

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)

CONTENTS

SAFETY PRECAUTIONS	1
CONDITIONS OF USE FOR THE PRODUCT	1
INTRODUCTION	2
RELEVANT MANUALS	28
TERMS	28
GENERIC TERMS AND ABBREVIATIONS	28

CHAPTER 1 OVERVIEW 29

1.1 List of Applicable Models	29
-------------------------------------	----

CHAPTER 2 PROTOCOLS SUPPORTED BY YASKAWA Electric Corporation (YRC1000, DX200, FS100) 31

2.1 Setting Method	31
2.2 List of Applicable Protocols	32
2.3 Details of Applicable Protocols	34
RD: Latest Alarm Data Read	34
RD: Alarm Data Read	34
RD: Alarm History Read	35
RD: Status Information Read	35
RD: Execution Job Information Read	36
RD: Axis Structure Information Read	36
RD: Robot Positioning Data Read (Cartesian)	37
RD: Robot Positioning Data Read (Pulse)	38
RD: Normal Deviation Read	38
RD: Torque Data Read	39
RD: Emergency Stop IO Data Read	39
RD: IO Data Read	40
WR: IO Data Write	40
RD: Register Data Read	41
WR: Register Data Write	41
RD: Byte Variable (B) Read	42
WR: Byte Variable (B) Write	42
RD: Integer Variable (I) Read	43
WR: Integer Variable (I) Write	43
RD: Double-precision Integer Variable (D) Read	44
WR: Double-precision Integer Variable (D) Write	44
RD: Real Variable (R) Read	45
WR: Real Variable (R) Write	45
RD: 16-byte String Variable (S) Read	46
WR: 16-byte String Variable (S) Write	46
WR: Alarm Reset	47
WR: Error Cancellation	47
WR: HOLD On	47
WR: HOLD Off	47
WR: Servo On	48
WR: Servo Off	48
WR: HLOCK On	48
WR: HLOCK Off	48

WR: Operation Cycle Switch (Step)	49
WR: Operation Cycle Switch (Cycle).	49
WR: Operation Cycle Switch (Continuation)	49
WR: Displaying Strings to the Pendant	49
WR: Start (Job Start)	50
WR: Job Selection	50
RD: Management Time Acquisition	50
RD: System Information Acquisition	51
RD: 32-byte String Variable (S) Read	51
WR: 32-byte String Variable (S) Write	51

CHAPTER 3 PROTOCOLS SUPPORTED BY Mitsubishi Electric (CR800) 52

3.1 Setting Method.	52
3.2 List of Applicable Protocols	52
3.3 Details of Applicable Protocols	53
RD: DDEVVL* Read (Data type: 0)	53
RD: DDEVVL* Read (Data type: 1, 2)	53
RD: DDEVVL* Read (Data type: 3)	54
RD: DDEVVL* Read (Data type: 4, 6)	55
RD: DDEVVL* Read (Data type: 5)	56
RD: DDEVVL* Read (Data type: 7)	57
WR: DDEVVL* Write (Data type: 3)	58
RD: Write DDEVVL* (data type: 4, 6)	59
WR: DDEVVL* Write (Data type: 5)	60
WR: DDEVVL* Write (Data type: 7)	61
RD: Latest Self-diagnostics Error Read.	62
RD: Latest Error Information Read (R/D)	62
RD: Self-diagnostics Error Code Read (R/D)	63
RD: Latest Error Information Read (Q)	63
RD: Battery Low Read (Q)	64
RD: Momentary Interruption Detection Read (Q)	64
RD: Momentary Interruption Detection Count (Q)	64
RD: LED Status Read	65
RD: CPU Operating Status Read	65

CHAPTER 4 PROTOCOLS SUPPORTED BY FANUC (R-30iB) 66

4.1 Setting Method.	66
4.2 List of Applicable Protocols	67
4.3 Details of Applicable Protocols	68
RD: Alarm History	68
RD: Program Execution Status	68
RD: System Total Time	69
RD: Q Phase Current Value/Current Value	69
RD: Digital Input (DI) [1-16]	70
RD: Robot Input (RI) [1-16]	70
RD: Peripheral Input (UI) [1-32]	71
RD: Peripheral Output (UO) [1-32]	71
RD: Operation Panel Input (SI) [0-15]	72
RD: Operation Panel Output (SO) [0-15]	72
RD: Welding Digital Input (WI) [1-32]	73

RD: Welding Digital Output (WO) [1-32]	73
RD: Welding Detection Circuit Input (WSI) [1-32]	74
RD: Welding Detection Circuit Output (WSO) [1-32]	74
RD: Digital Output (DO) [1-16]	75
RD: Robot Output (RO) [1-16]	75
RD: Flag (F) [1-16]	75
RD: Group Input (GI) [1-8]	76
RD: Group Output (GO) [1-8]	76
RD: Analog Input (AI) [1-6]	77
RD: Analog Output (AO) [1-2]	77
WR: Flag (F) [1001-1018]	78
WR: Holding Register 1001 to 1002	78
RD: Coils	79
RD: Discrete Inputs	79
RD: Holding Registers	80
RD: Input Registers	80
WR: Single Coil	81
WR: Single Holding Register	81
WR: Multiple Coils	82
WR: Multiple Holding Registers	82

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

83

5.1	Setting Method	83
5.2	List of Applicable Protocols	83
5.3	Details of Applicable Protocols	85
	RD: Controller Version	85
	RD: Robot Mode	85
	RD: Robot Status (Bit)	86
	RD: Robot Status (Word)	86
	RD: Current	86
	RD: Joint Angle	87
	RD: Joint Angle Velocity	87
	RD: Joint Current	88
	RD: Joint Temperature	88
	RD: Joint Mode	89
	RD: Joint Revolution Count	89
	RD: TCP Pause	90
	RD: TCP Speed	90
	RD: TCP Offset	91
	RD: Split Time	91
	WR: Split Time Trigger	92
	RD: Digital Inputs 0-15 (Bit)	92
	RD: Digital Inputs 0-15 (Word)	92
	RD: Digital Outputs 0-15 (Bit)	93
	RD: Digital Outputs 0-15 (Word)	93
	WR: Digital Outputs 0-15 (Bit)	94
	WR: Digital Outputs 0-15 (Word)	94
	WR: Digital Outputs 0 (Bit)	95
	RD: Configurable Inputs 0-7 (Bit)	96

RD: Configurable Inputs 0-15 (Word)	96
RD: Configurable Outputs 0-7 (Bit)	96
RD: Configurable Outputs 0-15 (Word)	97
WR: Configurable Outputs 0-7 (Bit)	97
WR: Configurable Outputs 0-15 (Word)	98
WR: Configurable Outputs 0 (Bit)	98
RD: Analog Input 0	99
RD: Analog Input 0 Domain	99
WR: Analog Input 0 Domain	99
RD: Analog Input 1	100
RD: Analog Input 1 Domain	100
WR: Analog Input 1 Domain	100
RD: Analog Output 0	101
WR: Analog Output 0	101
RD: Analog Output 1	102
WR: Analog Output 1	102
RD: Tool Output Voltage	103
WR: Tool Output Voltage	103
RD: Tool Digital Input	103
RD: Tool Digital Output	104
WR: Tool Digital Output	104
RD: General Register	105
WR: General Register	105
RD: Coils	106
RD: Discrete Inputs	106
RD: Holding Registers	107
RD: Input Registers	107
WR: Single Coil	108
WR: Single Holding Register	108
WR: Multiple Coils	109
WR: Multiple Holding Registers	109

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

110

6.1	Setting Method	110
6.2	List of Applicable Protocols	111
6.3	Details of Applicable Protocols	112
	RD: Measured Value (PV) (Address 1)	112
	RD: Current Transformer 1 (CT1) (Address 1)	112
	RD: Current Transformer 2 (CT2) (Address 1)	113
	RD: Set Value (SV) (Address 1)	113
	RD: MV1 [heat-side] (Address 1)	114
	RD: MV2 [cool-side] (Address 1)	114
	RD: Digital Input (DI) State (Address 1)	115
	RD: Output State (Address 1)	116
	RD: Operation Mode State (Address 1)	117
	RD: Heater Break Alarm 1 State (Address 1)	118
	RD: Heater Break Alarm 2 State (Address 1)	118
	RD: Error Code (Address 1)	119
	RD: Interlock State (Address 1)	119

WR: Set Value (SV) (Address 1)	120
WR: Heater Break Alarm 1 Set Value (Address 1)	121
WR: Heater Break Alarm 2 Set Value (Address 1)	122
WR: Memory Area Transfer (Address 1)	123
WR: Auto Mode Transfer (Address 1)	124
WR: Manual Mode Transfer (Address 1)	124
WR: RUN (Address 1)	125
WR: STOP (Address 1)	125
WR: PID/AT Transfer (Address 1)	126
WR: Interlock Release (Address 1)	127
WR: Single Holding Register	128
RD: Holding Registers	128

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

129

7.1 Setting Method.	129
7.2 List of Applicable Protocols	129
7.3 Details of Applicable Protocols	131
RD: [Z-TIO] Measured Value (PV) (CH 1 to 4)	131
RD: [Z-TIO] MV [heat-side] (CH1 to 4)	132
RD: [Z-TIO] MV [cool-side] (CH1 to 4)	132
RD: [Z-TIO] Set Value (SV) (CH1 to 4)	133
RD: [Z-TIO] Comprehensive Event State (CH1 to 4)	134
RD: [Z-DIO] Digital Input (DI) State	135
RD: [Z-DIO] Digital Output (DO) State	136
RD: [Z-TIO] Error Code	137
RD: [Z-DIO] Error Code	137
WR: [Z-TIO] Set Value (SV) (CH1)	138
WR: [Z-TIO] Set Value (SV) (CH2)	138
WR: [Z-TIO] Set Value (SV) (CH3)	139
WR: [Z-TIO] Set Value (SV) (CH4)	139
WR: [Z-TIO] Memory Area Transfer (CH1)	140
WR: [Z-TIO] Memory Area Transfer (CH2)	140
WR: [Z-TIO] Memory Area Transfer (CH3)	141
WR: [Z-TIO] Memory Area Transfer (CH4)	141
WR: [Z-TIO] PID/AT Transfer (CH1)	142
WR: [Z-TIO] PID/AT Transfer (CH2)	142
WR: [Z-TIO] PID/AT Transfer (CH3)	143
WR: [Z-TIO] PID/AT Transfer (CH4)	143
WR: [Z-TIO] Auto Mode Transfer (CH1)	144
WR: [Z-TIO] Auto Mode Transfer (CH2)	144
WR: [Z-TIO] Auto Mode Transfer (CH3)	145
WR: [Z-TIO] Auto Mode Transfer (CH4)	145
WR: [Z-TIO] Manual Mode Transfer (CH1)	146
WR: [Z-TIO] Manual Mode Transfer (CH2)	146
WR: [Z-TIO] Manual Mode Transfer (CH3)	147
WR: [Z-TIO] Manual Mode Transfer (CH4)	147
WR: [Z-TIO] Operation Mode (CH1)	148
WR: [Z-TIO] Operation Mode (CH2)	148
WR: [Z-TIO] Operation Mode (CH3)	149

WR: [Z-TIO] Operation Mode (CH4)	149
WR: [Z-TIO] RUN	150
WR: [Z-TIO] STOP	150
WR: [Z-DIO] RUN	151
WR: [Z-DIO] STOP	151
WR: [Z-TIO] Interlock Release (CH1)	152
WR: [Z-TIO] Interlock Release (CH2)	152
WR: [Z-TIO] Interlock Release (CH3)	153
WR: [Z-TIO] Interlock Release (CH4)	153
WR: Single Holding Register	154
RD: Holding Registers	154

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

155

8.1 Setting Method	155
8.2 List of Applicable Protocols	156
8.3 Details of Applicable Protocols	157
RD: [Z-TIO] Measured Value (PV) (CH 1 to 4)	157
RD: [Z-TIO] MV [heat-side] (CH1 to 4)	157
RD: [Z-TIO] MV [cool-side] (CH1 to 4)	158
RD: [Z-TIO] Set Value (SV) (CH1 to 4)	158
RD: [Z-TIO] Comprehensive Event State (CH1 to 4)	159
RD: [Z-DIO] Digital Input (DI) State	160
RD: [Z-DIO] Digital Output (DO) State	161
RD: [Z-TIO] Error Code	162
RD: [Z-DIO] Error Code	162
WR: [Z-TIO] Set Value (SV) (CH1)	163
WR: [Z-TIO] Memory Area Transfer (CH1)	163
WR: [Z-TIO] PID/AT Transfer (CH1)	164
WR: [Z-TIO] Auto Mode Transfer (CH1)	164
WR: [Z-TIO] Manual Mode Transfer (CH1)	165
WR: [Z-TIO] Operation Mode (CH1)	165
WR: [SRZ] RUN	166
WR: [SRZ] STOP	166
WR: [Z-TIO] RUN	166
WR: [Z-TIO] STOP	167
WR: [Z-DIO] RUN	167
WR: [Z-DIO] STOP	168
WR: [Z-TIO] Interlock Release (CH1)	168
WR: Single Holding Register	169
RD: Holding Registers	169

CHAPTER 9 PROTOCOLS SUPPORTED BY Azbil (NX-D, NX-S, NX-DX, NX-DY)

170

9.1 Setting Method	170
9.2 List of Applicable Protocols	170
9.3 Details of Applicable Protocols	172
RD: [NX-D] All Typical Alarms	172
RD: [NX-D] Alarm Information 1 To 4	172
RD: [NX-D] PV (Loop 1)	174
RD: [NX-D] SP (Loop 1)	174

RD: [NX-D] MV (Loop 1)	174
RD: [NX-D] Event 1 To 16	175
RD: [NX-D] AT Progress (Loop 1)	175
RD: [NX-D] Heater Line Break Detection	176
RD: [NX-D] Overcurrent Detection	176
RD: [NX-D] Short-circuit Detection	176
RD: [NX-D] Measured Current When Output ON	177
RD: [NX-D] Measured Current When Output OFF	177
RD: [NX-D] P Band/I Time/D Time (Loop 1)	178
WR: [NX-D] LSP (Loop 1)	178
WR: [NX-D] RUN (Loop 1)	178
WR: [NX-D] READY (Loop 1)	179
WR: [NX-D] AT Cancel (Loop 1)	179
WR: [NX-D] AT Execute (Loop 1)	179
WR: [NX-D] Bias/Ratio (Loop 1)	180
WR: [NX-D] Event Setting (Operating Point) (1)	180
WR: [NX-D] HTR Burnout Detect Cur Val (Loop 1)	181
WR: [NX-D] Min Cur Val as Overcurrent (Loop 1)	181
WR: [NX-D] Min Cur Val as Short-circuit (Loop 1)	182
WR: [NX-D] P Band/I Time/D Time (Loop 1)	182
RD: [NX-S] Status	183
RD: [NX-S] System Error	183
RD: [NX-S] SV Module Error	183
RD: [NX-S] IO Mgmt Module Representative Error	184
RD: [NX-S] Communication Representative Error	184
WR: [NX-S] RUN	185
WR: [NX-S] IDLE	185
RD: [NX-DX] Alarm Information 1 To 4	186
RD: [NX-DX] DI Input (1 to 16ch)	187
RD: [NX-DX2] Pulse Estimate Value (1 to 8ch)	188
RD: [NX-DX2] Pulse Estimate Value (9 to 16ch)	189
RD: [NX-DX2] Pulse Instant Value (1 to 16ch)	190
RD: [NX-DX2] Pulse Count Value (1ch)	190
WR: [NX-DX2] Start Estimating (1ch)	191
WR: [NX-DX2] Stop Estimating (1ch)	191
WR: [NX-DX2] Reset Estimate Values (1ch)	191
RD: [NX-DY] Alarm Information 1 To 4	192
RD: [NX-DY] DO Terminal ON/OFF Data	193
WR: [NX-DY] RUN	194
WR: [NX-DY] READY	194
RD: Single Holding Register	195
WR: Single Holding Register	195

CHAPTER 10 PROTOCOLS SUPPORTED BY Yokogawa Electric Corporation (UT75A, UT55A, UT35A, UP55A, UP35A) 196

10.1 Setting Method	196
10.2 List of Applicable Protocols	196
10.3 Details of Applicable Protocols	198
RD: Control Setpoint Loop-1	198
RD: Measurement Value Loop-1	198

RD: Control Output Loop-1	198
RD: Heat Control Output Loop-1	199
RD: Cool Control Output Loop-1	199
RD: AL1-AL3 Terminal Status	199
RD: DI Terminal Status	200
RD: DO Terminal Status (E1)	201
RD: Alarm-1 Setpoint Loop-1 (UT)	202
RD: Alarm-2 Setpoint Loop-1 (UT)	202
RD: Alarm-3 Setpoint Loop-1 (UT)	203
RD: Alarm-1 Setpoint Loop-1 (UP)	203
RD: Alarm-2 Setpoint Loop-1 (UP)	203
RD: Alarm-3 Setpoint Loop-1 (UP)	204
WR: Target Setpoint Loop-1 (UT)	204
WR: Local Target Setpoint Loop-1 (UP)	204
WR: Alarm-1 Setpoint Loop-1 (UT)	205
WR: Alarm-2 Setpoint Loop-1 (UT)	205
WR: Alarm-3 Setpoint Loop-1 (UT)	205
WR: Alarm-1 Setpoint Loop-1 (UP)	206
WR: Alarm-2 Setpoint Loop-1 (UP)	206
WR: Alarm-3 Setpoint Loop-1 (UP)	206
WR: AUTO Switch Loop-1 (UP)	207
WR: MAN Switch Loop-1 (UP)	207
WR: STOP (UT)	207
WR: RUN (UT)	208
WR: REMOTE Loop-1 (UT)	208
WR: LOCAL Loop-1 (UT)	208
WR: Auto-tuning ON Loop-1	209
WR: Auto-tuning OFF Loop-1	209
WR: RESET (UP)	209
WR: PROG (UP)	210
WR: REMOTE (UP)	210
WR: LOCAL (UP)	210
WR: HOLD ON (UP)	211
WR: HOLD OFF (UP)	211
RD: I relay on Bit-by-bit Basis	211
RD: I relays on Word-by-word Basis	212
RD: D registers on Word-by-word Basis	212
WR: I relay on Bit-by-bit Basis	212
WR: I relays on Word-by-word Basis	213
WR: D registers on Word-by-word Basis	213

CHAPTER 11 PROTOCOLS SUPPORTED BY Mitsubishi Electric (NF250, NF400, NF630, NF800)

214

11.1	Setting Method	214
11.2	List of Applicable Protocols	214
11.3	Details of Applicable Protocols	216
	RD: Line System	216
	RD: 16 bit Monitor	217
	RD: Ip (Pre-alarm Pickup Current)	218
	RD: TL (LTD Operation Time)	218

RD: Is (STD Pickup Current)	218
RD: Ts (STD Operation Time)	219
RD: Ii (INST Pickup Current)	219
RD: Number of Poles	219
RD: Open / Close Frequency	219
RD: Trip Frequency	220
RD: Rated Current	220
RD: Current Setting Ir	220
RD: Model Code	221
RD: Phase Current	221
RD: Demand Current	221
RD: Line Voltage	222
RD: Phase Voltage	222
RD: Power Factor	222
RD: Frequency	223
RD: Electric Power	223
RD: Demand Electric Power	223
RD: Reactive Power	224
RD: Demand Reactive Power	224
RD: Fault Current	224
RD: Max. Demand Electric Power	225
RD: Max. Demand Reactive Power	225
RD: Electric Energy	225
RD: Reactive Energy (LAG)	226
RD: Harmonics Current (Total)	226
RD: Fundamental Current	226
RD: Harmonics Current (3rd)	227
WR: Line System	227
WR: Reset Memory	228
RD: Holding Registers	229
WR: Holding Registers	229

CHAPTER 12 PROTOCOLS SUPPORTED BY Mitsubishi Electric **(EcoMonitorLight Series: EMU4-BD1-MB, EMU4-HD1-MB) 230**

12.1 Setting Method	230
12.2 List of Applicable Protocols	230
12.3 Details of Applicable Protocols	233
RD: Phase Wire System	233
RD: Primary Voltage (L-L: Line Voltage)	233
RD: Primary Voltage (L-N: Phase Voltage)	234
RD: Secondary Voltage	234
RD: Primary Current	234
RD: 16 Bits Monitor	235
RD: 5A Input Change (Sensor Type)	235
RD: Measuring Method of Operating Time	236
RD: Multiplying Factors	236
RD: Model Code	237
RD: Phase Current	237
RD: Phase Current Demand	238
RD: Line Voltage	238

RD: Phase Voltage	239
RD: Power Factor	239
RD: Frequency	240
RD: Active Power	240
RD: Active Power Demand	241
RD: Reactive Power	241
RD: Apparent Power	242
RD: Integrated Electric Energy (import).	242
RD: Integrated Electric Energy (export).	243
RD: Reactive Energy (import LAG).	243
RD: Integrated Electric Energy Extended (import)	244
RD: Integrated Electric Energy Extended (export)	244
RD: Reactive Energy Extended (import LAG).	245
RD: Periodic Electric Energy (import)	245
RD: Pulse Count	246
RD: Operating Time.	246
RD: Harmonics Phase Voltage (Total).	247
RD: Harmonics Phase Voltage (1st)	248
RD: Harmonics Line Voltage (Total)	249
RD: Harmonics Line Voltage (1st)	250
RD: Harmonics Current (Total)	251
RD: Harmonics Current (1st).	252
RD: Harmonics Phase Voltage Distortion (Total).	253
RD: Harmonics Phase Voltage Distortion (3rd).	254
RD: Harmonics Line Voltage Distortion (Total)	255
RD: Harmonics Line Voltage Distortion (3rd).	256
RD: Harmonics Current Content Rate (Total)	257
RD: Harmonics Current Content Rate (3rd)	258
WR: Phase Wire System.	258
WR: Primary Voltage (L-L: Line Voltage).	259
WR: Primary Voltage (L-N: Phase Voltage).	259
WR: Secondary Voltage	259
WR: Primary Current.	260
WR: 16 Bits Set/Reset Register	260
WR: 5A Input Change (Sensor Type)	261
WR: Measuring Method of Operating Time	261
WR: Integrated Electric Energy (import)	262
WR: Integrated Electric Energy (export)	262
WR: Reactive Energy (import LAG).	263
WR: Periodic Electric Energy (import).	263
WR: Pulse Count.	264
WR: Operating Time	264
RD: Holding Registers.	265
WR: Holding Registers	265

CHAPTER 13 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorPlus Series: EMU4-*M1-MB, EMU4-*A2-MB, EMU4-*X4-MB)

266

13.1 Setting Method.	266
13.2 List of Applicable Protocols.	266

13.3	Details of Applicable Protocols	277
	RD: [EMU4-*M1] Phase Wire System	277
	RD: [EMU4-*M1] Primary Voltage (L-L: Line)	277
	RD: [EMU4-*M1] Primary Voltage (L-N: Phase)	278
	RD: [EMU4-*M1] Secondary Voltage	278
	RD: [EMU4-*M1] Primary Current	278
	RD: [EMU4-*M1] 16 bits Monitor	279
	RD: [EMU4-*M1] 5A Input Change (Sensor Type)	279
	RD: [EMU4-*M1] External Input Method	280
	RD: [EMU4-*M1] External Input Reset Method	280
	RD: [EMU4-*M1] 16 bits Monitor2	281
	RD: [EMU4-*M1] Counting Operating Time	281
	RD: [MEU4-*M1] Counting Operating Time 3side	282
	RD: [EMU4-*M1] Measuring Method Op. Time 3side	282
	RD: [EMU4-*M1] Convert Rate of Pulse	282
	RD: [EMU4-*M1] Energy Converted Rate	283
	RD: [EMU4-*M1] Energy Converted Rate 3side	283
	RD: [EMU4-*M1] 2 Circuit Measuring Setting	283
	RD: [EMU4-*M1] Measuring Method of Op. Time	284
	RD: [EMU4-*M1] Multiplying Factors	284
	RD: [EMU4-*M1] Model Code	285
	RD: [EMU4-*M1] Phase Current	285
	RD: [EMU4-*M1] Phase Current Demand	286
	RD: [EMU4-*M1] Line Voltage	286
	RD: [EMU4-*M1] Phase Voltage	287
	RD: [EMU4-*M1] Phase 3 Power Factor	287
	RD: [EMU4-*M1] Power Factor	288
	RD: [EMU4-*M1] Frequency	288
	RD: [EMU4-*M1] Phase 3 Active Power	288
	RD: [EMU4-*M1] Active Power	289
	RD: [EMU4-*M1] Phase 3 Active Power Demand	289
	RD: [EMU4-*M1] Active Power Demand	289
	RD: [EMU4-*M1] Phase 3 Reactive Power	290
	RD: [EMU4-*M1] Reactive Power	290
	RD: [EMU4-*M1] Apparent Power	291
	RD: [EMU4-*M1] Current Unbalance Rate	291
	RD: [EMU4-*M1] Voltage Unbalance Rate	292
	RD: [EMU4-*M1] VT Use or No-use	292
	RD: [EMU4-*M1] Energy (import)	292
	RD: [EMU4-*M1] Energy (export)	293
	RD: [EMU4-*M1] Reactive Energy	293
	RD: [EMU4-*M1] Energy Extended (import)	293
	RD: [EMU4-*M1] Energy Extended (export)	294
	RD: [EMU4-*M1] Reactive Energy Extended (import)	294
	RD: [EMU4-*M1] Periodic Energy (export)	294
	RD: [EMU4-*M1] Pulse Count	295
	RD: [EMU4-*M1] Operating Time	295
	RD: [EMU4-*M1] Energy 3side (import)	295
	RD: [EMU4-*M1] Energy 3side (export)	296
	RD: [EMU4-*M1] Energy Extended 3side (import)	296
	RD: [EMU4-*M1] Energy Extended 3side (export)	297

RD: [EMU4-*M1] Operating Time 3side.	297
RD: [EMU4-*M1] Periodic Energy 3side	298
RD: [EMU4-*M1] Energy Conversion	298
RD: [EMU4-*M1] Energy Conversion 3side.	298
RD: [EMU4-*M1] Pulse Conversion.	299
RD: [EMU4-*M1] Harmonics Phase Voltage (Total)	299
RD: [EMU4-*M1] Harmonics Phase Voltage (1st)	300
RD: [EMU4-*M1] Harmonics Line Voltage (Total)	300
RD: [EMU4-*M1] Harmonics Line Voltage (1st).	301
RD: [EMU4-*M1] Harmonics Current (Total)	301
RD: [EMU4-*M1] Harmonics Current (1st)	302
RD: [EMU4-*M1] Distortion of HPV (Total)	303
RD: [EMU4-*M1] Distortion of HPV (3rd).	303
RD: [EMU4-*M1] Distortion of HLV (Total).	304
RD: [EMU4-*M1] Distortion of HLV (3rd)	304
RD: [EMU4-*M1] Distortion of HCC (Total)	305
RD: [EMU4-*M1] Distortion of HCC (3rd)	305
WR: [EMU4-*M1] Phase Wire System	306
WR: [EMU4-*M1] Primary Voltage (L-L: Line).	306
WR: [EMU4-*M1] Primary Voltage (L-N: Phase).	307
WR: [EMU4-*M1] Secondary Voltage	307
WR: [EMU4-*M1] Primary Current.	307
WR: [EMU4-*M1] 16 bits Set/Reset Register	308
WR: [EMU4-*M1] 5A Input Change (Sensor Type)	308
WR: [EMU4-*M1] External Input Method.	309
WR: [EMU4-*M1] External Input Reset Method	309
WR: [EMU4-*M1] Counting Operating Time	310
WR: [EMU4-*M1] Counting Operating Time 3side	310
WR: [EMU4-*M1] Measuring Method Op. Time 3side.	311
WR: [EMU4-*M1] Convert Rate of Pulse.	311
WR: [EMU4-*M1] Energy Converted Rate	312
WR: [EMU4-*M1] Energy Converted Rate 3side.	312
WR: [EMU4-*M1] 2 Circuit Measuring Setting.	312
WR: [EMU4-*M1] Measuring Method Op. Time.	313
WR: [EMU4-*M1] VT Use or No-use	313
WR: [EMU4-*M1] Energy (import)	314
WR: [EMU4-*M1] Energy (export)	314
WR: [EMU4-*M1] Reactive Energy	315
WR: [EMU4-*M1] Periodic Energy (export)	315
WR: [EMU4-*M1] Pulse Count	316
WR: [EMU4-*M1] Operating Time	316
WR: [EMU4-*M1] Energy 3side (import)	317
WR: [EMU4-*M1] Energy 3side (export)	318
WR: [EMU4-*M1] Operating Time 3side	318
WR: [EMU4-*M1] Periodic Energy 3side.	319
WR: [EMU4-*M1] Energy Conversion	319
WR: [EMU4-*M1] Energy Conversion 3side	320
WR: [EMU4-*M1] Pulse Conversion	320
RD: [EMU4-*A2] Model Code	321
RD: [EMU4-*A2] 16 bits Monitor	322
RD: [EMU4-*A2] Multiplying Factors	323

RD: [EMU4-*A2] Phase Wire System	323
RD: [EMU4-*A2] Primary Voltage (L-L: Line).	324
RD: [EMU4-*A2] Primary Voltage (L-N: Phase).	324
RD: [EMU4-*A2] Secondary Voltage	325
RD: [EMU4-*A2] 5A Input Change (Sensor Type).	325
RD: [EMU4-*A2] Primary Current	325
RD: [EMU4-*A2] Energy Converted Rate	326
RD: [EMU4-*A2] Energy Converted Rate 3side	326
RD: [EMU4-*A2] Measuring Method Op. Time	327
RD: [EMU4-*A2] Measuring Method Op. Time 3side	327
RD: [EMU4-*A2] 16 bits Monitor2	328
RD: [EMU4-*A2] VT Use or No-use.	329
RD: [EMU4-*A2] 2 Circuit Measuring Setting	329
RD: [EMU4-*A2] Phase Current	330
RD: [EMU4-*A2] Phase Current Demand	331
RD: [EMU4-*A2] Line Voltage	331
RD: [EMU4-*A2] Phase Voltage	332
RD: [EMU4-*A2] Phase 3 Power Factor	332
RD: [EMU4-*A2] Power Factor	333
RD: [EMU4-*A2] Frequency	333
RD: [EMU4-*A2] Phase 3 Active Power	334
RD: [EMU4-*A2] Active Power.	334
RD: [EMU4-*A2] Phase 3 Active Power Demand	335
RD: [EMU4-*A2] Active Power Demand	335
RD: [EMU4-*A2] Phase 3 Reactive Power	336
RD: [EMU4-*A2] Reactive Power	336
RD: [EMU4-*A2] Apparent Power	337
RD: [EMU4-*A2] Current Unbalance Rate.	337
RD: [EMU4-*A2] Voltage Unbalance Rate.	338
RD: [EMU4-*A2] Energy (import).	338
RD: [EMU4-*A2] Energy (export).	339
RD: [EMU4-*A2] Reactive Energy	339
RD: [EMU4-*A2] Energy Extended (import)	340
RD: [EMU4-*A2] Energy Extended (export)	340
RD: [EMU4-*A2] Reactive Energy Extended (import)	341
RD: [EMU4-*A2] Operating Time.	341
RD: [EMU4-*A2] Energy 3side (import).	342
RD: [EMU4-*A2] Energy 3side (export).	342
RD: [EMU4-*A2] Energy Extended 3side (import).	343
RD: [EMU4-*A2] Energy Extended 3side (export).	343
RD: [EMU4-*A2] Operating Time 3side	344
RD: [EMU4-*A2] Energy Conversion.	344
RD: [EMU4-*A2] Energy Conversion 3side	345
WR: [EMU4-*A2] 16 bits Set/Reset Register.	346
WR: [EMU4-*A2] Phase Wire System	347
WR: [EMU4-*A2] Primary Voltage (L-L: Line)	347
WR: [EMU4-*A2] Primary Voltage (L-N: Phase)	348
WR: [EMU4-*A2] Secondary Voltage	348
WR: [EMU4-*A2] 5A Input Change (Sensor Type)	349
WR: [EMU4-*A2] Primary Current	349
WR: [EMU4-*A2] Energy Converted Rate.	350

WR: [EMU4-*A2] Energy Converted Rate 3side	350
WR: [EMU4-*A2] Measuring Method Op. Time	351
WR: [EMU4-*A2] Measuring Method Op. Time 3side	351
WR: [EMU4-*A2] VT Use or No-use	352
WR: [EMU4-*A2] 2 Circuit Measuring Setting	352
WR: [EMU4-*A2] Energy (import)	353
WR: [EMU4-*A2] Energy (export)	354
WR: [EMU4-*A2] Reactive Energy	355
WR: [EMU4-*A2] Operating Time	355
WR: [EMU4-*A2] Energy 3side (import)	356
WR: [EMU4-*A2] Energy 3side (export)	357
WR: [EMU4-*A2] Operating Time 3side	357
WR: [EMU4-*A2] Energy Conversion	358
WR: [EMU4-*A2] Energy Conversion 3side	358
RD: [EMU4-AX4] Model Code	359
RD: [EMU4-AX4] 16 bits Monitor	360
RD: [EMU4-AX4] Measuring Interval	360
RD: [EMU4-AX4] ADC Enable/Disable Setting (CH1/CH2/CH3/CH4)	361
RD: [EMU4-AX4] Input Range Setting (CH1/CH2/CH3/CH4)	361
RD: [EMU4-AX4] Scaling Lower Limit Value (CH1/CH2/CH3/CH4)	362
RD: [EMU4-AX4] Scaling Upper Limit Value (CH1/CH2/CH3/CH4)	362
RD: [EMU4-AX4] ADC Moving Average (CH1/CH2/CH3/CH4)	363
RD: [EMU4-AX4] Analog Value (CH1/CH2/CH3/CH4)	363
RD: [EMU4-AX4] Scaling Value (CH1/CH2/CH3/CH4)	364
WR: [EMU4-AX4] 16 bits Set/Reset Register	365
WR: [EMU4-AX4] Measuring Interval	366
WR: [EMU4-AX4] ADC Enable/Disable Setting (CH1/CH2/CH3/CH4)	366
WR: [EMU4-AX4] Input Range Setting (CH1/CH2/CH3/CH4)	367
WR: [EMU4-AX4] Scaling Lower Limit Value (CH1/CH2/CH3/CH4)	367
WR: [EMU4-AX4] Scaling Upper Limit Value (CH1/CH2/CH3/CH4)	368
WR: [EMU4-AX4] ADC Moving Average (CH1/CH2/CH3/CH4)	368
RD: [EMU4-PX4] Model Code	369
RD: [EMU4-PX4] 16 bits Monitor	369
RD: [EMU4-PX4] Convert Rate of Pulse (CH1/CH2/CH3/CH4)	370
RD: [EMU4-PX4] Measuring Method Op. Time (CH1/CH2/CH3/CH4)	370
RD: [EMU4-PX4] External Input Method (CH1/CH2/CH3/CH4)	371
RD: [EMU4-PX4] External Input Reset Method (CH1/CH2/CH3/CH4)	371
RD: [EMU4-PX4] Contact Input State (CH1/CH2/CH3/CH4)	372
RD: [EMU4-PX4] Pulse Count (CH1/CH2/CH3/CH4)	372
RD: [EMU4-PX4] Operating Time (CH1/CH2/CH3/CH4)	373
RD: [EMU4-PX4] Pulse Conversion (CH1/CH2/CH3/CH4)	373
WR: [EMU4-PX4] 16 bits Set/Reset Register	374
WR: [EMU4-PX4] Convert Rate of Pulse (CH1/CH2/CH3/CH4)	375
WR: [EMU4-PX4] Measuring Method Op. Time (CH1/CH2/CH3/CH4)	375
WR: [EMU4-PX4] External Input Method (CH1/CH2/CH3/CH4)	376
WR: [EMU4-PX4] External Input Reset Method (CH1/CH2/CH3/CH4)	376
WR: [EMU4-PX4] Pulse Count (CH1/CH2/CH3/CH4)	377
WR: [EMU4-PX4] Operating Time (CH1/CH2/CH3/CH4)	377
WR: [EMU4-PX4] Pulse Conversion (CH1/CH2/CH3/CH4)	378
RD: Holding Registers	378
WR: Holding Registers	379

CHAPTER 14 PROTOCOLS SUPPORTED BY Mitsubishi Electric	380
(ME96 SERIES: ME96SSHB-MB, ME96SSRB-MB)	
14.1 Setting Method	380
14.2 List of Applicable Protocols	380
14.3 Details of Applicable Protocols	384
RD: Phase Wiring	384
RD: Primary Voltage	384
RD: Primary Voltage (L-N)	385
RD: Secondary Voltage	385
RD: Primary Current	385
RD: 16 bits Monitor 1	386
RD: Secondary Current	386
RD: Interval Time Constant	387
RD: Subinterval Time Constant	387
RD: 16 bits Monitor 2	388
RD: Multiplying Factors	389
RD: Model Code	389
RD: Phase Current	390
RD: Phase Current Demand	391
RD: Line Voltage	392
RD: Phase Voltage	393
RD: Power Factor	394
RD: Frequency	395
RD: Active Power	395
RD: Rolling Demand (kW) (Last)	396
RD: Reactive Power	396
RD: Apparent Power	397
RD: Rolling Demand (kvar) (Last)	397
RD: Rolling Demand (kVA) (Last)	398
RD: Rolling Demand (kW) (Max.)	398
RD: Rolling Demand (kvar) (Max.)	399
RD: Rolling Demand (kVA) (Max.)	399
RD: Rolling Demand (kW) (Present)	400
RD: Rolling Demand (kvar) (Present)	400
RD: Rolling Demand (kVA) (Present)	401
RD: Rolling Demand (kW) (Predict.)	401
RD: Rolling Demand (kvar) (Predict.)	402
RD: Rolling Demand (kVA) (Predict.)	402
RD: Operating Time 1	403
RD: Operating Time 2	403
RD: Active Energy (import)	403
RD: Active Energy (export)	404
RD: Reactive Energy (import LAG)	404
RD: Reactive Energy (export LAG)	404
RD: Reactive Energy (import LEAD)	405
RD: Reactive Energy (export LEAD)	405
RD: Apparent Energy	405
RD: Periodic Active Energy (Period 1) (import)	406
RD: Periodic Active Energy (Period 2) (import)	406
RD: Periodic Active Energy (Period 3) (import)	406

RD: CO2 Equivalent	407
RD: Harmonics Phase Voltage (Total)	407
RD: Harmonics Phase Voltage (1st)	408
RD: Harmonics Line Voltage (Total)	409
RD: Harmonics Line Voltage (1st)	410
RD: Harmonics Current (Total)	411
RD: Harmonics Current (1st)	412
RD: Harmonics Phase Voltage Distortion (THD)	413
RD: Harmonics Phase Voltage Distortion (3rd)	414
RD: Harmonics Line Voltage Distortion (THD)	415
RD: Harmonics Line Voltage Distortion (3rd)	416
RD: Harmonics Current Distortion (THD)	417
RD: Harmonics Current Distortion (3rd)	418
WR: Phase Wiring	419
WR: Primary Voltage	419
WR: Primary Voltage (L-N)	420
WR: Secondary Voltage	420
WR: Primary Current	420
WR: 16 bits Set/Reset Register 1	421
WR: Secondary Current	422
WR: Interval Time Constant	422
WR: Subinterval Time Constant	422
WR: 16 bits Set/Reset Register 2	423
RD: Holding Registers	423
WR: Holding Registers	424

CHAPTER 15 PROTOCOLS SUPPORTED BY OMRON

(V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN) 425

15.1 Setting Method	425
15.2 List of Applicable Protocols	425
15.3 Details of Applicable Protocols	426
RD: Data	426
RD: ID	426
RD: Tag Communications Option	427
RD: Tag Communications Conditions	427
RD: Noise Level	428
RD: Operating Status	428
RD: Recent Error Query Information	429
RD: Communication Diagnostic Information	430
WR: Data	431
WR: Copy Data	431
WR: Data Fill	432
WR: Lock	432
WR: Restore Data	432
WR: Tag Communications Option	433
WR: Tag Communications Conditions	433
WR: STOP	434
WR: RESET	434
WR: Communication Diagnostic Setting	434
WR: Holding Registers	435

RD: Holding Registers	435
CHAPTER 16 PROTOCOLS SUPPORTED BY Keyence (TR-H, TR-W)	436
16.1 Setting Method.	436
16.2 List of Applicable Protocols	436
16.3 Details of Applicable Protocols	437
RD: Temp Voltage CH Data (float) (CH1-CH8)	437
RD: Temp Voltage CH Data (short) (CH1-CH8)	438
RD: Temp Voltage CH Alarm State (CH1-CH8)	439
RD: Pulse CH Data (float) (CH1-CH4)	440
RD: Pulse CH Data (short) (CH1-CH4)	441
RD: Pulse CH Alarm State (CH1-CH4)	442
RD: Modbus CH Data (float) (CH1-CH4)	443
RD: Modbus CH Data (short) (CH1-CH4)	444
RD: Modbus CH Alarm State (CH1-CH4)	445
RD: Calc. CH Data (float) (CH1-CH4)	446
RD: Calc. CH Data (short) (CH1-CH4)	447
RD: Calc. CH Alarm State (CH1-CH4)	448
RD: External Relay State (1-16)	449
RD: Internal Relay State (1-8)	450
RD: Input Terminal State (1-16)	451
RD: System State	452
RD: Unit Time	452
WR: Modbus CH Data (short) (CH1-CH4)	453
RD: Input Registers	453
WR: Holding Registers	454
CHAPTER 17 PROTOCOLS SUPPORTED BY OMRON (S8VK-X)	455
17.1 Setting Method.	455
17.2 List of Applicable Protocols	455
17.3 Details of Applicable Protocols	456
RD: Status	456
RD: Output Voltage Measured.	457
RD: Output Current Measured.	457
RD: Peak Hold Current Measured.	458
RD: Years Until Replacement	458
RD: Percentage Until Replacement.	459
RD: Total Run Time	459
RD: Continuous Run Time.	459
RD: Product Information	460
WR: Reset Peak Hold Current.	460
RD: Holding Registers	460
WR: Holding Registers	461
CHAPTER 18 PROTOCOLS SUPPORTED BY Yokogawa Electric Corporation (GP10, GX10)	462
18.1 Setting Method.	462
18.2 List of Applicable Protocols	462
18.3 Details of Applicable Protocols	464
RD: [Input Reg] I/O CH Data (32 SINT).	464

