MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

MELSEC iQ-R Simple Device Communication Library Reference Manual

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using MELSEC iQ-R series programmable controllers, please read the manuals for the product and the relevant manuals introduced in those manuals carefully, and pay full attention to safety to handle the product correctly.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

CONDITIONS OF USE FOR THE PRODUCT

(1) MELSEC programmable controller ("the PRODUCT") shall be used in conditions;

i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and

ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

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("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above restrictions, Mitsubishi Electric may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi Electric and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi Electric representative in your region.

(3) Mitsubishi Electric shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.
This manual describes the simple device communication library required to use the simple device communication function of the relevant products listed below.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.

Relevant products

- RJ71EN71
- RnENCPU (network part)

CONTENTS

RELEVANT MANUALS

Manual name [manual number]	Description	Available form
MELSEC iQ-R Simple Device Communication Library Reference Manual [SH-082515ENG] (this manual)	Simple device communication library protocol	e-Manual PDF
MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup) [SH-081256ENG]	Specifications, procedures before operation, system configuration, wiring, and communication examples of Ethernet, CC-Link IE Controller Network, and CC-Link IE Field Network	Print book e-Manual PDF
MELSEC iQ-R Ethernet User's Manual (Application) [SH-081257ENG]	Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of Ethernet	Print book e-Manual PDF

Point

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance
RnENCPU (network part)	A module on the right-hand side of the RnENCPU (MELSEC iQ-R Ethernet/CC-Link IE User's Manual (Startup))

GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Generic term/abbreviation	Description
RnENCPU	A generic term for the R04ENCPU, R08ENCPU, R16ENCPU, R32ENCPU, and R120ENCPU

1 OVERVIEW

The simple device communication library is a collection of protocol templates of external devices for the engineering tool.

1.1 List of Applicable Models

This chapter describes the simple device communication library included with the engineering tool.

Manufacturer	Device Type	Model	Communication Destination Port No. (Default)	Protocol Format (Default)	Software version of the engineering tool
YASKAWA Electric Corporation	Industrial robot	• YRC1000 • DX200 • FS100	10040	UDP	"1.075D" or later
Mitsubishi Electric		CR800	45237	UDP	"1.075D" or later
FANUC		R-30iB	502	TCP Active	"1.085P" or later
UNIVERSAL ROBOTS		• UR3e • UR5e • UR10e • UR16e	502	TCP Active	"1.085P" or later
RKC INSTRUMENT	Temperature controller	FB series • FB100 • FB400 • FB900	502	TCP Active	"1.085P" or later
		SRZ series (COM-JL) • Z-TIO • Z-DIO	502	TCP Active	"1.085P" or later
		SRZ series (COM-ME-1) • Z-TIO • Z-DIO	502	TCP Active	"1.085P" or later
Azbil		• NX-D • NX-S • NX-DX • NX-DY	502	TCP Active	"1.085P" or later
Yokogawa Electric		UTAdvanced • UT75A • UT55A • UT35A • UP55A • UP35A	502	TCP Active	"1.090U" or later
Mitsubishi Electric	MDU breaker	• NF250 • NF400 • NF630 • NF800 *1	502	TCP Active	"1.095Z" or later
	Energy measuring module	EcoMonitorLight • EMU4-BD1-MB • EMU4-HD1-MB	502	TCP Active	"1.095Z" or later
		EcoMonitorPlus • EMU4-BM1-MB • EMU4-HM1-MB • EMU4-A2 • EMU4-VA2 • EMU4-AX4 • EMU4-PX4	502	TCP Active	"1.095Z" or later
	Electronic multi-indicating instrument	ME96 Series • ME96SSRB-MB • ME96SSHB-MB	502	TCP Active	"1.095Z" or later
Omron	RFID system	V680S series • V680S-HMD63-ETN • V680S-HMD64-ETN • V680S-HMD66-ETN	502	TCP Active	"1.095Z" or later

Manufacturer	Device Type	Model	Communication Destination Port No. (Default)	Protocol Format (Default)	Software version of the engineering tool
Keyence	Recorder	• TR-H • TR-W	502	TCP Active	"1.095Z" or later

*1 Ground leakage alarm circuit breakers (NF250-ZEVMB, NF400-ZEWMB, NF630-ZEWMB, NF800-ZEWMB) are not supported.

Point

Before using the simple device communication library, check the versions of the module and engineering tool used.

MELSEC iQ-R Ethernet User's Manual (Application)

2 PROTOCOLS SUPPORTED BY YASKAWA Electric Corporation (YRC1000, DX200, FS100)

2.1 Setting Method

YRC1000

For communications with the YRC1000, use the high-speed Ethernet server communication function.
For the setting method of parameters, refer to the manual of YASKAWA Electric Corporation (YRC1000 Ethernet Function Instruction Manual).

DX200

For communications with the DX200, use the DX200 high-speed Ethernet server function.
Change the settings of the DX200 to enable the Ethernet host control function and high-speed Ethernet server function.
For the setting method of parameters, refer to the manuals of YASKAWA Electric Corporation (DX200 Ethernet Function Instruction Manual and DX200 High-Speed Ethernet Server Function Instruction Manual).

FS100

For communications with FS100, use the FS100 high-speed Ethernet server function.
Change the settings of FS100 to enable the Ethernet host control function and high-speed Ethernet server function.
For the setting method of parameters, refer to the manuals of YASKAWA Electric Corporation (FS100 Ethernet Function Instruction Manual and FS100 High-Speed Ethernet Server Function Instruction Manual).

2.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Latest Alarm Data Read	Reads the latest alarm data from four alarms displayed on a programming pendant.	To be added	Fixed Intrvl
RD: Alarm Data Read	Reads the specified alarm number data from four alarms displayed on a programming pendant.	Not to be added	Request
RD: Alarm History Read	Reads the specified alarm number data.	Not to be added	Request
RD: Status Information Read	Reads the status information.	To be added	Fixed Intrvl
RD: Execution Job Information Read	Reads the job information that is being executed in the master task.	To be added	Fixed Intrvl
RD: Axis Structure Information Read	Reads the axis name of the first to eighth axes of the control group 1: R1 robot (pulse value).	Not to be added	Request
RD: Robot Positioning Data Read (Cartesian)	Reads the location data of the control group 101: R1 robot coordinate value (orthogonal value).	To be added	Fixed Intrvl
RD: Robot Positioning Data Read (Pulse)	Reads the position data of the control group 1: R1 robot (pulse value).	To be added	Fixed Intrvl
RD: Normal Deviation Read	Reads the position deviation of the control group 1: R1 robot axis.	To be added	Fixed Intrvl
RD: Torque Data Read	Reads the torque data of the control group 1: R1 robot axis.	To be added	Fixed Intrvl
RD: Emergency Stop IO Data Read	Reads the value of the logical number: 8002 (robot control status signal).	To be added	Fixed Intrvl
RD: IO Data Read	Reads the IO data of the specified logical number.	Not to be added	Request
WR: IO Data Write	Writes data into the IO data of the specified logical number.	Not to be added	Request
RD: Register Data Read	Reads the register data of the specified register number.	Not to be added	Request
WR: Register Data Write	Writes data into the specified register number.	Not to be added	Request
RD: Byte Variable (B) Read	Reads the byte-type variable (B) data of the specified variable number.	Not to be added	Request
WR: Byte Variable (B) Write	Writes data into the byte-type variable (B) of the specified variable number.	Not to be added	Request
RD: Integer Variable (I) Read	Reads the integral-type variable (I) data of the specified variable number.	Not to be added	Request
WR: Integer Variable (I) Write	Writes data into the integral-type variable (I) of the specified variable number.	Not to be added	Request
RD: Double-precision Integer Variable (D) Read	Reads double-precision integral-type variable (D) data of the specified variable number.	Not to be added	Request
WR: Double-precision Integer Variable (D) Write	Writes data into the double-precision integral-type variable (D) of the specified variable number.	Not to be added	Request
RD: Real Variable (R) Read	Reads the real number-type variable (R) data of the specified variable number.	Not to be added	Request
WR: Real Variable (R) Write	Writes data into the real number-type variable (R) of the specified variable number.	Not to be added	Request
RD: 16-byte String Variable (S) Read	Reads 16 bytes of the character string-type variable (S) data of the specified variable number.	Not to be added	Request
WR: 16-byte String Variable (S) Write	Writes 16 bytes of data into the character string-type variable (S) of the specified variable number.	Not to be added	Request
WR: Alarm Reset	Resets the alarm.	To be added	Request
WR: Error Cancellation	Cancels the error.	Not to be added	Request
WR: HOLD On	Turns on HOLD.	To be added	Request
WR: HOLD Off	Turns off HOLD.	To be added	Request
WR: Servo On	Turns on the servo.	To be added	Request
WR: Servo Off	Turns off the servo.	To be added	Request
WR: HLOCK On	Turns on HLOCK.	Not to be added	Request
WR: HLOCK Off	Turns off HLOCK.	Not to be added	Request
WR: Operation Cycle Switch (Step)	Writes the status switching command type (1: Step) and change the operating status to step.	To be added	Request
WR: Operation Cycle Switch (Cycle)	Writes the status switching command type (2: Cycle) and change the operating status to cycle.	To be added	Request
WR: Operation Cycle Switch (Continuation)	Writes the status switching command type (3: continuous) and change the operating status to continuous.	To be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: Displaying Strings to the Pendant	Displays any specified character string on the programming pendant.	Not to be added	Request
WR: Start (Job Start)	Starts up the job.	To be added	Request
WR: Job Selection	Selects the execution job (line number 0).	To be added	Request
RD: Management Time Acquisition	Reads the data of the specified control time.	Not to be added	Request
RD: System Information Acquisition	Reads data (model information, application information) of the specified system type.	Not to be added	Request
RD: 32-byte String Variable (S) Read*2	Reads 32 bytes of the specified character string-type variable (S).	Not to be added	Request
WR: 32-byte String Variable (S) Write*2	Writes 32 bytes of data into the specified character string-type variable (S).	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 The FS100 is excluded.

2.3 Details of Applicable Protocols

RD: Latest Alarm Data Read

Reads the latest alarm data from four alarms displayed on a programming pendant.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Alarm Code • Alarm Data • Alarm Type • Alarm Time (String: 16 characters) • Alarm String Name (String: 32 characters)	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: Alarm Data Read

Reads the specified alarm number data from four alarms displayed on a programming pendant.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Reading Alarm Specification)	Specify the device that stores alarm numbers (1 to 4) of the target to be read.
Normal response	• Alarm Code • Alarm Data • Alarm Type • Alarm Time (String: 16 characters) • Alarm String Name (String: 32 characters)	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: Alarm History Read

Reads the specified alarm number data.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Alarm No.)	Specify the device that stores alarm number[*1] of the target to be read.
Normal response	• Alarm Code • Alarm Data • Alarm Type • Alarm Time (String: 16 characters) • Alarm String Name (String: 32 characters)	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

*1 1 to 100: Major failure, 1001 to 1100: Minor failure, 2001 to 2100: User alarm (system), 3001 to 3100: User alarm (user), 4001 to 4100: Offline alarm

RD: Status Information Read

Reads the status information.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Data 1 • Data 2	Specify the device for storing the read data.[*1]
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

*1 Data to be stored in "Data 1" and "Data 2"

Bit	Data 1	Data 2
0	Step	—
1	1 cycle	In hold status (by programming pendant)
2	Automatic and continuous	In hold status (externally)
3	Running	In hold status (by command)
4	In-guard safe operation	Alarming
5	Teach	Error occurring
6	Play	Servo ON
7	Command remote	—

RD: Execution Job Information Read

Reads the job information that is being executed in the master task.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Job name (string: 32 (1 byte)) • Line No. (0 to 9999) • Step No. (1 to 9998) • Speed Override Value	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: Axis Structure Information Read

Reads the axis name of the first to eighth axes of the control group 1: R1 robot (pulse value).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• 1st Coordinate Name • 2nd Coordinate Name • 3rd Coordinate Name • 4th Coordinate Name • 5th Coordinate Name • 6th Coordinate Name • 7th Coordinate Name • 8th Coordinate Name	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: Robot Positioning Data Read (Cartesian)

Reads the location data of the control group 101: R1 robot coordinate value (orthogonal value).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Data type (0: Pulse/16: Base Coordinate) • Form • Tool No. • User Coordinate No. • Extension Form • 1st Axis Data • 2nd Axis Data • 3rd Axis Data • 4th Axis Data • 5th Axis Data • 6th Axis Data • 7th Axis Data • 8th Axis Data	Specify the device for storing the read data.*1
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

*1 Data to be stored in "Form" and "Extension Form"

Bit	Form		Extension Form	
0	0: Front	1: Back	0: θL<180	1: θL≥180
1	0: Upper arm	1: Lower arm	0: θU<180	1: θU≥180
2	0: Flip	1: No Flip	0: θB<180	1: θB≥180
3	0: θR<180	1: θR≥180	0: θE<180	1: θE≥180
4	0: θT<180	1: θT≥180	0: θW<180	1: θW≥180
5	0: θS<180	1: θS≥180	—	
6	0: Redundant front	1: Redundant back		
7	0: Previous step regarded reverse conversion specified	1: Type regarded reverse conversion specified		

RD: Robot Positioning Data Read (Pulse)

Reads the position data of the control group 1: R1 robot (pulse value).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
• Normal response (7 Axes) • Normal response (6 Axes)	• Data type (0: Pulse/16: Base Coordinate) • Form • Tool No. • User Coordinate No. • Extension Form • 1st Axis Data • 2nd Axis Data • 3rd Axis Data • 4th Axis Data • 5th Axis Data • 6th Axis Data • 7th Axis Data	Specify the device for storing the read data. 0 is stored in "Form" and "Extension Form".
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The normal response for which verification matches differs depending on the robot in use (for seven axes or six axes).
Check the specifications of the robot in use, and set a dummy device for "Device" of unnecessary receive packets ("Normal response (7 Axes)" or "Normal response (6 Axes)").

RD: Normal Deviation Read

Reads the position deviation of the control group 1: R1 robot axis.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
• Normal response (7 Axes) • Normal response (6 Axes)	• 1st Axis Data • 2nd Axis Data • 3rd Axis Data • 4th Axis Data • 5th Axis Data • 6th Axis Data • 7th Axis Data	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The normal response for which verification matches differs depending on the robot in use (for seven axes or six axes).
Check the specifications of the robot in use, and set a dummy device for "Device" of unnecessary receive packets ("Normal response (7 Axes)" or "Normal response (6 Axes)").

RD: Torque Data Read

Reads the torque data of the control group 1: R1 robot axis.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
• Normal response (7 Axes) • Normal response (6 Axes)	• 1st Axis Data • 2nd Axis Data • 3rd Axis Data • 4th Axis Data • 5th Axis Data • 6th Axis Data • 7th Axis Data	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The normal response for which verification matches differs depending on the robot in use (for seven axes or six axes).
Check the specifications of the robot in use, and set a dummy device for "Device" of unnecessary receive packets ("Normal response (7 Axes)" or "Normal response (6 Axes)").

RD: Emergency Stop IO Data Read

Reads the value of the logical number: 8002 (robot control status signal).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	8002 Control Status Signal	Specify the device for storing the read data. Stores the value of the control status signal (80020 to 80027) to the bits 0 to 7 of the specified device.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: IO Data Read

Reads the IO data of the specified logical number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Logical No.)	Specify the device that stores the logical number of the target to be read. Logical numbers (values obtained from dividing the logical numbers by 10) that can be specified are as listed below. • 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
Normal response	IO Data Read Value	Specify the device for storing the read data. The data size to be read is one-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

All the IO data can be read.

WR: IO Data Write

Writes the IO data into the specified logical number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Logical No.)	Specify the device that stores the logical number of the target to be written. Logical numbers (values obtained from dividing the logical numbers by 10) that can be specified are 2701 to 2956: Network input signals.
	IO Data Write Value	Specify the device that stores the write data. The data size to be written is one-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: Register Data Read

Reads the register data of the specified register number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Register No.)	Specify the device that stores register numbers (0 to 999) of the target to be read.
Normal response	Register Data Read Value	Specify the device for storing the read data. The data size to be read is two-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Register Data Write

Writes data into the specified register number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Register No.)	Specify the device that stores register numbers (0 to 599) of the target to be written.
	Register Data Write Value	Specify the device that stores the write data. The data size to be written is two-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

Only the register numbers 0 to 599 can be written.

RD: Byte Variable (B) Read

Reads the byte-type variable (B) data of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable number (0 to 99) of the target to be read.
Normal response	B Variable Read Value	Specify the device for storing the read data. The data size to be read is one-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: Byte Variable (B) Write

Writes data into the byte-type variable (B) of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable numbers (0 to 99) of the target to be written.
	B Variable Write Value	Specify the device that stores the write data. The data size to be written is one-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

RD: Integer Variable (I) Read

Reads the integral-type variable (I) data of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable number (0 to 99) of the target to be read.
Normal response	I Variable Read Value	Specify the device for storing the read data. The data size to be read is two-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: Integer Variable (I) Write

Writes data into the integral-type variable (I) of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable numbers (0 to 99) of the target to be written.
	I Variable Write Value	Specify the device that stores the write data. The data size to be written is two-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

RD: Double-precision Integer Variable (D) Read

Reads double-precision integral-type variable (D) data of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable number (0 to 99) of the target to be read.
Normal response	D Variable Read Value	Specify the device for storing the read data. The data size to be read is four-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: Double-precision Integer Variable (D) Write

Writes data into the double-precision integral-type variable (D) of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable numbers (0 to 99) of the target to be written.
	D Variable Write Value	Specify the device that stores the write data. The data size to be written is four-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

RD: Real Variable (R) Read

Reads the real number-type variable (R) data of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable number (0 to 99) of the target to be read.
Normal response	R Variable Read Value	Specify the device for storing the read data. The data size to be read is four-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: Real Variable (R) Write

Writes data into the real number-type variable (R) of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable numbers (0 to 99) of the target to be written.
	R Variable Write Value	Specify the device that stores the write data. The data size to be written is four-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

RD: 16-byte String Variable (S) Read

Reads 16 bytes of the character string-type variable (S) data of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable number (0 to 99) of the target to be read.
Normal response	S Variable Read Value	Specify the device for storing the read data. The data size to be read is 16-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: 16-byte String Variable (S) Write

Writes 16 bytes of data into the character string-type variable (S) of the specified variable number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable numbers (0 to 99) of the target to be written.
	S Variable Write Value	Specify the device that stores the write data. The data size to be written is 16-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: Alarm Reset

Resets the alarm.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Error Cancellation

Cancels the error.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: HOLD On

Turns on HOLD.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: HOLD Off

Turns off HOLD.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Servo On

Turns on the servo.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Servo Off

Turns off the servo.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: HLOCK On

Turns on HLOCK.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: HLOCK Off

Turns off HLOCK.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Operation Cycle Switch (Step)

Writes the status switching command type (1: Step) and change the operating status to step.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Operation Cycle Switch (Cycle)

Writes the status switching command type (2: Cycle) and change the operating status to cycle.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Operation Cycle Switch (Continuation)

Writes the status switching command type (3: continuous) and change the operating status to continuous.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Displaying Strings to the Pendant

Displays any specified character string on the programming pendant.

Setting data

Packet name	Element name	Description
Request	Message to be displayed	Specify the device that stores the data. For the number of characters, 30 one-byte characters or 15 double-byte characters can be specified.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Start (Job Start)

Starts up the job.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

WR: Job Selection

Selects the execution job (line number 0).

Setting data

Packet name	Element name	Description
Request	Job Name (32 (1 byte), 16 (2 bytes))	Specify the device that stores the job name (32 one-byte characters, 16 double-byte characters).
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: Management Time Acquisition

Obtains the data of the specified control time.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Management Time Type)	Specify the device that stores the control time type. The type numbers and types of the control time that can be specified are as listed below. • 1: Control power ON time • 10: 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: Playback time (TOTAL) • 111 to 118: Playback time (R1 to R8) • 121 to 144: Playback 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)
Normal response	• Start Time (yyyy/mm/dd hh:mm) • Elapsed Time (000000:00'00)	Specify the device that stores the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: System Information Acquisition

Reads data (model information, application information) of the specified system type.

Setting data

Packet name	Element name	Description
Request	Data Array No. (System Type)	Specify the device that stores the system type. The system type numbers and system types that can be specified are as listed below. • 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)
Normal response	• System Software Version • Model/Application • Parameter Version	Specify the device that stores the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: 32-byte String Variable (S) Read

Reads 32 bytes of the specified character string-type variable (S).

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable number (0 to 99) of the target to be read. The data size to be read for one time is 32-byte fixed.
Normal response	S Variable Read Value	Specify the device for storing the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

WR: 32-byte String Variable (S) Write

Writes 32 bytes of data into the specified character string-type variable (S).

Setting data

Packet name	Element name	Description
Request	Data Array No. (Variable No.)	Specify the device that stores variable numbers (0 to 99) of the target to be written.
	S Variable Write Value	Specify the device that stores the write data. The data size to be written is 32-byte fixed.
Normal response	—	No setting is required.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

Point

The standard setting range of the variable numbers is 0 to 99. Because the range can be extended with the optional function of the communication destination, check the range of variable numbers that can be specified.

3 PROTOCOLS SUPPORTED BY Mitsubishi Electric (CR800)

3.1 Setting Method

CR800

For communications with the CR800, use the SLMP connection function.

For steps to set the parameters, refer to the following.

CR800 series controller, CR750/CR751 series controller Ethernet Function Instruction Manual (BFP-A3379)

3.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: DDEVVL* Read (Data type: 0)	Reads data of the robot variable (integer type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	To be added	Request
RD: DDEVVL* Read (Data type: 1, 2)	Reads data of the robot variable (long-precision integral-type, single-precision real number type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
RD: DDEVVL* Read (Data type: 3)	Reads data of the robot variable (double-precision real number type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
RD: DDEVVL* Read (Data type: 4, 6)	Reads data of the robot variable (position type, work coordinate type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
RD: DDEVVL* Read (Data type: 5)	Reads data of the robot variable (joint type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
RD: DDEVVL* Read (Data type: 7)	Reads data of the robot variable (string type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
WR: DDEVVL* Write (Data type: 3)	Writes data into the robot variable (double-precision real number type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	To be added	Request
WR: DDEVVL* Write (Data type: 4, 6)	Writes data into the robot variable (position type, work coordinate type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
WR: DDEVVL* Write (Data type: 5)	Writes data into the robot variable (joint type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
WR: DDEVVL* Write (Data type: 7)	Writes data into the robot variable (string type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).	Not to be added	Request
RD: Latest Self-diagnostics Error Read	Reads the latest self-diagnostic error (including annunciator ON) (SM0).	Not to be added	Fixed Intrvl
RD: Latest Error Information Read (R/D)	Reads the latest self-diagnostics error code (SD0) and details of the latest self-diagnostics error time (SD1 to SD7).	To be added	Fixed Intrvl
RD: Self-diagnostics Error Code Read (R/D)	Reads the latest 16 error codes of the errors that occurred. (SD10 to SD25)	Not to be added	Request
RD: Latest Error Information Read (Q)	Reads the latest self-diagnostics error code (SD0) and the error time (SD1 to SD3).	To be added	Fixed Intrvl
RD: Battery Low Read (Q)	Reads the detection status of the CPU battery low (SM52).	Not to be added	Fixed Intrvl
RD: Momentary Interruption Detection Read (Q)	Reads occurrence of the momentary power failure (SM53).	Not to be added	Fixed Intrvl
RD: Momentary Interruption Detection Count (Q)	Reads the number of momentary power failure detections (SD53).	Not to be added	Request
RD: LED Status Read	Reads the LED status (SD201) of the CPU module for checking the error occurrence conditions.	Not to be added	Fixed Intrvl
RD: CPU Operating Status Read	Reads the operating status (SD203) of the CPU module for checking the operating status of the CPU module.	To be added	Fixed Intrvl

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

3.3 Details of Applicable Protocols

RD: DDEVVL* Read (Data type: 0)

Reads data of the robot variable (integer type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).
The default value is set to read DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5119, set FF1300.)
Normal response	Read Data	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 1, 2)

Reads data of the robot variable (long-precision integral-type, single-precision real number type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).
The default value is set to read DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5118, set FE1300.)
Normal response	Read Data	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 3)

Reads data of the robot variable (double-precision real number type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).

The default value is set to read DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5116, set FC1300.)
Normal response	Read Data	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 4, 6)

Reads data of the robot variable (position type, work coordinate type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).

The default value is set to read DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5098, set EA1300.)
Normal response	• X coordinate value • Y coordinate value • Z coordinate value • A coordinate value • B coordinate value • C coordinate value • L1 coordinate value • L2 coordinate value • Structure flag*1 • Multiple rotation data*2	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

*1 Stored values of a device specified to the structure flag

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0													• 0: Left • 1: Right	• 0: Below • 1: Above	• 0: Flip • 1: Non Flip

*2 Stored values of a device specified to the multi-rotation data

Offset	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
+0	J4				J3				J2				J1			
+1	J8				J7				J6				J5			

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 5)

Reads data of the robot variable (joint type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).
The default value is set to read DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5102, set EE1300.)
Normal response	• J1 coordinate value • J2 coordinate value • J3 coordinate value • J4 coordinate value • J5 coordinate value • J6 coordinate value • J7 coordinate value • J8 coordinate value	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

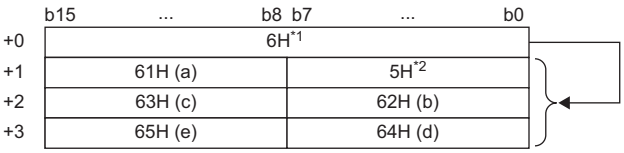
- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 7)

Reads data of the robot variable (string type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).
The default value is set to read DDEVVL* in which the element 10: start D device number is set to 4096.
127 characters can be read at the maximum.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5056, set C01300.)
	Read Size	Specify the device that stores the size of a string to be read into "Read Size". Set a value (round up to the nearest integer) calculated from (number of characters to be written + 1) / 2 to the specified device using a program or other means.
Normal response	Read Data	Specify the device that stores the read data to "Read Data". The following example shows reading a string-type variable to which a string abcde is set. (If the number of characters to be read is an even number, truncate the last one byte of the read data using a program or other means.)  *1: Read data length (byte) *2: String length (the number of characters set to the string-type variable that is set to DDEVVL)
Error response	Error Code	Specify the device for storing the error code.

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

WR: DDEVVL* Write (Data type: 3)

Writes data into the robot variable (double-precision real number type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).

The default value is set to write DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5116, set FC1300.)
	Write Data	Specify the device that stores the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device for storing the error code.

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- Set the element 1: variable type of DDEVVL* to the program external variable (1).
- When the element 1: variable type of DDEVVL* is status variable (2), writing will not be reflected.
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: Write DDEVVL* (data type: 4, 6)

Writes data into the robot variable (position type, work coordinate type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).

The default value is set to write data into DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5098, set EA1300.)
	• X coordinate value • Y coordinate value • Z coordinate value • A coordinate value • B coordinate value • C coordinate value • L1 coordinate value • L2 coordinate value • Structure flag*1 • Multiple rotation data*2	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device for storing the error code.

*1 Stored values of a device specified to the structure flag

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0													• 0: Left • 1: Right	• 0: Below • 1: Above	• 0: Flip • 1: Non Flip

*2 Stored values of a device specified to the multi-rotation data

Offset	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
+0	J4				J3				J2				J1			
+1	J8				J7				J6				J5			

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- Set the element 1: variable type of DDEVVL* to the program external variable (1).
- When the element 1: variable type of DDEVVL* is status variable (2), writing will not be reflected.
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

WR: DDEVVL* Write (Data type: 5)

Writes data into the robot variable (joint type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).
The default value is set to write DDEVVL* in which the element 10: start D device number is set to 4096.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5102, set EE1300.)
	• J1 coordinate value • J2 coordinate value • J3 coordinate value • J4 coordinate value • J5 coordinate value • J6 coordinate value • J7 coordinate value • J8 coordinate value	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device for storing the error code.

Point

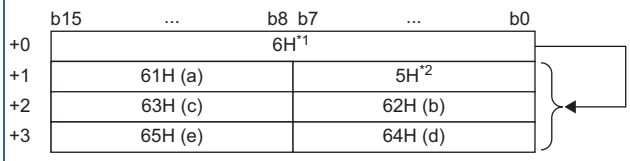
- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- Set the element 1: variable type of DDEVVL* to the program external variable (1).
- When the element 1: variable type of DDEVVL* is status variable (2), writing will not be reflected.
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

WR: DDEVVL* Write (Data type: 7)

Writes data into the robot variable (string type) assigned to DDEVVL1 to 32 (assign the robot variable to the D device).
The default value is set to write DDEVVL* in which the element 10: start D device number is set to 4096.
127 characters can be written at the maximum.

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5056, set C01300.)
	Write Size	Specify the device that stores the size of a string to be written into "Write Size". Set a value (round up to the nearest integer) calculated from (number of characters to be written + 1) / 2 to the specified device using a program or other means.
	Write Data	For "Write Data", specify the device for storing the data to be written. The following example shows writing a string abcde. (If the number of characters to be written is an even number, data of the last one byte is ignored.)  *1: Write data length (byte) *2: String length (number of characters to be written)
Normal response	—	No setting is required.
Error response	Error Code	Specify the device for storing the error code.

Point

- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- Set the element 1: variable type of DDEVVL* to the program external variable (1).
- When the element 1: variable type of DDEVVL* is status variable (2), writing will not be reflected.
- For details on DDEVVL*, refer to the following.

CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: Latest Self-diagnostics Error Read

Reads the latest self-diagnostic error (including annunciator ON) (SM0). Occurrence of errors is stored in the latest self-diagnostics error of the response message (normal response). (0H: No error, 10H: Error exists)

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Latest self-diagnostics Error	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: Latest Error Information Read (R/D)

Reads the latest self-diagnostics error code (SD0) and details of the latest self-diagnostics error time (SD1 to SD7).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Latest Self-diagnostics Error Code • Error Date (Year) • Error Date (Month) • Error Date (Day) • Error Date (Hour) • Error Date (Minute) • Error Date (Second) • Error Date (Week) (0: Sun., 1: Mon. ... 6: Sat.)	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: Self-diagnostics Error Code Read (R/D)

Reads the latest 16 error codes of the errors that occurred. (SD10 to SD25)

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Self-diagnostic Error Code 1 • Self-diagnostic Error Code 2 • Self-diagnostic Error Code 3 • Self-diagnostic Error Code 4 • Self-diagnostic Error Code 5 • Self-diagnostic Error Code 6 • Self-diagnostic Error Code 7 • Self-diagnostic Error Code 8 • Self-diagnostic Error Code 9 • Self-diagnostic Error Code 10 • Self-diagnostic Error Code 11 • Self-diagnostic Error Code 12 • Self-diagnostic Error Code 13 • Self-diagnostic Error Code 14 • Self-diagnostic Error Code 15 • Self-diagnostic Error Code 16	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: Latest Error Information Read (Q)

Reads the latest self-diagnostics error code (SD0) and the error time (SD1 to SD3).

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Latest Self-diagnostics Error Code • Error Date (b15 to 8: Year, b7 to 0: Month) • Error Date (b15 to 8: Day, b7 to 0: Hour) • Error Date (b15 to 8: Minute, b7 to 0: Second)	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: Battery Low Read (Q)

Reads the detection status of the CPU battery low (SM52). Occurrence of battery low detection is stored in the battery information of the response message (normal response). (0H: Normal, 10H: Battery low detected)

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Battery Information	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: Momentary Interruption Detection Read (Q)

Reads occurrence of the momentary power failure (SM53).
Occurrence of momentary power failure is stored in the momentary power failure detection information of the response message (normal response). (0H: No momentary power failure, 10H: Momentary power failure detected)

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Momentary interruption Detection Information	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: Momentary Interruption Detection Count (Q)

Reads the number of momentary power failure detections (SD53).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Momentary interruption Detection Count	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: LED Status Read

Reads the LED status (SD201) of the CPU module for checking the error occurrence conditions.

The values listed below are stored in the device specified to the LED status of the response message (normal response).

- 1H: No error
- 5H: Error exists (C level)
- 9H: Error exists (H, L level)

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	LED Status (1: No Err, 5: Err(C), Err(H, L))	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

RD: CPU Operating Status Read

Reads the operating status (SD203) of the CPU module for checking the operating status of the CPU module.

The values listed below are stored in the device specified to the operating status of the response message (normal response).

- 0H: RUN
- 2H: STOP
- 3H: PAUSE

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Status (0: RUN, 2: STOP, 3: PAUSE)	Specify the device for storing the read data.
Error response	Error Code	Specify the device for storing the error code.

Point

The device subject to reading and the number of items cannot be changed.

4 PROTOCOLS SUPPORTED BY FANUC (R-30iB)

4.1 Setting Method

R-30iB

For communications with the R-30iB, use the R-30iB touch panel communication function.

For the setting method of parameters, refer to the manual of FANUC Corporation (FANUC Robot Series Optional Function Instruction Manual).

List of Holding Registers

Library files are created based on the assignments in the table below.

Assign the robot data to the holding register in advance in R-30iB.

Address of the holding register	Robot data	
1	Alarm History 1	Alarm ID
2		Alarm No.
3		Detailed code: Alarm ID
4		Detailed code: Alarm No.
5		Major alarm
6 to 50	Alarm History 2 to 10	—
51 to 58	Program Execution Status	Program Name
59		Line No.
60		Execution status
61 to 68		Parent Program Name
69 to 70	System variable - Energization total time for robot controller	Group 1
71 to 72	System variable - Servo-on total time	Group 1
73 to 74	System variable - Program operation total time	Group 1
75 to 76	System variable - Program standby total time	Group 1
77 to 78	System variable - Brake release total time	Group 1
79 to 80	System variable - Each axis Q phase current value	Group 1: Axis 1
81 to 96		Group 1: Axis 2 to 9
97 to 98	System variable - Each axis current value	Group 1: Axis 1
99 to 114		Group 1: Axis 2 to 9

4.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Alarm History	Reads alarm history 1 to 10.	To be added	Fixed Intrvl
RD: Program Execution Status	Reads the program execution status.	To be added	Fixed Intrvl
RD: System Total Time	Reads the total system time for Group 1.	Not to be added	Fixed Intrvl
RD: Q Phase Current Value/Current Value	Reads the individual axis current values and individual axis Q-phase current values for Group 1.	Not to be added	Fixed Intrvl
RD: Digital Input (DI) [1-16]*2	Reads DI [1] to [16].	To be added	Fixed Intrvl
RD: Robot Input (RI) [1-16]*2	Reads RI [1] to [16].	To be added	Fixed Intrvl
RD: Peripheral Input (UI) [1-32]*2	Reads UI [1] to [32].	Not to be added	Fixed Intrvl
RD: Peripheral Output (UO) [1-32]*2	Reads UO [1] to [32].	Not to be added	Fixed Intrvl
RD: Operation Panel Input (SI) [0-15]*2	Reads SI [0] to [15].	Not to be added	Fixed Intrvl
RD: Operation Panel Output (SO) [0-15]*2	Reads SO [0] to [15].	Not to be added	Fixed Intrvl
RD: Welding Digital Input (WI) [1-32]*2	Reads WI [1] to [32].	Not to be added	Fixed Intrvl
RD: Welding Digital Output (WO) [1-32]*2	Reads WO [1] to [32].	Not to be added	Fixed Intrvl
RD: Welding Detection Circuit Input (WSI) [1-32]*2	Reads WSI [1] to [32].	Not to be added	Fixed Intrvl
RD: Welding Detection Circuit Output (WSO)[1-32]*2	Reads WSO [1] to [32].	Not to be added	Fixed Intrvl
RD: Digital Output (DO) [1-16]*2	Reads DO [1] to [16].	To be added	Fixed Intrvl
RD: Robot Output (RO) [1-16]*2	Reads RO [1] to [16].	To be added	Fixed Intrvl
RD: Flag (F) [1-16]*2	Reads F [1] to [16].	Not to be added	Fixed Intrvl
RD: Group Input (GI) [1-8]*2	Reads GI [1] to [8].	Not to be added	Fixed Intrvl
RD: Group Output (GO) [1-8]*2	Reads GO from [1] to [8].	Not to be added	Fixed Intrvl
RD: Analog Input (AI) [1-6]*2	Reads AI from [1] to [6].	Not to be added	Fixed Intrvl
RD: Analog Output (AO) [1-2]*2	Reads AO from [1] to [2].	Not to be added	Fixed Intrvl
WR: Flag (F) [1001-1018]*2	Writes into F [1001] to [1018].	Not to be added	Request
WR: Holding Register 1001 to 1002	Writes into holding registers 1001 and 1002.	Not to be added	Request
RD: Coils*3	Reads the value to be stored in the MODBUS coil device.	Not to be added	Request
RD: Discrete Inputs*3	Reads the value to be stored in the MODBUS input device.	Not to be added	Request
RD: Holding Registers*3	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
RD: Input Registers*3	Reads the value to be stored in the MODBUS input register device.	Not to be added	Request
WR: Single Coil*3	Writes the value into the MODBUS coil device one point at a time.	Not to be added	Request
WR: Single Holding Register*3	Writes the value into the MODBUS holding register device one point at a time.	Not to be added	Request
WR: Multiple Coils*3	Writes the number of multiple points into the MODBUS coil device.	Not to be added	Request
WR: Multiple Holding Registers*3	Writes the number of multiple points to the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 Edit the "Start Coil No.", "Start Input No.", "Start Holding Register No.", and "Start Input Register No.", in the request message according to the robot data to be read or written.

*3 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

4.3 Details of Applicable Protocols

RD: Alarm History

Reads alarm history 1 to 10 information stored in holding registers 1 to 50.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Alarm History 1 to 10*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Address (offset)	Element name	
+0	Alarm History 1	Alarm ID
+1		Alarm No.
+2		Detailed code: Alarm ID
+3		Detailed code: Alarm No.
+4		Major alarm
...	...	...
+45	Alarm History 10	Alarm ID
+46		Alarm No.
+47		Detailed code: Alarm ID
+48		Detailed code: Alarm No.
+49		Major alarm

Precautions

- Assign the robot data to the holding register according to the list of holding registers. (☞ Page 58 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: Program Execution Status

Reads the program execution status information stored in holding registers 51 to 68.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Program Name • Line No. • Execution status • Parent Program Name	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Assign the robot data to the holding register according to the list of holding registers. (☞ Page 58 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: System Total Time

Reads the information on the total system time for Group 1 stored in holding registers 69 to 78.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Power-on Time for Controller: Group 1 • Servo-on Time: Group 1 • Program Operating Time: Group 1 • Program Standby Time: Group 1 • Brake Release Time: Group 1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Assign the robot data to the holding register according to the list of holding registers. (☞ Page 58 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: Q Phase Current Value/Current Value

Reads the information on Q-phase current value/current value for Group 1 stored in holding registers 79 to 114.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Each Axis Q Phase Current Value: Group 1: Axis 1 to Axis 9 • Each Axis Current Value: Group 1: Axis 1 to Axis 9	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Assign the robot data to the holding register according to the list of holding registers. (☞ Page 58 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: Digital Input (DI) [1-16]

Reads the value stored in the digital input for robot data.
In the default setting, the digital input DI [1-16] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
Normal response	DI [1-16]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the digital input DI [1-10000] is assigned to MODBUS input devices 1 to 10000, the setting range of the Start Input No. is 0000H to 2700H (0 to 9984).

RD: Robot Input (RI) [1-16]

Reads the value stored in the robot input for robot data.
In the default setting, the robot input RI [1-16] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 2710H when reading address 10001 of the MODBUS device.)
Normal response	RI [1-16]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the robot input RI [1-10000] is assigned to MODBUS input devices 10001 to 20000, the setting range of the Start Input No. is 2710H to 4E10H (10000 to 19984).

RD: Peripheral Input (UI) [1-32]

Reads the value stored in the peripheral device input for robot data.
In the default setting, the peripheral device input UI [1-32] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 4E20H when reading address 20001 of the MODBUS device.)
Normal response	• UI [1-16] • UI [17-32]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the peripheral device input UI [1-1000] is assigned to MODBUS input devices 20001 to 21000, the setting range of the Start Input No. is 4E20H to 51E8H (20000 to 20968).

RD: Peripheral Output (UO) [1-32]

Reads the value stored in the peripheral device output for robot data.
In the default setting, the peripheral device output UO [1-32] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 5208H when reading address 21001 of the MODBUS device.)
Normal response	• UO [1-16] • UO [17-32]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the peripheral device output UO [1-999] is assigned to MODBUS input devices 21001 to 21999, the setting range of the Start Input No. is 5208H to 55CFH (21000 to 21967).

RD: Operation Panel Input (SI) [0-15]

Reads the value stored in the operation panel input for robot data.
In the default setting, the operation panel input SI [0-15] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 55EFH when reading address 22000 of the MODBUS device.)
Normal response	SI [0-15]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the operation panel input SI [0-999] is assigned to MODBUS input devices 22000 to 22999, the setting range of the Start Input No. is 55EFH to 59C7H (21999 to 22983).

RD: Operation Panel Output (SO) [0-15]

Reads the value stored in the operation panel output for robot data.
In the default setting, the operation panel output SO [0-15] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 59D7H when reading address 23000 of the MODBUS device.)
Normal response	SO [0-15]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the operation panel output SO [0-1000] is assigned to MODBUS input devices 23000 to 24000, the setting range of the Start Input No. is 59D7H to 5DB0H (22999 to 23984).

RD: Welding Digital Input (WI) [1-32]

Reads the value stored in the weld digital input for robot data.
In the default setting, the weld digital input WI [1-32] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 5DC0H when reading address 24001 of the MODBUS device.)
Normal response	• WI [1-16] • WI [17-32]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the weld digital input WI [1-1000] is assigned to MODBUS input devices 24001 to 25000, the setting range of the Start Input No. is 5DC0H to 6188H (24000 to 24968).

RD: Welding Digital Output (WO) [1-32]

Reads the value stored in the weld digital output for robot data.
In the default setting, the weld digital output WO [1-32] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 61A8H when reading address 25001 of the MODBUS device.)
Normal response	• WO [1-16] • WO [17-32]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the weld digital output WO [1-1000] is assigned to MODBUS input devices 25001 to 26000, the setting range of the Start Input No. is 61A8H to 6570H (25000 to 25968).

