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.

MITSUBISHI ELECTRIC SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI ELECTRIC USER'S, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.

("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)

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# RELEVANT MANUALS

The following manuals are relevant to this product.

| Manual name [manual number] | Description |
|---|---|
| MELSEC iQ-R Simple Device Communication Library Reference Manual [SH-082515ENG] (this manual) | Simple device communication library protocol |
| 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 |
| MELSEC iQ-R Ethernet User's Manual (Application) [SH-081257ENG] | Functions, parameter settings, programming, troubleshooting, I/O signals, and buffer memory of Ethernet |
| SLMP Reference Manual [SH-080956ENG] | A protocol for accessing an SLMP-compatible device from an external device (such as a personal computer or HMI (Human Machine Interface)) or an SLMP-compatible module (such as the Ethernet-equipped module or CC-Link IE TSN modules) |

# 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<br>• DX200<br>• FS100 | 10040 | UDP | "1.075D" or later |
| Mitsubishi Electric | Industrial robot | CR800 | 45237 | UDP | "1.075D" or later |
| FANUC | Industrial robot | R-30iB | 502 | TCP Active | "1.085P" or later |
| UNIVERSAL ROBOTS | Industrial robot | • UR3e<br>• UR5e<br>• UR10e<br>• UR16e | 502 | TCP Active | "1.085P" or later |
| RKC INSTRUMENT | Temperature controller | FB series<br>• FB100<br>• FB400<br>• FB900 | 502 | TCP Active | "1.085P" or later |
| RKC INSTRUMENT | Temperature controller | SRZ series (COM-JL)<br>• Z-TIO<br>• Z-DIO | 502 | TCP Active | "1.085P" or later |
| RKC INSTRUMENT | Temperature controller | SRZ series (COM-ME-1)<br>• Z-TIO<br>• Z-DIO | 502 | TCP Active | "1.085P" or later |
| Azbil | Temperature controller | • NX-D<br>• NX-S<br>• NX-DX<br>• NX-DY | 502 | TCP Active | "1.085P" or later |
| Yokogawa Electric | Temperature controller | UTAdvanced<br>• UT75A<br>• UT55A<br>• UT35A<br>• UP55A<br>• UP35A | 502 | TCP Active | "1.090U" or later |
| Mitsubishi Electric | MDU breaker | • NF250<br>• NF400<br>• NF630<br>• NF800 *1 | 502 | TCP Active | "1.095Z" or later |
| Mitsubishi Electric | Energy measuring module | EcoMonitorLight<br>• EMU4-BD1-MB<br>• EMU4-HD1-MB | 502 | TCP Active | "1.095Z" or later |
| Mitsubishi Electric | Energy measuring module | EcoMonitorPlus<br>• EMU4-BM1-MB<br>• EMU4-HM1-MB<br>• EMU4-A2<br>• EMU4-VA2<br>• EMU4-AX4<br>• EMU4-PX4 | 502 | TCP Active | "1.095Z" or later |
| Mitsubishi Electric | Electronic multi-indicating instrument | ME96 Series<br>• ME96SSRB-MB<br>• ME96SSHB-MB | 502 | TCP Active | "1.095Z" or later |
| Omron | RFID system | V680S series<br>• V680S-HMD63-ETN<br>• V680S-HMD64-ETN<br>• 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<br>• TR-W | 502 | TCP Active | "1.095Z" or later |
| Omron | Switching power supply | S8VK-X | 502 | TCP Active | "1.100E" or later |
| Yokogawa Electric | Recorder | • GP10<br>• GX10 | 502 | TCP Active | "1.100E" or later |
| Japan Steel Works | Injection molding machine | J-ADS | 502 | TCP Active | "1.100E" or later |
| General-purpose protocol | MODBUS/TCP (general purpose) | MODBUS/TCP (general purpose) | 502 | TCP Active | "1.100E" or later |
| Mitsubishi Electric | Energy measuring module | EcoMonitorLight<br>• EMU4-BD1A-MB<br>• EMU4-HD1A-MB | 502 | TCP Active | "1.100E" or later |
| UNIVERSAL ROBOTS | Industrial robot | • UR3e<br>• UR5e<br>• UR10e<br>• UR16e<br>(Dashboard server) | 29999 | TCP Active | "1.100E" or later |
| Omron | RFID system | V780 series<br>• V780-HMD68-ETN-** | 502 | TCP Active | "1.105K" or later |
| Silex Technology | Protocol converter | • FBR-100AN<br>• FBR-100 | 502 | TCP Active | "1.105K" or later |
| SATO | Barcode printer | • CL4NX(-J) Plus<br>• CL6NX(-J) Plus | 9100 | TCP Active | "1.110Q" or later |
| NACHI-FUJIKOSHI | Industrial robot | FD controller | 10030 | TCP Active | "1.110Q" or later |
| Sumitomo Heavy Industries | Injection molding machine | SE-EV* | 33333 | TCP Active | "1.110Q" or later |
| Sumitomo Heavy Industries | Injection molding machine | SE* | 33333 | TCP Active | "1.115V" or later |
| TOYO INNOVEX | Injection molding machine | • Si-6S<br>• Si-6 | 8200 | TCP Active | "1.115V" or later |
| DENSO WAVE | Industrial robot | RC8 | 5007 | TCP Active | "1.115V" or later |
| General-purpose protocol | SLMP | SLMP | 45237 | TCP Active | "1.115V" 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<br>• Alarm Data<br>• Alarm Type<br>• Alarm Time (String: 16 characters)<br>• Alarm String Name (String: 32 characters) | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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<br>• Alarm Data<br>• Alarm Type<br>• Alarm Time (String: 16 characters)<br>• Alarm String Name (String: 32 characters) | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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<br>• Alarm Data<br>• Alarm Type<br>• Alarm Time (String: 16 characters)<br>• Alarm String Name (String: 32 characters) | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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<br>• Data 2 | Specify the device for storing the read data.*1 |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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))<br>• Line No. (0 to 9999)<br>• Step No. (1 to 9998)<br>• Speed Override Value | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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<br>• 2nd Coordinate Name<br>• 3rd Coordinate Name<br>• 4th Coordinate Name<br>• 5th Coordinate Name<br>• 6th Coordinate Name<br>• 7th Coordinate Name<br>• 8th Coordinate Name | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Form<br>• Tool No.<br>• User Coordinate No.<br>• Extension Form<br>• 1st Axis Data<br>• 2nd Axis Data<br>• 3rd Axis Data<br>• 4th Axis Data<br>• 5th Axis Data<br>• 6th Axis Data<br>• 7th Axis Data<br>• 8th Axis Data | Specify the device for storing the read data.*1 |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Normal response (6 Axes) | • Data type (0: Pulse/16: Base Coordinate)<br>• Form<br>• Tool No.<br>• User Coordinate No.<br>• Extension Form<br>• 1st Axis Data<br>• 2nd Axis Data<br>• 3rd Axis Data<br>• 4th Axis Data<br>• 5th Axis Data<br>• 6th Axis Data<br>• 7th Axis Data | Specify the device for storing the read data.<br>0 is stored in "Form" and "Extension Form". |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Normal response (6 Axes) | • 1st Axis Data<br>• 2nd Axis Data<br>• 3rd Axis Data<br>• 4th Axis Data<br>• 5th Axis Data<br>• 6th Axis Data<br>• 7th Axis Data | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Normal response (6 Axes) | • 1st Axis Data<br>• 2nd Axis Data<br>• 3rd Axis Data<br>• 4th Axis Data<br>• 5th Axis Data<br>• 6th Axis Data<br>• 7th Axis Data | Specify the device for storing the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>Logical numbers (values obtained from dividing the logical numbers by 10) that can be specified are as listed below.<br>• 1 to 512: Robot general input signal<br>• 1001 to 1512: Robot general output signal<br>• 2001 to 2512: External input signal<br>• 2701 to 2956: Network input signal<br>• 3001 to 3512: External output signal<br>• 3701 to 3956: Network output signal<br>• 4001 to 4256: Robot specific input signal<br>• 5001 to 5512: Robot specific output signal<br>• 6001 to 6064: Interface panel input signal<br>• 7001 to 7999: Auxiliary relay signal<br>• 8001 to 8512: Robot control status signal<br>• 8701 to 8720: Pseudo input signal |
| Normal response | IO Data Read Value | Specify the device for storing the read data.<br>The data size to be read is one-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>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.<br>The data size to be written is one-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be read is two-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is two-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be read is one-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is one-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be read is two-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is two-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be read is four-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is four-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be read is four-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is four-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be read is 16-byte fixed. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is 16-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The type numbers and types of the control time that can be specified are as listed below.<br>• 1: Control power ON time<br>• 10: Servo power ON time (TOTAL)<br>• 11 to 18: Servo power ON time (R1 to R8)<br>• 21 to 44: Servo power ON time (S1 to S24)<br>• 110: Playback time (TOTAL)<br>• 111 to 118: Playback time (R1 to R8)<br>• 121 to 144: Playback time (S1 to S24)<br>• 210: Moving time (TOTAL)<br>• 211 to 218: Moving time (R1 to R8)<br>• 221 to 244: Moving time (S1 to S24)<br>• 301 to 308: Operation time (Application 1 to 8) |
| Normal response | • Start Time (yyyy/mm/dd hh:mm)<br>• Elapsed Time (000000:00'00) | Specify the device that stores the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The system type numbers and system types that can be specified are as listed below.<br>• 11 to 18: Type information (R1 to R8)<br>• 21 to 44: Type information (S1 to S24)<br>• 101 to 108: Application information (Application 1 to 8) |
| Normal response | • System Software Version<br>• Model/Application<br>• Parameter Version | Specify the device that stores the read data. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>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)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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.<br>The data size to be written is 32-byte fixed. |
| Normal response | — | No setting is required. |
| Error response | • Status (0: Normal, Others: Error)<br>• Additional Status Size (0: 0, 1: 1, 2: 2 (WORD))<br>• 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*.<br>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*.<br>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*.<br>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*.<br>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<br>• Y coordinate value<br>• Z coordinate value<br>• A coordinate value<br>• B coordinate value<br>• C coordinate value<br>• L1 coordinate value<br>• L2 coordinate value<br>• Structure flag*1<br>• 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<br>• 1: Right | • 0: Below<br>• 1: Above | • 0: Flip<br>• 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*.<br>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<br>• J2 coordinate value<br>• J3 coordinate value<br>• J4 coordinate value<br>• J5 coordinate value<br>• J6 coordinate value<br>• J7 coordinate value<br>• J8 coordinate value | Specify the device for storing the read data. |
| Error response | Error Code | Specify the device for storing the error code. |

**Point**

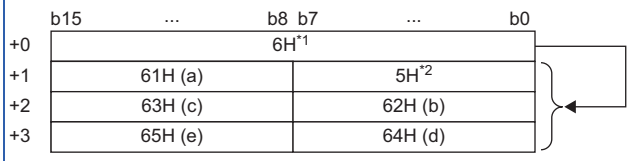
- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- For details on DDEVVL*, refer to the following.

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*.<br>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".<br>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.)<br>  <br>*1: Read data length (byte)<br>*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*.<br>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*.<br>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<br>• Y coordinate value<br>• Z coordinate value<br>• A coordinate value<br>• B coordinate value<br>• C coordinate value<br>• L1 coordinate value<br>• L2 coordinate value<br>• Structure flag*1<br>• 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<br>• 1: Right | • 0: Below<br>• 1: Above | • 0: Flip<br>• 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*.<br>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<br>• J2 coordinate value<br>• J3 coordinate value<br>• J4 coordinate value<br>• J5 coordinate value<br>• J6 coordinate value<br>• J7 coordinate value<br>• 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**

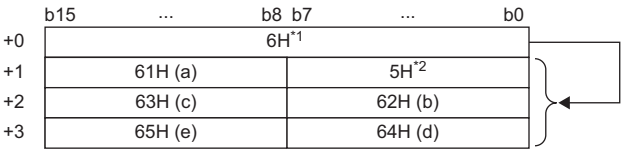
- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- Set the element 1: variable type of DDEVVL* to the program external variable (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*.<br>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.)<br>  <br><br>*1: Write data length (byte)<br>*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<br>• Error Date (Year)<br>• Error Date (Month)<br>• Error Date (Day)<br>• Error Date (Hour)<br>• Error Date (Minute)<br>• Error Date (Second)<br>• 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<br>• Self-diagnostic Error Code 2<br>• Self-diagnostic Error Code 3<br>• Self-diagnostic Error Code 4<br>• Self-diagnostic Error Code 5<br>• Self-diagnostic Error Code 6<br>• Self-diagnostic Error Code 7<br>• Self-diagnostic Error Code 8<br>• Self-diagnostic Error Code 9<br>• Self-diagnostic Error Code 10<br>• Self-diagnostic Error Code 11<br>• Self-diagnostic Error Code 12<br>• Self-diagnostic Error Code 13<br>• Self-diagnostic Error Code 14<br>• Self-diagnostic Error Code 15<br>• 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<br>• Error Date (b15 to 8: Year, b7 to 0: Month)<br>• Error Date (b15 to 8: Day, b7 to 0: Hour)<br>• 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 70 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<br>• Line No.<br>• Execution status<br>• 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 70 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<br>• Servo-on Time: Group 1<br>• Program Operating Time: Group 1<br>• Program Standby Time: Group 1<br>• 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 70 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<br>• 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 70 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]<br>• 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]<br>• 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]<br>• 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]<br>• 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]<br>• 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]<br>• 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>Write one of the following to the specified device.<br>• On: FF00H<br>• 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.<br>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.<br>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.<br>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.<br>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.<br>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 Registers[*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)<br>• 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<br>• 1: Confirm_safety<br>• 2: Booting<br>• 3: Power_off<br>• 4: Power_on<br>• 5: Idle<br>• 6: Backdrive<br>• 7: Running |
| | For CB2 (2nd generation) | • -1 (FFFFH): Running<br>• 0: No_controller<br>• 1: Freedrive<br>• 2: Ready<br>• 3: Initializing<br>• 4: Security_stopped<br>• 5: Emergency_stopped<br>• 6: Fault<br>• 8: Not_connected<br>• 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<br>• Protective Stop<br>• Emergency Stop<br>• Free Drive<br>• Power Button<br>• 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)<br>• 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<br>• EDH (237): JOINT_PART_D_CALIBRATION_MODE<br>• EEH (238): JOINT_BACKDRIVE_MODE<br>• EFH (239): JOINT_POWER_OFF_MODE<br>• F5H (245): JOINT_NOT_RESPONDING_MODE<br>• F6H (246): JOINT_MOTOR_INITIALISATION_MODE<br>• F7H (247): JOINT_BOOTING_MODE<br>• F8H (248): JOINT_PART_D_CALIBRATION_ERROR_MODE<br>• F9H (249): JOINT_BOOTLOADER_MODE<br>• FAH (250): JOINT_CALIBRATION_MODE<br>• FCH (252): JOINT_FAULT_MODE<br>• FDH (253): JOINT_RUNNING_MODE<br>• 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<br>• Second<br>• Minute<br>• Hour<br>• 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 96 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 99 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.<br>Write one of the following to the specified device.<br>• On: FF00H<br>• 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 98 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 102 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.<br>Write one of the following to the specified device.<br>• On: FF00H<br>• 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 101 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.<br>Store one of the following to the specified device.<br>• 0H (mA)<br>• 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.<br>Store one of the following to the specified device.<br>• 0H (mA)<br>• 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.<br>Store one of the following to the specified device.<br>• 0H (mA)<br>• 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.<br>Store one of the following to the specified device.<br>• 0H (mA)<br>• 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]<br>• 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<br>• 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]<br>• 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<br>• 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]<br>• 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<br>• 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]<br>• 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<br>• 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.<br>Store one of the following to the specified device.<br>• 0000H (0V)<br>• 000CH (12V)<br>• 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>Write one of the following to the specified device.<br>• On: FF00H<br>• 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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).)<br>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.<br>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.)<br>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).)<br>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.<br>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.)<br>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).)<br>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.<br>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.)<br>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).)<br>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.<br>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.)<br>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).)<br>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.<br>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.)<br>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).)<br>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.<br>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.<br>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).<br>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)).<br>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)<br>• Measured Value (PV) (CH2)<br>• Measured Value (PV) (CH3)<br>• 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)).<br>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)<br>• MV [heat-side] (CH2)<br>• MV [heat-side] (CH3)<br>• 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)).<br>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)<br>• MV [cool-side] (CH2)<br>• MV [cool-side] (CH3)<br>• 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)).<br>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)<br>• Set Value (SV) (CH2)<br>• Set Value (SV) (CH3)<br>• 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)).<br>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<br>• Comprehensive Event State (CH2)*1<br>• Comprehensive Event State (CH3)*1<br>• 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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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.<br>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.<br>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).<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>Specify the device for storing the read data.<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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.<br>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.)<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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)).<br>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.<br>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.<br>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).<br>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<br>• Alarm Information 2*2<br>• Alarm Information 3*3<br>• 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.<br>• Loop 2: 381CH<br>• Loop 3: 3824H<br>• 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.<br>• Loop 2: 381DH<br>• Loop 3: 3825H<br>• 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.<br>• Loop 2: 381EH<br>• Loop 3: 3826H<br>• 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<br>• Event 2<br>• Event 3<br>• Event 4<br>• Event 5<br>• Event 6<br>• Event 7<br>• Event 8<br>• Event 9<br>• Event 10<br>• Event 11<br>• Event 12<br>• Event 13<br>• Event 14<br>• Event 15<br>• 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.<br>• Loop 2: 2855H<br>• Loop 3: 2865H<br>• 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<br>• CT2 Heater Line Break Detection<br>• CT3 Heater Line Break Detection<br>• 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<br>• CT2 Overcurrent Detection<br>• CT3 Overcurrent Detection<br>• 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<br>• CT2 Short-circuit Detection<br>• CT3 Short-circuit Detection<br>• 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<br>• CT2 Measured Current When Output ON<br>• CT3 Measured Current When Output ON<br>• 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<br>• CT2 Measured Current When Output OFF<br>• CT3 Measured Current When Output OFF<br>• 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.<br>• Loop 2: 3A0CH<br>• Loop 3: 3A18H<br>• Loop 4: 3A24H |
| Normal response | • P Band<br>• I Time<br>• 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.<br>• Loop 2: 3909H<br>• Loop 3: 3911H<br>• 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.<br>• Loop 2: 390BH<br>• Loop 3: 3913H<br>• 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.<br>• Loop 2: 390BH<br>• Loop 3: 3913H<br>• 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.<br>• Loop 2: 390DH<br>• Loop 3: 3915H<br>• 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.<br>• Loop 2: 390DH<br>• Loop 3: 3915H<br>• 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.<br>• Loop 2: 236CH<br>• Loop 3: 238CH<br>• Loop 4: 23ACH |
| | • Bias<br>• 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)).<br>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<br>• 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.<br>• Loop 2: 2BA4H<br>• Loop 3: 2BB4H<br>• 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.<br>• Loop 2: 2BA5H<br>• Loop 3: 2BB5H<br>• 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.<br>• Loop 2: 2BA6H<br>• Loop 3: 2BB6H<br>• 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.<br>• Loop 2: 3A0CH<br>• Loop 3: 3A18H<br>• Loop 4: 3A24H |
| | • P Band<br>• I Time<br>• 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<br>• 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<br>• 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<br>• 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<br>• Minor Malfunction Flag<br>• 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<br>• Alarm Information 2*2<br>• Alarm Information 3*3<br>• 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)<br>• Pulse Estimate Value 1 (H)<br>• Pulse Estimate Value 2 (L)<br>• Pulse Estimate Value 2 (H)<br>• Pulse Estimate Value 3 (L)<br>• Pulse Estimate Value 3 (H)<br>• Pulse Estimate Value 4 (L)<br>• Pulse Estimate Value 4 (H)<br>• Pulse Estimate Value 5 (L)<br>• Pulse Estimate Value 5 (H)<br>• Pulse Estimate Value 6 (L)<br>• Pulse Estimate Value 6 (H)<br>• Pulse Estimate Value 7 (L)<br>• Pulse Estimate Value 7 (H)<br>• Pulse Estimate Value 8 (L)<br>• 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)<br>• Pulse Estimate Value 9 (H)<br>• Pulse Estimate Value 10 (L)<br>• Pulse Estimate Value 10 (H)<br>• Pulse Estimate Value 11 (L)<br>• Pulse Estimate Value 11 (H)<br>• Pulse Estimate Value 12 (L)<br>• Pulse Estimate Value 12 (H)<br>• Pulse Estimate Value 13 (L)<br>• Pulse Estimate Value 13 (H)<br>• Pulse Estimate Value 14 (L)<br>• Pulse Estimate Value 14 (H)<br>• Pulse Estimate Value 15 (L)<br>• Pulse Estimate Value 15 (H)<br>• Pulse Estimate Value 16 (L)<br>• 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<br>• Pulse Instant Value 2<br>• Pulse Instant Value 3<br>• Pulse Instant Value 4<br>• Pulse Instant Value 5<br>• Pulse Instant Value 6<br>• Pulse Instant Value 7<br>• Pulse Instant Value 8<br>• Pulse Instant Value 9<br>• Pulse Instant Value 10<br>• Pulse Instant Value 11<br>• Pulse Instant Value 12<br>• Pulse Instant Value 13<br>• Pulse Instant Value 14<br>• Pulse Instant Value 15<br>• 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)).<br>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)<br>• Estimate Count Value (H)<br>• Instant Count Value (L)<br>• 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)).<br>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)).<br>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)).<br>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<br>• Alarm Information 2*2<br>• Alarm Information 3*3<br>• 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<br>• DO Terminal ON/OFF Data 2<br>• DO Terminal ON/OFF Data 3<br>• DO Terminal ON/OFF Data 4<br>• DO Terminal ON/OFF Data 5<br>• DO Terminal ON/OFF Data 6<br>• DO Terminal ON/OFF Data 7<br>• DO Terminal ON/OFF Data 8<br>• DO Terminal ON/OFF Data 9<br>• DO Terminal ON/OFF Data 10<br>• DO Terminal ON/OFF Data 11<br>• DO Terminal ON/OFF Data 12<br>• DO Terminal ON/OFF Data 13<br>• DO Terminal ON/OFF Data 14<br>• DO Terminal ON/OFF Data 15<br>• 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.<br>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.<br>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<br>0: Off<br>1: On |
| 1 | OUT_AL2 | AL2 terminal status<br>0: Off<br>1: On |
| 2 | OUT_AL3 | AL3 terminal status<br>0: Off<br>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.<br>• E1 terminal area: 1DB1H<br>• E2 terminal area: 1DB2H<br>• E3 terminal area: 1DB3H<br>• 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.<br>• E2 terminal area: 1DBCH<br>• E3 terminal area: 1DBDH<br>• 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.<br>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.<br>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.<br>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.<br>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.<br>Off: 0000H<br>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.<br>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.<br>Specify the value of each bit in the following.<br>Off: 0<br>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.<br>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.<br>• Phase 1 Current (I1)<br>• Phase 2 Current (I2)<br>• Phase 3 Current (I3)<br>• Phase N Current (IN)<br>• Average Current | To be added | Fixed Intrvl |
| RD: Demand Current | Reads the following values.<br>• Demand Current Phase 1 (I1)<br>• Demand Current Phase 2 (I2)<br>• Demand Current Phase 3 (I3)<br>• Demand Current Phase N (IN) | Not to be added | Fixed Intrvl |
| RD: Line Voltage | Reads the following values.<br>• Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• Average Voltage (L-L) | To be added | Fixed Intrvl |
| RD: Phase Voltage | Reads the following values.<br>• Voltage V1N<br>• Voltage V2N<br>• 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.<br>• Total Harmonics Current Phase 1 (I1)<br>• Total Harmonics Current Phase 2 (I2)<br>• Total Harmonics Current Phase 3 (I3)<br>• Total Harmonics Current Phase N (IN) | Not to be added | Fixed Intrvl |
| RD: Fundamental Current | Reads the following values.<br>• Fundamental Current Phase 1 (I1)<br>• Fundamental Current Phase 2 (I2)<br>• Fundamental Current Phase 3 (I3)<br>• Fundamental Current Phase N (IN) | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (3rd) | Reads the following values.<br>• Harmonics Current Phase 1 (I1)<br>• Harmonics Current Phase 2 (I2)<br>• Harmonics Current Phase 3 (I3)<br>• 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)<br>• Phase 2 Current (I2)<br>• Phase 3 Current (I3)<br>• Phase N Current (IN)<br>• 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)<br>• Demand Current Phase 2 (I2)<br>• Demand Current Phase 3 (I3)<br>• 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<br>• Voltage V23<br>• Voltage V31<br>• 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<br>• Voltage V2N<br>• 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)<br>• Total Harmonics Current Phase 2 (I2)<br>• Total Harmonics Current Phase 3 (I3)<br>• 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)<br>• Fundamental Current Phase 2 (I2)<br>• Fundamental Current Phase 3 (I3)<br>• 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.<br>When another harmonic protocol is used, set the following start address.<br>• 5th: 090CH<br>• 7th: 0910H<br>• 9th: 0914H<br>• 11th: 0918H<br>• 13th: 091CH<br>• 15th: 0920H<br>• 17th: 0924H<br>• 19th: 0928H |
| Normal response | • Harmonics Current Phase 1 (I1)<br>• Harmonics Current Phase 2 (I2)<br>• Harmonics Current Phase 3 (I3)<br>• 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.<br>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.<br>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.<br>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.<br>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.)<br>Specify the device that stores the write data. The number of words specified by the "Number of Register (1)" is used.<br>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.<br>• Phase 1 Current<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• Average Value Current | To be added | Fixed Intrvl |
| RD: Phase Current Demand | Reads the following instantaneous values.<br>• Phase 1 Current Demand<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• Neutral Current Demand | To be added | Fixed Intrvl |
| RD: Line Voltage | Reads the following instantaneous values.<br>• Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• 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.<br>• Voltage V1N<br>• Voltage V2N<br>• 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.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage (1st) | Reads the following instantaneous values.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage (Total) | Reads the following instantaneous values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage (1st) | Reads the following instantaneous values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (Total) | Reads the following instantaneous values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (1st) | Reads the following instantaneous values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage Distortion (Total) | Reads the following instantaneous values.<br>• THD V1N<br>• THD V2N<br>• THD V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage Distortion (3rd) | Reads the following instantaneous values.<br>• Harmonics Ratio V1N<br>• Harmonics Ratio V2N<br>• Harmonics Ratio V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage Distortion (Total) | Reads the following instantaneous values.<br>• THD V12<br>• 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.<br>• Harmonics Ratio V12<br>• Harmonics Ratio V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Current Content Rate (Total) | Reads the following instantaneous values.<br>• THD I1<br>• THD I2<br>• THD I3<br>• THD IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Current Content Rate (3rd) | Reads the following instantaneous values.<br>• Harmonics Ratio I1<br>• Harmonics Ratio I2<br>• Harmonics Ratio I3<br>• 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.<br>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.<br>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 the 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.<br>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.<br>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 the 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 the 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<br>• Voltage<br>• Electric Power<br>• Electric Energy<br>• Power Factor<br>• Frequency<br>• Content Rate of Harmonic Current<br>• Content Rate of Harmonic Voltage<br>• 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<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• 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 the 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<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• 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 the 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<br>• Voltage V23<br>• Voltage V31<br>• 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 the 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<br>• Voltage V2N<br>• 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 the 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 the 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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 the 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.<br>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 the 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.<br>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<br>• Harmonics Value V2N<br>• 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 the 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.<br>• 3rd: 0706H<br>• 5th: 0709H<br>• 7th: 070CH<br>• 9th: 070FH<br>• 11th: 0712H<br>• 13th: 0715H |
| Normal response | • Harmonics Value V1N<br>• Harmonics Value V2N<br>• 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 the 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<br>• 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 the 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.<br>• 3rd: 0806H<br>• 5th: 0809H<br>• 7th: 080CH<br>• 9th: 080FH<br>• 11th: 0812H<br>• 13th: 0815H |
| Normal response | • Harmonics Value V12<br>• 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 the 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<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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 the 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.<br>• 3rd: 0908H<br>• 5th: 090CH<br>• 7th: 0910H<br>• 9th: 0914H<br>• 11th: 0918H<br>• 13th: 091CH |
| Normal response | • Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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 the 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<br>• THD V2N<br>• 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 the 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.<br>• 5th: 0A06H<br>• 7th: 0A09H<br>• 9th: 0A0CH<br>• 11th: 0A0FH<br>• 13th: 0A12H |
| Normal response | • Harmonics Ratio V1N<br>• Harmonics Ratio V2N<br>• 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 the 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<br>• 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 the 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.<br>• 5th: 0B06H<br>• 7th: 0B09H<br>• 9th: 0B0CH<br>• 11th 0B0FH<br>• 13th: 0B12H |
| Normal response | • Harmonics Ratio V12<br>• 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 the 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<br>• THD I2<br>• THD I3<br>• 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 the 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.<br>• 5th: 0C08H<br>• 7th: 0C0CH<br>• 9th: 0C10H<br>• 11th: 0C14H<br>• 13th: 0C18H |
| Normal response | • Harmonics Ratio I1<br>• Harmonics Ratio I2<br>• Harmonics Ratio I3<br>• 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 the 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.<br>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.<br>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 the 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.<br>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.<br>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 the 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 the 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.<br>The device uses 2 words.<br>• Set the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Set electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>The device uses 2 words.<br>• Set the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Set electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>The device uses 2 words.<br>• Set the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Set electric energy = 123.456kvarh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>The device uses 2 words.<br>• Set the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Set electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>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 the 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.<br>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.<br>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.<br>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.<br>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.<br>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.)<br>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.<br>• Phase 1 Current<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• Average Value Current | To be added | Fixed Intrvl |
| RD: [EMU4-*M1] Phase Current Demand | Reads the following instantaneous values.<br>• Phase 1 Current Demand<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• Neutral Current Demand | To be added | Fixed Intrvl |
| RD: [EMU4-*M1] Line Voltage | Reads the following instantaneous values.<br>• Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• Average Value Voltage (L-L) | To be added | Fixed Intrvl |
| RD: [EMU4-*M1] Phase Voltage | Reads the following instantaneous values.<br>• Voltage V1N<br>• Voltage V2N<br>• 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.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Harmonics Phase Voltage (1st) | Reads the following instantaneous values.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Harmonics Line Voltage (Total) | Reads the following instantaneous values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Harmonics Line Voltage (1st) | Reads the following instantaneous values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Harmonics Current (Total) | Reads the following instantaneous values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Harmonics Current (1st) | Reads the following instantaneous values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Distortion of HPV (Total) | Reads the following instantaneous values.<br>• THD V1N<br>• THD V2N<br>• THD V3N | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Distortion of HPV (3rd) | Reads the following instantaneous values.<br>• Harmonics Ratio V1N<br>• Harmonics Ratio V2N<br>• Harmonics Ratio V3N | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Distortion of HLV (Total) | Reads the following instantaneous values.<br>• THD V12<br>• THD V23 | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Distortion of HLV (3rd) | Reads the following instantaneous values.<br>• Harmonics Ratio V12<br>• Harmonics Ratio V23 | Not to be added | Fixed Intrvl |
| RD: [EMU4-*M1] Distortion of HCC (Total) | Reads the following instantaneous values.<br>• THD I1<br>• THD I2<br>• THD I3<br>• 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.<br>• Harmonics Ratio I1<br>• Harmonics Ratio I2<br>• Harmonics Ratio I3<br>• 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.<br>• Phase 1 Current<br>• Phase 2 Current<br>• Phase 3 Current<br>• Phase N Current<br>• Average Value Current | Not to be added | Fixed Intrvl |
| RD: [EMU4-*A2] Phase Current Demand | Reads the following instantaneous values.<br>• Phase 1 Current Demand<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• Neutral Current Demand | Not to be added | Fixed Intrvl |
| RD: [EMU4-*A2] Line Voltage | Reads the following instantaneous values.<br>• Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• Average Value Voltage (L-L) | Not to be added | Fixed Intrvl |
| RD: [EMU4-*A2] Phase Voltage | Reads the following instantaneous values.<br>• Voltage V1N<br>• Voltage V2N<br>• 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.<br>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.<br>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 the 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.<br>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.<br>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 the 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<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 10 | Leakage current two-level alarm<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 11 | Resistive leakage current single-level alarm<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 12 | Resistive leakage current two-level alarm<br>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 the 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 the 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 the 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.<br>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.<br>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.<br>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 the 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 the 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 the 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<br>• Voltage<br>• Electric Power<br>• Electric Energy<br>• Power Factor<br>• Frequency<br>• Content Rate of Harmonic Current<br>• Content Rate of Harmonic Voltage<br>• 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 the 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<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• 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 the 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<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• 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 the 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<br>• Voltage V23<br>• Voltage V31<br>• 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 the 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<br>• Voltage V2N<br>• 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 the 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 the 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 the 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 the 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 the 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 the 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.<br>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 the 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.<br>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 the 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 the 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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 the 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.<br>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 the 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.<br>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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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<br>• Harmonics Value V2N<br>• 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 the 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<br>• Harmonics Value V2N<br>• 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 the 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<br>• 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 the 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<br>• 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 the 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<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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 the 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<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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 the 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<br>• THD V2N<br>• 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 the 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<br>• Harmonics Ratio V2N<br>• 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 the 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<br>• 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 the 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<br>• 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 the 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<br>• THD I2<br>• THD I3<br>• 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 the 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<br>• Harmonics Ratio I2<br>• Harmonics Ratio I3<br>• 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 the 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.<br>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.<br>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 the 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.<br>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.<br>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 the 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 the 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 the 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 the 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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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 the 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 the 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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kvarh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>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 the 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.<br>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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>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 the 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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>When using the protocols for circuit ID = 3 to 7, set to 8003H + N ×700H (N = Circuit ID-2). |
| Normal response | • Current<br>• Voltage<br>• Electric Power<br>• Electric Energy<br>• Power Factor<br>• Frequency<br>• Content Rate of Harmonic Current<br>• Content Rate of Harmonic Voltage<br>• 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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<br>(3 sides at 1P2W) | Alarm occurring | No alarm |
| 3 | Power demand upper and lower limit alarm<br>(3 sides at 1P2W) | Alarm occurring | No alarm |
| 4 | Not used | — | — |
| 5 | Upper and lower limit alarm (batch)<br>(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<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 10 | Leakage current two-level alarm<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 11 | Resistive leakage current single-level alarm<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 12 | Resistive leakage current two-level alarm<br>Occurrence count upper limit alarm | Alarm occurring | No alarm |
| 13 | Power factor upper and lower limit alarm<br>(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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• 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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• 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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>When using the protocols for circuit ID = 3 to 7, set to 810AH + N × 700H (N = Circuit ID-2). |
| Normal response | • Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• 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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>When using the protocols for circuit ID = 3 to 7, set to 810EH + N × 700H (N = Circuit ID-2). |
| Normal response | • Voltage V1N<br>• Voltage V2N<br>• 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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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 the 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.<br>Use a value in the range of 1 (default) to 247. |
| | Start Address | It is set to use the protocol for circuit ID = 2.<br>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.<br>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.<br>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.<br>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 the 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.<br>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 the 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.<br>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.<br>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.<br>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.<br>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.<br>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 the 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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 the 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.<br>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.<br>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 the 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.<br>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 the 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.<br>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 the 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.<br>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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kvarh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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.<br>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.<br>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.<br>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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>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.<br>The device uses 2 words.<br>Specify the data to be written as follows.*1<br>$\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^{n}}$<br>Example:<br>Setting electric energy = 123.456kWh<br>Multiplying factor = -3<br>$\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$ |
| 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 the 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.<br>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.<br>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 the 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.<br>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.<br>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.<br>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.<br>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 the 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.<br>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.<br>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 the 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.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805AH + N × 700H (N = Circuit ID-2)<br>• CH2: 8060H + N × 700H (N = Circuit ID-2)<br>• CH3: 8066H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805BH + N × 700H (N = Circuit ID-2)<br>• CH2: 8061H + N × 700H (N = Circuit ID-2)<br>• CH3: 8067H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805CH + N × 700H (N = Circuit ID-2)<br>• CH2: 8062H + N × 700H (N = Circuit ID-2)<br>• CH3: 8068H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805DH + N × 700H (N = Circuit ID-2)<br>• CH2: 8063H + N × 700H (N = Circuit ID-2)<br>• CH3: 8069H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805FH + N × 700H (N = Circuit ID-2)<br>• CH2: 8065H + N × 700H (N = Circuit ID-2)<br>• CH3: 806BH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8193H + N × 700H (N = Circuit ID-2)<br>• CH2: 8194H + N × 700H (N = Circuit ID-2)<br>• CH3: 8195H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8197H + N × 700H (N = Circuit ID-2)<br>• CH2: 8198H + N × 700H (N = Circuit ID-2)<br>• CH3: 8199H + N × 700H (N = Circuit ID-2)<br>• 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.<br>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 the 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.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805AH + N × 700H (N = Circuit ID-2)<br>• CH2: 8060H + N × 700H (N = Circuit ID-2)<br>• CH3: 8066H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805BH + N × 700H (N = Circuit ID-2)<br>• CH2: 8061H + N × 700H (N = Circuit ID-2)<br>• CH3: 8067H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805CH + N × 700H (N = Circuit ID-2)<br>• CH2: 8062H + N × 700H (N = Circuit ID-2)<br>• CH3: 8068H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805DH + N × 700H (N = Circuit ID-2)<br>• CH2: 8063H + N × 700H (N = Circuit ID-2)<br>• CH3: 8069H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 805FH + N × 700H (N = Circuit ID-2)<br>• CH2: 8065H + N × 700H (N = Circuit ID-2)<br>• CH3: 806BH + N × 700H (N = Circuit ID-2)<br>• 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.<br>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.<br>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 the 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 802BH + N × 700H (N = Circuit ID-2)<br>• CH2: 80A1H + N × 700H (N = Circuit ID-2)<br>• CH3: 80A4H + N × 700H (N = Circuit ID-2)<br>• 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.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8036H + N × 700H (N = Circuit ID-2)<br>• CH2: 8038H + N × 700H (N = Circuit ID-2)<br>• CH3: 803AH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8098H + N × 700H (N = Circuit ID-2)<br>• CH2: 8099H + N × 700H (N = Circuit ID-2)<br>• CH3: 809AH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 809CH + N × 700H (N = Circuit ID-2)<br>• CH2: 809DH + N × 700H (N = Circuit ID-2)<br>• CH3: 809EH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 817FH + N × 700H (N = Circuit ID-2)<br>• CH2: 8180H + N × 700H (N = Circuit ID-2)<br>• CH3: 8181H + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8232H + N × 700H (N = Circuit ID-2)<br>• CH2: 825EH + N × 700H (N = Circuit ID-2)<br>• CH3: 8262H + N × 700H (N = Circuit ID-2)<br>• CH4: 8266H + N × 700H (N = Circuit ID-2) |
| Normal response | Pulse Count (CH1/CH2/CH3/CH4) | Specify the device that stores the read data.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8234H + N × 700H (N = Circuit ID-2)<br>• CH2: 824EH + N × 700H (N = Circuit ID-2)<br>• CH3: 8250H + N × 700H (N = Circuit ID-2)<br>• CH4: 826AH + N × 700H (N = Circuit ID-2) |
| Normal response | Operating Time (CH1/CH2/CH3/CH4) | Specify the device that stores the read data.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 825CH + N × 700H (N = Circuit ID-2)<br>• CH2: 8260H + N × 700H (N = Circuit ID-2)<br>• CH3: 8264H + N × 700H (N = Circuit ID-2)<br>• CH4: 8268H + N × 700H (N = Circuit ID-2) |
| Normal response | Pulse Conversion (CH1/CH2/CH3/CH4) | Specify the device that stores the read data.<br>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.<br>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 the 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 802BH + N × 700H (N = Circuit ID-2)<br>• CH2: 80A1H + N × 700H (N = Circuit ID-2)<br>• CH3: 80A4H + N × 700H (N = Circuit ID-2)<br>• 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.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8036H + N × 700H (N = Circuit ID-2)<br>• CH2: 8038H + N × 700H (N = Circuit ID-2)<br>• CH3: 803AH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8098H + N × 700H (N = Circuit ID-2)<br>• CH2: 8099H + N × 700H (N = Circuit ID-2)<br>• CH3: 809AH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 809CH + N × 700H (N = Circuit ID-2)<br>• CH2: 809DH + N × 700H (N = Circuit ID-2)<br>• CH3: 809EH + N × 700H (N = Circuit ID-2)<br>• 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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8232H + N × 700H (N = Circuit ID-2)<br>• CH2: 825EH + N × 700H (N = Circuit ID-2)<br>• CH3: 8262H + N × 700H (N = Circuit ID-2)<br>• CH4: 8266H + N × 700H (N = Circuit ID-2) |
| | Pulse Count (CH1/CH2/CH3/CH4) | Specify the device for storing the data to be written.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 8234H + N × 700H (N = Circuit ID-2)<br>• CH2: 824EH + N × 700H (N = Circuit ID-2)<br>• CH3: 8250H + N × 700H (N = Circuit ID-2)<br>• CH4: 826AH + N × 700H (N = Circuit ID-2) |
| | Operating Time (CH1/CH2/CH3/CH4) | Specify the device for storing the data to be written.<br>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.<br>When using the protocols for circuit ID = 3 to 7, specify as follows.<br>• CH1: 825CH + N × 700H (N = Circuit ID-2)<br>• CH2: 8260H + N × 700H (N = Circuit ID-2)<br>• CH3: 8264H + N × 700H (N = Circuit ID-2)<br>• CH4: 8268H + N × 700H (N = Circuit ID-2) |
| | Pulse Conversion (CH1/CH2/CH3/CH4) | Specify the device for storing the data to be written.<br>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.<br>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.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes.<br>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.<br>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.<br>• 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.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes.<br>Example: To specify 3096, store 0C18H. |
| | Number of Register (1) | Rewrite to the number of data to be written.<br>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)".<br>Example: If the number of registers is 123, set 246.<br>• Specify the device that stores the write data.<br>Consecutive word devices of the number set in "Number of Register (1)" are used.<br>• 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.<br>• Voltage (L-L) (3P4W)<br>• Current<br>• Voltage<br>• Power<br>• Energy<br>• Power Factor<br>• Frequency<br>• Current THD<br>• Voltage THD<br>• 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.<br>• Phase 1 Current<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• 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.<br>• Phase 1 Current Demand<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• Neutral Current Demand<br>• Average Value Current Demand | To be added | Fixed Intrvl |
| RD: Line Voltage | Reads the following instantaneous values.<br>• Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• Average Value Voltage (L-L) | To be added | Fixed Intrvl |
| RD: Phase Voltage | Reads the following instantaneous values.<br>• Voltage V1N<br>• Voltage V2N<br>• Voltage V3N<br>• Average Value Voltage (L-N) | To be added | Fixed Intrvl |
| RD: Power Factor | Reads the following instantaneous values.<br>• Phase 1 Power Factor<br>• Phase 2 Power Factor<br>• Phase 3 Power Factor<br>• 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.<br>• Phase 1 Active Power<br>• Phase 2 Active Power<br>• Phase 3 Active Power<br>• 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.<br>• Phase 1 Reactive Power<br>• Phase 2 Reactive Power<br>• Phase 3 Reactive Power<br>• Σ Reactive Power | To be added | Fixed Intrvl |
| RD: Apparent Power | Reads the following instantaneous values.<br>• Phase 1 Apparent Power<br>• Phase 2 Apparent Power<br>• Phase 3 Apparent Power<br>• 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.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage (1st) | Reads the following root mean square (RMS) values.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage (Total) | Reads the following root mean square (RMS) values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage (1st) | Reads the following root mean square (RMS) values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (Total) | Reads the following root mean square (RMS) values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (1st) | Reads the following root mean square (RMS) values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage Distortion (THD) | Reads the following root mean square (RMS) values.<br>• THD V1N<br>• THD V2N<br>• THD V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage Distortion (3rd) | Reads the following root mean square (RMS) values.<br>• Harmonic Distortion V1N<br>• Harmonic Distortion V2N<br>• Harmonic Distortion V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage Distortion (THD) | Reads the following root mean square (RMS) values.<br>• THD V12<br>• THD V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage Distortion (3rd) | Reads the following root mean square (RMS) values.<br>• Harmonic Distortion V12<br>• 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.<br>• THD I1<br>• THD I2<br>• THD I3<br>• THD IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Current Distortion (3rd) | Reads the following root mean square (RMS) values.<br>• Harmonic Distortion I1<br>• Harmonic Distortion I2<br>• Harmonic Distortion I3<br>• 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.<br>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.<br>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 the 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.<br>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.<br>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 the 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.<br>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 the 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)<br>• Current<br>• Voltage<br>• Power<br>• Energy<br>• Power Factor<br>• Frequency<br>• Current THD<br>• Voltage THD<br>• 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<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• 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 the 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<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• Neutral Current Demand<br>• 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 the 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<br>• Voltage V23<br>• Voltage V31<br>• 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 the 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<br>• Voltage V2N<br>• Voltage V3N<br>• 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 the 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<br>• Phase 2 Power Factor<br>• Phase 3 Power Factor<br>• 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 the 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<br>• Phase 2 Active Power<br>• Phase 3 Active Power<br>• 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 the 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<br>• Phase 2 Reactive Power<br>• Phase 3 Reactive Power<br>• 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 the 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<br>• Phase 2 Apparent Power<br>• Phase 3 Apparent Power<br>• 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 the 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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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.<br>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 the 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<br>• Harmonics Value V2N<br>• 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 the 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<br>Reads RMS values of 1st harmonics of phase voltages.<br>■If the protocol is used for other harmonics<br>Rewrite the "Start Holding Register No." to 1795 + ((N-1) × 3) ÷ 2.<br>N: Harmonics number (odd number from 3 to 31)<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, if N=31, set 0730H to specify 1840.<br>For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H). |
| Normal response | • Harmonics Value V1N<br>• Harmonics Value V2N<br>• 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 the 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<br>• 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 the 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<br>Reads RMS values of 1st harmonics of line voltages.<br>■If the protocol is used for other harmonics<br>Rewrite the "Start Holding Register No." to 2051 + ((N-1) × 3) ÷ 2.<br>N: Harmonics number (odd number from 3 to 31)<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, if N=31, set 0830H to specify 2096.<br>For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H). |
| Normal response | • Harmonics Value V12<br>• 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 the 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<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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 the 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<br>Reads RMS values of 1st harmonics of phase current.<br>■If the protocol is used for other harmonics<br>Rewrite the "Start Holding Register No." to 2308 + (N-1) × 2.<br>N: Harmonics number (odd number from 3 to 31)<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, if N=31, set 0940H to specify 2368.<br>For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H). |
| Normal response | • Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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 the 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<br>• THD V2N<br>• 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 the 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<br>Reads distortion ratio of 3rd harmonics of phase voltages.<br>■If the protocol is used for other harmonics<br>Rewrite the "Start Holding Register No." to 2563 + ((N-3) × 3) ÷ 2.<br>N: Harmonics number (odd number from 5 to 31)<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, if N=31, set 0A2DH to specify 2605.<br>For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H). |
| Normal response | • Harmonic Distortion V1N<br>• Harmonic Distortion V2N<br>• 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 the 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<br>• 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 the 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<br>Reads distortion values of 3rd harmonics of line voltages.<br>■If the protocol is used for other harmonics<br>Rewrite the "Start Holding Register No." to 2819 + ((N-3) × 3) ÷ 2.<br>N: Harmonics number (odd number from 5 to 31)<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, if N=31, set 0B2DH to specify 2861.<br>For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H). |
| Normal response | • Harmonic Distortion V12<br>• 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 the 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<br>• THD I2<br>• THD I3<br>• 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 the 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<br>Reads distortion values of 3rd harmonics of line voltages.<br>■If the protocol is used for other harmonics<br>Rewrite the "Start Holding Register No." to 3076 + (N-3) × 2.<br>N: Harmonics number (odd number from 5 to 31)<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, if N=31, set 0C3CH to specify 3132.<br>For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H). |
| Normal response | • Harmonic Distortion I1<br>• Harmonic Distortion I2<br>• Harmonic Distortion I3<br>• 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 the 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 the 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.<br>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 the 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.<br>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 the 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 the 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.<br>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 the 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.<br>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 the 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 the 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.<br>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 the 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.<br>Specify the device value in the range from 1 to 125. |
| Normal response | Read Data | Specify the device that stores the read data.<br>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.<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>For example, to specify 3096, set 0C18H. |
| | Write Points | Set it to the number of data points to be written.<br>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.<br>For example, if the number of write points is 123, set 246 points.<br>Specify the device that stores the data to be written in write data.<br>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 the 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.<br>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.<br>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)<br>Specify the device that stores the read data.<br>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.<br>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<br>• 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<br>• Maximum Noise Level<br>• 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<br>• 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.<br>For example, 192.168.1.200 is displayed as C0A801C8H. |
| Query Error Code | For details, refer to the 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<br>• IP Address of Remote Node<br>• Query Error Code | Specify the device that stores the read data.<br>The device uses 2 words. |
| | • Query Exception Code<br>• Communications Query Information Size | Specify the device that stores the read data.<br>The device uses 1 byte. |
| | Communications Query Information | Specify the device that stores the read data.<br>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 the 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.<br>Among multiple Send Power Level values, the corrected minimum value of the DAC (10 bits) successfully communicated with the RF tag is read.<br>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.<br>The correction value of the ADC (10 bits) during communication with the RF tag (during response reception) is read.<br>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.<br>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.<br>The sum of Send Power Level and Receive Power Level is calculated using the following formula.<br>(Send Power Level + Receive Power Level)÷2 |
| Tag ID Data | Displays the tag ID of the RF tag identified during communication diagnosis.<br>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.<br>The device uses 2 words. |
| | • Query Type<br>• Communications Result<br>• Diagnostic Result<br>• Send Power Level<br>• Receive Power Level<br>• Noise Level<br>• Power Level | Specify the device that stores the read data. |
| | Tag ID Data | Specify the device that stores the read data.<br>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.<br>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.<br>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)<br>Specify the device that stores the write data.<br>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.<br>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.<br>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.<br>The device uses 2 words.<br>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.<br>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.<br>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<br>• 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.<br>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.<br>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)<br>Specify the device that stores the write data.<br>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.<br>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.<br>To use this protocol on other channels, replace it with a value that is 2 × (start channel number-1).<br>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.<br>When changing the number of channels, replace it with 2 × number of channels.<br>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.<br>Specify the device that stores the read data.<br>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.<br>To use this protocol on other channels, replace it with a value that is 500 + (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with the number of channels.<br>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.)<br>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.<br>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.)<br>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.<br>To use this protocol on other channels, replace it with a value that is 1000 + 2 × (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with 2 × number of channels.<br>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.)<br>Specify the device that stores the read data.<br>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.<br>To use this protocol on other channels, replace it with a value that is 1500 + (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with the number of channels.<br>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.)<br>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.<br>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.<br>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.)<br>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.<br>To use this protocol on other channels, replace it with a value that is 22000 + (start channel number - 1) × 2.<br>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.<br>When changing the number of channels, replace it with 2 × number of channels.<br>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.)<br>Specify the device that stores the read data.<br>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.<br>To use this protocol on other channels, replace it with a value that is 22500 + (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with the number of channels.<br>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.)<br>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.<br>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.<br>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.)<br>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.<br>To use this protocol on other channels, replace it with a value that is 23000 + 2 × (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with 2 × number of channels.<br>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.)<br>Specify the device that stores the read data.<br>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.<br>To use this protocol on other channels, replace it with a value that is 23500 + (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with the number of channels.<br>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.)<br>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.<br>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.<br>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.)<br>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 |

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## 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.<br>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.)<br>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<br>• Month<br>• Day<br>• Hour<br>• Min<br>• Sec<br>• 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.<br>To use this protocol on other channels, replace it with a value that is 22500 + (start channel number - 1).<br>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.<br>When changing the number of channels, replace it with the number of channels.<br>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.)<br>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.<br>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.<br>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.<br>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.<br>When using the protocol for other registers, rewrite to the value of the start address to be written.<br>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.<br>Rewrite to the same value as the number of registers to be written.<br>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.)<br>Specify the device that stores the write data.<br>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.