RD: [Input Reg] I/O CH Data (32 FLOAT)	464
RD: [Input Reg] I/O CH Data (16 SINT)	465
RD: [Input Reg] I/O CH Status Info.	465
RD: [Input Reg] Math CH Data (32 SINT)	466
RD: [Input Reg] Math CH Data (32 FLOAT)	466
RD: [Input Reg] Math CH Data (16 SINT)	467
RD: [Input Reg] Math CH Status Info.	467
RD: [Input Reg] I/O CH Data Cont. (32 SINT)	468
RD: [Input Reg] I/O CH Data Cont. (32 FLOAT)	468
RD: [Input Reg] I/O CH Data Cont. (16 SINT)	469
RD: [Input Reg] I/O CH Status Info. Cont.	469
RD: [Input Reg] GP Status	470
RD: [Hold Reg] I/O CH Data (32 SINT)	471
RD: [Hold Reg] I/O CH Data (32 FLOAT)	471
RD: [Hold Reg] I/O CH Data (16 SINT)	472
RD: [Hold Reg] I/O CH Status Info.	472
RD: [Hold Reg] I/O CH Data Cont. (32 SINT)	473
RD: [Hold Reg] I/O CH Data Cont. (32 FLOAT)	473
RD: [Hold Reg] I/O CH Data Cont. (16 SINT)	474
RD: [Hold Reg] I/O CH Status Info. Cont.	474
RD: [Hold Reg] Com. CH Data (32 SINT)	475
RD: [Hold Reg] Com. CH Data (32 FLOAT)	475
RD: [Hold Reg] Com. CH Data (16 SINT)	476
RD: [Hold Reg] Com. CH Status Info.	476
RD: [Hold Reg] Internal Switch	477
WR: [Hold Reg] Com. CH Data (32 SINT)	477
WR: [Hold Reg] Com. CH Data (32 FLOAT)	478
WR: [Hold Reg] Com. CH Data (16 SINT)	478
WR: [Hold Reg] Internal Switch	479
WR: [Hold Reg] Start/Stop Recording	479
WR: [Hold Reg] Computation Operation	480
WR: [Hold Reg] All Alarm ACK	480
WR: [Hold Reg] Individual Alarm ACK	481
WR: [Hold Reg] Manual Operation	482
WR: [Hold Reg] Reset a Relative Timer	482
WR: [Hold Reg] Reset a Match Time Timer.	483
WR: [Hold Reg] Write Message	484
WR: [Hold Reg] Batch, Lot Number.	485
WR: [Hold Reg] Alarm Settings	486
WR: [Hold Reg] Alarm Delay Settings	487
RD: Holding Registers	487
WR: Holding Registers	488
RD: Input Registers	488
RD: Coils	489
WR: Coil	489
RD: Input Relays	489

CHAPTER 19 PROTOCOLS SUPPORTED BY Japan Steel Works (J-ADS SERIES) 490

19.1 Setting Method.	490
19.2 List of Applicable Protocols.	490

19.3	Details of Applicable Protocols	491
	RD: Monitor Value Long (0000 - 0017)	491
	RD: Monitor Value Real (0500 - 0523)	492
	RD: Setting Value Long (1000 - 1023)	493
	RD: Setting Value Long (1024 - 1034)	494
	RD: Setting Value Real (1500 - 1520)	495
	RD: Setting Value Real (1521 - 1546)	496
	RD: Setting Value Real (1547 - 1568)	497
	RD: Setting Value Real (1569 - 1592)	498
	RD: Setting Value Real (1593 - 1610)	499
	RD: Measured Value Long (2000 - 2011)	500
	RD: Measured Value Real (2500 - 2514)	501
	RD: Measured Value Real (2515 - 2528)	501
CHAPTER 20 MODBUS/TCP GENERAL PURPOSE PROTOCOL		502
20.1	Setting Method.	502
20.2	List of Applicable Protocols	503
20.3	Details of Applicable Protocols	504
	RD: Read Coils (FC: 01H)	504
	RD: Read Discrete Inputs (FC: 02H)	504
	RD: Read Holding Registers (FC: 03H)	505
	RD: Read Input Registers (FC: 04H)	505
	RD: Read File Record (FC: 14H)	506
	RD/WR: Read/Write Multiple Registers (FC: 17H)	507
	WR: Write Single Coil (FC: 05H)	508
	WR: Write Single Register (FC: 06H)	508
	WR: Write Multiple Coils (FC: 0FH)	509
	WR: Write Multiple Registers (FC: 10H)	509
	WR: Write File Record (FC: 15H)	510
	WR: Mask Write Register (FC: 16H)	511
CHAPTER 21 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorLight Series: EMU4-BD1A-MB, EMU4-HD1A-MB)		512
21.1	Setting Method.	512
21.2	List of Applicable Protocols	512
21.3	Details of Applicable Protocols	516
	RD: Phase Wire System	516
	RD: Primary Voltage (Line Voltage)	516
	RD: Primary Voltage (Phase Voltage)	517
	RD: Secondary Voltage	517
	RD: Primary Current	517
	RD: 16 Bit Monitor	518
	RD: 5A Input Change (Sensor Type)	518
	RD: External Input Method	519
	RD: External Input Reset Method	519
	RD: 16 Bit Monitor 2	520
	RD: Measuring Method Op. Time 3side	521
	RD: Convert Rate of Pulse	521
	RD: Energy Converted Rate	521
	RD: Energy Converted Rate 3side	522

RD: 2 Circuit Measuring Setting	522
RD: Measuring Method of Op. Time	522
RD: Multiplying Factors	523
RD: Model Code	523
RD: Phase Current	524
RD: Phase Current Demand	524
RD: Line Voltage	525
RD: Phase Voltage	525
RD: Phase 3 Power Factor	526
RD: Total Power Factor	526
RD: Frequency	527
RD: Phase 3 Active Power	527
RD: Total Active Power	528
RD: Phase 3 Active Power Demand	528
RD: Total Active Power Demand	529
RD: Phase 3 Reactive Power	529
RD: Total Reactive Power	530
RD: Total Apparent Power	530
RD: Current Unbalance Rate	531
RD: Voltage Unbalance Rate	531
RD: VT Use or No-use	531
RD: Average Value of Ref. Waveform (1 to 20)	532
RD: Standard Deviation of Ref. Waveform (1 to 20)	532
RD: Number of Ref. Waveform Data	532
RD: Waveform Band Monitoring or Not	533
RD: Waveform Band Monitoring Element	533
RD: Sampling Period	534
RD: Bandwidth Setting Value	534
RD: Standard Deviation Lower Limit Set Value	535
RD: Waveform Band Monitoring Value	536
RD: Cumulative Alarm Time Monitor Multiplier	537
RD: Cumulative Alarm Time 2 Monitor Multiplier	537
RD: Integrated Electric Energy (Import)	538
RD: Integrated Electric Energy (Export)	538
RD: Reactive Energy (Import LAG)	539
RD: Integrated Electric Energy Ext. (Import)	539
RD: Integrated Electric Energy Ext. (Export)	540
RD: Reactive Energy Ext. (Import LAG)	540
RD: Periodic Electric Energy (Import)	541
RD: Pulse Count	541
RD: Operating Time	542
RD: Integrated Electric Energy 3side (Import)	542
RD: Integrated Electric Energy 3side (Export)	543
RD: Integrated Energy Ext. 3side (Import)	543
RD: Integrated Energy Ext. 3side (Export)	544
RD: Operating Time 3side	544
RD: Periodic Electric Energy 3side	545
RD: Electric Energy Conversion	545
RD: Electric Energy Conversion 3side	546
RD: Pulse Conversion	546
RD: Harmonics Phase Voltage (Total)	547

RD: Harmonics Phase Voltage (1st)	548
RD: Harmonics Line Voltage (Total)	549
RD: Harmonics Line Voltage (1st)	550
RD: Harmonics Current (Total)	551
RD: Harmonics Current (1st)	552
RD: Harmonics Phase Voltage Distortion (Total)	553
RD: Harmonics Phase Voltage Distortion (3rd)	554
RD: Harmonics Line Voltage Distortion (Total)	555
RD: Harmonics Line Voltage Distortion (3rd)	555
RD: Harmonics Current Content Rate (Total)	556
RD: Harmonics Current Content Rate (3rd)	557
RD: Waveform Data (1 to 20)	557
RD: Number of Waveform Data Acquisition Cycles	558
WR: Phase Wire System	558
WR: Primary Voltage (Line Voltage)	558
WR: Primary Voltage (Phase Voltage)	559
WR: Secondary Voltage	559
WR: Primary Current	559
WR: 16 Bit Set/Reset Register	560
WR: 5A Input Change (Sensor Type)	560
WR: External Input Method	561
WR: External Input Reset Method	561
WR: Measuring Method Op. Time 3side	562
WR: Convert Rate of Pulse	562
WR: Energy Converted Rate	563
WR: Energy Converted Rate 3side	563
WR: 2 Circuit Measuring Setting	564
WR: Measuring Method of Op. Time	564
WR: VT Use or No-use	565
WR: Waveform Band Monitoring or Not	565
WR: Waveform Band Monitoring Element	566
WR: Sampling Period	566
WR: Bandwidth Setting Value	567
WR: Standard Deviation Lower Limit Set Value	567
WR: Waveform Band Monitoring Value	568
WR: Cumulative Alarm Time Monitor Multiplier	569
WR: Cumulative Alarm Time 2 Monitor Multiplier	569
WR: Integrated Electric Energy (Import)	570
WR: Integrated Electric Energy (Export)	570
WR: Reactive Energy (Import LAG)	570
WR: Periodic Electric Energy (Import)	571
WR: Pulse Count	571
WR: Operating Time	571
WR: Integrated Electric Energy 3side (Import)	572
WR: Integrated Electric Energy 3side (Export)	572
WR: Operating Time 3side	573
WR: Periodic Electric Energy 3side	573
WR: Electric Energy Conversion	574
WR: Electric Energy Conversion 3side	574
WR: Pulse Conversion	574
WR: Number of Waveform Data Acquisition Cycles	575

RD: Read Holding Registers	575
WR: Write Multiple Registers	576

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

577

22.1 Setting Method	577
22.2 List of Applicable Protocols	577
22.3 Details of Applicable Protocols	578
RD: running	578
RD: robotmode	578
RD: get loaded program	579
RD: isProgramSaved	579
RD: programState	579
RD: PolyscopeVersion	580
RD: get operational mode	580
RD: safetystatus	581
WR: load<program.urp>	582
WR: play	582
WR: stop	582
WR: pause	583
WR: quit	583
WR: shutdown	583
WR: popup<popup-text>	583
WR: close popup	584
WR: addToLog<log-message>	584
WR: set operational mode manual	584
WR: set operational mode automatic	585
WR: clear operational mode	585
WR: power on	585
WR: power off	585
WR: brake release	586
WR: unlock protective stop	586
WR: close safety popup	586

CHAPTER 23 PROTOCOLS SUPPORTED BY OMRON (V780-HMD68-ETN-**) 587

23.1 Setting Method	587
23.2 List of Applicable Protocols	588
23.3 Details of Applicable Protocols	589
RD: ID	589
RD: Data	589
RD: Multiaccess ID Read Results	590
RD: Multiaccess Data Read Results	591
RD: Multi-Reader/Writer Configuration Settings	592
RD: Model Information	593
RD: Operating Status	593
RD: Multi-Reader/Writer Status	594
RD: System Error Log	595
RD: Command Error Log	596
RD: Noise Level	597
RD: Communications Diagnostic Information	597

WR: Data	599
WR: Lock	600
WR: Data Fill	601
WR: Multiaccess ID Read Settings	601
WR: Multiaccess Data Read Settings	602
WR: Reset	602
WR: Stop	603
WR: Multi-Reader/Writer Configuration Settings	604
WR: Clear System Error Log	605
RD: Read Holding Registers (FNC 03)	605
WR: Write Multiple Registers (FNC 16)	605

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

606

24.1 Setting Method	606
24.2 List of Applicable Protocols	606
24.3 Details of Applicable Protocols	608
RD: CNC Device Basic Information	608
RD: Emergency Stop Status	608
RD: CNC Operation Mode	609
RD: Number of Processed Parts	609
RD: CNC Operating Status	610
RD: Sequence No. of Program in Operation	610
RD: Main Program Name	611
RD: Main Program Comment	611
RD: Tool Number	612
RD: Feed Rate Override	612
RD: Block of the Program in Operation	613
RD: Operation Mode of Spindle (1 - 4)	613
RD: Fast Forward Override	614
RD: Spindle Override	614
RD: Active Axis Name	615
RD: Dry Run	615
RD: Cutting Feed	616
RD: M00	616
RD: M01	617
RD: Cycle Time	617
RD: Load and Speed of Spindle (1 - 4)	618
RD: Insulation Value of Spindle (1 - 4)	619
RD: Feed Rate	619
RD: X Axis Absolute Position and Load Values	620
RD: Y Axis Absolute Position and Load Values	621
RD: Z Axis Absolute Position and Load Values	622
RD: U Axis Absolute Position and Load Values	623
RD: V Axis Absolute Position and Load Values	624
RD: W Axis Absolute Position and Load Values	625
RD: A Axis Absolute Position and Load Values	626
RD: B Axis Absolute Position and Load Values	627
RD: C Axis Absolute Position and Load Values	628
RD: Alarm (1 - 15)	629

RD: Alarm (16 - 30)	630
RD: Alarm (31 - 32)	631
RD: PMC (1 - 20).	632
RD: Macro (1 - 10).	633
RD: Insulation Resistance Value of Axis (1 - 9).	634
RD: Total Travel Amount of Axis (1 - 9)	635
RD: Real Speed for Servo Adjustment of Axis (1-9)	636
RD: Read Input Registers	637

CHAPTER 25 PROTOCOLS SUPPORTED BY SATO (CL4NX(-J) Plus, CL6NX(-J) Plus)

638

25.1 Setting Method.	638
25.2 List of Applicable Protocols	638
25.3 Details of Applicable Protocols	639
WR: Print QR Code	639
WR: Print Barcode	641
WR: Print Characters	644
RD: Enquiry Status	646
WR: Cancel Request	646
WR: Reset	647
WR: Power OFF	647
25.4 Range Setting Values	648
Kanji code specification <KC>	648
Rotation specification <%>	648
Media size specification <A1>	648
Vertical print position specification <V>	649
Horizontal print position specification <H>	649
QR code <2D30>	650
Binary data print specification <DN>	650
Character pitch specification <P>	650
Enlargement ratio specification <L>	650
24 times 24 dot horizontal writing mixed one-byte and two-byte Kanji specification <K9>	651
Barcode specification 	651

CHAPTER 26 PROTOCOLS SUPPORTED BY NACHI-FUJIKOSHI (FD CONTROLLER)

652

26.1 Setting Method.	652
26.2 List of Applicable Protocols	652
26.3 Details of Applicable Protocols	653
RD: GET1	653
RD: GET2	654
WR: QUIT	654

CHAPTER 27 PROTOCOLS SUPPORTED BY SUMITOMO HEAVY INDUSTRIES (SE-EV* SERIES)

655

27.1 Setting Method.	655
27.2 List of Applicable Protocols	655
27.3 Details of Applicable Protocols	657
RD: [SE-EV*]Condition Name	657
RD: [SE-EV*]Molding Machine Status	657

RD: [SE-EV*]Total Number of Shots	658
RD: [SE-EV*]Number of Acceptable Shots	658
RD: [SE-EV*]Time Information	659
RD: [SE-EV*]Position Information	660
RD: [SE-EV*]Pressure Information	661
RD: [SE-EV*]Clamping Force Information	662
RD: [SE-EV*]Actual Temperature	663
RD: [SE-EV*]Fill Time	664
RD: [SE-EV*]Holding Time	665
RD: [SE-EV*]Holding Pressure	666
RD: [SE-EV*]Fill Position	667
RD: [SE-EV*]Fill Speed	668
RD: [SE-EV*]Measurement Delay Time/Cooling Time	669
RD: [SE-EV*]V-P Switch Selection	669
RD: [SE-EV*]Measurement Mode	670
RD: [SE-EV*]Measurement Rotation Acceleration	670
RD: [SE-EV*]Measurement Position	671
RD: [SE-EV*]Suck Back Speed	672
RD: [SE-EV*]Back Pressure Information	673
RD: [SE-EV*]Measurement Rotation Speed	674
RD: [SE-EV*]Measurement Rotation Information	675
RD: [SE-EV*]Plasticization Backward Selection	675
RD: [SE-EV*]Plasticization Backward Information	676
RD: [SE-EV*]Main Molding Temperature Setting	677
RD: [SE-EV*]Clamping Force	678
RD: [SE-EV*]Number of Shots Change Notification	678
RD: Error History Read	679
WR: [SE-EV*]No. of Shots Change Notification On	680
WR: [SE-EV*]No. of Shots Change Notification Off	681
WR: All Data Change Notifications Clear	682
WR: End of Transmission (EOT)	682
RD: Data Read	683
RD: Data Change Notification	683
WR: Data Change Notification On	684
WR: Data Change Notification Off	685
27.4 Library Usage Example	686
Reading molding conditions	686
Data logging	687

INDEX	688
--------------	------------

REVISIONS	690
WARRANTY	691
INFORMATION AND SERVICES	692
TRADEMARKS	692

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

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 (L 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

1

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

1.1 List of Applicable Models

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

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

Manufacturer	Device Type	Model	Communication Destination Port No. (Default)	Protocol Format (Default)	Software version of the engineering tool
Keyence	Recorder	• TR-H • TR-W	502	TCP Active	"1.095Z" or later
Omron	Switching power supply	S8VK-X	502	TCP Active	"1.100E" or later
Yokogawa Electric	Recorder	• GP10 • 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 • EMU4-BD1A-MB • EMU4-HD1A-MB	502	TCP Active	"1.100E" or later
UNIVERSAL ROBOTS	Industrial robot	• UR3e • UR5e • UR10e • UR16e (Dashboard server)	29999	TCP Active	"1.100E" or later
Omron	RFID system	V780 series • V780-HMD68-ETN-**	502	TCP Active	"1.105K" or later
Silex Technology	Protocol converter	• FBR-100AN • FBR-100	502	TCP Active	"1.105K" or later
SATO	Barcode printer	• CL4NX(-J) Plus • 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

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



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

2

YRC1000

For communications with the YRC1000, use the high-speed Ethernet server communication function.

For the setting method of parameters, refer to the manual of YASKAWA Electric Corporation (YRC1000 Ethernet Function Instruction Manual).

DX200

For communications with the DX200, use the DX200 high-speed Ethernet server function.

Change the settings of the DX200 to enable the Ethernet host control function and high-speed Ethernet server function.

For the setting method of parameters, refer to the manuals of YASKAWA Electric Corporation (DX200 Ethernet Function Instruction Manual and DX200 High-Speed Ethernet Server Function Instruction Manual).

FS100

For communications with FS100, use the FS100 high-speed Ethernet server function.

Change the settings of FS100 to enable the Ethernet host control function and high-speed Ethernet server function.

For the setting method of parameters, refer to the manuals of YASKAWA Electric Corporation (FS100 Ethernet Function Instruction Manual and FS100 High-Speed Ethernet Server Function Instruction Manual).

2.2 List of Applicable Protocols

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

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

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

*2 The FS100 is excluded.

2.3 Details of Applicable Protocols

RD: Latest Alarm Data Read

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

Setting data

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

RD: Alarm Data Read

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

Setting data

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

RD: Alarm History Read

Reads the specified alarm number data.

Setting data

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

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

RD: Status Information Read

Reads the status information.

Setting data

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

^{*1} Data to be stored in "Data 1" and "Data 2"

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

RD: Execution Job Information Read

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

Setting data

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

RD: Axis Structure Information Read

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

Setting data

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

RD: Robot Positioning Data Read (Cartesian)

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

Setting data

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

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

Bit	Form		Extension Form	
0	0: Front	1: Back	0: $\theta L < 180$	1: $\theta L \geq 180$
1	0: Upper arm	1: Lower arm	0: $\theta U < 180$	1: $\theta U \geq 180$
2	0: Flip	1: No Flip	0: $\theta B < 180$	1: $\theta B \geq 180$
3	0: $\theta R < 180$	1: $\theta R \geq 180$	0: $\theta E < 180$	1: $\theta E \geq 180$
4	0: $\theta T < 180$	1: $\theta T \geq 180$	0: $\theta W < 180$	1: $\theta W \geq 180$
5	0: $\theta S < 180$	1: $\theta S \geq 180$	—	
6	0: Redundant front	1: Redundant back		
7	0: Previous step regarded reverse conversion specified	1: Type regarded reverse conversion specified		

RD: Robot Positioning Data Read (Pulse)

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

Setting data

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

Point

The normal response for which verification matches differs depending on the robot in use (for seven axes or six axes).

Check the specifications of the robot in use, and set a dummy device for "Device" of unnecessary receive packets ("Normal response (7 Axes)" or "Normal response (6 Axes)").

RD: Normal Deviation Read

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

Setting data

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

Point

The normal response for which verification matches differs depending on the robot in use (for seven axes or six axes).

Check the specifications of the robot in use, and set a dummy device for "Device" of unnecessary receive packets ("Normal response (7 Axes)" or "Normal response (6 Axes)").

RD: Torque Data Read

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

Setting data

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

Point

The normal response for which verification matches differs depending on the robot in use (for seven axes or six axes).

Check the specifications of the robot in use, and set a dummy device for "Device" of unnecessary receive packets ("Normal response (7 Axes)" or "Normal response (6 Axes)").

RD: Emergency Stop IO Data Read

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

Setting data

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

RD: IO Data Read

Reads the IO data of the specified logical number.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Logical No.)	Specify the device that stores the logical number of the target to be read. Logical numbers (values obtained from dividing the logical numbers by 10) that can be specified are as listed below. • 1 to 512: Robot general input signal • 1001 to 1512: Robot general output signal • 2001 to 2512: External input signal • 2701 to 2956: Network input signal • 3001 to 3512: External output signal • 3701 to 3956: Network output signal • 4001 to 4256: Robot specific input signal • 5001 to 5512: Robot specific output signal • 6001 to 6064: Interface panel input signal • 7001 to 7999: Auxiliary relay signal • 8001 to 8512: Robot control status signal • 8701 to 8720: Pseudo input signal
Normal response	IO Data Read Value	Specify the device for storing the read data. The data size to be read is one-byte fixed.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.



All the IO data can be read.

WR: IO Data Write

Writes the IO data into the specified logical number.

Setting data

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

RD: Register Data Read

Reads the register data of the specified register number.

Setting data

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

WR: Register Data Write

Writes data into the specified register number.

Setting data

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



Only the register numbers 0 to 599 can be written.

RD: Byte Variable (B) Read

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

Setting data

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

Point

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

WR: Byte Variable (B) Write

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

Setting data

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

Point

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

RD: Integer Variable (I) Read

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

Setting data

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

Point

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

WR: Integer Variable (I) Write

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

Setting data

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

Point

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

RD: Double-precision Integer Variable (D) Read

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

Setting data

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

Point

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

WR: Double-precision Integer Variable (D) Write

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

Setting data

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

Point

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

RD: Real Variable (R) Read

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

Setting data

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

Point

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

WR: Real Variable (R) Write

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

Setting data

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

Point

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

RD: 16-byte String Variable (S) Read

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

Setting data

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

Point

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

WR: 16-byte String Variable (S) Write

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

Setting data

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

Point

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

WR: Alarm Reset

Resets the alarm.

Setting data

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

WR: Error Cancellation

Cancels the error.

Setting data

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

WR: HOLD On

Turns on HOLD.

Setting data

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

WR: HOLD Off

Turns off HOLD.

Setting data

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

WR: Servo On

Turns on the servo.

Setting data

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

WR: Servo Off

Turns off the servo.

Setting data

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

WR: HLOCK On

Turns on HLOCK.

Setting data

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

WR: HLOCK Off

Turns off HLOCK.

Setting data

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

WR: Operation Cycle Switch (Step)

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

Setting data

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

WR: Operation Cycle Switch (Cycle)

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

Setting data

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

WR: Operation Cycle Switch (Continuation)

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

Setting data

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

WR: Displaying Strings to the Pendant

Displays any specified character string on the programming pendant.

Setting data

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

WR: Start (Job Start)

Starts up the job.

Setting data

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

WR: Job Selection

Selects the execution job (line number 0).

Setting data

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

RD: Management Time Acquisition

Obtains the data of the specified control time.

Setting data

Packet name	Element name	Description
Request	Data Array No. (Management Time Type)	Specify the device that stores the control time type. The type numbers and types of the control time that can be specified are as listed below. • 1: Control power ON time • 10: Servo power ON time (TOTAL) • 11 to 18: Servo power ON time (R1 to R8) • 21 to 44: Servo power ON time (S1 to S24) • 110: Playback time (TOTAL) • 111 to 118: Playback time (R1 to R8) • 121 to 144: Playback time (S1 to S24) • 210: Moving time (TOTAL) • 211 to 218: Moving time (R1 to R8) • 221 to 244: Moving time (S1 to S24) • 301 to 308: Operation time (Application 1 to 8)
Normal response	• Start Time (yyyy/mm/dd hh:mm) • Elapsed Time (000000:00'00)	Specify the device that stores the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: System Information Acquisition

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

Setting data

Packet name	Element name	Description
Request	Data Array No. (System Type)	Specify the device that stores the system type. The system type numbers and system types that can be specified are as listed below. • 11 to 18: Type information (R1 to R8) • 21 to 44: Type information (S1 to S24) • 101 to 108: Application information (Application 1 to 8)
Normal response	• System Software Version • Model/Application • Parameter Version	Specify the device that stores the read data.
Error response	• Status (0: Normal, Others: Error) • Additional Status Size (0: 0, 1: 1, 2: 2 (WORD)) • Additional Status	Specify the device for storing the data.

RD: 32-byte String Variable (S) Read

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

Setting data

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



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

WR: 32-byte String Variable (S) Write

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

Setting data

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



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

3 PROTOCOLS SUPPORTED BY Mitsubishi Electric (CR800)

3.1 Setting Method

CR800

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

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

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

3.2 List of Applicable Protocols

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

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

3.3 Details of Applicable Protocols

RD: DDEVVL* Read (Data type: 0)

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

Setting data

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

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

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

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

Setting data

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 3)

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

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

Setting data

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

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

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

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

Setting data

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

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

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

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

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 5)

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

Setting data

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: DDEVVL* Read (Data type: 7)

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

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the setting value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5056, set C01300.)
	Read Size	Specify the device that stores the size of a string to be read into "Read Size". Set a value (round up to the nearest integer) calculated from (number of characters to be written + 1) / 2 to the specified device using a program or other means.
Normal response	Read Data	Specify the device that stores the read data to "Read Data". The following example shows reading a string-type variable to which a string abcde is set. (If the number of characters to be read is an even number, truncate the last one byte of the read data using a program or other means.) b15 ... b8 b7 ... b0 +0 6H*1 +1 61H (a) 5H*2 +2 63H (c) 62H (b) +3 65H (e) 64H (d)

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

WR: DDEVVL* Write (Data type: 3)

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

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

Setting data

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

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

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

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

Setting data

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

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

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

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

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

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

WR: DDEVVL* Write (Data type: 5)

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

Setting data

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

Point

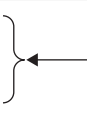
- Use DDEVVL* to assign the robot variable to the D device on the CR800 side beforehand. (Range of D devices that can be set: D4096 to D5119)
- Do not change values of "Static data" other than "Head D Device No. (Element 10)".
- Set the element 1: variable type of DDEVVL* to the program external variable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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

WR: DDEVVL* Write (Data type: 7)

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

Setting data

Packet name	Element name	Description
Request	Head D Device No. (Element 10)	Double-click "Head D Device No. (Element 10)" and rewrite the value to a value specified for the element 10: start D device number of DDEVVL*. Specify the device number as a hexadecimal in the order from lower bytes to upper bytes. (For example, to specify 5056, set C01300.)
	Write Size	Specify the device that stores the size of a string to be written into "Write Size". Set a value (round up to the nearest integer) calculated from (number of characters to be written + 1) / 2 to the specified device using a program or other means.
	Write Data	For "Write Data", specify the device for storing the data to be written. The following example shows writing a string abcde. (If the number of characters to be written is an even number, data of the last one byte is ignored.) b15 b8 b7 ... b0 +0 6H*1 +1 61H (a) 5H*2 +2 63H (c) 62H (b) +3 65H (e) 64H (d)  *1: Write data length (byte) *2: String length (number of characters to be written)
Normal response	—	No setting is required.
Error response	Error Code	Specify the device for storing the error code.

Point

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

 CR800 Series Controller INSTRUCTION MANUAL Detailed explanations of functions and operations

RD: Latest Self-diagnostics Error Read

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

Setting data

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



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

RD: Latest Error Information Read (R/D)

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

Setting data

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



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

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

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

Setting data

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



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

RD: Latest Error Information Read (Q)

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

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



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.



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.



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.



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 66 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: Program Execution Status

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

Setting data

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

Precautions

- Assign the robot data to the holding register according to the list of holding registers. ( Page 66 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: System Total Time

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

Setting data

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

Precautions

- Assign the robot data to the holding register according to the list of holding registers. (☞ Page 66 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

RD: Q Phase Current Value/Current Value

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

Setting data

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

Precautions

- Assign the robot data to the holding register according to the list of holding registers. (☞ Page 66 List of Holding Registers)
- When changing the assignment address, modify the "Start Holding Register No."
- Do not change values of "Fixed Data" other than "Start Holding Register No."

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

Reads the value stored in the digital input for robot data.

In the default setting, the digital input DI [1-16] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the robot input for robot data.

In the default setting, the robot input RI [1-16] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the peripheral device input for robot data.

In the default setting, the peripheral device input UI [1-32] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the peripheral device output for robot data.

In the default setting, the peripheral device output UO [1-32] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the operation panel input for robot data.

In the default setting, the operation panel input SI [0-15] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the operation panel output for robot data.

In the default setting, the operation panel output SO [0-15] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the weld digital input for robot data.

In the default setting, the weld digital input WI [1-32] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the weld digital output for robot data.

In the default setting, the weld digital output WO [1-32] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the weld detection circuit input for robot data.

In the default setting, the weld detection circuit input WSI [1-32] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the weld detection circuit output for robot data.

In the default setting, the weld detection circuit output WSO [1-32] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the digital output for robot data.

In the default setting, the digital output DO [1-16] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the robot output for robot data.

In the default setting, the robot output RO [1-16] is read.

Setting data

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

Precautions

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

RD: Flag (F) [1-16]

Reads the value stored in the flag for robot data.

In the default setting, Flag F [1-16] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the group input for robot data.

In the default setting, the group input GI [1-8] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the group output for robot data.

In the default setting, the group output GO [1-8] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the analog input for robot data.

In the default setting, the analog input AI [1-6] is read.

Setting data

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

Precautions

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

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

Reads the value stored in the analog output for robot data.

In the default setting, the analog output AO [1-2] is read.

Setting data

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

Precautions

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

WR: Flag (F) [1001-1018]

Writes the value to be stored in the flag for robot data.

In the default setting, Flag F [1001-1018] is written.

Setting data

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

Precautions

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

WR: Holding Register 1001 to 1002

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

Setting data

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

Precautions

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

RD: Coils

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

Setting data

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

Precautions

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

RD: Discrete Inputs

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

Setting data

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

Precautions

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

RD: Holding Registers

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

Setting data

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

Precautions

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

RD: Input Registers

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

Setting data

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

Precautions

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

WR: Single Coil

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

Setting data

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

Precautions

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

WR: Single Holding Register

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

Setting data

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

Precautions

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

WR: Multiple Coils

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

Setting data

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

Precautions

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

WR: Multiple Holding Registers

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

Setting data

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

Precautions

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

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

5.1 Setting Method

9UR3e, UR5e, UR10e, UR16e

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

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

5.2 List of Applicable Protocols

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

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

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

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

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

5.3 Details of Applicable Protocols

RD: Controller Version

Reads the value of the controller version.

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: Robot Mode

Reads the value of the robot mode.

Setting data

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

^{*1} The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Robot Status (Bit)

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

Setting data

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

*1 The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Robot Status (Word)

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

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: Current

Reads the robot current and I/O current.

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: Joint Angle

Reads the value of the joint angle.

Setting data

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

*1 The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Joint Angle Velocity

Reads the value of the joint rotation speed.

Setting data

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

*1 The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Joint Current

Reads the value of the joint current.

Setting data

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

^{*1} The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Joint Temperature

Reads the value of the joint temperature.

Setting data

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

^{*1} The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Joint Mode

Reads the value of the joint mode.

Setting data

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

^{*1} The following data is stored.

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

Precautions

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

RD: Joint Revolution Count

Reads the value of the joint revolution.

Setting data

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

^{*1} The following data is stored.

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

Precautions

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

RD: TCP Pause

Reads the value of the TCP pose.

Setting data

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

*¹ The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: TCP Speed

Reads the value of the TCP speed.

Setting data

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

*¹ The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: TCP Offset

Reads the value of the TCP offset.

Setting data

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

*1 The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

RD: Split Time

Reads the value of the split time.

Setting data

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

Precautions

- Do not change values of "Fixed Data".
- Use this protocol after executing WR: Split Time Trigger. Writing a non-zero value to the split time trigger (equivalent to the split time in the UNIVERSAL ROBOTS signal name) stores values in milliseconds, seconds, minutes, hours, and days.
( Page 92 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 95 WR: Digital Outputs 0 (Bit))

WR: Digital Outputs 0-15 (Word)

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

Setting data

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

^{*1} The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

WR: Digital Outputs 0 (Bit)

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

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

Setting data

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

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

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

Precautions

- Do not change values of "Fixed Data" other than "Write Start Number".
- When a value outside the range is written, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".
- To write in batches, use WR: Digital output 0 to 15 (bit type). ( Page 94 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 98 WR: Configurable Outputs 0 (Bit))
- This protocol cannot be used when configurable outputs are used as safety I/O. When used, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

WR: Configurable Outputs 0-15 (Word)

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

Setting data

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

^{*1} The following data is stored.

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

Precautions

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

WR: Configurable Outputs 0 (Bit)

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

The default value is set to write data into the configurable output 0 in which the element 6: Write Start Number is set to 88H.

Setting data

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

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

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

Precautions

- Do not change values of "Fixed Data" other than "Write Start Number".
- When a value outside the range is written, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".
- To write in batches, use WR: Configurable output 0-7 (bit type). ( Page 97 WR: Configurable Outputs 0-7 (Bit))
- This protocol cannot be used when configurable outputs are used as safety I/O. When used, 02H: ILLEGAL_DATA_ACCESS is stored in the "Abnormal Response Code".

RD: Analog Input 0

Reads the value of the analog input 0.

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: Analog Input 0 Domain

Reads the unit of the analog input 0.

Setting data

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

Precautions

Do not change values of "Fixed Data".

WR: Analog Input 0 Domain

Writes the unit into the analog input 0.

Setting data

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

Precautions

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

RD: Analog Input 1

Reads the value of the analog input 1.

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: Analog Input 1 Domain

Reads the unit of the analog input 1.

Setting data

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

Precautions

Do not change values of "Fixed Data".

WR: Analog Input 1 Domain

Writes the unit into the analog input 1.

Setting data

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

Precautions

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

RD: Analog Output 0

Reads the value and unit of the analog output 0.

Setting data

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

*1 The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

WR: Analog Output 0

Writes the value and unit into the analog output 0.

Setting data

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

*1 The following data is stored.

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

Precautions

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

RD: Analog Output 1

Reads the value and unit of the analog output 1.

Setting data

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

*1 The following data is stored.

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

Precautions

Do not change values of "Fixed Data".

WR: Analog Output 1

Writes the value and unit into the analog output 1.

Setting data

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

*1 The following data is stored.

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

Precautions

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

RD: Tool Output Voltage

Reads the value of the tool power supply voltage.

Setting data

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

Precautions

Do not change values of "Fixed Data".

WR: Tool Output Voltage

Writes the value into the tool power supply voltage.

Setting data

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

Precautions

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

RD: Tool Digital Input

Reads the value of the tool digital input.

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: Tool Digital Output

Reads the value of the tool digital output.

Setting data

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

Precautions

Do not change values of "Fixed Data".

WR: Tool Digital Output

Writes the value into the tool digital output.

Setting data

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

Precautions

Do not change values of "Fixed Data".

RD: General Register

Reads the value of the general register for two words.

Setting data

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

Precautions

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

WR: General Register

Writes the value into the general register for two words.

Setting data

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

Precautions

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

RD: Coils

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

Setting data

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

Precautions

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

RD: Discrete Inputs

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

Setting data

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

Precautions

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

RD: Holding Registers

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

Setting data

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

Precautions

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

RD: Input Registers

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

Setting data

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

Precautions

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

WR: Single Coil

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

Setting data

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

Precautions

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

WR: Single Holding Register

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

Setting data

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

Precautions

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

WR: Multiple Coils

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

Setting data

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

Precautions

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

WR: Multiple Holding Registers

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

Setting data

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

Precautions

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

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

6.1 Setting Method

FB100

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

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

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

FB400, FB900

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

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

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

Restriction

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

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

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

6.2 List of Applicable Protocols

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

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

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

6.3 Details of Applicable Protocols

RD: Measured Value (PV) (Address 1)

Reads the Measured Value (PV) stored in register address 0.

The default value is set to read the Measured Value (PV) of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

Ex.

20.0°C is read as 200 (00C8H). -20.0°C is read as -200 (FF38H (0000H-00C8H)).

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

Reads the input value of Current Transformer 1 (CT1) stored in register address 32.

The default value is set to read the input value of Current Transformer 1 (CT1) of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

Ex.

30.0A is read as 300 (012CH).

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

Reads the input value of Current Transformer 2 (CT2) stored in register address 64.

The default value is set to read the input value of Current Transformer 2 (CT2) of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

Ex.

30.0A is read as 300 (012CH).

RD: Set Value (SV) (Address 1)

Reads the Set Value (SV) stored in register address 96.

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

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

Setting data

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

Precautions

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

Ex.

20.0°C is read as 200 (00C8H). -20.0°C is read as -200 (FF38H (0000H-00C8H)).

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

Reads the operation output value 1 (MV1) [heat-side] stored in register address 416.

The default value is set to operation output value 1 (MV1) [heat-side] of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

Ex.

30.0% is read as 300 (012CH).

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

Reads the operation output value 2 (MV2) [cool-side] stored in register address 448.

The default value is set to operation output value 2 (MV2) [cool-side] of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

Ex.

30.0% is read as 300 (012CH).

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

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

Setting data

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

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

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

Precautions

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

RD: Output State (Address 1)

Reads the Output State stored in register address 544.

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

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

Setting data

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

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

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

Precautions

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

RD: Operation Mode State (Address 1)

Reads the Operation Mode State stored in register address 576.
The default value is set to read the Operation Mode State of a single digital indication controller (address 1).
When reading the values of multiple digital indication controllers, refer to the setting details of the setting data.

Setting data

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

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

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

Precautions

Do not change values other than setting data.

RD: Heater Break Alarm 1 State (Address 1)

Reads the Heater Break Alarm 1 (HBA1) State stored in register address 352.

The default value is set to read the Heater Break Alarm 1 (HBA1) State of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

RD: Heater Break Alarm 2 State (Address 1)

Reads the Heater Break Alarm 2 (HBA2) State stored in register address 384.

The default value is set to read the Heater Break Alarm 2 (HBA2) State of a single digital indication controller (address 1).

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

Setting data

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

Precautions

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

RD: Error Code (Address 1)

Reads the Error Code stored in register address 480.

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

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

Setting data

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

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

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

Precautions

Do not change values other than setting data.

RD: Interlock State (Address 1)

Reads the Interlock State stored in register address 1184.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: Set Value (SV) (Address 1)

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

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

When writing into the multiple digital indication controllers

Setting data

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

When writing into a single digital indication controller

Setting data

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

Precautions

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

Ex.

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

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

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

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

When writing into the multiple digital indication controllers

Setting data

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

When writing into a single digital indication controller

Setting data

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

Precautions

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

Ex.

30.0A is specified as 300 (012CH).

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

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

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

When writing into the multiple digital indication controllers

Setting data

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

When writing into a single digital indication controller

Setting data

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

Precautions

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

Ex.

30.0A is specified as 300 (012CH).

