MITSUBISHI ELECTRIC

Energy Measuring Unit

Programming Manual (CC-Link IE Field Network Basic) (SLMP)

MODEL

EMU4-BD1-MB, EMU4-HD1-MB, EMU4-FD1-MB
EMU4-BM1-MB, EMU4-HM1-MB
EMU4-LG1-MB
EMU4-A2, EMU4-VA2
EMU4-AX4, EMU4-PX4

（LEN180123）

CONTENTS

1. General description

This manual describes the programming methods that should be created by the user for monitoring measurement value of Energy Measuring Unit (hereinafter referred to as “Measuring unit”), for setting respective set-up values of the Measuring unit by communicating between Mitsubishi Programmable controller and the Measuring unit using CC-Link IE Field Network Basic (hereinafter referred to as “CC-Link IEF Basic”) or SLMP.

This manual describes an example of communication with MELSEC iQ-R using GX Works3.

When communicating with MELSEC iQ-F, MELSEC-Q and MELSEC-L or actual programming, read the following manuals.

* For actual communication, the measuring unit is needed to be connected with the CC-Link IE Field Network Basic (Model：EMU4-CM-CIFB) for the Energy Measuring Unit

Related Manual:

Title	Manual No.
GX Works3 Operating Manual	SH-081215ENG
GX Works2 Version1 Oerating Manual (Common)	SH-080779ENG
CC-Link IE Field Network Basic Reference Manual	SH-081684ENG
SLMP Reference Manual	SH-080956ENG
User’s Manual for the respective Measuring unit	Supplied with product (including download)

Terminology

Terms	Description
Reference response time	Response time of slave station of the CC-Link IEF Basic from receiving a request from the master station until responding to the master station.
Command	Word data for obtaining arbitrary data from the measuring unit, for changing setting of the measuring unit.
Cyclic transmission	Function for periodically communicating data between network stations using link devices.
Slave station	Station for performing cyclic transmission with the master station of the CC-Link IEF Basic. It gives and receives bit-wise input/output signals, input/output data of word unit.
Master station	Station for controlling CC-Link IEF Basic. Only 1 master station exists for 1 network.
Monitor pattern	Group of measuring items for sending to the master station. When the master station monitors a measurement value, the master station obtains a measurement value of certain group by sending bit data to the measuring unit.
Link scan (Link scan time)	Master station of CC-Link IEF Basic start sending next request upon receiving response from all slave stations. (Time from sending request until sending nest request.)
Link device	Device (RX, RY, RWr and RWw) in the CPU for communicating with slave station.
Link refresh	Function for automatically transferring data between user device and link device.

2. Specification

2.1. Specification

CC-Link IEF Basic specification is shown as below:
(Communication specifications of the communication unit of CC-Link IEF Basic.)

Item	Specification
Number of occupied stations	1 station
Link device (RX, RY)	64 points each
Link device (RWr, RWw)	32 points each
Standard response time	300 seconds
Interface	1 port (100BASE-TX)
Transmission method	Base band
Transmission speed	100Mbps
Number of cascade connection *1	Up to 2 stages
Max. distance of stations	100m (Comply with ANSI / TIA / EIA-568-B(Category 5e))
Connector compatible for the external wiring	RJ-45
Cable	Cable compatible for IEEE802.3, 100BASE-TX (Twisted-pair cable with shield (STP cable), Category 5e)
Protocol	CC-Link IEF Basic
Support function	Automatic MDIX function (automatic recognition of straight cable / cross cable)
IP address(Default)	192.168.3.10
Subnet mask(Default)	255.255.255.0

*1 Number of connectable stages when using repeater hub.
Consult with the maker of switching hubs used concerning the number of connectable stages.

2.2. Function

Function		Details
Measuring values acquiring function		
	Monitor pattern	Pre-defined measurement items can be acquired / monitored by turning link devices ON.
	Command	Optional set-up value / measurement items can be acquired. Needed to store information into link devices (RWw) for specifying data. 8 data can be monitored at once.
Measuring unit set-up function		
	Command	Set-up value of the Measuring unit like phase wire system can be changed. Needed to store information of set-up value to be changed into link devices (RWw). 1 set-up value can be set at once.

2.3. Target devices

Target devices to be connected with CC-Link IEF Basic as below (1):
When using CC-Link IEF Basic, users have to register the profile of the measuring unit to GX Works3.
Registration procedure as below (2):

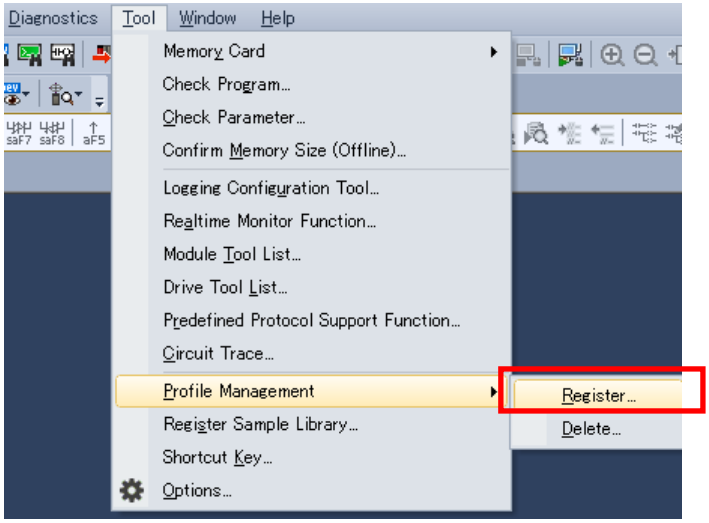
(1)Target devices

Series	Product name		Model name
EcoMonitorLight	Standard model		EMU4-BD1-MB
	High performance model		EMU4-HD1-MB
	General current transformer model		EMU4-FD1-MB
EcoMonitorPlus	Basic unit	Energy measuring standard model	EMU4-BM1-MB
		Energy measuring high performance model	EMU4-HM1-MB
		Insulation monitor device	EMU4-LG1-MB
	Extension unit*1	Energy measuring extension unit for same voltage system	EMU4-A2
		Energy measuring extension unit for different voltage system	EMU4-VA2
		Analog input unit	EMU4-AX4
		Pulse input unit	EMU4-PX4

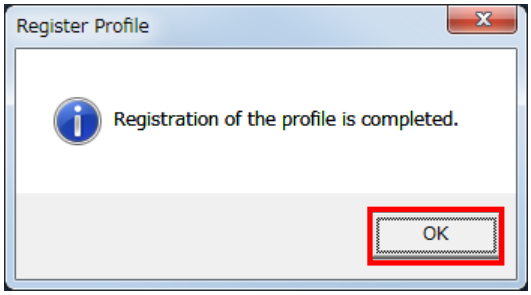
*1 The extension unit has no profile.
When using the extension unit, register a profile of the basic unit to be connected.

(2)Registration procedure for profile:

① Download a profile of the device to be used from CC-Link Partner Association website (www.cc-link.org).
② Start up the GX Works3.
③ Select as [Tool] → [Profile Management] → [Register].



④ Select downloaded file (zip) of above ① at the “register profile” screen to click [Register].
⑤ After completion of register, display as below.
Click [OK] to shut the display.
Finished.



3. System configurations

Access range of CC-Link IE is within the same network address of the Ethernet.
It is not accessible over the range of routers.

Additionally, connectable number of the slave station varies according to the programmable controller to be connected.

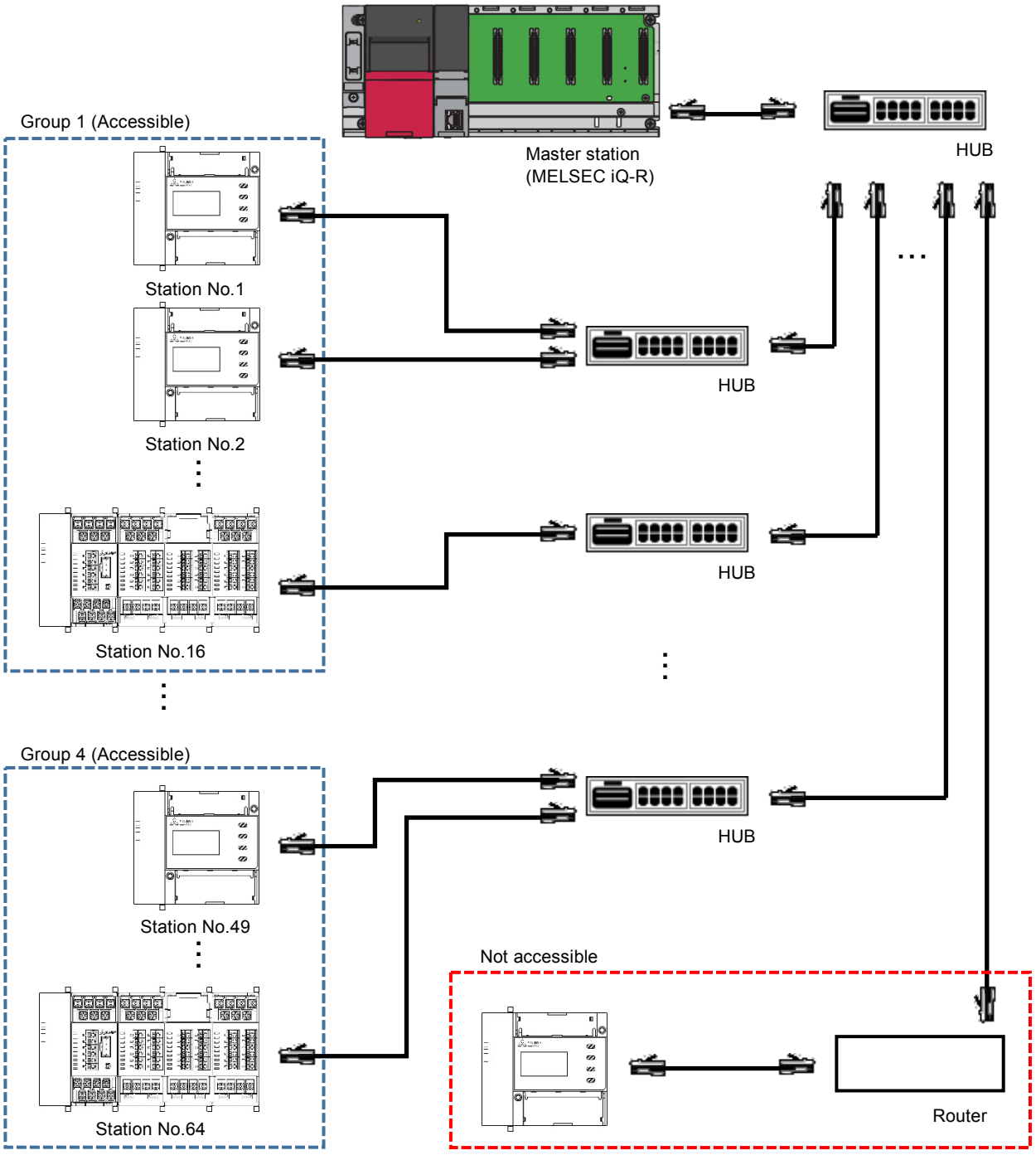
Refer to [CC-Link IE Field Network Basic Reference Manual].

Example for connecting with MELSEC iQ-R as below:

・Max. Registrable number of slave station is 64.

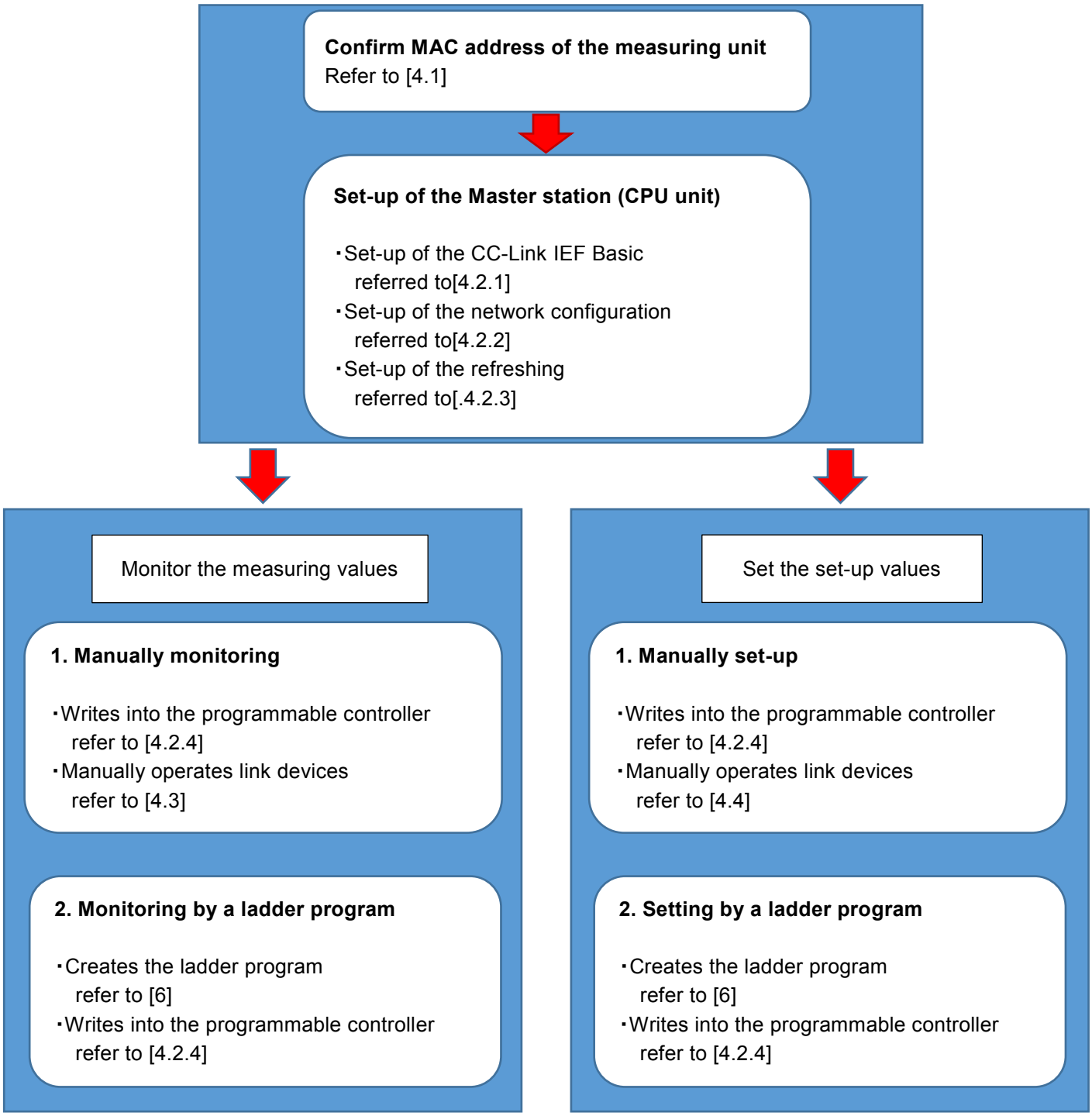
・Max. 16 slave stations can be registered to 1 group.

(When registering slave stations over 16, grouping is needed.)



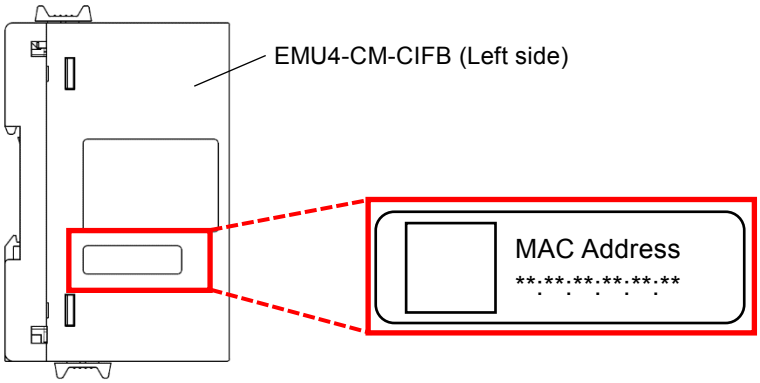
4. Starting up procedure(basic)

Starting up flow of CC-Link IE functions is shown as below:
Details are described in the reference.
(In this manual, starting up flow is shown in the case when slave station is EMU4-HM1-MB.)



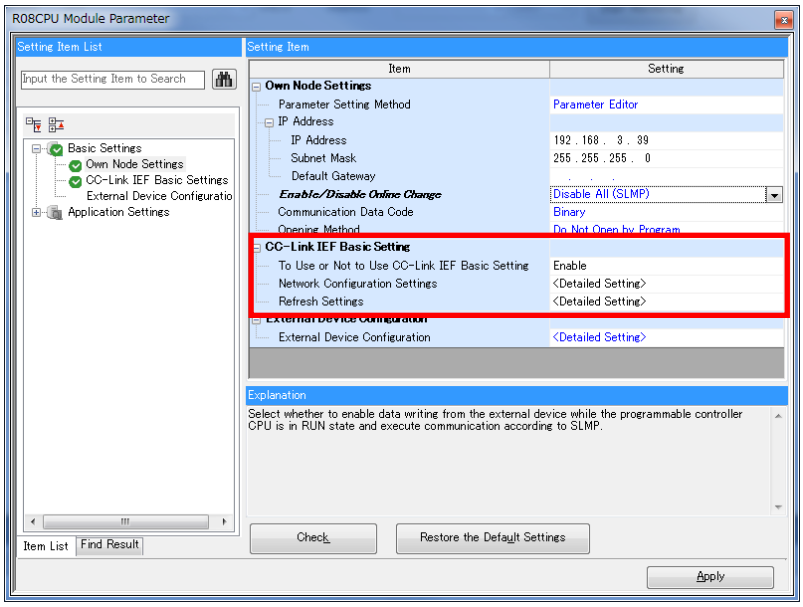
4.1. Confirm MAC address of the measuring unit

Confirm MAC address of the measuring unit and keep it.
The MAC address is provided on the left side of the CC-Link IEF Basic (model: EMU4-CM-CIFB)
(Required in [4.2.2])



4.2. Setting of master station

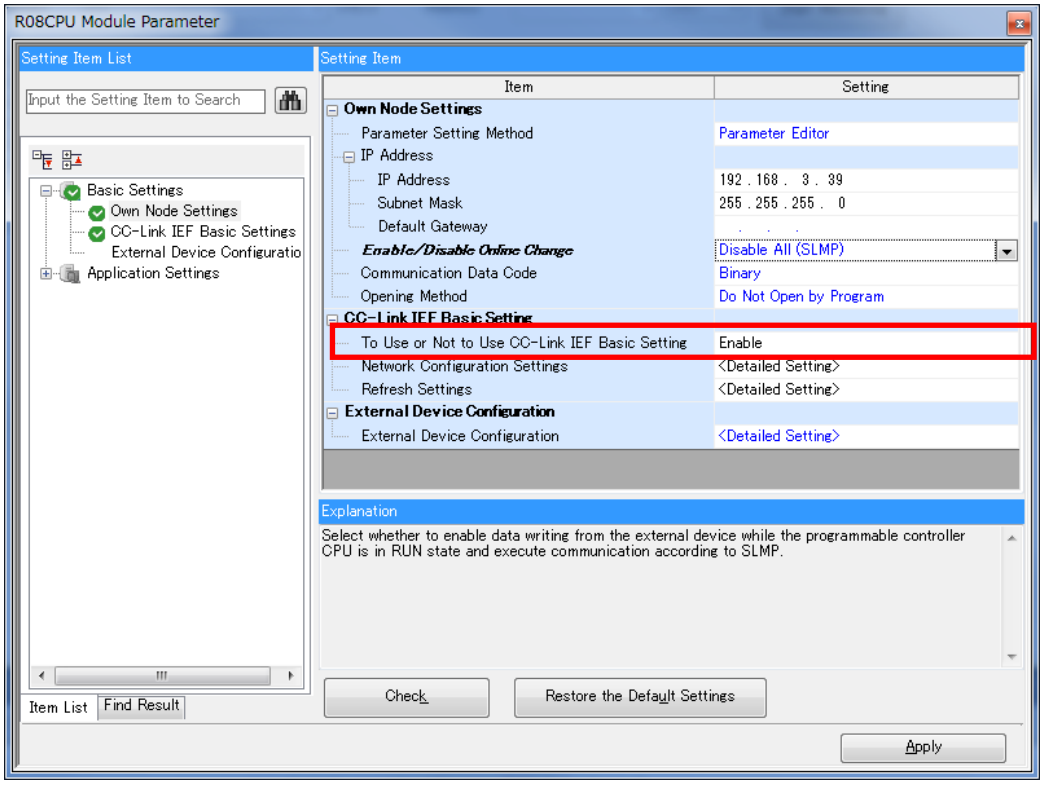
Set-up a unit parameter of the master station (CPU unit).
Refer to [GX Works3 Operating Manual], [CC-Link IE Field Basic Reference Manual] as for operation of respective screens.



Setting range of the master station

4.2.1. Setting of the CC-Link IEF Basic

Select “To use or not to use CC-Link IEF Basic” to set “Enable” in the pull-down menus.



4.2.2. Setting of the network configuration

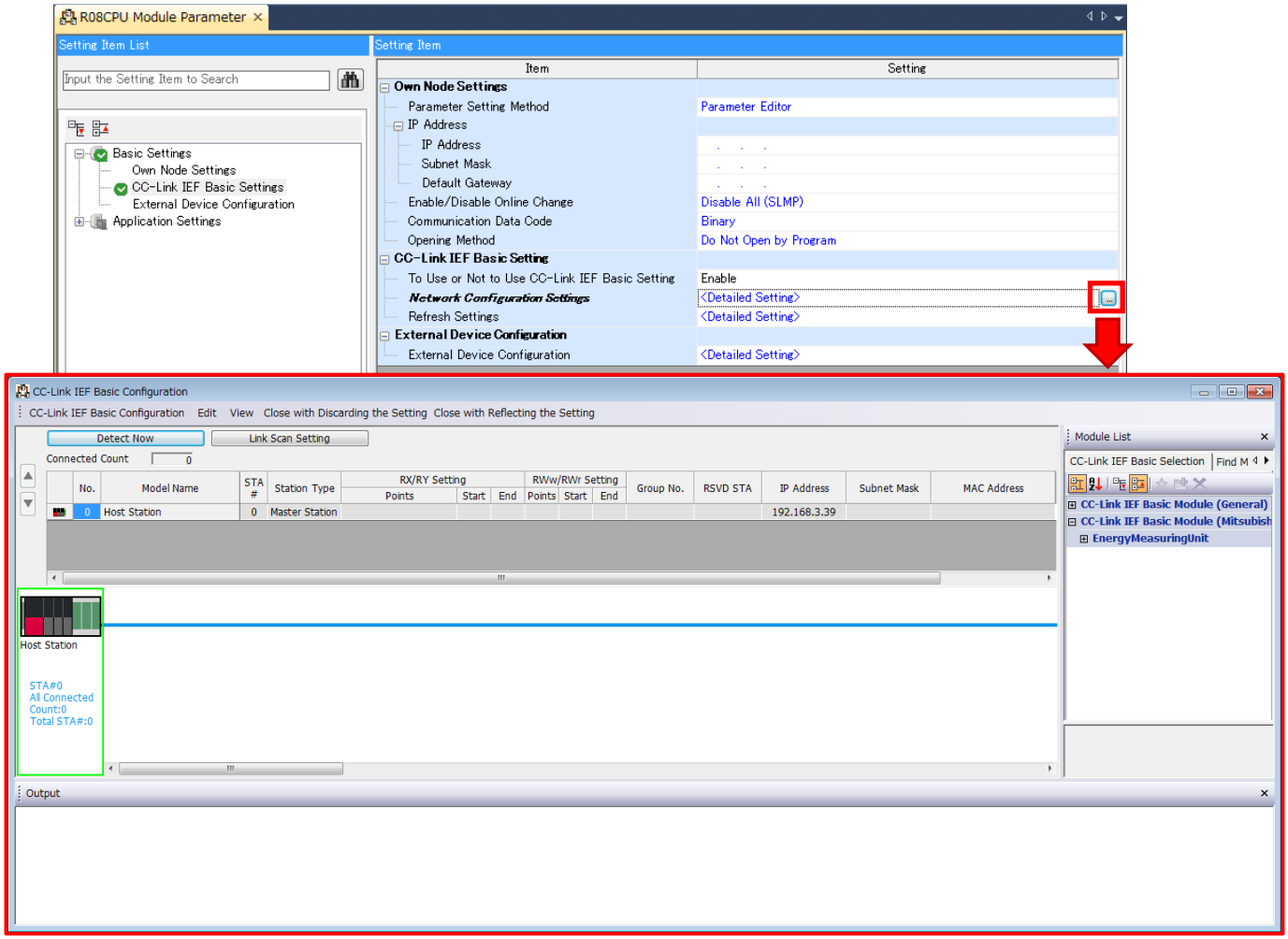
Setting of the network configuration and link scan.

(1) Network configuration

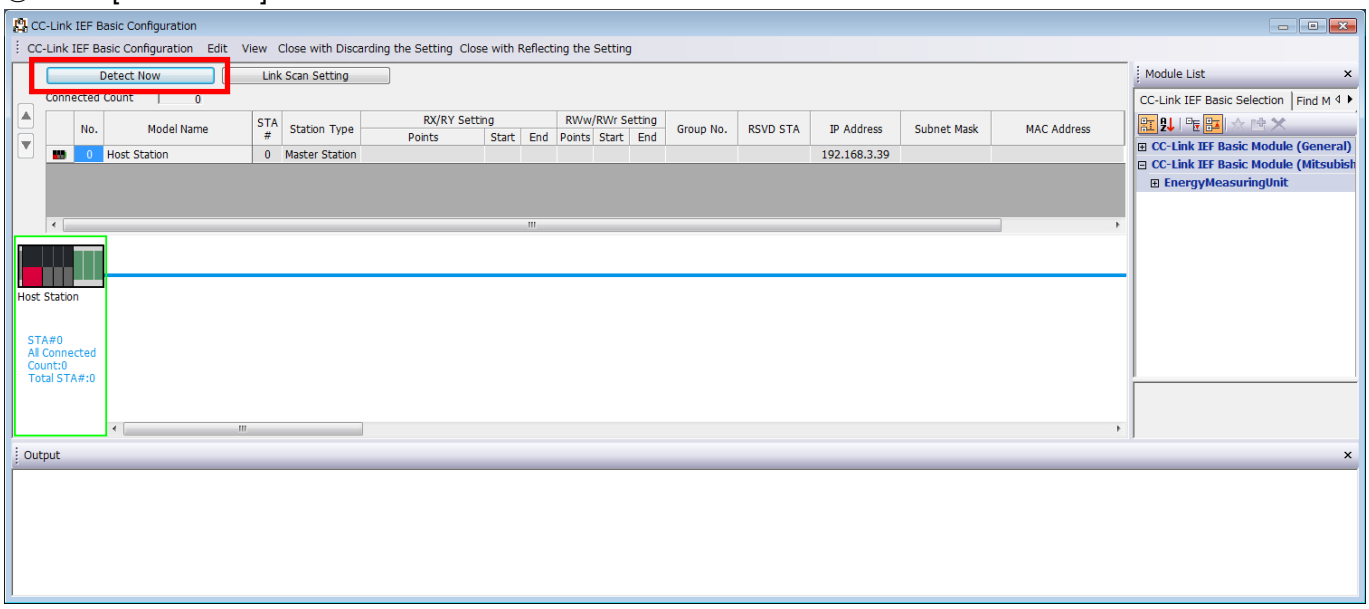
Master station must be connected with the measuring unit for setting.

In this case, turn the power ON of the measuring unit.

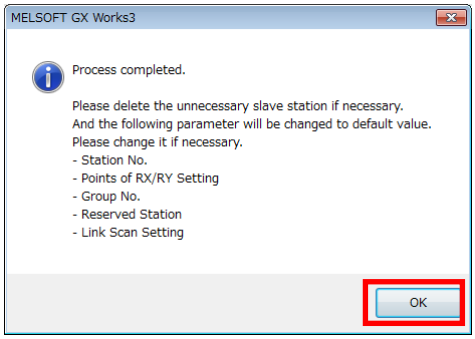
① Select “Network Configuration Settings”. “CC-Link IEF Basic Configuration” is displayed upon clicking “…” button.



② Click [Detect Now] to detect the slave station connected with network.

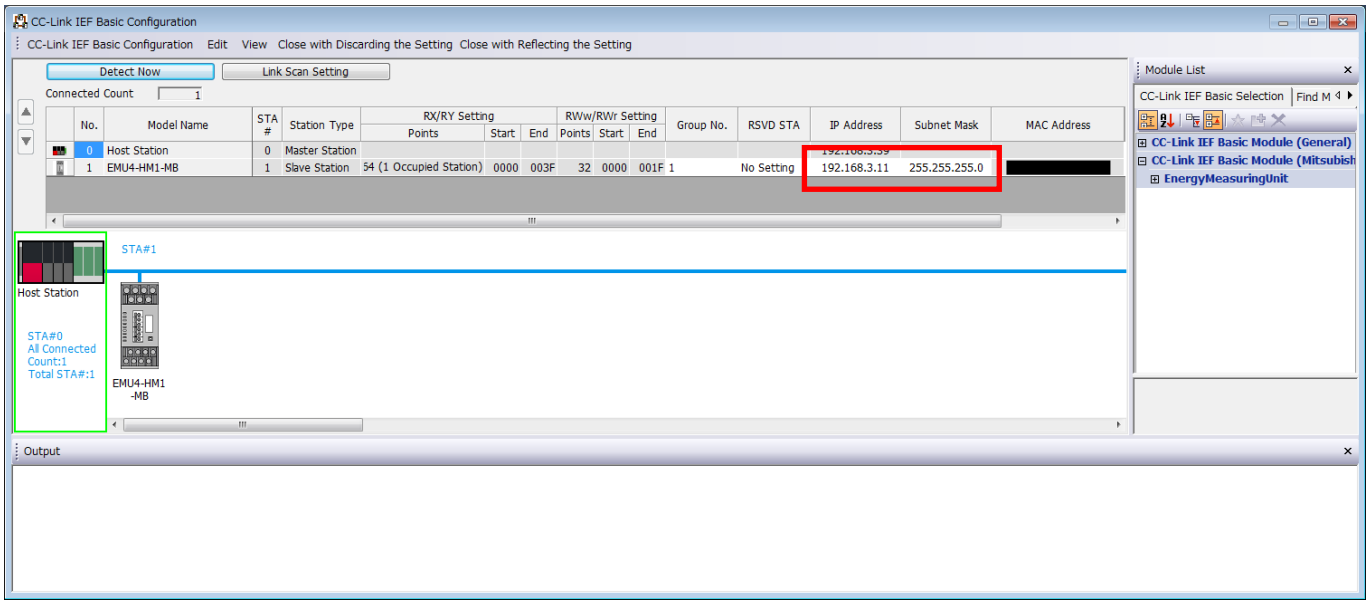


③ The following message is displayed after detection.
Click “OK” to shut the message.

