Sub header part

#### <Details>

Command No.	0x7B	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01     Set_Attribute_Single: 0x10     Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

## Data part

## (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	I variable				Set the data when writing.

Answer

Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	I variable				The data exists only when requested by the client.

3.3 Communication Method

# 3.3.3.13 Double Precision Integer Type Variable (D) Reading / Writing Command

## Request

## Sub header part

## <Details>

Command No.	0x7C	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01     Set_Attribute_Single: 0x10     Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

## Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	D variable	;			Set the data when writing.

## Answer

#### Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	D variable	;			The data exists only when requested by the client.

3.3 Communication Method

# 3.3.3.14 Real Type Variable (R) Reading / Writing Command

## Request

## Sub header part

#### <Details>

Command No.	0x7D	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01     Set_Attribute_Single: 0x10     Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

# Data part

## (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	R variable	;			Set the data when writing.

#### Answer

## Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	• 0: no added status     • 1: 1 WORD     • 2: 2 WORD	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	R variable				The data exists only when requested by the client.

3.3 Communication Method

# 3.3.3.15 16 Byte Character Type Variable (S) Reading Writing Command

## Request

## Sub header part

## <Details>

Command No.	0x7E	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01     Set_Attribute_Single: 0x10     Set_Attribute_Al: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

# Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	S variable	;			Set the data when writing.
2					
3					
4	1				

#### Answer

#### Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	S variable	;			The data exists only when requested by the client.
2					
3					
4					

3.3 Communication Method

# 3.3.3.16 Robot Position Type Variable (P) Reading / Writing Command

Request

# Sub header part

<Details>

Command No.	0x7F	
Instance	Specify one out of followings • 0 to 127 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Specify one out of followings 1: Data type 2: Figure 3: Tool number 4: User coordinate number 5: Extended figure 6: "Coordinated data" of the first axis 7: "Coordinated data" of the second axis 8: "Coordinated data" of the third axis 9: "Coordinated data" of the fourth axis 10: "Coordinated data" of the fifth axis 11: "Coordinated data" of the sixth axis 12: "Coordinated data" of the seventh axis 13: "Coordinated data" of the seventh axis	Specify the axis information data number. Followings are the data type. 0: Pulse value 16: Base coordinated value 17: Robot coordinated value 18: User coordinated value 19: Tool coordinated value
Service	Get_Attribute_All: 0x01     Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data type				0: Pulse value 16: Base coordinated value 17: Robot coordinated value 18: User coordinated value 19: Tool coordinated value
2	Figure				For the figure, refer to "Details of data".
3	Tool numb	ber			Tool number
4	User coor	dinate nur	nber		User coordinate number
5	Extended	figure			For the extended figure, refer to "Details of data".
6	First coor	dinate data	а		
7	Second c	oordinate	data		
8	Third coo	rdinated d	ata		
9	Fourth coordinate data				
10	Fifth coordinate data				
11	Sixth coordinate data				
12	Seventh coordinate data				
13	Eighth co	ordinate d	ata		]

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

# Details of data

# Please refer "Chap.3.9.4.12 Flip/ No flip" in "YRC1000 GENERAL OPERATOR'S MANUAL(RE-CSO-A051)" prepared for each application.

Туре	bit0	0: Front	1: Back	Extended type	bit0	0: <b>Ə</b> L<180,	1: <b>⊖</b> L ≥180
	bit1	0: Upper arm	1: Lower arm		bit1	0: <b>⊖</b> U<180,	1: <b>⊖</b> U ≥180
	bit2	0: Flip	1:No flip		bit2	0: <b>0</b> B<180,	1: <b>⊖</b> B ≥180
	bit3	0: <b>Ə</b> R < 180,	1: <b>⊖</b> R ≥180		bit3	0: <b>Ə</b> E<180,	1: <del>0</del> E ≥180
	bit4	0: <del>O</del> T<180,	1: <b>⊖</b> T ≥180		bit4	0: <b>⊖</b> W<180,	1: <b>⊖</b> W ≥180
	bit5	0: <b>Ə</b> S<180,	1: <b>⊖</b> S ≥180		bit5	Reserve	
	bit6	0: Redundant front	1: Redundant back		bit6	Reserve	
	bit7	<ul><li>0: Previous step re conversion spec</li><li>1: Type regarded r specified</li></ul>		bit7	Reserve		

#### Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# HW1483358 91/293

3.3 Communication Method

# Data part

(Data exists during the reading operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data type				0: Pulse value 16: Base coordinated value 17: Robot coordinated value 18: User coordinated value 19: Tool coordinated value
2	Туре				For the type, refer to "Details of data".
3	Tool number				Tool number
4	User coor	dinate nur	nber		User coordinate number
5	Extended	type			For the extended type, refer to "Details of data".
6	First coord	dinate dat	а		
7	Second co	oordinate	data		
8	Third coor	rdinated d	ata		
9	Fourth co	ordinate d	ata		
10	Fifth coordinate data				
11	Sixth coordinate data				
12	Seventh c	oordinate	data		
13	Eighth coo	ordinate d	ata		]

## Details of data

# Please refer "Chap.3.9.4.12 Flip/ No flip" in "YRC1000 GENERAL OPERATOR'S MANUAL(RE-CSO-A051)" prepared for each application.

Туре	bit0	0: Front	1: Back	Extended type	bit0	0: <b>Ə</b> L<180,	1: <b>⊖</b> L ≥180
	bit1	0: Upper arm	1: Lower arm		bit1	0: <b>Ə</b> U<180,	1: <b>⊖</b> U ≥180
	bit2	0: Flip	1:No flip		bit2	0: <b>0</b> B<180,	1: <b>Θ</b> B ≥180
	bit3	0: <b> </b>	1: <b>θ</b> R ≥180		bit3	0: <b>Θ</b> E<180,	1: <b>⊖</b> E ≥180
	bit4	0: <b> </b>	1: <b>⊖</b> T ≥180		bit4	0: <b>⊖</b> W<180,	1: <del>0</del> W ≥180
	bit5	0: <b> </b>	1: <b>⊖</b> S ≥180		bit5	Reserve	
	bit6	0: Redundant front	1: Redundant back		bit6	Reserve	
	bit7	0: Previous step re conversion species 1: Type regarded in specified		bit7	Reserve		

3.3 Communication Method

# 3.3.3.17 Base Position Type Variable (BP) Reading / Writing Command

## Request

## Sub header part

<Details>

Command No.	0x80	
Instance	Specify one out of followings • 0 to 127 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Specify one out of followings 1: Data type 2: "Coordinated data" of the first axis 3: "Coordinated data" of the second axis 4: "Coordinated data" of the third axis 5: "Coordinated data" of the fourth axis 6: "Coordinated data" of the fifth axis 7: "Coordinated data" of the sixth axis 8: "Coordinated data" of the seventh axis 9: "Coordinated data" of the eighth axis	Specify the axis information data number. Followings are the data type. 0: Pulse value 16: Base coordinated value
Service	Get_Attribute_Single :0x0E     Get_Attribute_All :0x01     Set_Attribute_Single :0x10     Set_Attribute_All :0x02	<ul> <li>Specify the accessing method to the data.</li> <li>0x0E: Read out the specified data</li> <li>0x01: Read out the data</li> <li>0x10: Write a specified data. If it is not an object element, keep the data previous to writing operation.</li> <li>0x02: Write the data</li> </ul>

Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data type			0: Pulse value 16: Base coordinated value	
2	First coor	dinate dat	а		
3	Second c	oordinate	data		
4	Third coo	rdinated d	ata		
5	Fourth co	ordinate d	lata		
6	Fifth coor	dinate dat	а		
7	Sixth coor	dinate da	ta		
8	Seventh of	coordinate	data	]	
9	Eighth co	ordinate d	ata		]

HW1483358 93/293

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

## Answer

# Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data type			0: Pulse value 16: Base coordinated value	
2	First coord	dinate dat	а		
3	Second co	oordinate	data	_	
4	Third coor	rdinated d	ata	_	
5	Fourth co	ordinate d	ata		
6	Fifth coord	dinate dat	а	_	
7	Sixth coor	dinate da	ta	_	
8	Seventh of	coordinate	data		
9	Eighth co	ordinate d	ata		

Communication Method 3.3

# 3.3.3.18 External Axis Type Variable (EX) Reading / Writing Command

## Request

## Sub header part

<Details>

Command No.	0x81	
Instance	Specify one out of followings • 0 to 127 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number.
Attribute	Specify one out of followings 1: Data type 2: "Coordinated data" of the first axis 3: "Coordinated data" of the second axis 4: "Coordinated data" of the third axis 5: "Coordinated data" of the fourth axis 6: "Coordinated data" of the fifth axis 7: "Coordinated data" of the sixth axis 8: "Coordinated data" of the seventh axis 9: "Coordinated data" of the eighth axis	Specify the axis information data number. Followings are the data type. 0: Pulse value
Service	Get_Attribute_Single :0x0E     Get_Attribute_All :0x01     Set_Attribute_Single :0x10     Set_Attribute_All :0x02	<ul> <li>Specify the accessing method to the data.</li> <li>0x0E : Read out the specified data</li> <li>0x01 : Read out the data</li> <li>0x10 :Write a specified data. If it is not an object element, keep the data previous to writing operation.</li> <li>0x02 : Write the data</li> </ul>

## Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>	
1	Data type				0: Pulse v	
2	First coord	dinate dat	а			
3	Second co	oordinate	data			
4	Third coor	Third coordinated data				
5	Fourth co	Fourth coordinate data				
6	Fifth coord					
7	Sixth coor					
8	Seventh c					
9	Eighth co	ordinate d	ata		]	

alue

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

## Answer

# Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>	
1	Data type				0: Pulse value	
2	First coord	dinate dat	а			
3	Second co	Second coordinate data				
4	Third coor	Third coordinated data				
5	Fourth co	Fourth coordinate data				
6	Fifth coord	Fifth coordinate data				
7	Sixth coordinate data					
8	Seventh coordinate data					
9	Eighth coo	ordinate d	ata			

3.3 Communication Method

## 3.3.3.19 Alarm Reset / Error Cancel Command

## Request

## Sub header part

### <Details>

Command No.	0x82	
Instance	Specify one out of followings 1: Resetting of alarm 2: Cancelling of error	Specify the type of reset/cancel 1: RESET (resetting of alarm) 2: CANCEL (cancelling of error)
Attribute	Fixed to "1".	Specify "1".
Service	Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x10 : Execute the specified request

# Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data 1				Fixed to "1".

## Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

3.3 Communication Method

## 3.3.3.20 Hold / Servo On/off Command

## Request

#### Sub header part

		<details></details>
Command No.	0x83	
Instance	Specify one out of followings 1: HOLD 2: Servo ON 3: HLOCK	Specify the type of OFF/ON command 1: HOLD 2: Servo ON 3: HLOCK (Refer to "Details of data".)
Attribute	Fixed to "1".	Specify "1".
Service	Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x10 : Execute the specified request

## Data part

(Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	1:ON				Specify ON/OFF
	2:OFF				

## Details of data

#### HLOCK

This data interlocks the P.P and I/O operation system signals. Only the following operations are available while the interlock operation is ON.

- · Emergency stop for the programming pendant
- Inputting signals excluding I/O mode switching, external start, external servo ON, cycle switch, inhibit I/O, inhibit PP/PANEL and calling up master JOB.

HLOCK is invalid while the programming pendant is in edit mode or it is file accessing using other functions.

Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

3.3 Communication Method

# 3.3.3.21 Step / Cycle / Auto Switching Command

## Request

## Sub header part

## <Details>

Command No.	0x84	
Instance	Specify the following •2	Specify the type of status switch command 2: CYCLE (switching of STEP/CYCLE/AUTO)
Attribute	Fixed to "1".	Specify "1".
Service	Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x10 : Execute the specified request

# Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data 1				CYCLE = 1: STEP/2: 1 CYCLE/3:AUTO

#### Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

3.3 Communication Method

## 3.3.3.22 Character String Display Command To The Programming Pendant

Request

Sub header part

		<details></details>
Command No.	0x85	
Instance	Fixed to "1".	Specify "1".
Attribute	Fixed to "1".	Specify "1".
Service	Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x10 : Execute the specified request

## Data part

(Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Displaying	g message	e		Set the character strings to be indicated on the
2					programming pendant
3					Full-width character: 15 characters
4					
5	-				
6	-				
7	]				
8	]				

Answer

#### Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

No data part



For the strings displayed on the Programing Pendant, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.

#### HW1483358

3 High-Speed Ethernet Server Function

3.3 Communication Method

# 3.3.3.23 Start-up (Job Start) Command

# Request

## Sub header part

#### <Details>

Command No.	0x86	
Instance	Fixed to "1".	Specify "1".
Attribute	Fixed to "1".	Specify "1".
Service	Set_Attribute_Single: 0x10	Specify the accessing method to the data. 0x10 : Execute the specified request

## Data part

# (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Data 1				Fixed to "1".

Answer

Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

3.3 Communication Method

# 3.3.3.24 Job Select Command

## Request

Sub header part

		<details></details>
Command No.	0x87	
Instance	Specify one out of followings 1: Set the executing job 10: Set the master job (task 0) 11: Set the master job (task 1) 12: Set the master job (task 2) 13: Set the master job (task 3) 14: Set the master job (task 3) 14: Set the master job (task 4) 15: Set the master job (task 5) 16: Set the master job (task 6) 17: Set the master job (task 7) 18: Set the master job (task 8) 19: Set the master job (task 9) 20: Set the master job (task 10) 21: Set the master job (task 11) 22: Set the master job (task 13) 24: Set the master job (task 15)	Specify the type.
Attribute	Specify one out of followings 1: Job name 2: Line number (valid only when executing job setting.)	Specify the setting content.
Service	Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x02: Read out data of all the element number (In this case, specify0 to the element number.)

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Job name				Job name
2	(Characte	r strings: 3	32 charact	ters)	Half-width character: 32 characters
3	-				
4					
5	-				
6					
7	-				
8	]				
9	Line num	oer (0 to 9	999)		Line number



For the JOB name, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.



HW1483358

- 3 High-Speed Ethernet Server Function Communication Method
- 3.3

## Answer

# Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

No data part

#### HW1483358 103/293

3.3 Communication Method

# 3.3.3.25 Management Time Acquiring Command

## Request

## Sub header part

		<details></details>
Command No.	0x88	
Instance	Specify one out of followings • 1 • 10 • 11 to 18 • 21 to 44 • 110 • 111 to 118 • 121 to 144 • 210 • 211 to 218 • 221 to 244 • 301 to 308	Specify the type of the management time1:Control power ON time10:Servo power ON time (TOTAL)11 to 18:Servo power ON time (R1 to R8)21 to 44:Servo power ON time (S1 to S24)110:Play back time (TOTAL)111 to 118:Play back time (R1 to R8)121 to 144:Play back time (S1 to S24)10:Moving time (S1 to S24)210:Moving time (TOTAL)211 to 218:Moving time (R1 to R8)221 to 244:Moving time (S1 to S24)301 to 308:Operation time (application 1 to 8)
Attribute	Specify one out of followings 1: Operation start time 2: Elapse time	Specify the type of the management time
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E : Read out data of the specified element number 0x01 : Read out data of all the element number (In this case, specify0 to the element number.)

## Answer

# Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Operation	start time	Operation start time		
2	(Characte	r strings: 1			
3	LA. 2011/	10/10 13.4			
4					
5	Elapse tim	ne			Elapse time
6	(Characte	r strings: ´ ∩·∩∩'∩∩			
7	LA. 00000	0.00 00			

3.3 Communication Method

# 3.3.3.26 System Information Acquiring Command

# Request

## Sub header part

#### <Details>

Command No.	0x89	
Instance	Specify one out of followings • 11 to 18 • 21 to 44 • 101 to 108	Specify the type of system type. 11 to 18: Type information (R1 to R8) 21 to 44: Type information (S1 to S24) 101 to 108: Application information (application 1 to 8)
Attribute	Specify one out of followings 1: System software version 2: Model name / application 3: Parameter version	Specify the type of system information
Service	Get_Attribute_Single: 0x0E     Get_Attribute_AI: 0x01	Specify the accessing method to the data. 0x0E: :Read out data of the specified element number 0x01 : Read out data of all the element number (In this case, specify0 to the element number)

## Answer

# Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: no added status</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>		
1	System so	oftware ve	rsion		The same character strings are returned even if either		
2	(Character strings: 24 characters)			ters)	11 to 18, 21 to 44 or 101 to 108 is specified to the		
3	EX. TAST	.00.00A. (.	JP/05)-00	J			
4							
5							
6							
7	Model na	me / applic	cation		The model name is returned when it is R1 to R8, and		
8	Character strings: 16 characters) Ex. (For model) ES0165D-A0*		ters)	NULL character is returned when it is S1 to S24. Also			
9				8.			
10	(For appli	cation) AR	C WELDI	NG			
11	Parameter version				R1 to R8: Parameter version		
12	(Characte Ex. 12.34	er strings: 8	8 characte	ers)	When it is nonexistent control group, it is returned in NULL characters.		

3.3 Communication Method

# 3.3.3.27 Plural I/O Data Reading / Writing Command

## Request

# Sub header part

		<details></details>
Command No.	0x300	
Instance	Specify one out of followings • 1 to 512 • 1001 to 1512 • 2001 to 2512 • 2701 to 2956 • 3001 to 3512 • 3701 to 3956 • 4001 to 4256 • 5001 to 5512 • 6001 to 6064 • 7001 to 7999 • 8001 to 8512 • 8701 to 8720	Specify logical number /10 • 1 to 512 : Robot general input signal • 1001 to 1512: Robot general output signal • 2001 to 2512: External input signal • 2701 to 2956: Network input signal • 3001 to 3512: External output signal • 3701 to 3956: Network output signal • 4001 to 4256: Robot specific input signal • 5001 to 5512: Robot specific output signal • 6001 to 6064: Interface panel input signal • 7001 to 7999: Auxiliary relay signal • 8001 to 8512: Robot control status signal • 8701 to 8720: Pseudo input signal
Attribute	Fixed to "0".	Specify "0".
Service	0x33:Read plural data 0x34:Write plural data	Specify the accessing method to the data. 0x33: Read out the fixed size specified by the data part. 0x34: Write the fixed size specified by the data part. Only the network input signal can be writable.

Data part

1       Number       Maximum: 474 *It can specify by a multiple of 2 only         2       I/O data 1       I/O data 2       I/O data 3       I/O data 4       I/O data part is valid only when writin Only the number of data is valid when reading.	32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
2 I/O data 1 I/O data 2 I/O data 3 I/O data 4 I/O data part is valid only when writin Only the number of data is valid when writin reading.	1	Number				Maximum: 474 *It can specify by a multiple of 2 only.
	2	I/O data 1	I/O data 2	I/O data 3	I/O data 4	I/O data part is valid only when writing Only the number of data is valid when reading.

120	I/O data	I/O data
	473	474

Answer

# Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number		1	1	Maximum: 474 *It can specify by a multiple of 2 only.
2	I/O data 1	I/O data 2	I/O data 3	I/O data 4	
	:				_
120	I/O data 473	I/O data 474	]		

3.3 Communication Method

# 3.3.3.28 Plural Register Data Reading / Writing Command

#### Request

## Sub header part

		<details></details>
Command No.	0x301	
Instance	Specify one out of followings • 0 to 999	Specify the variable number (the first number with which reading/writing is executed) 0 to 999 (writable register: 0 to 559)
Attribute	Fixed to "0"	Specify "0"
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read out the fixed size specified by the data part. 0x34: Write the fixed size specified by the data part.

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 237
2	Register dat	a 1	Register data 2		I/O data part is valid only when writing. Only
	:				the number of data is valid when reading.
120	Register dat	a 237			

## Answer

## Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 237
2	Register data 1		Register data 2		-
	:				_
3.3 Communication Method

## 3.3.3.29 Plural Byte Type Variable (B) Reading / Writing Command

#### Request

#### Sub header part

#### <Details>

Command No.	0x302	
Instance	Specify one out of followings <ul> <li>0 to 99 (for standard setting)</li> </ul>	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0".	Specify "0".
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read out the fixed size specified by the data part. 0x34: Write the fixed size specified by the data part.

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 474 *It can specify by a multiple of 2 only.
2	B variable 1	B variable 2	B variable 3	B variable 4	Variable data part is valid only
	:				when writing. Only the number of data is valid when reading.
120	B variable 473	B variable 474			

#### Answer

#### Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>• 0: no added status</li><li>• 1: 1 WORD</li><li>• 2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

#### <Details>

- High-Speed Ethernet Server Function Communication Method 3
- 3.3

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 474 *It can specify by a multiple of 2 only. (invalid if specified by other than a multiple of 2)
2	B variable 1	B variable 2	B variable 3	B variable 4	

120 B varia	ble 473 B variable 474
-------------	------------------------

3.3 Communication Method

## 3.3.3.30 Plural Integer Type Variable (I) Reading / Writing Command

#### Request

#### Sub header part

#### <Details>

Command No.	0x303	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0" Only batch access of all elements is valid
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data. 0x34: Write plural data

#### Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 237
2	I variable 1 I variable 2			Variable data part is valid only	
	:				when writing. Only the number of data is valid when reading.

120 I variable 237

## Answer

#### Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

Dyteo	Byte 1	Byte 2	Byte3	<details></details>
Number				Maximum: 237
I variable 1		I variable 2		1
:				
	Number I variable 1 :	Number I variable 1 :	Number     I variable 1     :	Number     I variable 1     I variable 2

|--|

3.3 **Communication Method** 

3.3.3.31 Plural Double Precision Integer Type Variable (D) Reading / Writing Command

#### Request

#### Sub header part

#### <Details>

Command No.	0x304	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0" Only batch access of all elements is valid
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

#### Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number			Maximum: 118	
2	D variable 1				Variable data part is valid only
	:				when writing. Only the number of data is valid when reading.
119	D variable 118				

D variable 118 119

#### Answer

#### Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>• 0: no added status</li><li>• 1: 1 WORD</li><li>• 2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number	Maximum: 118			
2	D variable 1				
	:				-
119	D variable 118				

3.3 Communication Method

## 3.3.3.32 Plural Real Type Variable (R) Reading / Writing Command

#### Request

#### Sub header part

#### <Details>

Command No.	0x305	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0" Only batch access of all elements is valid
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

#### Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 118
2	R variable 1				Variable data part is valid only
:					when writing. Only the number of data is valid when reading.
119	R variable 118				

#### Answer

#### Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

(Data exists during the reading operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 118
2	R variable 1				
	:				

	119	R variable 118
--	-----	----------------

# HW1483358 113/293

3.3 Communication Method

3.3.3.3 Plural 16 Byte Character Type Variable (S) Reading / Writing Command

Request

Sub header part

<Details>

Command No.	0x306	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0" Only batch access of all elements is valid
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

Data part

	Бугет	Byte 2	Byte3	<details></details>
Number		•		Maximum: 29
S variable 1				Variable data part is valid only when writing.
				Only the number of data is valid when
				reading.
_	Number S variable 1	Number S variable 1	Number S variable 1	Number S variable 1

114	S variable 29
115	
116	
117	

Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

- 3 High-Speed Ethernet Server Function Communication Method
- 3.3

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 29
2	S variable 1				
3					
4					
5	]				
	:				-

114	S variable 29
115	
116	
117	

3.3 Communication Method

## 3.3.3.34 Plural Robot Position Type Variable (P) Reading / Writing Command

#### Request

# Sub header part

#### <Details>

Command No.	0x307	
Instance	Specify one out of followings • 0 to 127 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0" Only batch access of all elements is valid
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

#### Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number	lumber			Maximum: 9
2 to 14	Data type			0: Pulse value	
				16: Base coordinated value	
				17: Robot coordinated value	
					18: User coordinated value
					19: Tool coordinated value
	Туре				Туре
	Tool number	•			Tool number
	User coordinate number Extended type First coordinate data Second coordinate data			User coordinate number	
				-	
	Third coordin	nated data			
	Fourth coord	dinate data			
	Fifth coordin	ate data			Variable data part is valid only when writing.
	Sixth coordin	nate data			Only the number of data is valid when
	Seventh coordinate data		reading.		
	Eighth coord	linate data			
	:				

106 to 118	Data type	<ul> <li>0: Pulse value</li> <li>16: Base coordinated value</li> <li>17: Robot coordinated value</li> <li>18: User coordinated value</li> <li>19: Tool coordinated value</li> </ul>
	Туре	Туре
	Tool number	Tool number
	User coordinate number	User coordinate number
	Extended type	
	First coordinate data	
	Second coordinate data	
	Third coordinated data	
	Fourth coordinate data	
	Fifth coordinate data	
	Sixth coordinate data	
	Seventh coordinate data	]
	Eighth coordinate data	1

HW1483358 116/293

3.3 Communication Method

#### Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

## Data part

## (Data exists during the reading operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number			Maximum: 9	
2 to 14	Data type Type Tool number User coordinate number Extended type			0: Pulse value 16: Base coordinated value 17: Robot coordinated value 18: User coordinated value 19: Tool coordinated value Type	
				Tool number	
				User coordinate number	
	First coordin	nate data			
	Second coo	rdinate data			
	Third coordi	nated data			
	Fourth coord	dinate data			
	Fifth coordin	nate data			Variable data part is valid only when writing.
	Sixth coordinate data			Only the number of data is valid when reading.	
	Seventh coordinate data				
	Eighth coord	dinate data			
106 to 118	: Data type				0: Pulse value 16: Base coordinated value 17: Robot coordinated value 18: User coordinated value 19: Tool coordinated value
	Туре	Туре			Туре
	Tool number	r			Tool number
	User coordin	nate numbei	ſ		User coordinate number
	Extended ty	pe			_
	First coordin	hate data		_	
	Second coo	rdinate data			4
	Third coordi	nated data			
		ainate data			_
	Fifth coordin	nate data			
	Sixth coordinate data				

Seventh coordinate data Eighth coordinate data

3.3 Communication Method

## 3.3.3.35 Plural Base Position Type Variable (BP) Reading / Writing Command

#### Request

# Sub header part

#### <Details>

Command No.	0x308	
Instance	Specify one out of followings • 0 to 127 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0".	Specify "0".
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number			Maximum: 13	
2 (Replying data is determined by the value specified by the element number.)	Data type First coordi Second coord Third coord Fourth coord Fifth coord Sixth coord Seventh co	nate data ordinate da linated data rdinate data nate data linate data ordinate data	ta a a ata		0x00 : Pulse value         0x10 : Base coordinate value         Variable data part is valid only when writing.         Only the number of data is valid when reading.
	Eighth coor	rdinate data	a		
	:				

119	Data type	0x0 0x1
	First coordinate data	
	Second coordinate data	
	Third coordinated data	
	Fourth coordinate data	
	Fifth coordinate data	
	Sixth coordinate data	
	Seventh coordinate data	
	Eighth coordinate data	

0x00 : Pulse value 0x10 : Base coordinate value

3.3 Communication Method

#### Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

## Data part

Fourth coordinate data Fifth coordinate data Sixth coordinate data Seventh coordinate data Eighth coordinate data

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number		Maximum: 13		
2 to 10 (Replying data	Data type		0x00 : Pulse value 0x10 : Base coordinate		
is determined	First coordin	ate data			-
by the value	Second coor	rdinate data			
the element	Third coordin	nated data			
number.)	Fourth coord	linate data			
,	Fifth coordin	ate data			
	Sixth coordin	nate data			
	Seventh coo	rdinate data			
	Eighth coord	linate data			
					_
119	Data type		0x00 : Pulse value 0x10 : Base coordinate		
	First coordinate data				
	Second coor	rdinate data	1		
	Third coordin	nated data	1		

3.3 Communication Method

## 3.3.3.36 Plural Station Type Variable (EX) Reading / Writing Command

#### Request

## Sub header part

#### <Details>

Command No.	0x309	
Instance	Specify one out of followings • 0 to 127 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0".
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

## Data part

Fifth coordinate data Sixth coordinate data Seventh coordinate data Eighth coordinate data

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>	
1	Number			Maximum: 13		
2 to 10	Data type			0 : Pulse value		
	First coordin	ate data				
	Second coor	rdinate data				
	Third coordin	nated data				
	Fourth coord	linate data				
	Fifth coordin	ate data			Variable data part is valid only when writing.	
	Sixth coordin	nate data			Only the number of data is valid when	
	Seventh coo	ordinate data	l		reading.	
	Eighth coord	linate data				
	:					
110 to 118	Data type				0 : Pulse value	
	First coordin	ate data				
	Second coor	rdinate data				
	Third coordin	nated data				
	Fourth coord	dinate data				

3.3 Communication Method

#### Answer

## Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number	Maximum: 13			
2 to 10	Data type				0: Pulse value
	First coordin	ate data			
	Second coor	dinate data			
	Third coordin	nated data			-
	Fourth coord	linate data			
	Fifth coordin	ate data			
	Sixth coordin	nate data			-
	Seventh coo	rdinate data			-
	Eighth coord	linate data			-
	:				-
110 to 118	Data type				0: Pulse value
	First coordin	ate data			
	Second coor	dinate data			
	Third coordin	nated data			
	Fourth coord	linate data			
	Fifth coordin	ate data			
	Sixth coordin	nate data			
	Seventh coo				
	Eighth coord	linate data			

3.3 Communication Method

## 3.3.3.37 Alarm Data Reading Command (for Applying the Sub Code Character String)

#### Request

# Sub header part

#### <Details>

Command No.	0x30A	
Instance	<ul> <li>Specify one out of followings</li> <li>1: The latest alarm</li> <li>2: The second alarm from the latest</li> <li>3: The third alarm from the latest</li> <li>4: The fourth alarm from the latest</li> </ul>	Up to four alarms are displayed on the P.P display at the same time. Specify one out of them.
Attribute	Specify one out of followings 1: Alarm code 2: Alarm data 3: Alarm type 4: Alarm occurring time 5: Alarm character string name 6: Sub code data additional information character strings 7:Sub code data character strings 8:Sub code data character strings reverse display information	Alarm code means the alarm No. Alarm data means the sub code which supports the alarm contents. Some alarms may not appear as the sub code. Sub code additional info character strings means the number for alarms from the Servo circuit board [SV#*]or the function safety board[FSU#*(CPU#*)]. (*denotes number) Sub code data character string reverse display information sets [1], when the characters are reverse.
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify0 to the element number.)