# 17 PROTOCOLS SUPPORTED BY OMRON (S8VK-X)

## 17.1 Setting Method

### S8VK-X

Use the MODBUS/TCP communication function of the S8VK-X to communicate with the S8VK-X.

For the parameter setting method, refer to the Switch-mode Power Supplies Communications Manual S8VK-X.

## 17.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: Status | Reads the status of the S8VK-X. | Not to be added | Fixed Intrvl |
| RD: Output Voltage Measured | Reads the measured output voltage. | To be added | Fixed Intrvl |
| RD: Output Current Measured | Reads the measured output current. | To be added | Fixed Intrvl |
| RD: Peak Hold Current Measured | Reads the measured peak hold current. | To be added | Fixed Intrvl |
| RD: Years Until Replacement | Reads the number of years until replacement. | Not to be added | Fixed Intrvl |
| RD: Percentage Until Replacement | Reads the percentage until replacement. | Not to be added | Fixed Intrvl |
| RD: Total Run Time | Reads the estimate operating time. | Not to be added | Fixed Intrvl |
| RD: Continuous Run Time | Reads the continuous operating time. | Not to be added | Fixed Intrvl |
| RD: Product Information | Reads the following product information.<br>• Vendor ID<br>• Device Type<br>• Product Code<br>• Device Major Revision<br>• Device Minor Revision<br>• Serial Number | Not to be added | Fixed Intrvl |
| WR: Reset Peak Hold Current | Resets the peak hold current. | To be added | Request |
| RD: Holding Registers*2 | Reads the value to be stored in the MODBUS holding register. | Not to be added | Request |
| WR: Holding Registers*2 | Writes the value to the MODBUS holding register. | 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.

# 17.3 Details of Applicable Protocols

## RD: Status

This protocol reads the S8VK-X status stored in register address 0000H.

| Bit | Description | If the value is 1 | If the value is 0 |
|---|---|---|---|
| 0 | Memory error | Occur | Not occur |
| 1 | Product overheating error | Occur | Not occur |
| 2 | Current measurement error | Occur | Not occur |
| 3 | Voltage measurement error | Occur | Not occur |
| 4 | Overheating warning | Occur | Not occur |
| 5 | Not used | — | — |
| 6 | Not used | — | — |
| 7 | Not used | — | — |
| 8 | Years Until Replacement (FUL) | FUL | Other than FUL |
| 9 | Years Until Replacement (HLF) | HLF | Other than HLF |
| 10 | Not used | — | — |
| 11 | Not used | — | — |
| 12 | Not used | — | — |
| 13 | Not used | — | — |
| 14 | Not used | — | — |
| 15 | Not used | — | — |

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Status | 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: Output Voltage Measured

This protocol reads the output voltage measurement value stored in register address 0001H.
Unit is 0.01V. The value is read in the range of 0 to 9990.
The measurement value can be obtained by multiplying the read data by "$10^{n}$".

Ex.
Read value = 1234
Multiplying factor = -3
Measurement value = $1234 \times 10^{-3} = 1.234$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Output Voltage Measured | 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.
- The maximum value that can be read differs depending on the model type. Also, the least significant digit of the read value is fixed to 0.

# RD: Output Current Measured

This protocol reads the output current measurement value stored in register address 0002H.
Unit is 0.01A. The value is read in the range of 0 to 9990.
The measurement value can be obtained by multiplying the read data by "$10^{n}$".

Ex.
Read value = 1234
Multiplying factor = -3
Measurement value = $1234 \times 10^{-3} = 1.234$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Output Current Measured | 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.
- The maximum value that can be read differs depending on the model type. Also, the least significant digit of the read value is fixed to 0.

# RD: Peak Hold Current Measured

This protocol reads the peak hold current measurement value stored in register address 0003H.
Unit is 0.01A. The value is read in the range of 0 to 9990.
The measurement value can be obtained by multiplying the read data by "$10^n$".

Ex.
Read value = 1234
Multiplying factor = -3
Measurement value = $1234 \times 10^{-3} = 1.234$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Peak Hold Current Measured | 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.
- The maximum value that can be read differs depending on the model type. Also, the least significant digit of the read value is fixed to 0.

# RD: Years Until Replacement

This protocol reads the number of years until replacement stored in register address 0004H.
Unit is 0.1 year. The value is read in the range of 0 to 1500.
The measurement value can be obtained by multiplying the read data by "$10^n$".

Ex.
Read value = 123
Multiplying factor = -2
Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Years Until Replacement | 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: Percentage Until Replacement

This protocol reads the percentage until replacement time stored in register address 0005H.
Unit is 0.1%. The value is read in the range of 0 to 1000.
The measurement value can be obtained by multiplying the read data by "$10^{n}$".

Ex.
Read value = 123
Multiplying factor = -2
Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Percentage Until Replacement | 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: Total Run Time

This protocol reads the estimate operating time stored in register address 0006H.
Unit is 1 hour. The value is read in the range of 0 to 262800.
The read data becomes the measurement value as is.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Total Run Time | Specify the device that stores the read data.<br>The device uses 2 words. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: Continuous Run Time

This protocol reads the continuous operating time stored in register address 0008H.
Unit is 1 minute. The value is read in the range of 0 to 15768000.
The continuous operating time is reset when the power is turned off.
The read data becomes the measurement value as is.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Continuous Run Time | Specify the device that stores the read data.<br>The device uses 2 words. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: Product Information

This protocol reads the vendor ID, device type, product code, product revision (major), product revision (minor), and serial number stored in register addresses 000AH to 0010H.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Vendor ID<br>• Device Type<br>• Product Code<br>• Device Major Revision<br>• Device Minor Revision<br>• Serial Number | Specify the device that stores the read data.<br>The serial number uses two word devices. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# WR: Reset Peak Hold Current

This protocol resets the peak hold current.

## 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.

# 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 | Start Address | Specify the device that stores the register address to be read.<br>For details, refer to the Switch-mode Power Supplies Communications Manual S8VK-X provided by OMRON Corporation. |
| | Number of Words to Read | Specify the device that stores the number of data points to be read.<br>Use a value in the range of 1 to 32. |
| Normal response | Register Content | Specify the device that stores the read data.<br>The default value is set to the maximum number of registers (32). |
| Error response | Exception 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 the value to the MODBUS holding register device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Start Address | Specify the device that stores the write data.<br>For details, refer to the Switch-mode Power Supplies Communications Manual S8VK-X provided by OMRON Corporation. |
| | Number of Words to Write | The default value is set as the number of registers written as 1.<br>Set the value in the range of 0001H to 0008H, and rewrite it to the same value as the number of registers to be written. |
| | Data | Set the data length to a value that is twice the number of words to write.<br>For example, if the number of words to write is 8, specify 16.<br>Specify the device that stores the write data.<br>The number of words written 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.

# 18 PROTOCOLS SUPPORTED BY Yokogawa Electric Corporation (GP10, GX10)

## 18.1 Setting Method

### GP10, GX10

Use the MODBUS/TCP communication function to communicate with the GP10 and GX10 series.
For the setting method, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual provided by Yokogawa Electric Corporation.

## 18.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: [Input Reg] I/O CH Data (32 SINT) | Reads signed 32-bit integer I/O channel data from the input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Data (32 FLOAT) | Reads 32-bit floating point I/O channel data from the input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Data (16 SINT) | Reads signed 16-bit integer I/O channel data from the input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Status Info. | Reads the status information of I/O channel data from the input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] Math CH Data (32 SINT) | Reads signed 32-bit integer numerical calculation channel data from the input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] Math CH Data (32 FLOAT) | Reads 32-bit floating point channel data from the input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] Math CH Data (16 SINT) | Reads signed 16-bit integer numerical calculation channel data from the input register. | To be added | Fixed Intrvl |
| RD: [Input Reg] Math CH Status Info. | Reads the status information of the numerical calculation channel from the input register. | To be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Data Cont. (32 SINT) | Reads 32-bit signed integer I/O channel data from the continuous input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Data Cont. (32 FLOAT) | Reads 32-bit floating point I/O channel data from the continuous input register. | Not to be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Data Cont. (16 SINT) | Reads 16-bit signed integer I/O channel data from the continuous input register. | To be added | Fixed Intrvl |
| RD: [Input Reg] I/O CH Status Info. Cont. | Reads the status information of the I/O channel from the continuous input register. | To be added | Fixed Intrvl |
| RD: [Input Reg] GP Status | Reads, from the input register, the status of the GP model during measurement, calculation, alarm, email start, memory end, login status from the window, and Modbus communication error status. | To be added | Request |
| RD: [Hold Reg] I/O CH Data (32 SINT) | Reads 32-bit signed integer I/O channel data from the holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] I/O CH Data (32 FLOAT) | Reads 32-bit floating point I/O channel data from the holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] I/O CH Data (16 SINT) | Reads 16-bit signed integer I/O channel data from the holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] I/O CH Status Info. | Reads the status information of the I/O channel from the holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] I/O CH Data Cont. (32 SINT) | Reads 32-bit signed integer I/O channel data from the continuous holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] I/O CH Data Cont. (32 FLOAT) | Reads 32-bit floating point I/O channel data from the continuous holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] I/O CH Data Cont. (16 SINT) | Reads 16-bit signed integer I/O channel data from the continuous holding register. | Not to be added | Fixed Intrvl |

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: [Hold Reg] I/O CH Status Info. Cont. | Reads the status information of the I/O channel from the continuous holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] Com. CH Data (32 SINT) | Reads 32-bit signed integer communication channel data from the continuous holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] Com. CH Data (32 FLOAT) | Reads 32-bit floating point communication channel data from the continuous holding register. | Not to be added | Fixed Intrvl |
| RD: [Hold Reg] Com. CH Data (16 SINT) | Reads 16-bit signed integer communication channel data from the continuous holding register. | To be added | Fixed Intrvl |
| RD: [Hold Reg] Com. CH Status Info. | Reads communication channel status information from the continuous holding register. | To be added | Fixed Intrvl |
| RD: [Hold Reg] Internal Switch | Reads the internal switch status from the holding register. | Not to be added | Request |
| WR: [Hold Reg] Com. CH Data (32 SINT) | Writes signed 32-bit integer communication channel data to the continuous holding register. | Not to be added | Request |
| WR: [Hold Reg] Com. CH Data (32 FLOAT) | Writes 32-bit floating point communication channel data to the continuous holding register. | Not to be added | Request |
| WR: [Hold Reg] Com. CH Data (16 SINT) | Writes signed 16-bit integer communication channel data to the continuous holding register. | To be added | Request |
| WR: [Hold Reg] Internal Switch | Writes internal switch data to the holding register. | Not to be added | Request |
| WR: [Hold Reg] Start/Stop Recording | Starts or stops recording when the multi-batch function is not in use. | To be added | Request |
| WR: [Hold Reg] Computation Operation | Writes the recording start/stop settings when the multi-batch function is not in use. | To be added | Request |
| WR: [Hold Reg] All Alarm ACK | Clears all activated alarm indicators and outputs (relays). | To be added | Request |
| WR: [Hold Reg] Individual Alarm ACK | Writes an individual alarm ACK to the holding register. | Not to be added | Request |
| WR: [Hold Reg] Manual Operation | Writes manual trigger, manual sample, snapshot, and forced timeout manual operation commands to the holding register. | Not to be added | Request |
| WR: [Hold Reg] Reset a Relative Timer | Resets the relative timer. | Not to be added | Request |
| WR: [Hold Reg] Reset a Match Time Timer | Resets the match time timer. | Not to be added | Request |
| WR: [Hold Reg] Write Message | Writes free or preset messages to a device. | Not to be added | Request |
| WR: [Hold Reg] Batch, Lot Number | Writes the batch number and lot number. | Not to be added | Request |
| WR: [Hold Reg] Alarm Settings | Configures alarm settings such as channel type, channel number, alarm level, alarm type, and alarm setting value. | Not to be added | Request |
| WR: [Hold Reg] Alarm Delay Settings | Configures alarm delay settings such as channel type, channel number, and alarm delay seconds. | Not to be added | Request |
| RD: Holding Registers*2 | Reads the value from the holding register. | Not to be added | Request |
| WR: Hold Registers*2 | Writes the value to the holding register. | Not to be added | Request |
| RD: Input Registers*2 | Reads the value from the input register. | Not to be added | Request |
| RD: Coils*2 | Reads the coil value. | Not to be added | Request |
| WR: Coil*2 | Writes the coil value. | Not to be added | Request |
| RD: Input Relays*2 | Reads the value from the input relay. | 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.

# 18.3 Details of Applicable Protocols

## RD: [Input Reg] I/O CH Data (32 SINT)

This protocol reads the I/O channel data (32-bit SINT) of main module slot 0 from input register addresses 300001 to 300020.
It can be used not only for extensible I/O but also for reading I/O channel data of the main module.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (0000) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (Slot number × 100)<br>For extension I/O: (5000 + 5000 × module number + slot number × 100)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 28A0H (10400).) |
| | Quantity of Input Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0064H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

## RD: [Input Reg] I/O CH Data (32 FLOAT)

This protocol reads the I/O channel data (32-bit FLOAT) of main module slot 0 from input register addresses 301001 to 301020.
It can be used not only for extensible I/O but also for reading I/O channel data of the main module.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (1000) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (1000 + slot number × 100)<br>For extension I/O: (6000 + 5000 × module number + slot number × 100)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 2C88H (11400).) |
| | Quantity of Input Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0064H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

# RD: [Input Reg] I/O CH Data (16 SINT)

This protocol reads the I/O channel data (16-bit SINT) of main module slot 0 from input register addresses 302001 to 302010.
It can be used not only for extensible I/O but also for reading I/O channel data of the main module.



## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (2000) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (2000 + slot number ×50)<br>For extension I/O: (7000 + 5000 × module number + slot number × 50)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 2FA8H (12200).) |
| | Quantity of Input Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0032H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of input registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 50, specify 100.)<br>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: [Input Reg] I/O CH Status Info.

This protocol reads the I/O channel data status information of main module slot 0 from input register addresses 302501 to 302510.
It can be used not only for extensible I/O, but also for reading the I/O channel data status of the main module.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (2500) | The default value is set to read the I/O channel status of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (2500 + slot number × 50)<br>For extension I/O: (7500 + 5000 × module number + slot number × 50)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel status of slot 4 of extensible I/O module 1, specify 4524H (17700).) |
| | Quantity of Input Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0032H.) |
| Normal Response | I/O Channel Status Information | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 50, specify 100.)<br>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: [Input Reg] Math CH Data (32 SINT)

This protocol reads the calculation channel data (32-bit SINT) from input register addresses 305001 to 305020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (5000) | The default value is set to read calculation channel data from channel A001.<br>To use this protocol on other channels, replace it with a value that is 4998 + channel number × 2.<br>Calculation channels A001 to A050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel A040, specify 13D6H (5078).) |
| | Quantity of Input Registers (20) | The default value is set to read data from 10 calculation channels.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 calculation channel data, specify 0064H.) |
| Normal Response | Computed Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Input Reg] Math CH Data (32 FLOAT)

This protocol reads the calculation channel data (32-bit FLOAT) from input register addresses 305201 to 305220.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (5200) | The default value is set to read calculation channel data from channel A001.<br>To use this protocol on other channels, replace it with a value that is 5198 + channel number × 2.<br>Calculation channels A001 to A050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel A040, specify 149EH (52788).) |
| | Quantity of Input Registers (20) | The default value is set to read data from 10 calculation channels.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 calculation channel data, specify 0064H.) |
| Normal Response | Computed Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Input Reg] Math CH Data (16 SINT)

This protocol reads the calculation channel data (16-bit SINT) from input register addresses 305401 to 305410.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (5400) | The default value is set to read calculation channel data from channel A001.<br>To use this protocol on other channels, replace it with a value that is 5399 + channel number.<br>Calculation channels A001 to A050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel A040, specify 153FH (5439).) |
| | Quantity of Input Registers (20) | The default value is set to read data from 10 calculation channels.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 calculation channel data, specify 0032H.) |
| Normal Response | Computed Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 50, specify 100.)<br>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: [Input Reg] Math CH Status Info.

This protocol reads the calculation channel status information from input register addresses 305501 to 305510.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (5500) | The default value is set to read calculation channel status information from channel A001.<br>To use this protocol on other channels, replace it with a value that is 5499 + channel number.<br>Calculation channels A001 to A050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel A040, specify 15A3H (5539).) |
| | Quantity of Input Registers (10) | The default value is set to read data from 10 calculation channels.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0032H.) |
| Normal Response | Math Channel Status Information | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 50, specify 100.)<br>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: [Input Reg] I/O CH Data Cont. (32 SINT)

This protocol reads the I/O channel continuous data (32-bit SINT) of slot 0 from input register addresses 304001 to 304020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4000) | The default value is set to read the I/O channel continuous data of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4000 + slot number × 20.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous data of slot 4, specify 0FF0H (4080).) |
| | Quantity of Input Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of the number of channels from 1 to 124 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 62 I/O channel data, specify 007CH.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 124, specify 248.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Input Reg] I/O CH Data Cont. (32 FLOAT)

This protocol reads the I/O channel continuous data (32-bit FLOAT) of slot 0 from input register addresses 304201 to 304220.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4200) | The default value is set to read the I/O channel continuous data of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4200 + slot number × 2.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous data of slot 4, specify 10B8H (4080).) |
| | Quantity of Input Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of the number of channels from 1 to 124 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 62 I/O channel data, specify 007CH.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 124, specify 248.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Input Reg] I/O CH Data Cont. (16 SINT)

This protocol reads the I/O channel continuous data (32-bit SINT) of slot 0 from input register addresses 304401 to 304410.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4400) | The default value is set to read the I/O channel continuous data of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4400 + slot number × 10.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous data of slot 4, specify 1158H (4440).) |
| | Quantity of Input Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 125 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 125 I/O channel data, specify 007DH.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 125, specify 00FAH.)<br>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: [Input Reg] I/O CH Status Info. Cont.

This protocol reads the I/O channel continuous area status information of slot 0 from input register addresses 304501 to 304510.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4500) | The default value is set to read the I/O channel continuous area status information of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4500 + slot number × 10.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous status data of slot 4, specify 11BCH (4540).) |
| | Quantity of Input Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 100 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 125 I/O channel data, specify 007DH.) |
| Normal Response | I/O Channel Status Information | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Input Registers" is 125, specify 250.)<br>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: [Input Reg] GP Status

This protocol reads the GP model status from input register addresses 308001 to 308007.
Details of GP status are as follows.

| Data | Description |
|---|---|
| Measuring Status | 0: Recording stops<br>1: Recording |
| Computing Status | 0: Calculation stops<br>1: Calculating |
| Alarm Status | 0: No alarm<br>1: Alarming |
| E-mail Transmission Status | 0: No email sent<br>1: Email sent |
| Memory Status | 0: Internal memory or external storage capacity available<br>1: Small capacity of internal memory and external storage |
| Screen Login Status | 0: No login<br>1: Logging in |
| Modbus Communication Error | 0: Modbus master or client command normal<br>1: Modbus master or client command error |

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Measuring Status | Specify the device that stores the read data. |
| | Computing Status | Specify the device that stores the read data. |
| | Alarm Status | Specify the device that stores the read data. |
| | E-mail Transmission Status | Specify the device that stores the read data. |
| | Memory Status | Specify the device that stores the read data. |
| | Screen Login Status | Specify the device that stores the read data. |
| | Modbus Communication Error | 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: [Hold Reg] I/O CH Data (32 SINT)

This protocol reads the I/O channel data (32-bit SINT) of main module slot 0 from holding register addresses 400001 to 400020.

It can be used not only for extensible I/O but also for reading I/O channel data of the main module.



## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (0000) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (Slot number × 100)<br>For extension I/O: (5000 + 5000 × module number + slot number × 100)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 28A0H (10400).) |
| | Quantity of Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0064H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 00C8H.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Hold Reg] I/O CH Data (32 FLOAT)

This protocol reads the I/O channel data (32-bit FLOAT) of main module slot 0 from holding register addresses 401001 to 401020.

It can be used not only for extensible I/O but also for reading I/O channel data of the main module.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (1000) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (1000 + slot number × 100)<br>For extension I/O: (6000 + 5000 × module number + slot number × 100)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 2C88H (11400).) |
| | Quantity of Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0064H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Hold Reg] I/O CH Data (16 SINT)

This protocol reads the I/O channel data (16-bit SINT) of main module slot 0 from holding register addresses 402001 to 402010.
It can be used not only for extensible I/O but also for reading I/O channel data of the main module.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (2000) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (2000 + slot number × 100)<br>For extension I/O: (7000 + 5000 × module number + slot number × 50)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 2FA8H (12200).) |
| | Quantity of Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0064H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.)<br>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: [Hold Reg] I/O CH Status Info.

This protocol reads the I/O channel data status information of main module slot 0 from input register addresses 402501 to 402510.
It can be used not only for extensible I/O but also for reading I/O channel data of the main module.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (2500) | The default value is set to read the I/O channel data of main module slot 0.<br>When using the protocol for other slots, rewrite the value as follows.<br>Main module: (2500 + slot number × 50)<br>For extension I/O: (7500 + 5000 × module number + slot number × 50)<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of the I/O channel data of slot 4 of extensible I/O module 1, specify 319CH (12700).) |
| | Quantity of Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 I/O channel data, specify 0032H.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.)<br>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: [Hold Reg] I/O CH Data Cont. (32 SINT)

This protocol reads the I/O channel continuous data (32-bit SINT) of slot 0 from holding register addresses 404001 to 404020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4000) | The default value is set to read the I/O channel continuous data of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4000 + slot number × 20.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous data of slot 4, specify 1054H (4180).) |
| | Quantity of Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 124, which is a multiple of 2 for the number of channels 1 to 62, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 62 I/O channel data, specify 007CH.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 124, specify 248.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Hold Reg] I/O CH Data Cont. (32 FLOAT)

This protocol reads the I/O channel continuous data (32-bit FLOAT) of slot 0 from holding register addresses 404201 to 404220.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4200) | The default value is set to read the I/O channel continuous data of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4200 + slot number × 2.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous data of slot 4, specify 10B8H (4280).) |
| | Quantity of Registers (20) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 124, which is a multiple of 2 for the number of channels 1 to 62, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 62 I/O channel data, specify 007CH.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 124, specify 248.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Hold Reg] I/O CH Data Cont. (16 SINT)

This protocol reads the I/O channel continuous data (16-bit SINT) of slot 0 from holding register addresses 404001 to 404410.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4400) | The default value is set to read the I/O channel continuous data of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4400 + slot number × 10.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the value of I/O channel continuous data of slot 4, specify 1158H (4440).) |
| | Quantity of Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 125 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 125 I/O channel data, specify 007DH.) |
| Normal Response | I/O Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 125, specify 250.)<br>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: [Hold Reg] I/O CH Status Info. Cont.

This protocol reads the I/O channel continuous area status information of slot 0 from holding register addresses 404501 to 404510.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (4500) | The default value is set to read the I/O channel continuous area status information of slot 0.<br>To use this protocol on other slots, replace it with a value that is 4500 + slot number × 10.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the I/O channel continuous status information of slot 4, specify 11BCH (4540).) |
| | Quantity of Registers (10) | The default value is set to read 10 I/O channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of 1 to 100 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 125 I/O channel data, specify 007DH.) |
| Normal Response | I/O Channel Status Information | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 125, specify 250.)<br>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.
- When changing "Quantity of Registers", check that the value obtained from "Starting Address" + "Quantity of Registers" do not exceed the valid continuous channel data address range. For details on valid address range, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual.

# RD: [Hold Reg] Com. CH Data (32 SINT)

This protocol reads the communication channel data (32-bit SINT) from holding register addresses 405001 to 405020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (5000) | The default value is set to read communication channel data from channel C001.<br>To use this protocol on other channels, replace it with a value that is 4998 + channel number × 2.<br>Communication channels A001 to A050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel A040, specify 13D6H (5078).) |
| | Quantity of Registers (20) | The default value is set to read data from 10 communication channels.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 communication channel data, specify 0064H.) |
| Normal Response | Communication Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Hold Reg] Com. CH Data (32 FLOAT)

This protocol reads communication channel data (32-bit FLOAT) from holding register addresses 406001 to 406020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (6000) | The default value is set to read communication channel data starting from channel C001.<br>To use this protocol on other channels, replace it with a value that is 5998 + channel number × 2.<br>Communication channels A001 to A050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel C040, specify 17BEH (6078).) |
| | Quantity of Registers (20) | The default value is set to read data from 10 communication channels.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 communication channel data, specify 0064H.) |
| Normal Response | Communication Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 200.)<br>Specify the device that stores the read data.<br>The device uses 2 words. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: [Hold Reg] Com. CH Data (16 SINT)

This protocol reads the communication channel data (16-bit SINT) from holding register addresses 407001 to 407010.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (7000) | The default value is set to read communication channel data from channel C001.<br>To use this protocol on other channels, replace it with a value that is 6999 + channel number.<br>Communication channels C001 to C050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel C040, specify 1B7FH (7039).) |
| | Quantity of Registers (10) | The default value is set to read data from 10 communication channels.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 communication channel data, specify 0032H.) |
| Normal Response | Communication Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.)<br>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: [Hold Reg] Com. CH Status Info.

This protocol reads communication channel status information from holding register addresses 407501 to 407510.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (7500) | The default value is set to read communication channel status information from channel C001.<br>To use this protocol on other channels, replace it with a value that is 7499 + channel number.<br>Communication channels C001 to C050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading data from calculation channel C040, specify 1D73H (7539).) |
| | Quantity of Registers (10) | The default value is set to read data from 10 communication channels.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 50 communication channel data, specify 0032H.) |
| Normal Response | Communication Channel Status Information | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.)<br>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: [Hold Reg] Internal Switch

This protocol reads internal switch data from holding register addresses 408001 to 408010.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (8000) | The default value is set to read internal switch data from S001.<br>To use this protocol on other internal switches, replace it with a value that is 7999 + switch number.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading internal switch data from switch S100, specify 1FA3H (8099).) |
| | Quantity of Registers (10) | The default value is set to read the values of 10 internal switch data.<br>When changing the number of registers, replace it with the same value as the number of internal switches.<br>Specify the value within the range of 1 to 100 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading 100 internal switch data, specify 0064H.) |
| Normal Response | Internal Switch Input Data*1 | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 10, specify 20.)<br>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 | Internal switch data |
|---|---|
| 0 | Off |
| 1 | On |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Com. CH Data (32 SINT)

This protocol writes communication channel data (32-bit SINT) to holding register addresses 405001 to 405020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (5000) | The default value is set to write the value to the channel data starting from C001.<br>To use this protocol on other channels, replace it with a value that is 4998 + channel number × 2.<br>Communication channels C001 to C050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing a value to the communication channel data of C040, specify 13D6H (5078).) |
| | Quantity of Registers (20) | The default value is set to write 10 communication channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing 50 communication channel data, specify 0064H.) |
| | Communication Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 200.)<br>Specify the device that stores the write data.<br>The device uses 2 words. |
| 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: [Hold Reg] Com. CH Data (32 FLOAT)

This protocol writes communication channel data (32-bit FLOAT) to holding register addresses 406001 to 406020.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (6000) | The default value is set to write the value to the channel data starting from C001.<br>To use this protocol on other channels, replace it with a value that is 5998 + channel number × 2.<br>Communication channels C001 to C050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing a value to the communication channel data of C040, specify 17BEH (6078).) |
| | Quantity of Registers (20) | The default value is set to write 10 communication channel data.<br>When changing the number of channels, replace it with the same value as 2 × number of channels.<br>Specify the value within the range of 2 to 100, which is a multiple of 2 for the number of channels 1 to 50, as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing 50 communication channel data, specify 0064H.) |
| | Communication Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 200.)<br>Specify the device that stores the write data.<br>The device uses 2 words. |
| 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: [Hold Reg] Com. CH Data (16 SINT)

This protocol writes communication channel data (16-bit SINT) to holding register addresses 407001 to 407010.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (7000) | The default value is set to write the value to the channel data starting from C001.<br>To use this protocol on other channels, replace it with a value that is 6999 + channel number.<br>Communication channels C001 to C050 use channel numbers 1 to 50.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing a value to the communication channel data of C040, specify 1B7FH (7039).) |
| | Quantity of Registers (10) | The default value is set to write 10 communication channel data.<br>When changing the number of channels, replace it with the same value as the number of channels.<br>Specify the value within the range of the number of channels from 1 to 50 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing 50 communication channel data, specify 0032H.) |
| | Communication Channel Data | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.)<br>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.

# WR: [Hold Reg] Internal Switch

This protocol writes internal switch data to holding register addresses 408001 to 408010.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (8000) | The default value is set to write internal switch data starting from S001.<br>To use this protocol on other internal switches, replace it with a value that is 7999 + switch number.<br>Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing internal switch data to switch S100, specify 1FA3H (8099).) |
| | Quantity of Registers (10) | The default value is set to write 10 internal switch data.<br>When changing the number of internal switch data, rewrite it to the same value as the number of internal switch data.<br>Specify the value within the range of 1 to 100 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when writing 100 internal switch data, specify 0064H.) |
| | Internal Switch Input Data*1 | Rewrite the data length to the same value as the number of registers × 2 in the request message. (For example, if "Quantity of Registers" is 10, specify 20.)<br>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 Set internal switch data as follows.

| Setting value | Internal switch data |
|---|---|
| 0 | Off |
| 1 | On |

## Precautions

- Do not change values other than setting data.
- To control the internal switch by MODBUS write, set the internal switch to manual.

# WR: [Hold Reg] Start/Stop Recording

This protocol starts or stops recording operation.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Start/Stop Recording*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 Set the recording start/stop operation as follows.

| Setting value | Recording start/stop |
|---|---|
| 1 | Recording start |
| 2 | Recording stop |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Computation Operation

This protocol writes the calculation operation setting value to holding register address 409021.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Computation Operation*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 Set the calculation operation setting values as follows.

| Setting value | Computation operation |
|---|---|
| 1 | Starts calculation |
| 2 | Stops calculation |
| 3 | Resets calculation |
| 4 | Cancels calculation omission status display |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] All Alarm ACK

This protocol writes the value that clears all activated alarm indicators and outputs (relays) at holding register address 409041.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | All Alarm ACK*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 | Data details |
|---|---|
| 1 | Cancels alarm output |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Individual Alarm ACK

This protocol writes the individual alarm ACK setting value to holding register addresses 409042 to 409044.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Channel Type*1 | Specify the device that stores the write data. |
| | Channel Number*2 | Specify the device that stores the write data. |
| | Alarm Level*3 | 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 | Alarm ACK channel type |
|---|---|
| 1 | I/O channel |
| 2 | Calculation channel |
| 3 | Communication channel |

*2 Store the following data.

| Setting value | Alarm ACK channel No. |
|---|---|
| 1 to 6932 | I/O channel |
| 1 to 100 | Calculation channel |
| 1 to 500 | Communication channel |

*3 Store the following data.

| Setting value | Alarm ACK alarm level |
|---|---|
| 1 | Alarm level 1 ACK |
| 2 | Alarm level 2 ACK |
| 3 | Alarm level 3 ACK |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Manual Operation

This protocol writes the manual operation setting value to holding register address 409051.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Manual Operation*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 | Manual operation |
|---|---|
| 1 | Manual sample execution |
| 2 | Manual trigger operation execution |
| 3 | Snapshot execution |
| 4 | Forced time-up execution of display data |
| 5 | Forced time-up execution of event data |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Reset a Relative Timer

This protocol writes the value to reset the relative time timer settings at holding register address 409055.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Reset a Relative Timer*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 | Function number |
|---|---|
| 1 to 12 | Timer reset of specified timer number |
| 100 | Reset of all timers |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Reset a Match Time Timer

This protocol writes the value to reset the match time timer settings to holding register address 409056.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Reset a Match Time Timer*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 | Function number |
|---|---|
| 1 to 12 | Timer reset of specified timer number |
| 100 | Reset of all timers |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Write Message

This protocol writes the message write value to holding register addresses 409042 to 409044.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Write Method*1 | Specify the device that stores the write data. |
| | Message Number*2 | Specify the device that stores the write data. |
| | Write Destination*3 | Specify the device that stores the write data. |
| | Batch Group Number*4 | Specify the device that stores the write data. |
| | Free Message | Specify the device that stores the write data.<br>The device uses 26 words. |
| 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 | Write method |
|---|---|
| 1 | Preset message write |
| 2 | Free message write |

*2 Store the following data.

| Setting value | Message number |
|---|---|
| 1 to 100 | Preset |
| 1 to 10 | Free |

*3 Store the following data.

| Setting value | Write destination |
|---|---|
| 0 | Full window group |
| 1 or higher | Specified window group |

*4 Store the following data.

| Setting value | Batch group |
|---|---|
| 1 or higher | Batch group number |

## Precautions

Do not change values other than setting data.

# WR: [Hold Reg] Batch, Lot Number

This protocol writes the batch setting value to holding register addresses 409031 to 409319.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Lot Number | Specify the device that stores the write data.<br>The device uses 2 words.<br>Set the device values as follows.<br>• 1st word device: Lot number lower data<br>• 2nd word device: Lot number upper data<br>The size of data to be written is 1-byte fixed. |
| | Batch Number | Specify the device that stores the write data.<br>The device uses 17 words.<br>Specify the device value using UTF-8 characters (2 characters for each word device).<br>32 one-byte characters maximum (Add the terminating character '\0' at the end.) |
| 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: [Hold Reg] Alarm Settings

This protocol writes the alarm setting value to holding register addresses 409701 to 409705.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Channel Type*1 | Specify the device that stores the write data. |
| | Channel Number*2 | Specify the device that stores the write data. |
| | Alarm Level*3 | Specify the device that stores the write data. |
| | Alarm Type*4 | Specify the device that stores the write data. |
| | Alarm Setpoint | Specify the device that stores the write data.<br>The device uses 2 words. |
| 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 | Channel type |
|---|---|
| 1 | I/O channel |
| 2 | Calculation channel |
| 3 | Communication channel |

*2 Store the following data.

| Setting value | Channel No. |
|---|---|
| 1 to 6932 | I/O channel |
| 1 to 50 | Calculation channel |
| 1 to 50 | Communication channel |

*3 Store the following data.

| Setting value | Alarm level |
|---|---|
| 1 to 4 | Alarm level |

*4 Store the following data.

| Setting value | Alarm type |
|---|---|
| 0 | Off |
| 1 | Upper limit alarm |
| 2 | Lower limit alarm |
| 3 | Variation rate upper limit alarm |
| 4 | Variation rate lower limit alarm |
| 5 | Delay upper limit alarm |
| 6 | Delay lower limit alarm |
| 7 | Difference upper limit alarm |
| 8 | Difference lower limit alarm |
| 10 | Profile upper limit alarm |
| 11 | Profile lower limit alarm |

## Precautions

- Do not change values other than setting data.
- Depending on the channel specified in "Channel Type", "alarm types" that can be set differs. For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual.

# WR: [Hold Reg] Alarm Delay Settings

This protocol writes the alarm delay setting value to holding register addresses 409711 to 409713.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Channel Type*1 | Specify the device that stores the write data. |
| | Channel Number*2 | Specify the device that stores the write data. |
| | Alarm Delay Seconds | Specify the device that stores the write data.<br>The device uses 2 words. |
| 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 | Channel type |
|---|---|
| 1 | I/O channel |
| 2 | Calculation channel |
| 3 | Communication channel |

*2 Store the following data.

| Setting value | Channel No. |
|---|---|
| 1 to 6932 | I/O channel |
| 1 to 200 | Calculation channel |
| 1 to 500 | Communication channel |

## Precautions

Do not change values other than setting data.

# RD: Holding Registers

MODBUS standard function.

It reads the value stored in the holding register device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address | Specify the device that stores the register address to be read.<br>For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual. |
| | Quantity of Registers | Specify the device that stores the number of data points to be read.<br>Use a value in the range of 1 to 125. |
| Normal Response | Read Data | Specify the device that stores the read data.<br>The default value is set to the maximum number of registers (125). |
| 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 the value to the holding register device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address (0000) | The default value is set to write to holding register address 400001.<br>When using the protocol for other registers, rewrite to the value of the start address to be written.<br>For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual. |
| | Quantity of Registers (2) | The default value is set to write as 2.<br>Rewrite to the same value as the number of registers to be written.<br>Use a value in the range of 0001H to 007BH (1 to 123). |
| | Write Data | Rewrite the data length to a value that is 2 × "Quantity of Registers". (For example, if "Quantity of Registers" is 123, specify 246.)<br>Specify the device that stores the write data.<br>The number of devices used is the same as "Quantity of Registers". |
| 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: Input Registers

MODBUS standard function.

It reads the value stored in the input register address.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address | Specify the device that stores the register address to be read.<br>For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual. |
| | Quantity of Input Registers | Specify the device that stores the number of data points to be read.<br>Specify the device value in the range from 1 to 125. |
| Normal Response | Read Data | Specify the device that stores the read data.<br>The default value is set to the maximum number of registers (125). |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: Coils

MODBUS standard function.

It reads the value stored in the MODBUS coil address.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address | Specify the device that stores the coil address to be read.<br>For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual. |
| | Quantity of Coils | Specify the device that stores the number of data points to be read.<br>Use a value in the range of 1 to 2000. |
| Normal Response | Read Data | Specify the device that stores the read data.<br>The default value is set to the maximum number of bit devices of 2000 (125 words). |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# WR: Coil

MODBUS standard function.

It writes the value to the MODBUS coil device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Coil Address (0000) | The default value is set to write to MODBUS coil address 0000.<br>When using the protocol for other coils, rewrite it to the value of the start address to be written.<br>For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual. |
| | Write Data | 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.

# RD: Input Relays

MODBUS standard function.

It reads the value stored in the MODBUS input relay address.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address | Specify the device that stores the input relay address to be read.<br>For details, refer to the Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual. |
| | Quantity of Input Relays | Specify the device that stores the number of input relay points to be read.<br>Use a value in the range of 1 to 2000. |
| Normal Response | Read Data | Specify the device that stores the read data.<br>The default value is set to the maximum number of input relays of 2000 (125 words). |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# 19 PROTOCOLS SUPPORTED BY Japan Steel Works (J-ADS SERIES)

## 19.1 Setting Method

### J-ADS

Refer to the manual of the target device.

## 19.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: Monitor Value Long (0000 - 0017) | Reads the long type monitor value. | To be added | Fixed Intrvl |
| RD: Monitor Value Real (0500 - 0523) | Reads the real type monitor value. | To be added | Fixed Intrvl |
| RD: Setting Value Long (1000 - 1023) | Reads the long type setting value (1000 to 1023). | To be added | Request |
| RD: Setting Value Long (1024 - 1034) | Reads the long type setting value (1024 to 1034). | To be added | Request |
| RD: Setting Value Real (1500 - 1520) | Reads the real type setting value (1500 to 1520). | To be added | Request |
| RD: Setting Value Real (1521 - 1546) | Reads the real type setting value (1521 to 1546). | To be added | Request |
| RD: Setting Value Real (1547 - 1568) | Reads the real type setting value (1547 to 1568). | To be added | Request |
| RD: Setting Value Real (1569 - 1592) | Reads the real type setting value (1569 to 1592). | To be added | Request |
| RD: Setting Value Real (1593 - 1610) | Reads the real type setting value (1593 to 1610). | To be added | Request |
| RD: Measured Value Long (2000 - 2011) | Reads the long type measurement value (2000 to 2011). | To be added | Fixed Intrvl |
| RD: Measured Value Real (2500 - 2514) | Reads the real type measurement value (2500 to 2514). | To be added | Fixed Intrvl |
| RD: Measured Value Real (2515 - 2528) | Reads the real type measurement value (2515 to 2528). | 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.