WR: Memory Area Transfer (Address 1)

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

When writing into the multiple digital indication controllers

Setting data

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

When writing into a single digital indication controller

Setting data

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

Precautions

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

WR: Auto Mode Transfer (Address 1)

Switches to the auto mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: Manual Mode Transfer (Address 1)

Switches to the manual mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: RUN (Address 1)

Switches to the RUN mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: STOP (Address 1)

Switches to the STOP mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: PID/AT Transfer (Address 1)

Switches to PID control mode or auto tuning (AT) mode.

The default value is set to write the PID/AT Transfer into a single digital indication controller (address 1). (0: PID Control, 1: Auto Tuning (AT))

When the auto tuning (AT) ends, the control automatically returns to 0: PID control.

When writing into the multiple digital indication controllers

Setting data

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

When writing into a single digital indication controller

Setting data

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

Precautions

Do not change values other than setting data.

WR: Interlock Release (Address 1)

Writes the Interlock Release in register address 1184.

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

When writing into the multiple digital indication controllers

Setting data

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

When writing into a single digital indication controller

Setting data

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

Precautions

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

WR: Single Holding Register

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

Setting data

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

Precautions

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

RD: Holding Registers

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

Setting data

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

Precautions

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

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

7.1 Setting Method

COM-JL

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

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

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

Restriction

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

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

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

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

7.2 List of Applicable Protocols

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

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

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

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

7.3 Details of Applicable Protocols

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

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

Setting data

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

Precautions

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

Ex.
20.0°C is read as 200 (00C8H). -20.0°C 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 $(832 + 4 \times (\text{module address} - 1))$. Specify the value within the range of 832 to 892 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 892, set 037CH.)
Normal response	- MV [heat-side] (CH1) - MV [heat-side] (CH2) - MV [heat-side] (CH3) - MV [heat-side] (CH4)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

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

Ex.

Displays 30.0% as 300 (012CH).

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

Reads the MV [cool-side] of CH1 to CH4 stored in register addresses 896 to 899.

The default value is set to read the MV [cool-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-JL.

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

Setting data

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

Precautions

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

Ex.

Displays 30.0% as 300 (012CH).

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

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

Setting data

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

Precautions

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

Ex.

20.0°C is read as 200 (00C8H). -20.0°C 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 $(1536 + 4 \times (\text{module address} - 1))$. Specify the value within the range of 1536 to 1596 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1596, set 063CH.)
Normal response	- Comprehensive Event State (CH1)^{*1} - Comprehensive Event State (CH2)^{*1} - Comprehensive Event State (CH3)^{*1} - Comprehensive Event State (CH4)^{*1}	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

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

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

Precautions

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

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

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

Setting data

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

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

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

Precautions

Do not change values other than setting data.

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

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

Setting data

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

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

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

Precautions

Do not change values other than setting data.

RD: [Z-TIO] Error Code

Reads the Error Code stored in register address 960.

The default value is set to read the Z-TIO module (address 1) error code connected to COM-JL.

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

Setting data

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

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

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

Precautions

Do not change values other than setting data.

RD: [Z-DIO] Error Code

Reads the Error Code stored in register address 976.

The default value is set to read the Z-DIO module (address 17) error code connected to COM-JL.

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

Setting data

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

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

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

Precautions

Do not change values other than setting data.

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

Writes the CH1 Set Value (SV) in register address 2816.

The default value is set to write the Set Value (SV) of CH1 of the Z-TIO module (address 1) connected to COM-JL.

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

Setting data

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

Precautions

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

Ex.

20.0°C is specified as 200 (00C8H). For -20.0°C, 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 $(2817 + 4 \times (\text{module address} - 1))$. Specify the value within the range of 2817 to 2877 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2877, set 0B3DH.)
	Set Value (SV) (CH2)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

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

Ex.

20.0°C is specified as 200 (00C8H). For -20.0°C, 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 $(2818 + 4 \times (\text{module address} - 1))$. Specify the value within the range of 2818 to 2878 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2878, set 0B3EH.)
	Set Value (SV) (CH3)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

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

Ex.

20.0°C is specified as 200 (00C8H). For -20.0°C, 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 $(2819 + 4 \times (\text{module address} - 1))$. Specify the value within the range of 2819 to 2879 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2879, set 0B3FH.)
	Set Value (SV) (CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

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

Ex.

20.0°C is specified as 200 (00C8H). For -20.0°C, 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 $(2304 + 4 \times (\text{module address} - 1))$. Specify the value within the range of 2304 to 2364 that is a multiple of 4 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2364, set 093CH.)
	Memory Area Number (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

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

Writes the Memory Area No. (1 to 8) to be used as the CH2 control area in register address 2305.

The default value is set to write the Memory Area No. of CH2 of the Z-TIO module (address 1) connected to COM-JL.

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Writes the Memory Area No. (1 to 8) to be used as the CH3 control area in register address 2306.

The default value is set to write the Memory Area No. of CH3 of the Z-TIO module (address 1) connected to COM-JL.

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

Setting data

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

Precautions

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

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

Writes the Memory Area No. (1 to 8) to be used as the CH4 control area in register address 2307.

The default value is set to write the Memory Area No. of CH4 of the Z-TIO module (address 1) connected to COM-JL.

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

Setting data

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

Precautions

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

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

Switches CH1 to PID control mode or auto tuning (AT) mode.

The default value is set to switch CH1 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Switches CH2 to PID control mode or auto tuning (AT) mode.

The default value is set to switch CH2 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Switches CH3 to PID control mode or auto tuning (AT) mode.

The default value is set to switch CH3 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))

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

Setting data

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

Precautions

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

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

Switches CH4 to PID control mode or auto tuning (AT) mode.

The default value is set to switch CH4 of the Z-TIO module (address 1) connected to COM-JL to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))

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

Setting data

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

Precautions

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

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

Switches CH1 to the auto mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Switches CH2 to the auto mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Switches CH3 to the auto mode.

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

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

Setting data

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

Precautions

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

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

Switches CH4 to the auto mode.

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

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

Setting data

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

Precautions

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

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

Switches CH1 to the manual mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Switches CH2 to the manual mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Switches CH3 to the manual mode.

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

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

Setting data

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

Precautions

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

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

Switches CH4 to the manual mode.

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

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

Setting data

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

Precautions

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

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

Set the CH1 operation mode.

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

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

Setting data

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

*1 Set the following data.

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

Precautions

Do not change values other than setting data.

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

Set the CH2 operation mode.

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

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

Setting data

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

*1 Set the following data.

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

Precautions

Do not change values other than setting data.

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

Set the CH3 operation mode.

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

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

Setting data

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

*1 Set the following data.

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

Precautions

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

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

Set the CH4 operation mode.

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

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

Setting data

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

*1 Set the following data.

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

Precautions

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

WR: [Z-TIO] RUN

Switches the Z-TIO module to the RUN mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: [Z-TIO] STOP

Switches the Z-TIO module to the STOP mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: [Z-DIO] RUN

Switches the Z-DIO module to the RUN mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

WR: [Z-DIO] STOP

Switches the Z-DIO module to the STOP mode.

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

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Release the CH1 event interlock hold and switch to the execution status.

The default value is set to release the interlock of CH1 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Release the CH2 event interlock hold and switch to the execution status.

The default value is set to release the interlock of CH2 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)

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

Setting data

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

Precautions

Do not change values other than setting data.

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

Release the CH3 event interlock hold and switch to the execution status.

The default value is set to release the interlock of CH3 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)

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

Setting data

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

Precautions

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

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

Release the CH4 event interlock hold and switch to the execution status.

The default value is set to release the interlock of CH4 of the Z-TIO module (address 1) connected to COM-JL. (0: Normal State, 1: Interlock Release Execution)

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

Setting data

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

Precautions

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

WR: Single Holding Register

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

Setting data

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

Precautions

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

RD: Holding Registers

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

Setting data

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

Precautions

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

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

8.1 Setting Method

COM-ME-1

Use the MODBUS/TCP protocol function of the Ethernet [MODBUS/TCP] communication converter COM-ME-1 (for SRZ) to communicate with the SRZ series using COM-ME-1.

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

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

Restriction

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

8.2 List of Applicable Protocols

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

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

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

8.3 Details of Applicable Protocols

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

Reads the Measured Value (PV) of CH1 to CH4 stored in register addresses 508 to 511.

The default value is set to read the Measured Value (PV) of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.

When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

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

Precautions

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

Ex.

20.0°C is read as 200 (00C8H). -20.0°C is read as -200 (FF38H (0000H-00C8H)).

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

Reads the MV [heat-side] of CH1 to CH4 stored in register addresses 716 to 719.

The default value is set to read the MV [heat-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.

When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

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

Precautions

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

Ex.

Displays 30.0% as 300 (012CH).

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

Reads the MV [cool-side] of CH1 to CH4 stored in register addresses 780 to 783.

The default value is set to read the MV [cool-side] of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.

When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

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

Precautions

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

Ex.

Displays 30.0% as 300 (012CH).

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

Reads the Set Value (SV) of CH1 to CH4 stored in register addresses 908 to 911.

The default value is set to read the Set Value (SV) of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.

When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

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

Precautions

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

Ex.

20.0°C is read as 200 (00C8H). -20.0°C is read as -200 (FF38H (0000H-00C8H)).

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

Reads the Comprehensive Event State of CH1 to CH4 stored in register addresses 572 to 575.
The default value is set to read the Comprehensive Event State of CH1 to CH4 of the Z-TIO module (address 1) connected to COM-ME-1.
When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

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

*1 The following data is stored. (0: Off, 1: On)

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

Precautions

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

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

Reads the Digital Input (DI) State stored in register address 15980.

The default value is set to read the Digital Input (DI) State of the Z-DIO module (address 17) connected to COM-ME-1.

When reading the value of multiple Z-DIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-DIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Digital Input (DI) State ^{*1}	Rewrites the data length of the Digital Input (DI) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 17 of Z-DIO module)
Error response	Exception code	Specify the device for storing the read data.

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

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

Precautions

Do not change values other than setting data.

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

Reads the Digital Output (DO) State stored in register address 15996.
The default value is set to read the Digital Output (DO) State of the Z-DIO module (address 17) connected to COM-ME-1.
When reading the value of multiple Z-DIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-DIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Digital Output (DO) State*1	Rewrites the data length of the Digital Output (DO) State to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 17 of Z-DIO module)
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored. (0: Off, 1: On)

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

Precautions

Do not change values other than setting data.

RD: [Z-TIO] Error Code

Reads the Error Code stored in register address 1.

The default value is set to read the Z-TIO module (address 1) error code connected to COM-ME-1.

When reading the value of multiple Z-TIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-TIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Error Code* ¹	Rewrites the data length of the Error Code to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 1 of Z-TIO module)
Error response	Exception code	Specify the device for storing the read data.

*¹ The following data is stored. (When multiple errors occur, the error number will be the same as the total value.)

Value	Data
1	Adjustment data error
2	Data backup error
4	A/D conversion error
32	Custom data error (logical output download data error)

Precautions

Do not change values other than setting data.

RD: [Z-DIO] Error Code

Reads the Error Code stored in register address 17.

The default value is set to read the Z-DIO module (address 17) error code connected to COM-ME-1.

When reading the value of multiple Z-DIO modules connected to COM-ME-1, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Quantity (Number of words) (1)	Rewrites the Quantity (Number of words) (1) to the number of Z-DIO modules to be read. Specify the value within the range of 1 to 16 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 16, set 0010H.)
Normal response	Error Code* ¹	Rewrites the data length of the Error Code to the value of (2 × Quantity (Number of words)). (For example, if the Quantity (Number of words) is 16, specify 32.) Specify the device for storing the read data. (Register contents of multiple modules are stored in the device specified in order from address 17 of Z-DIO module)
Error response	Exception code	Specify the device for storing the read data.

*¹ The following data is stored.

Value	Data
2	Data backup error

Precautions

Do not change values other than setting data.

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

Writes the CH1 Set Value (SV) in register address 2780.

The default value is set to write the Set Value (SV) of CH1 of the Z-TIO module (address 1) connected to COM-ME-1.

When writing the value into another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2780)	Rewrites the register address (2780) to (2780+ (channel No. -1)). Specify the value within the range of 2780 to 2843 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2843, set 0B1BH.)
	Set Value (SV) (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

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

Ex.

20.0°C is read as 200 (00C8H). -20.0°C is read as -200 (FF38H (0000H-00C8H)).

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

Writes the Memory Area No. (1 to 8) to be used as the CH1 control area in register address 2268.

The default value is set to write the Memory Area No. of CH1 of the Z-TIO module (address 1) connected to COM-ME-1.

When writing the value into another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2268)	Rewrites the register address (2268) to (2268+ (channel No. -1)). Specify the value within the range of 2268 to 2331 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2331, set 091BH.)
	Memory Area Number (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use the protocol of CH3 and CH4 for 2-channel type (Z-TIO-B module).

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

Switches CH1 to PID control mode or auto tuning (AT) mode.

The default value is set to switch the Z-TIO module (address 1) connected to COM-ME-1 to PID control mode or auto tuning (AT) mode. (0: PID Control mode, 1: Auto Tuning (AT mode))

When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2060)	Rewrites the register address (2060) to (2060+ (channel No. -1)). Specify the value within the range of 2060 to 2123 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2123, set 084BH.)
	PID/AT Transfer (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- Do not use the protocol of CH3 and CH4 for 2-channel type (Z-TIO-B module).

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

Switches CH1 to the auto mode.

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

When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2124)	Rewrites the register address (2124) to (2124 + (channel No. -1)). Specify the value within the range of 2124 to 2187 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2187, set 088BH.)
	—	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] Manual Mode Transfer (CH1)

Switches CH1 to the manual mode.

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

When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2124)	Rewrites the register address (2124) to (2124 + (channel No. -1)). Specify the value within the range of 2124 to 2187 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2187, set 088BH.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

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

Sets the CH1 operation mode.

This protocol writes the operation mode into holding register 5660.

The default value is set to write the operation mode of CH1 of the Z-TIO module (address 1) connected to COM-ME-1.

When switching the mode of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (5660)	Rewrites the register address (5660) to (5660 + (channel No. -1)). Specify the value within the range of 5660 to 5723 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 5723, set 165BH.)
	Operation Mode (CH1)*1	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

*1 Set the following data.

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

Precautions

Do not change values other than setting data.

WR: [SRZ] RUN

Switches all equipped SRZ units to the RUN mode.

Setting data

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

Precautions

Do not change values other than setting data.

WR: [SRZ] STOP

Switches all equipped SRZ units to the STOP mode.

Setting data

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

Precautions

Do not change values other than setting data.

WR: [Z-TIO] RUN

Switches the Z-TIO module to the RUN mode.

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

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

Setting data

Packet name	Element name	Description
Request	Register address (308)	Rewrites the register address (308) to (308 + (Z-TIO address-1)). Specify the value within the range of 308 to 323 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 323, set 0143H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-TIO] STOP

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

Setting data

Packet name	Element name	Description
Request	Register address (308)	Rewrites the register address (308) to (308 + (Z-TIO address-1)). Specify the value within the range of 308 to 323 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 323, set 0143H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-DIO] RUN

Switches the Z-DIO module to the RUN mode.
The default value is set to switch the first Z-DIO module (address 17) connected to COM-ME-1 to the RUN mode.
When switching the value of the Z-DIO module of addresses 18 to 32, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (324)	Rewrites the register address (324) to (324 + (Z-DIO address-1)). Specify the value within the range of 324 to 339 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 339, set 0153H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: [Z-DIO] STOP

Switches the Z-DIO module to the STOP mode.

The default value is set to switch the first Z-DIO module (address 17) connected to COM-ME-1 to the STOP mode.

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

Setting data

Packet name	Element name	Description
Request	Register address (324)	Rewrites the register address (324) to (324 + (Z-DIO address-1)). Specify the value within the range of 324 to 339 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 339, set 0153H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

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

Release the CH1 event interlock hold and switch to the execution status.

The default value is set to release the interlock of CH1 of the Z-TIO module (address 1) connected to COM-ME-1. (0: Normal State, 1: Interlock Release Execution)

When releasing the interlock of another channel, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Register address (2332)	Rewrites the register address (2332) to (2332 + (channel No. -1)). Specify the value within the range of 2332 to 2395 for the register address of Channel 1 to 64 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 2395, set 095BH.)
	Interlock Release (CH1)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Single Holding Register

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

Setting data

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

Precautions

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

RD: Holding Registers

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

Setting data

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

Precautions

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

9 PROTOCOLS SUPPORTED BY Azbil (NX-D, NX-S, NX-DX, NX-DY)

9.1 Setting Method

NX-D, NX-S, NX-DX, NX-DY

Use the MODBUS/TCP communication function of the NX series instrumentation network module (NX-D/NX-S/NX-DX/NX-DY) to communicate with the NX series.

For steps to set the parameters, refer to the Azbil manual.

- Instrumentation Network Module Manual Network Design
- Functional Description Manual on each Instrumentation Network Module

9.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [NX-D] All Typical Alarms	Reads the All Typical Alarms (logical sum) stored in address 18432.	To be added	Fixed Intrvl
RD: [NX-D] Alarm Information 1 To 4	Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.	To be added	Fixed Intrvl
RD: [NX-D] PV (Loop 1)	Reads the PV value of the Loop 1 stored in address 14356.	To be added	Fixed Intrvl
RD: [NX-D] SP (Loop 1)	Reads the SP Set Value of Loop 1 stored in address 14357.	To be added	Fixed Intrvl
RD: [NX-D] MV (Loop 1)	Reads the MV manipulated value of the Loop 1 stored in address 14358.	To be added	Fixed Intrvl
RD: [NX-D] Event 1 To 16	Reads the Event 1 to 16 stored in addresses 17728 to 17743.	Not to be added	Fixed Intrvl
RD: [NX-D] AT Progress (Loop 1)	Reads the AT progress of the Loop 1 stored in address 10309.	Not to be added	Fixed Intrvl
RD: [NX-D] Heater Line Break Detection	Reads the status of Heater Line Break Detection in CT1 to CT4 stored in addresses 17760 to 17763.	Not to be added	Fixed Intrvl
RD: [NX-D] Overcurrent Detection	Reads the status of Overcurrent Detection in CT1 to CT4 stored in addresses 17764 to 17767.	Not to be added	Fixed Intrvl
RD: [NX-D] Short-circuit Detection	Reads the status of Short-circuit Detection in CT1 to CT4 stored in addresses 17768 to 17771.	Not to be added	Fixed Intrvl
RD: [NX-D] Measured Current When Output ON	Reads the Measured Current When Output ON in CT1 to CT4 stored in addresses 19136 to 19139.	Not to be added	Fixed Intrvl
RD: [NX-D] Measured Current When Output OFF	Reads the Measured Current When Output OFF in CT1 to CT4 stored in addresses 19152 to 19155.	Not to be added	Fixed Intrvl
RD: [NX-D] P Band/I Time/D Time (Loop 1)	Reads the P Band/I Time/D Time of the Loop 1 stored in addresses 14848 to 14850.	Not to be added	Request
WR: [NX-D] LSP (Loop 1)	Writes the LSP Set Value of Loop 1 in address 14593.	Not to be added	Request
WR: [NX-D] RUN (Loop 1)	Switches Loop 1 to the RUN mode.	To be added	Request
WR: [NX-D] READY (Loop 1)	Switches Loop 1 to the READY mode.	To be added	Request
WR: [NX-D] AT Cancel (Loop 1)	Cancel Loop 1 AT.	Not to be added	Request
WR: [NX-D] AT Execute (Loop 1)	Execute Loop 1 AT.	Not to be added	Request
WR: [NX-D] Bias/Ratio (Loop 1)	Writes the Bias and Ratio values of Loop 1 in addresses 9036 and 9037.	Not to be added	Request
WR: [NX-D] Event Setting (Operating Point) (1)	Writes the Event 1 setting (operating point) in addresses 4336 (Event Main Setting) and 4337 (Event Sub-setting).	Not to be added	Request
WR: [NX-D] HTR Burnout Detect Cur Val (Loop 1)	Writes the HTR Burnout Detect Cur Val of Loop 1 in address 11156.	Not to be added	Request
WR: [NX-D] Min Cur Val as Overcurrent (Loop 1)	Writes the Min Cur Val as Overcurrent of Loop 1 in address 11157.	Not to be added	Request
WR: [NX-D] Min Cur Val as Short-circuit (Loop 1)	Writes the Min Cur Val as Short-circuit of Loop 1 in address 11158.	Not to be added	Request

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
WR: [NX-D] P Band/I Time/D Time (Loop 1)	Writes the P Band/I Time/D Time of the Loop 1 in addresses 14848 to 14850.	Not to be added	Request
RD: [NX-S] Status	Reads the Display Status and Module Status stored in addresses 4096 and 4097.	Not to be added	Fixed Intrvl
RD: [NX-S] System Error	Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4865 to 4866.	Not to be added	Fixed Intrvl
RD: [NX-S] SV Module Error	Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4897 to 4898.	Not to be added	Fixed Intrvl
RD: [NX-S] IO Mgmt Module Representative Error	Reads the status of Serious Malfunction Flag, Minor Malfunction Flag and Partial Failure Flag stored in addresses 5248 to 5250.	Not to be added	Fixed Intrvl
RD: [NX-S] Communication Representative Error	Reads the status of Communication Representative Error Flag stored in address 5504.	Not to be added	Fixed Intrvl
WR: [NX-S] RUN	Switches the Module Status to the RUN mode.	Not to be added	Request
WR: [NX-S] IDLE	Switches the Module Status to the IDLE mode.	Not to be added	Request
RD: [NX-DX] Alarm Information 1 To 4	Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.	Not to be added	Fixed Intrvl
RD: [NX-DX] DI Input (1 to 16ch)	Reads the DI Input (1 to 16ch) Status stored in address 10832.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Estimate Value (1 to 8ch)	Reads the Pulse Estimate Value in Channel 1 to 8 stored in addresses 11744 to 11759.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Estimate Value (9 to 16ch)	Reads the Pulse Estimate Value in Channel 9 to 16 stored in addresses 11760 to 11775.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Instant Value (1 to 16ch)	Reads the Pulse Instant Value in Channel 1 to 6 stored in addresses 11776 to 11791.	Not to be added	Fixed Intrvl
RD: [NX-DX2] Pulse Count Value (1ch)	Reads the Pulse Count Value in Channel 1 stored in address 11232.	Not to be added	Fixed Intrvl
WR: [NX-DX2] Start Estimating (1ch)	Starts integrating Channel 1.	Not to be added	Request
WR: [NX-DX2] Stop Estimating (1ch)	Stops integrating Channel 1.	Not to be added	Request
WR: [NX-DX2] Reset Estimate Values (1ch)	Resets the Estimate Value of Channel 1.	Not to be added	Request
RD: [NX-DY] Alarm Information 1 To 4	Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.	Not to be added	Fixed Intrvl
RD: [NX-DY] DO Terminal ON/OFF Data	Reads the DO Terminal ON/OFF Data stored in addresses 10464 to 10479.	Not to be added	Fixed Intrvl
WR: [NX-DY] RUN	Switches the Module Status to the RUN mode.	Not to be added	Request
WR: [NX-DY] READY	Switches the Module Status to the READY mode.	Not to be added	Request
RD: Single Holding Register ^{*2}	Reads the value to be stored in the MODBUS holding register device one point at a time.	Not to be added	Request
WR: Single Holding Register ^{*2}	Writes the value into the MODBUS holding register device one point at a time.	Not to be added	Request

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

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

9.3 Details of Applicable Protocols

RD: [NX-D] All Typical Alarms

Reads the All Typical Alarms (logical sum) stored in address 18432.

The logical sum of all alarms is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	All Typical Alarms	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Alarm Information 1 To 4

Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Alarm Information 1^{*1} • Alarm Information 2^{*2} • Alarm Information 3^{*3} • Alarm Information 4^{*4}	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0	PV1 upper limit error (minor failure) AL01
1	PV1 lower limit error (minor failure) AL02
2	PV2 upper limit error (minor failure) AL03
3	PV2 lower limit error (minor failure) AL04
4	PV3 upper limit error (minor failure) AL05
5	PV3 lower limit error (minor failure) AL06
6	PV4 upper limit error (minor failure) AL07
7	PV4 lower limit error (minor failure) AL08
8	AD1 failure (minor failure) AL11
9	AD2 failure (minor failure) AL12
10	AD3 failure (minor failure) AL13
11	AD4 failure (minor failure) AL14
12 to 15	Undefined

*2 The following data is stored.

Bit	Data
0	MFB1 input error (minor failure) AL21
1	MFB1 adjustment error (minor failure) AL22
2	MFB2 input error (minor failure) AL23
3	MFB2 adjustment error (minor failure) AL24
4	CT1 input error (minor failure) AL25
5	CT2 input error (minor failure) AL26
6	CT3 input error (minor failure) AL27
7	CT4 input error (minor failure) AL28
8	Reception monitoring (Representation of 1 to 16) (minor failure) AL31
9	Inter-module communication transmission timeout (minor failure) AL32
10	RS-485 setting error (minor failure) AL33
11	Inter-module communication setting error (minor failure) AL34
12 to 14	Undefined
15	Adjacent ring disconnection (minor failure) AL38

*3 The following data is stored.

Bit	Data
0	Base EEPROM read/write error (major failure) AL87
1	Base EEPROM error (minor failure) AL88
2	Base/body communication setting mismatch (minor failure) AL53
3	Base/body shape mismatch (minor failure) AL54
4	Base verify error (major failure) AL55
5 to 15	Undefined

*4 The following data is stored.

Bit	Data
0	CJ1 error (minor failure) AL71
1	CJ2 error (minor failure) AL72
2	CJ3 error (minor failure) AL73
3	CJ4 error (minor failure) AL74
4 to 5	Undefined
6	EEPROM uninitialized (major failure) AL83
7	MAC address error (major failure) AL84
8	RAM read/write error (major failure) AL85
9	EEPROM read/write error (major failure) AL86
10	RAM error (parameter range) (minor failure) AL94
11	RAM error (adjustment area) (minor failure) AL95
12	Undefined
13	EEPROM error (parameter range) (minor failure) AL97
14	EEPROM error (adjustment area) (minor failure) AL98
15	ROM error (major failure) AL99

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] PV (Loop 1)

Reads the PV value of the Loop 1 stored in address 14356.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14356)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 381CH • Loop 3: 3824H • Loop 4: 382CH
Normal response	PV	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] SP (Loop 1)

Reads the SP Set Value of Loop 1 stored in address 14357.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14357)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 381DH • Loop 3: 3825H • Loop 4: 382DH
Normal response	SP	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] MV (Loop 1)

Reads the MV manipulated value of the Loop 1 stored in address 14358.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14358)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 381EH • Loop 3: 3826H • Loop 4: 382EH
Normal response	MV	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] Event 1 To 16

Reads the Event 1 to 16 stored in addresses 17728 to 17743.

The event status is read as 0: OFF, 1: ON.

Setting data

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

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] AT Progress (Loop 1)

Reads the AT progress of the Loop 1 stored in address 10309.

The AT progress status is stored as 0: Stop, 1 to 8: AT Progress Number.

Setting data

Packet name	Element name	Description
Request	Start Data Address (10309)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2855H • Loop 3: 2865H • Loop 4: 2875H
Normal response	AT Progress Number	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-D] Heater Line Break Detection

Reads the status of Heater Line Break Detection in CT1 to CT4 stored in addresses 17760 to 17763.

The heater disconnection detection is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Heater Line Break Detection • CT2 Heater Line Break Detection • CT3 Heater Line Break Detection • CT4 Heater Line Break Detection	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Overcurrent Detection

Reads the status of Overcurrent Detection in CT1 to CT4 stored in addresses 17764 to 17767.

The overcurrent detection is read as 0: Off, 1: On.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Overcurrent Detection • CT2 Overcurrent Detection • CT3 Overcurrent Detection • CT4 Overcurrent Detection	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Short-circuit Detection

Reads the status of Short-circuit Detection in CT1 to CT4 stored in addresses 17768 to 17771.

The short-circuit detection is read as 0: OFF, 1: ON.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Short-circuit Detection • CT2 Short-circuit Detection • CT3 Short-circuit Detection • CT4 Short-circuit Detection	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Measured Current When Output ON

Reads the Measured Current When Output ON in CT1 to CT4 stored in addresses 19136 to 19139.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Measured Current When Output ON • CT2 Measured Current When Output ON • CT3 Measured Current When Output ON • CT4 Measured Current When Output ON	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] Measured Current When Output OFF

Reads the Measured Current When Output OFF in CT1 to CT4 stored in addresses 19152 to 19155.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Request	• CT1 Measured Current When Output OFF • CT2 Measured Current When Output OFF • CT3 Measured Current When Output OFF • CT4 Measured Current When Output OFF	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

RD: [NX-D] P Band/I Time/D Time (Loop 1)

Reads the P Band/I Time/D Time of the Loop 1 stored in addresses 14848 to 14850.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14848)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 3A0CH • Loop 3: 3A18H • Loop 4: 3A24H
Normal response	• P Band • I Time • D Time	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] LSP (Loop 1)

Writes the LSP Set Value of Loop 1 in address 14593.

Setting data

Packet name	Element name	Description
Request	Write Address (14593)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 3909H • Loop 3: 3911H • Loop 4: 3919H
	LSP	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] RUN (Loop 1)

Switches Loop 1 to the RUN mode.

Setting data

Packet name	Element name	Description
Request	Write Address (14595)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390BH • Loop 3: 3913H • Loop 4: 391BH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] READY (Loop 1)

Switches Loop 1 to the READY mode.

Setting data

Packet name	Element name	Description
Request	Write Address (14595)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390BH • Loop 3: 3913H • Loop 4: 391BH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] AT Cancel (Loop 1)

Cancel Loop 1 AT.

Setting data

Packet name	Element name	Description
Request	Write Address (14597)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390DH • Loop 3: 3915H • Loop 4: 391DH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] AT Execute (Loop 1)

Execute Loop 1 AT.

Setting data

Packet name	Element name	Description
Request	Write Address (14597)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 390DH • Loop 3: 3915H • Loop 4: 391DH
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Bias/Ratio (Loop 1)

Writes the Bias and Ratio values of Loop 1 in addresses 9036 and 9037.

Setting data

Packet name	Element name	Description
Request	Start Data Address (9036)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 236CH • Loop 3: 238CH • Loop 4: 23ACH
	• Bias • Ratio	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Event Setting (Operating Point) (1)

Writes the Event 1 setting (operating point) in addresses 4336 (Event Main Setting) and 4337 (Event Sub-setting).

Setting data

Packet name	Element name	Description
Request	Start Data Address (4336)	When using the protocol for events 2 to 24, rewrite the start data address (4336) to $(4336 + 2 \times (\text{event number} - 1))$. Specify the value within the range of 4336 to 4382 for the start data address of events 1 to 24 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 4382, set 111EH.)
	• Event Main Setting • Event Sub-setting	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Do not change values other than setting data.

WR: [NX-D] HTR Burnout Detect Cur Val (Loop 1)

Writes the HTR Burnout Detect Cur Val of Loop 1 in address 11156.

Setting data

Packet name	Element name	Description
Request	Write Address (11156)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2BA4H • Loop 3: 2BB4H • Loop 4: 2BC4H
	HTR Burnout Detect Cur Val	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Min Cur Val as Overcurrent (Loop 1)

Writes the Min Cur Val as Overcurrent of Loop 1 in address 11157.

Setting data

Packet name	Element name	Description
Request	Write Address (11157)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2BA5H • Loop 3: 2BB5H • Loop 4: 2BC5H
	Min Cur Val as Overcurrent	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] Min Cur Val as Short-circuit (Loop 1)

Writes the Min Cur Val as Short-circuit of Loop 1 in address 11158.

Setting data

Packet name	Element name	Description
Request	Write Address (11158)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 2BA6H • Loop 3: 2BB6H • Loop 4: 2BC6H
	Min Cur Val as Short-circuit	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

WR: [NX-D] P Band/I Time/D Time (Loop 1)

Writes the P Band/I Time/D Time of the Loop 1 in addresses 14848 to 14850.

Setting data

Packet name	Element name	Description
Request	Start Data Address (14848)	When using the protocols for Loop 2 to 4, change to the following values. • Loop 2: 3A0CH • Loop 3: 3A18H • Loop 4: 3A24H
	• P Band • I Time • D Time	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the controller module (NX-D15/25/35).
- Protocols for Loop 3 and Loop 4 are not available for NX-D35.
- Do not change values other than setting data.

RD: [NX-S] Status

Reads the Display Status and Module Status stored in addresses 4096 and 4097.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Display Status^{*1} • Module Status^{*1}	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

^{*1} The following data is stored.

Bit	Data
0	IDLE
1	RUN
2	IDLE (Partial failure occurring)
3	RUN (Partial failure occurring)

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] System Error

Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4865 to 4866.

Each flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Minor Malfunction Flag • Partial Failure Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] SV Module Error

Reads the status of Minor Malfunction Flag and Partial Failure Flag stored in addresses 4897 to 4898.

Each flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Minor Malfunction Flag • Partial Failure Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] IO Mgmt Module Representative Error

Reads the status of Serious Malfunction Flag, Minor Malfunction Flag and Partial Failure Flag stored in addresses 5248 to 5250.

Each flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Serious Malfunction Flag • Minor Malfunction Flag • Partial Failure Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-S] Communication Representative Error

Reads the status of Communication Representative Error Flag stored in address 5504.

The Communication Representative Error Flag is read as 0: no failure, 1: failure.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Communication Representative Error Flag	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

WR: [NX-S] RUN

Switches the Module Status to the RUN mode.

Setting data

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

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

WR: [NX-S] IDLE

Switches the Module Status to the IDLE mode.

Setting data

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

Precautions

- This protocol is available for the supervisor module (NX-S11/12/21).
- Do not change values other than setting data.

RD: [NX-DX] Alarm Information 1 To 4

Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Alarm Information 1^{*1} - Alarm Information 2^{*2} - Alarm Information 3^{*3} - Alarm Information 4^{*4}	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0 to 15	Undefined

*2 The following data is stored.

Bit	Data
0 to 7	Undefined
8	Reception monitoring (Representation of 1 to 16) (minor failure) AL31
9	Inter-module communication transmission timeout (minor failure) AL32
10	RS-485 setting error (minor failure) AL33
11 to 15	Undefined

*3 The following data is stored.

Bit	Data
0	Base EEPROM read/write error (major failure) AL87
1	Base EEPROM error (minor failure) AL88
2 to 15	Undefined

*4 The following data is stored.

Bit	Data
0 to 5	Undefined
6	Base EEPROM uninitialized (major failure) AL83
7	MAC address error (major failure) AL84
8	RAM read/write error (major failure) AL85
9	EEPROM read/write error (major failure) AL86
10	RAM error (parameter range) (minor failure) AL94
11	RAM error (adjustment area) (minor failure) AL95
12	Undefined
13	EEPROM error (parameter range) (minor failure) AL97
14	EEPROM error (adjustment area) (minor failure) AL98
15	ROM error (major failure) AL99

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX1/DX2).
- Do not change values other than setting data.

RD: [NX-DX] DI Input (1 to 16ch)

Reads the DI Input (1 to 16ch) Status stored in address 10832.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	DI Input (1 to 16ch)*1	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0	Status DI01
1	Status DI02
2	Status DI03
3	Status DI04
4	Status DI05
5	Status DI06
6	Status DI07
7	Status DI08
8	Status DI09
9	Status DI010
10	Status DI011
11	Status DI012
12	Status DI013
13	Status DI014
14	Status DI015
15	Status DI016

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX1/DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Estimate Value (1 to 8ch)

Reads the Pulse Estimate Value in Channel 1 to 8 stored in addresses 11744 to 11759.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Pulse Estimate Value 1 (L) • Pulse Estimate Value 1 (H) • Pulse Estimate Value 2 (L) • Pulse Estimate Value 2 (H) • Pulse Estimate Value 3 (L) • Pulse Estimate Value 3 (H) • Pulse Estimate Value 4 (L) • Pulse Estimate Value 4 (H) • Pulse Estimate Value 5 (L) • Pulse Estimate Value 5 (H) • Pulse Estimate Value 6 (L) • Pulse Estimate Value 6 (H) • Pulse Estimate Value 7 (L) • Pulse Estimate Value 7 (H) • Pulse Estimate Value 8 (L) • Pulse Estimate Value 8 (H)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Estimate Value (9 to 16ch)

Reads the Pulse Estimate Value in Channel 9 to 16 stored in addresses 11760 to 11775.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Pulse Estimate Value 9 (L) • Pulse Estimate Value 9 (H) • Pulse Estimate Value 10 (L) • Pulse Estimate Value 10 (H) • Pulse Estimate Value 11 (L) • Pulse Estimate Value 11 (H) • Pulse Estimate Value 12 (L) • Pulse Estimate Value 12 (H) • Pulse Estimate Value 13 (L) • Pulse Estimate Value 13 (H) • Pulse Estimate Value 14 (L) • Pulse Estimate Value 14 (H) • Pulse Estimate Value 15 (L) • Pulse Estimate Value 15 (H) • Pulse Estimate Value 16 (L) • Pulse Estimate Value 16 (H)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Instant Value (1 to 16ch)

Reads the Pulse Instant Value in Channel 1 to 16 stored in addresses 11776 to 11791.

Setting data

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

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DX2] Pulse Count Value (1ch)

Reads the Pulse Count Value in Channel 1 stored in address 11232.

The default value is set to read the pulse count value in Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Start Data Address (11232)	Rewrites the Start Data Address (11232) to $(11232 + 8 \times (\text{channel No.} - 1))$. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (To specify 11352, set 2C58H.)
Normal response	• Estimate Count Value (L) • Estimate Count Value (H) • Instant Count Value (L) • Instant Count Value (H)	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

WR: [NX-DX2] Start Estimating (1ch)

Starts integrating Channel 1.

The default value is set to start integrating of Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Write Address (9024)	Rewrites the Write Address (9024) to $(9024 + 16 \times (\text{channel No.} - 1))$. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 9264, set 2430H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

WR: [NX-DX2] Stop Estimating (1ch)

Stops integrating Channel 1.

The default value is set to Stop integrating of Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Write Address (9024)	Rewrites the Write Address (9024) to $(9024 + 16 \times (\text{channel No.} - 1))$. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 9264, set 2430H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

WR: [NX-DX2] Reset Estimate Values (1ch)

Resets the estimate value of Channel 1.

The default value is set to reset the estimate value of Channel 1 only.

When using the protocols for Channel 2 to 16, refer to the setting details of the setting data.

Setting data

Packet name	Element name	Description
Request	Write Address (9027)	Rewrites the Write Address (9027) to $(9027 + 16 \times (\text{channel No.} - 1))$. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 9267, set 2433H.)
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital input/pulse input module (NX-DX2).
- Do not change values other than setting data.

RD: [NX-DY] Alarm Information 1 To 4

Reads the Alarm Information 1 to 4 stored in addresses 10288 to 10291.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Alarm Information 1^{*1} - Alarm Information 2^{*2} - Alarm Information 3^{*3} - Alarm Information 4^{*4}	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

*1 The following data is stored.

Bit	Data
0 to 15	Undefined

*2 The following data is stored.

Bit	Data
0 to 7	Undefined
8	Reception monitoring (Representation of 1 to 16) (minor failure) AL31
9	Inter-module communication transmission timeout (minor failure) AL32
10	RS-485 setting error (minor failure) AL33
11	Inter-module communication setting error (minor failure) AL34
12 to 14	Undefined
15	Adjacent ring disconnection (minor failure) AL38

*3 The following data is stored.

Bit	Data
0	Base EEPROM read/write error (major failure) AL87
1	Base EEPROM error (minor failure) AL88
2	Base/body communication setting mismatch (minor failure) AL53
3	Base/body shape mismatch (minor failure) AL54
4	Base verify error (major failure) AL55
5 to 15	Undefined

*4 The following data is stored.

Bit	Data
0 to 5	Undefined
6	EEPROM uninitialized (major failure) AL83
7	MAC address error (major failure) AL84
8	RAM read/write error (major failure) AL85
9	EEPROM read/write error (major failure) AL86
10	RAM error (parameter range) (minor failure) AL94
11	RAM error (adjustment area) (minor failure) AL95
12	Undefined
13	EEPROM error (parameter range) (minor failure) AL97
14	EEPROM error (adjustment area) (minor failure) AL98
15	ROM error (major failure) AL99

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

RD: [NX-DY] DO Terminal ON/OFF Data

Reads the DO Terminal ON/OFF Data stored in addresses 10464 to 10479.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• DO Terminal ON/OFF Data 1 • DO Terminal ON/OFF Data 2 • DO Terminal ON/OFF Data 3 • DO Terminal ON/OFF Data 4 • DO Terminal ON/OFF Data 5 • DO Terminal ON/OFF Data 6 • DO Terminal ON/OFF Data 7 • DO Terminal ON/OFF Data 8 • DO Terminal ON/OFF Data 9 • DO Terminal ON/OFF Data 10 • DO Terminal ON/OFF Data 11 • DO Terminal ON/OFF Data 12 • DO Terminal ON/OFF Data 13 • DO Terminal ON/OFF Data 14 • DO Terminal ON/OFF Data 15 • DO Terminal ON/OFF Data 16	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

WR: [NX-DY] RUN

Switches the Module Status to the RUN mode.

Setting data

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

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

WR: [NX-DY] READY

Switches the Module Status to the READY mode.

Setting data

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

Precautions

- This protocol is available for the digital output module (NX-DY1/2).
- Do not change values other than setting data.

RD: Single Holding Register

MODBUS standard function. This protocol reads the value to be stored in the MODBUS holding register device one point at a time.