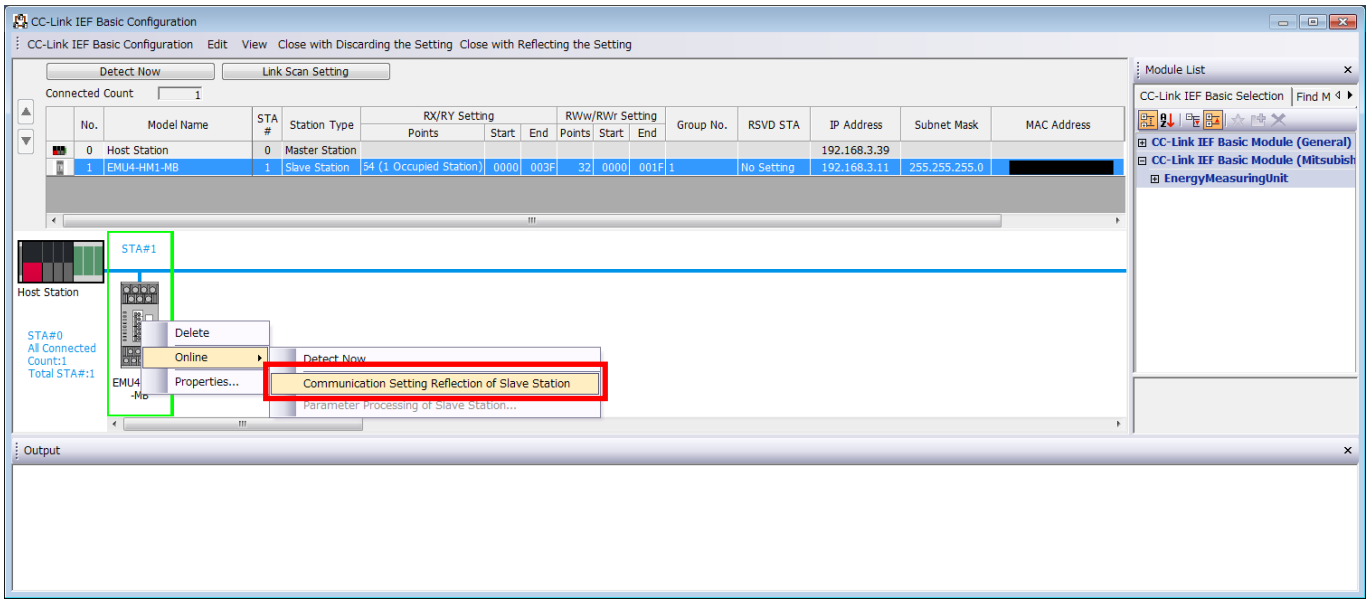


The following ④ to ⑦ are change process for IP address of the slave station. Perform any of them when needed.
(Resume from process ⑧ when ④ to ⑦ are unnecessary.)

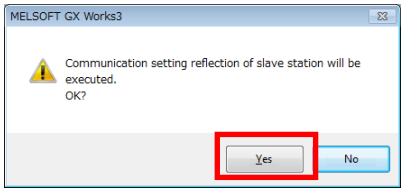
④ Select the target measuring unit using MAC address of [4.1], then input optional IP address and subnet mask.



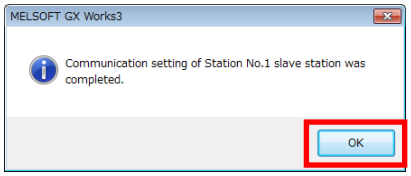
⑤ Right click the measuring unit to be reflect, then select “Online” → “Communication Setting Reflection of Slave Station”.



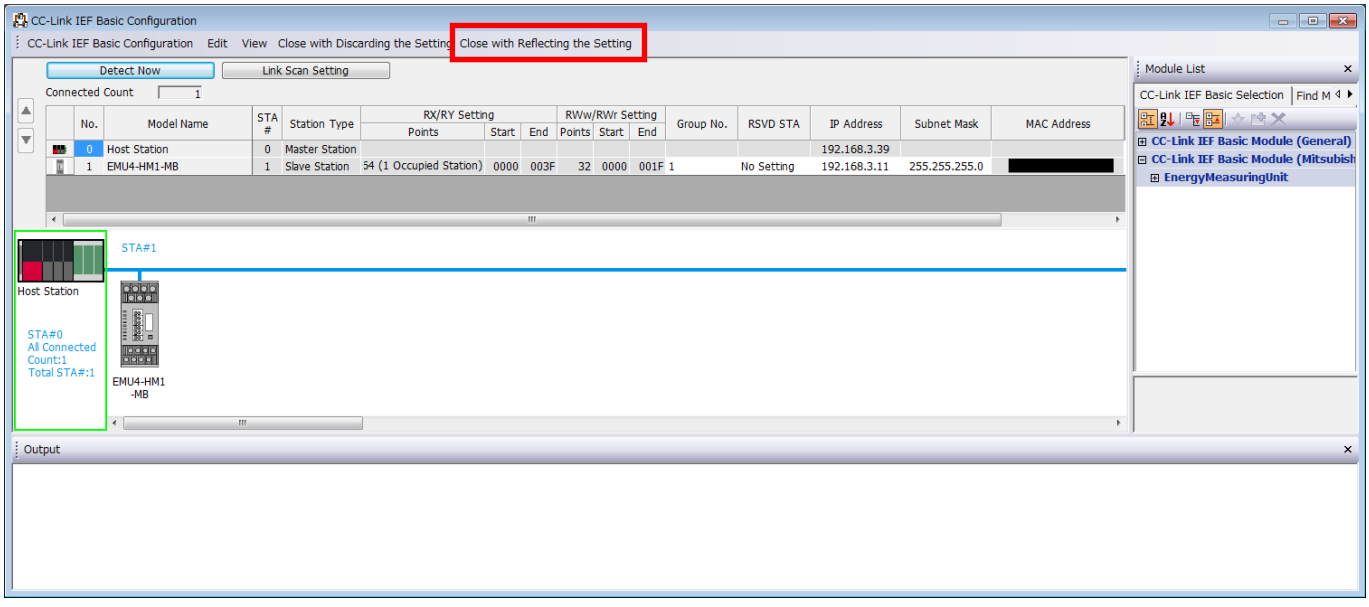
⑥ The following message is displayed.
Click “Yes”, perform network setting of the measuring unit.



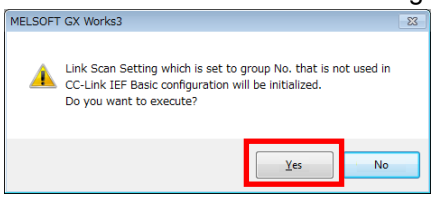
⑦ The following message is displayed when setting completed.
Click “OK” to shut the message.



⑧ Click “Close with Reflecting the Setting” to shut the window.



⑨ The following message is displayed.
Click “Yes”, store the setting.
The window is shut when setting completed.



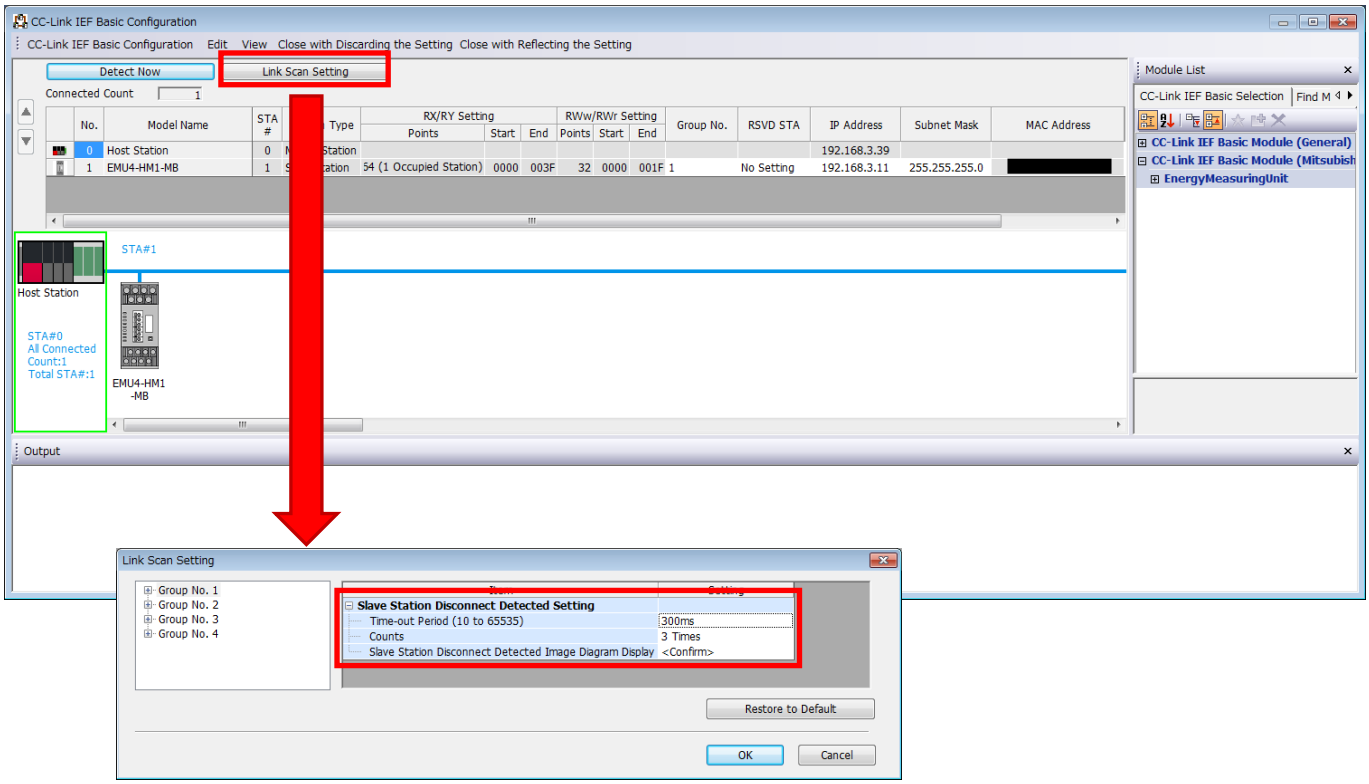
(2) Setting of link scan

When clicking the [Link Scan Setting] as below, [Link Scan Setting] screen is displayed.

Set below terms to the group No. of slave station.

・Timeout period：more than 300ms

・Count：Optional

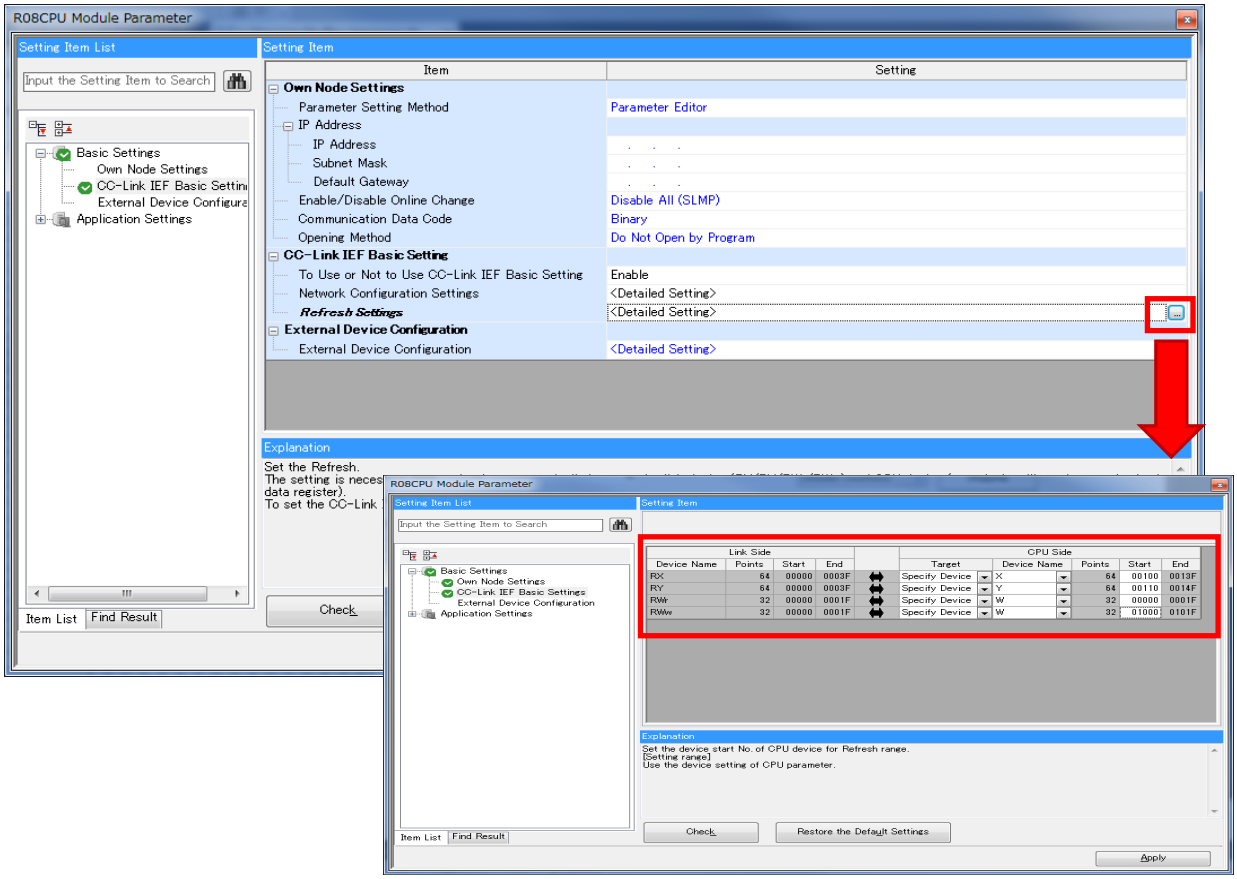


4.2.3. Refresh setting

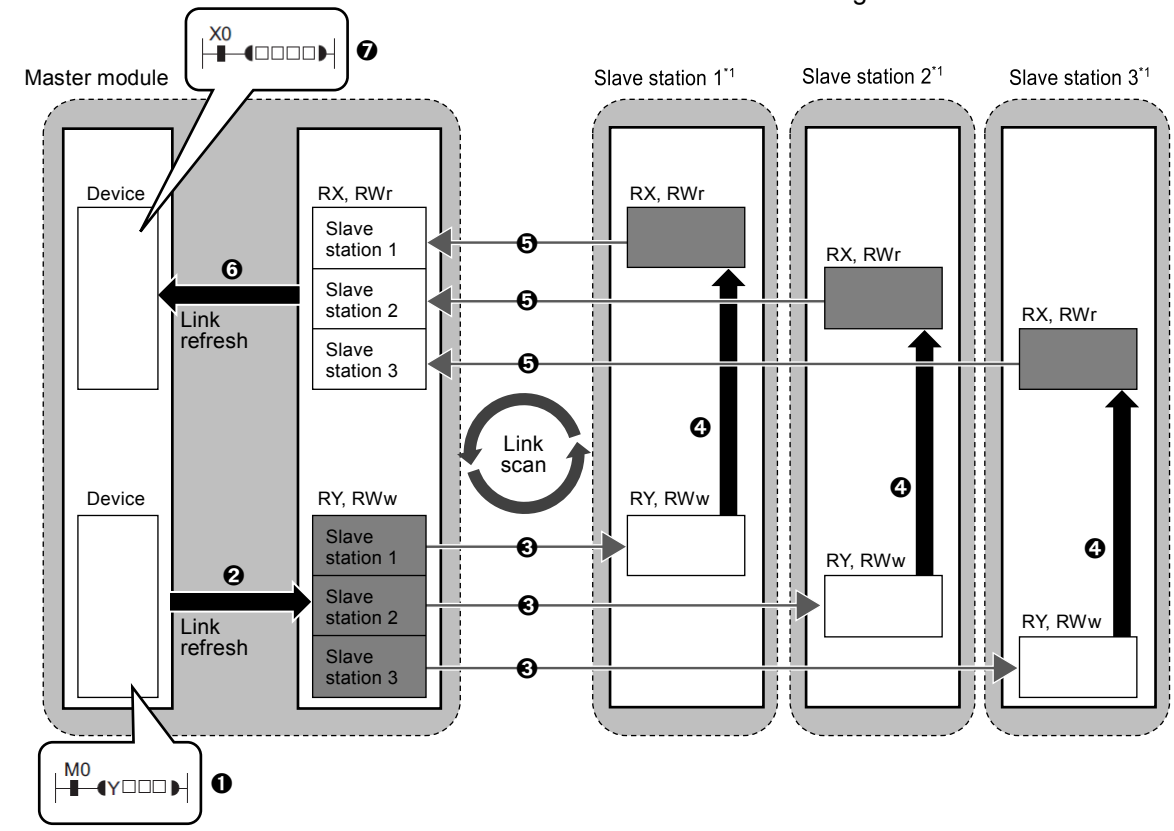
Set the Refresh parameter

Select “Refresh Settings”. When clicking “…” button, it shifts to “setting item list” as below.

Set-up the link refresh target device.



Below shows data flow between master station and slave stations using link devices.



: Sending area to other stations

*1 The order of slave stations is according to the station order of the “Network Configuration Settings”. (Refer to [4.2.2])

・Upon outputting from master station:

❶ A device of the master station turns ON.

❷ Device status of the master station is stored into link devices (RY, RWw) of the master station by link refresh.

❸ Link devices (RY, RWw) status of the master station is stored into devices (RY, RWw) of the slave station by link scanning.

❹ The slave station performs acquiring measuring values / various settings according to link devices (RY, RWr) status of the slave station. Then the slave station stores the result into link devices (RY, RWw).

・Upon inputting from slave station:

❺ Link devices (RY, RWr) status of the slave station is stored into link devices (RY, RWr) of the master station by link scanning.

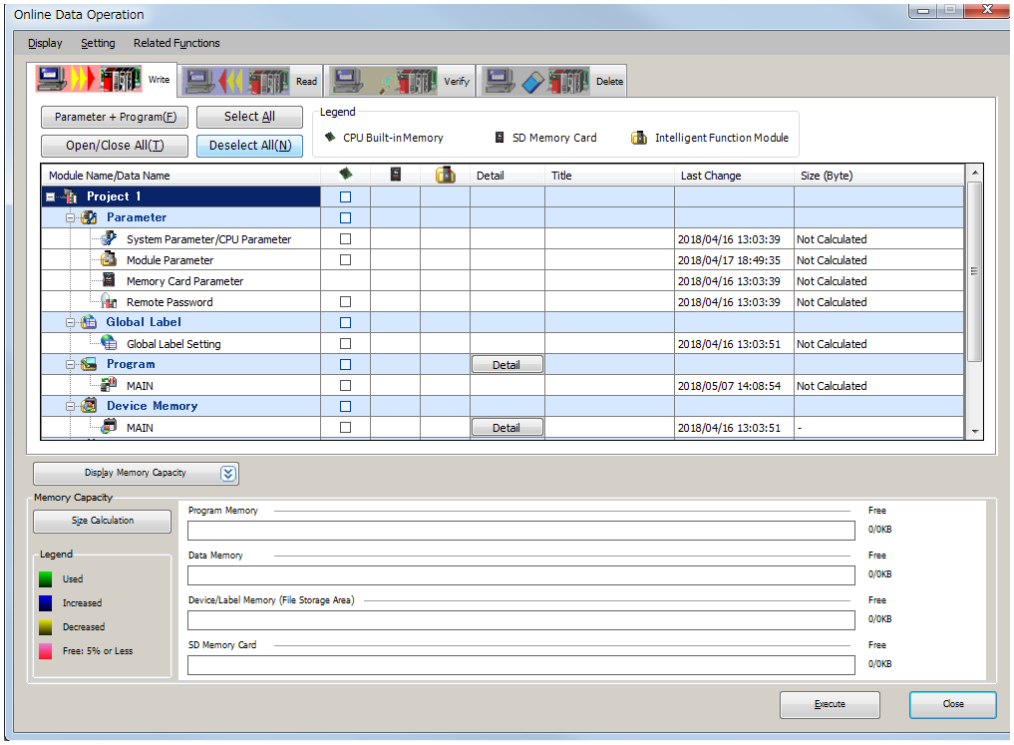
❻ Link devices (RY, RWr) status of the master station is stored into devices of the master station by link refresh.

❼ A device of the master station turns ON.

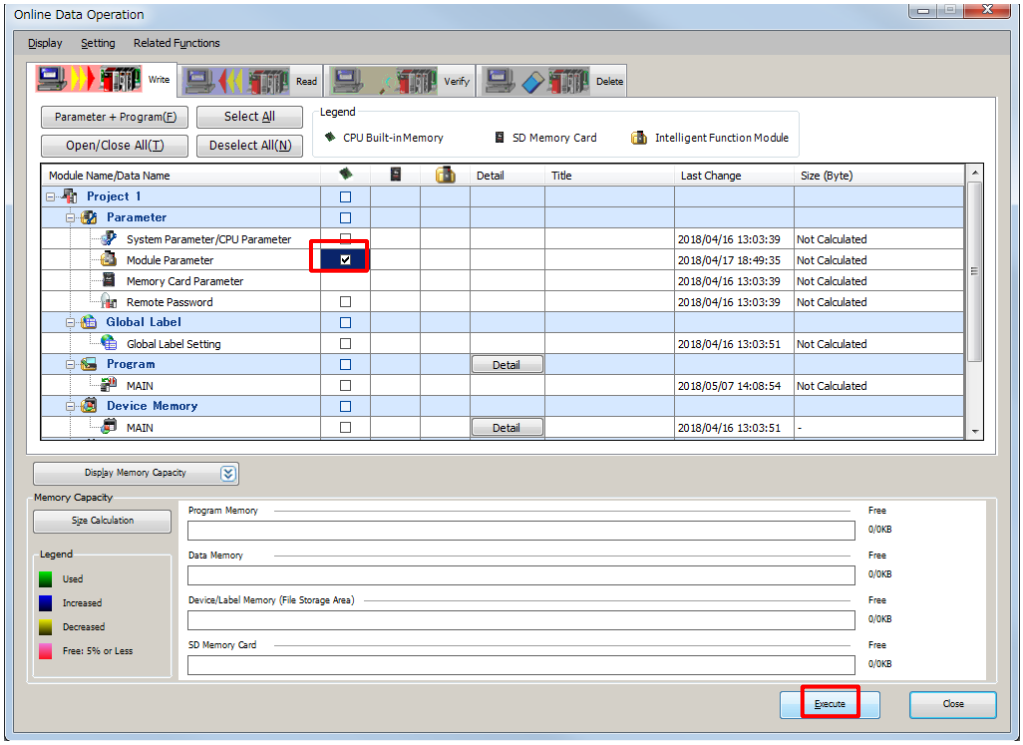
4.2.4. Writes into the programmable controller

Writes settings of master station into the programmable controller.

[Online]menu → select [Write to PLC] then “Online Data Operation” screen is displayed.
Writes into the programmable controller in accordance with users conditions.



Ex: In case when writing into the memory in CPU
“(Project 1)”→“Parameter”→ Tick the “Module Parameter”, then click [Execute].



Note: Reset the CPU module or Power OFF→ON after writing.

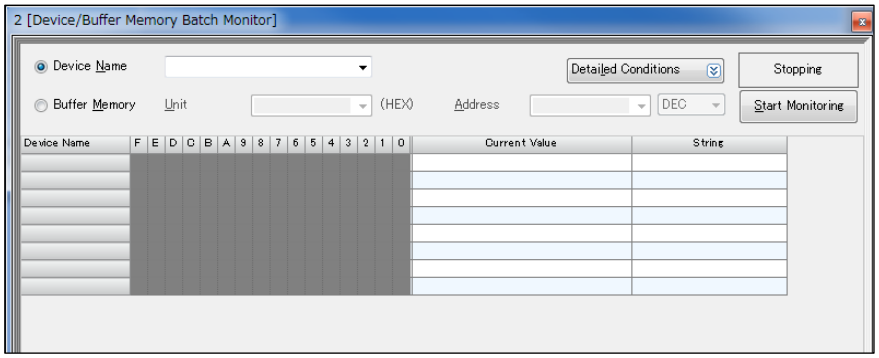
4.3. Manually monitoring data

Procedure for manually monitoring data.
2 types of monitoring data as below.
Operation differs according to the monitoring methods.
・Monitoring measuring values by monitor pattern.
・Monitoring data by command.
* Refer to [5.2] as for pattern.

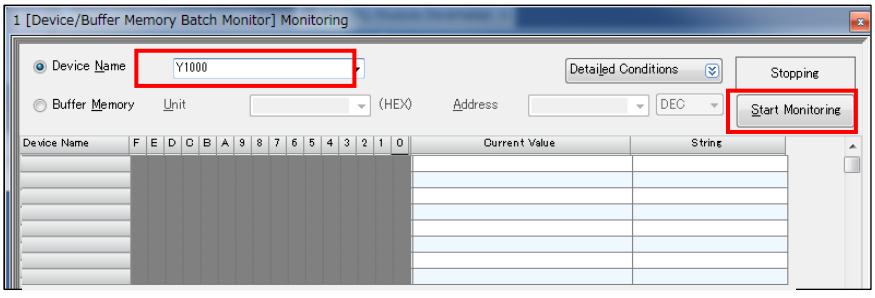
4.3.1. Method for monitoring measuring values by monitor pattern

Refer to [5.2] as for monitor pattern.
Method for monitoring measuring values of monitor pattern P08 as below.
* Slave station (model of terminal devices):
Station No. 1：EMU4-HM1-MB
* Refresh setting:
RX ：X1000 to X103F
RY ：Y1000 to Y103F
RWr ：W0 to W1F
RWw ：W1000 to W101F

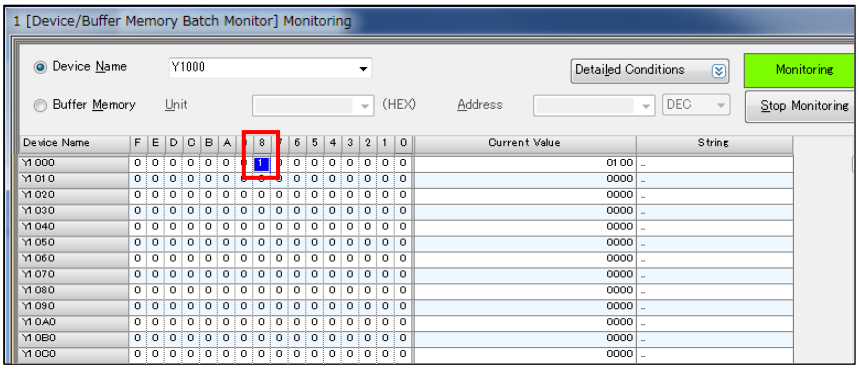
① “Online” menu→”Monitor” → open the “Device/Buffer Memory Batch Monitor”



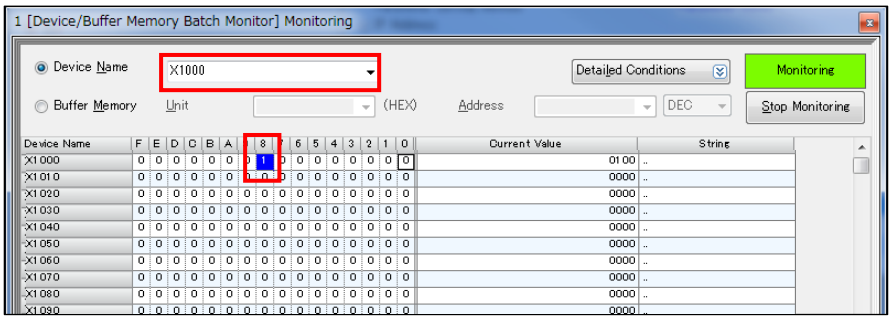
② Input “RYn0(Y1000)” to “Device Name”, then click “Monitoring”.
Monitoring devices of the programmable controller starts monitoring.



③ By referring [5.5.1], double click the device (Y1008)corresponding to the target monitor pattern(P08) to “ON(1)”.

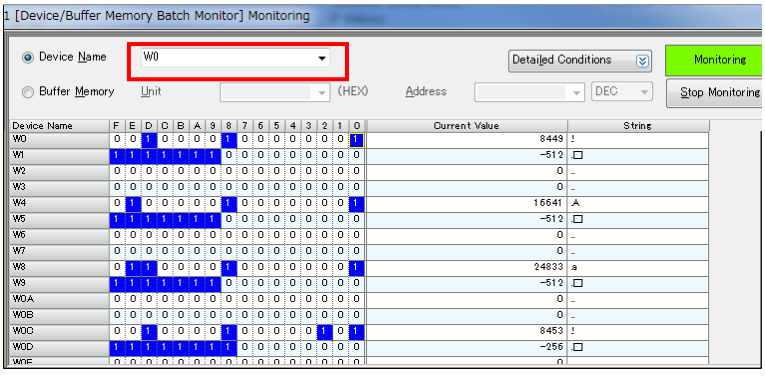


④ Confirm whether the measuring values of target monitor pattern is monitored.
Input “RXn0(X1000)” to “Device Name” to press “Enter”.
By referring [5.4.2], confirm whether the device (X1008)corresponding to the target monitor pattern(P08) is “ON(1)”.



⑤ Input start device(W0) of RWr to “Device Name” to press “Enter”.
Measuring values is stored into RWr.
(Measuring values is always updated.)
Procedure for manually monitoring measuring values by monitor pattern is finished.

* Stored data is confirmed by following procedure.
・Refer to [5.5.1], confirm the group format of the monitor pattern.
・Refer to [5.5.2], confirm the stored data configuration of the group format.