# 19.3 Details of Applicable Protocols

## RD: Monitor Value Long (0000 - 0017)

This protocol reads the long type monitor values No.0000 to 0017 stored in register address 400000 to 400035.
The read data is stored as shown below.

| No. | Description | If the value is 1 | If the value is 0 |
|---|---|---|---|
| 0000 | Molding machine information | Producing | Preparation |
| 0001 | Fully automatic mode | On | Off |
| 0002 | Semi-automatic mode | On | Off |
| 0003 | Manual mode | On | Off |
| 0004 | Preparation mode | On | Off |
| 0005 | Paused | On | Off |
| 0006 | Injecting | On | Off |
| 0007 | Alarm status | On | Off |
| 0008 | Safety door closed | On | Off |
| 0009 | Both safety doors closed | On | Off |
| 0010 | Number of accepted products | Long type monitor value | |
| 0011 | Number of rejected products | | |
| 0012 | Mold closing completed | On | Off |
| 0013 | Mold opening completed | On | Off |
| 0014 | EJ forward | On | Off |
| 0015 | EJ backward | On | Off |
| 0016 | Measuring | On | Off |
| 0017 | Servo status | On | Off |

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Molding Machine Information<br>• Fully Automatic Mode<br>• Semi-Automatic Mode<br>• Manual Mode<br>• Preparation Mode<br>• Pause<br>• Injecting<br>• Alarm Status<br>• Safety Door Closed State<br>• Both Safety Doors Closed<br>• Number of Good Products<br>• Number of Defects<br>• Mold Close<br>• Mold Open<br>• EJ Forward<br>• EJ Backward<br>• Measuring<br>• Servo State | Specify the device that stores the read data.<br>Each monitor value uses two words of the device. |
| Error response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

# RD: Monitor Value Real (0500 - 0523)

This protocol reads real type monitor values No.0500 to 0523 stored in register addresses 401000 to 401047.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Cooling Time<br>• Holding Time<br>• Filling Time<br>• Injection Pressure<br>• Filling Peak Pressure<br>• EJ Position<br>• Mold Open Position<br>• Screw Movement Position<br>• HP Temperature<br>• H1 Temperature<br>• H2 Temperature<br>• H3 Temperature<br>• H4 Temperature<br>• H5 Temperature<br>• H6 Temperature<br>• NH1 Temperature<br>• NH2 Temperature<br>• NH3 Temperature<br>• SNH Temperature<br>• HV Temperature<br>• Mold Temperature 1<br>• Mold Temperature 2<br>• Mold Temperature 3<br>• Mold Temperature 4 | Specify the device that stores the read data.<br>Each monitor value uses two words of the device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each monitor value is stored in IEEE754 single-precision floating point format.

# RD: Setting Value Long (1000 - 1023)

This protocol reads long type setting values No.1000 to 1023 stored in register addresses 402000 to 402047.
The read data is stored as shown below.

| No. | Description | If the value is 1 | If the value is 0 |
|---|---|---|---|
| 1000 | HP use | On | Off |
| 1001 | H1 use | On | Off |
| 1002 | H2 use | On | Off |
| 1003 | H3 use | On | Off |
| 1004 | H4 use | On | Off |
| 1005 | H5 use | On | Off |
| 1006 | H6 use | On | Off |
| 1007 | NH1 use | On | Off |
| 1008 | NH2 use | On | Off |
| 1009 | NH3 use | On | Off |
| 1010 | SNH use | On | Off |
| 1011 | HV use | On | Off |
| 1012 | HP AT use | On | Off |
| 1013 | H1 AT use | On | Off |
| 1014 | H2 AT use | On | Off |
| 1015 | H3 AT use | On | Off |
| 1016 | H4 AT use | On | Off |
| 1017 | H5 AT use | On | Off |
| 1018 | H6 AT use | On | Off |
| 1019 | NH1 AT use | On | Off |
| 1020 | NH2 AT use | On | Off |
| 1021 | NH3 AT use | On | Off |
| 1022 | SNH AT use | On | Off |
| 1023 | HV AT use | On | Off |

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • HP Use<br>• H1 Use<br>• H2 Use<br>• H3 Use<br>• H4 Use<br>• H5 Use<br>• H6 Use<br>• NH1 Use<br>• NH2 Use<br>• NH3 Use<br>• SNH Use<br>• HV Use<br>• HP AT Use<br>• H1 AT Use<br>• H2 AT Use<br>• H3 AT Use<br>• H4 AT Use<br>• H5 AT Use<br>• H6 AT Use<br>• NH1 AT Use<br>• NH2 AT Use<br>• NH3 AT Use<br>• SNH AT Use<br>• HV AT Use | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

## RD: Setting Value Long (1024 - 1034)

This protocol reads long type setting values No.1024 to 1034 stored in register addresses 402048 to 402069.

The read data is stored as shown below.

| No. | Description | If the value is 1 | If the value is 0 |
|---|---|---|---|
| 1024 | Mold temperature 1 movable 1 use | On | Off |
| 1025 | Mold temperature 2 fixed 1 use | On | Off |
| 1026 | Mold temperature 3 movable 2 use | On | Off |
| 1027 | Mold temperature 4 fixed 2 use | On | Off |
| 1028 | Mold temperature 1 movable 1 AT use | On | Off |
| 1029 | Mold temperature 2 fixed 1 AT use | On | Off |
| 1030 | Mold temperature 3 movable 2 AT use | On | Off |
| 1031 | Mold temperature 4 fixed 2 AT use | On | Off |
| 1032 | Number of shots | Long type setting value | |
| 1033 | Mold clamping force | | |
| 1034 | EJ count setting | | |

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Mold Temperature 1 Movable 1 Use<br>• Mold Temperature 2 Fixed 1 Use<br>• Mold Temperature 3 Movable 2 Use<br>• Mold Temperature 4 Fixed 2 Use<br>• Mold Temperature 1 Movable 1 AT Use<br>• Mold Temperature 2 Fixed 1 AT Use<br>• Mold Temperature 3 Movable 2 AT Use<br>• Mold Temperature 4 Fixed 2 AT Use<br>• Number of Shots<br>• Mold Clamping Force<br>• EJ Count Setting | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

# RD: Setting Value Real (1500 - 1520)

This protocol reads real type setting values No.1500 to 1520 stored in register addresses 403000 to 403041.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • NH1 Temperature<br>• NH2 Temperature<br>• NH3 Temperature<br>• H1 Temperature<br>• H2 Temperature<br>• H3 Temperature<br>• H4 Temperature<br>• H5 Temperature<br>• H6 Temperature<br>• HP Temperature<br>• Mold Temperature<br>• Injection Speed 1<br>• Injection Speed 2<br>• Injection Speed 3<br>• Injection Speed 4<br>• Injection Speed 5<br>• Injection Speed 6<br>• Injection Speed 7<br>• Injection Speed 8<br>• Injection Speed 9<br>• Injection Speed 10 | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each setting value is stored in IEEE754 single-precision floating point format.

# RD: Setting Value Real (1521 - 1546)

This protocol reads real type setting values No.1521 to 1546 stored in register addresses 403042 to 403093.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Injection Speed Switching Position 1<br>• Injection Speed Switching Position 2<br>• Injection Speed Switching Position 3<br>• Injection Speed Switching Position 4<br>• Injection Speed Switching Position 5<br>• Injection Speed Switching Position 6<br>• Injection Speed Switching Position 7<br>• Injection Speed Switching Position 8<br>• Injection Speed Switching Position 9<br>• Injection Pressure 1<br>• Injection Pressure 2<br>• Injection Pressure 3<br>• Injection Pressure 4<br>• Injection Pressure 5<br>• Injection Pressure 6<br>• Injection Pressure 7<br>• Injection Pressure 8<br>• Injection Pressure 9<br>• Injection Pressure 10<br>• V-P Switching Position<br>• Measurement Rotation Speed 1<br>• Measurement Rotation Speed 2<br>• Measurement Rotation Speed 3<br>• Measurement Switching Position 1<br>• Measurement Switching Position 2<br>• Measurement Completion Position | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each setting value is stored in IEEE754 single-precision floating point format.

# RD: Setting Value Real (1547 - 1568)

This protocol reads real type setting values No.1547 to 1568 stored in register addresses 403094 to 403137.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Back Pressure 1<br>• Back Pressure 2<br>• Back Pressure 3<br>• After Holding Pressure PB<br>• After Measuring PB<br>• Holding Pressure 1<br>• Holding Pressure 2<br>• Holding Pressure 3<br>• Holding Pressure 4<br>• Holding Pressure 5<br>• Holding Pressure 6<br>• Holding Pressure Time 1<br>• Holding Pressure Time 2<br>• Holding Pressure Time 3<br>• Holding Pressure Time 4<br>• Holding Pressure Time 5<br>• Holding Pressure Time 6<br>• Cooling Timer<br>• Mold Opening Speed 1<br>• Mold Opening Speed 2<br>• Mold Opening Speed 3<br>• Mold Opening Speed 4 | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each setting value is stored in IEEE754 single-precision floating point format.

# RD: Setting Value Real (1569 - 1592)

This protocol reads real type setting values No.1569 to 1592 stored in register addresses 403138 to 403185.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Mold Opening Switching Position 1<br>• Mold Opening Switching Position 2<br>• Mold Opening Switching Position 3<br>• Mold Opening Switching Position 4<br>• Mold Closing Speed 1<br>• Mold Closing Speed 2<br>• Mold Closing Speed 3<br>• Mold Closing Speed 4<br>• Mold Closing Switching Position 1<br>• Mold Closing Switching Position 2<br>• Mold Closing Switching Position 3<br>• Mold Closing Switching Position 4<br>• EJ Forward Speed 1<br>• EJ Forward Speed 2<br>• EJ Forward Speed 3<br>• EJ Forward Switching Position 1<br>• EJ Forward Switching Position 2<br>• EJ Forward Switching Position 3<br>• EJ Backward Speed 1<br>• EJ Backward Speed 2<br>• EJ Backward Speed 3<br>• EJ Backward Switching Position 1<br>• EJ Backward Switching Position 2<br>• EJ Forward Holding Time | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each setting value is stored in IEEE754 single-precision floating point format.

# RD: Setting Value Real (1593 - 1610)

This protocol reads real type setting values No.1593 to 1610 stored in register addresses 403186 to 403221.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • SNH Temperature<br>• HV Temperature<br>• Mold Temperature 2 Fixed 1<br>• Mold Temperature 3 Movable 2<br>• Mold Temperature 4 Fixed 2<br>• Injection Holding Time<br>• Maximum Injection Speed<br>• Minimum Injection Speed<br>• Maximum Injection Pressure<br>• Minimum Injection Pressure<br>• Maximum Measuring Rotation Speed<br>• Minimum Measuring Rotation Speed<br>• Maximum EJ Speed<br>• Minimum EJ Speed<br>• Maximum Back-Pressure Force<br>• Minimum Back-Pressure Force<br>• Maximum Holding Pressure<br>• Minimum Holding Pressure | Specify the device that stores the read data.<br>Each setting value uses two words of device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each setting value is stored in IEEE754 single-precision floating point format.

# RD: Measured Value Long (2000 - 2011)

This protocol reads long type measurement values No.2000 to 2011 stored in register addresses 404000 to 404023.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Total Number of Shots<br>• Shot Number<br>• Measurement Time - Year<br>• Measurement Time - Month<br>• Measurement Time - Day<br>• Measurement Time - Hour<br>• Measurement Time - Minute<br>• Measurement Time - Second<br>• Pass/Fail Code*1<br>• Mold Clamping Force FB<br>• Mold Clamping Force<br>• Mold Clamping Force Peak | Specify the device that stores the read data.<br>Each measurement value uses two words of devices. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 The following data is stored.

| Measurement value | Description |
|---|---|
| 1 | Accepted product |
| 2 | Reserve molding 1<br>(Measurement value data during operation using reserve molding 1 with reserve molding logging set to ON) |
| 3 | Reserve molding 2<br>(Measurement value data during operation using reserve molding 2 with reserve molding logging set to ON) |
| 4 | Rejected product<br>(Measurement value data when alarm monitoring is set to continuous mode and the measurement value reaches the upper/lower limit) |
| 5 | Rejected product<br>(Measurement value data when an alarm that causes the machine to stop occurs during automatic operation) |
| 6 | Dry operation (optional)<br>(Measurement value data during dry operation) |

## Precautions

Do not change values other than setting data.

# RD: Measured Value Real (2500 - 2514)

This protocol reads real type measurement values No.2500 to 2514 stored in register addresses 405000 to 405029.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Cycle Time<br>• Injection Start Position<br>• Injection Time<br>• Maximum Injection Pressure<br>• Holding Pressure Switching Position<br>• Holding Pressure Switching Speed<br>• Holding Pressure Switching Pressure<br>• Cushion Position<br>• Holding Completion Position<br>• Measuring Time<br>• Measuring Torque<br>• Back Pressure<br>• Measuring Completion Position<br>• Mold Opening Time<br>• Mold Closing Time | Specify the device that stores the read data.<br>Each measurement value uses two words of devices. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each measurement value is stored in IEEE754 single-precision floating point format.

# RD: Measured Value Real (2515 - 2528)

This protocol reads real type measurement values No.2515 to 2528 stored in register addresses 405030 to 405057.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | • Shift Volume<br>• Completed Back Pressure Speed<br>• Cross Head Position<br>• HP Temperature<br>• H1 Temperature<br>• H2 Temperature<br>• H3 Temperature<br>• H4 Temperature<br>• H5 Temperature<br>• H6 Temperature<br>• NH1 Temperature<br>• NH2 Temperature<br>• NH3 Temperature<br>• HV Temperature | Specify the device that stores the read data.<br>Each measurement value uses two words of devices. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Each measurement value is stored in IEEE754 single-precision floating point format.

# 20 MODBUS/TCP GENERAL PURPOSE PROTOCOL

## 20.1 Setting Method

### MODBUS/TCP

Refer to the manual of the target device.

#### Precautions

Select the appropriate byte swap for non-conversion variables that are the components that store read and write data.
The following example shows an example of how the send data (AABBCCDDH) is stored in the data storage location for each byte swap setting.

| Item | | Description | |
|---|---|---|---|
| Fixed Length/Variable Length | | Fixed Length | |
| Data Length/Maximum Data Length | | 4 | |
| Unit of Stored Data | | Lower Byte + Upper Byte | Lower Bytes Only |
| Send/Receive Data Storage Area | | D0 | |
| Byte Swap | Disable (Lower → Upper) | D0 = BBAAH<br>D1 = DDCCH | D0 = 00AAH<br>D1 = 00BBH<br>D2 = 00CCH<br>D3 = 00DDH |
| | Enable (Upper → Lower) | D0 = AABBH<br>D1 = CCDDH | D0 = 00BBH<br>D1 = 00AAH<br>D2 = 00DDH<br>D3 = 00CCH |
| | Enable (Upper → Lower, two-word units) | D0 = DDCCH<br>D1 = BBAAH | D0 = 00CCH<br>D1 = 00DDH<br>D2 = 00AAH<br>D3 = 00BBH |
| | Enable (Upper → Lower, four-byte units) | D0 = CCDDH<br>D1 = AABBH | D0 = 00DDH<br>D1 = 00CCH<br>D2 = 00BBH<br>D3 = 00AAH |

# 20.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: Read Coils (FC: 01H) | Reads the status (on/off) of one or more coils. | To be added | Fixed Intrvl |
| RD: Read Discrete Inputs (FC: 02H) | Reads the status (on/off) of one or more inputs. | To be added | Fixed Intrvl |
| RD: Read Holding Registers (FC: 03H) | Reads one or more holding register values. | To be added | Fixed Intrvl |
| RD: Read Input Registers (FC: 04H) | Reads one or more input register values. | To be added | Fixed Intrvl |
| RD: Read File Record (FC: 14H) | Reads the values of multiple extended file register areas. | Not to be added | Fixed Intrvl |
| RD/WR: Read/Write Multiple Registers (FC: 17H) | Reads and writes multiple holding register areas. | Not to be added | Request |
| WR: Write Single Coil (FC: 05H) | Writes a value (on/off) to a single coil. | Not to be added | Request |
| WR: Write Single Register (FC: 06H) | Writes a value to a single holding register. | Not to be added | Request |
| WR: Write Multiple Coils (FC: 0FH) | Writes values (on/off) to multiple coils. | To be added | Request |
| WR: Write Multiple Registers (FC: 10H) | Writes values to multiple holding register areas. | To be added | Request |
| WR: Write File Record (FC: 15H) | Writes a value to one or more extended file register areas. | Not to be added | Request |
| WR: Mask Write Register (FC: 16H) | Writes the mask value obtained by performing AND mask operation and OR mask operation for the value stored in a single holding register. | 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.

# 20.3 Details of Applicable Protocols

## RD: Read Coils (FC: 01H)

This protocol reads the status (on/off) of one or more coils.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Head Coil Number | Specify the device to store it.<br>For the address range of the coil, refer to the manual of the target device and specify the device value. |
| | Read Points | Specify the device to store it.<br>Specify the device value in the range from 1 to 2000. |
| Normal Response | Device Data | Specify the device that stores the read data.<br>By default, a 126-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 125 consecutive word devices starting from the second device. |
| Error Response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

## RD: Read Discrete Inputs (FC: 02H)

This protocol reads the status (on/off) of one or more inputs.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Head Input Number | Specify the device to store it.<br>For the input address range, refer to the manual of the target device and specify the device value. |
| | Read Points | Specify the device to store it.<br>Specify the device value in the range from 1 to 2000. |
| Normal Response | Device Data | Specify the device that stores the read data.<br>By default, a 126-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 125 consecutive word devices starting from the second device. |
| Error Response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

# RD: Read Holding Registers (FC: 03H)

This protocol reads one or more holding register values.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Head Holding Register Number | Specify the device to store it.<br>For the address range of the holding register, refer to the manual of the target device and specify the device value. |
| | Read Points | Specify the device to store it.<br>Specify the device value in the range from 1 to 125. |
| Normal Response | Device Data | By default, a 126-word device is secured.<br>Specify the device that stores the read data.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 125 consecutive word devices starting from the second device. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: Read Input Registers (FC: 04H)

This protocol reads one or more input register values.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Head Input Register Number | Specify the device to store it.<br>For the input register address range, refer to the manual of the target device and specify the device value. |
| | Read Points | Specify the device to store it.<br>Specify the device value in the range from 1 to 125. |
| Normal Response | Device Data | Specify the device that stores the read data.<br>By default, a 126-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 125 consecutive word devices starting from the second device. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: Read File Record (FC: 14H)

This protocol reads the values of multiple extended file register areas.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Length | Modify the calculation range (end) to be the final component according to the number of subrequests. |
| | Number of Bytes | Modify the calculation range (end) to be the final component according to the number of subrequests. |
| | Sub-Request File Number | Specify the device to store it.<br>Specify the device value in the range from 0 to 65535.<br>For the address range, refer to the manual of the target device. |
| | Sub-Request Record Number | Specify the device to store it.<br>Specify the device value in the range from 0 to 9999.<br>For the address range, refer to the manual of the target device. |
| | Sub-Request Record Length | Specify the device to store it.<br>Specify the device value in the range from 1 to 124.<br>For the address range, refer to the manual of the target device. |
| Normal Response | Sub-Request Data | Specify the device that stores the read data.<br>By default, a 125-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 124 consecutive word devices starting from the second device. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- By default, the number of subrequests is set to one. One subrequest consists of "Reference Number", "Sub-Request File Number", "Sub-Request Record Number", and "Sub-Request Record Length". To set up multiple subrequests, copy and add these components.
- Specify the number of subrequests so that the size of the protocol data part of the request message does not exceed 253 bytes.
- The number of subrequests is limited by the maximum number of components that can be set in one packet using the simple device communication function.

# RD/WR: Read/Write Multiple Registers (FC: 17H)

This protocol reads and writes multiple holding register areas.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Read Head Holding Register Number | Specify the device to store it.<br>For the address range of the holding register, refer to the manual of the target device and specify the device value. |
| | Read Points | Specify the device to store it.<br>Specify the device value in the range from 1 to 125. |
| | Write Head Holding Register Number | Specify the device to store it.<br>For the address range of the write holding register, refer to the manual of the target device and specify the device value. |
| | Write Device Data | Specify the device to store it.<br>Set the data length to be 2 × number of write points.<br>Store the data length (bytes) in the start device.<br>Write data is stored in consecutive word devices (up to 121 devices) starting from the second device. |
| Normal Response | Read Device Data | The data length (in byte units, 2 × number of read points) is stored in the start device.<br>Read data is stored in consecutive word devices (up to 125 devices) starting from the second device. |
| Error Response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# WR: Write Single Coil (FC: 05H)

This protocol writes a value (on/off) to a single coil.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Coil Number | Specify the device to store it.<br>For the address range of the coil, refer to the manual of the target device and specify the device value. |
| | On/Off Specification | Specify the device to store it.<br>ON/OFF specification = 0000H forces the coil to turn off.<br>ON/OFF specification = FF00H forces the coil to turn on. |
| 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: Write Single Register (FC: 06H)

This protocol writes a value to a single holding register.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Holding Register Number | Specify the device to store it.<br>For the address range, refer to the manual of the target device and specify the device value. |
| | Write Data | Specify the device to store it. |
| 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: Write Multiple Coils (FC: 0FH)

This protocol writes values (on/off) to multiple coils.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Head Coil Number | Specify the device to store it.<br>For the address range of the coil, refer to the manual of the target device and specify the device value. |
| | Write Points | Specify the device to store it.<br>Specify the device value in the range from 1 to 1968. |
| | Device Data | Specify the device to store it.<br>Data length = Perform number of write points ÷ 8, and add 1 to the data length if the remainder is not 0.<br>The data length (number of bytes) of the write data is stored in the start device.<br>Write data is stored in consecutive word devices (up to 123 devices) starting from the second device. |
| 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: Write Multiple Registers (FC: 10H)

This protocol writes values to multiple holding register areas.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Head Holding Register Number | Specify the device to store it.<br>For the address range of the holding register, refer to the manual of the target device and specify the device value. |
| | Device Data | Specify the device to store it.<br>The data length (number of bytes) of the write data is stored in the start device.<br>Set the data length to be 2 × number of write points.<br>The range of write points is 1 to 123.<br>The write data is stored in 123 consecutive word devices starting from the second device. |
| 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: Write File Record (FC: 15H)

This protocol writes a value to one or more extended file register areas.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Length | Modify the calculation range (end) to be the final component according to the number of subrequests. |
| | Number of Bytes | Modify the calculation range (end) to be the final component according to the number of subrequests. |
| | Sub-Request File Number | Specify the device to store it.<br>Specify the device value in the range from 0 to 65535.<br>For the address range, refer to the manual of the target device. |
| | Sub-Request Record Number | Specify the device to store it.<br>Specify the device value in the range from 0 to 9999.<br>For the address range, refer to the manual of the target device. |
| | Sub-Request Data | Specify the device to store it.<br>The data length (number of bytes) of the write data is stored in the start device.<br>Set the data length to be 2 × number of write points.<br>The range of write points is 1 to 122.<br>The write data is stored in 122 consecutive word devices starting from the second device. |
| 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.
- By default, the number of subrequests is set to one. One subrequest consists of "Reference Number", "Sub-Request File Number", "Sub-Request Record Number", "Sub-Request Record Length", and "Sub-Request Data". To set up multiple subrequests, copy and add these components. Specify "Sub-Request Data" for the calculation range of "Sub-Request Record Length".
- Specify the number of subrequests and the number of write points for each subrequest so that the size of the protocol data part of the request message does not exceed 253 bytes.
- The number of subrequests is limited by the maximum number of components that can be set in one packet using the simple device communication function.

# WR: Mask Write Register (FC: 16H)

This protocol writes the mask value obtained by performing AND mask operation and OR mask operation for the value stored in a single holding register.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Module ID | The default value for fixed data is FFH.<br>To use a different unit ID, rewrite the value. |
| | Target Holding Register Number | Specify the device to store it.<br>For the holding address range, refer to the manual of the target device and specify the device value. |
| | AND Mask Value | Specify the device to store it. |
| | OR Mask Value | Specify the device to store it. |
| 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.

# 21 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorLight Series: EMU4-BD1A-MB, EMU4-HD1A-MB)

## 21.1 Setting Method

Communication with the EcoMonitorLight series (EMU4-BD1A-MB, EMU4-HD1A-MB) uses the MODBUS RTU communication function of the Mitsubishi Electric Energy Measuring Unit EcoMonitorLight Series.
For the setting method, refer to the following.

- Energy Measuring Unit EMU4-BD1-MB, EMU4-HD1-MB User's Manual (IB63771)
- MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025)

**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 manual of the protocol converter to be used.

## 21.2 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 (Line Voltage) | Reads the value of the primary line voltage. | Not to be added | Request |
| RD: Primary Voltage (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 Bit 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. | Not to be added | Request |
| RD: External Input Method | Reads the value of the external input method. | Not to be added | Request |
| RD: External Input Reset Method | Reads the value of the external input reset method. | Not to be added | Request |
| RD: 16 Bit Monitor 2 | Reads the value of the 16 bits monitor 2. | Not to be added | Request |
| RD: Measuring Method Op. Time 3side | Reads the value of the operating time measuring method (phase 3). | Not to be added | Request |
| RD: Convert Rate of Pulse | Reads the value of the pulse converted rate. | Not to be added | Request |
| RD: Energy Converted Rate | Reads the value of the electric energy converted rate. | Not to be added | Request |
| RD: Energy Converted Rate 3side | Reads the value of the electric energy converted rate (phase 3). | Not to be added | Request |
| RD: 2 Circuit Measuring Setting | Reads the value of 2 circuit measurement. | Not to be added | Request |
| RD: Measuring Method of Op. 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 values.<br>• Phase 1 Current<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current | To be added | Fixed Intrvl |
| RD: Phase Current Demand | Reads the following values.<br>• Phase 1 Current Demand<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• Neutral Current Demand | To be added | Fixed Intrvl |

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: Line Voltage | Reads the following values.<br>• Voltage V1N<br>• Voltage V2N<br>• Voltage V3N<br>• Average Line Voltage | To be added | Fixed Intrvl |
| RD: Phase Voltage | Reads the following values.<br>• Voltage V1N<br>• Voltage V2N<br>• Voltage V3N | To be added | Fixed Intrvl |
| RD: Phase 3 Power Factor | Reads the instantaneous value of the phase 3 power factor. | Not to be added | Request |
| RD: Total Power Factor | Reads the instantaneous value of the total power factor. | To be added | Request |
| RD: Frequency | Reads the instantaneous value of frequency. | To be added | Request |
| RD: Phase 3 Active Power | Reads the instantaneous value of the phase 3 power. | Not to be added | Request |
| RD: Total Active Power | Reads the instantaneous value of the total power. | To be added | Request |
| RD: Phase 3 Active Power Demand | Reads the instantaneous value of the phase 3 power demand. | Not to be added | Request |
| RD: Total Active Power Demand | Reads the instantaneous value of the total power demand. | To be added | Request |
| RD: Phase 3 Reactive Power | Reads the instantaneous value of the phase 3 reactive power. | Not to be added | Request |
| RD: Total Reactive Power | Reads the instantaneous value of the total reactive power. | To be added | Request |
| RD: Total Apparent Power | Reads the instantaneous value of the total apparent power. | To be added | Request |
| RD: Current Unbalance Rate | Reads the value of the current unbalance rate. | Not to be added | Request |
| RD: Voltage Unbalance Rate | Reads the value of the voltage unbalance rate. | Not to be added | Request |
| RD: VT Use or No-use | Reads the value of the VT use or no-use setting register. | Not to be added | Fixed Intrvl |
| RD: Average Value of Ref. Waveform (1 to 20) | Reads the reference waveform average value (1 to 20). | Not to be added | Fixed Intrvl |
| RD: Standard Deviation of Ref. Waveform (1 to 20) | Reads the reference waveform standard deviation value (1 to 20). | Not to be added | Fixed Intrvl |
| RD: Number of Ref. Waveform Data | Reads the value of the number of reference waveform data. | Not to be added | Fixed Intrvl |
| RD: Waveform Band Monitoring or Not | Reads the waveform band monitoring value. | Not to be added | Request |
| RD: Waveform Band Monitoring Element | Reads the value of the waveform band monitoring element. | Not to be added | Request |
| RD: Sampling Period | Reads the sampling cycle value. | Not to be added | Request |
| RD: Bandwidth Setting Value | Reads the bandwidth setting value. | Not to be added | Request |
| RD: Standard Deviation Lower Limit Set Value | Reads the standard deviation lower limit setting value. | Not to be added | Request |
| RD: Waveform Band Monitoring Value | Reads the waveform band monitoring value. | Not to be added | Request |
| RD: Cumulative Alarm Time Monitor Multiplier | Reads the value of the alarm cumulative time monitor multiplying factor. | Not to be added | Request |
| RD: Cumulative Alarm Time 2 Monitor Multiplier | Reads the value of the alarm cumulative time monitor multiplying factor. | Not to be added | Request |
| RD: Integrated Electric Energy (Import) | Reads the value of the estimate electric energy (power receiving side). | To be added | Fixed Intrvl |
| RD: Integrated Electric Energy (Export) | Reads the value of the estimate electric energy (power sending side). | Not to be added | Fixed Intrvl |
| RD: Reactive Energy (Import LAG) | Reads the value of the reactive energy (power receiving side LAG). | To be added | Fixed Intrvl |
| RD: Integrated Electric Energy Ext. (Import) | Reads the value of the estimate electric energy extended (power receiving side). | To be added | Fixed Intrvl |
| RD: Integrated Electric Energy Ext. (Export) | Reads the value of the estimate electric energy extended (power sending side). | Not to be added | Fixed Intrvl |
| RD: Reactive Energy Ext. (Import LAG) | Reads the value of the reactive energy extended (import LAG). | Not to be added | Fixed Intrvl |
| RD: Periodic Electric Energy (Import) | Reads the value of the periodic electric energy (power receiving side). | To be added | Fixed Intrvl |
| RD: Pulse Count | Reads the pulse count value. | To be added | Fixed Intrvl |
| RD: Operating Time | Reads the value of the operating time. | To be added | Fixed Intrvl |
| RD: Integrated Electric Energy 3side (Import) | Reads the value of the estimate electric energy (power receiving side) (phase 3). | Not to be added | Fixed Intrvl |
| RD: Integrated Electric Energy 3side (Export) | Reads the value of the estimate electric energy (power sending side) (phase 3). | Not to be added | Fixed Intrvl |

| Name | Description | Automatic Addition[*1] | Communication Timing (Default) |
|---|---|---|---|
| RD: Integrated Energy Ext. 3side (Import) | Reads the value of the estimate electric energy extended (power receiving side) (phase 3). | Not to be added | Fixed Intrvl |
| RD: Integrated Energy Ext. 3side (Export) | Reads the value of the estimate electric energy extended (power sending side) (phase 3). | Not to be added | Fixed Intrvl |
| RD: Operating Time 3side | Reads the value of the operating time (phase 3). | Not to be added | Fixed Intrvl |
| RD: Periodic Electric Energy 3side | Reads the value of the periodic electric energy (phase 3). | Not to be added | Fixed Intrvl |
| RD: Electric Energy Conversion | Reads the value of electric energy conversion. | Not to be added | Fixed Intrvl |
| RD: Electric Energy Conversion 3side | Reads the value of electric energy conversion (phase 3). | Not to be added | Fixed Intrvl |
| RD: Pulse Conversion | Reads the value of pulse conversion. | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage (Total) | Reads the following values.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage (1st) | Reads the following values.<br>• Harmonics Value V1N<br>• Harmonics Value V2N<br>• Harmonics Value V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage (Total) | Reads the following values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage (1st) | Reads the following values.<br>• Harmonics Value V12<br>• Harmonics Value V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (Total) | Reads the following values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Current (1st) | Reads the following values.<br>• Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• Harmonics Value IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage Distortion (Total) | Reads the following values.<br>• THD V1N<br>• THD V2N<br>• THD V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Phase Voltage Distortion (3rd) | Reads the following values.<br>• Harmonics Ratio V1N<br>• Harmonics Ratio V2N<br>• Harmonics Ratio V3N | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage Distortion (Total) | Reads the following values.<br>• THD V12<br>• THD V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Line Voltage Distortion (3rd) | Reads the following values.<br>• Harmonics Ratio V12<br>• Harmonics Ratio V23 | Not to be added | Fixed Intrvl |
| RD: Harmonics Current Content Rate (Total) | Reads the following values.<br>• THD I1<br>• THD I2<br>• THD I3<br>• THD IN | Not to be added | Fixed Intrvl |
| RD: Harmonics Current Content Rate (3rd) | Reads the following values.<br>• Harmonics Ratio I1<br>• Harmonics Ratio I2<br>• Harmonics Ratio I3<br>• Harmonics Ratio IN | Not to be added | Fixed Intrvl |
| RD: Waveform Data (1 to 20) | Reads waveform data 1 to 20. | Not to be added | Fixed Intrvl |
| RD: Number of Waveform Data Acquisition Cycles | Reads the number of waveform data acquisition cycles. | 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 (Line Voltage) | Writes the value of the primary line voltage. | Not to be added | Request |

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| WR: Primary Voltage (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 Bit Set/Reset Register | Writes the value of the 16 bits set/reset. | Not to be added | Request |
| WR: 5A Input Change (Sensor Type) | Writes the value of 5A input switching. | Not to be added | Request |
| WR: External Input Method | Writes the value of the external input method. | Not to be added | Request |
| WR: External Input Reset Method | Writes the value of the external input reset method. | Not to be added | Request |
| WR: Measuring Method Op. Time 3side | Writes the value of the operating time measuring method (phase 3). | Not to be added | Request |
| WR: Convert Rate of Pulse | Writes the value of the pulse converted rate. | Not to be added | Request |
| WR: Energy Converted Rate | Writes the value of the electric energy converted rate. | Not to be added | Request |
| WR: Energy Converted Rate 3side | Writes the value of the electric energy converted rate (phase 3). | Not to be added | Request |
| WR: 2 Circuit Measuring Setting | Writes the value of 2 circuit measuring setting. | Not to be added | Request |
| WR: Measuring Method of Op. Time | Writes the value of the operating time measuring method. | Not to be added | Request |
| WR: VT Use or No-use | Writes the value of VT. | Not to be added | Request |
| WR: Waveform Band Monitoring or Not | Writes the waveform band monitoring value. | Not to be added | Request |
| WR: Waveform Band Monitoring Element | Writes the value of the waveform band monitoring element. | Not to be added | Request |
| WR: Sampling Period | Writes the sampling cycle value. | Not to be added | Request |
| WR: Bandwidth Setting Value | Writes the bandwidth setting value. | Not to be added | Request |
| WR: Standard Deviation Lower Limit Set Value | Writes the standard deviation lower limit value. | Not to be added | Request |
| WR: Waveform Band Monitoring Value | Writes the waveform band monitoring value. | Not to be added | Request |
| WR: Cumulative Alarm Time Monitor Multiplier | Writes the value of the alarm cumulative time monitor multiplying factor. | Not to be added | Request |
| WR: Cumulative Alarm Time 2 Monitor Multiplier | Writes the value of the alarm cumulative time 2 monitor multiplying factor. | Not to be added | Request |
| WR: Integrated Electric Energy (Import) | Writes the value of the estimate electric energy (power receiving side). | Not to be added | Request |
| WR: Integrated Electric Energy (Export) | Writes the value of the estimate electric energy (power sending side). | Not to be added | Request |
| WR: Reactive Energy (Import LAG) | Writes the value of the reactive energy. | Not to be added | Request |
| WR: Periodic Electric Energy (Import) | Writes the value of the periodic electric energy (power receiving side). | Not to be added | Request |
| WR: Pulse Count | Writes the pulse count value. | Not to be added | Request |
| WR: Operating Time | Writes the value of the operating time. | Not to be added | Request |
| WR: Integrated Electric Energy 3side (Import) | Writes the value of the estimate electric energy (power receiving side) (phase 3). | Not to be added | Request |
| WR: Integrated Electric Energy 3side (Export) | Writes the value of the estimate electric energy (power sending side) (phase 3). | Not to be added | Request |
| WR: Operating Time 3side | Writes the value of the operating time (phase 3). | Not to be added | Request |
| WR: Periodic Electric Energy 3side | Writes the value of the periodic electric energy (phase 3). | Not to be added | Request |
| WR: Electric Energy Conversion | Writes the value of the electric energy conversion. | Not to be added | Request |
| WR: Electric Energy Conversion 3side | Writes the value of the electric energy conversion (phase 3). | Not to be added | Request |
| WR: Pulse Conversion | Writes the value of pulse conversion. | Not to be added | Request |
| WR: Number of Waveform Data Acquisition Cycles | Writes the number of waveform data acquisition cycles. | Not to be added | Request |
| RD: Read Holding Registers*2 | Reads data from multiple holding registers. | Not to be added | Request |
| WR: Write Multiple Registers*2 | Writes data to multiple holding registers. | 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.

# 21.3 Details of Applicable Protocols

## RD: Phase Wire System

This protocol reads the 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 01H (default) to F7H. |
| 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_2CT | 0003H |
| 3P4W | 0004H |
| 3P3W_3CT | 0006H |

### Precautions

Do not change values other than setting data.

## RD: Primary Voltage (Line Voltage)

This protocol reads the value of the primary line voltage stored in register address 513.
The range is 1 to 110000. Unit is V.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Primary Line Voltage | Specify the device that stores the read data.<br>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 (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 01H (default) to F7H. |
| Normal Response | Primary Phase Voltage | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).



# RD: Secondary Voltage

This protocol reads the secondary voltage value stored in register address 517.
The range is 10 to 2200. Unit is ×0.1V.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Secondary Voltage | Specify the device that stores the read data.<br>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 primary current value stored in register address 519.
The range is 50 to 300000. Unit is ×0.1A.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Primary Current | Specify the device that stores the read data.<br>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 Bit Monitor

This protocol reads the 16 bits monitor value stored at register address 524.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.

○: Applicable, —: No applicable

| Bit | Description | If the value is 1 | If the value is 0 | EMU4-BD1A-MB | EMU4-HD1A-MB |
|---|---|---|---|---|---|
| 0 | Pulse count value upper limit alarm*1*2 | 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*3 | On (closed) | Off (open) | — | ○ |
| 5 | Upper and lower limit batch alarm | 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*4 | 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 | Band monitoring alarm status | Alarm occurring | No alarm | — | ○ |
| 15 | Not used | — | — | — | — |

*1 It is valid only when the external input method is set to 1 (pulse input).

*2 16-bit monitor 2 can also be used for monitoring.

*3 It is valid only when the external input method is set to 2 (contact input).

*4 If the phase wire system is set to 0001H (1P2W), either the 16-bit monitor or 16-bit monitor 2 can be used for monitoring. The effective bit differs depending on the model. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

## Precautions

Do not change values other than setting data.

# RD: 5A Input Change (Sensor Type)

This protocol reads the value of 5A input switching (sensor type) stored in register address 531.

The value 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 01H (default) to F7H. |
| 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: External Input Method

This protocol reads the value of the external input method stored in register address 587.

The value is read as follows.

- 0: Not set
- 1: Pulse input
- 2: Contact input

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: External Input Reset Method

This protocol reads the value of the external input reset method stored in register address 588.

The value is read as follows.

- 1: Auto reset
- 2: Latch

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: 16 Bit Monitor 2

This protocol reads the 16 bits monitor 2 value stored at register address 594.

The value is read as follows.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | 16 Bit Monitor 2*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.

○: Applicable, —: No applicable

| Bit | Description | If the value is 1 | If the value is 0 | EMU4-BD1A-MB | EMU4-HD1A-MB |
|---|---|---|---|---|---|
| 0 | Pulse count value upper limit alarm*1*2 | 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 batch alarm (3 sides at 1P2W) | Alarm occurring | No alarm | ○ | ○ |
| 6 | Not used | — | — | — | — |
| 7 | Not used | — | — | — | — |
| 8 | Voltage upper and lower limit alarm*3 | Alarm occurring | No alarm | ○ | ○ |
| 9 | Not used | — | — | — | — |
| 10 | Not used | — | — | — | — |
| 11 | Not used | — | — | — | — |
| 12 | Not used | — | — | — | — |
| 13 | Power factor upper and lower limit alarm (3 sides at 1P2W) | Alarm occurring | No alarm | ○ | ○ |
| 14 | Not used | — | — | — | — |
| 15 | Not used | — | — | — | — |

*1 It is valid only when the external input method is set to 1 (pulse input).

*2 16-bit monitor can also be used for monitoring.

*3 If the phase wire system is set to 0001H (1P2W), either the 16-bit monitor or 16-bit monitor 2 can be used for monitoring. The effective bit differs depending on the model. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

## Precautions

Do not change values other than setting data.

# RD: Measuring Method Op. Time 3side

This protocol reads the value of the operating time measuring method (phase 3) stored in register address 733.
The value 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 01H (default) to F7H. |
| 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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Convert Rate of Pulse

This protocol reads the value of the pulse converted rate stored in register address 738.
The range is 1 to 10000000. Unit is ×0.001.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Convert Rate of Pulse | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Energy Converted Rate

This protocol reads the value of the electric energy converted rate stored in register address 741.
The range is 1 to 10000000. Unit is ×0.001.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Electric Energy Converted Rate | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Energy Converted Rate 3side

This protocol reads the value of the electric energy converted rate (phase 3) stored in register address 747.
The range is 1 to 10000000. Unit is ×0.001.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Electric Energy Converted Rate 3side | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: 2 Circuit Measuring Setting

This protocol reads the value of 2 circuit measuring setting stored in register address 749.
The value is read as follows.

- 0: Off
- 1: On

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- This protocol applies only when using phase wire type 1P2W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Measuring Method of Op. Time

This protocol reads the value of the operating time measuring method stored in register address 753.
The value 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 01H (default) to F7H. |
| 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the 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.
The range is -127 to 127.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Current<br>• Voltage<br>• Electric Power<br>• Electric Energy<br>• Power Factor<br>• Frequency<br>• Content Rate of Harmonic Current<br>• Content Rate of Harmonic Voltage | 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 multiplying factors of content rate of harmonic current and content rate of harmonic voltage are not applied to the EMU4-HD1A-MB and read 0 when the phase wire system is set to 0001H (1P2W) and 0002H (1P3W). For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# 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 01H (default) to F7H. |
| 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-BD1A-MB | 0001H |
| EMU4-HD1A-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.
The range is 0 to 65535. 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 = 12345
Multiplying factor = -3
Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Phase 1 Current<br>• Phase 2 Current<br>• Phase 3 Current<br>• Neutral Current<br>• 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.
- This protocol has unused values depending on the model and phase wire system. Unused values are stored as 0. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Phase Current Demand

This protocol reads the values of Phase 1 current demand, Phase 2 current demand, Phase 3 current demand, and Phase N current demand stored in register addresses 773 to 776.
The range is 0 to 65535. 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 = 12345
Multiplying factor = -3
Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Phase 1 Current Demand<br>• Phase 2 Current Demand<br>• Phase 3 Current Demand<br>• 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 model and phase wire system. Unused values are stored as 0. For details, refer to the 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.
The range is 0 to 65535. 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 = 12345
Multiplying factor = -3
Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Voltage V12<br>• Voltage V23<br>• Voltage V31<br>• Average Line Voltage | 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 model and phase wire system. Unused values are stored as 0. For details, refer to the 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.
The range is 0 to 65535. 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 = 12345
Multiplying factor = -3
Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Voltage V1N<br>• Voltage V2N<br>• 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 applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Phase 3 Power Factor

This protocol reads the instantaneous value of the phase 3 power factor stored in register address 788.

The range is -1 to 1000 to 0. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-2} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Total Power Factor

This protocol reads the instantaneous value of the total power factor stored in register address 789.

The range is -1 to +1000 to 0. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-2} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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 instantaneous value of frequency stored in register address 790.

The range is 445 to 999. Unit is ×0.1Hz.

The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the current frequency multiplying factor data (register address: 759).

Ex.

Read value = 456

Multiplying factor = -2

Measurement value = $456 \times 10^{-2} = 4.56$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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: Phase 3 Active Power

This protocol reads the instantaneous value of phase 3 power stored in register address 793.

The range is -32767 to 32767. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Total Active Power

This protocol reads the instantaneous value of total power stored in register address 794.

The range is -32767 to 32767. 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 = 12345

Multiplying factor = -3

Measurement value = 12345 × $10^{-3}$ = 12.345

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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: Phase 3 Active Power Demand

This protocol reads the instantaneous value of phase 3 power demand stored in register address 797.

The range is -32767 to 32767. 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 = 12345

Multiplying factor = -3

Measurement value = 12345 × $10^{-3}$ = 12.345

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Total Active Power Demand

This protocol reads the instantaneous value of the total power demand stored in register address 798.
The range is -32767 to 32767. 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 = 12345
Multiplying factor = -3
Measurement value = 12345 × $10^{-3}$ = 12.345

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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: Phase 3 Reactive Power

This protocol reads the instantaneous value of the phase 3 reactive power stored in register address 801.
The range is -32767 to 32767. 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 = 12345
Multiplying factor = -3
Measurement value = 12345 × $10^{-3}$ = 12.345

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Total Reactive Power

This protocol reads the instantaneous value of the total reactive power stored in register address 802.

The range is -32767 to 32767. 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 = 12345

Multiplying factor = -3

Measurement value = 12345 × $10^{-3}$ = 12.345

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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: Total Apparent Power

This protocol reads the instantaneous value of the total apparent power stored in register address 806.

The range is -32767 to 32767. 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 = 12345

Multiplying factor = -3

Measurement value = 12345 × $10^{-3}$ = 12.345

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- This protocol applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Current Unbalance Rate

This protocol reads the current unbalance rate value stored in register address 925.
The range is 0 to 99999. Unit is ×0.01%.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Current Unbalance Rate | Specify the device that stores the read data.<br>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 applied depending on the phase wire system selected. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Voltage Unbalance Rate

This protocol reads the voltage unbalance rate value stored in register address 927.
The range is 0 to 99999. Unit is ×0.01%.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Voltage Unbalance Rate | Specify the device that stores the read data.<br>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 applied depending on the phase wire system selected. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: VT Use or No-use

This protocol reads the value of VT stored in register address 1062.
The value is read as follows.

- 0: VT not used
- 1: VT used

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| 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.
- This protocol is applied depending on the phase wire system selected. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Average Value of Ref. Waveform (1 to 20)

This protocol reads the reference waveform average value stored in register addresses 1084 to 1103.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Average Value of Reference Waveform (1 to 20) | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Standard Deviation of Ref. Waveform (1 to 20)

This protocol reads the reference waveform standard deviation value (1 to 20) stored in register addresses 1111 to 1130.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Standard Deviation Value Ref. Waveform (1 to 20) | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Number of Ref. Waveform Data

This protocol reads the value of the number of reference waveform data stored in register address 1131.
Range is 0 and 10 to 20.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | No. of Reference Waveform Data | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Waveform Band Monitoring or Not

This protocol reads the waveform band monitoring value stored in register address 1132.