Setting data

Packet name	Element name	Description
Request	Start Data Address	Specify the device that stores the address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the address 10080, set 2760H.)
Normal response	Read Data	Specify the device for storing the read data.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For the setting range of "Start Data Address", refer to the Azbil manual.

WR: Single Holding Register

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

Setting data

Packet name	Element name	Description
Request	Write Address	Specify the device that stores the address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the address 10080, set 2760H.)
	Write Data	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Exception code	Specify the device for storing the read data.

Precautions

- Do not change values other than setting data.
- For the setting range of "Write Address", refer to the Azbil manual.

10 PROTOCOLS SUPPORTED BY Yokogawa Electric Corporation (UT75A, UT55A, UT35A, UP55A, UP35A)

10.1 Setting Method

UT75A, UT55A, UT35A, UP55A, UP35A

Use the Ethernet communication (MODBUS/TCP) function of the UTAdvanced series digital indicating controller and the program controller (UT75A, UT55A, UT35A, UP55A, and UP35A) to communicate with the UTAdvanced series.

For steps to set the parameters, refer to the Yokogawa Electric manual.

- UTAdvanced Series Communication Interface (RS-485, Ethernet) User's Manual
- User's manual for the controller to be used

10.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Control Setpoint Loop-1	Reads the target control value used in loop 1.	Not to be added	Fixed Intrvl
RD: Measurement Value Loop-1	Reads the measurement input value in loop 1.	To be added	Fixed Intrvl
RD: Control Output Loop-1	Reads the control output value in loop 1.	To be added	Fixed Intrvl
RD: Heat Control Output Loop-1	Reads the heating-side control output value at the heating-side control in loop 1.	To be added	Fixed Intrvl
RD: Cool Control Output Loop-1	Reads the cooling-side control output value at the heating-side control in loop 1.	To be added	Fixed Intrvl
RD: AL1-AL3 Terminal Status	Reads the status of terminals AL1 to AL3.	To be added	Fixed Intrvl
RD: DI Terminal Status	Reads the status of digital input terminals (DI1 to DI3).	Not to be added	Fixed Intrvl
RD: DO Terminal Status (E1)	Reads the status of digital output terminals (DO11 to DO15) of the E1 terminal area.	Not to be added	Fixed Intrvl
RD: Alarm-1 Setpoint Loop-1 (UT)*3	Reads the alarm 1 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-2 Setpoint Loop-1 (UT)*3	Reads the alarm 2 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-3 Setpoint Loop-1 (UT)*3	Reads the alarm 3 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-1 Setpoint Loop-1 (UP)*4	Reads the alarm 1 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-2 Setpoint Loop-1 (UP)*4	Reads the alarm 2 setting value in loop 1.	Not to be added	Fixed Intrvl
RD: Alarm-3 Setpoint Loop-1 (UP)*4	Reads the alarm 3 setting value in loop 1.	Not to be added	Fixed Intrvl
WR: Target Setpoint Loop-1 (UT)*3	Writes a value into the target setting value in loop 1.	To be added	Request
WR: Local Target Setpoint Loop-1 (UP)*4	Writes a value into the local target setting value in loop 1.	To be added	Request
WR: Alarm-1 Setpoint Loop-1 (UT)*3	Writes the alarm 1 setting value in loop 1.	To be added	Request
WR: Alarm-2 Setpoint Loop-1 (UT)*3	Writes the alarm 2 setting value in loop 1.	Not to be added	Request
WR: Alarm-3 Setpoint Loop-1 (UT)*3	Writes the alarm 3 setting value in loop 1.	Not to be added	Request
WR: Alarm-1 Setpoint Loop-1 (UP)*4	Writes the alarm 1 setting value in loop 1.	Not to be added	Request
WR: Alarm-2 Setpoint Loop-1 (UP)*4	Writes the alarm 2 setting value in loop 1.	Not to be added	Request
WR: Alarm-3 Setpoint Loop-1 (UP)*4	Writes the alarm 3 setting value in loop 1.	Not to be added	Request
WR: AUTO Switch Loop-1 (UP)*4	Switches mode to automatic mode in loop 1.	Not to be added	Request
WR: MAN Switch Loop-1 (UP)*4	Switches mode to manual mode in loop 1.	Not to be added	Request
WR: STOP (UT)*3	Switches mode to stop mode in loop 1.	To be added	Request
WR: RUN (UT)*3	Switches mode to run mode in loop 1.	To be added	Request

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
WR: REMOTE Loop-1 (UT) ^{*3}	Switches mode to remote mode in loop 1.	Not to be added	Request
WR: LOCAL Loop-1 (UT) ^{*3}	Switches mode to local mode in loop 1.	Not to be added	Request
WR: Auto-tuning ON Loop-1	Switches auto-tuning mode to on mode in loop 1.	Not to be added	Request
WR: Auto-tuning OFF Loop-1	Switches auto-tuning mode to off mode in loop 1.	Not to be added	Request
WR: RESET (UP) ^{*4}	Stops program operation.	Not to be added	Request
WR: PROG (UP) ^{*4}	Starts program operation.	Not to be added	Request
WR: REMOTE (UP) ^{*5}	Switches mode to remote mode.	Not to be added	Request
WR: LOCAL (UP) ^{*4}	Switches mode to local mode.	Not to be added	Request
WR: HOLD ON (UP) ^{*4}	Suspends program operation.	Not to be added	Request
WR: HOLD OFF (UP) ^{*4}	Restarts program operation.	Not to be added	Request
RD: I relay on Bit-by-bit Basis ^{*2}	Reads on/off status of the specified I relay.	Not to be added	Request
RD: I relays on Word-by-word Basis ^{*2}	Reads on/off status of the I relay in units of words.	Not to be added	Request
RD: D registers on Word-by-word Basis ^{*2}	Reads the value of the specified D register number.	Not to be added	Request
WR: I relay on Bit-by-bit Basis ^{*2}	Writes on/off status into the specified I relay.	Not to be added	Request
WR: I relays on Word-by-word Basis ^{*2}	Writes on/off status into the I relay in units of words.	Not to be added	Request
WR: D registers on Word-by-word Basis ^{*2}	Writes a value into the specified D register number.	Not to be added	Request

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

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

*3 This protocol is available for the UT75A, UT55A, and UT35A.

*4 This protocol is available for the UP55A and UP35A.

*5 This protocol is available for the UP55A.

10.3 Details of Applicable Protocols

RD: Control Setpoint Loop-1

Reads the Control Setpoint Loop-1 stored in the register start number (2004).

The default value is set to read the control target value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2004)	Change the value to 07E3H when reading the control target value in loop 2.
Normal response	Control Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the control target value in loop 2.

RD: Measurement Value Loop-1

Reads the Measurement Value Loop-1 stored in the register start number (2003).

The default value is set to read the measurement input value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2003)	Change the value to 07E2H when reading the measurement input value in loop 2.
Normal response	Measurement Value	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the measurement input value in loop 2.

RD: Control Output Loop-1

Reads the Control Output Loop-1 stored in the register start number (2005).

The default value is set to read the control output value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2005)	Change the value to 07E4H when reading the control output value in loop 2.
Normal response	Control Output	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the control output value in loop 2.

RD: Heat Control Output Loop-1

Reads the Heat Control Output Loop-1 stored in the register start number (2006).

The default value is set to read the heat-side control output value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2006)	Change the value to 07E5H when reading the heating-side control output value in loop 2.
Normal response	Heat Control Output	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the heating-side control output value in loop 2.

RD: Cool Control Output Loop-1

Reads the Cool Control Output Loop-1 stored in the register start number (2007).

The default value is set to read the cooling-side control output value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2007)	Change the value to 07E6H when reading the cooling-side control output value in loop 2.
Normal response	Cool Control Output	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can read the cooling-side control output value in loop 2.

RD: AL1-AL3 Terminal Status

Reads the AL1-AL3 Terminal Status stored in the register start number (7611).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	AL1-AL3 Terminal Status ^{*1}	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

^{*1} The following data is stored.

Bit	Symbol	Description
0	OUT_AL1	AL1 terminal status 0: Off 1: On
1	OUT_AL2	AL2 terminal status 0: Off 1: On
2	OUT_AL3	AL3 terminal status 0: Off 1: On
3 to 15	Not used	

Precautions

Do not change values other than setting data.

RD: DI Terminal Status

Reads the DI Terminal Status (standard feature) stored in the register start number (7601).

The default value is set to read the DI terminal status (standard feature).

This protocol can also be used when the data of DI terminal status in the terminal areas (E1 to E4) is read.

Setting data

Packet name	Element name	Description
Request	Register start No. (7601)	To read the values in other terminal areas, change the values as follows. • E1 terminal area: 1DB1H • E2 terminal area: 1DB2H • E3 terminal area: 1DB3H • E4 terminal area: 1DB4H
Normal response	DI Terminal Status *1*2*3*4*5	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

*1 When the DI terminal status (standard feature) is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7601)	0	DI1	DI1 Terminal Status
	1	DI2	DI2 Terminal Status
	2	DI3	DI3 Terminal Status
	3 to 15	Not used	

*2 When data of the E1 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7602)	0	DI11	DI11 Terminal Status
	1	DI12	DI12 Terminal Status
	2	DI13	DI13 Terminal Status
	3	DI14	DI14 Terminal Status
	4	DI15	DI15 Terminal Status
	5	DI16	DI16 Terminal Status
	6 to 15	Not used	

*3 When data of the E2 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7603)	0	DI21	DI21 Terminal Status
	1	DI22	DI22 Terminal Status
	2	DI23	DI23 Terminal Status
	3	DI24	DI24 Terminal Status
	4	DI25	DI25 Terminal Status
	5	DI26	DI26 Terminal Status
	6 to 15	Not used	

*4 When data of the E3 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7604)	0	DI31	DI31 Terminal Status
	1	DI32	DI32 Terminal Status
	2	DI33	DI33 Terminal Status
	3	DI34	DI34 Terminal Status
	4	DI35	DI35 Terminal Status
	5 to 15	Not used	

*5 When data of the E4 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7605)	0	DI41	DI41 Terminal Status
	1	DI42	DI42 Terminal Status
	2	DI43	DI43 Terminal Status
	3	DI44	DI44 Terminal Status
	4	DI45	DI45 Terminal Status
	5	DI46	DI46 Terminal Status
	6 to 15	Not used	

Precautions

Do not change values other than setting data.

RD: DO Terminal Status (E1)

Reads the DO Terminal Status (E1) stored in the register start number (7612).

This protocol can be used when the data of DO terminal status in the terminal areas (E2 to E4) is read.

Setting data

Packet name	Element name	Description
Request	Register start No. (7612)	To read the values in other terminal areas, change the values as follows. • E2 terminal area: 1DBCH • E3 terminal area: 1DBDH • E4 terminal area: 1DBEH
Normal response	DO Terminal Status (E1)*1*2*3*4	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

*1 When data of the E1 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Description
Register start No. (7612)	0	OUT_DO11	DO11 Terminal Status
	1	OUT_DO12	DO12 Terminal Status
	2	OUT_DO13	DO13 Terminal Status
	3	OUT_DO14	DO14 Terminal Status
	4	OUT_DO15	DO15 Terminal Status
	5 to 15	Not used	

*2 When data of the E2 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7613)	0	OUT_DO21	DO21 Terminal Status
	1	OUT_DO22	DO22 Terminal Status
	2	OUT_DO23	DO23 Terminal Status
	3	OUT_DO24	DO24 Terminal Status
	4	OUT_DO25	DO25 Terminal Status
	5 to 15	Not used	

*3 When data of the E3 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7614)	0	OUT_DO31	DO31 Terminal Status
	1	OUT_DO32	DO32 Terminal Status
	2	OUT_DO33	DO33 Terminal Status
	3	OUT_DO34	DO34 Terminal Status
	4	OUT_DO35	DO35 Terminal Status
	5 to 15	Not used	

*4 When data of the E4 terminal area is read, the following data is stored. (0: Off, 1: On)

D register	Bit	Symbol	Data
Register start No. (7615)	0	OUT_DO41	DO41 Terminal Status
	1	OUT_DO42	DO42 Terminal Status
	2	OUT_DO43	DO43 Terminal Status
	3	OUT_DO44	DO44 Terminal Status
	4	OUT_DO45	DO45 Terminal Status
	5 to 15	Not used	

Precautions

Do not change values other than setting data.

RD: Alarm-1 Setpoint Loop-1 (UT)

Reads the Alarm-1 Setpoint Loop-1 stored in the register start number (2104).

The default value is set to read the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2104)	Change the value to 0869H when reading the alarm 1 setting value in loop 2.
Normal response	Alarm-1 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can read the alarm 1 setting value in loop 2.

RD: Alarm-2 Setpoint Loop-1 (UT)

Reads the Alarm-2 Setpoint Loop-1 (UT) stored in the register start number (2105).

The default value is set to read the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2105)	Change the value to 086AH when reading the alarm 2 setting value in loop 2.
Normal response	Alarm-2 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can read the alarm 2 setting value in loop 2.

RD: Alarm-3 Setpoint Loop-1 (UT)

Reads the Alarm-3 Setpoint Loop-1 stored in the register start number (2106).

The default value is set to read the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2106)	Change the value to 086BH when reading the alarm 3 setting value in loop 2.
Normal response	Alarm-3 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can read the alarm 3 setting value in loop 2.

RD: Alarm-1 Setpoint Loop-1 (UP)

Reads the Alarm-1 Setpoint Loop-1 stored in the register start number (2351).

The default value is set to read the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2351)	Change the value to 0938H when reading the alarm 1 setting value in loop 2.
Normal response	Alarm-1 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can read the alarm 1 setting value in loop 2.

RD: Alarm-2 Setpoint Loop-1 (UP)

Reads the Alarm-2 Setpoint Loop-1 stored in the register start number (2352).

The default value is set to read the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2352)	Change the value to 0939H when reading the alarm 2 setting value in loop 2.
Normal response	Alarm-2 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can read the alarm 2 setting value in loop 2.

RD: Alarm-3 Setpoint Loop-1 (UP)

Reads the Alarm-3 Setpoint Loop-1 stored in the register start number (2353).
The default value is set to read the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2353)	Change the value to 093AH when reading the alarm 3 setting value in loop 2.
Normal response	Alarm-3 Setpoint	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can read the alarm 3 setting value in loop 2.

WR: Target Setpoint Loop-1 (UT)

Writes the Target Setpoint Loop-1 stored in the register start number (2101).
The default value is set to write the target setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2101)	Change the value to 0866H when reading the target setting value in loop 2.
	Target Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the target setting value in loop 2.

WR: Local Target Setpoint Loop-1 (UP)

Writes the Target Setpoint Loop-1 stored in the register start number (2201).
The default value is set to write the local target setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2201)	Change the value to 0899H when reading the local target setting value in loop 2.
	Local Target Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the local target setting value in loop 2.

WR: Alarm-1 Setpoint Loop-1 (UT)

Writes the Alarm-1 Setpoint Loop-1 stored in the register start number (2104).

The default value is set to write the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2104)	Change the value to 0869H when writing the alarm 1 setting value in loop 2.
	Alarm-1 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the alarm 1 setting value in loop 2.

WR: Alarm-2 Setpoint Loop-1 (UT)

Writes the Alarm-2 Setpoint Loop-1 stored in the register start number (2105).

The default value is set to write the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2105)	Change the value to 086AH when writing the alarm 2 setting value in loop 2.
	Alarm-2 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the alarm 2 setting value in loop 2.

WR: Alarm-3 Setpoint Loop-1 (UT)

Writes the Alarm-3 Setpoint Loop-1 stored in the register start number (2106).

The default value is set to write the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2106)	Change the value to 086BH when writing the alarm 3 setting value in loop 2.
	Alarm-3 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the alarm 3 setting value in loop 2.

WR: Alarm-1 Setpoint Loop-1 (UP)

Writes the Alarm-1 Setpoint Loop-1 stored in the register start number (2351).
The default value is set to write the alarm 1 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2351)	Change the value to 0938H when writing the alarm 1 setting value in loop 2.
	Alarm-1 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the alarm 1 setting value in loop 2.

WR: Alarm-2 Setpoint Loop-1 (UP)

Writes the Alarm-2 Setpoint Loop-1 stored in the register start number (2352).
The default value is set to write the alarm 2 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2352)	Change the value to 0939H when writing the alarm 2 setting value in loop 2.
	Alarm-2 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the alarm 2 setting value in loop 2.

WR: Alarm-3 Setpoint Loop-1 (UP)

Writes the Alarm-3 Setpoint Loop-1 stored in the register start number (2353).
The default value is set to write the alarm 3 setting value in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2353)	Change the value to 093AH when writing the alarm 3 setting value in loop 2.
	Alarm-3 Setpoint	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the alarm 3 setting value in loop 2.

WR: AUTO Switch Loop-1 (UP)

Switches mode to auto mode in loop 1.

The default value is set to write the value of the automatic switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2319)	Change the value to 090FH when writing the automatic switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the value of the automatic switch in loop 2.

WR: MAN Switch Loop-1 (UP)

Switches mode to manual mode in loop 1.

The default value is set to write the value of the manual switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2319)	Change the value to 090FH when writing the value of manual switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UP55A can write the value of the manual switch in loop 2.

WR: STOP (UT)

Switches mode to STOP mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: RUN (UT)

Switches mode to RUN mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: REMOTE Loop-1 (UT)

Switches mode to remote mode in loop 1.

The default value is set to write the value of the remote switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2306)	Change the value to 0902H when writing value of the remote switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the value of the remote switch in loop 2.

WR: LOCAL Loop-1 (UT)

Switches mode to local mode in loop 1.

The default value is set to write the value of the local switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2306)	Change the value to 0902H when writing the value of the local switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A and UT55A can write the value of the local switch in loop 2.

WR: Auto-tuning ON Loop-1

Turns on the auto-tuning in loop 1.

The default value is set to write the value of the auto-tuning on switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2308)	Change the value to 0904H when writing the value of the auto-tuning on switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can write the value of the auto-tuning on switch in loop 2.

WR: Auto-tuning OFF Loop-1

Turns off the auto-tuning in loop 1.

The default value is set to write the value of the auto-tuning off switch in loop 1.

Setting data

Packet name	Element name	Description
Request	Register start No. (2308)	Change the value to 0904H when writing the value of the auto-tuning off switch in loop 2.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Only the UT75A, UT55A, and UP55A can write the value of the auto-tuning off switch in loop 2.

WR: RESET (UP)

Switches mode to program stop mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: PROG (UP)

Switches mode to program start mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: REMOTE (UP)

Switches mode to remote mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: LOCAL (UP)

Switches mode to local mode.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: HOLD ON (UP)

Suspends program operation.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: HOLD OFF (UP)

Restarts program operation.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: I relay on Bit-by-bit Basis

MODBUS standard function. This protocol reads on/off status of the specified I relay number.

Setting data

Packet name	Element name	Description
Request	Start I relay No.	Specify the device that stores the I relay start number for reading. Store the value of the I relay start number -1 in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I4001, set 0FA0H.)
Normal response	I relay content	Specify the device that stores the read data. One byte of the specified device is used.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: I relays on Word-by-word Basis

MODBUS standard function. This protocol reads on/off status of 16 consecutive I relay which starts from the specified I relay start number.

Setting data

Packet name	Element name	Description
Request	Start I relay No.	Specify the device that stores the I relay start number for reading. Store the value of the I relay start number -1 in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I4001, set 0FA0H.)
Normal response	I relay content	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: D registers on Word-by-word Basis

MODBUS standard function. This protocol reads the value of the specified D register number.

Setting data

Packet name	Element name	Description
Request	Register start No.	Specify the device that stores the register start number for reading. Store the value of the D register number -1 to be read in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access D7601, set 1DB0H.)
Normal response	Register Content	Specify the device that stores the read data.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: I relay on Bit-by-bit Basis

MODBUS standard function. This protocol writes on/off status of the specified I relay number.

Setting data

Packet name	Element name	Description
Request	I relay No.	Specify the device that stores the I relay number for writing. Store the value of the I relay number -1 to be written in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I5537, set 15A0H.)
	Write data	For write data, specify the following values. Off: 0000H On: FF00H
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: I relays on Word-by-word Basis

MODBUS standard function. This protocol writes on/off status of 16 consecutive I relay which starts from the specified I relay start number.

Setting data

Packet name	Element name	Description
Request	Start I relay No.	Specify the device that stores the I relay number for writing. Store the value of the I relay number -1 to be written in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access I5537, set 15A0H.)
	Write data	I relay specified by the I relay start number is assigned in order from the 0 bit of the device. Specify the value of each bit in the following. Off: 0 On: 1
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: D registers on Word-by-word Basis

MODBUS standard function. This protocol writes a value into the specified D register number.

Setting data

Packet name	Element name	Description
Request	Register No.	Specify the device that stores the register number for writing. Store the value of the D register number -1 to be written in the device. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to access D7201, set 1C20H.)
	Write data	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

11 PROTOCOLS SUPPORTED BY Mitsubishi Electric (NF250, NF400, NF630, NF800)

11.1 Setting Method

NF250, NF400, NF630, NF800

Use the MODBUS RTU communication function of the MDU breaker to communicate with the MDU breaker.

For the parameter setting method, refer to MDU Breaker Programming Manual MODBUS Communication Version (KGA190085).

Point

To connect to the MDU breaker, a MODBUS TCP-MODBUS RTU (RS-485) protocol converter is required. Wire the Ethernet side of the protocol converter to the RJ71EN71 and the RS-485 side to the MDU breaker. For the protocol converter settings, refer to the instruction manual of the protocol converter to be used.

11.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Line System	Reads the value of the line system.	Not to be added	Request
RD: 16 bit Monitor	Reads the value of the 16 bit monitor.	To be added	Fixed Intrvl
RD: Ip (Pre-alarm Pickup Current)	Reads the value of the pre-alarm current Ip setup register.	Not to be added	Request
RD: TL (LTD Operation Time)	Reads the value of the long-time tripping time TL setup register.	Not to be added	Request
RD: Is (STD Pickup Current)	Reads the value of the short-time tripping current Isd setup register.	Not to be added	Request
RD: Ts (STD Operation Time)	Reads the value of the short-time tripping time Tsd setup register.	Not to be added	Request
RD: li (INST Pickup Current)	Reads the value of the instantaneous tripping current (li) setup register.	Not to be added	Request
RD: Number of Poles	Reads the value of the pole number setup register.	Not to be added	Request
RD: Open / Close Frequency	Reads the total number of times the MDU breaker has opened and closed since the start of use.	To be added	Fixed Intrvl
RD: Trip Frequency	Reads the total number of times the MDU breaker has tripped since the start of use.	To be added	Fixed Intrvl
RD: Rated Current	Reads the CT rated current value.	Not to be added	Request
RD: Current Setting Ir	Reads the rated setting current.	Not to be added	Request
RD: Model Code	Reads the model code.	Not to be added	Request
RD: Phase Current	Reads the following values. • Phase 1 Current (I1) • Phase 2 Current (I2) • Phase 3 Current (I3) • Phase N Current (IN) • Average Current	To be added	Fixed Intrvl
RD: Demand Current	Reads the following values. • Demand Current Phase 1 (I1) • Demand Current Phase 2 (I2) • Demand Current Phase 3 (I3) • Demand Current Phase N (IN)	Not to be added	Fixed Intrvl
RD: Line Voltage	Reads the following values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Voltage (L-L)	To be added	Fixed Intrvl
RD: Phase Voltage	Reads the following values. • Voltage V1N • Voltage V2N • Voltage V3N	To be added	Fixed Intrvl

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
RD: Power Factor	Reads the total power factor current value.	To be added	Fixed Intrvl
RD: Frequency	Reads the frequency current value.	To be added	Fixed Intrvl
RD: Electric Power	Reads the total power current value.	To be added	Fixed Intrvl
RD: Demand Electric Power	Reads the total power demand current value.	Not to be added	Fixed Intrvl
RD: Reactive Power	Reads the total reactive power current value.	To be added	Fixed Intrvl
RD: Demand Reactive Power	Reads the reactive power demand current value.	Not to be added	Fixed Intrvl
RD: Fault Current	Reads the accident current value.	To be added	Fixed Intrvl
RD: Max. Demand Electric Power	Reads the total power demand maximum value.	Not to be added	Fixed Intrvl
RD: Max. Demand Reactive Power	Reads the reactive power demand maximum value.	Not to be added	Fixed Intrvl
RD: Electric Energy	Reads the electric energy.	To be added	Fixed Intrvl
RD: Reactive Energy (LAG)	Reads the reactive energy (LAG).	To be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following values. • Total Harmonics Current Phase 1 (I1) • Total Harmonics Current Phase 2 (I2) • Total Harmonics Current Phase 3 (I3) • Total Harmonics Current Phase N (IN)	Not to be added	Fixed Intrvl
RD: Fundamental Current	Reads the following values. • Fundamental Current Phase 1 (I1) • Fundamental Current Phase 2 (I2) • Fundamental Current Phase 3 (I3) • Fundamental Current Phase N (IN)	Not to be added	Fixed Intrvl
RD: Harmonics Current (3rd)	Reads the following values. • Harmonics Current Phase 1 (I1) • Harmonics Current Phase 2 (I2) • Harmonics Current Phase 3 (I3) • Harmonics Current Phase N (IN)	Not to be added	Fixed Intrvl
WR: Line System	Writes the value of the line system.	Not to be added	Request
WR: Reset Memory	Write 16-bit data to the 16-bit set/reset.	To be added	Request
RD: Holding Registers ^{*2}	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers ^{*2}	Writes the value into the MODBUS holding register device.	Not to be added	Request

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

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

11.3 Details of Applicable Protocols

RD: Line System

This protocol reads the setting value of the line system stored in register address 512.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Line System ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Line system	Setting value
Single-phase 2-wire	0001H
Single-phase 3-wire	0002H
3-phase 3-wire	0003H
3-phase 4-wire	0004H

Precautions

Do not change values other than setting data.

RD: 16 bit Monitor

This protocol reads the 16 bit monitor data stored in register address 524.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	16 bit Monitor ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored. For details on the stored data, refer to MDU Breaker Programming Manual MODBUS Communication Version (KGA190085).

Bit	Description	If the value is 1	If the value is 0
0	AX (on/off state)	On	Off or trip
1	AL (shutdown state)	Trip	On or off
2	PAL (pre-alarm)	With alarm	No alarm
3	Not used	—	—
4	Not used	—	—
5	Not used	—	—
6	LTD (overcurrent cutoff)	Occur	Not occur
7	STD/INST (short circuit break)	Occur	Not occur
8	Current demand lower limit alarm	—	—
9	Current demand upper limit alarm	—	—
10	IDM_AL (current demand alarm)	With alarm	No alarm
11	IUB_AL (current unbalance alarm)	With alarm	No alarm
12	OVER (overcurrent alarm)	With alarm	No alarm
13	ILA_AL (current open phase alarm)	With alarm	No alarm
14	Not used	—	—
15	Not used	—	—

Precautions

Do not change values other than setting data.

RD: Ip (Pre-alarm Pickup Current)

This protocol reads the setting value of pre-alarm current Ip stored in register address 538.

Unit is %.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Ip (Pre-alarm Pickup Current)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: TL (LTD Operation Time)

This protocol reads the setting value of the long-time tripping time TL stored in register address 541.

Unit is 0.1s.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	TL (LTD Operation Time)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Is (STD Pickup Current)

This protocol reads the setting value of the short-time tripping current Isd stored in register address 542.

Unit is $\times 0.1$.

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: li (INST Pickup Current)

This protocol reads the setting value of instantaneous tripping current (li) stored in register address 544.

Unit is $\times 0.1$.

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	li (INST Pickup Current)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Number of Poles

This protocol reads the setting value of the pole number stored in register address 560.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Number of Poles	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Open / Close Frequency

This protocol reads the value of the main module open/close count stored in register address 565, which is the total number of times the MDU breaker has opened and closed since the start of use.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Open / Close Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Trip Frequency

This protocol reads the value of the main module trip count stored in register address 566, which is the total number of times the MDU breaker has tripped since the start of use.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Trip Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Rated Current

This protocol reads the CT rated current setting value stored in register address 592.

Unit is A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Rated Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Current Setting Ir

This protocol reads the rated setting current value stored in register address 700.

Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Current Setting Ir	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Model Code	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Phase Current

This protocol reads the value of current for phases 1, 2, 3, and N, as well as the value of average current, stored in register addresses 768 to 772.

Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Phase 1 Current (I1) • Phase 2 Current (I2) • Phase 3 Current (I3) • Phase N Current (IN) • Average Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Demand Current

This protocol reads the value of current demand for phases 1, 2, 3, and N stored in register addresses 773 to 776.

Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Demand Current Phase 1 (I1) • Demand Current Phase 2 (I2) • Demand Current Phase 3 (I3) • Demand Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Line Voltage

This protocol reads the value of voltage for phases 1-2, 2-3, and 3-1, as well as the value of average voltage (L-L), stored in register addresses 778 to 781.

Unit is 0.1V.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	- Voltage V12 - Voltage V23 - Voltage V31 - Average Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Phase Voltage

This protocol reads the value of voltage for phases 1-N, 2-N, and 3-N stored in register addresses 782 to 784.

Unit is 0.1V.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	- Voltage V1N - Voltage V2N - Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Power Factor

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

Unit is 0.1%.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Power Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Frequency

This protocol reads the frequency current value stored in register address 790.

Unit is 0.1Hz.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Electric Power

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

Unit is 0.1kW.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Electric Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Demand Electric Power

This protocol reads the total power demand current value stored in register address 798.

Unit is 0.1kW.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Demand Electric Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Power

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

Unit is 0.1kvar.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Demand Reactive Power

This protocol reads the reactive power demand current value stored in register address 807.

Unit is 0.1kvar.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Demand Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Fault Current

This protocol reads the accident current value stored in register address 811.

Unit is 1.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Fault Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Max. Demand Electric Power

This protocol reads the total power demand maximum value stored in register address 845.

Unit is 0.1kW.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Max. Demand Electric Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Max. Demand Reactive Power

This protocol reads the reactive power demand maximum value stored in register address 854.

Unit is 0.1kvar.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Max. Demand Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Electric Energy

This protocol reads the value of the electric energy stored in register address 1304.

The unit differs depending on the MDU breaker model.

- For NF250: 0.1kWh
- For NF400, NF630, NF800: kWh

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Electric Energy ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} Two consecutive word devices are used.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (LAG)

This protocol reads the reactive energy (LAG) stored in register address 1308.

The unit differs depending on the MDU breaker model.

- For NF250: 0.1kvarh
- For NF400, NF630, NF800: kvarh

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	Reactive Energy (LAG) ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 Two consecutive word devices are used.

Precautions

Do not change values other than setting data.

RD: Harmonics Current (Total)

This protocol reads the value of total harmonics current for phases 1, 2, 3, and N stored in register addresses 2304 to 2307.

Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Total Harmonics Current Phase 1 (I1) • Total Harmonics Current Phase 2 (I2) • Total Harmonics Current Phase 3 (I3) • Total Harmonics Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Fundamental Current

This protocol reads the value of fundamental harmonics current for phases 1, 2, 3, and N stored in register addresses 2308 to 2311.

Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
Normal response	• Fundamental Current Phase 1 (I1) • Fundamental Current Phase 2 (I2) • Fundamental Current Phase 3 (I3) • Fundamental Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Harmonics Current (3rd)

This protocol reads the value of 3rd harmonics current for phases 1, 2, 3, and N stored in register addresses 2312 to 2315. Unit is 0.1A.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Starting Address (2312)	It is set to read the 3rd order harmonics current value. When another harmonic protocol is used, set the following start address. • 5th: 090CH • 7th: 0910H • 9th: 0914H • 11th: 0918H • 13th: 091CH • 15th: 0920H • 17th: 0924H • 19th: 0928H
Normal response	• Harmonics Current Phase 1 (I1) • Harmonics Current Phase 2 (I2) • Harmonics Current Phase 3 (I3) • Harmonics Current Phase N (IN)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Line System

This protocol writes the setting value of the line system to register address 512.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Line System ^{*1}	Specify the device that stores the setting value of the line system.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Line system	Setting value
Single-phase 2-wire	0001H
Single-phase 3-wire	0002H
3-phase 3-wire	0003H
3-phase 4-wire	0004H

Precautions

Do not change values other than setting data.

WR: Reset Memory

This protocol writes 16-bit data to the 16-bit set/reset of address 523.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	16 bit Reset ^{*1}	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

^{*1} Specify the following data. For details on the data to be specified, refer to MDU Breaker Programming Manual MODBUS Communication Version (KGA190085).

Bit	Description	If the value is 1	If the value is 0
0	Batch reset circuit breaker alarm	Reset	—
1	Erase all memory	Erase all	—
2	Batch erase memory of the harmonics current maximum value of each order	Erase	—
3	Not used	Fixed to "0"	
4	Erase memory of the power factor maximum value	Erase	—
5	Not used	Fixed to "0"	
6	Erase memory of the power demand maximum value	Erase	—
7	Erase memory of accident information (cause + current)	Erase	—
8	Erase memory of the reactive power demand maximum value	Erase	—
9	Erase memory of reactive energy	Erase	—
10	Erase memory of the time reactive energy maximum value	Erase	—
11	Erase memory of the current demand maximum value	Erase	—
12	Erase memory of the voltage maximum value	Erase	—
13	Erase memory of the harmonics current demand maximum value	Erase	—
14	Erase memory of energy	Erase	—
15	Erase memory of the time energy maximum value	Erase	—

Precautions

Do not change values other than setting data.

RD: Holding Registers

This is a MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Starting Address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H)
	Quantity of Registers	Specify the device that stores the data points to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. The range is 0001H to 007DH (1 to 125).)
Normal response	Read Data	Specify the device that stores the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
	Non-conversion Variable: Read Data	Change the byte swap setting according to the specification of the external device.
Error response	Error Code	Specify the device for storing the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

This is a MODBUS standard function.

It writes the value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting to a slave address, specify a range from 1 (default) to 127.
	Starting Address (0)	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H.)
	Quantity of Registers (1)	Specify the device that stores the data points to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 123, set 007BH. The range is 0001H to 007BH (1 to 123).)
	Write Data	Rewrite the data length to the value of (2 × "Number of Register"). (For example, specify 246 for 123.) Specify the device that stores the write data. The number of words specified by the "Number of Register (1)" is used. Change the byte swap setting according to the specification of the external device.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

12 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorLight Series: EMU4-BD1-MB, EMU4-HD1-MB)

12.1 Setting Method

EMU4-BD1-MB, EMU4-HD1-MB

Communication with the EcoMonitorLight series uses the MODBUS RTU communication function of the Mitsubishi Electric Energy Measuring Unit EcoMonitorLight Series.

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

- MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025)
- Energy Measuring Unit User's Manual (Details) (IB63771)

Point

A MODBUS TCP-MODBUS RTU (RS-485) protocol converter is required to connect to EcoMonitorLight. Wire the Ethernet side of the protocol converter to the RJ71EN71 and the RS-485 side to EcoMonitorLight. For the protocol converter settings, refer to the instruction manual of the protocol converter to be used.

12.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Phase Wire System	Reads the value of the phase wire system.	Not to be added	Request
RD: Primary Voltage (L-L: Line Voltage)	Reads the value of the primary line voltage.	Not to be added	Request
RD: Primary Voltage (L-N: Phase Voltage)	Reads the value of the primary phase voltage.	Not to be added	Request
RD: Secondary Voltage	Reads the value of the secondary voltage.	Not to be added	Request
RD: Primary Current	Reads the value of the primary current.	Not to be added	Request
RD: 16 Bits Monitor	Reads the value of the 16 bits monitor.	To be added	Fixed Intrvl
RD: 5A Input Change (Sensor Type)	Reads the value of 5A input switching (sensor type).	Not to be added	Request
RD: Measuring Method of Operating Time	Reads the value of the operating time measuring method.	Not to be added	Request
RD: Multiplying Factors	Reads all multiplying factor values.	To be added	Request
RD: Model Code	Reads the model code value.	Not to be added	Request
RD: Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	To be added	Fixed Intrvl
RD: Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	To be added	Fixed Intrvl
RD: Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	To be added	Fixed Intrvl

Name	Description	Automatic Addition *1	Communication Timing (Default)
RD: Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N	To be added	Fixed Intrvl
RD: Power Factor	Reads the total power factor current value.	To be added	Fixed Intrvl
RD: Frequency	Reads the frequency current value.	To be added	Fixed Intrvl
RD: Active Power	Reads the total power current value.	To be added	Fixed Intrvl
RD: Active Power Demand	Reads the total power demand current value.	To be added	Fixed Intrvl
RD: Reactive Power	Reads the total reactive power current value.	To be added	Fixed Intrvl
RD: Apparent Power	Reads the total apparent power current value.	To be added	Fixed Intrvl
RD: Integrated Electric Energy (import)	Reads the electric energy (import).	To be added	Fixed Intrvl
RD: Integrated Electric Energy (export)	Reads the electric energy (export).	Not to be added	Fixed Intrvl
RD: Reactive Energy (import LAG)	Reads the reactive energy (import LAG).	To be added	Fixed Intrvl
RD: Integrated Electric Energy Extended (import)	Reads the electric energy extended (import).	To be added	Fixed Intrvl
RD: Integrated Electric Energy Extended (export)	Reads the electric energy extended (export).	Not to be added	Fixed Intrvl
RD: Reactive Energy Extended (import LAG)	Reads the reactive energy extended (import LAG).	Not to be added	Fixed Intrvl
RD: Periodic Electric Energy (import)	Reads the periodic electric energy (import).	To be added	Fixed Intrvl
RD: Pulse Count	Reads the pulse count value.	To be added	Fixed Intrvl
RD: Operating Time	Reads the operating time.	To be added	Fixed Intrvl
RD: Harmonics Phase Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Current (1st)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (Total)	Reads the following instantaneous values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (3rd)	Reads the following instantaneous values. • Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (Total)	Reads the following instantaneous values. • THD V12 • THD V23	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
RD: Harmonics Line Voltage Distortion (3rd)	Reads the following instantaneous values. • Harmonics Ratio V12 • Harmonics Ratio V23	Not to be added	Fixed Intrvl
RD: Harmonics Current Content Rate (Total)	Reads the following instantaneous values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl
RD: Harmonics Current Content Rate (3rd)	Reads the following instantaneous values. • Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Not to be added	Fixed Intrvl
WR: Phase Wire System	Writes the value of the phase wire system.	Not to be added	Request
WR: Primary Voltage (L-L: Line Voltage)	Writes the value of the primary line voltage.	Not to be added	Request
WR: Primary Voltage (L-N: Phase Voltage)	Writes the value of the primary phase voltage.	Not to be added	Request
WR: Secondary Voltage	Writes the value of the secondary voltage.	Not to be added	Request
WR: Primary Current	Writes the value of the primary current.	Not to be added	Request
WR: 16 Bits Set/Reset Register	Writes the value to the 16-bit set/reset register.	Not to be added	Request
WR: 5A Input Change (Sensor Type)	Writes the value of 5A input switching (sensor type).	Not to be added	Request
WR: Measuring Method of Operating Time	Writes the operating time measuring method.	Not to be added	Request
WR: Integrated Electric Energy (import)	Writes the electric energy (import).	Not to be added	Request
WR: Integrated Electric Energy (export)	Writes the electric energy (export).	Not to be added	Request
WR: Reactive Energy (import LAG)	Writes the reactive energy (import LAG).	Not to be added	Request
WR: Periodic Electric Energy (import)	Writes the periodic electric energy (import).	Not to be added	Request
WR: Pulse Count	Writes the pulse count value.	Not to be added	Request
WR: Operating Time	Writes the operating time.	Not to be added	Request
RD: Holding Registers ^{*2}	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers ^{*2}	Writes the value to the MODBUS holding register device.	Not to be added	Request

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

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

12.3 Details of Applicable Protocols

RD: Phase Wire System

This protocol reads the setting value of the phase wire system stored in register address 512.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Phase Wire System ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

- Do not change values other than setting data.
- 3P4W is only compatible with the EMU4-HD1-MB.

RD: Primary Voltage (L-L: Line Voltage)

This protocol reads the setting value of the primary line voltage stored in register address 513.

Unit is V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Primary Line Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Voltage (L-N: Phase Voltage)

This protocol reads the setting value of the primary phase voltage stored in register address 515.

Unit is $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Primary Phase Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Current

This protocol reads the setting value of the primary current stored in register address 519.

Unit is $\times 0.1A$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Primary Current	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: 16 Bits Monitor

This protocol reads the 16 bits monitor data stored in register address 524.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 127.
Normal response	16 Bits Monitor ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

The effective bit differs depending on the model. For details, refer to 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 • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • Content Rate of Harmonic Voltage • Detail Electric Energy	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- The EMU4-BD1-MB stores 0 as the multiplying factor for the harmonics current content rate and harmonics voltage content rate.

RD: Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	Model Code ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Model Code	Data
EMU4-BD1-MB	0001H
EMU4-HD1-MB	0002H

Precautions

Do not change values other than setting data.

RD: Phase Current

This protocol reads the value of current for phases 1, 2, 3, and N, as well as the value of average current, stored in register addresses 768 to 772.

Unit is A.

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

^{*1} n is the current multiplying factor data (register address: 754).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	- Phase 1 Current - Phase 2 Current - Phase 3 Current - Neutral Current - Average Value Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*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 Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

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	• Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

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	- Voltage V1N - Voltage V2N - Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 $\times 0.1\%$.

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

*1 n is the power factor multiplying factor data (register address: 758).

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	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 $\times 0.1\text{Hz}$.