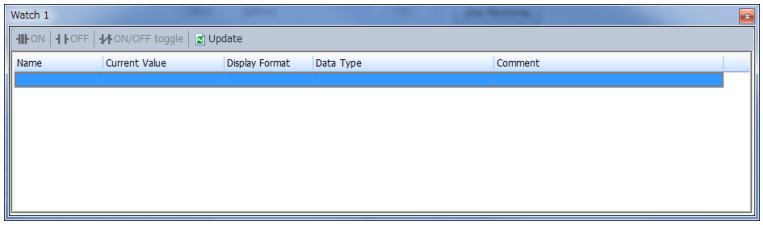


4.3.2. Method for monitoring data by command

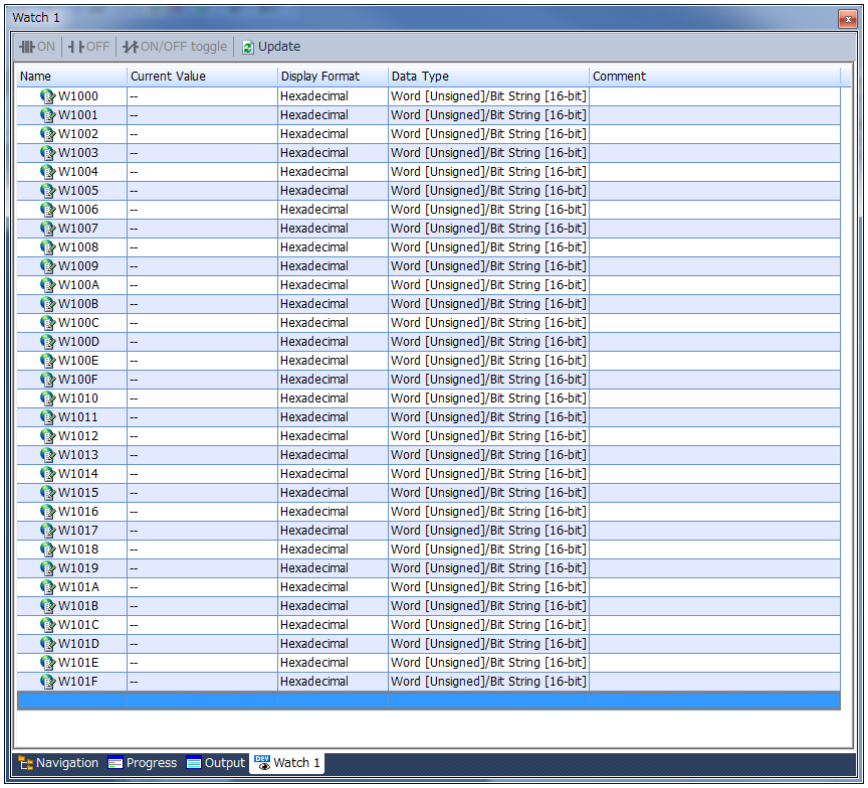
Refer to [5.3.1] as for command.
Method for monitoring data as below.

* Slave station (model of terminal devices):
  Station No.1：EMU4-HM1-MB
* Refresh setting:
  RX ：X1000 to X103F
  RY ：Y1000 to Y103F
  RWr ：W0 to W1F
  RWw ：W1000 to W101F
* Data to be monitored:
  ・Average current
  ・Average voltage
  ・Active power
  ・Power factor
  ・Frequency
  ・Active energy (import)
  ・Periodic active energy
  ・Pulse count

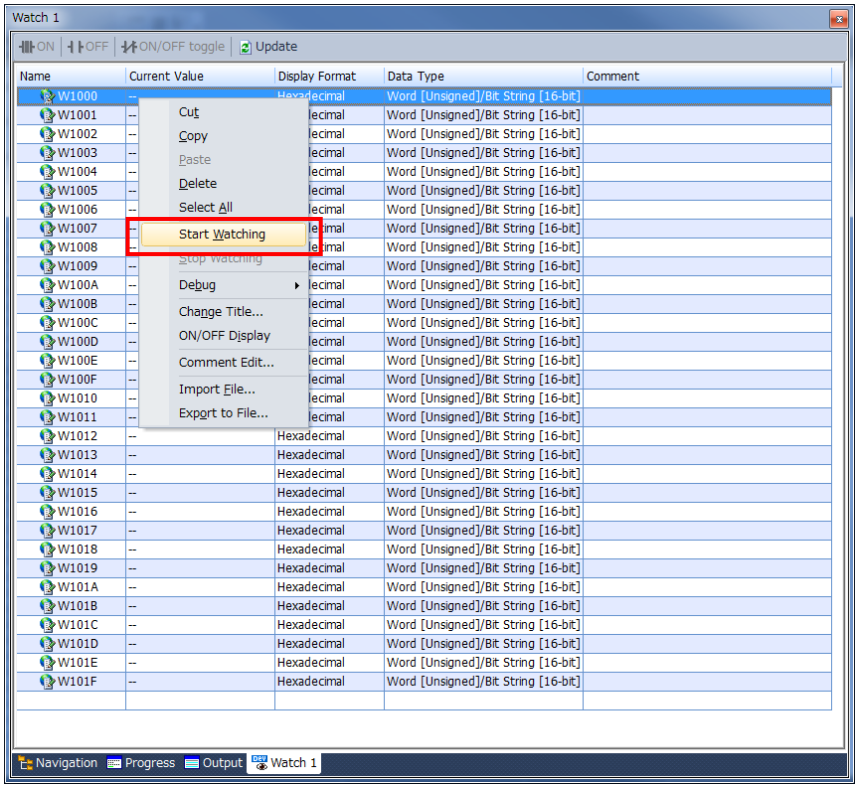
① “View” menu → “Docking Window” → “Watch 1”, then open “Watch” window.



② Register RWw(W1000 to W101F)
After registration, set “Display Format” as “Hexadecimal”, “Data Type” as “Word [Unsigned]/Bit String [16-Bit]”.



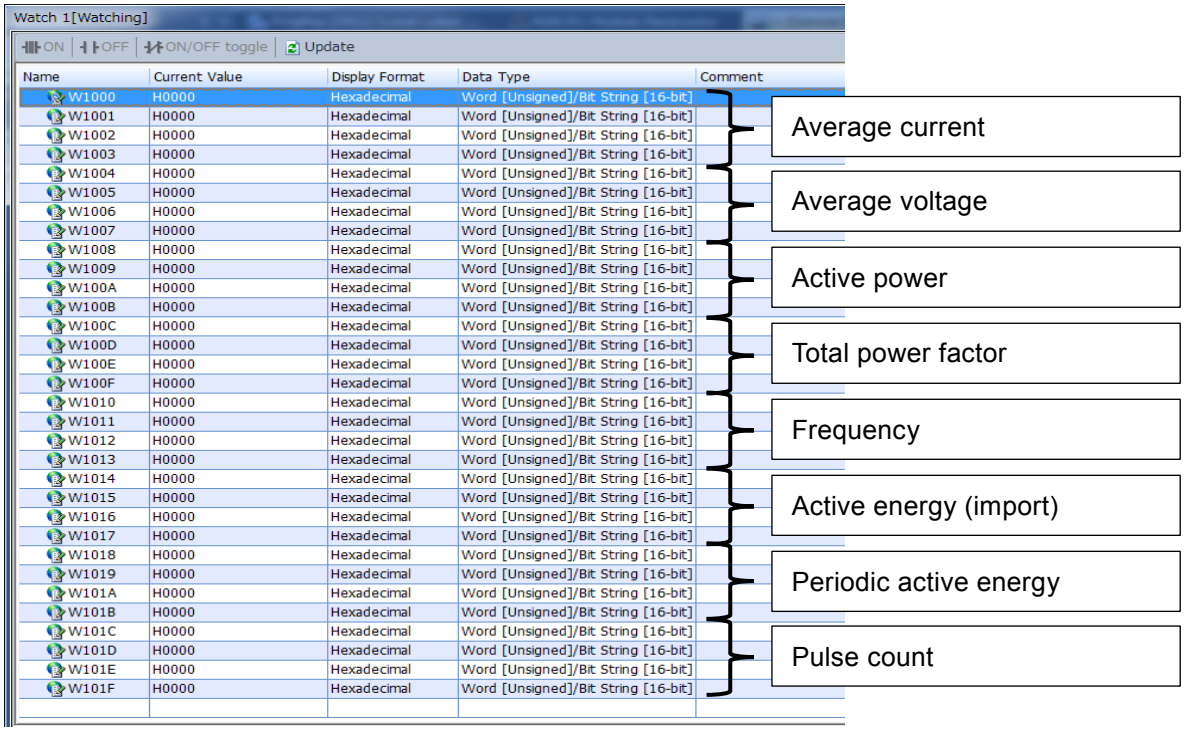
③ “Right-click” → select “Start Watching”, then display current value of the registered device.



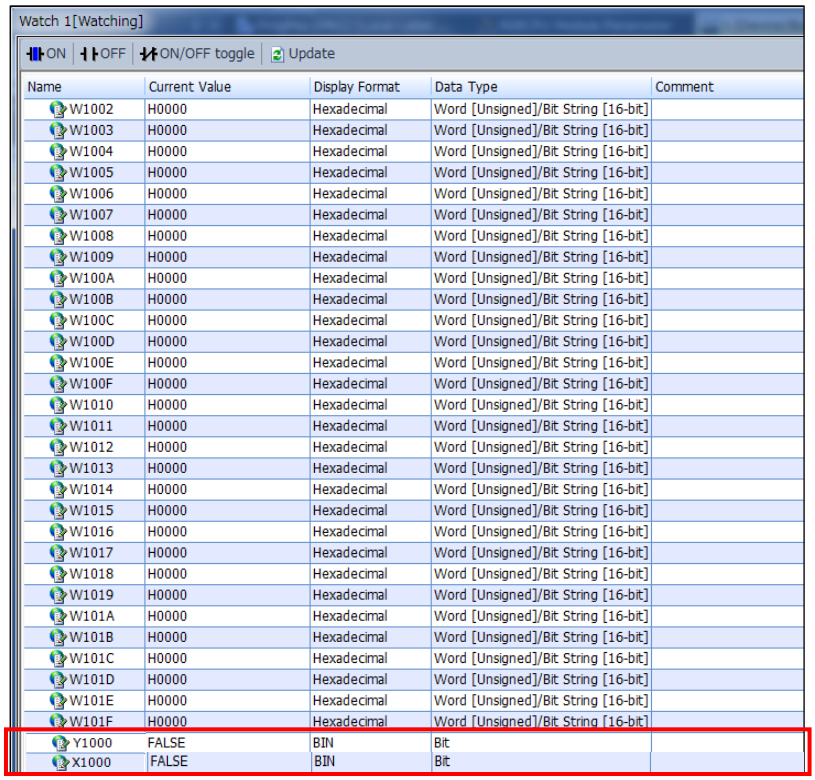
④ Refer to [5.5.4] and [5.5.7],confirm the group No., channel No., unit No. of data to be monitored.
* Obtainable data is up to 8.

⑤ Refer to [5.5.3], apply the value confirmed in ④ to confirm the value for input to RWw.

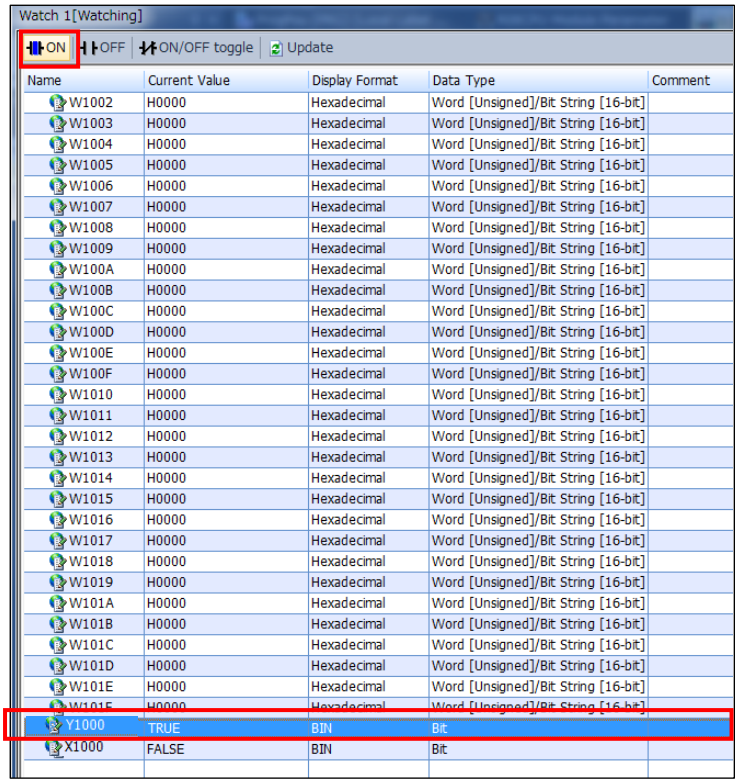
⑥ Input the value confirmed in ⑤ to RWw(W1000 to W101F) in the Watch window.



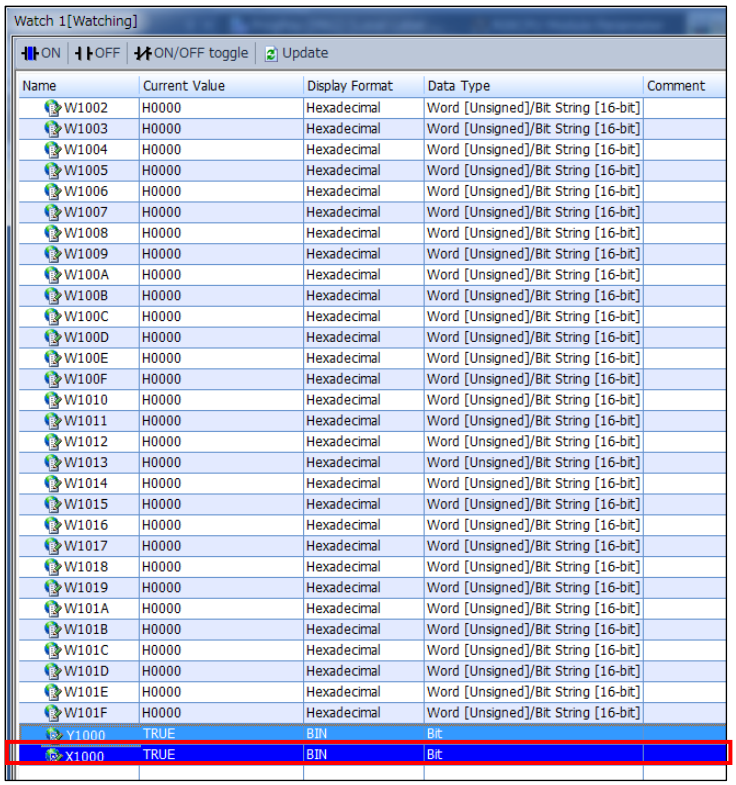
⑦ Register RYn0, RXn0(Y1000, X1000).



⑧ Keep selecting RYn0(Y1000) to click “ON” button, then Current Value changes to “TRUE”.

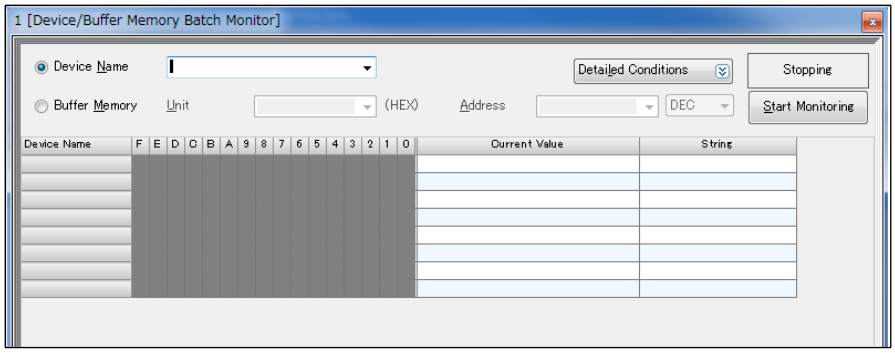


⑨ Confirm RXn0(X1000) is “TRUE”.



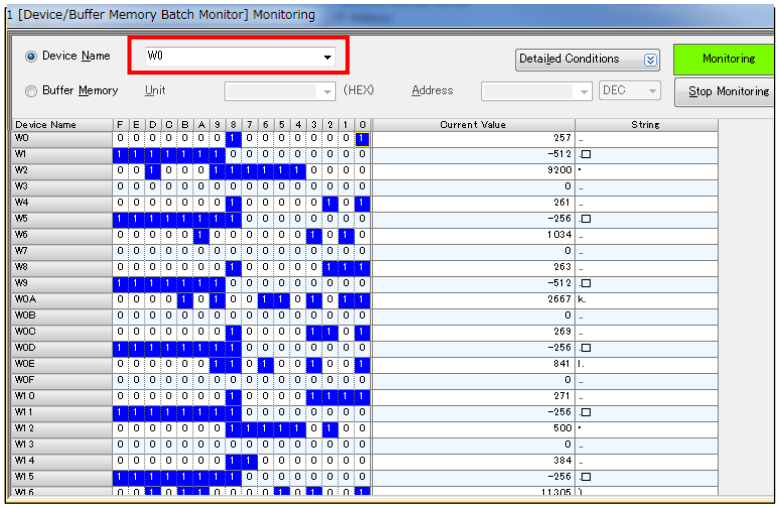
* If RXn0(X1000) is still “FALSE”, an error code is stored in the RWr device.
  Refer to [5.5.3], [5.7], remove the error cause.

⑩ To confirm whether data is properly monitored,
“Online” menu → “Monitor” →open ”Device/Buffer Memory Batch Monitor”.



⑪ Input start device(W0) of RWr to “Device Name” to press “Enter”.
Confirm that data is stored into RWr.
Procedure for manually monitoring measuring data by manual command is finished.

* Stored data is confirmed by following procedure.
・Refer to [5.5.4], confirm the group format of obtained data.
・Refer to [5.5.8], confirm the data configuration of respective data format.

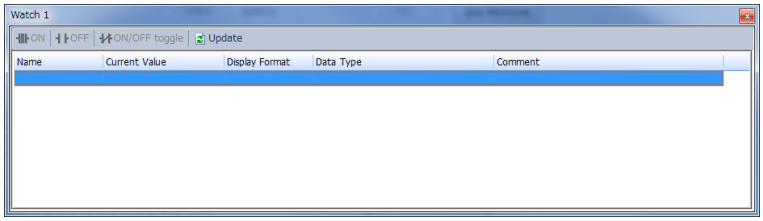


4.4. Manually setting the measuring unit

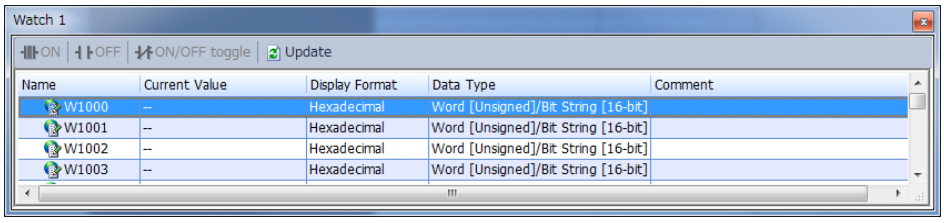
Procedure for manually setting a set-up value from master station.
Setting can be performed from master station by communicating with the measuring unit.
* We recommend setting by the measuring unit.
When setting by the measuring unit, operation in this section is unnecessary.
The set-up value can be set using command.
Refer to [5.3.2] as for command details.

Method for setting the set-up value as below.
Slave station (model of terminal devices)
Station No.1：EMU4-HM1-MB
Refresh setting
RX ：X1000 to X103F
RY ：Y1000 to Y103F
RWr ：W0 to W1F
RWw ：W1000 to W101F
Set-up value
Phase wire system ：3P3W

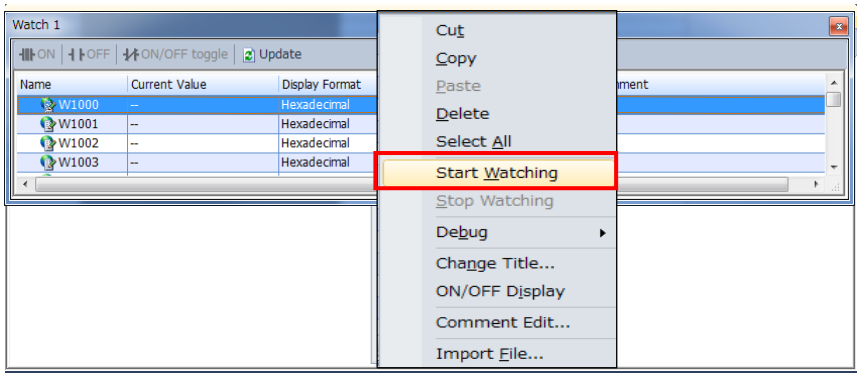
① “Display” menu → “Docking Window” →“Watch 1”, then open “Watch” window.



② For RWw, register 4 devices as (W1000 to W1003)from start device.
After registration, set “Display Format” as “Hexadecimal”, “Data Type” as “Word [Unsigned]/Bit String [16-Bit]”.



③ “Right-click” → select “Start Watching”, then display current value.

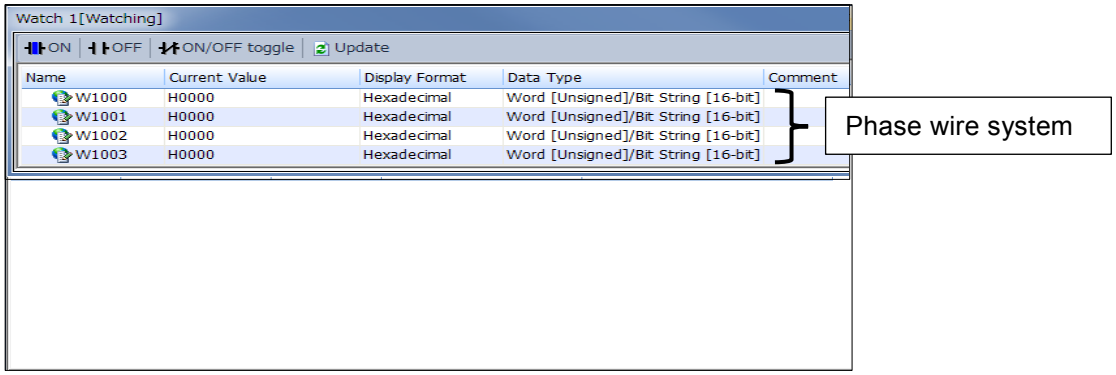


④ Refer to [5.5.6], [5.5.7] confirm the group No., channel No. and data format, unit No. of the set-up value.
* Settable item is 1 at once.

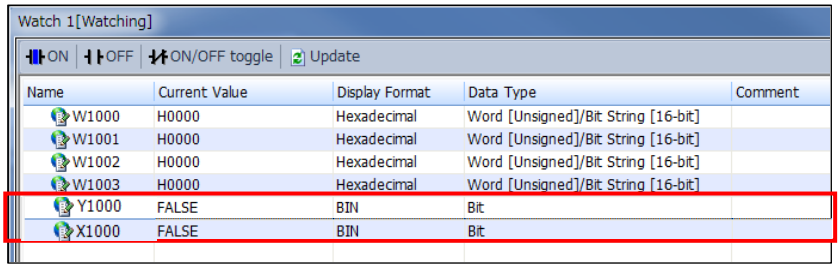
⑤ Refer to [5.5.8], confirm the data configuration of the data format confirmed in ④

⑥ Refer to [5.5.5], apply the value confirmed in ④, ⑤ to confirm the value for input to RWw.

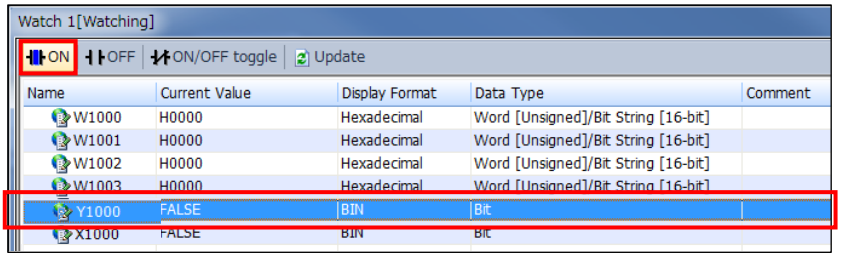
⑦ Input the value of ⑥ to RWw device (W1000 to 1003)in the Watch window.



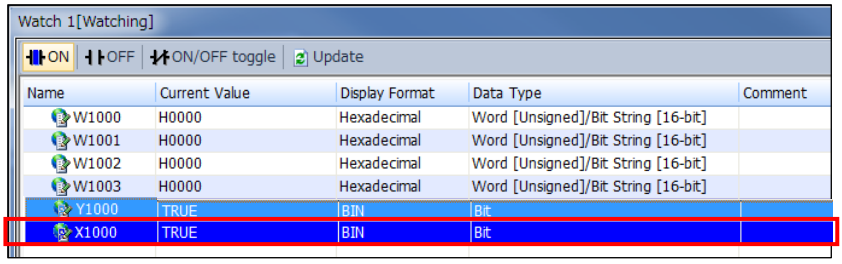
⑧ Register RYn0, RXn0(Y1000, X1000) as below.



⑨ Keep selecting RYn0(Y1000) to click “ON” button, then Current Value changes to “TRUE”.



⑩ Confirm that RXn0(X1000) is “TRUE”, then wait for up to 20 seconds.
(It might be “FALSE” while waiting, it is normal operation.)
Procedure for manually setting set-up value of the measuring unit is finished.



* If RXn0(X1000) is still “FALSE”, an error code is stored in the RWr device.
Refer to [5.5.5], [5.7], remove the error cause.

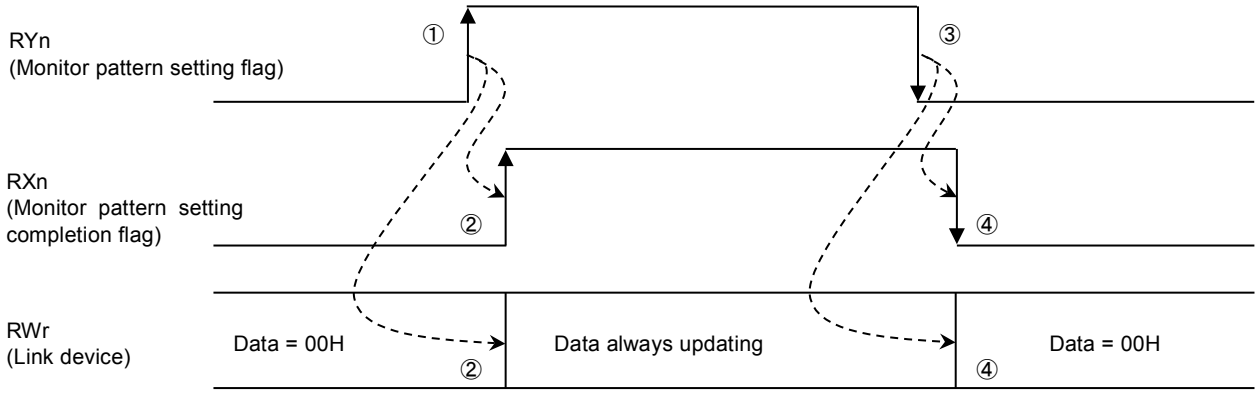
5. Communication by monitor pattern, command.

5.1. Outlines

2 methods for communicating with the measuring unit.
・Communication by monitor pattern
・Communication by command
It is possible to monitor “alarm status” or “bit data of digital input status”, data and setting a set-up value during communication.
* Even items not displayed on the measuring unit can be monitored.

5.2. Communication by monitor pattern

Group of measurement factors to be obtained is set in the measuring unit.
In this method, measuring values can be obtained from the measuring unit by specifying a group to be obtained by specifying corresponding link device (RY).
Refer to [5.5.1] as for measurement factors obtainable per group.



・Upon start monitoring
① Turn the setting flag (RYn) of the monitor pattern to be obtained OFF→ON.
② When the measuring unit can reply measuring values, corresponding monitor pattern setting completion flag (RXn) changes as OFF→ON.
At the time, updated measuring values are stored into the link device (RWr).

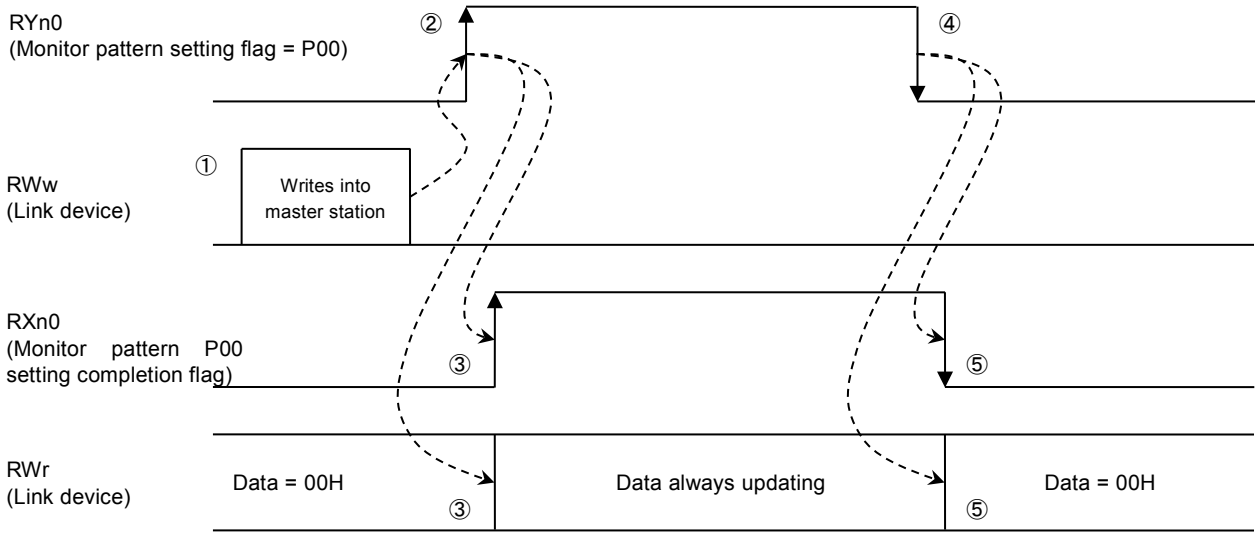
・Upon finish monitoring
③ Turn the monitor pattern setting completion flag (RYn) as ON→OFF.
④ Monitor pattern setting completion flag(RXn) changes as ON→OFF, link device: RWr is 00H.

* When multiple monitor pattern setting flags (RYn) are ON, RXn is not “ON”. Measuring values cannot be obtained.