The value is read as follows.

- 0: Do not monitor
- 1: Monitor

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Waveform Band Monitoring | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Waveform Band Monitoring Element

This protocol reads the setting value of the waveform band monitoring element stored in register address 1133.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Waveform Band Monitoring Element*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.

| Waveform band monitoring element | Setting value |
|---|---|
| Phase 1 Current | 01H |
| Phase 2 Current | 02H |
| Phase 3 Current | 03H |
| Neutral Current | 04H |

## Precautions

- Do not change values other than setting data.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Sampling Period

This protocol reads the sampling cycle value stored in register address 1134.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Sampling Period*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.

| Sampling cycle | Setting value |
|---|---|
| 250ms | 01H |
| 500ms | 02H |
| 1250ms | 03H |
| 2500ms | 04H |
| 5000ms | 05H |

## Precautions

- Do not change values other than setting data.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Bandwidth Setting Value

This protocol reads the bandwidth setting value stored in register address 1135.
The range is 1 to 10.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Bandwidth Setting 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Standard Deviation Lower Limit Set Value

This protocol reads the lower limit value set for the standard deviation stored in register address 1136.
The range is 1 to 100.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Standard Deviation Lower Limit Set 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Waveform Band Monitoring Value

This protocol reads the waveform band monitoring value stored in register address 1137.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Waveform Band Monitoring Value*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.

| Waveform band monitoring value | Setting value |
|---|---|
| 0% | 00H |
| 5% | 01H |
| 10% | 02H |
| 15% | 03H |
| 20% | 04H |
| 25% | 05H |
| 30% | 06H |
| 35% | 07H |
| 40% | 08H |
| 45% | 09H |
| 50% | 0AH |
| 55% | 0BH |
| 60% | 0CH |
| 65% | 0DH |
| 70% | 0EH |
| 75% | 0FH |
| 80% | 10H |
| 85% | 11H |
| 90% | 12H |
| 95% | 13H |
| 100% | 14H |

## Precautions

- Do not change values other than setting data.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Cumulative Alarm Time Monitor Multiplier

This protocol reads the value of the alarm cumulative time monitor multiplying factor stored in register address 1182.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Cumulative Alarm Time Monitor Multiplier*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.

| Alarm cumulative time monitor multiplying factor | Setting value |
|---|---|
| ×1 | 00H |
| ×10 | 01H |
| ×100 | 02H |
| ×1000 | 03H |

## Precautions

Do not change values other than setting data.

# RD: Cumulative Alarm Time 2 Monitor Multiplier

This protocol reads the alarm cumulative time 2 monitor multiplying factor value stored in register address 1183.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Cumulative Alarm Time 2 Monitor Multiplier*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.

| Alarm cumulative time 2 monitor multiplying factor | Setting value |
|---|---|
| ×1 | 00H |
| ×10 | 01H |
| ×100 | 02H |
| ×1000 | 03H |

## Precautions

- Do not change values other than setting data.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Integrated Electric Energy (Import)

This protocol reads the value of the estimate electric energy (power receiving side) stored in register address 1304.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy (Import) | 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: Integrated Electric Energy (Export)

This protocol reads the value of the estimate electric energy (power sending side) stored in register address 1306.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy (Export) | Specify the device that stores the read data.<br>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 value of the reactive energy (power receiving side LAG) stored in register address 1308.

The range is 0 to 999999. Unit is kvarh.

The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Reactive Energy (Import LAG) | Specify the device that stores the read data.<br>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 Ext. (Import)

This protocol reads the value of the estimate electric energy extended (power receiving side) stored in register address 1316.

The range is 0 to 999999. Unit is kWh.

The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy Ext. (Import) | Specify the device that stores the read data.<br>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 Ext. (Export)

This protocol reads the value of the estimate electric energy extended (power sending side) stored in register address 1318.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (register address: 757).

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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy Ext. (Export) | Specify the device that stores the read data.<br>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 Ext. (Import LAG)

This protocol reads the value of the reactive energy extended (import LAG) stored in register address 1320.
The range is 0 to 999999. Unit is kvarh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (register address: 757).

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 01H (default) to F7H. |
| Normal Response | Reactive Energy Extended (Import LAG) | Specify the device that stores the read data.<br>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 value of the periodic electric energy (power receiving side) stored in register address 1374.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Periodic Electric Energy (Import) | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the 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.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Pulse Count | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Operating Time

This protocol reads the operating time value stored in register address 1378.
The range is 0 to 999999. Unit is h.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Operating Time | Specify the device that stores the read data.<br>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 3side (Import)

This protocol reads the value of the estimate electric energy (power receiving side) (phase 3) stored in register address 1460.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (register address: 757).

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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy 3side (Import) | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Integrated Electric Energy 3side (Export)

This protocol reads the value of the estimate electric energy (power sending side) (phase 3) stored in register address 1462.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy 3side (Export) | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Integrated Energy Ext. 3side (Import)

This protocol reads the value of the estimate electric energy extended (power receiving side) (phase 3) stored in register address 1464.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy Extend 3side (Import) | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Integrated Energy Ext. 3side (Export)

This protocol reads the value of the estimate electric energy extended (power sending side) (phase 3) stored in register address 1466.

The range is 0 to 999999. Unit is kWh.

The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Integrated Electric Energy Extend 3side (Export) | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Operating Time 3side

This protocol reads the value of the operating time (phase 3) stored in register address 1470.

The range is 0 to 999999. Unit is h.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Operating Time 3side | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Periodic Electric Energy 3side

This protocol reads the value of the periodic electric energy (phase 3) stored in register address 1474.
The range is 0 to 999999. Unit is kWh.
The measurement value can be obtained by multiplying the read data by "$10^{n}$". *1

*1 n is the multiplying factor data of the electric energy (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 01H (default) to F7H. |
| Normal Response | Periodic Electric Energy 3side | Specify the device that stores the read data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Electric Energy Conversion

This protocol reads electric energy conversion stored in register address 1476.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Electric Energy Conversion | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Electric Energy Conversion 3side

This protocol reads electric energy conversion (phase 3) stored in register address 1480.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Electric Energy Conversion 3side | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB when using phase wire type 1P2W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Pulse Conversion

This protocol reads the pulse conversion value stored in register address 1482.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Pulse Conversion | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# 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.

The range is 0 to 65535. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Harmonics Value V1N<br>• Harmonics Value V2N<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the 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 harmonics voltage for phases 1-N, 2-N, and 3-N stored in register addresses 1795 to 1797.

The range is 0 to 65535. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | The effective value (fundamental wave) of the harmonics of the phase voltage can be read by setting the initial value to 0703H. When another harmonics protocol is used, change it as follows.<br>• 3rd: 0706H<br>• 5th: 0709H<br>• 7th: 070CH<br>• 9th: 070FH<br>• 11th: 0712H<br>• 13th: 0715H |
| Normal Response | • Harmonics Value V1N<br>• Harmonics Value V2N<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the 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.

The range is 0 to 65535. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Harmonics Value V12<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using a phase wire system other than 3P4W. For details, refer to the 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 harmonics voltage for phases 1-2 and 2-3 stored in register addresses 2051 to 2052.

The range is 0 to 65535. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | The effective value (fundamental wave) of the harmonics of the line voltage can be read by setting the initial value to 0803H. When another harmonics protocol is used, change it as follows.<br>• 3rd: 0806H<br>• 5th: 0809H<br>• 7th: 080CH<br>• 9th: 080FH<br>• 11th: 0812H<br>• 13th: 0815H |
| Normal Response | • Harmonics Value V12<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using a phase wire system other than 3P4W. For details, refer to the 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.

The range is 0 to 65535. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB due to the phase wire system. For details, refer to the 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 harmonics current for phases 1, 2, 3, and N stored in register addresses 2308 to 2311.

The range is 0 to 65535. 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 = 12345

Multiplying factor = -3

Measurement value = $12345 \times 10^{-3} = 12.345$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | The effective value of the harmonics phase current (fundamental wave) can be read by setting the initial value to 0904H. When another harmonics protocol is used, change it as follows.<br>• 3rd: 0908H<br>• 5th: 090CH<br>• 7th: 0910H<br>• 9th: 0914H<br>• 11th: 0918H<br>• 13th: 091CH |
| Normal Response | • Harmonics Value I1<br>• Harmonics Value I2<br>• Harmonics Value I3<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB due to the phase wire system. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Harmonics Phase Voltage Distortion (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.

The range is 0 to 1000. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • THD V1N<br>• THD V2N<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Harmonics Phase Voltage Distortion (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.

The range is 0 to 1000. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | The harmonics phase voltage (3rd) can be read by setting the initial value to 0A03H. When another harmonics protocol is used, change it as follows.<br>• 5th: 0A06H<br>• 7th: 0A09H<br>• 9th: 0A0CH<br>• 11th: 0A0FH<br>• 13th: 0A12H |
| Normal Response | • Harmonics Ratio V1N<br>• Harmonics Ratio V2N<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the 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.

The range is 0 to 1000. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • THD V12<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using a phase wire system other than 3P4W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Harmonics Line Voltage Distortion (3rd)

This protocol reads the 3rd harmonics voltage ratio for phases 1-2 and 2-3 stored in register addresses 2819 to 2820.

The range is 0 to 1000. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | The harmonics line voltage (3rd) can be read by setting the initial value to 0B03H. When another harmonics protocol is used, change it as follows.<br>• 5th: 0B06H<br>• 7th: 0B09H<br>• 9th: 0B0CH<br>• 11th 0B0FH<br>• 13th: 0B12H |
| Normal Response | • Harmonics Ratio V12<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB when using a phase wire system other than 3P4W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Harmonics Current Content Rate (Total)

This protocol reads the instantaneous RMS value of total harmonics current for phases 1, 2, 3, and N stored in register addresses 3072 to 3075.

The range is 0 to 1000. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | • THD I1<br>• THD I2<br>• THD I3<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB due to the phase wire system. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Harmonics Current Content Rate (3rd)

This protocol reads the instantaneous RMS value of harmonics current ratio for phases 1, 2, 3, and N stored in register addresses 3076 to 3079.

The range is 0 to 1000. 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 = 123

Multiplying factor = -2

Measurement value = $123 \times 10^{-3} = 1.23$

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | The harmonics phase current (3rd) can be read by setting the initial value to 0C04H. When another harmonics protocol is used, change it as follows.<br>• 5th: 0C08H<br>• 7th: 0C0CH<br>• 9th: 0C10H<br>• 11th: 0C14H<br>• 13th: 0C18H |
| Normal Response | • Harmonics Ratio I1<br>• Harmonics Ratio I2<br>• Harmonics Ratio I3<br>• 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.
- This protocol applies only to the EMU4-HD1A-MB due to the phase wire system. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Waveform Data (1 to 20)

This protocol reads waveform data 1 to 20 stored in register addresses 34306 to 34325.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | Waveform Data (1 to 20) | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# RD: Number of Waveform Data Acquisition Cycles

This protocol reads the number of waveform data acquisition cycles stored in register address 34328.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| Normal Response | No. of Waveform Data Acquisition Cycles | Specify the device that stores the read data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the 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 01H (default) to F7H. |
| | 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_2CT | 0003H |
| 3P4W | 0004H |
| 3P3W_3CT | 0006H |

## Precautions

Do not change values other than setting data.

# WR: Primary Voltage (Line Voltage)

This protocol writes the primary line voltage setting value to register address 513.
The range is 0 to 110000. Unit is V.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Primary Line Voltage | Specify the device that stores the write data.<br>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 (Phase Voltage)

This protocol writes the primary phase voltage setting value to register address 515.
The range is 10 to 1100000. Unit is ×0.1V.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Primary Phase Voltage | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB when using phase wire type 3P4W. For details, refer to the 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.
The range is 10 to 2200. Unit is ×0.1V.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Secondary Voltage | Specify the device that stores the write data.<br>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.
The range is 50 to 300000. Unit is ×0.1A.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Primary Current | Specify the device that stores the write data.<br>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 Bit Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset register to register address 523.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | 16 Bit Set/Reset Register*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 selection. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

○: Applicable, —: No applicable

| Bit | Description | If the value is 1 | If the value is 0 | EMU4-BD1A-MB | EMU4-HD1A-MB |
|---|---|---|---|---|---|
| 0 | Alarm reset | Clear | Do not clear | ○ | ○ |
| 1 | Reset of integrated value data | Clear | Do not clear | ○ | ○ |
| 2 | Reset of maximum/minimum value | Clear | Do not clear | ○ | ○ |
| 3 | Band monitoring alarm occurrence count reset | Clear | Do not clear | — | ○ |
| 4 | Alarm cumulative time reset | Clear | Do not clear | ○ | ○ |
| 5 | Digital output | On | Off | — | ○ |
| 6 | Not used | — | — | — | — |
| 7 | Not used | — | — | — | — |
| 8 | Contact input latch clear | Clear | Do not clear | — | ○ |
| 9 | Reset of external input data | Clear | Do not clear | ○ | ○ |
| 10 | Reset of integrated value data (1st circuit) | Clear | Do not clear | ○ | ○ |
| 11 | Reset of integrated value data (2nd circuit) | Clear | Do not clear | ○ | ○ |
| 12 | Reset of maximum/minimum value (1st circuit) | Clear | Do not clear | ○ | ○ |
| 13 | Reset of maximum/minimum value (2nd circuit) | Clear | Do not clear | ○ | ○ |
| 14 | Electric energy/reactive energy (integrated value) reset | Clear | Do not clear | ○ | ○ |
| 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.

The setting values are 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 01H (default) to F7H. |
| | 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: External Input Method

This protocol writes the setting value of the external input method to register address 587.

The setting values are as follows.

- 0: Not set
- 1: Pulse input
- 2: Contact input

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting to the slave address, specify it in the range of 01H (default) to F7H. |
| | External Input Method | 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: External Input Reset Method

This protocol writes the setting value of the external input reset method to register address 588.

The setting values are as follows.

- 1: Auto reset
- 2: Latch

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting to the slave address, specify it in the range of 01H (default) to F7H. |
| | External Input Reset Method | 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Measuring Method Op. Time 3side

This protocol writes the setting value of the operating time measuring method (phase 3) to register address 733.
The setting values are as follows.

- 1: Current
- 2: Contact

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting to the slave address, specify it in the range of 01H (default) to F7H. |
| | 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.
- This protocol applies only to the EMU4-HD1A-MB when using phase wire type 1P2W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Convert Rate of Pulse

This protocol writes the setting value of the pulse converted rate to register address 738.
The range is 1 to 10000000. Unit is ×0.001.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Convert Rate of Pulse | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Energy Converted Rate

This protocol writes the setting value of the electric energy converted rate to register address 741.
The range is 1 to 10000000. Unit is ×0.001.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Electric Energy Converted Rate | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Energy Converted Rate 3side

This protocol writes the setting value of the electric energy converted rate (phase 3) to register address 747.
The range is 1 to 10000000. Unit is ×0.001.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Electric Energy Converted Rate 3side | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB when using phase wire type 1P2W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: 2 Circuit Measuring Setting

This protocol writes the setting value of 2 circuit measuring setting to register address 749.

The setting values are as follows.

- 0: Off
- 1: On

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | 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.
- This protocol applies only when using phase wire type 1P2W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Measuring Method of Op. Time

This protocol writes the setting value of the operating time measuring method to register address 753.

The setting values are 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 01H (default) to F7H. |
| | 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.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: VT Use or No-use

This protocol writes the setting value of VT to register address 1062.

The setting values are as follows.

- 0: VT not used
- 1: VT used

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | 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.
- This protocol is applied depending on the phase wire system selected. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Waveform Band Monitoring or Not

This protocol writes the setting value of waveform band monitoring to register address 1132.

The setting values are as follows.

- 0: Do not monitor
- 1: Monitor

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Waveform Band Monitoring | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Waveform Band Monitoring Element

This protocol writes the setting value of the waveform band monitoring element to register address 1133.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Waveform Band Monitoring Element*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.

| Waveform band monitoring element | Setting value |
|---|---|
| Phase 1 current | 01H |
| Phase 2 current | 02H |
| Phase 3 current | 03H |
| Phase 4 current | 04H |

## Precautions

- Do not change values other than setting data.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Sampling Period

This protocol writes the setting value of the sampling cycle to register address 1134.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Sampling Period*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.

| Sampling cycle | Setting value |
|---|---|
| 250ms | 01H |
| 500ms | 02H |
| 1250ms | 03H |
| 2500ms | 04H |
| 5000ms | 05H |

## Precautions

- Do not change values other than setting data.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Bandwidth Setting Value

This protocol writes the bandwidth setting value to register address 1135.
The range is 1 to 10.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Bandwidth Setting Value | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).



# WR: Standard Deviation Lower Limit Set Value

This protocol writes the standard deviation lower limit setting value to register address 1136.
The range is 1 to 100. Unit is %.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Standard Deviation Lower Limit Set Value | 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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Waveform Band Monitoring Value

This protocol writes the waveform band monitoring value to register address 1137.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Waveform Band Monitoring Value*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.

| Waveform band monitoring value | Setting value |
|---|---|
| 0% | 00H |
| 5% | 01H |
| 10% | 02H |
| 15% | 03H |
| 20% | 04H |
| 25% | 05H |
| 30% | 06H |
| 35% | 07H |
| 40% | 08H |
| 45% | 09H |
| 50% | 0AH |
| 55% | 0BH |
| 60% | 0CH |
| 65% | 0DH |
| 70% | 0EH |
| 75% | 0FH |
| 80% | 10H |
| 85% | 11H |
| 90% | 12H |
| 95% | 13H |
| 100% | 14H |

## Precautions

- Do not change values other than setting data.
- This protocol applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Cumulative Alarm Time Monitor Multiplier

This protocol writes the setting value of the alarm cumulative time monitor multiplying factor to register address 1182.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Cumulative Alarm Time Monitor Multiplier*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.

| Alarm cumulative time monitor multiplying factor | Setting value |
|---|---|
| ×1 | 00H |
| ×10 | 01H |
| ×100 | 02H |
| ×1000 | 03H |

## Precautions

Do not change values other than setting data.

# WR: Cumulative Alarm Time 2 Monitor Multiplier

This protocol writes the setting value of the alarm cumulative time 2 monitor multiplying factor to register address 1183.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Cumulative Alarm Time 2 Monitor Multiplier*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.

| Alarm cumulative time 2 monitor multiplying factor | Setting value |
|---|---|
| ×1 | 00H |
| ×10 | 01H |
| ×100 | 02H |
| ×1000 | 03H |

- Do not change values other than setting data.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Integrated Electric Energy (Import)

This protocol writes the setting value of the estimate electric energy (power receiving side) to register address 1304.
The range is 0 to 999999. Unit is kWh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Integrated Electric Energy (Import) | Specify the device that stores the write data.<br>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: Integrated Electric Energy (Export)

This protocol writes the setting value of the estimate electric energy (power sending side) to register address 1306.
The range is 0 to 999999. Unit is kWh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Integrated Electric Energy (Export) | Specify the device that stores the write data.<br>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: Reactive Energy (Import LAG)

This protocol writes the setting value of the reactive energy (power receiving side LAG) to register address 1308.
The range is 0 to 999999. Unit is kvarh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Reactive Energy (Import LAG) | Specify the device that stores the write data.<br>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: Periodic Electric Energy (Import)

This protocol writes the setting value of the periodic electric energy (power receiving side) to register address 1374.
The range is 0 to 999999. Unit is kWh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Periodic Electric Energy (Import) | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Pulse Count

This protocol writes the pulse count setting value to register address 1376.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Pulse Count | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Operating Time

This protocol writes the setting value of the operating time to register address 1378.
The range is 0 to 999999. Unit is h.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Operating Time | Specify the device that stores the write data.<br>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: Integrated Electric Energy 3side (Import)

This protocol writes the setting value of the estimate electric energy (power receiving side) (phase 3) to register address 1460.
The range is 0 to 999999. Unit is kWh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Integrated Electric Energy 3side (Import) | Specify the device that stores the write data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Integrated Electric Energy 3side (Export)

This protocol writes the setting value of the estimate electric energy (power sending side) (phase 3) to register address 1462.
The range is 0 to 999999. Unit is kWh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Integrated Energy 3side (Export) | Specify the device that stores the write data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Operating Time 3side

This protocol writes the setting value of the operating time (phase 3) to register address 1470.
The range is 0 to 999999. Unit is h.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Operating Time 3side | Specify the device that stores the write data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Periodic Electric Energy 3side

This protocol writes the setting value of the periodic electric energy (power receiving side) (phase 3) to register address 1474.
The range is 0 to 999999. Unit is kWh.
When the electric energy 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 the slave address, specify it in the range from 01H (default) to F7H. |
| | Periodic Electric Energy 3side | Specify the device that stores the write data.<br>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.
- If the phase wire system is set to 0001H (1P2W), this protocol is applied only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Electric Energy Conversion

This protocol writes electric energy conversion to register address 1476.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Electric Energy Conversion | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Electric Energy Conversion 3side

This protocol writes electric energy conversion (phase 3) to register address 1480.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Electric Energy Conversion 3side | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB when using phase wire type 1P2W. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

# WR: Pulse Conversion

This protocol writes the pulse conversion value to register address 1482.
The range is 0 to 999999.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Pulse Conversion | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

## WR: Number of Waveform Data Acquisition Cycles

This protocol writes the setting value of the number of waveform data acquisition cycles to register address 34328.
The range is 0 to 999999.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Number of Waveform Data Acquisition Cycles | Specify the device that stores the write data.<br>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 applies only to the EMU4-HD1A-MB. For details, refer to the MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025).

## RD: Read Holding Registers

Standard MODBUS protocol. It reads values from multiple holding registers.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | Rewrite it to the start address to be read.<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>By default, 0200H is set. |
| | Number of Registers | Specify the device that stores the number of registers to be read.<br>Specify the device value in the range from 1 to 125. |
| Normal Response | Read Data | Specify the device that stores the read data.<br>By default, a 126-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The actual read data is stored in 125 consecutive word devices in order from the second device. |
| Error Response | Error Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

# WR: Write Multiple Registers

Standard MODBUS protocol. It writes setting values to multiple holding registers.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Address | Rewrite it to be the same as the slave address.<br>When rewriting the slave address, specify it in the range from 01H (default) to F7H. |
| | Start Address | Rewrite it to the start address to be written.<br>Specify the value in hexadecimal in the order from upper bytes to lower bytes.<br>By default, 0200H is set. |
| | Number of Registers | Rewrite to the number of registers to be written.<br>Use a value in the range of 0001H to 007BH.<br>The default value is 1H. |
| | Write Data | Specify the device that stores the write data.<br>Rewrite the data length to the value of the number of registers × 2.<br>For example, if the number of registers is 123, specify 246.<br>Store the data to be written to the specified device.<br>Devices for the number of consecutive registers are 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.

# 22 PROTOCOLS SUPPORTED BY UNIVERSAL ROBOTS (UR3e, UR5e, UR10e, AND UR16e) DASHBOARD SERVER

## 22.1 Setting Method

### UNIVERSAL ROBOTS (UR3e, UR5e, UR10e, UR16e)

Use the TCP/IP server socket feature of the dashboard server.

For the setting method, refer to the manual for Universal Robots (Dashboard Server Remote Control Interface e-Series).

## 22.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: running | Reads the program execution status. | To be added | Request |
| RD: robotmode | Reads the robot mode. | Not to be added | Request |
| RD: get loaded program | Reads the loaded program path. | Not to be added | Request |
| RD: isProgramSaved | Reads the save state of the active program and the path to the loaded program file. | Not to be added | Request |
| RD: programState | Reads the state of the active program and the path to the loaded program file. | To be added | Request |
| RD: PolyscopeVersion | Reads the version information of the UR software installed on the robot. | To be added | Request |
| RD: get operational mode | Reads the operation mode manually or automatically if a password is set for the mode in the settings. If no password is set, it will be read as invalid. | To be added | Request |
| RD: safetystatus | Reads the safety status of the robot. | To be added | Request |
| WR: load<program.urp> | Loads a program. | Not to be added | Request |
| WR: play | Starts the program. | To be added | Request |
| WR: stop | Stops the program. | To be added | Request |
| WR: pause | Pauses the program. | To be added | Request |
| WR: quit | Closes the connection. | To be added | Request |
| WR: shutdown | Shuts down and powers off the robot and controller. | To be added | Request |
| WR: popup<popup-text> | Converts pop-text to the selected language if text exists in the language file. | Not to be added | Request |
| WR: close popup | Closes the popup. | Not to be added | Request |
| WR: addToLog<log-message> | Adds a log message to the log history. | Not to be added | Request |
| WR: set operational mode manual | Sets the operation mode to manual. | To be added | Request |
| WR: set operational mode automatic | Sets the operation mode to automatic. | To be added | Request |
| WR: clear operational mode | Clears the operation mode. | To be added | Request |
| WR: power on | Turns on the power to the robot arm. | To be added | Request |
| WR: power off | Turns off the power to the robot arm. | To be added | Request |
| WR: brake release | Releases the brake. | To be added | Request |
| WR: unlock protective stop | Closes the current popup and unlocks the protective stop. | To be added | Request |
| WR: close safety popup | Closes the safety popup. | 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.

# 22.3 Details of Applicable Protocols

## RD: running

This protocol reads the program execution status.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response (True) | — | No setting is required. |
| Normal Response (False) | — | No setting is required. |
| Other Response | — | No setting is required. |

## RD: robotmode

This protocol reads the robot mode.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (No Controller) | — | No setting is required. |
| Normal Response (Disconnected) | — | No setting is required. |
| Normal Response (Confirm Safety) | — | No setting is required. |
| Normal Response (Booting) | — | No setting is required. |
| Normal Response (Power Off) | — | No setting is required. |
| Normal Response (Power On) | — | No setting is required. |
| Normal Response (Idle) | — | No setting is required. |
| Normal Response (Backdrive) | — | No setting is required. |
| Normal Response (Running) | — | No setting is required. |
| Other Response | — | No setting is required. |

# RD: get loaded program

This protocol reads the path of the loaded program.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Loaded Program) | Path To Loaded Program File | Specify the device to store it.<br>131 consecutive word devices are used.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The actual read data is stored in 130 consecutive devices in order from the second device. |
| Error Response (No Program Loaded) | — | No setting is required. |
| Other Response | — | No setting is required. |

## Precautions

Do not change values other than setting data.

# RD: isProgramSaved

This protocol reads the save state of the active program and the path to the loaded program file.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (True) | Program Name | Specify the device to store it.<br>131 consecutive word devices are used.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The actual read data is stored in 130 consecutive devices in order from the second device. |
| Normal Response (False) | Program Name | Specify the device to store it.<br>131 consecutive word devices are used.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The actual read data is stored in 130 consecutive devices in order from the second device. |
| Other Response | Other Response | No setting is required. |

## Precautions

Do not change values other than setting data.

# RD: programState

This protocol reads the state of the active program and the path to the loaded program file, and stops if the program is not loaded.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Stopped) | — | No setting is required. |
| Normal Response (Playing) | — | No setting is required. |
| Normal Response (Paused) | — | No setting is required. |
| Other Response | — | No setting is required. |

# RD: PolyscopeVersion

This protocol reads the version information of the UR software installed on the robot.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Version) | Version | Specify the device to store it.<br>51 consecutive word devices are used.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The actual read data is stored in 50 consecutive devices in order from the second device. |
| Other Response | — | No setting is required. |

## Precautions

Do not change values other than setting data.

# RD: get operational mode

This protocol reads the operation mode manually or automatically if a password is set for the mode in the settings. If no password is set, it will be read as invalid.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Manual) | — | No setting is required. |
| Normal Response (Automatic) | — | No setting is required. |
| Normal Response (None) | — | No setting is required. |
| Other Response | — | No setting is required. |

# RD: safetystatus

This protocol reads the safety status of the robot.

The safety state specifies which of the following causes the preventive stop, and is different from the safety mode.

- Caused by permanent preventive stop I/O
- Caused by configurable automatic mode preventive shutdown of I/O
- Caused by configurable 3-position activation device input/output stop

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Normal) | — | No setting is required. |
| Normal Response (Reduced) | — | No setting is required. |
| Normal Response (Protective Stop) | — | No setting is required. |
| Normal Response (Recovery) | — | No setting is required. |
| Normal Response (Safeguard Stop) | — | No setting is required. |
| Normal Response (System Emergency Stop) | — | No setting is required. |
| Normal Response (Robot Emergency Stop) | — | No setting is required. |
| Normal Response (Violation) | — | No setting is required. |
| Normal Response (Fault) | — | No setting is required. |
| Normal Response (Automatic Mode Safeguard Stop) | — | No setting is required. |
| Normal Response(System 3 Position Enabling Stop) | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: load<program.urp>

This protocol loads a program and related installation.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Program Name | Specify the device to store it.<br>131 consecutive word devices are used.<br>The data length (number of bytes) to be written is stored in the start device.<br>The actual written data is stored in 130 consecutive devices in order from the second device. |
| Normal Response (Loading Program) | Program Name | Specify the device to store it.<br>131 consecutive word devices are used.<br>The program name is stored in the start device.<br>The actual program name is stored in 130 consecutive devices in order from the second device. |
| Error Response (File Not Found) | Program Name | Specify the device to store it.<br>131 consecutive word devices are used.<br>The length of the program name is stored in the start device.<br>The actual program name is stored in 130 consecutive devices in order from the second device. |
| Error Response (Error Loading Program) | Program Name | Specify the device to store it.<br>131 consecutive word devices are used.<br>The length of the program name is stored in the start device.<br>The actual program name is stored in 130 consecutive devices in order from the second device. |
| Other Response | Other Response | No setting is required. |

## Precautions

- Do not change values other than setting data.
- If the related installation requires a safety check, the load command will fail. In this case, the return value will be "Error while loading program".

# WR: play

This protocol starts the program.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Starting Program) | — | No setting is required. |
| Error Response (Failed to Execute) | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: stop

This protocol stops the program.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Stopped) | — | No setting is required. |
| Error Response (Failed to Execute) | — | No setting is required. |
| Other Response | — | No setting is required. |

## WR: pause

This protocol pauses the program.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Pausing Program) | — | No setting is required. |
| Error Response (Failed to Execute) | — | No setting is required. |
| Other Response | — | No setting is required. |

## WR: quit

This protocol closes the connection.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Disconnected) | — | No setting is required. |
| Other Response | — | No setting is required. |

## WR: shutdown

This protocol shuts down and powers off the robot and controller.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Shutting Down) | — | No setting is required. |
| Other Response | — | No setting is required. |

## WR: popup<popup-text>

This protocol converts pop-text to the selected language if text exists in the language file.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Popup (Text) | Specify the device to store it.<br>131 consecutive word devices are used.<br>The write data (number of bytes) is stored in the start device.<br>The actual written data is stored in 130 consecutive devices in order from the second device. |
| Normal Response (Showing Popup) | — | No setting is required. |
| Other Response | — | No setting is required. |

### Precautions

Do not change values other than setting data.

# WR: close popup

This protocol closes the popup.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Closing Popup) | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: addToLog<log-message>

This protocol adds a log message to the log history.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | AddToLog (log-message) | Specify the device to store it.<br>131 consecutive word devices are used.<br>The write data (number of bytes) is stored in the start device.<br>The actual written data is stored in 130 consecutive devices in order from the second device. |
| Normal Response (Added Log Message) | — | No setting is required. |
| Error Response (No Log Message to Add) | — | No setting is required. |
| Other Response | — | No setting is required. |

## Precautions

Do not change values other than setting data.

# WR: set operational mode manual

This protocol sets the operation mode to manual. Program load can be edited in manual mode.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Set) 1 | — | No setting is required. |
| Normal Response (Set) 2 | — | No setting is required. |
| Error Response (Failed) | — | No setting is required. |
| Other Response | — | No setting is required. |

## Precautions

- If executed in operation mode, it cannot be changed from PolyScope and the user password will be invalid.
- This function is for switching the operation mode using an Ethernet-based keycard reader. Place the device that switches the operation mode near the robot.

# WR: set operational mode automatic

This protocol sets the operation mode to automatic. Programs can only be executed in Automatic mode. Programs cannot be loaded, edited, or installed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Set) 1 | — | No setting is required. |
| Normal Response (Set) 2 | — | No setting is required. |
| Error Response (Failed) | — | No setting is required. |
| Other Response | — | No setting is required. |

## Precautions

- If executed in operation mode, it cannot be changed from PolyScope and the user password will be invalid.
- This function is for switching the operation mode using an Ethernet-based keycard reader. Place the device that switches the operation mode near the robot.

# WR: clear operational mode

This protocol clears the operation mode.
The operation mode will no longer be controlled by the dashboard server. After the protocol is executed, the operation mode can be changed again from PolyScope and the user password becomes valid.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Clear) 1 | — | No setting is required. |
| Normal Response (Clear) 2 | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: power on

This protocol turns on the power to the robot arm.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Powering On) | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: power off

This protocol turns off the power to the robot arm.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Powering Off) | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: brake release

This protocol releases the brake.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Brake Releasing) | — | No setting is required. |
| Other Response | — | No setting is required. |

# WR: unlock protective stop

This protocol closes the current popup and unlocks the protective stop.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Releasing) | — | No setting is required. |
| Error Response (Cannot Unlock) | — | No setting is required. |
| Other Response | — | No setting is required. |

## Precautions

If 5 seconds or more have not passed since the protection was stopped, the unlock protective stop command will fail.

# WR: close safety popup

This protocol closes the safety popup.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response (Closing) | — | No setting is required. |
| Other Response | — | No setting is required. |

# 23 PROTOCOLS SUPPORTED BY OMRON (V780-HMD68-ETN-**)

## 23.1 Setting Method

### V780-HMD68-ETN-**

Communication with the V780 series uses the MODBUS/TCP communication function of the RFID system V780 series (V780-HMD68-ETN-**).

For the parameter setting method, refer to the UHF RFID System V780-series Reader/Writer User's Manual by OMRON Corporation.

#### ■RF tag ID

The RF tag ID has the following parameters.

| Parameter | Description |
|---|---|
| StoredPC | Represents the StoredPC data in 4-digit hexadecimal.<br>The top 5 bits represent the UII (EPC) word length. |
| UII (EPC code) | Stores unique tag information in accordance with the Gen2 standard.<br>The UII (EPC) area exceeding the UII (EPC) word length on StoredPC is filled with 00H and returned. |

# 23.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: ID | Reads the ID (UII (EPC code)) of the RF tag within the communication area. | To be added | Request |
| RD: Data | Reads data from the RF tag within the communication area. | To be added | Request |
| RD: Multiaccess ID Read Results | Reads the ID (UII (EPC code)) of the multiple RF tags within the communication area. | To be added | Request |
| RD: Multiaccess Data Read Results | Reads data from the multiple RF tags within the communication area. | To be added | Request |
| RD: Multi-Reader/Writer Configuration Settings | Reads the multi-reader/writer configuration settings from the reader/writer. | Not to be added | Request |
| RD: Model Information | Reads the model of the reader/writer. | To be added | Request |
| RD: Operating Status | Reads the operating status of the reader/writer. | To be added | Fixed Intrvl |
| RD: Multi-Reader/Writer Status | Reads the multi-reader/writer status. | To be added | Fixed Intrvl |
| RD: System Error Log | Reads the history of system errors that occurred in the reader/writer. | Not to be added | Request |
| RD: Command Error Log | Reads the history of command errors that occurred in the reader/writer. Restarting the reader/writer clears the history of command errors. | Not to be added | Request |
| RD: Noise Level | Reads the noise level of the surrounding environment measured by the reader/writer. | To be added | Fixed Intrvl |
| RD: Communications Diagnostic Information | Reads the latest communication diagnostic information. | To be added | Request |
| WR: Data | Writes data to a single RF tag within the communication area. | To be added | Request |
| WR: Lock | Controls lock and unlock of the memory of RF tags within the communication area. | To be added | Request |
| WR: Data Fill | Writes the specified number of words of the specified data from the specified start address of RF tags within the communication area. | To be added | Request |
| WR: Multiaccess ID Read Settings | Issues a command to read the ID (UII (EPC code)) of the multiple RF tags within the communication area. | Not to be added | Request |
| WR: Multiaccess Data Read Settings | Issues a command to read the data of multiple RF tags within the communication area. | Not to be added | Request |
| WR: Reset | Restarts the reader/writer itself.<br>After reset, the reader/writer waits for a connection. | Not to be added | Request |
| WR: Stop | Stops the execution of RF tag communication commands by the reader/writer. | To be added | Request |
| WR: Multi-Reader/Writer Configuration Settings | Writes the configuration settings of the multi-reader/writer to the master reader/writer. | Not to be added | Request |
| WR: Clear System Error Log | Clears the system error (fatal error) history stored in the reader/writer. | Not to be added | Request |
| RD: Read Holding Registers (FNC 03)*2 | Reads the value to be stored in the MODBUS holding register device. | Not to be added | Request |
| WR: Write Multiple Registers (FNC 16)*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.

# 23.3 Details of Applicable Protocols

## RD: ID

This protocol reads the ID (UII (EPC code)) of the RF tag within the communication area.
This single-access communication protocol reads the RF tag ID from register number 4000H.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | StoredPC*1 | Specify the device that stores the read data. |
| | UII (EPC code)*1 | Specify the device that stores the read data.<br>31 consecutive word devices are used. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 For details, refer to the following.
☞ Page 591 RF tag ID

### Precautions

- Do not change values other than setting data.
- If multiple RF tags exist within the communication area, normal communication may not occur.

## RD: Data

This protocol reads data for the specified number of words from the specified address of the RF tag within the communication area.
It is a single-access communication protocol.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Register Address*1 | Rewrite to the start address of the data to be read.<br>The default value is set to read 3000H (user area of RF tag). |
| | Word Count*2 | Rewrite to the number of words of data to be read.<br>The default value is set to 120 words.<br>Use a value in the range of 1 to 120. |
| Normal response | Read Data | Specify the device that stores the read data.<br>By default, a 121-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 120 consecutive word devices starting from the second device. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 To read data from other area, change the value as follows.
The actual address range that can be read depends on the type of RF tag used.

| Description | Setting range |
|---|---|
| 0000H to 07FFH | Reserved area |
| 1000H to 17FFH | UII (EPC) area |
| 2000H to 27FFH | TID area |
| 3000H to 3FFFH | User area |

*2 The word count that can be set depends on the read area. For details, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

### Precautions

- Do not change values other than setting data.
- If multiple RF tags exist within the communication area, normal communication may not occur.
- With a single command execution, up to 120 words of data can be read from any one address area of the RF tag register.

# RD: Multiaccess ID Read Results

This protocol reads the IDs (UII (EPC codes)) of multiple RF tags within the communication area of the reader/writer.
This multi-access communication protocol reads the RF tag ID from register number 9100H.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Number of RF Tags | Specify the device that stores the read data. |
| | Error Code*1 | Specify the device for storing the error code. |
| | StoredPC*2 | Specify the device that stores the read data. |
| | UII (EPC code)*2 | Specify the device that stores the read data.<br>31 consecutive word devices are used. |
| | Reception Level | Specify the device that stores the read data. |
| | Reader/Writer Number | 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 on the error codes, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

| Setting value | Error code |
|---|---|
| 0000H | Normal end |
| Other than 0000H | Error |

*2 For details, refer to the following.
☞ Page 591 RF tag ID

## Precautions

- Do not change values other than setting data.
- This protocol can read up to 120 words of data from the specified RF tag address range in a single execution.
- This protocol reads two or three RF tags at a time.
- Multi-access ID read is not supported in FOCUS mode.

# RD: Multiaccess Data Read Results

This protocol reads the result of the data read from RF tags within the communication area of the reader/writer.
This multi-access communication reads the RF tag data from register number 9300H.
The number of result data of communication with RF tags that is stored in the reader/writer is decremented after the response to this command.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Word Count*3 | Specify the size to read according to the read size.<br>The default value is set to 0044H.<br>Use a value in the range of 0025H to 0044H. |
| Normal response | Number of RF Tags | Specify the device that stores the read data. |
| | Error Code*1 | Specify the device for storing the error code. |
| | Read Data*3 | Specify the device that stores the read data according to the read size.<br>The default value uses 32 consecutive word devices. |
| | StoredPC*2 | Specify the device that stores the read data. |
| | UII (EPC code)*2 | Specify the device that stores the read data.<br>31 consecutive word devices are used. |
| | Reception Level | Specify the device that stores the read data. |
| | Reader/Writer Number | 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 on the error codes, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

| Setting value | Error code |
|---|---|
| 0000H | Normal end |
| Other than 0000H | Error |

*2 For details, refer to the following.
☞ Page 591 RF tag ID

*3 For details on the read size, refer to the following request message.
☞ Page 606 WR: Multiaccess Data Read Settings

## Precautions

- Do not change values other than setting data.
- This protocol can read up to 120 words of data from the specified RF tag address range in a single execution.
- Multi-access data read is not supported in FOCUS mode.
- If the count of RF tags reaches 0, the response returns 00H.
- The actual address range that can be read depends on the type of RF tag used.

# RD: Multi-Reader/Writer Configuration Settings

This protocol reads the multi-reader/writer configuration set in the reader/writer from register number B900H.
The multi-reader/writer function allows up to eight readers/writers to be linked, with one reader/writer set as the master using reader/writer number 0 for master/slave control.
Settings for multi-reader/writer communication are enabled.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Multi-Reader/Writer Mode*1 | Specify the device that stores the read data. |
| | Number of Slave Reader/Writers | Specify the device that stores the read data.<br>Specifiable range: 0000H to 0007H |
| | Slave Reader/Writer 1 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801C9H (192.168.1.201) |
| | Slave Reader/Writer 2 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CAH (192.168.1.202) |
| | Slave Reader/Writer 3 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CBH (192.168.1.203) |
| | Slave Reader/Writer 4 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CCH (192.168.1.204) |
| | Slave Reader/Writer 5 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CDH (192.168.1.205) |
| | Slave Reader/Writer 6 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CEH (192.168.1.206) |
| | Slave Reader/Writer 7 IP Address | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CFH (192.168.1.207) |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 The following data is stored.

| Setting value | Multi-reader/writer mode |
|---|---|
| 0000H | Disabled |
| 0001H | Enabled |

## Precautions

- Do not change values other than setting data.
- If the multi-reader/writer mode is disabled, communication occurs with a single reader/writer.
- The models (destination countries) of the linked readers/writers must be the same, and the version must be Ver.3.0 or later.
- Slave-only devices do not accept ModbusTCP port connections (excluding Web ports) from any device other than the master reader/writer.

# RD: Model Information

This protocol reads the type of the reader/writer from register number D000H.
The type information consists of up to 31 characters + end code (00H).
If the number of characters is less than 31 characters, all the subsequent areas will be filled with 00H.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Model Information | Specify the device that stores the read data.<br>16 consecutive word devices are used.<br>ASCII character string range: 20H (" " (space)) to 7EH (~) |
| 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 of the reader/writer from register number D300H.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Mode*1 | Specify the device that stores the read data. |
| | Status*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 |
|---|---|
| 0001H | Idling |
| 0002H | Communicating with RF tag |
| 0003H | Setting change in progress |
| 0004H | Error occurring |

## Precautions

Do not change values other than setting data.

# RD: Multi-Reader/Writer Status

This protocol reads the multi-reader/writer status from register number D500H.

The status values of the slave readers/writers are as shown below.

| Setting value | Status of slave reader/writer |
|---|---|
| 0000H | Not registered |
| 0001H | Linked |
| 0002H | Not linked |
| 0003H | Communication failure*1 |

*1 This describes the status when communication with a slave reader/writer failed after linking. If communication with the slave reader/writer is successful, the status changes from communication failure to linked.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Master Reader/Writer Status*1 | Specify the device that stores the read data. |
| | Slave Reader/Writer 1 Status | Specify the device that stores the read data. |
| | Slave Reader/Writer 2 Status | |
| | Slave Reader/Writer 3 Status | |
| | Slave Reader/Writer 4 Status | |
| | Slave Reader/Writer 5 Status | |
| | Slave Reader/Writer 6 Status | |
| | Slave Reader/Writer 7 Status | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 The following data is stored.

| Setting value | Master reader/writer status |
|---|---|
| 0000H | Disabled |
| 1000H | Communication area extended mode starting<br>(To be operational, the linking process with the slave reader/writer needs to be completed.) |
| 1001H | Communication area extended mode operating<br>(To be operational, the linking process with the slave reader/writer needs to be completed.) |

## Precautions

Do not change values other than setting data.

# RD: System Error Log

This protocol reads the history of system errors that occurred in the reader/writer from register number D600H.
Even after the reader/writer is restarted, the history of system errors before the restart is retained.
When the number of records reaches the upper limit, older records will be overwritten by newer ones.
The system error history record includes the following fields.

| Field | Size |
|---|---|
| Time information | 4 bytes |
| Error code | 2 bytes |
| Reserved | 2 bytes |
| Attached information 1 | 4 bytes |
| Attached information 2 | 4 bytes |

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Number of Records | Specify the device that stores the read data. |
| | System Error Log Record 1 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 2 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 3 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 4 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 5 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 6 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 7 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 8 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 9 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 10 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 11 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 12 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 13 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 14 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| | System Error Log Record 15 | Specify the device that stores the read data.<br>Eight consecutive word devices are used. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

Do not change values other than setting data.

# RD: Command Error Log

This protocol reads the history of command errors that occurred in the reader/writer from register number D800H.
When the number of records reaches the upper limit, older records will be overwritten by newer ones.
The command error history record includes the following fields.

| Field | Size |
|---|---|
| Time information | 4 bytes |
| IP Address | 4 bytes |
| Transaction identifier | 2 bytes |
| Command code | 2 bytes |
| Error code | 2 bytes |
| Reader/Writer Number*1 | 2 bytes |
| Attached information 1 | 4 bytes |
| Attached information 2 | 4 bytes |

*1 If the multi-reader/writer mode is disabled or a command error occurs, the value will be 0000H.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Number of Records | Specify the device that stores the read data. |
| | Command Error Log Record 1 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 2 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 3 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 4 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 5 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 6 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 7 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| | Command Error Log Record 8 | Specify the device that stores the read data.<br>12 consecutive word devices are used. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- Restarting the reader/writer clears the history of command errors.