RD: Welding Detection Circuit Input (WSI) [1-32]

Reads the value stored in the weld detection circuit input for robot data.
In the default setting, the weld detection circuit input WSI [1-32] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 6590H when reading address 26001 of the MODBUS device.)
Normal response	• WSI [1-16] • WSI [17-32]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the weld detection circuit input WSI [1-1000] is assigned to MODBUS input devices 26001 to 27000, the setting range of the Start Input No. is 6590H to 6958H (26000 to 26968).

RD: Welding Detection Circuit Output (WSO) [1-32]

Reads the value stored in the weld detection circuit output for robot data.
In the default setting, the weld detection circuit output WSO [1-32] is read.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 6978H when reading address 27001 of the MODBUS device.)
Normal response	• WSO [1-16] • WSO [17-32]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input No."
- Since the weld detection circuit output WSO [1-1000] is assigned to MODBUS input devices 27001 to 28000, the setting range of the Start Input No. is 6978H to 6D40H (27000 to 27968).

RD: Digital Output (DO) [1-16]

Reads the value stored in the digital output for robot data.
In the default setting, the digital output DO [1-16] is read.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
Normal response	DO [1-16]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Coil No."
- Since the digital output DO [1-10000] is assigned to the MODBUS coil devices 1 to 10000, the setting range of the Start Coil No. is 0000H to 2700H (0 to 9984).

RD: Robot Output (RO) [1-16]

Reads the value stored in the robot output for robot data.
In the default setting, the robot output RO [1-16] is read.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 2710H when reading address 10001 of the MODBUS device.)
Normal response	RO [1-16]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Coil No."
- Since the robot output RO [1-10000] is assigned to the MODBUS coil devices 10001 to 20000, the setting range of the Start Coil No. is 2710H to 4E10H (10000 to 19984).

RD: Flag (F) [1-16]

Reads the value stored in the flag for robot data.
In the default setting, Flag F [1-16] is read.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 4E20H when reading address 20001 of the MODBUS device.)
Normal response	F [1-16]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Coil No."
- Since Flag F [1-10000] is assigned to the MODBUS coil devices 20001 to 30000, the setting range of the Start Coil No. is 4E20H to 7520H (20000 to 29984).

RD: Group Input (GI) [1-8]

Reads the value stored in the group input for robot data.
In the default setting, the group input GI [1-8] is read.

Setting data

Packet name	Element name	Description
Request	Start Input Register No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
Normal response	GI [1] to GI [8]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input Register No."
- Since the group input GI [1-1000] is assigned to the MODBUS input register devices 1 to 1000, the setting range of the Start Input Register No. is 0000H to 03E0H (0 to 992).

RD: Group Output (GO) [1-8]

Reads the value stored in the group output for robot data.
In the default setting, the group output GO [1-8] is read.

Setting data

Packet name	Element name	Description
Request	Start Input Register No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 03E8H when reading address 1001 of the MODBUS device.)
Normal response	GO [1] to GO [8]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input Register No."
- Since the group output GO [1-1000] is assigned to the MODBUS input register devices 1001 to 2000, the setting range of the Start Input Register No. is 03E8H to 07C8H (1000 to 1992).

RD: Analog Input (AI) [1-6]

Reads the value stored in the analog input for robot data.
In the default setting, the analog input AI [1-6] is read.

Setting data

Packet name	Element name	Description
Request	Start Input Register No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 07D0H when reading address 2001 of the MODBUS device.)
Normal response	AI [1] to AI [6]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input Register No."
- Since the analog input AI [1-1000] is assigned to the MODBUS input register devices 2001 to 3000, the setting range of the Start Input Register No. is 07D0H to 0BB2H (2000 to 2994).

RD: Analog Output (AO) [1-2]

Reads the value stored in the analog output for robot data.
In the default setting, the analog output AO [1-2] is read.

Setting data

Packet name	Element name	Description
Request	Start Input Register No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0BB8H when reading address 3001 of the MODBUS device.)
Normal response	AO [1] to AO [2]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Input Register No."
- Since the analog output AO [1-1000] is assigned to the MODBUS input register devices 3001 to 4000, the setting range of the Start Input Register No. is 0BB8H to 0F9EH (3000 to 3998).

WR: Flag (F) [1001-1018]

Writes the value to be stored in the flag for robot data.
In the default setting, Flag F [1001-1018] is written.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 4E20H when writing address 20001 of the MODBUS device.)
	F [1001-1018]	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Start Coil No."
- Since Flag F [1-10000] is assigned to the MODBUS coil devices 20001 to 30000, the setting range of the Start Coil No. is 4E20H to 751EH (20000 to 29982).

WR: Holding Register 1001 to 1002

Writes the value to be stored in the holding register for robot data.

Setting data

Packet name	Element name	Description
Request	Start Holding Register No.	Specify the address -1 of the MODBUS device corresponding to the robot data to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Device Data	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Assign any robot data to the corresponding holding register in advance on the R-30iB side as necessary.
- Do not change values of "Fixed Data" other than "Start Holding Register No."
- The setting range of the "Start Holding Register No." is 0000H to 3FFEH (0 to 16382).

RD: Coils

MODBUS standard function. This protocol reads the value to be stored in the MODBUS coil device.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device that stores the coil number to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the data points to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Set the number within the range from 0001H to 07D0H (1 to 2000).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS coil devices are 1 to 65536. Set the setting range of the "Start Coil No." considering the "Number of Read Points".

RD: Discrete Inputs

MODBUS standard function. This protocol reads the value to be stored in the MODBUS input device.

Setting data

Packet name	Element name	Description
Request	Start Input No.	Specify the address -1 of the MODBUS device that stores the input number to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the data points to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Set the number within the range from 0001H to 07D0H (1 to 2000).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS input devices are 1 to 65536. Set the setting range of the "Start Input No." considering the "Number of Read Points".

RD: Holding Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Start Holding Register No.	Specify the address -1 of the MODBUS device that stores the holding register number to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the data points to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. The range is 0001H to 07D0H (1 to 125).)
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS holding register devices are 1 to 65536. Set the setting range of the "Start Holding Register No." considering the "Number of Read Points".

RD: Input Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS input register device.

Setting data

Packet name	Element name	Description
Request	Start Input Register No.	Specify the address -1 of the MODBUS device that stores the input register number to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the data points to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Set the number within the range from 0001H to 07D0H (1 to 125).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS input register devices are 1 to 65536. Set the setting range of the "Start Input Register No." considering the "Number of Read Points".

WR: Single Coil

MODBUS standard function. This protocol writes the value into the MODBUS coil device one point at a time.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device that stores the coil number to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	ON/OFF Specification	Specify the device for storing the data to be written. Write one of the following to the specified device. • On: FF00H • Off: 0000H
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS coil devices are 1 to 65536. The setting range of the "Start Coil No." is 0000H to FFFFH (0 to 65535).

WR: Single Holding Register

MODBUS standard function. This protocol writes the value into the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Start Holding Register No.	Specify the address -1 of the MODBUS device that stores the holding register number to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS holding register devices are 1 to 65536. The setting range of the "Start Holding Register No." is 0000H to FFFFH (0 to 65535).

WR: Multiple Coils

MODBUS standard function. This protocol writes the number of multiple points into the MODBUS coil device.

Setting data

Packet name	Element name	Description
Request	Start Coil No.	Specify the address -1 of the MODBUS device that stores the coil number to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Number of Write Points	Specify the device for storing the data points to be written. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
	Device Data	Specify the device for storing the data to be written. (For devices, secure the maximum number of write points + 1 (124 words). Store the data length (in unit of bytes) of the data to be written in the first word, and store the data to be written in the second and subsequent words.)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS coil devices are 1 to 65536. Set the setting range of the "Start Coil No." considering the "Number of Write Points".

WR: Multiple Holding Registers

MODBUS standard function. This protocol writes the number of multiple points to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Start Holding Register No.	Specify the address -1 of the MODBUS device that stores the holding register number to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Number of Write Points	Specify the device that stores the data points to be written. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 5119, set 13FFH.)
	Device Data	Specify the device for storing the data to be written. (For devices, secure the maximum number of write points + 1 (124 words). Store the data length (in unit of bytes) of the data to be written in the first word, and store the data to be written in the second and subsequent words.)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- The addresses of MODBUS holding register devices are 1 to 65536. Set the setting range of the "Start Holding Register No." considering the "Number of Write Points".

5 PROTOCOLS SUPPORTED BY UNIVERSAL ROBOTS (UR3e, UR5e, UR10e, AND UR16e)

5.1 Setting Method

9UR3e, UR5e, UR10e, UR16e

Use the MODBUS/TCP function to communicate with UR3e, UR5e, UR10e, and UR16e.

For the setting method of parameters, refer to the manual of UNIVERSAL ROBOTS (Universal Robots e-Series user manual).

5.2 List of Applicable Protocols

Name[*1]	Description	Automatic Addition[*2]	Communication Timing (Default)
RD: Controller Version	Reads the value of the controller version.	Not to be added	Request
RD: Robot Mode	Reads the value of the robot mode.	To be added	Fixed Intrvl
RD: Robot Status (Bit)	Reads the value of the robot status in the digital I/O (bit type).	Not to be added	Fixed Intrvl
RD: Robot Status (Word)	Reads the value of the robot status in the register I/O (word type).	To be added	Fixed Intrvl
RD: Current	Reads the robot current and I/O current.	To be added	Fixed Intrvl
RD: Joint Angle	Reads the value of the joint angle.	To be added	Fixed Intrvl
RD: Joint Angle Velocity	Reads the value of the joint rotation speed.	To be added	Fixed Intrvl
RD: Joint Current	Reads the value of the joint current.	To be added	Fixed Intrvl
RD: Joint Temperature	Reads the value of the joint temperature.	To be added	Fixed Intrvl
RD: Joint Mode	Reads the value of the joint mode.	Not to be added	Fixed Intrvl
RD: Joint Revolution Count	Reads the value of the joint revolution.	To be added	Fixed Intrvl
RD: TCP Pause	Reads the value of the TCP pose.	To be added	Fixed Intrvl
RD: TCP Speed	Reads the value of the TCP speed.	To be added	Fixed Intrvl
RD: TCP Offset	Reads the value of the TCP offset.	To be added	Fixed Intrvl
RD: Split Time	Reads the value of the split time.	Not to be added	Request
WR: Split Time Trigger	Writes the value into the split time trigger.	Not to be added	Request
RD: Digital Inputs 0-15 (Bit)	Reads the value of the digital input 0 to 15 in the digital I/O (bit type).	Not to be added	Fixed Intrvl
RD: Digital Inputs 0-15 (Word)	Reads the value of the digital input 0 to 15 in the register I/O (word type).	Not to be added	Fixed Intrvl
RD: Digital Outputs 0-15 (Bit)	Reads the value of the digital output 0 to 15 in the digital I/O (bit type).	Not to be added	Fixed Intrvl
RD: Digital Outputs 0-15 (Word)	Reads the value of the digital output 0 to 15 in the register I/O (word type).	To be added	Fixed Intrvl
WR: Digital Outputs 0-15 (Bit)	Writes the value into the digital output 0 to 15 in the digital I/O (bit type).	Not to be added	Request
WR: Digital Outputs 0-15 (Word)	Writes the value into the digital output 0 to 15 in the register I/O (word type).	To be added	Request
WR: Digital Outputs 0 (Bit)	Writes the value into the digital output 0 in the digital I/O (bit type).	Not to be added	Request
RD: Configurable Inputs 0-7 (Bit)	Reads the value of the configurable input 0 to 7 in the digital I/O (bit type).	Not to be added	Fixed Intrvl
RD: Configurable Inputs 0-15 (Word)	Reads the value of the configurable input 0 to 15 in the register I/O (word type).	Not to be added	Fixed Intrvl
RD: Configurable Outputs 0-7 (Bit)	Reads the value of the configurable output 0 to 7 in the digital I/O (bit type).	Not to be added	Fixed Intrvl
RD: Configurable Outputs 0-15 (Word)	Reads the value of the configurable output 0 to 15 in the register I/O (word type).	Not to be added	Fixed Intrvl
WR: Configurable Outputs 0-7 (Bit)	Writes the value into the configurable output 0 to 7 in the digital I/O (bit type).	Not to be added	Request
WR: Configurable Outputs 0-15 (Word)	Writes the value into the configurable output 0 to 15 in the register I/O (word type).	Not to be added	Request
WR: Configurable Outputs 0 (Bit)	Writes the value into the configurable output 0 in the digital I/O (bit type).	Not to be added	Request
RD: Analog Input 0	Reads the value of the analog input 0.	Not to be added	Fixed Intrvl
RD: Analog Input 0 Domain	Reads the unit of the analog input 0.	Not to be added	Fixed Intrvl
WR: Analog Input 0 Domain	Writes the unit into the analog input 0.	Not to be added	Request

Name[*1]	Description	Automatic Addition[*2]	Communication Timing (Default)
RD: Analog Input 1	Reads the value of the analog input 1.	Not to be added	Fixed Intrvl
RD: Analog Input 1 Domain	Reads the unit of the analog input 1.	Not to be added	Fixed Intrvl
WR: Analog Input 1 Domain	Writes the unit into the analog input 1.	Not to be added	Request
RD: Analog Output 0	Reads the value and unit of the analog output 0.	Not to be added	Fixed Intrvl
WR: Analog Output 0	Writes the value and unit into the analog output 0.	Not to be added	Request
RD: Analog Output 1	Reads the value and unit of the analog output 1.	Not to be added	Fixed Intrvl
WR: Analog Output 1	Writes the value and unit into the analog output 1.	Not to be added	Request
RD: Tool Output Voltage	Reads the value of the tool power supply voltage.	Not to be added	Fixed Intrvl
WR: Tool Output Voltage	Writes the value into the tool power supply voltage.	Not to be added	Request
RD: Tool Digital Input	Reads the value of the tool digital input.	Not to be added	Fixed Intrvl
RD: Tool Digital Output	Reads the value of the tool digital output.	Not to be added	Fixed Intrvl
WR: Tool Digital Output	Writes the value into the tool digital output.	Not to be added	Request
RD: General Register	Reads the value of the general register for two words.	Not to be added	Request
WR: General Register	Writes the value into the general register for two words.	Not to be added	Request
RD: Coils[*3]	Reads the value to be stored in the MODBUS coil device.	Not to be added	Request
RD: Discrete Inputs[*3]	Reads the value to be stored in the MODBUS input device.	Not to be added	Request
RD: Holding Registers[*3]	Reads the value to be stored in the MODBUS holding register.	Not to be added	Request
RD: Input Register[*3]	Reads the value to be stored in the MODBUS input register.	Not to be added	Request
WR: Single Coil[*3]	Writes the value into the MODBUS coil device one point at a time.	Not to be added	Request
WR: Single Holding Register[*3]	Writes the value into the MODBUS holding register one point at a time.	Not to be added	Request
WR: Multiple Coils[*3]	Writes the number of multiple points into the MODBUS coil device.	Not to be added	Request
WR: Multiple Holding Registers[*3]	Writes the number of multiple points to the MODBUS holding register.	Not to be added	Request

*1 The protocol to be used depends on the signal type (digital I/O (bit type) or register I/O (word type)).

*2 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*3 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

5.3 Details of Applicable Protocols

RD: Controller Version

Reads the value of the controller version.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Controller Version (High Number) • Controller Version (Low Number)	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Robot Mode

Reads the value of the robot mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Robot Mode*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		
Robot Mode	For CB3, CB3.1 (3rd generation)	• 0: Disconnected • 1: Confirm_safety • 2: Booting • 3: Power_off • 4: Power_on • 5: Idle • 6: Backdrive • 7: Running
	For CB2 (2nd generation)	• -1 (FFFFH): Running • 0: No_controller • 1: Freedrive • 2: Ready • 3: Initializing • 4: Security_stopped • 5: Emergency_stopped • 6: Fault • 8: Not_connected • 9: Shoutdown

Precautions

Do not change values of "Fixed Data".

RD: Robot Status (Bit)

Reads the value of the robot status in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Robot Status*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b6	b5	b4	b3	b2	b1	b0
0 (undefined)	...	0 (undefined)	Presence of the safety signal to stop	Power button	Free drive	Emergency stop	Protective stop	Power status

Precautions

Do not change values of "Fixed Data".

RD: Robot Status (Word)

Reads the value of the robot status in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Power-on • Protective Stop • Emergency Stop • Free Drive • Power Button • Stop by Safety Signal	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Current

Reads the robot current and I/O current.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Robot Current (mA) • I/O Current (mA)	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Joint Angle

Reads the value of the joint angle.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Joint Angle (mrad)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Joint Angle (mrad)	Robot base (mrad)	+0
	Robot arm (mrad)	+1
	Robot elbow (mrad)	+2
	Robot wrist 1 (mrad)	+3
	Robot wrist 2 (mrad)	+4
	Robot wrist 3 (mrad)	+5

Precautions

Do not change values of "Fixed Data".

RD: Joint Angle Velocity

Reads the value of the joint rotation speed.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Joint Angle Velocity (mrad/s)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Joint Angle Velocity (mrad/s)	Robot base (mrad/s)	+0
	Robot arm (mrad/s)	+1
	Robot elbow (mrad/s)	+2
	Robot wrist 1 (mrad/s)	+3
	Robot wrist 2 (mrad/s)	+4
	Robot wrist 3 (mrad/s)	+5

Precautions

Do not change values of "Fixed Data".

RD: Joint Current

Reads the value of the joint current.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Joint Current (mA)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Joint Current (mA)	Robot base (mA)	+0
	Robot arm (mA)	+1
	Robot elbow (mA)	+2
	Robot wrist 1 (mA)	+3
	Robot wrist 2 (mA)	+4
	Robot wrist 3 (mA)	+5

Precautions

Do not change values of "Fixed Data".

RD: Joint Temperature

Reads the value of the joint temperature.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Joint Temperature (C)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Joint Temperature (C)	Robot base (C)	+0
	Robot arm (C)	+1
	Robot elbow (C)	+2
	Robot wrist 1 (C)	+3
	Robot wrist 2 (C)	+4
	Robot wrist 3 (C)	+5

Precautions

Do not change values of "Fixed Data".

RD: Joint Mode

Reads the value of the joint mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Joint Mode*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name			Address (offset)
Joint Mode	Robot base	• ECH (236): JOINT_SHUTTING_DOWN_MODE • EDH (237): JOINT_PART_D_CALIBRATION_MODE • EEH (238): JOINT_BACKDRIVE_MODE • EFH (239): JOINT_POWER_OFF_MODE • F5H (245): JOINT_NOT_RESPONDING_MODE • F6H (246): JOINT_MOTOR_INITIALISATION_MODE • F7H (247): JOINT_BOOTING_MODE • F8H (248): JOINT_PART_D_CALIBRATION_ERROR_MODE • F9H (249): JOINT_BOOTLOADER_MODE • FAH (250): JOINT_CALIBRATION_MODE • FCH (252): JOINT_FAULT_MODE • FDH (253): JOINT_RUNNING_MODE • FFH (255): JOINT_IDLE_MODE	+0
	Robot arm		+1
	Robot elbow		+2
	Robot wrist 1		+3
	Robot wrist 2		+4
	Robot wrist 3		+5

Precautions

- Do not change values of "Fixed Data".
- This protocol can be used with Robot Version 1.7 or later.

RD: Joint Revolution Count

Reads the value of the joint revolution.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Joint Revolution Count*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Joint Revolution Count	Robot base (C)	+0
	Robot arm (C)	+1
	Robot elbow (C)	+2
	Robot wrist 1 (C)	+3
	Robot wrist 2 (C)	+4
	Robot wrist 3 (C)	+5

Precautions

- Do not change values of "Fixed Data".
- This protocol can be used with Robot Version 1.7 or later.

RD: TCP Pause

Reads the value of the TCP pose.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	TCP Pause (1/10mm, mrad)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
TCP Pause (1/10mm, mrad)	TCP-x (1/10mm)	+0
	TCP-y (1/10mm)	+1
	TCP-z (1/10mm)	+2
	TCP-rx (mrad)	+3
	TCP-ry (mrad)	+4
	TCP-rz (mrad)	+5

Precautions

Do not change values of "Fixed Data".

RD: TCP Speed

Reads the value of the TCP speed.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	TCP Speed (mm/s, mrad/s)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
TCP Speed (mm/s, mrad/s)	TCP-x (mm/s)	+0
	TCP-y (mm/s)	+1
	TCP-z (mm/s)	+2
	TCP-rx (mrad/s)	+3
	TCP-ry (mrad/s)	+4
	TCP-rz (mrad/s)	+5

Precautions

Do not change values of "Fixed Data".

RD: TCP Offset

Reads the value of the TCP offset.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	TCP Offset (mm, mrad)*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
TCP Offset (mm, mrad)	TCP-x (mm)	+0
	TCP-y (mm)	+1
	TCP-z (mm)	+2
	TCP-rx (mrad)	+3
	TCP-ry (mrad)	+4
	TCP-rz (mrad)	+5

Precautions

Do not change values of "Fixed Data".

RD: Split Time

Reads the value of the split time.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Millisecond • Second • Minute • Hour • Day	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- Use this protocol after executing WR: Split Time Trigger. Writing a non-zero value to the split time trigger (equivalent to the split time in the UNIVERSAL ROBOTS signal name) stores values in milliseconds, seconds, minutes, hours, and days. (☞ Page 84 WR: Split Time Trigger)

WR: Split Time Trigger

Writes the value into the split time trigger.

Changing the value from 0 to non-zero updates the value to be read in RD: Split Time.

Setting data

Packet name	Element name	Description
Request	Split Time Trigger	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Digital Inputs 0-15 (Bit)

Reads the value of the digital input 0 to 15 in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Digital Inputs 0-15*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b10	b9	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Tool CH2 (tool_in[1])	Tool CH1 (tool_in[0])	Controller CH8 (digital_in[7])	...	Controller CH1 (digital_in[0])

Precautions

Do not change values of "Fixed Data".

RD: Digital Inputs 0-15 (Word)

Reads the value of the digital input 0 to 15 in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Digital Inputs 0-15*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b10	b9	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Tool CH2 (tool_in[1])	Tool CH1 (tool_in[0])	Controller CH8 (digital_in[7])	...	Controller CH1 (digital_in[0])

Precautions

Do not change values of "Fixed Data".

RD: Digital Outputs 0-15 (Bit)

Reads the value of the digital output 0 to 15 in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Digital outputs 0-15*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b10	b9	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Tool CH2 (tool_out[1])	Tool CH1 (tool_out[0])	Controller CH8 (digital_out[7])	...	Controller CH1 (digital_out[0])

Precautions

Do not change values of "Fixed Data".

RD: Digital Outputs 0-15 (Word)

Reads the value of the digital output 0 to 15 in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Digital outputs 0-15*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b10	b9	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Tool CH2 (tool_out[1])	Tool CH1 (tool_out[0])	Controller CH8 (digital_out[7])	...	Controller CH1 (digital_out[0])

Precautions

Do not change values of "Fixed Data".

WR: Digital Outputs 0-15 (Bit)

Writes the value into the digital output 0 to 15 in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	Digital Outputs 0-15*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b10	b9	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Tool CH2 (tool_out[1])	Tool CH1 (tool_out[0])	Controller CH8 (digital_out[7])	...	Controller CH1 (digital_out[0])

Precautions

- Do not change values of "Fixed Data".
- To write one point at a time, use WR: Digital output 0 (bit type). (☞ Page 87 WR: Digital Outputs 0 (Bit))

WR: Digital Outputs 0-15 (Word)

Writes the value into the digital output 0 to 15 in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	Digital Outputs 0-15*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b10	b9	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Tool CH2 (tool_out[1])	Tool CH1 (tool_out[0])	Controller CH8 (digital_out[7])	...	Controller CH1 (digital_out[0])

Precautions

Do not change values of "Fixed Data".

WR: Digital Outputs 0 (Bit)

Writes the value into the digital output 0 in the digital I/O (bit type).

The default value is set to write data into the digital output 0 in which the element 6: Write Start Number is set to 10H.

Setting data

Packet name	Element name	Description
Request	Write Start Number*1	When changing the address to be written, change the value to the MODBUS address corresponding to the digital output to be written.
	Digital Outputs 0	Specify the device for storing the data to be written. Write one of the following to the specified device. • On: FF00H • Off: 0000H
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 When changing the address to write into, refer to the following.

MODBUS address	Data name
10H	Controller CH1 (digital_out[0])
...	...
17H	Controller CH8 (digital_out[7])
18H	Tool CH1 (tool_out[0])
19H	Tool CH2 (tool_out[1])

Precautions

- Do not change values of "Fixed Data" other than "Write Start Number".
- When a value outside the range is written, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".
- To write in batches, use WR: Digital output 0 to 15 (bit type). (☞ Page 86 WR: Digital Outputs 0-15 (Bit))

RD: Configurable Inputs 0-7 (Bit)

Reads the value of the configurable input 0 to 7 in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Configurable Inputs 0-7*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Controller CH8 (config_in[7])	...	Controller CH1 (config_in[0])

Precautions

Do not change values of "Fixed Data".

RD: Configurable Inputs 0-15 (Word)

Reads the value of the configurable input 0 to 15 in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Configurable Inputs 0-15*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Controller CH8 (config_in[7])	...	Controller CH1 (config_in[0])

Precautions

Do not change values of "Fixed Data".

RD: Configurable Outputs 0-7 (Bit)

Reads the value of the configurable output 0 to 7 in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Configurable Outputs 0-7*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Controller CH8 (config_out[7])	...	Controller CH1 (config_out[0])

Precautions

Do not change values of "Fixed Data".

RD: Configurable Outputs 0-15 (Word)

Reads the value of the configurable output 0 to 15 in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Configurable Outputs 0-15*1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Controller CH8 (config_out[7])	...	Controller CH1 (config_out[0])

Precautions

Do not change values of "Fixed Data".

WR: Configurable Outputs 0-7 (Bit)

Writes the value into the configurable output 0 to 7 in the digital I/O (bit type).

Setting data

Packet name	Element name	Description
Request	Configurable Outputs 0-7*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Controller CH8 (config_out[7])	...	Controller CH1 (config_out[0])

Precautions

- Do not change values of "Fixed Data".
- To write one point at a time, use WR: Configurable output 0 (bit type). (☞ Page 90 WR: Configurable Outputs 0 (Bit))
- This protocol cannot be used when configurable outputs are used as safety I/O. When used, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

WR: Configurable Outputs 0-15 (Word)

Writes the value into the configurable output 0 to 15 in the register I/O (word type).

Setting data

Packet name	Element name	Description
Request	Configurable Outputs 0-15*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

b15	...	b8	b7	...	b0
0 (undefined)	...	0 (undefined)	Controller CH8 (config_out[7])	...	Controller CH1 (config_out[0])

Precautions

- Do not change values of "Fixed Data".
- Writing to the configurable output used as a safety I/O is not reflected.

WR: Configurable Outputs 0 (Bit)

Writes the value into the configurable output 0 in the digital I/O (bit type).
The default value is set to write data into the configurable output 0 in which the element 6: Write Start Number is set to 88H.

Setting data

Packet name	Element name	Description
Request	Configurable Outputs 0*1	Specify the device for storing the data to be written. Write one of the following to the specified device. • On: FF00H • Off: 0000H
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 When changing the address to be written, refer to the following and change the value of the Write Start Number to the MODBUS address corresponding to the configurable output to be written.

MODBUS address	Data name
88H (136)	Controller CH1 (config_out[0])
...	...
8FH (143)	Controller CH8 (config_out[7])

Precautions

- Do not change values of "Fixed Data" other than "Write Start Number".
- When a value outside the range is written, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".
- To write in batches, use WR: Configurable output 0-7 (bit type). (☞ Page 89 WR: Configurable Outputs 0-7 (Bit))
- This protocol cannot be used when configurable outputs are used as safety I/O. When used, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

RD: Analog Input 0

Reads the value of the analog input 0.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Analog Input 0	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Analog Input 0 Domain

Reads the unit of the analog input 0.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Analog Input 0 Domain	Specify the device for storing the read data. Store one of the following to the specified device. • 0H (mA) • 1H (V)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

WR: Analog Input 0 Domain

Writes the unit into the analog input 0.

Setting data

Packet name	Element name	Description
Request	Analog Input 0 Domain	Specify the device for storing the data to be written. Store one of the following to the specified device. • 0H (mA) • 1H (V)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- When a value outside the range is written, 03H: ILLEGAL_DATA_VALUE is stored in the "Abnormal Response Code".

RD: Analog Input 1

Reads the value of the analog input 1.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Analog Input 1	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Analog Input 1 Domain

Reads the unit of the analog input 1.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Analog Input 1 Domain	Specify the device for storing the read data. Store one of the following to the specified device. • 0H (mA) • 1H (V)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

WR: Analog Input 1 Domain

Writes the unit into the analog input 1.

Setting data

Packet name	Element name	Description
Request	Analog Input 1 Domain	Specify the device for storing the data to be written. Store one of the following to the specified device. • 0H (mA) • 1H (V)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- When a value outside the range is written, 03H: ILLEGAL_DATA_VALUE is stored in the "Abnormal Response Code".

RD: Analog Output 0

Reads the value and unit of the analog output 0.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Analog Output 0[*1] • Analog Output 0 Domain[*1]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Analog Output 0	0 to 65535	+0
Analog Output 0 Domain	• 0: mA • 1: mV	+1

Precautions

Do not change values of "Fixed Data".

WR: Analog Output 0

Writes the value and unit into the analog output 0.

Setting data

Packet name	Element name	Description
Request	• Analog Output 0[*1] • Analog Output 0 Domain[*1]	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Analog Output 0	0 to 65535	+0
Analog Output 0 Domain	• 0: mA • 1: mV	+1

Precautions

- Do not change values of "Fixed Data".
- When a value outside the range is written, 03H: ILLEGAL_DATA_VALUE is stored in the "Abnormal Response Code".

RD: Analog Output 1

Reads the value and unit of the analog output 1.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Analog Output 1[*1] • Analog Output 1 Domain[*1]	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Analog Output 1	0 to 65535	+0
Analog Output 1 Domain	• 0: mA • 1: mV	+1

Precautions

Do not change values of "Fixed Data".

WR: Analog Output 1

Writes the value and unit into the analog output 1.

Setting data

Packet name	Element name	Description
Request	• Analog Output 1[*1] • Analog Output 1 Domain[*1]	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

*1 The following data is stored.

Element name		Address (offset)
Analog Output 1	0 to 65535	+0
Analog Output 1 Domain	• 0: mA • 1: mV	+1

Precautions

- Do not change values of "Fixed Data".
- When a value outside the range is written, 03H: ILLEGAL_DATA_VALUE is stored in the "Abnormal Response Code".

RD: Tool Output Voltage

Reads the value of the tool power supply voltage.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Tool Output Voltage (V)	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

WR: Tool Output Voltage

Writes the value into the tool power supply voltage.

Setting data

Packet name	Element name	Description
Request	Tool Output Voltage (V)	Specify the device for storing the data to be written. Store one of the following to the specified device. • 0000H (0V) • 000CH (12V) • 0018H (24V)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- When a value outside the range is written, 03H: ILLEGAL_DATA_VALUE is stored in the "Abnormal Response Code".

RD: Tool Digital Input

Reads the value of the tool digital input.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Tool Digital Input	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: Tool Digital Output

Reads the value of the tool digital output.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Tool Digital Output	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

WR: Tool Digital Output

Writes the value into the tool digital output.

Setting data

Packet name	Element name	Description
Request	Tool Digital Output	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

Do not change values of "Fixed Data".

RD: General Register

Reads the value of the general register for two words.

Setting data

Packet name	Element name	Description
Request	Read Start Number	Specify the MODBUS address to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0080H when reading address 128 of the MODBUS device.)
Normal response	General Register	Specify the device for storing the read data.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Read Start Number".
- The setting range of the "Read Start Number" is 0080H to 00FEH (128 to 254).

WR: General Register

Writes the value into the general register for two words.

Setting data

Packet name	Element name	Description
Request	Write Start Number	Specify the MODBUS address to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0080H when writing address 128 of the MODBUS device.)
	General Register	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data" other than "Write Start Number".
- The setting range of the "Write Start Number" is 0080H to 00FEH (128 to 254).

RD: Coils

MODBUS standard function. This protocol reads the value to be stored in the MODBUS coil device. (Function Code 01H: Reads the value to be stored at the specified MODBUS address using "Read coil")

Setting data

Packet name	Element name	Description
Request	Read Start Number	Specify the MODBUS address to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the read data. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Store the value in the device within the range from 0001H to 07D0H (1 to 2000).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Read Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it considering the "Number of Read Points".
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

RD: Discrete Inputs

MODBUS standard function. This protocol reads the value to be stored in the MODBUS input device. (Function Code 02H: Reads the value to be stored at the specified MODBUS address using the "Read input")

Setting data

Packet name	Element name	Description
Request	Read Start Number	Specify the MODBUS address to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the read data. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Store the value in the device within the range from 0001H to 07D0H (1 to 2000).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Read Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it considering the "Number of Read Points".
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

RD: Holding Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register. (Function Code 03H: Reads the value to be stored at the specified MODBUS address using the "Read holding register")

Setting data

Packet name	Element name	Description
Request	Read Start Number	Specify the MODBUS address to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when reading address 16 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the read data. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Store the value in the device within the range from 0001H to 007DH (1 to 125).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Read Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it considering the "Number of Read Points".
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

RD: Input Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS input register. (Function Code 04H: Reads the value to be stored at the specified MODBUS address using "Read input register")

Setting data

Packet name	Element name	Description
Request	Read Start Number	Specify the MODBUS address to be read. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0015H when reading address 21 of the MODBUS device.)
	Number of Read Points	Specify the device for storing the read data. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H. Store the value in the device within the range from 0001H to 007DH (1 to 125).
Normal response	Device Data	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Read Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it considering the "Number of Read Points".
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

WR: Single Coil

MODBUS standard function. This protocol writes the value into the MODBUS coil device one point at a time. (Writes the value to the specified MODBUS address using the function code 05H: Write single coil.)

Setting data

Packet name	Element name	Description
Request	Write Start Number	Specify the device for storing the MODBUS address to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	ON/OFF Specification	Specify the device for storing the data to be written. Write one of the following to the specified device. • On: FF00H • Off: 0000H
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Write Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it.
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

WR: Single Holding Register

MODBUS standard function. This protocol writes the value into the MODBUS holding register one point at a time. (Writes the value to the specified MODBUS address using the function code 06H: Write single register.)

Setting data

Packet name	Element name	Description
Request	Write Start Number	Specify the device for storing the MODBUS address to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Write Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it.
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

WR: Multiple Coils

MODBUS standard function. This protocol writes the number of multiple points into the MODBUS coil device. (Writes the value to the specified MODBUS address using the function code 0FH: Write multiple coils.)

Setting data

Packet name	Element name	Description
Request	Write Start Number	Specify the device for storing the MODBUS address to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Number of Write Points	Specify the device for storing the data points to be written. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
	Device Data	Specify the device for storing the data to be written. (For devices, secure the maximum number of write points + 1 (124 words). Store the data length (in unit of bytes) of the data to be written in the first word, and store the data to be written in the second and subsequent words.)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Write Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it considering the "Number of Write Points".
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

WR: Multiple Holding Registers

MODBUS standard function. This protocol writes the number of multiple points to the MODBUS holding register. (Writes the value to the specified MODBUS address using the function code 10H: Write multiple register.)

Setting data

Packet name	Element name	Description
Request	Write Start Number	Specify the device for storing the MODBUS address to be written. Specify the number as a hexadecimal in the order from upper bytes to lower bytes. (For example, specify 0010H when writing address 16 of the MODBUS device.)
	Number of Write Points	Specify the device that stores the data points to be written. Specify the number of points as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
	Device Data	Specify the device for storing the data to be written. (For devices, secure the maximum number of write points + 1 (124 words). Store the data length (in unit of bytes) of the data to be written in the first word, and store the data to be written in the second and subsequent words.)
Normal response	—	No setting is required.
Error response	Abnormal Response Code	Specify the device for storing the read data.

Precautions

- Do not change values of "Fixed Data".
- For the setting range of "Write Start Number", refer to the Modbus server appendix address table in the Universal Robots e-Series user manual and set it considering the "Number of Write Points".
- When a protocol is executed for an address outside the range, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

6 PROTOCOLS SUPPORTED BY RKC INSTRUMENT (FB SERIES: FB100, FB400, FB900)

6.1 Setting Method

FB100

Use the MODBUS/TCP protocol function of the Ethernet [MODBUS/TCP] communication converter COM-JL (for FB100/FB400/FB900) to communicate with FB100.

For steps to set the parameters, refer to the RKC INSTRUMENT manual.

- Ethernet (MODBUS/TCP) communication converter COM-JL (for FB100/FB400/FB900) manual
- Digital Indication Controller FB100 manual

FB400, FB900

FB400 Use the MODBUS/TCP protocol function of the Ethernet [MODBUS/TCP] communication converter COM-JL (for FB100/FB400/FB900) to communicate with FB400 and FB900.

For steps to set the parameters, refer to the RKC INSTRUMENT manual.

- Ethernet (MODBUS/TCP) communication converter COM-JL (for FB100/FB400/FB900) manual
- Digital Instruction Controller FB400/FB900 manual

Restriction

Set the device addresses of the FB series digital indication controllers connected to the RS-485 network in order from 1.

Do not change the settings of the following items (COM-JL communication data) from the defaults.

- Operation mode selection: 0
- Number of connectable controller channels: 32
- Controller type of No.1 to 31: 0

6.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Measured Value (PV) (Address 1)	Reads the Measured Value (PV) stored in register address 0.	To be added	Fixed Intrvl
RD: Current Transformer 1 (CT1) (Address 1)	Reads the input value of Current Transformer 1 (CT1) stored in register address 32.	To be added	Fixed Intrvl
RD: Current Transformer 2 (CT2) (Address 1)	Reads the input value of Current Transformer 2 (CT2) stored in register address 64.	Not to be added	Fixed Intrvl
RD: Set Value (SV) (Address 1)	Reads the Set Value (SV) stored in register address 96.	Not to be added	Fixed Intrvl
RD: MV1 [heat-side] (Address 1)	Reads the operation output value 1 (MV1) [heat-side] stored in register address 416.	To be added	Fixed Intrvl
RD: MV2 [cool-side] (Address 1)	Reads the operation output value 2 (MV2) [cool-side] stored in register address 448.	To be added	Fixed Intrvl
RD: Digital Input (DI) State (Address 1)	Reads the Digital Input (DI) State stored in register address 512.	To be added	Fixed Intrvl
RD: Output State (Address 1)	Reads the Output State stored in register address 544.	To be added	Fixed Intrvl
RD: Operation Mode State (Address 1)	Reads the Operation Mode State stored in register address 576.	Not to be added	Fixed Intrvl
RD: Heater Break Alarm 1 State (Address 1)	Reads the Heater Break Alarm 1 (HBA1) State stored in register address 352.	Not to be added	Fixed Intrvl
RD: Heater Break Alarm 2 State (Address 1)	Reads the Heater Break Alarm 2 (HBA2) State stored in register address 384.	Not to be added	Fixed Intrvl
RD: Error Code (Address 1)	Reads the Error Code stored in register address 480.	To be added	Fixed Intrvl
RD: Interlock State (Address 1)	Reads the Interlock State stored in register address 1184.	Not to be added	Fixed Intrvl
WR: Set Value (SV) (Address 1)	Writes the Set Value (SV) in register address 1408.	To be added	Request
WR: Heater Break Alarm 1 Set Value (Address 1)	Writes the Heater Break Alarm 1 (HBA1) Set Value in register address 1856.	Not to be added	Request
WR: Heater Break Alarm 2 Set Value (Address 1)	Writes the Heater Break Alarm 2 (HBA2) Set Value in register address 1952.	Not to be added	Request
WR: Memory Area Transfer (Address 1)	Writes the Memory Area No. (1 to 8) to be used as the control area in the Memory Area Transfer of register address 1152.	Not to be added	Request
WR: Auto Mode Transfer (Address 1)	Switches to the auto mode.	Not to be added	Request
WR: Manual Mode Transfer (Address 1)	Switches to the manual mode.	Not to be added	Request
WR: RUN (Address 1)	Switches to the RUN mode.	To be added	Request
WR: STOP (Address 1)	Switches to the STOP mode.	To be added	Request
WR: PID/AT Transfer (Address 1)	Switches to PID control mode or auto tuning (AT) mode.	Not to be added	Request
WR: Interlock Release (Address 1)	Writes the Interlock Release in register address 1184.	Not to be added	Request
WR: Single Holding Register*2	Writes the value into the MODBUS holding register device one point at a time.	Not to be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

6.3 Details of Applicable Protocols

RD: Measured Value (PV) (Address 1)

Reads the Measured Value (PV) stored in register address 0.
The default value is set to read the Measured Value (PV) of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Measured Value (PV)	Rewrites the data length of the Measured Value (PV) into the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The decimal point position of the "Measured Value (PV)" read from the digital indication controller is determined by the selection of input scale and decimal point position (0A80H). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

RD: Current Transformer 1 (CT1) (Address 1)

Reads the input value of Current Transformer 1 (CT1) stored in register address 32.
The default value is set to read the input value of Current Transformer 1 (CT1) of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	CT1 Input Value	Rewrites the data length of the CT1 Input Value to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- When the value of Current Transformer 1 (CT1) input is not sent to the connected digital indication controller, the command returns the default value (0).
- The "CT1 input value" is read to one decimal place. The following shows an example.

Ex.
30.0A is read as 300 (012CH).

RD: Current Transformer 2 (CT2) (Address 1)

Reads the input value of Current Transformer 2 (CT2) stored in register address 64.
The default value is set to read the input value of Current Transformer 2 (CT2) of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	CT2 Input Value	Rewrites the data length of the CT2 Input Value to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- When the value of Current Transformer 2 (CT2) input is not sent to the connected digital indication controller, the command returns the default value (0).
- The "CT2 input value" is read to one decimal place. The following shows an example.

Ex.
30.0A is read as 300 (012CH).

RD: Set Value (SV) (Address 1)

Reads the Set Value (SV) stored in register address 96.
The default value is set to read the Set Value (SV) of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Set Value (SV)	Rewrites the data length of the Set Value (SV) to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- When the "Set Value (SV)" value is not sent to the connected digital indication controller, the command returns the default value (0).
- The decimal point position of the "Set Value (SV)" value read from the digital indication controller is determined by the selection of input scale and decimal point position (0A80H). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

RD: MV1 [heat-side] (Address 1)

Reads the operation output value 1 (MV1) [heat-side] stored in register address 416.
The default value is set to operation output value 1 (MV1) [heat-side] of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	MV1 [heat-side]	Rewrites the data length of the MV1 [heat-side] to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- "MV1 [heat-side]" is read to one decimal place. The following shows an example.