5.3. Communication by command

5.3.1. Upon obtaining data

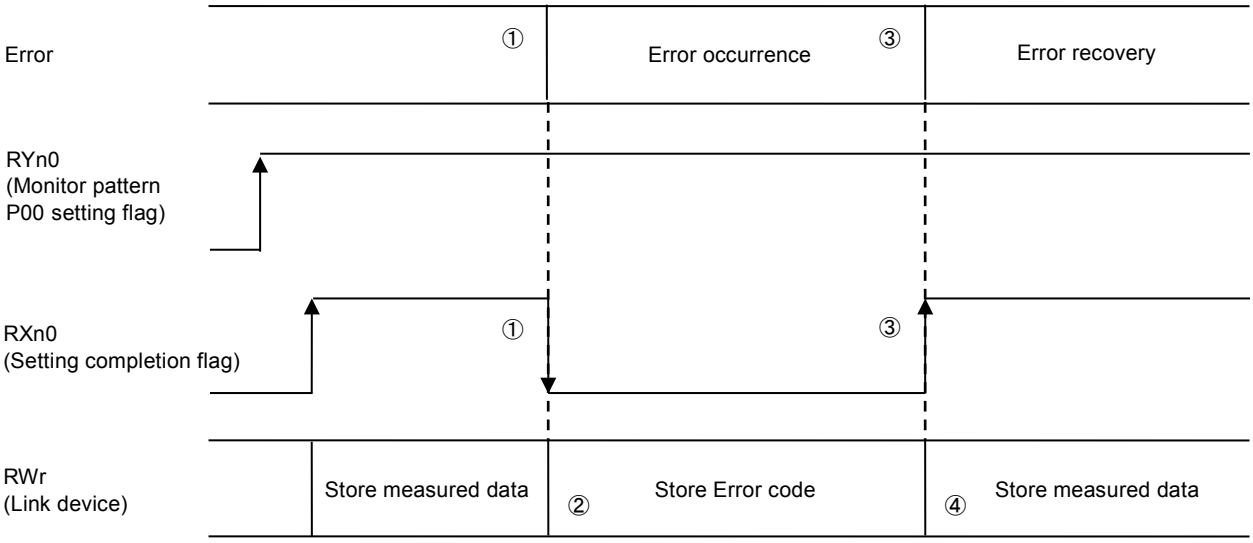
In this method, any data can be monitored by specifying data to be monitored in the link device (RWw) to turn corresponding link device (RYn0) ON.
Respective setting items and measurement items are set with group No. and channel No. By inputting the corresponding No. to the link device (RWw), specifying data to be obtained.
Obtainable data is up to 8.



・Upon start monitoring
① Write the command (group No., channel No.) of data to be obtained into the link device (RWw).
② Turn the monitor pattern P00 setting flag (RYn0)as OFF→ON.
③ When the measuring unit can reply data, monitor pattern P00 setting completion flag (RXn0) changes as OFF →ON.
At the time, updated data is stored into the link device (RWr).

・Upon finish monitoring
④ Turn the monitor pattern P00 setting flag(RYn0) as ON→OFF.
⑤ Monitor pattern P00 setting completion flag(RXn0) changes as ON→OFF, the link device (RWr) is 00H.

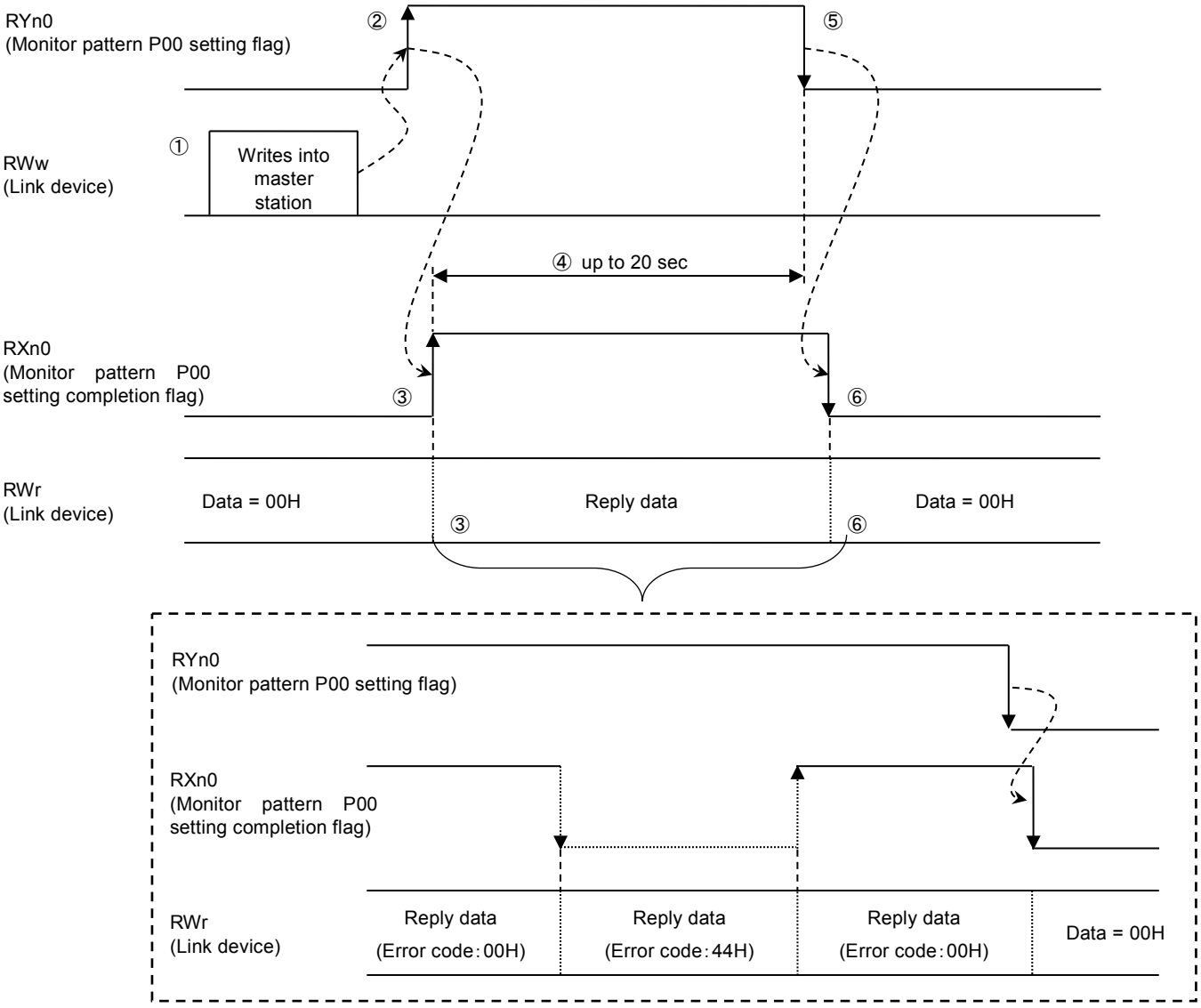
* When a command error occurs, monitor pattern P00 setting completion flag (RXn0) is OFF, then the error code stored into the RWr.
Refer to [5.7], remove the error cause.



① When an error occurs, monitor pattern P00 setting completion flag(RXn0) is OFF.
② An error code is stored into the link device(RWr). Refer to [5.5.3]
Read the error code to remove the error cause. (Data is not stored into the RWr)
③ When the error recovered, monitor pattern P00 setting completion flag(RXn0) is ON.
④ Resume data updating.

5.3.2. Upon setting the measuring unit

By specifying unit No., group No. and channel No. allocated to respective setting items and setting data, 1 setting item can be set.



・Upon start setting

① Write setting items and setting data (group No. and channel No.) into the link device (RWw).

② Turn the monitor pattern P00 setting flag (RYn0) as OFF→ON.

③ After checking the setting data in the measuring unit, setting completion flag(RXn0) changes as OFF→ON. Reply data is stored into the Link device (RWw).

* When a command error occurs, RXn0 is OFF, then the error code stored into the RWr. Refer to [5.7], remove the error cause.

④ It takes up to 20 seconds for completing setting changes. Please wait.

* The measuring unit restarts during setting changes. The measuring unit might operate as below upon restart. (Refer to above diagram ⬚)

・ The measuring unit restarts. During restart RXn0 changes as ON→OFF, an error code [44H] is stored into the link device (RWr).

・ Upon completion of restarting the measuring unit, RXn0 changes as OFF→ON, an error code is [00H]..

・Upon finish setting

⑤ After completion of restarting the measuring unit, RYn0 changes as ON→OFF.

⑥ RYn0 changes as ON→OFF, he link device (RWr) is 00H.

5.4. Allocation of link devices(RY, RX)

Link devices: RY, RX is used for communicating bit data between master station and measuring unit.

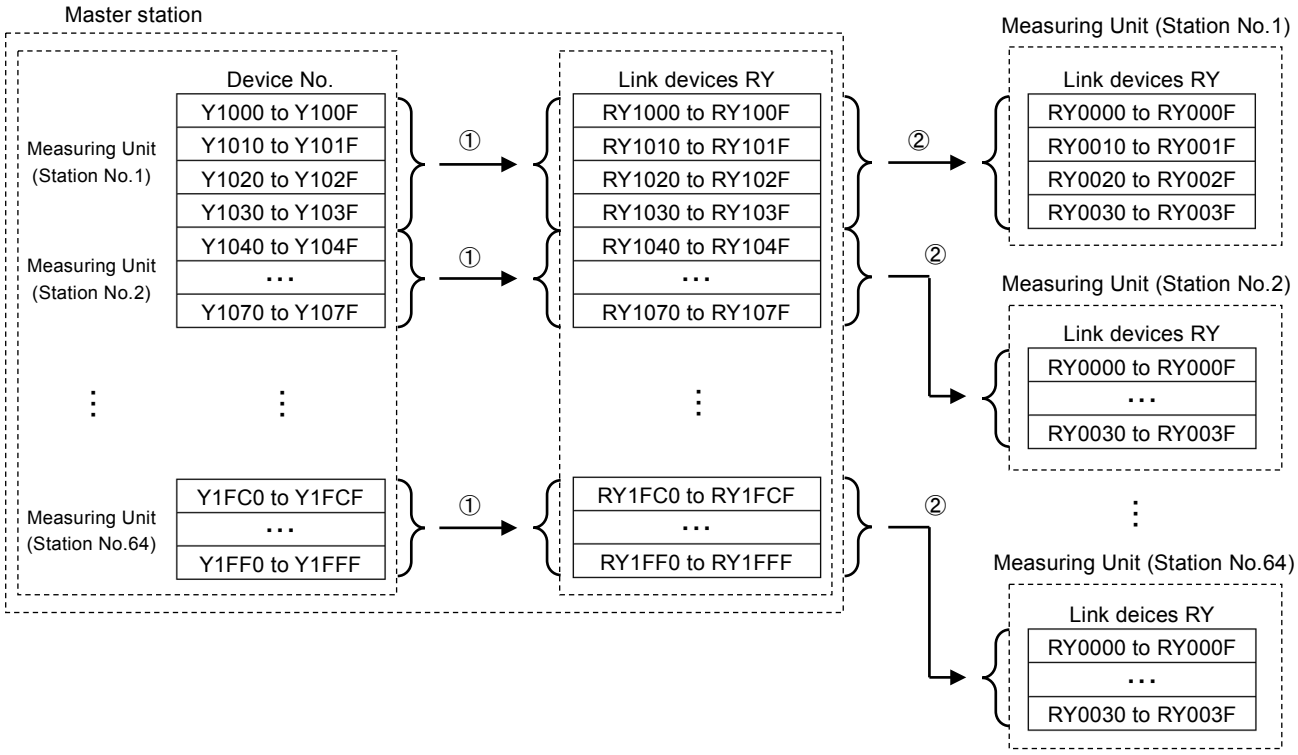
5.4.1. RY allocation

(1)Relationships between programmable controller CPU and link devices (RY) of the measuring unit.

① ON/OFF information of the device of the master station set by refresh setting(Refer to [4.2.3]) is stored into the buffer memory “link devices(RY)”.

② “Link devices(RY)” of the measuring unit is automatically (per link scanning) changed as ON/OFF depending on the output state stored into the “link devices(RY)” of the master station.

* Device No. is determined by setting “Y1000” to the link device in refresh setting (Refer to [4.2.3])
Device No. of respective stations are shown as below.



◆List of device No. when setting “Y1000” to the link device:

Station No.	Device No. RYn0 to RY(n+3)F	Station No.	Device No. RYn0 to RY(n+3)F	Station No.	Device No. RYn0 to RY(n+3)F	Station No.	Device No. RYn0 to RY(n+3)F
1	Y1000 to Y103F	17	Y1400 to Y143F	33	Y1800 to Y183F	49	Y1C00 to Y1C3F
2	Y1040 to Y107F	18	Y1440 to Y147F	34	Y1840 to Y187F	50	Y1C40 to Y1C7F
3	Y1080 to Y10BF	19	Y1480 to Y14BF	35	Y1880 to Y18BF	51	Y1C80 to Y1CBF
4	Y10C0 to Y10FF	20	Y14C0 to Y14FF	36	Y18C0 to Y18FF	52	Y1CC0 to Y1CFF
5	Y1100 to Y113F	21	Y1500 to Y153F	37	Y1900 to Y193F	53	Y1D00 to Y1D3F
6	Y1140 to Y117F	22	Y1540 to Y157F	38	Y1940 to Y197F	54	Y1D40 to Y1D7F
7	Y1180 to Y11BF	23	Y1580 to Y15BF	39	Y1980 to Y19BF	55	Y1D80 to Y1DBF
8	Y11C0 to Y11FF	24	Y15C0 to Y15FF	40	Y19C0 to Y19FF	56	Y1DC0 to Y1DFF
9	Y1200 to Y123F	25	Y1600 to Y163F	41	Y1A00 to Y1A3F	57	Y1E00 to Y1E3F
10	Y1240 to Y127F	26	Y1640 to Y167F	42	Y1A40 to Y1A7F	58	Y1E40 to Y1E7F
11	Y1280 to Y12BF	27	Y1680 to Y16BF	43	Y1A80 to Y1ABF	59	Y1E80 to Y1EBF
12	Y12C0 to Y12FF	28	Y16C0 to Y16FF	44	Y1AC0 to Y1AFF	60	Y1EC0 to Y1EFF
13	Y1300 to Y133F	29	Y1700 to Y173F	45	Y1B00 to Y1B3F	61	Y1F00 to Y1F3F
14	Y1340 to Y137F	30	Y1740 to Y177F	46	Y1B40 to Y1B7F	62	Y1F40 to Y1F7F
15	Y1380 to Y13BF	31	Y1780 to Y17BF	47	Y1B80 to Y1BBF	63	Y1F80 to Y1FBF
16	Y13C0 to Y13FF	32	Y17C0 to Y17FF	48	Y1BC0 to Y1BFF	64	Y1FC0 to Y1FFF

(2)List of RY allocation

RY allocation of the measuring unit is listed as below. RY is bit device for sending data to the measuring unit by programming.

◆EcoMonitorLight

Device No.	Signal name	Description		EMU4-BD1-MB	EMU4-HD1-MB	EMU4-FD1-MB	Note
		OFF(0)	ON(1)				
RYn0	Monitor pattern P00 setting completion flag	Not setting	Setting	○	○	○	
RYn1 to RYn7	Unusable	–	–	–	–	–	
RYn8	Monitor pattern P08 setting flag	Not setting	Setting	○	○	○	
RYn9	Monitor pattern P09 setting flag	Not setting	Setting	○	○	○	
RYnA	Monitor pattern P10 setting flag	Not setting	Setting	–	○	○	Note 1
RYnB	Monitor pattern P11 setting flag	Not setting	Setting	○	○	○	
RYnC	Monitor pattern P12 setting flag	Not setting	Setting	–	○	○	Note 1
RYnD	Monitor pattern P13 setting flag	Not setting	Setting	–	–	–	
RYnE to RY(n+3)F	Unusable	–	–	–	–	–	

Start RYn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

◆EcoMonitorPlus

Circuit 1(Model: EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB)

Device No.	Signal name	Description		EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	Note	Circuit No.
		OFF(0)	ON(1)					
RYn0	Monitor pattern P00 setting flag	Not setting	Setting	○	○	○		Circuit 1
RYn1 to RYn7	Unusable	–	–	–	–	–		
RYn8	Monitor pattern P08 setting flag	Not setting	Setting	○	○	–		
RYn9	Monitor pattern P09 setting flag	Not setting	Setting	○	○	–		
RYnA	Monitor pattern P10 setting flag	Not setting	Setting	–	○	–	Note 1	
RYnB	Monitor pattern setting flag P11	Not setting	Setting	○	○	–		
RYnC	Monitor pattern P12 setting flag	Not setting	Setting	–	○	–	Note 1	
RYnD	Monitor pattern P13 setting flag	Not setting	Setting	–	–	○		
RYnE	Unusable	–	–	–	–	–		
RYnF	Unusable	–	–	–	–	–		

Start RYn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

Circuit 2 and later (Model：EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PX4) (1/2)

Device No.	Signal name	Description		EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Note	Circuit No.
		OFF(0)	ON(1)				
RY(n+1)0	Monitor pattern P16 setting flag	Not setting	Setting	○	–		Circuit 2
RY(n+1)1	Monitor pattern P17 setting flag	Not setting	Setting	○	–		
RY(n+1)2	Monitor pattern P18 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+1)3	Monitor pattern P19 setting flag	Not setting	Setting	○	–		
RY(n+1)4	Monitor pattern P20 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+1)5	Monitor pattern P21 setting flag	Not setting	Setting	–	○		
RY(n+1)6	Unusable	–	–	–	–		
RY(n+1)7	Unusable	–	–	–	–		
RY(n+1)8	Monitor pattern P24 setting flag	Not setting	Setting	○	–		Circuit 3
RY(n+1)9	Monitor pattern P25 setting flag	Not setting	Setting	○	–		
RY(n+1)A	Monitor pattern P26 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+1)B	Monitor pattern P27 setting flag	Not setting	Setting	○	–		
RY(n+1)C	Monitor pattern P28 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+1)D	Monitor pattern P29 setting flag	Not setting	Setting	–	○		
RY(n+1)E	Unusable	–	–	–	–		
RY(n+1)F	Unusable	–	–	–	–		
RY(n+2)0	Monitor pattern P32 setting flag	Not setting	Setting	○	–		Circuit 4
RY(n+2)1	Monitor pattern P33 setting flag	Not setting	Setting	○	–		
RY(n+2)2	Monitor pattern P34 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+2)3	Monitor pattern P35 setting flag	Not setting	Setting	○	–		
RY(n+2)4	Monitor pattern P36 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+2)5	Monitor pattern P37 setting flag	Not setting	Setting	–	○		
RY(n+2)6	Unusable	–	–	–	–		
RY(n+2)7	Unusable	–	–	–	–		

Start RYn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

Circuit 2 and later (Model：EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PX4) (2/2)

Device No.	Signal name	Description		EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Note	Circuit No.
		OFF(0)	ON(1)				
RY(n+2)8	Monitor pattern P40 setting flag	Not setting	Setting	○	–		Circuit 5
RY(n+2)9	Monitor pattern P41 setting flag	Not setting	Setting	○	–		
RY(n+2)A	Monitor pattern P42 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+2)B	Monitor pattern P43 setting flag	Not setting	Setting	○	–		
RY(n+2)C	Monitor pattern P44 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+2)D	Monitor pattern P45 setting flag	Not setting	Setting	–	○		
RY(n+2)E	Unusable	–	–	–	–		
RY(n+2)F	Unusable	–	–	–	–		
RY(n+3)0	Monitor pattern P48 setting flag	Not setting	Setting	○	–		Circuit 6
RY(n+3)1	Monitor pattern P49 setting flag	Not setting	Setting	○	–		
RY(n+3)2	Monitor pattern P50 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+3)3	Monitor pattern P51 setting flag	Not setting	Setting	○	–		
RY(n+3)4	Monitor pattern P52 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+3)5	Monitor pattern P53 setting flag	Not setting	Setting	–	○		
RY(n+3)6	Unusable	–	–	–	–		
RY(n+3)7	Unusable	–	–	–	–		
RY(n+3)8	Monitor pattern P56 setting flag	Not setting	Setting	○	–		Circuit 7
RY(n+3)9	Monitor pattern P57 setting flag	Not setting	Setting	○	–		
RY(n+3)A	Monitor pattern P58 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+3)B	Monitor pattern P59 setting flag	Not setting	Setting	○	–		
RY(n+3)C	Monitor pattern P60 setting flag	Not setting	Setting	○	–	Note 1	
RY(n+3)D	Monitor pattern P61 setting flag	Not setting	Setting	–	○		
RY(n+3)E	Unusable	–	–	–	–		
RY(n+3)F	Unusable	–	–	–	–		

Start RYn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

5.4.2. RX allocation

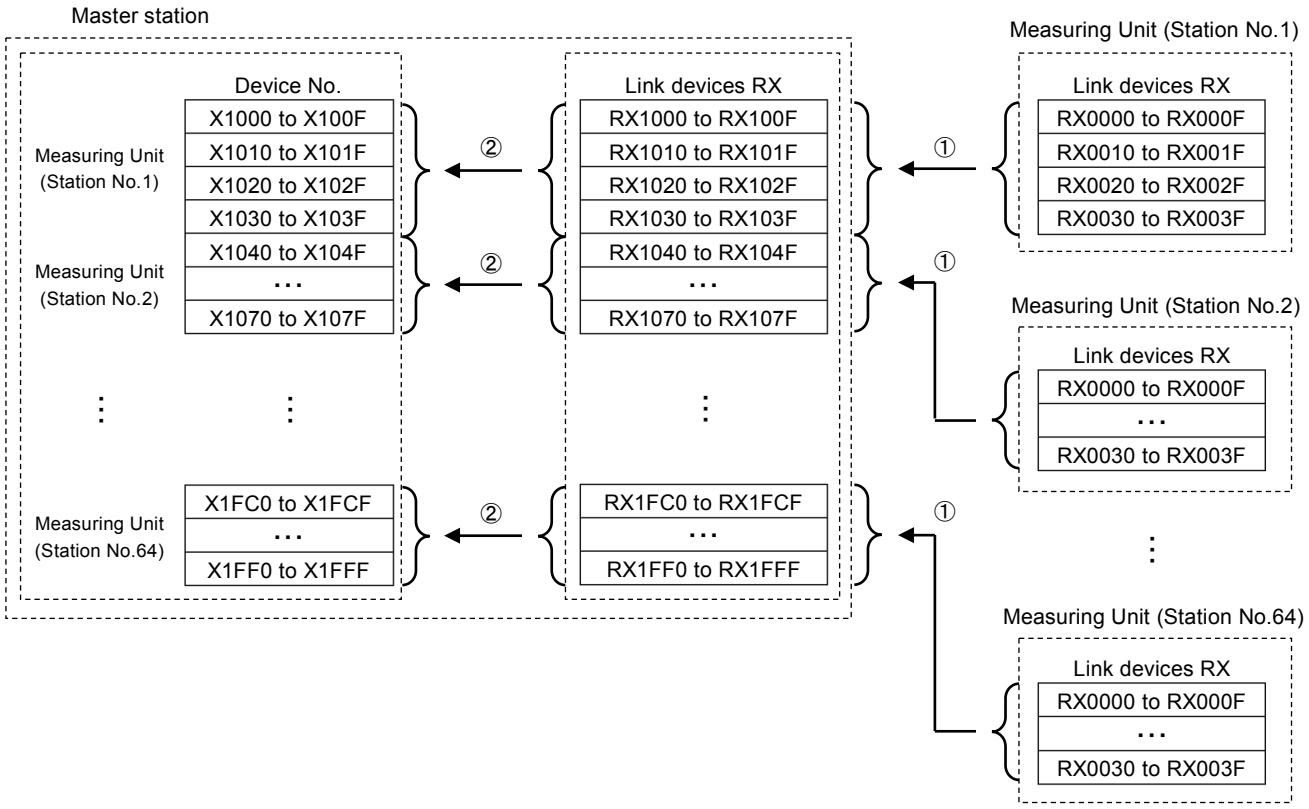
(1) Relationships between programmable controller CPU and link devices (RX) of the measuring unit.

① Link device RX of the measuring unit is automatically (per link scanning) stored into the buffer memory “link devices(RX)” of the master station.

② Input state stored into the buffer memory “link device(RX)” of the master station is stored into the device set by refresh setting(Refer to [4.2.3]).

* Device No. is determined by setting “X1000” to the link device in setting network parameter of the master station.

Device No. of respective stations are shown as below.



◆List of device No. when setting “X1000” to the link device:

Station No.	Device No. RXn0 to RX(n+3)F	Station No.	Device No. RXn0 to RX(n+3)F	Station No.	Device No. RXn0 to RX(n+3)F	Station No.	Device No. RXn0 to RX(n+3)F
1	X1000 to X103F	17	X1400 to X143F	33	X1800 to X183F	49	X1C00 to X1C3F
2	X1040 to X107F	18	X1440 to X147F	34	X1840 to X187F	50	X1C40 to X1C7F
3	X1080 to X10BF	19	X1480 to X14BF	35	X1880 to X18BF	51	X1C80 to X1CBF
4	X10C0 to X10FF	20	X14C0 to X14FF	36	X18C0 to X18FF	52	X1CC0 to X1CFF
5	X1100 to X113F	21	X1500 to X153F	37	X1900 to X193F	53	X1D00 to X1D3F
6	X1140 to X117F	22	X1540 to X157F	38	X1940 to X197F	54	X1D40 to X1D7F
7	X1180 to X11BF	23	X1580 to X15BF	39	X1980 to X19BF	55	X1D80 to X1DBF
8	X11C0 to X11FF	24	X15C0 to X15FF	40	X19C0 to X19FF	56	X1DC0 to X1DFF
9	X1200 to X123F	25	X1600 to X163F	41	X1A00 to X1A3F	57	X1E00 to X1E3F
10	X1240 to X127F	26	X1640 to X167F	42	X1A40 to X1A7F	58	X1E40 to X1E7F
11	X1280 to X12BF	27	X1680 to X16BF	43	X1A80 to X1ABF	59	X1E80 to X1EBF
12	X12C0 to X12FF	28	X16C0 to X16FF	44	X1AC0 to X1AFF	60	X1EC0 to X1EFF
13	X1300 to X133F	29	X1700 to X173F	45	X1B00 to X1B3F	61	X1F00 to X1F3F
14	X1340 to X137F	30	X1740 to X177F	46	X1B40 to X1B7F	62	X1F40 to X1F7F
15	X1380 to X13BF	31	X1780 to X17BF	47	X1B80 to X1BBF	63	X1F80 to X1FBF
16	X13C0 to X13FF	32	X17C0 to X17FF	48	X1BC0 to X1BFF	64	X1FC0 to X1FFF

(2)List of RX allocation

RX allocation of the measuring unit is listed as below. RX is bit device for storing input state of the measuring unit.

◆EcoMonitorLight

Device No.	Signal name	Description		EMU4-BD1-MB	EMU4-HD1-MB	EMU4-FD1-MB	Note
		OFF(0)	ON(1)				
RXn0	Monitor pattern P00 setting completion flag	Not receiving	Receiving	○	○	○	
RXn1 to RXn7	Unusable	–	–	–	–	–	
RXn8	Monitor pattern P08 setting completion flag	Not receiving	Receiving	○	○	○	
RXn9	Monitor pattern P09 setting completion flag	Not receiving	Receiving	○	○	○	
RXnA	Monitor pattern P10 setting completion flag	Not receiving	Receiving	–	○	○	Note 1
RXnB	Monitor pattern P11 setting completion flag	Not receiving	Receiving	○	○	○	
RXnC	Monitor pattern P12 setting completion flag	Not receiving	Receiving	–	○	○	Note 1
RXnD	Monitor pattern P13 setting completion flag	Not receiving	Receiving	–	–	–	
RXnE to RX(n+3)F	Unusable	–	–	–	–	–	

Start RXn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

◆EcoMonitorPlus

Circuit 1 (Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB)

Device No.	Signal name	Description		EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	Note	Circuit No.
		OFF(0)	ON(1)					
RXn0	Monitor pattern P00 setting completion flag	Not receiving	Receiving	○	○	○		Circuit 1
RXn1 to RXn7	Unusable	–	–	–	–	–		
RXn8	Monitor pattern P08 setting completion flag	Not receiving	Receiving	○	○	–		
RXn9	Monitor pattern P09 setting completion flag	Not receiving	Receiving	○	○	–		
RXnA	Monitor pattern P10 setting completion flag	Not receiving	Receiving	–	○	–	Note 1	
RXnB	Monitor pattern P11 setting completion flag	Not receiving	Receiving	○	○	–		
RXnC	Monitor pattern P12 setting completion flag	Not receiving	Receiving	–	○	–	Note 1	
RXnD	Monitor pattern P13 setting completion flag	Not receiving	Receiving	–	–	○		
RXnE	Unusable	–	–	–	–	–		
RXnF	Unusable	–	–	–	–	–		

Start RXn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

Circuit 2 and later (Model：EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PX4) (1/2)

Device No.	Signal name	Description		EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Note	Circuit No.
		OFF(0)	ON(1)				
RX(n+1)0	Monitor pattern P16 setting completion flag	Not receiving	Receiving	○	—		Circuit 2
RX(n+1)1	Monitor pattern P17 setting completion flag	Not receiving	Receiving	○	—		
RX(n+1)2	Monitor pattern P18 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+1)3	Monitor pattern P19 setting completion flag	Not receiving	Receiving	○	—		
RX(n+1)4	Monitor pattern P20 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+1)5	Monitor pattern P21 setting completion flag	Not receiving	Receiving	—	○		
RX(n+1)6	Unusable	—	—	—	—		
RX(n+1)7	Unusable	—	—	—	—		
RX(n+1)8	Monitor pattern P24 setting completion flag	Not receiving	Receiving	○	—		Circuit 3
RX(n+1)9	Monitor pattern P25 setting completion flag	Not receiving	Receiving	○	—		
RX(n+1)A	Monitor pattern P26 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+1)B	Monitor pattern P27 setting completion flag	Not receiving	Receiving	○	—		
RX(n+1)C	Monitor pattern P28 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+1)D	Monitor pattern P29 setting completion flag	Not receiving	Receiving	—	○		
RX(n+1)E	Unusable	—	—	—	—		
RX(n+1)F	Unusable	—	—	—	—		
RX(n+2)0	Monitor pattern P32 setting completion flag	Not receiving	Receiving	○	—		Circuit 4
RX(n+2)1	Monitor pattern P33 setting completion flag	Not receiving	Receiving	○	—		
RX(n+2)2	Monitor pattern P34 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+2)3	Monitor pattern P35 setting completion flag	Not receiving	Receiving	○	—		
RX(n+2)4	Monitor pattern P36 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+2)5	Monitor pattern P37 setting completion flag	Not receiving	Receiving	—	○		
RX(n+2)6	Unusable	—	—	—	—		
RX(n+2)7	Unusable	—	—	—	—		

Start RXn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

Circuit 2 and later (Model：EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PX4) (2/2)

Device No.	Signal name	Description		EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Note	Circuit No.
		OFF(0)	ON(1)				
RX(n+2)8	Monitor pattern P40 setting completion flag	Not receiving	Receiving	○	—		Circuit 5
RX(n+2)9	Monitor pattern P41 setting completion flag	Not receiving	Receiving	○	—		
RX(n+2)A	Monitor pattern P42 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+2)B	Monitor pattern P43 setting completion flag	Not receiving	Receiving	○	—		
RX(n+2)C	Monitor pattern P44 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+2)D	Monitor pattern P45 setting completion flag	Not receiving	Receiving	—	○		
RX(n+2)E	Unusable	—	—	—	—		
RX(n+2)F	Unusable	—	—	—	—		
RX(n+3)0	Monitor pattern P48 setting completion flag	Not receiving	Receiving	○	—		Circuit 6
RX(n+3)1	Monitor pattern P49 setting completion flag	Not receiving	Receiving	○	—		
RX(n+3)2	Monitor pattern P50 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+3)3	Monitor pattern P51 setting completion flag	Not receiving	Receiving	○	—		
RX(n+3)4	Monitor pattern P52 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+3)5	Monitor pattern P53 setting completion flag	Not receiving	Receiving	—	○		
RX(n+3)6	Unusable	—	—	—	—		
RX(n+3)7	Unusable	—	—	—	—		
RX(n+3)8	Monitor pattern P56 setting completion flag	Not receiving	Receiving	○	—		Circuit 7
RX(n+3)9	Monitor pattern P57 setting completion flag	Not receiving	Receiving	○	—		
RX(n+3)A	Monitor pattern P58 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+3)B	Monitor pattern P59 setting completion flag	Not receiving	Receiving	○	—		
RX(n+3)C	Monitor pattern P60 setting completion flag	Not receiving	Receiving	○	—	Note 1	
RX(n+3)D	Monitor pattern P61 setting completion flag	Not receiving	Receiving	—	○		
RX(n+3)E	Unusable	—	—	—	—		
RX(n+3)F	Unusable	—	—	—	—		

Start RXn0 is determined by the station No. of the slave station and setting of CC-Link IEF Basic.