# RD: Noise Level

This protocol reads the noise level of the surrounding environment measured by the reader/writer from register number DB00H.
The noise level is specified in signed hexadecimal format, and the range is FFFFH (-1dBm) to FF9DH (-99dBm).

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Word Count | Specify the device that stores the number of word data.<br>The specifiable range depends on the type of reader/writer used. For details, refer to the UHF RFID System V780-series Reader/Writer User's Manual. |
| Normal response | Channel Noise Level | Specify the device that stores the read data.<br>By default, a 51-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 50 consecutive word devices starting from the second device. |
| Error response | Exception Code | Specify the device that stores the read data. |

## Precautions

- Do not change values other than setting data.
- The number of available channels depends on the type of reader/writer. If using this protocol with a specific device type, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

# RD: Communications Diagnostic Information

This protocol reads the latest communication diagnostic information from register number DC00H.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal response | Time Information | Specify the device that stores the read data.<br>Two consecutive word devices are used.<br>The stored value is in the format of actual time flag/hour/minute/second. |
| | Command Code | Specify the device that stores the read data. |
| | Error Code*2 | Specify the device that stores the read data. |
| | Diagnostic Result*3 | Specify the device that stores the read data. |
| | Detailed Diagnostic Results*4 | Specify the device that stores the read data. |
| | Channel Used | Specify the device that stores the read data. |
| | Communications Speed*5 | Specify the device that stores the read data. |
| | Reception Level | Specify the device that stores the read data. |
| | Noise Level | Specify the device that stores the read data. |
| | Target Level | Specify the device that stores the read data. |
| | StoredPC*1 | Specify the device that stores the read data. |
| | UII (EPC code)*1 | Specify the device that stores the read data.<br>31 consecutive word devices are used. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 For details, refer to the following.
☞ Page 591 RF tag ID

*2 The following data is stored. For details on the error codes, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

| Setting value | Error code |
|---|---|
| 0000H | Normal end |
| Other than 0000H | Error |

*3 The values stored are as shown below. 0005H and 0006H are output only when diagnostic processing is performed in FOCUS communication mode.

| Setting value | Description |
|---|---|
| FFFFH | Abnormal (set if the error code does not end normally) |
| 0000H | Normal |
| 0001H | Insufficient send power |
| 0002H | Insufficient reception level |
| 0003H | Excessive noise |
| 0005H | Insufficient read |
| 0006H | Excessive read |

*4 The values stored are as shown below. Bits 4 and 5 are output only when diagnostic processing is performed in FOCUS communication mode.

| Bit | Description |
|---|---|
| 0 | Sufficient send power or not |
| 1 | Sufficient reception level or not |
| 2 | Excessive noise |
| 3 | Unusable |
| 4 | Sufficient read detection or not |
| 5 | Excessive read or not |
| 6 to 15 | Unusable |

*5 The values stored are as shown below.

| Setting value | Description |
|---|---|
| 0001H | High speed |
| Other than 0000H | Standard |

## Precautions

- Do not change values other than setting data.
- If the communication diagnostic setting is "Disabled", the latest communication diagnostic information will be 00H.

# WR: Data

This protocol writes data to a single RF tag within the communication area.
It is a single-access communication protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Register Address*1 | Rewrite to the start address of the data to be written.<br>The default value is set to write to 3000H (user area). |
| | Data to Write*2 | Specify the device that stores the write data.<br>121 consecutive word devices are used.<br>The data length (byte count) of the write data is stored in the start device.<br>Rewrite the data length to the value of 2 × word count to be written.<br>The write data is stored in 120 consecutive word devices starting from the second device. |
| Normal response | — | No setting is required. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 To write to other areas, change the value as follows.
The actual address range that can be written depends on the type of RF tag used.

| Setting range | Description |
|---|---|
| 0000H to 07FFH | Reserved area |
| 1000H to 17FFH | UII (EPC) area |
| 2000H to 27FFH | TID area |
| 3000H to 3FFFH | User area |

*2 The size of the write data that can be set depends on the write area. For details, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

## Precautions

- Do not change values other than setting data.
- When single-access method communication commands are used, normal communication may not occur if multiple RF tags exist within the communication area of the reader/writer.
- This protocol writes up to 120 words of data at once to any RF tag memory area.
- If the reader/writer accepts a stop after detecting an RF tag, it returns an error result (communication interruption).

# WR: Lock

This protocol sets register number 8000H and controls lock and unlock of the memory of RF tags within the communication area.

It is a single-access communication protocol.

For unlocking, specify all the locked areas.

When the area is unlocked, the access password area of the RF tag is cleared to 0.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Lock Operation*1 | Specify the device that stores the write data. |
| | Area to Lock/Unlock*2 | Specify the device that stores the write data. |
| | Password | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specify the access password in 8-digit hexadecimal, in 32-bit units. |
| 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 | Lock operation |
|---|---|
| 0000H | Unlock |
| 0001H | Lock |

*2 Store the following data.
If all values are zeros, a command parameter error occurs. The lock target area can be specified using OR.

| Setting value | Lock target area |
|---|---|
| 0001H | UII (EPC) area |
| 0002H | TID area |
| 0004H | User area |
| 0008H | Access password |

## Precautions

- Do not change values other than setting data.
- Data cannot be written to each area if the target area is locked.
- The access password cannot be read if the target area is locked.
- When the area is locked, the value specified by the password is written to the access password area of the RF tag.

# WR: Data Fill

This protocol sets register number 8100H and writes fill data for the specified number of words from the write start address specified by a command into the memory of RF tags within the communication area.
It is a single-access communication protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Fill Address*1 | Rewrite to the start address of the data to be written.<br>The default value is set to write to 3000H (user area). |
| | Number of Fill Words*2 | Rewrite to the number of words of the data to be written.<br>Specifiable range: 0000H, 0001H to 0800H (0, 1 to 2048) |
| | Fill Data | 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 To write to other areas, change the value as follows.

| Setting range | Description |
|---|---|
| 0000H to 07FFH | Reserved area |
| 1000H to 17FFH | UII (EPC) area |
| 2000H to 27FFH | TID area |
| 3000H to 37FFH | User area |

*2 The number of fill words that can be set depends on the write area. For details, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

## Precautions

- Do not change values other than setting data.
- Specifying the number of fill words to 0000H will write the specified data to the entire corresponding memory area.
- Data cannot be written across multiple memory areas of an RF tag.

# WR: Multiaccess ID Read Settings

This protocol sets register number 9000H and issues a command to read the IDs (UII (EPC codes)) of multiple RF tags within the communication area.

## 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: Multiaccess Data Read Settings

This protocol sets register number 9200H and issues a command to read the data of multiple RF tags within the communication area.
This protocol retrieves additional information such as the UII (EPC) of the RF tag, reception level, and reader/writer number in conjunction with the "RD: Multi-Access Data Read Result Acquisition" protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Read Area Start Address*1 | Rewrite to the start address of the data to be written.<br>The default value is set to write to 1000H (UII (EPC) area). |
| | Read Size*2 | Rewrite to the size of data to be read.<br>The default value is set to 0020H.<br>Set the value in the range of 0001H to 0020H. |
| Normal response | — | No setting is required. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 To write to other areas, change the value as follows.

| Setting range | Description |
|---|---|
| 0000H to 07FFH | Reserved area |
| 1000H to 17FFH | UII (EPC) area |
| 2000H to 27FFH | TID area |
| 3000H to 3FFFH | User area |

*2 The read size that can be set depends on the read area. For details, refer to the UHF RFID System V780-series Reader/Writer User's Manual.

## Precautions

Do not change values other than setting data.

# WR: Reset

This protocol sets register number A100H and restarts the reader/writer itself. After reset, the reader/writer waits for a connection.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Options*1 | Specify the device that stores the write data. |

*1 Store the following data.

| Setting value | Option |
|---|---|
| 0000H | Normal reset |
| FFFFH | Forced reset |

## Precautions

- Do not change values other than setting data.
- Check the status of the reader/writer itself to determine if it has restarted after a reset request.

# WR: Stop

This protocol sets register number A200H and stops the execution of RF tag communication commands by 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: Multi-Reader/Writer Configuration Settings

This protocol sets register number B900H and sets the configuration of the multi-reader/writer. The settings take effect at the next startup.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Multi-Reader/Writer Mode*1 | Specify the device that stores the write data. |
| | Number of Slave Reader/Writers | Specify the device that stores the write data.<br>Specifiable range: 0000H to 0007H |
| | Slave Reader/Writer 1 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801C9H (192.168.1.201) |
| | Slave Reader/Writer 2 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CAH (192.168.1.202) |
| | Slave Reader/Writer 3 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CBH (192.168.1.203) |
| | Slave Reader/Writer 4 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CCH (192.168.1.204) |
| | Slave Reader/Writer 5 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CDH (192.168.1.205) |
| | Slave Reader/Writer 6 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CEH (192.168.1.206) |
| | Slave Reader/Writer 7 IP Address | Specify the device that stores the write data.<br>Two consecutive word devices are used.<br>Specifiable range: 00000000H to DFFFFFFFH<br>Example: C0A801CFH (192.168.1.207) |
| 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 | Master reader/writer status |
|---|---|
| 0000H | Disabled |
| 0001H | Enabled |

## Precautions

Do not change values other than setting data.

## WR: Clear System Error Log

This protocol sets register number D700H and clears the system error (fatal error) history 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.

## RD: Read Holding Registers (FNC 03)

This MODBUS/TCP general protocol reads values from multiple holding registers.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Register Address | Rewrite to the value of the start address of the data to be read.<br>For the address numbers of the specifiable holding registers, refer to the UHF RFID System V780-series Reader/Writer User's Manual. |
| | Word Count | Specify the device that stores the data to be read.<br>Specify the device value in the range from 1 to 120. |
| Normal response | Read Data | Specify the device that stores the data to be read.<br>By default, a 121-word device is secured.<br>The data length (number of bytes) of the read data is stored in the start device.<br>The read data is stored in 120 consecutive word devices starting from the second device. |
| Error response | Exception Code | Specify the device that stores the read data. |

### Precautions

Do not change values other than setting data.

## WR: Write Multiple Registers (FNC 16)

This MODBUS/TCP general protocol writes values to multiple holding registers.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Register Address | Rewrite the write data to the value of the start address.<br>For the address numbers of the specifiable holding registers, refer to the UHF RFID System V780-series Reader/Writer User's Manual. |
| | Data to Write | Specify the device that stores the write data.<br>The data length (number of bytes) of the write data is stored in the start device.<br>Rewrite the data length to the value of 2 × word count to be written.<br>The write data is stored in 120 consecutive word devices starting from the second device. |
| 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.

# 24 PROTOCOLS SUPPORTED BY Silex Technology (FBR-100AN, FBR-100)

## 24.1 Setting Method

### FBR-100AN, FBR-100

Communication with the FBR-100AN or FBR-100 uses the Modbus TCP slave mode function (Modbus TCP activation function) of the FBR converter.
The supported Modbus/TCP protocol is only for reading input registers (FC: 04H). Other protocols are not supported.
For setting parameters, refer to the FBR-100AN/FBR-100 Modbus TCP Activation: Supported CNC Devices and Collectable Information of Silex Technology.

**Point**

- If CNC system 5 is not used, addresses of CNC system 5 can be exclusively used with the PMC batch collection protocol. The addresses can be used for collecting information about more than 20 PMCs (up to 750 PMCs).
- The byte order is big endian. The addresses are in word (2 bytes) units, but strings are set one byte at a time. The following shows a data setting example.

Character: abc/Data: 6162H 6300H (ASCII data)
Numerical value: 12345/Data: 3039H

- The exception code for error response is 1 byte.

## 24.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: CNC Device Basic Information | Collects the following basic information:<br>• CNC Series<br>• No. of PMC Paths/Channels<br>• No. of CNC Paths/Channels<br>• Status<br>• All Servo and Spindle Power Consumption | Not to be added | Request |
| RD: Emergency Stop Status | Reads the emergency stop status. | To be added | Fixed Intrvl |
| RD: CNC Operation Mode | Reads the current operation mode of the machine tool. | To be added | Fixed Intrvl |
| RD: Number of Processed Parts | Reads the number of workpieces produced by the machine tool. | To be added | Fixed Intrvl |
| RD: CNC Operating Status | Reads the current operating status of the machine tool. | To be added | Fixed Intrvl |
| RD: Sequence No. of Program in Operation | Reads the execution sequence information of the machining program. | To be added | Request |
| RD: Main Program Name | Reads the machining program name. | Not to be added | Request |
| RD: Main Program Comment | Reads supplementary information assigned to each machining program. | Not to be added | Request |
| RD: Tool Number | Reads the ID information of the tools installed on the machine tool. | Not to be added | Request |
| RD: Feed Rate Override | Reads the operating speed ≒ efficiency of the machine tool as a percentage. | Not to be added | Fixed Intrvl |
| RD: Block of the Program in Operation | Reads each block information of the machining program in operation. | Not to be added | Fixed Intrvl |
| RD: Operation Mode of Spindle (1 - 4) | Reads the operation mode (1 to 4) of the master axis. | To be added | Fixed Intrvl |
| RD: Fast Forward Override | Reads the operating speed ≒ efficiency of the machine tool as a percentage. | To be added | Fixed Intrvl |

| Name | Description | Automatic Addition*1 | Communication Timing (Default) |
|---|---|---|---|
| RD: Spindle Override | Reads the operating speed ≒ efficiency of the machine tool as a percentage. | To be added | Request |
| RD: Active Axis Name | Reads the available axis information of the machine tool. | To be added | Fixed Intrvl |
| RD: Dry Run | Reads the mode status used during the operation test of the NC program. | Not to be added | Request |
| RD: Cutting Feed | Reads the cutting feed command in the NC program. | Not to be added | Fixed Intrvl |
| RD: M00 | Reads the status of the M00 command. | Not to be added | Request |
| RD: M01 | Reads the status of the M01 command. | Not to be added | Request |
| RD: Cycle Time | Reads the time from the start to the end of workpiece cutting (integrated value of one automatic operation time). | To be added | Request |
| RD: Load and Speed of Spindle (1 - 4) | Reads the load ≒ cutting torque information (%) and rotation speed (rotations per minute) of each master axis. | Not to be added | Fixed Intrvl |
| RD: Insulation Value of Spindle (1 - 4) | Reads the insulation resistance value (MΩ) of each master axis motor, which can be used as a reference value for preventive maintenance. | Not to be added | Request |
| RD: Feed Rate | Reads the feed axis movement speed in mm/s. | Not to be added | Fixed Intrvl |
| RD: X Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the X axis. | Not to be added | Fixed Intrvl |
| RD: Y Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving Y axis. | Not to be added | Fixed Intrvl |
| RD: Z Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving Z axis. | Not to be added | Fixed Intrvl |
| RD: U Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving U axis. | Not to be added | Fixed Intrvl |
| RD: V Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving V axis. | Not to be added | Fixed Intrvl |
| RD: W Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving W axis. | Not to be added | Fixed Intrvl |
| RD: A Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving A axis. | Not to be added | Fixed Intrvl |
| RD: B Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving B axis. | Not to be added | Fixed Intrvl |
| RD: C Axis Absolute Position and Load Values | Reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving C axis. | Not to be added | Fixed Intrvl |
| RD: Alarm (1 - 15) | Reads alarms and operation messages. Operation messages are stored only in CNC system 1 as they are information independent of CNC systems. | To be added | Fixed Intrvl |
| RD: Alarm (16 - 30) | | To be added | Fixed Intrvl |
| RD: Alarm (31 - 32) | | To be added | Fixed Intrvl |
| RD: PMC (1 - 20) | Reads the registered values of up to 20 PMCs as required depending on the machine tool manufacturer or user. | To be added | Request |
| RD: Macro (1 - 10) | Reads up to 10 registered macros as required depending on the machine tool manufacturer or user. | Not to be added | Request |
| RD: Insulation Resistance Value of Axis (1 - 9) | Reads the insulation resistance values (MΩ) for each of the X, Y, Z, U, V, W, A, B, and C axes. | Not to be added | Request |
| RD: Total Travel Amount of Axis (1 - 9) | Reads the total travel distance for each of the X, Y, Z, U, V, W, A, B, and C axes. | To be added | Fixed Intrvl |
| RD: Real Speed for Servo Adjustment of Axis (1-9) | Reads the actual speed (rotations per minute) of the servo motor for each axis after servo amplifier adjustment.<br>This applies to all of the X, Y, Z, U, V, W, A, B, C axes. | To be added | Fixed Intrvl |
| RD: Read Input Registers*2 | Reads one or more input register values. | 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.

# 24.3 Details of Applicable Protocols

## RD: CNC Device Basic Information

This protocol reads the basic information of the CNC device.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address | No setting is required. |
| Normal response | CNC Series | Specify the device that stores the read data.<br>The device uses 64 words.<br>The stored value is the type information (string) of the CNC device. |
| | No. of PMC Paths/Channels | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| | No. of CNC Paths/Channels | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| | Status | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a communication availability status (string) listed below.<br>• AVAILABLE*1<br>• UNAVAILABLE*2 |
| | All Servo and Spindle Power Consumption | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is the integrated value of all servo-spindle power consumption values (string (integer)).<br>Unit is 0.001kWh. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 This value indicates that information is being collected from the CNC device.
*2 If the value is UNAVAILABLE, exception code 06H (slave BUSY) is returned.

### Precautions

- Do not change values other than setting data.
- All servo-spindle power consumption values can only be collected for the 30i/0i series.

## RD: Emergency Stop Status

This protocol reads the emergency stop status.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address | No setting is required.<br>The default value is set to read the emergency stop status of CNC system 1 (03E8H). |
| Normal response | RD: Emergency Stop Status | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string listed below.<br>• ARMED (Emergency stop clear status)<br>• TRIGGERED (Emergency stop status) |
| Error response | Exception Code | Specify the device that stores the read data. |

### Precautions

- Do not change values other than setting data.
- The emergency stop status can only be obtained from CNC system 1. Systems other than CNC system 1 are not supported.

# RD: CNC Operation Mode

This protocol reads the current operation mode of the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the operation mode of CNC from CNC system 1. |
| Normal response | CNC Operation Mode | Specify the device that stores the read data.<br>The device uses 16 words.<br>The stored value is a string listed below.<br>• MANUAL_DATA_INPUT<br>• AUTOMATIC<br>• EDIT<br>• MANUAL |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 03F0H |
| 2 | 09CCH |
| 3 | 0FA8H |
| 4 | 1584H |
| 5 | 1B60H |

## Precautions

Do not change values other than setting data.

# RD: Number of Processed Parts

This protocol reads the number of workpieces produced by the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the number of processed parts from CNC system 1. |
| Normal response | Number of Processed Parts | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0400H |
| 2 | 09DCH |
| 3 | 0FB8H |
| 4 | 1594H |
| 5 | 1B70H |

## Precautions

Do not change values other than setting data.

# RD: CNC Operating Status

This protocol reads the current operating status of the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the operating status of CNC from CNC system 1. |
| Normal response | CNC Operating Status | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string listed below.<br>• READY<br>• STOPPED<br>• INTERRUPTED<br>• ACTIVE |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0408H |
| 2 | 09E4H |
| 3 | 0FC0H |
| 4 | 159CH |
| 5 | 1B78H |

## Precautions

Do not change values other than setting data.

# RD: Sequence No. of Program in Operation

This protocol reads the execution sequence of the machining program.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the sequence number of the program currently being executed from CNC system 1. |
| Normal response | Sequence No. of Program in Operation | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0410H |
| 2 | 09ECH |
| 3 | 0FC8H |
| 4 | 15A4H |
| 5 | 1B80H |

## Precautions

Do not change values other than setting data.

# RD: Main Program Name

This protocol reads the name of the machining program.
It may be used by higher-level monitoring software to verify workpiece types.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the main program name from CNC system 1. |
| Normal response | Main Program Name | Specify the device that stores the read data.<br>The device uses 64 words.<br>The stored value is a string. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0418H |
| 2 | 09F4H |
| 3 | 0FD0H |
| 4 | 15ACH |
| 5 | 1B88H |

## Precautions

Do not change values other than setting data.

# RD: Main Program Comment

This protocol reads supplementary information assigned to each machining program.
It may be used by higher-level monitoring software to verify workpiece types.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the main program comment from CNC system 1. |
| Normal response | Main Program Comment | Specify the device that stores the read data.<br>The device uses 64 words.<br>The stored value is a string. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0458H |
| 2 | 0A34H |
| 3 | 1010H |
| 4 | 15ECH |
| 5 | 1BC8H |

## Precautions

Do not change values other than setting data.

# RD: Tool Number

This protocol reads the ID information of the tools installed on the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the tool number from CNC system 1. |
| Normal response | Tool Number | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0498H |
| 2 | 0A74H |
| 3 | 1050H |
| 4 | 162CH |
| 5 | 1C08H |

## Precautions

Do not change values other than setting data.

# RD: Feed Rate Override

This protocol reads the operating speed ≒ efficiency of the machine tool as a percentage.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the feed speed override from CNC system 1. |
| Normal response | Feed Rate Override | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 04A0H |
| 2 | 0A7CH |
| 3 | 1058H |
| 4 | 1634H |
| 5 | 1C10H |

## Precautions

Do not change values other than setting data.

# RD: Block of the Program in Operation

This protocol reads each block information of the machining program in operation.
It is used for debugging operations, verification, and so on.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the block of the program currently being executed from CNC system 1. |
| Normal response | Block of the Program in Operation | Specify the device that stores the read data.<br>The device uses 64 words.<br>The stored value is a string. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 04A8H |
| 2 | 0A84H |
| 3 | 1060H |
| 4 | 163CH |
| 5 | 1C18H |

## Precautions

Do not change values other than setting data.

# RD: Operation Mode of Spindle (1 - 4)

This protocol reads the operation mode (1 to 4) of the master axis.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the operation mode (1 to 4) of the master axis from CNC system 1. |
| Normal response | Operation Mode of Spindle 1 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string listed below.<br>• SPINDLE<br>• INDEX<br>• CONTOUR |
| | Operation Mode of Spindle 2 | |
| | Operation Mode of Spindle 3 | |
| | Operation Mode of Spindle 4 | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 04E8H |
| 2 | 0AC4H |
| 3 | 10A0H |
| 4 | 167CH |
| 5 | 1C58H |

## Precautions

Do not change values other than setting data.

# RD: Fast Forward Override

This protocol reads the operating speed ≒ efficiency of the machine tool as a percentage.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the rapid feed override from CNC system 1. |
| Normal response | Fast Forward Override | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0514H |
| 2 | 0AF0H |
| 3 | 10CCH |
| 4 | 16A8H |
| 5 | 1C84H |

## Precautions

Do not change values other than setting data.

# RD: Spindle Override

This protocol reads the operating speed ≒ efficiency of the machine tool as a percentage.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the master axis override from CNC system 1. |
| Normal response | Spindle Override | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 051CH |
| 2 | 0AF8H |
| 3 | 10D4H |
| 4 | 16B0H |
| 5 | 1C8CH |

## Precautions

Do not change values other than setting data.

# RD: Active Axis Name

This protocol reads the available axis information of the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the names of available axes from CNC system 1. |
| Normal response | Active Axis Name | Specify the device that stores the read data.<br>The device uses 16 words.<br>The stored value is a string. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0524H |
| 2 | 0B00H |
| 3 | 10DCH |
| 4 | 16B8H |
| 5 | 1C94H |

## Precautions

Do not change values other than setting data.

# RD: Dry Run

This protocol reads the mode status used during the operation test of the NC program.

It can be used by higher-level monitoring software to screen the actual operating time of the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read dry runs from CNC system 1. |
| Normal response | Dry Run | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer) listed below.<br>• ENABLED<br>• DISABLED |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0534H |
| 2 | 0B10H |
| 3 | 10ECH |
| 4 | 16C8H |
| 5 | 1CA4H |

## Precautions

- Do not change values other than setting data.
- Dry runs can only be collected for the 30i/0i series.

# RD: Cutting Feed

This protocol reads the cutting feed command in the NC program.
It can be used by higher-level monitoring software to screen the actual operating time of the machine tool.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the cutting feed from CNC system 1. |
| Normal response | Cutting Feed | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer) listed below.<br>• ENABLED<br>• DISABLED |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 053CH |
| 2 | 0B18H |
| 3 | 10F4H |
| 4 | 16D0H |
| 5 | 1CACH |

## Precautions

- Do not change values other than setting data.
- Cutting feed can only be collected for the 30i/0i series.

# RD: M00

This protocol reads the status of the M00 command.
It can be used by higher-level monitoring software to screen the actual operating time of the machine tool.
It is used to stop the machine during machining to check dimensions or the condition of tools.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read M00 from CNC system 1. |
| Normal response | M00 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string listed below.<br>• ENABLED<br>• DISABLED |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0544H |
| 2 | 0B20H |
| 3 | 10FCH |
| 4 | 16D8H |
| 5 | 1CB4H |

## Precautions

- Do not change values other than setting data.
- Cutting feed can only be collected for the 30i/0i series.

# RD: M01

This protocol reads the status of the M01 command.
It can be used by higher-level monitoring software to screen the actual operating time of the machine tool.
It is used when, as long as the machining result is checked with the first workpiece, checking with subsequent ones is not required.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read M01 from CNC system 1. |
| Normal response | M01 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string listed below.<br>• ENABLED<br>• DISABLED |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 054CH |
| 2 | 0B28H |
| 3 | 1104H |
| 4 | 16E0H |
| 5 | 1CBCH |

## Precautions

- Do not change values other than setting data.
- M01 can only be collected for the 30i/0i series.

# RD: Cycle Time

This protocol reads the cycle time in units of seconds.
It reads the time from the start to the end of workpiece cutting (integrated value of one automatic operation time).
It can be used for optimizing work process time or identifying causes of variation.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the cycle time (seconds) from CNC system 1. |
| Normal response | Cycle Time (Sec) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0554H |
| 2 | 0B30H |
| 3 | 110CH |
| 4 | 16E8H |
| 5 | 1CC4H |

## Precautions

Do not change values other than setting data.

# RD: Load and Speed of Spindle (1 - 4)

This protocol reads the load ≒ cutting torque information (%) and rotation speed (rotations per minute) of each master axis.
They can be used as reference values for machining condition settings and tool life estimation.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the load and speed (1 to 4) of the master axis from CNC system 1. |
| Normal response | Spindle 1 Load | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Spindle 2 Load | |
| | Spindle 3 Load | |
| | Spindle 4 Load | |
| | Spindle 1 Speed | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| | Spindle 2 Speed | |
| | Spindle 3 Speed | |
| | Spindle 4 Speed | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0578H |
| 2 | 0B54H |
| 3 | 1130H |
| 4 | 170CH |
| 5 | 1CE8H |

## Precautions

Do not change values other than setting data.

# RD: Insulation Value of Spindle (1 - 4)

This protocol reads the insulation resistance value (MΩ) of each master axis motor, which can be used as a reference value for preventive maintenance.
The value normally varies from around 100 to 0. If the value is below 10, replacement of related parts is recommended.
The information is updated when the emergency stop button of the CNC device is pressed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the insulation resistance value (1 to 4) of the master axis from CNC system 1. |
| Normal response | Spindle 1 Insulation Resistance | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Spindle 2 Insulation Resistance | |
| | Spindle 3 Insulation Resistance | |
| | Spindle 4 Insulation Resistance | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 05B8H |
| 2 | 0B94H |
| 3 | 1170H |
| 4 | 174CH |
| 5 | 1D28H |

## Precautions

- Do not change values other than setting data.
- The insulation resistance value (1 to 4) of the master axis can only be collected for the 30i/0i series.
- The information is updated when the emergency stop button of the CNC device is pressed. It may be recommended to press the emergency stop button before turning off the power supply to the machine tool.

# RD: Feed Rate

This protocol reads the feed axis movement speed in mm/s.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the feed speed (mm/second) from CNC system 1. |
| Normal response | Feed Rate (mm/sec) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 05DCH |
| 2 | 0BB8H |
| 3 | 1194H |
| 4 | 1770H |
| 5 | 1D4CH |

## Precautions

Do not change values other than setting data.

# RD: X Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the X axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the X axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 05E4H |
| 2 | 0BC0H |
| 3 | 119CH |
| 4 | 1778H |
| 5 | 1D54H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: Y Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving Y axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the Y axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0604H |
| 2 | 0BE0H |
| 3 | 11BCH |
| 4 | 1798H |
| 5 | 1D74H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: Z Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving Z axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the Z axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0624H |
| 2 | 0C00H |
| 3 | 11DCH |
| 4 | 17B8H |
| 5 | 1D94H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: U Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving U axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the U axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0644H |
| 2 | 0C20H |
| 3 | 11FCH |
| 4 | 17D8H |
| 5 | 1DB4H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: V Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving V axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the V axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0664H |
| 2 | 0C40H |
| 3 | 121CH |
| 4 | 17F8H |
| 5 | 1DD4H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: W Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving W axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the W axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0684H |
| 2 | 0C60H |
| 3 | 123CH |
| 4 | 1818H |
| 5 | 1DF4H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: A Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving A axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the A-axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 06A4H |
| 2 | 0C80H |
| 3 | 125CH |
| 4 | 1838H |
| 5 | 1E14H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: B Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving B axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the B-axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 06C4H |
| 2 | 0CA0H |
| 3 | 127CH |
| 4 | 1858H |
| 5 | 1E34H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: C Axis Absolute Position and Load Values

This protocol reads the absolute position (mm), moving axis load (%), and moving axis load current value (% and ampere) for the moving C axis.
Each axis load current value ≒ load information can be used as a reference value for machining condition settings and tool life estimation. Use the load current value information as a trend value such as a moving average, due to its accuracy.
The optimal values depend on each workpiece type/hardness.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the absolute position and load value of the C axis from CNC system 1. |
| Normal response | Absolute Position (mm) | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Load (%) | |
| | Load Current Value (%) | |
| | Load Current Value (A) | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 06E4H |
| 2 | 0CC0H |
| 3 | 129CH |
| 4 | 1878H |
| 5 | 1E54H |

## Precautions

- Do not change values other than setting data.
- The moving axis load current value can only be collected for the 30i/0i series.

# RD: Alarm (1 - 15)

This protocol reads alarm numbers 1 to 15.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read alarms (1 to 15) from CNC system 1. |
| Normal response | Alarm #1 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string. |
| | Alarm #2 | |
| | Alarm #3 | |
| | Alarm #4 | |
| | Alarm #5 | |
| | Alarm #6 | |
| | Alarm #7 | |
| | Alarm #8 | |
| | Alarm #9 | |
| | Alarm #10 | |
| | Alarm #11 | |
| | Alarm #12 | |
| | Alarm #13 | |
| | Alarm #14 | |
| | Alarm #15 | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0708H |
| 2 | 0CE4H |
| 3 | 12C0H |
| 4 | 189CH |
| 5 | 1E78H |

## Precautions

- Do not change values other than setting data.
- If an alarm and operation message occur simultaneously, both are stored in the alarm number. Operation messages are stored only in CNC system 1 as they are information independent of CNC systems.

# RD: Alarm (16 - 30)

This protocol reads alarm numbers 16 to 30.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read alarms (16 to 30) from CNC system 1. |
| Normal response | Alarm #16 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string. |
| | Alarm #17 | |
| | Alarm #18 | |
| | Alarm #19 | |
| | Alarm #20 | |
| | Alarm #21 | |
| | Alarm #22 | |
| | Alarm #23 | |
| | Alarm #24 | |
| | Alarm #25 | |
| | Alarm #26 | |
| | Alarm #27 | |
| | Alarm #28 | |
| | Alarm #29 | |
| | Alarm #30 | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0780H |
| 2 | 0D5CH |
| 3 | 1338H |
| 4 | 1914H |
| 5 | 1EF0H |

## Precautions

- Do not change values other than setting data.
- If an alarm and operation message occur simultaneously, both are stored in the alarm number. Operation messages are stored only in CNC system 1 as they are information independent of CNC systems.

# RD: Alarm (31 - 32)

This protocol reads alarm numbers 31 to 32.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read alarms (31 to 32) from CNC system 1. |
| Normal response | Alarm #31 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string. |
| | Alarm #32 | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 07F8H |
| 2 | 0DD4H |
| 3 | 13B0H |
| 4 | 198CH |
| 5 | 1F68H |

## Precautions

- Do not change values other than setting data.
- If an alarm and operation message occur simultaneously, both are stored in the alarm number. Operation messages are stored only in CNC system 1 as they are information independent of CNC systems.

# RD: PMC (1 - 20)

This protocol reads up to 20 registered PMCs.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read PMCs (1 to 20) from CNC system 1. |
| Normal response | PMC 1 | Specify the device that stores the read data.<br>The device uses 2 words.<br>The stored value is an integer. |
| | PMC 2 | |
| | PMC 3 | |
| | PMC 4 | |
| | PMC 5 | |
| | PMC 6 | |
| | PMC 7 | |
| | PMC 8 | |
| | PMC 9 | |
| | PMC 10 | |
| | PMC 11 | |
| | PMC 12 | |
| | PMC 13 | |
| | PMC 14 | |
| | PMC 15 | |
| | PMC 16 | |
| | PMC 17 | |
| | PMC 18 | |
| | PMC 19 | |
| | PMC 20 | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0834H |
| 2 | 0E10H |
| 3 | 13ECH |
| 4 | 19C8H |
| 5 | 1FA4H |

## Precautions

Do not change values other than setting data.

# RD: Macro (1 - 10)

This protocol reads up to 10 registered macros as required depending on the machine tool manufacturer or user.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read macros (1 to 10) from CNC system 1. |
| Normal response | Macro 1 | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Macro 2 | |
| | Macro 3 | |
| | Macro 4 | |
| | Macro 5 | |
| | Macro 6 | |
| | Macro 7 | |
| | Macro 8 | |
| | Macro 9 | |
| | Macro 10 | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0898H |
| 2 | 0E74H |
| 3 | 1450H |
| 4 | 1A2CH |
| 5 | 2008H |

## Precautions

Do not change values other than setting data.

# RD: Insulation Resistance Value of Axis (1 - 9)

This protocol reads the insulation resistance values (MΩ) for each of the X, Y, Z, U, V, W, A, B, and C moving axes.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the insulation resistance values (1 to 9) of the moving axis from CNC system 1. |
| Normal response | X Axis Insulation Resistance Value | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (decimal). |
| | Y Axis Insulation Resistance Value | |
| | Z Axis Insulation Resistance Value | |
| | U Axis Insulation Resistance Value | |
| | V Axis Insulation Resistance Value | |
| | W Axis Insulation Resistance Value | |
| | A Axis Insulation Resistance Value | |
| | B Axis Insulation Resistance Value | |
| | C Axis Insulation Resistance Value | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 08E8H |
| 2 | 0EC4H |
| 3 | 14A0H |
| 4 | 1A7CH |
| 5 | 2058H |

## Precautions

- Do not change values other than setting data.
- The insulation resistance value of the moving axis can only be collected for the 30i/0i series.

# RD: Total Travel Amount of Axis (1 - 9)

This protocol reads the total travel distance for each axis according to the axis name.
The travel distance can be used as a reference value for preventive maintenance and life management of the feed axes of the machine.
This applies to all of the X, Y, Z, U, V, W, A, B, C axes.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the total travel distance (1 to 9) of the axes of CNC system 1. |
| Normal response | X Axis Total Travel Amount | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| | Y Axis Total Travel Amount | |
| | Z Axis Total Travel Amount | |
| | U Axis Total Travel Amount | |
| | V Axis Total Travel Amount | |
| | W Axis Total Travel Amount | |
| | A Axis Total Travel Amount | |
| | B Axis Total Travel Amount | |
| | C Axis Total Travel Amount | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0930H |
| 2 | 0F0CH |
| 3 | 14E8H |
| 4 | 1AC4H |
| 5 | 20A0H |

## Precautions

- Do not change values other than setting data.
- In older CNC devices such as the 16i series, the optional function for displaying the total travel distance is required.

# RD: Real Speed for Servo Adjustment of Axis (1-9)

This protocol reads the actual speed (rotations per minute) of the servo motor for each axis after servo amplifier adjustment.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Rewrite to the value of the start address of the data to be read.<br>The default value is set to read the actual servo adjustment speed (1 to 9) of the axes of CNC system 1. |
| Normal response | X Axis Real Speed for Servo Adjustment | Specify the device that stores the read data.<br>The device uses 8 words.<br>The stored value is a string (integer). |
| | Y Axis Real Speed for Servo Adjustment | |
| | Z Axis Real Speed for Servo Adjustment | |
| | U Axis Real Speed for Servo Adjustment | |
| | V Axis Real Speed for Servo Adjustment | |
| | W Axis Real Speed for Servo Adjustment | |
| | A Axis Real Speed for Servo Adjustment | |
| | B Axis Real Speed for Sevo Adjustment | |
| | C Axis Real Speed for Servo Adjustment | |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 When the protocol of another system is used, change the value as follows.

| CNC system | Start address |
|---|---|
| 1 | 0978H |
| 2 | 0F54H |
| 3 | 1530H |
| 4 | 1B0CH |
| 5 | 20E8H |

## Precautions

Do not change values other than setting data.

# RD: Read Input Registers

This protocol reads one or more input register values.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Starting Address*1 | Specify the device to store it. |
| | No. of Input Registers | Specify the device to store it.<br>The value is specified within the range from 1 to 125. |
| Normal response | Read Data | Specify the device that stores the read data.<br>The device uses 126 words.<br>The data length of the read data is stored in the start device, and the actual data is stored from the second device onwards. |
| Error response | Exception Code | Specify the device that stores the read data. |

*1 The address range supported in the CNC system is as follows.

| CNC system | Start address | End address |
|---|---|---|
| Not applicable | 0000H | 005FH |
| 1 | 03E8H | 09C3H |
| 2 | 09C4H | 0F9FH |
| 3 | 0FA0H | 157BH |
| 4 | 157CH | 1B57H |
| 5 | 1B58H | 2133H |

## Precautions

Do not change values other than setting data.

# 25 PROTOCOLS SUPPORTED BY SATO (CL4NX(-J) Plus, CL6NX(-J) Plus)

## 25.1 Setting Method

Communication with barcode printer CL4NX(-J) Plus or CL6NX(-J) Plus by SATO HOLDINGS CORPORATION uses the TCP/IP server socket function.
Also, this library uses the Status 4 printer communication protocol.
For details on setting parameters, refer to the manual for SATO-Programming Reference For printer model: CL4NX Plus, CL6NX Plus.

## 25.2 List of Applicable Protocols

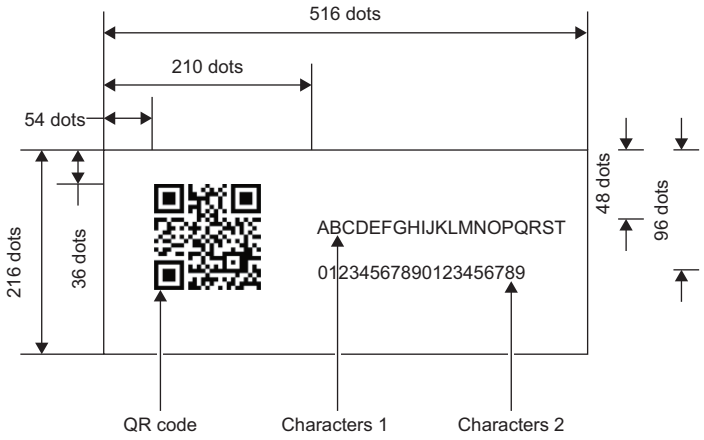
| Name | Description | Automatic addition*1 | Communication timing (Default)*2 |
|---|---|---|---|
| WR: Print QR Code | Prints QR codes and characters. | To be added | Request |
| WR: Print Barcode | Prints barcodes and characters. | To be added | Request |
| WR: Print Characters | Prints characters. | To be added | Request |
| RD: Enquiry Status | Reads the product status. | To be added | Request |
| WR: Cancel Request | Terminates printing and clears all contents of the receive buffer. | Not to be added | Request |
| WR: Reset | Restarts the product. | Not to be added | Request |
| WR: Power OFF | Powers off the product. | 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 value is the default when adding a protocol. After the protocol is added, the communication timing can be changed as necessary.

# 25.3 Details of Applicable Protocols

## WR: Print QR Code

This protocol prints QR codes, characters 1, and characters 2. The following figure shows the sample of a label printed by executing WR: Print QR Code.




The protocol setting window of the engineering tool displays WR: Print QR Code in two parts.

- WR: Print QR Code (Part 1): User must enter a QR code.
- WR: Print QR Code (Part 2): User must enter characters 1 and characters 2 data.

Executing WR: Print QR Code (Part 1) and WR: Print QR Code (Part 2) in sequence prints the QR code and characters on the label as shown above.

### Setting data

| Packet name | Element name | | Description |
|---|---|---|---|
| Request Message | <KC>Kanji Code Parameter | | The default value of static data "<KC> Kanji Code Parameter" is set to 1 (ASCII): Shift JIS code.<br>When changing the specified Kanji code, refer to the Kanji code setting range and change the value.<br>(☞ Page 652 Kanji code specification <KC>) |
| | <A1> Media Size Parameter | | The default value of static data "<A1> Media Size Parameter" is set to 02160516 (ASCII).<br>When changing the specified media size, refer to the media size setting range and change the value.<br>(☞ Page 652 Media size specification <A1>) |
| | QR Code | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0036 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0054 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <2D30> QR Code Parameter | The default value of static data "<2D30> QR Code Parameter" is set to M,04,1,0 (ASCII).<br>When changing the specified QR code, refer to the QR codes and change the value. (☞ Page 654 QR code <2D30>) |
| | | <DN> QR Code Data Size | The default value of static data "<DN> QR Code Data Size" is set to 0040,.<br>Change it according to the write data size of "QR Code Data".<br>When changing the specified QR code, refer to the binary data print specification and change the value. (☞ Page 654 Binary data print specification <DN>) |
| | | <DN> QR Code Data | Specify the device that stores the write data of "<DN> QR Code Data".<br>By default, 20 consecutive word devices are used. Specify the data in hexadecimal.<br>Specify the length (number of characters) of "QR Code Data" on the start device.<br>The actual data of "QR Code Data" is stored in consecutive devices starting from the second device. |

| Packet name | Element name | | Description |
|---|---|---|---|
| Request Message | Characters 1 | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0048 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0210 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value.<br>(☞ Page 654 Character pitch specification <P>) |
| | | <L> Enlargement Ratio Parameter | The default value of static data "<L> Enlargement Ratio Parameter" is set to 0101 (ASCII): Horizontal enlargement ratio (01) and vertical enlargement ratio (01).<br>When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 654 Enlargement ratio specification <L>) |
| | | <K9> Character Mode | The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified.<br>When changing the Kanji specification mode, refer to the setting range for 24 × 24 dot horizontal writing mixed one-byte and two-byte Kanji specification and change the value. (☞ Page 655 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>) |
| | | <K9> Characters 1 | Specify the device that stores the write data of "<K9> Characters 1".<br>By default, 10 consecutive word devices are used.<br>Specify the length (number of characters) of "Characters 1" on the start device.<br>The actual data of "Characters 1" is stored in consecutive devices starting from the second device. |
| | Characters 2 | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0096 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0210 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value.<br>(☞ Page 654 Character pitch specification <P>) |
| | | <L> Enlargement Ratio Parameter | The default value of static data "<L> Enlargement Ratio Parameter" is set to 0101 (ASCII): Horizontal enlargement ratio (01) and vertical enlargement ratio (01).<br>When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 654 Enlargement ratio specification <L>) |
| | | <K9> Character Mode | The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified.<br>When changing the Kanji specification mode, refer to the setting range for 24 × 24 dot horizontal writing mixed one-byte and two-byte Kanji specification and change the value. (☞ Page 655 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>) |
| | | <K9> Characters 2 | Specify the device that stores the write data of "<K9> Characters 2".<br>By default, 10 consecutive word devices are used.<br>Specify the length (number of characters) of "Characters 2" on the start device.<br>The actual data of "Characters 2" is stored in consecutive devices starting from the second device. |
| | <Q> Print Quantity Parameter | | The default value of static data "<Q> Print Quantity Parameter" is set to 000001 (ASCII).<br>When changing the number of copies to print, change the print quantity value. |

For details on the setting value range for each element of WR: Print QR Code, refer to the following.

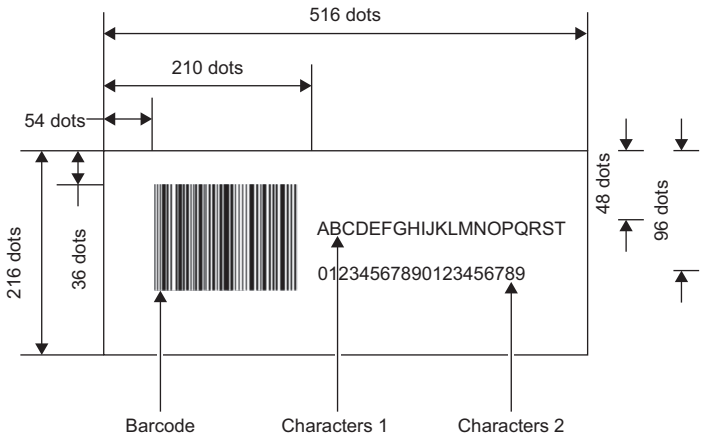
☞ Page 652 Range Setting Values

## Precautions

- Do not change values other than the setting data.
- Any content (such as characters, barcodes, graphics) that extends beyond the effective printing area will not be printed.
- If a value outside the effective range is set, a command error will occur and the label will not be printed.
- If the power is turned off, the set parameters will not be held.

# WR: Print Barcode

This protocol prints barcode, characters 1, and characters 2. The following figure shows the sample of a label printed by executing WR: Print Barcode.




The protocol setting window of the engineering tool displays WR: Print Barcode in two parts.

- WR: Print Barcode (Part 1): User must enter barcode data.
- WR: Print Barcode (Part 2): User must enter characters 1 and characters 2 data.

Executing WR: Print Barcode (Part 1) and WR: Print Barcode (Part 2) in sequence prints the barcodes and characters on the label as shown above.