Ex.
30.0% is read as 300 (012CH).

RD: MV2 [cool-side] (Address 1)

Reads the operation output value 2 (MV2) [cool-side] stored in register address 448.
The default value is set to operation output value 2 (MV2) [cool-side] of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	MV2 [cool-side]	Rewrites the data length of the MV2 [cool-side] to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- "MV2 [cool-side]" is read to one decimal place. The following shows an example.

Ex.
30.0% is read as 300 (012CH).

RD: Digital Input (DI) State (Address 1)

Reads the Digital Input (DI) State stored in register address 512.
The default value is set to read the Digital Input (DI) State of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Digital Input (DI) State*1	Rewrites the data length of the Digital Input (DI) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: contact open, 1: contact close)

Bit	Data
0	DI1
1	DI2
2	DI3
3	DI4
4	DI5
5	DI6 (Not used for FB100)
6	DI7 (Not used for FB100)
7 to 15	Not used

Precautions

- Do not change values other than setting data.
- When the respective value of the digital input is not used or not sent to the connected digital indication controller, the command returns the default value (OFF).

RD: Output State (Address 1)

Reads the Output State stored in register address 544.

The default value is set to read the Output State of a single digital indication controller (address 1).

When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Output State*1	Rewrites the data length of the Output State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	OUT1
1	OUT2
2	DO1
3	DO2
4	DO3 (Not used for FB100)
5	DO4 (Not used for FB100)
6 to 15	Not used

Precautions

- Do not change values other than setting data.
- When the respective value of the digital input is not used or not sent to the connected digital indication controller, the command returns the default value (OFF).

RD: Operation Mode State (Address 1)

Reads the Operation Mode State stored in register address 576.

The default value is set to read the Operation Mode State of a single digital indication controller (address 1).

When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Operation Mode State*1	Rewrites the data length of the Operation Mode State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	Control STOP
1	Control RUN
2	Manual mode
3	Remote mode
4 to 15	Not used

Precautions

Do not change values other than setting data.

RD: Heater Break Alarm 1 State (Address 1)

Reads the Heater Break Alarm 1 (HBA1) State stored in register address 352.
The default value is set to read the Heater Break Alarm 1 (HBA1) State of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Heater Break Alarm 1 (HBA1) State	Rewrites the data length of the Heater Break Alarm 1 (HBA1) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- When the current transformer input (CT1) is not connected, the default value (0) is stored in "Heater Break Alarm 1 (HBA1) State".

RD: Heater Break Alarm 2 State (Address 1)

Reads the Heater Break Alarm 2 (HBA2) State stored in register address 384.
The default value is set to read the Heater Break Alarm 2 (HBA2) State of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Heater Break Alarm 2 (HBA2) State	Rewrites the data length of the Heater Break Alarm 2 (HBA2) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- When the current transformer input (CT2) is not connected, the default value (0) is stored in "Heater Break Alarm 2 (HBA2) State".

RD: Error Code (Address 1)

Reads the Error Code stored in register address 480.

The default value is set to read the Error Code of a single digital indication controller (address 1).

When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Error Code*1	Rewrites the data length of the Error Code to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	Adjustment data error
1	Backup error
2	A/D conversion error
3, 4	Not used
5	Custom data error
6	Not used
7	Watchdog timer error
8	Stack overflow
9, 10	Not used
11	Program error (busy)
12 to 15	Not used

Precautions

Do not change values other than setting data.

RD: Interlock State (Address 1)

Reads the Interlock State stored in register address 1184.

The default value is set to read the Interlock State of a single digital indication controller (address 1).

When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be read. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
Normal response	Interlock State	Rewrites the data length of the Interlock State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the read data. (The number of words specified by the Quantity (Number of words) is secured.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Set Value (SV) (Address 1)

Writes the Set Value (SV) in register address 1408.

The default value is set to write the Set Value (SV) into a single digital indication controller (address 1).

When writing into the multiple digital indication controllers

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be written. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
	Set Value (SV)	Rewrites the data length of the Set Value (SV) to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the data to be written. (The number of words specified by the Quantity (Number of words) is secured.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

When writing into a single digital indication controller

Setting data

Packet name	Element name	Description
Request	Register address (1408)	Rewrites the register address (1408) to (1408 + digital indication controller No. -1). (For example, when writing the set value (SV) of digital indication controller No.31, rewrite it to 1438 (1408 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1438, set 059EH.)
	Set Value (SV)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The decimal point position of the "Set Value (SV)" written into the digital indication controller is determined by the selection of input scale and decimal point position (0A80H). The following shows an example of one decimal place.

Ex.

For 20.0℃, specify 200 (00C8H) as a Write Data. For -20.0℃, specify -200 (FF38H (0000H-00C8H)) as a Write Data.

WR: Heater Break Alarm 1 Set Value (Address 1)

Writes the Heater Break Alarm 1 (HBA1) Set Value in register address 1856.

The default value is set to write the Heater Break Alarm 1 (HBA1) Set Value to a single digital indication controller (address 1).

When writing into the multiple digital indication controllers

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be written. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
	Heater Break Alarm 1 (HBA1) Set Value	Rewrites the data length of the Heater Break Alarm 1 (HBA1) Set Value to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the data to be written. (The number of words specified by the Quantity (Number of words) is secured.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

When writing into a single digital indication controller

Setting data

Packet name	Element name	Description
Request	Register address (1856)	Rewrites the register address (1856) to (1856 + digital indication controller No. -1). (For example, when writing the Heater Break Alarm 1 (HBA1) Set Value of digital indication controller No.31, rewrite it to 1886 (1856 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1886, set 075EH.)
	Heater Break Alarm 1 (HBA1) Set Value	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The "Heater Break Alarm 1 (HBA1) Set Value" is specified to one decimal place. The following shows an example.

Ex.

30.0A is specified as 300 (012CH).

WR: Heater Break Alarm 2 Set Value (Address 1)

Writes the Heater Break Alarm 2 (HBA2) Set Value in register address 1952.

The default value is set to write the Heater Break Alarm 2 (HBA2) Set Value to a single digital indication controller (address 1).

When writing into the multiple digital indication controllers

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be written. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
	Heater Break Alarm 2 (HBA2) Set Value	Rewrites the data length of the Heater Break Alarm 2 (HBA2) Set Value to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the data to be written. (The number of words specified by the Quantity (Number of words) is secured.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

When writing into a single digital indication controller

Setting data

Packet name	Element name	Description
Request	Register address (1952)	Rewrites the register address (1952) to (1952 + digital indication controller No. -1). (For example, when writing the Heater Break Alarm 2 (HBA2) Set Value of digital indication controller No.31, rewrite it to 1982 (1952 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1982, set 07BEH.)
	Heater Break Alarm 2 (HBA2) Set Value	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The "Heater Break Alarm 2 (HBA2) Set Value" is specified to one decimal place. The following shows an example.

Ex.

30.0A is specified as 300 (012CH).

WR: Memory Area Transfer (Address 1)

Writes the Memory Area No. (1 to 8) to be used as the control area in the Memory Area Transfer of register address 1152. The default value is set to write the Memory Area No. to the Memory Area Transfer of a single digital indication controller (address 1).

When writing into the multiple digital indication controllers

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be written. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
	Memory Area Number	Rewrites the data length of the Memory Area No. to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

When writing into a single digital indication controller

Setting data

Packet name	Element name	Description
Request	Register address (1152)	Rewrites the register address (1152) to (1152 + digital indication controller No. -1). (For example, when writing to the Memory Area Transfer of digital indication controller No.31, rewrite it to 1182 (1152 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1182, set 049EH.)
	Memory Area Number	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Set the value of "Memory Area No." within the range of 1 to 8.

WR: Auto Mode Transfer (Address 1)

Switches to the auto mode.

The default value is set to switch the digital indication controller (address 1) to the auto mode.

When switching addresses 2-31 to the auto mode, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1056)	Rewrites the register address (1056) to (1056 + digital indication controller No. -1). (For example, when using the protocol of digital indication controller No.31, rewrite it to 1086 (1056 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1086, set 043EH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Manual Mode Transfer (Address 1)

Switches to the manual mode.

The default value is set to switch the digital indication controller (address 1) to the manual mode.

When switching addresses 2-31 to the manual mode, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1056)	Rewrites the register address (1056) to (1056 + digital indication controller No. -1). (For example, when using the protocol of digital indication controller No.31, rewrite it to 1086 (1056 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1086, set 043EH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: RUN (Address 1)

Switches to the RUN mode.

The default value is set to switch the digital indication controller (address 1) to the RUN mode.

When switching addresses 2-31 to the RUN mode, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1120)	Rewrites the register address (1120) to (1120 + digital indication controller No. -1). (For example, when using the protocol of digital indication controller No.31, rewrite it to 1150 (1120 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1150, set 047EH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: STOP (Address 1)

Switches to the STOP mode.

The default value is set to switch the digital indication controller (address 1) to the STOP mode.

When switching addresses 2-31 to the STOP mode, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1120)	Rewrites the register address (1120) to (1120 + digital indication controller No. -1). (For example, when using the protocol of digital indication controller No.31, rewrite it to 1150 (1120 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1150, set 047EH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: PID/AT Transfer (Address 1)

Switches to PID control mode or auto tuning (AT) mode.
The default value is set to write the PID/AT Transfer into a single digital indication controller (address 1). (0: PID Control, 1: Auto Tuning (AT))
When the auto tuning (AT) ends, the control automatically returns to 0: PID control.

When writing into the multiple digital indication controllers

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be written. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
	PID/AT Transfer	Rewrites the data length of the PID/AT Transfer to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the data to be written. (The number of words specified by the Quantity (Number of words) is secured.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

When writing into a single digital indication controller

Setting data

Packet name	Element name	Description
Request	Register address (1024)	Rewrites the register address (1024) to (1024 + digital indication controller No. -1). (For example, when writing the PID/AT Transfer of digital indication controller No.31, rewrite it to 1054 (1024 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1054, set 041EH.)
	PID/AT Transfer	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Interlock Release (Address 1)

Writes the Interlock Release in register address 1184.

The default value is set to write the Interlock Release into a single digital indication controller (address 1).

When writing into the multiple digital indication controllers

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of digital indication controllers to be written. Specify the value within the range of 1 to 31 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 31, set 001FH.)
	Interlock Release	Rewrites the data length of the Interlock Release to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 31, specify 62.) Specify the device for storing the data to be written. (The number of words specified by the Quantity (Number of words) is secured.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

When writing into a single digital indication controller

Setting data

Packet name	Element name	Description
Request	Register address (1184)	Rewrites the register address (1184) to (1184 + digital indication controller No. -1). (For example, when writing the Interlock Release of digital indication controller No.31, rewrite it to 1214 (1184 + 31-1).) Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1214, set 04BEH.)
	Interlock Release	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The event interlock is 1: Used, and the event with the ON status set will be 1: Interlock State. (1 is the value to monitor the interlock state. Do not write 1 for the "Interlock Release")

WR: Single Holding Register

MODBUS standard function. This protocol writes the value into the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Register address	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the register address 1024, set 0400H.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The value which is calculated by subtracting one from the last five digits of MODBUS holding register number is described as "Register address".
- For the setting range of "Register address", refer to the RKC INSTRUMENT manual.

RD: Holding Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the register address 1024, set 0400H.)
	Quantity (Number of words)	Specify the device for storing the data points to be read to the Quantity (Number of words). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. The range is 0001H to 007DH (1 to 125).)
Normal response	Register Content	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The value which is calculated by subtracting one from the last five digits of MODBUS holding register number is described as "Register address".
- For the setting range of "Register address", refer to the RKC INSTRUMENT manual, and consider the Quantity (Number of words) when setting the value.

7 PROTOCOLS SUPPORTED BY RKC INSTRUMENT (SRZ SERIES: Z-TIO, Z-DIO (COM-JL))

7.1 Setting Method

COM-JL

Use the MODBUS/TCP protocol function of the Ethernet [MODBUS/TCP] communication converter COM-JL (for SRZ) to communicate with the SRZ series using COM-JL.

For steps to set the parameters, refer to the RKC INSTRUMENT manual.

- Ethernet (MODBUS/TCP) communication converter COM-JL (for SRZ) manual
- Modular Controller SRZ manual

Restriction

Set slave addresses of Z-TIO modules in the order 1 to 16.

Set slave addresses of Z-DIO modules in the order 17 to 32.

Do not change the settings of the following items (COM-JL communication data) from the defaults.

- Operation mode selection: 0
- Number of connectable controller channels: 64
- Controller type of No.1 to 31: 4

7.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [Z-TIO] Measured Value (PV) (CH 1 to 4)	Reads the Measured Value (PV) of CH1 to CH4 stored in register addresses 0 to 3.	To be added	Fixed Intrvl
RD: [Z-TIO] MV [heat-side] (CH1 to 4)	Reads the MV [heat-side] of CH1 to CH4 stored in register addresses 832 to 835.	To be added	Fixed Intrvl
RD: [Z-TIO] MV [cool-side] (CH1 to 4)	Reads the MV [cool-side] of CH1 to CH4 stored in register addresses 896 to 899.	To be added	Fixed Intrvl
RD: [Z-TIO] Set Value (SV) (CH1 to 4)	Reads the Set Value (SV) of CH1 to CH4 stored in register addresses 192 to 195.	Not to be added	Fixed Intrvl
RD: [Z-TIO] Comprehensive Event State (CH1 to 4)	Reads the Comprehensive Event State of CH1 to CH4 stored in register addresses 1536 to 1539.	Not to be added	Fixed Intrvl
RD: [Z-DIO] Digital Input (DI) State	Reads the Digital Input State stored in register address 1664.	To be added	Fixed Intrvl
RD: [Z-DIO] Digital Output (DO) State	Reads the Digital Output State stored in register address 1728.	To be added	Fixed Intrvl
RD: [Z-TIO] Error Code	Reads the Error Code stored in register address 960.	Not to be added	Fixed Intrvl
RD: [Z-DIO] Error Code	Reads the Error Code stored in register address 976.	Not to be added	Fixed Intrvl
WR: [Z-TIO] Set Value (SV) (CH1)	Writes the CH1 Set Value (SV) in register address 2816.	To be added	Request
WR: [Z-TIO] Set Value (SV) (CH2)	Writes the CH2 Set Value (SV) in register address 2817.	Not to be added	Request
WR: [Z-TIO] Set Value (SV) (CH3)	Writes the CH3 Set Value (SV) in register address 2818.	Not to be added	Request
WR: [Z-TIO] Set Value (SV) (CH4)	Writes the CH4 Set Value (SV) in register address 2819.	Not to be added	Request
WR: [Z-TIO] Memory Area Transfer (CH1)	Writes the Memory Area No. (1 to 8) to be used as the CH1 control area in register address 2304.	Not to be added	Request
WR: [Z-TIO] Memory Area Transfer (CH2)	Writes the Memory Area No. (1 to 8) to be used as the CH2 control area in register address 2305.	Not to be added	Request
WR: [Z-TIO] Memory Area Transfer (CH3)	Writes the Memory Area No. (1 to 8) to be used as the CH3 control area in register address 2306.	Not to be added	Request
WR: [Z-TIO] Memory Area Transfer (CH4)	Writes the Memory Area No. (1 to 8) to be used as the CH4 control area in register address 2307.	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: [Z-TIO] PID/AT Transfer (CH1)	Switches CH1 to PID control mode or auto tuning (AT) mode.	Not to be added	Request
WR: [Z-TIO] PID/AT Transfer (CH2)	Switches CH2 to PID control mode or auto tuning (AT) mode.	Not to be added	Request
WR: [Z-TIO] PID/AT Transfer (CH3)	Switches CH3 to PID control mode or auto tuning (AT) mode.	Not to be added	Request
WR: [Z-TIO] PID/AT Transfer (CH4)	Switches CH4 to PID control mode or auto tuning (AT) mode.	Not to be added	Request
WR: [Z-TIO] Auto Mode Transfer (CH1)	Switches CH1 to the auto mode.	Not to be added	Request
WR: [Z-TIO] Auto Mode Transfer (CH2)	Switches CH2 to the auto mode.	Not to be added	Request
WR: [Z-TIO] Auto Mode Transfer (CH3)	Switches CH3 to the auto mode.	Not to be added	Request
WR: [Z-TIO] Auto Mode Transfer (CH4)	Switches CH4 to the auto mode.	Not to be added	Request
WR: [Z-TIO] Manual Mode Transfer (CH1)	Switches CH1 to the manual mode.	Not to be added	Request
WR: [Z-TIO] Manual Mode Transfer (CH2)	Switches CH2 to the manual mode.	Not to be added	Request
WR: [Z-TIO] Manual Mode Transfer (CH3)	Switches CH3 to the manual mode.	Not to be added	Request
WR: [Z-TIO] Manual Mode Transfer (CH4)	Switches CH4 to the manual mode.	Not to be added	Request
WR: [Z-TIO] Operation Mode (CH1)	Set the CH1 operation mode.	Not to be added	Request
WR: [Z-TIO] Operation Mode (CH2)	Set the CH2 operation mode.	Not to be added	Request
WR: [Z-TIO] Operation Mode (CH3)	Set the CH3 operation mode.	Not to be added	Request
WR: [Z-TIO] Operation Mode (CH4)	Set the CH4 operation mode.	Not to be added	Request
WR: [Z-TIO] RUN	Switches the Z-TIO module to the RUN mode.	To be added	Request
WR: [Z-TIO] STOP	Switches the Z-TIO module to the STOP mode.	To be added	Request
WR: [Z-DIO] RUN	Switches the Z-DIO module to the RUN mode.	To be added	Request
WR: [Z-DIO] STOP	Switches the Z-DIO module to the STOP mode.	To be added	Request
WR: [Z-TIO] Interlock Release (CH1)	Release the CH1 event interlock hold and switch to the execution status.	Not to be added	Request
WR: [Z-TIO] Interlock Release (CH2)	Release the CH2 event interlock hold and switch to the execution status.	Not to be added	Request
WR: [Z-TIO] Interlock Release (CH3)	Release the CH3 event interlock hold and switch to the execution status.	Not to be added	Request
WR: [Z-TIO] Interlock Release (CH4)	Release the CH4 event interlock hold and switch to the execution status.	Not to be added	Request
WR: Single Holding Register*2	Writes the value into the MODBUS holding register device one point at a time.	Not to be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

7.3 Details of Applicable Protocols

RD: [Z-TIO] Measured Value (PV) (CH 1 to 4)

Reads the Measured Value (PV) of CH1 to CH4 stored in register addresses 0 to 3.
The default value is set to read the Measured Value (PV) of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-JL.
When reading the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (0)	Rewrites the register address (0) to (0 + 4 × (module address -1)). Specify the value within the range of 0 to 60 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 60, set 003CH.)
Normal response	• Measured Value (PV) (CH1) • Measured Value (PV) (CH2) • Measured Value (PV) (CH3) • Measured Value (PV) (CH4)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the Measured Value (PV) as 0.
- The decimal point position of the "Measured Value (PV)" read from the controller is determined by the selection of input scale and decimal point position (1500H). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

RD: [Z-TIO] MV [heat-side] (CH1 to 4)

Reads the MV [heat-side] of CH1 to CH4 stored in register addresses 832 to 835.
The default value is set to read the MV [heat-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-JL.
When reading the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (832)	Rewrites the register address (832) to (832 + 4 × (module address -1)). Specify the value within the range of 832 to 892 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 892, set 037CH.)
Normal response	• MV [heat-side] (CH1) • MV [heat-side] (CH2) • MV [heat-side] (CH3) • MV [heat-side] (CH4)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the MV [heat-side] as 0.
- The MV [heat-side] is read to one decimal place. The following shows an example.

Ex.
Displays 30.0% as 300 (012CH).

RD: [Z-TIO] MV [cool-side] (CH1 to 4)

Reads the MV [cool-side] of CH1 to CH4 stored in register addresses 896 to 899.
The default value is set to read the MV [cool-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-JL.
When reading the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (896)	Rewrites the register address (896) to (896 + 4 × (module address -1)). Specify the value within the range of 896 to 956 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 956, set 03BCH.)
Normal response	• MV [cool-side] (CH1) • MV [cool-side] (CH2) • MV [cool-side] (CH3) • MV [cool-side] (CH4)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the MV [cool-side] as 0.
- The MV [cool-side] is read to one decimal place. The following shows an example.

Ex.
Displays 30.0% as 300 (012CH).

RD: [Z-TIO] Set Value (SV) (CH1 to 4)

Reads the Set Value (SV) of CH1 to CH4 stored in register addresses 192 to 195.
The default value is set to read the Set Value (SV) of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-JL.
When reading the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (192)	Rewrites the register address (192) to (192 + 4 × (module address -1)). Specify the value within the range of 192 to 252 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 252, set 00FCH.)
Normal response	• Set Value (SV) (CH1) • Set Value (SV) (CH2) • Set Value (SV) (CH3) • Set Value (SV) (CH4)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the Set Value (SV) as 0.
- The decimal point position of the Set Value (SV) read from the controller is determined by the selection of input scale and decimal point position (1500H). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

RD: [Z-TIO] Comprehensive Event State (CH1 to 4)

Reads the Comprehensive Event State of CH1 to CH4 stored in register addresses 1536 to 1539.
The default value is set to read the Comprehensive Event State of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-JL.
When reading the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1536)	Rewrites the register address (1536) to (1536 + 4 × (module address -1)). Specify the value within the range of 1536 to 1596 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1596, set 063CH.)
Normal response	• Comprehensive Event State (CH1)*1 • Comprehensive Event State (CH2)*1 • Comprehensive Event State (CH3)*1 • Comprehensive Event State (CH4)*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	Status of Event 1
1	Status of Event 2
2	Status of Event 3
3	Status of Event 4
4	Heater Break Alarm State
5	Temperature rise completed
6	Burnout
7 to 15	Not used

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the Comprehensive Event State as 0.

RD: [Z-DIO] Digital Input (DI) State

Reads the Digital Input State stored in register address 1664.
The default value is set to read the Digital Input (DI) State of the Z-DIO module (address 17) connected to COM-JL.
When reading the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1664)	Rewrites the register address (1664) to (1664 + (module address -17)). Specify the value within the range of 1664 to 1679 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1679, set 068FH.)
Normal response	Digital Input (DI) State*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: contact open, 1: contact close)

Bit	Data
0	DI1
1	DI2
2	DI3
3	DI4
4	DI5
5	DI6
6	DI7
7	DI8
8 to 15	Not used

Precautions

Do not change values other than setting data.

RD: [Z-DIO] Digital Output (DO) State

Reads the Digital Output State stored in register address 1728.
The default value is set to read the Digital Output (DO) State of the Z-DIO module (address 17) connected to COM-JL.
When reading the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (1728)	Rewrites the register address (1728) to (1728 + (module address -17)). Specify the value within the range of 1728 to 1743 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1743, set 06CFH.)
Normal response	Digital Output (DO) State*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	DO1
1	DO2
2	DO3
3	DO4
4	DO5
5	DO6
6	DO7
7	DO8
8 to 15	Not used

Precautions

Do not change values other than setting data.

RD: [Z-TIO] Error Code

Reads the Error Code stored in register address 960.
The default value is set to read the Z-TIO module (address 1) error code connected to COM-JL.
When reading the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (960)	Rewrites the register address (960) to (960 + (module address -1)). Specify the value within the range of 960 to 975 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 975, set 03CFH.)
Normal response	Error Code*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	Adjustment data error
1	Data backup error
2	A/D conversion value error
3 to 4	Not used
5	Logical output data error
6 to 15	Not used

Precautions

Do not change values other than setting data.

RD: [Z-DIO] Error Code

Reads the Error Code stored in register address 976.
The default value is set to read the Z-DIO module (address 17) error code connected to COM-JL.
When reading the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (976)	Rewrites the register address (976) to (976 + (module address -17)). Specify the value within the range of 976 to 991 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 991, set 03DFH.)
Normal response	Error Code*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: OFF, 1: ON)

Bit	Data
0	Not used
1	Data backup error
2 to 15	Not used

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Set Value (SV) (CH1)

Writes the CH1 Set Value (SV) in register address 2816.
The default value is set to write the Set Value (SV) of CH1 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2816)	Rewrites the register address (2816) to (2816 + 4 × (module address -1)). Specify the value within the range of 2816 to 2876 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2876, set 0B3CH.)
	Set Value (SV) (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The decimal point position of the Set Value (SV) is determined by the selection of input scale and decimal point position (1500H). The following shows an example of one decimal place.

Ex.
20.0℃ is specified as 200 (00C8H). For -20.0℃, specify as -200 (FF38H (0000H-00C8H)).

WR: [Z-TIO] Set Value (SV) (CH2)

Writes the CH2 Set Value (SV) in register address 2817.
The default value is set to write the Set Value (SV) of CH2 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2817)	Rewrites the register address (2817) to (2817 + 4 × (module address -1)). Specify the value within the range of 2817 to 2877 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2877, set 0B3DH.)
	Set Value (SV) (CH2)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The decimal point position of the Set Value (SV) is determined by the selection of input scale and decimal point position (1500H). The following shows an example of one decimal place.

Ex.
20.0℃ is specified as 200 (00C8H). For -20.0℃, specify as -200 (FF38H (0000H-00C8H)).

WR: [Z-TIO] Set Value (SV) (CH3)

Writes the CH3 Set Value (SV) in register address 2818.
The default value is set to write the Set Value (SV) of CH3 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2818)	Rewrites the register address (2818) to (2818 + 4 × (module address -1)). Specify the value within the range of 2818 to 2878 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2878, set 0B3EH.)
	Set Value (SV) (CH3)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).
- The decimal point position of the Set Value (SV) is determined by the selection of input scale and decimal point position (1500H). The following shows an example of one decimal place.

Ex.
20.0℃ is specified as 200 (00C8H). For -20.0℃, specify as -200 (FF38H (0000H-00C8H)).

WR: [Z-TIO] Set Value (SV) (CH4)

Writes the CH4 Set Value (SV) in register address 2819.
The default value is set to write the Set Value (SV) of CH4 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2819)	Rewrites the register address (2819) to (2819 + 4 × (module address -1)). Specify the value within the range of 2819 to 2879 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2879, set 0B3FH.)
	Set Value (SV) (CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).
- The decimal point position of the Set Value (SV) is determined by the selection of input scale and decimal point position (1500H). The following shows an example of one decimal place.

Ex.
20.0℃ is specified as 200 (00C8H). For -20.0℃, specify as -200 (FF38H (0000H-00C8H)).

WR: [Z-TIO] Memory Area Transfer (CH1)

Writes the Memory Area No. (1 to 8) to be used as the CH1 control area in register address 2304.
The default value is set to write the Memory Area No. of CH1 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2304)	Rewrites the register address (2304) to (2304 + 4 × (module address -1)). Specify the value within the range of 2304 to 2364 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2364, set 093CH.)
	Memory Area Number (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Memory Area Transfer (CH2)

Writes the Memory Area No. (1 to 8) to be used as the CH2 control area in register address 2305.
The default value is set to write the Memory Area No. of CH2 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2305)	Rewrites the register address (2305) to (2305 + 4 × (module address -1)). Specify the value within the range of 2305 to 2365 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2365, set 093DH.)
	Memory Area Number (CH2)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Memory Area Transfer (CH3)

Writes the Memory Area No. (1 to 8) to be used as the CH3 control area in register address 2306.
The default value is set to write the Memory Area No. of CH3 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2306)	Rewrites the register address (2306) to (2306 + 4 × (module address -1)). Specify the value within the range of 2306 to 2366 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2366, set 093EH.)
	Memory Area Number (CH3)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Memory Area Transfer (CH4)

Writes the Memory Area No. (1 to 8) to be used as the CH4 control area in register address 2307.
The default value is set to write the Memory Area No. of CH4 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2307)	Rewrites the register address (2307) to (2307 + 4 × (module address -1)). Specify the value within the range of 2307 to 2367 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2367, set 093FH.)
	Memory Area Number (CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] PID/AT Transfer (CH1)

Switches CH1 to PID control mode or auto tuning (AT) mode.
The default value is set to switch CH1 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2048)	Rewrites the register address (2048) to (2048 + 4 × (module address -1)). Specify the value within the range of 2048 to 2108 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2108, set 083CH.)
	PID/AT Transfer (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] PID/AT Transfer (CH2)

Switches CH2 to PID control mode or auto tuning (AT) mode.
The default value is set to switch CH2 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2049)	Rewrites the register address (2049) to (2049 + 4 × (module address -1)). Specify the value within the range of 2049 to 2109 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2109, set 083DH.)
	PID/AT Transfer (CH2)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] PID/AT Transfer (CH3)

Switches CH3 to PID control mode or auto tuning (AT) mode.
The default value is set to switch CH3 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2050)	Rewrites the register address (2050) to (2050 + 4 × (module address -1)). Specify the value within the range of 2050 to 2110 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2110, set 083EH.)
	PID/AT Transfer (CH3)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] PID/AT Transfer (CH4)

Switches CH4 to PID control mode or auto tuning (AT) mode.
The default value is set to switch CH4 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2051)	Rewrites the register address (2051) to (2051 + 4 × (module address -1)). Specify the value within the range of 2051 to 2111 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2111, set 083FH.)
	PID/AT Transfer (CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Auto Mode Transfer (CH1)

Switches CH1 to the auto mode.

The default value is set to switch CH1 of the Z-TIO module (address 1) connected to COM-JL to the auto mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2112)	Rewrites the register address (2112) to (2112 + 4 × (module address -1)). Specify the value within the range of 2112 to 2172 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2172, set 087CH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Auto Mode Transfer (CH2)

Switches CH2 to the auto mode.

The default value is set to switch CH2 of the Z-TIO module (address 1) connected to COM-JL to the auto mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2113)	Rewrites the register address (2113) to (2113 + 4 × (module address -1)). Specify the value within the range of 2113 to 2173 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2173, set 087DH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Auto Mode Transfer (CH3)

Switches CH3 to the auto mode.

The default value is set to switch CH3 of the Z-TIO module (address 1) connected to COM-JL to the auto mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2114)	Rewrites the register address (2114) to (2114 + 4 × (module address -1)). Specify the value within the range of 2114 to 2174 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2174, set 087EH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Auto Mode Transfer (CH4)

Switches CH4 to the auto mode.

The default value is set to switch CH4 of the Z-TIO module (address 1) connected to COM-JL to the auto mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2115)	Rewrites the register address (2115) to (2115 + 4 × (module address -1)). Specify the value within the range of 2115 to 2175 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2175, set 087FH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Manual Mode Transfer (CH1)

Switches CH1 to the manual mode.
The default value is set to switch CH1 of the Z-TIO module (address 1) connected to COM-JL to the manual mode.
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2112)	Rewrites the register address (2112) to (2112 + 4 × (module address -1)). Specify the value within the range of 2112 to 2172 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2172, set 087CH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Manual Mode Transfer (CH2)

Switches CH2 to the manual mode.
The default value is set to switch CH2 of the Z-TIO module (address 1) connected to COM-JL to the manual mode.
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2113)	Rewrites the register address (2113) to (2113 + 4 × (module address -1)). Specify the value within the range of 2113 to 2173 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2173, set 087DH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Manual Mode Transfer (CH3)

Switches CH3 to the manual mode.

The default value is set to switch CH3 of the Z-TIO module (address 1) connected to COM-JL to the manual mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2114)	Rewrites the register address (2114) to (2114 + 4 × (module address -1)). Specify the value within the range of 2114 to 2174 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2174, set 087EH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Manual Mode Transfer (CH4)

Switches CH4 to the manual mode.

The default value is set to switch CH4 of the Z-TIO module (address 1) connected to COM-JL to the manual mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2115)	Rewrites the register address (2115) to (2115 + 4 × (module address -1)). Specify the value within the range of 2115 to 2175 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2175, set 087FH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Operation Mode (CH1)

Set the CH1 operation mode.
The default value is set to write the operation mode of CH1 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (19648)	Rewrites the register address (19648) to (19648 + 4 × (module address -1)). Specify the value within the range of 19648 to 19708 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 19708, set 4CFCH.)
	Operation Mode (CH1)*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

*1 Set the following data.

Data	Operation Mode
0	Not used (monitoring and control are not performed)
1	Monitor (only data monitoring is performed)
2	Monitor + event function (data monitoring and event action are performed)
3	Control (control is executed)

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Operation Mode (CH2)

Set the CH2 operation mode.
The default value is set to write the operation mode of CH2 of the Z-TIO module (address 1) connected to COM-JL.
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (19649)	Rewrites the register address (19649) to (19649 + 4 × (module address -1)). Specify the value within the range of 19649 to 19709 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 19709, set 4CFDH.)
	Operation Mode (CH2)*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

*1 Set the following data.

Data	Operation Mode
0	Not used (monitoring and control are not performed)
1	Monitor (only data monitoring is performed)
2	Monitor + event function (data monitoring and event action are performed)
3	Control (control is executed)

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Operation Mode (CH3)

Set the CH3 operation mode.

The default value is set to write the operation mode of CH3 of the Z-TIO module (address 1) connected to COM-JL.

When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (19650)	Rewrites the register address (19650) to (19650 + 4 × (module address -1)). Specify the value within the range of 19650 to 19710 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 19710, set 4CFEH.)
	Operation Mode (CH3)*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

*1 Set the following data.

Data	Operation Mode
0	Not used (monitoring and control are not performed)
1	Monitor (only data monitoring is performed)
2	Monitor + event function (data monitoring and event action are performed)
3	Control (control is executed)

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Operation Mode (CH4)

Set the CH4 operation mode.

The default value is set to write the operation mode of CH4 of the Z-TIO module (address 1) connected to COM-JL.

When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (19651)	Rewrites the register address (19651) to (19651 + 4 × (module address -1)). Specify the value within the range of 19651 to 19711 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 19711, set 4CFFH.)
	Operation Mode (CH4)*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

*1 Set the following data.

Data	Operation Mode
0	Not used (monitoring and control are not performed)
1	Monitor (only data monitoring is performed)
2	Monitor + event function (data monitoring and event action are performed)
3	Control (control is executed)

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] RUN

Switches the Z-TIO module to the RUN mode.

The default value is set to switch the Z-TIO module (address 1) connected to COM-JL to the RUN mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2240)	Rewrites the register address (2240) to (2240 + (module address -1)). Specify the value within the range of 2240 to 2255 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2255, set 08CFH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] STOP

Switches the Z-TIO module to the STOP mode.

The default value is set to switch the Z-TIO module (address 1) connected to COM-JL to the STOP mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2240)	Rewrites the register address (2240) to (2240 + (module address -1)). Specify the value within the range of 2240 to 2255 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2255, set 08CFH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-DIO] RUN

Switches the Z-DIO module to the RUN mode.

The default value is set to switch the Z-DIO module (address 17) connected to COM-JL to the RUN mode.

When switching the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2256)	Rewrites the register address (2256) to (2256 + (module address -17)). Specify the value within the range of 2256 to 2271 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2271, set 08DFH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-DIO] STOP

Switches the Z-DIO module to the STOP mode.

The default value is set to switch the Z-DIO module (address 17) connected to COM-JL to the STOP mode.

When switching the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2256)	Rewrites the register address (2256) to (2256 + (module address -17)). Specify the value within the range of 2256 to 2271 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2271, set 08DFH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Interlock Release (CH1)

Release the CH1 event interlock hold and switch to the execution status.
The default value is set to release the interlock of CH1 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2368)	Rewrites the register address (2368) to (2368 + 4 × (module address -1)). Specify the value within the range of 2368 to 2428 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2428, set 097CH.)
	Interlock Release (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Interlock Release (CH2)

Release the CH2 event interlock hold and switch to the execution status.
The default value is set to release the interlock of CH2 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2369)	Rewrites the register address (2369) to (2369 + 4 × (module address -1)). Specify the value within the range of 2369 to 2429 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2429, set 097DH.)
	Interlock Release (CH2)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Interlock Release (CH3)

Release the CH3 event interlock hold and switch to the execution status.
The default value is set to release the interlock of CH3 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2370)	Rewrites the register address (2370) to (2370 + 4 × (module address -1)). Specify the value within the range of 2370 to 2430 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2430, set 097EH.)
	Interlock Release (CH3)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Interlock Release (CH4)

Release the CH4 event interlock hold and switch to the execution status.
The default value is set to release the interlock of CH4 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)
When writing the value into the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2371)	Rewrites the register address (2371) to (2371 + 4 × (module address -1)). Specify the value within the range of 2371 to 2431 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2431, set 097FH.)
	Interlock Release (CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use for 2-channel type (Z-TIO-B module).

WR: Single Holding Register

MODBUS standard function. This protocol writes the value into the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Register address	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the register address 1024, set 0400H.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The value which is calculated by subtracting one from the last five digits of MODBUS holding register number is described as "Register address".
- For the setting range of "Register address", refer to the RKC INSTRUMENT manual.

RD: Holding Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the register address 1024, set 0400H.)
	Quantity (Number of words)	Specify the device for storing the data points to be read to the Quantity (Number of words). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. The range is 0001H to 007DH (1 to 125).)
Normal response	Register Content	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The value which is calculated by subtracting one from the last five digits of MODBUS holding register number is described as "Register address".
- For the setting range of "Register address", refer to the RKC INSTRUMENT manual, and consider the Quantity (Number of words) when setting the value.

8 PROTOCOLS SUPPORTED BY RKC INSTRUMENT (SRZ SERIES: Z-TIO, Z-DIO (COM-ME-1))

8.1 Setting Method

COM-ME-1

Use the MODBUS/TCP protocol function of the Ethernet [MODBUS/TCP] communication converter COM-ME-1 (for SRZ) to communicate with the SRZ series using COM-ME-1.
For steps to set the parameters, refer to the RKC INSTRUMENT manual.

- Ethernet (MODBUS/TCP) communication converter COM-ME-1 (for SRZ) manual
- Modular Controller SRZ manual

Restriction

- Set slave addresses of Z-TIO modules in the order 1 to 16.
- Set slave addresses of Z-DIO modules in the order 17 to 32.

8.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [Z-TIO] Measured Value (PV) (CH 1 to 4)	Reads the Measured Value (PV) of CH1 to CH4 stored in register addresses 508 to 511.	To be added	Fixed Intrvl
RD: [Z-TIO] MV [heat-side] (CH1 to 4)	Reads the operation output value MV [heat-side] of CH1 to CH4 stored in register addresses 716 to 719.	To be added	Fixed Intrvl
RD: [Z-TIO] MV [cool-side] (CH1 to 4)	Reads the operation output value MV [cool-side] of CH1 to CH4 stored in register addresses 780 to 783.	To be added	Fixed Intrvl
RD: [Z-TIO] Set Value (SV) (CH1 to 4)	Reads the Set Value (SV) of CH1 to CH4 stored in register addresses 908 to 911.	Not to be added	Fixed Intrvl
RD: [Z-TIO] Comprehensive Event State (CH1 to 4)	Reads the Comprehensive Event State of CH1 to CH4 stored in register addresses 572 to 575.	Not to be added	Fixed Intrvl
RD: [Z-DIO] Digital Input (DI) State	Reads the Digital Input (DI) State stored in register address 15980.	To be added	Fixed Intrvl
RD: [Z-DIO] Digital Output (DO) State	Reads the Digital Output (DO) State stored in register address 15996.	To be added	Fixed Intrvl
RD: [Z-TIO] Error Code	Reads the Error Code stored in register address 1.	Not to be added	Fixed Intrvl
RD: [Z-DIO] Error Code	Reads the Error Code stored in register address 17.	Not to be added	Fixed Intrvl
WR: [Z-TIO] Set Value (SV) (CH1)	Writes the CH1 Set Value (SV) in register address 2780.	To be added	Request
WR: [Z-TIO] Memory Area Transfer (CH1)	Writes the Memory Area No. (1 to 8) to be used as the CH1 control area in register address 2268.	Not to be added	Request
WR: [Z-TIO] PID/AT Transfer (CH1)	Switches CH1 to PID control mode or auto tuning (AT) mode.	Not to be added	Request
WR: [Z-TIO] Auto Mode Transfer (CH1)	Switches CH1 to the auto mode.	Not to be added	Request
WR: [Z-TIO] Manual Mode Transfer (CH1)	Switches CH1 to the manual mode.	Not to be added	Request
WR: [Z-TIO] Operation Mode (CH1)	Set the CH1 operation mode.	Not to be added	Request
WR: [SRZ] RUN	Switches all equipped SRZ units to the RUN mode.	Not to be added	Request
WR: [SRZ] STOP	Switches all equipped SRZ units to the STOP mode.	Not to be added	Request
WR: [Z-TIO] RUN	Switches the Z-TIO module to the RUN mode.	To be added	Request
WR: [Z-TIO] STOP	Switches the Z-TIO module to the STOP mode.	To be added	Request
WR: [Z-DIO] RUN	Switches the Z-DIO module to the RUN mode.	To be added	Request
WR: [Z-DIO] STOP	Switches the Z-DIO module to the STOP mode.	To be added	Request
WR: [Z-TIO] Interlock Release (CH1)	Release the CH1 event interlock hold and switch to the execution status.	Not to be added	Request
WR: Single Holding Register*2	Writes the value into the MODBUS holding register device one point at a time.	Not to be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

8.3 Details of Applicable Protocols

RD: [Z-TIO] Measured Value (PV) (CH 1 to 4)

Reads the Measured Value (PV) of CH1 to CH4 stored in register addresses 508 to 511.
The default value is set to read the Measured Value (PV) of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (4)	Rewrites the Quantity (Number of words) (4) to the number of channels of Z-TIO module to be read. Specify the value within the range of 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 64, set 0040H.)
Normal response	Measured Value (PV)	Rewrites the data length of the Measured Value (PV) to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 64, specify 128.) Specify the device for storing the read data. (Register contents of multiple channels are stored in the device specified in order from CH1)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the Measured Value (PV) as 0.
- The decimal point position of the "Measured Value (PV)" read from the controller is determined by the selection of input scale and decimal point position (19ECH to 1A2BH). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

RD: [Z-TIO] MV [heat-side] (CH1 to 4)

Reads the MV [heat-side] of CH1 to CH4 stored in register addresses 716 to 719.
The default value is set to read the MV [heat-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (4)	Rewrites the Quantity (Number of words) (4) to the number of channels of Z-TIO module to be read. Specify the value within the range of 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 64, set 0040H.)
Normal response	MV [heat-side]	Rewrites the data length of the MV [heat-side] to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 64, specify 128.) Specify the device for storing the read data. (Register contents of multiple channels are stored in the device specified in order from CH1)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of "MV [heat-side] as 0.
- The "MV [heat-side]" is read to one decimal place. The following shows an example.