Note 1: it is valid only when phase wire system is 3P4W.

5.5. Allocation of link devices(RWr, RWw)

Link devices (RWr, RWw) are used for communicating word data between master station and measuring unit.
Link devices (RWr, RWw) of the measuring unit is 32 words per each.
As to communication method and link devices (RWr, RWw) are listed as below.

Communication method	Link devices	
	RWr	RWw
Monitor pattern	Store measuring values	(Not use)
Command (Obtain measuring data)	Store measuring values	Input commands
Command(Setting a set-up value)	Store measuring result	Input commands

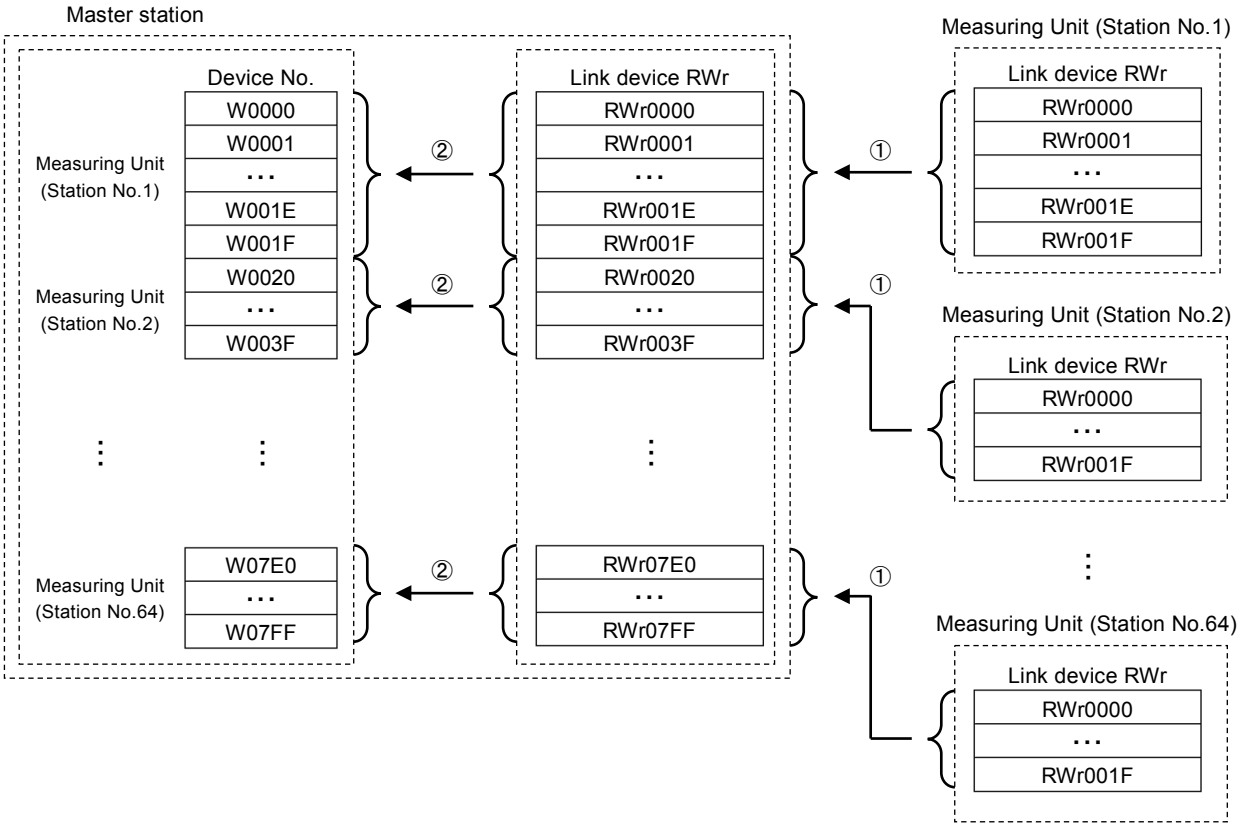
(1) Relationships between programmable controller CPU and link devices (RWr) of the measuring unit.

① Link device RX of the measuring unit is automatically (per link scan)stored into the buffer memory “link devices(RWr)” of the master station.

② Data of the link device RWr of the measuring unit stored into the buffer memory “link device RWr” of the master station is stored into the device set by refresh setting(Refer to [4.2.3]).

* Device No. is determined by setting “W0000” to the link device in setting network parameter of the master station.

Device No. of respective stations are shown as below.



◆List of device No. when setting “W0000” to the link device:

Station No.	Device No.	Station No.	Device No.	Station No.	Device No.	Station No.	Device No.
1	W0000 to W001F	17	W0200 to W021F	33	W0400 to W041F	49	W0600 to W061F
2	W0020 to W003F	18	W0220 to W023F	34	W0420 to W043F	50	W0620 to W063F
3	W0040 to W005F	19	W0240 to W025F	35	W0440 to W045F	51	W0640 to W065F
4	W0060 to W007F	20	W0260 to W027F	36	W0460 to W047F	52	W0660 to W067F
5	W0080 to W009F	21	W0280 to W029F	37	W0480 to W049F	53	W0680 to W069F
6	W00A0 to W00BF	22	W02A0 to W02BF	38	W04A0 to W04BF	54	W06A0 to W06BF
7	W00C0 to W00DF	23	W02C0 to W02DF	39	W04C0 to W04DF	55	W06C0 to W06DF
8	W00E0 to W00FF	24	W02E0 to W02FF	40	W04E0 to W04FF	56	W06E0 to W06FF
9	W0100 to W011F	25	W0300 to W031F	41	W0500 to W051F	57	W0700 to W071F
10	W0120 to W023F	26	W0320 to W033F	42	W0520 to W053F	58	W0720 to W073F
11	W0140 to W015F	27	W0340 to W035F	43	W0540 to W055F	59	W0740 to W075F
12	W0160 to W017F	28	W0360 to W037F	44	W0560 to W057F	60	W0760 to W077F
13	W0180 to W019F	29	W0380 to W039F	45	W0580 to W059F	61	W0780 to W079F
14	W01A0 to W01BF	30	W03A0 to W03BF	46	W05A0 to W05BF	62	W07A0 to W07BF
15	W01C0 to W01DF	31	W03C0 to W03DF	47	W05C0 to W05DF	63	W07C0 to W07DF
16	W01E0 to W01FF	32	W03E0 to W03FF	48	W05E0 to W05FF	64	W07E0 to W07FF

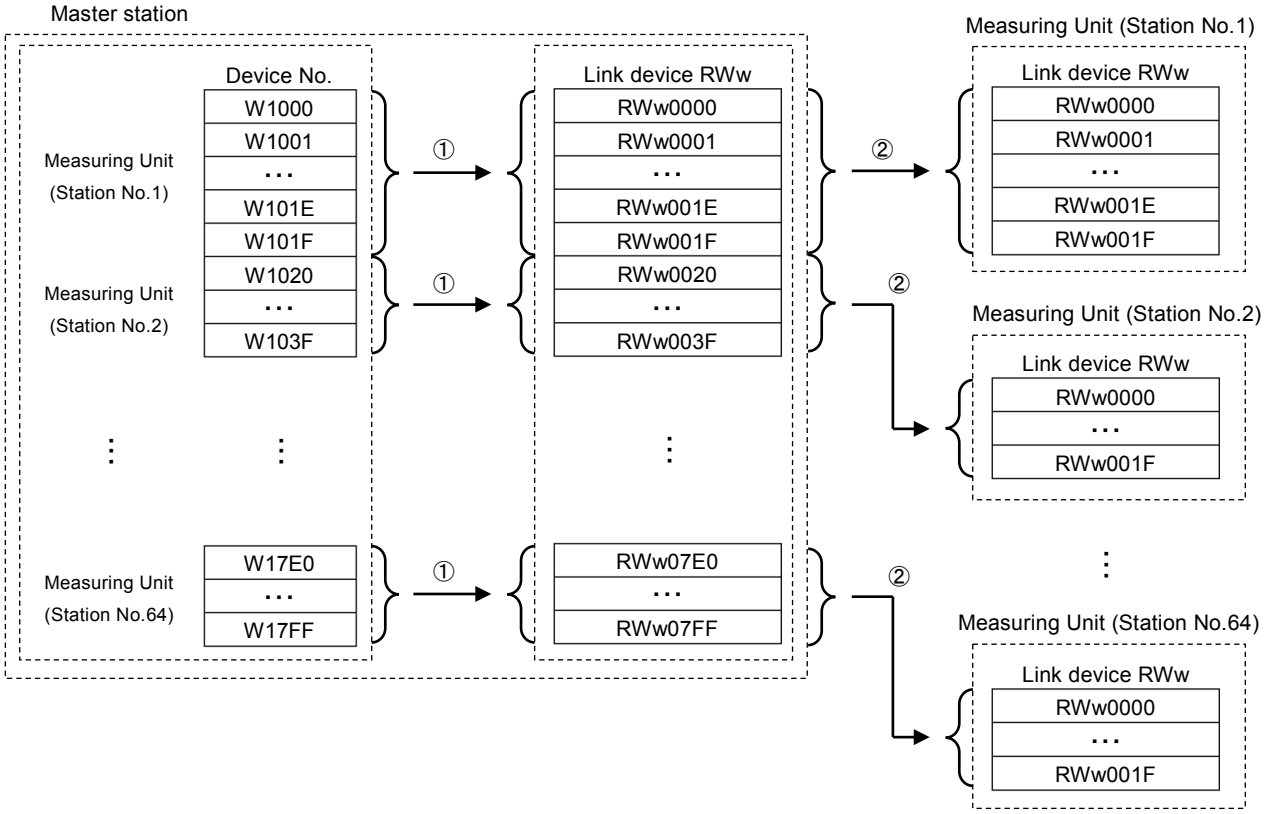
(2) Relationships between programmable controller CPU and link devices (RWw) of the measuring unit.

① Transmission data of the master station device set by refresh setting(Refer to [4.2.3]) is stored into the buffer memory “link devices(RWr)”.

② Data stored into the buffer memory “link device RWw” of the master station is automatically(per link scan) sent to the “link device RWw” of the measuring unit.

* Device No. is determined by setting “W1000” to the link device in setting network parameter of the master station.

Device No. of respective stations are shown as below.



◆List of device No. when setting “W1000” to the link device:

Station No.	Device No.	Station No.	Device No.	Station No.	Device No.	Station No.	Device No.
1	W1000 to W101F	17	W1200 to W121F	33	W1400 to W141F	49	W1600 to W161F
2	W1020 to W103F	18	W1220 to W123F	34	W1420 to W143F	50	W1620 to W163F
3	W1040 to W105F	19	W1240 to W125F	35	W1440 to W145F	51	W1640 to W165F
4	W1060 to W107F	20	W1260 to W127F	36	W1460 to W147F	52	W1660 to W167F
5	W1080 to W109F	21	W1280 to W129F	37	W1480 to W149F	53	W1680 to W169F
6	W10A0 to W10BF	22	W12A0 to W12BF	38	W14A0 to W14BF	54	W16A0 to W16BF
7	W10C0 to W10DF	23	W12C0 to W12DF	39	W14C0 to W14DF	55	W16C0 to W16DF
8	W10E0 to W10FF	24	W12E0 to W12FF	40	W14E0 to W14FF	56	W16E0 to W16FF
9	W1100 to W111F	25	W1300 to W131F	41	W1500 to W151F	57	W1700 to W171F
10	W1120 to W123F	26	W1320 to W133F	42	W1520 to W153F	58	W1720 to W173F
11	W1140 to W115F	27	W1340 to W135F	43	W1540 to W155F	59	W1740 to W175F
12	W1160 to W117F	28	W1360 to W137F	44	W1560 to W157F	60	W1760 to W177F
13	W1180 to W119F	29	W1380 to W139F	45	W1580 to W159F	61	W1780 to W179F
14	W11A0 to W11BF	30	W13A0 to W13BF	46	W15A0 to W15BF	62	W17A0 to W17BF
15	W11C0 to W11DF	31	W13C0 to W13DF	47	W15C0 to W15DF	63	W17C0 to W17DF
16	W11E0 to W11FF	32	W13E0 to W13FF	48	W15E0 to W15FF	64	W17E0 to W17FF

5.5.1. Monitor pattern details

RWr is used for updating word data between master station and measuring unit.
Measured value of the pattern defined by fixed RY is stored into RWr.

◆EcoMonitorLight
(Model：EMU4-BD1-MB, EMU4-HD1-MB, EMU4-FD1-MB)

Pattern	P08	P09	P10	P11	P12
Device No.	RYn8	RYn9	RYnA	RYnB	RYnC
RWr00	Phase 1 current (Inst.)[A]	Phase 1 current demand (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]
RWr01					
RWr02				Phase 2 current (Inst.)[A]	Phase N current demand (Inst.)[A]
RWr03					
RWr04	Phase 2 current (Inst.)[A]	Phase 2 current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 3 current (Inst.)[A]	1-N Voltage (Inst.)[V]
RWr05					
RWr06				Phase 1 current demand (Inst.)[A]	2-N Voltage (Inst.)[V]
RWr07					
RWr08	Phase 3 current (Inst.)[A]	Phase 3 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 2 current demand (Inst.)[A]	3-N Voltage (Inst.)[V]
RWr09					
RWr0A				Phase 3 current demand (Inst.)[A]	Average current (Inst.)[A]
RWr0B					
RWr0C	1-2 Voltage (Inst.)[V]	Total active power demand (Inst.)[kW]	2-N Voltage (Inst.)[V]	1-2 Voltage (Inst.)[V]	Average voltage (Inst.) [V]
RWr0D					
RWr0E				2-3 Voltage (Inst.)[V]	00H (No items)
RWr0F					
RWr10	2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	3-N Voltage (Inst.)[V]	3-1 Voltage (Inst.)[V]	00H (No items)
RWr11					
RWr12				Total active power (Inst.)[kW]	00H (No items)
RWr13					
RWr14	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	00h (No items)	Total active power demand (Inst.)[kW]	00H (No items)
RWr15					
RWr16				Total reactive power (Inst.)[kvar]	00H (No items)
RWr17					
RWr18	Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	Total power factor (Inst.)[%]	00H (No items)
RWr19					
RWr1A				Frequency (Inst.)[Hz]	00H (No items)
RWr1B					
RWr1C	Active energy(import) [kWh]	Reactive energy (import lag) [kvarh]	00h (No items)	Active energy(import) [kWh]	00H (No items)
RWr1D					
RWr1E				Reactive energy (import lag)[kvarh]	00H (No items)
RWr1F					
Group format	①	①	①	②	②

◆EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB)

Pattern	P08	P09	P10	P11	P12
Device No.	RYn8	RYn9	RYnA	RYnB	RYnC
RWr00	Phase 1 current (Inst.)[A]	Phase 1 current demand (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]
RWr01					
RWr02				Phase 2 current (Inst.)[A]	Phase N current demand (Inst.)[A]
RWr03					
RWr04	Phase 2 current (Inst.)[A]	Phase 2 current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 3 current (Inst.)[A]	1-N Voltage (Inst.)[V]
RWr05					
RWr06				Phase 1 current demand (Inst.)[A]	2-N Voltage (Inst.)[V]
RWr07					
RWr08	Phase 3 current (Inst.)[A]	Phase 3 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 2 current demand (Inst.)[A]	3-N Voltage (Inst.)[V]
RWr09					
RWr0A				Phase 3 current demand (Inst.)[A]	Average current (Inst.)[A]
RWr0B					
RWr0C	1-2 Voltage (Inst.)[V]	Total active power demand (Inst.)[kW]	2-N Voltage (Inst.)[V]	1-2 Voltage (Inst.)[V]	Average voltage (Inst.)[V]
RWr0D					
RWr0E				2-3 Voltage (Inst.)[V]	00H (No items)
RWr0F					
RWr10	2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	3-N Voltage (Inst.)[V]	3-1 Voltage (Inst.)[V]	00H (No items)
RWr11					
RWr12				Total active power (Inst.)[kW]	00H (No items)
RWr13					
RWr14	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	00h (No items)	Total active power demand (Inst.)[kW]	00H (No items)
RWr15					
RWr16				Total reactive power (Inst.)[kvar]	00H (No items)
RWr17					
RWr18	Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	Total power factor (Inst.)[%]	00H (No items)
RWr19					
RWr1A				Frequency (Inst.)[Hz]	00H (No items)
RWr1B					
RWr1C	Active energy(import) [kWh]	Reactive energy (import lag) [kvarh]	00h (No items)	Active energy(import) [kWh]	00H (No items)
RWr1D					
RWr1E				Reactive energy (import lag)[kvarh]	00H (No items)
RWr1F					
Group format	①	①	①	②	②

* Inst.: Instantaneous value

◆EcoMonitorPlus

(Model：EMU4-LG1-MB)

Pattern	P13
Device No.	RYnD
RWr00	Leak current
RWr01	(Inst.)[mA]
RWr02	Leak current demand
RWr03	(Inst.)[mA]
RWr04	Leak current for resistance
RWr05	(Inst.)[mA]
RWr06	Leak current for resistance demand
RWr07	(Inst.)[mA]
RWr08	Leak current for resistance
RWr09	differential conversion value[mA]
RWr0A	00H
RWr0B	(No items)
RWr0C	00H
RWr0D	(No items)
RWr0E	00H
RWr0F	(No items)
RWr10	00H
RWr11	(No items)
RWr12	00H
RWr13	(No items)
RWr14	00H
RWr15	(No items)
RWr16	00H
RWr17	(No items)
RWr18	00H
RWr19	(No items)
RWr1A	00H
RWr1B	(No items)
RWr1C	00H
RWr1D	(No items)
RWr1E	00H
RWr1F	(No items)
Group format	②

◆EcoMonitorPlus

(Model：EMU4-A2, EMU4-VA2)

Circuit 2	P16	RY(n+1)0	P17	RY(n+1)1	P18	RY(n+1)2	P19	RY(n+1)3	P20	RY(n+1)4
Circuit 3	P24	RY(n+1)8	P25	RY(n+1)9	P26	RY(n+1)A	P27	RY(n+1)B	P28	RY(n+1)C
Circuit 4	P32	RY(n+2)0	P33	RY(n+2)1	P34	RY(n+2)2	P35	RY(n+2)3	P36	RY(n+2)4
Circuit 5	P40	RY(n+2)8	P41	RY(n+2)9	P42	RY(n+2)A	P43	RY(n+2)B	P44	RY(n+2)C
Circuit 6	P48	RY(n+3)0	P49	RY(n+3)1	P50	RY(n+3)2	P51	RY(n+2)3	P52	RY(n+3)4
Circuit 7	P56	RY(n+3)8	P57	RY(n+3)9	P58	RY(n+3)A	P59	RY(n+3)B	P60	RY(n+3)C

RWr00	Phase 1 current (Inst.)[A]	Phase 1 current demand (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]
RWr01					
RWr02				Phase 2 current (Inst.)[A]	Phase N current demand (Inst.)[A]
RWr03					
RWr04	Phase 2 current (Inst.)[A]	Phase 2 current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 3 current (Inst.)[A]	1-N Voltage (Inst.)[V]
RWr05					
RWr06				Phase 1 current demand (Inst.)[A]	2-N Voltage (Inst.)[V]
RWr07					
RWr08	Phase 3 current (Inst.)[A]	Phase 3 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 2 current demand (Inst.)[A]	3-N Voltage (Inst.)[V]
RWr09					
RWr0A				Phase 3 current demand (Inst.)[A]	Average current (Inst.)[A]
RWr0B					
RWr0C	1-2 Voltage (Inst.)[V]	Total active power demand (Inst.)[kW]	2-N Voltage (Inst.)[V]	1-2 Voltage (Inst.)[V]	Average voltage (Inst.)[V]
RWr0D					
RWr0E				2-3 Voltage (Inst.)[V]	00H (No items)
RWr0F					
RWr10	2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	3-N Voltage (Inst.)[V]	3-1 Voltage (Inst.)[V]	00H (No items)
RWr11					
RWr12				Total active power (Inst.)[kW]	00H (No items)
RWr13					
RWr14	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	00h (No items)	Total active power demand (Inst.)[kW]	00H (No items)
RWr15					
RWr16				Total reactive power (Inst.)[kvar]	00H (No items)
RWr17					
RWr18	Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	Total power factor (Inst.)[%]	00H (No items)
RWr19					
RWr1A				Frequency (Inst.)[Hz]	00H (No items)
RWr1B					
RWr1C	Active energy(import) [kWh]	Reactive energy (import lag) [kvarh]	00h (No items)	Active energy(import) [kWh]	00H (No items)
RWr1D					
RWr1E				Reactive energy (import lag)[kvarh]	00H (No items)
RWr1F					
Group format	①	①	①	②	②

◆EcoMonitorPlus

(Model：EMU4-AX4)

Circuit 2	P21	RY(n+1)5
Circuit 3	P29	RY(n+1)D
Circuit 4	P37	RY(n+2)5
Circuit 5	P45	RY(n+2)D
Circuit 6	P53	RY(n+3)5
RWr00	AD conversion value(CH1)	
RWr01		
RWr02	AD conversion value(CH2)	
RWr03		
RWr04	AD conversion value(CH3)	
RWr05		
RWr06	AD conversion value(CH4)	
RWr07		
RWr08	Scaling value(CH1)	
RWr09		
RWr0A	Scaling value(CH2)	
RWr0B		
RWr0C	Scaling value(CH3)	
RWr0D		
RWr0E	Scaling value(CH4)	
RWr0F		
RWr10	00H	
RWr11	(No items)	
RWr12	00H	
RWr13	(No items)	
RWr14	00H	
RWr15	(No items)	
RWr16	00H	
RWr17	(No items)	
RWr18	00H	
RWr19	(No items)	
RWr1A	00H	
RWr1B	(No items)	
RWr1C	00H	
RWr1D	(No items)	
RWr1E	00H	
RWr1F	(No items)	
Group format	②	

◆EcoMonitorPlus

(Model：EMU4-PX4)

Circuit 2	P21	RY(n+1)5
Circuit 3	P29	RY(n+1)D
Circuit 4	P37	RY(n+2)5
Circuit 5	P45	RY(n+2)D
Circuit 6	P53	RY(n+3)5
RWr00	Pulse count(CH1)	
RWr01		
RWr02	Pulse count(CH2)	
RWr03		
RWr04	Pulse count(CH3)	
RWr05		
RWr06	Pulse count(CH4)	
RWr07		
RWr08	Pulse conversion value(CH1)	
RWr09		
RWr0A	Pulse conversion value(CH2)	
RWr0B		
RWr0C	Pulse conversion value(CH3)	
RWr0D		
RWr0E	Pulse conversion value(CH4)	
RWr0F		
RWr10	00H (No items)	
RWr11		
RWr12	00H (No items)	
RWr13		
RWr14	00H (No items)	
RWr15		
RWr16	00H (No items)	
RWr17		
RWr18	00H (No items)	
RWr19		
RWr1A	00H (No items)	
RWr1B		
RWr1C	00H (No items)	
RWr1D		
RWr1E	00H (No items)	
RWr1F		
Group format	②	

5.5.2. Data Format of pattern monitor

Data Format：Group format ①

Data Format

Measurement factors		b15 b8	b7 b0
1	RWr00	Channel No.	Group No.
	RWr01	Index number	00H
	RWr02	Low data	Low data
	RWr03	High data	High data
2	RWr04	Channel No.	Group No.
	RWr05	Index number	00H
	RWr06	Low data	Low data
	RWr07	High data	High data
3	RWr08	Channel No.	Group No.
	RWr09	Index number	00H
	RWr0A	Low data	Low data
	RWr0B	High data	High data
4	RWr0C	Channel No.	Group No.
	RWr0D	Index number	00H
	RWr0E	Low data	Low data
	RWr0F	High data	High data
5	RWr10	Channel No.	Group No.
	RWr11	Index number	00H
	RWr12	Low data	Low data
	RWr13	High data	High data
6	RWr14	Channel No.	Group No.
	RWr15	Index number	00H
	RWr16	Low data	Low data
	RWr17	High data	High data
7	RWr18	Channel No.	Group No.
	RWr19	Index number	00H
	RWr1A	Low data	Low data
	RWr1B	High data	High data
8	RWr1C	Channel No.	Group No.
	RWr1D	Index number	00H
	RWr1E	Low data	Low data
	RWr1F	High data	High data

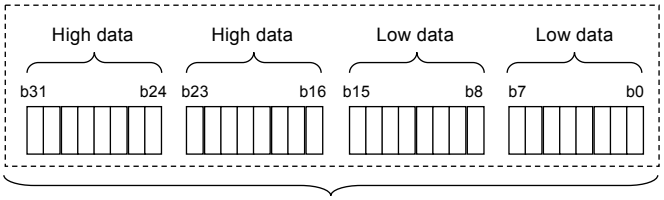
<Channel No., Group No.>
Measuring Unit returns fixed data determined for each measuring items. (About fixed data, refer to 5.5.4)
(Example: When selected phase 1 current (Inst),
Channel No.is 21h, Group No. is 01h.)

<Multiplicand>
Multiplying factor is fixed per each measurement factors according to phase wire system, primary voltage and primary current. (For details, refer to 5.6)

■Correspondence of index number and multiplying factor.

Index number	Multiplying factor	Remarks
04H	$\times 10^{4}$	Actual value = Numerical value ×Multiplying factor
03H	$\times 10^{3}$	
02H	$\times 10^{2}$	
01H	$\times 10$	
00H	$\times 1$	
FFH	$\times 10^{-1}$	
FEH	$\times 10^{-2}$	
FDH	$\times 10^{-3}$	
FCH	$\times 10^{-4}$	
FBH	$\times 10^{-5}$	

< Numerical value >



Numerical value：32-bit integer with a sign
-2147483648 to 2147483647
(80000000H to 7FFFFFFFH)

■Example: Active power

Index number	Data (Numerical value)	Actual value
FFH	000000FFH → 255	255×10^{-1}=25.5[kW]
00H	FFFFFF01H → -255	-255 × 1=-255[kW]

■Example: Power factor

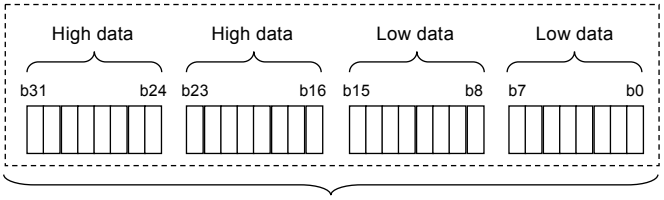
Index number	Data (Numerical value)	Actual value
FFH	000003E3H → 995	995×10^{-1}=99.5[%]
FFH	FFFFFC1DH → -995	-995×10^{-1}=-99.5[%]

Data Format：Group format ②

Data Format

Measurement factors		b15 b8	b7 b0
1	RWr00	Low data	Low data
	RWr01	High data	High data
2	RWr02	Low data	Low data
	RWr03	High data	High data
3	RWr04	Low data	Low data
	RWr05	High data	High data
4	RWr06	Low data	Low data
	RWr07	High data	High data
5	RWr08	Low data	Low data
	RWr09	High data	High data
6	RWr0A	Low data	Low data
	RWr0B	High data	High data
7	RWr0C	Low data	Low data
	RWr0D	High data	High data
8	RWr0E	Low data	Low data
	RWr0F	High data	High data
9	RWr10	Low data	Low data
	RWr11	High data	High data
10	RWr12	Low data	Low data
	RWr13	High data	High data
11	RWr14	Low data	Low data
	RWr15	High data	High data
12	RWr16	Low data	Low data
	RWr17	High data	High data
13	RWr18	Low data	Low data
	RWr19	High data	High data
14	RWr1A	Low data	Low data
	RWr1B	High data	High data
15	RWr1C	Low data	Low data
	RWr1D	High data	High data
16	RWr1E	Low data	Low data
	RWr1F	High data	High data

< Numerical value >



Numerical value：32-bit integer with a sign
-2147483648 to 2147483647
(80000000H to 7FFFFFFFH)

Format of numerical value is same as group format ①.

This format is not containing multiplying factor. Therefore, Confirm the multiplying factor fixed according to phase wire system, primary voltage and primary current by referring to [5.6], and multiply it using sequence program.

■Example: Phase 1 current

・Set-up value of primary current of the measuring unit: 200A

→Multiplying factor from [5.6]= x 10^{-2}

Data(Numerical value)	Actual value
000000FFH → 255	255 × 10^{-2}=2.55[A]

■Example: Active power (import)

・Setting value of the measuring unit

Phase wire system	3P3W
Primary voltage	6600V
Primary current	1200A

Multiplying factor = ×100 according to [7.2.5] Effective Range and multiplying factor.