## Setting data

| Packet name | Element name | | Description |
|---|---|---|---|
| Request Message | <KC>Kanji Code Parameter | | The default value of static data "<KC> Kanji Code Parameter" is set to 1 (ASCII): Shift JIS code.<br>When changing the specified Kanji code, refer to the Kanji code setting range and change the value.<br>(☞ Page 652 Kanji code specification <KC>) |
| | <A1> Media Size Parameter | | The default value of static data "<A1> Media Size Parameter" is set to 02160516 (ASCII).<br>When changing the specified media size, refer to the media size setting range and change the value.<br>(☞ Page 652 Media size specification <A1>) |
| | Barcode | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0036 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0054 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value.<br>(☞ Page 654 Character pitch specification <P>) |
| | | <B> Barcode Parameter | The default value of static data "<B> Barcode Parameter" is set to 101120 (ASCII): Barcode type (1: fixed to CODE39) = 1, Narrow bar width = 01, and Barcode height = 120.<br>When changing the specified barcode, refer to the barcode specification and change the value.<br>(☞ Page 655 Barcode specification <B>) |
| | | <B> Barcode Data | Specify the device that stores the write data of "<B> Barcode Data".<br>By default, 22 consecutive word devices are used.<br>Specify the length (number of characters) of "<B> Barcode Data" on the start device.<br>The actual data of "<B> Barcode Data" is stored in consecutive devices starting from the second device. |

| Packet name | Element name | | Description |
|---|---|---|---|
| Request Message | Characters 1 | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0048 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0210 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value.<br>(☞ Page 654 Character pitch specification <P>) |
| | | <L> Enlargement Ratio Parameter | The default value of static data "<L> Enlargement Ratio Parameter" is set to 0101 (ASCII): Horizontal enlargement ratio (01) and vertical enlargement ratio (01).<br>When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 654 Enlargement ratio specification <L>) |
| | | <K9> Character Mode | The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified.<br>When changing the Kanji specification mode, refer to the setting range for 24 × 24 dot horizontal writing mixed one-byte and two-byte Kanji specification and change the value. (☞ Page 655 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>) |
| | | <K9> Characters 1 | Specify the device that stores the write data of "<K9> Characters 1".<br>By default, 10 consecutive word devices are used.<br>Specify the length (number of characters) of "Characters 1" on the start device.<br>The actual data of "Characters 1" is stored in consecutive devices starting from the second device. |
| | Characters 2 | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0096 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0210 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value.<br>(☞ Page 654 Character pitch specification <P>) |
| | | <L> Enlargement Ratio Parameter | The default value of static data "<L> Enlargement Ratio Parameter" is set to 0101 (ASCII): Horizontal enlargement ratio (01) and vertical enlargement ratio (01).<br>When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 654 Enlargement ratio specification <L>) |
| | | <K9> Character Mode | The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified.<br>When changing the Kanji specification mode, refer to the setting range for 24 × 24 dot horizontal writing mixed one-byte and two-byte Kanji specification and change the value. (☞ Page 655 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>) |
| | | <K9> Characters 2 | Specify the device that stores the write data of "<K9> Characters 2".<br>By default, 10 consecutive word devices are used.<br>Specify the length (number of characters) of "Characters 2" on the start device.<br>The actual data of "Characters 2" is stored in consecutive devices starting from the second device. |
| | <Q> Print Quantity Parameter | | The default value of static data "<Q> Print Quantity Parameter" is set to 000001 (ASCII).<br>When changing the number of copies to print, change the print quantity value. |

For details on the setting value range for each element of WR: Print Barcode, refer to the following.

☞ Page 652 Range Setting Values

## Precautions

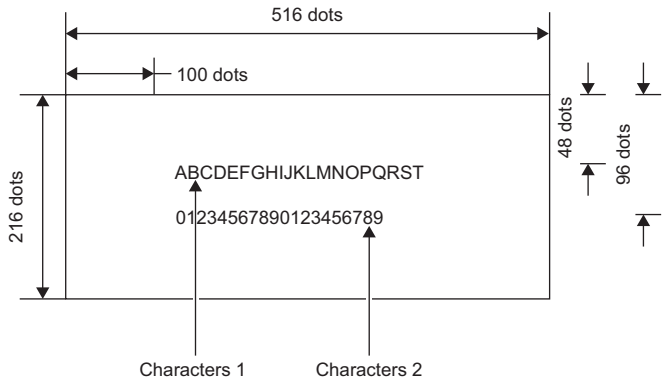
- Do not change values other than the setting data.
- Any content (such as characters, barcodes, graphics) that extends beyond the effective printing area will not be printed.
- If the narrow bar width is increased, it may extend beyond the printing area.
- Barcode character pitch setting specification = Narrow bar width × Specified character pitch
- For barcodes with valid character pitch, the scanner may not be able to read them if the character pitch is set too large. For details, refer to the specification of the scanner in use.
- Specify the narrow bar width taking into consideration the readability and head density of the scanner.

Head density: 8 dots/mm (Two dots or more)
Head density: 12 dots/mm (Two dots or more)
Head density: 24 dots/mm (Four dots or more)

- If a value outside the effective range is specified, a command error will occur and the label will not be printed.
- If the scanner read is poor, adjust "<CS> Print Speed" or "<#F>Print Darkness".
- If the power is turned off, the set parameters will not be held.

# WR: Print Characters

This protocol prints characters 1 and characters 2. The following figure shows the sample of a label printed by executing WR: Print Characters.




The protocol setting window of the engineering tool displays WR: Print Characters in two parts.

- WR: Print Characters (Part 1): User must enter character 1 data.
- WR: Print Characters (Part 2): User must enter character 2 data.

Executing WR: Print Characters (Part 1) and WR: Print Characters (Part 2) in sequence prints the characters on the label as shown above.

## Setting data

| Packet name | Element name | | Description |
|---|---|---|---|
| Request Message | <KC>Kanji Code Parameter | | The default value of static data "<KC> Kanji Code Parameter" is set to 1 (ASCII): Shift JIS code.<br>When changing the specified Kanji code, refer to the Kanji code (☞ Page 652 Kanji code specification <KC>) setting range and change the value. |
| | <A1> Media Size Parameter | | The default value of static data "<A1> Media Size Parameter" is set to 02160516 (ASCII).<br>When changing the specified media size, refer to the media size setting range and change the value. (☞ Page 652 Media size specification <A1>) |
| | Characters 1 | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value. (☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0048 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0100 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value. (☞ Page 654 Character pitch specification <P>) |
| | | <L> Enlargement Ratio Parameter | The default value of static data "<L> Enlargement Ratio Parameter" is set to 0101 (ASCII): Horizontal enlargement ratio (01) and vertical enlargement ratio (01).<br>When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 654 Enlargement ratio specification <L>) |
| | | <K9> Character Mode | The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified.<br>When changing the Kanji specification mode, refer to the setting range for 24 × 24 dot horizontal writing mixed one-byte and two-byte Kanji specification and change the value. (☞ Page 655 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>) |
| | | <K9> Characters 1 | Specify the device that stores the write data of "<K9> Characters 1".<br>By default, 10 consecutive word devices are used.<br>Specify the length (number of characters) of "Characters 1" on the start device.<br>The actual data of "Characters 1" is stored in consecutive devices starting from the second device. |

| Packet name | Element name | | Description |
|---|---|---|---|
| Request Message | Characters 2 | <%> Rotation Parameter | The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°).<br>When changing the specified rotation, refer to the rotation setting range and change the value.<br>(☞ Page 652 Rotation specification <%>) |
| | | <V> Vertical Print Position Parameter | The default value of static data "<V> Vertical Print Position Parameter" is set to 0096 (ASCII).<br>When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 653 Vertical print position specification <V>) |
| | | <H> Horizontal Print Position Parameter | The default value of static data "<H> Horizontal Print Position Parameter" is set to 0100 (ASCII).<br>When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 653 Horizontal print position specification <H>) |
| | | <P> Character Pitch Parameter | The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII).<br>When changing the character pitch, refer to the character pitch setting range and change the value.<br>(☞ Page 654 Character pitch specification <P>) |
| | | <L> Enlargement Ratio Parameter | The default value of static data "<L> Enlargement Ratio Parameter" is set to 0101 (ASCII): Horizontal enlargement ratio (01) and vertical enlargement ratio (01).<br>When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 654 Enlargement ratio specification <L>) |
| | | <K9> Character Mode | The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified.<br>When changing the Kanji specification mode, refer to the setting range for 24 × 24 dot horizontal writing mixed one-byte and two-byte Kanji specification and change the value. (☞ Page 655 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>) |
| | | <K9> Characters 2 | Specify the device that stores the write data of "<K9> Characters 2".<br>By default, 10 consecutive word devices are used.<br>Specify the length (number of characters) of "Characters 2" on the start device.<br>The actual data of "Characters 2" is stored in consecutive devices starting from the second device. |
| | <Q> Print Quantity Parameter | | The default value of static data "<Q> Print Quantity Parameter" is set to 000001 (ASCII).<br>When changing the number of copies to print, change the print quantity value. |

For details on the setting value range for each element of WR: Print Characters, refer to the following.

☞ Page 652 Range Setting Values

## Precautions

- Do not change values other than the setting data.
- Any content (such as characters, barcodes, graphics) that extends beyond the effective printing area will not be printed.
- If a value outside the effective range is specified, a command error will occur and the label will not be printed.
- If the power is turned off, the set parameters will not be held.

# RD: Enquiry Status

This protocol reads the job ID number of the receive data being printed, the status of this product, and the number of remaining labels to be printed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Response message | Status | Specify the device that stores "Status". |
| | Remaining Number of Labels | Specify the device that stores "Remaining Number of Labels".<br>Three consecutive word devices are used. |

## Precautions

- Do not change values other than the setting data.
- The Legacy status settings for Port 9100 on the CL4NX(-J) Plus and CL6NX(-J) Plus must be disabled.
- Do not execute RD: Enquiry Status while sending print data. The correct status may not be returned or printing may not be properly completed.
- After sending a status request command, send the next request after receiving the response message.
- For details on "Status" of the response message, refer to the manual for SATO-Programming Reference For printer model: CL4NX(-J) Plus, CL6NX(-J) Plus.

# WR: Cancel Request

This protocol terminates printing and clears all contents of the receive buffer.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |

## Precautions

Do not change values other than the setting data.

# WR: Reset

This protocol restarts the product.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Before executing WR: Reset, execute RD: Enquiry Status to check the printer status.
- Do not execute WR: Reset while the printer is operating. Otherwise, NAK [15h] will be returned.

# WR: Power OFF

Powers off the product.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Before executing WR: Power OFF, execute RD: Enquiry Status to check the printer status.
- Do not execute WR: Power OFF while the printer is operating. Otherwise, NAK [15h] will be returned.

# 25.4 Range Setting Values

Specify all setting values in ASCII code.

## Kanji code specification <KC>

Specify the parameter value in the form of a.

When setting each Kanji code, specify the appropriate Kanji mode in the printer settings.

For the correspondence between Kanji codes and Kanji modes, and how to set the Kanji mode, refer to the printer manual.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/<br>CL6NX(-J) PLUS | a | 0 | JIS code |
| | | 1 | Shift JIS code |
| | | 2 | Unicode (UTF-16) |
| | | 3 | Unicode (UTF-8) |
| | | 4 | BIG5 code |
| | | 5 | GB18030 code |
| | | 6 | KSC5601(EUC-KR) code |

## Rotation specification <%>

Specify the parameter value in the form of a.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/<br>CL6NX(-J) PLUS | a | 0 | Parallel 1 (0°) |
| | | 1 | Serial 1 (90°) |
| | | 2 | Parallel 2 (180°) |
| | | 3 | Serial 2 (270°) |

## Media size specification <A1>

Specify the parameter value in the form of aaaabbbb.

When setting a vertical label size equal to or greater than 10000, specify it in the form of VaaaaaHbbbb.

| Model | Head density | Horizontal label size (dot) | Vertical label size (dot) |
|---|---|---|---|
| CL4NX(-J) PLUS | 203dpi | 1 to 832 | 1 to 20000 |
| | 305dpi | 1 to 1248 | 1 to 18000 |
| | 609dpi | 1 to 2496 | 1 to 9600 |
| CL6NX(-J) PLUS | 203dpi | 1 to 1216*1<br>1 to 1340*2 | 1 to 20000 |
| | 305dpi | 1 to 1984*1<br>1 to 2010*2 | 1 to 18000 |

*1 Effective range of the print position when it is set to the standard

*2 Effective range of the print position when it is set to left justification

### Precautions

aaaa/aaaaa refers to the vertical label size.

bbbb refers to the horizontal label size.

# Vertical print position specification <V>

Specify the parameter value in the form of aaaaa.

| Model | Head density | Vertical print position specification |
|---|---|---|
| | | Effective range (dot) |
| CL4NX(-J) PLUS | 203dpi | 1 to 20000 |
| | 305dpi | 1 to 18000 |
| | 609dpi | 1 to 9600 |
| CL6NX(-J) PLUS | 203dpi | 1 to 20000 |
| | 305dpi | 1 to 18000 |

## Precautions

aaaaa refers to the vertical print position.

# Horizontal print position specification <H>

Specify the parameter value in the form of aaaa.

| Model | Head density | Horizontal print position specification |
|---|---|---|
| | | Effective range (dot) |
| CL4NX(-J) PLUS | 203dpi | 1 to 832 |
| | 305dpi | 1 to 1248 |
| | 609dpi | 1 to 2496 |
| CL6NX(-J) PLUS | 203dpi | 1 to 1216*1<br>1 to 1340*2 |
| | 305dpi | 1 to 1984*1<br>1 to 2010*2 |

*1 Effective range of the print position when it is set to the standard
*2 Effective range of the print position when it is set to left justification

## Precautions

aaaa refers to the horizontal print position.

# QR code <2D30>

Specify the parameter values in the form of a, bb, c, d (,ee, ff, gg).

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/ CL6NX(-J) PLUS | a | L: 7% | Error collection level |
| | | M: 15% | |
| | | Q: 25% | |
| | | H: 30% | |
| | bb | 01 to 99 (dot) | Size specification for one side of a cell |
| | c | 0: Manual setting | Data setting mode |
| | | 1: Automatic setting | |
| | d | 0: Normal mode | Link mode |
| | | 1: Link mode | |
| | ee*1 | 01 to 16 | Link mode division number*2 |
| | ff*1 | 01 to 16 | Link mode division serial number*3 |
| | gg*1 | 00 to FF | Link mode parity data*4 |

*1 In (d) link mode, if 1 (link mode) is specified, be sure to specify the ee, ff, and gg parameters. In (d) link mode, if 0 (normal mode) is specified, the ee, ff, and gg parameters are not required.
For example, when changing the parameter from the default value to link mode, change it as follows:
0: Normal mode: 2D30,M,04,1,0
1: Link mode: 2D30,M,04,1,1,01,01,FF (ee = 01/ff = 01/gg = FF)

*2 The number of divisions specifies how many divided QR codes according to the link mode should be linked.

*3 The serial number specifies the order of divided QR codes.

*4 Parity data is the data calculated (exclusive logical OR) of all the print data of the divided QR codes, and is specified in hexadecimal.

# Binary data print specification <DN>

Specify the parameter values in the form of mmmm, n to n.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/ CL6NX(-J) PLUS | mmmm | 1 to 2953 | Number of data |
| | n to n | Data | Print data |

# Character pitch specification <P>

Specify the parameter value in the form of aa.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/ CL6NX(-J) PLUS | aa | -99 to 99 (dot) | Spacing between letters or barcode characters when choosing fonts and barcodes |

# Enlargement ratio specification <L>

Specify the parameter value in the form of aabb.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/ CL6NX(-J) PLUS | aa | 01 to 36 | Horizontal enlargement ratio |
| | bb | 01 to 36 | Vertical enlargement ratio |

## 24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>

Specify the parameter value in the form of an to n.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/ CL6NX(-J) PLUS | a | H | Hexadecimal character specification |
| | | B | Binary code specification |
| | | I | Hexadecimal character specification with the smoothing function |
| | | C | Binary code specification with the smoothing function |
| | | J | Hexadecimal character specification with the highlighting function |
| | | D | Binary code specification with the highlighting function |
| | | K | Hexadecimal character specification with the smoothing and highlighting functions |
| | | E | Binary code specification with the smoothing and highlighting functions |
| | n to n | Data | Print data<br>For character code types that can be specified, refer to the Kanji code specification <KC>. (☞ Page 652 Kanji code specification <KC>) |

## Barcode specification <B>

Specify the parameter value in the form of abbcccn to n.

| Model | Parameter | Parameter value | Description |
|---|---|---|---|
| CL4NX(-J) PLUS/ CL6NX(-J) PLUS | a | 1 | Barcode type (1: CODE39 fixed)<br>The barcode configuration is as follows:<br>• Length: 43 characters<br>• Numerical value: 0 to 9<br>• Upper-case character (A to Z)<br>• Symbol: (-, $, /, ., +)<br>• Start/stop character: (*)<br>The barcode character pitch is enabled.<br>Character representation: A character is represented by 5 bars and 4 spaces. |
| | bb | 01 to 36 (dot) | Narrow bar width |
| | ccc | 001 to 999 (dot) | Barcode height |
| | n to n | Data | Print data (CODE39)<br>Specify the print data by including the start/stop characters (*).<br>Example: If the barcode print data is 123, specify it as *123*. |

# 26 PROTOCOLS SUPPORTED BY NACHI-FUJIKOSHI (FD CONTROLLER)

## 26.1 Setting Method

Communication with the target device uses socket communication as setting method.

For the setting method, refer to the following. XXXX contains version information.

- TFDEN-012-XXX_ FD CONTROLLER INSTRUCTION MANUAL Robot language
- CFDs-EN-127-XXX_CFDs CONTROLLER INSTRUCTION MANUAL Socket Communication
- FD20-EN-007-XXXX_F FD18/FD20 CONTROLLER INSTRUCTION MANUAL EXTERNAL INPUT/OUTPUT

Fix the port number to 10030.

## 26.2 List of Applicable Protocols

| Name | Description | Automatic addition*1 | Communication timing (Default)*2 |
|---|---|---|---|
| RD: GET1 | Gets information about the mechanism (current value of each axis) for the entered number. | To be added | Fixed Intrvl |
| RD: GET2 | Gets information about the module (Unit Error Number, operating status signal) for the entered number. | To be added | Fixed Intrvl |
| WR: QUIT | Terminates the server-side user task program. | 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 value is the default when adding a protocol. After the protocol is added, the communication timing can be changed as necessary.

# 26.3 Details of Applicable Protocols

## RD: GET1

This protocol reads information about the entered mechanism number (current value of each axis).



### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | J1 axis current value | Specifies the device that stores "J1 axis current value".<br>The read data uses a two-word device. |
| | J2 axis current value | Specifies the device that stores "J2 axis current value".<br>The read data uses a two-word device. |
| | J3 axis current value | Specifies the device that stores "J3 axis current value".<br>The read data uses a two-word device. |
| | J4 axis current value | Specifies the device that stores "J4 axis current value".<br>The read data uses a two-word device. |
| | J5 axis current value | Specifies the device that stores "J5 axis current value".<br>The read data uses a two-word device. |
| | J6 axis current value | Specifies the device that stores "J6 axis current value".<br>The read data uses a two-word device. |

### Precautions

- Do not change values other than the setting data.
- The order is set to command, module number, and mechanism number.
- The module number and mechanism number can each be set from 1 to 9, but the default is 1. If the user sends a mechanism number that is not in use or is outside the allowable range, all values will be returned as 0 (ASCII).
- When specifying a different mechanism number or sending multiple protocols, change the mechanism number in the static data.
- The current value for each axis is stored in the IEEE 754 single precision floating point format.

# RD: GET2

This protocol reads information about the entered module number (Unit Error Number, operating status).

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Unit Error Number | Specifies the device that stores "Unit Error Number". |
| | Running in AUTO | Specifies the device that stores the value of the basic output signal "Running in AUTO". |
| | Executing program | Specifies the device that stores the value of the basic output signal "Executing program". |
| | Error | Specifies the device that stores the value of the fixed output signal "Error". |
| | Alarm | Specifies the device that stores the value of the fixed output signal "Alarm". |
| | Information | Specifies the device that stores the value of the fixed input signal "Information". |
| | Stopping | Specifies the device that stores the value of the fixed output signal "Stopping". |

## Precautions

- Do not change values other than the setting data.
- The order is set to command, module number, and mechanism number.
- The module number and mechanism number can each be set from 1 to 9, but the default is 1. If the user sends a mechanism number that is not in use or is outside the allowable range, all values will be returned as 0 (ASCII).
- When specifying a different module number or sending multiple protocols, change the module number in the static data.

# WR: QUIT

This protocol terminates the server-side user task program.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |

## Precautions

Do not change values other than the setting data.

# 27 PROTOCOLS SUPPORTED BY SUMITOMO HEAVY INDUSTRIES (SE-EV* SERIES)

## 27.1 Setting Method

Refer to the manual of the target device.



**Point**

- After the molding machine starts up and the molding machine window is displayed, the communication application on the molding machine will be initialized. This process takes several minutes, so connect to the Ethernet module two or three minutes after the molding machine has started.
- The TCP communication port used by Sumitomo Heavy Industries injection molding machines is fixed at 33333.

## 27.2 List of Applicable Protocols

| Name | Description | Automatic addition*1 | Communication timing (Default)*2 |
|---|---|---|---|
| RD: [SE-EV*]Condition Name | Reads the data of the specified condition name. | To be added | Request |
| RD: [SE-EV*]Molding Machine Status | Reads the data of the molding machine status. | To be added | Request |
| RD: [SE-EV*]Total Number of Shots | Reads the data of the total number of shots. | To be added | Request |
| RD: [SE-EV*]Number of Acceptable Shots | Reads the data of the number of acceptable shots. | Not to be added | Request |
| RD: [SE-EV*]Time Information | Reads the data of the specified time information. | To be added | Request |
| RD: [SE-EV*]Position Information | Reads the data of the specified position information. | To be added | Request |
| RD: [SE-EV*]Pressure Information | Reads the data of the specified pressure information. | To be added | Request |
| RD: [SE-EV*]Clamping Force Information | Reads the data of the specified clamping force information. | To be added | Request |
| RD: [SE-EV*]Actual Temperature | Reads the data of the specified actual temperature. | To be added | Request |
| RD: [SE-EV*]Fill Time | Reads the data of the specified fill time. | To be added | Request |
| RD: [SE-EV*]Holding Time | Reads the data of the specified holding time. | To be added | Request |
| RD: [SE-EV*]Holding Pressure | Reads the data of the specified holding pressure. | To be added | Request |
| RD: [SE-EV*]Fill Position | Reads the data of the specified fill position. | To be added | Request |
| RD: [SE-EV*]Fill Speed | Reads the data of the specified fill speed. | To be added | Request |
| RD: [SE-EV*]Measurement Delay Time/ Cooling Time | Reads the data of the specified measurement delay time/cooling time. | To be added | Request |
| RD: [SE-EV*]V-P Switch Selection | Reads the data of the V-P switch selection. | To be added | Request |
| RD: [SE-EV*]Measurement Mode | Reads the data of the measurement mode. | To be added | Request |
| RD: [SE-EV*]Measurement Rotation Acceleration | Reads the data of the measurement rotation acceleration. | To be added | Request |
| RD: [SE-EV*]Measurement Position | Reads the data of the specified measurement position. | To be added | Request |
| RD: [SE-EV*]Suck Back Speed | Reads the data of the specified suck back speed. | To be added | Request |
| RD: [SE-EV*]Back Pressure Information | Reads the data of the specified back pressure information. | To be added | Request |
| RD: [SE-EV*]Measurement Rotation Speed | Reads the data of the specified measurement rotation speed. | To be added | Request |
| RD: [SE-EV*]Measurement Rotation Information | Reads the data of the specified measurement rotation information. | To be added | Request |
| RD: [SE-EV*]Plasticization Backward Selection | Reads the data of the plasticization backward selection. | To be added | Request |
| RD: [SE-EV*]Plasticization Backward Information | Reads the data of the specified plasticization backward information. | To be added | Request |
| RD: [SE-EV*]Main Molding Temperature Setting | Reads the data of the specified main molding temperature setting. | To be added | Request |

| Name | Description | Automatic addition[*1] | Communication timing (Default)[*2] |
|---|---|---|---|
| RD: [SE-EV*]Clamping Force | Reads the data of the clamping force. | To be added | Request |
| RD: [SE-EV*]Number of Shots Change Notification | Receives the data from the molding machine when the shot count information is updated. | Not to be added | Fixed Intrvl |
| RD: End of Transmission (EOT) | Gets termination of the procedure (communication) from the molding machine. | Not to be added | Fixed Intrvl |
| RD: Error History Read | Reads the error history. | Not to be added | Request |
| WR: [SE-EV*]No. of Shots Change Notification On | Registers the shot count information in the data change notification. | Not to be added | Request |
| WR: [SE-EV*]No. of Shots Change Notification Off | Clears the shot count information registered in the data change notification. | Not to be added | Request |
| WR: All Data Change Notifications Clear | Clears all data change notification setting registered in the molding machine. | Not to be added | Request |
| WR: End of Transmission (EOT) | Terminates the procedure (communication) when the protocol has ended. | To be added | Request |
| RD: Data Read[*3] | Specifies the setting ID and reads the data. | Not to be added | Request |
| RD: Data Change Notification[*3] | Gets data sent from the molding machine when a change occurs in the items that are registered for data change notification and monitored by the molding machine. | Not to be added | Fixed Intrvl |
| WR: Data Change Notification On[*3] | Registers the items for monitoring data change on the molding machine. | Not to be added | Request |
| WR: Data Change Notification Off[*3] | Clears the data change notification setting registered in the molding machine. | 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 value is the default when adding a protocol. After the protocol is added, the communication timing can be changed as necessary.

*3 It is a general purpose protocol. The protocol can be used as a basis for creating new protocols.

# 27.3 Details of Applicable Protocols

## RD: [SE-EV*]Condition Name

This protocol reads the condition name.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Condition Name | The initial value of static data "Condition Name" is set to read the molding condition name. When reading other condition names, change the "Condition Name" setting value as follows.<br>• Molding condition name: 800<br>• Mold name: 801 |
| Normal Response | Condition Name | Specify the device that stores "Condition Name". |
| Error Response | — | No setting is required. |

### Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

## RD: [SE-EV*]Molding Machine Status

This protocol reads the molding machine status.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Molding Machine Status | Specify the device that stores "Molding Machine Status". |
| Error Response | — | No setting is required. |

### Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Total Number of Shots

This protocol reads the total number of shots.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Total Number of Shots | Specify the device that stores "Total Number of Shots". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Number of Acceptable Shots

This protocol reads the number of acceptable shots.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Number of Acceptable Shots | Specify the device that stores "Number of Acceptable Shots". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Time Information

This protocol reads the time information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Time Information | The initial value of static data "Time Information" is set to read the cycle time. When reading other time information, change the "Time Information" setting value as follows.<br>• Cycle time: 300<br>• Fill time: 301<br>• Measurement time: 302<br>• Mold closing time: 303<br>• Mold opening time: 304<br>• Fill time 1: 306<br>• Screw movement time during holding pressure: 307<br>• Total ejector time: 274 |
| Normal Response | Time Information | Specify the device that stores "Time Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Position Information

This protocol reads the position information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Position Information | The initial value of static data "Position Information" is set to read the minimum cushion position. When reading other position information, change the "Position Information" setting value as follows.<br>• Pre-fill position: 301<br>• V-P switch position: 302<br>• Minimum cushion position: 303<br>• Holding end position: 304<br>• Pre-measurement position: 305<br>• Maximum pressure screw position: 306 |
| Normal Response | Position Information | Specify the device that stores "Position Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Pressure Information

This protocol reads the pressure information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Pressure Information | The initial value of static data "Pressure Information" is set to read the fill peak pressure. When reading other pressure information, change the "Pressure Information" setting value as follows.<br>• Fill peak pressure: 300<br>• All area peak pressure: 303<br>• Pre-measurement pressure: 305<br>• Pack pressure: PAK<br>• Back pressure during measurement: PBP |
| Normal Response | Pressure Information | Specify the device that stores "Pressure Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Clamping Force Information

This protocol reads the clamping force information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Clamping Force Information | The initial value of static data "Clamping Force Information" is set to read the mold fully closed. When reading other clamping force information, change the "Clamping Force Information" setting value as follows.<br>• Mold fully closed: 314<br>• Cooling end: CLF<br>• Holding end: HCF<br>• Fill start: ICF<br>• Peak clamping force: PCF<br>• VP position: VCF |
| Normal Response | Clamping Force Information | Specify the device that stores "Clamping Force Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Actual Temperature

This protocol reads the actual temperature.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Actual Temperature | The initial value of static data "Actual Temperature" is set to read the Z1. When reading other actual temperature, change the "Actual Temperature" setting value as follows.<br>• Z1: 301<br>• Z2: 302<br>• Z3: 303<br>• Z4: 304<br>• Z5(Z15a): 305<br>• Z6(Z15b): 306<br>• Water cooling: 307<br>• Mold 1: 308<br>• Mold 2: 309 |
| Normal Response | Actual Temperature | Specify the device that stores "Actual Temperature". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Fill Time

This protocol reads the fill time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Fill Time | The initial value of static data "Fill Time" is set to read the fill delay time. When reading other fill time, change the "Fill Time" setting value as follows.<br>• Fill delay time: 000<br>• Fill time: 019 |
| Normal Response | Fill Time | Specify the device that stores "Fill Time". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Holding Time

This protocol reads the holding time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Holding Time | The initial value of static data "Holding Time" is set to read the 1st. When reading other holding time, change the "Holding Time" setting value as follows.<br>• 1st: 001<br>• 2nd: 002<br>• 3rd: 003<br>• 4th: 004<br>• Just pack time: 009 |
| Normal Response | Holding Time | Specify the device that stores "Holding Time". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Holding Pressure

This protocol reads the holding pressure.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Holding Pressure | The initial value of static data "Holding Pressure" is set to read the 1st. When reading other holding pressure, change the "Holding Pressure" setting value as follows.<br>• 1st: 001<br>• 2nd: 002<br>• 3rd: 003<br>• 4th: 004 |
| Normal Response | Holding Pressure | Specify the device that stores "Holding Pressure". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Fill Position

This protocol reads the fill position.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Fill Position | The initial value of static data "Fill Position" is set to read the 1/5 speed. When reading other fill position, change the "Fill Position" setting value as follows.<br>• 1/5 speed: 000<br>• 2/5 speed: 001<br>• 3/5 speed: 002<br>• 4/5 speed: 003<br>• V-P SW: 004<br>• 1st/7V: 026<br>• 2nd/7V: 027 |
| Normal Response | Fill Position | Specify the device that stores "Fill Position". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Fill Speed

This protocol reads the fill speed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Fill Speed | The initial value of static data "Fill Speed" is set to read the 1st/5V(3rd/7V). When reading other fill speed, change the "Fill Speed" setting as follows.<br>• 1st/5V (3rd/7V): 000<br>• 2nd/5V (4th/7V): 001<br>• 3rd/5V (5th/7V): 002<br>• 4th/7V (4th/7V): 003<br>• V-P SW: 004<br>• 1st/7V: 026<br>• 2nd/7V: 027 |
| Normal Response | Fill Speed | Specify the device that stores "Fill Speed". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Measurement Delay Time/Cooling Time

This protocol reads the measurement delay time/cooling time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Measurement Delay Time/Cooling Time | The initial value of static data "Measurement Delay Time/Cooling Time" is set to read the measurement delay time. When reading other measurement delay time/cooling time, change the "Measurement Delay Time/Cooling Time" setting value as follows.<br>• Measurement delay time: 032<br>• Cooling time: 039 |
| Normal Response | Measurement Delay Time/Cooling Time | Specify the device that stores "Measurement Delay Time/Cooling Time". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]V-P Switch Selection

This protocol reads the V-P switch selection.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | V-P Switch Selection | Specify the device that stores "V-P Switch Selection". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Measurement Mode

This protocol reads the measurement mode.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Measurement Mode | Specify the device that stores "Measurement Mode". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Measurement Rotation Acceleration

This protocol reads the measurement rotation acceleration.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Measurement Rotation Acceleration | Specify the device that stores "Measurement Rotation Acceleration". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Measurement Position

This protocol reads the measurement position.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Measurement Position | The initial value of static data "Measurement Position" is set to read the s5 suck back. When reading other measurement position, change the "Measurement Position" setting value as follows.<br>• s5 suck back: 005<br>• 1st/3stg: 007<br>• 1st/2stg (2nd/3stg): 008<br>• Measurement end position: 009<br>• Decompression distance: 109<br>• Post-measurement suck back: 110 |
| Normal Response | Measurement Position | Specify the device that stores "Measurement Position". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Suck Back Speed

This protocol reads the suck back speed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Suck Back Speed | The initial value of static data "Suck Back Speed" is set to read the s5 suck back speed. When reading other suck back speed, change the "Suck Back Speed" setting value as follows.<br>• s5 suck back: 029<br>• Suck back speed: 030 |
| Normal Response | Suck Back Speed | Specify the device that stores "Suck Back Speed". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Back Pressure Information

This protocol reads the back pressure information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Back Pressure Information | The initial value of static data "Back Pressure Information" is set to read the 1st/3stg. When reading other back pressure information, change the "Back Pressure Information" setting value as follows.<br>• 1st/3stg: 005<br>• 1st/2stg (2nd/3stg): 009<br>• 2nd/2stg (3rd/3stg): 109 |
| Normal Response | Back Pressure Information | Specify the device that stores "Back Pressure Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Measurement Rotation Speed

This protocol reads the measurement rotation speed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Measurement Rotation Speed | The initial value of static data "Measurement Rotation Speed" is set to read the 1st/3stg. When reading other measurement rotation speed, change the "Measurement Rotation Speed" setting value as follows.<br>• 1st/3stg: 005<br>• 1st/2stg (2nd/3stg): 009<br>• 2nd/2stg (3rd/3stg): 109 |
| Normal Response | Measurement Rotation Speed | Specify the device that stores "Measurement Rotation Speed". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Measurement Rotation Information

This protocol reads the measurement rotation information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Measurement Rotation Information | The initial value of static data "Measurement Rotation Information" is set to read the measurement rotation decompression. When reading other measurement rotation information, change the "Measurement Rotation Information" setting value as follows.<br>• Measurement rotation decompression: 109<br>• Post-measurement suck back delay: 110 |
| Normal Response | Measurement Rotation Information | Specify the device that stores "Measurement Rotation Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Plasticization Backward Selection

This protocol reads the plasticization backward selection.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Plasticization Backward Selection | Specify the device that stores "Plasticization Backward Selection". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Plasticization Backward Information

This protocol reads the plasticization backward information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Plasticization Backward Information | The initial value of static data "Plasticization Backward Information" is set to read the plasticization backward operating time. When reading other plasticization backward information, change the "Plasticization Backward Information" setting value as follows.<br>• Plasticization backward operating time: 030<br>• Plasticization backward delay time: 038 |
| Normal Response | Plasticization Backward Information | Specify the device that stores "Plasticization Backward Information". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Main Molding Temperature Setting

This protocol reads the main molding temperature setting.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Main Molding Temperature Setting | The initial value of static data "Main Molding Temperature Setting" is set to read the Z1. When reading other main molding temperature setting, change the "Main Molding Temperature Setting" setting value as follows.<br>• Z1: 001<br>• Z2: 002<br>• Z3: 003<br>• Z4: 004<br>• Z5: 005<br>• Z15: 006<br>• Water cooling: 007 |
| Normal Response | Main Molding Temperature Setting | Specify the device that stores "Main Molding Temperature Setting". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Clamping Force

This protocol reads the clamping force.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | Clamping Force | Specify the device that stores "Clamping Force". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: [SE-EV*]Number of Shots Change Notification

The molding machine monitors the number of shots, and data is received from the molding machine when any changes occur.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Number of Shots | Specify the device that stores "Number of Shots". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Depending on the contents of the data change notification setting ID and the number of registrations, communication may occur frequently, which may impair the real-time nature of important communication. Therefore, keep registration of data change notification to a minimum. Also, clear data change notification registration as soon as the purpose is achieved.
- When execution of this protocol ends, send WR: End of Transmission (EOT) to the molding machine. When it is not sent, data from the molding machine may not be sent the next time the data changes. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: Error History Read

This protocol reads the latest 20 cases of error history.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Error Definition | The initial value of static data "Error Definition" is set to read all history. Changing the "Error Definition" setting value as shown below reads the corresponding item.<br>• Current error & interlock: 0<br>• Error history: 1<br>• Interlock history: 2<br>• Operation mode history: 3<br>• All history: 4 |
| Normal Response | Error History | Specify the device that stores "Error History".<br>The number of data items is stored starting from the specified device, and 20 cases of error history are stored from the next device.<br>The data structure consists of ID, occurrence time, and release time.*1 |
| Error Response | — | No setting is required. |

*1 For details about the data structure, refer to the manual of the external device.

## Precautions

- Do not change values other than the setting data.
- When execution of this protocol ends, send an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: End of Transmission (EOT)

This protocol gets termination of the procedure (communication) from the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- This protocol is used to receive "End of Transmission: EOT" from the molding machine.
- When molding conditions are read or data logging is performed with a possibility that the molding machine will send an End of Termination (EOT), use this protocol in combination.

# WR: [SE-EV*]No. of Shots Change Notification On

This protocol monitors data change of the number of shots.
For details, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Only numerical value (selection) setting can be registered for data change notification. Registration of change notification for character setting (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When the specified setting ID does not exist

- When resending after receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# WR: [SE-EV*]No. of Shots Change Notification Off

This protocol clears the data change notification setting for the number of shots registered in the data change notification. For details, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Only numerical value (selection) setting can be registered for data change notification. Registration of change notification for character setting (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs

❷ When a BCC error (parity error) occurs

❸ When data change notification for the specified setting ID is not registered

- When resending after receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# WR: All Data Change Notifications Clear

This protocol clears all settings registered in the data change notification settings.
For details, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- The data change notification settings registered from the programmable controller to the molding machine cannot be checked. If the registration status is unknown, cancel all registrations once and then reconfigure the necessary items.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs

# WR: End of Transmission (EOT)

This protocol terminates the procedure (communication) when the protocol has ended.
There is no response data.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | — | No setting is required. |

## Precautions

Do not change values other than the setting data.

# RD: Data Read

This protocol reads the data specified by the setting ID.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Setting ID | Specify the device that stores "Setting ID". |
| Normal Response | Data | Specify the device that stores "Data". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to Data logging. (☞ Page 692 Data logging)
- Error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for three seconds), and the molding machine sends an end of transmission (EOT) to interrupt the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# RD: Data Change Notification

This protocol gets data sent from the molding machine when a change occurs in the setting ID that is an item registered for data change notification and monitored by the molding machine.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Setting ID | Specify the device that stores "Setting ID". |
| | Data | Specify the device that stores "Data". |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Depending on the contents of the data change notification setting ID and the number of registrations, communication may occur frequently, which may impair the real-time nature of important communication. Therefore, keep registration of data change notification to a minimum. Also, clear data change notification registration as soon as the purpose is achieved.
- When execution of this protocol ends, send WR: End of Transmission (EOT) to the molding machine. When it is not sent, data from the molding machine may not be sent the next time the data changes. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# WR: Data Change Notification On

This protocol registers the setting ID of the item to be monitored for data changes on the molding machine.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Setting ID | Specify the device that stores "Setting ID". |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Only numerical value (selection) setting can be registered for data change notification. Registration of change notification for character setting (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When the specified setting ID does not exist

- When resending after receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# WR: Data Change Notification Off

This protocol clears the data change notification setting for the setting ID registered in the data change notification.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request Message | Setting ID | Specify the device that stores "Setting ID". |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than the setting data.
- Only numerical value (selection) setting can be registered for data change notification. Registration of change notification for character setting (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When data change notification for the specified setting ID is not registered

- When resending after receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

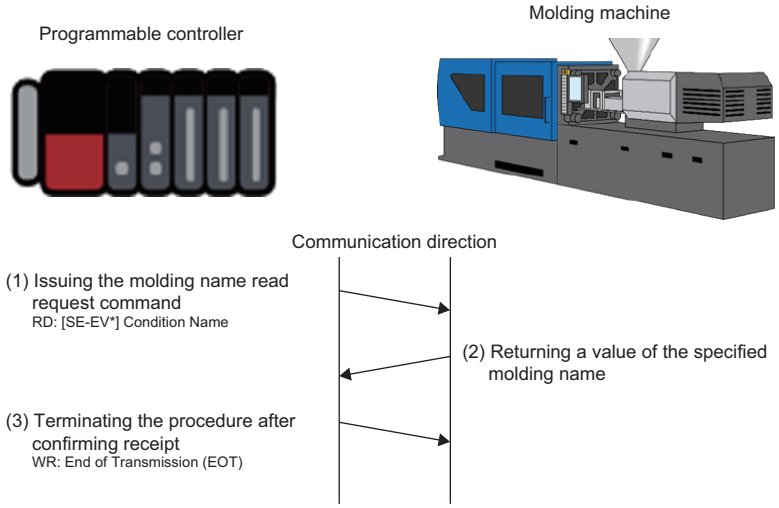
# 27.4 Library Usage Example

This section shows an example of library usage for the Sumitomo Heavy Industries injection molding machine, which is compatible with simple device communication.
For details on the communication protocol, refer to the manual of the external device, which contains specific examples of communication.

## Reading molding conditions

The following figure shows an example of communication when reading molding conditions.
After confirming receipt, send WR: End of Transmission (EOT) to terminate the procedure. However, when reading data continuously, terminate the procedure after the last read ends. For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT).
If the procedure is not terminated, the molding machine will send a timeout error.

Communication example



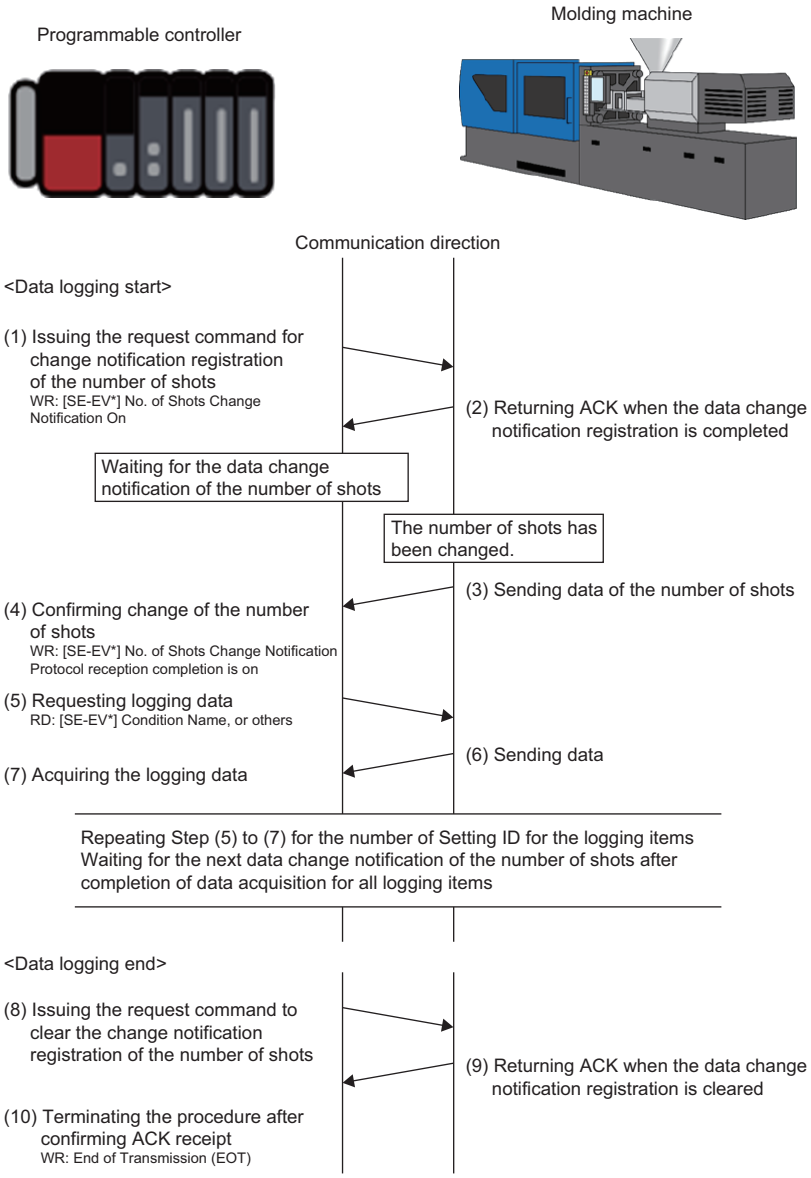

### Precautions

Even for an error response, send WR: End of Transmission (EOT) to terminate the procedure and then issue the request command again.
For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))
If a verification mismatch occurs, terminate the communication once using WR: End of Transmission (EOT), then restart the communication.
If an End of Transmission (EOT) is sent from the molding machine, receive it using "RD: End of Transmission (EOT)".

# Data logging

The following figure shows an example of communication when monitoring the number of shots and reading specific information triggered by data change notification of the number of shots.

Communication example



## Precautions

If logging is no longer needed after change notification registration, clear the change notification registration.
When reading data continuously, the procedure does not have to be terminated with WR: End of Transmission (EOT) each time the data is acquired. However, if the request is needed again due to an error response, terminate the procedure with WR: End of Transmission (EOT) and then issue the request again.
If a verification mismatch occurs, terminate the communication once using WR: End of Transmission (EOT), then restart the communication.
If an End of Transmission (EOT) is sent from the molding machine, receive it using "RD: End of Transmission (EOT)".
For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 687 WR: End of Transmission (EOT))

# 28 PROTOCOLS SUPPORTED BY SUMITOMO HEAVY INDUSTRIES (SE* SERIES)

## 28.1 Setting Method

For the communication specifications, refer to the manual of the dedicated controller for Sumitomo Heavy Industries injection molding machines (hereafter referred to as the external device manual).

**Point**

- After the molding machine starts up and the molding machine window is displayed, the communication application on the molding machine will be initialized. This process takes several minutes, so connect to the Ethernet module two or three minutes after the molding machine has started.
- The TCP communication port used by Sumitomo Heavy Industries injection molding machines is fixed at 33333.