Ex.
Displays 30.0% as 300 (012CH).

RD: [Z-TIO] MV [cool-side] (CH1 to 4)

Reads the MV [cool-side] of CH1 to CH4 stored in register addresses 780 to 783.
The default value is set to read the MV [cool-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (4)	Rewrites the Quantity (Number of words) (4) to the number of channels of Z-TIO module to be read. Specify the value within the range of 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 64, set 0040H.)
Normal response	MV [cool-side]	Rewrites the data length of the MV [cool-side] to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 64, specify 128.) Specify the device for storing the read data. (Register contents of multiple channels are stored in the device specified in order from CH1)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the "MV [cool-side]" as 0.
- The "MV [cool-side]" is read to one decimal place. The following shows an example.

Ex.
Displays 30.0% as 300 (012CH).

RD: [Z-TIO] Set Value (SV) (CH1 to 4)

Reads the Set Value (SV) of CH1 to CH4 stored in register addresses 908 to 911.
The default value is set to read the Set Value (SV) of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (4)	Rewrites the Quantity (Number of words) (4) to the number of channels of Z-TIO module to be read. Specify the value within the range of 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 64, set 0040H.)
Normal response	Set Value (SV)	Rewrites the data length to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 64, specify 128.) Specify the device for storing the read data. Register contents of multiple channels are stored in the device specified in order from CH1.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the "Set Value (SV)" as 0.
- The decimal point position of the "Set Value (SV)" read from the controller is determined by the selection of input scale and decimal point position (19ECH to 1A2BH). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

RD: [Z-TIO] Comprehensive Event State (CH1 to 4)

Reads the Comprehensive Event State of CH1 to CH4 stored in register addresses 572 to 575.
The default value is set to read the Comprehensive Event State of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (4)	Rewrites the Quantity (Number of words) (4) to the number of channels of Z-TIO module to be read. Specify the value within the range of 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 64, set 0040H.)
Normal response	Comprehensive Event State (CH1)*1	Rewrites the data length of the Comprehensive Event State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 64, specify 128.) Specify the device for storing the read data. (Register contents of multiple channels are stored in the device specified in order from CH1)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: Off, 1: On)

Bit	Data
0	Status of Event 1
1	Status of Event 2
2	Status of Event 3
3	Status of Event 4
4	Heater Break Alarm State
5	Temperature rise completed
6	Burnout
7 to 15	Not used

Precautions

- Do not change values other than setting data.
- For 2-channel type (Z-TIO-B module), reads CH3 and CH4 of the "Comprehensive Event State" as 0.

RD: [Z-DIO] Digital Input (DI) State

Reads the Digital Input (DI) State stored in register address 15980.
The default value is set to read the Digital Input (DI) State of the Z-DIO module (address 17) connected to COM-ME-1.
When reading the value of multiple Z-DIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-DIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Digital Input (DI) State*1	Rewrites the data length of the Digital Input (DI) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 17 of Z-DIO module)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: contact open, 1: contact close)

Bit	Data
0	DI1
1	DI2
2	DI3
3	DI4
4	DI5
5	DI6
6	DI7
7	DI8
8 to 15	Not used

Precautions

Do not change values other than setting data.

RD: [Z-DIO] Digital Output (DO) State

Reads the Digital Output (DO) State stored in register address 15996.
The default value is set to read the Digital Output (DO) State of the Z-DIO module (address 17) connected to COM-ME-1.
When reading the value of multiple Z-DIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-DIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Digital Output (DO) State*1	Rewrites the data length of the Digital Output (DO) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 17 of Z-DIO module)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: Off, 1: On)

Bit	Data
0	DO1
1	DO2
2	DO3
3	DO4
4	DO5
5	DO6
6	DO7
7	DO8
8 to 15	Not used

Precautions

Do not change values other than setting data.

RD: [Z-TIO] Error Code

Reads the Error Code stored in register address 1.
The default value is set to read the Z-TIO module (address 1) error code connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-TIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Error Code*1	Rewrites the data length of the Error Code to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 1 of Z-TIO module)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (When multiple errors occur, the error number will be the same as the total value.)

Value	Data
1	Adjustment data error
2	Data backup error
4	A/D conversion error
32	Custom data error (logical output download data error)

Precautions

Do not change values other than setting data.

RD: [Z-DIO] Error Code

Reads the Error Code stored in register address 17.
The default value is set to read the Z-DIO module (address 17) error code connected to COM-ME-1.
When reading the value of multiple Z-DIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-DIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Error Code*1	Rewrites the data length of the Error Code to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 17 of Z-DIO module)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Value	Data
2	Data backup error

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Set Value (SV) (CH1)

Writes the CH1 Set Value (SV) in register address 2780.
The default value is set to write the Set Value (SV) of CH1 of the Z-TIO module (address 1) connected to COM-ME-1.
When writing the value into another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2780)	Rewrites the register address (2780) to (2780+ (channel No. -1)). Specify the value within the range of 2780 to 2843 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2843, set 0B1BH.)
	Set Value (SV) (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use the protocol of CH3 and CH4 for 2-channel type (Z-TIO-B module).
- The decimal point position of the "Set Value (SV)" is determined by the selection of input scale and decimal point position (19ECH to 1A2BH). The following shows an example of one decimal place.

Ex.
20.0℃ is read as 200 (00C8H). -20.0℃ is read as -200 (FF38H (0000H-00C8H)).

WR: [Z-TIO] Memory Area Transfer (CH1)

Writes the Memory Area No. (1 to 8) to be used as the CH1 control area in register address 2268.
The default value is set to write the Memory Area No. of CH1 of the Z-TIO module (address 1) connected to COM-ME-1.
When writing the value into another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2268)	Rewrites the register address (2268) to (2268+ (channel No. -1)). Specify the value within the range of 2268 to 2331 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2331, set 091BH.)
	Memory Area Number (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use the protocol of CH3 and CH4 for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] PID/AT Transfer (CH1)

Switches CH1 to PID control mode or auto tuning (AT) mode.
The default value is set to switch the Z-TIO module (address 1) connected to COM-ME-1 to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))
When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2060)	Rewrites the register address (2060) to (2060+ (channel No. -1)). Specify the value within the range of 2060 to 2123 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2123, set 084BH.)
	PID/AT Transfer (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use the protocol of CH3 and CH4 for 2-channel type (Z-TIO-B module).

WR: [Z-TIO] Auto Mode Transfer (CH1)

Switches CH1 to the auto mode.
The default value is set to switch CH1 of the Z-TIO module (address 1) connected to COM-ME-1 to the auto mode.
When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2124)	Rewrites the register address (2124) to (2124 + (channel No. -1)). Specify the value within the range of 2124 to 2187 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2187, set 088BH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Manual Mode Transfer (CH1)

Switches CH1 to the manual mode.

The default value is set to switch CH1 of the Z-TIO module (address 1) connected to COM-ME-1 to the manual mode.

When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2124)	Rewrites the register address (2124) to (2124 + (channel No. -1)). Specify the value within the range of 2124 to 2187 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2187, set 088BH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Operation Mode (CH1)

Sets the CH1 operation mode.

This protocol writes the operation mode into holding register 5660.

The default value is set to write the operation mode of CH1 of the Z-TIO module (address 1) connected to COM-ME-1.

When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (5660)	Rewrites the register address (5660) to (5660 + (channel No. -1)). Specify the value within the range of 5660 to 5723 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 5723, set 165BH.)
	Operation Mode (CH1)*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

*1 Set the following data.

Data	Operation Mode
0	Not used (monitoring and control are not performed)
1	Monitor (only data monitoring is performed)
2	Monitor + event function (data monitoring and event action are performed)
3	Control (control is executed)

Precautions

Do not change values other than setting data.

WR: [SRZ] RUN

Switches all equipped SRZ units to the RUN mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [SRZ] STOP

Switches all equipped SRZ units to the STOP mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] RUN

Switches the Z-TIO module to the RUN mode.

The default value is set to switch the Z-TIO module (address 1) connected to COM-ME-1 to the RUN mode.

When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (308)	Rewrites the register address (308) to (308 + (Z-TIO address-1)). Specify the value within the range of 308 to 323 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 323, set 0143H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] STOP

Switches the Z-TIO module to the STOP mode.
The default value is set to switch the Z-TIO module (address 1) connected to COM-ME-1 to the STOP mode.
When switching the value of the Z-TIO module of addresses 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (308)	Rewrites the register address (308) to (308 + (Z-TIO address-1)). Specify the value within the range of 308 to 323 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 323, set 0143H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-DIO] RUN

Switches the Z-DIO module to the RUN mode.
The default value is set to switch the first Z-DIO module (address 17) connected to COM-ME-1 to the RUN mode.
When switching the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (324)	Rewrites the register address (324) to (324 + (Z-DIO address-1)). Specify the value within the range of 324 to 339 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 339, set 0153H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-DIO] STOP

Switches the Z-DIO module to the STOP mode.
The default value is set to switch the first Z-DIO module (address 17) connected to COM-ME-1 to the STOP mode.
When switching the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (324)	Rewrites the register address (324) to (324 + (Z-DIO address-1)). Specify the value within the range of 324 to 339 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 339, set 0153H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] Interlock Release (CH1)

Release the CH1 event interlock hold and switch to the execution status.
The default value is set to release the interlock of CH1 of the Z-TIO module (address 1) connected to COM-ME-1. (0: Normal State, 1: Interlock Release Execution)
When releasing the interlock of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2332)	Rewrites the register address (2332) to (2332 + (channel No. -1)). Specify the value within the range of 2332 to 2395 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2395, set 095BH.)
	Interlock Release (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Single Holding Register

MODBUS standard function. This protocol writes the value into the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Register address	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the register address 1024, set 0400H.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The value which is calculated by subtracting one from the last five digits of MODBUS holding register number is described as "Register address".
- For the setting range of "Register address", refer to the RKC INSTRUMENT manual.

RD: Holding Registers

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the register address 1024, set 0400H.)
	Quantity (Number of words)	Specify the device for storing the data points to be read to the Quantity (Number of words). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. The range is 0001H to 007DH (1 to 125).)
Normal response	Register Content	Specify the device for storing the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- The value which is calculated by subtracting one from the last five digits of MODBUS holding register number is described as "Register address".
- For the setting range of "Register address", refer to the RKC INSTRUMENT manual, and consider the Quantity (Number of words) when setting the value.

9 PROTOCOLS SUPPORTED BY Azbil (NX-D, NX-S, NX-DX, NX-DY)

9.1 Setting Method

NX-D, NX-S, NX-DX, NX-DY

Use the MODBUS/TCP communication function of the NX series instrumentation network module (NX-D/NX-S/NX-DX/NX-DY) to communicate with the NX series.

For steps to set the parameters, refer to the Azbil manual.

- Instrumentation Network Module Manual Network Design
- Functional Description Manual on each Instrumentation Network Module

9.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [NX-D] All Typical Alarms	Reads the All Typical Alarms (logical sum) stored in address 18432.	To be added	Fixed Intrvl
RD: [NX-D] Alarm Information 1 To 4	Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.	To be added	Fixed Intrvl
RD: [NX-D] PV (Loop 1)	Reads the PV value of the Loop 1 stored in address 14356.	To be added	Fixed Intrvl
RD: [NX-D] SP (Loop 1)	Reads the SP Set Value of Loop 1 stored in address 14357.	To be added	Fixed Intrvl
RD: [NX-D] MV (Loop 1)	Reads the MV manipulated value of the Loop 1 stored in address 14358.	To be added	Fixed Intrvl
RD: [NX-D] Event 1 To 16	Reads the Event 1 to 16 stored in addresses 17728 to 17743.	Not to be added	Fixed Intrvl
RD: [NX-D] AT Progress (Loop 1)	Reads the AT progress of the Loop 1 stored in address 10309.	Not to be added	Fixed Intrvl
RD: [NX-D] Heater Line Break Detection	Reads the status of Heater Line Break Detection in CT1 to CT4 stored in addresses 17760 to 17763.	Not to be added	Fixed Intrvl
RD: [NX-D] Overcurrent Detection	Reads the status of Overcurrent Detection in CT1 to CT4 stored in addresses 17764 to 17767.	Not to be added	Fixed Intrvl
RD: [NX-D] Short-circuit Detection	Reads the status of Short-circuit Detection in CT1 to CT4 stored in addresses 17768 to 17771.	Not to be added	Fixed Intrvl
RD: [NX-D] Measured Current When Output ON	Reads the Measured Current When Output ON in CT1 to CT4 stored in addresses 19136 to 19139.	Not to be added	Fixed Intrvl
RD: [NX-D] Measured Current When Output OFF	Reads the Measured Current When Output OFF in CT1 to CT4 stored in addresses 19152 to 19155.	Not to be added	Fixed Intrvl
RD: [NX-D] P Band/I Time/D Time (Loop 1)	Reads the P Band/I Time/D Time of the Loop 1 stored in addresses 14848 to 14850.	Not to be added	Request
WR: [NX-D] LSP (Loop 1)	Writes the LSP Set Value of Loop 1 in address 14593.	Not to be added	Request
WR: [NX-D] RUN (Loop 1)	Switches Loop 1 to the RUN mode.	To be added	Request
WR: [NX-D] READY (Loop 1)	Switches Loop 1 to the READY mode.	To be added	Request
WR: [NX-D] AT Cancel (Loop 1)	Cancel Loop 1 AT.	Not to be added	Request
WR: [NX-D] AT Execute (Loop 1)	Execute Loop 1 AT.	Not to be added	Request
WR: [NX-D] Bias/Ratio (Loop 1)	Writes the Bias and Ratio values of Loop 1 in addresses 9036 and 9037.	Not to be added	Request
WR: [NX-D] Event Setting (Operating Point) (1)	Writes the Event 1 setting (operating point) in addresses 4336 (Event Main Setting) and 4337 (Event Sub-setting).	Not to be added	Request
WR: [NX-D] HTR Burnout Detect Cur Val (Loop 1)	Writes the HTR Burnout Detect Cur Val of Loop 1 in address 11156.	Not to be added	Request
WR: [NX-D] Min Cur Val as Overcurrent (Loop 1)	Writes the Min Cur Val as Overcurrent of Loop 1 in address 11157.	Not to be added	Request
WR: [NX-D] Min Cur Val as Short-circuit (Loop 1)	Writes the Min Cur Val as Short-circuit of Loop 1 in address 11158.	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: [NX-D] P Band/I Time/D Time (Loop 1)	Writes the P Band/I Time/D Time of the Loop 1 in addresses 14848 to 14850.	Not to be added	Request
RD: [NX-S] Status	Reads the Display Status and Module Status stored in addresses 4096 and 4097.	Not to be added	Fixed Intrvl
RD: [NX-S] System Error	Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4865 to 4866.	Not to be added	Fixed Intrvl
RD: [NX-S] SV Module Error	Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4897 to 4898.	Not to be added	Fixed Intrvl
RD: [NX-S] IO Mgmt Module Representative Error	Reads the status of Serious Malfunction Flag, Minor Malfunction Flag and Partial Failure Flag stored in addresses 5248 to 5250.	Not to be added	Fixed Intrvl
RD: [NX-S] Communication Representative Error	Reads the status of Communication Representative Error Flag stored in address 5504.	Not to be added	Fixed Intrvl
WR: [NX-S] RUN	Switches the Module Status to the RUN mode.	Not to be added	Request
WR: [NX-S] IDLE	Switches the Module Status to the IDLE mode.	Not to be added	Request
RD: [NX-DX] Alarm Information 1 To 4	Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.	Not to be added	Fixed Intrvl
RD: [NX-DX] DI Input (1 to 16ch)	Reads the DI Input (1 to 16ch) Status stored in address 10832.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Estimate Value (1 to 8ch)	Reads the Pulse Estimate Value in Channel 1 to 8 stored in addresses 11744 to 11759.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Estimate Value (9 to 16ch)	Reads the Pulse Estimate Value in Channel 9 to 16 stored in addresses 11760 to 11775.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Instant Value (1 to 16ch)	Reads the Pulse Instant Value in Channel 1 to 6 stored in addresses 11776 to 11791.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Count Value (1ch)	Reads the Pulse Count Value in Channel 1 stored in address 11232.	Not to be added	Fixed Intrvl
WR: [NX-DX2] Start Estimating (1ch)	Starts integrating Channel 1.	Not to be added	Request
WR: [NX-DX2] Stop Estimating (1ch)	Stops integrating Channel 1.	Not to be added	Request
WR: [NX-DX2] Reset Estimate Values (1ch)	Resets the Estimate Value of Channel 1.	Not to be added	Request
RD: [NX-DY] Alarm Information 1 To 4	Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.	Not to be added	Fixed Intrvl
RD: [NX-DY] DO Terminal ON/OFF Data	Reads the DO Terminal ON/OFF Data stored in addresses 10464 to 10479.	Not to be added	Fixed Intrvl
WR: [NX-DY] RUN	Switches the Module Status to the RUN mode.	Not to be added	Request
WR: [NX-DY] READY	Switches the Module Status to the READY mode.	Not to be added	Request
RD: Single Holding Register*2	Reads the value to be stored in the MODBUS holding register device one point at a time.	Not to be added	Request
WR: Single Holding Register*2	Writes the value into the MODBUS holding register device one point at a time.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

9.3 Details of Applicable Protocols

RD: [NX-D] All Typical Alarms

Reads the All Typical Alarms (logical sum) stored in address 18432.
The logical sum of all alarms is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	All Typical Alarms	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Alarm Information 1 To 4

Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Alarm Information 1*1 • Alarm Information 2*2 • Alarm Information 3*3 • Alarm Information 4*4	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0	PV1 upper limit error (minor failure) AL01
1	PV1 lower limit error (minor failure) AL02
2	PV2 upper limit error (minor failure) AL03
3	PV2 lower limit error (minor failure) AL04
4	PV3 upper limit error (minor failure) AL05
5	PV3 lower limit error (minor failure) AL06
6	PV4 upper limit error (minor failure) AL07
7	PV4 lower limit error (minor failure) AL08
8	AD1 failure (minor failure) AL11
9	AD2 failure (minor failure) AL12
10	AD3 failure (minor failure) AL13
11	AD4 failure (minor failure) AL14
12 to 15	Undefined

*2 The following data is stored.

Bit	Data
0	MFB1 input error (minor failure) AL21
1	MFB1 adjustment error (minor failure) AL22
2	MFB2 input error (minor failure) AL23
3	MFB2 adjustment error (minor failure) AL24
4	CT1 input error (minor failure) AL25
5	CT2 input error (minor failure) AL26
6	CT3 input error (minor failure) AL27
7	CT4 input error (minor failure) AL28
8	Reception monitoring (Representation of 1 to 16) (minor failure) AL31
9	Inter-module communication transmission timeout (minor failure) AL32
10	RS-485 setting error (minor failure) AL33
11	Inter-module communication setting error (minor failure) AL34
12 to 14	Undefined
15	Adjacent ring disconnection (minor failure) AL38

*3 The following data is stored.

Bit	Data
0	Base EEPROM read/write error (major failure) AL87
1	Base EEPROM error (minor failure) AL88
2	Base/body communication setting mismatch (minor failure) AL53
3	Base/body shape mismatch (minor failure) AL54
4	Base verify error (major failure) AL55
5 to 15	Undefined

*4 The following data is stored.

Bit	Data
0	CJ1 error (minor failure) AL71
1	CJ2 error (minor failure) AL72
2	CJ3 error (minor failure) AL73
3	CJ4 error (minor failure) AL74
4 to 5	Undefined
6	EEPROM uninitialized (major failure) AL83
7	MAC address error (major failure) AL84
8	RAM read/write error (major failure) AL85
9	EEPROM read/write error (major failure) AL86
10	RAM error (parameter range) (minor failure) AL94
11	RAM error (adjustment area) (minor failure) AL95
12	Undefined
13	EEPROM error (parameter range) (minor failure) AL97
14	EEPROM error (adjustment area) (minor failure) AL98
15	ROM error (major failure) AL99

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] PV (Loop 1)

Reads the PV value of the Loop 1 stored in address 14356.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14356)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 381CH • Loop 3: 3824H • Loop 4: 382CH
Normal response	PV	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] SP (Loop 1)

Reads the SP Set Value of Loop 1 stored in address 14357.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14357)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 381DH • Loop 3: 3825H • Loop 4: 382DH
Normal response	SP	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] MV (Loop 1)

Reads the MV manipulated value of the Loop 1 stored in address 14358.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14358)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 381EH • Loop 3: 3826H • Loop 4: 382EH
Normal response	MV	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] Event 1 To 16

Reads the Event 1 to 16 stored in addresses 17728 to 17743.
The event status is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• Event 1 • Event 2 • Event 3 • Event 4 • Event 5 • Event 6 • Event 7 • Event 8 • Event 9 • Event 10 • Event 11 • Event 12 • Event 13 • Event 14 • Event 15 • Event 16	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] AT Progress (Loop 1)

Reads the AT progress of the Loop 1 stored in address 10309.
The AT progress status is stored as 0: Stop, 1 to 8: AT Progress Number.

Setting data

Packet name	Element name	Description
Request	Start Data Address (10309)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2855H • Loop 3: 2865H • Loop 4: 2875H
Normal response	AT Progress Number	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] Heater Line Break Detection

Reads the status of Heater Line Break Detection in CT1 to CT4 stored in addresses 17760 to 17763.
The heater disconnection detection is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Heater Line Break Detection • CT2 Heater Line Break Detection • CT3 Heater Line Break Detection • CT4 Heater Line Break Detection	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Overcurrent Detection

Reads the status of Overcurrent Detection in CT1 to CT4 stored in addresses 17764 to 17767.
The overcurrent detection is read as 0: Off, 1: On.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Overcurrent Detection • CT2 Overcurrent Detection • CT3 Overcurrent Detection • CT4 Overcurrent Detection	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Short-circuit Detection

Reads the status of Short-circuit Detection in CT1 to CT4 stored in addresses 17768 to 17771.
The short-circuit detection is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Short-circuit Detection • CT2 Short-circuit Detection • CT3 Short-circuit Detection • CT4 Short-circuit Detection	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Measured Current When Output ON

Reads the Measured Current When Output ON in CT1 to CT4 stored in addresses 19136 to 19139.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Measured Current When Output ON • CT2 Measured Current When Output ON • CT3 Measured Current When Output ON • CT4 Measured Current When Output ON	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Measured Current When Output OFF

Reads the Measured Current When Output OFF in CT1 to CT4 stored in addresses 19152 to 19155.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Measured Current When Output OFF • CT2 Measured Current When Output OFF • CT3 Measured Current When Output OFF • CT4 Measured Current When Output OFF	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] P Band/I Time/D Time (Loop 1)

Reads the P Band/I Time/D Time of the Loop 1 stored in addresses 14848 to 14850.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14848)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 3A0CH • Loop 3: 3A18H • Loop 4: 3A24H
Normal response	• P Band • I Time • D Time	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] LSP (Loop 1)

Writes the LSP Set Value of Loop 1 in address 14593.

Setting data

Packet name	Element name	Description
Request	Write Address (14593)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 3909H • Loop 3: 3911H • Loop 4: 3919H
	LSP	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] RUN (Loop 1)

Switches Loop 1 to the RUN mode.

Setting data

Packet name	Element name	Description
Request	Write Address (14595)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390BH • Loop 3: 3913H • Loop 4: 391BH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] READY (Loop 1)

Switches Loop 1 to the READY mode.

Setting data

Packet name	Element name	Description
Request	Write Address (14595)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390BH • Loop 3: 3913H • Loop 4: 391BH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] AT Cancel (Loop 1)

Cancel Loop 1 AT.

Setting data

Packet name	Element name	Description
Request	Write Address (14597)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390DH • Loop 3: 3915H • Loop 4: 391DH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] AT Execute (Loop 1)

Execute Loop 1 AT.

Setting data

Packet name	Element name	Description
Request	Write Address (14597)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390DH • Loop 3: 3915H • Loop 4: 391DH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Bias/Ratio (Loop 1)

Writes the Bias and Ratio values of Loop 1 in addresses 9036 and 9037.

Setting data

Packet name	Element name	Description
Request	Start Data Address (9036)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 236CH • Loop 3: 238CH • Loop 4: 23ACH
	• Bias • Ratio	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Event Setting (Operating Point) (1)

Writes the Event 1 setting (operating point) in addresses 4336 (Event Main Setting) and 4337 (Event Sub-setting).

Setting data

Packet name	Element name	Description
Request	Start Data Address (4336)	When using the protocol for events 2 to 24, rewrite the start data address (4336) to (4336 + 2 × (event number -1)). Specify the value within the range of 4336 to 4382 for the start data address of events 1 to 24 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 4382, set 111EH.)
	• Event Main Setting • Event Sub-setting	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

WR: [NX-D] HTR Burnout Detect Cur Val (Loop 1)

Writes the HTR Burnout Detect Cur Val of Loop 1 in address 11156.

Setting data

Packet name	Element name	Description
Request	Write Address (11156)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2BA4H • Loop 3: 2BB4H • Loop 4: 2BC4H
	HTR Burnout Detect Cur Val	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Min Cur Val as Overcurrent (Loop 1)

Writes the Min Cur Val as Overcurrent of Loop 1 in address 11157.

Setting data

Packet name	Element name	Description
Request	Write Address (11157)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2BA5H • Loop 3: 2BB5H • Loop 4: 2BC5H
	Min Cur Val as Overcurrent	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Min Cur Val as Short-circuit (Loop 1)

Writes the Min Cur Val as Short-circuit of Loop 1 in address 11158.

Setting data

Packet name	Element name	Description
Request	Write Address (11158)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2BA6H • Loop 3: 2BB6H • Loop 4: 2BC6H
	Min Cur Val as Short-circuit	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] P Band/I Time/D Time (Loop 1)

Writes the P Band/I Time/D Time of the Loop 1 in addresses 14848 to 14850.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14848)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 3A0CH • Loop 3: 3A18H • Loop 4: 3A24H
	• P Band • I Time • D Time	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-S] Status

Reads the Display Status and Module Status stored in addresses 4096 and 4097.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Display Status*1 • Module Status*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0	IDLE
1	RUN
2	IDLE (Partial failure occurring)
3	RUN (Partial failure occurring)

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] System Error

Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4865 to 4866.
Each flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Minor Malfunction Flag • Partial Failure Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] SV Module Error

Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4897 to 4898.
Each flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Minor Malfunction Flag • Partial Failure Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] IO Mgmt Module Representative Error

Reads the status of Serious Malfunction Flag, Minor Malfunction Flag and Partial Failure Flag stored in addresses 5248 to 5250.

Each flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Serious Malfunction Flag • Minor Malfunction Flag • Partial Failure Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] Communication Representative Error

Reads the status of Communication Representative Error Flag stored in address 5504.

The Communication Representative Error Flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Communication Representative Error Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

WR: [NX-S] RUN

Switches the Module Status to the RUN mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

WR: [NX-S] IDLE

Switches the Module Status to the IDLE mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-DX] Alarm Information 1 To 4

Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Alarm Information 1*1 • Alarm Information 2*2 • Alarm Information 3*3 • Alarm Information 4*4	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0 to 15	Undefined

*2 The following data is stored.

Bit	Data
0 to 7	Undefined
8	Reception monitoring (Representation of 1 to 16) (minor failure) AL31
9	Inter-module communication transmission timeout (minor failure) AL32
10	RS-485 setting error (minor failure) AL33
11 to 15	Undefined

*3 The following data is stored.

Bit	Data
0	Base EEPROM read/write error (major failure) AL87
1	Base EEPROM error (minor failure) AL88
2 to 15	Undefined

*4 The following data is stored.

Bit	Data
0 to 5	Undefined
6	Base EEPROM uninitialized (major failure) AL83
7	MAC address error (major failure) AL84
8	RAM read/write error (major failure) AL85
9	EEPROM read/write error (major failure) AL86
10	RAM error (parameter range) (minor failure) AL94
11	RAM error (adjustment area) (minor failure) AL95
12	Undefined
13	EEPROM error (parameter range) (minor failure) AL97
14	EEPROM error (adjustment area) (minor failure) AL98
15	ROM error (major failure) AL99

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX1/DX2).
- Do not change values other than setting data.

RD: [NX-DX] DI Input (1 to 16ch)

Reads the DI Input (1 to 16ch) Status stored in address 10832.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	DI Input (1 to 16ch)*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0	Status DI01
1	Status DI02
2	Status DI03
3	Status DI04
4	Status DI05
5	Status DI06
6	Status DI07
7	Status DI08
8	Status DI09
9	Status DI010
10	Status DI011
11	Status DI012
12	Status DI013
13	Status DI014
14	Status DI015
15	Status DI016

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX1/DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Estimate Value (1 to 8ch)

Reads the Pulse Estimate Value in Channel 1 to 8 stored in addresses 11744 to 11759.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Pulse Estimate Value 1 (L) • Pulse Estimate Value 1 (H) • Pulse Estimate Value 2 (L) • Pulse Estimate Value 2 (H) • Pulse Estimate Value 3 (L) • Pulse Estimate Value 3 (H) • Pulse Estimate Value 4 (L) • Pulse Estimate Value 4 (H) • Pulse Estimate Value 5 (L) • Pulse Estimate Value 5 (H) • Pulse Estimate Value 6 (L) • Pulse Estimate Value 6 (H) • Pulse Estimate Value 7 (L) • Pulse Estimate Value 7 (H) • Pulse Estimate Value 8 (L) • Pulse Estimate Value 8 (H)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Estimate Value (9 to 16ch)

Reads the Pulse Estimate Value in Channel 9 to 16 stored in addresses 11760 to 11775.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Pulse Estimate Value 9 (L) • Pulse Estimate Value 9 (H) • Pulse Estimate Value 10 (L) • Pulse Estimate Value 10 (H) • Pulse Estimate Value 11 (L) • Pulse Estimate Value 11 (H) • Pulse Estimate Value 12 (L) • Pulse Estimate Value 12 (H) • Pulse Estimate Value 13 (L) • Pulse Estimate Value 13 (H) • Pulse Estimate Value 14 (L) • Pulse Estimate Value 14 (H) • Pulse Estimate Value 15 (L) • Pulse Estimate Value 15 (H) • Pulse Estimate Value 16 (L) • Pulse Estimate Value 16 (H)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Instant Value (1 to 16ch)

Reads the Pulse Instant Value in Channel 1 to 16 stored in addresses 11776 to 11791.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Pulse Instant Value 1 • Pulse Instant Value 2 • Pulse Instant Value 3 • Pulse Instant Value 4 • Pulse Instant Value 5 • Pulse Instant Value 6 • Pulse Instant Value 7 • Pulse Instant Value 8 • Pulse Instant Value 9 • Pulse Instant Value 10 • Pulse Instant Value 11 • Pulse Instant Value 12 • Pulse Instant Value 13 • Pulse Instant Value 14 • Pulse Instant Value 15 • Pulse Instant Value 16	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Count Value (1ch)

Reads the Pulse Count Value in Channel 1 stored in address 11232.

The default value is set to read the pulse count value in Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Start Data Address (11232)	Rewrites the Start Data Address (11232) to (11232 + 8 × (channel No. -1)). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (To specify 11352, set 2C58H.)
Normal response	• Estimate Count Value (L) • Estimate Count Value (H) • Instant Count Value (L) • Instant Count Value (H)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

WR: [NX-DX2] Start Estimating (1ch)

Starts integrating Channel 1.

The default value is set to start integrating of Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Write Address (9024)	Rewrites the Write Address (9024) to (9024 + 16 × (channel No. -1)). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 9264, set 2430H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

WR: [NX-DX2] Stop Estimating (1ch)

Stops integrating Channel 1.

The default value is set to Stop integrating of Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Write Address (9024)	Rewrites the Write Address (9024) to (9024 + 16 × (channel No. -1)). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 9264, set 2430H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

WR: [NX-DX2] Reset Estimate Values (1ch)

Resets the estimate value of Channel 1.

The default value is set to reset the estimate value of Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Write Address (9027)	Rewrites the Write Address (9027) to (9027 + 16 × (channel No. -1)). Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 9267, set 2433H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DY] Alarm Information 1 To 4

Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Alarm Information 1*1 • Alarm Information 2*2 • Alarm Information 3*3 • Alarm Information 4*4	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0 to 15	Undefined

*2 The following data is stored.

Bit	Data
0 to 7	Undefined
8	Reception monitoring (Representation of 1 to 16) (minor failure) AL31
9	Inter-module communication transmission timeout (minor failure) AL32
10	RS-485 setting error (minor failure) AL33
11	Inter-module communication setting error (minor failure) AL34
12 to 14	Undefined
15	Adjacent ring disconnection (minor failure) AL38

*3 The following data is stored.

Bit	Data
0	Base EEPROM read/write error (major failure) AL87
1	Base EEPROM error (minor failure) AL88
2	Base/body communication setting mismatch (minor failure) AL53
3	Base/body shape mismatch (minor failure) AL54
4	Base verify error (major failure) AL55
5 to 15	Undefined

*4 The following data is stored.

Bit	Data
0 to 5	Undefined
6	EEPROM uninitialized (major failure) AL83
7	MAC address error (major failure) AL84
8	RAM read/write error (major failure) AL85
9	EEPROM read/write error (major failure) AL86
10	RAM error (parameter range) (minor failure) AL94
11	RAM error (adjustment area) (minor failure) AL95
12	Undefined
13	EEPROM error (parameter range) (minor failure) AL97
14	EEPROM error (adjustment area) (minor failure) AL98
15	ROM error (major failure) AL99

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

RD: [NX-DY] DO Terminal ON/OFF Data

Reads the DO Terminal ON/OFF Data stored in addresses 10464 to 10479.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• DO Terminal ON/OFF Data 1 • DO Terminal ON/OFF Data 2 • DO Terminal ON/OFF Data 3 • DO Terminal ON/OFF Data 4 • DO Terminal ON/OFF Data 5 • DO Terminal ON/OFF Data 6 • DO Terminal ON/OFF Data 7 • DO Terminal ON/OFF Data 8 • DO Terminal ON/OFF Data 9 • DO Terminal ON/OFF Data 10 • DO Terminal ON/OFF Data 11 • DO Terminal ON/OFF Data 12 • DO Terminal ON/OFF Data 13 • DO Terminal ON/OFF Data 14 • DO Terminal ON/OFF Data 15 • DO Terminal ON/OFF Data 16	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

WR: [NX-DY] RUN

Switches the Module Status to the RUN mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

WR: [NX-DY] READY

Switches the Module Status to the READY mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

RD: Single Holding Register

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Start Data Address	Specify the device that stores the address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the address 10080, set 2760H.)
Normal response	Read Data	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For the setting range of "Start Data Address", refer to the Azbil manual.

WR: Single Holding Register

MODBUS standard function. This protocol writes the value into the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Write Address	Specify the device that stores the address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the address 10080, set 2760H.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For the setting range of "Write Address", refer to the Azbil manual.

10 PROTOCOLS SUPPORTED BY Yokogawa Electric Corporation (UT75A, UT55A, UT35A, UP55A, UP35A)

10.1 Setting Method

UT75A, UT55A, UT35A, UP55A, UP35A

Use the Ethernet communication (MODBUS/TCP) function of the UTAdvanced series digital indicating controller and the program controller (UT75A, UT55A, UT35A, UP55A, and UP35A) to communicate with the UTAdvanced series.
For steps to set the parameters, refer to the Yokogawa Electric manual.

- UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual
- User's manual for the controller to be used

10.2 List of Applicable Protocols

Name	Description	Automatic Addition[*1]	Communication Timing (Default)
RD: Control Setpoint Loop-1	Reads the target control value used in loop 1.	Not to be added	Fixed Intrvl
RD: Measurement Value Loop-1	Reads the measurement input value in loop 1.	To be added	Fixed Intrvl
RD: Control Output Loop-1	Reads the control output value in loop 1.	To be added	Fixed Intrvl
RD: Heat Control Output Loop-1	Reads the heating-side control output value at the heating-side control in loop 1.	To be added	Fixed Intrvl
RD: Cool Control Output Loop-1	Reads the cooling-side control output value at the heating-side control in loop 1.	To be added	Fixed Intrvl
RD: AL1-AL3 Terminal Status	Reads the status of terminals AL1 to AL3.	To be added	Fixed Intrvl
RD: DI Terminal Status	Reads the status of digital input terminals (DI1 to DI3).	Not to be added	Fixed Intrvl
RD: DO Terminal Status (E1)	Reads the status of digital output terminals (DO11 to DO15) of the E1 terminal area.	Not to be added	Fixed Intrvl
RD: Alarm-1 Setpoint Loop-1 (UT)[*3]	Reads the alarm 1 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-2 Setpoint Loop-1 (UT)[*3]	Reads the alarm 2 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-3 Setpoint Loop-1 (UT)[*3]	Reads the alarm 3 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-1 Setpoint Loop-1 (UP)[*4]	Reads the alarm 1 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-2 Setpoint Loop-1 (UP)[*4]	Reads the alarm 2 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-3 Setpoint Loop-1 (UP)[*4]	Reads the alarm 3 setting value in loop 1.	Not to be added	Fixed Intrvl
WR: Target Setpoint Loop-1 (UT)[*3]	Writes a value into the target setting value in loop 1.	To be added	Request
WR: Local Target Setpoint Loop-1 (UP)[*4]	Writes a value into the local target setting value in loop 1.	To be added	Request
WR: Alarm-1 Setpoint Loop-1 (UT)[*3]	Writes the alarm 1 setting value in loop 1.	To be added	Request
WR: Alarm-2 Setpoint Loop-1 (UT)[*3]	Writes the alarm 2 setting value in loop 1.	Not to be added	Request
WR: Alarm-3 Setpoint Loop-1 (UT)[*3]	Writes the alarm 3 setting value in loop 1.	Not to be added	Request
WR: Alarm-1 Setpoint Loop-1 (UP)[*4]	Writes the alarm 1 setting value in loop 1.	Not to be added	Request
WR: Alarm-2 Setpoint Loop-1 (UP)[*4]	Writes the alarm 2 setting value in loop 1.	Not to be added	Request
WR: Alarm-3 Setpoint Loop-1 (UP)[*4]	Writes the alarm 3 setting value in loop 1.	Not to be added	Request
WR: AUTO Switch Loop-1 (UP)[*4]	Switches mode to automatic mode in loop 1.	Not to be added	Request
WR: MAN Switch Loop-1 (UP)[*4]	Switches mode to manual mode in loop 1.	Not to be added	Request
WR: STOP (UT)[*3]	Switches mode to stop mode in loop 1.	To be added	Request
WR: RUN (UT)[*3]	Switches mode to run mode in loop 1.	To be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: REMOTE Loop-1 (UT)*3	Switches mode to remote mode in loop 1.	Not to be added	Request
WR: LOCAL Loop-1 (UT)*3	Switches mode to local mode in loop 1.	Not to be added	Request
WR: Auto-tuning ON Loop-1	Switches auto-tuning mode to on mode in loop 1.	Not to be added	Request
WR: Auto-tuning OFF Loop-1	Switches auto-tuning mode to off mode in loop 1.	Not to be added	Request
WR: RESET (UP)*4	Stops program operation.	Not to be added	Request
WR: PROG (UP)*4	Starts program operation.	Not to be added	Request
WR: REMOTE (UP)*5	Switches mode to remote mode.	Not to be added	Request
WR: LOCAL (UP)*4	Switches mode to local mode.	Not to be added	Request
WR: HOLD ON (UP)*4	Suspends program operation.	Not to be added	Request
WR: HOLD OFF (UP)*4	Restarts program operation.	Not to be added	Request
RD: I relay on Bit-by-bit Basis*2	Reads on/off status of the specified I relay.	Not to be added	Request
RD: I relays on Word-by-word Basis*2	Reads on/off status of the I relay in units of words.	Not to be added	Request
RD: D registers on Word-by-word Basis*2	Reads the value of the specified D register number.	Not to be added	Request
WR: I relay on Bit-by-bit Basis*2	Writes on/off status into the specified I relay.	Not to be added	Request
WR: I relays on Word-by-word Basis*2	Writes on/off status into the I relay in units of words.	Not to be added	Request
WR: D registers on Word-by-word Basis*2	Writes a value into the specified D register number.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.
*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.
*3 This protocol is available for the UT75A, UT55A, and UT35A.
*4 This protocol is available for the UP55A and UP35A.
*5 This protocol is available for the UP55A.

10.3 Details of Applicable Protocols

RD: Control Setpoint Loop-1

Reads the Control Setpoint Loop-1 stored in the register start number (2004).
The default value is set to read the control target value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2004)	Change the value to 07E3H when reading the control target value in loop 2.
Normal response	Control Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the control target value in loop 2.

RD: Measurement Value Loop-1

Reads the Measurement Value Loop-1 stored in the register start number (2003).
The default value is set to read the measurement input value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2003)	Change the value to 07E2H when reading the measurement input value in loop 2.
Normal response	Measurement Value	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the measurement input value in loop 2.

RD: Control Output Loop-1

Reads the Control Output Loop-1 stored in the register start number (2005).
The default value is set to read the control output value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2005)	Change the value to 07E4H when reading the control output value in loop 2.
Normal response	Control Output	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the control output value in loop 2.

RD: Heat Control Output Loop-1

Reads the Heat Control Output Loop-1 stored in the register start number (2006).
The default value is set to read the heat-side control output value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2006)	Change the value to 07E5H when reading the heating-side control output value in loop 2.
Normal response	Heat Control Output	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the heating-side control output value in loop 2.

RD: Cool Control Output Loop-1

Reads the Cool Control Output Loop-1 stored in the register start number (2007).
The default value is set to read the cooling-side control output value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2007)	Change the value to 07E6H when reading the cooling-side control output value in loop 2.
Normal response	Cool Control Output	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the cooling-side control output value in loop 2.

RD: AL1-AL3 Terminal Status

Reads the AL1-AL3 Terminal Status stored in the register start number (7611).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	AL1-AL3 Terminal Status*1	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Symbol	Description
0	OUT_AL1	AL1 terminal status 0: Off 1: On
1	OUT_AL2	AL2 terminal status 0: Off 1: On
2	OUT_AL3	AL3 terminal status 0: Off 1: On
3 to 15	Not used	

Precautions

Do not change values other than setting data.

RD: DI Terminal Status

Reads the DI Terminal Status (standard feature) stored in the register start number (7601).
The default value is set to read the DI terminal status (standard feature).
This protocol can also be used when the data of DI terminal status in the terminal areas (E1 to E4) is read.