→Multiplying factor from [5.6] = x 100

Data(Numerical value)	Actual value
0000FFFFH → 65535	65535 × 100=6553500[kWh]

5.5.3. When Monitoring by Command 1H

Up to 8 measuring values can be monitored by setting the unit No., group No. and channel No. to link devices (RWw).
Monitor pattern P00 setting flag (RYn0) is used to send the command.
Refer to [5.3.1] for details

1H	Data Monitor

Link device RWw (Programmable controller → Measuring Unit)

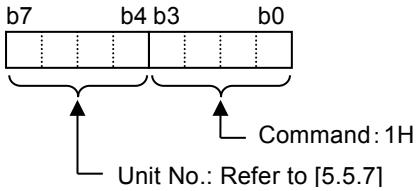
	b15 b8	b7 b0	
RWw00	Group No.	Unit No. / 1H	Item 1
RWw01	00H	Channel No.	
RWw02	00H	00H	
RWw03	00H	00H	
RWw04	Group No.	Unit No. / 1H	Item 2
RWw05	00H	Channel No.	
RWw06	00H	00H	
RWw07	00H	00H	
⋮	⋮		
RWw1C	Group No.	Unit No. / 1H	Item 8
RWw1D	00H	Channel No.	
RWw1E	00H	00H	
RWw1F	00H	00H	

Link device RWw (Measuring Unit → Programmable controller)

	b15 b8	b7 b0	
RWr00	Channel No.	Group No.	Item 1
RWr01	Index number	(Error code)	
RWr02	Low data	Low data	
RWr03	High data	High data	
RWr04	Channel No.	Group No.	Item 2
RWr05	Index number	(Error code)	
RWr06	Low data	Low data	
RWr07	High data	High data	
⋮	⋮		
RWr1C	Channel No.	Group No.	Item 8
RWr1D	Index number	(Error code)	
RWr1E	Low data	Low data	
RWr1F	High data	High data	

* At normal communication, Error code is 00H.
For other error codes, refer to [5.7].

* It is described as 8 bits data by combining the unit No. (high 4 bits) and the command (low 4 bits)



- Data are assigned with Group No and Channel No. (Refer to [5.5.4])
- Store the unused space to 00H when monitoring items are fewer than 8.
- Data format replied from the measuring unit varies according to data to be monitored.
  (Refer to [5.5.4] and [5.5.8])
- Data format and Effective Range of data differ according to the setting value (phase wire system, primary voltage and primary current) of the measuring unit.
  (Refer to Effective Range of data and multiplying factor in [5.6]).
- Measured data differs according to the setting value (phase wire system) of the measuring unit.
  When requiring unheld data, out of channel range error (error code：H42) appears.
- Monitoring is invalid during setting.
  When combining command (2H) used for setting, command abnormal (Error code：40H) error occurs.

5.5.4. Group No., Channel No. of Command 1H(Data monitor)

Below tables show Group No., Channel No. designated upon command communication.

◆EcoMonitorLight (1/3)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BD1-MB			EMU4-HD1-MB				EMU4-FD1-MB				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
F0	02		Model code	–			○	○	○	○	○	○	○	○	○	○	○	⑤
E0	11		Primary current	A			○	○	○	○	○	○	○	○	○	○	○	
E0	12		Primary voltage (L-L)	V			○	○	○	○	○	○	○	○	○	○	○	④
E0	1B		Primary voltage (L-N)	V			–	–	–	–	–	–	○	–	–	–	○	
E0	1C	Set-up	Secondary voltage (L-L/L-N)	V			○	○	○	○	○	○	○	○	○	○	○	
E0	13		Phase wire system	–			○	○	○	○	○	○	○	○	○	○	○	
02	E0		Time constant for DA	sec			○	○	○	○	○	○	○	○	○	○	○	⑤
08	E0		Time constant for DW	sec			○	○	○	○	○	○	○	○	○	○	○	
E0	92		5A/Direct	–			○	○	○	○	○	○	○	○	○	○	○	
01	01		Average current	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
01	21		Phase 1 current	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
01	41		Phase 2 current	A	Inst.		–	○	○	–	○	○	○	–	○	○	○	
01	61		Phase 3 current	A	Inst.		–	○	○	–	○	○	○	–	○	○	○	
01	81		Phase N current	A	Inst.		–	–	–	–	–	–	○	–	–	–	○	
02	21		Phase 1 current demand	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
02	41		Phase 2 current demand	A	Inst.		–	○	○	–	○	○	○	–	○	○	○	
02	61		Phase 3 current demand	A	Inst.		–	○	○	–	○	○	○	–	○	○	○	
02	81		Phase N current demand	A	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	21		1-N voltage	V	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	41		2-N voltage	V	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	61		3-N voltage	V	Inst.		–	–	–	–	–	–	○	–	–	–	○	
05	01		Average L-L voltage	V	Inst.		○	○	○	○	○	○	○	○	○	○	○	
05	21		1-2 voltage	V	Inst.		○	○	○	○	○	○	○	○	○	○	○	
05	41		2-3 voltage	V	Inst.		–	○	○	–	○	○	○	–	○	○	○	
05	61		3-1 voltage	V	Inst.		–	○	○	–	○	○	○	–	○	○	○	
07	01		Active power	kW	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
08	01		Active power demand	kW	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
09	01		Reactive power	kvar	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
0B	01		Apparent power	kVA	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
0D	01		Power factor	%	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
0F	01		Frequency	Hz	Inst.		○	○	○	○	○	○	○	○	○	○	○	
63	21		1-2 harmonic voltage	V	RMS.	Total	–	–	–	○	○	○	–	○	○	○	–	
4D	21		1-2 harmonic voltage	V	RMS.	1st	–	–	–	○	○	○	–	○	○	○	–	
4F	21		1-2 harmonic voltage	V	RMS.	3rd	–	–	–	○	○	○	–	○	○	○	–	
51	21		1-2 harmonic voltage	V	RMS.	5th	–	–	–	○	○	○	–	○	○	○	–	
53	21		1-2 harmonic voltage	V	RMS.	7th	–	–	–	○	○	○	–	○	○	○	–	
55	21		1-2 harmonic voltage	V	RMS.	9th	–	–	–	○	○	○	–	○	○	○	–	
57	21		1-2 harmonic voltage	V	RMS.	11th	–	–	–	○	○	○	–	○	○	○	–	
59	21		1-2 harmonic voltage	V	RMS.	13th	–	–	–	○	○	○	–	○	○	○	–	
5B	21		1-2 harmonic voltage	V	RMS.	15th	–	–	–	–	–	–	–	○	○	○	–	
76	86		1-2 voltage THD	%	Inst.	Total	–	–	–	○	○	○	–	○	○	○	–	
76	73		1-2 voltage harmonic distortion	%	Inst.	3rd	–	–	–	○	○	○	–	○	○	○	–	
76	75		1-2 voltage harmonic distortion	%	Inst.	5th	–	–	–	○	○	○	–	○	○	○	–	
76	77		1-2 voltage harmonic distortion	%	Inst.	7th	–	–	–	○	○	○	–	○	○	○	–	
76	79		1-2 voltage harmonic distortion	%	Inst.	9th	–	–	–	○	○	○	–	○	○	○	–	
76	7B	Measurement	1-2 voltage harmonic distortion	%	Inst.	11th	–	–	–	○	○	○	–	○	○	○	–	①
76	7D		1-2 voltage harmonic distortion	%	Inst.	13th	–	–	–	○	○	○	–	○	○	○	–	
76	7F		1-2 voltage harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	○	○	○	–	
63	41		2-3 harmonic voltage	V	RMS.	Total	–	–	–	–	○	○	–	–	○	○	–	
4D	41		2-3 harmonic voltage	V	RMS.	1st	–	–	–	–	○	○	–	–	○	○	–	
4F	41		2-3 harmonic voltage	V	RMS.	3rd	–	–	–	–	○	○	–	–	○	○	–	
51	41		2-3 harmonic voltage	V	RMS.	5th	–	–	–	–	○	○	–	–	○	○	–	
53	41		2-3 harmonic voltage	V	RMS.	7th	–	–	–	–	○	○	–	–	○	○	–	
55	41		2-3 harmonic voltage	V	RMS.	9th	–	–	–	–	○	○	–	–	○	○	–	
57	41		2-3 harmonic voltage	V	RMS.	11th	–	–	–	–	○	○	–	–	○	○	–	
59	41		2-3 harmonic voltage	V	RMS.	13th	–	–	–	–	○	○	–	–	○	○	–	
5B	41		2-3 harmonic voltage	V	RMS.	15th	–	–	–	–	–	–	–	–	○	○	–	
76	9C		2-3 voltage THD	%	Inst.	Total	–	–	–	–	○	○	–	–	○	○	–	
76	89		2-3 voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	○	○	–	–	○	○	–	
76	8B		2-3 voltage harmonic distortion	%	Inst.	5th	–	–	–	–	○	○	–	–	○	○	–	
76	8D		2-3 voltage harmonic distortion	%	Inst.	7th	–	–	–	–	○	○	–	–	○	○	–	
76	8F		2-3 voltage harmonic distortion	%	Inst.	9th	–	–	–	–	○	○	–	–	○	○	–	
76	91		2-3 voltage harmonic distortion	%	Inst.	11th	–	–	–	–	○	○	–	–	○	○	–	
76	93		2-3 voltage harmonic distortion	%	Inst.	13th	–	–	–	–	○	○	–	–	○	○	–	
76	95		2-3 voltage harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	○	○	–	
4B	21		1-N harmonic voltage	V	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
35	21		1-N harmonic voltage	V	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
37	21		1-N harmonic voltage	V	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
39	21		1-N harmonic voltage	V	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
3B	21		1-N harmonic voltage	V	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
3D	21		1-N harmonic voltage	V	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
3F	21		1-N harmonic voltage	V	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
41	21		1-N harmonic voltage	V	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
43	21		1-N harmonic voltage	V	RMS.	15th	–	–	–	–	–	–	–	–	–	–	○	
77	86		1-N voltage THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
77	73		1-N voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
77	75		1-N voltage harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
77	77		1-N voltage harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
77	79		1-N voltage harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
77	7B		1-N voltage harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
77	7D		1-N voltage harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
77	7F		1-N voltage harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	–	–	○	

* Inst.: Instantaneous value. * RMS.: Root-Mean-Square value.

* THD: Total Harmonics Distortion

◆EcoMonitorLight (2/3)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BD1-MB			EMU4-HD1-MB				EMU4-FD1-MB				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
4B	41		2-N voltage THD	V	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
35	41		2-N voltage harmonic distortion	V	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
37	41		2-N voltage harmonic distortion	V	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
39	41		2-N voltage harmonic distortion	V	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
3B	41		2-N voltage harmonic distortion	V	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
3D	41		2-N voltage harmonic distortion	V	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
3F	41		2-N voltage harmonic distortion	V	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
41	41		2-N voltage harmonic distortion	V	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
43	41		2-N voltage harmonic distortion	V	RMS.	15th	–	–	–	–	–	–	–	–	–	–	○	
77	9C		2-N voltage THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
77	89		2-N voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
77	8B		2-N voltage harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
77	8D		2-N voltage harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
77	8F		2-N voltage harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
77	91		2-N voltage harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
77	93		2-N voltage harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
77	95		2-N voltage harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	–	–	○	
4B	61		3-N harmonic voltage	V	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
35	61		3-N harmonic voltage	V	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
37	61		3-N harmonic voltage	V	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
39	61		3-N harmonic voltage	V	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
3B	61		3-N harmonic voltage	V	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
3D	61		3-N harmonic voltage	V	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
3F	61		3-N harmonic voltage	V	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
41	61		3-N harmonic voltage	V	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
43	61		3-N harmonic voltage	V	RMS.	15th	–	–	–	–	–	–	–	–	–	–	○	
77	B2		3-N voltage THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
77	9F		3-N voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
77	A1		3-N voltage harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
77	A3		3-N voltage harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
77	A5		3-N voltage harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
77	A7		3-N voltage harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
77	A9		3-N voltage harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
77	AB		3-N voltage harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	–	–	○	
33	21		Phase 1 harmonic current	A	RMS.	Total	–	–	–	○	○	○	○	○	○	○	○	
1D	21		Phase 1 harmonic current	A	RMS.	1st	–	–	–	○	○	○	○	○	○	○	○	
1F	21		Phase 1 harmonic current	A	RMS.	3rd	–	–	–	○	○	○	○	○	○	○	○	
21	21		Phase 1 harmonic current	A	RMS.	5th	–	–	–	○	○	○	○	○	○	○	○	
23	21		Phase 1 harmonic current	A	RMS.	7th	–	–	–	○	○	○	○	○	○	○	○	
25	21		Phase 1 harmonic current	A	RMS.	9th	–	–	–	○	○	○	○	○	○	○	○	
27	21		Phase 1 harmonic current	A	RMS.	11th	–	–	–	○	○	○	○	○	○	○	○	
29	21		Phase 1 harmonic current	A	RMS.	13th	–	–	–	○	○	○	○	○	○	○	○	
2B	21	Measurement	Phase 1 harmonic current	A	RMS.	15th	–	–	–	–	–	–	–	○	○	○	○	①
75	86		Phase 1 current THD	%	Inst.	Total	–	–	–	○	○	○	○	○	○	○	○	
75	73		Phase 1 current harmonic distortion	%	Inst.	3rd	–	–	–	○	○	○	○	○	○	○	○	
75	75		Phase 1 current harmonic distortion	%	Inst.	5th	–	–	–	○	○	○	○	○	○	○	○	
75	77		Phase 1 current harmonic distortion	%	Inst.	7th	–	–	–	○	○	○	○	○	○	○	○	
75	79		Phase 1 current harmonic distortion	%	Inst.	9th	–	–	–	○	○	○	○	○	○	○	○	
75	7B		Phase 1 current harmonic distortion	%	Inst.	11th	–	–	–	○	○	○	○	○	○	○	○	
75	7D		Phase 1 current harmonic distortion	%	Inst.	13th	–	–	–	○	○	○	○	○	○	○	○	
75	7F		Phase 1 current harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	○	○	○	○	
33	41		Phase 2 harmonic current	A	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
1D	41		Phase 2 harmonic current	A	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
1F	41		Phase 2 harmonic current	A	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
21	41		Phase 2 harmonic current	A	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
23	41		Phase 2 harmonic current	A	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
25	41		Phase 2 harmonic current	A	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
27	41		Phase 2 harmonic current	A	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
29	41		Phase 2 harmonic current	A	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
2B	41		Phase 2 harmonic current	A	RMS.	15th	–	–	–	–	–	–	–	–	–	–	○	
75	9C		Phase 2 current THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
75	89		Phase 2 current harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
75	8B		Phase 2 current harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
75	8D		Phase 2 current harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
75	8F		Phase 2 current harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
75	91		Phase 2 current harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
75	93		Phase 2 current harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
75	95		Phase 2 current harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	–	–	○	
33	61		Phase 3 harmonic current	A	RMS.	Total	–	–	–	–	○	○	○	–	○	○	○	
1D	61		Phase 3 harmonic current	A	RMS.	1st	–	–	–	–	○	○	○	–	○	○	○	
1F	61		Phase 3 harmonic current	A	RMS.	3rd	–	–	–	–	○	○	○	–	○	○	○	
21	61		Phase 3 harmonic current	A	RMS.	5th	–	–	–	–	○	○	○	–	○	○	○	
23	61		Phase 3 harmonic current	A	RMS.	7th	–	–	–	–	○	○	○	–	○	○	○	
25	61		Phase 3 harmonic current	A	RMS.	9th	–	–	–	–	○	○	○	–	○	○	○	
27	61		Phase 3 harmonic current	A	RMS.	11th	–	–	–	–	○	○	○	–	○	○	○	
29	61		Phase 3 harmonic current	A	RMS.	13th	–	–	–	–	○	○	○	–	○	○	○	
2B	61		Phase 3 harmonic current	A	RMS.	15th	–	–	–	–	–	–	–	–	○	○	○	
75	B2		Phase 3 current THD	%	Inst.	Total	–	–	–	–	○	○	○	–	○	○	○	
75	9F		Phase 3 current harmonic distortion	%	Inst.	3rd	–	–	–	–	○	○	○	–	○	○	○	
75	A1		Phase 3 current harmonic distortion	%	Inst.	5th	–	–	–	–	○	○	○	–	○	○	○	
75	A3		Phase 3 current harmonic distortion	%	Inst.	7th	–	–	–	–	○	○	○	–	○	○	○	
75	A5		Phase 3 current harmonic distortion	%	Inst.	9th	–	–	–	–	○	○	○	–	○	○	○	
75	A7		Phase 3 current harmonic distortion	%	Inst.	11th	–	–	–	–	○	○	○	–	○	○	○	
75	A9		Phase 3 current harmonic distortion	%	Inst.	13th	–	–	–	–	○	○	○	–	○	○	○	
75	AB		Phase 3 current harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	○	○	○	

* Inst.: Instantaneous value. * RMS.: Root-Mean-Square value.

* THD: Total Harmonics Distortion

◆EcoMonitorLight (3/3)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BD1-MB			EMU4-HD1-MB				EMU4-FD1-MB				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
33	81	Measurement	Phase N harmonic current	A	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	①
1D	81		Phase N harmonic current	A	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
1F	81		Phase N harmonic current	A	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
21	81		Phase N harmonic current	A	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
23	81		Phase N harmonic current	A	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
25	81		Phase N harmonic current	A	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
27	81		Phase N harmonic current	A	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
29	81		Phase N harmonic current	A	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
2B	81		Phase N harmonic current	A	RMS.	15th	–	–	–	–	–	–	–	–	–	–	○	
75	C8		Phase N current THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
75	B5		Phase N current harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
75	B7		Phase N current harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
75	B9		Phase N current harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
75	BB		Phase N current harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
75	BD		Phase N current harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
75	BF		Phase N current harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
75	C1		Phase N current harmonic distortion	%	Inst.	15th	–	–	–	–	–	–	–	–	–	–	○	
80	01		Active energy (import)	kWh	count		○	○	○	○	○	○	○	○	○	○	○	②
80	63		Active energy (export)	kWh	count		○	○	○	○	○	○	○	○	○	○	○	
81	01		Reactive energy (import lag)	kvarh	count		○	○	○	○	○	○	○	○	○	○	○	
80	64		Active energy (import)	kWh	count	expand	○	○	○	○	○	○	○	○	○	○	○	
80	65		Active energy (export)	kWh	count	expand	○	○	○	○	○	○	○	○	○	○	○	
81	66		Reactive energy (import lag)	kvarh	count	expand	○	○	○	○	○	○	○	○	○	○	○	
8B	01		Periodic active energy	kWh	count		–	–	–	○	○	○	○	○	○	○	○	
83	01		Pulse count	pulse	count		–	–	–	○	○	○	○	○	○	○	○	⑥
87	01		Operating time	hour	count		○	○	○	○	○	○	○	○	○	○	○	
A0	31	Alarm state	Alarm state monitoring	–	Alarm		–	–	–	○	○	○	○	○	○	○	○	③

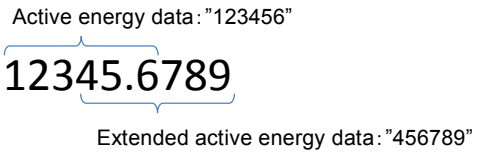
* Inst.: Instantaneous value. * RMS.: Root-Mean-Square value.

* THD: Total Harmonics Distortion

* Extended active energy reply data of three digits lower than active energy data.
  The number of digits of response data is same as that of the active energy data.

・The image of the Extended active energy

Where the measuring unit has "12345.6789" as internal data, calculate measured value by multiplying the multiplying factor to respective values (electric energy value or extended active energy value).



◆EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) (1/4)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BM1-MB			EMU4-HM1-MB				EMU4-A2/EMU4-VA2				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
F0	02	Set-up	Model code	–			○	○	○	○	○	○	○	○	○	○	○	⑤
E0	11		Primary current	A			○	○	○	○	○	○	○	○	○	○	○	④
E0	12		Primary voltage (L-L)	V			○	○	○	○	○	○	○	○	○	○	○	
E0	1B		Primary voltage (L-N)	V			–	–	–	–	–	–	○	–	–	–	○	
E0	1V		Secondary voltage (L-L/L-N)	V			○	○	○	○	○	○	○	○	○	○	○	
E0	13		Phase wire system	–			○	○	○	○	○	○	○	○	○	○	○	⑤
E0	21		Use VT	–			○	–	○	○	–	○	○	○	–	○	○	
02	E0		Time constant for DA	sec			○	○	○	○	○	○	○	○	○	○	○	
02	E7		Time constant for DA(3side)	sec			○	–	–	○	–	–	–	○	–	–	–	
08	E0		Time constant for DW	sec			○	○	○	○	○	○	○	○	○	○	○	
08	E7		Time constant for DW(3side)	sec			○	–	–	○	–	–	–	○	–	–	–	
E0	92		5A/Direct	–			○	○	○	○	○	○	○	○	○	○	○	
E0	97		External input signal setting	–			–	–	–	○	○	○	○	–	–	–	–	
E0	98		Contact input reset mode	–			–	–	–	○	○	○	○	–	–	–	–	
E0	99		External output signal setting	–			–	–	–	○	○	○	○	○	○	○	○	
E0	9A		External output signal target	–			–	–	–	○	–	–	–	○	–	–	–	
83	E6		Unit of pulse output	–			–	–	–	○	○	○	○	○	○	○	○	
87	E2		whether or not measuring operating time	–			○	○	○	○	○	○	○	○	○	○	○	
8E	E2		whether or not measuring operating time	–			○	–	–	○	–	–	–	○	–	–	–	
87	E3		Method of measuring operating time	–			–	–	–	○	○	○	○	–	–	–	–	
8E	E3		Method of measuring Operating time (3side)	–			–	–	–	○	–	–	–	–	–	–	–	
01	E8		Cut-off	%			○	○	○	○	○	○	○	○	○	○	○	①
01	EA		Cut-off(3side)	%			○	–	–	○	–	–	–	○	–	–	–	
83	E4		Pulse conversion rate	–			–	–	–	○	○	○	○	–	–	–	–	
83	E5		Unit of pulse converted	–			–	–	–	○	○	○	○	–	–	–	–	⑤
80	E4		Active energy converted rate	–			–	–	–	○	○	○	○	○	○	○	○	①
8A	E4		Active energy converted rate(3side)	–			–	–	–	○	–	–	–	○	–	–	–	
80	E5		Unit of electric energy converted	–			–	–	–	○	○	○	○	○	○	○	○	⑤
8A	E5		Unit of electric energy converted(3side)	–			–	–	–	○	–	–	–	○	–	–	–	
E0	9C		Alarm	–			○	○	○	○	○	○	○	○	○	○	○	
E0	A6		Alarm(3side)	–			○	–	–	○	–	–	–	○	–	–	–	
E0	9D		Alarm elements	–			○	○	○	○	○	○	○	○	○	○	○	
E0	A7		Alarm elements(3side)	–			○	–	–	○	–	–	–	○	–	–	–	
E0	9E		Alarm value	–			○	○	○	○	○	○	○	○	○	○	○	①
E0	A8		Alarm value(3side)	–			○	–	–	○	–	–	–	○	–	–	–	
E0	9F		Alarm delay time	–			○	○	○	○	○	○	○	○	○	○	○	⑤
E0	A9		Alarm delay time(3side)	–			○	–	–	○	–	–	–	○	–	–	–	
E0	A0		Alarm reset mode	–			○	○	○	○	○	○	○	○	○	○	○	
E0	AA		Alarm reset mode(3side)	–			○	–	–	○	–	–	–	○	–	–	–	
E0	AB		Simple measuring	–			○	○	○	○	○	○	○	○	○	○	○	
E0	AC		Power factor in simple measuring	–			○	○	○	○	○	○	○	○	○	○	○	①
E0	AD		Power factor in simple measuring(3side)	–			○	–	–	○	–	–	–	○	–	–	–	
E0	B1		2 circuits measuring	–			○	–	–	○	–	–	–	○	–	–	–	⑤
01	01	Measurement	Average current	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	①
01	21		Phase 1 current	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
01	41		Phase 2 current	A	Inst.		–	○	○	–	○	○	○	–	○	○	○	
01	61		Phase 3 current	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
01	81		Phase N current	A	Inst.		–	–	–	–	–	–	○	–	–	–	○	
01	1E		Current unbalance rate	%			–	○	○	–	○	○	○	–	○	○	○	
02	21		Phase 1 current demand	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
02	41		Phase 2 current demand	A	Inst.		–	○	○	–	○	○	○	–	○	○	○	
02	61		Phase 3 current demand	A	Inst.		○	○	○	○	○	○	○	○	○	○	○	
02	81		Phase N current demand	A	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	21		1-N voltage	V	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	41		2-N voltage	V	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	61		3-N voltage	V	Inst.		–	–	–	–	–	–	○	–	–	–	○	
03	1E		Voltage unbalance rate	%			–	○	○	–	○	○	○	–	○	○	○	
05	01		Average L-L voltage	V	Inst.		○	○	○	○	○	○	○	○	○	○	○	
05	21		1-2 voltage	V	Inst.		○	○	○	○	○	○	○	○	○	○	○	
05	41		2-3 voltage	V	Inst.		○	○	○	○	○	○	○	○	○	○	○	
05	61		3-1 voltage	V	Inst.		–	○	○	–	○	○	○	–	○	○	○	
07	01		Active power	kW	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
07	61		Active power(3side)	kW	Inst	Total	○	–	–	○	–	–	–	○	–	–	–	
08	01		Active power demand	kW	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
08	61		Active power demand(3side)	kW			○	–	–	○	–	–	–	○	–	–	–	
09	01		Reactive power	kvar	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
09	61		Reactive power(3side)	kvar			○	–	–	○	–	–	–	○	–	–	–	
0B	01		Apparent power	kVA	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
0D	01		Power factor	%	Inst.	Total	○	○	○	○	○	○	○	○	○	○	○	
0D	61		Power factor(3side)	%			○	–	–	○	–	–	–	○	–	–	–	
0F	01		Frequency	Hz	Inst.		○	○	○	○	○	○	○	○	○	○	○	

* Inst.: Instantaneous value.　　* RMS.: Root-Mean-Square value.

* THD: Total Harmonics Distortion

◆EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) (2/4)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BM1-MB			EMU4-HM1-MB				EMU4-A2/EMU4-VA2				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
63	21		1-2 harmonic voltage	V	RMS.	Total	–	–	–	○	○	○	–	○	○	○	–	
4D	21		1-2 harmonic voltage	V	RMS.	1st	–	–	–	○	○	○	–	○	○	○	–	
4F	21		1-2 harmonic voltage	V	RMS.	3rd	–	–	–	○	○	○	–	○	○	○	–	
51	21		1-2 harmonic voltage	V	RMS.	5th	–	–	–	○	○	○	–	○	○	○	–	
53	21		1-2 harmonic voltage	V	RMS.	7th	–	–	–	○	○	○	–	○	○	○	–	
55	21		1-2 harmonic voltage	V	RMS.	9th	–	–	–	○	○	○	–	○	○	○	–	
57	21		1-2 harmonic voltage	V	RMS.	11th	–	–	–	○	○	○	–	○	○	○	–	
59	21		1-2 harmonic voltage	V	RMS.	13th	–	–	–	○	○	○	–	○	○	○	–	
76	86		1-2 voltage THD	%	Inst.	Total	–	–	–	○	○	○	–	○	○	○	–	
76	73		1-2 voltage harmonic distortion	%	Inst.	3rd	–	–	–	○	○	○	–	○	○	○	–	
76	75		1-2 voltage harmonic distortion	%	Inst.	5th	–	–	–	○	○	○	–	○	○	○	–	
76	77		1-2 voltage harmonic distortion	%	Inst.	7th	–	–	–	○	○	○	–	○	○	○	–	
76	79		1-2 voltage harmonic distortion	%	Inst.	9th	–	–	–	○	○	○	–	○	○	○	–	
76	7B		1-2 voltage harmonic distortion	%	Inst.	11th	–	–	–	○	○	○	–	○	○	○	–	
76	7D		1-2 voltage harmonic distortion	%	Inst.	13th	–	–	–	○	○	○	–	○	○	○	–	
63	41		2-3 harmonic voltage	V	RMS.	Total	–	–	–	○	○	○	–	○	○	○	–	
4D	41		2-3 harmonic voltage	V	RMS.	1st	–	–	–	○	○	○	–	○	○	○	–	
4F	41		2-3 harmonic voltage	V	RMS.	3rd	–	–	–	○	○	○	–	○	○	○	–	
51	41		2-3 harmonic voltage	V	RMS.	5th	–	–	–	○	○	○	–	○	○	○	–	
53	41		2-3 harmonic voltage	V	RMS.	7th	–	–	–	○	○	○	–	○	○	○	–	
55	41		2-3 harmonic voltage	V	RMS.	9th	–	–	–	○	○	○	–	○	○	○	–	
57	41		2-3 harmonic voltage	V	RMS.	11th	–	–	–	○	○	○	–	○	○	○	–	
59	41		2-3 harmonic voltage	V	RMS.	13th	–	–	–	○	○	○	–	○	○	○	–	
76	9C		2-3 voltage THD	%	Inst.	Total	–	–	–	○	○	○	–	○	○	○	–	
76	89		2-3 voltage harmonic distortion	%	Inst.	3rd	–	–	–	○	○	○	–	○	○	○	–	
76	8B		2-3 voltage harmonic distortion	%	Inst.	5th	–	–	–	○	○	○	–	○	○	○	–	
76	8D		2-3 voltage harmonic distortion	%	Inst.	7th	–	–	–	○	○	○	–	○	○	○	–	
76	8F		2-3 voltage harmonic distortion	%	Inst.	9th	–	–	–	○	○	○	–	○	○	○	–	
76	91		2-3 voltage harmonic distortion	%	Inst.	11th	–	–	–	○	○	○	–	○	○	○	–	
76	93		2-3 voltage harmonic distortion	%	Inst.	13th	–	–	–	○	○	○	–	○	○	○	–	
4B	21		1-N harmonic voltage	V	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
35	21		1-N harmonic voltage	V	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
37	21		1-N harmonic voltage	V	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
39	21		1-N harmonic voltage	V	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
3B	21		1-N harmonic voltage	V	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
3D	21		1-N harmonic voltage	V	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
3F	21		1-N harmonic voltage	V	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
41	21	Measurement	1-N harmonic voltage	V	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	①
77	86		1-N voltage THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
77	73		1-N voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
77	75		1-N voltage harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
77	77		1-N voltage harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
77	79		1-N voltage harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
77	7B		1-N voltage harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
77	7D		1-N voltage harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
4B	41		2-N harmonic voltage	V	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
35	41		2-N harmonic voltage	V	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
37	41		2-N harmonic voltage	V	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
39	41		2-N harmonic voltage	V	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
3B	41		2-N harmonic voltage	V	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
3D	41		2-N harmonic voltage	V	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
3F	41		2-N harmonic voltage	V	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
41	41		2-N harmonic voltage	V	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
77	9C		2-N voltage THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
77	89		2-N voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
77	8B		2-N voltage harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
77	8D		2-N voltage harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
77	8F		2-N voltage harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
77	91		2-N voltage harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
77	93		2-N voltage harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
4B	61		3-N harmonic voltage	V	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
35	61		3-N harmonic voltage	V	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
37	61		3-N harmonic voltage	V	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
39	61		3-N harmonic voltage	V	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
3B	61		3-N harmonic voltage	V	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
3D	61		3-N harmonic voltage	V	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
3F	61		3-N harmonic voltage	V	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
41	61		3-N harmonic voltage	V	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
77	B2		3-N voltage THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
77	9F		3-N voltage harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
77	A1		3-N voltage harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
77	A3		3-N voltage harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
77	A5		3-N voltage harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
77	A7		3-N voltage harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
77	A9		3-N voltage harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	

* Inst.: Instantaneous value. * RMS.: Root-Mean-Square value.