## 28.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default)*2 |
|---|---|---|---|
| RD: [SE*] Condition Name | Reads the data of the specified condition name item. | To be added | Request |
| RD: [SE*] Molding Machine Status | Reads the data of the molding machine status. | To be added | Request |
| RD: [SE*] Total Number of Shots | Reads the data of the total number of shots. | To be added | Request |
| RD: [SE*] Number of Acceptable Shots | Reads the data of the number of acceptable shots. | Not to be added | Request |
| RD: [SE*] Time Information | Reads the data of the specified time information. | To be added | Request |
| RD: [SE*] Position Information | Reads the data of the specified position information. | To be added | Request |
| RD: [SE*] Pressure Information | Reads the data of the specified pressure information. | To be added | Request |
| RD: [SE*] Clamping Force Information | Reads the data of the specified clamping force information. | To be added | Request |
| RD: [SE*] Actual Temperature | Reads the data of the specified actual temperature. | To be added | Request |
| RD: [SE*] Fill Delay Time | Reads the data of the specified fill delay time. | To be added | Request |
| RD: [SE*] Holding Time | Reads the data of the specified holding time. | To be added | Request |
| RD: [SE*] Holding Pressure | Reads the data of the specified holding pressure. | To be added | Request |
| RD: [SE*] Fill Position | Reads the data of the specified fill position. | To be added | Request |
| RD: [SE*] Fill Speed | Reads the data of the specified fill speed. | To be added | Request |
| RD: [SE*] Measurement Delay Time/ Cooling Time | Reads the data of the specified measurement delay time/cooling time. | To be added | Request |
| RD: [SE*] V-P Switch Selection | Reads the data of the V-P switch selection. | To be added | Request |
| RD: [SE*] Measurement Mode | Reads the data of the measurement mode. | To be added | Request |
| RD: [SE*] Measurement Rotation Acceleration | Reads the data of the measurement rotation acceleration. | To be added | Request |
| RD: [SE*] Measurement Position | Reads the data of the specified measurement position. | To be added | Request |
| RD: [SE*] Suck Back Speed | Reads the data of the specified suck back speed. | To be added | Request |
| RD: [SE*] Back Pressure Information | Reads the data of the specified back pressure information. | To be added | Request |
| RD: [SE*] Measurement Rotation Speed | Reads the data of the specified measurement rotation speed. | To be added | Request |
| RD: [SE*] Measurement Rotation Information | Reads the data of the specified measurement rotation information. | To be added | Request |
| RD: [SE*] Plasticization Backward Selection | Reads the data of the plasticization backward selection. | To be added | Request |
| RD: [SE*] Plasticization Backward Information | Reads the data of the specified plasticization backward information. | To be added | Request |
| RD: [SE*] Main Molding Temperature Setting | Reads the data of the specified main molding temperature setting. | To be added | Request |

| Name | Description | Automatic Addition[*1] | Communication Timing (Default)[*2] |
|---|---|---|---|
| RD: [SE*] Clamping Force | Reads the data of the clamping force. | To be added | Request |
| RD: [SE*] Just Packing Time | Reads the data of the just packing time. | To be added | Request |
| RD: [SE*] Number of Shots Change Notification | Receives data from the molding machine when the number of shots information is updated. | Not to be added | Fixed Intrvl |
| RD: Error History Read | Reads the error history. | Not to be added | Request |
| RD: End of Transmission (EOT) | Gets termination of the procedure (communication) from the molding machine. | Not to be added | Fixed Intrvl |
| WR: [SE*] No. of Shots Change Notification On | Registers the number of shots information for data change notification. | Not to be added | Request |
| WR: [SE*] No. of Shots Change Notification Off | Clears the number of shots information registered for data change notification. | Not to be added | Request |
| WR: All Data Change Notifications Clear | Clears all data change notification settings registered in the molding machine. | Not to be added | Request |
| WR: End of Transmission (EOT) | Terminates the procedure (communication) when the protocol has ended. | To be added | Request |
| RD: Data Read[*3] | Reads the data by specifying the setting ID. | Not to be added | Request |
| RD: Data Change Notification[*3] | Gets data sent from the molding machine when a change occurs in the items that are registered for data change notification and monitored by the molding machine. | Not to be added | Fixed Intrvl |
| WR: Data Change Notification On[*3] | Registers the items whose data changes should be monitored by the molding machine. | Not to be added | Request |
| WR: Data Change Notification Off[*3] | Clears the data change notification settings registered in the molding machine. | 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 These values are the default values when a protocol is added. After the protocol is added, the communication timing can be changed as desired.

*3 General purpose protocol. These protocols can be used as a base when a new protocol is created.

# 28.3 Details of Applicable Protocols

## RD: [SE*] Condition Name

This protocol reads the condition name.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Condition Name | The initial value of static data "Condition Name" is set to read "Molding condition name". When reading other condition names, change the "Condition Name" setting value as follows.<br>• Molding condition name: 800<br>• Mold name: 801 |
| Normal Response | Condition Name | Specify the device that stores "Condition Name". |
| Error Response | — | No setting is required. |

### Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- An error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Molding Machine Status

This protocol reads the molding machine status.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Molding Machine Status | Specify the device that stores "Molding Machine Status".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- An error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Total Number of Shots

This protocol reads the data of the total number of shots.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Total Number of Shots | Specify the device that stores "Total Number of Shots".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- An error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Number of Acceptable Shots

This protocol reads the number of acceptable shots.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Number of Acceptable Shots | Specify the device that stores "Number of Acceptable Shots".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- An error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Time Information

This protocol reads the time information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Time Information | The initial value of static data "Time Information" is set to read "Cycle Time". When reading other time information, change the "Time Information" setting value as follows.<br>• Cycle time: 300<br>• Fill time: 301<br>• Measurement time: 302<br>• Mold closing time: 303<br>• Mold opening time: 304<br>• Fill time 1: 306<br>• Screw movement time during holding pressure: 307<br>• Total ejector time: 274<br>• Fill time: 19 |
| Normal Response | Time Information | Specify the device that stores "Time Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Position Information

This protocol reads the position information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Position Information | The initial value of static data "Position Information" is set to read "Pre-fill position". When reading other position information, change the "Position Information" setting value as follows.<br>• Pre-fill position: 301<br>• VP switch position: 302<br>• Minimum cushion position: 303<br>• Holding end position: 304<br>• Pre-measurement position: 305<br>• Maximum pressure screw position: 306 |
| Normal Response | Position Information | Specify the device that stores "Position Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Pressure Information

This protocol reads the pressure information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Pressure Information | The initial value of static data "Pressure Information" is set to read "Fill peak pressure". When reading other pressure information, change the "Pressure Information" setting value as follows.<br>• Fill peak pressure: 300<br>• All area peak pressure: 303<br>• Pre-measurement pressure: 305<br>• Pack pressure: PAK<br>• Back pressure during measurement: PBP |
| Normal Response | Pressure Information | Specify the device that stores "Pressure Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Clamping Force Information

This protocol reads the clamping force information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Clamping Force Information | The initial value of static data "Clamping Force Information" is set to read "Mold fully closed". When reading other clamping force information, change the "Clamping Force Information" setting value as follows.<br>• Mold fully closed: 314<br>• Cooling end: CLF<br>• Holding end: HCF<br>• Fill start: ICF<br>• Peak clamping force: PCF<br>• VP position: VCF |
| Normal Response | Clamping Force Information | Specify the device that stores "Clamping Force Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Actual Temperature

This protocol reads the actual temperature.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Actual Temperature | The initial value of static data "Actual Temperature" is set to read "Z1". When reading other actual temperatures, change the "Actual Temperature" setting value as follows.<br>• Z1: 301<br>• Z2: 302<br>• Z3: 303<br>• Z4: 304<br>• Z5 (Z15a): 305<br>• Z6 (Z15b): 306<br>• Water cooling: 307<br>• Mold 1: 308<br>• Mold 2: 309 |
| Normal Response | Actual Temperature | Specify the device that stores "Actual Temperature".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Fill Delay Time

This protocol reads the fill delay time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Fill Delay Time | No setting is required. |
| Normal Response | Fill Delay Time | Specify the device that stores "Fill Delay Time".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Holding Time

This protocol reads the holding time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Holding Time | The initial value of static data "Holding Time" is set to read "1st". When reading other holding time, change the "Holding Time" setting value as follows.<br>• 1st: 1<br>• 2nd: 2<br>• 3rd: 3<br>• 4th: 4 |
| Normal Response | Holding Time | Specify the device that stores "Holding Time".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Holding Pressure

This protocol reads the holding pressure.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Holding Pressure | The initial value of static data "Holding Pressure" is set to read "1st". When reading other holding pressures, change the "Holding Pressure" setting value as follows.<br>• 1st: 1<br>• 2nd: 2<br>• 3rd: 3<br>• 4th: 4 |
| Normal Response | Holding Pressure | Specify the device that stores "Holding Pressure".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Fill Position

This protocol reads the fill position.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Fill Position | The initial value of static data "Fill Position" is set to read "1/5 speed". When reading other fill positions, change the "Fill Position" setting value as follows.<br>• 1/5 speed: 0<br>• 2/5 speed: 1<br>• 3/5 speed: 2<br>• 4/5 speed: 3<br>• V-P SW: 4<br>• 1st/7V: 26<br>• 2nd/7V: 27 |
| Normal Response | Fill Position | Specify the device that stores "Fill Position".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Fill Speed

This protocol reads the fill speed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Fill Speed | The initial value of static data "Fill Speed" is set to read "1st/5V (3rd/7V)". When reading other fill speeds, change the "Fill Speed" setting value as follows.<br>• 1st/5V(3rd/7V): 0<br>• 2nd/5V(4th/7V): 1<br>• 3rd/5V(5th/7V): 2<br>• 4th/7V(4th/7V): 3<br>• V-P SW: 4<br>• 1st/7V: 26<br>• 2nd/7V: 27 |
| Normal Response | Fill Speed | Specify the device that stores "Fill Speed".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Measurement Delay Time/Cooling Time

This protocol reads the measurement delay time/cooling time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Measurement Delay Time/Cooling Time | The initial value of static data "Measurement Delay Time/Cooling Time" is set to read "Measurement Delay Time". When reading other measurement delay time/cooling time, change the "Measurement Delay Time/Cooling Time" setting value as follows.<br>• Measurement delay time: 32<br>• Cooling time: 39 |
| Normal Response | Measurement Delay Time/Cooling Time | Specify the device that stores "Measurement Delay Time/Cooling Time".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] V-P Switch Selection

This protocol reads the V-P switch selection.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | V-P Switch Selection | Specify the device that stores "V-P Switch Selection".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Measurement Mode

This protocol reads the measurement mode.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Measurement Mode | Specify the device that stores "Measurement Mode".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Measurement Rotation Acceleration

This protocol reads the measurement rotation acceleration.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Measurement Rotation Acceleration | Specify the device that stores "Measurement Rotation Acceleration".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Measurement Position

This protocol reads the measurement position.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Measurement Position | The initial value of static data "Measurement Position" is set to read "s5 suck back". When reading other measurement positions, change the "Measurement Position" setting value as follows.<br>• s5 suck back: 5<br>• 1st/3stg: 7<br>• 1st/2stg (2nd/3stg): 8<br>• Measurement end position: 9<br>• Decompression distance: 109<br>• Post-measurement suck back: 110 |
| Normal Response | Measurement Position | Specify the device that stores "Measurement Position".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Suck Back Speed

This protocol reads the suck back speed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Suck Back Speed | The initial value of static data "Suck Back Speed" is set to read "s5 suck back speed". When reading other suck back speeds, change the "Suck Back Speed" setting value as follows.<br>• s5 suck back speed: 29<br>• Suck back speed: 30 |
| Normal Response | Suck Back Speed | Specify the device that stores "Suck Back Speed".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Back Pressure Information

This protocol reads the back pressure information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Back Pressure Information | The initial value of static data "Back Pressure Information" is set to read "1st/3stg". When reading other back pressure information, change the "Back Pressure Information" setting value as follows.<br>• 1st/3stg: 5<br>• 1st/2stg (2nd/3stg): 9<br>• 2nd/2stg (3rd/3stg): 109 |
| Normal Response | Back Pressure Information | Specify the device that stores "Back Pressure Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Measurement Rotation Speed

This protocol reads the measurement rotation speed.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Measurement Rotation Speed | The initial value of static data "Measurement Rotation Speed" is set to read "1st/3stg". When reading other measurement rotation speeds, change the "Measurement Rotation Speed" setting value as follows.<br>• 1st/3stg: 5<br>• 1st/2stg (2nd/3stg): 9<br>• 2nd/2stg (3rd/3stg): 109 |
| Normal Response | Measurement Rotation Speed | Specify the device that stores "Measurement Rotation Speed".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Measurement Rotation Information

This protocol reads the measurement rotation information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Measurement Rotation Information | The initial value of static data "Measurement Rotation Information" is set to read "Measurement rotation decompression". When reading other measurement rotation information, change the "Measurement Rotation Information" setting value as follows.<br>• Measurement rotation decompression: 109<br>• Post-measurement suck back delay: 110 |
| Normal Response | Measurement Rotation Information | Specify the device that stores "Measurement Rotation Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Plasticization Backward Selection

This protocol reads the plasticization backward selection.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Plasticization Backward Selection | Specify the device that stores "Plasticization Backward Selection".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Plasticization Backward Information

This protocol reads the plasticization backward information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Plasticization Backward Information | The initial value of static data "Plasticization Backward Information" is set to read "Plasticization backward operating time". When reading other plasticization backward information, change the "Plasticization Backward Information" setting value as follows.<br>• Plasticization backward operating time: 30<br>• Plasticization backward delay time: 38 |
| Normal Response | Plasticization Backward Information | Specify the device that stores "Plasticization Backward Information".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Main Molding Temperature Setting

This protocol reads the main molding temperature setting.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Main Molding Temperature Setting | The initial value of static data "Main Molding Temperature Setting" is set to read "Z1". When reading other main molding temperature settings, change the "Main Molding Temperature Setting" setting value as follows.<br>• Z1: 1<br>• Z2: 2<br>• Z3: 3<br>• Z4: 4<br>• Z5: 5<br>• Z15: 6<br>• Water cooling: 7 |
| Normal Response | Main Molding Temperature Setting | Specify the device that stores "Main Molding Temperature Setting".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Clamping Force

This protocol reads the clamping force.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Clamping Force | Specify the device that stores "Clamping Force".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Just Packing Time

This protocol reads the just packing time.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Just Packing Time | Specify the device that stores "Just Packing Time".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- Error Response 1 is sent from the molding machine in the following cases.

❶ When the response data is a negative value

- Error Response 2 is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure

❷ When the specified ID does not exist

❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: [SE*] Number of Shots Change Notification

This protocol gets data sent from the molding machine when a change occurs in the number of shots monitored by the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Number of Shots | Specify the device that stores "Number of Shots".<br>If the presence/absence of a decimal point or the number of digits differs, the data cannot be received. In this case, check the molding machine data and review the elements of a normal response. |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Depending on the contents of the data change notification setting ID and the number of registrations, communication may occur frequently, which may impair the real-time nature of important communication. Therefore, keep registration of data change notification to a minimum. Also, clear data change notification registration as soon as the purpose is achieved.
- When execution of this protocol ends, send WR: End of Transmission (EOT) to the molding machine. When it is not sent, data from the molding machine may not be sent the next time the data changes. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: Error History Read

This protocol reads the latest 20 cases of error history.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Error Definition | The initial value of static data "Error Definition" is set to read "All history". Changing the "Error Definition" setting value as shown below reads the corresponding item.<br>• Current error & interlock: 0<br>• Error history: 1<br>• Interlock history: 2<br>• Operation mode history: 3<br>• All history: 4 |
| Normal Response | Error History | Specify the device that stores "Error History".<br>The number of data items is stored starting from the specified device, and 20 cases of error history are stored from the next device.<br>The data structure consists of "ID", "occurrence time", and "release time".*1 |
| Error Response | — | No setting is required. |

*1 For details about the data structure, refer to the manual of the external device.

## Precautions

- Do not change values other than setting data.
- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: End of Transmission (EOT)

This protocol gets termination of the procedure (communication) from the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- This protocol is used to receive "End of Transmission: EOT" from the molding machine.
- When molding conditions are read or data logging is performed with a possibility that the molding machine will send an End of Termination (EOT), use this protocol in combination.

# WR: [SE*] No. of Shots Change Notification On

This protocol monitors data change of the number of shots.
For details, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Only numerical value (selection) settings can be registered for data change notification. Registration of change notification for character settings (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When the specified setting ID does not exist

- For resending upon receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# WR: [SE*] No. of Shots Change Notification Off

This protocol clears the data change notification setting for the number of shots registered in the data change notification. For details, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Only numerical value (selection) settings can be registered for data change notification. Registration of change notification for character settings (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When data change notification for the specified setting ID is not registered

- For resending upon receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# WR: All Data Change Notifications Clear

This protocol clears all settings registered in the data change notification settings.
For details, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- The data change notification settings registered from the programmable controller to the molding machine cannot be checked. If the registration status is unknown, cancel all registrations once and then reconfigure the necessary items.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs

# WR: End of Transmission (EOT)

This protocol terminates the procedure (communication) when the protocol has ended.
There is no response data.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |

## Precautions

Do not change values other than setting data.

# RD: Data Read

This protocol reads the data specified by the setting ID.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Setting ID | Specify the device that stores "Setting ID". |
| Normal Response | Data | Specify the device that stores "Data".*1 |
| Error Response | — | No setting is required. |

*1 Since the data obtained varies depending on the setting ID, convert the data as necessary.

## Precautions

- Do not change values other than setting data.
- When reading data as a logging function, send a data change notification, set the information to be monitored in the molding machine, and use the change notification as a trigger to turn on the protocol start request. For the logging function, refer to "Data logging". (☞ Page 733 Data logging).
- An error response is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the specified ID does not exist
❸ When there is no response from the programmable controller for three seconds

- When execution of this protocol ends, send End of Transmission (EOT) to the molding machine. If it is not sent, a timeout (no response for three seconds) occurs, and the molding machine sends an End of Transmission (EOT) to interrupt the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# RD: Data Change Notification

This protocol gets data sent from the molding machine when a change occurs in the setting ID that is an item registered for data change notification and monitored by the molding machine.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Setting ID | Specify the device that stores "Setting ID". |
| | Data | Specify the device that stores "Data".*1 |
| Error Response | — | No setting is required. |

*1 Since the data obtained varies depending on the setting ID, convert the data as necessary.

## Precautions

- Do not change values other than setting data.
- Depending on the contents of the data change notification setting ID and the number of registrations, communication may occur frequently, which may impair the real-time nature of important communication. Therefore, keep registration of data change notification to a minimum. Also, clear data change notification registration as soon as the purpose is achieved.
- When execution of this protocol ends, send WR: End of Transmission (EOT) to the molding machine. When it is not sent, data from the molding machine may not be sent the next time the data changes. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# WR: Data Change Notification On

This protocol registers the setting ID that is an item whose data changes should be monitored by the molding machine.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Setting ID | Specify the device that stores "Setting ID". |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Only numerical value (selection) settings can be registered for data change notification. Registration of change notification for character settings (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When the specified setting ID does not exist

- For resending upon receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

# WR: Data Change Notification Off

This protocol clears the data change notification setting for the setting ID registered in the data change notification.
For the setting ID, refer to the manual of the external device.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Setting ID | Specify the device that stores "Setting ID". |
| Normal Response | — | No setting is required. |
| Error Response 1 | — | No setting is required. |
| Error Response 2 | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Only numerical value (selection) settings can be registered for data change notification. Registration of change notification for character settings (such as molding condition names) are not accepted. For details, refer to the manual of the external device.
- Error Response 1 (communication error) is sent from the molding machine in the following cases.

❶ When there is an error in the communication procedure
❷ When the programmable controller stops transmission halfway for three seconds or more

- Error Response 2 (unchangeable) is sent from the molding machine in the following cases.

❶ When a communication error occurs
❷ When a BCC error (parity error) occurs
❸ When data change notification for the specified setting ID is not registered

- For resending upon receiving an error response from the molding machine, the resending must be limited to about three times. From the fourth time onwards, send WR: End of Transmission (EOT) to terminate the procedure. For sending an End of Transmission (EOT), refer to "WR: End of Transmission (EOT)". (☞ Page 728 WR: End of Transmission (EOT)).

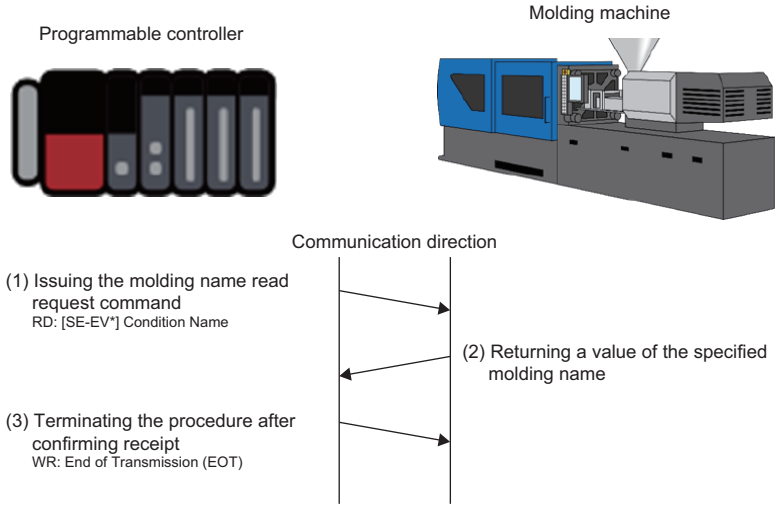
# 28.4 Library Usage Example

This section shows an example of library usage for the Sumitomo Heavy Industries injection molding machine, which is compatible with simple device communication.
For details on the communication protocol, refer to the manual of the external device, which contains specific examples of communication.

## Reading molding conditions

The following figure shows an example of communication for reading molding conditions.
After confirming receipt, send WR: End of Transmission (EOT) to terminate the procedure. However, when reading data continuously, terminate the procedure after the last read ends. For sending an End of Transmission (EOT), refer to WR: End of Transmission (EOT).
If the procedure is not terminated, the molding machine will send a timeout error.

Communication example



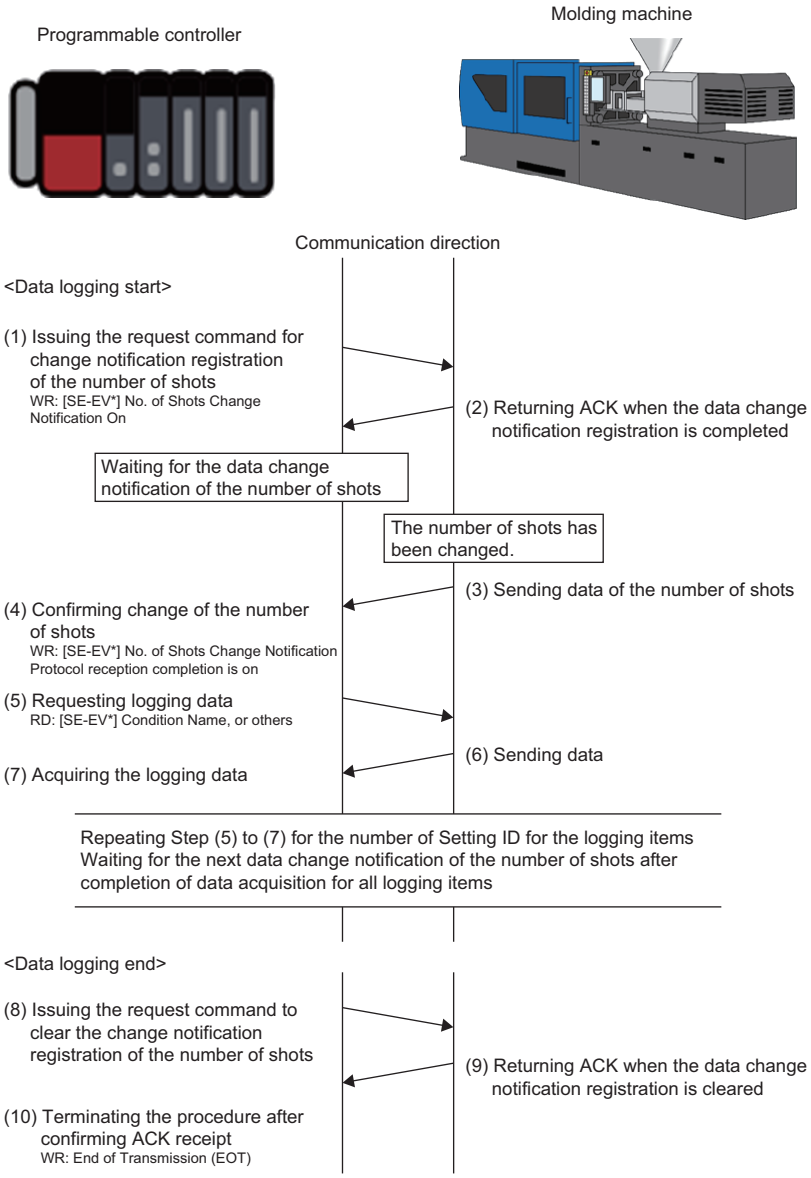

### Precautions

Even for an error response, send WR: End of Transmission (EOT) to terminate the procedure and then issue the request command again.
For sending an End of Transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 728 WR: End of Transmission (EOT)).
If a verification mismatch occurs, terminate the communication once using WR: End of Transmission (EOT), then restart the communication.
If an End of Transmission (EOT) is sent from the molding machine, receive it using "RD: End of Transmission (EOT)".

# Data logging

The following figure shows an example of communication when the number of shots is monitored and specific information is read using data change notification of the number of shots as the trigger.

Communication example



## Precautions

If logging is no longer needed after change notification registration, clear the change notification registration.
For reading data continuously, the procedure does not have to be terminated with WR: End of Transmission (EOT) each time the data is acquired. However, if the request is needed again due to an error response, terminate the procedure with WR: End of Transmission (EOT) and then issue the request again.
If a verification mismatch occurs, terminate the communication once using WR: End of Transmission (EOT), then restart the communication.
If an End of Transmission (EOT) is sent from the molding machine, receive it using "RD: End of Transmission (EOT)".
For sending an End of Transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 728 WR: End of Transmission (EOT)).

# 29 PROTOCOLS SUPPORTED BY TOYO INNOVEX (Si-6S/Si-6 SERIES)

## 29.1 Setting Method

For the communication specifications and the setting method, refer to the manual of the dedicated controller for TOYO INNOVEX injection molding machines (hereafter referred to as the external device manual).

**Point**

- After the molding machine starts up and the molding machine window is displayed, the communication application on the molding machine will be initialized. This process takes several minutes, so connect to the Ethernet module two or three minutes after the molding machine has started.
- The TCP communication port used by TOYO INNOVEX injection molding machines is fixed at 8200.
- For details about the data obtained from the molding machine, refer to the manual of the external device.
- When communicating with the molding machine, first send "WR: Communication Stop" and then "WR: Communication Start". In some cases, the molding machine may stop sending data during communication. In this case, resend "WR: Communication Stop" and then "WR: Communication Start".
- The molding machine may experience communication delays and accumulate data during that time. When communication resumes, the accumulated data may be sent all at once. However, the Ethernet module may be unable to process it all and may discard some data.

# 29.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default)*2 |
|---|---|---|---|
| RD: Injection Setting Values | Reads the injection setting values. | To be added | Request |
| RD: Measurement Setting Values | Reads the measurement setting values. | To be added | Request |
| RD: Temperature Setting Values | Reads the temperature setting values. | To be added | Request |
| RD: Mold Open/Close & EJ Setting Values | Reads the mold open/close & EJ setting values. | To be added | Request |
| RD: Mold Thickness, Timer & Counter Settings | Reads the mold thickness, timer & counter settings. | To be added | Request |
| RD: Production Control Schedule Settings | Reads the production control schedule settings. | To be added | Request |
| RD: Monitoring Mode Settings | Reads the monitoring mode settings. | To be added | Request |
| RD: Unit Setting Values | Reads the unit setting values. | To be added | Request |
| RD: Production Control Screen Data | Reads the production control screen data. | To be added | Request |
| RD: Timer Measurement Data | Reads the timer measurement data. | To be added | Request |
| RD: Monitor Data 2 | Reads monitor data 2. | To be added | Request |
| RD: Molding Condition Settings | Reads the molding condition settings. | To be added | Request |
| RD: Production Control Data | Reads the production control data. | To be added | Request |
| RD: Molding Operation Status | Reads the molding operation status. | To be added | Request |
| RD: Production Control Settings | Reads the production control settings. | To be added | Request |
| RD: Alarm Data | Gets the alarm data. | Not to be added | Fixed Intrvl |
| RD: Mode Data | Gets the mode data. | Not to be added | Fixed Intrvl |
| RD: Monitor Data 1 | Gets monitor data 1 sent from the molding machine. | Not to be added | Fixed Intrvl |
| WR: Communication Start | Starts communication with the molding machine. | To be added | Request |
| WR: Communication Stop | Stops communication with the molding machine. | 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 These values are the default values when a protocol is added. After the protocol is added, the communication timing can be changed as desired.

# 29.3 Details of Applicable Protocols

## RD: Injection Setting Values

This protocol reads the injection setting values.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Injection Setting Values | Specify the device that stores "Injection Setting Values".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>174 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

### Precautions

- Do not change values other than setting data.

## RD: Measurement Setting Values

This protocol reads the measurement setting values.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Measurement Setting Values | Specify the device that stores "Measurement Setting Values".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>135 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

### Precautions

- Do not change values other than setting data.

# RD: Temperature Setting Values

This protocol reads the temperature setting values.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Temperature Setting Values | Specify the device that stores "Temperature Setting Values".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>64 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Mold Open/Close & EJ Setting Values

This protocol reads the mold open/close & EJ setting values.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Mold Open/Close & EJ Setting Values | Specify the device that stores "Mold Open/Close & EJ Setting Values".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>125 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Mold Thickness, Timer & Counter Settings

This protocol reads the mold thickness, timer & counter settings.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Mold Thickness, Timer & Counter Settings | Specify the device that stores "Mold Thickness, Timer & Counter Settings".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>76 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Production Control Schedule Settings

This protocol reads the production control schedule settings.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Production Control Schedule Settings | Specify the device that stores "Production Control Schedule Settings".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>40 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Monitoring Mode Settings

This protocol reads the monitoring mode settings.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Monitoring Mode Settings | Specify the device that stores "Monitoring Mode Settings".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>Two word devices are used. |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.

# RD: Unit Setting Values

This protocol reads the unit setting values.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Unit Setting Values*1 | Specify the device that stores "Unit Setting Values".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>198 consecutive word devices are used.*2 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 For details about the unit setting values, refer to the manual of the external device.

*2 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Production Control Screen Data

This protocol reads the production control screen data.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Production Control Screen Data | Specify the device that stores "Production Control Screen Data".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>124 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Timer Measurement Data

This protocol reads the timer measurement data.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Timer Measurement Data | Specify the device that stores "Timer Measurement Data".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>81 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Monitor Data 2

This protocol reads monitor data.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Monitor Data 2*2 | Specify the device that stores "Monitor Data 2".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>644 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

*2 "RD: Monitor Data 1" is a protocol that gets monitor data sent based on the status of the molding machine.
"RD: Monitor Data 2" is a protocol used by the programmable controller to read monitor data from the molding machine.
When communication with the molding machine is started, a Monitor Data 2 message may be sent only once from the molding machine. Nevertheless, to get this data with the Ethernet module, use this protocol.

## Precautions

- Do not change values other than setting data.

# RD: Molding Condition Settings

This protocol reads the molding condition settings.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Molding Condition Settings | Specify the device that stores "Molding Condition Settings".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>722 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Production Control Data

This protocol reads the production control data.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Production Control Data | Specify the device that stores "Production Control Data".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>206 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Molding Operation Status

This protocol reads the molding operation status.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Molding Operation Status | Specify the device that stores "Molding Operation Status".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>103 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Production Control Settings

This protocol reads the production control settings.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Production Control Settings | Specify the device that stores "Production Control Settings".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>108 consecutive word devices are used.*1 |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.

# RD: Alarm Data

This protocol gets the alarm data sent from the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Alarm Data | Specify the device that stores "Alarm Data".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>121 consecutive word devices are used.*1 |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.
- To get alarm data, send "WR: Communication Start" to the molding machine.
- To stop getting alarm data, send "WR: Communication Stop" to the molding machine.

# RD: Mode Data

This protocol gets the mode data sent from the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Mode Data | Specify the device that stores "Mode Data".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>36 consecutive word devices are used.*1 |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

## Precautions

- Do not change values other than setting data.
- To get mode data, send "WR: Communication Start" to the molding machine.
- To stop getting mode data, send "WR: Communication Stop" to the molding machine.

# RD: Monitor Data 1

This protocol gets monitor data sent from the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Normal Response | Monitor Data 1*2 | Specify the device that stores "Monitor Data 1".<br>The data size is stored in the first one-word device, and the actual data is stored from the next device.<br>423 consecutive word devices are used.*1 |

*1 If the data cannot be acquired, set the data length/maximum data length of the normal response to be greater than the data to be acquired.

*2 "RD: Monitor Data 1" is a protocol that gets monitor data sent based on the status of the molding machine.
"RD: Monitor Data 2" is a protocol used by the programmable controller to read monitor data from the molding machine.

## Precautions

- Do not change values other than setting data.
- To get monitor data 1, send "WR: Communication Start" to the molding machine.
- To stop getting monitor data 1, send "WR: Communication Stop" to the molding machine.

# WR: Communication Start

This protocol starts communication with the molding machine.
When communication is started, "RD: Alarm Data", "RD: Mode Data", and "RD: Monitor Data 1" are sent based on the status of the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.

# WR: Communication Stop

This protocol stops communication with the molding machine.
When communication is stopped, "RD: Alarm Data", "RD: Mode Data", and "RD: Monitor Data 1" are no longer sent from the molding machine.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response | Function ID/Error ID | Specify the device that stores "Function ID/Error ID".<br>Two consecutive word devices are used. |
| | Reason Code | Specify the device that stores "Reason Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.

# 30 PROTOCOLS SUPPORTED BY DENSO WAVE (RC8)

## 30.1 Setting Method

For communication between the programmable controller and the robot, use the TCP/IP server socket function of the DENSO WAVE robot controller.
For the communication specifications and the setting method, refer to the manual of the dedicated controller for DENSO WAVE industrial robots (hereafter referred to as the external device manual).

### Precautions

- Communication between the programmable controller and the robot is transmitted and received in little-endian format.
- For details about the error codes, refer to the manual of the external device.
- For string-type data, one entered character corresponds to one word (2 bytes). 00H is added to the upper byte. The following is an example for the specified string "WDT=400" with the devices starting from "D100".

| Character | W | D | T | = | 4 | 0 | 0 |
|---|---|---|---|---|---|---|---|
| Character (ASCII hexadecimal) | 0057 | 0044 | 0054 | 003D | 0034 | 0030 | 0030 |
| Device | D100 | D101 | D102 | D103 | D104 | D105 | D106 |

- Compressed packet frames in b-CAP/TCP are not supported; the mode is fixed to 0 (normal).

# 30.2 List of Applicable Protocols

| Name | Description | Automatic Addition*1 | Communication Timing (Default)*2 |
|---|---|---|---|
| RD: Controller_Connect | Reads the handle number of the controller object to connect to the controller. | To be added | Request |
| RD: Controller_GetVariable | Reads the handle number of the specified variable object. | To be added | Request |
| RD: Controller_GetTask | Reads the handle number of the specified task object. | Not to be added | Request |
| RD: Controller_GetRobot | Reads the handle number of the specified robot object. | Not to be added | Request |
| RD: Variable_GetValue | Reads the value of the variable object specified with the handle number. | To be added | Request |
| RD: Execute_GetSrvData | Reads the motor current value from the internal servo data of the robot axis. | Not to be added | Request |
| RD: Execute_GetCurErrorInfo | Reads the currently occurring error information. | Not to be added | Request |
| WR: Variable_PutValue | Writes a value to the variable specified with the handle number. | To be added | Request |
| WR: Variable_Release | Writes the specified handle number to disconnect the client from the variable. | To be added | Request |
| WR: Task_Start | Starts the task. | Not to be added | Request |
| WR: Task_Stop | Stops the task. | Not to be added | Request |
| WR: Task_Release | Writes the specified handle number to disconnect the client from the task. | Not to be added | Request |
| WR: Robot_Release | Writes the specified handle number to disconnect the client from the robot. | Not to be added | Request |
| WR: Controller_Disconnect | Writes the specified handle number to disconnect the client from the controller. | To be added | Request |
| WR: Service_Start | Starts the server service. | To be added | Request |
| WR: Service_Stop | Stops the server service. | To be added | Request |

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

*2 These values are the default values when a protocol is added. After the protocol is added, the communication timing can be changed as desired.

# 30.3 Details of Applicable Protocols

## RD: Controller_Connect

This protocol reads the handle number of the specified controller object to connect to the controller.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Server IP Address | Specify the device that stores "Server IP Address".<br>The length of the "Server IP Address" string (in bytes) is stored in the head device.<br>The "Server IP Address" is stored as sequential data starting from the second device.<br>Specify the data in ASCII hexadecimal. |
| Normal Response | Handle Number (Controller) | Specify the device that stores "Handle Number (Controller)".<br>Two consecutive word devices are used. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

**Ex.**

When setting the server IP address (192.168.0.1) starting from device "D100"

| Data size/character | Size | 1 | 9 | 2 | . | 1 | 6 | 8 | . | 0 | . | 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Character (ASCII hexadecimal) | 0016 | 0031 | 0039 | 0032 | 002E | 0031 | 0036 | 0038 | 002E | 0030 | 002E | 0031 |
| Device | D100 | D101 | D102 | D103 | D104 | D105 | D106 | D107 | D108 | D109 | D110 | D111 |

### Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access" or "Task control". (☞ Page 758 Protocol execution example for "Variable access", Page 759 Protocol execution example for "Task control")

# RD: Controller_GetVariable

This protocol reads the handle number of the specified variable object.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Controller) | Specify the device that stores "Handle Number (Controller)".<br>Two consecutive word devices are used. |
| | Variable Name*1 | Specify the device that stores "Variable Name". The length of the "Variable Name" string (in bytes) is stored in the head device. The "Variable Name" is stored as sequential data starting from the second device. Specify the data in ASCII hexadecimal. |
| Normal Response | Handle Number (Variable) | Specify the device that stores "Handle Number (Variable)".<br>Two consecutive word devices are used. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 For details about the variable names, refer to the manual of the external device.

Ex.

When setting the variable name (IO150) starting from device "D100"

| Data size/character | Size | I | O | 1 | 5 | 0 |
|---|---|---|---|---|---|---|
| Character (ASCII hexadecimal) | 000A | 0049 | 004F | 0031 | 0035 | 0030 |
| Device | D100 | D101 | D102 | D103 | D104 | D105 |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access". (☞ Page 758 Protocol execution example for "Variable access").
- Execute "RD: Controller_Connect" and use the obtained controller handle with this protocol.
- To get variables from the task class or robot class, specify the task handle or robot handle obtained using "RD: Controller_GetTask" or "RD: Controller_GetRobot" based on the controller handle value. For information on task class and robot class variables, refer to the manual of the external device.

# RD: Controller_GetTask

This protocol reads the handle number of the specified task object.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Controller) | Specify the device that stores "Handle Number (Controller)".<br>Two consecutive word devices are used. |
| | Task Name | Specify the device that stores "Task Name".<br>The length of the "Task Name" string (in bytes) is stored in the head device.*1<br>"Task Name" is specified using consecutive devices starting from the second device.<br>Specify the data in ASCII hexadecimal. |
| Normal Response | Handle Number (Task) | Specify the device that stores "Handle Number (Task)".<br>Two consecutive word devices are used. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 The length of the "Task Name" string is calculated as "string × 2" bytes.

**Ex.**

When setting the task name (test_pro) starting from device "D100"

| Data size/character | Size | t | e | s | t | _ | p | r | o |
|---|---|---|---|---|---|---|---|---|---|
| Character (ASCII hexadecimal) | 0010 | 0074 | 0065 | 0073 | 0074 | 005F | 0070 | 0072 | 006F |
| Device | D100 | D101 | D102 | D103 | D104 | D105 | D106 | D107 | D108 |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Task control". (☞ Page 759 Protocol execution example for "Task control").
- Execute "RD: Controller_Connect" and use the obtained controller handle with this protocol.

# RD: Controller_GetRobot

This protocol reads the handle number of the specified robot object.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Controller) | Specify the device that stores "Handle Number (Controller)".<br>Two consecutive word devices are used. |
| | Robot Name | Specify the device that stores "Robot Name".<br>The length of the "Robot Name" string (in bytes) is stored in the head device.*1<br>"Robot Name" is specified using consecutive devices starting from the second device.<br>Specify the data in ASCII hexadecimal. |
| Normal Response | Handle Number (Robot) | Specify the device that stores "Handle Number (Robot)".<br>Two consecutive word devices are used. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 The length of the "Robot Name" string is calculated as "string × 2" bytes.

**Ex.**

When setting the robot name (Arm) starting from device "D100"

| Data size/character | Size | A | r | m |
|---|---|---|---|---|
| Character (ASCII hexadecimal) | 0006 | 0041 | 0072 | 006D |
| User device | D100 | D101 | D102 | D103 |

## Precautions

- Do not change values other than setting data.
- Execute "RD: Controller_Connect" and use the obtained controller handle with this protocol.

# RD: Variable_GetValue

This protocol reads the value of the variable object specified with the handle number of the variable object.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Variable) | Specify the device that stores "Handle Number (Variable)".<br>Two consecutive word devices are used. |
| Normal Response | Data Type*1 | Specify the device that stores "Data Type".<br>One word device is used. |
| | Number of Elements | Specify the device that stores "Number of Elements".<br>Two word devices are used. |
| | Value of Variable*2 | Specify the device that stores "Value of Variable".<br>The length of the "Value of Variable" string (in bytes) is stored in the head device.<br>The actual data of "Value of Variable" is stored in consecutive devices starting from the second device.<br>Change the data length/maximum data length to be used according to the value of variable to be gotten. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 For details about the data type, refer to the manual of the external device.
*2 For details about the value of variable, refer to the manual of the external device.

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access". (☞ Page 758 Protocol execution example for "Variable access").
- Execute "RD: Controller_GetVariable" and use the obtained variable handle with this protocol.

# RD: Execute_GetSrvData

This protocol reads the motor current value from the internal servo data of the robot axis.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Robot) | Specify the device that stores "Handle Number (Robot)".<br>Two consecutive word devices are used. |
| Normal Response | Motor Current Value | Specify the device that stores "Motor Current Value".<br>The absolute values of motor current (as a percentage of rated value) for up to 8 axes (8 bytes of double-precision real number per axis) are stored without delimiters.<br>The data size of "Motor Current Value" is stored in the first word.<br>"Motor Current Value" is stored sequentially starting from the second device. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "GetSrvData command". (☞ Page 760 Protocol execution example for "GetSrvData command").
- Execute "RD: Controller_GetRobot" and use the obtained robot handle with this protocol.
- When using this protocol, refer to the manual of the external device.

# RD: Execute_GetCurErrorInfo

This protocol reads the most recent currently occurring error information.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Controller) | Specify the device that stores "Handle Number (Controller)".<br>Two consecutive word devices are used. |
| Normal Response | Error Code | Specify the device that stores "Error Code".<br>Two consecutive word devices are used. |
| | Error Message | Specify the device that stores "Error Message".<br>The data size of "Error Message" is stored in the first word, and "Error Message" is stored sequentially starting from the second device.*1 |
| | Sub Code | Specify the device that stores "Sub Code".<br>Two consecutive word devices are used. |
| | File ID + Line Number | Specify the device that stores "File ID + Line Number".*2<br>Two consecutive word devices are used. |
| | Program Name | Specify the device that stores "Program Name".<br>The data size of "Program Name" is stored in the first word, and "Program Name" is stored sequentially starting from the second device.*1 |
| | Line Number | Specify the device that stores "Line Number".<br>Two consecutive word devices are used. |
| | File ID | Specify the device that stores "File ID".<br>Two consecutive word devices are used. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 For both "Error Message" and "Program Name" data, the first 4 bytes store the data size, followed by a Unicode string of up to 20 characters.

*2 "File ID + Line Number" is represented as (((File ID << 20) & FFF00000H) | (Line Number & 000FFFFFH)).

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "GetCurErrorInfo command". (☞ Page 761 Protocol execution example for "GetCurErrorInfo command").
- Execute "RD: Controller_Connect" and use the obtained controller handle with this protocol.
- When using this protocol, refer to the manual of the external device.

# WR: Variable_PutValue

This protocol writes a value to the variable specified with the handle number of the variable.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Variable) | Specify the device that stores "Handle Number (Variable)".<br>Two consecutive word devices are used. |
| | Data Type*1 | Specify the device that stores "Data Type".<br>One word device is used. |
| | Number of Written Elements | Specify the device that stores "Number of Written Elements".<br>Two word devices are used. |
| | Write Value*2 | Specify the device that stores "Write Value".<br>The length of the "Write Value" string (in bytes) is stored in the head device.<br>"Write Value" is specified using consecutive devices starting from the second device.<br>Specify the data in ASCII hexadecimal. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 For details about the data type, refer to the manual of the external device.
*2 For details about the write value, refer to the manual of the external device.

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access". (☞ Page 758 Protocol execution example for "Variable access").
- Execute "RD: Controller_GetVariable" and use the obtained variable handle with this protocol.

# WR: Variable_Release

This protocol writes the handle number of the variable to disconnect from the variable object.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Variable) | Specify the device that stores "Handle Number (Variable)".<br>Two consecutive word devices are used. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access". (☞ Page 758 Protocol execution example for "Variable access").
- Execute "RD: Controller_GetVariable" and use the obtained variable handle with this protocol.