Setting data

Packet name	Element name	Description
Request	Register start No. (7601)	To read the values in other terminal areas, change the values as follows. • E1 terminal area: 1DB1H • E2 terminal area: 1DB2H • E3 terminal area: 1DB3H • E4 terminal area: 1DB4H
Normal response	DI Terminal Status*1*2*3*4*5	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

*1 When the DI terminal status (standard feature) is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7601)	0	DI1	DI1 Terminal Status
	1	DI2	DI2 Terminal Status
	2	DI3	DI3 Terminal Status
	3 to 15	Not used	

*2 When data of the E1 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7602)	0	DI11	DI11 Terminal Status
	1	DI12	DI12 Terminal Status
	2	DI13	DI13 Terminal Status
	3	DI14	DI14 Terminal Status
	4	DI15	DI15 Terminal Status
	5	DI16	DI16 Terminal Status
	6 to 15	Not used	

*3 When data of the E2 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7603)	0	DI21	DI21 Terminal Status
	1	DI22	DI22 Terminal Status
	2	DI23	DI23 Terminal Status
	3	DI24	DI24 Terminal Status
	4	DI25	DI25 Terminal Status
	5	DI26	DI26 Terminal Status
	6 to 15	Not used	

*4 When data of the E3 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7604)	0	DI31	DI31 Terminal Status
	1	DI32	DI32 Terminal Status
	2	DI33	DI33 Terminal Status
	3	DI34	DI34 Terminal Status
	4	DI35	DI35 Terminal Status
	5 to 15	Not used	

*5 When data of the E4 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7605)	0	DI41	DI41 Terminal Status
	1	DI42	DI42 Terminal Status
	2	DI43	DI43 Terminal Status
	3	DI44	DI44 Terminal Status
	4	DI45	DI45 Terminal Status
	5	DI46	DI46 Terminal Status
	6 to 15	Not used	

Precautions

Do not change values other than setting data.

RD: DO Terminal Status (E1)

Reads the DO Terminal Status (E1) stored in the register start number (7612).
This protocol can be used when the data of DO terminal status in the terminal areas (E2 to E4) is read.

Setting data

Packet name	Element name	Description
Request	Register start No. (7612)	To read the values in other terminal areas, change the values as follows. • E2 terminal area: 1DBCH • E3 terminal area: 1DBDH • E4 terminal area: 1DBEH
Normal response	DO Terminal Status (E1)*1*2*3*4	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

*1 When data of the E1 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Description
Register start No. (7612)	0	OUT_DO11	DO11 Terminal Status
	1	OUT_DO12	DO12 Terminal Status
	2	OUT_DO13	DO13 Terminal Status
	3	OUT_DO14	DO14 Terminal Status
	4	OUT_DO15	DO15 Terminal Status
	5 to 15	Not used	

*2 When data of the E2 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7613)	0	OUT_DO21	DO21 Terminal Status
	1	OUT_DO22	DO22 Terminal Status
	2	OUT_DO23	DO23 Terminal Status
	3	OUT_DO24	DO24 Terminal Status
	4	OUT_DO25	DO25 Terminal Status
	5 to 15	Not used	

*3 When data of the E3 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7614)	0	OUT_DO31	DO31 Terminal Status
	1	OUT_DO32	DO32 Terminal Status
	2	OUT_DO33	DO33 Terminal Status
	3	OUT_DO34	DO34 Terminal Status
	4	OUT_DO35	DO35 Terminal Status
	5 to 15	Not used	

*4 When data of the E4 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7615)	0	OUT_DO41	DO41 Terminal Status
	1	OUT_DO42	DO42 Terminal Status
	2	OUT_DO43	DO43 Terminal Status
	3	OUT_DO44	DO44 Terminal Status
	4	OUT_DO45	DO45 Terminal Status
	5 to 15	Not used	

Precautions

Do not change values other than setting data.

RD: Alarm-1 Setpoint Loop-1 (UT)

Reads the Alarm-1 Setpoint Loop-1 stored in the register start number (2104).
The default value is set to read the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2104)	Change the value to 0869H when reading the alarm 1 setting value in loop 2.
Normal response	Alarm-1 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can read the alarm 1 setting value in loop 2.

RD: Alarm-2 Setpoint Loop-1 (UT)

Reads the Alarm-2 Setpoint Loop-1 (UT) stored in the register start number (2105).
The default value is set to read the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2105)	Change the value to 086AH when reading the alarm 2 setting value in loop 2.
Normal response	Alarm-2 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can read the alarm 2 setting value in loop 2.

RD: Alarm-3 Setpoint Loop-1 (UT)

Reads the Alarm-3 Setpoint Loop-1 stored in the register start number (2106).
The default value is set to read the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2106)	Change the value to 086BH when reading the alarm 3 setting value in loop 2.
Normal response	Alarm-3 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can read the alarm 3 setting value in loop 2.

RD: Alarm-1 Setpoint Loop-1 (UP)

Reads the Alarm-1 Setpoint Loop-1 stored in the register start number (2351).
The default value is set to read the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2351)	Change the value to 0938H when reading the alarm 1 setting value in loop 2.
Normal response	Alarm-1 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can read the alarm 1 setting value in loop 2.

RD: Alarm-2 Setpoint Loop-1 (UP)

Reads the Alarm-2 Setpoint Loop-1 stored in the register start number (2352).
The default value is set to read the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2352)	Change the value to 0939H when reading the alarm 2 setting value in loop 2.
Normal response	Alarm-2 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can read the alarm 2 setting value in loop 2.

RD: Alarm-3 Setpoint Loop-1 (UP)

Reads the Alarm-3 Setpoint Loop-1 stored in the register start number (2353).
The default value is set to read the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2353)	Change the value to 093AH when reading the alarm 3 setting value in loop 2.
Normal response	Alarm-3 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can read the alarm 3 setting value in loop 2.

WR: Target Setpoint Loop-1 (UT)

Writes the Target Setpoint Loop-1 stored in the register start number (2101).
The default value is set to write the target setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2101)	Change the value to 0866H when reading the target setting value in loop 2.
	Target Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the target setting value in loop 2.

WR: Local Target Setpoint Loop-1 (UP)

Writes the Target Setpoint Loop-1 stored in the register start number (2201).
The default value is set to write the local target setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2201)	Change the value to 0899H when reading the local target setting value in loop 2.
	Local Target Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the local target setting value in loop 2.

WR: Alarm-1 Setpoint Loop-1 (UT)

Writes the Alarm-1 Setpoint Loop-1 stored in the register start number (2104).
The default value is set to write the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2104)	Change the value to 0869H when writing the alarm 1 setting value in loop 2.
	Alarm-1 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the alarm 1 setting value in loop 2.

WR: Alarm-2 Setpoint Loop-1 (UT)

Writes the Alarm-2 Setpoint Loop-1 stored in the register start number (2105).
The default value is set to write the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2105)	Change the value to 086AH when writing the alarm 2 setting value in loop 2.
	Alarm-2 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the alarm 2 setting value in loop 2.

WR: Alarm-3 Setpoint Loop-1 (UT)

Writes the Alarm-3 Setpoint Loop-1 stored in the register start number (2106).
The default value is set to write the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2106)	Change the value to 086BH when writing the alarm 3 setting value in loop 2.
	Alarm-3 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the alarm 3 setting value in loop 2.

WR: Alarm-1 Setpoint Loop-1 (UP)

Writes the Alarm-1 Setpoint Loop-1 stored in the register start number (2351).
The default value is set to write the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2351)	Change the value to 0938H when writing the alarm 1 setting value in loop 2.
	Alarm-1 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the alarm 1 setting value in loop 2.

WR: Alarm-2 Setpoint Loop-1 (UP)

Writes the Alarm-2 Setpoint Loop-1 stored in the register start number (2352).
The default value is set to write the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2352)	Change the value to 0939H when writing the alarm 2 setting value in loop 2.
	Alarm-2 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the alarm 2 setting value in loop 2.

WR: Alarm-3 Setpoint Loop-1 (UP)

Writes the Alarm-3 Setpoint Loop-1 stored in the register start number (2353).
The default value is set to write the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2353)	Change the value to 093AH when writing the alarm 3 setting value in loop 2.
	Alarm-3 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the alarm 3 setting value in loop 2.

WR: AUTO Switch Loop-1 (UP)

Switches mode to auto mode in loop 1.

The default value is set to write the value of the automatic switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2319)	Change the value to 090FH when writing the automatic switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the value of the automatic switch in loop 2.

WR: MAN Switch Loop-1 (UP)

Switches mode to manual mode in loop 1.

The default value is set to write the value of the manual switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2319)	Change the value to 090FH when writing the value of manual switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the value of the manual switch in loop 2.

WR: STOP (UT)

Switches mode to STOP mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: RUN (UT)

Switches mode to RUN mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: REMOTE Loop-1 (UT)

Switches mode to remote mode in loop 1.

The default value is set to write the value of the remote switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2306)	Change the value to 0902H when writing value of the remote switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the value of the remote switch in loop 2.

WR: LOCAL Loop-1 (UT)

Switches mode to local mode in loop 1.

The default value is set to write the value of the local switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2306)	Change the value to 0902H when writing the value of the local switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the value of the local switch in loop 2.

WR: Auto-tuning ON Loop-1

Turns on the auto-tuning in loop 1.

The default value is set to write the value of the auto-tuning on switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2308)	Change the value to 0904H when writing the value of the auto-tuning on switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can write the value of the auto-tuning on switch in loop 2.

WR: Auto-tuning OFF Loop-1

Turns off the auto-tuning in loop 1.

The default value is set to write the value of the auto-tuning off switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2308)	Change the value to 0904H when writing the value of the auto-tuning off switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can write the value of the auto-tuning off switch in loop 2.

WR: RESET (UP)

Switches mode to program stop mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: PROG (UP)

Switches mode to program start mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: REMOTE (UP)

Switches mode to remote mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: LOCAL (UP)

Switches mode to local mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: HOLD ON (UP)

Suspends program operation.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: HOLD OFF (UP)

Restarts program operation.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: I relay on Bit-by-bit Basis

MODBUS standard function. This protocol reads on/off status of the specified I relay number.

Setting data

Packet name	Element name	Description
Request	Start I relay No.	Specify the device that stores the I relay start number for reading. Store the value of the I relay start number -1 in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I4001, set 0FA0H.)
Normal response	I relay content	Specify the device that stores the read data. One byte of the specified device is used.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: I relays on Word-by-word Basis

MODBUS standard function. This protocol reads on/off status of 16 consecutive I relay which starts from the specified I relay start number.

Setting data

Packet name	Element name	Description
Request	Start I relay No.	Specify the device that stores the I relay start number for reading. Store the value of the I relay start number -1 in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I4001, set 0FA0H.)
Normal response	I relay content	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: D registers on Word-by-word Basis

MODBUS standard function. This protocol reads the value of the specified D register number.

Setting data

Packet name	Element name	Description
Request	Register start No.	Specify the device that stores the register start number for reading. Store the value of the D register number -1 to be read in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access D7601, set 1DB0H.)
Normal response	Register Content	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: I relay on Bit-by-bit Basis

MODBUS standard function. This protocol writes on/off status of the specified I relay number.

Setting data

Packet name	Element name	Description
Request	I relay No.	Specify the device that stores the I relay number for writing. Store the value of the I relay number -1 to be written in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I5537, set 15A0H.)
	Write data	For write data, specify the following values. Off: 0000H On: FF00H
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: I relays on Word-by-word Basis

MODBUS standard function. This protocol writes on/off status of 16 consecutive I relay which starts from the specified I relay start number.

Setting data

Packet name	Element name	Description
Request	Start I relay No.	Specify the device that stores the I relay number for writing. Store the value of the I relay number -1 to be written in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I5537, set 15A0H.)
	Write data	I relay specified by the I relay start number is assigned in order from the 0 bit of the device. Specify the value of each bit in the following. Off: 0 On: 1
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: D registers on Word-by-word Basis

MODBUS standard function. This protocol writes a value into the specified D register number.

Setting data

Packet name	Element name	Description
Request	Register No.	Specify the device that stores the register number for writing. Store the value of the D register number -1 to be written in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access D7201, set 1C20H.)
	Write data	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

11 PROTOCOLS SUPPORTED BY Mitsubishi Electric (NF250, NF400, NF630, NF800)

11.1 Setting Method

NF250, NF400, NF630, NF800

Use the MODBUS RTU communication function of the MDU breaker to communicate with the MDU breaker.
For the parameter setting method, refer to MDU Breaker Programming Manual MODBUS Communication Version (KGA190085).

Point

To connect to the MDU breaker, a MODBUS TCP-MODBUS RTU (RS-485) protocol converter is required.
Wire the Ethernet side of the protocol converter to the RJ71EN71 and the RS-485 side to the MDU breaker.
For the protocol converter settings, refer to the instruction manual of the protocol converter to be used.

11.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Line System	Reads the value of the line system.	Not to be added	Request
RD: 16 bit Monitor	Reads the value of the 16 bit monitor.	To be added	Fixed Intrvl
RD: Ip (Pre-alarm Pickup Current)	Reads the value of the pre-alarm current Ip setup register.	Not to be added	Request
RD: TL (LTD Operation Time)	Reads the value of the long-time tripping time TL setup register.	Not to be added	Request
RD: Is (STD Pickup Current)	Reads the value of the short-time tripping current Isd setup register.	Not to be added	Request
RD: Ts (STD Operation Time)	Reads the value of the short-time tripping time Tsd setup register.	Not to be added	Request
RD: Ii (INST Pickup Current)	Reads the value of the instantaneous tripping current (Ii) setup register.	Not to be added	Request
RD: Number of Poles	Reads the value of the pole number setup register.	Not to be added	Request
RD: Open / Close Frequency	Reads the total number of times the MDU breaker has opened and closed since the start of use.	To be added	Fixed Intrvl
RD: Trip Frequency	Reads the total number of times the MDU breaker has tripped since the start of use.	To be added	Fixed Intrvl
RD: Rated Current	Reads the CT rated current value.	Not to be added	Request
RD: Current Setting Ir	Reads the rated setting current.	Not to be added	Request
RD: Model Code	Reads the model code.	Not to be added	Request
RD: Phase Current	Reads the following values. • Phase 1 Current (I1) • Phase 2 Current (I2) • Phase 3 Current (I3) • Phase N Current (IN) • Average Current	To be added	Fixed Intrvl
RD: Demand Current	Reads the following values. • Demand Current Phase 1 (I1) • Demand Current Phase 2 (I2) • Demand Current Phase 3 (I3) • Demand Current Phase N (IN)	Not to be added	Fixed Intrvl
RD: Line Voltage	Reads the following values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Voltage (L-L)	To be added	Fixed Intrvl
RD: Phase Voltage	Reads the following values. • Voltage V1N • Voltage V2N • Voltage V3N	To be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Power Factor	Reads the total power factor current value.	To be added	Fixed Intrvl
RD: Frequency	Reads the frequency current value.	To be added	Fixed Intrvl
RD: Electric Power	Reads the total power current value.	To be added	Fixed Intrvl
RD: Demand Electric Power	Reads the total power demand current value.	Not to be added	Fixed Intrvl
RD: Reactive Power	Reads the total reactive power current value.	To be added	Fixed Intrvl
RD: Demand Reactive Power	Reads the reactive power demand current value.	Not to be added	Fixed Intrvl
RD: Fault Current	Reads the accident current value.	To be added	Fixed Intrvl
RD: Max. Demand Electric Power	Reads the total power demand maximum value.	Not to be added	Fixed Intrvl
RD: Max. Demand Reactive Power	Reads the reactive power demand maximum value.	Not to be added	Fixed Intrvl
RD: Electric Energy	Reads the electric energy.	To be added	Fixed Intrvl
RD: Reactive Energy (LAG)	Reads the reactive energy (LAG).	To be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following values. • Total Harmonics Current Phase 1 (I1) • Total Harmonics Current Phase 2 (I2) • Total Harmonics Current Phase 3 (I3) • Total Harmonics Current Phase N (IN)	Not to be added	Fixed Intrvl
RD: Fundamental Current	Reads the following values. • Fundamental Current Phase 1 (I1) • Fundamental Current Phase 2 (I2) • Fundamental Current Phase 3 (I3) • Fundamental Current Phase N (IN)	Not to be added	Fixed Intrvl
RD: Harmonics Current (3rd)	Reads the following values. • Harmonics Current Phase 1 (I1) • Harmonics Current Phase 2 (I2) • Harmonics Current Phase 3 (I3) • Harmonics Current Phase N (IN)	Not to be added	Fixed Intrvl
WR: Line System	Writes the value of the line system.	Not to be added	Request
WR: Reset Memory	Write 16-bit data to the 16-bit set/reset.	To be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers*2	Writes the value into the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

11.3 Details of Applicable Protocols

RD: Line System

This protocol reads the setting value of the line system stored in register address 512.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Line System*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Line system	Setting value
Single-phase 2-wire	0001H
Single-phase 3-wire	0002H
3-phase 3-wire	0003H
3-phase 4-wire	0004H

Precautions

Do not change values other than setting data.

RD: 16 bit Monitor

This protocol reads the 16 bit monitor data stored in register address 524.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	16 bit Monitor*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored. For details on the stored data, refer to MDU Breaker Programming Manual MODBUS Communication Version (KGA190085).

Bit	Description	If the value is 1	If the value is 0
0	AX (on/off state)	On	Off or trip
1	AL (shutdown state)	Trip	On or off
2	PAL (pre-alarm)	With alarm	No alarm
3	Not used	—	—
4	Not used	—	—
5	Not used	—	—
6	LTD (overcurrent cutoff)	Occur	Not occur
7	STD/INST (short circuit break)	Occur	Not occur
8	Current demand lower limit alarm	—	—
9	Current demand upper limit alarm	—	—
10	IDM_AL (current demand alarm)	With alarm	No alarm
11	IUB_AL (current unbalance alarm)	With alarm	No alarm
12	OVER (overcurrent alarm)	With alarm	No alarm
13	ILA_AL (current open phase alarm)	With alarm	No alarm
14	Not used	—	—
15	Not used	—	—

Precautions

Do not change values other than setting data.

RD: Ip (Pre-alarm Pickup Current)

This protocol reads the setting value of pre-alarm current Ip stored in register address 538.
Unit is %.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Ip (Pre-alarm Pickup Current)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: TL (LTD Operation Time)

This protocol reads the setting value of the long-time tripping time TL stored in register address 541.
Unit is 0.1s.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	TL (LTD Operation Time)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Is (STD Pickup Current)

This protocol reads the setting value of the short-time tripping current Isd stored in register address 542.
Unit is ×0.1.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Is (STD Pickup Current)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Ts (STD Operation Time)

This protocol reads the setting value of the short-time tripping time Tsd stored in register address 543.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Ts (STD Operation Time)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Ii (INST Pickup Current)

This protocol reads the setting value of instantaneous tripping current (Ii) stored in register address 544.
Unit is ×0.1.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Ii (INST Pickup Current)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Number of Poles

This protocol reads the setting value of the pole number stored in register address 560.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Number of Poles	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Open / Close Frequency

This protocol reads the value of the main module open/close count stored in register address 565, which is the total number of times the MDU breaker has opened and closed since the start of use.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Open / Close Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Trip Frequency

This protocol reads the value of the main module trip count stored in register address 566, which is the total number of times the MDU breaker has tripped since the start of use.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Trip Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rated Current

This protocol reads the CT rated current setting value stored in register address 592.
Unit is A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Rated Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Current Setting Ir

This protocol reads the rated setting current value stored in register address 700.
Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Current Setting Ir	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Model Code	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Phase Current

This protocol reads the value of current for phases 1, 2, 3, and N, as well as the value of average current, stored in register addresses 768 to 772.
Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Phase 1 Current (I1) • Phase 2 Current (I2) • Phase 3 Current (I3) • Phase N Current (IN) • Average Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Demand Current

This protocol reads the value of current demand for phases 1, 2, 3, and N stored in register addresses 773 to 776.
Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Demand Current Phase 1 (I1) • Demand Current Phase 2 (I2) • Demand Current Phase 3 (I3) • Demand Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Line Voltage

This protocol reads the value of voltage for phases 1-2, 2-3, and 3-1, as well as the value of average voltage (L-L), stored in register addresses 778 to 781.
Unit is 0.1V.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Voltage V12 • Voltage V23 • Voltage V31 • Average Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Phase Voltage

This protocol reads the value of voltage for phases 1-N, 2-N, and 3-N stored in register addresses 782 to 784.
Unit is 0.1V.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Voltage V1N • Voltage V2N • Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Power Factor

This protocol reads the total power factor current value stored in register address 789.
Unit is 0.1%.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Power Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Frequency

This protocol reads the frequency current value stored in register address 790.
Unit is 0.1Hz.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Electric Power

This protocol reads the total power current value stored in register address 794.
Unit is 0.1kW.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Electric Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Demand Electric Power

This protocol reads the total power demand current value stored in register address 798.
Unit is 0.1kW.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Demand Electric Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Power

This protocol reads the total reactive power current value stored in register address 802.
Unit is 0.1kvar.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Demand Reactive Power

This protocol reads the reactive power demand current value stored in register address 807.
Unit is 0.1kvar.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Demand Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Fault Current

This protocol reads the accident current value stored in register address 811.
Unit is 1.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Fault Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Max. Demand Electric Power

This protocol reads the total power demand maximum value stored in register address 845.
Unit is 0.1kW.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Max. Demand Electric Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Max. Demand Reactive Power

This protocol reads the reactive power demand maximum value stored in register address 854.
Unit is 0.1kvar.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Max. Demand Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Electric Energy

This protocol reads the value of the electric energy stored in register address 1304.
The unit differs depending on the MDU breaker model.

- For NF250: 0.1kWh
- For NF400, NF630, NF800: kWh

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Electric Energy*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 Two consecutive word devices are used.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (LAG)

This protocol reads the reactive energy (LAG) stored in register address 1308.
The unit differs depending on the MDU breaker model.

- For NF250: 0.1kvarh
- For NF400, NF630, NF800: kvarh

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Reactive Energy (LAG)*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 Two consecutive word devices are used.

Precautions

Do not change values other than setting data.

RD: Harmonics Current (Total)

This protocol reads the value of total harmonics current for phases 1, 2, 3, and N stored in register addresses 2304 to 2307.
Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Total Harmonics Current Phase 1 (I1) • Total Harmonics Current Phase 2 (I2) • Total Harmonics Current Phase 3 (I3) • Total Harmonics Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Fundamental Current

This protocol reads the value of fundamental harmonics current for phases 1, 2, 3, and N stored in register addresses 2308 to 2311.
Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Fundamental Current Phase 1 (I1) • Fundamental Current Phase 2 (I2) • Fundamental Current Phase 3 (I3) • Fundamental Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Harmonics Current (3rd)

This protocol reads the value of 3rd harmonics current for phases 1, 2, 3, and N stored in register addresses 2312 to 2315. Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Starting Address (2312)	It is set to read the 3rd order harmonics current value. When another harmonic protocol is used, set the following start address. • 5th: 090CH • 7th: 0910H • 9th: 0914H • 11th: 0918H • 13th: 091CH • 15th: 0920H • 17th: 0924H • 19th: 0928H
Normal response	• Harmonics Current Phase 1 (I1) • Harmonics Current Phase 2 (I2) • Harmonics Current Phase 3 (I3) • Harmonics Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Line System

This protocol writes the setting value of the line system to register address 512.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Line System*1	Specify the device that stores the setting value of the line system.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Line system	Setting value
Single-phase 2-wire	0001H
Single-phase 3-wire	0002H
3-phase 3-wire	0003H
3-phase 4-wire	0004H

Precautions

Do not change values other than setting data.

WR: Reset Memory

This protocol writes 16-bit data to the 16-bit set/reset of address 523.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	16 bit Reset*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Specify the following data. For details on the data to be specified, refer to MDU Breaker Programming Manual MODBUS Communication Version (KGA190085).

Bit	Description	If the value is 1	If the value is 0
0	Batch reset circuit breaker alarm	Reset	—
1	Erase all memory	Erase all	—
2	Batch erase memory of the harmonics current maximum value of each order	Erase	—
3	Not used	Fixed to "0"	
4	Erase memory of the power factor maximum value	Erase	—
5	Not used	Fixed to "0"	
6	Erase memory of the power demand maximum value	Erase	—
7	Erase memory of accident information (cause + current)	Erase	—
8	Erase memory of the reactive power demand maximum value	Erase	—
9	Erase memory of reactive energy	Erase	—
10	Erase memory of the time reactive energy maximum value	Erase	—
11	Erase memory of the current demand maximum value	Erase	—
12	Erase memory of the voltage maximum value	Erase	—
13	Erase memory of the harmonics current demand maximum value	Erase	—
14	Erase memory of energy	Erase	—
15	Erase memory of the time energy maximum value	Erase	—

Precautions

Do not change values other than setting data.

RD: Holding Registers

This is a MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Starting Address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H)
	Quantity of Registers	Specify the device that stores the data points to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. The range is 0001H to 007DH (1 to 125).)
Normal response	Read Data	Specify the device that stores the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
	Non-conversion Variable: Read Data	Change the byte swap setting according to the specification of the external device.
Error response	Error Code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

This is a MODBUS standard function.

It writes the value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Starting Address (0)	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H.)
	Quantity of Registers (1)	Specify the device that stores the data points to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 123, set 007BH. The range is 0001H to 007BH (1 to 123).)
	Write Data	Rewrite the data length to the value of (2 × "Number of Register"). (For example, specify 246 for 123.) Specify the device that stores the write data. The number of words specified by the "Number of Register (1)" is used. Change the byte swap setting according to the specification of the external device.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

12 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorLight Series: EMU4-BD1-MB, EMU4-HD1-MB)

12.1 Setting Method

EMU4-BD1-MB, EMU4-HD1-MB

Communication with the EcoMonitorLight series uses the MODBUS RTU communication function of the Mitsubishi Electric Energy Measuring Unit EcoMonitorLight Series.

For steps to set the parameters, refer to the following.

- MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025)
- Energy Measuring Unit User's Manual (Details) (IB63771)

Point

A MODBUS TCP-MODBUS RTU (RS-485) protocol converter is required to connect to EcoMonitorLight. Wire the Ethernet side of the protocol converter to the RJ71EN71 and the RS-485 side to EcoMonitorLight. For the protocol converter settings, refer to the instruction manual of the protocol converter to be used.

12.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Phase Wire System	Reads the value of the phase wire system.	Not to be added	Request
RD: Primary Voltage (L-L: Line Voltage)	Reads the value of the primary line voltage.	Not to be added	Request
RD: Primary Voltage (L-N: Phase Voltage)	Reads the value of the primary phase voltage.	Not to be added	Request
RD: Secondary Voltage	Reads the value of the secondary voltage.	Not to be added	Request
RD: Primary Current	Reads the value of the primary current.	Not to be added	Request
RD: 16 Bits Monitor	Reads the value of the 16 bits monitor.	To be added	Fixed Intrvl
RD: 5A Input Change (Sensor Type)	Reads the value of 5A input switching (sensor type).	Not to be added	Request
RD: Measuring Method of Operating Time	Reads the value of the operating time measuring method.	Not to be added	Request
RD: Multiplying Factors	Reads all multiplying factor values.	To be added	Request
RD: Model Code	Reads the model code value.	Not to be added	Request
RD: Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	To be added	Fixed Intrvl
RD: Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	To be added	Fixed Intrvl
RD: Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	To be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N	To be added	Fixed Intrvl
RD: Power Factor	Reads the total power factor current value.	To be added	Fixed Intrvl
RD: Frequency	Reads the frequency current value.	To be added	Fixed Intrvl
RD: Active Power	Reads the total power current value.	To be added	Fixed Intrvl
RD: Active Power Demand	Reads the total power demand current value.	To be added	Fixed Intrvl
RD: Reactive Power	Reads the total reactive power current value.	To be added	Fixed Intrvl
RD: Apparent Power	Reads the total apparent power current value.	To be added	Fixed Intrvl
RD: Integrated Electric Energy (import)	Reads the electric energy (import).	To be added	Fixed Intrvl
RD: Integrated Electric Energy (export)	Reads the electric energy (export).	Not to be added	Fixed Intrvl
RD: Reactive Energy (import LAG)	Reads the reactive energy (import LAG).	To be added	Fixed Intrvl
RD: Integrated Electric Energy Extended (import)	Reads the electric energy extended (import).	To be added	Fixed Intrvl
RD: Integrated Electric Energy Extended (export)	Reads the electric energy extended (export).	Not to be added	Fixed Intrvl
RD: Reactive Energy Extended (import LAG)	Reads the reactive energy extended (import LAG).	Not to be added	Fixed Intrvl
RD: Periodic Electric Energy (import)	Reads the periodic electric energy (import).	To be added	Fixed Intrvl
RD: Pulse Count	Reads the pulse count value.	To be added	Fixed Intrvl
RD: Operating Time	Reads the operating time.	To be added	Fixed Intrvl
RD: Harmonics Phase Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Current (1st)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (Total)	Reads the following instantaneous values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (3rd)	Reads the following instantaneous values. • Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (Total)	Reads the following instantaneous values. • THD V12 • THD V23	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Harmonics Line Voltage Distortion (3rd)	Reads the following instantaneous values. • Harmonics Ratio V12 • Harmonics Ratio V23	Not to be added	Fixed Intrvl
RD: Harmonics Current Content Rate (Total)	Reads the following instantaneous values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl
RD: Harmonics Current Content Rate (3rd)	Reads the following instantaneous values. • Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Not to be added	Fixed Intrvl
WR: Phase Wire System	Writes the value of the phase wire system.	Not to be added	Request
WR: Primary Voltage (L-L: Line Voltage)	Writes the value of the primary line voltage.	Not to be added	Request
WR: Primary Voltage (L-N: Phase Voltage)	Writes the value of the primary phase voltage.	Not to be added	Request
WR: Secondary Voltage	Writes the value of the secondary voltage.	Not to be added	Request
WR: Primary Current	Writes the value of the primary current.	Not to be added	Request
WR: 16 Bits Set/Reset Register	Writes the value to the 16-bit set/reset register.	Not to be added	Request
WR: 5A Input Change (Sensor Type)	Writes the value of 5A input switching (sensor type).	Not to be added	Request
WR: Measuring Method of Operating Time	Writes the operating time measuring method.	Not to be added	Request
WR: Integrated Electric Energy (import)	Writes the electric energy (import).	Not to be added	Request
WR: Integrated Electric Energy (export)	Writes the electric energy (export).	Not to be added	Request
WR: Reactive Energy (import LAG)	Writes the reactive energy (import LAG).	Not to be added	Request
WR: Periodic Electric Energy (import)	Writes the periodic electric energy (import).	Not to be added	Request
WR: Pulse Count	Writes the pulse count value.	Not to be added	Request
WR: Operating Time	Writes the operating time.	Not to be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers*2	Writes the value to the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

12.3 Details of Applicable Protocols

RD: Phase Wire System

This protocol reads the setting value of the phase wire system stored in register address 512.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Phase Wire System*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

- Do not change values other than setting data.
- 3P4W is only compatible with the EMU4-HD1-MB.

RD: Primary Voltage (L-L: Line Voltage)

This protocol reads the setting value of the primary line voltage stored in register address 513.
Unit is V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Primary Line Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Voltage (L-N: Phase Voltage)

This protocol reads the setting value of the primary phase voltage stored in register address 515.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Primary Phase Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Secondary Voltage

This protocol reads the setting value of the secondary voltage stored in register address 517.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Current

This protocol reads the setting value of the primary current stored in register address 519.
Unit is ×0.1A.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Primary Current	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: 16 Bits Monitor

This protocol reads the 16 bits monitor data stored in register address 524.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 127.
Normal response	16 Bits Monitor*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.
The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Bit	Description	If the value is 1	If the value is 0
0	Pulse count value upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm	Alarm occurring	No alarm
4	Contact input	On (closed)	Off (open)
5	Upper and lower limit batch alarm	Alarm occurring	No alarm
6	Not used	—	—
7	Not used	—	—
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Not used	—	—
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Power factor upper and lower limit alarm	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

Precautions

Do not change values other than setting data.

RD: 5A Input Change (Sensor Type)

This protocol reads the setting value of 5A input switching (sensor type) stored in register address 531.

The sensor type setting data is read as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	5A Input Change	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Measuring Method of Operating Time

This protocol reads the setting value of the operating time measuring method stored in register address 753.
The operating time measuring method setting data is read as follows.

- 1: Current
- 2: Contact

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Measuring Method of Operating Time	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Multiplying Factors

This protocol reads the current, voltage, power, electric energy, power factor, frequency, harmonics current content rate, harmonics voltage content rate, and detailed energy multiplying factor stored in register addresses 754 to 762.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Current • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • Content Rate of Harmonic Voltage • Detail Electric Energy	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- The EMU4-BD1-MB stores 0 as the multiplying factor for the harmonics current content rate and harmonics voltage content rate.

RD: Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model Code	Data
EMU4-BD1-MB	0001H
EMU4-HD1-MB	0002H

Precautions

Do not change values other than setting data.

RD: Phase Current

This protocol reads the value of current for phases 1, 2, 3, and N, as well as the value of average current, stored in register addresses 768 to 772.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Phase Current Demand

This protocol reads the value of current demand for phases 1, 2, 3, and N stored in register addresses 773 to 776.
Unit is A.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.
Read value = 123456
Multiplying factor = -3
Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Line Voltage

This protocol reads the value of voltage for phases 1-2, 2-3, and 3-1, as well as the value of average voltage (L-L), stored in register addresses 778 to 781.
Unit is V.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.
Read value = 123456
Multiplying factor = -3
Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Phase Voltage

This protocol reads the value of voltage for phases 1-N, 2-N, and 3-N stored in register addresses 782 to 784.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Voltage V1N • Voltage V2N • Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Power Factor

This protocol reads the total power factor current value stored in register address 789.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power factor multiplying factor data (register address: 758).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	ΣPower Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Frequency

This protocol reads the frequency current value stored in register address 790.

Unit is ×0.1Hz.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the frequency multiplying factor data (register address: 759).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Power

This protocol reads the total power current value stored in register address 794.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	ΣActive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Power Demand

This protocol reads the total power demand current value stored in register address 798.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	ΣActive Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Power

This protocol reads the total reactive power current value stored in register address 802.

Unit is kvar.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	ΣReactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Apparent Power

This protocol reads the total apparent power current value stored in register address 806.

Unit is kVA.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	ΣApparent Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Integrated Electric Energy (import)

This protocol reads the electric energy (import) stored in register address 1304.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Integrated Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy (export)

This protocol reads the electric energy (export) stored in register address 1306.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Integrated Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (import LAG)

This protocol reads the reactive energy (import LAG) stored in register address 1308.

Unit is kvarh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Reactive Energy (import LAG)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy Extended (import)

This protocol reads the energy extended (import) stored in register address 1316.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy Extended (export)

This protocol reads the energy extended (export) stored in register address 1318.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy Extended (import LAG)

This protocol reads the reactive energy extended (import LAG) stored in register address 1320.

Unit is kvarh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Reactive Energy Extended (import LAG)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Electric Energy (import)

This protocol reads the periodic electric energy (import) stored in register address 1374.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Periodic Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Pulse Count

This protocol reads the pulse count value stored in register address 1376.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Pulse Count	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Operating Time

This protocol reads the operating time stored in register address 1378.

Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Operating Time	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Harmonics Phase Voltage (Total)

This protocol reads the instantaneous RMS value of total harmonics voltage for phases 1-N, 2-N, and 3-N stored in register addresses 1792 to 1794.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Phase Voltage (1st)

This protocol reads the instantaneous RMS value of fundamental harmonics voltage for phases 1-N, 2-N, and 3-N stored in register addresses 1795 to 1797.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (1795)	It is set to read the fundamental harmonics value. When another harmonics protocol is used, change the fixed data start address (1795) as follows. • 3rd: 0706H • 5th: 0709H • 7th: 070CH • 9th: 070FH • 11th: 0712H • 13th: 0715H
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Line Voltage (Total)

This protocol reads the instantaneous RMS value of total harmonics voltage for phases 1-2 and 2-3 stored in register addresses 2048 to 2049.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Line Voltage (1st)

This protocol reads the instantaneous RMS value of fundamental harmonics voltage for phases 1-2 and 2-3 stored in register addresses 2051 to 2052.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2051)	It is set to read the fundamental harmonics line voltage. When another harmonics protocol is used, change the fixed data start address (2051) as follows. • 3rd: 0806H • 5th: 0809H • 7th: 080CH • 9th: 080FH • 11th: 0812H • 13th: 0815H
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Current (Total)

This protocol reads the instantaneous RMS value of total harmonics current for phases 1, 2, 3, and N stored in register addresses 2304 to 2307.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Current (1st)

This protocol reads the instantaneous RMS value of fundamental harmonics current for phases 1, 2, 3, and N stored in register addresses 2308 to 2311.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 754).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2308)	It is set to read the fundamental harmonics current value. When another harmonics protocol is used, change it as follows. • 3rd: 0908H • 5th: 090CH • 7th: 0910H • 9th: 0914H • 11th: 0918H • 13th: 091CH
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Phase Voltage Distortion (Total)

This protocol reads the value of total harmonics voltage distortion for phases 1-N, 2-N, and 3-N stored in register addresses 2560 to 2562.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• THD V1N • THD V2N • THD V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Phase Voltage Distortion (3rd)

This protocol reads the value of 3rd harmonics voltage ratio for phases 1-N, 2-N, and 3-N stored in register addresses 2563 to 2565.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2563)	It is set to read the 3rd order harmonics phase voltage ratio. When another harmonics protocol is used, change it as follows. • 5th: 0A06H • 7th: 0A09H • 9th: 0A0CH • 11th: 0A0FH • 13th: 0A12H
Normal response	• Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Line Voltage Distortion (Total)

This protocol reads the value of total harmonics voltage distortion for phases 1-2, and 2-3 stored in register addresses 2816 to 2817.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• THD V12 • THD V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Line Voltage Distortion (3rd)

This protocol reads the value of 3rd harmonics voltage ratio for phases 1-2 and 2-3 stored in register addresses 2819 to 2820.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2819)	It is set to read the 3rd order harmonics line voltage ratio. When another harmonics protocol is used, change it as follows. • 5th: 0B06H • 7th: 0B09H • 9th: 0B0CH • 11th 0B0FH • 13th: 0B12H
Normal response	• Harmonics Ratio V12 • Harmonics Ratio V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Current Content Rate (Total)

This protocol reads the value of total harmonics current distortion for phases 1, 2, 3, and N stored in register addresses 3072 to 3075.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics current content rate (register address: 760).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• THD I1 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: Harmonics Current Content Rate (3rd)

This protocol reads the value of 3rd harmonics current ratio for phases 1, 2, 3, and N stored in register addresses 3076 to 3079.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics current content rate (register address: 760).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (3076)	It is set to read the 3rd order harmonics current ratio. When another harmonics protocol is used, change it as follows. • 5th: 0C08H • 7th: 0C0CH • 9th: 0C10H • 11th: 0C14H • 13th: 0C18H
Normal response	• Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: Phase Wire System

This protocol writes the setting value of the phase wire system to register address 512.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Phase Wire System*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

- Do not change values other than setting data.
- 3P4W is only compatible with the EMU4-HD1-MB.

WR: Primary Voltage (L-L: Line Voltage)

This protocol writes the setting value of the primary line voltage to register address 513.
Unit is V. Use a value in the range of 1 to 6600.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Primary Line Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Primary Voltage (L-N: Phase Voltage)

This protocol writes the setting value of the primary phase voltage to register address 515.
Unit is ×0.1V. Use a value in the range of 10 to 66000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Primary Phase Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: Secondary Voltage

This protocol writes the setting value of the secondary voltage to register address 517.
Unit is ×0.1V. The value is set within the range from 10 to 2200.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Secondary Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Primary Current

This protocol writes the setting value of the primary current to register address 519.
Unit is ×0.1A. Use a value in the range of 50 to 60000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Primary Current	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: 16 Bits Set/Reset Register

This protocol writes 16-bit data to register address 523.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting the slave address, specify it in the range from 1 (default) to 127.
	16-bit set/reset*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Specify the following data.
The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Reset of alarm occurrence count	Reset	Do not reset
4	Not used	—	—
5	Not used	—	—
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Reset of electric energy data	Reset	Do not reset
15	Not used	—	—

Precautions

Do not change values other than setting data.

WR: 5A Input Change (Sensor Type)

This protocol writes the setting value of 5A input switching (sensor type) to register address 531.

Specify the sensor type setting data as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	5A Input Change	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Measuring Method of Operating Time

This protocol writes the setting value of the operating time measuring method to register address 753.

Specify the operating time measuring method setting data as follows.

- 1: Current
- 2: Contact

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Measuring Method of Operating Time	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: Integrated Electric Energy (import)

This protocol writes the electric energy (import) in register address 1304.
Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (import) setting value is written, the electric energy multiplying factor data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Integrated Electric Energy (import)	• Specify the device for storing the data to be written. The device uses 2 words. • Set the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Set electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the electric energy multiplying factor data (register address: 757).

Precautions

Do not change values other than setting data.

WR: Integrated Electric Energy (export)

This protocol writes the electric energy (export) in register address 1306.
Unit is kWh. Use a value in the range of 0 to 999999.
When the electric energy (export) setting value is written, the electric energy multiplying factor data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Integrated Electric Energy (export)	• Specify the device for storing the data to be written. The device uses 2 words. • Set the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Set electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the electric energy multiplying factor data (register address: 757).

Precautions

Do not change values other than setting data.

WR: Reactive Energy (import LAG)

This protocol writes the reactive energy (import LAG) in register address 1308.
Unit is kvarh. Use a value in the range of 0 to 999999. When the reactive energy (import LAG) setting value is written, the energy multiplier data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Reactive Energy (import LAG)	• Specify the device for storing the data to be written. The device uses 2 words. • Set the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Set electric energy = 123.456kvarh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the electric energy multiplying factor data (register address: 757).

Precautions

Do not change values other than setting data.

WR: Periodic Electric Energy (import)

This protocol writes the periodic electric energy (import) in register address 1374.
Unit is kWh. Use a value in the range of 0 to 999999. When the periodic electric energy (import) setting value is written, the electric energy multiplying factor data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Periodic Electric Energy (import)	• Specify the device for storing the data to be written. The device uses 2 words. • Set the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Set electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the electric energy multiplying factor data (register address: 757).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: Pulse Count

This protocol writes the pulse count value to register address 1376.
Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Pulse Count	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: Operating Time

This protocol writes the operating time to register address 1378.
Unit is h. Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Operating Time	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Holding Registers

This is a MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H)
	Number of Register	Specify the device that stores the data points to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. Store the value in the device within the range from 0001H to 007DH (1 to 125).
Normal response	Read Data	Specify the device that stores the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

This is a MODBUS standard function.