#### Data part

#### No data part

Answer

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: not specified</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	Error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

High-Speed Ethernet Server Function Communication Method 3

3.3

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>		
1	Alarm code			Range is from 0x0001 to 0x270F(decimal value: 9999)			
2	Alarm da	ata			Setting values vary in accordance with the contents of the alarm type. Also, some alarms are not displayed with the sub code. In this case, the value is zero (0x0).		
3	Alarm ty	pe			<ul> <li>No alarm</li> <li>Decimal UNSIGNED SHORT type (display example: [1])</li> <li>UNSIGNED CHAR bit pattern (display example: [0000_0001])</li> <li>User axis type (display example: [SLURBT])</li> <li>Spacial coordinate type (display example: [XYZRxRyRz])</li> <li>Robot coordinate type (display example: [XYZRxRyRz])</li> <li>Control group type (display example: [R1R2S1S2]) robot &amp; station</li> <li>Decimal SHORT type (display example: [-1])</li> <li>UNSIGNED SHORT bit pattern (display example: [0000_0000_0000_0001])</li> <li>Control group type (display example: [R1]) for robot only</li> <li>Control group type (display example: [R1]) for robot only</li> <li>Control group type (display example: [R1]) for robot, station and base</li> <li>Control group LOW/HIGH logical axis (display example: [R1:LOW SLURBT, HIGH SLURBT])</li> <li>Control group MIN/MAX logical axis (display example: [R1: MIN SLURBT, MAX SLURBT])</li> <li>Control group MIN/MAX spacial coordinate (display example: [R1: MIN XYZ, MAX XYZ])</li> <li>Logical axis of both control group 1 and control group 2 (display example: [R1: SLURBT, R2: SLURBT])</li> <li>Logical axis of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>Logical axis of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>Control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> <li>Control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> </ul>		
4 to 7	Alarm oc (Charact Ex.2011/	ccurring tin er strings 10/10 15:4	ne of 16 lette 49	ers)			
8 to 15	Alarm ch (characte	naracter str er strings:	rings nam 32 letters	e )	It is transmitted in the form of the character strings whose language code was selected by the programming pendant and half- and full-width characters are mixed.		
16 to 19	Sub cod characte (Charact	e data ado r strings er strings	litional info	ormation ers)	[SV#1] indicates the servo board number 1. [FSU#1(CPU#1)] indicates that an alarm is found in the function safety board number 1 CPU#1.		
20 to 43	Sub cod (Charact	e data cha er strings	racter stri of 96 lette	ngs ers)			
44 to 67	Sub cod reverse (Charact	e data cha display info er strings	racter stri ormation of 96 lette	ngs ers)	Regular characters show [0] and reverse characters show [1]. (display example: [R1R2S1S2])		

# Data part

3.3 Communication Method



For the alarm character strings name, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.

3.3 Communication Method

## 3.3.3.38 Alarm History Reading Command (for Applying the Sub Code Character String)

## Request

Sub header part

		<details></details>
Command No.	0x30B	
Instance	Specify one out of followings • 1 to 100 • 1001 to 1100 • 2001 to 2100 • 3001 to 3100 • 4001 to 4100	Specify the alarm number 1 to 100 : Major failure 1001 to 1100: Minor alarm 2001 to 2100: User alarm (system) 3001 to 3100: User alarm (user) 4001 to 4100: OFF line alarm
Attribute	Specify one out of followings 1:Alarm code 2:Alarm data 3:Alarm type 4:Alarm occurring time 5:Alarm character strings name 6:Sub code data additional information character strings 7:Sub code data character strings 8:Sub code data character strings reverse display information	Alarm code means the alarm No. Alarm data means the sub code which supports the alarm content. Some alarms may not appear as the sub code. Sub code additional info character strings mean the number for alarms from the Servo circuit board [SV#*]or the function safety board [FSU#*(CPU#*)]. Sub code data character strings reverse display information means setting [1], when the characters are reverse.
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01	Specify the accessing method to the data. 0x0E: Read out data of the specified element number 0x01: Read out data of all the element number (In this case, specify0 to the element number.)

## Data part

## No data part

#### Answer

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	• 0: not specified     • 1: 1 WORD     • 2: 2 WORD	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	Error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

3 High-Speed Ethernet Server Function Communication Method

3.3

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>			
1	Alarm code				Range is from 0x0001 to 0x270F(decimal value: 9999)			
2	Alarm da	ata			Setting values vary in accordance with the contents of the alarm type. Also, some alarms are not displayed with the sub code. In this case, the value is zero (0x0).			
3	Alarm ty	pe			<ul> <li>0 : No alarm</li> <li>1 : Decimal UNSIGNED SHORT type (display example: [1])</li> <li>2 : UNSIGNED CHAR bit pattern (display example: [0000_0001])</li> <li>3 : User axis type (display example: [SLURBT])</li> <li>4 : Spacial coordinate type (display example: [XYZ])</li> <li>5 : Robot coordinate type (display example: [XYZRxRyRz])</li> <li>6 : Conveyor characteristic file (display example: [123])</li> <li>8 : Control group type (display example: [R1R2S1S2]) robot &amp; station</li> <li>9 : Decimal SHORT type (display example: [-1])</li> <li>10 : UNSIGNED SHORT bit pattern (display example: [0000_0000_0000_0001])</li> <li>11 : Control group type (display example: [R1]) for robot only</li> <li>12 : Control group type (display example: [R1]) for robot, station and base</li> <li>20 : Control group type (display example: [R1S1B1]) for robot, station and base</li> <li>20 : Control group MIN/MAX logical axis (display example: [R1:LOW SLURBT, HIGH SLURBT])</li> <li>21 : Control group MIN/MAX spacial coordinate (display example: [R1: MIN SLURBT, MAX SLURBT])</li> <li>22 : Control group MIN/MAX spacial coordinate (display example: [R1: MIN XYZ, MAX XYZ])</li> <li>23 : Logical axis of both control group 1 and control group 2 (display example: [R1: SLURBT, R2: SLURBT])</li> <li>24 : Logical axis of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis of the control group (display example: [R1: SLURBT, SLURBT])</li> <li>25 : Logical axis of the control group and UNSIGNED CHAR type (display example: [R1: SLURBT, 1])</li> <li>27 : Control group and UNSIGNED CHAR type (display example: [R1: 1])</li> </ul>			
4 to 7	Alarm oc (Charact Ex.2011/	curring tin er strings 10/10 15:4	ne of 16 lette 49	ers)				
8 to 15	Alarm ch (characte	aracter st er strings:	rings nam 32 letters)	e )	It is transmitted in the form of the character strings whose language code was selected by the programming pendant and half- and full-width characters are mixed.			
16 to 19	Sub code characte (Charact	e data ado r strings er strings	litional info	ormation ers)	[SV#1] indicates the servo board number 1. [FSU#1(CPU#1)] indicates that an alarm is found in the function safety board number 1 CPU#1.			
20 to 43	Sub code (Charact	e data cha er strings	racter stri of 96 lette	ngs ers)				
44 to 67	Sub code reverse of (Charact	e data cha display info er strings	racter stri ormation of 96 lette	ngs ers)	Regular characters show [0] and reverse characters show [1]. (display example: [ <b>R1</b> R2S1S2])			

3.3 Communication Method

NOTE

For the alarm character strings name, it is transmitted in the form of the character strings whose language code was selected by the programming pendant.

Use the same language code as the YRC1000, or the characters corrupt in case the client side dose not correspond to its language code.

# HW1483358 127/293

3.3 Communication Method

## 3.3.3.39 Move instruction command (Type Cartesian Coordinate)

Request

Sub header part

		<details></details>
Command No.	0x8A	
Instance	Specify one out of followings 1:Link absolute position operation	Specify the operation number from one to three.
	2:Straight absolute position	1:Link absolute position operation
	operation	2:Straight absolute position operation
	3:Straight increment value operation	3:Straight increment value operation
Attribute	Fixed to "1"	Specify "1".
Service	Set_Attribute_All: 0x02	Specify the accessing method to the data. 0x02: Write the data to the specified coordinate.

HW1483358 128/293

3 High-Speed Ethernet Server Function Communication Method

3.3

32bit integer	Byte 0   Byte 1   Byte 2   Byte3	<details></details>		
1	Specifying control group (Robot)	1 to 8 (Robot No.)		
2	Specifying control group (Station)	1 to 24 (Station No.)		
3	Specifying the classification in speed	Specify the classification of operations 0: % (Link operation) 1: V (Cartesian operation) 2: VR (Cartesian operation)		
4	Specifying a speed	Specify the rate Link operation : 0.01% Cartesian operation V speed : 0.1 mm/s Cartesian operation VR speed : 0.1 degree/s		
5	Specifying the operation coordinate	Specify the operation coordinate 16: Base coordinate 17: Robot coordinate 18: User coordinate 19: Tool coordinate		
6	X coordinate value (unit: $\mu$ m)			
7	Y coordinate value (unit: $\mu$ m)			
8	Z coordinate value (unit: $\mu$ m)			
9	Tx coordinate value (unit: 0.0001 degree)			
10	Ty coordinate value (unit: 0.0001 degree)			
11	Tz coordinate value (unit: 0.0001 degree)			
12	Reservation	]		
13	Reservation			
14	Туре	For Type and Expanded type, refer to "Details of Data" in		
15	Expanded type	the following page.		
16	Tool No. (0 to 63)	-		
17	User coordinate No. (1 to 63)			
18	Base 1st axis position (unit: $\mu m$ )	The base axis can be used up to three axes.		
19	Base 2nd axis position (unit: $\mu m$ )			
20	Base 3rd axis position (unit: $\mu$ m)			
21	Station 1st axis position (pulse value)			
22	Station 2nd axis position (pulse value)			
23	Station 3rd axis position (pulse value)			
24	Station 4th axis position (pulse value)			
25	Station 5th axis position (pulse value)			
26	Station 6th axis position (pulse value)			

# Data part

3.3 Communication Method

#### Details of data

Please refer "Chap.3.9.4.12 Flip/ No flip" in "YRC1000 GENERAL OPERATOR'S MANUAL(RE-CSO-A051)" prepared for each application.

Туре	bit0	0: Front	1: Back	Extended type	bit0	0: <b>0</b> L<180,	1: <b>⊖</b> L ≥180
	bit1	0: Upper arm	1: Lower arm		bit1	0: <b>Ə</b> U<180,	1: <b>⊖</b> U ≥180
	bit2	0: Flip	1:No flip		bit2	0: <b>0</b> B<180,	1: <b>⊖</b> B ≥180
	bit3	0: <b> </b>	1: <b>Θ</b> R ≥180		bit3	0: <b>0</b> E<180,	1: <b>⊖</b> E ≥180
	bit4	0: <b> </b>	1: <b>⊖</b> T ≥180		bit4	0: <b>0</b> W<180,	1: <b>⊖</b> W ≥180
	bit5	0: <b> </b>	1: <b>⊖</b> S ≥180		bit5	Reserve	
	bit6	Reserve			bit6	Reserve	
	bit7	Reserve			bit7	Reserve	



- Tx coordinate value (unit: 0.0001 degree)
- Ty coordinate value (unit: 0.0001 degree)
- Tz coordinate value (unit: 0.0001 degree)

Answer

Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul><li>0: not specified</li><li>1: 1 WORD</li><li>2: 2 WORD</li></ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	Error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

#### Data part

No data part



It is not able to operate the robot and the station at the same time. Setting the both operation at the same time receives the control group setting error (0xB008) from the YRC1000.



3.3 Communication Method

## 3.3.3.40 Move Instruction Command (Type Pulse)

## Request

## Sub header part

#### <Details>

Command No.	0x8B	
Instance	Specify one out of followings	Specify the operation number from one to three.
	1:Link absolute position operation	
	2:Straight absolute position	1:Link absolute position operation
	operation	2:Straight absolute position operation
Attribute	Fixed to "1"	Specify "1".
Service	Set_Attribute_All: 0x02	Specify the accessing method to the data.
		0x02: Write the data to the specified coordinate.

3 High-Speed Ethernet Server Function Communication Method

3.3

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Specifying control group (Robot)			bot)	1 to 8 (Robot No.)
2	Specifyir	ng control	group (Sta	ation)	1 to 24 (Station No.)
3	Specifying the classification in speed			in speed	Specify the classification of operations 0: % (Link operation) 1: V (Cartesian operation) 2: VR (Cartesian operation)
4	Specifying a speed				Specify the rate Link Operation : 0.01% Cartesian operation V speed : 0.1 mm/s Cartesian operation VR speed : 0.1 degree/s
5	Robot 1s	st axis pul	se value		
6	Robot 2r	nd axis pu	lse value		
7	Robot 3r	d axis pul	se value		
8	Robot 4t	h axis pul:	se value		
9	Robot 5t	haxis puls	e value		
10	Robot 6t	h axis pul:	se value		
11	Robot 7t	Robot 7th axis pulse value			
12	Robot 8th axis pulse value				
13	Tool No. (0 to 63)				
14	Base 1st axis position (Pulse value)			e value)	The base axis can be used up to three axes.
15	Base 2nd axis position (Pulse value)			e value)	
16	Base 3rc	laxis posit	ion (Pulse	value)	
17	Station 1 (pulse va	Station 1st axis position (pulse value)			
18	Station 2 (pulse va	Station 2nd axis position (pulse value)			
19	Station 3rdaxis position (pulse value)				
20	Station 4th axis position (pulse value)				
21	Station 5 (pulse va	Station 5th axis position (pulse value)			
22	Station 6 (pulse va	Station 6th axis position (pulse value)			

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method



Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	• 0: not specified     • 1: 1 WORD     • 2: 2 WORD	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	Error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

No data part



It is not able to operate the robot and the station at the same time. Setting the both operation at the same time receives the control group setting error (0xB008) from the YRC1000.

3.3 Communication Method

# 3.3.3.41 32 Byte Character Type Variable (S) Reading Writing Command

#### Request

#### Sub header part

#### <Details>

Command No.	0x8C	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number. Since the extended variable is an optional function, follow the numbers of the variables specified by the parameter when specifying the number
Attribute	Fixed to "1".	Specify "1".
Service	Get_Attribute_Single: 0x0E     Get_Attribute_All: 0x01     Set_Attribute_Single: 0x10     Set_Attribute_Al: 0x02	Specify the accessing method to the data. 0x0E/0x01: Read out data of the specified element number 0x10/0x02: Write the data to the specified variable

## Data part

## (Data exists during the writing operation only)

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	S variable	;	•	•	Set the data when writing.
2					
3					
4					
5					
6					
7					
8					

Answer

#### Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3
1	S variabl	е		
2	1			
3				
4				
5				
6				
7				
8				

3.3 Communication Method

# 3.3.3.42 Plural 32 Byte Character Type Variable (S) Reading / Writing Command

#### Request

## Sub header part

#### <Details>

Command No.	0x30C	
Instance	Specify one out of followings • 0 to 99 (for standard setting)	Specify the variable number (the first number with which reading/writing is executed) Follow the numbers of the variable specified by the parameter since the extended variable is an optional function.
Attribute	Fixed to "0"	Specify "0" Only batch access of all elements is valid
Service	0x33 : Read plural data 0x34 : Write plural data	Specify the accessing method to the data. 0x33: Read plural data 0x34: Write plural data

#### Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 14
2	S variable 1				Variable data part is valid only when writing.
3					Only the number of data is valid when
4					reading.
5					
6					
7					
8					
9					
	:				-

106	S variable 14
107	
108	
109	
110	
111	
112	
113	

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

## Answer

## Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

# Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
1	Number				Maximum: 14
2	S variable 1				
3					
4					
5					
6					
7					
8					
9					
	:				_

106	S variable 14
107	
108	
109	
110	
111	
112	
113	

- 3 High-Speed Ethernet Server Function
- 3.3 Communication Method

#### 3.3.4 File Control Command

Followings are respective commands used in the high-speed Ethernet communication.

No.	Command No.	Instance	Attribute	Service	Command name	Reference
1	0x0	0x0	0x0	0x09	File delete	Refer to chapter 3.3.4.1
2				0x15	File loading command (the PC to the YRC1000)	Refer to chapter 3.3.4.2 .
3				0x16	File saving command (the YRC1000 to the PC)	Refer to chapter 3.3.4.3 .
4				0x32	File list acquiring command	Refer to chapter 3.3.4.4 .
5				0x16	File saving command (A batch data backup) (the YRC1000 to the PC)	Refer to chapter 3.3.4.5 .

# HW1483358 137/293

3.3 Communication Method

# 3.3.4.1 File Deleting Command

Request

Sub header part

<Details>

Command No.	0x0	
Instance	0x0	
Attribute	0x0	
Service	0x09	File deleting process

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
	Т	E	S	Т	Specify the job name to be deleted
	J	0	В		
	J	В	I		

Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

No data part

#### HW1483358

3 High-Speed Ethernet Server Function

3.3 Communication Method

# 3.3.4.2 File Loading Command

## Request

#### Sub header part

<Details>

Command No.	0x0	
Instance	0x0	
Attribute	0x0	
Service	0x15	File loading process

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
	Т	E	S	Т	Specify the job name to be loaded
	J	0	В		
	J	В	I		-

#### Answer

#### Sub header part

#### <Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

Data part

No data part

3.3 Communication Method

## 3.3.4.3 File Saving Command

Command No. 0x0

Request

Sub header part

<details></details>

Instance	0x0	
Attribute	0x0	
Service	0x16	File saving process

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
	Т	E	S	Т	Specify the job names to be saved
	J	0	В		
	J	В	I		-

Answer

Sub header part

<Details>

Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2"

Data part

No data part

#### HW1483358

3 High-Speed Ethernet Server Function

3.3 Communication Method

# 3.3.4.4 File List Acquiring Command

## Request

#### Sub header part

		<details></details>
Command No.	0x0	
Instance	0x0	
Attribute	0x0	
Service	0x32	File list accruing process

## Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
	*	•	J	В	Refer to "Details of data" for the file type.
	1				_

#### Details of data

JBI list
JBI list
JBI list
DAT file list
CND file list
PRM file list
SYS file list
LST file list

Answer

Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

3 High-Speed Ethernet Server Function Communication Method

3.3

Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
	1		J	В	File name + <cr><lf> to input consecutively</lf></cr>
	1	<cr></cr>	<lf></lf>	2	
	2		J	В	
	1	<cr></cr>	<lf></lf>	3	
	3	3		J	
	В	I	<cr></cr>	<lf></lf>	
	Т	E	S	Т	
	0	1		J	
	В	I	<cr></cr>	<lf></lf>	

#### HW1483358

3 High-Speed Ethernet Server Function

3.3 Communication Method

#### 3.3.4.5 File Saving Command (Batch Data Backup)

#### Request

#### Sub header part

<Details>

Command No.	0x0	
Instance	0x0	
Attribute	0x0	
Service	0x16	File saving process

#### Data part

32bit integer	Byte 0	Byte 1	Byte 2	Byte3	<details></details>
	1	S	Р	D	Specify /SPDRV/CMOSBK.BIN
	R	V	1	С	
	М	0	S	В	
	К		В	1	
	N				-

#### Answer

#### Sub header part

		<details></details>
Status	Respond by one in the followings • 0x00 : respond normally • Other than 0x00 : respond abnormally	
Added status size	<ul> <li>0: no added status</li> <li>1: 1 WORD</li> <li>2: 2 WORD</li> </ul>	"1" indicates 1 WORD of added status data, and "2" indicates 2 WORD of added status data.
Added status	The error code specified by the added status size	The error code of 1 WORD exists if the added status code is "1" and that of 2 WORD exists if the code is "2".

#### Data part

No data part

To set the batch data backup function, set the device as "RAMDISK" as in advance.



It takes about ten minutes to finish backing-up the data by using the batch data backup function.

Refer to *chapter 3.2.2 "Batch Data Back-up Function Setting*" for more detail.

- 3 High-Speed Ethernet Server Function
- 3.4 Response Code

# 3.4 Response Code

For the results of the execution for the high-speed Ethernet server command, confirm the status code and the added status code.

#### 3.4.1 Status Code

The list of the status code is shown below.

Table 3-4: Status Code List

Status code	Details
0x00	The transmission processing was executed successfully. However, whether processing as the YRC1000 was completed successfully, confirm that an added status does not exist. In the following case, the added status shows that there was a problem in the processing as the YRC1000. • Requested a job file list that does not exist • Tried to read a job that does not exist
0x08	Requested command is not defined.
0x09	The element number of the invalid data is detected.
0x1f	An error inherent in vendor occurred. (This error corresponds to the vendor specification error in the CIP communication protocol.) For details, refer to <i>chapter 3.4.2 "Added Status Code"</i> .
0x28	An instance of the requested data does not exist in the specified command.
- 3 High-Speed Ethernet Server Function
- 3.4 Response Code

# 3.4.2 Added Status Code

The list of the added status code is shown below.

Added status code	Details
1010	Command error
1011	Error in number of command operands
1012	Command operand value range over
1013	Command operand length error
1020	Disk full of files
2010	Manipulator operating
2020	Hold by programming pendant
2030	Hold by playback panel
2040	External hold
2050	Command hold
2060	Error/alarm occurring
2070	Servo OFF
2080	Incorrect mode
2090	File accessing by other function
2100	Command remote not set
2110	This data cannot be accessed
2120	This data cannot be loaded
2130	Editing
2150	Running the coordinate conversion function *Refer to the NOTE in the last page of this list.
3010	Turn ON the servo power
3040	Perform home positioning
3050	Confirm positions
3070	Current value not made
3220	Panel lock; mode/cycle prohibit signal is ON
3230	Panel lock; start prohibit signal is ON
3350	User coordinate is not taught
3360	User coordinate is destroyed
3370	Incorrect control group
3380	Incorrect base axis data
3390	Relative job conversion prohibited (at CVTRJ)
3400	Master job call prohibited (parameter)
3410	Master job call prohibited (lamp ON during operation)
3420	Master job call prohibited (teach lock)
3430	Robot calibration data not defined
3450	Servo power cannot be turned ON
3460	Coordinate system cannot be set
4010	Insufficient memory capacity (job registered memory)
4012	Insufficient memory capacity (position data registered memory)
4020	Job editing prohibited
4030	Same job name exists
4040	No specified job

3 High-Speed Ethernet Server Function Response Code

3.4

Added status code	Details
4060	Set an execution job
4120	Position data is destroyed
4130	Position data not exist
4140	Incorrect position variable type
4150	END instruction for job which is not master job
4170	Instruction data is destroyed
4190	Invalid character in job name
4200	Invalid character in the label name
4230	Invalid instruction in this system
4420	No step in job to be converted
4430	Already converted
4480	Teach user coordinate
4490	Relative job/ independent control function not permitted
5110	Syntax error (syntax of instruction)
5120	Position data error
5130	No NOP or END
5170	Format error (incorrect format)
5180	Incorrect number of data
5200	Data range over
5310	Syntax error (except instruction)
5340	Error in pseudo instruction specification
5370	Error in condition file data record
5390	Error in JOB data record
5430	System data not same
5480	Incorrect welding function type
6010	The robot/station is under the operation
6020	Not enough memory of the specified device
6030	Cannot be accessed to the specified device
6040	Unexpected auto backup request
6050	CMOS size is over the RAM area
6060	No memory allocation at the power supply on
6070	Accessing error to backup file information
6080	Failed in sorting backup file (Remove)
6090	Failed in sorting backup file (Rename)
6100	Drive name exceeds the specified values
6110	Incorrect device
6120	System error
6130	Auto backup is not available
6140	Cannot be backed up under the auto backup
A000	Undefined command
A001	Instance error
A002	Attribute error
A100	Replying data part size error (hardware limit)
A101	Replying data part size error (software limit)
B001	Undefined position variable

146/293

3 High-Speed Ethernet Server Function Response Code

3.4

Added status code	Details
B002	Data use prohibited
B003	Requiring data size error
B004	Out of range the data
B005	Data undefined
B006	Specified application unregistered
B007	Specified type unregistered
B008	Control group setting error
B009	Speed setting error
B00A	Operating speed is not setting
B00B	Operation coordinate system setting error
B00C	Type setting error
B00D	Tool No. setting error
B00E	User No. setting error
C001	System error (data area setting processing error)
C002	System error (over the replying data area)
C003	System error (size of the data element not same)
C800	System error (customize API processing error) (Exam- ple) When a writing command during play in S2C541=1 is performed, etc.
CFFF	Other error
D8FA	Transmission exclusive error (BUSY or Semaphore error)
D8F1	Processing the another command (BUSY condition)
E24F	Wrong parameter setting for the system backup
E250	System backup file creating error (confirm if the mode is the remote mode)
E289	System error
E28A	System error
E28B	Disconnect the communication due to receive timeout
E28C	Cannot over write the target file
E29C	The requested file does not exist or the file size is "0".
E29D	System error
E29E	System error
E29F	System error
E2A0	The wrong required pass
E2A7	The relevant file is not in the requested file list.
E2AA	System error
E2AF	Receive the deletion request of the file that cannot to delete
E2B0	System error
E2B1	The directory cannot to be deleted
E2B2	Receive the request of the sending/receiving file at the remote OFF state.
E2B3	File not found
E2B4	The requested pass is too long
E444	Processing the another command (BUSY condition)
E49D	Format error (data size 0)

3 High-Speed Ethernet Server Function Response Code

3.4

Added status code	Details
E49E	Format error (frame size over)
E49F	Format error (frame size 0)
E4A1	Format error (block number error)
E4A2	Format error (ACK error)
E4A3	Format error (processing category error)
E4A4	Format error (access level error)
E4A5	Format error (header size error)
E4A6	Format error (identifier error)
E4A7	Format error (the size of the requested command and received frame are different)
E4A8	System error
E4A9	System error
FFF0	System error
FFF2	System error
FFF3	System error
FFF4	System error
FFF5	System error
FFF6	Too many request and unable to process (BUSY condition)
FFF7	System error
FFF8	System error
FFFE	The remote mode is detected, and disconnect the com- munication

	<ul> <li>Added status code 2150: Running the coordinate conversion function</li> </ul>
	This error occurs when executes the axis configuration information reading command at displaying the following window.
	<ul> <li>Parallel shift job conversion window</li> </ul>
	Mirror shift conversion window
	PAM window
NOTE	Relative job conversion window
	PMT conversion window
•	Position modification window
	Arm bend compensate window
	User coordinate shift window
	<ul> <li>Gun teaching position modification window</li> </ul>
	<ul> <li>4 point teaching window</li> </ul>
	Also, the same error occurs not only when each of the above mentioned window is indicated, it occurs when the PMT command is being executed.