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 = $123456 \times 10^{-3} = 123.456$

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	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 = $123456 \times 10^{-3} = 123.456$

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	Σ 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.

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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

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	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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

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	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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

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	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 "10ⁿ".*1

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Integrated Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy (export)

This protocol reads the electric energy (export) stored in register address 1306.

Unit is kWh.

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

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Integrated Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (import LAG)

This protocol reads the reactive energy (import LAG) stored in register address 1308.

Unit is kvarh.

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

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Reactive Energy (import LAG)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy Extended (import)

This protocol reads the energy extended (import) stored in register address 1316.

Unit is kWh.

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

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy Extended (export)

This protocol reads the energy extended (export) stored in register address 1318.

Unit is kWh.

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

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy Extended (import LAG)

This protocol reads the reactive energy extended (import LAG) stored in register address 1320.

Unit is kvarh.

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

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Reactive Energy Extended (import LAG)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Electric Energy (import)

This protocol reads the periodic electric energy (import) stored in register address 1374.

Unit is kWh.

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

*1 n is the electric energy multiplying factor data (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 1 (default) to 247.
Normal response	Periodic Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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. 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. 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (1795)	It is set to read the fundamental harmonics value. When another harmonics protocol is used, change the fixed data start address (1795) as follows. • 3rd: 0706H • 5th: 0709H • 7th: 070CH • 9th: 070FH • 11th: 0712H • 13th: 0715H
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

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	- Harmonics Value V12 - Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2051)	It is set to read the fundamental harmonics line voltage. When another harmonics protocol is used, change the fixed data start address (2051) as follows. • 3rd: 0806H • 5th: 0809H • 7th: 080CH • 9th: 080FH • 11th: 0812H • 13th: 0815H
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read value = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2308)	It is set to read the fundamental harmonics current value. When another harmonics protocol is used, change it as follows. • 3rd: 0908H • 5th: 090CH • 7th: 0910H • 9th: 0914H • 11th: 0918H • 13th: 091CH
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

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	• THD V1N • THD V2N • THD V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2563)	It is set to read the 3rd order harmonics phase voltage ratio. When another harmonics protocol is used, change it as follows. • 5th: 0A06H • 7th: 0A09H • 9th: 0A0CH • 11th: 0A0FH • 13th: 0A12H
Normal response	• Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

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	• THD V12 • THD V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (2819)	It is set to read the 3rd order harmonics line voltage ratio. When another harmonics protocol is used, change it as follows. • 5th: 0B06H • 7th: 0B09H • 9th: 0B0CH • 11th 0B0FH • 13th: 0B12H
Normal response	• Harmonics Ratio V12 • Harmonics Ratio V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

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	• THD I1 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (3076)	It is set to read the 3rd order harmonics current ratio. When another harmonics protocol is used, change it as follows. • 5th: 0C08H • 7th: 0C0CH • 9th: 0C10H • 11th: 0C14H • 13th: 0C18H
Normal response	• Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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. 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 $\times 0.1V$. Use a value in the range of 10 to 66000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Primary Phase Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1V$. The value is set within the range from 10 to 2200.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Secondary Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Primary Current

This protocol writes the setting value of the primary current to register address 519.
Unit is $\times 0.1\text{A}$. Use a value in the range of 50 to 60000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Primary Current	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: 16 Bits Set/Reset Register

This protocol writes 16-bit data to register address 523.

Setting data

Packet name	Element name	Description
Request	Slave Address	When rewriting the slave address, specify it in the range from 1 (default) to 127.
	16-bit set/reset ^{*1}	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Specify the following data.

The effective bit differs depending on the model. For details, refer to 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. - The device uses 2 words. - Set the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Set electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

Do not change values other than setting data.

WR: Integrated Electric Energy (export)

This protocol writes the electric energy (export) in register address 1306.

Unit is kWh. Use a value in the range of 0 to 999999.

When the electric energy (export) setting value is written, the electric energy multiplying factor data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Integrated Electric Energy (export)	- Specify the device for storing the data to be written. - The device uses 2 words. - Set the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Set electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

Do not change values other than setting data.

WR: Reactive Energy (import LAG)

This protocol writes the reactive energy (import LAG) in register address 1308.

Unit is kvarh. Use a value in the range of 0 to 999999. When the reactive energy (import LAG) setting value is written, the energy multiplier data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Reactive Energy (import LAG)	- Specify the device for storing the data to be written. - The device uses 2 words. - Set the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Set electric energy = 123.456kvarh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

Do not change values other than setting data.

WR: Periodic Electric Energy (import)

This protocol writes the periodic electric energy (import) in register address 1374.

Unit is kWh. Use a value in the range of 0 to 999999. When the periodic electric energy (import) setting value is written, the electric energy multiplying factor data (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Periodic Electric Energy (import)	- Specify the device for storing the data to be written. - The device uses 2 words. - Set the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Set electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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. 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. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Holding Registers

This is a MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H)
	Number of Register	Specify the device that stores the data points to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH. Store the value in the device within the range from 0001H to 007DH (1 to 125).)
Normal response	Read Data	Specify the device that stores the read data. (For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words.)
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

This is a MODBUS standard function.

It writes a value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting the slave address, specify it in the range from 1 (default) to 247.
	Start Address (0)	Specify the device that stores the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 3096, set 0C18H)
	Number of Register (1)	Specify the device that stores the data points to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 123, set 007BH. Store the value in the device within the range from 0001H to 007BH (1 to 123).)
	Write Data	Rewrite the data length to the value of $(2 \times \text{"Number of Register"})$. (For example, specify 246 for 123.) Specify the device for storing the data to be written. The number of words specified by "Number of Register" is used.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

13 PROTOCOLS SUPPORTED BY Mitsubishi Electric (EcoMonitorPlus Series: EMU4-*M1-MB, EMU4-*A2-MB, EMU4-*X4-MB)

13.1 Setting Method

EMU4-*M1-MB, EMU4-*A2-MB, EMU4-*X4-MB

Communication with the EcoMonitorPlus series uses the MODBUS RTU communication function of the Mitsubishi Electric Energy Measuring Unit EcoMonitorPlus Series.

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

- MITSUBISHI Energy Measuring Unit EcoMonitorLight/EcoMonitorPlus Series MODBUS I/F Specification (LSPY-9025)
- Energy Measuring Unit Energy Measuring Standard Model Energy Measuring Unit Energy Measuring High Performance Model User's Manual (Details) (IB63A15)
- Energy Measuring Unit Insulation Monitoring Model User's Manual (Details) (IB63A18)

Point

A MODBUS TCP-MODBUS RTU (RS-485) protocol converter is required to connect to EcoMonitorPlus. Wire the Ethernet side of the protocol converter to the RJ71EN71 and the RS-485 side to EcoMonitorPlus. For the protocol converter settings, refer to the instruction manual of the protocol converter to be used.

13.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*M1] Phase Wire System	Reads the value of the phase wire system.	Not to be added	Request
RD: [EMU4-*M1] Primary Voltage (L-L: Line)	Reads the value of the primary line voltage.	Not to be added	Request
RD: [EMU4-*M1] Primary Voltage (L-N: Phase)	Reads the value of the primary phase voltage.	Not to be added	Request
RD: [EMU4-*M1] Secondary Voltage	Reads the value of the secondary voltage.	Not to be added	Request
RD: [EMU4-*M1] Primary Current	Reads the value of the primary current.	Not to be added	Request
RD: [EMU4-*M1] 16 bits Monitor	Reads the value of the 16 bits monitor.	To be added	Fixed Intrvl
RD: [EMU4-*M1] 5A Input Change (Sensor Type)	Reads the value of 5A input switching (sensor type).	Not to be added	Request
RD: [EMU4-*M1] External Input Method	Reads the value of the external input method.	Not to be added	Request
RD: [EMU4-*M1] External Input Reset Method	Reads the value of the external input reset method.	Not to be added	Request
RD: [EMU4-*M1] 16 bits Monitor2	Reads the value of 16 bits monitor 2.	Not to be added	Request
RD: [EMU4-*M1] Counting Operating Time	Reads the value of the counting operating time.	Not to be added	Request
RD: [EMU4-*M1] Counting Operating Time 3side	Reads the value of the counting operating time (3 sides).	Not to be added	Request
RD: [EMU4-*M1] Measuring Method Op. Time 3side	Reads the value of the operating time measuring method (3 sides).	Not to be added	Request
RD: [EMU4-*M1] Convert Rate of Pulse	Reads the value of the pulse converted rate.	Not to be added	Request
RD: [EMU4-*M1] Energy Converted Rate	Reads the value of the electric energy converted rate.	Not to be added	Request

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
RD: [EMU4-*M1] Energy Converted Rate 3side	Reads the value of the electric energy converted rate (3 sides).	Not to be added	Request
RD: [EMU4-*M1] 2 Circuit Measuring Setting	Reads the value of 2 circuit measuring setting.	Not to be added	Request
RD: [EMU4-*M1] Measuring Method of Op. Time	Reads the value of the operating time measuring method.	Not to be added	Request
RD: [EMU4-*M1] Multiplying Factors	Reads the values of all multiplying factors.	To be added	Request
RD: [EMU4-*M1] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-*M1] Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	To be added	Fixed Intrvl
RD: [EMU4-*M1] Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Power Factor	Reads the instantaneous value of the phase 3 power factor.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Power Factor	Reads the instantaneous value of the total power factor.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Frequency	Reads the instantaneous value of frequency.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Active Power	Reads the instantaneous value of the phase 3 power.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Active Power	Reads the instantaneous value of the total power.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Active Power Demand	Reads the instantaneous value of the phase 3 power demand.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Active Power Demand	Reads the instantaneous value of the total power demand.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Phase 3 Reactive Power	Reads the instantaneous value of the phase 3 reactive power.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Reactive Power	Reads the instantaneous value of the total reactive power.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Apparent Power	Reads the instantaneous value of the total apparent power.	To be added	Fixed Intrvl
RD: [EMU4-*M1] Current Unbalance Rate	Reads the value of the current unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Voltage Unbalance Rate	Reads the value of the voltage unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] VT Use or No-use	Reads the value of VT.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy (import)	Reads the value of the electric energy (import).	To be added	Fixed Intrvl
RD: [EMU4-*M1] Energy (export)	Reads the value of the electric energy (export).	To be added	Fixed Intrvl
RD: [EMU4-*M1] Reactive Energy	Reads the value of the reactive energy (import LAG).	To be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended (import)	Reads the value of the electric energy extended (import).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended (export)	Reads the value of the electric energy extended (export).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Reactive Energy Extended (import)	Reads the value of the reactive energy extended (import LAG).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Periodic Energy (export)	Reads the value of the periodic electric energy (import).	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*M1] Pulse Count	Reads the pulse count value.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Operating Time	Reads the value of the operating time.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy 3side (export)	Reads the value of the electric energy (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Extended 3side (export)	Reads the value of the electric energy extended (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Operating Time 3side	Reads the value of the operating time (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Periodic Energy 3side	Reads the value of the periodic electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Conversion	Reads the value of electric energy conversion.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Energy Conversion 3side	Reads the value of electric energy conversion (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Pulse Conversion	Reads the value of pulse conversion.	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Phase Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Phase Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Line Voltage (Total)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Line Voltage (1st)	Reads the following instantaneous values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Current (Total)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Harmonics Current (1st)	Reads the following instantaneous values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HPV (Total)	Reads the following instantaneous values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HPV (3rd)	Reads the following instantaneous values. • Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HLV (Total)	Reads the following instantaneous values. • THD V12 • THD V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HLV (3rd)	Reads the following instantaneous values. • Harmonics Ratio V12 • Harmonics Ratio V23	Not to be added	Fixed Intrvl
RD: [EMU4-*M1] Distortion of HCC (Total)	Reads the following instantaneous values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition *1	Communication Timing (Default)
RD: [EMU4-*M1] Distortion of HCC (3rd)	Reads the following instantaneous values. • Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Not to be added	Fixed Intrvl
WR: [EMU4-*M1] Phase Wire System	Writes the value of the phase wire system.	Not to be added	Request
WR: [EMU4-*M1] Primary Voltage (L-L: Line)	Writes the value of the primary line voltage.	Not to be added	Request
WR: [EMU4-*M1] Primary Voltage (L-N: Phase)	Writes the value of the primary phase voltage.	Not to be added	Request
WR: [EMU4-*M1] Secondary Voltage	Writes the value of the secondary voltage.	Not to be added	Request
WR: [EMU4-*M1] Primary Current	Writes the value of the primary current.	Not to be added	Request
WR: [EMU4-*M1] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset register.	Not to be added	Request
WR: [EMU4-*M1] 5A Input Change (Sensor Type)	Writes the value of 5A input switching (sensor type).	Not to be added	Request
WR: [EMU4-*M1] External Input Method	Writes the value of the external input method.	Not to be added	Request
WR: [EMU4-*M1] External Input Reset Method	Writes the value of the external input reset method.	Not to be added	Request
WR: [EMU4-*M1] Counting Operating Time	Writes the value of the counting operating time.	Not to be added	Request
WR: [EMU4-*M1] Counting Operating Time 3side	Writes the value of the counting operating time (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Measuring Method Op. Time 3side	Writes the value of the operating time measuring method (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Convert Rate of Pulse	Writes the value of the pulse converted rate.	Not to be added	Request
WR: [EMU4-*M1] Energy Converted Rate	Writes the value of the electric energy converted rate.	Not to be added	Request
WR: [EMU4-*M1] Energy Converted Rate 3side	Writes the value of the electric energy converted rate (3 sides).	Not to be added	Request
WR: [EMU4-*M1] 2 Circuit Measuring Setting	Writes the value of 2 circuit measuring setting.	Not to be added	Request
WR: [EMU4-*M1] Measuring Method Op. Time	Writes the value of the operating time measuring method.	Not to be added	Request
WR: [EMU4-*M1] VT Use or No-use	Writes the value of VT.	Not to be added	Request
WR: [EMU4-*M1] Energy (import)	Writes the value of the electric energy (import).	Not to be added	Request
WR: [EMU4-*M1] Energy (export)	Writes the value of the electric energy (export).	Not to be added	Request
WR: [EMU4-*M1] Reactive Energy	Writes the value of the reactive energy (import LAG).	Not to be added	Request
WR: [EMU4-*M1] Periodic Energy (export)	Writes the value of the periodic electric energy (import).	Not to be added	Request
WR: [EMU4-*M1] Pulse Count	Writes the pulse count value.	Not to be added	Request
WR: [EMU4-*M1] Operating Time	Writes the value of the operating time.	Not to be added	Request
WR: [EMU4-*M1] Energy 3side (import)	Writes the value of the electric energy (import) (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Energy 3side (export)	Writes the value of the electric energy (export) (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Operating Time 3side	Writes the value of the operating time (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Periodic Energy 3side	Writes the value of the periodic electric energy (import) (3 sides).	Not to be added	Request
WR: [EMU4-*M1] Energy Conversion	Writes the value of electric energy conversion.	Not to be added	Request
WR: [EMU4-*M1] Energy Conversion 3side	Writes the value of electric energy conversion (3 sides).	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: [EMU4-*M1] Pulse Conversion	Writes the value of pulse conversion.	Not to be added	Request
RD: [EMU4-*A2] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-*A2] 16 bits Monitor	Reads the value of the 16 bits monitor.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Multiplying Factors	Reads the values of all multiplying factors.	Not to be added	Request
RD: [EMU4-*A2] Phase Wire System	Reads the value of the phase wire system.	Not to be added	Request
RD: [EMU4-*A2] Primary Voltage (L-L: Line)	Reads the value of the primary line voltage.	Not to be added	Request
RD: [EMU4-*A2] Primary Voltage (L-N: Phase)	Reads the value of the primary phase voltage.	Not to be added	Request
RD: [EMU4-*A2] Secondary Voltage	Reads the value of the secondary voltage.	Not to be added	Request
RD: [EMU4-*A2] 5A Input Change (Sensor Type)	Reads the value of 5A input switching (sensor type).	Not to be added	Request
RD: [EMU4-*A2] Primary Current	Reads the value of the primary current.	Not to be added	Request
RD: [EMU4-*A2] Energy Converted Rate	Reads the value of the electric energy converted rate.	Not to be added	Request
RD: [EMU4-*A2] Energy Converted Rate 3side	Reads the value of the electric energy converted rate (3 sides).	Not to be added	Request
RD: [EMU4-*A2] Measuring Method Op. Time	Reads the value of the counting operating time.	Not to be added	Request
RD: [EMU4-*A2] Measuring Method Op. Time 3side	Reads the value of the counting operating time (3 sides).	Not to be added	Request
RD: [EMU4-*A2] 16 bits Monitor2	Reads the value of 16 bits monitor 2.	Not to be added	Request
RD: [EMU4-*A2] VT Use or No-use	Reads the value of VT.	Not to be added	Request
RD: [EMU4-*A2] 2 Circuit Measuring Setting	Reads the value of 2 circuit measuring setting.	Not to be added	Request
RD: [EMU4-*A2] Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Phase N Current • Average Value Current	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Power Factor	Reads the instantaneous value of the phase 3 power factor.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Power Factor	Reads the instantaneous value of the total power factor.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Frequency	Reads the instantaneous value of frequency.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Active Power	Reads the instantaneous value of the phase 3 power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Active Power	Reads the instantaneous value of the total power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Active Power Demand	Reads the instantaneous value of the phase 3 power demand.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Active Power Demand	Reads the instantaneous value of the total power demand.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Phase 3 Reactive Power	Reads the instantaneous value of the phase 3 reactive power.	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-*A2] Reactive Power	Reads the instantaneous value of the total power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Apparent Power	Reads the instantaneous value of the total apparent power.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Current Unbalance Rate	Reads the value of the current unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Voltage Unbalance Rate	Reads the value of the voltage unbalance rate.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy (import)	Reads the value of the electric energy (import).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy (export)	Reads the value of the electric energy (export).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Reactive Energy	Reads the value of the reactive energy (import LAG).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended (import)	Reads the value of the electric energy extended (import).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended (export)	Reads the value of the electric energy extended (export).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Reactive Energy Extended (import)	Reads the value of the reactive energy extended (import LAG).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Operating Time	Reads the value of the operating time.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy 3side (export)	Reads the value of the electric energy (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended 3side (import)	Reads the value of the electric energy (import) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Extended 3side (export)	Reads the value of the electric energy extended (export) (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Operating Time 3side	Reads the value of the operating time (3 sides).	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Conversion	Reads the value of electric energy conversion.	Not to be added	Fixed Intrvl
RD: [EMU4-*A2] Energy Conversion 3side	Reads the value of electric energy conversion (3 sides).	Not to be added	Fixed Intrvl
WR: [EMU4-*A2] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset.	Not to be added	Request
WR: [EMU4-*A2] Phase Wire System	Writes the value of the phase wire system.	Not to be added	Request
WR: [EMU4-*A2] Primary Voltage (L-L: Line)	Writes the value of the primary line voltage.	Not to be added	Request
WR: [EMU4-*A2] Primary Voltage (L-N: Phase)	Writes the value of the primary phase voltage.	Not to be added	Request
WR: [EMU4-*A2] Secondary Voltage	Writes the value of the secondary voltage.	Not to be added	Request
WR: [EMU4-*A2] 5A Input Change (Sensor Type)	Writes the value of 5A input switching (sensor type).	Not to be added	Request
WR: [EMU4-*A2] Primary Current	Writes the value of the primary current.	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion	Writes the value of electric energy conversion.	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion 3side	Writes the value of electric energy conversion (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Measuring Method Op. Time	Writes the value of the counting operating time.	Not to be added	Request
WR: [EMU4-*A2] Measuring Method Op. Time 3side	Writes the value of the counting operating time (3 sides).	Not to be added	Request
WR: [EMU4-*A2] VT Use or No-use	Writes the value of VT.	Not to be added	Request
WR: [EMU4-*A2] 2 Circuit Measuring Setting	Writes the value of 2 circuit measuring setting.	Not to be added	Request
WR: [EMU4-*A2] Energy (import)	Writes the value of the electric energy (import).	Not to be added	Request
WR: [EMU4-*A2] Energy (export)	Writes the value of the electric energy (export).	Not to be added	Request
WR: [EMU4-*A2] Reactive Energy	Writes the value of the reactive energy (import LAG).	Not to be added	Request
WR: [EMU4-*A2] Operating Time	Writes the value of the operating time.	Not to be added	Request

Name	Description	Automatic Addition*1	Communication Timing (Default)
WR: [EMU4-*A2] Energy 3side (import)	Writes the value of the electric energy (import) (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Energy 3side (export)	Writes the value of the electric energy (export) (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Operating Time 3side	Writes the value of the operating time (3 sides).	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion	Writes the value of electric energy conversion.	Not to be added	Request
WR: [EMU4-*A2] Energy Conversion 3side	Writes the value of electric energy conversion (3 sides).	Not to be added	Request
RD: [EMU4-AX4] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-AX4] 16 bits Monitor	Reads the value of the 16 bits monitor.	Not to be added	Request
RD: [EMU4-AX4] Measuring Interval	Reads the value of the conversion speed setting.	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/Disable Setting (CH1)	Reads the value of the A/D conversion enable/disable setting (CH1).	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/Disable Setting (CH2)	Reads the value of the A/D conversion enable/disable setting (CH2).	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/Disable Setting (CH3)	Reads the value of the A/D conversion enable/disable setting (CH3).	Not to be added	Request
RD: [EMU4-AX4] ADC Enable/Disable Setting (CH4)	Reads the value of the A/D conversion enable/disable setting (CH4).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH1)	Reads the value of the input range setting (CH1).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH2)	Reads the value of the input range setting (CH2).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH3)	Reads the value of the input range setting (CH3).	Not to be added	Request
RD: [EMU4-AX4] Input Range Setting (CH4)	Reads the value of the input range setting (CH4).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH1)	Reads the scaling lower limit value (CH1).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH2)	Reads the scaling lower limit value (CH2).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH3)	Reads the scaling lower limit value (CH3).	Not to be added	Request
RD: [EMU4-AX4] Scaling Lower Limit Value (CH4)	Reads the scaling lower limit value (CH4).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH1)	Reads the scaling upper limit value (CH1).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH2)	Reads the scaling upper limit value (CH2).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH3)	Reads the scaling upper limit value (CH3).	Not to be added	Request
RD: [EMU4-AX4] Scaling Upper Limit Value (CH4)	Reads the scaling upper limit value (CH4).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH1)	Reads the value of the A/D conversion moving average (CH1).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH2)	Reads the value of the A/D conversion moving average (CH2).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH3)	Reads the value of the A/D conversion moving average (CH3).	Not to be added	Request
RD: [EMU4-AX4] ADC Moving Average (CH4)	Reads the value of the A/D conversion moving average (CH4).	Not to be added	Request
RD: [EMU4-AX4] Analog Value (CH1)	Reads the AD conversion value (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Analog Value (CH2)	Reads the AD conversion value (CH2).	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-AX4] Analog Value (CH3)	Reads the AD conversion value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Analog Value (CH4)	Reads the AD conversion value (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH1)	Reads the scaling value (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH2)	Reads the scaling value (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH3)	Reads the scaling value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-AX4] Scaling Value (CH4)	Reads the scaling value (CH4).	Not to be added	Fixed Intrvl
WR: [EMU4-AX4] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset.	Not to be added	Request
WR: [EMU4-AX4] Measuring Interval	Writes the value of the conversion speed setting.	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/Disable Setting (CH1)	Writes the value of the A/D conversion enable/disable setting (CH1).	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/Disable Setting (CH2)	Writes the value of the A/D conversion enable/disable setting (CH2).	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/Disable Setting (CH3)	Writes the value of the A/D conversion enable/disable setting (CH3).	Not to be added	Request
WR: [EMU4-AX4] ADC Enable/Disable Setting (CH4)	Writes the value of the A/D conversion enable/disable setting (CH4).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH1)	Writes the value of the input range setting (CH1).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH2)	Writes the value of the input range setting (CH2).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH3)	Writes the value of the input range setting (CH3).	Not to be added	Request
WR: [EMU4-AX4] Input Range Setting (CH4)	Writes the value of the input range setting (CH4).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH1)	Writes the value of scaling lower limit value (CH1).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH2)	Writes the value of scaling lower limit value (CH2).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH3)	Writes the value of scaling lower limit value (CH3).	Not to be added	Request
WR: [EMU4-AX4] Scaling Lower Limit Value (CH4)	Writes the value of scaling lower limit value (CH4).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH1)	Writes the scaling upper limit value (CH1).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH2)	Writes the scaling upper limit value (CH2).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH3)	Writes the scaling upper limit value (CH3).	Not to be added	Request
WR: [EMU4-AX4] Scaling Upper Limit Value (CH4)	Writes the scaling upper limit value (CH4).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH1)	Writes the value of the A/D conversion moving average (CH1).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH2)	Writes the value of the A/D conversion moving average (CH2).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH3)	Writes the value of the A/D conversion moving average (CH3).	Not to be added	Request
WR: [EMU4-AX4] ADC Moving Average (CH4)	Writes the value of the A/D conversion moving average (CH4).	Not to be added	Request
RD: [EMU4-PX4] Model Code	Reads the value of the model code.	Not to be added	Request
RD: [EMU4-PX4] 16 bits Monitor	Reads the value of the 16 bits monitor.	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-PX4] Convert Rate of Pulse (CH1)	Reads the value of the pulse converted rate (CH1).	Not to be added	Request
RD: [EMU4-PX4] Convert Rate of Pulse (CH2)	Reads the value of the pulse converted rate (CH2).	Not to be added	Request
RD: [EMU4-PX4] Convert Rate of Pulse (CH3)	Reads the value of the pulse converted rate (CH3).	Not to be added	Request
RD: [EMU4-PX4] Convert Rate of Pulse (CH4)	Reads the value of the pulse converted rate (CH4).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH1)	Reads the value of the counting operating time (CH1).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH2)	Reads the value of the counting operating time (CH2).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH3)	Reads the value of the counting operating time (CH3).	Not to be added	Request
RD: [EMU4-PX4] Measuring Method Op. Time (CH4)	Reads the value of the counting operating time (CH4).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH1)	Reads the value of the external input method (CH1).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH2)	Reads the value of the external input method (CH2).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH3)	Reads the value of the external input method (CH3).	Not to be added	Request
RD: [EMU4-PX4] External Input Method (CH4)	Reads the value of the external input method (CH4).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH1)	Reads the value of the external input reset method (CH1).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH2)	Reads the value of the external input reset method (CH2).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH3)	Reads the value of the external input reset method (CH3).	Not to be added	Request
RD: [EMU4-PX4] External Input Reset Method (CH4)	Reads the value of the external input reset method (CH4).	Not to be added	Request
RD: [EMU4-PX4] Contact Input State (CH1)	Reads the value of the contact input state (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Contact Input State (CH2)	Reads the value of the contact input state (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Contact Input State (CH3)	Reads the value of the contact input state (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Contact Input State (CH4)	Reads the value of the contact input state (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH1)	Reads the pulse count value (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH2)	Reads the pulse count value (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH3)	Reads the pulse count value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Count (CH4)	Reads the pulse count value (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH1)	Reads the value of the operating time (CH1).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH2)	Reads the value of the operating time (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH3)	Reads the value of the operating time (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Operating Time (CH4)	Reads the value of the operating time (CH4).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Conversion (CH1)	Reads the pulse conversion value (CH1).	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: [EMU4-PX4] Pulse Conversion (CH2)	Reads the pulse conversion value (CH2).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Conversion (CH3)	Reads the pulse conversion value (CH3).	Not to be added	Fixed Intrvl
RD: [EMU4-PX4] Pulse Conversion (CH4)	Reads the pulse conversion value (CH4).	Not to be added	Fixed Intrvl
WR: [EMU4-PX4] 16 bits Set/Reset Register	Writes the value of the 16 bits set/reset.	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH1)	Writes the value of the pulse converted rate (CH1).	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH2)	Writes the value of the pulse converted rate (CH2).	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH3)	Writes the value of the pulse converted rate (CH3).	Not to be added	Request
WR: [EMU4-PX4] Convert Rate of Pulse (CH4)	Writes the value of the pulse converted rate (CH4).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH1)	Writes the value of the counting operating time (CH1).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH2)	Writes the value of the counting operating time (CH2).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH3)	Writes the value of the counting operating time (CH3).	Not to be added	Request
WR: [EMU4-PX4] Measuring Method Op. Time (CH4)	Writes the value of the counting operating time (CH4).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH1)	Writes the value of the external input method (CH1).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH2)	Writes the value of the external input method (CH2).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH3)	Writes the value of the external input method (CH3).	Not to be added	Request
WR: [EMU4-PX4] External Input Method (CH4)	Writes the value of the external input method (CH4).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH1)	Writes the value of the external input reset method (CH1).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH2)	Writes the value of the external input reset method (CH2).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH3)	Writes the value of the external input reset method (CH3).	Not to be added	Request
WR: [EMU4-PX4] External Input Reset Method (CH4)	Writes the value of the external input reset method (CH4).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH1)	Writes the pulse count value (CH1).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH2)	Writes the pulse count value (CH2).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH3)	Writes the pulse count value (CH3).	Not to be added	Request
WR: [EMU4-PX4] Pulse Count (CH4)	Writes the pulse count value (CH4).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH1)	Writes the value of the operating time (CH1).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH2)	Writes the value of the operating time (CH2).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH3)	Writes the value of the operating time (CH3).	Not to be added	Request
WR: [EMU4-PX4] Operating Time (CH4)	Writes the value of the operating time (CH4).	Not to be added	Request
WR: [EMU4-PX4] Pulse Conversion (CH1)	Writes the pulse conversion value (CH1).	Not to be added	Request

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
WR: [EMU4-PX4] Pulse Conversion (CH2)	Writes the pulse conversion value (CH2).	Not to be added	Request
WR: [EMU4-PX4] Pulse Conversion (CH3)	Writes the pulse conversion value (CH3).	Not to be added	Request
WR: [EMU4-PX4] Pulse Conversion (CH4)	Writes the pulse conversion value (CH4).	Not to be added	Request
RD: Holding Registers ^{*2}	Reads the value stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers ^{*2}	Writes the value into the MODBUS holding register device.	Not to be added	Request

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

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

13.3 Details of Applicable Protocols

RD: [EMU4-*M1] Phase Wire System

This protocol reads the setting value of the phase wire system stored in register address 512.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Phase Wire System ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Phase Wire System	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

13

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Primary Voltage (L-L: Line)

This protocol reads the setting value of the primary line voltage stored in register address 513.

Unit is V.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Primary Line Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Primary Voltage (L-N: Phase)

This protocol reads the setting value of the primary phase voltage stored in register address 515.

Unit is $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Primary Phase Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Primary Current

This protocol reads the primary current stored in register address 519.

Unit is $\times 0.1A$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Primary Current	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] 16 bits Monitor

This protocol reads the setting value of the 16 bits monitor stored in register address 524.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	16 bits Monitor ^{*1,2}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm	Alarm occurring	No alarm
4	Contact input	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Current unbalance rate upper limit alarm	Alarm occurring	No alarm
7	Voltage unbalance rate upper limit alarm	Alarm occurring	No alarm
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

^{*2} The effective bit differs depending on the model. For details, refer to 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}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
4	Not used	—	—
5	Upper and lower limit alarm (batch) (3 sides at 1P2W)	Alarm occurring	No alarm
6	Not used	—	—
7	Not used	—	—
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

^{*2} The effective bit differs depending on the model. For details, refer to 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 $\times 0.001$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Convert Rate of Pulse	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model.

RD: [EMU4-*M1] Energy Converted Rate

This protocol reads the electric energy converted rate stored in register address 741.

Unit is $\times 0.001$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Converted Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model.

RD: [EMU4-*M1] Energy Converted Rate 3side

This protocol reads the electric energy converted rate (3 sides) stored in register address 747.

Unit is $\times 0.001$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Converted Rate (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to 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 • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • Content Rate of Harmonic Voltage • Detail Electric Energy	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- The EMU4-BM1-MB stores 0 as the multiplying factor for the harmonics current content rate and harmonics voltage content rate. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

If read value = 123456 and multiplying factor = -3

Current value: $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	- Phase 1 Current - Phase 2 Current - Phase 3 Current - Neutral Current - Average Value Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	- Voltage V1N - Voltage V2N - Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 "10ⁿ".*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 $\times 0.1\%$.

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	Σ 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.
- 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 $\times 0.1\text{Hz}$.

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 "10ⁿ".*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 "10ⁿ".*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 "10ⁿ".*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 "10ⁿ".*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 "10ⁿ".*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 "10ⁿ".*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. 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 $\times 0.01\%$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Voltage Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. 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 "10ⁿ".*1

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Reactive Energy

This protocol reads the reactive energy (import LAG) stored in register address 1308.

Unit is kvarh.

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

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Reactive Energy	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Energy Extended (import)

This protocol reads the electric energy extended (import) stored in register address 1316.

Unit is kWh.

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

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Energy Extended (export)

This protocol reads the electric energy extended (export) stored in register address 1318.

Unit is kWh.

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

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy Extended (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Reactive Energy Extended (import)

This protocol reads the reactive energy extended (import LAG) stored in register address 1320.

Unit is kvarh.

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

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Reactive Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*M1] Periodic Energy (export)

This protocol reads the periodic electric energy (import) stored in register address 1374.

Unit is kWh.

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

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Periodic Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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. 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. 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 "10ⁿ".*1

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Integrated Electric Energy (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Extended (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Electric Energy Extended (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. 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 "10ⁿ".*1

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	Periodic Electric Energy (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. 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. 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. 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (1795)	The default value is set to read the fundamental harmonics phase voltage value.*2
Normal response	- Harmonics Value V1N - Harmonics Value V2N - Harmonics Value V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
3rd	0706H
5th	0709H
7th	070CH
9th	070FH
11th	0712H
13th	0715H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	- Harmonics Value V12 - Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2051)	The default value is set to read the fundamental harmonics line voltage.*2
Normal response	- Harmonics Value V12 - Harmonics Value V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
3rd	0806H
5th	0809H
7th	080CH
9th	080FH
11th	0812H
13th	0815H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	- Harmonics Value I1 - Harmonics Value I2 - Harmonics Value I3 - Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2308)	The default value is set to read the fundamental harmonics current value.*2
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*2 When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
3rd	0908H
5th	090CH
7th	0910H
9th	0914H
11th	0918H
13th	091CH

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• THD V1N • THD V2N • THD V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2563)	The default value is set to read the 3rd order harmonics ratio. ^{*2}
Normal response	• Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*2} When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
5th	0A06H
7th	0A09H
9th	0A0CH
11th	0A0FH
13th	0A12H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• THD V12 • THD V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the multiplying factor data for the harmonics voltage content rate (register address: 761).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (2819)	The default value is set to read the 3rd order harmonics line voltage ratio. ^{*2}
Normal response	• Harmonics Ratio V12 • Harmonics Ratio V23	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*2} When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
5th	0B06H
7th	0B09H
9th	0B0CH
11th	0B0FH
13th	0B12H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the multiplying factor data for the harmonics current content rate (register address: 760).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
Normal response	• THD I1 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the multiplying factor data for the harmonics current content rate (register address: 760).

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (3076)	The default value is set to read the 3rd order harmonics current ratio. ^{*2}
Normal response	• Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*2} When another harmonics protocol is used, change it as follows.

Harmonics	Start Address
5th	0C08H
7th	0C0CH
9th	0C10H
11th	0C14H
13th	0C18H

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the model and phase wire system. For details, refer to 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. 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 $\times 0.1V$. The value is set within the range from 10 to 635000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Primary Phase Voltage	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model and phase wire system. For details, refer to 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 $\times 0.1V$. The value is set within the range from 10 to 2200.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Secondary Voltage	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Primary Current

This protocol writes the setting value of the primary current to register address 519.

Unit is $\times 0.1A$. The value is set within the range from 50 to 300000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Primary Current	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] 16 bits Set/Reset Register

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	16 bits Set/Reset Register ^{*1*2}	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

^{*1} Set the following data.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Reset of alarm occurrence count	Reset	Do not reset
4	Not used	—	—
5	Not used	—	—
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Reset of electric energy data	Reset	Do not reset
15	Not used	—	—

^{*2} Some bits are not used depending on the model. For details, refer to 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 $\times 0.001$. The value is set within the range from 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Convert Rate of Pulse	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to 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 $\times 0.001$. The value is set within the range from 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Electric Energy Converted Rate	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the model. For details, refer to 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 $\times 0.001$. The value is set within the range from 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Electric Energy Converted Rate (3side)	Specify the device that stores the write data. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol is only compatible with the EMU4-HM1-MB 1P2W with two circuit measurements. For details, refer to 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. The device uses 2 words. Specify the data to be written as follows.*1 Data to be written = $\frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 Data to be written = $\frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Energy (export)

This protocol writes the electric energy (export) to register address 1306.

Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (export) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Integrated Electric Energy (export)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows.*1 Data to be written = $\frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 Data to be written = $\frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Reactive Energy

This protocol writes the reactive energy (import LAG) to register address 1308.

Unit is kvarh. Use a value in the range of 0 to 999999. When the reactive energy (import LAG) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Reactive Energy	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows. *1 Data to be written = $\frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kvarh Multiplying factor = -3 Data to be written = $\frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Periodic Energy (export)

This protocol writes the periodic electric energy (import) to register address 1374.

Unit is kWh. Use a value in the range of 0 to 999999. When the setting value of the periodic electric energy (import) is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Periodic Electric Energy (export)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows. *1 Data to be written = $\frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 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. 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. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*M1] Energy 3side (import)

This protocol writes the electric energy (import) (3 sides) to register address 1460.

Unit is kWh. Use a value in the range of 0 to 999999. When the electric energy (import) (3 sides) setting value is written, the multiplying factor data of the electric energy (register address: 757) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Integrated Electric Energy (3side) (import)	Specify the device that stores the write data. The device uses 2 words. Specify the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the phase wire system. For details, refer to 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. The device uses 2 words. Specify the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

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

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be written or an error may be returned depending on the phase wire system. For details, refer to 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. 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. The device uses 2 words. Specify the data to be written as follows.*1 Data to be written = $\frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 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. 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. 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. 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8000H + N × 700H (N = Circuit ID-2).
Normal response	Model Code ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Model code	Setting value
EMU4-A2	0005H
EMU4-VA2	0006H

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] 16 bits Monitor

This protocol reads the 16 bits monitor for circuit ID = 2 stored in register address 32770.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8002H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor ^{*1*2}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm	Alarm occurring	No alarm
4	Contact input	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Current unbalance rate upper limit alarm	Alarm occurring	No alarm
7	Voltage unbalance rate upper limit alarm	Alarm occurring	No alarm
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8003H + N × 700H (N = Circuit ID-2).
Normal response	• Current • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • Content Rate of Harmonic Voltage • Electric Energy (Extended)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Phase Wire System

This protocol reads the phase wire system for circuit ID = 2 stored in register address 32780.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 800CH + N × 700H (N = Circuit ID-2).
Normal response	Phase Wire System ^{*1}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Primary Voltage (L-L: Line)

This protocol reads the primary line voltage for circuit ID = 2 stored in register address 32781.
Unit is V.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 800DH + N × 700H (N = Circuit ID-2).
Normal response	Primary Line Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Primary Voltage (L-N: Phase)

This protocol reads the primary phase voltage for circuit ID = 2 stored in register address 32783.
Unit is ×0.1V.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to 800FH + N × 700H (N = Circuit ID-2).
Normal response	Primary Phase Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8011H + N \times 700H$ ($N = \text{Circuit ID}-2$).
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] 5A Input Change (Sensor Type)

This protocol reads 5A input switching (sensor type) for circuit ID = 2 stored in register address 32787.

The setting value data of 5A input switching (sensor type) is read as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8013H + N \times 700H$ ($N = \text{Circuit ID}-2$).
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 $\times 0.1A$.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to $8016H + N \times 700H$ ($N = \text{Circuit ID}-2$).
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 $\times 0.001$.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $802EH + N \times 700H$ ($N = \text{Circuit ID}-2$).
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 $\times 0.001$.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to $8034H + N \times 700H$ ($N = \text{Circuit ID}-2$).
Normal response	Electric Energy Converted Rate (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8036H + N × 700H (N = Circuit ID-2).
Normal response	Measuring Method of Operating Time	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Measuring Method Op. Time 3side

This protocol reads the counting operating time (3 sides) for circuit ID = 2 stored in register address 32826.