# WR: Task_Start

This protocol starts the task of the specified handle number.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Task) | Specify the device that stores "Handle Number (Task)".<br>Two consecutive word devices are used. |
| | Start Mode | The default value of static data "Start Mode" is "2: Continuous execution".<br>To set a different "Start Mode", change the value as follows.<br>• 1: Execution per cycle<br>• 2: Continuous execution<br>• 3: Step forward |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Task control". (☞ Page 759 Protocol execution example for "Task control").
- Execute "RD: Controller_GetTask" and use the obtained task handle with this protocol.

# WR: Task_Stop

This protocol stops the task of the specified handle number.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Task) | Specify the device that stores "Handle Number (Task)".<br>Two consecutive word devices are used. |
| | Stop Mode | The default value of static data "Stop Mode" is "3: Cycle stop".<br>To set a different "Stop Mode", change the value as follows.<br>• 0: Default stop<br>• 1: Instantaneous stop<br>• 2: Step stop<br>• 3: Cycle stop<br>• 4: Initialized stop |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Task control". (☞ Page 759 Protocol execution example for "Task control").
- Execute "RD: Controller_GetTask" and use the obtained task handle with this protocol.

# WR: Task_Release

This protocol writes the specified handle number to disconnect the client from the task object.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Task) | Specify the device that stores "Handle Number (Task)".<br>Two consecutive word devices are used. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Task control". (☞ Page 759 Protocol execution example for "Task control").
- Execute "RD: Controller_GetTask" and use the obtained task handle with this protocol.

# WR: Robot_Release

This protocol disconnects the client from the robot of the specified handle number.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Robot) | Specify the device that stores "Handle Number (Robot)".<br>Two consecutive word devices are used. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- Execute "RD: Controller_GetRobot" and use the obtained robot handle with this protocol.

# WR: Controller_Disconnect

This protocol writes the handle number of the controller object to disconnect from the controller.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Handle Number (Controller) | Specify the device that stores "Handle Number (Controller)".<br>Two consecutive word devices are used. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access" or "Task control". (☞ Page 758 Protocol execution example for "Variable access", Page 759 Protocol execution example for "Task control")
- Execute "RD: Controller_Connect" and use the obtained controller handle with this protocol.

# WR: Service_Start

This protocol starts the server service.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Watch Dog Time | The default value of static data "Watch Dog Time" is "WDT=400".*1<br>Specify the data in ASCII hexadecimal. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

*1 Set "Watch Dog Time" to a value greater than 80ms and less than the timeout time (default: 500ms). For details, refer to the manual of the external device.

Ex.

When setting the watchdog timer (WDT=400) starting from device "D100"

| Character | W | D | T | = | 4 | 0 | 0 |
|---|---|---|---|---|---|---|---|
| Character (ASCII hexadecimal) | 0057 | 0044 | 0054 | 003D | 0034 | 0030 | 0030 |
| Device | D100 | D101 | D102 | D103 | D104 | D105 | D106 |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access" or "Task control". (☞ Page 758 Protocol execution example for "Variable access", Page 759 Protocol execution example for "Task control")

# WR: Service_Stop

This protocol stops the server service.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response | Return Code | Specify the device that stores "Return Code".<br>Two consecutive word devices are used. |

## Precautions

- Do not change values other than setting data.
- For executing protocols, refer to the protocol execution example for "Variable access" or "Task control". (☞ Page 758 Protocol execution example for "Variable access", Page 759 Protocol execution example for "Task control")

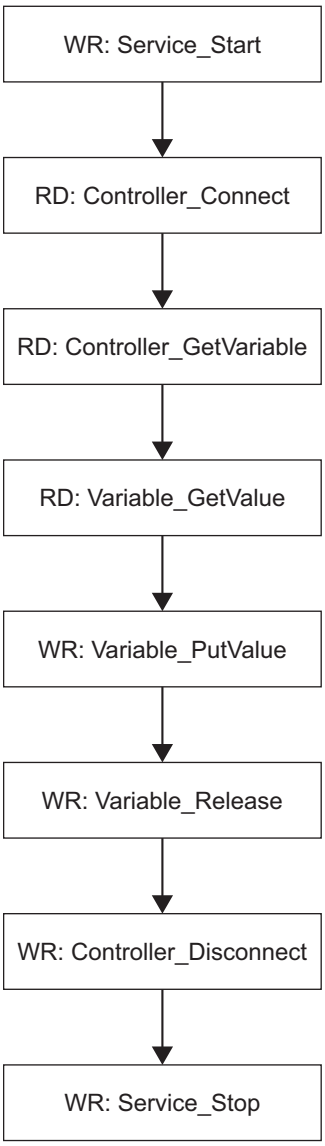
# 30.4 Library Usage Example

An overview of the communication process with the robot controller is shown below.

The connection configuration image is shown below.

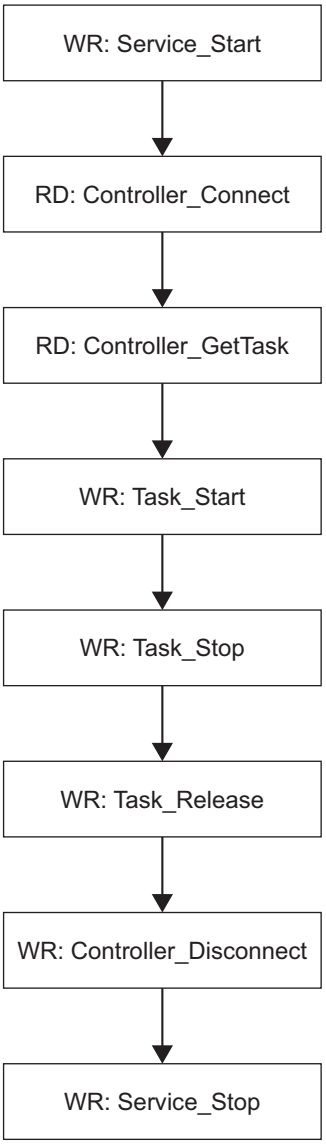
## Protocol execution example for "Variable access"

A protocol execution example for variable access is shown below.



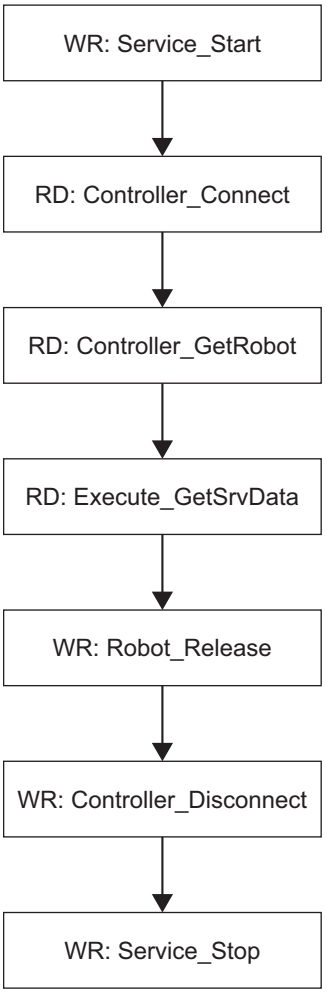
## Protocol execution example for "Task control"

A protocol execution example for task control is shown below.



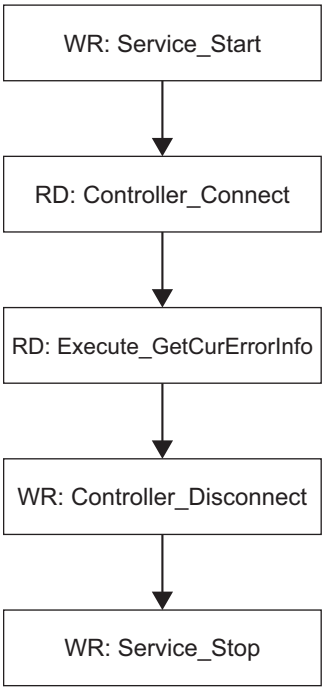
# Protocol execution example for "GetSrvData command"

A protocol execution example for "RD: Execute_GetSrvData" is shown below.



## Protocol execution example for "GetCurErrorInfo command"

A protocol execution example for "RD: Execute_GetCurErrorInfo" is shown below.



# 31 SLMP GENERAL PURPOSE PROTOCOL

## 31.1 Setting Method

- Use the SLMP server function of the target device.
- This library supports 4E frames, and the communication data code is in binary format.

### Precautions

- The default order for sending and receiving word device data is from the lower bytes to the upper bytes.
- For static data, specify values in the order from the lower bytes to the upper bytes.
- For non-conversion variables, specify device values in the order from the upper bytes to the lower bytes.
- This library does not support ASCII format for communication data codes.

### Common elements of each protocol

| Packet name | Element name | Description |
|---|---|---|
| Request | Serial No. | The value of static data "Serial No." can be changed within the range of 0 to 65535.<br>The default value is 0.<br>Specify the value in hexadecimal.<br>(For example, to set "Serial No." to 1234, specify it as D204H.) |
| | Network No. | Change the value of static data "Network No." within the range of 01H to EFH (1 to 239) for other stations, or within 00H for the connected station.<br>The default value is 0.<br>Specify the value in hexadecimal.<br>(For example, to set "Network No." to 239, specify it as EFH.) |
| | Station No. | Change the value of static data "Station No." within the following range: 01H to 78H (1 to 120) for other stations, FFH (255) for own station, 7DH (125) for specified control station/master station, and 7EH (126) for current control station/master station.<br>The default value is 255.<br>Specify the value in hexadecimal.<br>(For example, to set "Station No." to 120, specify it as 78H.) |
| | Module I/O No. | Specify the value of static data "Module I/O No.".<br>The default value is 1023.<br>Specify the value in hexadecimal.<br>(For example, to set "Module I/O No." to 1023, specify it as FF03H.) |
| | Multidrop Station No. | Specify the value of static data "Multidrop Station No." within the range of 00H to 1FH (0 to 31).<br>The default value is 0.<br>Specify the value in hexadecimal.<br>(For example, to set "Multidrop Station No." to 31, specify it as 1FH.) |
| | Monitoring Timer | Set the value of static data "Monitoring Timer" to 0000H for waiting infinitely (waiting until processing is completed), or to a value in the range of 0001H to FFFFH (1 to 65535) for specifying the wait time (unit: 250ms).<br>The default value is 0.<br>Specify the value in hexadecimal.<br>(For example, to set "Monitoring Timer" to 10 seconds, specify it as 2800H.) |
| Normal Response | Serial No. | No setting is required. |
| | Network No. | |
| | Station No. | |
| | Module I/O No. | |
| | Multidrop Station No. | |

| Packet name | Element name | Description |
|---|---|---|
| Error Response | Serial No. | No setting is required. |
| | Network No. | |
| | Station No. | |
| | Module I/O No. | |
| | Multidrop Station No. | |
| | End Code*1*2 | Specify the device that stores "End Code". |
| | Network No. (Responding Station)*2 | Specify the device that stores "Network No. (Responding Station)". |
| | Station No. (Responding Station)*2 | Specify the device that stores "Station No. (Responding Station)". |
| | Module I/O No. (Responding Station)*2 | Specify the device that stores "Module I/O No. (Responding Station)". |

*1 No error code is stored upon normal completion. If an abnormal termination occurs, the error code from the accessed destination is stored.

*2 Specify the device that stores the values read by protocols other than those listed below.
- WR: [1613] Write Memory
- WR: [1601] Write Extend Unit
- WR: [1001] Remote Run
- WR: [1002] Remote Stop
- WR: [1003] Remote Pause
- WR: [1005] Remote Latch Clear
- WR: [1006] Remote Reset

These protocols do not have response messages.

**Point**

- For SLMP communication, refer to the SLMP Reference Manual.
- For the parameter setting method for target devices, refer to the user's manual of each target device.

# 31.2 List of Applicable Protocols

| Name | Description | Automatic Addition[*1] | Communication Timing (Default)[*2] |
|---|---|---|---|
| RD: [0401, 0000] Read (Word) | Reads values from consecutive word devices. | To be added | Fixed Intrvl |
| RD: [0401, 0002] Read (Word) | | Not to be added | Fixed Intrvl |
| RD: [0401, 0001] Read (Bit) | Reads values from consecutive bit devices. | To be added | Fixed Intrvl |
| RD: [0401, 0003] Read (Bit) | | Not to be added | Fixed Intrvl |
| RD: [0401, 0080] Read (Word, Link Direct) | Reads values from consecutive word link direct devices. | Not to be added | Fixed Intrvl |
| RD: [0401, 0082] Read (Word, Link Direct) | | Not to be added | Fixed Intrvl |
| RD: [0401, 0081] Read (Bit, Link Direct) | Reads values from consecutive bit link direct devices. | Not to be added | Fixed Intrvl |
| RD: [0401, 0083] Read (Bit, Link Direct) | | Not to be added | Fixed Intrvl |
| RD: [0401, 0080] Read (Word, Intelligent) | Reads values from consecutive word devices in the buffer memory of the intelligent function module. | Not to be added | Fixed Intrvl |
| RD: [0401, 0082] Read (Word, Intelligent) | | Not to be added | Fixed Intrvl |
| RD: [0403, 0000] Read Random | Reads values from the specified non-consecutive word and double-word devices. | To be added | Fixed Intrvl |
| RD: [0403, 0002] Read Random | | Not to be added | Fixed Intrvl |
| RD: [0403, 0080] Read Random (Link Direct) | Reads values from the specified non-consecutive word and double-word link direct devices. | Not to be added | Fixed Intrvl |
| RD: [0403, 0082] Read Random (Link Direct) | | Not to be added | Fixed Intrvl |
| RD: [0403, 0080] Read Random (Intelligent) | Reads values from non-consecutive word and double-word devices in the buffer memory of the intelligent function module. | Not to be added | Fixed Intrvl |
| RD: [0403, 0082] Read Random (Intelligent) | | Not to be added | Fixed Intrvl |
| RD: [0406, 0000] Read Block (x Pts) | Reads data of the specified number of word devices and bit devices as one block. | To be added | Fixed Intrvl |
| RD: [0406, 0002] Read Block (x Pts) | | Not to be added | Fixed Intrvl |
| RD: [0406, 0080] Read Block (Link, x Pts) | Reads data of the specified number of word link direct devices and bit link direct devices as one block. | Not to be added | Fixed Intrvl |
| RD: [0406, 0082] Read Block (Link, x Pts) | | Not to be added | Fixed Intrvl |
| RD: [0406, 0080] Read Block (Intelligent, x Pts) | Reads the specified number of word devices as one block from the buffer memory of the intelligent function module. | Not to be added | Fixed Intrvl |
| RD: [0406, 0082] Read Block (Intelligent, x Pts) | | Not to be added | Fixed Intrvl |
| RD: [0613] Read Memory | Reads data from the buffer memory of the own station. | Not to be added | Fixed Intrvl |
| RD: [0601] Read Extend Unit | Reads buffer memory data from the intelligent function module. | Not to be added | Fixed Intrvl |
| RD: [0101] Read Type Name | Reads the model name and model code of the accessed module. | Not to be added | Request |
| WR: [1401, 0000] Write (Word) | Writes values to consecutive word devices. | To be added | Request |
| WR: [1401, 0002] Write (Word) | | Not to be added | Request |
| WR: [1401, 0001] Write (Bit) | Writes values to consecutive bit devices. | To be added | Request |
| WR: [1401, 0003] Write (Bit) | | Not to be added | Request |

| Name | Description | Automatic Addition[*1] | Communication Timing (Default)[*2] |
|---|---|---|---|
| WR: [1401, 0080] Write (Word, Link Direct) | Writes values to consecutive word link direct devices. | Not to be added | Request |
| WR: [1401, 0082] Write (Word, Link Direct) | | Not to be added | Request |
| WR: [1401, 0081] Write (Bit, Link Direct) | Writes values to consecutive bit link direct devices. | Not to be added | Request |
| WR: [1401, 0083] Write (Bit, Link Direct) | | Not to be added | Request |
| WR: [1401, 0080] Write (Word, Intelligent) | Writes values to consecutive word devices in the buffer memory of the intelligent function module. | Not to be added | Request |
| WR: [1401, 0082] Write (Word, Intelligent) | | Not to be added | Request |
| WR: [1402, 0000] Write Random (Word) | Writes values to non-consecutive word devices. | To be added | Request |
| WR: [1402, 0002] Write Random (Word) | | Not to be added | Request |
| WR: [1402, 0001] Write Random (Bit) | Writes values to non-consecutive bit devices. | To be added | Request |
| WR: [1402, 0003] Write Random (Bit) | | Not to be added | Request |
| WR: [1402, 0080] Write Random (Word, Link) | Writes values to non-consecutive word link direct devices. | Not to be added | Request |
| WR: [1402, 0082] Write Random (Word, Link) | | Not to be added | Request |
| WR: [1402, 0081] Write Random (Bit, Link) | Writes values to non-consecutive bit link direct devices. | Not to be added | Request |
| WR: [1402, 0083] Write Random (Bit, Link) | | Not to be added | Request |
| WR: [1402, 0080] Write Random (Word, Intelligent) | Writes the values of non-consecutive word devices to the buffer memory of the intelligent function module. | Not to be added | Request |
| WR: [1402, 0082] Write Random (Word, Intelligent) | | Not to be added | Request |
| WR: [1406, 0000] Write Block (1 Pt) | Writes data to the specified number of word devices and bit devices as one block. | To be added | Request |
| WR: [1406, 0002] Write Block (1 Pt) | | Not to be added | Request |
| WR: [1406, 0080] Write Block (Link, 1 Pt) | Writes data to the specified number of word link devices and bit link devices as one block. | Not to be added | Request |
| WR: [1406, 0082] Write Block (Link, 1 Pt) | | Not to be added | Request |
| WR: [1406, 0080] Write Block (Intelligent, 1 Pt) | Writes data from the buffer memory to the specified number of word devices as one block. | Not to be added | Request |
| WR: [1406, 0082] Write Block (Intelligent, 1 Pt) | | Not to be added | Request |
| WR: [1613] Write Memory | Writes data to the buffer memory area of own station. | Not to be added | Request |
| WR: [1601] Write Extend Unit | Writes data to the buffer memory area of the intelligent function module. | Not to be added | Request |
| WR: [1001] Remote Run | Executes remote RUN on the accessed module. | Not to be added | Request |
| WR: [1002] Remote Stop | Executes remote STOP on the accessed module. | Not to be added | Request |
| WR: [1003] Remote Pause | Executes remote PAUSE on the accessed module. | Not to be added | Request |
| WR: [1005] Remote Latch Clear | Executes remote latch clear on the accessed module. | Not to be added | Request |
| WR: [1006] Remote Reset | Executes remote RESET on the accessed module. | Not to be added | Request |
| WR: [1617] Clear Error | Initializes the error code of the own station and turns off the LED indicating occurrence of the corresponding error. | 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 These values are the default values when a protocol is added. After the protocol is added, the communication timing can be changed as desired.

**Point**

1. If the access destination is a MELSEC-Q/L series, use subcommand 00☐1 or 00☐0.
2. If the access destination is a MELSEC iQ-R series, use subcommand 00☐3 or 00☐2.
3. When subcommand 0001 or 0000 is used, the method for specifying the device code differs. For details, refer to the SLMP Reference Manual.

Example: When setting data register (D)

• The subcommand is 0001 or 0000.

A8H

• The subcommand is other than 0001 or 0000.

00A8H

4. Even if the access destination is a MELSEC iQ-R series, devices of the same type and range as the MELSEC-Q/L series can be accessed by using MELSEC-Q/L series subcommands.
5. When the following devices are accessed, use device extension (subcommand: 008☐).
   • Link direct devices
   • Module access devices
   • CPU buffer memory access devices

# 31.3 Details of Applicable Protocols

## RD: [0401, 0000] Read (Word)

This protocol reads values in 1-word units from word devices (with consecutive device numbers) and in 16-point units from bit devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

### Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS) and coil (LTC) of long timer
· Contact (LSTS) and coil (LSTC) of long retentive timer
· Long index register (LZ)

## RD: [0401, 0002] Read (Word)

This protocol reads values in 1-word units from word devices (with consecutive device numbers) and in 16-point units from bit devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R series, use this protocol.

### Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

### Precautions

- Do not change values other than setting data.

# RD: [0401, 0001] Read (Bit)

This protocol reads values from bit devices (with consecutive device numbers) in 1-point units. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 1793 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device.<br>The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS) and coil (LTC) of long timer
· Contact (LSTS) and coil (LSTC) of long retentive timer
· Long index register (LZ)

# RD: [0401, 0003] Read (Bit)

This protocol reads values from bit devices (with consecutive device numbers) in 1-point units. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 1793 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device.<br>The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# RD: [0401, 0080] Read (Word, Link Direct)

This protocol reads values from word link direct devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code". One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS) and coil (LTC) of long timer
· Contact (LSTS) and coil (LSTC) of long retentive timer
· Long index register (LZ)

# RD: [0401, 0082] Read (Word, Link Direct)

This protocol reads values from word link direct devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R/iQ-L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code". One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# RD: [0401, 0081] Read (Bit, Link Direct)

This protocol reads values from bit link direct devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 1793 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS) and coil (LTC) of long timer
· Contact (LSTS) and coil (LSTC) of long retentive timer
· Long index register (LZ)

# RD: [0401, 0083] Read (Bit, Link Direct)

This protocol reads values from bit link direct devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R/iR-L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 1793 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# RD: [0401, 0080] Read (Word, Intelligent)

This protocol reads values from word devices (with consecutive device numbers) in the buffer memory of the intelligent function module. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.



# RD: [0401, 0082] Read (Word, Intelligent)

This protocol reads values from word devices (with consecutive device numbers) in the buffer memory of the intelligent function module. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" of the devices to be read.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# RD: [0403, 0000] Read Random

When the device number is specified, this protocol reads the device value. Non-consecutive device numbers can be specified. Values are read from word devices in 1-word or 2-word units.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Device Code (D-word)*1 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| Normal Response | Response Data (Word) | Specify the device that stores the read data.<br>One word device is used per one-word access point. |
| | Response Data (D-word) | Specify the device that stores the read data.<br>Two consecutive word devices are used per double-word access point. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Do not execute the Read Random protocol to the CPU module during conditional monitoring. The SLMP protocol will terminate abnormally. The protocol can be executed during unconditional monitoring.
- The following devices cannot be specified.

· Contact (LTS) and coil (LTC) of long timer
· Contact (LSTS) and coil (LSTC) of long retentive timer
· Contact (LCS) and coil (LCC) of long counter

# RD: [0403, 0002] Read Random

When the device number is specified, this protocol reads the device value. Non-consecutive device numbers can be specified. Values are read from word devices in 1-word or 2-word units.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Device Code (D-word)*1 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| Normal Response | Response Data (Word) | Specify the device that stores the read data.<br>One word device is used per one-word access point. |
| | Response Data (D-word) | Specify the device that stores the read data.<br>Two consecutive word devices are used per double-word access point. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Do not execute the Read Random protocol to the CPU module during conditional monitoring. The SLMP protocol will terminate abnormally. The protocol can be executed during unconditional monitoring.

# RD: [0403, 0080] Read Random (Link Direct)

When the link direct device number is specified, this protocol reads the device value. Non-consecutive device numbers can be specified. Values are read from word devices in 1-word or 2-word units.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Device Code (D-word)*2 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| Normal Response | Response Data (Word) | Specify the device that stores the read data.<br>One word device is used per word access point. |
| | Response Data (D-word) | Specify the device that stores the read data.<br>Two consecutive word devices are used per double-word access point. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Do not execute the Read Random protocol to the CPU module during conditional monitoring. The SLMP protocol will terminate abnormally. The protocol can be executed during unconditional monitoring.
- The following devices cannot be specified.

· Contact (LTS) and coil (LTC) of long timer
· Contact (LSTS) and coil (LSTC) of long retentive timer
· Contact (LCS) and coil (LCC) of long counter

# RD: [0403, 0802] Read Random (Link Direct)

When the link direct device number is specified, this protocol reads the device value. Non-consecutive device numbers can be specified. Values are read from word devices in 1-word or 2-word units.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Device Code (D-word)*2 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| Normal Response | Response Data (Word) | Specify the device that stores the read data.<br>One word device is used per word access point. |
| | Response Data (D-word) | Specify the device that stores the read data.<br>Two consecutive word devices are used per double-word access point. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Do not execute the Read Random protocol to the CPU module during conditional monitoring. The SLMP protocol will terminate abnormally. The protocol can be executed during unconditional monitoring.

# RD: [0403, 0080] Read Random (Intelligent)

When the device number is specified, this protocol reads the device value from the buffer memory of the intelligent function module. Non-consecutive device numbers can be specified.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| Normal Response | Response Data (Word) | Specify the device that stores the read data.<br>For response data, one word device is used per word access point. |
| | Response Data (D-word) | Specify the device that stores the read data.<br>For response data, two consecutive word devices are used per double-word access point. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.
- Do not execute the Read Random protocol to the CPU module during conditional monitoring. The SLMP protocol will terminate abnormally. The protocol can be executed during unconditional monitoring.

# RD: [0403, 0082] Read Random (Intelligent)

When the device number is specified, this protocol reads the device value from the buffer memory of the intelligent function module. Non-consecutive device numbers can be specified.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| Normal Response | Response Data (Word) | Specify the device that stores the read data.<br>For response data, one word device is used per word access point. |
| | Response Data (D-word) | Specify the device that stores the read data.<br>For response data, two consecutive word devices are used per double-word access point. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.
- Do not execute the Read Random protocol to the CPU module during conditional monitoring. The SLMP protocol will terminate abnormally. The protocol can be executed during unconditional monitoring.

# RD: [0406, 0000] Read Block (x Pts)

This protocol reads the n points of data from word devices or bit devices (1 point is equivalent to 16 bits) as one block. Specify one block to word devices and bit devices.

When specifying the contact or coil of the timer, retentive timer, or counter, use a bit device block. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | No. of Device Points (Word) | Specify the device that stores "No. of Device Points (Word)" of the devices to be read. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*1 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | No. of Device Points (Bit) | Specify the device that stores "No. of Device Points (Bit)" of the devices to be read. One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Specify the number of device points so that the following condition is met.

(Total number of points for each word device block + Total number of points for each bit device block) ≤ 960

- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer

· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer

· Contact (LCS), coil (LCC), and current value (LCN) of long counter

· Long index register (LZ)

# RD: [0406, 0002] Read Block (x Pts)

This protocol reads the n points of data from word devices or bit devices (1 point is equivalent to 16 bits) as one block. Specify one block to word devices and bit devices.

When specifying the contact or coil of the timer, retentive timer, or counter, use a bit device block. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | No. of Device Points (Word) | Specify the device that stores "No. of Device Points (Word)" of the devices to be read. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*1 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | No. of Device Points (Bit) | Specify the device that stores "No. of Device Points (Bit)" of the devices to be read. One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Specify the number of device points so that the following condition is met.

(Total number of points for each word device block + Total number of points for each bit device block) ≤ 960

# RD: [0406, 0080] Read Block (Link, x Pts)

This protocol reads the n points of data from link direct word devices or link direct bit devices (1 point is equivalent to 16 bits) as one block.

Specify one block to word devices and bit devices.

When specifying the contact or coil of the timer, retentive timer, or counter, use a bit device block. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | No. of Device Points (Word) | Specify the device that stores "No. of Device Points (Word)" of the devices to be read. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*2 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | Extension Specification (Bit)*1 | Specify the device that stores the value of "Extension Specification (Bit)". One word device is used. |
| | No. of Device Points (Bit) | Specify the device that stores "No. of Device Points (Bit)" of the devices to be read. One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.

*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Specify the number of device points so that the following condition is met.

(Total number of points for each word device block + Total number of points for each bit device block) ≤ 960

- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer

· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer

· Contact (LCS), coil (LCC), and current value (LCN) of long counter

· Long index register (LZ)

# RD: [0406, 0082] Read Block (Link, x Pts)

This protocol reads the n points of data from link direct word devices or link direct bit devices (1 point is equivalent to 16 bits) as one block.

Specify one block to word devices and bit devices.

When specifying the contact or coil of the timer, retentive timer, or counter, use a bit device block. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | No. of Device Points (Word) | Specify the device that stores "No. of Device Points (Word)" of the devices to be read. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*2 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | Extension Specification (Bit)*1 | Specify the device that stores the value of "Extension Specification (Bit)". One word device is used. |
| | No. of Device Points (Bit) | Specify the device that stores "No. of Device Points (Bit)" of the devices to be read. One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.

*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- Specify the number of device points so that the following condition is met.

(Total number of points for each word device block + Total number of points for each bit device block) ≤ 960

# RD: [0406, 0080] Read Block (Intelligent, x Pts)

This protocol reads the n points of data from word devices or bit devices (1 point is equivalent to 16 bits) in the buffer memory of the intelligent function module as one block.
Specify one block to word devices and bit devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | No. of Device Points (Word) | Specify the device that stores "No. of Device Points (Word)" of the devices to be read. One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.
- Specify the number of device points so that the following condition is met.

(Total number of points for each word device block) ≤ 960

# RD: [0406, 0082] Read Block (Intelligent, x Pts)

This protocol reads the n points of data from word devices or bit devices (1 point is equivalent to 16 bits) in the buffer memory of the intelligent function module as one block.
Specify one block to word devices and bit devices. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | No. of Device Points (Word) | Specify the device that stores "No. of Device Points (Word)" of the devices to be read. One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# RD: [0613] Read Memory

This protocol reads data from the buffer memory of the own station (SLMP-compatible device).

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Address | Specify the device that stores "Head Address" of the buffer memory. Two consecutive word devices are used. |
| | Word Length | Specify the device that stores the value of "Word Length".<br>1H to 1E0H (1 to 480): Specify the range of "Word Length".<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 481 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 480 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- The following buffer memory areas cannot be accessed.

· Intelligent function module mounted on own station

· Buffer memory on other stations

# RD: [0601] Read Extend Unit

This protocol reads data from the buffer memory of the MELSEC-Q series intelligent function module.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Address*1 | Specify the device that stores "Head Address" of the buffer memory. Two consecutive word devices are used. |
| | No. of Bytes | Specify the device that stores the value of "No. of Bytes".<br>2H to 780H (2 to 1920): Specify the range of "No. of Bytes".<br>Specify the number of bytes as a multiple of 2. |
| | Module No. | Specify the device that stores "Module No." of the intelligent function module.<br>Module No. = (Upper three digits of the four-digit start I/O number of the intelligent function module) + (Module number when mounted in slot 0)*2<br>One word device is used. |
| Normal Response | Response Data | Specify the device that stores the read data.<br>A total of 961 consecutive word devices are used.<br>The data length (number of bytes) of the read response is stored in the head device. The actual data is stored in 960 consecutive word devices starting from the second device. |
| Error Response | — | No setting is required. |

*1 The head address is calculated as follows.
{Result of (Buffer memory address of module × 2) expressed in hexadecimal} + ("Head Address" listed in Extend Unit (buffer memory access for intelligent function modules) table)
Example: When specifying buffer memory address 1H of Q62DA with head address of 1008H
(1H*2+1008H=2H+1008H=100AH)
For details on the head addresses of MELSEC-Q series intelligent function modules, refer to the SLMP Reference Manual.

*2 For the module number when mounted in slot 0, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# RD: [0101] Read Type Name

This protocol reads the model name and model code of the accessed module.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | Model Name*1 | Specify the device that stores "Model Name" of the target device.<br>The module model name is stored as 16 characters, starting from the upper byte.<br>If the model name less than 16 characters is read, the remaining characters are filled with spaces (20H). Even in binary code communications, the module model name is stored in ASCII code.<br>Eight consecutive word devices are used. |
| | Model Code*1 | Specify the device that stores "Model Code" of the target device.<br>One word device is used. |
| Error Response | — | No setting is required. |

*1 For details about model names and model codes, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1401, 0000] Write (Word)

This protocol writes values in 1-word units to word devices (with consecutive device numbers) and in 16-point units to bit devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device.<br>Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer
· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer
· Long index register (LZ)

# WR: [1401, 0002] Write (Word)

This protocol writes values in 1-word units to word devices (with consecutive device numbers) and in 16-point units to bit devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device.<br>Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1401, 0001] Write (Bit)

This protocol writes values in 1-point units to bit devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 1793 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer

· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer

· Long index register (LZ)

# WR: [1401, 0003] Write (Bit)

This protocol writes values in 1-point units to bit devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 1793 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1401, 0080] Write (Word, Link Direct)

This protocol writes values to word link direct devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code". One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer
· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer
· Long index register (LZ)

# WR: [1401, 0082] Write (Word, Link Direct)

This protocol writes values to word link direct devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R/iQ-L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code". One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1401, 0081] Write (Bit, Link Direct)

This protocol writes values to bit link direct devices (with consecutive device numbers). If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code". One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 1C00H (1 to 7168): Specify the range of "No. of Device Points". One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 1793 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer
· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer
· Long index register (LZ)

# WR: [1401, 0083] Write (Bit, Link Direct)

This protocol writes values to bit link direct devices (with consecutive device numbers). If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code". One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 1C00H (up to 7168): Specify the range of "No. of Device Points". One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 1793 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 1792 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1401, 0080] Write (Word, Intelligent)

This protocol writes values to word devices (with consecutive device numbers) in the buffer memory of the intelligent function module. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# WR: [1401, 0082] Write (Word, Intelligent)

This protocol writes values to word devices (with consecutive device numbers) in the buffer memory of the intelligent function module. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification". One word device is used. |
| | No. of Device Points | Specify the device that stores "No. of Device Points" to be written.<br>01H to 3C0H (1 to 960): Specify the range of "No. of Device Points".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual data is stored in 960 consecutive word devices starting from the second device. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0000] Write Random (Word)

When the device number is specified, this protocol writes values to the device. Non-consecutive device numbers can be specified.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Device Code (D-word)*1 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| | Write Data (D-word) | Specify the device for storing the data to be written.<br>Two consecutive device numbers are used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0002] Write Random (Word)

When the device number is specified, this protocol writes values to the device. Non-consecutive device numbers can be specified.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC iQ-R/iQ-L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Device Code (D-word)*1 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| | Write Data (D-word) | Specify the device for storing the data to be written.<br>Two consecutive device numbers are used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0001] Write Random (Bit)

When the bit device number is specified, this protocol writes values to the device. The specified number of bit access points is 1. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Device No. | Specify the device that stores "Device No." of the target device.<br>Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | Set/Reset | Specify the device for storing the data to be written.<br>One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0003] Write Random (Bit)

When the bit device number is specified, this protocol writes values to the device. The specified number of bit access points is 1. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Device No. | Specify the device that stores "Device No." of the target device.<br>Two consecutive word devices are used. |
| | Device Code*1 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | Set/Reset | Specify the device for storing the data to be written.<br>One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0080] Write Random (Word, Link)

This protocol writes data to the link direct devices with the specified word and double-word device numbers. Non-consecutive device numbers can be specified.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device.<br>Two consecutive word devices are used. |
| | Device Code (D-word)*2 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| | Write Data (D-word) | Specify the device for storing the data to be written.<br>Two consecutive device numbers are used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0082] Write Random (Word, Link)

This protocol writes data to the link direct devices with the specified word and double-word device numbers. Non-consecutive device numbers can be specified.
In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device.<br>Two consecutive word devices are used. |
| | Device Code (D-word)*2 | Specify the device that stores the value of "Device Code (D-word)". One word device is used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| | Write Data (D-word) | Specify the device for storing the data to be written.<br>Two consecutive device numbers are used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0081] Write Random (Bit, Link)

This protocol writes data to the link direct device with the specified bit device number. The specified number of access points is 1. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification".<br>One word device is used. |
| | Set/Reset | Specify the device for storing the data to be written.<br>One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0083] Write Random (Bit, Link)

This protocol writes data to the link direct device with the specified bit device number. The specified number of access points is 1. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. | Specify the device that stores "Head Device No." of the target device. Two consecutive word devices are used. |
| | Device Code*2 | Specify the device that stores the value of "Device Code".<br>One word device is used. |
| | Extension Specification*1 | Specify the device that stores the value of "Extension Specification".<br>One word device is used. |
| | Set/Reset | Specify the device for storing the data to be written.<br>One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0080] Write Random (Word, Intelligent)

This protocol writes data to the specified buffer memory area of the intelligent function module. Consecutive device numbers can be specified. In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| | Write Data (D-word) | Specify the device for storing the data to be written.<br>Two consecutive device numbers are used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# WR: [1402, 0082] Write Random (Word, Intelligent)

This protocol writes data to the specified buffer memory area of the intelligent function module. Consecutive device numbers can be specified. In this protocol, specify the number of access points as 1 for both word and double-word devices. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (D-word) | Specify the device that stores "Head Device No. (D-word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (D-word)*1 | Specify the device that stores the value of "Extension Specification (D-word)". One word device is used. |
| | Write Data (D-word) | Specify the device for storing the data to be written.<br>Two consecutive device numbers are used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# WR: [1406, 0000] Write Block (1 Pt)

This protocol writes each specified block of data to word devices and bit devices, treating 1 point of word or bit device (1 point is equivalent to 16 bits) as one block. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*1 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | Write Data (Bit) | Specify the device for storing the data to be written. One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer
· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer
· Contact (LCS), coil (LCC), and current value (LCN) of long counter
· Long index register (LZ)

# WR: [1406, 0002] Write Block (1 Pt)

This protocol writes each specified block of data to word devices and bit devices, treating 1 point of word or bit device (1 point is equivalent to 16 bits) as one block. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*1 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*1 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | Write Data (Bit) | Specify the device for storing the data to be written. One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1406, 0080] Write Block (Link, 1 Pt)

This protocol writes each specified block of data to word link direct and bit link direct devices, treating 1 point of word link direct or bit link direct device (1 point is equivalent to 16 bits) as one block.
When specifying the contact or coil of the timer, retentive timer, or counter, use a bit device block. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*2 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | Extension Specification (Bit)*1 | Specify the device that stores the value of "Extension Specification (Bit)". One word device is used. |
| | Write Data (Bit) | Specify the device for storing the data to be written. One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.
- The following devices cannot be specified.

· Contact (LTS), coil (LTC), and current value (LTN) of long timer
· Contact (LSTS), coil (LSTC), and current value (LSTN) of long retentive timer
· Contact (LCS), coil (LCC), and current value (LCN) of long counter
· Long index register (LZ)

# WR: [1406, 0082] Write Block (Link, 1 Pt)

This protocol writes each specified block of data to word link direct and bit link direct devices, treating 1 point of word link direct or bit link direct device (1 point is equivalent to 16 bits) as one block.
When specifying the contact or coil of the timer, retentive timer, or counter, use a bit device block. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Device Code (Word)*2 | Specify the device that stores the value of "Device Code (Word)". One word device is used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| | Head Device No. (Bit) | Specify the device that stores "Head Device No. (Bit)" of the target device. Two consecutive word devices are used. |
| | Device Code (Bit)*2 | Specify the device that stores the value of "Device Code (Bit)". One word device is used. |
| | Extension Specification (Bit)*1 | Specify the device that stores the value of "Extension Specification (Bit)". One word device is used. |
| | Write Data (Bit) | Specify the device for storing the data to be written. One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 For indirect specification of the access target network, refer to the SLMP Reference Manual.
*2 For details on the device codes that can be specified, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1406, 0080] Write Block (Intelligent, 1 Pt)

This protocol writes each specified block of data to word devices, treating one word device as one block. If the access destination is a MELSEC-Q/L series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# WR: [1406, 0082] Write Block (Intelligent, 1 Pt)

This protocol writes each specified block of data to word devices, treating one word device as one block. If the access destination is a MELSEC iQ-R series, use this protocol.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Device No. (Word) | Specify the device that stores "Head Device No. (Word)" of the target device. Two consecutive word devices are used. |
| | Extension Specification (Word)*1 | Specify the device that stores the value of "Extension Specification (Word)". One word device is used. |
| | Write Data (Word) | Specify the device for storing the data to be written. One word device is used. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

*1 Specify 0 when accessing the buffer memory of modules other than intelligent function modules (such as CC-Link IE Field Network Ethernet adapter modules).

## Precautions

- Do not change values other than setting data.

# WR: [1613] Write Memory

This protocol writes data to the buffer memory area of own station (SLMP-compatible device).
The Write Memory protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Address | Specify the device that stores "Head Address" of the buffer memory. Two consecutive word devices are used. |
| | Word Length | Specify the device that stores the value of "Word Length".<br>1H to 1E0H (1 to 480): Specify the range of "Word Length".<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 481 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual "Write Data" is stored in 480 consecutive word devices starting from the second device. |

## Precautions

- Do not change values other than setting data.
- Do not write data to the "system area" of the buffer memory. Writing data to the "system area" may cause the programmable controller system to malfunction.
- The following buffer memory areas cannot be accessed.

· Intelligent function module mounted on own station
· Buffer memory on other stations

# WR: [1601] Write Extend Unit

This protocol writes data to the buffer memory of MELSEC-Q series intelligent function modules.
The Write Extend Unit protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Head Address*1 | Specify the device that stores "Head Address" of the buffer memory. Two consecutive word devices are used. |
| | No. of Bytes | Specify the device that stores the value of "No. of Bytes".<br>2H to 780H (2 to 1920): Specify the range of "No. of Bytes".<br>Specify the number of bytes as a multiple of 2. One word device is used. |
| | Module No. | Specify the device that stores "Module No." of the intelligent function module.<br>Module No. = (Upper three digits of the four-digit start I/O number of the intelligent function module) + (Module number when mounted in slot 0)*2<br>One word device is used. |
| | Write Data | Specify the device for storing the data to be written.<br>A total of 961 consecutive word devices are used.<br>The data length (in bytes) of the write data is stored in the head device.<br>The actual "Write Data" is stored in 960 consecutive word devices starting from the second device. |

*1 The head address is calculated as follows.
{Result of (Buffer memory address of module × 2) expressed in hexadecimal} + ("Head Address" listed in Extend Unit (buffer memory access for intelligent function modules) table)
Example: When specifying buffer memory address 1H of Q62DA with head address of 1008H
(1H*2+1008H=2H+1008H=100AH)
For the head addresses of MELSEC-Q series intelligent function modules, refer to the SLMP Reference Manual.

*2 For the module number when mounted in slot 0, refer to the SLMP Reference Manual.

## Precautions

- Do not change values other than setting data.

# WR: [1001] Remote Run

This protocol executes remote RUN on the accessed module.

The Remote Run protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Mode | Specify the device that stores the value of "Mode".<br>One word device is used.<br>The device value specifies whether to forcibly execute remote RUN from a device other than the external device that performed remote STOP or remote PAUSE.<br>If forced execution is not used, remote RUN can only be executed from the external device that executed remote STOP or remote PAUSE.<br>Forced execution is used when remote RUN is not possible from a remotely-operated device due to a malfunction in the external device.<br>Specify the mode as follows.<br>• 01H (1): Do not force execution.<br>• 03H (3): Force execution. |
| | Clear Mode | Specify the device that stores the value of "Clear Mode".<br>One word device is used.<br>The device value specifies whether to perform a device clear (initialization) process when operations are started with remote RUN.<br>The device that receives the remote RUN request enters RUN state after the device clear (initialization). Specify the clear mode as follows.<br>• 00H (0): Do not clear devices.<br>• 01H (1): Clear all devices except those in latch range.<br>• 02H (2): Clear all devices including those in latch range. |

## Precautions

• Do not change values other than setting data.

# WR: [1002] Remote Stop

This protocol executes remote STOP on the accessed module.

The Remote Stop protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |

## Precautions

• Do not change values other than setting data.

# WR: [1003] Remote Pause

This protocol executes remote PAUSE on the accessed module.

The Remote Pause protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | Mode | Specify the device that stores the value of "Mode".<br>One word device is used.<br>The device value specifies whether to forcibly execute remote PAUSE from a device other than the external device that performed remote STOP or remote PAUSE.<br>If forced execution is not used, remote PAUSE can only be executed from the external device that executed remote STOP or remote PAUSE.<br>Forced execution is used when remote PAUSE is not possible from a remotely-operated device due to a malfunction in the external device.<br>Specify the mode as follows.<br>• 01H (1): Do not force execution.<br>• 03H (3): Force execution. |

## Precautions

- Do not change values other than setting data.

# WR: [1005] Remote Latch Clear

This protocol executes remote latch clear on the accessed module.

The Remote Latch Clear protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Before performing remote latch clear, place the accessed module in STOP state.
- Remote latch clear cannot be performed if the accessed module is in remote STOP or PAUSE state due to a request from another external device. The protocol will terminate abnormally. Before executing the protocol, cancel any remote STOP or remote PAUSE request from other external devices.

# WR: [1006] Remote Reset

This protocol executes remote RESET on the accessed module. Remote RESET is used to recover from errors that occur in the module.
The Remote Reset protocol does not have response messages.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |

## Precautions

- Do not change values other than setting data.
- Before performing remote RESET, set the parameter of the accessed module to allow remote RESET if such a permission setting exists. Also, place the accessed module in STOP state before executing remote RESET.
- Remote RESET may not be possible due to hardware failures of the accessed module.
- When remote RESET is executed, the accessed module is reset and cannot respond to requests from external devices.

# WR: [1617] Clear Error

This protocol initializes the error code of the own station and turns off the COM ERR LED of the own station.

## Setting data

| Packet name | Element name | Description |
|---|---|---|
| Request | — | No setting is required. |
| Normal Response | — | No setting is required. |
| Error Response | — | No setting is required. |

## Precautions

- Do not change values other than setting data.

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# MEMO

# 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<br>Section 1.1, Chapter 10 |
| May 2023 | SH(NA)-082515ENG-C | ■Added or modified parts<br>Section 1.1, Chapter 11, 12, 13, 14, 15, 16 |
| November 2023 | SH(NA)-082515ENG-D | ■Added or modified parts<br>Section 1.1, 13.2, Chapter 17, 18, 19, 20, 21, 22 |
| May 2024 | SH(NA)-082515ENG-E | ■Added or modified parts<br>Section 1.1, 13.2, 18.3, 21.2, 22.3, Chapter 23, 24 |
| October 2024 | SH(NA)-082515ENG-F | ■Added or modified parts<br>Section 1.1, Chapter 25, 26, 27 |
| June 2025 | SH(NA)-082515ENG-G | ■Added or modified parts<br>■Section 1.1, 27.3. Chapter 28, 29, 30, 31 |

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# 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.

# INFORMATION AND SERVICES

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