- 3 High-Speed Ethernet Server Function
- 3.4 Response Code

When the YRC1000 returning the system error, perform the following procedures.



- 1: Reset the alarm.
- 2: By using the mode key of the programming pendant, perform the remote OFF/ON operation.
- 3: Save the CMOS.BIN, and report the occurence of the alarm to YASKAWA service representative.

# HW1483358 149/293

- 3 High-Speed Ethernet Server Function
- 3.5 Troubleshooting

# 3.5 Troubleshooting

### 3.5.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation"*, and confirm that TCP/IP basic communication can be performed.

### 3.5.2 Communication Setting Confirmation for Firewall and Security Software

The high-speed Ethernet server function uses UDP port 10040 and 10041.

Confirm that these ports are not blocked by the firewall or security software.

### 3.5.3 Error Log Confirmation of High-speed Ethernet Server Communication

The YRC10000 performs the error logging for the high-speed Ethernet server. Confirm that there are no errors in the communication data using this logging information.

1. Start in online mode, select {SYSTEM INFO} - {HI-SPEED ETHER.ERR LOG.} under the Main Menu.

DATA	EI	DIT	DISPLAY	U	TILITY	12 🗳 🦌	1	📮 🕀	
JOB			IRITY				1		
DOUT MOVE ENC			ERSION			R DEFINITION NU			
ARC WELDI	NG	G <sub>2</sub> :	IONITORING 1	TIME	CPU	RESET			
VARIABLE		9	ONTROLLER INFORMATION	4	R OR	CODE			
		۵	LARM HISTOP	RY	NET	WORK UTILITY			
ROBOT		C) I	:/O MSG HIST	FORY	HI- ET	SPEED HER.ERR LOG.			
SYSTEM IN	FO	BB №	IETWORK SERV	/ICE	😴 SEC	URITY			
		۵	.OGDATA						
Main Menu		Simp	le Menu						

 Select {START} in the HIGH-SPEED ETHERNET SERVER LOGGING window to start acquiring logging information, and then select {STOP} to stop acquiring logging information.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 🔞	🖲 🖵 🙌 🛛 🖻
HIGH-SPEE DATECT DA IP ADDRES **** REQUE No. ITE 2 HEA 3 DAT 4 RES 5 PRO 6 ACK 7 REQ 8 BLO 9 RES 10 COM 11 INS	D ETHERNET TE : S : S ST **** M NTIFIER DER SIZE A SIZE ERVE1 CESSING DIV UEST ID CK No. ERVE2 MAND No. TANCE	SERVER ERR SIZE 4Byte 2Byte 2Byte 1Byte 1Byte 1Byte 1Byte 4Byte 2Byte 2Byte 2Byte		AGE : 1 No. : DECIMAL	
STA	RT			PAGE	REROAD
Main Men	u Simp	le Menu			

3-107

HW1483358

- 4 FTP Server Function
- 4.1 Outline

# 4 FTP Server Function

# 4.1 Outline

With the FTP (File Transfer Protocol), the FTP server function can send / receive the YRC1000 internal data from the operation by PC, etc. Encrypted communication is also possible by using the FTPS (File Transfer Protocol over SSL/TLS).

The batch file (CMOSBK.BIN) of the YRC1000 internal data can also be saved.

# 4.1.1 System Configuration

The FTP server function can be used with the following configuration.

Fig. 4-1: System Configuration When Using the FTP Server Function



# 4.1.2 Communication Target

The following can be used as a communication target with the FTP server function.

Table 4-1: FTP Server Function Communication Targe	эt
--	----

Device	Software	Details
Windows PC	FTP client software included in Windows	FTP client software that operates using the Windows command prompt (cmd.exe) * Only when set to the FTP server function's "STANDARD" mode
	FTP client software other than those listed above	FTP client software such as FileZilla or FFFTP
Device with which Ethernet communication is available	FTP client software	FTP client software

- 4 FTP Server Function
- 4.1 Outline

# 4.1.3 Function Mode

For the FTP server function, either the "STANDARD" or "EXPAND" mode can be used. The differences of both modes in regards to the DX200 are shown below.

Division	Details	DX200	YRC1000		
			Standard	Expand	
Unencrypted communication	Plain text communication	0	0	×	
Encrypted communication	SSL/TLS encrypted × × communication		0		
Login name	'rcmaster'	0	0	0	
	'ftp'	0	0	×	
	'anonymous'	0	0	×	
Command support	'ls' (list display)	Job list output * Other than the job, an extension must be specified.	File/folder list output * If an extension is no files and folders are o	t specified, a list of all utput.	
	'cd' (change directory)	×	(	)	
	'b' (binary transmission)	0	0		
	'a' (ASCII transmission) * Responds OK to the ASCII transmission command, but it is not applied.	×	,	<	
Data configuration	Data saved to the login directory * Changes can be made by the parameter.	Internal data	Data folder • JBI • DAT • CND Others		

# 4.1.4 CMOS Saving Function via FTP

When the FTP server function is enabled, the CMOS data, which is the batch data of the YRC1000, can be saved to the PC via FTP. The CMOS data to be saved is the saved data to the internal memory by the automatic backup function.

4 FTP Server Function

4.1 Outline

# 4.1.5 Restriction

① Restriction of the function by the remote mode

The FTP server function can be used only when the command remote is enabled.

For the command remote, refer to *chapter 1.2 "Command Remote Setting for YRC1000"*.

② Prohibition of sending of the files whose size is "0"

Do not send a file whose size is "0" to the YRC1000. When a file whose size is "0" is sent to the YRC1000, a transmission system error occurs and the FTP connection is disconnected. In this case, after resetting the alarm, reconnect the FTP, and then perform transmission processing.

③ Prohibition of interruption of the data transmission

Do not interrupt the transmission using, such as "Ctrl" + "c". If the transmission is interrupted, the FTP connection status error may occur. In this case, disconnect the FTP connection, and then perform the FTP connection again.

④ File information

If the file list is acquired from the YRC1000, the information of each file (file size, date, attributes) is given to match the format of the general FTP client software, and the actual status is not reflected. For file information of the actual status, receive each file to confirm the status.

⑤ Restriction of access with other communication processing by the exclusion

The communication function of the YRC1000 (such as the high-speed Ethernet server function, the FTP server function, or the internal data browsing function by using the Web browser) cannot be performed simultaneously. Normally, the pseudo multiplex communication by dividing the time can be performed, but because FTP communication occupies a lot of communication bandwidth during FTP communication, other communication processes may be made to wait a long time or the communication time out may occur. For this reason, design the system so that it can avoid any influences by waiting to be processed caused by the FTP server function.

© SSL certificate for encrypted communication

The SSL certificate when performing encrypted communication is a selfcertificate. This certificate is not issued by a third-party.

⑦ No support for parallel forwarding

Since the parallel forwarding is not supported, the number of files that can be simultaneously forwarded is one even if a FTP client that supports parallel forwarding, such as FileZilla is used.

- 4 FTP Server Function
- 4.2 Setting

# 4.2 Setting

## 4.2.1 Enabling Setting for the FTP Function

Enable the FTP function in accordance with following procedures.

1. Turn ON the power supply while pressing {Main Menu}. Maintenance mode starts.



2. Set the security mode to the "MANAGEMENT MODE".

			<b>(3)</b>	
SYSTEM FILE EX. MEMORY SS DISPLAY SETUP	SECURITY MODE	MANAGEMENT MO	DE	
Main Menu	Simple Menu	Maintenance	mode	

- 4 FTP Server Function
- 4.2 Setting
- 3. In the Main Menu, select {SYSTEM} {SETUP} "OPTION FUNCTION".

The OPTION FUNCTION window appears.



 After necessary settings are done, select "DETAIL" of the "NETWORK FUNCTION SETTING". NETWORK FUNCTION SETTING appears.

> 1 NETWORK FUNCTION SETTING USED ETHERNET DISABLE FTP FILE SAVING CMOS VIA FTP DISABLE ETHERNET SERVER DISABLE EX. MEMORY SD SD DISPLAY SETUP Maintenance mode

5. Set "FTP" to either "STANDARD" or "EXPAND". For details about the difference between STANDARD and EXPAND, refer to *chapter 4.1.3 "Function Mode"*.

- 4 FTP Server Function
- 4.2 Setting
- 6. Press [Enter].

The confirmation dialog box appears.

	6
SYSTEM	NETWORK FUNCTION SETTING
FILE	ETHERNET USED FTP <b>STANDARD</b>
	SAVING CMOS VIA FTP DISABLE ETHERNET SERVER DISABLE
EX. MEMORY	Modify?
DISPLAY SETUP	
	TES NU
5	
Main Menu	Simple Henu Maintenance mode

7. Select {YES}.

Select {YES} to return to the OPTION FUNCTION window.

# 4.2.2 Enabling the CMOS Saving Function via FTP

The CMOS saving function via FTP is a function which backs up the data saved in the YRC1000 such as system settings or operation conditions via the FTP server function by using the YRC1000 automatic backup function.

When using this function, perform the following settings.

1) Function enabling settings

Enable this function in accordance with following procedures.

1. Turn ON the power supply while pressing {Main Menu}. Maintenance mode starts.



- 4 FTP Server Function
- 4.2 Setting
- 2. Set the security mode to the "MANAGEMENT MODE".

			<b>(3)</b>	
SYSTEM FILE EX. MEMORY SS DISPLAY SETUP TA	SECURITY MODE	MANAGEMENT MOOR		
Main Menu	Simple Menu	Maintenance m	ode	

3. In the Main Menu, select {SYSTEM} - {SETUP} - "OPTION FUNCTION".

The OPTION FUNCTION window appears.

		<b>1</b>
SYSTEM FILE EX. MEMORY DISPLAY SETUP TAB	OPTION FUNCTION ARC WELDING WELD.PULSE COND.TRANS. LAN INTERFACE SETTING NETWORK FUNCTION SETTING EtherNet/IP(CPU Board) DAYLIGHT SAVING TIME LIMITS CUSTOMIZATION TOOL NO. SWITCHING SI UNIT INDICATION DISPLAY IO NAME IN JOB EXTERNAL IO SETUP VARIABLE ALLOCATION WELDCOM FUNC. (ARC DIGITAL I/F MotoPlus FUNC.	STANDARD NOT USED DETAIL DETAIL DETAIL DETAIL DETAIL NOT USED NOT USED NOT USED DETAIL DETAIL DETAIL DETAIL NOT USED
Main Menu	Simple Menu Maintenance m	ode

4. Select "DETAIL" of the "NETWORK FUNCTION SETTING". The NETWORK FUNCTION SETTING window appears.

			<b>(3)</b>	
SYSTEM FILE EX. MEMORY SS DISPLAY SETUP	NETWORK FUNCTIO ETHERNET FTP SAVING CMOS ETHERNET SER	N SETTING	ISED DISABLE DISABLE DISABLE	
Main Menu	Simple Menu	Maintenance m	ode	

- 4 FTP Server Function
- 4.2 Setting
- 5. Set "SAVING CMOS VIA FTP" to "NORMAL MODE" or "SIMPLE MODE".

SIMPLE MODE: There is no notification about the generation of CMOS data for forwarding.

NORMAL MODE: There is notification about the generation of CMOS data for forwarding.

When the "FTP" is set to "DISABLE", set the "FTP" to "STANDARD" or "EXPAND".

6. Press [Enter].

The confirmation dialog box appears.

		<b>(3)</b>						
SYSTEM	NETWORK FUNCTION SETTING							
EUE	ETHERNET FTP	USED STANDARD						
	SAVING CMOS VIA FTP ETHERNET SERVER	NORMAL MODE DISABLE	-					
EX. MEMORY	Modify?							
DISPLAY SETUP								
Aa	YES	NO						
Main Menu	Simple Menu - Maintena	nce mode						

7. Select {YES}.

Select {YES} to return to the OPTION FUNCTION window.

8. Turn ON the power supply again to start the normal operation mode.

2) Data generation notification setting in the NORMAL MODE

If the CMOS saving function via FTP is set to "NORMAL MODE", also perform the following settings for the CMOS data generation notification.

1. Start normal operation mode. Starts in online mode.

- 4 FTP Server Function
- 4.2 Setting
- 2. Under the Main Menu, select {EX. MEMORY} {COMM SETTING(EXPAND)}.

The COMM SETTING(EXPAND) window appears.

DATA	E	DIT	DISPLAY	UTILITY	12 🗳	M 😵 🔟	
EX. MEMOR	RY	EXTER COMM	NAL MEMORY SETTING(E>	(DEVICE (PAND)			
SETUP		CMC	ST ADDRESS DS CREATE-C	COMP NOTIFY	PORT _	0	
SAFETY FUN	IC.						
РМ +							
DISPLAY SE Aa	TUP						
Main Menu		Simp	le Menu				

 Set the HOST ADDRESS and the NOTIFY PORT number. Set the HOST ADDRESS for the communication target to notify the CMOS data generation notification and port number.

# HOST ADDRESS

For the IP address of the communication target, use half-width numbers and periods (.), and set "xx.xx.xx" using the following format (xx is a decimal number from 0 to 255). Note that if the DNS client function is enabled, the FQDN (Fully Qualified Domain Name:

"Hostname@domainname" name format) can also be set. Characters that can be used for the FQDN are half-width alphanumeric characters, hyphens (-), underscores (\_) and the at-sign (@) which acts as the character boundary between the host name and the domain name. Set it within 128 characters or less.

### CMOS CREATION NOTIFICATION REPORT

Set the port number of the communication target by using half-width numeric characters and decimal digits from 1 to 65535. For this port number, perform CMOS creation notification with TCP. The notification message is the ASCII character string "Ready to CMOS Save".



If the CMOS creation notification cannot be performed, the system judges that an error occurred in the automatic backup. And then a signal output to "UNIV.OUT ON ERROR" and "DISPLAY AT EMERGENCY" are performed.



The host address set in this window is commonly used with DCI function and the standalone function. These addresses cannot be set separately.

- 4 FTP Server Function
- 4.2 Setting

3) Automatic backup function settings

The YRC1000 automatic backup function is used to backup the batch data. Perform the following settings for the function.

- 1. Set the security mode to the "MANAGEMENT MODE".
- 2. Select {Controller Setting} {AUTO BACKUP SET}. The AUTO BACKUP SET window appears.
- 3. Set "DEVICE" to "FTP".

DATA	EDIT	DISPLAY	UTILITY	12 🗷 🖌	1 🚯 1	0 🖵 (	<del>)</del>
AUTO BACK RESERVE BASE BACKU RETRY MODE CH STARTUP SPECIFI UNIV.OU DISPLAY DURING DEVICE STORED BACKUP LATEST	JP SET TIME BACKL TIME BACKL OYCLE CYCLE ANGE BACKUF ALTO BACKL C INPUT BAC T NO. ON EF AT EMERGEN ALARM OCCUF FILE SETTIN FILES BACKUP FILE	P IN P IN P IN KUP IN KUP IN KUP IN KUP IN ENCE SA ENCE SA IN IN IN IN IN IN IN IN IN IN	VALID : [00] 440]min 0]min 0]min 10 VALID VALID ₩ALID ₩ALID ₩ALID ₩ALID ₩ALIO 10 11 11 11 11 11 11 11 11 11	(Max 1)			
				ARRANGE			
Main Men	u Simp	le Menu					

- For details of the automatic backup function, refer to "Chap. 9.3 Automatic Backup Function" in "YRC1000 INSTRUCTIONS (RE-CTO-A221)".
  - For operations which the backed-up batch data that uses the CMOS saving function via FTP is written to the YRC1000, refer to "Chap. 9.4 Loading the Backup Data from the SD Card" in "YRC1000 INSTRUCTIONS (RE-CTO-A221)".
  - While an alarm is occurring, the device cannot be changed on the AUTO BACKUP SET window. In this case, first cancel the alarm, and then change the device.
  - If the parameter is not RS004=20, "FTP" will not appear on the DEVICE in the "AUTO BACKUP SET" window. In this case, confirm the setting of the parameter RS004.



When performing these settings, the automatic backup to the SD Card is not performed. Also, these settings cannot be used together with the high-speed Ethernet server function, which is previously described.

When using these settings, the maximum number of saves is one. (The saved file name must be "CMOSBK.BIN".)

- 4 FTP Server Function
- 4.2 Setting

# 4.2.3 Command Remote Setting

When using the FTP server function, set the command remote to "VALID".

For procedures to enable the command remote, refer to *chapter 1.2.3 "Command Remote Setting Method"*.

# HW1483358 161/293

- 4 FTP Server Function
- 4.3 Specification

# 4.3 Specification

### 4.3.1 Account

For the FTP server function, the following account can be used.

Files which can be sent and received differ depending on the account. *Table 4-2: FTP Server Function Account* 

User name	Password	Processes that can be executed
'rcmaster'	Management mode password	<ul> <li>Saving / Loading a job</li> <li>Saving / Loading a condition file or general data</li> <li>Saving the system data</li> <li>Saving the parameters</li> <li>Backing up batch data</li> </ul>
'ftp' * Only in the standard mode	Any password	<ul> <li>Saving / Loading a job</li> <li>Saving / Loading a condition file or general data</li> <li>Saving the system data</li> <li>Backing up batch data</li> </ul>
'anonymous' * Only in the standard mode	Any password	<ul> <li>Saving / Loading a job</li> <li>Saving a condition file or general data</li> </ul>



If the password protection function (extra charged option) is enabled, only the user name and password defined in the password protection function can be used. In this case, the above user name and login name cannot be used.

- 4 FTP Server Function
- 4.4 Communication Method

# 4.4 Communication Method

Shows an example of the communication procedure for the FTP server function.

#### 4.4.1 Example of Communication Procedure in Normal Operation Mode (When Using the Windows 7 Command Prompt)

Shows the example of the procedure for performing FTP communications in the normal operation mode.

In the following example, the Windows 7 command prompt is used to save (get) a job. The underlined sections are the items to enter. After inputting each section, enter [Enter].

 $C:/> ftp 192.168.255.1 \cdot \cdot \cdot 1)$ Connected to 192.168.255.1 220 YRC FTP server (1.00) ready. User (192.168.255.1:(none)): <u>ftp</u> • • • <sup>2)</sup> 331 Password required for ftp. 230 User ftp logged in. ftp> $\underline{ls} \cdot \cdot \cdot \cdot 4^{)}$ 200 PORT command successful. 150 Opening ASCII mode data connection. (192,168,255,100,63365) JOB DAT CND SYS PRM LST CSV LOG TXT 226 Transfer complete. ftp: 45 bytes received in 0.02Seconds 2.81Kbytes/sec. ftp> cd JOB  $\cdot \cdot \cdot 5^{5}$ 250 CWD command successful. ftp> $\underline{ls} \cdot \cdot \cdot \cdot {}^{6)}$ 200 PORT command successful. 150 Opening ASCII mode data connection. (192,168,255,100,63366) A.JBI **B.JBI** C.JBI 226 Transfer complete. ftp: 21 bytes received in 0.00Seconds 21000.00Kbytes/sec. ftp>  $\underline{\text{get A.JBI}} \cdot \cdot \cdot \cdot 7^{)}$ 200 PORT command successful. 150 Opening ASCII mode data connection. (192,168,255,100,63369) 226 Transfer complete. ftp: 118 bytes received in 0.00Seconds 118000.00Kbytes/sec. ftp> bye • • •  $^{8)}$ 221 Goodbye.

```
C:/>
```

4 FTP Server Function

### 4.4 Communication Method

- 1. The processing is for starting the FTP connection to the YRC1000 (FTP server).
- 2. Enter the user name for logging in to the YRC1000.
- 3. Enter the password that corresponds to the user name.
- 4. The processing is for acquiring the folder list of the YRC1000.
- 5. The processing is for changing the target directory to "JOB".
- 6. The processing is for acquiring the job list in the "JOB" folder.
- 7. The processing is for acquiring a job from the YRC1000.
- 8. The processing is for ending the FTP connection.

### 4.4.2 Example of Communication Procedure in Expand Mode (When Using FileZilla)

Shows the example of the procedure for performing FTP encrypted communications in the expand mode.

In the following example, FileZilla version 3.9.0.6 is used to save (get) a job.

- 1. FTP Server Setting Procedure
- Select {File} {Site Manager}.





Site Manager	×
Select Entry:	General Advanced Transfer Settings Charset
New site	Host Port
	Protocol: FTP - File Transfer Protocol 💌
	Encryption: Use plain FTP
	Logon Type: Anonymous
	User: anonymous
	Pass <u>w</u> ord:
	Account:
	Co <u>m</u> ments:
New Site New Folder	<u> </u>
New Book <u>m</u> ark <u>R</u> ename	
Delete Dupl <u>i</u> cate	
	Connect OK Cancel

- 4 FTP Server Function
- 4.4 Communication Method

Set each item in the General tab.

Site Manager					×
Select Entry:			1 3 4 5 6 7	General Ad Host: Protocol: Encryption: Logon Type: User: Password: Account: Comments:	Vanced Transfer Settings Charset   192.168 255.1 2 Port FTP - File Transfer Protocol Require explicit FTP over TLS Normal romaster
	New Site New Bookmark Delete	New Folder Rename Duplicate		Connect	t (8) OK Cancel

- 1 Host: Enter the IP address of the FTP server.
- 2 Port: Leave it blank.
- ③ Protocol: Select "FTP File Transfer Protocol".
- ④ Encryption: Select "Require explicit FTP over TLS".
- S Logon Type: Select "Normal".
- 6 User: Enter the FTP account name of the FTP server.
- O Password: Enter the password that corresponds to the FTP account.
- ⑧ Click {OK}.

# •Select {Edit} - {Settings}.

🔁 File	Zilla														_ 🗆 🗙
File	Edit	View	Transfer	Server	Bookmark	s Help									
ച 🗉	Netw	ork co	nfiguration	n wizard	1	E 🕅 🗊	i n								
Host:	Clear	' priva	te data				Password:		F	Port:		Quicko	connect	-	
	Setti	ngs…													<b></b>
															~
Local	site: C	:¥ftp¥1	est¥				-	Remote sit	2						~
		÷	tmp				-								
	ŧ	- 🌺 Ì	ntel												
		•	Java			1	<b>•</b>					<b>E</b> (1) -			1141 1
Filena	me			_	Filesize	Last mo	dified ^	Filename	*		Filesize	Filetyp	)e	Lastm	odified
L.															
Empty	directo	rv						Not connect	ed						<u> </u>
Server	/Local	file			Direction	Remote fil		Jitot connoci	.00.	Size	Priority	1.5	tatue		
	) 200ai	me			Direction	Tiemote m	•			0120	THORING		(Grus		
Que	ued fil	es 🗍	Failed tran	sfers	Successf	ul transfers									
Open th	ne setti	nes di	alog of Fil	eZilla							6	aaa Que	ue: empt	ty	•• //

- 4 FTP Server Function
- 4.4 Communication Method

Set "Maximum simultaneous transfers" to "1" in "Transfers".

Settings		×
Select gage:	Concurrent transfers Maximum simultaneous transfers: 1 (1-10) Limit for concurrent gownloads: 0 (0 for no Limit for concurrent goloads: 0 (0 for no Speed limits Enable speed limits Download Jimit: 100 (in KiB/s) Ugload limit: 20 (in KiB/s) Burst tolerance: Normal Filter invalid characters in filenames Filter invalid characters that are not supported by t in filenames are replaced if downloading such a file. Beplace invalid characters with: .	limit) limit) he local operating system
Uancel	The following characters will be replaced: # 7 : * !	

2. FTP Communication Procedure

# 2.1. Connection

Click  $\{ {\ensuremath{\blacktriangledown}} \}$  under "File", and select the appropriate account.

🔁 FileZilla	
File Édit View Transfer Server Bookmarks Help	
1 · 7 · · · · · · · · · · · · · · · · ·	
test_ftp Username: Passw	ord: Port: Quickconnect V
	A
Local site: C:¥ttp¥test¥	Hemote site:
H- Intel	
📃 🗍 Java 🔽	
Filename * Filesize Last modified	Filename - Filesize Last modified
· · · · · · · · · · · · · · · · · · ·	
	Not connected to any server
Empty directory	Not connected
Direction Remote file	Size Friority Status
Queued files Failed transfers Successful transfers	
	🖼 Queue: empty 🛛 🕥 🍎 🥢

- 4 FTP Server Function
- 4.4 Communication Method

When the certificate appears, confirm the contents, and select {OK}.