The setting value data of the counting operating time (3 sides) is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 803AH + N × 700H (N = Circuit ID-2).
Normal response	Measuring Method of Operating Time (3side)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8056H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor2 ^{*1*2}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Pulse conversion upper limit alarm	Alarm occurring	No alarm
1	Not used	—	—
2	Current demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
3	Power demand upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
4	Not used	—	—
5	Upper and lower limit alarm (batch) (3 sides at 1P2W)	Alarm occurring	No alarm
6	Not used	—	—
7	Not used	—	—
8	Voltage upper and lower limit alarm	Alarm occurring	No alarm
9	Leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
10	Leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
11	Resistive leakage current single-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
12	Resistive leakage current two-level alarm Occurrence count upper limit alarm	Alarm occurring	No alarm
13	Power factor upper and lower limit alarm (3 sides at 1P2W)	Alarm occurring	No alarm
14	Not used	—	—
15	Not used	—	—

^{*2} The effective bit differs depending on the model. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8057H + N × 700H (N = Circuit ID-2).
Normal response	VT Use or No-use	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8058H + N × 700H (N = Circuit ID-2).
Normal response	2 Circuit Measuring Setting	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set the fixed data start address to $8100H + N \times 700H$ (N = Circuit ID-2).
Normal response	- Phase 1 Current - Phase 2 Current - Phase 3 Current - Neutral Current - Average Value Current	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system, and 0 is stored in the unused data. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8105H + N \times 700H$ (N = Circuit ID-2).
Normal response	- Phase 1 Current Demand - Phase 2 Current Demand - Phase 3 Current Demand - Neutral Current Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system, and 0 is stored in the unused data. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $810AH + N \times 700H$ (N = Circuit ID-2).
Normal response	- Voltage V12 - Voltage V23 - Voltage V31 - Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system, and 0 is stored in the unused data. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 810EH + N × 700H (N = Circuit ID-2).
Normal response	• Voltage V1N • Voltage V2N • Voltage V3N	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of power factor (for circuit ID = 2, register address: 32775).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8114H + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Power Factor	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of power factor (for circuit ID = 2, register address: 32775).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8115H + N \times 700H$ (N = Circuit ID-2).
Normal response	Σ 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.
- 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 $\times 0.1\text{Hz}$.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of frequency (for circuit ID = 2, register address: 32776).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8116H + N \times 700H$ (N = Circuit ID-2).
Normal response	Frequency	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Phase 3 Active Power

This protocol reads the instantaneous value of phase 3 power for circuit ID = 2 stored in register address 33049.

Unit is kW.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8119H + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Active Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 811AH + N × 700H (N = Circuit ID-2).
Normal response	ΣActive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 811DH + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Active Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 811EH + N × 700H (N = Circuit ID-2).
Normal response	ΣActive Power Demand	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*A2] Phase 3 Reactive Power

This protocol reads the instantaneous value of the phase 3 reactive power for circuit ID = 2 stored in register address 33057. Unit is kvar.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8121H + N × 700H (N = Circuit ID-2).
Normal response	Phase 3 Reactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8122H + N × 700H (N = Circuit ID-2).
Normal response	ΣReactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol stores the value of one side when there are two circuit measurements with 1P2W.

RD: [EMU4-*A2] Apparent Power

This protocol reads the instantaneous value of the total apparent power for circuit ID = 2 stored in register address 33062.
Unit is kVA.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of power (for circuit ID = 2, register address: 32773).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8126H + N × 700H (N = Circuit ID-2).
Normal response	ΣReactive Power	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8178H + N × 700H (N = Circuit ID-2).
Normal response	Current Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 $\times 0.01\%$.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $817AH + N \times 700H$ (N = Circuit ID-2).
Normal response	Voltage Unbalance Rate	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8218H + N \times 700H$ (N = Circuit ID-2).
Normal response	Integrated Electric Energy (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy (export)

This protocol reads the electric energy (export) for circuit ID = 2 stored in register address 33306.

Unit is kWh.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821AH + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Reactive Energy

This protocol reads the reactive energy (import LAG) for circuit ID = 2 stored in register address 33308.

Unit is kvarh.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821CH + N × 700H (N = Circuit ID-2).
Normal response	Reactive Energy	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Extended (import)

This protocol reads the electric energy extended (import) for circuit ID = 2 stored in register address 33316.

Unit is kWh.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8224H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Extended (export)

This protocol reads the electric energy extended (export) for circuit ID = 2 stored in register address 33318.

Unit is kWh.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8226H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy Extended (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Reactive Energy Extended (import)

This protocol reads the reactive energy extended (import LAG) for circuit ID = 2 stored in register address 33320.

Unit is kvarh.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32779).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8228H + N × 700H (N = Circuit ID-2).
Normal response	Reactive Energy Extended (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Operating Time

This protocol reads the operating time for circuit ID = 2 stored in register address 33332.

Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8234H + N × 700H (N = Circuit ID-2).
Normal response	Operating Time	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy 3side (import)

This protocol reads the electric energy (import) (3 sides) for circuit ID = 2 stored in register address 33350.

Unit is kWh.

The measured value can be obtained by multiplying the read data by 10^n .

n is the multiplying factor data of the electric energy (for circuit ID = 2, register address: 32774).

Setting data

Packet name	Element name	Description
Request	Address	Rewrite to the slave address. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8246H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8248H + N × 700H (N = Circuit ID-2).
Normal response	Integrated Electric Energy (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 824AH + N × 700H (N = Circuit ID-2).
Normal response	Energy Extended (3side) (import)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 824CH + N × 700H (N = Circuit ID-2).
Normal response	Energy Extended (3side) (export)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8250H + N × 700H (N = Circuit ID-2).
Normal response	Operating Time (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. Use a value in the range of 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8256H + N × 700H (N = Circuit ID-2).
Normal response	Electric Energy Conversion	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-*A2] Energy Conversion 3side

This protocol reads electric energy conversion (3 sides) for circuit ID = 2 stored in register address 33370.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 825AH + N × 700H (N = Circuit ID-2).
Normal response	Electric Energy Conversion (3side)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. 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. When using the protocols for circuit ID = 3 to 7, set to 800CH + N × 700H (N = Circuit ID-2).
	Phase Wire System ^{*1}	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Phase wire system	Setting value
1P2W	0001H
1P3W	0002H
3P3W	0003H
3P4W	0004H

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Primary Voltage (L-L: Line)

This protocol writes the setting value of the primary line voltage for circuit ID = 2 to register address 32781.

Unit is V. Use a value in the range of 1 to 110000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 800DH + N × 700H (N = Circuit ID-2).
	Primary Line Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Primary Voltage (L-N: Phase)

This protocol writes the setting value of the primary phase voltage for circuit ID = 2 to register address 32783.
Unit is $\times 0.1V$. Use a value in the range of 10 to 635000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $800FH + N \times 700H$ ($N = \text{Circuit ID}-2$).
	Primary Phase Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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 $\times 0.1V$. Use a value in the range of 10 to 2200.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8011H + N \times 700H$ ($N = \text{Circuit ID}-2$).
	Secondary Voltage	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] 5A Input Change (Sensor Type)

This protocol writes the setting value of 5A input switching (sensor type) for circuit ID = 2 to register address 32787.

Specify the sensor type setting data as follows.

- 0: Direct
- 2: 5A

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8013H + N × 700H (N = Circuit ID-2).
	5A Input Change	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Primary Current

This protocol writes the setting value of the primary voltage for circuit ID = 2 to register address 32790.

Unit is ×0.1A. Use a value in the range of 50 to 300000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8016H + N × 700H (N = Circuit ID-2).
	Primary Current	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy Converted Rate

This protocol writes the setting value of the electric energy converted rate for circuit ID = 2 to register address 32814. Unit is $\times 0.001$. Use a value in the range of 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $802EH + N \times 700H$ ($N = \text{Circuit ID}-2$).
	Electric Energy Converted Rate	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy Converted Rate 3side

This protocol writes the setting value of the electric energy converted rate (3 sides) for circuit ID = 2 to register address 32820. Unit is $\times 0.001$. Use a value in the range of 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $8034H + N \times 700H$ ($N = \text{Circuit ID}-2$).
	Electric Energy Converted Rate (3side)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to 8036H + N × 700H (N = Circuit ID-2).
	Measuring Method of Operating Time	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Measuring Method Op. Time 3side

This protocol writes the setting value of the counting operating time (3 sides) for circuit ID = 2 to register address 32826.

Specify the setting data of the counting operating time (3 sides) as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 803AH + N × 700H (N = Circuit ID-2).
	Measuring Method of Operating Time (3side)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. 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. 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. When using the protocols for circuit ID = 3 to 7, set to 8218H + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (import)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy (export)

This protocol writes the setting value of the electric energy (export) for circuit ID = 2 to register address 33306.

Unit is kWh. Use a value in the range of 0 to 999999.

When the electric energy (export) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821AH + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (export)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Reactive Energy

This protocol writes the setting value of the reactive energy (import LAG) for circuit ID = 2 to register address 33308.

Unit is kvarh. Use a value in the range of 0 to 999999.

When the reactive energy (import LAG) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 821CH + N × 700H (N = Circuit ID-2).
	Reactive Energy	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows. *1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kvarh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Operating Time

This protocol writes the setting value of operating time for circuit ID = 2 to register address 33332.

Unit is h. Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8234H + N × 700H (N = Circuit ID-2).
	Operating Time	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy 3side (import)

This protocol writes the setting value of the electric energy (import) (3 sides) for circuit ID = 2 to register address 33350. Unit is kWh. Use a value in the range of 0 to 999999.

When the electric energy (import) (3 sides) setting value is written, the multiplying factor data of the electric energy (register address: 32774) is applied.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8246H + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (3side) (import)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to 8248H + N × 700H (N = Circuit ID-2).
	Integrated Electric Energy (3side) (export)	Specify the device for storing the data to be written. The device uses 2 words. Specify the data to be written as follows.*1 $\text{Data to be written} = \frac{\text{Any electric energy data to be written}}{10^n}$ Example: Setting electric energy = 123.456kWh Multiplying factor = -3 $\text{Data to be written} = \frac{123.456}{10^{-3}} = 123456$
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 n is the multiplying factor data of the electric energy (register address: 32774).

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to 8250H + N × 700H (N = Circuit ID-2).
	Operating Time (3side)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to $8256H + N \times 700H$ (N = Circuit ID-2).
	Electric Energy Conversion	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-*A2] Energy Conversion 3side

This protocol writes the setting value of electric energy conversion (3 sides) for circuit ID = 2 to register address 33370.
Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to $825AH + N \times 700H$ (N = Circuit ID-2).
	Electric Energy Conversion (3side)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- With this protocol, valid data may not be acquired or an error may be returned depending on the phase wire system. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to 8000H + N × 700H (N = Circuit ID-2).
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model code	Setting value
EMU4-AX4	0009H

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] 16 bits Monitor

This protocol reads setting value of the 16 bits monitor for circuit ID = 2 stored in register address 32770.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8002H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor ^{*1*2}	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Bit	Description	If the value is 1	If the value is 0
0	Upper and lower limit alarm (CH1)	Alarm occurring	No alarm
1	Upper and lower limit alarm (CH2)	Alarm occurring	No alarm
2	Upper and lower limit alarm (CH3)	Alarm occurring	No alarm
3	Upper and lower limit alarm (CH4)	Alarm occurring	No alarm
4	Contact input (CH1)	On (closed)	Off (open)
5	Upper and lower limit alarm (batch)	Alarm occurring	No alarm
6	Contact input (CH2)	On (closed)	Off (open)
7	Contact input (CH3)	On (closed)	Off (open)
8	Contact input (CH4)	On (closed)	Off (open)
9	Not used	—	—
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to 8059H + N × 700H (N = Circuit ID-2).
Normal response	Measuring Interval	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] ADC Enable/Disable Setting (CH1/CH2/CH3/CH4)

This protocol reads the A/D conversion enable/disable setting (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32858/32864/32870/32876.

The setting value of the A/D conversion enable/disable setting is read as follows.

- 0: Prohibit
- 1: Allow

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805AH + N × 700H (N = Circuit ID-2) • CH2: 8060H + N × 700H (N = Circuit ID-2) • CH3: 8066H + N × 700H (N = Circuit ID-2) • CH4: 806CH + N × 700H (N = Circuit ID-2)
Normal response	A/D Conversion Enable/Disable Setting (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Input Range Setting (CH1/CH2/CH3/CH4)

This protocol reads the input range setting (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32859/32865/32871/32877.

The setting value of the input range setting is read as follows.

- 0: Voltage input
- 1: Current input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805BH + N × 700H (N = Circuit ID-2) • CH2: 8061H + N × 700H (N = Circuit ID-2) • CH3: 8067H + N × 700H (N = Circuit ID-2) • CH4: 806DH + N × 700H (N = Circuit ID-2)
Normal response	Input Range Setting (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Scaling Lower Limit Value (CH1/CH2/CH3/CH4)

This protocol reads the scaling lower limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32860/32866/32872/32878.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $805CH + N \times 700H$ (N = Circuit ID-2) • CH2: $8062H + N \times 700H$ (N = Circuit ID-2) • CH3: $8068H + N \times 700H$ (N = Circuit ID-2) • CH4: $806EH + N \times 700H$ (N = Circuit ID-2)
Normal response	Scaling Lower Limit Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Scaling Upper Limit Value (CH1/CH2/CH3/CH4)

This protocol reads the scaling upper limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32861/32867/32873/32879.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $805DH + N \times 700H$ (N = Circuit ID-2) • CH2: $8063H + N \times 700H$ (N = Circuit ID-2) • CH3: $8069H + N \times 700H$ (N = Circuit ID-2) • CH4: $806FH + N \times 700H$ (N = Circuit ID-2)
Normal response	Scaling Upper Limit Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] ADC Moving Average (CH1/CH2/CH3/CH4)

This protocol reads the A/D conversion moving average (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32863/32869/32875/32881.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805FH + N × 700H (N = Circuit ID-2) • CH2: 8065H + N × 700H (N = Circuit ID-2) • CH3: 806BH + N × 700H (N = Circuit ID-2) • CH4: 8071H + N × 700H (N = Circuit ID-2)
Normal response	A/D Conversion Moving Average (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Analog Value (CH1/CH2/CH3/CH4)

This protocol reads the AD conversion value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33171/33172/33173/33174.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8193H + N × 700H (N = Circuit ID-2) • CH2: 8194H + N × 700H (N = Circuit ID-2) • CH3: 8195H + N × 700H (N = Circuit ID-2) • CH4: 8196H + N × 700H (N = Circuit ID-2)
Normal response	Analog Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-AX4] Scaling Value (CH1/CH2/CH3/CH4)

This protocol reads the scaling value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33175/33176/33177/33178.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $8197H + N \times 700H$ (N = Circuit ID-2) • CH2: $8198H + N \times 700H$ (N = Circuit ID-2) • CH3: $8199H + N \times 700H$ (N = Circuit ID-2) • CH4: $819AH + N \times 700H$ (N = Circuit ID-2)
Normal response	Scaling Value (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] 16 bits Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset for circuit ID = 2 to register address 32769.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8001H + N × 700H (N = Circuit ID-2).
	16 bits Set/Reset Register ^{*1*2}	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Not used	—	—
4	Reset of levels A to D excess count (all CHs)	Reset	Do not reset
5	Contact output	On (closed)	Off (open)
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to 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. When using the protocols for circuit ID = 3 to 7, set to 8059H + N × 700H (N = Circuit ID-2).
	Measuring Interval	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] ADC Enable/Disable Setting (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the A/D conversion enable/disable setting (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32858/32864/32870/32876.

Specify the setting value of the A/D conversion enable/disable setting as follows.

- 0: Prohibit
- 1: Allow

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805AH + N × 700H (N = Circuit ID-2) • CH2: 8060H + N × 700H (N = Circuit ID-2) • CH3: 8066H + N × 700H (N = Circuit ID-2) • CH4: 806CH + N × 700H (N = Circuit ID-2)
	A/D Conversion Enable/Disable Setting (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Input Range Setting (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the input range setting (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32859/32865/32871/32877.

Specify the setting value of the input range setting as follows.

- 0: Voltage input
- 1: Current input

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805BH + N × 700H (N = Circuit ID-2) • CH2: 8061H + N × 700H (N = Circuit ID-2) • CH3: 8067H + N × 700H (N = Circuit ID-2) • CH4: 806DH + N × 700H (N = Circuit ID-2)
	Input Range Setting (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Scaling Lower Limit Value (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the scaling lower limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32860/32866/32872/32878.

Use a value in the range of -32767 to 32767.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805CH + N × 700H (N = Circuit ID-2) • CH2: 8062H + N × 700H (N = Circuit ID-2) • CH3: 8068H + N × 700H (N = Circuit ID-2) • CH4: 806EH + N × 700H (N = Circuit ID-2)
	Scaling Lower Limit Value (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] Scaling Upper Limit Value (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the scaling upper limit value (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32861/32867/32873/32879.

Use a value in the range of -32767 to 32767.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805DH + N × 700H (N = Circuit ID-2) • CH2: 8063H + N × 700H (N = Circuit ID-2) • CH3: 8069H + N × 700H (N = Circuit ID-2) • CH4: 806FH + N × 700H (N = Circuit ID-2)
	Scaling Upper Limit Value (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-AX4] ADC Moving Average (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the A/D conversion moving average (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32863/32869/32875/32881.

Use a value in the range of 1 to 100.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 805FH + N × 700H (N = Circuit ID-2) • CH2: 8065H + N × 700H (N = Circuit ID-2) • CH3: 806BH + N × 700H (N = Circuit ID-2) • CH4: 8071H + N × 700H (N = Circuit ID-2)
	A/D Conversion Moving Average (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Model Code

This protocol reads the setting value of the model code for circuit ID = 2 stored in register address 32768.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8000H + N × 700H (N = Circuit ID-2).
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored.

Model code	Setting value
EMU4-PX4	000AH

13

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] 16 bits Monitor

This protocol reads setting value of the 16 bits monitor for circuit ID = 2 stored in register address 32770.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8002H + N × 700H (N = Circuit ID-2).
Normal response	16 bits Monitor*1	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

*1 The following data is stored. For details, refer to 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 $\times 0.001$.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $802BH + N \times 700H$ (N = Circuit ID-2) • CH2: $80A1H + N \times 700H$ (N = Circuit ID-2) • CH3: $80A4H + N \times 700H$ (N = Circuit ID-2) • CH4: $80A7H + N \times 700H$ (N = Circuit ID-2)
Normal response	Convert Rate of Pulse (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Measuring Method Op. Time (CH1/CH2/CH3/CH4)

This protocol reads the counting operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32822/32824/32826/32937.

The setting value of the counting operating time is read as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $8036H + N \times 700H$ (N = Circuit ID-2) • CH2: $8038H + N \times 700H$ (N = Circuit ID-2) • CH3: $803AH + N \times 700H$ (N = Circuit ID-2) • CH4: $80A9H + N \times 700H$ (N = Circuit ID-2)
Normal response	Measuring Method of Operating Time (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] External Input Method (CH1/CH2/CH3/CH4)

This protocol reads the external input method (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 32920/32921/32922/32923.

The setting value of the external input method is read as follows.

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8098H + N × 700H (N = Circuit ID-2) • CH2: 8099H + N × 700H (N = Circuit ID-2) • CH3: 809AH + N × 700H (N = Circuit ID-2) • CH4: 809BH + N × 700H (N = Circuit ID-2)
Normal response	External Input Method (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] External Input Reset Method (CH1/CH2/CH3/CH4)

This protocol reads the external input reset method (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register address 32924/32925/32926/32927.

The setting value of the external input reset method is read as follows.

- 1: Auto reset
- 2: Latch

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 809CH + N × 700H (N = Circuit ID-2) • CH2: 809DH + N × 700H (N = Circuit ID-2) • CH3: 809EH + N × 700H (N = Circuit ID-2) • CH4: 809FH + N × 700H (N = Circuit ID-2)
Normal response	External Input Reset Method (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Contact Input State (CH1/CH2/CH3/CH4)

This protocol reads the contact input state (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33151/33152/33153/33154.

The setting value of the contact input state is read as follows.

- 0: Off state
- 1: On state

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 817FH + N × 700H (N = Circuit ID-2) • CH2: 8180H + N × 700H (N = Circuit ID-2) • CH3: 8181H + N × 700H (N = Circuit ID-2) • CH4: 8182H + N × 700H (N = Circuit ID-2)
Normal response	Contact Input State (CH1/CH2/CH3/CH4)	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Pulse Count (CH1/CH2/CH3/CH4)

This protocol reads the pulse count value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33330/33374/33378/33382.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8232H + N × 700H (N = Circuit ID-2) • CH2: 825EH + N × 700H (N = Circuit ID-2) • CH3: 8262H + N × 700H (N = Circuit ID-2) • CH4: 8266H + N × 700H (N = Circuit ID-2)
Normal response	Pulse Count (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Operating Time (CH1/CH2/CH3/CH4)

This protocol reads the operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33332/33358/33360/33386.

Unit is h.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $8234H + N \times 700H$ (N = Circuit ID-2) • CH2: $824EH + N \times 700H$ (N = Circuit ID-2) • CH3: $8250H + N \times 700H$ (N = Circuit ID-2) • CH4: $826AH + N \times 700H$ (N = Circuit ID-2)
Normal response	Operating Time (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: [EMU4-PX4] Pulse Conversion (CH1/CH2/CH3/CH4)

This protocol reads the pulse conversion value (CH1/CH2/CH3/CH4) for circuit ID = 2 stored in register addresses 33372/33376/33380/33384.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $825CH + N \times 700H$ (N = Circuit ID-2) • CH2: $8260H + N \times 700H$ (N = Circuit ID-2) • CH3: $8264H + N \times 700H$ (N = Circuit ID-2) • CH4: $8268H + N \times 700H$ (N = Circuit ID-2)
Normal response	Pulse Conversion (CH1/CH2/CH3/CH4)	Specify the device that stores the read data. The device uses 2 words.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] 16 bits Set/Reset Register

This protocol writes the setting value of the 16 bits set/reset for circuit ID = 2 to register address 32769.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, set to 8001H + N × 700H (N = Circuit ID-2).
	16 bits Set/Reset Register ^{*1*2}	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

*1 Store the following data.

Bit	Description	If the value is 1	If the value is 0
0	Alarm reset	Reset	Do not reset
1	Reset of integrated value data	Reset	Do not reset
2	Reset of max/min value	Reset	Do not reset
3	Not used	—	—
4	Reset of levels A to D excess count (all CHs)	Reset	Do not reset
5	Contact output	On (closed)	Off (open)
6	Not used	—	—
7	Not used	—	—
8	Contact input latch clear	Clear	Do not clear
9	Reset of external input data	Reset	Do not reset
10	Not used	—	—
11	Not used	—	—
12	Not used	—	—
13	Not used	—	—
14	Not used	—	—
15	Not used	—	—

*2 The effective bit differs depending on the model. For details, refer to 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 $\times 0.001$. Use a value in the range of 1 to 10000000.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $802BH + N \times 700H$ (N = Circuit ID-2) • CH2: $80A1H + N \times 700H$ (N = Circuit ID-2) • CH3: $80A4H + N \times 700H$ (N = Circuit ID-2) • CH4: $80A7H + N \times 700H$ (N = Circuit ID-2)
	Convert Rate of Pulse (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Measuring Method Op. Time (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the counting operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32822/32824/32826/32937.

Specify the setting value of the counting operating time as follows.

- 0: Do not measure
- 1: Measure

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $8036H + N \times 700H$ (N = Circuit ID-2) • CH2: $8038H + N \times 700H$ (N = Circuit ID-2) • CH3: $803AH + N \times 700H$ (N = Circuit ID-2) • CH4: $80A9H + N \times 700H$ (N = Circuit ID-2)
	Measuring Method of Operating Time (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] External Input Method (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the external input method (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 32920/32921/32922/32923.

Specify the setting value of the external input method as follows.

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

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 8098H + N × 700H (N = Circuit ID-2) • CH2: 8099H + N × 700H (N = Circuit ID-2) • CH3: 809AH + N × 700H (N = Circuit ID-2) • CH4: 809BH + N × 700H (N = Circuit ID-2)
	External Input Method (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] External Input Reset Method (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the external input reset method (CH1/CH2/CH3/CH4) for circuit ID = 2 to register address 32924/32925/32926/32927.

Specify the setting value of the external input reset method as follows.

- 1: Auto reset
- 2: Latch

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: 809CH + N × 700H (N = Circuit ID-2) • CH2: 809DH + N × 700H (N = Circuit ID-2) • CH3: 809EH + N × 700H (N = Circuit ID-2) • CH4: 809FH + N × 700H (N = Circuit ID-2)
	External Input Reset Method (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Pulse Count (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the pulse count (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 33330/33374/33378/33382.

Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $8232H + N \times 700H$ (N = Circuit ID-2) • CH2: $825EH + N \times 700H$ (N = Circuit ID-2) • CH3: $8262H + N \times 700H$ (N = Circuit ID-2) • CH4: $8266H + N \times 700H$ (N = Circuit ID-2)
	Pulse Count (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Operating Time (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the operating time (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 33332/33358/33360/33386.

Unit is h. Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $8234H + N \times 700H$ (N = Circuit ID-2) • CH2: $824EH + N \times 700H$ (N = Circuit ID-2) • CH3: $8250H + N \times 700H$ (N = Circuit ID-2) • CH4: $826AH + N \times 700H$ (N = Circuit ID-2)
	Operating Time (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: [EMU4-PX4] Pulse Conversion (CH1/CH2/CH3/CH4)

This protocol writes the setting value of the pulse conversion value (CH1/CH2/CH3/CH4) for circuit ID = 2 to register addresses 33372/33376/33380/33384.

Use a value in the range of 0 to 999999.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	It is set to use the protocol for circuit ID = 2. When using the protocols for circuit ID = 3 to 7, specify as follows. • CH1: $825CH + N \times 700H$ (N = Circuit ID-2) • CH2: $8260H + N \times 700H$ (N = Circuit ID-2) • CH3: $8264H + N \times 700H$ (N = Circuit ID-2) • CH4: $8268H + N \times 700H$ (N = Circuit ID-2)
	Pulse Conversion (CH1/CH2/CH3/CH4)	Specify the device for storing the data to be written. The device uses 2 words.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Holding Registers

MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address	Specify the device that stores the register address to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes.
	Number of Register	Specify the device that stores the number of data points to be read. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. Store the value in the device within the range from 0001H to 007DH (1 to 125).
Normal response	Read Data	• Specify the device that stores the read data. For devices, secure the maximum number of read points + 1 (126 words). The data length (in byte units) of the data read is stored in the first word, and the data read is stored from the second and subsequent words. • Change the byte swap setting according to the specification of the external device.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

MODBUS standard function.

It writes the value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Address	When rewriting to a slave address, specify a range from 1 (default) to 247.
	Start Address (0)	Rewrite to the register address to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. Example: To specify 3096, store 0C18H.
	Number of Register (1)	Rewrite to the number of data to be written. Specify the value in the device within the range from 0001H to 007BH (1 to 123).
	Write Data	• Rewrite the data length to the value of $2 \times$ "Number of Register (1)". Example: If the number of registers is 123, set 246. • Specify the device that stores the write data. Consecutive word devices of the number set in "Number of Register (1)" are used. • Change the byte swap setting according to the specification of the external device.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

14 PROTOCOLS SUPPORTED BY Mitsubishi Electric (ME96 SERIES: ME96SSHB-MB, ME96SSRB-MB)

14.1 Setting Method

ME96SSHB-MB, ME96SSRB-MB

Communication with the ME96 series uses the MODBUS TCP PROTOCOL function of the Mitsubishi Electric multi-measuring instrument ME96 series. In that case, use the optional plug-in module (ME-0000MT-SS96, ME-0040MT2-SS96).

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

- ME series MODBUS Interface specifications (LSPM-0075H)
- User's Manual: Detailed Edition (MODEL: ME96SSHB-MB), User's Manual: Detailed Edition (MODEL: ME96SSRB-MB)

14.2 List of Applicable Protocols

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
RD: Phase Wiring	Reads the value of the phase wiring setup register.	Not to be added	Request
RD: Primary Voltage	Reads the value of the primary voltage setup register.	Not to be added	Request
RD: Primary Voltage (L-N)	Reads the value of the primary voltage (L-N) setup register.	Not to be added	Request
RD: Secondary Voltage	Reads the value of the secondary voltage setup register.	Not to be added	Request
RD: Primary Current	Read the value of the primary current setup register.	Not to be added	Request
RD: 16 bits Monitor 1	Reads the value of the 16-bit monitor 1.	To be added	Fixed Intrvl
RD: Secondary Current	Reads the value of the secondary current setup register.	Not to be added	Request
RD: Interval Time Constant	Reads the value of the interval time constant setup register.	Not to be added	Request
RD: Subinterval Time Constant	Reads the value of the subinterval time constant setup register.	Not to be added	Request
RD: 16 bits Monitor 2	Reads the value of the 16 bits monitor 2.	Not to be added	Fixed Intrvl
RD: Multiplying Factors	Reads the value of the following multiplying factors. • Voltage (L-L) (3P4W) • Current • Voltage • Power • Energy • Power Factor • Frequency • Current THD • Voltage THD • Energy (extended)	To be added	Request
RD: Model Code	Reads the value of the model code.	Not to be added	Request
RD: Phase Current	Reads the following instantaneous values. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	To be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Phase Current Demand	Reads the following instantaneous values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand • Average Value Current Demand	To be added	Fixed Intrvl
RD: Line Voltage	Reads the following instantaneous values. • Voltage V12 • Voltage V23 • Voltage V31 • Average Value Voltage (L-L)	To be added	Fixed Intrvl
RD: Phase Voltage	Reads the following instantaneous values. • Voltage V1N • Voltage V2N • Voltage V3N • Average Value Voltage (L-N)	To be added	Fixed Intrvl
RD: Power Factor	Reads the following instantaneous values. • Phase 1 Power Factor • Phase 2 Power Factor • Phase 3 Power Factor • Σ Power Factor	To be added	Fixed Intrvl
RD: Frequency	Reads the instantaneous value of frequency.	To be added	Fixed Intrvl
RD: Active Power	Reads the following instantaneous values. • Phase 1 Active Power • Phase 2 Active Power • Phase 3 Active Power • Σ Active Power	To be added	Fixed Intrvl
RD: Rolling Demand (kW) (Last)	Reads the instantaneous value of the Σ rolling demand (kW) (last).	Not to be added	Fixed Intrvl
RD: Reactive Power	Reads the following instantaneous values. • Phase 1 Reactive Power • Phase 2 Reactive Power • Phase 3 Reactive Power • Σ Reactive Power	To be added	Fixed Intrvl
RD: Apparent Power	Reads the following instantaneous values. • Phase 1 Apparent Power • Phase 2 Apparent Power • Phase 3 Apparent Power • Σ Apparent Power	To be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Last)	Reads the instantaneous value of the Σ rolling demand (kvar) (last).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Last)	Reads the instantaneous value of the Σ rolling demand (kVA) (last).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kW) (Max.)	Reads the instantaneous value of the Σ rolling demand (kW) (max.).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Max.)	Reads the instantaneous value of the Σ rolling demand (kvar) (max.).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Max.)	Reads the instantaneous value of the Σ rolling demand (kVA) (max.).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kW) (Present)	Reads the instantaneous value of the Σ rolling demand (kW) (present).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Present)	Reads the instantaneous value of the Σ rolling demand (kvar) (present).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Present)	Reads the instantaneous value of the Σ rolling demand (kVA) (present).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kW) (Predict.)	Reads the instantaneous value of the Σ rolling demand (kW) (predict).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kvar) (Predict.)	Reads the instantaneous value of the Σ rolling demand (kvar) (predict).	Not to be added	Fixed Intrvl
RD: Rolling Demand (kVA) (Predict.)	Reads the instantaneous value of the Σ rolling demand (kVA) (predict).	Not to be added	Fixed Intrvl
RD: Operating Time 1	Reads the instantaneous value of the operating time 1.	To be added	Fixed Intrvl

Name	Description	Automatic Addition *1	Communication Timing (Default)
RD: Operating Time 2	Reads the instantaneous value of the operating time 2.	To be added	Fixed Intrvl
RD: Active Energy (import)	Reads the instantaneous value of the active energy (import).	To be added	Fixed Intrvl
RD: Active Energy (export)	Reads the instantaneous value of the active energy (export).	Not to be added	Fixed Intrvl
RD: Reactive Energy (import LAG)	Reads the instantaneous value of the reactive energy (import LAG).	To be added	Fixed Intrvl
RD: Reactive Energy (export LAG)	Reads the instantaneous value of the reactive energy (export LAG).	Not to be added	Fixed Intrvl
RD: Reactive Energy (import LEAD)	Reads the instantaneous value of the reactive energy (import LEAD).	To be added	Fixed Intrvl
RD: Reactive Energy (export LEAD)	Reads the instantaneous value of the reactive energy (export LEAD).	Not to be added	Fixed Intrvl
RD: Apparent Energy	Reads the instantaneous value of the apparent energy.	To be added	Fixed Intrvl
RD: Periodic Active Energy (Period 1) (import)	Reads the instantaneous value of the periodic active energy (period 1) (import).	Not to be added	Fixed Intrvl
RD: Periodic Active Energy (Period 2) (import)	Reads the instantaneous value of the periodic active energy (period 2) (import).	Not to be added	Fixed Intrvl
RD: Periodic Active Energy (Period 3) (import)	Reads the instantaneous value of the periodic active energy (period 3) (import).	Not to be added	Fixed Intrvl
RD: CO2 Equivalent	Reads the instantaneous value of the CO2 Equivalent.	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (Total)	Reads the following root mean square (RMS) values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (1st)	Reads the following root mean square (RMS) values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (Total)	Reads the following root mean square (RMS) values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (1st)	Reads the following root mean square (RMS) values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following root mean square (RMS) values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Current (1st)	Reads the following root mean square (RMS) values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (THD)	Reads the following root mean square (RMS) values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (3rd)	Reads the following root mean square (RMS) values. • Harmonic Distortion V1N • Harmonic Distortion V2N • Harmonic Distortion V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (THD)	Reads the following root mean square (RMS) values. • THD V12 • THD V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (3rd)	Reads the following root mean square (RMS) values. • Harmonic Distortion V12 • Harmonic Distortion V23	Not to be added	Fixed Intrvl

Name	Description	Automatic Addition ^{*1}	Communication Timing (Default)
RD: Harmonics Current Distortion (THD)	Reads the following root mean square (RMS) values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl
RD: Harmonics Current Distortion (3rd)	Reads the following root mean square (RMS) values. • Harmonic Distortion I1 • Harmonic Distortion I2 • Harmonic Distortion I3 • Harmonic Distortion IN	Not to be added	Fixed Intrvl
WR: Phase Wiring	Writes the values to the phase wiring setup register.	Not to be added	Request
WR: Primary Voltage	Writes the values to the primary voltage setup register.	Not to be added	Request
WR: Primary Voltage (L-N)	Writes the values to the primary voltage (L-N) setup register.	Not to be added	Request
WR: Secondary Voltage	Writes the values to the secondary voltage setup register.	Not to be added	Request
WR: Primary Current	Writes the values to the primary current setup register.	Not to be added	Request
WR: 16 bits Set/Reset Register 1	Writes the values to the 16 bits set/reset register 1 setup register.	Not to be added	Request
WR: Secondary Current	Writes the values to the secondary current setup register.	Not to be added	Request
WR: Interval Time Constant	Writes the values to the interval time constant setup register.	Not to be added	Request
WR: Subinterval Time Constant	Writes the values to the subinterval time constant setup register.	Not to be added	Request
WR: 16 bits Set/Reset Register 2	Writes the values to the 16 bits set/reset register 2 setup register.	Not to be added	Request
RD: Holding Registers ^{*2}	Reads the value to be stored in the MODBUS holding register device.	Not to be added	Request
WR: Holding Registers ^{*2}	Writes the value into the MODBUS holding register device.	Not to be added	Request

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

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

14.3 Details of Applicable Protocols

RD: Phase Wiring

This protocol reads the phase wiring value stored in setup register address 512.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Phase Wiring ^{*1}	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

^{*1} The following data is stored.

Phase Wiring	Data
1P2W	0001H
1P3W_1N3	0002H
3P3W_2CT	0003H
3P4W	0004H
1P3W_1N2	0005H
3P3W_3CT	0006H

Precautions

Do not change values other than setting data.

RD: Primary Voltage

This protocol reads the primary voltage value stored in setup register address 513.

Unit is V.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Primary Voltage	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Voltage (L-N)

This protocol reads the primary voltage value stored in setup register address 515.

Unit is $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Primary Voltage (L-N)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1V$.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Secondary Voltage	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Primary Current

This protocol reads the primary current value stored in setup register address 519.

Unit is $\times 0.1A$.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Primary Current	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: 16 bits Monitor 1

This protocol reads the 16 bits monitor 1 value stored at register address 524.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	16 bits Monitor 1 ^{*1}	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

^{*1} The following data is stored. For details, refer to 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. 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) • Current • Voltage • Power • Energy • Power Factor • Frequency • Current THD • Voltage THD • Energy (extended)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Model Code

This protocol reads the model code stored in register address 763.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Model Code*1	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Model Code	Data
ME96SSRB-MB	021AH
ME96SSHB-MB	021BH

Precautions

Do not change values other than setting data.

RD: Phase Current

This protocol reads the instantaneous values of Phase 1 current, Phase 2 current, Phase 3 current, Neutral current, and Average current stored in register addresses 768 to 772.

Unit is A.

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

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current • Average Value Current	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand • Average Value Current Demand	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Voltage V12 - Voltage V23 - Voltage V31 - Average Value Voltage (L-L)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Voltage V1N - Voltage V2N - Voltage V3N - Average Value Voltage (L-N)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Power Factor • Phase 2 Power Factor • Phase 3 Power Factor • Σ Power Factor	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 $\times 0.1\text{Hz}$.

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 = $123456 \times 10^{-3} = 123.456$

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Phase 1 Active Power - Phase 2 Active Power - Phase 3 Active Power Σ Active Power	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Phase 1 Reactive Power • Phase 2 Reactive Power • Phase 3 Reactive Power • Σ Reactive Power	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Phase 1 Apparent Power - Phase 2 Apparent Power - Phase 3 Apparent Power Σ Apparent Power	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the phase wire system. Unused values are stored as 0. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling 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 "10ⁿ".*1

*1 n is the power multiplying factor data (register address: 756).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Σ Rolling Demand (kVA) (Predict.)	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Operating Time 1

This protocol reads the instantaneous value of Operating time 1 stored in register address 1378.

Unit is h.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Time 1	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Operating Time 2

This protocol reads the instantaneous value of Operating time 2 stored in register address 1380.

Unit is h.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Time 2	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Energy (import)

This protocol reads the active energy (import) value stored in register address 1408.

Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Active Energy (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Active Energy (export)

This protocol reads the active energy (export) value stored in register address 1410.

Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Active Energy (export)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (import LAG)

This protocol reads the reactive energy (import LAG) value stored in register address 1412.

Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (import LAG)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (export LAG)

This protocol reads the reactive energy (export LAG) value stored in register address 1414.

Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (export LAG)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (import LEAD)

This protocol reads the reactive energy (import LEAD) value stored in register address 1416.

Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (import LEAD)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (export LEAD)

This protocol reads the reactive energy (export LEAD) value stored in register address 1418.

Unit is kvarh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Reactive Energy (export LEAD)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Apparent Energy

This protocol reads the apparent energy value stored in register address 1420.

Unit is kVAh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Apparent Energy	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Active Energy (Period 1) (import)

This protocol reads the periodic active energy (period 1) (import) value stored in register address 1422.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Periodic Active Energy (Period 1) (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Active Energy (Period 2) (import)

This protocol reads the periodic active energy (period 2) (import) value stored in register address 1424.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Periodic Active Energy (Period 2) (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Periodic Active Energy (Period 3) (import)

This protocol reads the periodic active energy (period 3) (import) value stored in register address 1488.
Unit is kWh.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Periodic Active Energy (Period 3) (import)	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: CO2 Equivalent

This protocol reads the CO2 equivalent value stored in register address 1476.

Unit is kg.

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

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

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	CO2 Equivalent	Specify the device that stores the read data. The device uses two consecutive word devices.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (1795)	■Default Reads RMS values of 1st harmonics of phase voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to $1795 + ((N-1) \times 3) \div 2$. N: Harmonics number (odd number from 3 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0730H to specify 1840. For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755). However, for voltage (L-L) (3P4W), use the voltage (L-L) (3P4W) multiplying factor (register address: 751).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the voltage multiplying factor data (register address: 755). However, for voltage (L-L) (3P4W), use the voltage (L-L) (3P4W) multiplying factor (register address: 751).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2051)	■Default Reads RMS values of 1st harmonics of line voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 2051 + ((N-1) × 3) ÷ 2. N: Harmonics number (odd number from 3 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0830H to specify 2096. For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 "10ⁿ".*1

*1 n is the current multiplying factor data (register address: 754).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = 123456 × 10⁻³ = 123.456

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2308)	■Default Reads RMS values of 1st harmonics of phase current. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to 2308 + (N-1) × 2. N: Harmonics number (odd number from 3 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0940H to specify 2368. For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

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

^{*1} n is the voltage THD multiplying factor data (register address: 761).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• THD V1N • THD V2N • THD V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2563)	■Default Reads distortion ratio of 3rd harmonics of phase voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to $2563 + ((N-3) \times 3) \div 2$. N: Harmonics number (odd number from 5 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0A2DH to specify 2605. For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonic Distortion V1N • Harmonic Distortion V2N • Harmonic Distortion V3N	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

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

*1 n is the voltage THD multiplying factor data (register address: 761).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• THD V12 • THD V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number (2819)	■Default Reads distortion values of 3rd harmonics of line voltages. ■If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to $2819 + ((N-3) \times 3) \div 2$. N: Harmonics number (odd number from 5 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0B2DH to specify 2861. For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonic Distortion V12 • Harmonic Distortion V23	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

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

*1 n is the current THD multiplying factor data (register address: 760).

Ex.

Read data = 123456

Multiplying factor = -3

Measurement value = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• THD I1 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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 $\times 0.1\%$.

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 = $123456 \times 10^{-3} = 123.456$

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number	■ Default Reads distortion values of 3rd harmonics of line voltages. ■ If the protocol is used for other harmonics Rewrite the "Start Holding Register No." to $3076 + (N-3) \times 2$. N: Harmonics number (odd number from 5 to 31) Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, if N=31, set 0C3CH to specify 3132. For details, refer to the ME series MODBUS Interface specifications (LSPM-0075H).
Normal response	• Harmonic Distortion I1 • Harmonic Distortion I2 • Harmonic Distortion I3 • Harmonic Distortion IN	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol may not be applicable depending on the phase wire system. For details, refer to 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. 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 $\times 0.1V$.