It writes a value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (0)	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H)
	Number of Register (1)	Specify the device that stores the data points to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 123, set 007BH. Store the value in the device within the range from 0001H to 007BH (1 to 123).
	Write Data	Rewrite the data length to the value of (2 × "Number of Register"). (For example, specify 246 for 123.) Specify the device for storing the data to be written. The number of words specified by "Number of Register" is used.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

13 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorPlus Series: EMU4-*M1-MB, EMU4-*A2-MB, EMU4-*X4-MB)

13.1 Setting Method

EMU4-*M1-MB, EMU4-*A2-MB, EMU4-*X4-MB

Communication with the EcoMonitorPlus series uses the MODBUS RTU communication function of the Mitsubishi Electric Energy Measuring Unit EcoMonitorPlus Series.

For steps to set the parameters, refer to the following.

- MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025)
- Energy Measuring Unit Energy Measuring Standard Model Energy Measuring Unit Energy Measuring High Performance Model User's Manual (Details) (IB63A15)
- Energy Measuring Unit Insulation Monitoring Model User's Manual (Details) (IB63A18)

Point

A MODBUS TCP-MODBUS RTU (RS-485) protocol converter is required to connect to EcoMonitorPlus. Wire the Ethernet side of the protocol converter to the RJ71EN71 and the RS-485 side to EcoMonitorPlus. For the protocol converter settings, refer to the instruction manual of the protocol converter to be used.

13.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*M1] Phase Wire System	Reads the value of the phase wire system.	Not to be added	Request
RD: [EMU4-*M1] Primary Voltage (L-L: Line)	Reads the value of the primary line voltage.	Not to be added	Request
RD: [EMU4-*M1] Primary Voltage (L-N: Phase)	Reads the value of the primary phase voltage.	Not to be added	Request
RD: [EMU4-*M1] Secondary Voltage	Reads the value of the secondary voltage.	Not to be added	Request
RD: [EMU4-*M1] Primary Current	Reads the value of the primary current.	Not to be added	Request
RD: [EMU4-*M1] 16 bits Monitor	Reads the value of the 16 bits monitor.	To be added	Fixed Intrvl
RD: [EMU4-*M1] 5A Input Change (Sensor Type)	Reads the value of 5A input switching (sensor type).	Not to be added	Request
RD: [EMU4-*M1] External Input Method	Reads the value of the external input method.	Not to be added	Request
RD: [EMU4-*M1] External Input Reset Method	Reads the value of the external input reset method.	Not to be added	Request
RD: [EMU4-*M1] 16 bits Monitor2	Reads the value of 16 bits monitor 2.	Not to be added	Request
RD: [EMU4-*M1] Counting Operating Time	Reads the value of the counting operating time.	Not to be added	Request
RD: [EMU4-*M1] Counting Operating Time 3side	Reads the value of the counting operating time (3 sides).	Not to be added	Request
RD: [EMU4-*M1] Measuring Method Op. Time 3side	Reads the value of the operating time measuring method (3 sides).	Not to be added	Request
RD: [EMU4-*M1] Convert Rate of Pulse	Reads the value of the pulse converted rate.	Not to be added	Request
RD: [EMU4-*M1] Energy Converted Rate	Reads the value of the electric energy converted rate.	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*M1] Energy Converted Rate 3side	Reads the value of the electric energy converted rate (3 sides).	Not to be added	Request
RD: [EMU4-*M1] 2 Circuit Measuring Setting	Reads the value of 2 circuit measuring setting.	Not to be added	Request
RD: [EMU4-*M1] Measuring Method of Op. Time	Reads the value of the operating time measuring method.	Not to be added	Request
RD: [EMU4-*M1] Multiplying Factors	Reads the values of all multiplying factors.	To be added	Request
RD: [EMU4-*M1] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-*M1] Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	To be added	Fixed Intrvl
RD: [EMU4-*M1] Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Power Factor	Reads the instantaneous value of the phase 3 power factor.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Power Factor	Reads the instantaneous value of the total power factor.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Frequency	Reads the instantaneous value of frequency.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Active Power	Reads the instantaneous value of the phase 3 power.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Active Power	Reads the instantaneous value of the total power.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Active Power Demand	Reads the instantaneous value of the phase 3 power demand.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Active Power Demand	Reads the instantaneous value of the total power demand.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Reactive Power	Reads the instantaneous value of the phase 3 reactive power.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Reactive Power	Reads the instantaneous value of the total reactive power.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Apparent Power	Reads the instantaneous value of the total apparent power.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Current Unbalance Rate	Reads the value of the current unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Voltage Unbalance Rate	Reads the value of the voltage unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] VT Use or No-use	Reads the value of VT.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy (import)	Reads the value of the electric energy (import).	To be added	Fixed Intrvl
RD: [EMU4-*M1] Energy (export)	Reads the value of the electric energy (export).	To be added	Fixed Intrvl
RD: [EMU4-*M1] Reactive Energy	Reads the value of the reactive energy (import LAG).	To be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended (import)	Reads the value of the electric energy extended (import).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended (export)	Reads the value of the electric energy extended (export).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Reactive Energy Extended (import)	Reads the value of the reactive energy extended (import LAG).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Periodic Energy (export)	Reads the value of the periodic electric energy (import).	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*M1] Pulse Count	Reads the pulse count value.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Operating Time	Reads the value of the operating time.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy 3side (export)	Reads the value of the electric energy (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended 3side (export)	Reads the value of the electric energy extended (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Operating Time 3side	Reads the value of the operating time (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Periodic Energy 3side	Reads the value of the periodic electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Conversion	Reads the value of electric energy conversion.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Conversion 3side	Reads the value of electric energy conversion (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Pulse Conversion	Reads the value of pulse conversion.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Phase Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Phase Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Line Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Line Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Current (Total)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Current (1st)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HPV (Total)	Reads the following instantaneous values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HPV (3rd)	Reads the following instantaneous values. • Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HLV (Total)	Reads the following instantaneous values. • THD V12 • THD V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HLV (3rd)	Reads the following instantaneous values. • Harmonics Ratio V12 • Harmonics Ratio V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HCC (Total)	Reads the following instantaneous values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*M1] Distortion of HCC (3rd)	Reads the following instantaneous values. • Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Not to be added	Fixed Intrvl
WR: [EMU4-*M1] Phase Wire System	Writes the value of the phase wire system.	Not to be added	Request
WR: [EMU4-*M1] Primary Voltage (L-L: Line)	Writes the value of the primary line voltage.	Not to be added	Request
WR: [EMU4-*M1] Primary Voltage (L-N: Phase)	Writes the value of the primary phase voltage.	Not to be added	Request
WR: [EMU4-*M1] Secondary Voltage	Writes the value of the secondary voltage.	Not to be added	Request
WR: [EMU4-*M1] Primary Current	Writes the value of the primary current.	Not to be added	Request
WR: [EMU4-*M1] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset register.	Not to be added	Request
WR: [EMU4-*M1] 5A Input Change (Sensor Type)	Writes the value of 5A input switching (sensor type).	Not to be added	Request
WR: [EMU4-*M1] External Input Method	Writes the value of the external input method.	Not to be added	Request
WR: [EMU4-*M1] External Input Reset Method	Writes the value of the external input reset method.	Not to be added	Request
WR: [EMU4-*M1] Counting Operating Time	Writes the value of the counting operating time.	Not to be added	Request
WR: [EMU4-*M1] Counting Operating Time 3side	Writes the value of the counting operating time (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Measuring Method Op. Time 3side	Writes the value of the operating time measuring method (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Convert Rate of Pulse	Writes the value of the pulse converted rate.	Not to be added	Request
WR: [EMU4-*M1] Energy Converted Rate	Writes the value of the electric energy converted rate.	Not to be added	Request
WR: [EMU4-*M1] Energy Converted Rate 3side	Writes the value of the electric energy converted rate (3 sides).	Not to be added	Request
WR: [EMU4-*M1] 2 Circuit Measuring Setting	Writes the value of 2 circuit measuring setting.	Not to be added	Request
WR: [EMU4-*M1] Measuring Method Op. Time	Writes the value of the operating time measuring method.	Not to be added	Request
WR: [EMU4-*M1] VT Use or No-use	Writes the value of VT.	Not to be added	Request
WR: [EMU4-*M1] Energy (import)	Writes the value of the electric energy (import).	Not to be added	Request
WR: [EMU4-*M1] Energy (export)	Writes the value of the electric energy (export).	Not to be added	Request
WR: [EMU4-*M1] Reactive Energy	Writes the value of the reactive energy (import LAG).	Not to be added	Request
WR: [EMU4-*M1] Periodic Energy (export)	Writes the value of the periodic electric energy (import).	Not to be added	Request
WR: [EMU4-*M1] Pulse Count	Writes the pulse count value.	Not to be added	Request
WR: [EMU4-*M1] Operating Time	Writes the value of the operating time.	Not to be added	Request
WR: [EMU4-*M1] Energy 3side (import)	Writes the value of the electric energy (import) (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Energy 3side (export)	Writes the value of the electric energy (export) (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Operating Time 3side	Writes the value of the operating time (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Periodic Energy 3side	Writes the value of the periodic electric energy (import) (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Energy Conversion	Writes the value of electric energy conversion.	Not to be added	Request
WR: [EMU4-*M1] Energy Conversion 3side	Writes the value of electric energy conversion (3 sides).	Not to be added	Request

Name	Description	Automatic Addition[*1]	Communication Timing (Default)
WR: [EMU4-*M1] Pulse Conversion	Writes the value of pulse conversion.	Not to be added	Request
RD: [EMU4-*A2] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-*A2] 16 bits Monitor	Reads the value of the 16 bits monitor.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Multiplying Factors	Reads the values of all multiplying factors.	Not to be added	Request
RD: [EMU4-*A2] Phase Wire System	Reads the value of the phase wire system.	Not to be added	Request
RD: [EMU4-*A2] Primary Voltage (L-L: Line)	Reads the value of the primary line voltage.	Not to be added	Request
RD: [EMU4-*A2] Primary Voltage (L-N: Phase)	Reads the value of the primary phase voltage.	Not to be added	Request
RD: [EMU4-*A2] Secondary Voltage	Reads the value of the secondary voltage.	Not to be added	Request
RD: [EMU4-*A2] 5A Input Change (Sensor Type)	Reads the value of 5A input switching (sensor type).	Not to be added	Request
RD: [EMU4-*A2] Primary Current	Reads the value of the primary current.	Not to be added	Request
RD: [EMU4-*A2] Energy Converted Rate	Reads the value of the electric energy converted rate.	Not to be added	Request
RD: [EMU4-*A2] Energy Converted Rate 3side	Reads the value of the electric energy converted rate (3 sides).	Not to be added	Request
RD: [EMU4-*A2] Measuring Method Op. Time	Reads the value of the counting operating time.	Not to be added	Request
RD: [EMU4-*A2] Measuring Method Op. Time 3side	Reads the value of the counting operating time (3 sides).	Not to be added	Request
RD: [EMU4-*A2] 16 bits Monitor2	Reads the value of 16 bits monitor 2.	Not to be added	Request
RD: [EMU4-*A2] VT Use or No-use	Reads the value of VT.	Not to be added	Request
RD: [EMU4-*A2] 2 Circuit Measuring Setting	Reads the value of 2 circuit measuring setting.	Not to be added	Request
RD: [EMU4-*A2] Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Phase N Current • Average Value Current	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Power Factor	Reads the instantaneous value of the phase 3 power factor.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Power Factor	Reads the instantaneous value of the total power factor.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Frequency	Reads the instantaneous value of frequency.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Active Power	Reads the instantaneous value of the phase 3 power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Active Power	Reads the instantaneous value of the total power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Active Power Demand	Reads the instantaneous value of the phase 3 power demand.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Active Power Demand	Reads the instantaneous value of the total power demand.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Reactive Power	Reads the instantaneous value of the phase 3 reactive power.	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*A2] Reactive Power	Reads the instantaneous value of the total power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Apparent Power	Reads the instantaneous value of the total apparent power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Current Unbalance Rate	Reads the value of the current unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Voltage Unbalance Rate	Reads the value of the voltage unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy (import)	Reads the value of the electric energy (import).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy (export)	Reads the value of the electric energy (export).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Reactive Energy	Reads the value of the reactive energy (import LAG).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended (import)	Reads the value of the electric energy extended (import).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended (export)	Reads the value of the electric energy extended (export).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Reactive Energy Extended (import)	Reads the value of the reactive energy extended (import LAG).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Operating Time	Reads the value of the operating time.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy 3side (export)	Reads the value of the electric energy (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended 3side (export)	Reads the value of the electric energy extended (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Operating Time 3side	Reads the value of the operating time (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Conversion	Reads the value of electric energy conversion.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Conversion 3side	Reads the value of electric energy conversion (3 sides).	Not to be added	Fixed Intrvl
WR: [EMU4-*A2] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset.	Not to be added	Request
WR: [EMU4-*A2] Phase Wire System	Writes the value of the phase wire system.	Not to be added	Request
WR: [EMU4-*A2] Primary Voltage (L-L: Line)	Writes the value of the primary line voltage.	Not to be added	Request
WR: [EMU4-*A2] Primary Voltage (L-N: Phase)	Writes the value of the primary phase voltage.	Not to be added	Request
WR: [EMU4-*A2] Secondary Voltage	Writes the value of the secondary voltage.	Not to be added	Request
WR: [EMU4-*A2] 5A Input Change (Sensor Type)	Writes the value of 5A input switching (sensor type).	Not to be added	Request
WR: [EMU4-*A2] Primary Current	Writes the value of the primary current.	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion	Writes the value of electric energy conversion.	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion 3side	Writes the value of electric energy conversion (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Measuring Method Op. Time	Writes the value of the counting operating time.	Not to be added	Request
WR: [EMU4-*A2] Measuring Method Op. Time 3side	Writes the value of the counting operating time (3 sides).	Not to be added	Request
WR: [EMU4-*A2] VT Use or No-use	Writes the value of VT.	Not to be added	Request
WR: [EMU4-*A2] 2 Circuit Measuring Setting	Writes the value of 2 circuit measuring setting.	Not to be added	Request
WR: [EMU4-*A2] Energy (import)	Writes the value of the electric energy (import).	Not to be added	Request
WR: [EMU4-*A2] Energy (export)	Writes the value of the electric energy (export).	Not to be added	Request
WR: [EMU4-*A2] Reactive Energy	Writes the value of the reactive energy (import LAG).	Not to be added	Request
WR: [EMU4-*A2] Operating Time	Writes the value of the operating time.	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: [EMU4-*A2] Energy 3side (import)	Writes the value of the electric energy (import) (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Energy 3side (export)	Writes the value of the electric energy (export) (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Operating Time 3side	Writes the value of the operating time (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion	Writes the value of electric energy conversion.	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion 3side	Writes the value of electric energy conversion (3 sides).	Not to be added	Request
RD: [EMU4-AX4] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-AX4] 16 bits Monitor	Reads the value of the 16 bits monitor.	Not to be added	Request
RD: [EMU4-AX4] Measuring Interval	Reads the value of the conversion speed setting.	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/ Disable Setting (CH1)	Reads the value of the A/D conversion enable/disable setting (CH1).	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/ Disable Setting (CH2)	Reads the value of the A/D conversion enable/disable setting (CH2).	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/ Disable Setting (CH3)	Reads the value of the A/D conversion enable/disable setting (CH3).	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/ Disable Setting (CH4)	Reads the value of the A/D conversion enable/disable setting (CH4).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH1)	Reads the value of the input range setting (CH1).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH2)	Reads the value of the input range setting (CH2).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH3)	Reads the value of the input range setting (CH3).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH4)	Reads the value of the input range setting (CH4).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH1)	Reads the scaling lower limit value (CH1).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH2)	Reads the scaling lower limit value (CH2).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH3)	Reads the scaling lower limit value (CH3).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH4)	Reads the scaling lower limit value (CH4).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH1)	Reads the scaling upper limit value (CH1).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH2)	Reads the scaling upper limit value (CH2).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH3)	Reads the scaling upper limit value (CH3).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH4)	Reads the scaling upper limit value (CH4).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH1)	Reads the value of the A/D conversion moving average (CH1).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH2)	Reads the value of the A/D conversion moving average (CH2).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH3)	Reads the value of the A/D conversion moving average (CH3).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH4)	Reads the value of the A/D conversion moving average (CH4).	Not to be added	Request
RD: [EMU4-AX4] Analog Value (CH1)	Reads the AD conversion value (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Analog Value (CH2)	Reads the AD conversion value (CH2).	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-AX4] Analog Value (CH3)	Reads the AD conversion value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Analog Value (CH4)	Reads the AD conversion value (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH1)	Reads the scaling value (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH2)	Reads the scaling value (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH3)	Reads the scaling value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH4)	Reads the scaling value (CH4).	Not to be added	Fixed Intrvl
WR: [EMU4-AX4] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset.	Not to be added	Request
WR: [EMU4-AX4] Measuring Interval	Writes the value of the conversion speed setting.	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/ Disable Setting (CH1)	Writes the value of the A/D conversion enable/disable setting (CH1).	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/ Disable Setting (CH2)	Writes the value of the A/D conversion enable/disable setting (CH2).	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/ Disable Setting (CH3)	Writes the value of the A/D conversion enable/disable setting (CH3).	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/ Disable Setting (CH4)	Writes the value of the A/D conversion enable/disable setting (CH4).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH1)	Writes the value of the input range setting (CH1).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH2)	Writes the value of the input range setting (CH2).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH3)	Writes the value of the input range setting (CH3).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH4)	Writes the value of the input range setting (CH4).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH1)	Writes the value of scaling lower limit value (CH1).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH2)	Writes the value of scaling lower limit value (CH2).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH3)	Writes the value of scaling lower limit value (CH3).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH4)	Writes the value of scaling lower limit value (CH4).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH1)	Writes the scaling upper limit value (CH1).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH2)	Writes the scaling upper limit value (CH2).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH3)	Writes the scaling upper limit value (CH3).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH4)	Writes the scaling upper limit value (CH4).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH1)	Writes the value of the A/D conversion moving average (CH1).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH2)	Writes the value of the A/D conversion moving average (CH2).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH3)	Writes the value of the A/D conversion moving average (CH3).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH4)	Writes the value of the A/D conversion moving average (CH4).	Not to be added	Request
RD: [EMU4-PX4] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-PX4] 16 bits Monitor	Reads the value of the 16 bits monitor.	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-PX4] Convert Rate of Pulse (CH1)	Reads the value of the pulse converted rate (CH1).	Not to be added	Request
RD: [EMU4-PX4] Convert Rate of Pulse (CH2)	Reads the value of the pulse converted rate (CH2).	Not to be added	Request
RD: [EMU4-PX4] Convert Rate of Pulse (CH3)	Reads the value of the pulse converted rate (CH3).	Not to be added	Request
RD: [EMU4-PX4] Convert Rate of Pulse (CH4)	Reads the value of the pulse converted rate (CH4).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH1)	Reads the value of the counting operating time (CH1).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH2)	Reads the value of the counting operating time (CH2).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH3)	Reads the value of the counting operating time (CH3).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH4)	Reads the value of the counting operating time (CH4).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH1)	Reads the value of the external input method (CH1).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH2)	Reads the value of the external input method (CH2).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH3)	Reads the value of the external input method (CH3).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH4)	Reads the value of the external input method (CH4).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH1)	Reads the value of the external input reset method (CH1).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH2)	Reads the value of the external input reset method (CH2).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH3)	Reads the value of the external input reset method (CH3).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH4)	Reads the value of the external input reset method (CH4).	Not to be added	Request
RD: [EMU4-PX4] Contact Input State (CH1)	Reads the value of the contact input state (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Contact Input State (CH2)	Reads the value of the contact input state (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Contact Input State (CH3)	Reads the value of the contact input state (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Contact Input State (CH4)	Reads the value of the contact input state (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH1)	Reads the pulse count value (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH2)	Reads the pulse count value (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH3)	Reads the pulse count value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH4)	Reads the pulse count value (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH1)	Reads the value of the operating time (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH2)	Reads the value of the operating time (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH3)	Reads the value of the operating time (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH4)	Reads the value of the operating time (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Conversion (CH1)	Reads the pulse conversion value (CH1).	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-PX4] Pulse Conversion (CH2)	Reads the pulse conversion value (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Conversion (CH3)	Reads the pulse conversion value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Conversion (CH4)	Reads the pulse conversion value (CH4).	Not to be added	Fixed Intrvl
WR: [EMU4-PX4] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset.	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH1)	Writes the value of the pulse converted rate (CH1).	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH2)	Writes the value of the pulse converted rate (CH2).	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH3)	Writes the value of the pulse converted rate (CH3).	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH4)	Writes the value of the pulse converted rate (CH4).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH1)	Writes the value of the counting operating time (CH1).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH2)	Writes the value of the counting operating time (CH2).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH3)	Writes the value of the counting operating time (CH3).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH4)	Writes the value of the counting operating time (CH4).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH1)	Writes the value of the external input method (CH1).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH2)	Writes the value of the external input method (CH2).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH3)	Writes the value of the external input method (CH3).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH4)	Writes the value of the external input method (CH4).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH1)	Writes the value of the external input reset method (CH1).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH2)	Writes the value of the external input reset method (CH2).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH3)	Writes the value of the external input reset method (CH3).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH4)	Writes the value of the external input reset method (CH4).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH1)	Writes the pulse count value (CH1).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH2)	Writes the pulse count value (CH2).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH3)	Writes the pulse count value (CH3).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH4)	Writes the pulse count value (CH4).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH1)	Writes the value of the operating time (CH1).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH2)	Writes the value of the operating time (CH2).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH3)	Writes the value of the operating time (CH3).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH4)	Writes the value of the operating time (CH4).	Not to be added	Request
WR: [EMU4-PX4] Pulse Conversion (CH1)	Writes the pulse conversion value (CH1).	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: [EMU4-PX4] Pulse Conversion (CH2)	Writes the pulse conversion value (CH2).	Not to be added	Request
WR: [EMU4-PX4] Pulse Conversion (CH3)	Writes the pulse conversion value (CH3).	Not to be added	Request
WR: [EMU4-PX4] Pulse Conversion (CH4)	Writes the pulse conversion value (CH4).	Not to be added	Request
RD: Holding Registers*2	Reads the value stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers*2	Writes the value into the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

13.3 Details of Applicable Protocols

RD: [EMU4-*M1] Phase Wire System

This protocol reads the setting value of the phase wire system stored in register address 512.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Phase Wire System*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Phase Wire System	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Primary Voltage (L-L: Line)

This protocol reads the setting value of the primary line voltage stored in register address 513.
Unit is V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Primary Line Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Primary Voltage (L-N: Phase)

This protocol reads the setting value of the primary phase voltage stored in register address 515.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Primary Phase Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Secondary Voltage

This protocol reads the secondary voltage stored in register address 517.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Primary Current

This protocol reads the primary current stored in register address 519.
Unit is ×0.1A.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Primary Current	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] 16 bits Monitor

This protocol reads the setting value of the 16 bits monitor stored in register address 524.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	16 bits Monitor*1*2	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm	Alarm occurring	No alarm
4	Contact input	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Current unbalance rate upper limit alarm	Alarm occurring	No alarm
7	Voltage unbalance rate upper limit alarm	Alarm occurring	No alarm
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] 5A Input Change (Sensor Type)

This protocol reads the setting value of 5A input switching (sensor type) stored in register address 531.

The sensor type setting data is read as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	5A Input Change	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] External Input Method

This protocol reads the setting value of the external input method stored in register address 587.

The setting data of the external input method is read as follows.

- 0: Not set
- 1: Pulse input
- 2: Contact input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	External Input Method	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model.

RD: [EMU4-*M1] External Input Reset Method

This protocol reads the setting value of the external input reset method stored in register address 588.

The data of the external input reset method is read as follows.

- 1: Auto reset
- 2: Latch

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	External Input Reset Method	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model.

RD: [EMU4-*M1] 16 bits Monitor2

This protocol reads the setting value of 16 bits monitor 2 stored in register address 594.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	16 bits Monitor2*1*2	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
4	Not used	—	—
5	Upper and lower limit alarm (batch) (3 sides at 1P2W)	Alarm occurring	No alarm
6	Not used	—	—
7	Not used	—	—
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Counting Operating Time

This protocol reads the setting value of the counting operating time stored in register address 699.

The data of the counting operating time is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Counting Operating Time	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [MEU4-*M1] Counting Operating Time 3side

This protocol reads the setting value of the counting operating time (3 sides) stored in register address 732.
The data of the counting operating time (3 sides) is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Counting Operating Time (3side)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Measuring Method Op. Time 3side

This protocol reads the setting value of the operating time measuring method (3 sides) stored in register address 733.
The data of the operating time measuring method (3 sides) is read as follows.

- 1: Current
- 2: Contact

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Measuring Method of Operating Time (3side)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Convert Rate of Pulse

This protocol reads the pulse converted rate stored in register address 738.
Unit is ×0.001.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Convert Rate of Pulse	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model.

RD: [EMU4-*M1] Energy Converted Rate

This protocol reads the electric energy converted rate stored in register address 741.
Unit is ×0.001.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Converted Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model.

RD: [EMU4-*M1] Energy Converted Rate 3side

This protocol reads the electric energy converted rate (3 sides) stored in register address 747.
Unit is ×0.001.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Converted Rate (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] 2 Circuit Measuring Setting

This protocol reads the setting value of 2 circuit measuring setting stored in register address 749.
The data of the 2 circuit measuring setting is read as follows.

- 0: Disable
- 1: Enable

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	2 Circuit Measuring Setting	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Measuring Method of Op. Time

This protocol reads the setting value of the operating time measuring method stored in register address 753.
The data of the operating time measuring method is read as follows.

- 1: Current
- 2: Contact

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Measuring Method of Operating Time	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Multiplying Factors

This protocol reads the current, voltage, power, electric energy, power factor, frequency, harmonics current content rate, harmonics voltage content rate, and the multiplying factor of the electric energy (extended) stored in register addresses 754 to 762.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Current • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • Content Rate of Harmonic Voltage • Detail Electric Energy	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- The EMU4-BM1-MB stores 0 as the multiplying factor for the harmonics current content rate and harmonics voltage content rate. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model code	Data
EMU4-BM1-MB	0003H
EMU4-HM1-MB	0004H

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Phase Current

This protocol reads the instantaneous value of current for phases 1, 2, 3, and N, as well as the value of average current, stored in register addresses 768 to 772.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

If read value = 123456 and multiplying factor = -3

Current value: $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Phase Current Demand

This protocol reads the instantaneous value of current demand for phases 1, 2, 3, and N stored in register addresses 773 to 776.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Line Voltage

This protocol reads the instantaneous value of voltage for phases 1-2, 2-3, and 3-1, as well as the instantaneous value of average voltage (L-L), stored in register addresses 778 to 781.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Phase Voltage

This protocol reads the instantaneous value of voltage for phases 1-N, 2-N, and 3-N stored in register addresses 782 to 784.
Unit is V.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Voltage V1N • Voltage V2N • Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Phase 3 Power Factor

This protocol reads the instantaneous value of the phase 3 power factor stored in register address 788.
Unit is ×0.1%.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power factor multiplying factor data (register address: 758).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Phase 3 Power Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Power Factor

This protocol reads the instantaneous value of the total power factor stored in register address 789.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power factor multiplying factor data (register address: 758).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	ΣPower Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*M1] Frequency

This protocol reads the instantaneous value of frequency stored in register address 790.

Unit is ×0.1Hz.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data of frequency (register address: 759).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Phase 3 Active Power

This protocol reads the instantaneous value of phase 3 power stored in register address 793.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Phase 3 Active Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Active Power

This protocol reads the instantaneous value of total power stored in register address 794.
Unit is kW.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	ΣActive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*M1] Phase 3 Active Power Demand

This protocol reads the instantaneous value of phase 3 power demand stored in register address 797.
Unit is kW.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Phase 3 Active Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Active Power Demand

This protocol reads the instantaneous value of the total power demand stored in register address 798.
Unit is kW.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	ΣActive Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*M1] Phase 3 Reactive Power

This protocol reads the instantaneous value of the phase 3 reactive power stored in register address 801.
Unit is kvar.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Phase 3 Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Reactive Power

This protocol reads the instantaneous value of the total reactive power stored in register address 802.
Unit is kvar.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	ΣReactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*M1] Apparent Power

This protocol reads the instantaneous value of the total apparent power stored in register address 806.
Unit is kVA.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	ΣApparent Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Current Unbalance Rate

This protocol reads the current unbalance rate stored in register address 925.
Unit is ×0.01%.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Current Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Voltage Unbalance Rate

This protocol reads the voltage unbalance rate stored in register address 927.
Unit is ×0.01%.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Voltage Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] VT Use or No-use

This protocol reads the setting value of VT stored in register address 1062.
The data of VT is read as follows.

- 0: VT not used
- 1: VT used

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	VT Use or No-use	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Energy (import)

This protocol reads the electric energy (import) stored in register address 1304.
Unit is kWh.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Energy (export)

This protocol reads the electric energy (export) stored in register address 1306.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Reactive Energy

This protocol reads the reactive energy (import LAG) stored in register address 1308.

Unit is kvarh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Reactive Energy	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Energy Extended (import)

This protocol reads the electric energy extended (import) stored in register address 1316.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Energy Extended (export)

This protocol reads the electric energy extended (export) stored in register address 1318.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Reactive Energy Extended (import)

This protocol reads the reactive energy extended (import LAG) stored in register address 1320.

Unit is kvarh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Reactive Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Periodic Energy (export)

This protocol reads the periodic electric energy (import) stored in register address 1374.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Periodic Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Pulse Count

This protocol reads the pulse count value stored in register address 1376.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Pulse Count	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Operating Time

This protocol reads the operating time stored in register address 1378.

Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Operating Time	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Energy 3side (import)

This protocol reads the electric energy (import) (3 sides) stored in register address 1460.

Unit is kWh.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Energy 3side (export)

This protocol reads the electric energy (export) (3 sides) stored in register address 1462.
Unit is kWh.
The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Energy Extended 3side (import)

This protocol reads the electric energy extended (import) (3 sides) stored in register address 1464.
Unit is kWh.
The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Extended (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Energy Extended 3side (export)

This protocol reads the electric energy extended (export) (3 sides) stored in register address 1466.
Unit is kWh.
The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Extended (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Operating Time 3side

This protocol reads the operating time (3 sides) stored in register address 1470.
Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Operating Time (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Periodic Energy 3side

This protocol reads the periodic electric energy (import) (3 sides) stored in register address 1474.

Unit is kWh.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the electric energy multiplying factor data (register address: 757).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Periodic Electric Energy (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Energy Conversion

This protocol reads electric energy conversion stored in register address 1476.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Conversion	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Energy Conversion 3side

This protocol reads electric energy conversion (3 sides) stored in register address 1480.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Conversion (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Pulse Conversion

This protocol reads the pulse conversion value stored in register address 1482.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Pulse Conversion	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Harmonics Phase Voltage (Total)

This protocol reads the instantaneous RMS value of total harmonics voltage for phases 1-N, 2-N, and 3-N stored in register addresses 1792 to 1794.

Unit is V.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Harmonics Phase Voltage (1st)

This protocol reads the instantaneous RMS value of fundamental harmonics voltage for phases 1-N, 2-N, and 3-N stored in register addresses 1795 to 1797.

Unit is V.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (1795)	The default value is set to read the fundamental harmonics phase voltage value.*2
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
3rd	0706H
5th	0709H
7th	070CH
9th	070FH
11th	0712H
13th	0715H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Harmonics Line Voltage (Total)

This protocol reads the instantaneous RMS value of total harmonics voltage for phases 1-2 and 2-3 stored in register addresses 2048 to 2049.

Unit is V.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Harmonics Line Voltage (1st)

This protocol reads the instantaneous RMS value of fundamental harmonics voltage for phases 1-2 and 2-3 stored in register addresses 2051 to 2052.

Unit is V.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2051)	The default value is set to read the fundamental harmonics line voltage.*2
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
3rd	0806H
5th	0809H
7th	080CH
9th	080FH
11th	0812H
13th	0815H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Harmonics Current (Total)

This protocol reads the instantaneous RMS value of total harmonics current for phases 1, 2, 3, and N stored in register addresses 2304 to 2307.

Unit is A.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Harmonics Current (1st)

This protocol reads the instantaneous RMS value of fundamental harmonics current for phases 1, 2, 3, and N stored in register addresses 2308 to 2311.

Unit is A.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2308)	The default value is set to read the fundamental harmonics current value.*2
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
3rd	0908H
5th	090CH
7th	0910H
9th	0914H
11th	0918H
13th	091CH

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Distortion of HPV (Total)

This protocol reads the instantaneous RMS value of total harmonics voltage distortion for phases 1-N, 2-N, and 3-N stored in register addresses 2560 to 2562.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• THD V1N • THD V2N • THD V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Distortion of HPV (3rd)

This protocol reads the instantaneous RMS value of 3rd harmonics voltage ratio for phases 1-N, 2-N, and 3-N stored in register addresses 2563 to 2565.

Unit is ×0.1%.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2563)	The default value is set to read the 3rd order harmonics ratio.*2
Normal response	• Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
5th	0A06H
7th	0A09H
9th	0A0CH
11th	0A0FH
13th	0A12H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Distortion of HLV (Total)

This protocol reads the instantaneous RMS value of total harmonics voltage distortion for phases 1-2 and 2-3 stored in register addresses 2816 to 2817.

Unit is ×0.1%.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• THD V12 • THD V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Distortion of HLV (3rd)

This protocol reads the value of 3rd harmonics voltage ratio for phases 1-2 and 2-3 stored in register addresses 2819 to 2820.

Unit is ×0.1%.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2819)	The default value is set to read the 3rd order harmonics line voltage ratio.*2
Normal response	• Harmonics Ratio V12 • Harmonics Ratio V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
5th	0B06H
7th	0B09H
9th	0B0CH
11th	0B0FH
13th	0B12H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Distortion of HCC (Total)

This protocol reads the instantaneous RMS value of total harmonics current distortion for phases 1, 2, 3, and N stored in register addresses 3072 to 3075.

Unit is ×0.1%.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics current content rate (register address: 760).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• THD I1 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*M1] Distortion of HCC (3rd)

This protocol reads the instantaneous RMS value of 3rd harmonics current ratio for phases 1, 2, 3, and N stored in register addresses 3076 to 3079.

Unit is ×0.1%.

The measured value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the multiplying factor data for the harmonics current content rate (register address: 760).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (3076)	The default value is set to read the 3rd order harmonics current ratio.*2
Normal response	• Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
5th	0C08H
7th	0C0CH
9th	0C10H
11th	0C14H
13th	0C18H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Phase Wire System

This protocol writes the setting value of the phase wire system to register address 512.
The value is set within the range from 1 to 4.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Phase Wire System*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Set the following data.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

- Do not change values other than setting data.
- 3P4W is only compatible with the EMU4-HM1-MB.

WR: [EMU4-*M1] Primary Voltage (L-L: Line)

This protocol writes the setting value of the primary line voltage to register address 513.
Unit is V. The value is set within the range from 1 to 110000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Primary Line Voltage	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Primary Voltage (L-N: Phase)

This protocol writes the setting value of the primary phase voltage to register address 515.
Unit is ×0.1V. The value is set within the range from 10 to 635000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Primary Phase Voltage	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Secondary Voltage

This protocol writes the setting value of the secondary voltage to register address 517.
Unit is ×0.1V. The value is set within the range from 10 to 2200.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Secondary Voltage	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Primary Current

This protocol writes the setting value of the primary current to register address 519.
Unit is ×0.1A. The value is set within the range from 50 to 300000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Primary Current	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] 16 bits Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset to register address 523.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	16 bits Set/Reset Register*1*2	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Set the following data.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Reset of alarm occurrence count	Reset	Do not reset
4	Not used	—	—
5	Not used	—	—
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Reset of electric energy data	Reset	Do not reset
15	Not used	—	—

*2 Some bits are not used depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] 5A Input Change (Sensor Type)

This protocol writes the setting value of 5A input switching (sensor type) to register address 531.

Specify the sensor type setting data as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	5A Input Change	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] External Input Method

This protocol writes the setting value of the external input method to register address 587.

Specify the setting data of the external input method as follows.

- 0: Not set
- 1: Pulse input
- 2: Contact input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	External Input Method	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] External Input Reset Method

This protocol writes the setting value of the external input reset method to register address 588.

Specify the setting data of the external input reset method as follows.

- 1: Auto reset
- 2: Latch

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	External Input Reset Method	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Counting Operating Time

This protocol writes the setting value of the counting operating time to register address 699.
Specify the setting data of the counting operating time as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Counting Operating Time	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Counting Operating Time 3side

This protocol writes the setting value of the counting operating time (3 sides) to register address 732.
Specify the setting data of the counting operating time (3 sides) as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Counting Operating Time (3side)	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Measuring Method Op. Time 3side

This protocol writes the setting value of the operating time measuring method (3 sides) to register address 733.
Specify the setting data of the operating time measuring method (3 sides) as follows.

- 1: Current
- 2: Contact

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Measuring Method of Operating Time (3side)	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Convert Rate of Pulse

This protocol writes the setting value of the pulse converted rate to register address 738.
Unit is ×0.001. The value is set within the range from 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Convert Rate of Pulse	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Energy Converted Rate

This protocol writes the setting value of the electric energy converted rate to register address 741.
Unit is ×0.001. The value is set within the range from 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Electric Energy Converted Rate	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Energy Converted Rate 3side

This protocol writes the setting value of the electric energy converted rate (3 sides) to register address 747.
Unit is ×0.001. The value is set within the range from 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Electric Energy Converted Rate (3side)	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] 2 Circuit Measuring Setting

This protocol writes the setting value of 2 circuit measuring setting to register address 749.
Specify the setting data of 2 circuit measuring setting as follows.

- 0: Disable
- 1: Enable

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	2 Circuit Measuring Setting	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Measuring Method Op. Time

This protocol writes the setting value of the operating time measuring method to register address 753.
Specify the setting data of the operating time measuring method as follows.

- 1: Current
- 2: Contact

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Measuring Method of Operating Time	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] VT Use or No-use

This protocol writes the setting value of VT to register address 1062.
Specify the setting data of VT as follows.

- 0: VT not used
- 1: VT used

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	VT Use or No-use	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Energy (import)

This protocol writes the electric energy (import) to register address 1304.
Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (import) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Integrated Electric Energy (import)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Energy (export)

This protocol writes the electric energy (export) to register address 1306.
Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (export) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Integrated Electric Energy (export)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Reactive Energy

This protocol writes the reactive energy (import LAG) to register address 1308.
Unit is kvarh. Use a value in the range of 0 to 999999. When the reactive energy (import LAG) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Reactive Energy	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kvarh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Periodic Energy (export)

This protocol writes the periodic electric energy (import) to register address 1374.
Unit is kWh. Use a value in the range of 0 to 999999. When the setting value of the periodic electric energy (import) is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Periodic Electric Energy (export)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Pulse Count

This protocol writes the pulse count value to register address 1376.
The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Pulse Count	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Operating Time

This protocol writes the operating time to register address 1378.
Unit is h. The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Operating Time	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Energy 3side (import)

This protocol writes the electric energy (import) (3 sides) to register address 1460.
Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (import) (3 sides) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Integrated Electric Energy (3side) (import)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Energy 3side (export)

This protocol writes the electric energy (export) (3 sides) to register address 1462.
Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (export) (3 sides) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Integrated Electric Energy (3side) (export)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Operating Time 3side

This protocol writes the operating time (3 sides) to register address 1470.
Unit is h. The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Operating Time (3side)	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Periodic Energy 3side

This protocol writes the periodic electric energy (import) (3 sides) to register address 1474.
Unit is kWh. The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Periodic Electric Energy (3side)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 757).

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Energy Conversion

This protocol writes electric energy conversion to register address 1476.
The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Electric Energy Conversion	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Energy Conversion 3side

This protocol writes electric energy conversion (3 sides) to register address 1480.
The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Electric Energy Conversion (3side)	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model and phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*M1] Pulse Conversion

This protocol writes the pulse conversion value to register address 1482.
The value is set within the range from 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Pulse Conversion	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Model Code

This protocol reads the model code for circuit ID = 2 stored in register address 32768.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8000H + N × 700H (N = Circuit ID-2).
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model code	Setting value
EMU4-A2	0005H
EMU4-VA2	0006H

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] 16 bits Monitor

This protocol reads the 16 bits monitor for circuit ID = 2 stored in register address 32770.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8002H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor*1*2	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm	Alarm occurring	No alarm
4	Contact input	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Current unbalance rate upper limit alarm	Alarm occurring	No alarm
7	Voltage unbalance rate upper limit alarm	Alarm occurring	No alarm
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Multiplying Factors

This protocol reads the current, voltage, power, electric energy, power factor, frequency, harmonics current content rate, harmonics voltage content rate, and multiplying factor of electric energy extended for circuit ID = 2 stored in register addresses 32771 to 32779.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8003H + N ×700H (N = Circuit ID-2).
Normal response	• Current • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • Content Rate of Harmonic Voltage • Electric Energy (Extended)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Phase Wire System

This protocol reads the phase wire system for circuit ID = 2 stored in register address 32780.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 800CH + N × 700H (N = Circuit ID-2).
Normal response	Phase Wire System*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Primary Voltage (L-L: Line)

This protocol reads the primary line voltage for circuit ID = 2 stored in register address 32781.
Unit is V.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 800DH + N × 700H (N = Circuit ID-2).
Normal response	Primary Line Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Primary Voltage (L-N: Phase)

This protocol reads the primary phase voltage for circuit ID = 2 stored in register address 32783.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 800FH + N × 700H (N = Circuit ID-2).
Normal response	Primary Phase Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Secondary Voltage

This protocol reads the secondary voltage for circuit ID = 2 stored in register address 32785.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8011H + N × 700H (N = Circuit ID-2).
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] 5A Input Change (Sensor Type)

This protocol reads 5A input switching (sensor type) for circuit ID = 2 stored in register address 32787.
The setting value data of 5A input switching (sensor type) is read as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8013H + N × 700H (N = Circuit ID-2).
Normal response	5A Input Change	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Primary Current

This protocol reads the primary current for circuit ID = 2 stored in register address 32790.
Unit is ×0.1A.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 8016H + N × 700H (N = Circuit ID-2).
Normal response	Primary Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Converted Rate

This protocol reads the electric energy converted rate for circuit ID = 2 stored in register address 32814.
Unit is ×0.001.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 802EH + N × 700H (N = Circuit ID-2).
Normal response	Electric Energy Converted Rate	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Converted Rate 3side

This protocol reads the electric energy converted rate (3 sides) for circuit ID = 2 stored in register address 32820.
Unit is ×0.001.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 8034H + N × 700H (N = Circuit ID-2).
Normal response	Electric Energy Converted Rate (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Measuring Method Op. Time

This protocol reads the counting operating time for circuit ID = 2 stored in register address 32822.