- Details				
Valid from:	9/11/2015			
Valid to:	12/31/2037			
Serial numb	er: 00:89:ee:bf:ce:85:f4:ca:f2			
Public key a	leorithm: RSA with 2048 bits			
Signature al	gorithm: RSA-SHA1			
Fingerprint	(MD5): 41:02:69:91:1f:11:5e:32:5d:70:c8:ee:4e:04	ko6:f8		
Fingerprint	SHA-1): 68:74:30:d5:e5:5d:0a:e8:89:d0:1d:1e:bd:2	4:df:8e:fa:77:6a:1c		
-Subject of c	ertificate	-Certificate issuer		
Organization	ASKAWA ELECTRIC CORPORATION	Organization:	YASKAWA ELE	CTRIC CORPORATIC
Unit	Robotics Division	Unit:	Robotics Divis	on
Country:	JP	Country:	JP	
State or pro	vince: Fukuoka	State or province:	Fukuoka	
Locality:	Kitakyushu	Locality:	Kitakyushu	
_ Session det	ails			
Host:	192.168.255.1:21			
Protocol:	TLS1.0			
Key exchan	ge: RSA			
Cipher:	AES-256-CBC			
	SH01			

If the folder appears in the remote site, the connection is complete

successfully.			
🛃 test ftp - ftpes://rcma	aster@192.168.255.1 - FileZilla		
File Edit View Transfer	Server Bookmarks Help		
al - 📝 🗉 😭 🚅 🛤	a 👯 🏁 🕵 🛷 🔳 🛒 🚰 🖍		
Host:	Username: Pas	sword:	Port: Quickconnect -
14:35:30 Command: F	PASV		
14:35:30 Response: 2	227 Entering passive mode (192,168,255	.221,157)	
14:35:30 Command: L	IST		
14:35:30 Response: 1	125 Using existing data connection		
14:35:30 Response: 2	226 Transfer complete		
14:35:30 Status: E	Directory listing successful		<b>T</b>
Local site: C.¥ftp¥test¥		- Remote site: /	
test ⊕∳test ⊕∳test tmp htel ↓↓Java			
Filename *	Filesize Last modified	Filename 🔶	Filesize Last modified
		 CND CSV DAT JOB LOG	8/5/2016 10:11:00 AM 8/5/2016 10:11:00 AM 8/5/2016 10:11:00 AM 8/5/2016 10:11:00 AM 8/5/2016 10:11:00 AM ▼
Empty directory.		9 directories	
Server/Local file	Direction Remote file	Size	Priority Status
Queued files Failed tran	nsfers Successful transfers		
			🔒 🗾 🎟 Queue: empty 🛛 🔍 🖉

- 4 FTP Server Function
- 4.4 Communication Method

# 2.2 Downloading and Uploading a File

To download a file, double-click the target folder in the remote site, and then open the folder containing the file to download.

🔁 test ft	) - ftpes://rcm	naster@192.168	.255.1 - FileZi	lla						- 🗆 ×
File Edit	View Transfe	er Server Bool	kmarks Help							
a • 🗾	E 🖀 🛹 🕴	🙀 🖉 🐘	🛷 🖃 📯 🕏	- <i>6</i> 1						
<u>H</u> ost:		<u>U</u> sername:		Pass <u>w</u> or	rd:		Port:		Quickconr	nect 🔻
14:35:30	Command:	PASV								<b></b>
14:35:30	Response:	227 Entering pas	sive mode (192,1	68,255,1,22	1,157)	1				
14:35:30	Command:	LIST								
14:35:30	Response:	125 Using existin	ng data connectio	n						
14:35:30	Response:	226 Transfer con	nplete							_
14:35:30	Status:	Directory listing	successful							-
l Level sites	CMM-Maran				Damata di	hay []				
Local site.	C.FILDFLESTF			<b>_</b> _	Remote si	(e. )				<u> </u>
	test ⊕] tmp tmp Intel ↓] Java			-						
Filename	*	Filesize	Last modified		Filename	*	Files	size 🛛	Last modifi	ed 🔺
<b>)</b>					 CND CSV DTT JOB LOG				8/5/2016 1 8/5/2016 1 8/5/2016 1 8/5/2016 1 8/5/2016 1	0:11:00 AM 0:11:00 AM 0:11:00 AM 0:11:00 AM 0:11:00 AM
					•					
Empty direc	story.				Selected 1	directory.				
Server/Loc	al file	Direction	Remote file			Size	Priority	Statu	s	
Queued	files   Failed tr	ansfers Suc	cessful transfers							
							🔒 🖉 🖻	🗉 Quei	ie: empty	•• //.

Select the target file in the remote site, and then drag the file to the file display field of the local site.

尼 test_ftp - ftpes:,	//rcmaster@192.168.255.1 - Fil	eZilla		_ D ×
File Edit View T	ransfer Server Bookmarks Hel	p		
🔬 - 📝 🎟 😷 .	🛃 🗱 🛞 🏁 💺 🛷 🔳 😪	1 😚 🚜		
Host:	Username:	Pass <u>w</u> ord:	Port:	Quickconnect 💌
14:36:27         Command           14:36:27         Response           14:36:27         Command           14:36:27         Response           14:36:27         Response           14:36:27         Response           14:36:27         Response           14:36:27         Response           14:36:27         Status:	PASV     227 Entering passive mode (1     LIST     125 Using existing data conne     226 Transfer complete     Directory listing successful	92,168,255,1,233,238) ection		
	,	Downste sites (	10.0	<u> </u>
total site 0+10+tes	test tmp el	Constant of the state of t		×
Filename 🔶	Filesize Last modified	Filename 🗠	Filesize	Last modified
<b>.</b>	•	■ AJBI ■ BJBI ■ CJBI	1 1 1	8/5/2016 2:01:00 PM 8/5/2016 11:11:00 AM 8/5/2016 11:11:00 AM
•				l •
Empty directory.		Selected 1 file. T	otal size: 1 byte	
Server/Local file	Direction Remote file	•	Size Priority Stat	tus
Queued files Fa	iled transfers Successful trans	fers	🔒 🗾 🚥 Qu	eue: empty

- 4 FTP Server Function
- 4.4 Communication Method

#### **Transfer Result**

🛃 test ftp	- ftpes://rc	master@192.1	68.255.1 - FileZil	lla					
File Edit	View Trans	fer Server E	Bookmarks Help						
🛛 •		🗱 👷 🏁 🛔	k 🛷   🗉 📯 🕏	in i					
Host:		<u>U</u> sername:		Pass <u>w</u> or	d: 🗌		Port:	Quickcon	nect 🔻
14:37:04	Command:	PASV							
14:37:04	Response:	227 Entering p	passive mode (192,1)	68,255,1,22	0,7)				
14:37:04	Command:	RETR A.JBI							
14:37:04	Response:	125 Using exi	sting data connectio	n					
14:37:04	Response:	226 Transfer	complete						
14:37:04	Status:	File transfer s	successful, transferre	ed 118 byt	es in 1 se	econd			▼
Local site:	C:¥ftp¥test¥			-	Remote :	site: /JOB			•
	🗄 🛄 ftp					CND			
	test					🚹 CSV			
	主 鷆 tmp					DAT 👔			
	🗄 퉲 Intel					JOB			
	🕀 📕 🕂					LOG			
Filename 4	•	Filesize	Last modified		Filename	÷ ^	Filesiz	e 🛛 Last modifi	ed
					<u>}</u>				
🔳 A.JBI		118	8/5/2016 2:37:04	PM	🔳 A.JBI			1 8/5/2016 2	:01:00 PM
					🔳 B.JBI			1 8/5/2016 1	1:11:00 AM
					📓 C.JBI			1 8/5/2016 1	1:11:00 AM
					_				
					4			-	
1 file. Total	size: 118 bytes				Selected	1 file. Total siz	e: 1 byte		
Comment of the second	-1.61-	Diverti	an [ Damata Gla			Circ.	Dutantin I.	P4-4	
Jerver/Loc	arme	Directi	on premote the			alze	Friority	อเสเนร	
		I. J. J	L C	( / 1)					
Gueued T	nes Fai	ieu transfers	Jouccessful trans	iers (1)					
							🔒 🥂 🚥	Queue: empty	• • /i.

To upload a file, as the same procedure above, select the target file in the local site, and then drag the file to the file display field of the remote site.

# 2.3. Deleting a File

To delete a file, right click the target file in the remote site, and select "Delete".

🔁 test_i	itp – ftpes://rci	master@192.1	68.255.1 - FileZil	la				
File Ed	lit View Transf	er Server B	ookmarks Help					
1 -	/ 🗉 😤 🖈	😫 🔛 🍽 👙	k 🛷 💷 📯 😚	a a				
Host:		<u>U</u> sername:		Pass <u>w</u> o	rd:		Port:	Quickconnect 💌
14:37:04 14:37:04 14:37:04 14:37:04 14:37:04 14:37:04 14:38:04	Response: Command: Response: Response: Status: Status:	227 Entering p RETR AJBI 125 Using exis 226 Transfer o File transfer s Disconnected	assive mode (192,16 sting data connection complete uccessful, transferre from server	38,255,1,2 n ed 118 by	20,7) tes in 1 seo	cond		<b>A</b>
Local sit	e: C:¥ftp¥test¥			× •	Remote s	ite: /JOB CND CSV DAT JOB LOG		• • •
Filename	<b>}</b> ▲	Filesize	Last modified	PM	Filename  A.JBI B.JBI C.JBI	▲ Download ↓ Download ↓ Add files View/Edit	Filesize	Last modified 0.45/2016 2:01:00 PM /2016 11:11:00 AM /2016 11:11:00 AM
I file. Tot	al size: 118 bytes ocal file d files Fail	Directi	on Remote file	• • • • • • • • • • • • • • • • • • •	Selected	Create dir Create dir Create ne Refresh Delete Rename Copy UPI	ectory ectory and enter w file	it
						File permi	ssions	mpty 🔍 🔍 🧳

- 4 FTP Server Function
- 4.4 Communication Method

Click {YES}.



# Result of Deleting a File

🔁 test_ftp - itpes://rcmaster@192.168.255.1 - FileZilla	
File Edit View Transfer Server Bookmarks Help	
🧏 • 📝 🗊 😭 💐 🛱 🛠 🏁 象 🛷 🗐 📯 😚 🙃	
Host: Passw	ord: Port: Quickconnect V
14:37:04         Response:         125 Nsing existing data connection           14:37:04         Response:         226 Transfer complete           14:37:04         Status:         File transfer successful, transferred 118 b	vtes in 1 second
14:38:04 Status: Disconnected from server 14:40:33 Command: DELE AJBI 14:40:33 Response: 250 File deleted	<b>.</b>
Local site: C¥ftp¥test¥	Remote site:         /JOB           -2         CND           -2         CSV           -2         DAT           -3         JOB           -2         LOG
Filename • Filesize   Last modified	Filesize         Last modified           Image: Straight of the stra
1 file. Total size: 118 bytes	Z files. Total size: 2 bytes
Server/Local file Direction Remote file	Size Priority Status
Queued files Failed transfers Successful transfers (1)	🔒 🖡 🛤 Queue: empty 🔍 👁 🖉

# 4.4.3 Saving CMOS Data by Using CMOS Saving Function via FTP

The procedure for accessing the CMOS data is the same as the one for accessing the general files, such as the job files, however, the existing folder is different from these files. If the CMOS data is created, the data exists as the following file.

'/SPDRV/CMOSBK.BIN'

- 4 FTP Server Function
- 4.5 Troubleshooting

# 4.5 Troubleshooting

### 4.5.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation*", and confirm that TCP/IP basic communication can be performed.

### 4.5.2 Confirming the Communication Setting for Firewall and Security Software

Confirm that FTP communications are not blocked by the firewall or security software.

### 4.5.3 Confirming the Function Mode

In the standard mode, confirm whether the encrypted communication is not being performed.

In the expand mode, confirm whether the unencrypted communication is not being performed.

# HW1483358 171/293

- 4 FTP Server Function
- 4.6 FTP Job Overwrite Function

# 4.6 FTP Job Overwrite Function

### 4.6.1 Outline of Function

With this function, when uploading of a job is performed by the FTP server function, uploading can be requested even during playback.

### 4.6.2 Parameter for Setting Function

This function is set to valid or invalid by the following parameter.

Setting the FTP job overwrite function	RS214	0: Invalid
		2: Valid

### 4.6.3 FTP command

By uploading the job by using a normal PUT command when this function is valid, job overwrite is executed.

Note the following restrictions during playback:

- During playback, job overwrite is not immediately executed, and the status turns to overwrite waiting. In this case, if there is no free space in the job capacity, an error is returned to the client's side.
- If two or more overwrite requests are executed to the same job during playback, the job in the overwrite waiting status is updated to the latest request.
- If the target job does not exist on the job stack when the playback ends, job overwrite is executed at that time. If the target job exists on the job stack and the job stack is cleared, job overwrite is executed.
- Even if the playback does not end, job overwrite can be executed by using the RFLCTJOB instruction. However, if the target job exists on the job stack, job overwrite cannot be executed.

### 4.6.4 **RFLCTJOB Instruction**

By executing the RFLCTJOB instruction, an overwrite-waiting job is overwritten.



### 4.6.5 Specific Output Signal

When an overwrite-waiting job exists, the following specific output signal is turned ON.

#51230	
OVERWRITE	
WAIT	

While this specific output signal is turned ON, the message "Waiting for the job to be overwritten." appears on the message area.

- 5 DCI Function
- 5.1 Outline

# 5 DCI Function

# 5.1 Outline

The DCI (Data Communication by Instruction) function can send / receive jobs or variables with the YRC1000 and PC by executing the transmission commands written in the job.

# 5.1.1 System Configuration

The DCI function can be used with the following configuration.

Fig. 5-1: System Configuration When Using the DCI Function



# 5.1.2 Communication Target

The following can be used as a communication target of the DCI function. *Table 5-1: DCI Function Communication Target* 

Device	Software	Details
Windows PC	AUTO JOB CHANGER OPERATION	Application software included with the MOTOCOM32 which is an optional function.
	MOTOCOM application	Customer-created communication application software by using the communication DLL included with the MOTOCOM32 which is an optional function.

- 5 DCI Function
- 5.2 Setting

# 5.2 Setting

## 5.2.1 Communication Target Setting

Perform the settings for the communication target of DCI in accordance with following procedures.

- 1. Start normal operation mode. Start in the online mode.
- Change the security mode. Change the security mode to the management mode.
- 3. Under the Main Menu, select {EX. MEMORY} {COMM SETTING(EXPAND)}.

The COMM SETTING(EXPAND) window appears.

DATA	EI	ыт	DISPLAY	UTILITY	12	2 🖌 😣 🔟	
EX. MEMOF SETUP SAFETY FUN PM PM DISPLAY SE	χγ μc. TUP	EXTER COMM HOS CMO	NAL MEMORY SETTING(E) ST ADDRESS )S CREATE-(	(PEVICE (PAND) COMP NOTIFY	PORT	0	
<b>▲</b> }(]							
Main Men	u.	Simp	le Menu				

4. Set a HOST ADDRESS. Set the HOST ADDRESS for the communication target.

# HOST ADDRESS

For the communication target IP address, use half-width numbers and periods (.), and set "xx.xx.xx" using the following format (xx is a decimal number from 0 to 255). Note that if the DNS client function is enabled, the FQDN (Fully Qualified Domain Name:

'Hostname@domainname' name format) can also be set. Characters that can be used for the FQDN are half-width alphanumeric characters, hyphens (-), underscores (\_) and the at-sign (@) which acts as the character boundary between the host name and the domain name. Set it within 128 characters or less.



The host address that is set on this window is used for CMOS save functions and standalone functions via FTP. These addresses cannot be set separately.

# 5.2.2 Command Remote OFF Setting

Set the command remote to DISABLE.

To disable the command remote, set the key switch of the programming pendant to "PLAY" or "TEACH", or set the "CMD REMOTE SEL" of the PSEUDO INPUT SIGNAL to DISABLE. For procedures about changing the pseudo input signal, refer to *chapter 1.2.3* "Command Remote Setting Method".



- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

# 5.3 Preparation at the YRC1000 Side

#### 5.3.1 Command for Job Transmission

#### 5.3.1.1 LOADJ

### Function

Loads specified jobs as single or related jobs, from the PC to the memory of the YRC1000.

### Configuration



 If the YRC1000 memory already contains a job having the same name as the job to be loaded, the existing job is deleted and the new job is loaded.

However, if the job to be loaded is as follows, an alarm occurs.

- Execution starting job
- Job under execution/halting
- Job registered in job call stack
- Specify input group numbers (BCD/BIN, parity specification), and variable numbers in the same way as for the CALL command. If the pattern input value is 0, the operation is not executed. A variable number 0 is valid.

For characters which are used for entering the job names of the pattern input value and the variable number, only the half-width numeric characters are used.

- Unit of loading : Select either a single job (JBI) or related jobs (JBR).
- When the NWAIT is specified, the next command is executed without waiting completion of job loading.
- While a job is being loaded by the LOADJ command for which NWAIT is specified, if an access is attempted to a job called by the CALL command or JUMP command, an alarm occurs.
   If a LOADJ or SAVEJ command has already been executed, a job is loaded after completion of the execution.

# HW1483358 175/293

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

5.3.1.2 SAVEJ

### Function

Saves a specified job as single or related jobs, from the memory of the YRC1000 to the PC.

#### Configuration



• Specify input group numbers (BCD/BIN, parity specification), and variable numbers in the same way as for the CALL command. If the pattern input value is 0, the operation is not executed. A variable number 0 is valid.

For characters which are used for entering the job names of the pattern input value and the variable number, only the half-width numeric characters are used.

- Unit of saving : Select either a single job (JBI) or related jobs (JBR).
- When the NWAIT is specified, the next command is executed without waiting completion of job saving.

When a LOADJ or SAVEJ command has already been executed, a job is saved after completion of the execution.

### 5.3.1.3 DELETEJ

## Function

Deletes all jobs except its own job or specified jobs as single or related jobs, from the memory of the YRC1000.

### Configuration



- Unit of deleting : Select either a single job (JBI) or related jobs (JBR).
- The following jobs cannot be deleted.
  - Execution starting job
  - · Job under execution/halting
  - Job registered in job call stack

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

# 5.3.1.4 SWAIT

# Function

Waits for completion of loading or saving jobs or variables.

Use this command to recognize a completion of LOADJ, SAVEJ, LOADV, and SAVEV commands when a NWAIT is specified for these commands.

### Configuration



### 5.3.2 Command for Variable Transmission

#### 5.3.2.1 LOADV

- Function Loads the specified global variables from a PC to the YRC1000 memory.
- Configuration



#### 5.3.2.2 SAVEV

### Function

Saves the specified global variables from the YRC1000 memory to a PC.

Configuration



- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

## 5.3.3 Registering DCI Command

- 1. Move the cursor to the address area.
- 2. Move the cursor to the line where a command is to be registered in the job content window.
  - In the job content window in the teach mode, move the cursor to the line just above the place where a command is to be registered.

JOB	EDIT	DISPLAY	UTILITY	<u>1</u> 12 🗉	2 🖌 🔞	10 🖵 🙌	
JOB CONTE J:TEST CONTROL G	NT ROUP: R1		S:C TOOL	0002 .: 00			
0000 NOP 0001 MOV 0002 MOV 0003 MOV 0004 DOU 0005 MOV 0006 END	J VJ=25.00 L V=100 ← J VJ=25.00 T OT#(1) ON J VJ=25.00	1			Line just a where a c be registe	above the place command is to rred	]
MOVJ VJ=	25.00						
Main Men	u Simp	le Menu					

- 3. Press [INFORM LIST].
- 4. Select a command to be registered.
  - The command list dialog is displayed.

JOB	EDIT	DISPLAY	UTILITY	12 🖻 📶 🔞	10 📑 🥀	)
JOB CONTE	NT		S:00	02		IN/OUT
CONTROL G	ROUP: R1		TOOL:	00	LOADJ	CONTROL
0001 MOV	J VJ=25.00				SAVEJ	DEVICE
0003 MOV	J VJ=25.00				LOADV	MOTION
0004 DOU 0005 MOV	T OT#(1) ON J VJ=25.00				SAVEV	ARITH
0006 END					DELETEJ	SHIFT
					SWAIT	OTHER
					SHCKSET	SAME
	R. IOR IRI				SHCKRST	PRIOR
LOADO OC			_			
Main Men	u Simp	le Menu				

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side
  - The cursor moves to the command list dialog, and the cursor in the address area changed to an underline.

The command where the cursor is positioned is displayed with the previously registered additional items in the input buffer line.

JOB	EDIT	DISPLAY	UTILITY	12 🗹 🖬 🦁	🖇 🔟 🖵 🗄	9
JOB CONTE J:TEST	NT		S:00	12		IN/OUT
CONTROL G	ROUP: R1		TOOL:	00	LOADJ	CONTROL
0000 NOP	J VJ=25.00				SAVEJ	DEVICE
0003 MOV	L V=100 J VJ=25.00				LOADV	MOTION
0004 DOU 0005 MOV	T OT#(1) ON J VJ=25.00	l			SAVEV	ARITH
0006 END					DELETEJ	SHIFT
					SWAIT	OTHER
					SHCKSET	SAME
	10.0				SHCKRST	PRIOR
LOADY DO	00					
Main Men	u Simp	le Menu				

- 5. Change the additional items and variable data.
  - <To register items as displayed in the input buffer>
  - (1) Perform operation described in the step 6 below.
  - <To edit any additional items>

LOADV B000

- (1) With the cursor on the command to be registered, press [SELECT].
- The cursor moves to the input buffer line.



 Move the cursor to the additional item whose numerical value is to be changed. Pressing simultaneously [SHIFT] and the cursor key increments or decrements the value.

LOADV BOOO		
r		

 To enter a value by pressing the number key, press [SELECT] to display the input line.



Enter a value, then press [ENTER]. The value displayed in the input buffer line is changed.

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side
  - Adding, changing, or deleting the additional items
  - To add, change or delete the additional items, select a command in the input buffer line to display the detail edit display.

JOB	EDIT DISPLAY	UTILITY	12 🗹 🕼 🎨 🖻 寻 🙌	
DETAIL EDIT LOADV				
VARIABLE NWAIT	BOOO 💌 UNUSED			
LUADA BOOO				
Main Menu	Simple Menu			

- · Adding the additional item
  - Select "UNUSED" of an additional item selection status, then display the selection dialog.
  - II) Select an additional item to be added.
- To delete an additional item, move the cursor to an additional item to be deleted, then select "UNUSED" to delete.

DETAIL EDIT LOADV			
VARIABLE NWAIT	B000 MAIT UNUSED		

· Changing the data type

DETAIL EDIT		,		
VARIABLE NWAIT	B000 B UNUSI I D R P S			

- (2) After having added, changed or deleted the addtional items, press [ENTER].
- The detail edit window is exited and the job content window appears.
- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side
- 6. Press [INSERT] and [ENTER].
  - The command displayed in the input buffer line is registered.
  - To register a command just before an END command, it is not necessary to press [INSERT].

JOB	EDIT	DISPLAY	UTILITY	12 🖻 🖌	1 👒 🔟 🗔	ļ ( <del>¶</del> )
JOB CONTEL J:TEST	NT		S:000	)2		IN/OUT
CONTROL G	ROUP: R1		TOOL:	00		CONTROL
0001 MOV	J VJ=25.00					DEVICE
0002 MOV	DV 1000					MOTION
0004 MUV 0005 DOU	J VJ=25.00 T OT#(1) ON					ARITH
0006 MOV 0007 END	J VJ=25.00					SHIFT
						OTHER
						SAME
						PRIOR
						_
Main Men	u Simp	le Menu				

#### 5.3.4 Concurrent Task from Multiple Job

As an option, commands related to DCI function can be executed from more than one job concurrently. The operations are explained below.

- The DCI related commands can be executed in any job regardless of distinction among the ordinary job, concurrent job (optional), or job activated in series (optional).
- Multiplexing of DCI transmission function is not supported. Therefore, it is impossible to manipulate files on two or more PCs connected to the YRC1000.
- If two or more commands related to DCI function are issued concurrently, the execution starts after completion of processing of the currently executing command. Therefore, if a module issues a command request while another module is executing DCI function, the request has to wait until the ongoing processing completes.

## HW1483358 181/293

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

#### 5.3.5 DCI Parallel Execution

By using the function described below, the DCI command can be executed in parallel with general commands such as a move command and operating command.

When this function is used, the robot can be moved or the calculation is executed during data transmission; this function is effective for reduction of tact time, etc.

#### 5.3.5.1 Parallel Execution Using NWAIT

NOP	
MOVJ VJ=50.00	
MOVJ VJ=50.00	
LOADJ JOB:ABC JBI NWAIT · · ·	1
MOVJ VJ=50.00 · · · · · · · ·	2
MOVJ VJ=50.00 · · · · · · · ·	3
SWAIT·····	4
CALL JOB:ABC · · · · · · · ·	5
END	

In the above job, when the command  ${\rm \textcircled{O}}$  is executed, loading of the job is executed with PC.

Normally, when NWAIT is not specified, the commands of ② and later are not executed until the job loading is completed. However, when NWAIT is specified, the commands ③ and ③ are executed sequentially during the job loading; at execution of SWAIT command ④, the execution of command ⑤ is waited for the job "ABC" loading is completed.

At the time of completion of job "ABC" loading, the command (5) is executed to execute the job "ABC".

At this time, if SWAIT command is not specified before the command (\$), the command (\$) is executed during the loading of job "ABC", and an alarm occurs.

Therefore, be sure to verify that loading is completed before executing a job to be loaded, by using SWAIT command.

To load/save variables, be sure to input a SWAIT command before using variables to be loaded/saved as shown below.

(Correct)	(Wrong)
NOP	NOP
• • •	• • •
LOADV B000 NWAIT	LOADV B000 NWAIT
• • •	• • •
SWAIT	SET B001 B000
SET B001 B000	

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

#### 5.3.5.2 Parallel Execution Using PSTART (Optional)

By using an independent control command (optional), DCI commands can be executed in parallel with general commands.

For example, to execute the job "R1" for robot 1 is to be executed in parallel with the job "S1" for station 1 during job loading, the following procedure is taken :

Job "R1" : Job for robot 1 Job "S1" : Job for station 1

[JOB:R1]	[JOB:S1]
NOP MOVJ VJ=50.00 MOVJ VJ=50.00 PSTART JOB:S1 SUB1 · · · ① LOADJ JOB:ABC · · · · · ② PWAIT · · · · · · · · · ③ CALL JOB:ABC · · · · · · ④ END	NOP MOVJ VJ=50.00 MOVJ VJ=50.00 END

When PSTART command  $\bigcirc$  is executed, the job "S1" starts execution in parallel with the job "R1".

The job "ABC" is loaded by the command @ during execution of the job "S1"; when loading is completed, the YRC1000 waits for the job "S1" to be completed by the command @.

When the execution of job "S1" is completed, the job "ABC" is executed by the command @.

#### 5.3.6 Axis Data Transmission Format

The YRC1000 data transmission function has the following restrictions on transmission of the YRC1000 internal data.

The robot axes are fixed to a 6-axis set.

A base axis and a station axis are recognized as an external axis.

Up to three base axes are available. With station axis data added after base axis data, up to six axes can be handled.

For example, SAVEV BP005 is read as SAVEV BP005 + EX005.

If the one of the variables does not exist in the system, only the other existing variable is used.

However, if the existing variable has not been registered, an error occurs.

The definition of the robot, base, and station axes is used as it is, free of the predetermined axis data R1, B1, and S1.

HW1483358 183/293

- 5 DCI Function
- 5.3 Preparation at the YRC1000 Side

#### <Example>

Transmission data of SAVEV in different system configurations are shown below.