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. 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 $\times 0.1V$.

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. 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 $\times 0.1A$.

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. 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. 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. Specify the device value in the range from 1 to 125.
Normal response	Read Data	Specify the device that stores the read data. Secure the maximum number of read points (125 words) for the device.
	Byte Swap	Change the byte exchange setting according to the specification of the external device.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

MODBUS standard function.
It writes a value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Head Holding Register Number	Specify the device that stores the write data. Specify the value in hexadecimal in the order from upper bytes to lower bytes. For example, to specify 3096, set 0C18H.
	Write Points	Set it to the number of data points to be written. Use a value in the range of 0001H to 007BH (1 to 123).
	Write Data	Set the data length to a value that is twice the number of write points. For example, if the number of write points is 123, set 246 points. Specify the device that stores the data to be written in write data. Modify the "Byte Swap" setting of non-conversion variable "Write Data" as necessary.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

15 PROTOCOLS SUPPORTED BY OMRON (V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN)

15.1 Setting Method

V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN

Communication with the V680S series uses the MODBUS/TCP communication function of the RFID system V680S series (V680S-HMD63-ETN, V680S-HMD64-ETN, V680S-HMD66-ETN).

For the parameter setting method, refer to 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. Specify the value within the range of 0000H (default) to 9FFFH as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1024, set 0400H.)
	Word Count (1)	Rewrite to the number of words of data to be read. Specify the value within the range of 0001H to 007DH (1 to 125) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 125, set 007DH)
Normal response	Read Data	Rewrite the data length to the value of $2 \times \text{Word Count (1)}$. (For example, if Word Count (1) is 125, specify 250) Specify the device that stores the read data. The number of words specified by Word Count (1) is used.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: ID

This protocol reads the ID code of the RF tag within the communication area.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	ID Code	Specify the device that stores the read data. The device uses 4 words.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Tag Communications Option

This protocol reads the communication options (Once/Auto/FIFO Trigger) set in the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Tag Communications Option Setting* ¹	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*¹ The following data is stored.

Setting value	Tag communications option setting
0000H	Once
0001H	Auto
0002H	FIFO Trigger (no ID code check)
0012H	FIFO Trigger (with ID code check)

Precautions

Do not change values other than setting data.

RD: Tag Communications Conditions

This protocol reads the communication conditions (high-speed communication/standard communication, write verification status) set in the reader/writer.

15

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Communications Speed*¹ - Write Verification*²	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*¹ The following data is stored.

Setting value	Communications speed
0000H	High speed
0001H	Standard

*² The following data is stored.

Setting value	Write verification
0000H	No
0001H	Yes

Precautions

Do not change values other than setting data.

RD: Noise Level

This protocol measures the average, maximum, and minimum noise levels near the reader/writer.
The value is read in the range of 0000H to 0063H (0 to 99).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Average Noise Level - Maximum Noise Level - Minimum Noise Level	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Operating Status

This protocol reads the operating status (mode and status information) of the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	- Mode^{*1} - Status Information^{*2}	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

*1 The following data is stored.

Setting value	Mode
0000H	Safe mode
0001H	RUN mode
0002H	Slave mode

*2 The following data is stored.

Setting value	Status information
0000H	Initializing
0001H	Idling
0002H	Communicating with RF tag
0003H	Downloading
0004H	Error occurring
0005H	Shutting down

Precautions

Do not change values other than setting data.

RD: Recent Error Query Information

This protocol reads the latest error information from the reader/writer.
The latest error information is read as follows.

Parameter	Description
Operating Time	Displays the running time since the reader/writer started. (Unit: ms)
IP Address of Remote Node	Displays the IP address of the communication device. For example, 192.168.1.200 is displayed as C0A801C8H.
Query Error Code	For details, refer to 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 • IP Address of Remote Node • Query Error Code	Specify the device that stores the read data. The device uses 2 words.
	• Query Exception Code • Communications Query Information Size	Specify the device that stores the read data. The device uses 1 byte.
	Communications Query Information	Specify the device that stores the read data. The device uses 118 words.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Communication Diagnostic Information

This protocol reads the latest communication diagnostic information.

The communication diagnostic information is read as follows.

Parameter	Description
Operating Time	Displays the system operating time during communication diagnosis.
Query Type	For details, refer to 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. Among multiple Send Power Level values, the corrected minimum value of the DAC (10 bits) successfully communicated with the RF tag is read. If the communication result is "RF Tag missing error", it becomes 0000H (fixed).
Receive Power Level	Displays the Receive Power Level value during communication diagnosis. The value is read in the range of 0 to 10. The correction value of the ADC (10 bits) during communication with the RF tag (during response reception) is read. If the communication result is "RF Tag missing error", it becomes 0000H (fixed).
Noise Level	Displays the noise level value during communication diagnosis. The value is read in the range of 0 to 10. The ADC (10 bits) value before communicating with the RF tag is read.
Power Level	Displays the power level value during communication diagnosis. The value is read in the range of 0 to 10. The sum of Send Power Level and Receive Power Level is calculated using the following formula. (Send Power Level + Receive Power Level)÷2
Tag ID Data	Displays the tag ID of the RF tag identified during communication diagnosis. If the communication result is "RF Tag missing error", it becomes 0000000000000000H (fixed).

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Operating Time	Specify the device that stores the read data. The device uses 2 words.
	• Query Type • Communications Result • Diagnostic Result • Send Power Level • Receive Power Level • Noise Level • Power Level	Specify the device that stores the read data.
	Tag ID Data	Specify the device that stores the read data. The device uses 4 words.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

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

WR: Data

This protocol writes data to the RF tag within the communication area.

The default value is set to write 1 word of data to register number 0.

Setting data

Packet name	Element name	Description
Request	Register Address (0)	Rewrite to the write start address. Specify the value within the range of 0000H (default) to 9FFFH as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1024, set 0400H.)
	Word Count (1)	Rewrite to the number of words of the data to be written. Specify the value in the range of 0001H to 0071H (1 to 113) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 113, set 0071H)
	Write Data	Rewrite the data length to the value of $2 \times$ Word Count (1). (For example, if Word Count (1) is 113, specify 226) Specify the device that stores the write data. The number of words specified by Word Count (1) is used.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Copy Data

This protocol uses two readers/writers to copy data from the RF tag within the communication area of one reader/writer (A) to the RF tag memory within the communication area of the other reader/writer (B).

Setting data

Packet name	Element name	Description
Request	Copy Address	Specify the device that stores the write start address of the copy destination RF tag. Use a value in the range of 0000H to 9FFFH.
	Copy Word Count	Specify the device that stores the number of words of copy data. Use a value in the range of 1 to 102.
	IP Address	Specify the device that stores the IP address of the copy destination reader/writer. The device uses 2 words. For example, to specify 192.168.1.200, set C0A801C8H.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Data Fill

This protocol writes data for the specified number of words from the specified start address.

Setting data

Packet name	Element name	Description
Request	Fill Address	Specify the device that stores the write start address of the RF tag. Use a value in the range of 0000H to 9FFFH.
	Number of Fill Words	Specify the device that stores the number of words of fill data. Use a value in the range of 0001H to FFFFH. When 0000H is specified, all areas are filled.
	Fill Data	Specify the device that stores the data to be written to the RF tag.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Lock

This protocol locks the memory of the specified RF tag.

Setting data

Packet name	Element name	Description
Request	Lock Number	Specify the device that stores the block number or sector number to be locked.
	Lock Count	Specify the device that stores the number of blocks or sectors to be locked.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Note that the locked memory cannot be written to again, nor can it be unlocked.

WR: Restore Data

This protocol restores the RF tag data stored in the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- Restoration to the RF tag is executed only when an RF tag matching the retained tag ID exists within the communication area.

WR: Tag Communications Option

This protocol writes the communication options (Once/Auto/FIFO Trigger) set in the reader/writer.

Setting data

Packet name	Element name	Description
Request	Tag Communications Option Setting* ¹	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*¹ Store the following data.

Setting value	Tag communications option setting
0000H	Once
0001H	Auto
0002H	FIFO Trigger (no ID code check)
0012H	FIFO Trigger (with ID code check)

Precautions

Do not change values other than setting data.

WR: Tag Communications Conditions

This protocol writes the communication conditions (high-speed communication/standard communication, write verification status) set in the reader/writer.

15

Setting data

Packet name	Element name	Description
Request	- Communications Speed*¹ - Write Verification*²	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

*¹ Store the following data.

Setting value	Communications speed
0000H	High speed
0001H	Standard

*² Store the following data.

Setting value	Write verification
0000H	No
0001H	Yes

Precautions

Do not change values other than setting data.

WR: STOP

This protocol stops the operation of the reader/writer.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: RESET

This protocol resets the reader/writer.

Setting data

Packet name	Element name	Description
Request	Option ^{*1}	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

^{*1} Store the following data.

Setting value	Option
0000H	Normal reset
FFFFH	Forced reset

Precautions

Do not change values other than setting data.

WR: Communication Diagnostic Setting

This protocol writes the communication diagnostic settings (communication diagnostic settings enable/disable).

Setting data

Packet name	Element name	Description
Request	Communication Diagnostic Setting ^{*1}	Specify the device that stores the write data.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

^{*1} Store the following data.

Setting value	Communication diagnostic setting
0000H	Disabled
0001H	Enabled

Precautions

- Do not change values other than setting data.
- Communication diagnosis cannot be used together with the communication option "FIFO Trigger". Use with the communication option "Once" or "Auto".
- Enabling communication diagnostics increases the communication time by up to 200ms.

WR: Holding Registers

This is a MODBUS standard function.

It writes the value to the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register Address (0)	Rewrite to the register number to be written. Specify the value as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 1024, set 0400H.)
	Word Count (1)	Rewrite to the number of data to be written. Specify the value in the range of 0001H to 0071H (1 to 113) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify 113, set 0071H)
	Write Data	Rewrite the data length to the value of $2 \times \text{Word Count (1)}$. (For example, if Word Count (1) is 113, specify 226) Specify the device that stores the write data. The number of words specified by Word Count (1) is used.
Normal response	—	No setting is required.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Holding Registers

This is a MODBUS standard function.

It reads the value stored in the MODBUS holding register device.

Setting data

Packet name	Element name	Description
Request	Register Address	Specify the device that stores the register number to be read.
	Word Count	Specify the device that stores the data points to be read. Use a value in the range of 0001H to 007DH (1 to 125).
Normal response	Read Data	Specify the device that stores the read data.
Error response	Exception Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

16 PROTOCOLS SUPPORTED BY Keyence (TR-H, TR-W)

16.1 Setting Method

TR-H, TR-W

Use the MODBUS TCP communication function to communicate with the TR-H and TR-W series.

For the setting method of Keyence (touch panel recorder), refer to the following manuals provided by Keyence Corporation.

- Touch Panel Recorder TR-H/TR-W Series Setting Guide
- Touch Panel Recorder TR-H/TR-W Series Instruction Manual

16.2 List of Applicable Protocols

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Temp Voltage CH Data (float) (CH1-CH8)	Reads the temperature voltage channel measurement data (float).	Not to be added	Fixed Intrvl
RD: Temp Voltage CH Data (short) (CH1-CH8)	Reads the temperature voltage channel measurement data (short).	To be added	Fixed Intrvl
RD: Temp Voltage CH Alarm State (CH1-CH8)	Reads the alarm state of the temperature voltage channel.	To be added	Fixed Intrvl
RD: Pulse CH Data (float) (CH1-CH4)	Reads the pulse channel measurement data (float).	Not to be added	Fixed Intrvl
RD: Pulse CH Data (short) (CH1-CH4)	Reads the pulse channel measurement data (short).	Not to be added	Fixed Intrvl
RD: Pulse CH Alarm State (CH1-CH4)	Reads the alarm state of the pulse channel.	Not to be added	Fixed Intrvl
RD: Modbus CH Data (float) (CH1-CH4)	Reads the Modbus channel measurement data (float).	Not to be added	Fixed Intrvl
RD: Modbus CH Data (short) (CH1-CH4)	Reads the Modbus channel measurement data (short).	Not to be added	Fixed Intrvl
RD: Modbus CH Alarm State (CH1-CH4)	Reads the alarm state of the Modbus channel.	Not to be added	Fixed Intrvl
RD: Calc. CH Data (float) (CH1-CH4)	Reads the calculation channel measurement data (float).	To be added	Fixed Intrvl
RD: Calc. CH Data (short) (CH1-CH4)	Reads the calculation channel measurement data (short).	Not to be added	Fixed Intrvl
RD: Calc. CH Alarm State (CH1-CH4)	Reads the alarm state of the calculation channel.	Not to be added	Fixed Intrvl
RD: External Relay State (1-16)	Read the external relay state.	Not to be added	Fixed Intrvl
RD: Internal Relay State (1-8)	Reads the internal relay state.	Not to be added	Fixed Intrvl
RD: Input Terminal State (1-16)	Reads the state of the input terminal.	Not to be added	Fixed Intrvl
RD: System State	Reads the state of the system.	Not to be added	Fixed Intrvl
RD: Unit Time	Reads the time of this machine.	Not to be added	Fixed Intrvl
WR: Modbus CH Data (short) (CH1-CH4)	Writes the Modbus channel measurement data (short).	Not to be added	Request
RD: Input Registers	Reads the value stored in the input register.	Not to be added	Request
WR: Holding Registers*2	Writes the value of the MODBUS holding register device.	Not to be added	Request

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

*2 MODBUS general purpose protocol. This function can be used as a base when creating a protocol.

16.3 Details of Applicable Protocols

RD: Temp Voltage CH Data (float) (CH1-CH8)

This protocol reads the value of the temperature voltage channel measurement data (float) (CH1-CH8) from input register addresses 300001 to 300016.

Setting data

Packet name	Element name	Description
Request	Start Address (300001)	The default value is set to read the temperature voltage measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is $2 \times (\text{start channel number}-1)$. Specify the value within the range of 0000H to 009EH (0 to 158) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the temperature voltage measurement data starting from channel 73, set 0090H.)
	Number of Registers (16)	The default value is set to read the value of the temperature voltage measurement data for 8 channels. When changing the number of channels, replace it with $2 \times \text{number of channels}$. Specify the value within the range of 0002H to 007CH (2 to 124) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 62 channels, set 007CH.)
Normal response	Temp Volt Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of $2 \times \text{number of registers}$ in the request message. For example, if "Number of Registers" is 124, specify 248. Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (300160 (009FH)).

RD: Temp Voltage CH Data (short) (CH1-CH8)

This protocol reads the value of the temperature voltage channel measurement data (short) (CH1-CH8) from input register addresses 300501 to 300508.

Setting data

Packet name	Element name	Description
Request	Start Address (300501)	The default value is set to read the temperature voltage measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 500 + (start channel number - 1). Specify the value within the range of 01F4H to 0243H (500 to 579) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the temperature voltage measurement data starting from channel 73, set 023CH.)
	Number of Registers (8)	The default value is set to read the value of the temperature voltage measurement data for 8 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 0050H (1 to 80) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 80 channels, set 0050H.)
Normal response	Temp Volt Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of $2 \times$ number of registers in the request message. (For example, if "Number of Registers" is 80, specify 160.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (300580 (243H)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Temp Voltage CH Alarm State (CH1-CH8)

This protocol reads the temperature voltage channel alarm state (CH1-CH8) from input register addresses 300801 and 300802.

Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel number 1, 5, 9, ..., 77.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

16

Setting data

Packet name	Element name	Description
Request	Number of Registers (2)	The default value is set to read the temperature voltage channel alarm state for 8 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0014H (1 to 20) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the alarm state of 80 channels, set 0014H.)
Normal response	Temp Volt Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 20, specify 40.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Pulse CH Data (float) (CH1-CH4)

This protocol reads the value of the pulse channel measurement data (float) (CH1-CH4) from input register addresses 301001 to 301008.

Setting data

Packet name	Element name	Description
Request	Start Address (301001)	The default value is set to read the value of the pulse channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is $1000 + 2 \times (\text{start channel number} - 1)$. Specify the value within the range of 03E8H to 03F6H (1000 to 1014) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the pulse channel measurement data starting from channel 5, set 03F0H.)
	Number of Registers (8)	The default value is set to read the value of the pulse channel measurement data for 4 channels. When changing the number of channels, replace it with $2 \times \text{number of channels}$. Specify the value within the range of 0002H to 0010H (2 to 16) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 8 channels, set 0010H.)
Normal response	Pulse Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of $2 \times \text{number of registers}$ in the request message. (For example, if "Number of Registers" is 16, specify 32.) Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (301016 (3F7H)).

RD: Pulse CH Data (short) (CH1-CH4)

This protocol reads the value of the pulse channel measurement data (short) (CH1-CH4) from input register addresses 301501 to 301504.

Setting data

Packet name	Element name	Description
Request	Start Address (301501)	The default value is set to read the value of the pulse channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 1500 + (start channel number - 1). Specify the value within the range of 05DCH to 05E3H (1500 to 1507) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the pulse channel measurement data starting from channel 5, set 05E0H.)
	Number of Registers (4)	The default value is set to read the value of the pulse channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 0008H (1 to 8) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 8 channels, set 0008H.)
Normal response	Pulse Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of $2 \times$ number of registers in the request message. (For example, if "Number of Registers" is 8, specify 16.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (301508 (5E3H)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Pulse CH Alarm State (CH1-CH4)

This protocol reads the pulse channel alarm state (CH1-CH4) from input register address 301801.

Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel numbers 1 and 5.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the pulse channel alarm state for 4 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0002H (1 to 2) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the alarm state of 8 channels, specify 0002H.)
Normal response	Pulse Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 2, specify 4.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Modbus CH Data (float) (CH1-CH4)

This protocol reads the value of the Modbus channel measurement data (float) (CH1-CH4) from input register addresses 322001 to 322008.

Setting data

Packet name	Element name	Description
Request	Start Address (322001)	The default value is set to read the value of the Modbus channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is $22000 + (\text{start channel number} - 1) \times 2$. Specify the value within the range of 55F0H to 56EEH (22000 to 22254) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus channel measurement data starting from channel 125, set 56E8H.)
	Number of Registers (8)	The default value is set to read the value of the Modbus channel measurement data for 4 channels. When changing the number of channels, replace it with $2 \times \text{number of channels}$. Specify the value within the range of 0002H to 007CH (2 to 124) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the measurement data of 62 channels, set 007CH.)
Normal response	Modbus Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of $2 \times \text{number of registers}$ in the request message. (For example, if "Number of Registers" is 124, specify 248.) Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (322256 (56EFH)).

RD: Modbus CH Data (short) (CH1-CH4)

This protocol reads the value of the Modbus channel measurement data (short) (CH1-CH4) from input register addresses 322501 to 322504.

Setting data

Packet name	Element name	Description
Request	Start Address (322501)	The default value is set to read the value of the Modbus channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 22500 + (start channel number - 1). Specify the value within the range of 57E4H to 5863H (22500 to 22627) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus channel measurement data starting from channel 125, set 5860H.)
	Number of Registers (4)	The default value is set to read the value of the Modbus channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 007DH (1 to 125) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 125 channels, set 007DH.)
Normal response	Modbus Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of $2 \times$ number of registers in the request message. (For example, if "Number of Registers" is 125, specify 250.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (322628 (5863H)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Modbus CH Alarm State (CH1-CH4)

This protocol reads the Modbus channel alarm state (CH1-CH4) from input register address 322801.

Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel number 1, 5, 9, ..., 125.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

16

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the Modbus channel alarm state for 4 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0020H (1 to 32) as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the alarm state of 128 channels, set 0020H.)
Normal response	Modbus Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 32, specify 64.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Calc. CH Data (float) (CH1-CH4)

This protocol reads the value of the calculation channel measurement data (float) (CH1-CH4) from input register addresses 323001 to 323008.

Setting data

Packet name	Element name	Description
Request	Start Address (323001)	The default value is set to read the value of the calculation channel measurement data from channel 1. To use this protocol on other channels, replace it with a value that is $23000 + 2 \times (\text{start channel number} - 1)$. Specify the value within the range of 59D8H to 5A16H (23000 to 23062) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus data starting from channel 29, set 5A10H.)
	Number of Registers (8)	The default value is set to read the value of the calculation channel measurement data for 4 channels. When changing the number of channels, replace it with $2 \times \text{number of channels}$. Specify the value within the range of 0002H to 0040H (2 to 64) that is a multiple of 2 as a hexadecimal in the order from upper bytes to lower bytes. (For example, when reading the measurement data of 32 channels, set 0040H.)
Normal response	Calculation Channel Measurement Data (float)	Rewrite the data length to the value corresponding to the number of $2 \times \text{number of registers}$ in the request message. (For example, if "Number of Registers" is 64, specify 128.) Specify the device that stores the read data. The device uses 2 words and stores the float value for each channel.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (323064 (5A17H)).

RD: Calc. CH Data (short) (CH1-CH4)

This protocol reads the value of the calculation channel measurement data (short) (CH1-CH4) from input register addresses 323501 to 323504.

Setting data

Packet name	Element name	Description
Request	Start Address (323501)	The default value is set to read the value of the calculation channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 23500 + (start channel number - 1). Specify the value within the range of 5BCCH to 5BEBH (23500 to 23531) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the calculation channel measurement data starting from channel 29, set 5BE8H.)
	Number of Registers (4)	The default value is set to read the value of the calculation channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 0020H (1 to 32) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 32 channels, set 0020H.)
Normal response	Calculation Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 32, specify 64.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (323532 (5BEBH)).
- Channel data is read as a signed 16 bits integer. Since there is no decimal point display, 12.345 is displayed as 12345. If the measured value or the data other than the numerical value of the measured data is greater than or equal to the upper limit value or less than or equal to the lower limit value of INT16, it becomes +32767 (7FFFH) or -32768 (8000H).

RD: Calc. CH Alarm State (CH1-CH4)

This protocol reads the calculation channel alarm state (CH1-CH4) from input register address 323801.
Each input register stores 4 channels of alarm states as shown below.

Bit No.	Channel No.*1	Alarm No.
Bit 0	Channel n	Alarm 1
Bit 1		Alarm 2
Bit 2		Alarm 3
Bit 3		Alarm 4
Bit 4	Channel n + 1	Alarm 1
Bit 5		Alarm 2
Bit 6		Alarm 3
Bit 7		Alarm 4
Bit 8	Channel n + 2	Alarm 1
Bit 9		Alarm 2
Bit 10		Alarm 3
Bit 11		Alarm 4
Bit 12	Channel n + 3	Alarm 1
Bit 13		Alarm 2
Bit 14		Alarm 3
Bit 15		Alarm 4

*1 n is the start channel number 1, 5, 9, ..., 29.

The alarm state is stored as follows.

Setting value	Alarm state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the calculation channel alarm state for 4 channels. When changing the number of channels, replace it with the number of channels ÷ 4. The number of channels is to be a multiple of 4. Specify the value within the range of 0001H to 0008H (1 to 8) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to read the alarm state of 32 channels, specify 0008H.)
Normal response	Calculation Channel Alarm State	Rewrite the data length to the value corresponding to the number of 2 × number of registers in the request message. (For example, if "Number of Registers" is 8, specify 16.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: External Relay State (1-16)

This protocol reads the state of external relays from input register address 305001.

Each input register stores the state of 16 external relays as follows.

Bit No.	External relay No.
Bit 0	External relay 1
Bit 1	External relay 2
Bit 2	External relay 3
Bit 3	External relay 4
Bit 4	External relay 5
Bit 5	External relay 6
Bit 6	External relay 7
Bit 7	External relay 8
Bit 8	External relay 9
Bit 9	External relay 10
Bit 10	External relay 11
Bit 11	External relay 12
Bit 12	External relay 13
Bit 13	External relay 14
Bit 14	External relay 15
Bit 15	External relay 16

The state of a relay is stored as follows.

Setting value	Relay state
0	Off
1	On

16

Setting data

Packet name	Element name	Description
Request	Number of Registers (1)	The default value is set to read the state of external relays 1 to 16. When using the protocols of external relays 1 to 32, rewrite to 2.
Normal response	External Relay State	Rewrite the data length to the value corresponding to the number of $2 \times$ number of registers in the request message. (For example, if "Number of Registers" is 2, specify 4.) Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Internal Relay State (1-8)

This protocol reads the internal relay state from input register address 305101.
The internal relay is stored as follows.

Bit No.	Internal relay No.
Bit 0	Internal relay 1
Bit 1	Internal relay 2
Bit 2	Internal relay 3
Bit 3	Internal relay 4
Bit 4	Internal relay 5
Bit 5	Internal relay 6
Bit 6	Internal relay 7
Bit 7	Internal relay 8
Bits 8 to 15	Not used

The state of a relay is stored as follows.

Setting value	Relay state
0	Off
1	On

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Internal Relay State	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Input Terminal State (1-16)

This protocol reads the input terminal state from input register address 305201.

The input state of the external terminal is stored as follows.

Bit No.	External terminal No
Bit 0	External terminal 1
Bit 1	External terminal 2
Bit 2	External terminal 3
Bit 3	External terminal 4
Bit 4	External terminal 5
Bit 5	External terminal 6
Bit 6	External terminal 7
Bit 7	External terminal 8
Bit 8	External terminal 9
Bit 9	External terminal 10
Bit 10	External terminal 11
Bit 11	External terminal 12
Bit 12	External terminal 13
Bit 13	External terminal 14
Bit 14	External terminal 15
Bit 15	External terminal 16

The state of a relay is stored as follows.

Setting value	Relay state
0	Off
1	On

16

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	Input Terminal State	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: System State

This protocol reads the system state from input register address 309001.

Bit No.	System state
Bit 0	System error
Bit 1	Measurement error
Bit 2	Burnout
Bit 3	Communication error
Bit 4	Not used
Bit 5	Not used
Bit 6	Not used
Bit 7	Not used
Bit 8	Not used
Bit 9	Not used
Bit 10	Memory remaining capacity alarm
Bit 11	USB memory remaining capacity alarm
Bit 12	Collecting
Bit 13	Stopped
Bit 14	Not used
Bit 15	Not used

The system state is stored as follows.

Setting value	System state
0	The state does not occur.
1	The state occurs.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	System State	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Unit Time

This protocol reads "Year", "Month", "Day", "Hour", "Min", "Sec", and "Msec" as the time of this machine from input register addresses 309101 to 309107.

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Year • Month • Day • Hour • Min • Sec • Msec	Specify the device that stores the read data.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Modbus CH Data (short) (CH1-CH4)

This protocol writes values from holding register addresses 422501 to 422504 to the Modbus channel measurement data (short) (CH1-CH4).

Setting data

Packet name	Element name	Description
Request	Start Address (422501)	The default values are set to write the value to the Modbus channel measurement data starting from channel 1. To use this protocol on other channels, replace it with a value that is 22500 + (start channel number - 1). Specify the value within the range of 57E4H to 5863H (22500 to 22627) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the Modbus channel measurement data starting from channel 125, set 5860H.)
	Number of Registers (4)	The default value is set to write the value of the Modbus channel measurement data for 4 channels. When changing the number of channels, replace it with the number of channels. Specify the value within the range of 0001H to 007BH (1 to 123) as a hexadecimal in the order from upper bytes to lower bytes. (For example, to specify the measurement data of 123 channels, set 007BH.)
	Modbus Channel Measurement Data (short)	Rewrite the data length to the value corresponding to the number of $2 \times$ number of registers in the request message. (For example, if "Number of Registers" is 123, specify 246.) Specify the device that stores the read data.
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- When changing "Number of Registers", check that the value obtained from "Start Address" + "Number of Registers" do not exceed the channel data address range (422628 (5863H)).
- Channel data is written as a signed 16 bits integer. When writing 12.345, store 12345 in the device.

RD: Input Registers

MODBUS standard function.

It reads the value stored in the input register address.

Setting data

Packet name	Element name	Description
Request	Start Address	Specify the device that stores the register address to be read. For the register address, refer to the manual provided by Keyence Corporation (Touch Panel Recorder TR-H/TR-W Series Setting Guide 96M12442).
	Number of Registers	Specify the device that stores the number of data points to be read. Use a value in the range of 0001H to 007DH (1 to 125).
Normal response	Read Data	Specify the device that stores the read data. The default value is set to the maximum number of registers (125).
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

WR: Holding Registers

MODBUS standard function.
It writes the value to the holding register device.

Setting data

Packet name	Element name	Description
Request	Start Address (420401)	The default value is set to write to holding register address 420401. When using the protocol for other registers, rewrite to the value of the start address to be written. For details, refer to the manual provided by Keyence Corporation (Touch Panel Recorder TR-H/ TR-W Series Setting Guide 96M12442).
	Number of Registers (1)	The default value is set to write as 1. Rewrite to the same value as the number of registers to be written. Use a value in the range of 0001H to 007BH (1 to 123).
	Changed Data	Rewrite the data length to a value that is $2 \times$ "Number of Registers". (For example, if "Number of Registers" is 123, specify 246.) Specify the device that stores the write data. The number of devices used is the same as "Number of Registers".
Normal response	—	No setting is required.
Error response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

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. • Vendor ID • Device Type • Product Code • Device Major Revision • Device Minor Revision • 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 "10ⁿ".

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 "10ⁿ".

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 "10ⁿ".

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 "10ⁿ".

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 "10ⁿ".

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. 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. 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 • Device Type • Product Code • Device Major Revision • Device Minor Revision • Serial Number	Specify the device that stores the read data. 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. 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. Use a value in the range of 1 to 32.
Normal response	Register Content	Specify the device that stores the read data. 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. 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. 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. For example, if the number of words to write is 8, specify 16. Specify the device that stores the write data. 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. When using the protocol for other slots, rewrite the value as follows. Main module: (Slot number $\times$ 100) For extension I/O: (5000 + 5000 $\times$ module number + slot number $\times$ 100) 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. When changing the number of channels, replace it with the same value as $2 \times$ number of channels. 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 $\times$ 2 in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.) Specify the device that stores the read data. 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. When using the protocol for other slots, rewrite the value as follows. Main module: (1000 + slot number $\times$ 100) For extension I/O: (6000 + 5000 $\times$ module number + slot number $\times$ 100) 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. When changing the number of channels, replace it with the same value as $2 \times$ number of channels. 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 $\times$ 2 in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.) Specify the device that stores the read data. 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. When using the protocol for other slots, rewrite the value as follows. Main module: (2000 + slot number × 50) For extension I/O: (7000 + 5000 × module number + slot number × 50) 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. When changing the number of channels, replace it with the same value as 2 × number of channels. 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.) 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. When using the protocol for other slots, rewrite the value as follows. Main module: (2500 + slot number × 50) For extension I/O: (7500 + 5000 × module number + slot number × 50) 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. When changing the number of channels, replace it with the same value as the number of channels. 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.) 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. To use this protocol on other channels, replace it with a value that is $4998 + \text{channel number} \times 2$. Calculation channels A001 to A050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.) Specify the device that stores the read data. 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. To use this protocol on other channels, replace it with a value that is $5198 + \text{channel number} \times 2$. Calculation channels A001 to A050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 100, specify 200.) Specify the device that stores the read data. 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. To use this protocol on other channels, replace it with a value that is 5399 + channel number. Calculation channels A001 to A050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as $2 \times$ number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 50, specify 100.) 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. To use this protocol on other channels, replace it with a value that is 5499 + channel number. Calculation channels A001 to A050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 50, specify 100.) 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. To use this protocol on other slots, replace it with a value that is $4000 + \text{slot number} \times 20$. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 124, specify 248.) Specify the device that stores the read data. 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. To use this protocol on other slots, replace it with a value that is $4200 + \text{slot number} \times 2$. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 124, specify 248.) Specify the device that stores the read data. 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. To use this protocol on other slots, replace it with a value that is $4400 + \text{slot number} \times 10$. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 125, specify 00FAH.) 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. To use this protocol on other slots, replace it with a value that is $4500 + \text{slot number} \times 10$. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Input Registers" is 125, specify 250.) 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 1: Recording
Computing Status	0: Calculation stops 1: Calculating
Alarm Status	0: No alarm 1: Alarming
E-mail Transmission Status	0: No email sent 1: Email sent
Memory Status	0: Internal memory or external storage capacity available 1: Small capacity of internal memory and external storage
Screen Login Status	0: No login 1: Logging in
Modbus Communication Error	0: Modbus master or client command normal 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. When using the protocol for other slots, rewrite the value as follows. Main module: (Slot number $\times$ 100) For extension I/O: (5000 + 5000 $\times$ module number + slot number $\times$ 100) 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. When changing the number of channels, replace it with the same value as $2 \times$ number of channels. 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 $\times$ 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 00C8H.) Specify the device that stores the read data. 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. When using the protocol for other slots, rewrite the value as follows. Main module: (1000 + slot number $\times$ 100) For extension I/O: (6000 + 5000 $\times$ module number + slot number $\times$ 100) 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. When changing the number of channels, replace it with the same value as $2 \times$ number of channels. 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 $\times$ 2 in the request message. (For example, if "Quantity of Registers" is 100, specify 200.) Specify the device that stores the read data. 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. When using the protocol for other slots, rewrite the value as follows. Main module: $(2000 + \text{slot number} \times 100)$ For extension I/O: $(7000 + 5000 \times \text{module number} + \text{slot number} \times 50)$ 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 50, specify 100.) 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. When using the protocol for other slots, rewrite the value as follows. Main module: $(2500 + \text{slot number} \times 50)$ For extension I/O: $(7500 + 5000 \times \text{module number} + \text{slot number} \times 50)$ 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 50, specify 100.) 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. To use this protocol on other slots, replace it with a value that is $4000 + \text{slot number} \times 20$. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 124, specify 248.) Specify the device that stores the read data. 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. To use this protocol on other slots, replace it with a value that is $4200 + \text{slot number} \times 2$. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 124, specify 248.) Specify the device that stores the read data. 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. To use this protocol on other slots, replace it with a value that is $4400 + \text{slot number} \times 10$. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 125, specify 250.) 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. To use this protocol on other slots, replace it with a value that is $4500 + \text{slot number} \times 10$. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 125, specify 250.) 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. To use this protocol on other channels, replace it with a value that is $4998 + \text{channel number} \times 2$. Communication channels A001 to A050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 100, specify 200.) Specify the device that stores the read data. 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. To use this protocol on other channels, replace it with a value that is $5998 + \text{channel number} \times 2$. Communication channels A001 to A050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 100, specify 200.) Specify the device that stores the read data. 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. To use this protocol on other channels, replace it with a value that is 6999 + channel number. Communication channels C001 to C050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times$ 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.) 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. To use this protocol on other channels, replace it with a value that is 7499 + channel number. Communication channels C001 to C050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times$ 2 in the request message. (For example, if "Quantity of Registers" is 50, specify 100.) 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. To use this protocol on other internal switches, replace it with a value that is 7999 + switch number. 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. When changing the number of registers, replace it with the same value as the number of internal switches. 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.) 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. To use this protocol on other channels, replace it with a value that is 4998 + channel number × 2. Communication channels C001 to C050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as 2 × number of channels. 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.) Specify the device that stores the write data. 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. To use this protocol on other channels, replace it with a value that is $5998 + \text{channel number} \times 2$. Communication channels C001 to C050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as $2 \times \text{number of channels}$. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 100, specify 200.) Specify the device that stores the write data. 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. To use this protocol on other channels, replace it with a value that is $6999 + \text{channel number}$. Communication channels C001 to C050 use channel numbers 1 to 50. 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. When changing the number of channels, replace it with the same value as the number of channels. 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 $\times 2$ in the request message. (For example, if "Quantity of Registers" is 50, specify 100.) 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. To use this protocol on other internal switches, replace it with a value that is 7999 + switch number. 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. When changing the number of internal switch data, rewrite it to the same value as the number of internal switch data. 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.) 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. 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. The device uses 2 words. Set the device values as follows. • 1st word device: Lot number lower data • 2nd word device: Lot number upper data The size of data to be written is 1-byte fixed.
	Batch Number	Specify the device that stores the write data. The device uses 17 words. Specify the device value using UTF-8 characters (2 characters for each word device). 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. 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. 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. 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. Use a value in the range of 1 to 125.
Normal Response	Read Data	Specify the device that stores the read data. The default value is set to the maximum number of registers (125).
Error Response	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. When using the protocol for other registers, rewrite to the value of the start address to be written. 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. Rewrite to the same value as the number of registers to be written. Use a value in the range of 0001H to 007BH (1 to 123).
	Write Data	Rewrite the data length to a value that is $2 \times$ "Quantity of Registers". (For example, if "Quantity of Registers" is 123, specify 246.) Specify the device that stores the write data. 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. 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. Specify the device value in the range from 1 to 125.
Normal Response	Read Data	Specify the device that stores the read data. The default value is set to the maximum number of registers (125).
Error Response	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. 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. Use a value in the range of 1 to 2000.
Normal Response	Read Data	Specify the device that stores the read data. 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. When using the protocol for other coils, rewrite it to the value of the start address to be written. 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. 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. Use a value in the range of 1 to 2000.
Normal Response	Read Data	Specify the device that stores the read data. 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