The setting value data of the counting operating time is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8036H + N × 700H (N = Circuit ID-2).
Normal response	Measuring Method of Operating Time	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Measuring Method Op. Time 3side

This protocol reads the counting operating time (3 sides) for circuit ID = 2 stored in register address 32826.

The setting value data of the counting operating time (3 sides) is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 803AH + N × 700H (N = Circuit ID-2).
Normal response	Measuring Method of Operating Time (3side)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] 16 bits Monitor2

This protocol reads the 16 bits monitor 2 for circuit ID = 2 stored in register address 32854.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8056H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor2*1*2	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
4	Not used	—	—
5	Upper and lower limit alarm (batch) (3 sides at 1P2W)	Alarm occurring	No alarm
6	Not used	—	—
7	Not used	—	—
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] VT Use or No-use

This protocol reads VT for circuit ID = 2 stored in register address 32855.

The setting value of VT is read as follows.

- 0: VT not used
- 1: VT used

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8057H + N × 700H (N = Circuit ID-2).
Normal response	VT Use or No-use	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] 2 Circuit Measuring Setting

This protocol reads 2 circuit measuring setting for circuit ID = 2 stored in register address 32856.

The setting value of 2 circuit measuring setting is read as follows.

- 0: Disable
- 1: Enable

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8058H + N × 700H (N = Circuit ID-2).
Normal response	2 Circuit Measuring Setting	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Phase Current

This protocol reads the instantaneous value of current for phases 1, 2, 3, and N of circuit ID = 2, as well as the instantaneous value of average current of circuit ID = 2, stored in register addresses 33024 to 33028.
Unit is A.
The measured value can be obtained by multiplying the read data by 10^n.
n is the current multiplying factor data (for circuit ID = 2, register address: 32771).

Ex.
If the read value = 123456 and multiplying factor = -3
Current value: $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 8100H + N × 700H (N = Circuit ID-2).
Normal response	• Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system, and 0 is stored in the unused data. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Phase Current Demand

This protocol reads the instantaneous value of current demand for phases 1, 2, 3, and N of circuit ID = 2 stored in register addresses 33029 to 33032.
Unit is A.
The measured value can be obtained by multiplying the read data by 10^n.
n is the current multiplying factor data (for circuit ID = 2, register address: 32771).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8105H + N × 700H (N = Circuit ID-2).
Normal response	• Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system, and 0 is stored in the unused data. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Line Voltage

This protocol reads the instantaneous value of voltage for phases 1-2, 2-3, and 3-1 of circuit ID = 2, as well as the instantaneous value of average voltage (L-L) of circuit ID = 2, stored in register addresses 33034 to 33037.
Unit is V.
The measured value can be obtained by multiplying the read data by 10^n.
n is the voltage multiplying factor data (for circuit ID = 2, register address: 32772).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 810AH + N × 700H (N = Circuit ID-2).
Normal response	• Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system, and 0 is stored in the unused data. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Phase Voltage

This protocol reads the instantaneous value of voltage for phases 1-N, 2-N, and 3-N of circuit ID = 2 stored in register addresses 33038 to 33040.
Unit is V.
The measured value can be obtained by multiplying the read data by 10^n.
n is the voltage multiplying factor data (for circuit ID = 2, register address: 32772).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 810EH + N × 700H (N = Circuit ID-2).
Normal response	• Voltage V1N • Voltage V2N • Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Phase 3 Power Factor

This protocol reads the instantaneous value of the phase 3 power factor for circuit ID = 2 stored in register address 33044.
Unit is ×0.1%.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power factor (for circuit ID = 2, register address: 32775).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8114H + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Power Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Power Factor

This protocol reads the instantaneous value of the total power factor for circuit ID = 2 stored in register address 33045.
Unit is ×0.1%.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power factor (for circuit ID = 2, register address: 32775).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8115H + N × 700H (N = Circuit ID-2).
Normal response	ΣPower Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Frequency

This protocol reads the instantaneous value of frequency for circuit ID = 2 stored in register address 33046.
Unit is ×0.1Hz.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of frequency (for circuit ID = 2, register address: 32776).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8116H + N × 700H (N = Circuit ID-2).
Normal response	Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Phase 3 Active Power

This protocol reads the instantaneous value of phase 3 power for circuit ID = 2 stored in register address 33049.
Unit is kW.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8119H + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Active Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Active Power

This protocol reads the instantaneous value of total power stored in register address 33050.
Unit is kW.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 811AH + N × 700H (N = Circuit ID-2).
Normal response	ΣActive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Phase 3 Active Power Demand

This protocol reads the instantaneous value of phase 3 power demand for circuit ID = 2 stored in register address 33053.
Unit is kW.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 811DH + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Active Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Active Power Demand

This protocol reads the instantaneous value of the total power demand for circuit ID = 2 stored in register address 33054.
Unit is kW.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 811EH + N × 700H (N = Circuit ID-2).
Normal response	ΣActive Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*A2] Phase 3 Reactive Power

This protocol reads the instantaneous value of the phase 3 reactive power for circuit ID = 2 stored in register address 33057.
Unit is kvar.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8121H + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Reactive Power

This protocol reads the instantaneous value of the total reactive power for circuit ID = 2 stored in register address 33058.
Unit is kvar.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8122H + N × 700H (N = Circuit ID-2).
Normal response	ΣReactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*A2] Apparent Power

This protocol reads the instantaneous value of the total apparent power for circuit ID = 2 stored in register address 33062.
Unit is kVA.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8126H + N × 700H (N = Circuit ID-2).
Normal response	ΣReactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Current Unbalance Rate

This protocol reads the current unbalance rate for circuit ID = 2 stored in register address 33144.
Unit is ×0.01%.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8178H + N × 700H (N = Circuit ID-2).
Normal response	Current Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Voltage Unbalance Rate

This protocol reads the voltage unbalance rate for circuit ID = 2 stored in register address 33146.
Unit is ×0.01%.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 817AH + N × 700H (N = Circuit ID-2).
Normal response	Voltage Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Energy (import)

This protocol reads the electric energy (import) for circuit ID = 2 stored in register address 33304.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8218H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy (export)

This protocol reads the electric energy (export) for circuit ID = 2 stored in register address 33306.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821AH + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Reactive Energy

This protocol reads the reactive energy (import LAG) for circuit ID = 2 stored in register address 33308.
Unit is kvarh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821CH + N × 700H (N = Circuit ID-2).
Normal response	Reactive Energy	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Extended (import)

This protocol reads the electric energy extended (import) for circuit ID = 2 stored in register address 33316.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8224H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Extended (export)

This protocol reads the electric energy extended (export) for circuit ID = 2 stored in register address 33318.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8226H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy Extended (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Reactive Energy Extended (import)

This protocol reads the reactive energy extended (import LAG) for circuit ID = 2 stored in register address 33320.
Unit is kvarh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8228H + N × 700H (N = Circuit ID-2).
Normal response	Reactive Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Operating Time

This protocol reads the operating time for circuit ID = 2 stored in register address 33332.
Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8234H + N × 700H (N = Circuit ID-2).
Normal response	Operating Time	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy 3side (import)

This protocol reads the electric energy (import) (3 sides) for circuit ID = 2 stored in register address 33350.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8246H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Energy 3side (export)

This protocol reads the electric energy (export) (3 sides) for circuit ID = 2 stored in register address 33352.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8248H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Energy Extended 3side (import)

This protocol reads the electric energy extended (import) (3 sides) stored in register address 33354.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 824AH + N × 700H (N = Circuit ID-2).
Normal response	Energy Extended (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Energy Extended 3side (export)

This protocol reads the electric energy extended (export) (3 sides) for circuit ID = 2 stored in register address 33356.
Unit is kWh.
The measured value can be obtained by multiplying the read data by 10^n.
n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 824CH + N × 700H (N = Circuit ID-2).
Normal response	Energy Extended (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Operating Time 3side

This protocol reads the operating time (3 sides) for circuit ID = 2 stored in register address 33360.
Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8250H + N × 700H (N = Circuit ID-2).
Normal response	Operating Time (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-*A2] Energy Conversion

This protocol reads electric energy conversion for circuit ID = 2 stored in register address 33366.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8256H + N × 700H (N = Circuit ID-2).
Normal response	Electric Energy Conversion	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Conversion 3side

This protocol reads electric energy conversion (3 sides) for circuit ID = 2 stored in register address 33370.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 825AH + N × 700H (N = Circuit ID-2).
Normal response	Electric Energy Conversion (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] 16 bits Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset for circuit ID = 2 to register address 32769.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8001H + N × 700H (N = Circuit ID-2).
	16 bits Set/Reset Register*1*2	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Reset of alarm occurrence count	Reset	Do not reset
4	Not used	—	—
5	Not used	—	—
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Reset of electric energy data	Reset	Do not reset
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Phase Wire System

This protocol writes the setting value of the phase wire system for circuit ID = 2 to register address 32780.
Use a value in the range of 1 to 4.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 800CH + N × 700H (N = Circuit ID-2).
	Phase Wire System*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Primary Voltage (L-L: Line)

This protocol writes the setting value of the primary line voltage for circuit ID = 2 to register address 32781.
Unit is V. Use a value in the range of 1 to 110000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 800DH + N × 700H (N = Circuit ID-2).
	Primary Line Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Primary Voltage (L-N: Phase)

This protocol writes the setting value of the primary phase voltage for circuit ID = 2 to register address 32783.
Unit is ×0.1V. Use a value in the range of 10 to 635000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 800FH + N × 700H (N = Circuit ID-2).
	Primary Phase Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] Secondary Voltage

This protocol writes the setting value of the secondary voltage for circuit ID = 2 to register address 32785.
Unit is ×0.1V. Use a value in the range of 10 to 2200.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8011H + N × 700H (N = Circuit ID-2).
	Secondary Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] 5A Input Change (Sensor Type)

This protocol writes the setting value of 5A input switching (sensor type) for circuit ID = 2 to register address 32787.
Specify the sensor type setting data as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8013H + N × 700H (N = Circuit ID-2).
	5A Input Change	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Primary Current

This protocol writes the setting value of the primary voltage for circuit ID = 2 to register address 32790.
Unit is ×0.1A. Use a value in the range of 50 to 300000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8016H + N × 700H (N = Circuit ID-2).
	Primary Current	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy Converted Rate

This protocol writes the setting value of the electric energy converted rate for circuit ID = 2 to register address 32814.
Unit is ×0.001. Use a value in the range of 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 802EH + N × 700H (N = Circuit ID-2).
	Electric Energy Converted Rate	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy Converted Rate 3side

This protocol writes the setting value of the electric energy converted rate (3 sides) for circuit ID = 2 to register address 32820.
Unit is ×0.001. Use a value in the range of 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8034H + N × 700H (N = Circuit ID-2).
	Electric Energy Converted Rate (3side)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] Measuring Method Op. Time

This protocol writes the setting value of the counting operating time for circuit ID = 2 to register address 32822.
Specify the setting data of the counting operating time as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8036H + N × 700H (N = Circuit ID-2).
	Measuring Method of Operating Time	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Measuring Method Op. Time 3side

This protocol writes the setting value of the counting operating time (3 sides) for circuit ID = 2 to register address 32826.
Specify the setting data of the counting operating time (3 sides) as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 803AH + N × 700H (N = Circuit ID-2).
	Measuring Method of Operating Time (3side)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] VT Use or No-use

This protocol writes the setting value of VT for circuit ID = 2 to register address 32855.
Specify the setting data of VT as follows.

- 0: VT not used
- 1: VT used

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8057H + N × 700H (N = Circuit ID-2).
	VT Use or No-use	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] 2 Circuit Measuring Setting

This protocol writes the setting value of 2 circuit measuring setting for circuit ID = 2 to register address 32856.
Specify the setting data of 2 circuit measuring setting as follows.

- 0: Disable
- 1: Enable

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8058H + N × 700H (N = Circuit ID-2).
	2 Circuit Measuring Setting	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] Energy (import)

This protocol writes the setting value of the electric energy (import) for circuit ID = 2 to register address 33304.
Unit is kWh. Use a value in the range of 0 to 999999.
When the electric energy (import) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8218H + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (import)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy (export)

This protocol writes the setting value of the electric energy (export) for circuit ID = 2 to register address 33306.
Unit is kWh. Use a value in the range of 0 to 999999.
When the electric energy (export) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821AH + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (export)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Reactive Energy

This protocol writes the setting value of the reactive energy (import LAG) for circuit ID = 2 to register address 33308.
Unit is kvarh. Use a value in the range of 0 to 999999.
When the reactive energy (import LAG) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821CH + N × 700H (N = Circuit ID-2).
	Reactive Energy	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kvarh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Operating Time

This protocol writes the setting value of operating time for circuit ID = 2 to register address 33332.
Unit is h. Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8234H + N × 700H (N = Circuit ID-2).
	Operating Time	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy 3side (import)

This protocol writes the setting value of the electric energy (import) (3 sides) for circuit ID = 2 to register address 33350.
Unit is kWh. Use a value in the range of 0 to 999999.
When the electric energy (import) (3 sides) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8246H + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (3side) (import)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] Energy 3side (export)

This protocol writes the setting value of the electric energy (export) (3 sides) for circuit ID = 2 to register address 33352.
Unit is kWh. Use a value in the range of 0 to 999999.
When the electric energy (export) (3 sides) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8248H + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (3side) (export)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] Operating Time 3side

This protocol writes the setting value of operating time (3 sides) for circuit ID = 2 to register address 33360.
Unit is h. Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8250H + N × 700H (N = Circuit ID-2).
	Operating Time (3side)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

WR: [EMU4-*A2] Energy Conversion

This protocol writes the setting value of electric energy conversion for circuit ID = 2 to register address 33366.
Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8256H + N × 700H (N = Circuit ID-2).
	Electric Energy Conversion	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy Conversion 3side

This protocol writes the setting value of electric energy conversion (3 sides) for circuit ID = 2 to register address 33370.
Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 825AH + N × 700H (N = Circuit ID-2).
	Electric Energy Conversion (3side)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

RD: [EMU4-AX4] Model Code

This protocol reads the setting value of the model code for circuit ID = 2 stored in register address 32768.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8000H + N × 700H (N = Circuit ID-2).
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model code	Setting value
EMU4-AX4	0009H

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] 16 bits Monitor

This protocol reads setting value of the 16 bits monitor for circuit ID = 2 stored in register address 32770.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8002H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor*1*2	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Upper and lower limit alarm (CH1)	Alarm occurring	No alarm
1	Upper and lower limit alarm (CH2)	Alarm occurring	No alarm
2	Upper and lower limit alarm (CH3)	Alarm occurring	No alarm
3	Upper and lower limit alarm (CH4)	Alarm occurring	No alarm
4	Contact input (CH1)	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Contact input (CH2)	On (closed)	Off (open)
7	Contact input (CH3)	On (closed)	Off (open)
8	Contact input (CH4)	On (closed)	Off (open)
9	Not used	—	—
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Measuring Interval

This protocol reads the conversion speed setting for circuit ID = 2 stored in register address 32857.

The setting value of the conversion speed setting is read as follows.

- 0: 50ms
- 1: 1ms

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8059H + N × 700H (N = Circuit ID-2).
Normal response	Measuring Interval	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] ADC Enable/Disable Setting (CH1/CH2/CH3/CH4)

This protocol reads the A/D conversion enable/disable setting (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32858/32864/32870/32876.

The setting value of the A/D conversion enable/disable setting is read as follows.

- 0: Prohibit
- 1: Allow

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805AH + N × 700H (N = Circuit ID-2) • CH2: 8060H + N × 700H (N = Circuit ID-2) • CH3: 8066H + N × 700H (N = Circuit ID-2) • CH4: 806CH + N × 700H (N = Circuit ID-2)
Normal response	A/D Conversion Enable/Disable Setting (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Input Range Setting (CH1/CH2/CH3/CH4)

This protocol reads the input range setting (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32859/32865/32871/32877.

The setting value of the input range setting is read as follows.

- 0: Voltage input
- 1: Current input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805BH + N × 700H (N = Circuit ID-2) • CH2: 8061H + N × 700H (N = Circuit ID-2) • CH3: 8067H + N × 700H (N = Circuit ID-2) • CH4: 806DH + N × 700H (N = Circuit ID-2)
Normal response	Input Range Setting (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Scaling Lower Limit Value (CH1/CH2/CH3/CH4)

This protocol reads the scaling lower limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32860/32866/32872/32878.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805CH + N × 700H (N = Circuit ID-2) • CH2: 8062H + N × 700H (N = Circuit ID-2) • CH3: 8068H + N × 700H (N = Circuit ID-2) • CH4: 806EH + N × 700H (N = Circuit ID-2)
Normal response	Scaling Lower Limit Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Scaling Upper Limit Value (CH1/CH2/CH3/CH4)

This protocol reads the scaling upper limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32861/32867/32873/32879.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805DH + N × 700H (N = Circuit ID-2) • CH2: 8063H + N × 700H (N = Circuit ID-2) • CH3: 8069H + N × 700H (N = Circuit ID-2) • CH4: 806FH + N × 700H (N = Circuit ID-2)
Normal response	Scaling Upper Limit Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] ADC Moving Average (CH1/CH2/CH3/CH4)

This protocol reads the A/D conversion moving average (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32863/32869/32875/32881.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805FH + N × 700H (N = Circuit ID-2) • CH2: 8065H + N × 700H (N = Circuit ID-2) • CH3: 806BH + N × 700H (N = Circuit ID-2) • CH4: 8071H + N × 700H (N = Circuit ID-2)
Normal response	A/D Conversion Moving Average (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Analog Value (CH1/CH2/CH3/CH4)

This protocol reads the AD conversion value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33171/33172/33173/33174.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8193H + N × 700H (N = Circuit ID-2) • CH2: 8194H + N × 700H (N = Circuit ID-2) • CH3: 8195H + N × 700H (N = Circuit ID-2) • CH4: 8196H + N × 700H (N = Circuit ID-2)
Normal response	Analog Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Scaling Value (CH1/CH2/CH3/CH4)

This protocol reads the scaling value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33175/33176/33177/33178.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8197H + N × 700H (N = Circuit ID-2) • CH2: 8198H + N × 700H (N = Circuit ID-2) • CH3: 8199H + N × 700H (N = Circuit ID-2) • CH4: 819AH + N × 700H (N = Circuit ID-2)
Normal response	Scaling Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] 16 bits Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset for circuit ID = 2 to register address 32769.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8001H + N × 700H (N = Circuit ID-2).
	16 bits Set/Reset Register*1*2	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Not used	—	—
4	Reset of levels A to D excess count (all CHs)	Reset	Do not reset
5	Contact output	On (closed)	Off (open)
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Measuring Interval

This protocol writes the setting value of the conversion speed setting for circuit ID = 2 to register address 32857.
Specify the setting value of the conversion speed setting as follows.

- 0: 50ms
- 1: 1ms

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8059H + N × 700H (N = Circuit ID-2).
	Measuring Interval	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] ADC Enable/Disable Setting (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the A/D conversion enable/disable setting (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32858/32864/32870/32876.
Specify the setting value of the A/D conversion enable/disable setting as follows.

- 0: Prohibit
- 1: Allow

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805AH + N × 700H (N = Circuit ID-2) • CH2: 8060H + N × 700H (N = Circuit ID-2) • CH3: 8066H + N × 700H (N = Circuit ID-2) • CH4: 806CH + N × 700H (N = Circuit ID-2)
	A/D Conversion Enable/Disable Setting (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Input Range Setting (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the input range setting (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32859/32865/32871/32877.

Specify the setting value of the input range setting as follows.

- 0: Voltage input
- 1: Current input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805BH + N × 700H (N = Circuit ID-2) • CH2: 8061H + N × 700H (N = Circuit ID-2) • CH3: 8067H + N × 700H (N = Circuit ID-2) • CH4: 806DH + N × 700H (N = Circuit ID-2)
	Input Range Setting (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Scaling Lower Limit Value (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the scaling lower limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32860/32866/32872/32878.

Use a value in the range of -32767 to 32767.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805CH + N × 700H (N = Circuit ID-2) • CH2: 8062H + N × 700H (N = Circuit ID-2) • CH3: 8068H + N × 700H (N = Circuit ID-2) • CH4: 806EH + N × 700H (N = Circuit ID-2)
	Scaling Lower Limit Value (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Scaling Upper Limit Value (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the scaling upper limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32861/32867/32873/32879.
Use a value in the range of -32767 to 32767.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805DH + N × 700H (N = Circuit ID-2) • CH2: 8063H + N × 700H (N = Circuit ID-2) • CH3: 8069H + N × 700H (N = Circuit ID-2) • CH4: 806FH + N × 700H (N = Circuit ID-2)
	Scaling Upper Limit Value (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] ADC Moving Average (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the A/D conversion moving average (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32863/32869/32875/32881.
Use a value in the range of 1 to 100.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805FH + N × 700H (N = Circuit ID-2) • CH2: 8065H + N × 700H (N = Circuit ID-2) • CH3: 806BH + N × 700H (N = Circuit ID-2) • CH4: 8071H + N × 700H (N = Circuit ID-2)
	A/D Conversion Moving Average (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Model Code

This protocol reads the setting value of the model code for circuit ID = 2 stored in register address 32768.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8000H + N × 700H (N = Circuit ID-2).
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model code	Setting value
EMU4-PX4	000AH

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] 16 bits Monitor

This protocol reads setting value of the 16 bits monitor for circuit ID = 2 stored in register address 32770.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8002H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Bit	Description	If the value is 1	If the value is 0
0	Upper and lower limit alarm (CH1)	Alarm occurring	No alarm
1	Upper and lower limit alarm (CH2)	Alarm occurring	No alarm
2	Upper and lower limit alarm (CH3)	Alarm occurring	No alarm
3	Upper and lower limit alarm (CH4)	Alarm occurring	No alarm
4	Contact input (CH1)	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Contact input (CH2)	On (closed)	Off (open)
7	Contact input (CH3)	On (closed)	Off (open)
8	Contact input (CH4)	On (closed)	Off (open)
9	Not used	—	—
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Convert Rate of Pulse (CH1/CH2/CH3/CH4)

This protocol reads the pulse converted rate (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32811/32929/32932/32935.

Unit is ×0.001.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 802BH + N × 700H (N = Circuit ID-2) • CH2: 80A1H + N × 700H (N = Circuit ID-2) • CH3: 80A4H + N × 700H (N = Circuit ID-2) • CH4: 80A7H + N × 700H (N = Circuit ID-2)
Normal response	Convert Rate of Pulse (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Measuring Method Op. Time (CH1/CH2/CH3/CH4)

This protocol reads the counting operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32822/32824/32826/32937.

The setting value of the counting operating time is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8036H + N × 700H (N = Circuit ID-2) • CH2: 8038H + N × 700H (N = Circuit ID-2) • CH3: 803AH + N × 700H (N = Circuit ID-2) • CH4: 80A9H + N × 700H (N = Circuit ID-2)
Normal response	Measuring Method of Operating Time (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] External Input Method (CH1/CH2/CH3/CH4)

This protocol reads the external input method (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32920/32921/32922/32923.

The setting value of the external input method is read as follows.

- 0: Not set
- 1: Pulse input
- 2: Contact input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8098H + N × 700H (N = Circuit ID-2) • CH2: 8099H + N × 700H (N = Circuit ID-2) • CH3: 809AH + N × 700H (N = Circuit ID-2) • CH4: 809BH + N × 700H (N = Circuit ID-2)
Normal response	External Input Method (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] External Input Reset Method (CH1/CH2/CH3/CH4)

This protocol reads the external input reset method (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register address 32924/32925/32926/32927.

The setting value of the external input reset method is read as follows.

- 1: Auto reset
- 2: Latch

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 809CH + N × 700H (N = Circuit ID-2) • CH2: 809DH + N × 700H (N = Circuit ID-2) • CH3: 809EH + N × 700H (N = Circuit ID-2) • CH4: 809FH + N × 700H (N = Circuit ID-2)
Normal response	External Input Reset Method (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Contact Input State (CH1/CH2/CH3/CH4)

This protocol reads the contact input state (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33151/33152/33153/33154.

The setting value of the contact input state is read as follows.

- 0: Off state
- 1: On state

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 817FH + N × 700H (N = Circuit ID-2) • CH2: 8180H + N × 700H (N = Circuit ID-2) • CH3: 8181H + N × 700H (N = Circuit ID-2) • CH4: 8182H + N × 700H (N = Circuit ID-2)
Normal response	Contact Input State (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Pulse Count (CH1/CH2/CH3/CH4)

This protocol reads the pulse count value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33330/33374/33378/33382.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8232H + N × 700H (N = Circuit ID-2) • CH2: 825EH + N × 700H (N = Circuit ID-2) • CH3: 8262H + N × 700H (N = Circuit ID-2) • CH4: 8266H + N × 700H (N = Circuit ID-2)
Normal response	Pulse Count (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Operating Time (CH1/CH2/CH3/CH4)

This protocol reads the operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33332/33358/33360/33386.
Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8234H + N × 700H (N = Circuit ID-2) • CH2: 824EH + N × 700H (N = Circuit ID-2) • CH3: 8250H + N × 700H (N = Circuit ID-2) • CH4: 826AH + N × 700H (N = Circuit ID-2)
Normal response	Operating Time (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Pulse Conversion (CH1/CH2/CH3/CH4)

This protocol reads the pulse conversion value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33372/33376/33380/33384.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 825CH + N × 700H (N = Circuit ID-2) • CH2: 8260H + N × 700H (N = Circuit ID-2) • CH3: 8264H + N × 700H (N = Circuit ID-2) • CH4: 8268H + N × 700H (N = Circuit ID-2)
Normal response	Pulse Conversion (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] 16 bits Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset for circuit ID = 2 to register address 32769.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8001H + N × 700H (N = Circuit ID-2).
	16 bits Set/Reset Register*1*2	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Not used	—	—
4	Reset of levels A to D excess count (all CHs)	Reset	Do not reset
5	Contact output	On (closed)	Off (open)
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to MITSUBISHI Energy Measuring Unit EcoMonitorLight/ EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Convert Rate of Pulse (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the pulse converted rate (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32811/32929/32932/32935.

Unit is ×0.001. Use a value in the range of 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 802BH + N × 700H (N = Circuit ID-2) • CH2: 80A1H + N × 700H (N = Circuit ID-2) • CH3: 80A4H + N × 700H (N = Circuit ID-2) • CH4: 80A7H + N × 700H (N = Circuit ID-2)
	Convert Rate of Pulse (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Measuring Method Op. Time (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the counting operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32822/32824/32826/32937.

Specify the setting value of the counting operating time as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8036H + N × 700H (N = Circuit ID-2) • CH2: 8038H + N × 700H (N = Circuit ID-2) • CH3: 803AH + N × 700H (N = Circuit ID-2) • CH4: 80A9H + N × 700H (N = Circuit ID-2)
	Measuring Method of Operating Time (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] External Input Method (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the external input method (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32920/32921/32922/32923.

Specify the setting value of the external input method as follows.

- 0: Not set
- 1: Pulse input
- 2: Contact input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8098H + N × 700H (N = Circuit ID-2) • CH2: 8099H + N × 700H (N = Circuit ID-2) • CH3: 809AH + N × 700H (N = Circuit ID-2) • CH4: 809BH + N × 700H (N = Circuit ID-2)
	External Input Method (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] External Input Reset Method (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the external input reset method (CH1/CH2/CH3/CH4) for circuit ID = 2 to register address 32924/32925/32926/32927.

Specify the setting value of the external input reset method as follows.

- 1: Auto reset
- 2: Latch

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 809CH + N × 700H (N = Circuit ID-2) • CH2: 809DH + N × 700H (N = Circuit ID-2) • CH3: 809EH + N × 700H (N = Circuit ID-2) • CH4: 809FH + N × 700H (N = Circuit ID-2)
	External Input Reset Method (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Pulse Count (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the pulse count (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 33330/33374/33378/33382.

Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8232H + N × 700H (N = Circuit ID-2) • CH2: 825EH + N × 700H (N = Circuit ID-2) • CH3: 8262H + N × 700H (N = Circuit ID-2) • CH4: 8266H + N × 700H (N = Circuit ID-2)
	Pulse Count (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Operating Time (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 33332/33358/33360/33386.

Unit is h. Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8234H + N × 700H (N = Circuit ID-2) • CH2: 824EH + N × 700H (N = Circuit ID-2) • CH3: 8250H + N × 700H (N = Circuit ID-2) • CH4: 826AH + N × 700H (N = Circuit ID-2)
	Operating Time (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Pulse Conversion (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the pulse conversion value (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 33372/33376/33380/33384.
Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 825CH + N × 700H (N = Circuit ID-2) • CH2: 8260H + N × 700H (N = Circuit ID-2) • CH3: 8264H + N × 700H (N = Circuit ID-2) • CH4: 8268H + N × 700H (N = Circuit ID-2)
	Pulse Conversion (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Holding Registers

MODBUS standard function.
It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes.
	Number of Register	Specify the device that stores the number of data points to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. Store the value in the device within the range from 0001H to 007DH (1 to 125).
Normal response	Read Data	• Specify the device that stores the read data. For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words. • Change the byte swap setting according to the specification of the external device.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

MODBUS standard function.

It writes the value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (0)	Rewrite to the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. Example: To specify 3096, store 0C18H.
	Number of Register (1)	Rewrite to the number of data to be written. Specify the value in the device within the range from 0001H to 007BH (1 to 123).
	Write Data	• Rewrite the data length to the value of 2 × "Number of Register (1)". Example: If the number of registers is 123, set 246. • Specify the device that stores the write data. Consecutive word devices of the number set in "Number of Register (1)" are used. • Change the byte swap setting according to the specification of the external device.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

14 PROTOCOLS SUPPORTED BY Mitsubishi Electric (ME96 SERIES: ME96SSHB-MB, ME96SSRB-MB)

14.1 Setting Method

ME96SSHB-MB, ME96SSRB-MB

Communication with the ME96 series uses the MODBUS TCP PROTOCOL function of the Mitsubishi Electric multi-measuring instrument ME96 series. In that case, use the optional plug-in module (ME-0000MT-SS96, ME-0040MT2-SS96).
For steps to set the parameters, refer to the following.

- ME series MODBUS Interface specifications (LSPM-0075H)
- User's Manual: Detailed Edition (MODEL: ME96SSHB-MB), User's Manual: Detailed Edition (MODEL: ME96SSRB-MB)

14.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Phase Wiring	Reads the value of the phase wiring setup register.	Not to be added	Request
RD: Primary Voltage	Reads the value of the primary voltage setup register.	Not to be added	Request
RD: Primary Voltage (L-N)	Reads the value of the primary voltage (L-N) setup register.	Not to be added	Request
RD: Secondary Voltage	Reads the value of the secondary voltage setup register.	Not to be added	Request
RD: Primary Current	Read the value of the primary current setup register.	Not to be added	Request
RD: 16 bits Monitor 1	Reads the value of the 16-bit monitor 1.	To be added	Fixed Intrvl
RD: Secondary Current	Reads the value of the secondary current setup register.	Not to be added	Request
RD: Interval Time Constant	Reads the value of the interval time constant setup register.	Not to be added	Request
RD: Subinterval Time Constant	Reads the value of the subinterval time constant setup register.	Not to be added	Request
RD: 16 bits Monitor 2	Reads the value of the 16 bits monitor 2.	Not to be added	Fixed Intrvl
RD: Multiplying Factors	Reads the value of the following multiplying factors. • Voltage (L-L) (3P4W) • Current • Voltage • Power • Energy • Power Factor • Frequency • Current THD • Voltage THD • Energy (extended)	To be added	Request
RD: Model Code	Reads the value of the model code.	Not to be added	Request
RD: Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	To be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand • Average Value Current Demand	To be added	Fixed Intrvl
RD: Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	To be added	Fixed Intrvl
RD: Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N • Average Value Voltage (L-N)	To be added	Fixed Intrvl
RD: Power Factor	Reads the following instantaneous values. • Phase 1 Power Factor • Phase 2 Power Factor • Phase 3 Power Factor • Σ Power Factor	To be added	Fixed Intrvl
RD: Frequency	Reads the instantaneous value of frequency.	To be added	Fixed Intrvl
RD: Active Power	Reads the following instantaneous values. • Phase 1 Active Power • Phase 2 Active Power • Phase 3 Active Power • Σ Active Power	To be added	Fixed Intrvl
RD: Rolling Demand (kW) (Last)	Reads the instantaneous value of the Σ rolling demand (kW) (last).	Not to be added	Fixed Intrvl
RD: Reactive Power	Reads the following instantaneous values. • Phase 1 Reactive Power • Phase 2 Reactive Power • Phase 3 Reactive Power • Σ Reactive Power	To be added	Fixed Intrvl
RD: Apparent Power	Reads the following instantaneous values. • Phase 1 Apparent Power • Phase 2 Apparent Power • Phase 3 Apparent Power • Σ Apparent Power	To be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Last)	Reads the instantaneous value of the Σ rolling demand (kvar) (last).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Last)	Reads the instantaneous value of the Σ rolling demand (kVA) (last).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kW) (Max.)	Reads the instantaneous value of the Σ rolling demand (kW) (max.).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Max.)	Reads the instantaneous value of the Σ rolling demand (kvar) (max.).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Max.)	Reads the instantaneous value of the Σ rolling demand (kVA) (max.).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kW) (Present)	Reads the instantaneous value of the Σ rolling demand (kW) (present).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Present)	Reads the instantaneous value of the Σ rolling demand (kvar) (present).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Present)	Reads the instantaneous value of the Σ rolling demand (kVA) (present).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kW) (Predict.)	Reads the instantaneous value of the Σ rolling demand (kW) (predict).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Predict.)	Reads the instantaneous value of the Σ rolling demand (kvar) (predict).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Predict.)	Reads the instantaneous value of the Σ rolling demand (kVA) (predict).	Not to be added	Fixed Intrvl
RD: Operating Time 1	Reads the instantaneous value of the operating time 1.	To be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Operating Time 2	Reads the instantaneous value of the operating time 2.	To be added	Fixed Intrvl
RD: Active Energy (import)	Reads the instantaneous value of the active energy (import).	To be added	Fixed Intrvl
RD: Active Energy (export)	Reads the instantaneous value of the active energy (export).	Not to be added	Fixed Intrvl
RD: Reactive Energy (import LAG)	Reads the instantaneous value of the reactive energy (import LAG).	To be added	Fixed Intrvl
RD: Reactive Energy (export LAG)	Reads the instantaneous value of the reactive energy (export LAG).	Not to be added	Fixed Intrvl
RD: Reactive Energy (import LEAD)	Reads the instantaneous value of the reactive energy (import LEAD).	To be added	Fixed Intrvl
RD: Reactive Energy (export LEAD)	Reads the instantaneous value of the reactive energy (export LEAD).	Not to be added	Fixed Intrvl
RD: Apparent Energy	Reads the instantaneous value of the apparent energy.	To be added	Fixed Intrvl
RD: Periodic Active Energy (Period 1) (import)	Reads the instantaneous value of the periodic active energy (period 1) (import).	Not to be added	Fixed Intrvl
RD: Periodic Active Energy (Period 2) (import)	Reads the instantaneous value of the periodic active energy (period 2) (import).	Not to be added	Fixed Intrvl
RD: Periodic Active Energy (Period 3) (import)	Reads the instantaneous value of the periodic active energy (period 3) (import).	Not to be added	Fixed Intrvl
RD: CO2 Equivalent	Reads the instantaneous value of the CO2 Equivalent.	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (Total)	Reads the following root mean square (RMS) values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (1st)	Reads the following root mean square (RMS) values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (Total)	Reads the following root mean square (RMS) values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (1st)	Reads the following root mean square (RMS) values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following root mean square (RMS) values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Current (1st)	Reads the following root mean square (RMS) values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (THD)	Reads the following root mean square (RMS) values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (3rd)	Reads the following root mean square (RMS) values. • Harmonic Distortion V1N • Harmonic Distortion V2N • Harmonic Distortion V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (THD)	Reads the following root mean square (RMS) values. • THD V12 • THD V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (3rd)	Reads the following root mean square (RMS) values. • Harmonic Distortion V12 • Harmonic Distortion V23	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Harmonics Current Distortion (THD)	Reads the following root mean square (RMS) values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl
RD: Harmonics Current Distortion (3rd)	Reads the following root mean square (RMS) values. • Harmonic Distortion I1 • Harmonic Distortion I2 • Harmonic Distortion I3 • Harmonic Distortion IN	Not to be added	Fixed Intrvl
WR: Phase Wiring	Writes the values to the phase wiring setup register.	Not to be added	Request
WR: Primary Voltage	Writes the values to the primary voltage setup register.	Not to be added	Request
WR: Primary Voltage (L-N)	Writes the values to the primary voltage (L-N) setup register.	Not to be added	Request
WR: Secondary Voltage	Writes the values to the secondary voltage setup register.	Not to be added	Request
WR: Primary Current	Writes the values to the primary current setup register.	Not to be added	Request
WR: 16 bits Set/Reset Register 1	Writes the values to the 16 bits set/reset register 1 setup register.	Not to be added	Request
WR: Secondary Current	Writes the values to the secondary current setup register.	Not to be added	Request
WR: Interval Time Constant	Writes the values to the interval time constant setup register.	Not to be added	Request
WR: Subinterval Time Constant	Writes the values to the subinterval time constant setup register.	Not to be added	Request
WR: 16 bits Set/Reset Register 2	Writes the values to the 16 bits set/reset register 2 setup register.	Not to be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers*2	Writes the value into the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

14.3 Details of Applicable Protocols

RD: Phase Wiring

This protocol reads the phase wiring value stored in setup register address 512.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Phase Wiring*1	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Phase Wiring	Data
1P2W	0001H
1P3W_1N3	0002H
3P3W_2CT	0003H
3P4W	0004H
1P3W_1N2	0005H
3P3W_3CT	0006H

Precautions

Do not change values other than setting data.

RD: Primary Voltage

This protocol reads the primary voltage value stored in setup register address 513.
Unit is V.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Primary Voltage	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Voltage (L-N)

This protocol reads the primary voltage value stored in setup register address 515.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Primary Voltage (L-N)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Secondary Voltage

This protocol reads the secondary voltage value stored in setup register address 517.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Current

This protocol reads the primary current value stored in setup register address 519.
Unit is ×0.1A.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Primary Current	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: 16 bits Monitor 1

This protocol reads the 16 bits monitor 1 value stored at register address 524.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	16 bits Monitor 1*1	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Bit	Description	If the value is 1	If the value is 0
0	Digital input 1 (DI1)	On	Off
1	Digital input 2 (DI2)	On	Off
2	Digital input 3 (DI3)	On	Off
3	Digital input 4 (DI4)	On	Off
4	Digital input 5 (DI5)	On	Off
5	Alarm (total)	Alarm	Non-Alarm
6	Alarm of Demand current	Alarm	Non-Alarm
7	Alarm of Rolling Demand (W, var, VA)	Alarm	Non-Alarm
8	Alarm of Voltage	Alarm	Non-Alarm
9	Alarm of Current	Alarm	Non-Alarm
10	Alarm of Active power	Alarm	Non-Alarm
11	Alarm of Reactive power	Alarm	Non-Alarm
12	Alarm of Frequency	Alarm	Non-Alarm
13	Alarm of Power factor	Alarm	Non-Alarm
14	Alarm of T.H.D (Voltage)	Alarm	Non-Alarm
15	Alarm of Harmonics current	Alarm	Non-Alarm

Precautions

Do not change values other than setting data.

RD: Secondary Current

This protocol reads the secondary current value stored in setup register address 581.
Unit is A.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Secondary Current	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Interval Time Constant

This protocol reads the value of the interval time constant stored in setup register address 583.
Unit is min.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Interval Time Constant	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Subinterval Time Constant

This protocol reads the subinterval time constant value stored in setup register address 584.
Unit is min.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Subinterval Time Constant	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: 16 bits Monitor 2

This protocol reads the 16 bits monitor 2 value stored at register address 594.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	16 bits Monitor 2*1	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Bit	Description	If the value is 1	If the value is 0
0	Upper limit alarm of current (phase 1)	Alarm	Non-Alarm
1	Upper limit alarm of current (phase 2)	Alarm	Non-Alarm
2	Upper limit alarm of current (phase 3)	Alarm	Non-Alarm
3	Upper limit alarm of current (phase N)	Alarm	Non-Alarm
4	Upper limit alarm of current (total)	Alarm	Non-Alarm
5	Lower limit alarm of current (total)	Alarm	Non-Alarm
6	Upper limit alarm of L-L voltage (total)	Alarm	Non-Alarm
7	Lower limit alarm of L-L voltage (total)	Alarm	Non-Alarm
8	Upper limit alarm of L-N voltage (1-N)	Alarm	Non-Alarm
9	Upper limit alarm of L-N voltage (2-N)	Alarm	Non-Alarm
10	Upper limit alarm of L-N voltage (3-N)	Alarm	Non-Alarm
11	Upper limit alarm of L-N voltage (total)	Alarm	Non-Alarm
12	Lower limit alarm of L-N voltage (1-N)	Alarm	Non-Alarm
13	Lower limit alarm of L-N voltage (2-N)	Alarm	Non-Alarm
14	Lower limit alarm of L-N voltage (3-N)	Alarm	Non-Alarm
15	Lower limit alarm of L-N voltage (total)	Alarm	Non-Alarm

Precautions

Do not change values other than setting data.

RD: Multiplying Factors

This protocol reads the values of multiplying factors of voltage (L-L) (3P4W), current, voltage, power, energy, power factor, frequency, current THD, voltage THD, and energy (extension) stored in register addresses 751 to 762. (Register addresses 752 and 753 are reserved.)

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Voltage (L-L) (3P4W) • Current • Voltage • Power • Energy • Power Factor • Frequency • Current THD • Voltage THD • Energy (extended)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Model Code	Data
ME96SSRB-MB	021AH
ME96SSHB-MB	021BH

Precautions

Do not change values other than setting data.