In a system having two base axes (X and Z) and no station axis

If BP005 is pulse type and 1st axis is 100 and 2nd axis is 200, then SAVEV BP005  $\rightarrow$  03, 007 100, 200, 0, 0, 0, 0 If BP005 is XYZ type and X-axis is 123.456 and Z-axis is 234.567, then SAVEV BP005  $\rightarrow$  03, 008 123.456, 234.567, 0,0, 0, 0

· In a system having no base axis and three station axes

If EX005 is pulse type and 1st axis is 500, 2nd axis is 600, and 3rd axis is 700, then SAVES EX005  $\rightarrow$  03, 007 500, 600, 700, 0, 0, 0

• In a system having two base axes (X and Z) and three station axes

If BP005 is pulse type, 1st axis is 100 and 2nd axis is 200, and EX005 is pulse type, 1st axis is 500, 2nd axis is 600, and 3rd axis is 700, then SAVEV BP005  $\rightarrow$  03, 007 100, 200, 500, 600, 700, 0 (Same as for SAVEV EX005) If BP005 is XYZ type, X axis is 123.456, and Z axis is 234.567, and EX005 is pulse type, 1st axis is 500, 2nd axis is 600, and 3rd axis is 700, then SAVEV BP005  $\rightarrow$  03, 008 123.456, 234.567, 500, 600, 700, 0 (same as for SAVEV EX005)

- 5 DCI Function
- 5.4 Preparation at the PC Side

## 5.4 Preparation at the PC Side

When using the DCI function, the "AUTO JOB CHANGER OPERATION" or a customer-created communication application is required on the PC side. For details about this software, refer to "5 AUTO JOB CHANGER OPERATION" or "6 TRANSMISSION APPLICATION PREPARATION PROCEDURES" in the "MOTOCOM32 OPERATION MANUAL(HW9482689)" included with the MOTOCOM32, which is YASKAWA other optional functions.

- 5 DCI Function
- 5.5 Executing the DCI Function

## 5.5 Executing the DCI Function

After starting the application from *chapter 5.4 "Preparation at the PC Side"*, execute the job created in *chapter 5.3 "Preparation at the YRC1000 Side"*.

- 5 DCI Function
- 5.6 Alarm Code

## 5.6 Alarm Code

If the transmission command cannot execute normally, an alarm will occur on the YRC1000. The alarm list and data are shown below.

Table 5-2: Alarm Codes and Data

Code	Message	Data
4104	WRONG EXECUTION OF LOAD INST	Refer to the table below.
4105	WRONG EXECUTION OF SAVE INST	
4106	WRONG EXECUTION OF DELETE INST	

Data	Contents			
001	Insufficient memory capacity			
002	Job editing prohibited			
003	Attempted to load or delete a job being executed.			
004	No specified job			
012	Position data destroyed			
013	Position variable not registered			
017	Command destroyed			
019	Invalid character in job name			
020	Invalid character in label			
023	Invalid character in this system			
024	Syntax error			
090	Control command sending/receiving error (Ethernet)			
104	Error response from PC			
111	Syntax error			
112	Error in position data			
113	No NOP or END command			
117	Format error			
118	Invalid number of data			
120	Data range exceeded			
122	Destroyed file exists			
125	No standard port setting. Confirm the setting of the parameter RS000.			
126	This standard port already used by other function.			
127	This protocol already used by other function.			
128	File accessing in other function			
211	System block error (Receiving EOT while waiting ACK)			
212	System block error (Receiving EOT at starting receiving)			
213	System block error (Receiving EOT before receiving the last block)			
214	System block error (Receiving codes other than EOT before receiving the last block)			
221	Sending error (Retry for NAK exceeded)			
222	Sending error (Timeup for timer A after multiple retries)			
223	Sending error (ACK0/ACK1 order error after multiple retries)			
231	Receiving error (Timeup for timer A while waiting ACK after ENQ, timeup for timer A while waiting ENQ response)			

5 DCI Function

5.6 Alarm Code

Data	Contents
232	Receiving error (Timeup for timer B while receiving text)
233	Receiving error (Heading length is shorter than 6 characters)
234	Receiving error (Heading length is longer than 6 characters)
235	Receiving error (Header number error)
236	Receiving error (Text length exceeds 256 bytes)
237	Receiving error (Receiving other than ENQ while waiting ENQ, receiving other than control code while waiting control code, receiving other than STX, SOH, ENQ, EOT while waiting text)
240	Software error
241	Hardware error (Overrun error)
242	Hardware error (Parity error)
243	Hardware error (Framing error)
244	Hardware error (Sending timeup (timer A))
245	Hardware error (Sending timeup (timer B))

- 5 DCI Function
- 5.7 Troubleshooting

## 5.7 Troubleshooting

#### 5.7.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation"*, and confirm that TCP/IP basic communication can be performed.

#### 5.7.2 Communication Setting Confirmation for Firewall and Security Software

The DCI function uses UDP ports 10000 and 10006.

Confirm that these ports are not blocked by the firewall or security software.

#### 5.7.3 Confirming the Operation of the PC-side Application

Confirm that the PC-side applications are operating normally.

#### 5.7.4 Confirming That the Remote Setting is OFF

Confirm that the settings of the command remote and the read-only option are disabled.

# HW1483358 189/293

- 6 FTP Client Function
- 6.1 Outline

## 6 FTP Client Function

## 6.1 Outline

The FTP client function can send / receive the internal data of the YRC1000 by operating external memory of the YRC1000 via the FTP (File Transfer Protocol), general file transfer protocol. When using this function, refer to "Chap. 7 External Memory Devices" in "YRC1000 OPERATOR'S MANUAL (GENERAL) (R-CSO-A051)".

### 6.1.1 System Configuration

The FTP client function can be used with the following configuration. *Fig. 6-1: System Configuration When Using the FTP Client Function* 



Files that can be sent or received via the FTP client function are described below.

Table 6-1: Files That Can be Sent or Received viathe FTP Client Function

Data type
JOB
Condition file / General data
Parameter
I/O data
System data



For the FTP client function, the system backup (the batch data backup) cannot be performed.

Some of the files above can be saved (loading is not available).

- 6 FTP Client Function
- 6.1 Outline

#### 6.1.2 Communication Target

The following can be used as a communication target of the FTP client function.

Table 6-2: FTP Client Function Communication Target

Device	Software	Details
Windows PC	FTP server software	Free or paid FTP server software such as FileZilla
Ethernet communication- enabled devices	FTP server software	FTP server software

#### 6.1.3 Restriction

- ① Encrypted communications cannot be performed.
- ② Folder operations (folder creation/deletion, relocation of folders) cannot be performed.
- ③ Cannot communicate with the FTP server, which sends welcome message by dividing into plural packets. Make sure that the welcome message is sent in the single packet. For the IIS (Internet Information Service manufactured by Microsoft®) version 7.5.7600.16385, uncheck the checkbox of the "Suppress default banner".

Connections		Actions Rf. Areals
Defuel Web See     Defuel W	- - - -	ti <u>€ Const</u>

- 6 FTP Client Function
- 6.2 Preparation at the PC Side

## 6.2 Preparation at the PC Side

Prepare a PC on which the FTP server software, as the target of the communication, is operated or a network device equivalent to the PC.

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

## 6.3 YRC1000-side Setting and Operation

In order to use the FTP client function, perform the following settings and operations.

#### 6.3.1 Enabling Setting for the FTP Function

Enable the FTP function in accordance with following procedures.

1. Turn ON the power supply while pressing {Main Menu}. Maintenance mode starts.



2. Set the security mode to the "MANAGEMENT MODE".

			<b>Ø</b>	
FILE EX. MEMORY DISPLAY SETUP	SECURITY MODE	J	MODE	
Main Menu	Simple Menu	Maintenar	nce mode	

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation
- 3. Under the Main Menu, select {SYSTEM} {SETUP} "OPTION FUNCTION".

The OPTION FUNCTION window appears.

			1	
SYSTEM FILE EX. MEMORY SS DISPLAY SETUP	OPTION FUNCTION ARC WELDING WELD.PULSE COND.TF LAN INTERFACE SET INTEWORK FUNCTION S EtherNet/IP(CPU B DDAYLIGHT SAVING T LIMITS CUSTOMIZAT: TOOL NO. SWITCHING SI UNIT INDICATION DISPLAY IO NAME IN EXTERNAL IO SETUP VARIABLE ALLOCATION WARIABLE ALLOCATION WARIABLE FUNC.	RANS. FING SETTING Sard) IME ION 3 4 JOB DIGITAL 1/F)	STANDARO NOT USED DETAIL DETAIL DETAIL DETAIL DETAIL DETAIL NOT USED NOT USED DETAIL DETAIL DETAIL NOT USED	
Main Menu	Simple Menu	laintenance mode		

4. After necessary settings are done, select DETAIL of the "NETWORK FUNCTION SETTING".

NETWORK FUNCTION SETTING appears.

			<b>(3)</b>	
FILE FILE EX. MEMORY SD DISPLAY SETUP	NETWORK FUNCTI ETHERNET FTP SAVING CMOS ETHERNET SE	VIA FTP C RVER C	ISED DISABLE DISABLE DISABLE	
Main Menu	Simple Menu	Maintenance mo	ode	

5. Set "FTP" to either "STANDARD" or "EXPAND".

There is no functional differences between the FTP client settings set by "STANDARD" and "EXPAND". This setting affects the FTP server function. For details about the difference between them, refer to *chapter 4.1.3 "Function Mode"*.

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation
- 6. Press [ENTER].

The confirmation dialog box appears.

			<b>(3)</b>	
SYSTEM	NETWORK FUNCTIO	ON SETTING		
FILE	ETHERNET FTP	l B	JSED STANDARD	
	SAVING CMOS ETHERNET SEF	VIAFTP E RVER E	DISABLE DISABLE	_
EX. MEMORY		Modify?		
DISPLAY SETUP	YES	3	NO	
Main Menu	Simple Menu	Maintenance mo	ode	

- Select {YES}. Select {YES} to return to the OPTION FUNCTION window.
- 8. Turn ON the power supply again. Turn ON the power supply again to start the normal operation mode.

#### 6.3.2 Setting for the FTP Connection Condition

Set the FTP connection condition in accordance with the following procedures.

1. In the Main Menu, select {EX. MEMORY} - {FTP PROFILE}. FTP PROFILE window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 🔞	10 🖳 👆
EXTERNAL M	EMORY DEV. E	ICE			
HOST ADD USER ID	RESS				
PASSWORD DIRECTOR	Y				
Main Menu	Simp	le Menu			

 Set the connection condition. Set the connection conditions as needed.

#### HOST ADDRESS

For the communication target IP address, use half-width numbers and periods (.), and set "xx.xx.xx" using the following format (xx is a decimal number from 0 to 255). Note that if the DNS client function is enabled, a host name can be set instead of an IP address. Characters that can be used for the host name are half-width alphanumeric characters, hyphens (-), underscores (\_), and periods (.). Set it within 50 characters or less.

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

#### USER ID

Set the user ID for logging into the FTP server. Characters that can be used for the user ID are half-width alphanumeric characters, hyphens (-) and underscores (\_). Set it within 16 characters or less.

#### PASSWORD

Set the password for logging into the FTP server. Characters that can be used for the password are half-width alphanumeric characters, hyphens (-) and underscores (\_). Set it within 32 characters or less.

#### DIRECTORY

Set the default directory for logging into the FTP server. Characters that can be used for the default directory are half-width alphanumeric characters, hyphens (-), underscores (\_), and slashes (/). Set it within 63 characters or less. Do not use a slash (/) at the beginning of the directory.

#### 6.3.3 Selecting the FTP Function

Specify a FTP client as the external memory device to be used.

- 1. Select {EX. MEMORY} {DEVICE / SETUP} under the Main Menu.
  - DEVICE / SETUP window appears.
- 2. Select "FTP".
  - FTP is selected as the external memory device.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 🔞	🙋 🖵 🙌
DEVICE /	SETUP			2	
DEVICE FILE S JOB LO	AVE OVERWRI AD OVERWRII	TE IN	P VALID VALID		
Main Men	u Simp	le Menu			

#### 6.3.4 Save

Save means the operation to PUT (write) data from the YRC1000 to the FTP server.



- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

## 6.3.4.1 Saving a Job

- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {SAVE}.
  - The SAVE window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 🔞	10 🖳 🙌
EXTERNAL M FTP(SAVE)	MEMORY DEVI	CE			
□ JOB □ FILE/0	GENERAL DAT	A	(	]	
	TA			] ]	
	A DATA		ι	J	
Main Menu	J Simp	le Menu			

- 3. Select "JOB".
  - The job list appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 🖌	🔞 🔯 🖵 🙌	Þ
EXTERNAL DEVICE FT	MEMORY DEV: P	CE(SAVE)		SINGLE NO.	5	
TEST1 TEST2 TEST3 TEST4 TEST5			* * * *			
				PAGE		
Main Men	u Simp	le Menu				

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation
- 4. Select the job to save.

- "  $\star$  " will appear for the selected job.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 🖌	🔞 🔯 📮	•
EXTERNAL M DEVICE FTP	EMORY DEVI	CE(SAVE)		SINGLE NO.	5	
★IEST1 TEST2 TEST3 TEST4			* * * *			
TEST5			*			
				PAGE		
Main Menu	Simp	le Menu				

- 5. Press [Enter].
  - The confirmation dialog box appears.

DATA	EDIT	DISPLAY	UTILITY	] 12 🗷 네	👒 🙋 🗆	} ( <del>h</del>	Þ
EXTERNAL N DEVICE FT	MEMORY DEVI	CE(SAVE)		SINGLE NO.	5		
★TEST1 TEST2 TEST3			* * *				
TEST4 TEST5			Save	e?			
		YES		NO			
				PAGE			
Main Men	J Simp	le Menu					

6. Select {YES}.

- The selected job will be saved.

## 6.3.4.2 Saving Files Except for Job

Save required files using the same procedure as *chapter 6.3.4.1* "Saving a Job".

With the FTP client function, saving of the system backup file (CMOS.BIN) is not available.

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

#### 6.3.5 Load

The operation is to GET (read) data from the FTP server to the YRC1000. The operating procedure is the same as saving.

#### 6.3.5.1 Loading a Job

- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {LOAD}.
  - The LOAD window appears.
- 3. Select {JOB}.
  - The job list appears.
- 4. Select the job to load.
  - "  $\star$  " will appear for the selected job.
- 5. Press [Enter].
  - The confirmation dialog box appears.
- 6. Select {YES}.
  - The selected job will be loaded.
- 6.3.5.2 Loading File Except for Job

Load the required files using the same procedure as *chapter 6.3.5.1 "Loading a Job"*.

The FTP client function cannot load the parameters and the system backup file (CMOS.BIN).

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

#### 6.3.6 Verification

This operation is to verify the YRC1000 data and the FTP server data.

If there is any difference, a notification message will appear.

The operating procedure is the same as saving.

#### 6.3.6.1 Verifying a Job

- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {VERIFY}.
  - The VERYFY window appears.
- 3. Select {JOB}.
  - The job list appears.
- 4. Select job to verify.
  - "  $\star$  " will appear for the selected job.
- 5. Press [Enter].
  - The confirmation dialog box appears.
- 6. Select {YES}.
  - The selected job will be verified.

#### 6.3.6.2 Verifying File Except for Job

Verify any required files using the same procedure as *chapter 6.3.6.1 "Verifying a Job"*.

The FTP client function cannot verify the system backup (CMOS.BIN).

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

#### 6.3.7 Selecting Job and Data File

The method of selecting a job and various data files when loading, saving, verifying, and deleting are described in the following:

- Individual Selection Jobs and data files are selected individually one at a time.
- Batch Selection Jobs and data files are selected all at one time.
- Marker (\*) Selection
   Loading: selects the files in the external memory device.
   Saving: selects the files in the memory of the YRC1000.
   Verifying: selects both the files in the external memory device and in the memory of the YRC1000.
- Batch Selection (individual file) Jobs and data files (FILE/GENERAL DATA, PARAMETER, I/O DATA, SYSTEM DATA) are selected all at one time. This operation can be performed on the window where the data type of the external memory device is selected. Only in the case of saving and verifying, operation of the external memory device can be performed.

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

## Using Individual Selection

1. In either the external memory JOB LIST window or the file selection window, move the cursor to a job or a file to be selected.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 📶	😢 🖾 🕞 👘	Þ
EXTERNAL DEVICE FT	MEMORY DEV P	ICE(SAVE)		SINGLE NO.	5	
TEST1 TEST2 TEST3 TEST4 TEST5			* * * *			
Main Men	u Simp	)le Menu				

2. Press [SELECT].

Move the cursor to a file needed and press [SELECT] again. \*To cancel the selected items, select {EDIT} and then {CANCEL SELECT}.

– The selected jobs are marked with "  $\star$  ".

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶	😢 🔯 🕞 👘	▶
EXTERNAL DEVICE FT	MEMORY DEV: P	ICE(SAVE)		SINGLE NO.	5	
★TEST1 ★TEST2			* *			
★TEST3 TEST4 TEST5			* *			
Main Men	u Simp	le Menu				

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

#### Using Batch Selection

- 1. In either the external memory JOB LIST window or the file selection window, select {EDIT} under the menu.
  - The pull-down menu appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 🖌	📢 🔟 📑 👆	Þ
EXTERNAL DEVICE FT	SELECT ALL	WE)		SINGLE NO.	5	
TEST1 TEST2	SELECT MARK (*)	KER	*			
TEST3 TEST4	CANCEL SEL	ECT	* *			
IE010			*			
Main Men	u Simp	le Menu				

- 2. Select {SELECT ALL}.
  - All files are selected.

\*To cancel the selected items, select {EDIT} and then {CANCEL SELECT}.

DATA	EDIT	DISPLAY	UTILITY	12 🖻 🖌	🔞 🔯 🖵 👌	Þ
EXTERNAL DEVICE FT	Memory de P	VICE(SAVE)		SINGLE NO.	5	
			*			
★TEST3			* *			
★TEST5			*			
	- T					
Main Mer	iu Si	mple Menu				

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation

## Using Marker (\*) Selection

- 1. In either the external memory JOB LIST window or the file selection window, select {EDIT} under the menu.
  - The pull-down menu appears.



Select {SELECT MARKER (\*)}.
 \*To cancel the selected items, select {EDIT} and then {CANCEL SELECT}.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 🖌	😢 🔯 🗔	} 🙌 🗈
EXTERNAL DEVICE FT	MEMORY DEV. P	ICE(SAVE)		SINGLE NO.	5	
★TEST1			*			
★TEST2 ★TEST3			*			
★TEST4			*			
ALLOTO						
Main Men	u Simp	le Menu				

6 FTP Client Function

6.3 YRC1000-side Setting and Operation

#### Using Batch Selection (individual file)

For two or more types of data (JOB, FILE/GENERAL DATA, PARAMETER, I/O DATA, SYSTEM DATA), the data can be selected all at one time. This operation can be performed when saving or verifying the data in the external memory device.

 On the window where the types of data in the external memory device are selected, select {SELECT ALL (INDIVIDUAL)} from the pull-down menu {EDIT}.

DATA	EDIT	DISPLAY	UTILITY	12 🖻 📶 😣	10 🕞 👆
EXTERNAL FTP(SAVE	SELECT ALL (INDIVIDUAL)	,			
□ JOB □ FILE/	CANCEL ALL (INDIVIDUAL)	,	(	)	
	ATA M DATA		(	) ) )	
	m Daid			,	
Main Mer	u Simp	le Menu	i) Turn on	servo power	

 On the left of JOB, FILE/GENERAL DATA, PARAMETER, I/O DATA, and SYSTEM DATA, the signs "★" appear and indicate the items are selected.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 📶 🔞	10 🕞 👘
EXTERNAL FTP(SAVE	MEMORY DEVI )	ICE			
★□ JOB ★□ FILE/	GENERAL DAT	ΓA	(	)	
★□ PARAM ★□ I/0 D	ETER ATA		(	)	
	M DATA		l	J	
Main Men	u Simp	le Menu	i) Turn on	servo power	

3. Press [ENTER].

- 6 FTP Client Function
- 6.3 YRC1000-side Setting and Operation
- The confirmation dialog box appears. When saving the data, "Do you save all individual files?" appears. When verifying the data, "Do you verify all individual files?" appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 🖬 🕯	🙈 🔞 🗆	} (*
EXTERNAL MEMO FTP(SAVE)	RY DEVIC	E				
★□ <mark>JOB</mark> ★□ FILE/GENE ★□ PARAMETER	RAL DATA			0 0 0		
★□ I/O DATA ★□ SYSTEM DA	Do	you sav	e all i	0 ndividual fil	es?	
		YES		NO		
Main Menu	Simple	e Menu	🌒 Turn c	n servo power		

- 5. Select "YES".
  - The data of the data type selected all at one time is saved or verified in the external memory device.

DATA	EDIT	DISPLAY	UTILITY	12 🗳 🖌	😣 🔟 🖵	} ( <del>h</del>
EXTERNAL MEMO FTP(SAVE)	RY DEVI	Έ				
□ JOB □ FILE/GENE	RAL DATA	ł		5 12		
□ PARAMETER □ I/O DATA				19 8		
LI SYSTEM DA	ATA .			31		
Main Menu	Simpl	e Menu	Į Turn o	n servo power		



 Move the cursor to the data type (JOB, FILE/GENERAL DATA, PARAMETER, I/O DATA, SYSTEM DATA) and press [SHIFT] + [SELECT] to individually select/cancel the data type.

• To perform operation (save/verify) of the external memory device all at one time for one specific data type, press [SHIFT] + [SELECT], and while the specific data type is selected, perform the steps 3 to 5 above.



To cancel all the selection on the window where the data type is selected, select {CANCEL ALL (INDIVIDUAL)} from the pull-down menu {EDIT}. The selection of the data types is canceled all at one time, and the signs "  $\star$ " on the left of JOB, FILE/GENERAL DATA, PARAMETER, I/O DATA, and SYSTEM DATA are hidden.

- 6 FTP Client Function
- 6.4 Troubleshooting

## 6.4 Troubleshooting

#### 6.4.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation*", and confirm that the basic communication of TCP/IP is performed.

#### 6.4.2 Communication Setting Confirmation for Firewall and Security Software

Confirm that FTP communications are not blocked by the firewall or security software.

#### 6.4.3 Confirming the FTP Server Operation

Confirm that the PC-side FTP server is operating normally.

#### 6.4.4 Confirming That the Remote Setting is OFF

Confirm that the settings of the command remote and the read-only option are disabled.

# HW1483358 207/293

7 Internal Data Browsing Function by Using a Web Browser

7.1 Outline

\_\_\_\_\_

Internal Data Browsing Function by Using a Web Browser

### 7.1 Outline

The internal data browsing function by using a Web browser is that by using the web browser such as Internet Explorer® by Mircrosoft®, the data in the YRC1000 can be browsed.

#### 7.1.1 System Configuration

7

The internal data browsing function by using a Web browser can be used with the following configuration.

*Fig. 7-1: System Configuration When Using the Internal Data Browsing Function by Using a Web Browser* 



#### 7.1.2 Communication Target

The following can be used as a communication target of the internal data browsing function by using a Web browser.

Table 7-1: Communication	Target of	the Internal	Data I	Browsing	Function
by Using a Web Browser					

Device	Software	Details
Windows PC	WEB browser	WEB browser Internet Explorer®, Firefox, etc.
Ethernet communication- enabled devices	WEB browser	WEB browser

#### 7.1.3 Restriction

1) Restriction of the function by the remote mode

The internal data browsing function by using a Web browser can be executed only when the command remote is enabled.

For command remote, refer to *chapter 1.2* "Command Remote Setting for YRC1000".

2) Simultaneous use with other transmission functions

No error may occur when other communication function is performed simultaneously with this communication function, however this communication function is made to wait until the process of other communication function is completed.

- 7 Internal Data Browsing Function by Using a Web Browser
- 7.2 Setting Method

## 7.2 Setting Method

#### 7.2.1 Function Setting

Enable the internal data browsing function by using the Web browser in accordance with the following procedures.

1. Turn ON the power supply while pressing {Main Menu}. Maintenance mode starts.



2. Set the security mode to the "MANAGEMENT MODE".

			<b>(iii</b> )	
SYSTEM FILE EX. MEMORY SD DISPLAY SETUP Aa	SECURITY MODE	MANAGEMENT MOD		
Main Menu	Simple Menu	Maintenance m	ode	

- 7 Internal Data Browsing Function by Using a Web Browser
- 7.2 Setting Method
- 3. Under the Main Menu, select {SYSTEM} {SETUP} "OPTION FUNCTION".

The OPTION FUNCTION window appears.

			1	
SYSTEM FILE EX. MEMORY DISPLAY SETUP	OPTION FUNCTION ARC WELDING WELD.PULSE CONC LAN INTERFACE S NETWORK FUNCTIO EtherNet/IP(CPU DAYLIGHT SAVING LIMITS CUSTOMIZ TOOL NO. SWITCH SI UNIT INDICAT	). TRANS. SETTING IN SETTING J Board) 3 TIME 2ATION HING TION	STANDARD NOT USED DETAIL DETAIL DETAIL DETAIL DETAIL NOT USED NOT USED	
	DISPLAY IO NAME DEXTERNAL IO SET VARIABLE ALLOCA WELDCOM FUNC. (A MotoPlus FUNC.	EIN JOB TUP ATION ARC DIGITAL I/F)	NOT USED DETAIL DETAIL DETAIL NOT USED	
Main Menu	Simple Menu	Maintenance mode	e	

4. After necessary settings are done, select DETAIL of the "NETWORK FUNCTION SETTING".

NETWORK FUNCTION SETTING appears.

		Ø
FILE EX. MEMORY DISPLAY SETUP	NETWORK FUNCTION SETTING ETHERNET FTP SAVING CMOS VIA FTP ETHERNET SERVER	USED DISABLE DISABLE DISABLE DISABLE
Main Menu	Simple Menu Mainten	ance mode

5. Set "ETHERNET SERVER" to "EXPAND".

- 7 Internal Data Browsing Function by Using a Web Browser
- 7.2 Setting Method
- 6. Press [Enter].

The confirmation dialog box appears.



7. Select {YES}.

If the network function settings are correct, select {YES}. Return to the OPTION FUNCTION window.

### 7.2.2 Command Remote Setting

Set the command remote to "VALID".

For procedures to enable the command remote, refer to chapter 1.2.3 "Command Remote Setting Method".

# HW1483358 211/293

- 7 Internal Data Browsing Function by Using a Web Browser
- 7.3 Transmission Procedure Example

## 7.3 Transmission Procedure Example

- 1. Enter 'http://YRC1000's IP address/' into the address bar of Internet Explorer®.
  - The following window appears.

	YASKAWA Robot Controller	
	(YRC1000)	
	Information index	
		HOST: MY-HOS
Back		
	File Index	
	Back	

- 2. Select "File Index" from the window.
  - The following window appears.

C (2) MEMO/1992.148.255.3/7439 (2) + (2) (2) MY-HOST ×
YASKAWA Robot Controller
(YRC1000)
Information index
HOST: MY-HOST
Teck
JDE DAT CRO SIS FEM IST CRV LOG TAT
Beck

- 7 Internal Data Browsing Function by Using a Web Browser
- 7.3 Transmission Procedure Example
- 3. For the following, click a folder or a file to be accessed in the same way.