19

Setting data

Packet name	Element name	Description
Request	—	No setting is required.
Normal response	• Molding Machine Information • Fully Automatic Mode • Semi-Automatic Mode • Manual Mode • Preparation Mode • Pause • Injecting • Alarm Status • Safety Door Closed State • Both Safety Doors Closed • Number of Good Products • Number of Defects • Mold Close • Mold Open • EJ Forward • EJ Backward • Measuring • Servo State	Specify the device that stores the read data. 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 • Holding Time • Filling Time • Injection Pressure • Filling Peak Pressure • EJ Position • Mold Open Position • Screw Movement Position • HP Temperature • H1 Temperature • H2 Temperature • H3 Temperature • H4 Temperature • H5 Temperature • H6 Temperature • NH1 Temperature • NH2 Temperature • NH3 Temperature • SNH Temperature • HV Temperature • Mold Temperature 1 • Mold Temperature 2 • Mold Temperature 3 • Mold Temperature 4	Specify the device that stores the read data. 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 • H1 Use • H2 Use • H3 Use • H4 Use • H5 Use • H6 Use • NH1 Use • NH2 Use • NH3 Use • SNH Use • HV Use • HP AT Use • H1 AT Use • H2 AT Use • H3 AT Use • H4 AT Use • H5 AT Use • H6 AT Use • NH1 AT Use • NH2 AT Use • NH3 AT Use • SNH AT Use • HV AT Use	Specify the device that stores the read data. 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 • Mold Temperature 2 Fixed 1 Use • Mold Temperature 3 Movable 2 Use • Mold Temperature 4 Fixed 2 Use • Mold Temperature 1 Movable 1 AT Use • Mold Temperature 2 Fixed 1 AT Use • Mold Temperature 3 Movable 2 AT Use • Mold Temperature 4 Fixed 2 AT Use • Number of Shots • Mold Clamping Force • EJ Count Setting	Specify the device that stores the read data. 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 • NH2 Temperature • NH3 Temperature • H1 Temperature • H2 Temperature • H3 Temperature • H4 Temperature • H5 Temperature • H6 Temperature • HP Temperature • Mold Temperature • Injection Speed 1 • Injection Speed 2 • Injection Speed 3 • Injection Speed 4 • Injection Speed 5 • Injection Speed 6 • Injection Speed 7 • Injection Speed 8 • Injection Speed 9 • Injection Speed 10	Specify the device that stores the read data. 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 • Injection Speed Switching Position 2 • Injection Speed Switching Position 3 • Injection Speed Switching Position 4 • Injection Speed Switching Position 5 • Injection Speed Switching Position 6 • Injection Speed Switching Position 7 • Injection Speed Switching Position 8 • Injection Speed Switching Position 9 • Injection Pressure 1 • Injection Pressure 2 • Injection Pressure 3 • Injection Pressure 4 • Injection Pressure 5 • Injection Pressure 6 • Injection Pressure 7 • Injection Pressure 8 • Injection Pressure 9 • Injection Pressure 10 • V-P Switching Position • Measurement Rotation Speed 1 • Measurement Rotation Speed 2 • Measurement Rotation Speed 3 • Measurement Switching Position 1 • Measurement Switching Position 2 • Measurement Completion Position	Specify the device that stores the read data. 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 • Back Pressure 2 • Back Pressure 3 • After Holding Pressure PB • After Measuring PB • Holding Pressure 1 • Holding Pressure 2 • Holding Pressure 3 • Holding Pressure 4 • Holding Pressure 5 • Holding Pressure 6 • Holding Pressure Time 1 • Holding Pressure Time 2 • Holding Pressure Time 3 • Holding Pressure Time 4 • Holding Pressure Time 5 • Holding Pressure Time 6 • Cooling Timer • Mold Opening Speed 1 • Mold Opening Speed 2 • Mold Opening Speed 3 • Mold Opening Speed 4	Specify the device that stores the read data. 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 • Mold Opening Switching Position 2 • Mold Opening Switching Position 3 • Mold Opening Switching Position 4 • Mold Closing Speed 1 • Mold Closing Speed 2 • Mold Closing Speed 3 • Mold Closing Speed 4 • Mold Closing Switching Position 1 • Mold Closing Switching Position 2 • Mold Closing Switching Position 3 • Mold Closing Switching Position 4 • EJ Forward Speed 1 • EJ Forward Speed 2 • EJ Forward Speed 3 • EJ Forward Switching Position 1 • EJ Forward Switching Position 2 • EJ Forward Switching Position 3 • EJ Backward Speed 1 • EJ Backward Speed 2 • EJ Backward Speed 3 • EJ Backward Switching Position 1 • EJ Backward Switching Position 2 • EJ Forward Holding Time	Specify the device that stores the read data. 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 • HV Temperature • Mold Temperature 2 Fixed 1 • Mold Temperature 3 Movable 2 • Mold Temperature 4 Fixed 2 • Injection Holding Time • Maximum Injection Speed • Minimum Injection Speed • Maximum Injection Pressure • Minimum Injection Pressure • Maximum Measuring Rotation Speed • Minimum Measuring Rotation Speed • Maximum EJ Speed • Minimum EJ Speed • Maximum Back-Pressure Force • Minimum Back-Pressure Force • Maximum Holding Pressure • Minimum Holding Pressure	Specify the device that stores the read data. 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 • Shot Number • Measurement Time - Year • Measurement Time - Month • Measurement Time - Day • Measurement Time - Hour • Measurement Time - Minute • Measurement Time - Second • Pass/Fail Code^{*1} • Mold Clamping Force FB • Mold Clamping Force • Mold Clamping Force Peak	Specify the device that stores the read data. 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 (Measurement value data during operation using reserve molding 1 with reserve molding logging set to ON)
3	Reserve molding 2 (Measurement value data during operation using reserve molding 2 with reserve molding logging set to ON)
4	Rejected product (Measurement value data when alarm monitoring is set to continuous mode and the measurement value reaches the upper/lower limit)
5	Rejected product (Measurement value data when an alarm that causes the machine to stop occurs during automatic operation)
6	Dry operation (optional) (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 • Injection Start Position • Injection Time • Maximum Injection Pressure • Holding Pressure Switching Position • Holding Pressure Switching Speed • Holding Pressure Switching Pressure • Cushion Position • Holding Completion Position • Measuring Time • Measuring Torque • Back Pressure • Measuring Completion Position • Mold Opening Time • Mold Closing Time	Specify the device that stores the read data. 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 • Completed Back Pressure Speed • Cross Head Position • HP Temperature • H1 Temperature • H2 Temperature • H3 Temperature • H4 Temperature • H5 Temperature • H6 Temperature • NH1 Temperature • NH2 Temperature • NH3 Temperature • HV Temperature	Specify the device that stores the read data. 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 D1 = DDCCH	D0 = 00AAH D1 = 00BBH D2 = 00CCH D3 = 00DDH
	Enable (Upper → Lower)	D0 = AABBH D1 = CCDDH	D0 = 00BBH D1 = 00AAH D2 = 00DDH D3 = 00CCH
	Enable (Upper → Lower, two-word units)	D0 = DDCCH D1 = BBAAH	D0 = 00CCH D1 = 00DDH D2 = 00AAH D3 = 00BBH
	Enable (Upper → Lower, four-byte units)	D0 = CCDDH D1 = AABBH	D0 = 00DDH D1 = 00CCH D2 = 00BBH 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. To use a different unit ID, rewrite the value.
	Head Coil Number	Specify the device to store it. 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. Specify the device value in the range from 1 to 2000.
Normal Response	Device Data	Specify the device that stores the read data. By default, a 126-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. To use a different unit ID, rewrite the value.
	Head Input Number	Specify the device to store it. 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. Specify the device value in the range from 1 to 2000.
Normal Response	Device Data	Specify the device that stores the read data. By default, a 126-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. To use a different unit ID, rewrite the value.
	Head Holding Register Number	Specify the device to store it. 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. Specify the device value in the range from 1 to 125.
Normal Response	Device Data	By default, a 126-word device is secured. Specify the device that stores the read data. The data length (number of bytes) of the read data is stored in the start device. 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. To use a different unit ID, rewrite the value.
	Head Input Register Number	Specify the device to store it. 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. Specify the device value in the range from 1 to 125.
Normal Response	Device Data	Specify the device that stores the read data. By default, a 126-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. 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. Specify the device value in the range from 0 to 65535. For the address range, refer to the manual of the target device.
	Sub-Request Record Number	Specify the device to store it. Specify the device value in the range from 0 to 9999. For the address range, refer to the manual of the target device.
	Sub-Request Record Length	Specify the device to store it. Specify the device value in the range from 1 to 124. 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. By default, a 125-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. To use a different unit ID, rewrite the value.
	Read Head Holding Register Number	Specify the device to store it. 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. Specify the device value in the range from 1 to 125.
	Write Head Holding Register Number	Specify the device to store it. 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. Set the data length to be 2 × number of write points. Store the data length (bytes) in the start device. 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. 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. To use a different unit ID, rewrite the value.
	Coil Number	Specify the device to store it. 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. ON/OFF specification = 0000H forces the coil to turn off. 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. To use a different unit ID, rewrite the value.
	Holding Register Number	Specify the device to store it. 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. To use a different unit ID, rewrite the value.
	Head Coil Number	Specify the device to store it. 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. Specify the device value in the range from 1 to 1968.
	Device Data	Specify the device to store it. Data length = Perform number of write points ÷ 8, and add 1 to the data length if the remainder is not 0. The data length (number of bytes) of the write data is stored in the start device. 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. To use a different unit ID, rewrite the value.
	Head Holding Register Number	Specify the device to store it. 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. The data length (number of bytes) of the write data is stored in the start device. Set the data length to be 2 × number of write points. The range of write points is 1 to 123. 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. 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. Specify the device value in the range from 0 to 65535. For the address range, refer to the manual of the target device.
	Sub-Request Record Number	Specify the device to store it. Specify the device value in the range from 0 to 9999. For the address range, refer to the manual of the target device.
	Sub-Request Data	Specify the device to store it. The data length (number of bytes) of the write data is stored in the start device. Set the data length to be $2 \times$ number of write points. The range of write points is 1 to 122. 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. To use a different unit ID, rewrite the value.
	Target Holding Register Number	Specify the device to store it. 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. • Phase 1 Current • Phase 2 Current • Phase 3 Current • Neutral Current	To be added	Fixed Intrvl
RD: Phase Current Demand	Reads the following values. • Phase 1 Current Demand • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	To be added	Fixed Intrvl

Name	Description	Automatic Addition*1	Communication Timing (Default)
RD: Line Voltage	Reads the following values. • Voltage V1N • Voltage V2N • Voltage V3N • Average Line Voltage	To be added	Fixed Intrvl
RD: Phase Voltage	Reads the following values. • Voltage V1N • Voltage V2N • 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. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage (1st)	Reads the following values. • Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (Total)	Reads the following values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage (1st)	Reads the following values. • Harmonics Value V12 • Harmonics Value V23	Not to be added	Fixed Intrvl
RD: Harmonics Current (Total)	Reads the following values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Current (1st)	Reads the following values. • Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (Total)	Reads the following values. • THD V1N • THD V2N • THD V3N	Not to be added	Fixed Intrvl
RD: Harmonics Phase Voltage Distortion (3rd)	Reads the following values. • Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (Total)	Reads the following values. • THD V12 • THD V23	Not to be added	Fixed Intrvl
RD: Harmonics Line Voltage Distortion (3rd)	Reads the following values. • Harmonics Ratio V12 • Harmonics Ratio V23	Not to be added	Fixed Intrvl
RD: Harmonics Current Content Rate (Total)	Reads the following values. • THD I1 • THD I2 • THD I3 • THD IN	Not to be added	Fixed Intrvl
RD: Harmonics Current Content Rate (3rd)	Reads the following values. • Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • 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. 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 $\times 0.1V$.

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. 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 $\times 0.1V$.

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. 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 $\times 0.1A$.

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. 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 $\times 0.001$.

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. 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 $\times 0.001$.

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. 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 $\times 0.001$.

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. 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 • Voltage • Electric Power • Electric Energy • Power Factor • Frequency • Content Rate of Harmonic Current • 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.

21

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 "10ⁿ". *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 • Phase 2 Current • Phase 3 Current • Neutral Current • 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 "10ⁿ". *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 • Phase 2 Current Demand • Phase 3 Current Demand • Neutral Current Demand	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol has unused values depending on the 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 "10ⁿ". *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 - Voltage V23 - Voltage V31 - 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 "10ⁿ". *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 - Voltage V2N - Voltage V3N	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- This protocol 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 $\times 0.1\%$.

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 $\times 0.1\%$.

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	Σ 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 instantaneous value of frequency stored in register address 790.

The range is 445 to 999. Unit is $\times 0.1\text{Hz}$.

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 "10ⁿ". *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	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 "10ⁿ". *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 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 "10ⁿ". *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	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 "10ⁿ". *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 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 "10ⁿ". *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	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 "10ⁿ". *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	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 $\times 0.01\%$.

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. 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 $\times 0.01\%$.

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. 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 "10ⁿ". *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 (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 "10ⁿ". *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 (Export)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Reactive Energy (Import LAG)

This protocol reads the 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 "10ⁿ". *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 (Import LAG)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy 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 "10ⁿ". *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. (Import)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

Do not change values other than setting data.

RD: Integrated Electric Energy 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 "10ⁿ". *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. 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 "10ⁿ". *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. 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 "10ⁿ". *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	Periodic Electric Energy (Import)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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. 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. 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 "10ⁿ". *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. 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 "10ⁿ". *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 (Export)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 "10ⁿ". *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 Extend 3side (Import)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 "10ⁿ". *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 Extend 3side (Export)	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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. 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 "10ⁿ". *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	Periodic Electric Energy 3side	Specify the device that stores the read data. The device uses 2 words.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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. 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. 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. 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 "10ⁿ". *1

*1 n is the voltage multiplying factor data (register address: 755).

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	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 "10ⁿ". *1

*1 n is the voltage multiplying factor data (register address: 755).

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.
	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. • 3rd: 0706H • 5th: 0709H • 7th: 070CH • 9th: 070FH • 11th: 0712H • 13th: 0715H
Normal Response	• Harmonics Value V1N • Harmonics Value V2N • Harmonics Value V3N	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 "10ⁿ". *1

*1 n is the voltage multiplying factor data (register address: 755).

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	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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. • 3rd: 0806H • 5th: 0809H • 7th: 080CH • 9th: 080FH • 11th: 0812H • 13th: 0815H
Normal Response	• Harmonics Value V12 • Harmonics Value V23	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 "10ⁿ". *1

*1 n is the current multiplying factor data (register address: 754).

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	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 "10ⁿ". *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. • 3rd: 0908H • 5th: 090CH • 7th: 0910H • 9th: 0914H • 11th: 0918H • 13th: 091CH
Normal Response	• Harmonics Value I1 • Harmonics Value I2 • Harmonics Value I3 • Harmonics Value IN	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 $\times 0.1\%$.

The measurement value can be obtained by multiplying the read data by "10ⁿ". *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 • THD V2N • THD V3N	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 $\times 0.1\%$.

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. • 5th: 0A06H • 7th: 0A09H • 9th: 0A0CH • 11th: 0A0FH • 13th: 0A12H
Normal Response	• Harmonics Ratio V1N • Harmonics Ratio V2N • Harmonics Ratio V3N	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 $\times 0.1\%$.

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 • 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 $\times 0.1\%$.

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. • 5th: 0B06H • 7th: 0B09H • 9th: 0B0CH • 11th: 0B0FH • 13th: 0B12H
Normal Response	• Harmonics Ratio V12 • Harmonics Ratio V23	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 $\times 0.1\%$.

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 • THD I2 • THD I3 • THD IN	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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 $\times 0.1\%$.

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. • 5th: 0C08H • 7th: 0C0CH • 9th: 0C10H • 11th: 0C14H • 13th: 0C18H
Normal Response	• Harmonics Ratio I1 • Harmonics Ratio I2 • Harmonics Ratio I3 • Harmonics Ratio IN	Specify the device that stores the read data.
Error Response	Error Code	Specify the device that stores the read data.

Precautions

- Do not change values other than setting data.
- 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. 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. 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 $\times 0.1V$.

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. 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 $\times 0.1V$.

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. 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 $\times 0.1A$.

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. 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 $\times 0.001$.

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. 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 $\times 0.001$.

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. 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 $\times 0.001$.

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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. 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. Specify the value in hexadecimal in the order from upper bytes to lower bytes. By default, 0200H is set.
	Number of Registers	Specify the device that stores the number of registers to be read. Specify the device value in the range from 1 to 125.
Normal Response	Read Data	Specify the device that stores the read data. By default, a 126-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. 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. Specify the value in hexadecimal in the order from upper bytes to lower bytes. By default, 0200H is set.
	Number of Registers	Rewrite to the number of registers to be written. Use a value in the range of 0001H to 007BH. The default value is 1H.
	Write Data	Specify the device that stores the write data. Rewrite the data length to the value of the number of registers $\times$ 2. For example, if the number of registers is 123, specify 246. Store the data to be written to the specified device. 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. 131 consecutive word devices are used. The data length (number of bytes) of the read data is stored in the start device. 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. 131 consecutive word devices are used. The data length (number of bytes) of the read data is stored in the start device. 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. 131 consecutive word devices are used. The data length (number of bytes) of the read data is stored in the start device. 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. 51 consecutive word devices are used. The data length (number of bytes) of the read data is stored in the start device. 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. 131 consecutive word devices are used. The data length (number of bytes) to be written is stored in the start device. 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. 131 consecutive word devices are used. The program name is stored in the start device. 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. 131 consecutive word devices are used. The length of the program name is stored in the start device. 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. 131 consecutive word devices are used. The length of the program name is stored in the start device. 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. 131 consecutive word devices are used. The write data (number of bytes) is stored in the start device. 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. 131 consecutive word devices are used. The write data (number of bytes) is stored in the start device. 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. The top 5 bits represent the UII (EPC) word length.
UII (EPC code)	Stores unique tag information in accordance with the Gen2 standard. 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. 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. 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 587 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. 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. The default value is set to 120 words. Use a value in the range of 1 to 120.
Normal response	Read Data	Specify the device that stores the read data. By default, a 121-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. 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 587 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. The default value is set to 0044H. 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. 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. 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 587 RF tag ID

*3 For details on the read size, refer to the following request message.

☞ Page 602 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. Specifiable range: 0000H to 0007H
	Slave Reader/Writer 1 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801C9H (192.168.1.201)
	Slave Reader/Writer 2 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CAH (192.168.1.202)
	Slave Reader/Writer 3 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CBH (192.168.1.203)
	Slave Reader/Writer 4 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CCH (192.168.1.204)
	Slave Reader/Writer 5 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CDH (192.168.1.205)
	Slave Reader/Writer 6 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CEH (192.168.1.206)
	Slave Reader/Writer 7 IP Address	Specify the device that stores the read data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH 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. 16 consecutive word devices are used. 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 (To be operational, the linking process with the slave reader/writer needs to be completed.)
1001H	Communication area extended mode operating (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. Eight consecutive word devices are used.
	System Error Log Record 2	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 3	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 4	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 5	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 6	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 7	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 8	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 9	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 10	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 11	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 12	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 13	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 14	Specify the device that stores the read data. Eight consecutive word devices are used.
	System Error Log Record 15	Specify the device that stores the read data. 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. 12 consecutive word devices are used.
	Command Error Log Record 2	Specify the device that stores the read data. 12 consecutive word devices are used.
	Command Error Log Record 3	Specify the device that stores the read data. 12 consecutive word devices are used.
	Command Error Log Record 4	Specify the device that stores the read data. 12 consecutive word devices are used.
	Command Error Log Record 5	Specify the device that stores the read data. 12 consecutive word devices are used.
	Command Error Log Record 6	Specify the device that stores the read data. 12 consecutive word devices are used.
	Command Error Log Record 7	Specify the device that stores the read data. 12 consecutive word devices are used.
	Command Error Log Record 8	Specify the device that stores the read data. 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. 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. By default, a 51-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. Two consecutive word devices are used. 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. 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 587 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. The default value is set to write to 3000H (user area).
	Data to Write ^{*2}	Specify the device that stores the write data. 121 consecutive word devices are used. The data length (byte count) of the write data is stored in the start device. Rewrite the data length to the value of 2 × word count to be written. 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. Two consecutive word devices are used. 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. 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. 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. The default value is set to write to 1000H (UII (EPC) area).
	Read Size ^{*2}	Rewrite to the size of data to be read. The default value is set to 0020H. 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. Specifiable range: 0000H to 0007H
	Slave Reader/Writer 1 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801C9H (192.168.1.201)
	Slave Reader/Writer 2 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CAH (192.168.1.202)
	Slave Reader/Writer 3 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CBH (192.168.1.203)
	Slave Reader/Writer 4 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CCH (192.168.1.204)
	Slave Reader/Writer 5 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CDH (192.168.1.205)
	Slave Reader/Writer 6 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH Example: C0A801CEH (192.168.1.206)
	Slave Reader/Writer 7 IP Address	Specify the device that stores the write data. Two consecutive word devices are used. Specifiable range: 00000000H to DFFFFFFFH 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. 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. 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. By default, a 121-word device is secured. The data length (number of bytes) of the read data is stored in the start device. 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. 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. The data length (number of bytes) of the write data is stored in the start device. Rewrite the data length to the value of $2 \times$ word count to be written. 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: • CNC Series • No. of PMC Paths/Channels • No. of CNC Paths/Channels • Status • All Servo and Spindle Power Consumption	Not to be added	Request
RD: Emergency Stop Status	Reads the emergency stop status.	To be added	Fixed Intvl
RD: CNC Operation Mode	Reads the current operation mode of the machine tool.	To be added	Fixed Intvl
RD: Number of Processed Parts	Reads the number of workpieces produced by the machine tool.	To be added	Fixed Intvl
RD: CNC Operating Status	Reads the current operating status of the machine tool.	To be added	Fixed Intvl
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 $\approx$ efficiency of the machine tool as a percentage.	Not to be added	Fixed Intvl
RD: Block of the Program in Operation	Reads each block information of the machining program in operation.	Not to be added	Fixed Intvl
RD: Operation Mode of Spindle (1 - 4)	Reads the operation mode (1 to 4) of the master axis.	To be added	Fixed Intvl
RD: Fast Forward Override	Reads the operating speed $\approx$ efficiency of the machine tool as a percentage.	To be added	Fixed Intvl

Name	Description	Automatic Addition* ¹	Communication Timing (Default)
RD: Spindle Override	Reads the operating speed $\approx$ 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 $\approx$ 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 (M Ω) 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 (M Ω) 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. 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. The device uses 64 words. 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. The device uses 8 words. The stored value is a string (integer).
	No. of CNC Paths/Channels	Specify the device that stores the read data. The device uses 8 words. The stored value is a string (integer).
	Status	Specify the device that stores the read data. The device uses 8 words. The stored value is a communication availability status (string) listed below. • AVAILABLE^{*1} • UNAVAILABLE^{*2}
	All Servo and Spindle Power Consumption	Specify the device that stores the read data. The device uses 8 words. The stored value is the integrated value of all servo-spindle power consumption values (string (integer)). 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/Oi 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. 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. The device uses 8 words. The stored value is a string listed below. • ARMED (Emergency stop clear status) • 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. 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. The device uses 16 words. The stored value is a string listed below. • MANUAL_DATA_INPUT • AUTOMATIC • EDIT • 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.

24

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. 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. The device uses 8 words. 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. 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. The device uses 8 words. The stored value is a string listed below. • READY • STOPPED • INTERRUPTED • 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. 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. The device uses 8 words. 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. 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. The device uses 64 words. 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. 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. The device uses 64 words. 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. 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. The device uses 8 words. 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 $\rightleftharpoons$ 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. 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. The device uses 8 words. 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. 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. The device uses 64 words. 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. 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. The device uses 8 words. The stored value is a string listed below. • SPINDLE • INDEX • 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 $\rightleftharpoons$ 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. 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. The device uses 8 words. 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 $\rightleftharpoons$ 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. 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. The device uses 8 words. 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. 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. The device uses 16 words. 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.

24

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. 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. The device uses 8 words. The stored value is a string (integer) listed below. • ENABLED • 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. 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. The device uses 8 words. The stored value is a string (integer) listed below. • ENABLED • 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. The default value is set to read M00 from CNC system 1.
Normal response	M00	Specify the device that stores the read data. The device uses 8 words. The stored value is a string listed below. • ENABLED • 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. The default value is set to read M01 from CNC system 1.
Normal response	M01	Specify the device that stores the read data. The device uses 8 words. The stored value is a string listed below. • ENABLED • 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. 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. The device uses 8 words. 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 $\equiv$ 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. 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. The device uses 8 words. 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. The device uses 8 words. 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 ($M\Omega$) 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. 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. The device uses 8 words. 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

24

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/Oi 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. 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. The device uses 8 words. 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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 $\approx$ 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. 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.
	Load (%)	The device uses 8 words.
	Load Current Value (%)	The stored value is a string (decimal).
	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/Oi 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. 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.
	Alarm #2	The device uses 8 words.
	Alarm #3	The stored value is a string.
	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. 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.
	Alarm #17	The device uses 8 words.
	Alarm #18	The stored value is a string.
	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. 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.
	Alarm #32	The device uses 8 words. 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	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. 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.
	PMC 2	The device uses 2 words.
	PMC 3	The stored value is an integer.
	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. 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.
	Macro 2	The device uses 8 words.
	Macro 3	The stored value is a string (decimal).
	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 ($M\Omega$) 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. 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. The device uses 8 words. 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/Oi 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. 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. The device uses 8 words. 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. 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. The device uses 8 words. 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 Servo 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. The value is specified within the range from 1 to 125.
Normal response	Read Data	Specify the device that stores the read data. The device uses 126 words. 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

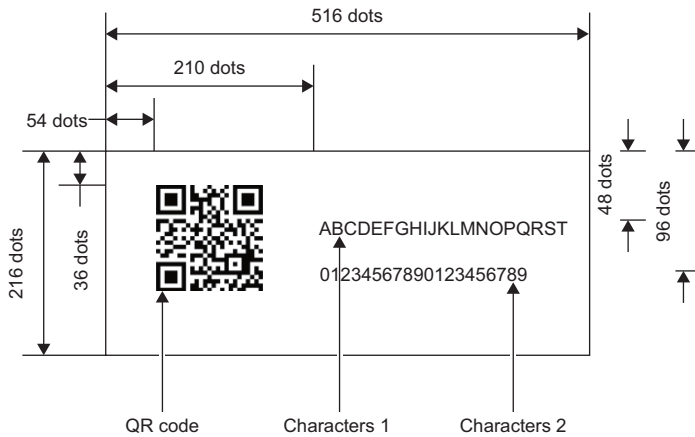
*1 Automatic addition: Items configured as "To be added" are protocols to be automatically added when the "Protocol Setting" window is opened with no protocol set.

*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. When changing the specified Kanji code, refer to the Kanji code setting range and change the value. (Page 648 Kanji code specification <KC>)
	<A1> Media Size Parameter	The default value of static data "<A1> Media Size Parameter" is set to 02160516 (ASCII). When changing the specified media size, refer to the media size setting range and change the value. (Page 648 Media size specification <A1>)
	QR Code	<%> Rotation Parameter The default value of static data "<%> Rotation Parameter" is set to 0 (ASCII): Parallel 1 (0°). When changing the specified rotation, refer to the rotation setting range and change the value. (Page 648 Rotation specification <%>)
		<V> Vertical Print Position Parameter The default value of static data "<V> Vertical Print Position Parameter" is set to 0036 (ASCII). When changing the vertical print position, refer to the vertical print position setting range and change the value. (Page 649 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). When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (Page 649 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). When changing the specified QR code, refer to the QR codes and change the value. (Page 650 QR code <2D30>)
		<DN> QR Code Data Size The default value of static data "<DN> QR Code Data Size" is set to 0040,. Change it according to the write data size of "QR Code Data". When changing the specified QR code, refer to the binary data print specification and change the value. (Page 650 Binary data print specification <DN>)
	<DN> QR Code Data	Specify the device that stores the write data of "<DN> QR Code Data". By default, 20 consecutive word devices are used. Specify the data in hexadecimal. Specify the length (number of characters) of "QR Code Data" on the start device. 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°). When changing the specified rotation, refer to the rotation setting range and change the value. (☞ Page 648 Rotation specification <%>)
		<V> Vertical Print Position Parameter The default value of static data "<V> Vertical Print Position Parameter" is set to 0048 (ASCII). When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 649 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). When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 649 Horizontal print position specification <H>)
		<P> Character Pitch Parameter The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII). When changing the character pitch, refer to the character pitch setting range and change the value. (☞ Page 650 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). When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 650 Enlargement ratio specification <L>)
		<K9> Character Mode The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified. 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 651 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". By default, 10 consecutive word devices are used. Specify the length (number of characters) of "Characters 1" on the start device. 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°). When changing the specified rotation, refer to the rotation setting range and change the value. (☞ Page 648 Rotation specification <%>)
		<V> Vertical Print Position Parameter The default value of static data "<V> Vertical Print Position Parameter" is set to 0096 (ASCII). When changing the vertical print position, refer to the vertical print position setting range and change the value. (☞ Page 649 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). When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (☞ Page 649 Horizontal print position specification <H>)
		<P> Character Pitch Parameter The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII). When changing the character pitch, refer to the character pitch setting range and change the value. (☞ Page 650 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). When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (☞ Page 650 Enlargement ratio specification <L>)
		<K9> Character Mode The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified. 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 651 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". By default, 10 consecutive word devices are used. Specify the length (number of characters) of "Characters 2" on the start device. 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). 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.

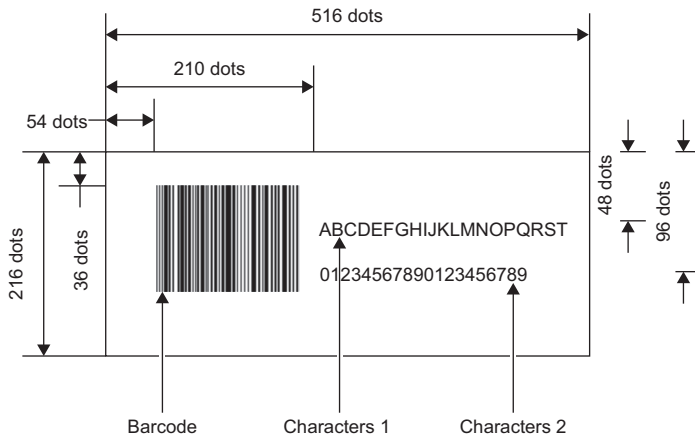
☞ Page 648 Range Setting Values

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. When changing the specified Kanji code, refer to the Kanji code setting range and change the value. (☞ Page 648 Kanji code specification <KC>)
	<A1> Media Size Parameter	The default value of static data "<A1> Media Size Parameter" is set to 02160516 (ASCII). When changing the specified media size, refer to the media size setting range and change the value. (☞ Page 648 Media size specification <A1>)
	Barcode	<%> Rotation Parameter
		<V> Vertical Print Position Parameter
		<H> Horizontal Print Position Parameter
		<P> Character Pitch Parameter
		 Barcode Parameter
		 Barcode Data

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°). When changing the specified rotation, refer to the rotation setting range and change the value. (Page 648 Rotation specification <%>)
		<V> Vertical Print Position Parameter	The default value of static data "<V> Vertical Print Position Parameter" is set to 0048 (ASCII). When changing the vertical print position, refer to the vertical print position setting range and change the value. (Page 649 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). When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (Page 649 Horizontal print position specification <H>)
		<P> Character Pitch Parameter	The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII). When changing the character pitch, refer to the character pitch setting range and change the value. (Page 650 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). When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (Page 650 Enlargement ratio specification <L>)
		<K9> Character Mode	The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified. 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 651 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". By default, 10 consecutive word devices are used. Specify the length (number of characters) of "Characters 1" on the start device. 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°). When changing the specified rotation, refer to the rotation setting range and change the value. (Page 648 Rotation specification <%>)
		<V> Vertical Print Position Parameter	The default value of static data "<V> Vertical Print Position Parameter" is set to 0096 (ASCII). When changing the vertical print position, refer to the vertical print position setting range and change the value. (Page 649 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). When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (Page 649 Horizontal print position specification <H>)
		<P> Character Pitch Parameter	The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII). When changing the character pitch, refer to the character pitch setting range and change the value. (Page 650 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). When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (Page 650 Enlargement ratio specification <L>)
		<K9> Character Mode	The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified. 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 651 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". By default, 10 consecutive word devices are used. Specify the length (number of characters) of "Characters 2" on the start device. 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). 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 648 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)

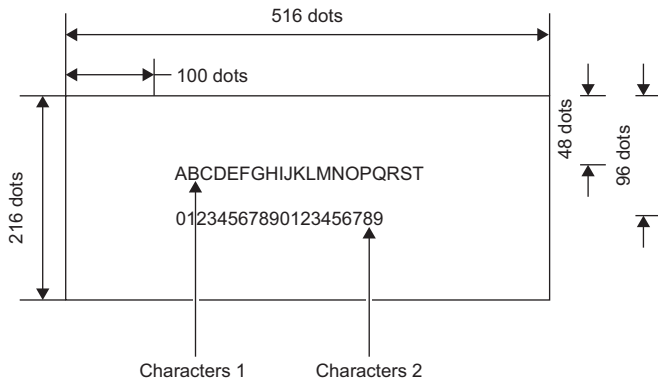
Head density: 12 dots/mm (Two dots or more)

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. When changing the specified Kanji code, refer to the Kanji code (Page 648 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). When changing the specified media size, refer to the media size setting range and change the value. (Page 648 Media size specification <A1>)
	Characters 1	<%> Rotation Parameter
		<V> Vertical Print Position Parameter
		<H> Horizontal Print Position Parameter
		<P> Character Pitch Parameter
		<L> Enlargement Ratio Parameter
		<K9> Character Mode
	<K9> Characters 1	Specify the device that stores the write data of "<K9> Characters 1". By default, 10 consecutive word devices are used. Specify the length (number of characters) of "Characters 1" on the start device. 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°). When changing the specified rotation, refer to the rotation setting range and change the value. (Page 648 Rotation specification <%>)
	<V> Vertical Print Position Parameter	The default value of static data "<V> Vertical Print Position Parameter" is set to 0096 (ASCII). When changing the vertical print position, refer to the vertical print position setting range and change the value. (Page 649 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). When changing the horizontal print position, refer to the horizontal print position setting range and change the value. (Page 649 Horizontal print position specification <H>)
	<P> Character Pitch Parameter	The default value of static data "<P> Character Pitch Parameter" is set to 00 (ASCII). When changing the character pitch, refer to the character pitch setting range and change the value. (Page 650 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). When changing the specified enlargement ratio, refer to the enlargement ratio setting range and change the value. (Page 650 Enlargement ratio specification <L>)
	<K9> Character Mode	The default value of static data "<K9> Character Mode" is set to B (ASCII): Binary code specified. 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 651 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". By default, 10 consecutive word devices are used. Specify the length (number of characters) of "Characters 2" on the start device. 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). 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 648 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". 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/ 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/ 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} 1 to 1340 ^{*2}	1 to 20000
	305dpi	1 to 1984 ^{*1} 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} 1 to 1340 ^{*2}
	305dpi	1 to 1984 ^{*1} 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 For character code types that can be specified, refer to the Kanji code specification <KC>. (Page 648 Kanji code specification <KC>)

Barcode specification

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) The barcode configuration is as follows: • Length: 43 characters • Numerical value: 0 to 9 • Upper-case character (A to Z) • Symbol: (-, \$, /, ., +) • Start/stop character: (*) The barcode character pitch is enabled. 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) Specify the print data by including the start/stop characters (*). 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).

26

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". The read data uses a two-word device.
	J2 axis current value	Specifies the device that stores "J2 axis current value". The read data uses a two-word device.
	J3 axis current value	Specifies the device that stores "J3 axis current value". The read data uses a two-word device.
	J4 axis current value	Specifies the device that stores "J4 axis current value". The read data uses a two-word device.
	J5 axis current value	Specifies the device that stores "J5 axis current value". The read data uses a two-word device.
	J6 axis current value	Specifies the device that stores "J6 axis current value". 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.

27

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

Name	Description	Automatic addition ^{*1}	Communication timing (Default) ^{*2}
RD: [SE-EV*]Main Molding Temperature Setting	Reads the data of the specified main molding temperature setting.	To be added	Request
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: 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}	The molding machine monitors items for which data change notifications have been registered and gets the data sent when any changes occur.	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. • Molding condition name: 800 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Cycle time: 300 • Fill time: 301 • Measurement time: 302 • Mold closing time: 303 • Mold opening time: 304 • Fill time 1: 306 • Screw movement time during holding pressure: 307 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Pre-fill position: 301 • V-P switch position: 302 • Minimum cushion position: 303 • Holding end position: 304 • Pre-measurement position: 305 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Fill peak pressure: 300 • All area peak pressure: 303 • Pre-measurement pressure: 305 • Pack pressure: PAK • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Mold fully closed: 314 • Cooling end: CLF • Holding end: HCF • Fill start: ICF • Peak clamping force: PCF • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Z1: 301 • Z2: 302 • Z3: 303 • Z4: 304 • Z5(Z15a): 305 • Z6(Z15b): 306 • Water cooling: 307 • Mold 1: 308 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Fill delay time: 000 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • 1st: 001 • 2nd: 002 • 3rd: 003 • 4th: 004 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • 1st: 001 • 2nd: 002 • 3rd: 003 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • 1/5 speed: 000 • 2/5 speed: 001 • 3/5 speed: 002 • 4/5 speed: 003 • V-P SW: 004 • 1st/7V: 026 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • 1st/5V (3rd/7V): 000 • 2nd/5V (4th/7V): 001 • 3rd/5V (5th/7V): 002 • 4th/7V (4th/7V): 003 • V-P SW: 004 • 1st/7V: 026 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Measurement delay time: 032 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • s5 suck back: 005 • 1st/3stg: 007 • 1st/2stg (2nd/3stg): 008 • Measurement end position: 009 • Decompression distance: 109 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • s5 suck back: 029 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • 1st/3stg: 005 • 1st/2stg (2nd/3stg): 009 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • 1st/3stg: 005 • 1st/2stg (2nd/3stg): 009 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Measurement rotation decompression: 109 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Plasticization backward operating time: 030 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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. • Z1: 001 • Z2: 002 • Z3: 003 • Z4: 004 • Z5: 005 • Z15: 006 • 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 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 682 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. • Current error & interlock: 0 • Error history: 1 • Interlock history: 2 • Operation mode history: 3 • All history: 4
Normal Response	Error History	Specify the device that stores "Error History". The number of data items is stored starting from the specified device, and 20 cases of error history are stored from the next device. 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 3 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 682 WR: End of Transmission (EOT))

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 transmitting for three seconds or more
- Error Response 2 (change not allowed) 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 682 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 transmitting for three seconds or more
- Error Response 2 (change not allowed) 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 682 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 setting registered from the programmable controller to the molding machine cannot be confirmed. Therefore, if the registration status is unknown, clear all registrations and then re-set 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 transmitting for three seconds or more
- Error Response 2 (change not allowed) 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 687 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 an end of transmission (EOT) to the molding machine. If it is not sent, a timeout occurs (no response for 3 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 682 WR: End of Transmission (EOT))

RD: Data Change Notification

The molding machine monitors the setting ID of the item registered in the data change notification, and gets the data sent from the molding machine when any changes occur.

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 682 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 transmitting for three seconds or more
- Error Response 2 (change not allowed) 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 682 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 transmitting for three seconds or more
- Error Response 2 (change not allowed) 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 682 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 SE-EV* Series, 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.

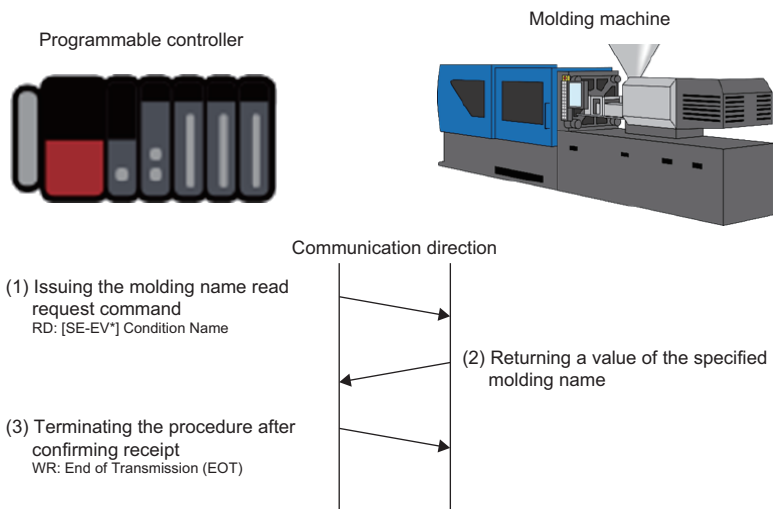
Reading molding conditions

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

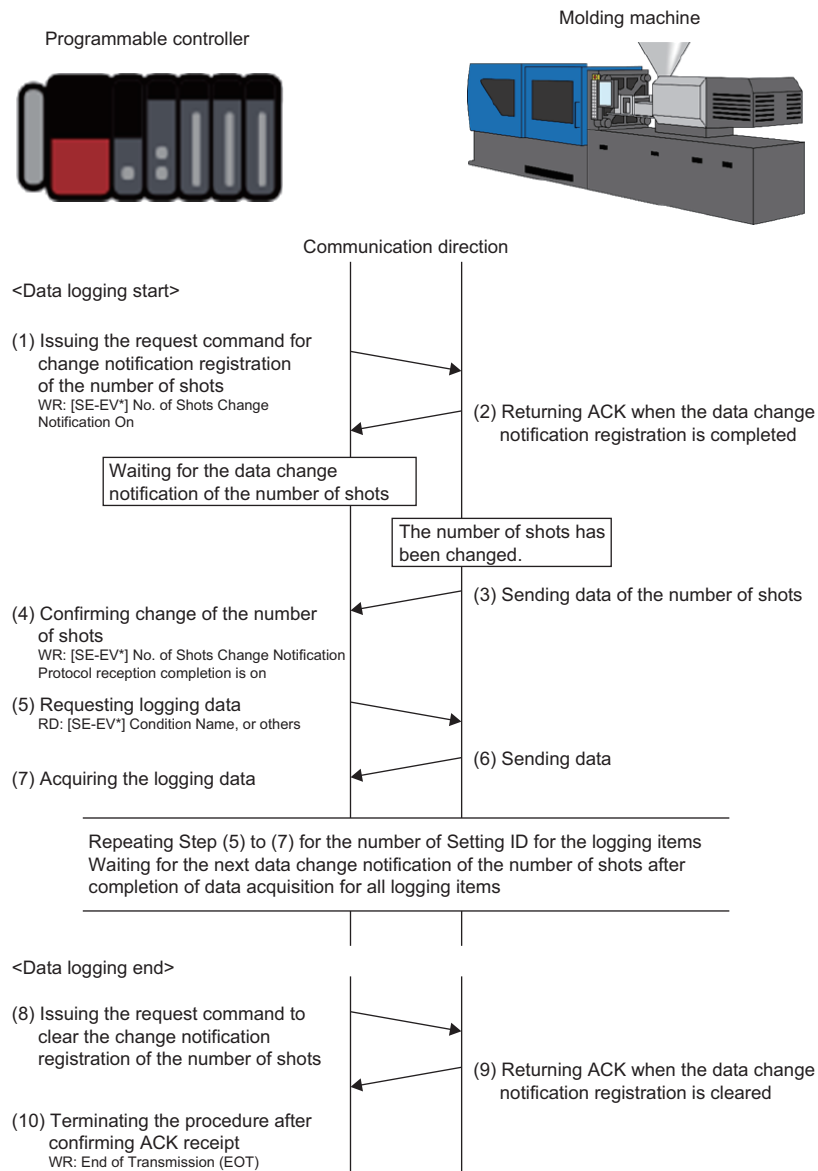
Even for an error response, send WR: End of Transmission (EOT) to terminate the procedure and then issue the request command again.

For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). ( Page 682 WR: 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.

For sending an end of transmission (EOT), refer to WR: End of Transmission (EOT). (☞ Page 682 WR: End of Transmission (EOT))

INDEX

E

Engineering tool 28

R

RnENCPU (network part). 28

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 Section 1.1, Chapter 10
May 2023	SH(NA)-082515ENG-C	■Added or modified parts Section 1.1, Chapter 11, 12, 13, 14, 15, 16
November 2023	SH(NA)-082515ENG-D	■Added or modified parts Section 1.1, 13.2, Chapter 17, 18, 19, 20, 21, 22
May 2024	SH(NA)-082515ENG-E	■Added or modified parts Section 1.1, 13.2, 18.3, 21.2, 22.3, Chapter 23, 24
October 2024	SH(NA)-082515ENG-F	■Added or modified parts Section 1.1, Chapter 25, 26, 27

Japanese manual number: SH-082514-F

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

© 2022 MITSUBISHI ELECTRIC CORPORATION

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

For further information and services, please contact your local Mitsubishi Electric sales office or representative.
Visit our website to find our locations worldwide.

MITSUBISHI ELECTRIC Factory Automation Global Website

Locations Worldwide

www.MitsubishiElectric.com/fa/about-us/overseas/

TRADEMARKS

The company names, system names and product names mentioned in this manual are either registered trademarks or trademarks of their respective companies.

In some cases, trademark symbols such as '™' or '®' are not specified in this manual.

SH(NA)-082515ENG-F(2410)MEE

mitsubishi electric corporation

HEAD OFFICE: TOKYO BLDG., 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS: 1-14, YADA-MINAMI 5-CHOME, HIGASHI-KU, NAGOYA 461-8670, JAPAN

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.