RD: Phase Current

This protocol reads the instantaneous values of Phase 1 current, Phase 2 current, Phase 3 current, Neutral current, and Average current stored in register addresses 768 to 772.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Phase Current Demand

This protocol reads the instantaneous values of Phase 1 current demand, Phase 2 current demand, Phase 3 current demand, Neutral current demand, and Average current demand stored in register addresses 773 to 777.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand • Average Value Current Demand	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Line Voltage

This protocol reads the instantaneous values of voltage V12, voltage V23, voltage V31, and average voltage (L-L) stored in register addresses 778 to 781.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755). However, for voltage (L-L) (3P4W), use the voltage (L-L) (3P4W) multiplying factor (register address: 751).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Phase Voltage

This protocol reads the instantaneous values of phase voltage V1N, phase voltage V2N, phase voltage V3N, and average voltage (L-N) stored in register addresses 782 to 785.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Voltage V1N • Voltage V2N • Voltage V3N • Average Value Voltage (L-N)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Power Factor

This protocol reads the instantaneous values of the Phase 1 power factor, Phase 2 power factor. Phase 3 power factor, and Σ power factor stored in register addresses 786 to 789.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power factor multiplying factor data (register address: 758).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Power Factor • Phase 2 Power Factor • Phase 3 Power Factor • Σ Power Factor	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Frequency

This protocol reads the instantaneous value of frequency stored in register address 790.

Unit is ×0.1Hz.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the frequency multiplying factor data (register address: 759).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Frequency	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Power

This protocol reads the instantaneous values of Phase 1 active power, Phase 2 active power, Phase 3 active power, and Σ active power stored in register addresses 791 to 794.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Active Power • Phase 2 Active Power • Phase 3 Active Power • Σ Active Power	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Rolling Demand (kW) (Last)

This protocol reads the Σ rolling demand (kW) (last) value stored in register address 798.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kW) (Last)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Power

This protocol reads the instantaneous values of Phase 1 reactive power, Phase 2 reactive power, Phase 3 reactive power, and Σ reactive power stored in register addresses 799 to 802.

Unit is kvar.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Reactive Power • Phase 2 Reactive Power • Phase 3 Reactive Power • Σ Reactive Power	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Apparent Power

This protocol reads the instantaneous values of Phase 1 apparent power, Phase 2 apparent power, Phase 3 apparent power, and Σ apparent power stored in register addresses 803 to 806.

Unit is kVA.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Apparent Power • Phase 2 Apparent Power • Phase 3 Apparent Power • Σ Apparent Power	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Rolling Demand (kvar) (Last)

This protocol reads the Σ rolling demand (kvar) (last) value stored in register address 807.

Unit is kvar.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kvar) (Last)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kVA) (Last)

This protocol reads the Σ rolling demand (kVA) (last) value stored in register address 808.

Unit is kVA.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kVA) (Last)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kW) (Max.)

This protocol reads the Σ rolling demand (kW) (max.) value stored in register address 845.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kW) (Max.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kvar) (Max.)

This protocol reads the Σ rolling demand (kvar) (max.) value stored in register address 854.

Unit is kvar.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kvar) (Max.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kVA) (Max.)

This protocol reads the Σ rolling demand (kVA) (max.) value stored in register address 855.

Unit is kVA.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kVA) (Max.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kW) (Present)

This protocol reads the Σ rolling demand (kW) (present) value stored in register address 957.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kW) (Present)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kvar) (Present)

This protocol reads the Σ rolling demand (kvar) (present) value stored in register address 958.

Unit is kvar.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kvar) (Present)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kVA) (Present)

This protocol reads the Σ rolling demand (kVA) (present) value stored in register address 959.

Unit is kVA.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kVA) (Present)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kW) (Predict.)

This protocol reads the Σ rolling demand (kW) (predict) value stored in register address 963.

Unit is kW.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kW) (Predict.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kvar) (Predict.)

This protocol reads the Σ rolling demand (kvar) (predict) value stored in register address 964.

Unit is kvar.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kvar) (Predict.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rolling Demand (kVA) (Predict.)

This protocol reads the Σ rolling demand (kVA) (predict) value stored in register address 965.

Unit is kVA.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ΣRolling Demand (kVA) (Predict.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Operating Time 1

This protocol reads the instantaneous value of Operating time 1 stored in register address 1378.
Unit is h.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Time 1	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Operating Time 2

This protocol reads the instantaneous value of Operating time 2 stored in register address 1380.
Unit is h.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Time 2	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Energy (import)

This protocol reads the active energy (import) value stored in register address 1408.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Active Energy (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Energy (export)

This protocol reads the active energy (export) value stored in register address 1410.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Active Energy (export)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (import LAG)

This protocol reads the reactive energy (import LAG) value stored in register address 1412.
Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (import LAG)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (export LAG)

This protocol reads the reactive energy (export LAG) value stored in register address 1414.
Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (export LAG)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (import LEAD)

This protocol reads the reactive energy (import LEAD) value stored in register address 1416.
Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (import LEAD)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (export LEAD)

This protocol reads the reactive energy (export LEAD) value stored in register address 1418.
Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (export LEAD)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Apparent Energy

This protocol reads the apparent energy value stored in register address 1420.
Unit is kVAh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Apparent Energy	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Active Energy (Period 1) (import)

This protocol reads the periodic active energy (period 1) (import) value stored in register address 1422.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Periodic Active Energy (Period 1) (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Active Energy (Period 2) (import)

This protocol reads the periodic active energy (period 2) (import) value stored in register address 1424.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Periodic Active Energy (Period 2) (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Active Energy (Period 3) (import)

This protocol reads the periodic active energy (period 3) (import) value stored in register address 1488.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Periodic Active Energy (Period 3) (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: CO2 Equivalent

This protocol reads the CO2 equivalent value stored in register address 1476.

Unit is kg.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the energy multiplying factor data (register address: 757).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	CO2 Equivalent	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Phase Voltage (Total)

This protocol reads the RMS values of total harmonics of phase voltage V1N, phase voltage V2N, and phase voltage V3N stored in register addresses 1792 to 1794.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Phase Voltage (1st)

This protocol reads the RMS. values of 1st harmonics of phase voltage V1N, phase voltage V2N, and phase voltage V3N stored in register addresses 1795 to 1797.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (1795)	■Default Reads RMS values of 1st harmonics of phase voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 1795 + ((N-1) × 3) ÷ 2. N: Harmonics number (odd number from 3 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0730H to specify 1840. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Line Voltage (Total)

This protocol reads the RMS values of total harmonics of line voltage V12 and line voltage V23 stored in register addresses 2048 and 2049.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755). However, for voltage (L-L) (3P4W), use the voltage (L-L) (3P4W) multiplying factor (register address: 751).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Line Voltage (1st)

This protocol reads the RMS values of 1st harmonics of line voltage V12 and line voltage V23 stored in register addresses 2051 and 2052.

Unit is V.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage multiplying factor data (register address: 755). However, for voltage (L-L) (3P4W), use the voltage (L-L) (3P4W) multiplying factor (register address: 751).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2051)	■Default Reads RMS values of 1st harmonics of line voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 2051 + ((N-1) × 3) ÷ 2. N: Harmonics number (odd number from 3 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0830H to specify 2096. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Current (Total)

This protocol reads the RMS values of total harmonics of current I1, current I2, current I3, and current IN stored in register addresses 2304 to 2307.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Current (1st)

This protocol reads the RMS values of 1st harmonics of current I1, current I2, current I3, and current IN stored in register addresses 2308 to 2311.

Unit is A.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2308)	■Default Reads RMS values of 1st harmonics of phase current. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 2308 + (N-1) × 2. N: Harmonics number (odd number from 3 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0940H to specify 2368. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Phase Voltage Distortion (THD)

This protocol reads values of distortion ratio for total harmonics of phase voltage V1N, phase voltage V2N, and phase voltage V3N stored in register addresses 2560 to 2562.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage THD multiplying factor data (register address: 761).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• THD V1N • THD V2N • THD V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Phase Voltage Distortion (3rd)

This protocol reads values of distortion ratio for 3rd harmonic of phase voltage V1N, phase voltage V2N, and phase voltage V3N stored in register addresses 2563 to 2565.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage THD multiplying factor data (register address: 761).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2563)	■Default Reads distortion ratio of 3rd harmonics of phase voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 2563 + ((N-3) × 3) ÷ 2. N: Harmonics number (odd number from 5 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0A2DH to specify 2605. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonic Distortion V1N • Harmonic Distortion V2N • Harmonic Distortion V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Line Voltage Distortion (THD)

This protocol reads the distortion ratio for total harmonics of line voltage V12 and line voltage V23 stored in register addresses 2816 and 2817.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage THD multiplying factor data (register address: 761).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• THD V12 • THD V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Line Voltage Distortion (3rd)

This protocol reads values of the distortion ratio for 3rd harmonics of line voltage V12 and line voltage V23 stored in register addresses 2819 and 2820.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the voltage THD multiplying factor data (register address: 761).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2819)	■Default Reads distortion values of 3rd harmonics of line voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 2819 + ((N-3) × 3) ÷ 2. N: Harmonics number (odd number from 5 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0B2DH to specify 2861. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonic Distortion V12 • Harmonic Distortion V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Current Distortion (THD)

This protocol reads values of the distortion ratio for total harmonics of phase current I1, phase current I2, phase current I3, and phase current IN stored in register addresses 3072 to 3075.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current THD multiplying factor data (register address: 760).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• THD I1 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

RD: Harmonics Current Distortion (3rd)

This protocol reads values of the distortion ratio for 3rd harmonics of current I1, current I2, current I3, and current IN stored in register addresses 3076 to 3079.

Unit is ×0.1%.

The measurement value can be obtained by multiplying the read data by "10^{n}".*1

*1 n is the current THD multiplying factor data (register address: 760).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10^{-3} = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number	■Default Reads distortion values of 3rd harmonics of line voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 3076 + (N-3) × 2. N: Harmonics number (odd number from 5 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0C3CH to specify 3132. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonic Distortion I1 • Harmonic Distortion I2 • Harmonic Distortion I3 • Harmonic Distortion IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

WR: Phase Wiring

This protocol writes the setting value of phase wiring to setup register address 512.

Setting data

Packet name	Element name	Description
Request	Phase Wiring*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Specify the following data.

Phase Wiring	Data
1P2W	0001H
1P3W_1N3	0002H
3P3W_2CT	0003H
3P4W	0004H
1P3W_1N2	0005H
3P3W_3CT	0006H

Precautions

Do not change values other than setting data.

WR: Primary Voltage

Write the setting value of primary voltage to setup register address 513.

Unit is V.

For the setting range, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Setting data

Packet name	Element name	Description
Request	Primary Voltage	Specify the device that stores the write data. The device uses two consecutive word devices.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Primary Voltage (L-N)

Write the primary voltage (L-N) value to setup register address 515.
Unit is ×0.1V.
For the setting range, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Setting data

Packet name	Element name	Description
Request	Primary Voltage (L-N)	Specify the device that stores the write data. The device uses two consecutive word devices.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

WR: Secondary Voltage

Write the setting value of secondary voltage to setup register address 517.
Unit is ×0.1V.
For the setting range, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Setting data

Packet name	Element name	Description
Request	Secondary Voltage	Specify the device that stores the write data. The device uses two consecutive word devices.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Primary Current

Write the setting value of primary current to setup register address 519.
Unit is ×0.1A.
For the setting range, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Setting data

Packet name	Element name	Description
Request	Primary Current	Specify the device that stores the write data. The device uses two consecutive word devices.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: 16 bits Set/Reset Register 1

This protocol writes the setting value of the 16 bits set/reset register 1 to register address 523.

Setting data

Packet name	Element name	Description
Request	16 bits Set/Reset Register 1*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Specify the following data. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Bit	Description	If the value is 1	If the value is 0
0	Reset of all alarm	Executed	—
1	Reset of all energy and all max/min value	Executed	—
2	Reset of all max/min value	Executed	—
3	Unusable	—	—
4	Set of digital output 1 (DO1)	Set	Reset
5	Set of digital output 2 (DO2)	Set	Reset
6	Unusable	—	—
7	Unusable	—	—
8	Reset of all digital input (DI) latch	Executed	—
9	Unusable	—	—
10	Unusable	—	—
11	Unusable	—	—
12	Unusable	—	—
13	Unusable	—	—
14	Reset of all energy	Executed	—
15	Unusable	—	—

Precautions

Do not change values other than setting data.

WR: Secondary Current

This protocol writes the setting value of the secondary current to the setup register address 581.
Unit is A.
For the setting range, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Setting data

Packet name	Element name	Description
Request	Secondary Current	Specify the device that stores the write data. The device uses two consecutive word devices.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Interval Time Constant

This protocol writes the setting value of the interval time constant to setup register address 583.
Unit is min.

Setting data

Packet name	Element name	Description
Request	Interval Time Constant	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- If the interval time constant is changed, the subinterval time constant is changed to 1min.

WR: Subinterval Time Constant

This protocol writes the setting value of the subinterval time constant to setup register address 584.
Unit is min.

Setting data

Packet name	Element name	Description
Request	Subinterval Time Constant	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When the subinterval time constant is changed, if the interval time constant cannot be divided by the subinterval time constant, an illegal data value error will occur.

WR: 16 bits Set/Reset Register 2

This protocol writes the setting value of the 16 bits set/reset register 2 to register address 585.

Setting data

Packet name	Element name	Description
Request	16 bits Set/Reset Register 2*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Specify the following data. For details, refer to ME series MODBUS Interface specifications (LSPM-0075H).

Bit	Description	If the value is 1	If the value is 0
0	Select of periodic active energy (period 1)	Select	Cancel
1	Select of periodic active energy (period 2)	Select	Cancel
2	Select of periodic active energy (period 3)	Select	Cancel
3	Unusable	—	—
4	Reset of periodic active energy (period 1)	Executed	—
5	Reset of periodic active energy (period 2)	Executed	—
6	Reset of periodic active energy (period 3)	Executed	—
7	Unusable	—	—
8	Reset of maximum value of rolling demand power	Executed	—
9	Reset of CO2 equivalent	Executed	—
10	Unusable	—	—
11	Unusable	—	—
12	Unusable	—	—
13	Unusable	—	—
14	Restart of rolling demand calculation	Executed	—
15	Unusable	—	—

Precautions

Do not change values other than setting data.

RD: Holding Registers

MODBUS standard function.

It reads the value to be stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number	Specify the device that stores the read register address.
	Number of Read Points	Specify the device that stores the number of read data points. Specify the device value in the range from 1 to 125.
Normal response	Read Data	Specify the device that stores the read data. Secure the maximum number of read points (125 words) for the device.
	Byte Swap	Change the byte exchange setting according to the specification of the external device.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

MODBUS standard function.

It writes a value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number	Specify the device that stores the write data. Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, to specify 3096, set 0C18H.
	Write Points	Set it to the number of data points to be written. Use a value in the range of 0001H to 007BH (1 to 123).
	Write Data	Set the data length to a value that is twice the number of write points. For example, if the number of write points is 123, set 246 points. Specify the device that stores the data to be written in write data. Modify the "Byte Swap" setting of non-conversion variable "Write Data" as necessary.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

15 PROTOCOLS SUPPORTED BY OMRON (V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN)

15.1 Setting Method

V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN

Communication with the V680S series uses the MODBUS/TCP communication function of the RFID system V680S series (V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN).

For the parameter setting method, refer to V680S series Reader/Writer (Modbus TCP) User's Manual by OMRON Corporation.

15.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Data	Reads data from the RF tag within the communication area.	To be added	Request
RD: ID	Reads the ID code from the RF tag within the communication area.	To be added	Request
RD: Tag Communications Option	Reads the reader/writer communication option settings (Once/Auto/FIFO Trigger).	Not to be added	Request
RD: Tag Communications Conditions	Reads the reader/writer communication conditions (High speed/Normal speed, Write verify).	Not to be added	Request
RD: Noise Level	Reads the noise level near the reader/writer.	To be added	Fixed Intrvl
RD: Operating Status	Reads the operating time of the reader/writer.	To be added	Fixed Intrvl
RD: Recent Error Query Information	Reads the information of the latest error that occurred in the reader/writer.	Not to be added	Request
RD: Communication Diagnostic Information	Reads the latest communication diagnostic information.	Not to be added	Request
WR: Data	Writes data to the RF tag within the communication area.	To be added	Request
WR: Copy Data	Copies data from the RF tag memory within the communication area of one reader/writer to the RF tag memory within the communication area of the other reader/writer.	Not to be added	Request
WR: Data Fill	Writes the specified number of words of the specified data from the specified start address.	To be added	Request
WR: Lock	Locks the specified memory of the RF tag.	Not to be added	Request
WR: Restore Data	Restores the RF tag data stored in the reader/writer.	Not to be added	Request
WR: Tag Communications Option	Writes the reader/writer communication option settings (Once/Auto/FIFO Trigger).	Not to be added	Request
WR: Tag Communications Conditions	Writes the reader/writer communication conditions (high-speed communication/standard communication, write verification).	Not to be added	Request
WR: STOP	Stops the operation of the reader/writer.	To be added	Request
WR: RESET	Resets the reader/writer.	To be added	Request
WR: Communication Diagnostic Setting	Enables or disables the communication diagnostic function.	Not to be added	Request
WR: Holding Registers*2	Writes the value to the MODBUS holding register device.	Not to be added	Request
RD: Holding Registers*2	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 This is a MODBUS standard function. This function can be used as a base when creating a protocol.

15.3 Details of Applicable Protocols

RD: Data

This protocol reads data for the specified number of words from the specified address of the RF tag within the communication area.

The default value is set to read one word from register number 0.

Setting data

Packet name	Element name	Description
Request	Register Address (0)	Rewrite to the start address of the data to be read. Specify the value within the range of 0000H (default) to 9FFFH as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1024, set 0400H.)
	Word Count (1)	Rewrite to the number of words of data to be read. Specify the value within the range of 0001H to 007DH (1 to 125) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH)
Normal response	Read Data	Rewrite the data length to the value of 2 × Word Count (1). (For example, if Word Count (1) is 125, specify 250) Specify the device that stores the read data. The number of words specified by Word Count (1) is used.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: ID

This protocol reads the ID code of the RF tag within the communication area.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ID Code	Specify the device that stores the read data. The device uses 4 words.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Tag Communications Option

This protocol reads the communication options (Once/Auto/FIFO Trigger) set in the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Tag Communications Option Setting*1	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Setting value	Tag communications option setting
0000H	Once
0001H	Auto
0002H	FIFO Trigger (no ID code check)
0012H	FIFO Trigger (with ID code check)

Precautions

Do not change values other than setting data.

RD: Tag Communications Conditions

This protocol reads the communication conditions (high-speed communication/standard communication, write verification status) set in the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Communications Speed*1 • Write Verification*2	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Setting value	Communications speed
0000H	High speed
0001H	Standard

*2 The following data is stored.

Setting value	Write verification
0000H	No
0001H	Yes

Precautions

Do not change values other than setting data.

RD: Noise Level

This protocol measures the average, maximum, and minimum noise levels near the reader/writer.
The value is read in the range of 0000H to 0063H (0 to 99).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Average Noise Level • Maximum Noise Level • Minimum Noise Level	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Operating Status

This protocol reads the operating status (mode and status information) of the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Mode*1 • Status Information*2	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Setting value	Mode
0000H	Safe mode
0001H	RUN mode
0002H	Slave mode

*2 The following data is stored.

Setting value	Status information
0000H	Initializing
0001H	Idling
0002H	Communicating with RF tag
0003H	Downloading
0004H	Error occurring
0005H	Shutting down

Precautions

Do not change values other than setting data.

RD: Recent Error Query Information

This protocol reads the latest error information from the reader/writer.

The latest error information is read as follows.

Parameter	Description
Operating Time	Displays the running time since the reader/writer started. (Unit: ms)
IP Address of Remote Node	Displays the IP address of the communication device. For example, 192.168.1.200 is displayed as C0A801C8H.
Query Error Code	For details, refer to V680S series Reader/Writer (Modbus TCP) User's Manual by OMRON Corporation.
Query Exception Code	
Communications Query Information Size	Displays the number of bytes of communication query information.
Communications Query Information	Displays the query executed when an error occurred.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Operating Time • IP Address of Remote Node • Query Error Code	Specify the device that stores the read data. The device uses 2 words.
	• Query Exception Code • Communications Query Information Size	Specify the device that stores the read data. The device uses 1 byte.
	Communications Query Information	Specify the device that stores the read data. The device uses 118 words.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Communication Diagnostic Information

This protocol reads the latest communication diagnostic information.

The communication diagnostic information is read as follows.

Parameter	Description
Operating Time	Displays the system operating time during communication diagnosis.
Query Type	For details, refer to V680S series Reader/Writer (Modbus TCP) User's Manual by OMRON Corporation.
Communications Result	
Diagnostic Result	
Send Power Level	Displays the Send Power Level value during communication diagnosis. The value is read in the range of 0 to 10. Among multiple Send Power Level values, the corrected minimum value of the DAC (10 bits) successfully communicated with the RF tag is read. If the communication result is "RF Tag missing error", it becomes 0000H (fixed).
Receive Power Level	Displays the Receive Power Level value during communication diagnosis. The value is read in the range of 0 to 10. The correction value of the ADC (10 bits) during communication with the RF tag (during response reception) is read. If the communication result is "RF Tag missing error", it becomes 0000H (fixed).
Noise Level	Displays the noise level value during communication diagnosis. The value is read in the range of 0 to 10. The ADC (10 bits) value before communicating with the RF tag is read.
Power Level	Displays the power level value during communication diagnosis. The value is read in the range of 0 to 10. The sum of Send Power Level and Receive Power Level is calculated using the following formula. (Send Power Level + Receive Power Level)÷2
Tag ID Data	Displays the tag ID of the RF tag identified during communication diagnosis. If the communication result is "RF Tag missing error", it becomes 0000000000000000H (fixed).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Time	Specify the device that stores the read data. The device uses 2 words.
	• Query Type • Communications Result • Diagnostic Result • Send Power Level • Receive Power Level • Noise Level • Power Level	Specify the device that stores the read data.
	Tag ID Data	Specify the device that stores the read data. The device uses 4 words.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- If the communication diagnostic setting is "Disabled", the communication diagnostic information will not be returned.

WR: Data

This protocol writes data to the RF tag within the communication area.
The default value is set to write 1 word of data to register number 0.

Setting data

Packet name	Element name	Description
Request	Register Address (0)	Rewrite to the write start address. Specify the value within the range of 0000H (default) to 9FFFH as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1024, set 0400H.)
	Word Count (1)	Rewrite to the number of words of the data to be written. Specify the value in the range of 0001H to 0071H (1 to 113) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 113, set 0071H)
	Write Data	Rewrite the data length to the value of 2 × Word Count (1). (For example, if Word Count (1) is 113, specify 226) Specify the device that stores the write data. The number of words specified by Word Count (1) is used.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Copy Data

This protocol uses two readers/writers to copy data from the RF tag within the communication area of one reader/writer (A) to the RF tag memory within the communication area of the other reader/writer (B).

Setting data

Packet name	Element name	Description
Request	Copy Address	Specify the device that stores the write start address of the copy destination RF tag. Use a value in the range of 0000H to 9FFFH.
	Copy Word Count	Specify the device that stores the number of words of copy data. Use a value in the range of 1 to 102.
	IP Address	Specify the device that stores the IP address of the copy destination reader/writer. The device uses 2 words. For example, to specify 192.168.1.200, set C0A801C8H.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Data Fill

This protocol writes data for the specified number of words from the specified start address.

Setting data

Packet name	Element name	Description
Request	Fill Address	Specify the device that stores the write start address of the RF tag. Use a value in the range of 0000H to 9FFFH.
	Number of Fill Words	Specify the device that stores the number of words of fill data. Use a value in the range of 0001H to FFFFH. When 0000H is specified, all areas are filled.
	Fill Data	Specify the device that stores the data to be written to the RF tag.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Lock

This protocol locks the memory of the specified RF tag.

Setting data

Packet name	Element name	Description
Request	Lock Number	Specify the device that stores the block number or sector number to be locked.
	Lock Count	Specify the device that stores the number of blocks or sectors to be locked.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Note that the locked memory cannot be written to again, nor can it be unlocked.

WR: Restore Data

This protocol restores the RF tag data stored in the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Restoration to the RF tag is executed only when an RF tag matching the retained tag ID exists within the communication area.

WR: Tag Communications Option

This protocol writes the communication options (Once/Auto/FIFO Trigger) set in the reader/writer.

Setting data

Packet name	Element name	Description
Request	Tag Communications Option Setting*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Store the following data.

Setting value	Tag communications option setting
0000H	Once
0001H	Auto
0002H	FIFO Trigger (no ID code check)
0012H	FIFO Trigger (with ID code check)

Precautions

Do not change values other than setting data.

WR: Tag Communications Conditions

This protocol writes the communication conditions (high-speed communication/standard communication, write verification status) set in the reader/writer.

Setting data

Packet name	Element name	Description
Request	• Communications Speed*1 • Write Verification*2	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Store the following data.

Setting value	Communications speed
0000H	High speed
0001H	Standard

*2 Store the following data.

Setting value	Write verification
0000H	No
0001H	Yes

Precautions

Do not change values other than setting data.

WR: STOP

This protocol stops the operation of the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: RESET

This protocol resets the reader/writer.

Setting data

Packet name	Element name	Description
Request	Option*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Store the following data.

Setting value	Option
0000H	Normal reset
FFFFH	Forced reset

Precautions

Do not change values other than setting data.

WR: Communication Diagnostic Setting

This protocol writes the communication diagnostic settings (communication diagnostic settings enable/disable).

Setting data

Packet name	Element name	Description
Request	Communication Diagnostic Setting*1	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*1 Store the following data.

Setting value	Communication diagnostic setting
0000H	Disabled
0001H	Enabled

Precautions

- Do not change values other than setting data.
- Communication diagnosis cannot be used together with the communication option "FIFO Trigger". Use with the communication option "Once" or "Auto".
- Enabling communication diagnostics increases the communication time by up to 200ms.

WR: Holding Registers

This is a MODBUS standard function.

It writes the value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register Address (0)	Rewrite to the register number to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1024, set 0400H.)
	Word Count (1)	Rewrite to the number of data to be written. Specify the value in the range of 0001H to 0071H (1 to 113) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 113, set 0071H)
	Write Data	Rewrite the data length to the value of 2 × Word Count (1). (For example, if Word Count (1) is 113, specify 226) Specify the device that stores the write data. The number of words specified by Word Count (1) is used.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Holding Registers

This is a MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register Address	Specify the device that stores the register number to be read.
	Word Count	Specify the device that stores the data points to be read. Use a value in the range of 0001H to 007DH (1 to 125).
Normal response	Read Data	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

16 PROTOCOLS SUPPORTED BY Keyence (TR-H, TR-W)

16.1 Setting Method

TR-H, TR-W

Use the MODBUS TCP communication function to communicate with the TR-H and TR-W series.

For the setting method of Keyence (touch panel recorder), refer to the following manuals provided by Keyence Corporation.

- Touch Panel Recorder TR-H/TR-W Series Setting Guide
- Touch Panel Recorder TR-H/TR-W Series Instruction Manual

16.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Temp Voltage CH Data (float) (CH1-CH8)	Reads the temperature voltage channel measurement data (float).	Not to be added	Fixed Intrvl
RD: Temp Voltage CH Data (short) (CH1-CH8)	Reads the temperature voltage channel measurement data (short).	To be added	Fixed Intrvl
RD: Temp Voltage CH Alarm State (CH1-CH8)	Reads the alarm state of the temperature voltage channel.	To be added	Fixed Intrvl
RD: Pulse CH Data (float) (CH1-CH4)	Reads the pulse channel measurement data (float).	Not to be added	Fixed Intrvl
RD: Pulse CH Data (short) (CH1-CH4)	Reads the pulse channel measurement data (short).	Not to be added	Fixed Intrvl
RD: Pulse CH Alarm State (CH1-CH4)	Reads the alarm state of the pulse channel.	Not to be added	Fixed Intrvl
RD: Modbus CH Data (float) (CH1-CH4)	Reads the Modbus channel measurement data (float).	Not to be added	Fixed Intrvl
RD: Modbus CH Data (short) (CH1-CH4)	Reads the Modbus channel measurement data (short).	Not to be added	Fixed Intrvl
RD: Modbus CH Alarm State (CH1-CH4)	Reads the alarm state of the Modbus channel.	Not to be added	Fixed Intrvl
RD: Calc. CH Data (float) (CH1-CH4)	Reads the calculation channel measurement data (float).	To be added	Fixed Intrvl
RD: Calc. CH Data (short) (CH1-CH4)	Reads the calculation channel measurement data (short).	Not to be added	Fixed Intrvl
RD: Calc. CH Alarm State (CH1-CH4)	Reads the alarm state of the calculation channel.	Not to be added	Fixed Intrvl
RD: External Relay State (1-16)	Read the external relay state.	Not to be added	Fixed Intrvl
RD: Internal Relay State (1-8)	Reads the internal relay state.	Not to be added	Fixed Intrvl
RD: Input Terminal State (1-16)	Reads the state of the input terminal.	Not to be added	Fixed Intrvl
RD: System State	Reads the state of the system.	Not to be added	Fixed Intrvl
RD: Unit Time	Reads the time of this machine.	Not to be added	Fixed Intrvl
WR: Modbus CH Data (short) (CH1-CH4)	Writes the Modbus channel measurement data (short).	Not to be added	Request
RD: Input Registers	Reads the value stored in the input register.	Not to be added	Request
WR: Holding Registers*2	Writes the value of the MODBUS holding register device.	Not to be added	Request

*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*2 MODBUS general purpose protocol. This function can be used as a base when creating a protocol.

16.3 Details of Applicable Protocols

RD: Temp Voltage CH Data (float) (CH1-CH8)

This protocols reads the value of the temperature voltage channel measurement data (float) (CH1-CH8) from input register addresses 300001 to 300016.

Setting data

Packet name	Element name	Description
Request	Start Address (300001)	The default value is set to read the temperature voltage measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 2 × (start channel number-1). Specify the value within the range of 0000H to 009EH (0 to 158) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the temperature voltage measurement data starting from channel 73, set 0090H.)
	Number of Registers (16)	The default value is set to read the value of the temperature voltage measurement data for 8 channels. When changing the number of channels, replace it with 2 × number of channels. Specify the value within the range of 0002H to 007CH (2 to 124) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 62 channels, set 007CH.)
Normal response	Temp Volt Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. For example, if "Number of Registers" is 124, specify 248. Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (300160 (009FH)).

RD: Temp Voltage CH Data (short) (CH1-CH8)

This protocol reads the value of the temperature voltage channel measurement data (short) (CH1-CH8) from input register addresses 300501 to 300508.

Setting data

Packet name	Element name	Description
Request	Start Address (300501)	The default value is set to read the temperature voltage measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 500 + (start channel number - 1). Specify the value within the range of 01F4H to 0243H (500 to 579) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the temperature voltage measurement data starting from channel 73, set 023CH.)
	Number of Registers (8)	The default value is set to read the value of the temperature voltage measurement data for 8 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 0050H (1 to 80) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 80 channels, set 0050H.)
Normal response	Temp Volt Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 80, specify 160.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (300580 (243H)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Temp Voltage CH Alarm State (CH1-CH8)

This protocol reads the temperature voltage channel alarm state (CH1-CH8) from input register addresses 300801 and 300802.

Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel number 1, 5, 9, …, 77.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	Number of Registers (2)	The default value is set to read the temperature voltage channel alarm state for 8 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0014H (1 to 20) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the alarm state of 80 channels, set 0014H.)
Normal response	Temp Volt Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 20, specify 40.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Pulse CH Data (float) (CH1-CH4)

This protocol reads the value of the pulse channel measurement data (float) (CH1-CH4) from input register addresses 301001 to 301008.

Setting data

Packet name	Element name	Description
Request	Start Address (301001)	The default value is set to read the value of the pulse channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 1000 + 2 × (start channel number - 1). Specify the value within the range of 03E8H to 03F6H (1000 to 1014) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the pulse channel measurement data starting from channel 5, set 03F0H.)
	Number of Registers (8)	The default value is set to read the value of the pulse channel measurement data for 4 channels. When changing the number of channels, replace it with 2 × number of channels. Specify the value within the range of 0002H to 0010H (2 to 16) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 8 channels, set 0010H.)
Normal response	Pulse Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 16, specify 32.) Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (301016 (3F7H)).

RD: Pulse CH Data (short) (CH1-CH4)

This protocol reads the value of the pulse channel measurement data (short) (CH1-CH4) from input register addresses 301501 to 301504.

Setting data

Packet name	Element name	Description
Request	Start Address (301501)	The default value is set to read the value of the pulse channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 1500 + (start channel number - 1). Specify the value within the range of 05DCH to 05E3H (1500 to 1507) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the pulse channel measurement data starting from channel 5, set 05E0H.)
	Number of Registers (4)	The default value is set to read the value of the pulse channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 0008H (1 to 8) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 8 channels, set 0008H.)
Normal response	Pulse Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 8, specify 16.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (301508 (5E3H)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Pulse CH Alarm State (CH1-CH4)

This protocol reads the pulse channel alarm state (CH1-CH4) from input register address 301801.

Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel numbers 1 and 5.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the pulse channel alarm state for 4 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0002H (1 to 2) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the alarm state of 8 channels, specify 0002H.)
Normal response	Pulse Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 2, specify 4.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Modbus CH Data (float) (CH1-CH4)

This protocol reads the value of the Modbus channel measurement data (float) (CH1-CH4) from input register addresses 322001 to 322008.

Setting data

Packet name	Element name	Description
Request	Start Address (322001)	The default value is set to read the value of the Modbus channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 22000 + (start channel number - 1) × 2. Specify the value within the range of 55F0H to 56EEH (22000 to 22254) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus channel measurement data starting from channel 125, set 56E8H.)
	Number of Registers (8)	The default value is set to read the value of the Modbus channel measurement data for 4 channels. When changing the number of channels, replace it with 2 × number of channels. Specify the value within the range of 0002H to 007CH (2 to 124) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 62 channels, set 007CH.)
Normal response	Modbus Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 124, specify 248.) Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (322256 (56EFH)).

RD: Modbus CH Data (short) (CH1-CH4)

This protocol reads the value of the Modbus channel measurement data (short) (CH1-CH4) from input register addresses 322501 to 322504.

Setting data

Packet name	Element name	Description
Request	Start Address (322501)	The default value is set to read the value of the Modbus channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 22500 + (start channel number - 1). Specify the value within the range of 57E4H to 5863H (22500 to 22627) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus channel measurement data starting from channel 125, set 5860H.)
	Number of Registers (4)	The default value is set to read the value of the Modbus channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 007DH (1 to 125) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 125 channels, set 007DH.)
Normal response	Modbus Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 125, specify 250.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (322628 (5863H)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Modbus CH Alarm State (CH1-CH4)

This protocol reads the Modbus channel alarm state (CH1-CH4) from input register address 322801.
Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel number 1, 5, 9, …, 125.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the Modbus channel alarm state for 4 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0020H (1 to 32) as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the alarm state of 128 channels, set 0020H.)
Normal response	Modbus Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 32, specify 64.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Calc. CH Data (float) (CH1-CH4)

This protocol reads the value of the calculation channel measurement data (float) (CH1-CH4) from input register addresses 323001 to 323008.

Setting data

Packet name	Element name	Description
Request	Start Address (323001)	The default value is set to read the value of the calculation channel measurement data from channel 1. To use this protocol on other channels, replace it with a value that is 23000 + 2 × (start channel number - 1). Specify the value within the range of 59D8H to 5A16H (23000 to 23062) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus data starting from channel 29, set 5A10H.)
	Number of Registers (8)	The default value is set to read the value of the calculation channel measurement data for 4 channels. When changing the number of channels, replace it with 2 × number of channels. Specify the value within the range of 0002H to 0040H (2 to 64) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the measurement data of 32 channels, set 0040H.)
Normal response	Calculation Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 64, specify 128.) Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (323064 (5A17H)).

RD: Calc. CH Data (short) (CH1-CH4)

This protocol reads the value of the calculation channel measurement data (short) (CH1-CH4) from input register addresses 323501 to 323504.

Setting data

Packet name	Element name	Description
Request	Start Address (323501)	The default value is set to read the value of the calculation channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 23500 + (start channel number - 1). Specify the value within the range of 5BCCH to 5BEBH (23500 to 23531) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the calculation channel measurement data starting from channel 29, set 5BE8H.)
	Number of Registers (4)	The default value is set to read the value of the calculation channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 0020H (1 to 32) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 32 channels, set 0020H.)
Normal response	Calculation Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 32, specify 64.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (323532 (5BEBH)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Calc. CH Alarm State (CH1-CH4)

This protocol reads the calculation channel alarm state (CH1-CH4) from input register address 323801.

Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel number 1, 5, 9, …, 29.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the calculation channel alarm state for 4 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0008H (1 to 8) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the alarm state of 32 channels, specify 0008H.)
Normal response	Calculation Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 8, specify 16.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: External Relay State (1-16)

This protocol reads the state of external relays from input register address 305001.

Each input register stores the state of 16 external relays as follows.

Bit No.	External relay No.
Bit 0	External relay 1
Bit 1	External relay 2
Bit 2	External relay 3
Bit 3	External relay 4
Bit 4	External relay 5
Bit 5	External relay 6
Bit 6	External relay 7
Bit 7	External relay 8
Bit 8	External relay 9
Bit 9	External relay 10
Bit 10	External relay 11
Bit 11	External relay 12
Bit 12	External relay 13
Bit 13	External relay 14
Bit 14	External relay 15
Bit 15	External relay 16

The state of a relay is stored as follows.

Setting value	Relay state
0	Off
1	On

16

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the state of external relays 1 to 16. When using the protocols of external relays 1 to 32, rewrite to 2.
Normal response	External Relay State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 2, specify 4.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Internal Relay State (1-8)

This protocol reads the internal relay state from input register address 305101.

The internal relay is stored as follows.

Bit No.	Internal relay No.
Bit 0	Internal relay 1
Bit 1	Internal relay 2
Bit 2	Internal relay 3
Bit 3	Internal relay 4
Bit 4	Internal relay 5
Bit 5	Internal relay 6
Bit 6	Internal relay 7
Bit 7	Internal relay 8
Bits 8 to 15	Not used

The state of a relay is stored as follows.

Setting value	Relay state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Internal Relay State	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Input Terminal State (1-16)

This protocol reads the input terminal state from input register address 305201.

The input state of the external terminal is stored as follows.

Bit No.	External terminal No
Bit 0	External terminal 1
Bit 1	External terminal 2
Bit 2	External terminal 3
Bit 3	External terminal 4
Bit 4	External terminal 5
Bit 5	External terminal 6
Bit 6	External terminal 7
Bit 7	External terminal 8
Bit 8	External terminal 9
Bit 9	External terminal 10
Bit 10	External terminal 11
Bit 11	External terminal 12
Bit 12	External terminal 13
Bit 13	External terminal 14
Bit 14	External terminal 15
Bit 15	External terminal 16

The state of a relay is stored as follows.

Setting value	Relay state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Input Terminal State	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: System State

This protocol reads the system state from input register address 309001.

Bit No.	System state
Bit 0	System error
Bit 1	Measurement error
Bit 2	Burnout
Bit 3	Communication error
Bit 4	Not used
Bit 5	Not used
Bit 6	Not used
Bit 7	Not used
Bit 8	Not used
Bit 9	Not used
Bit 10	Memory remaining capacity alarm
Bit 11	USB memory remaining capacity alarm
Bit 12	Collecting
Bit 13	Stopped
Bit 14	Not used
Bit 15	Not used

The system state is stored as follows.

Setting value	System state
0	The state does not occur.
1	The state occurs.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	System State	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Unit Time

This protocol reads "Year", "Month", "Day", "Hour", "Min", "Sec", and "Msec" as the time of this machine from input register addresses 309101 to 309107.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Year • Month • Day • Hour • Min • Sec • Msec	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Modbus CH Data (short) (CH1-CH4)

This protocol writes values from holding register addresses 422501 to 422504 to the Modbus channel measurement data (short) (CH1-CH4).

Setting data

Packet name	Element name	Description
Request	Start Address (422501)	The default values are set to write the value to the Modbus channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 22500 + (start channel number - 1). Specify the value within the range of 57E4H to 5863H (22500 to 22627) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus channel measurement data starting from channel 125, set 5860H.)
	Number of Registers (4)	The default value is set to write the value of the Modbus channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 007BH (1 to 123) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 123 channels, set 007BH.)
	Modbus Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 123, specify 246.) Specify the device that stores the read data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (422628 (5863H)).
- Channel data is written as a signed 16 bits integer. When writing 12.345, store 12345 in the device.

RD: Input Registers

MODBUS standard function.

It reads the value stored in the input register address.

Setting data

Packet name	Element name	Description
Request	Start Address	Specify the device that stores the register address to be read. For the register address, refer to the manual provided by Keyence Corporation (Touch Panel Recorder TR-H/TR-W Series Setting Guide 96M12442).
	Number of Registers	Specify the device that stores the number of data points to be read. Use a value in the range of 0001H to 007DH (1 to 125).
Normal response	Read Data	Specify the device that stores the read data. The default value is set to the maximum number of registers (125).
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

MODBUS standard function.

It writes the value to the holding register device.

Setting data

Packet name	Element name	Description
Request	Start Address (420401)	The default value is set to write to holding register address 420401. When using the protocol for other registers, rewrite to the value of the start address to be written. For details, refer to the manual provided by Keyence Corporation (Touch Panel Recorder TR-H/TR-W Series Setting Guide 96M12442).
	Number of Registers (1)	The default value is set to write as 1. Rewrite to the same value as the number of registers to be written. Use a value in the range of 0001H to 007BH (1 to 123).
	Changed Data	Rewrite the data length to a value that is 2 × "Number of Registers". (For example, if "Number of Registers" is 123, specify 246.) Specify the device that stores the write data. The number of devices used is the same as "Number of Registers".
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

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REVISIONS

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

Revision date	*Manual number	Description
June 2022	SH(NA)-082515ENG-A	First edition
December 2022	SH(NA)-082515ENG-B	■Added or modified parts Section 1.1, Chapter 10
May 2023	SH(NA)-082515ENG-C	■Added or modified parts Section 1.1, Chapter 11, 12, 13, 14, 15, 16

Japanese manual number: SH-082514-C

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

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