YASKAWA Robot Controller					
	Information index				
	HOST: MY-HO	os			
1					
ARCSUPEAT	ARC ALMULARY COND DATA				
VARDAT	VARAELE DATA				
ALMERT DAT	ALCONTRACTORY DATA				
LWORD DAT	LISER WORD				
REVALLOCIDAT	KEY ALLOCATION DATA				
WELDERDAT	POWER SOLIFICE COND. DATA				
WELDLOEF DAT	POWER SOURCE USE DEF DATA				
SVMONDAT	SV MONITOR SIGNAL				
VAENAME.OAT	VAPIAALE NAME				
HUME LINT	SECOND HOME POSITION				
CONCORD DAT	HUNK, CAR LOG DATA				
De Lote d'Aller	LO MESSAGE HISTORY DATA				
E. 20, Proc. ar-Proc. 1, 1, 165, 7	IO NAME DATA				
IONALE DAT					
COMMEDAT PSELCOINDAT	FSELDO INFUT SIONAL				
CNAME DAT PSEUCONDAT COMMANE DAT	ESELEO INFUT SIGNAL EEGISTERINATE DATA				
CAMAGINE FORT PSEUCON DAT COMAME DAT EXCAME DAT	ESELCO INFULSIONAL TECNISTER NAME DATA EXTERNAL O NAME DATA				

C C Matpu//192.168.255.1/PCRT (D + C) C MrtHOST x	n * 0
YASKAWA Robot Controller	^
(YRC1000)	
Information index	
	HOST: MY-HOST
Beck	
//98 //FYNM 5.0.0.0 //JPWE 50.100.100.100.100.100.10.0.0	
$2^{+}$ $0^{+$	
0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 0 = 0 = 0 = 0 = 0 = 0 = 0 = 0 0 = 0 = 0 = 0 = 0 = 0 = 0	
///1 6.0.6.0.6.0.5.0.6.0.6.0 6.0.6.0.6.0.5.0.6.0.6.0 6.0.6.0.0.0.5.0.6.0.0	
(0, 0, 1, 0, 1, 0, 1, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	
0.0.0.0.0.0.0.0.0.0 0.0.0.0.0.0.0.0.0.0	

# HW1483358 213/293

- 7 Internal Data Browsing Function by Using a Web Browser
- 7.4 Troubleshooting

## 7.4 Troubleshooting

#### 7.4.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation"*, and confirm that TCP/IP basic communication can be performed.

#### 7.4.2 Communication Setting Confirmation for Firewall and Security Software

Confirm that HTTP communications are not blocked by the firewall or security software.

- 8 Ethernet Server Function
- 8.1 Outline

## 8 Ethernet Server Function

## 8.1 Outline

The Ethernet server function is that the host control function of the YRC1000 Ethernet function can be communicated by using easier protocol.

#### 8.1.1 System Configuration

The Ethernet server function can be used with the following configuration.

Fig. 8-1: System Configuration When Using the Ethernet Server Function



#### 8.1.2 Communication Target

The following can be used as a communication target of the Ethernet server function.

Table 8-1: Communication	Target of the	Ethernet Server	Function
--------------------------	---------------	-----------------	----------

Device	Software	Details	
Windows PC	Host control	Application software included with the MOTOCOM32 which is an optional function.	
	MOTOCOM32 application	Customer-created communication application software by using the communication DLL included with the MOTOCOM32 which is an optional function.	
	Customer-created application	By referring the communication procedure described later, a customer-created communication application software	
Ethernet communication- enabled devices	Customer-created application	By referring the communication procedure described later, a customer-created communication application software	

- 8 Ethernet Server Function
- 8.1 Outline

## 8.1.3 General Information for When Using the Ethernet Server Function

When using the Ethernet server function, refer to *chapter 11.1 "General Information About the Host Control System Function"*.

#### 8.1.4 Restriction

1) Restriction of the function by the remote mode

The Ethernet server function can be executed only when the command remote is enabled.

For command remote, refer to *chapter 1.2* "Command Remote Setting for YRC1000".

#### 2) Simultaneous use with other transmission functions

No error may occur when other communication function is performed simultaneously with the Ethernet server function, however this communication function is made to wait until the process of other communication function is completed.

#### Automatic Close of Socket

In the Ethernet server function, the socket is automatically closed in the following cases to prevent the socket connection from remaining unreasonably.

- When the command execution is completed at a single command execution
- When the command execution for the specified number of times is completed at multiple commands execution
- When the command is not input for a given amount of time (approx. 30 seconds) at multiple commands execution
- When the processing ends abnormally (Including the case that the interpreter message is sent back.)

When the socket is closed, connect the socket again.

4) JWAIT command and sending/receiving file commands

The Ethernet server function cannot be used with JWAIT command of the host control function or sending/receiving file commands.
- 8 Ethernet Server Function
- 8.1 Outline

5) Restrictions on the Number of Sockets

The Ethernet server function, being different from the host control function of the YRC1000 Ethernet function, adopts TCP, and arbitrary number can be used for the port on the PC side. Furthermore, the Ethernet server function can perform faster data transmission compared to the host control function.

For this reason, if a socket is repeatedly created/closed in a small amount of time in the setting that allows the use of arbitrary unoccupied port for the port on the PC side, many sockets remain waiting for time-out.

Since the number of available sockets is limited, if sockets are used up to this limit, a new socket cannot be created until the remained sockets time out.

To avoid this, perform the following procedures if necessary.

- Perform multiple commands execution, not single command execution.
- Use a fixed number for the port number on the PC side.
- (If sockets are insufficient on the PC side) Execute "reset close" of the socket.

#### 6) Restrictions on Transmission Text Length

The text length of the Ethernet server function is limited up to 256 bytes. When sending command data to the YRC1000 from the PC side, messages exceeding 256 bytes cannot be sent.

If an answer is sent back to the PC from the YRC1000, the message exceeding 256 bytes are split into several packets and sent back.

#### 7) Restrictions on Access from Multiple PCs

Communication resources of the YRC1000 are occupied by the PC during the period from when the PC sends a communication start request (CONNECT Robot\_access<CR><LF>) until when the YRC1000 sends back an answer.

In this situation, communication start requests from other PCs (or other application in the same PC) cannot be accepted. The request from the Ethernet function and the FTP function cannot be accepted as well.

For this reason, the start requests from other PCs are forced to wait until an earlier request is completed. Especially if a start request is specified to infinite execution (CONNECT Robot\_access Keep-Alive:-1<CR><LF>), START requests from other PCs cannot be received.

If accesses from multiple PCs are required, build a system so that a particular application does not occupy the communication resources.

# HW1483358 217/293

- 8 Ethernet Server Function
- 8.2 Setting

# 8.2 Setting

### 8.2.1 Function Setting

Enable the Ethernet server function in accordance with following procedures.

1. Turn ON the power supply while pressing {Main Menu}. Maintenance mode starts.



2. Set the security mode to the "MANAGEMENT MODE".

			<b>(iii</b> )	
SYSTEM FILE EX. MEMORY SD DISPLAY SETUP	SECURITY MODE	MANAGEMENT MOD		
Main Menu	Simple Menu	Maintenance m	ode	

- 8 Ethernet Server Function
- 8.2 Setting
- 3. In the Main Menu, select {SYSTEM} {SETUP} "OPTION FUNCTION".

The OPTION FUNCTION window appears.



4. After necessary settings are done, select DETAIL of the "NETWORK FUNCTION SETTING".

NETWORK FUNCTION SETTING appears.

SYSTEM	NETWORK FUNCTION SETTING	
FILE EX. MEMORY EX. SETUP DISPLAY SETUP	ETHERNET FTP SAVING CMOS VIA FTP ETHERNET SERVER	USED DISABLE DISABLE DISABLE
Main Menu	Simple Menu - Mainte	mance mode

5. Set "ETHERNET SERVER" to either "STANDARD" or "EXPAND". When "EXPAND" is set, the internal data browsing function by using the Web browser can be used. For details, refer to *chapter 7 "Internal Data Browsing Function by Using a Web Browser"*.

- 8 Ethernet Server Function
- 8.2 Setting
- 6. Press [Enter].

The confirmation dialog box appears.

		<b>Ø</b>	
SYSTEM	NETWORK FUNCTION SETTING		
	ETHERNET FTP	USED DISABLE	
	SAVING CMOS VIA FTP ETHERNET SERVER	DISABLE STANDARD	
EX. MEMORY	Modify?		
DISPLAY SETUP	YES	NO	
Main Menu	Simple Menu Mainter		

7. Select {YES}.

If the network function settings are correct, select {YES}. Return to the OPTION FUNCTION window.

### 8.2.2 Command Remote Setting

Set the command remote to "VALID".

For procedures to enable the command remote, refer to chapter 1.2.3 "Command Remote Setting Method".

- 8 Ethernet Server Function
- 8.3 Communication Method

### 8.3 Communication Method

Shows the transmission procedure for the Ethernet server in this chapter.



In the Ethernet server function, processings other than socket connection are performed by the transmission of ASCII character string. The processings are not correctly performed if the ASCII character string is not in accordance with the ASCII code. Use case-sensitive ASCII character string.

#### 8.3.1 Transmission procedure

The command transmission with the YRC1000 Ethernet server function proceeds as follows.

- 1. Connects a socket on the TCP port 80 of the YRC1000 from the PC.
- 2. The PC sends a START request.
- 3. After the START request is accepted, the YRC1000 sends the response to the START request.
- 4. The PC sends a command.
- 5. The YRC1000 sends the response to the command sent from the PC.
- 6. The PC sends command data if required.
- 7. The YRC1000 sends an answer.
- 8. Closes a TCP socket from the PC.

For more information on the procedures, refer to the descriptions in the next and later paragraphs.

Fig. 8-2: Outline of Command Transmission by Ethernet Server Function



#### 8.3.1.1 Socket Connection

Connects a socket on the TCP port 80 of the YRC1000 from the PC.

- 8 Ethernet Server Function
- 8.3 Communication Method

#### 8.3.1.2 START Request

The PC sends a character string of a START request: "CONNECT Robot\_access<CR><LF>".

This character string allows for a single command processing.

If multiple commands need to be processed in a row, the PC sends a character string: "CONNECT Robot\_access Keep-Alive:n < CR > <LF >". The following integer values can be specified in n.

2 to 32767 : Executes as many commands as the number specified in *n*.

-1 : Executes infinite number of commands.

#### 8.3.1.3 Response to START Request

After receiving a START request from the PC, the YRC1000 sends back a character string for the response to the request.

If the YRC1000 normally receives a START request, it sends a character string: "OK: YR Information Server(Ver).<CR><LF>" for a single command processing and "OK: YR Information Server(Ver) Keep-Alive: *n*.<CR><LF>" for processing of multiple commands. In each case the YRC1000 waits for reception of *chapter 8.3.1.4 "Command"* after sending back a character string.

If the YRC1000 cannot normally receive a START request, it sends back a character string: "NG: *HTTP Error Response*<CR><LF>", and closes a socket.

#### 8.3.1.4 Command

The PC sends a character string: "HOSTCTRL\_REQUEST **Command Size**<CR><LF>".

#### Command

Use the character strings listed in *chapter 8.3.2 "Command Detail"* for *Command*.

#### Size

For *Size*, use the ASCII character string which represents the byte number in decimal form, of character string that is sent in *chapter 8.3.1.6 "Command Data"*. This byte number is calculated including the linefeed code <CR> at the end of the character string. If no command data are sent, writes "0" in *Size*.

#### 8.3.1.5 Response to Command

After receiving a command from the PC, the YRC1000 sends back a character string for the response to the command.

The YRC1000 normally sends back a character string: "OK: *Command*<CR><LF>". Furthermore, if the *Size* specified in *chapter 8.3.1.4 "Command"* is "0", the YRC1000 responses according to *chapter 8.3.1.7 "Answer*". If the *Size* is other than "0", the YRC1000 waits for *chapter 8.3.1.6 "Command Data"*.

At an error, the YRC1000 sends back a character string: "NG: *Message*<CR><LF>" and closes a socket.

- 8 Ethernet Server Function
- 8.3 Communication Method

8.3.1.6 Command Data		
	If a command is accompanied by data, the PC sends a character string of the command data. The command data differ from <b>Command</b> to <b>Command</b> . ( <b>Command</b> is not always accompanied by command data.) Make sure to add the linefeed code <cr> to the end of the command data character string.</cr>	
	The description method of command data differs with each <b>Command</b> . Refer to <i>chapter 8.3.2 "Command Detail"</i> for details on the description method.	

#### 8.3.1.7 Answer

The YRC1000 sends back an answer in the following format according to a request from the PC.

Classification	Subclassification	Format	
At normal answer	In case that the YRC1000 sends back <b>data</b>	Data <cr> (Refer to <i>chapter 8.3.2 "Command Detail</i>").</cr>	
	In case that the YRC1000 answers normally (In the absence of <b>data</b> )	0000 <cr><lf></lf></cr>	
At abnormal answer	In case that the YRC1000 sends back an error answer	ERROR:[ <b>Command</b> ] is not successful ( <i>xxxx</i> ). <cr><lf> * <i>xxxx</i> indicates an interpreter message.</lf></cr>	
At socket error	In case that an error occurs at socket processing	ERROR: <b>Message</b> <cr><lf></lf></cr>	

The linefeed code of when *data* are sent back as normal answer is different from the one of the case other than normal answer with *data* sent back.

The linefeed code of the normal answer with data sent back: <CR>

The linefeed code of the case other than above: <CR><LF>

The format when *data* are sent back as normal answer varies from each command. For details in the format, refer to *chapter 8.3.2 "Command Detail"*. For interpreter message, refer to *chapter 11.1.5 "Interpreter Message"*.

8.3.1.8 Closing of a Socket

A socket is closed.

# HW1483358 223/293

- 8 Ethernet Server Function
- 8.3 Communication Method

#### 8.3.2 Command Detail

The following show how to use each command.

The answer for each command is the one at normal answer.

For details on robot control function, commands for multi-control group and independent control functions, and interpreter message list, refer to *chapter 11.1 "General Information About the Host Control System Function"*.

#### 8.3.2.1 Status Read Function

Read/Monitor Command

## RALARM

Reads the error alarm code.

Command format: RALARM

Command data: None

Answer format: Data-1, Data-2, Data-3, Data-4, · · · , Data-10

Data-1 = Error code (0 to 9999)

Data-2 = Error data (0 to 256)

Data-3 = Alarm code (0 to 9999)

Data-4 = Alarm data (0 to 256)

Data-5 = Alarm code (0 to 9999)

Data-6 = Alarm data (0 to 256)

Data-7 = Alarm code (0 to 9999)

Data-8 = Alarm data (0 to 256)

Data-9 = Alarm code (0 to 9999)

Data-10 = Alarm data (0 to 256)

- 8 Ethernet Server Function
- 8.3 Communication Method

## **RPOSJ**

Reads the current position in joint coordinate system.

Command format: RPOSJ

Command data: None

Answer format: Data-1, Data-2, Data-3, Data-4,  $\cdot \cdot \cdot$ , Data-12 (For robots with 6 axes or less)

- Data-1 = Number of S-axis pulses
- Data-2 = Number of L-axis pulses
- Data-3 = Number of U-axis pulses
- Data-4 = Number of R-axis pulses
- Data-5 = Number of B-axis pulses
- Data-6 = Number of T-axis pulses
- Data-7 = Number of 7th axis pulses
- Data-8 = Number of 8th axis pulses
- Data-9 = Number of 9th axis pulses
- Data-10 = Number of 10th axis pulses
- Data-11 = Number of 11th axis pulses
- Data-12 = Number of 12th axis pulses
  - For 7-axis robots, Data-7 (number of pulses of the 7th axis) is the number of pulses of the E-axis and Data-13 (number of pulses of the 13th axis) is added.

- 8 Ethernet Server Function
- 8.3 Communication Method

#### RPOSC

Reads the current position in a specified coordinate system. The specification with or without external axis can be made.

Command format: RPOSC

Command data: Data-1, Data-2

Data-1 = Specification of coordinate system

- 0: Base coordinate
- 1: Robot coordinate
- 2: User coordinate 1

65: User coordinate 64

Data-2 = With or Without external axis

- 0: Without external axis
- 1: With external axis

Answer format: Data-1, Data-2, Data-3, Data-4,  $\cdot \cdot \cdot$ , Data-14 (For robots with 6 axes or less)

Data-1 = X coordinate value (unit: mm, significant 3 decimal points)

Data-2 = Y coordinate value (unit: mm, significant 3 decimal points)

Data-3 = Z coordinate value (unit: mm, significant 3 decimal points)

Data-4 = Wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal point)

Data-5 = Wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal point)

Data-6 =Wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal point)

Data-7 =Type

Data-8 = Tool number (0 to 63)

Data-9 = Numter of 7th axis pulses (for travel axis, mm)

Data-10 = Number of 8th axis pulses (for travel axis, mm)

Data-11 = Number of 9th axis pulses (for travel axis, mm)

Data-12 = Number of 10th axis pulses

Data-13 = Number of 11th axis pulses

Data-14 = Number of 12th axis pulses

 Data-9 to Data-14 are added only when "With external axis" is specified.

226/293

- 8 Ethernet Server Function
- 8.3 Communication Method
  - If the specified user coordinate system is undefined, an error answer is sent back.
  - Data of the type are represented by the following bit data coded into a decimal number.



• For 7-axis robots, the elbow angle posture Re is inserted between Data-6 (Wrist angle Rz coordinate value) and Data-7 (Type). Therefore, the numbers of Data-7 and later are increased by 1 and the final data is Data-15.

# HW1483358 227/293

- 8 Ethernet Server Function
- 8.3 Communication Method

## **RSTATS**

Reads the status of mode, cycle, operation, alarm error, and servo.

Command format: RSTATS

Command data: None

Answer format: Data-1, Data-2,

Data-1 = Represented by the following bit data coded into a decimal number



Data-2 = Represented by the following bit data coded into a decimal number



- 8 Ethernet Server Function
- 8.3 Communication Method

## RJSEQ

Reads the current job name, line No. and step No.

Command format: RJSEQ

Command data: None

Answer format: Data-1, Data-2, Data-3 Data-1 = Read job name Data-2 = Read line No. (0 to 9999) Data-3 = Read step No. (1 to 9998)

## JWAIT

The Ethernet server function does not support the JWAIT command.



Use the command: JWAIT in the Host Control function.

- 8 Ethernet Server Function
- 8.3 Communication Method

#### RGROUP

Reads the current control group set by the CGROUP command or CTASK command, and the task selection status.

Command format: RGROUP

Command data: None

Answer format: Data-1, Data-2, Data-3

Data-1 = Robot control group information

· Represented by the following bit data coded into a decimal number



#### Data-2 = Station control group information

#### · Represented by the following bit data coded into a decimal number





- 8 Ethernet Server Function
- 8.3 Communication Method

Data-3 = Task information

In a system where independent control group is not allowed, "0" is returned.

- 0: Master task
- 1: Sub 1 task

2: Sub 2 task

.

15: Sub 15 task

#### Read/Data Access System Command

#### RJDIR

Reads all job names, or the names of jobs related to the parent job.

Command format: RJDIR

Command data: Job-Name

Job-Name = \*

= Parent job name

If Job-Name is specified with "\*", RJDIR reads all the job names currently registered.

If Job-Name is specified with a parent job name, RJDIR reads the name of related jobs excluding the parent job. If there is not related child jobs, the command returns the null list. If the parent job has related child jobs but they are not registered in the system, an error occurs.

Answer format: Name-1, Name-2, · · · , Name-N Name-1 = Job name-1 Name-2 = Job name-2

Name-N = Job name-N

• When the number of jobs exceeds 20, the output includes line feeds every 20 job names. A comma"," is not used for line feed.

# HW1483358 231/293

- 8 Ethernet Server Function
- 8.3 Communication Method

### RUFRAME

Reads a specified user coordinate data.

Command format: RUFRAME

Command data: Data-1

Data-1 = User coordinate No.

2: User coordinate 1

65: User coordinate 64

Answer format: Data-1, Data-2, · · · , Data-28

Data-1 = ORG X coordinate value (unit: mm, significant 3 decimal points)

Data-2 = ORG Y coordinate value (unit: mm, significant 3 decimal points)

Data-3 = ORG Z coordinate value (unit: mm, significant 3 decimal points)

Data-4 = ORG wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-5 = ORG wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-6 = ORG wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-7 = ORG type

Data-8 = XX X coordinate value (unit: mm, significant 3 decimal points)

Data-9 = XX Y coordinate value (unit: mm, significant 3 decimal points)

Data-10 = XX Z coordinate value (unit: mm, significant 3 decimal points)

Data-11 = XX wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-12 = XX wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-13 = XX wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-14 = XX type

Data-15 = XY X coordinate value (unit: mm, significant 3 decimal points)

Data-16 = XY Y coordinate value (unit: mm, significant 3 decimal points)

Data-17 = XY Z coordinate value (unit: mm, significant 3 decimal points)

Data-18 = XY wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-19 = XY wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

- 8 Ethernet Server Function
- 8.3 Communication Method

Data-20 = XY wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-21 = XY type

Data-22 = Tool No. (0 to 63)

Data-23 = Number of 7th axis pulses (for travel axis, unit: mm)

Data-24 = Number of 8th axis pulses (for travel axis, unit: mm)

Data-25 = Number of 9th axis pulses (for travel axis, unit: mm)

Data-26 = Number of 10th axis pulses

Data-27 = Number of 11th axis pulses

Data-28 = Number of 12th axis pulses

- ORG, XX, XY coordinates are read in the base coordinate system.
- In a system having no external axis, Data-23 to Data-28 are "0".
- If the specified user coordinate system is not registered, an error answer is sent back.
- If the group axis of the specified user coordinate system is not R1, an error answer is sent back.
- If ORG, XX, and XY have different base axis data, an error answer is sent back.
- Data of the type are represented by the following bit data coded into a decimal number.



• For 7-axis robots, this command cannot be used.

- 8 Ethernet Server Function
- 8.3 Communication Method

#### SAVEV

Reads variable data.

Command format: SAVEV

Command data: Data-1, Data-2

Data-1 = Type of variables

- 0: Byte type variables
- 1: Integer type variables
- 2: Double precision type variables
- 3: Real number type variables
- 4: Robot axis position type variables
- 5: Base axis position type variables
- 6: Station axis position type variables (only pulse type)
- 7:String variable
- Data-2 = Variable No.

Answer format 1 (When the type of variables specified with the command data is 0, 1, 2, 3, or 7)

Answer: Data-1

Data-1 = Byte value / Integer value / Double precision integer value / Real number value / String

The value corresponding to the type of variables that is specified with the command data is read out.

Answer format 2 (When the type of variables specified with the command data is 4, 5, or 6)

Answer: Data-1, Data-2,  $\cdot$   $\cdot$  , Data-10 (When all the robots controlled by YRC1000 have 6 axes or less)

Data-1 = Position data type (0: Pulse type, 1: Cartesian type)

(When the position data type is "0")

Data-2 = Number of robot S-axis pulses / Number of base 1st axis pulses / Number of station 1st axis pulses

Data-3 = Number of robot L-axis pulses / Number of base 2nd axis pulses / Number of station 2nd axis pulses

Data-4 = Number of robot U-axis pulses / Number of base 3rd axis pulses / Number of station 3rd axis pulses

Data-5 = Number of robot R-axis pulses / Number of base 4th axis pulses / Number of station 4th axis pulses

Data-6 = Number of robot B-axis pulses / Number of base 5th axis pulses / Number of station 5th axis pulses

234/293

- 8 Ethernet Server Function
- 8.3 Communication Method

Data-7 = Number of robot T-axis pulses / Number of base 6th axis pulses / Number of station 6th axis pulses

Data-8 = Tool No. (0 to 63)

Data-9 = Not exist

Data-10 = Not exist

 When the robots controlled by YRC1000 include a 7-axis robot, the number of pulses of robot's E-axis is inserted between Data-7 (Number of robot T-axis pulses) and Data-8 (Tool No). Therefore, the tool number is Data-9.

(When the position data type is "1": Only robot axis position type variables and base axis position type variables exist.)

Data-2 = Coordinate data

- 0: Base coordinate
- 1: Robot coordinate
- 2: User coordinate 1
- 3: User coordinate 2
- 65: User coordinate 64
- 66: Tool coordinate
- 67: Master tool coordinate

Data-3 = X coordinate value / Base 1st Cartesian value (unit: mm, significant 3 decimal points)

Data-4 = Y coordinate value / Base 2nd Cartesian value (unit: mm, significant 3 decimal points)

Data-5 = Z coordinate value / Base 3rd Cartesian value (unit: mm, significant 3 decimal points)

Data-6 = Wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-7 = Wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-8 = Wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-9 = Type

 Data of the type are represented by the following bit data coded into a decimal number.

#### 8 Ethernet Server Function

## 8.3 Communication Method



Data-10 = Tool No. (0 to 63)

• When the robots controlled by YRC1000 include a 7-axis robot, the elbow angle posture Re is inserted between Data-8 (Wrist angle Rz coordinate value) and Data-9 (Type). Therefore, the numbers of Data-9 and later are increased by 1 and the final data is Data-11.

#### HW1483358

- 8 Ethernet Server Function
- 8.3 Communication Method

#### 8.3.2.2 System Control Function

#### Operation System Command

#### HOLD

Turns HOLD ON/OFF.

Command format: HOLD

Command data: Data Data = Specification of HOLD ON/OFF status 0: OFF 1: ON

Answer format: 0000 at normal answer

### RESET

Resets an alarm of manipulator.

The transmission alarms can be reset only by the programming pendant.

Command format: RESET

Command data: None

Answer format: 0000 at normal answer

# CANCEL

Cancels an error.

Command format: CANCEL

Command data: None

Answer format: 0000 at normal answer

# HW1483358 237/293

- 8 Ethernet Server Function
- 8.3 Communication Method

#### MODE

Selects a mode.

Command format: MODE

Command data: Mode-No

Mode-No = Mode specification No.

- 1: Teach mode
- 2: Play mode

Answer format: 0000 at normal answer



The MODE command can be used when the external mode switch is enabled on the OPERATING CONDITION window.

# CYCLE

Selects cycle.

Command format: CYCLE

Command data: Cycle-No

Cycle-No = Cycle specification No.

1: Step

- 2: 1 cycle
- 3: Auto

Answer format: 0000 at normal answer

## SVON

Turns servo power supply ON/OFF.

Command format: SVON

Command data: Data Data = Specification of servo power supply ON/OFF status 0: OFF

1: ON

- 8 Ethernet Server Function
- 8.3 Communication Method

Sets an interlock between the programming pendant and I/O operation signals. While the interlock is ON, all operations except the following are prohibited.

- · Emergency stop from the programming pendant
- Input signals except I/O mode change, external start, external servo ON, cycle change, I/O prohibited, PP/PANEL prohibited, and master call

HLOCK is invalid while the programming pendant is in the edit mode or accessing to a file for other function.

Command format: HLOCK

Command data: Data

Data = Interlock status setting

0: OFF

1: ON

Answer format: 0000 at normal answer

### **MDSP**

Receives message data and displays the message in the remote display of the programming pendant. If the currently shown display is not the remote display, it is forcibly changed to the remote display to display the MDSP command message.

Command format: MDSP

Command data: Data

Data = Message to be displayed (Characters up to 30 bytes)

Answer format: 0000 at normal answer

# HW1483358 239/293

- 8 Ethernet Server Function
- 8.3 Communication Method

#### CGROUP

Changes an objective control group of various commands used in the host control function. The YRC1000 can support multiple number of manipulators and stations. In this case, CGROUP is used when any control group for commands such as RPOSJ is to be changed.

When the power supply is started up, robot 1, base 1, and station 1 (when a base and a stations exist) are specified.

Command format: CGROUP

Command data: Data-1, Data-2

Data-1 = Robot control group specification

A control group can be specified according to the data shown below. However, the following settings cannot be made.

- Selection of control axis which does not exist
- · Specification of multiple number of robot

In a system with a base axis (such as travel axis), when the manipulator with this base axis is specified, this base axis is also automatically specified.



- 8 Ethernet Server Function
- 8.3 Communication Method

#### Data-2 = Station control group specification

A control group can be specified according to the following data. However, the following settings cannot be made.

- · Selection of control axis which does not exist
- · Specification of multiple number of station



- 8 Ethernet Server Function
- 8.3 Communication Method

# **CTASK (OPTIONAL)**

Changes the task for control in the host control function.

When the power supply is started up or in a system where an independent control is not allowed, CTASK is to be used as follows.

- When the power supply is started up, a master task is selected as a task to be controlled.
- CTASK cannot be used in a system where an independent control is not allowed.

Command format: CTASK

Command data: Data

Data = Specified task 0: Master task 1: Sub 1 task 2: Sub 2 task . .

15: Sub 15 task

Answer format: 0000 at normal answer

#### Start-Up System Command

#### START

Starts a job.

If a job name is specified for an operand, the execution is started from the beginning of the job. If no job name is specified, the execution is started from the current line number of the set execution job.

Command format: START

Command data: Job-Name (Can be omitted.)

Job-Name = Starting job name

- 8 Ethernet Server Function
- 8.3 Communication Method

## MOVJ

Moves a manipulator to a specified coordinate position in joint motion.

Command format: MOVJ

Command data: Data-1, Data-2,  $\cdot$   $\cdot$  , Data-16 (For robots with 6 axes or less)

Data-1 = Motion speed (0.01 to 100.0 %)

Data-2 = Coordinate specification

0: Base coordinate

- 1: Robot coordinate
- 2: User coordinate 1

65: User coordinate 64

Data-3 = X coordinate value (unit: mm, significant 3 decimal points)

Data-4 = Y coordinate value (unit: mm, significant 3 decimal points)

Data-5 = Z coordinate value (unit: mm, significant 3 decimal points)

Data-6 = Wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-7 = Wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-8 = Wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-9 = Type

• Data of the type are represented by the following bit data coded into a decimal number.



Data-10 = Tool No. (0 to 63)

Data-11 = Number of 7th axis pulses (for travel axis, unit: mm) Data-12 = Number of 8th axis pulses (for travel axis, unit: mm) Data-13 = Number of 9th axis pulses (for travel axis, unit: mm)



- 8 Ethernet Server Function
- 8.3 Communication Method

Data-14 = Number of 10th axis pulses

Data-15 = Number of 11th axis pulses

Data-16 = Number of 12th axis pulses

- In a system without external axis, Data-11 to Data-16 should be set to "0".
- If a specified user coordinate is not defined, an error occurs.
- For 7-axis robots, the elbow angle posture Re is inserted between Data-8 (Wrist angle Rz coordinate value) and Data-9 (Type). Therefore, the numbers of Data-9 and later are increased by 1 and the final data is Data-17.

- 8 Ethernet Server Function
- 8.3 Communication Method

### MOVL

Moves a manipulator to a specified coordinate position in linear motion.

Command format: MOVL

Command data: Data-1, Data-2,  $\cdot \cdot \cdot$ , Data-17 (For robots with 6 axes or less)

Data-1 = Motion speed selection

0: V (speed)

1: VR (posture speed)

Data-2 = Motion speed (0.1 to  $\Box \Box \Box$ .  $\Box \Box$  mm/s, 0.1 to  $\Box \Box \Box$ .  $\Box^{\circ}$  /s)

Data-3 = Coordinate specification

0: Base coordinate

- 1: Robot coordinate
- 2: User coordinate 1

65: User coordinate 64

Data-4 = X coordinate value (unit: mm, significant 3 decimal points)

Data-5 = Y coordinate value (unit: mm, significant 3 decimal points)

Data-6 = Z coordinate value (unit: mm, significant 3 decimal points)

Data-7 = Wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-8 = Wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-9 = Wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-10 = Type

• Data of the type are represented by the following bit data coded into a decimal number.



- 8 Ethernet Server Function
- 8.3 Communication Method

Data-11 = Tool No. (0 to 63)

Data-12 = Number of 7th axis pulses (for travel axis, unit: mm)

Data-13 = Number of 8th axis pulses (for travel axis, unit: mm)

Data-14 = Number of 9th axis pulses (for travel axis, unit: mm)

- Data-15 = Number of 10th axis pulses
- Data-16 = Number of 11th axis pulses

Data-17 = Number of 12th axis pulses

- In a system without external axis, Data-12 to Data-17 should be set to "0".
- If a specified user coordinate is not defined, an error occurs.
- For 7-axis robots, the elbow angle posture Re is inserted between Data-9 (Wrist angle Rz coordinate value) and Data-10 (Type). Therefore, the numbers of Data-10 and later are increased by 1 and the final data is Data-18.

Answer format: 0000 at normal answer

## IMOV

Moves a manipulator from the current position for a specified coordinate incremental value in linear motion.

Command format: IMOV

Command data: Data-1, Data-2,  $\cdot \cdot \cdot$  , Data-17 (For robots with 6 axes or less)

Data-1 = Motion speed selection

0: V (speed)

- 1: VR (posture speed)
- Data-2 = Motion speed (0.1 to  $\Box \Box \Box$ .  $\Box \Box$  mm/s, 0.1 to  $\Box \Box \Box$ .  $\Box^{\circ}$  /s)
- Data-3 = Coordinate specification
  - 0: Base coordinate
  - 1: Robot coordinate
  - 2: User coordinate 1
  - 65: User coordinate 64
  - 66: Tool coordinate

Data-4 = X coordinate incremental value (unit: mm, significant 3 decimal points)

246/293

- 8 Ethernet Server Function
- 8.3 Communication Method

Data-5 = Y coordinate incremental value (unit: mm, significant 3 decimal points)

Data-6 = Z coordinate incremental value (unit: mm, significant 3 decimal points)

Data-7 = Wrist angle Rx coordinate incremental value (unit: degree (°), significant 4 decimal points)

Data-8 = Wrist angle Ry coordinate incremental value (unit: degree (°), significant 4 decimal points)

Data-9 = Wrist angle Rz coordinate incremental value (unit: degree (°), significant 4 decimal points)

Data-10 = Reserved

Data-11 = Tool No. (0 to 63)

Data-12 = Number of 7th axis pulses (for travel axis, unit: mm)

Data-13 = Number of 8th axis pulses (for travel axis, unit: mm)

Data-14 = Number of 9th axis pulses (for travel axis, unit: mm)

Data-15 = Number of 10th axis pulses

Data-16 = Number of 11th axis pulses

Data-17 = Number of 12th axis pulses

- In a system without external axis, Data-12 to Data-17 should be set to "0".
- If a specified user coordinate is not defined, an error occurs.
- For 7-axis robots, the elbow angle posture Re is inserted between Data-9 (Wrist angle Rz coordinate incremental value) and Data-10 (Reserved). Therefore, the numbers of Data-10 and later are increased by 1 and the final data is Data-18.

- 8 Ethernet Server Function
- 8.3 Communication Method

#### **PMOVJ**

Moves a manipulator to a specified pulse position in joint motion.

Command format: PMOVJ

Command data: Data-1, Data-2, · · · , Data-14 (For robots with 6 axes or less) Data-1 = Motion speed (0.01 to 100.0 %) Data-2 = Number of S-axis pulses Data-3 = Number of L-axis pulses Data-4 = Number of L-axis pulses Data-5 = Number of R-axis pulses Data-6 = Number of R-axis pulses Data-7 = Number of T-axis pulses Data-8 = Tool No. (0 to 63) Data-9 = Number of 7th axis pulses

Data-10 = Number of 8th axis pulses

Data-11 = Number of 9th axis pulses

Data-12 = Number of 10th axis pulses

Data-13 = Number of 11th axis pulses

Data-14 = Number of 12th axis pulses

- In a system without external axis, Data-9 to Data-14 should be set to "0".
- For 7-axis robots, the number of pulses of the E-axis is inserted between Data-7 (Number of T-axis pulses) and Data-8 (Tool No.). Therefore, the numbers of Data-8 and later are increased by 1 and the final data is Data-15.

- 8 Ethernet Server Function
- 8.3 Communication Method

## **PMOVL**

Moves a manipulator to a specified pulse position in linear motion.

Command format: PMOVL

Command data: Data-1, Data-2,  $\cdot \cdot \cdot$  , Data-15 (For robots with 6 axes or less)

Data-1 = Motion speed selection

0: V (speed)

1: VR (posture speed)

Data-2 = Motion speed (0.1 to  $\Box \Box \Box$ .  $\Box \Box$  mm/s, 0.1 to  $\Box \Box \Box$ .  $\Box^{\circ}$  /s)

Data-3 = Number of S-axis pulses

Data-4 = Number of L-axis pulses

Data-5 = Number of U-axis pulses

Data-6 = Number of R-axis pulses

Data-7 = Number of B-axis pulses

Data-8 = Number of T-axis pulses

Data-9 = Tool No. (0 to 63)

Data-10 = Number of 7th axis pulses

Data-11 = Number of 8th axis pulses

Data-12 = Number of 9th axis pulses

Data-13 = Number of 10th axis pulses

Data-14 = Number of 11th axis pulses

Data-15 = Number of 12th axis pulses

- In a system without external axis, Data-10 to Data-15 should be set to "0".
- For 7-axis robots, the number of pulses of the E-axis is inserted between Data-8 (Number of T-axis pulses) and Data-9 (Tool No.). Therefore, the numbers of Data-9 and later are increased by 1 and the final data is Data-16.

- 8 Ethernet Server Function
- 8.3 Communication Method
- Editing System Commands

## DELETE

Deletes a specified job.

Command format: DELETE

Command data: Job-Name

Job-Name = \*

= Job name to be deleted

If Job-Name is specified with "\*", the command DELETE deletes all jobs which are currently registered.

If Job-Name is specified with the job name to be deleted, the command DELETE deletes only the specified job.

Answer format: 0000 at normal answer

# **CVTRJ** (Optional)

Converts a specified job to a relative job of a specified coordinate.

Command format: CVTRJ

Command data: Data-1, Data-2

- Data-1 = Name of job to be converted
- Data-2 = Conversion coordinate system specification
  - 0: Base coordinate
  - 1: Robot coordinate
  - 2: User coordinate 1

65: User coordinate 64

If the specified user coordinate is not defined, an error answer is sent back.

Answer format: 0000 at normal answer



The CVTRJ command can be used when the relative job function is enabled.



- 8 Ethernet Server Function
- 8.3 Communication Method

### CVTSJ (Optional)

Converts a specified job to a standard job (pulse job) in a specified converting method.

Command format: CVTSJ

Command data: Data-1, Data-2, Data-3

Data-1 = Name of job to be converted

Data-2 = Converting method specification

0: Previous step regarded (B-axis sign same)

- 1: Type regarded
- 2: Previous step regarded (R-axis travel amount minimum)

Data-3 = Reference position variable. Position variable No. indicating the first step conversion reference position when the previous step is regarded

Answer format: 0000 at normal answer



The CVTSJ command can be used when the relative job function is enabled.

## WUFRAME

Writes a user coordinate data to a specified user coordinate system.

Command format: WUFRAME

Command data: Data-1, Data-2, · · · , Data-29

Data-1 = User coordinate No.

2: User coordinate 1

65: User coordinate 64

Data-2 = ORG X coordinate value (unit: mm, significant 3 decimal points) Data-3 = ORG Y coordinate value (unit: mm, significant 3 decimal points) Data-4 = ORG Z coordinate value (unit: mm, significant 3 decimal points) Data-5 = ORG wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

- 8 Ethernet Server Function
- 8.3 Communication Method

Data-6 = ORG wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-7 = ORG wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-8 = ORG type

Data-9 = XX X coordinate value (unit: mm, significant 3 decimal points)

Data-10 = XX Y coordinate value (unit: mm, significant 3 decimal points)

Data-11 = XX Z coordinate value (unit: mm, significant 3 decimal points)

Data-12 = XX wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-13 = XX wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-14 = XX wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-15 = XX type

Data-16 = XY X coordinate value (unit: mm, significant 3 decimal points)

Data-17 = XY Y coordinate value (unit: mm, significant 3 decimal points)

Data-18 = XY Z coordinate value (unit: mm, significant 3 decimal points)

Data-19 = XY wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-20 = XY wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-21 = XY wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-22 = XY type

Data-23 = Tool Number (0 to 63)

Data-24 = Number of 7th axis pulses (for travel axis, unit: mm)

Data-25= Number of 8th axis pulses (for travel axis, unit: mm)

Data-26 = Number of 9th axis pulses (for travel axis, unit: mm)

Data-27 = Number of 10th axis pulses

Data-28 = Number of 11th axis pulses

Data-29 = Number of 12th axis pulses

- ORG, XX, and XY coordinates are written in the base coordinate system.
- In a system without external axis, Data-24 to Data-29 should be set to "0".
- If the group axis of the specified user coordinate system is not R1, an error answer is sent back.
- For base-axis data of ORG, XX, and XY, the same data should be used.
- Data of the type are represented by the following bit data coded into a decimal number.
## 8 Ethernet Server Function

8.3 Communication Method



• For 7-axis robots, this command cannot be used.

Answer format: 0000 at normal answer

# HW1483358 253/293

- 8 Ethernet Server Function
- 8.3 Communication Method

#### LOADV

Receives variable data from a PC and writes it in a specified variable.

Command format: LOADV

Command data format 1: (When the type of variables specified with the command data is 0, 1, 2, 3, or 7)

Command data: Data-1, Data-2, Data-3

#### Data-1 = Type of variables

0: Byte type variables

- 1: Integer type variables
- 2: Double precision type variables
- 3: Real number type variables
- 7: String variable
- Data-2 = Variable No.
- Data-3 = Byte value / Integer value / Double precision type integer value / Real number value / String

The value corresponding to the type of variables that is specified in Data-1 is written in.

Command data format 2: (When the type of variables specified with the command data is 4, 5, or 6)

Command data: Data-1, Data-2,  $\cdot$  · · , Data-12 (When all the robots controlled by YRC1000 have 6 axes or less)

Data-1 = Type of variables

- 4: Robot axis position type variables
- 5: Base axis position type variables
- 6: Station axis position type variables (only pulse type)

Data-2 = Variable No.

Data-3 = Position data type (0: Pulse type, 1: Cartesian type)

(When the position data type is 0)

Data-4 = Number of S-axis pulses / Number of base 1st axis pulses / Number of station 1st axis pulses

Data-5 = Number of L-axis pulses / Number of base 2nd axis pulses / Number of station 2nd axis pulses

Data-6 = Number of U-axis pulses / Number of base 3rd axis pulses / Number of station 3rd axis pulses

Data-7 = Number of R-axis pulses / Number of base 4th axis pulses / Number of station 4th axis pulses

Data-8 = Number of B-axis pulses / Number of base 5th axis pulses / Number of station 5th axis pulses

254/293

- 8 Ethernet Server Function
- 8.3 Communication Method

Data-9 = Number of T-axis pulses / Number of base 6th axis pulses / Number of station 6th axis pulses

Data-10 = Tool No.(0 to 63)

Data-11 = Not exist

Data-12 = Not exist

• When the robots controlled by YRC1000 include a 7-axis robot, the number of pulses of robot's E-axis is inserted between Data-9 (Number of T-axis pulses ) and Data-10 (Tool No.). Therefore, the tool number is Data-11.

(When the position data type is 1: Only robot axis position type variables / base axis position type variables exist.)

Data-4 = Coordinate data

0: Base coordinate

- 1: Robot coordinate
- 2: User coordinate 1
- 3: User coordinate 2

•

- 65: User coordinate 64
- 66: Tool coordinate
- 67: Master tool coordinate

Data-5 = X coordinate value / Base 1st axis Cartesian value (unit: mm, significant 3 decimal points)

Data-6 = Y coordinate value / Base 2nd axis Cartesian value (unit: mm, significant 3 decimal points)

Data-7 = Z coordinate value / Base 3rd axis Cartesian value (unit: mm, significant 3 decimal points)

Data-8 = Wrist angle Rx coordinate value (unit: degree (°), significant 4 decimal points)

Data-9 = Wrist angle Ry coordinate value (unit: degree (°), significant 4 decimal points)

Data-10 = Wrist angle Rz coordinate value (unit: degree (°), significant 4 decimal points)

Data-11 = Type

• Data of the type are represented by the following bit data coded into a decimal number.

## HW1483358 255/293

8 Ethernet Server Function

### 8.3 Communication Method



Data-12 = Tool No. (0 to 63)

• When the robots controlled by YRC1000 include a 7-axis robot, the elbow angle posture Re is inserted between Data-10 (Wrist angle Rz coordinate value) and Data-11 (Type). Therefore, the numbers of Data-11 and later are increased by 1 and the final data is Data-13.

Answer format: 0000 at normal answer

- 8 Ethernet Server Function
- 8.3 Communication Method

### Job Selection System Command

### SETMJ

Sets a specified job as a master job.

At the same time, the specified job is set as an execution job.

Command format: SETMJ

Command data: Job-Name Job-Name = Job name to be set

Answer format: 0000 at normal answer

### JSEQ

Sets a job name and a line No.

Command format: JSEQ

Command data: Data-1, Data-2 Data-1 = Job name to be set Data-2 = Line No. to be set (0 to 9999)

Answer format: 0000 at normal answer

- 8 Ethernet Server Function
- 8.3 Communication Method

#### 8.3.2.3 I/O Read/Write Function

Read-Out of I/O Signal Status

Reads out I/O signals.

Command format: IOREAD

Command data: Data-1, Data-2

Data-1 = Contact point No. to start read-out

- Data-2 = The number of contact points to be read out
  - I/O data are output every eight contact points. Specify the number of contact points to be read out, in multiples of eight.

Answer format: Data-1, Data-2, · · · , Data-N

Data-1 = Read-out data for the first eight contact points

Data-2 = Read-out data for the next eight contact points

Data-N = Read-out data for the last eight contact points

N = (Command data Data-2)/8. The command data Data-2 should be multiples of eight.

- 8 Ethernet Server Function
- 8.3 Communication Method

### Write-in of I/O Signal Status

Writes in I/O signals.

Command format: IOWRITE

Command data: Data-1, Data-2, · · · , Data-N

Data-1 = Contact point No. to start write-in

Data-2 = The number of contact points to be written in

Data-3 = Write-in data for the first eight contact points

Data-4 = Write-in data for the next eight contact points

Data-N = Write-in data for the last eight contact points

N = (Command data Data-2)/8+2. The command data Data-2 should be multiples of eight.

- I/O data are processed every eight contact points. Specify the number of contact points to be written-in, in multiples of eight.
- The IO signals can only be written to the network inputs (#27010 to #29567).

Answer format: 0000 at normal answer

- 8 Ethernet Server Function
- 8.3 Communication Method

### 8.3.3 Transmission Example

8.3.3.1 Read-Out of Status for Mode, Cycle, etc

See and follow the figure below to read out each status of mode, cycle, etc.



### 8.3.3.2 Read-Out of I/O Signals for the YRC1000

See and follow the figure below to read out three bytes (24 bits) from #50010.



- 8 Ethernet Server Function
- 8.3 Communication Method
- 8.3.3.3 Write-In of I/O Signals for the YRC1000

See and follow the figure below to write in three bytes (24 bits) from #27010.



- 8 Ethernet Server Function
- 8.3 Communication Method
- 8.3.3.4 Continuous Execution of Multiple Command

See and follow the figure below to read out three bytes (24 bits) from #50010, following the "Read-Out of Status for Mode, Cycle, etc".



- 8 Ethernet Server Function
- 8.4 Troubleshooting

### 8.4 Troubleshooting

#### 8.4.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation*", and confirm that TCP/IP basic communication can be performed.

#### 8.4.2 Communication Setting Confirmation for Firewall and Security Software

The Ethernet server function uses TCP port 80.

Confirm that these ports are not blocked by the firewall or security software.

#### 8.4.3 Confirming the connection of the Ethernet Server Function

Since the Ethernet server function uses the TCP port 80, it can be checked by the telnet command from the PC whether the Ethernet server function operates normally.

In the Windows 7, the command prompt can be started up to check the connection as follows:

1. Enter "telnet IP address 80".

C:\>telnet 192.168.255.1 80

- 2. The display switches to the window for telnet.
- Enter "CONNECT Robot\_access" (At normal settings, an echo is not returned).
- 4. Enter "HOSTCTRL\_REQUEST RSTATS 0".

HOSTCTRL\_REQUEST RSTATS 0

5. The check is completed when the response to command/answer is displayed.

HOSTCTRL\_REQUEST RSTATS 0 OK: RSTATS 194,0

- 9 Host Control Function
- 9.1 Outline

### 9 Host Control Function

### 9.1 Outline

The host control function is that by using the YASKAWA communication protocol, sending/receiving the data saved in the YRC1000, monitoring the manipulator status, controlling the manipulator can be performed by the operation from a PC, etc..

### 9.1.1 System Configuration



Fig. 9-1: System Configuration When Using the Host Control Function

### 9.1.2 Communication Target

The following can be used as a communication target of the host control function.

Device	Software	Details	
Windows PC	Host control (sending and receiving of the data in the YRC1000, monitoring the manipulator status, controlling the manipulator)	Application software included with the MOTOCOM32 which is an optional function.	
	High Speed JobExchanger (sending and receiving of the data in the YRC1000)	Application software included with the MOTOCOM32 which is an optional function.	
	MOTOCOM application	Customer-created communication application software which uses the communication DLL included with the MOTOCOM32 which is an optional function.	

Table 9-1: Host Control Function Communication Ta	rget
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### 9.1.3 General Information When Using the Host Control Function

When using the host control function, refer to *chapter 11.1 "General Information About the Host Control System Function"*.

- 9 Host Control Function
- 9.1 Outline

### 9.1.4 Restriction

1) Restrictions by the remote mode

The host control function can be used only when the command remote is enabled.

For command remote, refer to *chapter 1.2* "Command Remote Setting for YRC1000".

2) Restriction of the access by other communication processing and the exclusion

The communication function of the YRC1000 (such as the high-speed Ethernet server function, the FTP server function, or the internal data browsing function by using the Web browser) cannot perform the concurrent processing simultaneously with Host Control Function. If these communications are used simultaneously, communication error may occur in the host control function. Do not use other communication processing while communicating using the host control function.

## HW1483358 265/293

- 9 Host Control Function
- 9.2 Setting

### 9.2 Setting

### 9.2.1 Command Remote Setting

Set the command remote to "VALID".

For procedures to enable the command remote, refer to chapter 1.2.3 "Command Remote Setting Method".

- 9 Host Control Function
- 9.3 Transmission Procedure

### 9.3 Transmission Procedure

### 9.3.1 File Data Transmission Function

By using PC software (either "Host Control", "High Speed JobExchanger", or "MOTOCOM Applications"), perform transmission processing.

### 9.3.2 Manipulator Control Function

By using PC software (either "Host Control" or "Motocom Applications"), perform transmission processing.

# HW1483358 267/293

- 9 Host Control Function
- 9.4 Troubleshooting

### 9.4 Troubleshooting

### 9.4.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation"*, and confirm the status that TCP/IP basic communication can be used.

### 9.4.2 Communication Setting Confirmation of Firewall and Security Software

The host control function uses UDP ports 10000 and 10006.

Confirm that these ports are not blocked by the firewall or security software.

- 10 Standalone Function
- 10.1 Outline

## **10** Standalone Function

### 10.1 Outline

The standalone function is that, by operating the external memory of the YRC1000, sending and receiving of the YRC1000 internal data can be performed. When using this function, refer to "Chap. 7. External Memory Device" in the YRC1000 GENERAL OPERATOR'S MANUAL (RE-CSO-A051).

### 10.1.1 System Configuration





The files that can be sent or received via the standalone function are described below.

Table 10-1: Files That can be Sent or Received by Using the Standalone Function

Data type
JOB
Condition file / General Data *Some data is read only
System information *read only



The standalone function cannot be used for system backup (batch data backup).

Some of the files above can only be saved (not loaded).

# HW1483358 269/293

- 10 Standalone Function
- 10.1 Outline

### 10.1.2 Communication Target

The following can be used as a communication target with the standalone function.

Table 10-2: Standalone Function's Communication Target

Device	Software	Details
Windows PC	MOTOCOM application	Customer-created communication application software by using the communication DLL included with the MOTOCOM32 which is an optional function.

- 10 Standalone Function
- 10.2 Setting

### 10.2 Setting

#### 10.2.1 Communication Target Setting

Perform the settings for the standalone communication target in accordance with following procedures.

- 1. Start normal operation mode. Start in the online mode.
- Change the security mode. Change the security mode to the management mode.
- 3. In the Main Menu, select {EX. MEMORY} {COMM SETTING(EXPAND)}.

The COMM SETTING(EXPAND) window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🖻 🛓	1 畅 🔞	見健
EX. MEMOR	EXTE COMM	RNAL MEMORY SETTING(EX ST ADDRESS	(DEVICE (PAND)			
SETUP	CM	OS CREATE-C	COMP NOTIFY	PORT (		
SAFETY FUN						
РМ +						
DISPLAY SE	TUP					
	$\geq$					
Main Menu	J Simp	le Menu				

4. Set the HOST ADDRESS. Set the HOST ADDRESS for the communication target.

### HOST ADDRESS

For the communication target IP address, use half-width numbers and periods (.), and set "xx.xx.xx" using the following format (xx is a decimal number from 0 to 255). Note that if the DNS client function is enabled, the FQDN (Fully Qualified Domain Name: 'Hostname@domainname' name format) can also be set. Characters that can be used for the FQDN are half-width alphanumeric characters, hyphens (-), underscores (\_) and the at-sign (@) which acts as the character boundary between the host name and the domain name. Set it within 128 characters or less.



The host address that is set on this window is used for CMOS save functions via FTP and DCI functions. These addresses cannot be set separately.

- 10 Standalone Function
- 10.2 Setting

### 10.2.2 Command Remote to OFF Setting

Set the command remote INVALID.

To disable the command remote, set the key switch of the programming pendant to "PLAY" or "TEACH", or set the "CMD REMOTE SEL" of the PSUEDO INPUT SIGNAL window to DISABLE. For procedures about changing the pseudo input signal, refer to *chapter 1.2.3 "Command Remote Setting Method"*.

- 10 Standalone Function
- 10.3 Preparation at the PC Side

### **10.3** Preparation at the PC Side

On the PC, create the MOTOCOM application to be used as the communication target, and then execute it.

- 10 Standalone Function
- 10.4 Executing the Standalone Function

### **10.4** Executing the Standalone Function

#### 10.4.1 Selecting the Standalone Function

- 1. Select {EX. MEMORY} {DEVICE / SETUP} under the Main Menu.
  - The DEVICE / SETUP window appears.
- 2. Select "PC".
  - The PC is selected as the external memory device.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 😣	10 🖳 🕆
DEVICE /	SETUP				
DEVICE FILE Si JOB LOi	AVE OVERWR AD OVERWRI	ITE III TE <u>II</u>	WAL ID WAL ID	_	
Main Men	JSimp	ole Menu			

10.4.2 Save

This operation transmits (writes) data from the YRC1000 to the PC.



If the data is changed, save the target data separately.

- 10.4.2.1 Save Job
- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {SAVE}.
  - The SAVE window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🖻 📶 🔞	🔞 🖵 🙌				
EXTERNAL MEMORY DEVICE PC(SAVE)									
□ JOB □ FILE/	GENERAL DAT	A							
SYSTEM INFORMATION									
Main Men	u Simp	le Menu							

- 10 Standalone Function
- 10.4 Executing the Standalone Function
- 3. Select "JOB".
  - The job list appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗷 네	🔞 🙋 🖳 🙌	Þ
EXTERNAL N DEVICE PC	MEMORY DEVI	CE(SAVE)		SINGLE NO.	5	
TEST TEST2			*			
TEST3 TEST4 TEST5			* * *			
				PAGE		
Main Men	u Simp	le Menu				

- 4. Select a job to save.
  - "  $\star$  " will appear for the selected job.

DATA	EDIT	DISPLAY	UTILITY	12 🗷 네	😢 🔟 📑 👘	Þ
EXTERNAL DEVICE PC	MEMORY DEVI	CE(SAVE)		SINGLE NO.	5	
★TEST			×			
TEST2 TEST3			* *			
TEST4 TEST5			* *			
			1			
	T			PAGE		
Main Men	u Simp	le Menu				

- 5. Press [Enter].
  - The confirmation dialog box appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 🔞	10 📑 👘	Þ
EXTERNAL DEVICE PC	MEMORY DEV	ICE(SAVE)		SINGLE NO.	5	
★TEST TEST2 TEST3 TEST4			* * *			
TEST4 TEST5 Save? YES NO						
				PAGE		
Main Men	u Simp	le Menu				

HW1483358 275/293

- 10 Standalone Function
- 10.4 Executing the Standalone Function
- 6. Select {YES}.
  - The selected job is saved.

10.4.2.2 Save a File Other Than Job

Save required files using the same procedure as *chapter 10.4.2.1 "Save Job"*.

With the standalone function, the file other than JOB, FILE, and GENERAL DATA cannot be saved.

### 10.4.3 Load

This operation transmits (reads) data from the PC to the YRC1000.

- 10.4.3.1 Load the Job
- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {LOAD}.
  - The LOAD window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗳	1 🔞	10 🕞 🤅	<del>ħ)</del>			
EXTERNAL PC(LOAD)	EXTERNAL MEMORY DEVICE PC(LOAD)									
□ JOB □ FILE/	GENERAL DAT	A								
SYSTE	M INFORMATI	:ON								
Main Men	u Simp	le Menu								

- 3. Select "JOB".
  - The input window for a job name to be loaded appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 📶 🔞	10 🕞 🙌				
EXTERNAL MEMORY DEVICE PC(LOAD)									
JOB MODE JOB NAME	SING								
		EXECU	TE						
Main Men	Main Menu Simple Menu								

4. Enter a job name to load.

- 10 Standalone Function
- 10.4 Executing the Standalone Function
- 5. Select {EXECUTE}.
  - The job whose name is entered is loaded.

### 10.4.3.2 Load a File Other Than Job

Load required files using the same procedure as described in *chapter 10.4.3.1 "Load the Job"*.

With the standalone function, the file other than JOB, FILE, and GENERAL DATA cannot be saved.

- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {LOAD}.
  - The LOAD window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🖻 📶 🔞	🔟 🖵 🙌
EXTERNAL PC(LOAD)	MEMORY DEV	ICE			
	'GENERAL DA'	TA			
SYSTE	M INFORMAT	ION			
		r			
Main Mer	u Sim;	ole Menu			

- 3. Select a file group to load.
  - The file selection window appears.

DATA	EDIT	DISPLAY	UTILITY	12 🛙	2 📶 🤅	s 🔞 🕞	<b>(F)</b>
EXTERNAL PC(LOAD)	MEMORY DEVI	ICE					
O TOO WEA O USE O ARC O ARC O ARC O ARC O POW O POW O SHO O INTE O USE O TIM	L DATA VING DATA R COORDINAT START COND END COND I AUXILIARY ER SOURCE ( CK DETECTIO ERFERENCE A R MENU DATA ER VARIABLE	TE DATA ) DATA )ATA COND DATA )OND. DATA )SR DEF DAT )N LEVEL AREA DATA A E DATA	T00 WEA UFR ARC ARC ARC WEL SH0 CUB USE USE TMV	L .CT V .CT AME .CT .DJ SRT .CT END .CT END .CT SUP .DJ DER .DJ DUDEF.DJ CKLVL.CT EINTF.CT RMENU.DJ AR .DJ	10 10 10 10 10 10 10 10 11 11 11 11 11 1		
Main Men	u Simp	le Menu					

- 10 Standalone Function
- 10.4 Executing the Standalone Function
- 4. Select a file to load.
  - "  $\star$  " will appear for the selected file.

DATA EDIT DISPLAY	UTILITY 1 🔀 🛃 🚷 🐻 📑 👇
EXTERNAL MEMORY DEVICE PC(LOAD)	
O★     TOOL     DATA       WEAVING     DATA       USER     CORDINATE     DATA       VARIABLE     DATA       ARC     START       COND     DATA       ARC     AUXILIARY       CND     DATA       ARC     AUXILIARY       COND     DATA       POWER <source< td="">     COND       SHOCK     DETECTION       LEVEL     INTERFERENCE       ARC     INTERFERENCE       ARC     AUXILIARY</source<>	TOOL       .CND         WEAV       .CND         UFRAME       .CND         VAR       .DAT         ARCSRT       .CND         ARCSUP       .DAT         WELDER       .DAT         WELDER       .DAT         WELDUPE       .DAT         SHOCKLVL       .CND         CUBEINTF. <cnd< td="">       .CND         USERMENUDAT       .TMVAR</cnd<>
Main Menu Simple Menu	

- 5. Press [Enter].
  - The confirmation dialog box appears.

DATA	EDIT	DISPLAY	UTILITY	12 🗹 🛓	1 👒 🔟	🖵 🙌
EXTERNAL PC(LOAD)	MEMORY DEVI DE DATA	CE	TO WE,	DL <mark>.CND</mark> AV.CND		
O USE O VAR O ARC O ARC O ARC O POW O POW	R COORDINAT RIABLE SATA STA END AUX VER S VER S	e data Yes	Loa	RAME .CND d?		1
O INT O USE O TIM	ERFERENCE / ER MENU DAT/ MER VARIABLE	REA DATA A E DATA	CUE USE TM <sup>4</sup>	BEINTF.CND ERMENU.DAT /AR .DAT		
Main Mer	nu Simp	le Menu				

- 6. Select {YES}.
  - The selected file will be loaded.

### 10.4.4 Verification

This operation is to verify the YRC1000 data and the PC data. The operating procedure is same as that of saving.

### 10.4.4.1 Verifying the Job

- 1. Select {EX. MEMORY} under the Main Menu.
- 2. Select {VERIFY}.
  - The VERYFY window appears.
- 3. Select {JOB}.
  - The job list appears.
- 4. Select a job to verify.
  - "  $\star$  " will appear for the selected job.

- 10 Standalone Function
- 10.4 Executing the Standalone Function
- 5. Press [Enter].
  - The confirmation dialog box appears.
- 6. Select {YES}.
  - The selected job will be verified.

### 10.4.4.2 Verifying the File Other Than the Job

Verify any required files using the same procedure described in *chapter 10.4.4.1* "Verifying the Job".

With the standalone function, the file other than JOB, FILE, and GENERAL DATA cannot be verified.

#### 10.4.5 Selection Mode of the Job

Job can be loaded, saved, or verified by either one of the following modes.

#### 10.4.5.1 Single Selection Mode

Only the selected job is loaded, saved, or verified.

#### 10.4.5.2 Related Selection Mode

The selected job as well as the related jobs and data files are loaded, saved, or verified.



- 10 Standalone Function
- 10.4 Executing the Standalone Function

### 10.4.5.3 Switching the Selection Mode

- 1. Press [PAGE] on the external memory job list window.
  - Each time [PAGE] is pressed, the window switches alternatively from "single selection mode" to "related selection mode".

DATA	EDIT	DISPLAY	UTILITY	12 🗳 🖌	😢 🔯 📑	Þ
EXTERNAL M DEVICE PC	EMORY DEVI	ICE(SAVE)		RELATED NO.	5	
TEST TEST2 TEST3			* *			
TEST4 TEST5			* *			
				PAGE		
Main Menu	Simp	le Menu				

### 10.4.6 Selecting a Job or Data File

There are two ways to select a job or various data files to be loaded, saved, or verified.

### 10.4.6.1 Individual Selection

Selects job or data file one by one.

### 10.4.6.2 SELECT ALL

Selects all the jobs or data files at once.

When selecting all jobs, performs the following operation.

- Select {EDIT} of the menu in the EXTERNAL MEMORY JOB LIST window or the file selection window.
  - The pull down menu appears.

DATA	EDIT	DISPLAY	UTILITY	12 🖻 📶	📢 🔯 📮	( <del>†</del> )
EXTERNAL DEVICE PC	SELECT ALL	WE)		SINGLE NO.	5	
TEST TEST2	SELECT MARI (*)	(ER	*			
TEST3 TEST4 TEST5	CANCEL SELI	ECT	* * *			
				PAGE		
		r		THAL		
Main Men	u Simp	le Menu				

2. Select {SELECT ALL}.

- 10 Standalone Function
- 10.5 Troubleshooting

### 10.5 Troubleshooting

### 10.5.1 Network Communication Confirmation

Refer to *chapter 2.4 "Network Communication Confirmation"*, and confirm that TCP/IP basic communication can be performed.

### 10.5.2 Communication Setting Confirmation for Firewall and Security Software

The standalone function uses UDP ports 10000 and 10006.

Confirm that these ports are not blocked by the firewall or security software.

### 10.5.3 Confirming the Operation of the PC-side Application

Confirm that the PC-side applications are operating normally.

#### 10.5.4 Confirming That the Remote Setting is OFF

Confirm that the settings of the command remote and the read-only option are disabled.

## HW1483358 281/293

- 11 Related Information
- 11.1 General Information About the Host Control System Function

### **11** Related Information

### 11.1 General Information About the Host Control System Function

Shows the general information in *chapter 8 "Ethernet Server Function"* and *chapter 9 "Host Control Function"*.

### 11.1.1 List of Interlock for Command of Host Control Function

The executability of each command differs depending on the status of the YRC1000 as shown in the following table.

Command Name		Read/Writ	e Enabled	Only Read Enabled				
		Non-alarn	n/Non-error	Alarm/	Non-	Alarm/		
		Teach Mode		Play Mode	9	Error	alarm/	Error
		Stop	Operat- ing	Stop	Operat- ing		error	
Read or	RALARM	0	0	0	0	0	0	0
Monitor	RPOSC	0	0	0	0	0	0	0
	RPOSJ	0	0	0	0	0	0	0
	RSTATS	0	0	0	0	0	0	0
	RJSEQ	0	0	0	0	0	0	0
	JWAIT	0	0	0	0	A	0	A
	RGROUP	0	0	0	0	0	0	0
Read or	RJDIR	0	0	0	0	0	С	С
Data	RUFRAME	0	0	0	0	0	С	С
ALLESS	UPLOAD	0	0	0	0	0	С	С
	SAVEV	0	0	0	0	0	С	С
	SAVEVP	0	0	0	0	0	С	С
Operation	HOLD	0	0	0	0	0	С	С
	RESET	0	0	0	0	0	С	С
	CANCEL	0	0	0	0	0	С	С
	MODE	0	0	0	0	O/A *3	С	С
	CYCLE	0	0	0	0	O/A *3	С	С
	SVON 0 (OFF)	0	0	0	0	0	С	С
	SVON 1 (ON)	0	0	0	0	А	С	С
	HLOCK	0	0	0	0	0	С	С
	MDSP	0	0	0	0	0	С	С
	CGROUP	0	0	0	0	0	С	С
	CTASK	0	0	0	0	0	С	С
Activation	START	М	М	O/H *1	MOVE/O*2	А	С	С
	MOVJ	М	М	O/H *1	MOVE/O*2	А	С	С
	MOVL	М	М	O/H *1	MOVE/O*2	А	С	С
	IMOV	М	М	O/H *1	MOVE/O*2	А	С	С
	PMOVJ	М	М	O/H *1	MOVE/O*2	А	С	С
	PMOVL	М	М	O/H *1	MOVE/O*2	А	С	С

HW1483358

11 Related Information

11.1 General Information About the Host Control System Function

Command Name		Read/Wri	te Enabled		Only Read Enabled			
		Non-aları	m/Non-erro	r		Alarm/	Non-	Alarm/
		Teach Mo	ode	Play Mode		Error	alarm/	Error
		Stop	Operat- ing	Stop	Operat- ing		error	
Editing	DELETE	0	MOVE	М	М	А	С	С
	CVTRJ	0	MOVE	М	М	А	С	С
	CVTSJ	0	MOVE	М	М	А	С	С
	WUFRAME	0	MOVE	М	М	А	С	С
	DOWNLOAD	0	O/MOVE*4	0	O/MOVE*4	А	С	С
	LOADV	0	0	0	0	А	С	С
	LOADVP	0	0	0	0	А	С	С
Job selection	SETMJ	0	MOVE	0	MOVE	А	С	С
	JSEQ	0	MOVE	0	MOVE	А	С	С

#### <Interpreter message>

O : Possible to execute	
A : Alarm/error occurring	2060
M : Incorrect mode	2080
H : Hold	2020 to 2050
MOVE : Manipulator moving	2010
C : No command remote setting	2100

- \*1 "O" if not being held ; "H" if being held
- \*2 "MOVE" if the manipulator is moving by operation other than command ; "O" if the manipulator is moving by command since a single command can be accepted.
- \*3 "O" during an alarm ; "A" during error
- \*4 Only a single job can be executed.

### 11.1.2 Command that Handle Axis Data

The data transmission function of the YRC1000 has restrictions on handling control axis data.

- ① For the following commands, the order of response data varies whether the number of robot's axes is 6 or 7.
  - Object commands: RPOSJ, RPOSC, MOVJ, MOVL, IMOV, PMOVJ, PMOVL
- ② Since the manipulator axes are fixed to a six-axis set, any manipulator having more than seven axes cannot use the following commands.

Object commands: RUFRAME, WUFRAME

# HW1483358 283/293

- 11 Related Information
- 11.1 General Information About the Host Control System Function

#### 11.1.3 Response to MOV-type Command

The responses to MOV-type command are as follows.

- If the manipulator is moving by operations other than commands, the interpreter message 2010 (manipulator operating) is returned and the manipulator does not move.
- If the manipulator is in stop status, it turns ON the start lamp and moves according to the command, and returns a response immediately.
- If the manipulator is moving according to the previous commands, only a single command is accepted and the response is held up.
   After completing execution of the preceding commands, when starting execution of the suspended command, the manipulator returns a response.

This applied to the following commands.

MOVJ, MOVL, IMOV, PMOVJ, PMOVL

#### 11.1.4 Command for Multi-control Group and Independent Control Function

11.1.4.1 Command for Multi-control Group

The YRC1000 can control more than one manipulator or station simultaneously.

The following commands are available for this multi-control function.

- · CGROUP : Changing the control group
- RGROUP : Reading the control group and task selected status

S□<sup>1)</sup> **R1** R4 R2 R3 R5 R6 **R7 R8** (robot 1) (robot 2) (robot 3) (robot 4) (robot 5) (robot 6) (robot 7) (robot 8) • Х X Х х Х X × ●<sup>2)</sup>  $\times$  $\times$  $\times$ ×  $\times$  $\times$  $\times$ × • Х Х × Х × × × • • Х × × х × Х Х X  $\times$ . ×  $\times$ ×  $\times$ ×  $\times$ • Х Х • × х X × X х • х х • Х Х X X X  $\times$  $\times$ • ×  $\times$  $\times$ × Х  $\times$ • Х × х • х X × X • × × × × × × × ×  $\times$  $\times$ • • ×  $\times$  $\times$ Х  $\times$ • Х × × × х × Х х • • × × × × × × × × × × × Х × • × × × ×  $\times$ × Х × • × • • Х × × × × × × × Х × × × × Х  $\times$ • •

The following table shows the combination which can be set by using the above commands.

1 Either one station among S1 to S24 can be selected in a system having several stations.

2 Base axes is included in robot axes.

- 11 Related Information
- 11.1 General Information About the Host Control System Function

The following commands have influence when the above commands are used.

The operations of these commands are applicable to the set control group.

Read System Commands	Startup System Commands	Editing System Command
RPOSJ RPOSC	MOVJ MOVL	WUFRAME
RUFRAME	PMOVJ PMOVL	

11.1.4.2 Command for Independent Control Function

The YRC1000 supports the independent control function which can execute more than one job simultaneously.

For this independent function, the following commands are available.

- CTASK : Changing the tasks
- RGROUP : Reading the control group or task selected status

By using the above commands, a task to be controlled can be changed.

The following commands have influence when the independent control function is used.

#### ① Job startup (START)

Starts up a job.

When a job name specification is provided for operand, execution of that job is started from the head of job as a task that is currently selected.

When a job name is not specified, all tasks that are currently set are executed from the current line No.

- Waiting for completion of startup (JWAIT) As a response, returns the information whether the currently selected task operation has been completed.
- **③ Master job registration (SETMJ)**

Sets a specified job as a master job, to the currently selected task.

④ Job selection (JSEQ)

Sets a job name, a line No. to the currently selected task.

- S Read of selected job (RJSEQ) Reads the job name, line No., and step No. of the currently selected task.
- 6 Read of status (RSTATS)

Returns the system status disregarding the selected task status. However, the "running" status differs from the conventional status ; the "running" is entered even if only one task was operating. 11 Related Information

### 11.1 General Information About the Host Control System Function

### 11.1.5 Interpreter Message

The interpreter messages are classified into the following categories.

- 1xxx : Command text general error
- 2xxx : Command execution mode error
- 3xxx : Command execution error
- 4xxx : Job registration error
- 5xxx : File contents error
- Table 11-1: Interpreter Message List

Code	Content
1010	Command error
1011	Error in number of command operands
1012	Command operand value range over
1013	Command operand length error
1020	Disk full of files
2010	Manipulator operating
2020	Hold by programming pendant
2030	Hold by playback panel
2040	External hold
2050	Command hold
2060	Error/alarm occurring
2070	Servo OFF
2080	Incorrect mode
2090	File accessing by other function
2100	Command remote not set
2110	This data cannot be accessed.
2120	This data cannot be loaded.
2130	Editing
2150	Coordinates Conversion Function Execution
	*Refer to the NOTE in the last page of this table.
3010	Turn ON the servo power.
3040	Perform home positioning.
3050	Confirm positions.
3070	Current value not made
3220	Panel lock ; mode/cycle prohibit signal is ON.
3230	Panel lock ; start prohibit signal is ON.
3350	User coordinate not taught
3360	User file destroyed
3370	Incorrect control group
3380	Incorrect base axis data
3390	Relative job conversion prohibit (at CVTRJ)
3400	Master call prohibit (parameter)
3410	Master call prohibit (lamp On during operation)
3420	Master call prohibit (teach lock)
3430	Robot calibration data not defined
3450	Servo power cannot be turned ON.
3460	Coordinate system cannot be set.
4010	Insufficient memory capacity (job registered memory)
4012	Insufficient memory capacity (position data registered memory)
4020	Job editing prohibit
4030	Same job name exists
4040	No specified job

- 11 Related Information
- 11.1 General Information About the Host Control System Function

Table 1	Table 11-1: Interpreter Message List				
Code	Content				
4060	Set a execution job.				
4120	Position data destroyed				
4130	Position data not exist				
4140	Incorrect position variable type				
4150	END instruction for job which is not master job				
4170	Instruction data destroyed				
4190	Invalid character in job name				
4200	Invalid character in label name				
4230	Invalid command in this system				
4420	No step in job to be converted				
4430	Already converted				
4480	Teach user coordinate.				
4490	Relative job/Independent control function not permitted				
5110	Syntax error (syntax of command)				
5120	Position data error				
5130	No NOP or END instruction				
5170	Format error (incorrect format)				
5180	Incorrect number of data				
5200	Data range over				
5310	Syntax error (except command)				
5340	Error in pseudo command specification				
5370	Error in condition data record				
5390	Error in job data record				
5430	System not matched				
5480	Incorrect welding function type				



## HW1483358

287/293

11 Related Information

### 11.1 General Information About the Host Control System Function

### 11.1.6 Alarm Code

### The alarms for the host control system function are shown as follows.

Code	Contents	Remarks
4112	Data sending error 1 : NAK retry over 2 : Timer A timeup retry over 3 : Alternating response error retry over	The EOT code is sent out and the data link is canceled.
4113	<ul> <li>Data receiving error</li> <li>1 : Receiving timeup (Timer A)</li> <li>2 : Receiving timeup (Timer B)</li> <li>3 : Short heading length</li> <li>4 : Long heading length</li> <li>5 : Illegal header No.</li> <li>6 : Text longer than 256 characters</li> <li>7 : Receiving other than expected control code</li> </ul>	For 3 to 7, the EOT code is sent out and the data link is canceled.
4114	Transmission hardware error 1 : Overrun error 2 : Parity error 3 : Framing error 4 : Sending timeup (Timer A) 5 : Sending timeup (Timer B)	The EOT code is not sent.
4115	Transmission system block This alarm notifies that the transmission procedure is correct but the received contents makes inconsistency in the system. Usually this alarm is resulted from violation of rules on the other party or illegal notification. 1 : EOT was received while waiting for ACK 2 : EOT was received while waiting for ENQ 3 : EOT was received before receiving the last block 4 : Code other than EOT was received after receiving the last block	For 4, the EOT code is sent out and the data link is canceled.
4206	<ul> <li>Transmission system error</li> <li>This alarm notifies an error on processing of transmission system. This alarm occurs in the following cases.</li> <li>100 Error in transmission task</li> <li>A job containing position type variable of which the value is not set, was to be saved.</li> <li>A job which does not exist on the memory, was to be saved.</li> </ul>	The EOT code is not sent.
#### 11 Related Information

11.2 Related Parameter

Parameter	Details	Default setting value
S2C230	Specify the Valid of the programming pendant operation (in the remote) 0: INVALID 1: VALID Programming pendant SERVO ON ([SERVO ON READY] key) Programming pendant	0
S2C541	Specify the permission of variable and I/O input during the play mode 0: Writing is allowed 1: Writing is prohibited	0
S2C542	Specify the permission of variable and I/O input during the edit-lock status 0: Writing is allowed 1: Writing is prohibited	0
S2C680	Specify the permission of the batch data backup function 0: INVALID 1: Create RAMDISK at the STARTUP	1
RS000	Specify the standard port protocol 0: NON 1: System reserved 2: BSC LIKE 3: FC1	2
RS004	Specify the devices (automatic backup, system restore) 0: SD (programming pendant) 1: USB (programming pendant) 20: FTP (CMOS saving function via FTP) 21: RAMDISK	0
RS005	Host control (read-only) 0: INVALID 1: VALID	0
RS022	Specify the instance 0 permissions (high-speed Ethernet server, CIP message communications) 0: Instance "0" is prohibited 1: Instance "0" is allowed	1
RS023	Specify the 1 byte I/O prohibitions (high-speed Ethernet server, CIP message communications) 0: 1 byte I/O is allowed 1: 1 byte I/O is prohibited	0
RS029	Specify the permission of the jobs and the variables during playback 0: INVALID 1: VALID	1
RS034	Timer A: Sequence monitoring timer Serves as protection against invalid response or no response Unit: 0.1 sec. (Setting range: 0 to 200)	200
RS035	Timer B: Text reception monitoring timer Serves as protection against no response of text end character Unit: 0.1 sec. (Setting range: 0 to 255)	200

## 11.2 Related Parameter

- 11 Related Information
- 11.2 Related Parameter

Parameter	Details	Default setting value
RS036	Number of resendings of a control character for invalid response or no response (unit: times)	10
RS037	Number of resendings of a text for a block check error (unit: times)	3
RS038	Block check method 0: Check sum	0
RS065	Specify the passive close for the Ethernet server function 0: Active close 1 to 254: Passive close (specified value x 100 ms wait) 255: Passive close (infinite wait)	0
RS066	Specify the Ethernet server function ringer (reset close condition specification) 0: Standard close (default) 0x01: Reset close during normal 0x02: Reset close during abnormal 0x08: Specify the FIN strict check 0x10: Reset close only during non-passive 0x20: Standard close during non-passive 0x40: Reset close during reinitializing detection 0x80: Standard close during passive confirmed error	0
RS068	Specify the Ethernet server function's TCP delay 0: TCP delay 3: No TCP delay	3
RS089	Virtual directory 0: INVALID 1: VALID	1
RS097	Specify the FTP server function's passive close 0: Active close 1 to 254: Passive close (specified value x 100 ms wait) 255: Passive close (infinite wait)	0
RS098	Specify the FTP server function's ringer (specify the reset close condition) 0: Standard close (default) 0x01: Reset close during normal 0x08: Specify the FIN strict check 0x10: Reset close only during non-passive 0x20: Standard close during non-passive 0x40: Reset close during reinitializing detection 0x80: Standard close during passive confirmed error	0
RS275	Specify the FTP server function's passive close00: Active close1 to 254: Passive close (specified value x 100 ms wait)255: Passive close (infinite wait)	
RS276	Specify the FTP client function's ringer (specify the reset close condition) 0: Standard close (default) 0x01: Reset close during normal 0x08: Specify the FIN strict check 0x10: Reset close only during non-passive 0x20: Standard close during non-passive 0x40: Reset close during reinitializing detection 0x80: Standard close during passive confirmed error	0

- 11 Related Information
- 11.3 Communication Specification

## **11.3** Communication Specification

The communication specifications for both CN106 (LAN2) and CN107 (LAN3) are described below.

1) Electrical characteristics

IEEE 802.3 10Base-T/100Base-TX/1000Base-TX compliant



#### 2) LED specifications

	Left LED	Right LED
Link	-	Green lit
Action	-	Green blink
Speed	10Base-T Unlit 100Base-TX Green lit 1000Base-T Yellow lit	-



- 11 Related Information
- 11.4 Recommended Cable and Switching Hub

## 11.4 Recommended Cable and Switching Hub

1) Ethernet Cable

Category 5 Ethernet cables with shielding are recommended.

2) Switching Hub

The following switching hub is recommended.

Model: EDS-205 (manufactured by MOXA)

# YRC1000 OPTIONS INSTRUCTIONS

### FOR ETHERNET FUNCTION

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Specifications are subject to change without notice for ongoing product modifications and improvements.

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