* THD: Total Harmonics Distortion

◆EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) (3/4)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BM1-MB			EMU4-HM1-MB				EMU4-A2/EMU4-VA2				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
33	21	Measurement	Phase 1 harmonic current	A	RMS.	Total	–	–	–	○	○	○	○	○	○	○	○	①
1D	21		Phase 1 harmonic current	A	RMS.	1st	–	–	–	○	○	○	○	○	○	○	○	
1F	21		Phase 1 harmonic current	A	RMS.	3rd	–	–	–	○	○	○	○	○	○	○	○	
21	21		Phase 1 harmonic current	A	RMS.	5th	–	–	–	○	○	○	○	○	○	○	○	
23	21		Phase 1 harmonic current	A	RMS.	7th	–	–	–	○	○	○	○	○	○	○	○	
25	21		Phase 1 harmonic current	A	RMS.	9th	–	–	–	○	○	○	○	○	○	○	○	
27	21		Phase 1 harmonic current	A	RMS.	11th	–	–	–	○	○	○	○	○	○	○	○	
29	21		Phase 1 harmonic current	A	RMS.	13th	–	–	–	○	○	○	○	○	○	○	○	
75	86		Phase 1 current THD	%	Inst.	Total	–	–	–	○	○	○	○	○	○	○	○	
75	73		Phase 1 current harmonic distortion	%	Inst.	3rd	–	–	–	○	○	○	○	○	○	○	○	
75	75		Phase 1 current harmonic distortion	%	Inst.	5th	–	–	–	○	○	○	○	○	○	○	○	
75	77		Phase 1 current harmonic distortion	%	Inst.	7th	–	–	–	○	○	○	○	○	○	○	○	
75	79		Phase 1 current harmonic distortion	%	Inst.	9th	–	–	–	○	○	○	○	○	○	○	○	
75	7B		Phase 1 current harmonic distortion	%	Inst.	11th	–	–	–	○	○	○	○	○	○	○	○	
75	7D		Phase 1 current harmonic distortion	%	Inst.	13th	–	–	–	○	○	○	○	○	○	○	○	
33	41		Phase 2 harmonic current	A	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
1D	41		Phase 2 harmonic current	A	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
1F	41		Phase 2 harmonic current	A	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
21	41		Phase 2 harmonic current	A	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
23	41		Phase 2 harmonic current	A	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
25	41		Phase 2 harmonic current	A	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
27	41		Phase 2 harmonic current	A	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
29	41		Phase 2 harmonic current	A	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
75	9C		Phase 2 current THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
75	89		Phase 2 current harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
75	8B		Phase 2 current harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
75	8D		Phase 2 current harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
75	8F		Phase 2 current harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
75	91		Phase 2 current harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
75	93		Phase 2 current harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	
33	61		Phase 3 harmonic current	A	RMS.	Total	–	–	–	○	○	○	○	○	○	○	○	
1D	61		Phase 3 harmonic current	A	RMS.	1st	–	–	–	○	○	○	○	○	○	○	○	
1F	61		Phase 3 harmonic current	A	RMS.	3rd	–	–	–	○	○	○	○	○	○	○	○	
21	61		Phase 3 harmonic current	A	RMS.	5th	–	–	–	○	○	○	○	○	○	○	○	
23	61		Phase 3 harmonic current	A	RMS.	7th	–	–	–	○	○	○	○	○	○	○	○	
25	61		Phase 3 harmonic current	A	RMS.	9th	–	–	–	○	○	○	○	○	○	○	○	
27	61		Phase 3 harmonic current	A	RMS.	11th	–	–	–	○	○	○	○	○	○	○	○	
29	61		Phase 3 harmonic current	A	RMS.	13th	–	–	–	○	○	○	○	○	○	○	○	
75	B2		Phase 3 current THD	%	Inst.	Total	–	–	–	○	○	○	○	○	○	○	○	
75	9F		Phase 3 current harmonic distortion	%	Inst.	3rd	–	–	–	○	○	○	○	○	○	○	○	
75	A1		Phase 3 current harmonic distortion	%	Inst.	5th	–	–	–	○	○	○	○	○	○	○	○	
75	A3		Phase 3 current harmonic distortion	%	Inst.	7th	–	–	–	○	○	○	○	○	○	○	○	
75	A5		Phase 3 current harmonic distortion	%	Inst.	9th	–	–	–	○	○	○	○	○	○	○	○	
75	A7		Phase 3 current harmonic distortion	%	Inst.	11th	–	–	–	○	○	○	○	○	○	○	○	
75	A9		Phase 3 current harmonic distortion	%	Inst.	13th	–	–	–	○	○	○	○	○	○	○	○	
33	81		Phase N harmonic current	A	RMS.	Total	–	–	–	–	–	–	○	–	–	–	○	
1D	81		Phase N harmonic current	A	RMS.	1st	–	–	–	–	–	–	○	–	–	–	○	
1F	81		Phase N harmonic current	A	RMS.	3rd	–	–	–	–	–	–	○	–	–	–	○	
21	81		Phase N harmonic current	A	RMS.	5th	–	–	–	–	–	–	○	–	–	–	○	
23	81		Phase N harmonic current	A	RMS.	7th	–	–	–	–	–	–	○	–	–	–	○	
25	81		Phase N harmonic current	A	RMS.	9th	–	–	–	–	–	–	○	–	–	–	○	
27	81		Phase N harmonic current	A	RMS.	11th	–	–	–	–	–	–	○	–	–	–	○	
29	81		Phase N harmonic current	A	RMS.	13th	–	–	–	–	–	–	○	–	–	–	○	
75	C8		Phase N current THD	%	Inst.	Total	–	–	–	–	–	–	○	–	–	–	○	
75	B5		Phase N current harmonic distortion	%	Inst.	3rd	–	–	–	–	–	–	○	–	–	–	○	
75	B7		Phase N current harmonic distortion	%	Inst.	5th	–	–	–	–	–	–	○	–	–	–	○	
75	B9		Phase N current harmonic distortion	%	Inst.	7th	–	–	–	–	–	–	○	–	–	–	○	
75	BB		Phase N current harmonic distortion	%	Inst.	9th	–	–	–	–	–	–	○	–	–	–	○	
75	BD		Phase N current harmonic distortion	%	Inst.	11th	–	–	–	–	–	–	○	–	–	–	○	
75	BF		Phase N current harmonic distortion	%	Inst.	13th	–	–	–	–	–	–	○	–	–	–	○	

* Inst.: Instantaneous value. * RMS.: Root-Mean-Square value.

* THD: Total Harmonics Distortion

*1: Unit of electric energy converted, Unit of electric energy converted (3side in 1P2W), Pulse conversion value have different units according to each setup value.

Refer to [5.5.6] for more details.

◆EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) (4/4)

Group (H)	Channel (H)	Data type	Content name	Unit			EMU4-BM1-MB			EMU4-HM1-MB				EMU4-A2/EMU4-VA2				Data format
							1P2W	1P3W	3P3W	1P2W	1P3W	3P3W	3P4W	1P2W	1P3W	3P3W	3P4W	
80	01	Measurement	Active energy (import)	kWh	count		○	○	○	○	○	○	○	○	○	○	○	②
8A	01		Active energy (import)(3side)	kWh	count		○	–	–	○	–	–	–	○	–	–	–	
80	63		Active energy (export)	kWh	count		○	○	○	○	○	○	○	○	○	○	○	
8A	63		Active energy (export)(3side)	kWh	count		○	–	–	○	–	–	–	○	–	–	–	
81	01		Reactive energy (import lag)	kvarh	count		○	○	○	○	○	○	○	○	○	○	○	
80	64		Active energy (import)	kWh	count	expand	○	○	○	○	○	○	○	○	○	○	○	
8A	64		Active energy (import)(3side)	kWh	count	expand	○	–	–	○	–	–	–	○	–	–	–	
80	65		Active energy (export)	kWh	count	expand	○	○	○	○	○	○	○	○	○	○	○	
8A	65		Active energy (export)(3side)	kWh	count	expand	○	–	–	○	–	–	–	○	–	–	–	
81	66		Reactive energy (import lag)	kvarh	count	expand	○	○	○	○	○	○	○	○	○	○	○	
8B	01		Periodic active energy	kWh	count	expand	–	–	–	○	○	○	○	–	–	–	–	
90	01		Periodic active energy(3side)	kWh	count	expand	–	–	–	○	–	–	–	–	–	–	–	
80	6A		Active energy converted	*1	count	expand	–	–	–	○	○	○	○	○	○	○	○	
8A	6A		Active energy converted(3side)	*1	count	expand	–	–	–	○	–	–	–	○	–	–	–	②
83	6A		Pulse conversion value	*1			–	–	–	○	○	○	○	–	–	–	–	
83	01		Pulse count	pulse	count		–	–	–	○	○	○	○	–	–	–	–	⑥
87	01		Operating time	hour	count		○	○	○	○	○	○	○	○	○	○	○	
8E	01		Operating time(3side)	hour	count		○	–	–	○	–	–	–	○	–	–	–	
A0	31	Alarm state	Alarm state monitoring 1	–			○	○	○	○	○	○	○	○	○	○	○	③
A1	35		Alarm state monitoring 2	–			○	–	–	○	–	–	–	○	–	–	–	

* Inst.: Instantaneous value. * RMS.: Root-Mean-Square value.

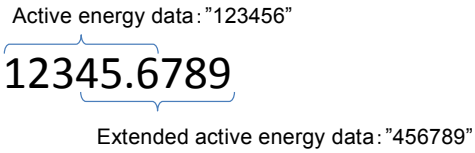
* THD: Total Harmonics Distortion

*1: Unit of electric energy converted, Unit of electric energy converted (3side in 1P2W), Pulse conversion value have different units according to each setup value.
Refer to [5.5.6] for more details.

* Extended active energy reply data of three digits lower than active energy data.
The number of digits of response data is same as that of the active energy data.

・The image of the Extended active energy

Where the measuring unit has "12345.6789" as internal data, calculate measured value by multiplying the multiplying factor to respective values (electric energy value or extended active energy value).



◆EcoMonitorPlus

(Model：EMU4-LG1-MB)

Group (H)	Channel (H)	Data type	Content name	Unit	EMU4-LG1-MB				Data format
					1P2W	1P3W	3P3W	3P4W	
F0	02	Set-up	Model code	—	○	○	○	○	⑤
E0	13		Phase wire system	—	○	○	○	○	
12	E0		Leak current demand time	sec	○	○	○	○	
E0	9F		Alarm delay time	—	○	○	○	○	
E0	A0		Alarm reset mode	—	○	○	○	○	
E0	AF		Measuring mode	—	○	○	○	○	
7A	81		Differential conversion	—	○	○	○	○	
7A	88		Differential conversion value	mA	○	○	○	○	①
11	89		Monitoring element for leak current alarm	—	○	○	○	○	⑤
7A	89		Alarm element of leak current	—	○	○	○	○	
11	86		Leak current Alarm1	mA	○	○	○	○	①
11	87		Leak current Alarm2	mA	○	○	○	○	
7A	86		Leak current for resistance Alarm1	mA	○	○	○	○	
7A	87		Leak current for resistance Alarm2	mA	○	○	○	○	
11	8A		Count of leak current alarm1	times	○	○	○	○	②
11	8B		Count of leak current alarm2	times	○	○	○	○	
7A	8A		Count of leak current for resistance alarm1	times	○	○	○	○	
7A	8B		Count of leak current for resistance alarm2	times	○	○	○	○	
E0	B0		External output signal target alarm	—	○	○	○	○	⑤
11	01	Measurement	Leak current	mA	○	○	○	○	①
12	01		Leak current demand	mA	○	○	○	○	
7A	01		Leak current for resistance	mA	○	○	○	—	
7B	01		Leak current for resistance demand	mA	○	○	○	—	
7A	82		Leak current for resistance converted	mA	○	○	○	—	
11	84		Count of alarm1 of leak current	times	○	○	○	○	⑥
11	85		Count of alarm2 of leak current	times	○	○	○	○	
7A	84		Count of alarm1 of leak current for resistance	times	○	○	○	—	
7A	85		Count of alarm2 of leak current for resistance	times	○	○	○	—	
A0	31	Alarm state	Alarm state monitoring 1	—	○	○	○	○	③
A1	35		Alarm state monitoring 2	—	○	○	○	—	

◆EcoMonitorPlus

(Model：EMU4-AX4) (1/2)

Group (H)	Channel (H)	Data type	Content name	Unit	EMU4-AX4	Data format
F0	02	Set-up	Model code	—	○	⑤
65	EB		Conversion rate setting	—	○	
65	EC		AD Conversion use or non-use setting (Ch1)	—	○	
67	EC		AD Conversion use or non-use setting (Ch2)	—	○	
69	EC		AD Conversion use or non-use setting (Ch3)	—	○	
6B	EC		AD Conversion use or non-use setting (Ch4)	—	○	
65	E2		Input range setting (Ch1)	—	○	
67	E2		Input range setting (Ch2)	—	○	
69	E2		Input range setting (Ch3)	—	○	
6B	E2		Input range setting (Ch4)	—	○	
65	ED		Scaling value lower value (Ch1)	—	○	①
67	ED		Scaling value lower value (Ch2)	—	○	
69	ED		Scaling value lower value (Ch3)	—	○	
6B	ED		Scaling value lower value (Ch4)	—	○	
65	EE		Scaling value upper value (Ch1)	—	○	
67	EE		Scaling value upper value (Ch2)	—	○	
69	EE		Scaling value upper value (Ch3)	—	○	
6B	EE		Scaling value upper value (Ch4)	—	○	
65	F0		Scaling unit (Ch1)	—	○	⑤
67	F0		Scaling unit (Ch2)	—	○	
69	F0		Scaling unit (Ch3)	—	○	
6B	F0		Scaling unit (Ch4)	—	○	
66	EF		Moving average number setting (Ch	times	○	
68	EF		Moving average number setting (Ch	times	○	
6A	EF		Moving average number setting (Ch	times	○	
6C	EF		Moving average number setting (Ch	times	○	
91	E0		Limit A setting (Ch1)	—	○	①
91	E1		Limit B setting (Ch1)	—	○	
91	E2		Limit C setting (Ch1)	—	○	
91	E3		Limit D setting (Ch1)	—	○	
91	E4		Limit A setting (Ch2)	—	○	
91	E5		Limit B setting (Ch2)	—	○	
91	E6		Limit C setting (Ch2)	—	○	
91	E7		Limit D setting (Ch2)	—	○	
91	E8		Limit A setting (Ch3)	—	○	
91	E9		Limit B setting (Ch3)	—	○	
91	EA		Limit C setting (Ch3)	—	○	
91	EB		Limit D setting (Ch3)	—	○	
91	EC		Limit A setting (Ch4)	—	○	
91	ED		Limit B setting (Ch4)	—	○	
91	EE		Limit C setting (Ch4)	—	○	
91	EF		Limit D setting (Ch4)	—	○	
91	F0		Number over limit multiplying factor setting (CH1)	—	○	⑤
91	F1		Number over limit multiplying factor setting (CH2)	—	○	
91	F2		Number over limit multiplying factor setting (CH3)	—	○	
91	F3		Number over limit multiplying factor setting (CH4)	—	○	
E0	99		External output signal setting	—	○	
E0	9A		External output signal target channe	—	○	
E0	B0		External output signal target alarm	—	○	
E0	9C		Upper limit alarm existence（CH1）	—	○	
E0	A1		Upper limit alarm existence（CH2）	—	○	
E0	A6		Upper limit alarm existence（CH3）	—	○	
E0	B2		Upper limit alarm existence（CH4）	—	○	
E0	9E		Upper limit alarm value（CH1）	—	○	①
E0	A3		Upper limit alarm value（CH2）	—	○	
E0	E8		Upper limit alarm value（CH3）	—	○	
E0	B4		Upper limit alarm value（CH4）	—	○	
E0	B7		Lower limit alarm extence（CH1）	—	○	⑤
E0	B9		Lower limit alarm extence（CH2）	—	○	
E0	BB		Lower limit alarm extence（CH3）	—	○	
E0	BD		Lower limit alarm extence（CH4）	—	○	
E0	B8		Lower limit value（CH1）	—	○	①
E0	BA		Lower limit value（CH2）	—	○	
E0	BC		Lower limit value（CH3）	—	○	
E0	BE		Lower limit value（CH4）	—	○	
E0	9F		Alarm delay time（CH1）	—	○	⑤
E0	A4		Alarm delay time（CH2）	—	○	
E0	A9		Alarm delay time（CH3）	—	○	
E0	B5		Alarm delay time（CH4）	—	○	
E0	A0		Alarm reset mode（CH1）	—	○	
E0	A5		Alarm reset mode（CH2）	—	○	
E0	AA		Alarm reset mode（CH3）	—	○	
E0	B6		Alarm reset mode（CH4）	—	○	

◆EcoMonitorPlus

(Model：EMU4-AX4) (2/2)

Group (H)	Channel (H)	Data type	Content name	Unit	EMU4-AX4	Data format
65	01	Measurement	AD conversion value（CH1）	digit	○	①
67	01		AD conversion value（CH2）	digit	○	
69	01		AD conversion value（CH3）	digit	○	
6B	01		AD conversion value（CH4）	digit	○	
65	21		Scaling value（CH1）	－	○	
67	21		Scaling value（CH2）	－	○	
69	21		Scaling value（CH3）	－	○	
6B	21		Scaling value（CH4）	－	○	
91	00		Number over Limit A（CH1）	times	○	②
91	01		Number over Limit B（CH1）	times	○	
91	02		Number over Limit C（CH1）	times	○	
91	03		Number over Limit D（CH1）	times	○	
91	10		Number over Limit A（CH2）	times	○	
91	11		Number over Limit B（CH2）	times	○	
91	12		Number over Limit C（CH2）	times	○	
91	13		Number over Limit D（CH2）	times	○	
91	20		Number over Limit A（CH3）	times	○	
91	21		Number over Limit B（CH3）	times	○	
91	22		Number over Limit C（CH3）	times	○	
91	23		Number over Limit D（CH3）	times	○	
91	30		Number over Limit A（CH4）	times	○	
91	31		Number over Limit B（CH4）	times	○	
91	32		Number over Limit C（CH4）	times	○	
91	33		Number over Limit D（CH4）	times	○	
A0	31	Alarm state	Alarm state monitoring	－	○	③

◆EcoMonitorPlus
(Model：EMU4-PX4)

Group (H)	Channel (H)	Data type	Content name	Unit	EMU4-PX4	Data format
F0	02	Set-up	Model code	—	○	⑤
87	E2		Operating time measuring（CH1）	—	○	
88	E2		Operating time measuring（CH2）	—	○	
8D	E2		Operating time measuring（CH3）	—	○	
8E	E2		Operating time measuring（CH4）	—	○	
83	E4		Pulse conversion rate（CH1）	—	○	①
84	E4		Pulse conversion rate（CH2）	—	○	
85	E4		Pulse conversion rate（CH3）	—	○	
86	E4		Pulse conversion rate（CH4）	—	○	
83	E5		Pulse conversion unit（CH1）	—	○	⑤
84	E5		Pulse conversion unit（CH2）	—	○	
85	E5		Pulse conversion unit（CH3）	—	○	
86	E5		Pulse conversion unit（CH4）	—	○	
E0	99		External output signal setting	—	○	
E0	9A		External output signal target channel	—	○	
E0	9C		Upper limit alarm existence（CH1）	—	○	
E0	A1		Upper limit alarm existence（CH2）	—	○	
E0	A6		Upper limit alarm existence（CH3）	—	○	
E0	E2		Upper limit alarm existence（CH4）	—	○	
E0	9E		Upper limit alarm value（CH1）	*1	○	②
E0	A3		Upper limit alarm value（CH2）	*1	○	
E0	A8		Upper limit alarm value（CH3）	*1	○	
E0	B4		Upper limit alarm value（CH4）	*1	○	
E0	97		External input signal setting （CH1）	—	○	⑤
E0	BF		External input signal setting （CH2）	—	○	
E0	C0		External input signal setting （CH3）	—	○	
E0	C1		External input signal setting （CH4）	—	○	
E0	98		Contact input reset mode（CH1）	—	○	
E0	C2		Contact input reset mode（CH2）	—	○	
E0	C3		Contact input reset mode（CH3）	—	○	
E0	C4		Contact input reset mode（CH4）	—	○	
83	01	Measurement	Pulse count（CH1）	pulse	○	⑥
84	01		Pulse count（CH2）	pulse	○	
85	01		Pulse count（CH3）	pulse	○	
86	01		Pulse count（CH4）	pulse	○	
83	6A		Pulse conversion value（CH1）	*1	○	②
84	6A		Pulse conversion value（CH2）	*1	○	
85	6A		Pulse conversion value（CH3）	*1	○	
86	6A		Pulse conversion value（CH4）	*1	○	
87	01		Operating time（CH1）	hour	○	⑥
88	01		Operating time（CH2）	hour	○	
8D	01		Operating time（CH3）	hour	○	
8E	01		Operating time（CH4）	hour	○	
A0	01		Contact input state（CH1）	—	○	⑤
A0	02		Contact input state（CH2）	—	○	
A0	03		Contact input state（CH3）	—	○	
A0	04		Contact input state（CH4）	—	○	
A0	31	Alarm state	Alarm state monitoring	—	○	③

*1：Unit differs according to the setup value of Pulse conversion unit.
Refer to [5.5.6] for more details.

5.5.5. Setting details by Command 2H

Settings of Measuring Unit can be set by master station.
Monitor pattern P00 setting flag RYn0 is used to send the command.
For details, refer to [5.3.2]

2H	Data Set

Link device RWw(Programmable controller→Unit)

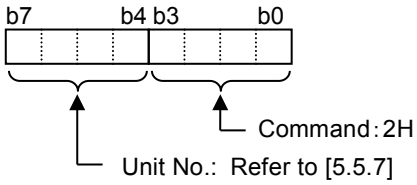
	b15 b8	b7 b0
RWw00	Group No.	Unit No. / Command 2H
RWw01	Index number	Channel No.
RWw02	Low data	Low data
RWw03	High data	High data
RWw04	00H	00H
RWw05	00H	00H
RWw06	00H	00H
RWw07	00H	00H
⋮	⋮	
RWw1C	00H	00H
RWw1D	00H	00H
RWw1E	00H	00H
RWw1F	00H	00H

Link device RWr(Unit→Programmable controller)

	b15 b8	b7 b0
RWr00	Channel No.	Group No.
RWr01	00H	(Error code)
RWr02	00H	00H
RWr03	00H	00H
RWr04	00H	00H
RWr05	00H	00H
RWr06	00H	00H
RWr07	00H	00H
⋮	⋮	
RWr1C	00H	00H
RWr1D	00H	00H
RWr1E	00H	00H
RWr1F	00H	00H

* At normal communication, Error code is 00H.
As to other error codes, refer to [5.7].

* It is described as 8 bits data by combining the unit No. (high 4 bits) and the command (low 4 bits)



- A setting item of Measuring Unit can be set by storing Group No., Channel No. and setting data to link device (RWw).
- About Group No. and Channel No., refer to [5.5.6].
- Refer to [5.5.8] for details of data format.

* After writing the set-up value, up to 20 seconds is needed to restart the measurement based on new set-up value.

5.5.6. Group No., Channel No. of Command 2H (set-up value setting)

Group No., Channel No. and setting range upon setting set-up value are shown below:

①EcoMonitorLight

(Model：EMU4-BD1-MB, EMU4-HD1-MB, EMU4-FD1-MB)

Hex		Content name	EMU4-BD1-MB EMU4-HD1-MB EMU4-FD1-MB		Data format
Group No. (H)	Channel No. (H)		Range	Setting unit	
E0	11	Primary current	5.0A to 6000.0A	(Note 1)	④
E0	12	Primary voltage (L-L)	1V to 6600V	(Note2)	④
E0	1B	Primary voltage (L-N)	1V to 6600V (Only EMU4-HD1-MB 3P4W)	(Note3)	④
E0	1C	Secondary voltage (L-L/L-N)	1V to 220V	1V	④
E0	13	Phase Wire system	01H：1P2W 02H：1P3W 03H：3P3W 04H：3P4W (Only EMU4-HD1-MB)	—	⑤
02	E0	Time constant for DA	0 to 1800s	(Note4)	⑤
08	E0	Time constant for DW	0 to 1800s	(Note4)	⑤
E0	92	5A/Direct setup	00H: Direct sensor 02H：5A sensor	—	⑤
80	01	Active energy (import)	0 to 999999×multiplying factor (Note5)	1×multiplying factor	②
80	63	Active energy (export)	0 to 999999×multiplying factor (Note5)	1×multiplying factor	②
81	01	Reactive energy (import lag)	0 to 999999×multiplying factor (Note5)	1×multiplying factor	②
A1	3A	16bit set register	Refer to [5.5.8] data format ⑦	—	⑦

Note 1：Effective value of 5A/Direct setup as below:

Primary current when setup value is 5A/Direct setup is 0: Direct Sensor.	50A, 100A, 250A, 400A, 600A
Primary current when setup value is 5A/Direct setup is 2: 5A Sensor.	From the most significant digit to 3 digits can be freely setting in the range from 5.0A to 6000.0A. Digits of 4 or more are rounded down to 3 digits. (When less than 10A, to 2 digits.)

Note 2: Effective value of primary voltage (L-L) is as follows.

3P3W or 1P2W:

From the most significant digit to 3 digits can be freely setting in the range from 1V to 6600V.
(When less than from 1V to 99V, to 2 digits.)
When setup 110V or 220V, Setup is direct setup (Not use VT) in EMU4-BD1-MB.
When setup 110V, 220V or 440V, Setup is direct setup (Not use VT) in EMU4-HD1-MB.

1P3W:

110V is valid only.

3P4W:

From the most significant digit to 3 digits can be freely setting in the range from 1V to 6600V.
(When less than 1V-99V, to 2 digits.)

Set value	Direct voltage	Set value	Direct voltage
110V	63.5/110V	380V	220/380V
173V	100/173V	400V	230/400V
182V	105/182V	415V	240/415V
190V	110/190V	420V	242/420V
199V	115/199V	430V	250/430V
208V	120/208V	440V	254/440V
220V	127/220V	460V	265/460V
346V	200/346V	480V	277/480V

Note 3: Setup of phase voltage is only available in 3P4W.
From the most significant digit to 3 digits can be freely setting in the range from 1V to 6600V.
(When less than from 1V to 99V, to 2 digits.)
Setup is Direct setup (Not use VT) when setup in below value

Set value	Direct voltage
63.5V	63.5/110V
100V	100/173V
105V	105/182V
110V	110/190V
115V	115/199V
120V	120/208V
127V	127/220V
200V	200/346V
220V	220/380V
230V	230/400V
240V	240/415V
242V	242/420V
250V	250/430V
254V	254/440V
265V	265/460V
277V	277/480V

Note 4: The set value is the second unit value. (For example of 2 minutes, set as 120 seconds.) About setting range, Refer to each user's manuals.

Note 5: Multiplying factor differs according to settings of phase wiring, primary voltage and primary current. For details, refer to [5.6].

②EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) (1/2)

Hex		Content name	EMU4-BM1-MB, EMU4-HM1-MB EMU4-A2, EMU4-VA2		Data format
Group No. (H)	Channel No. (H)		Range	Setting unit	
E0	11	Primary current	5.0A to 30000.0A	Note1	④
E0	12	Primary voltage (L-L)	1V to 110000V	Note2	④
E0	1B	Primary voltage (L-N)	1V to 110000V (Only EMU4-HM1-MB 3P4W, EMU4-A2 3P4W, EMU4-VA2 3P4W)	Note3	④
E0	1C	Secondary voltage (L-L/L-N)	1V to 220V	1V	④
E0	13	Phase Wire system	01H：1P2W, 02H：1P3W 03H：3P3W, 04H：3P4W (Only EMU4-HM1-MB, EMU4-A2, EMU4-VA2)	—	⑤
E0	21	VT use or non-use	00H:VT non-use, 01H: VT use	—	⑤
02	E0	Time constant for DA	0 to 1800s	Note4	⑤
02	E7	Time constant for DA (3side in 1P2W)			
08	E0	Time constant for DW	0 to 1800s	Note4	⑤
08	E7	Time constant for DW (3side in 1P2W)			
E0	92	5A/Direct setup	00H: Direct sensor 02H: 5A sensor	—	⑤
E0	97	External input signal setting value	00H:non-use, 01H:pulse input, 02H:contact input	—	⑤
E0	98	Contact input reset mode	01H:AUTO,02H:HOLD	—	⑤
E0	99	External output signal setting value	00H:non-use, 01H:pulse output, 02H:alarm output	—	⑤
E0	A0	External output target circuit	00H:1side, 01H:3side	—	⑤
83	E6	The unit of pulse output	00H：0.001, 01H：0.01, 02H：0.1, 03H：1, 04H：10, 05H：100, 06H：1000, 07H：10000, 08H：100000 (Note5)	—	⑤
87	E2	Operating time	00H:non-use 01H:use	—	⑤
8E	E2	Operating time (3side in 1P2W)			
87	E3	Counting method of operating time	01H：Current input 02H：Contact input	—	⑤
8E	E3	Counting method of operating time (3side in 1P2W)			
01	E8	Cut-off	0.1 to 50.0	0.1 step	①
01	EA	Cut-off(3side in 1P2W)			
83	E4	Pulse conversion rate	0.001 to 10000	Note6	①
83	E5	Pulse conversion unit	00H:non-use, 01H:Wh, 02H:kWh, 03H:MWh, 04H:J, 05H:m2, 06H:m3, 07H:l, 08H:kl, 09H:sec, 0AH:min, 0BH:hour, 0CH:piece, 0DH:set, 0EH:g, 0FH:kg, 10H:t, 11H:¥, 12H:$	—	⑤
80	E4	Active energy converted rate	0.001 to 10000	Note6	①
8A	E4	Active energy converted rate (3side in 1P2W)			
80	E5	Active energy converted unit setting	00H:non-use, 01H:Wh, 02H:kWh, 03H:MWh, 04H:J,05H:m2, 06H:m3, 07H:l, 08H:kl, 09H:sec,0AH:min, 0BH:hour, 0CH:piece, 0DH:set, 0EH:g, 0FH:kg, 10H:t, 11H:¥, 12H:$	—	⑤
8A	E5	Active energy converted unit setting (3side in 1P2W)			

②EcoMonitorPlus

(Model：EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2) (2/2)

Hex		Content name	EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2		Data format
Group No. (H)	Channel No. (H)		Range	Setting unit	
E0	9C	Upper and lower limit alarm existence	00H:non-use 01H:use	—	⑤
E0	A6	Upper and lower limit alarm existence (3side in 1P2W)			
E0	9D	Upper and lower limit alarm element	00H:Current demand upper limit 01H:Current demand lower limit 02H:N phase demand upper limit 03H:Line voltage upper limit 04H:Line voltage lower limit 05H:Phase voltage upper limit 06H:Phase voltage lower limit 07H:Active power demand upper limit 08H:Active power demand lower limit 09H:Power factor upper limit 0AH:Power factor lower limit 0BH:Pulse converted upper limit 0CH:Current unbalance rate upper limit 0DH:Voltage unbalance rate upper limit	—	⑤
E0	A7	Upper and lower limit alarm element (3side in 1P2W)			
E0	9E	Upper and lower limit alarm value	Note7	Note7	①
E0	9F	Alarm delay time	00H:0, 01H:5, 02H:10, 03H:20, 04H:30, 05H:40, 06H50, 07H:60, 08H:120, 09H:180, 0AH:240, 0BH:300	—	⑤
E0	A9	Alarm delay time (3side in 1P2W)			
E0	A0	Alarm reset mode	01H:AUTO 02H:HOLD	—	⑤
E0	AA	Alarm reset mode (3side in 1P2W)			
E0	AB	Simple measuring setup	00H: non-use 01H: use	—	⑤
E0	AC	Power factor setup in simple measuring	-0.1 to 100.0 to 0.0%	0.1% step	①
E0	AD	Power factor setup in simple measuring (3side in 1P2W)	-0.1 to 100.0 to 0.0%	0.1% step	①
E0	B1	2 circuits measuring	00H: non-use 01H: use	—	⑤
80	01	Active energy (import)	0 to 999999×multiplying factor (Note8)	1×multiplying factor	②
8A	01	Active energy (import)(3side in 1P2W)	0 to 999999×multiplying factor (Note8)	1×multiplying factor	②
80	63	Active energy (export)	0 to 999999×multiplying factor (Note8)	1×multiplying factor	②
8A	63	Active energy (export)(3side in 1P2W)	0 to 999999×multiplying factor (Note8)	1×multiplying factor	②
81	01	Reactive energy (import lag)	0 to 999999×multiplying factor (Note8)	1×multiplying factor	②
A1	3A	16bit set register	Refer to [5.5.8]data format⑦	—	⑦

Note 1: Effective value of 5A/Direct setup is as below:

Primary current when setup value is 5A/Direct setup is 0: Direct Sensor.	50A, 100A, 250A, 400A, 600A
Primary current when setup value is 5A/Direct setup is 2:5A Sensor.	From the most significant digit to 3 digits can be freely setting in a range from 5.0A to 6000.0A. Digits of 4 or more are rounded down to 3 digits. (When less than 10A, to 2 digits.)

Note 2: Effective value of primary voltage (L-L) is follows:

3P3W / 1P2W;

From the most significant digit to 3 digits can be freely setting in the range from 1V to 110000V.
(When less than from 1V to 99V, to 2 digits.)
When setup 110V or 220V, setup is use VT in EMU4-BM1-MB.
When setup 110V, 220V or 440V, setup is use VT in EMU4-HM1-MB, EMU4-A2, EMU4-VA2.

1P3W;

110V is valid when using EMU4-BM1-MB.
110V and 220V is valid when using EMU4-HM1-MB, EMU4-A2, EMU4-VA2.

3P4W;

From the most significant digit to 3 digits can be freely setting in the range from 1V to 110000V.
(When less than 1V-99V, to 2 digits.)
Digits of 4 or more are rounded down to 3 digits.

Note 3: From the most significant digit to 3 digits can be freely setting in the range from 1V to 63500V.
Digits of 4 or more are rounded down to 3 digits.

Note 4: The set value is the second unit value. (For example of 2 minutes, set as 120 seconds.)
Setting range:
0 sec, 10 sec, 20 sec, 30 sec, 40 sec, 50 sec, 1 min, 2 min, 3 min, 4 min, 5 min, 6 min, 7 min, 8 min, 9 min, 10 min, 11 min, 12 min, 13 min, 14 min, 15 min, 20 min, 25 min, 30 min

Note 5: Setting range is changed by the value of Full load power.

Full load power(kW)		Setting range			
	Less than 12	1	0.1	0.01	0.001
12 or more	Less than 120	10	1	0.1	0.01
120 or more	Less than 1200	100	10	1	0.1
1200 or more	Less than 12000	1000	100	10	1
12000 or more	Less than 120000	10000	1000	100	10
120000 or more		100000	10000	1000	100

Full load power is calculated as below:

$$\text{Full load power [kW]} = \frac{\alpha \times (\text{Primary voltage}) \times (\text{Primary current})}{1000}$$

α: 1 1P2W
: 2 1P3W (Primary voltage is 110V or 220V)
: $\sqrt{3}$ 3P3W
: 3 3P4W (Primary voltage is phase voltage)

Note 6: From the most significant digit to 4 digits can be freely setting in the range from 0.001 to 10000.

Note 7: Setting for Upper and lower alarm.

Setting range differs depending on the monitoring target.

Directly specify Upper and lower value instead of % from setting range as below.

Monitoring target	Setting range
Current demand upper limit alarm	0 to 120% of primary current
Current demand lower limit alarm	
Line voltage upper limit alarm Phase voltage upper limit alarm	15/11 × 0 to 100% of primary voltage
Line voltage lower limit alarm Phase voltage lower limit alarm	
Electric energy demand upper limit alarm	-120 to 120% of Full load power
Electric energy demand lower limit alarm	
Power factor upper limit alarm	-5 to 100 to 5%
Power factor lower limit alarm	
Pulse conversion upper limit alarm	0.001 to 999999000
Current unbalance rate upper limit alarm	0.01 to 999.99
Voltage unbalance rate upper limit alarm	

* Rounded off to the decimal point

Note 8: Multiplying factor fixed for each items according to phase wire system, primary voltage and primary current.

For details, refer to [5.6]

③EcoMonitorPlus

(Model：EMU4-LG1-MB)

Hex		Content name	EMU4-LG1-MB		Data format
Group No. (H)	Channel No. (H)		Range	Setting unit	
E0	13	Phase wire system	01H：1P2W, 02H：1P3W 03H：3P3W, 04H：3P4W	—	⑤
E0	AF	Measuring mode	00H：Low SENS, 01H：High SENS	—	⑤
12	E0	Leak current demand time	0 to 1800 sec	(Note 1)	⑤
7A	81	Differential conversion	00H：Invalid, 01H: Valid	—	⑤
7A	88	Differential conversion value	Low SENS： 0 to 1000mA High SENS： 0 to 100.00mA	(Note 2)	①
11	89	Monitoring element for leak current alarm	00H: present value, 01H demand value	—	⑤
7A	89	Alarm element of leak current for resistance	00H: present value, 01H demand value, 02H: Differential conversion value	—	⑤
11	86	Leak current Alarm1	Low SENS：0 to 1000mA High SENS：0 to 100.00mA	(Note 2)	①
11	87	Leak current Alarm2	Low SENS：0 to 1000mA High SENS：0 to 100.00mA	(Note 2)	①
7A	86	Leak current for resistance Alarm1	Low SENS：0 to 1000mA High SENS：0 to 100.00mA	(Note 2)	①
7A	87	Leak current for resistance Alarm2	Low SENS：0 to 1000mA High SENS：0 to 100.00mA	(Note 2)	①
11	8A	Count of leak current alarm1	0 to 999999	1 step	②
11	8B	Count of leak current alarm2	0 to 999999	1 step	②
7A	8A	Count of leak current for resistance alarm1	0 to 999999	1 step	②
7A	8B	Count of leak current for resistance alarm2	0 to 999999	1 step	②
E0	B0	External output signal target alarm	00H: Non 01H: leak current Alarm1 02H: leak current Alarm2 03H: leak current for resistance Alarm1 04H: leak current for resistance Alarm2 05H:Count of leak current Alarm1 06H:Count of leak current Alarm2 07H:Count of leak current for resistance Alarm1 08H:Count of leak current for resistance Alarm2	—	⑤
E0	9E	Alarm delay time	00H：0, 01H：5, 02H：10, 03H：20, 04H：30, 05H：40, 06H：50, 07H：60, 08H：120, 09H：180, 0AH：240, 0BH：300	—	⑤
E0	9F	Alarm reset mode	01H: Auto / 02H: Hold	—	⑤
A1	3A	ON/OFF output of 16bits	Refer to [5.5.8] data format ⑦	—	⑦

Note 1： The set value is the second unit. (For example of 2 minutes, set as 120 seconds.)

Note 2： Effective value is as below:

Measuring mode is Low SENS mode	0 to 1000mA by 1mA step
Measuring mode is High SENS mode	0 to 100.00mA by 0.01mA step

* SENS: Sensitivity

④EcoMonitorPlus

(Model：EMU4-AX4) (1/2)

Hex		Content name	EMU4-AX4		Data format
Group No. (H)	Channel No. (H)		Range	Setting unit	
65	EB	Conversion rate setting	00H：50ms, 01H：1ms	—	⑤
65	EC	AD Conversion use or non-use setting (Ch1)	00H：non-use 01H：use	—	⑤
67	EC	AD Conversion use or non-use setting (Ch2)			
69	EC	AD Conversion use or non-use setting (Ch3)			
6B	EC	AD Conversion use or non-use setting (Ch4)			
65	E2	Input range setting (Ch1)	00H：Voltage input 01H：Current input	—	⑤
67	E2	Input range setting (Ch2)			
69	E2	Input range setting (Ch3)			
6B	E2	Input range setting (Ch4)			
65	ED	Scaling value lower value (Ch1)	-32767 to 32767	1 step	①
67	ED	Scaling value lower value (Ch2)			
69	ED	Scaling value lower value (Ch3)			
6B	ED	Scaling value lower value (Ch4)			
65	EE	Scaling value upper value (Ch1)	-32767 to 32767	1 step	①
67	EE	Scaling value upper value (Ch2)			
69	EE	Scaling value upper value (Ch3)			
6B	EE	Scaling value upper value (Ch4)			
65	F0	Scaling unit (Ch1)	00H：N/A, 01H：A, 02H：mA, 03H：kA, 04H：V, 05H：kV, 06H：W, 07H：kW, 08H：MW, 09H：Hz, 0AH：N, 0BH：kN, 0CH：Pa, 0DH：kPa, 0EH：MPa, 0FH：C, 10H：deg, 11H：%	—	⑤
67	F0	Scaling unit (Ch2)			
69	F0	Scaling unit (Ch3)			
6B	F0	Scaling unit (Ch4)			
66	EF	Moving average number setting (Ch1)	1 to 100 times	1 step	⑤
68	EF	Moving average number setting (Ch2)			
6A	EF	Moving average number setting (Ch3)			
6C	EF	Moving average number setting (Ch4)			
91	E0	Limit A setting (Ch1)	-32767 to 32767 Within the range from lower limit value to upper limit value	1 step	①
91	E1	Limit B setting (Ch1)			
91	E2	Limit C setting (Ch1)			
91	E3	Limit D setting (Ch1)			
91	E4	Limit A setting (Ch2)			
91	E5	Limit B setting (Ch2)			
91	E6	Limit C setting (Ch2)			
91	E7	Limit D setting (Ch2)			
91	E8	Limit A setting (Ch3)			
91	E9	Limit B setting (Ch3)			
91	EA	Limit C setting (Ch3)			
91	EB	Limit D setting (Ch3)			
91	EC	Limit A setting (Ch4)			
91	ED	Limit B setting (Ch4)			
91	EE	Limit C setting (Ch4)			
91	EF	Limit D setting (Ch4)			
91	F0	Number over limit multiplying factor setting (CH1)	00H：Integer 01H：Integer (×10) 02H：Integer (×100) 03H：Integer (×1000)	—	⑤
91	F1	Number over limit multiplying factor setting (CH2)			
91	F2	Number over limit multiplying factor setting (CH3)			
91	F3	Number over limit multiplying factor setting (CH4)			

④EcoMonitorPlus

(Model：EMU4-AX4) (2/2)

Hex		Content name	EMU4-AX4		Data format
Group (H)	Channel (H)		Range	Setting unit	
E0	99	External output signal setting value	00H：N/A 02H：Alarm output 03H：Contact output	—	⑤
E0	9A	External output signal target circuit	00H：N/A 01H：CH1, 02H：CH2, 03H：CH3, 04H：CH4	—	⑤
E0	B0	External output signal target alarm	00H：Upper or Lower limit 01H：Upper limit 02H：Lower limit	—	⑤
E0	9C	Upper limit alarm existence (CH1)	00H：Non-Monitoring 01H：Monitoring	—	⑤
E0	A1	Upper limit alarm existence (CH2)			
E0	A6	Upper limit alarm existence (CH3)			
E0	B2	Upper limit alarm existence (CH4)			
E0	9E	Upper limit alarm value(CH1)	-32767 to 32767 Within the range from lower limit value to upper limit value	1 step	①
E0	A3	Upper limit alarm value (CH2)			
E0	A8	Upper limit alarm value (CH3)			
E0	B4	Upper limit alarm value (CH4)			
E0	B7	Lower limit alarm existence (CH1)	00H：Non-Monitoring 01H：Monitoring	—	⑤
E0	B9	Lower limit alarm existence (CH2)			
E0	BB	Lower limit alarm existence (CH3)			
E0	BD	Lower limit alarm existence (CH4)			
E0	B8	Lower limit value(CH1)	-32767 to 32767 Within the range from lower limit value to upper limit value	1 step	①
E0	BA	Lower limit value (CH2)			
E0	BC	Lower limit value (CH3)			
E0	BE	Lower limit value (CH4)			
E0	9F	Alarm delay time (CH1)	00H：0sec, 01H：5 sec, 02H：10 sec, 03H：20 sec, 04H：30 sec, 05H：40 sec, 06H：50 sec, 07H：60 sec, 08H：120 sec, 09H：180 sec, 0AH：240 sec, 0BH：300 sec	—	⑤
E0	A4	Alarm delay time (CH2)			
E0	A9	Alarm delay time (CH3)			
E0	B5	Alarm delay time (CH4)			
E0	A0	Alarm reset mode (CH1)	01H：Auto 02H：Hold	—	⑤
E0	A5	Alarm reset mode (CH2)			
E0	AA	Alarm reset mode (CH3)			
E0	B6	Alarm reset mode (CH4)			

⑤EcoMonitorPlus

(Model：EMU4-PX4)

Hex		Content name	EMU4-PX4		Data format
Group (H)	Channel (H)		Range	Setting unit	
87	E2	Operating time measuring (CH1)	00H：Off 01H：On	—	⑤
88	E2	Operating time measuring (CH2)			
8D	E2	Operating time measuring (CH3)			
8E	E2	Operating time measuring (CH4)			
83	E4	Pulse conversion rate(CH1)	0.001 to 10000 Valid for up to four digits. Truncates after five digit.	1×multiplying factor	①
84	E4	Pulse conversion rate(CH2)			
85	E4	Pulse conversion rate(CH3)			
86	E4	Pulse conversion rate(CH4)			
83	E5	Pulse conversion unit (CH1)	00H：N/A, 01H：Wh, 02H：kWh, 03H：MWh, 04H：J, 05H：m^2, 06H：m^3, 07H：l, 08H：kl, 09H：sec, 0AH：min, 0BH：hour, 0CH：piece, 0DH：set, 0EH：g, 0FH：kg, 10H：t, 11H：¥, 12H：$	—	⑤
84	E5	Pulse conversion unit (CH2)			
85	E5	Pulse conversion unit (CH3)			
86	E5	Pulse conversion unit (CH4)			
E0	99	External output signal setting value	00H：N/A 02H：Alarm output 03H：Contact output	—	⑤
E0	9A	External output signal target channel	00H：N/A, 01H：CH1, 02H：CH2, 03H：CH3, 04H：CH4	—	⑤
E0	9C	Upper limit alarm (Ch1)	00H：Off 01H：On	—	⑤
E0	A1	Upper limit alarm (Ch2)			
E0	A6	Upper limit alarm (Ch3)			
E0	B2	Upper limit alarm (Ch4)			
E0	9E	Upper limit value (Ch1)	0.001 to 999999000	1×multiplying factor	②
E0	A3	Upper limit value (Ch2)			
E0	A8	Upper limit value (Ch3)			
E0	B4	Upper limit value (Ch4)			
E0	97	External input signal setting (CH1)	00H：N/A 01H：Pulse input 02H：Contact input	—	⑤
E0	BF	External input signal setting (CH2)			
E0	C0	External input signal setting (CH3)			
E0	C1	External input signal setting (CH4)			
E0	98	Contact input reset mode (CH1)	01H：Auto 02H：Hold	—	⑤
E0	C2	Contact input reset mode (CH2)			
E0	C3	Contact input reset mode (CH3)			
E0	C4	Contact input reset mode (CH4)			
83	01	Pulse count (CH1)	0 to 999999	1 step	⑥
84	01	Pulse count (CH2)			
85	01	Pulse count (CH3)			
86	01	Pulse count(CH4)			
87	01	Operating time (CH1)	0 to 999999	1 step	⑥
88	01	Operating time (CH2)			
8D	01	Operating time (CH3)			
8E	01	Operating time (CH4)			

5.5.7. Unit No.

This No. is used for identify individual circuit where one terminal has multiple same functions (circuits).
Unit No. for respective measuring units are as below:

Model	Unit No.
EMU4-BD1-MB EMU4-HD1-MB EMU4-FD1-MB	1H fixed
EMU4-BM1-MB EMU4-HM1-MB EMU4-LG1-MB EMU4-A2 EMU4-VA2 EMU4-AX4 EMU4-PX4	Input circuit No. = unit No. Refer to below table

For EcoMonitorPlus, 1 basic unit is expanded with up to 3 extension units.
Since input circuit varies according to the type of extension unit, circuit No. (unit No.) of the extension unit varies according to combination of the extension unit.
Confirm input circuit No. based on below table:

(1) Input circuit No. of respective units:

Unit		Input circuit No.
Basic unit	EMU4-BM1-MB EMU4-HM1-MB EMU4-LG1-MB	1
Extension unit	EMU4-A2 EMU4-VA2	2
	EMU4-AX4 EMU4-PX4	1

(2) Combination example:

	Circuit 1	Circuit 2	Circuit 3	Circuit 4	Circuit 5	Circuit 6	Circuit 7
Unit No.	1	2	3	4	5	6	7
Example 1	EMU4-BM1-MB						
Example 2	EMU4-HM1-MB	EMU4-AX4					
Example 3	EMU4-LG1-MB	EMU4-A2					
Example 4	EMU4-BM1-MB	EMU4-AX4	EMU4-AX4	EMU4-PX4			
Example 5	EMU4-BM1-MB	EMU4-A2		EMU4-VA2			
Example 6	EMU4-BM1-MB	EMU4-A2		EMU4-A2		EMU4-AX4	
Example 7	EMU4-BM1-MB	EMU4-A2		EMU4-A2		EMU4-A2	

5.5.8. Data format of Command

Data format obtained from the measuring unit upon communication by command is shown below.

Data: Measurement

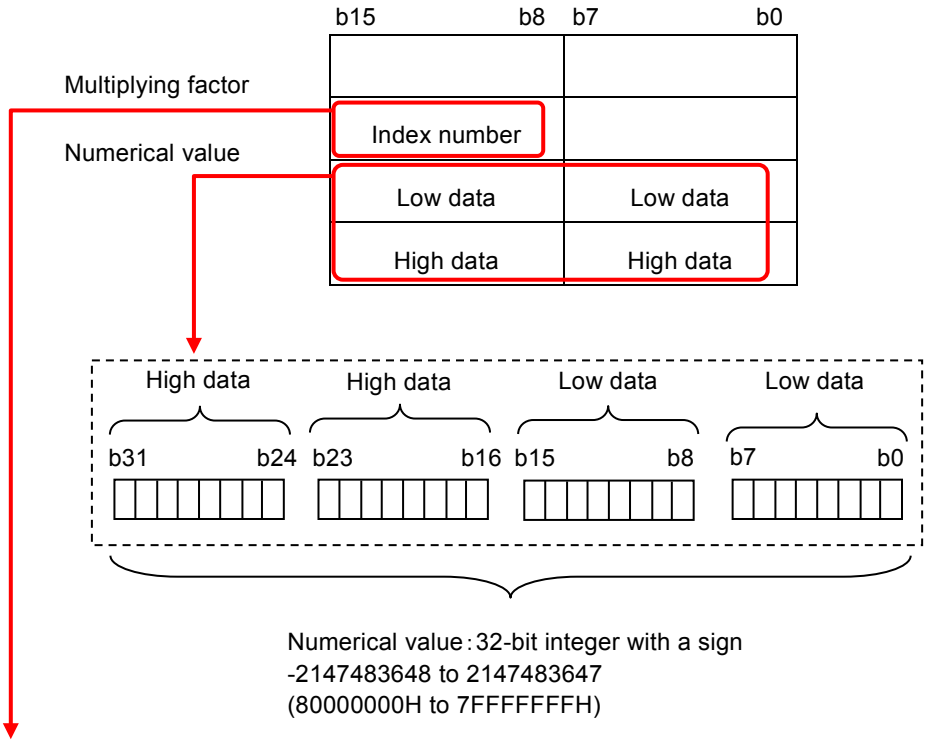
Voltage, Current
Total active power, Total reactive power
Apparent total active power
Total power factor, Frequency, etc.

Data: Setup data

Cutoff
Pulse conversion,
Active energy converted rate,
Alarm value, etc

Format ①

Data Format



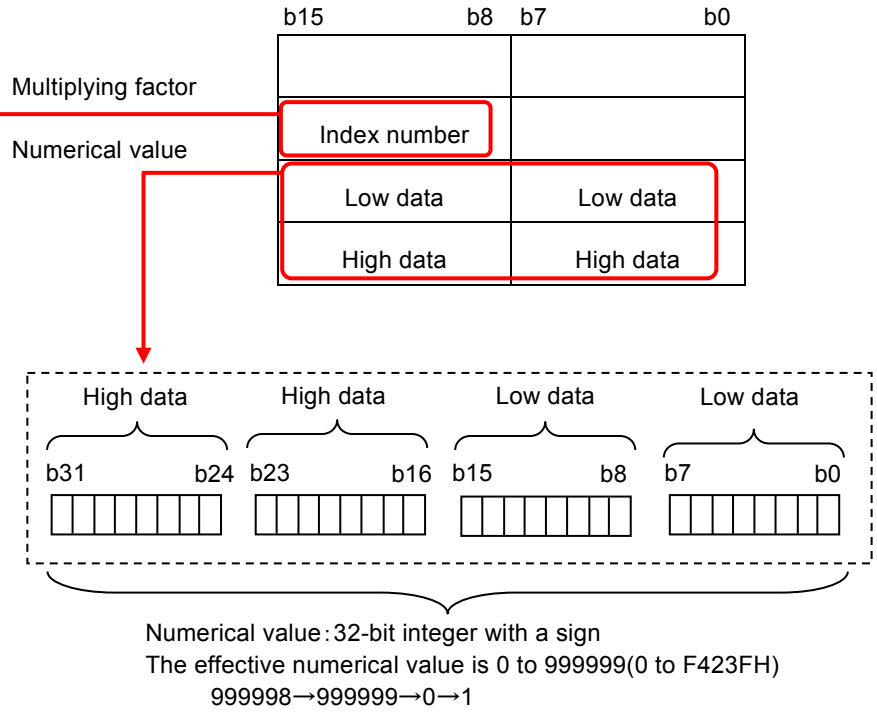
<Multiplicand>

Multiplying factor is fixed for every item according to settings of primary current, primary voltage, and phase wiring.
Refer to [5.6].

Index number								Multiplying factor	Notes
b15	b14	b13	b12	b11	b10	b9	b8		
0H				1H				×10	Actual value = Numerical value × Multiplying factor
0H				0H				×1	
FH				FH				$\times 10^{-1}$	
FH				EH				$\times 10^{-2}$	
FH				DH				$\times 10^{-3}$	

<Example: Active power>

Data	Multiplying factor	Numerical value	Actual value
Total active power	FFH⇒ $\times 10^{-1}$	000000FFH⇒255	255×10^{-1} =25.5[kW]
	00H⇒ ×1	000000FFH⇒255	255 ×1=255[kW]
	FFH⇒ $\times 10^{-1}$	FFFFFF01H⇒-255	-255×10^{-1} =-25.5[kW]
	00H⇒ ×1	FFFFFF01H⇒-255	-255 ×1=-255[kW]
Power factor	FFH⇒ $\times 10^{-1}$	000003E3H⇒995	995×10^{-1} =99.5[%]
	FFH⇒ $\times 10^{-1}$	FFFFFC1DH⇒-995	-995×10^{-1} =-99.5[%]
Frequency	FFH⇒ $\times 10^{-1}$	00000258H⇒600	600×10^{-1} =60.0[Hz]

Data	Data Format
Measurement Active energy, Reactive energy, Operating time, Active energy converted, Periodic active energy, Pulse conversion value, etc. Setup data Active energy, Reactive energy, Leak current (step1) Upper limit alarm value Format ②	 Numerical value : 32-bit integer with a sign The effective numerical value is 0 to 999999(0 to F423FH) 999998→999999→0→1 <Multiplicand> Multiplying factor is fixed for every item according to settings of primary current, primary voltage, and phase wiring. Refer to [5.6].

Index number								Multiplying factor	Notes
b15	b14	b13	b12	b11	b10	b9	b8		
0H				4H				$\times 10^{4}$	Actual value = Numerical value × Multiplying factor
0H				3H				$\times 10^{3}$	
0H				2H				$\times 10^{2}$	
0H				1H				$\times 10$	
0H				0H				$\times 1$	
FH				FH				$\times 10^{-1}$	
FH				EH				$\times 10^{-2}$	
FH				DH				$\times 10^{-3}$	
FH				CH				$\times 10^{-4}$	
FH				BH				$\times 10^{-5}$	

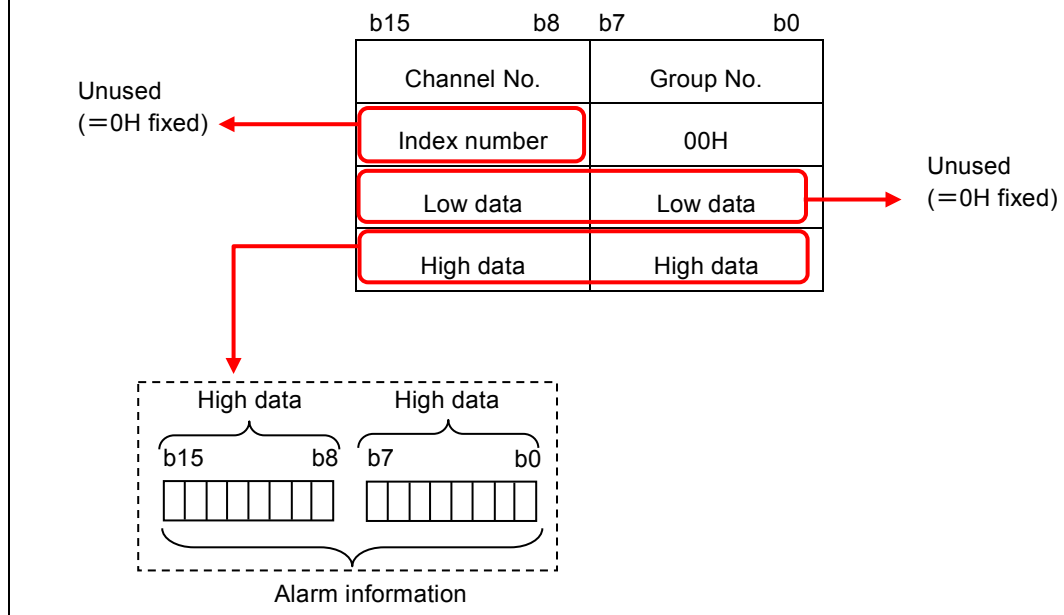
<Example: Active power>

Data	Multiplying factor	Numerical value	Actual value
Active energy	FFH⇒ $\times 10^{-1}$	000000FFH⇒255	$255 \times 10^{-1} = 25.5$[kWh]
	00H⇒ $\times 1$	000000FFH⇒255	$255 \times 1 = 255$[kWh]

<Ex. of set-up value: Active energy (Inst)>

Used when presetting for maintenance.

Measurement items	Actual value	Multiplying factor	Numerical value
Active energy	Set-up value =22.83[kWh] (Effective range = 2 digits after the decimal point)	$\times 10^{-2}$→FEH	2283→000008EBH

Data	Data Format
Alarm information Format ③	 * See details as below.

<The allocation of the alarm state>

① Alarm state 1

	Bit	Set data			EMU4-BD1-MB	EMU4-HD1-MB	EMU4-FD1-MB
		Description	OFF(0)	ON(1)			
High data	b0	Alarm Pulse count	Non-Alarm state	Alarm state	—	○	○
	b1	Unused	—	—	—	—	—
	b2	Alarm demand current	Non-Alarm state	Alarm state	—	○	○
	b3	Alarm demand electric power	Non-Alarm state	Alarm state	—	○	○
	b4	Contact input	OFF (Open)	ON (Close)	—	○	○
	b5	Alarm (Total)	Non-Alarm state	Alarm state	—	○	○
	b6	Unused	—	—	—	—	—
	b7	Unused	—	—	—	—	—
High data	b8	Alarm voltage	Non-Alarm state	Alarm state	—	○	○
	b9	Unused	—	—	—	—	—
	b10	Unused	—	—	—	—	—
	b11	Unused	—	—	—	—	—
	b12	Unused	—	—	—	—	—
	b13	Alarm power factor	Non-Alarm state	Alarm state	—	○	○
	b14	Unused	—	—	—	—	—
	b15	Unused	—	—	—	—	—

Note 1: b0(Alarm pulse count) is available only when External input signal setting value of EMU4-HD1-MB, EMU4-FD1-MB is set as “pulse input.”

Note2: b4(Contact input) is available only when External input signal setting value of EMU4-HM1-MB, EMU4-FD1-MB is set as “contact input.”

	Bit	Set data			EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	EMU4-A2 EMU4-VA2
		Description	OFF(0)	ON(1)				
High data	b0	Alarm Pulse conversion count	Non-Alarm state	Alarm state	—	○	—	—
	b1	Unused	—	—	—	—	—	—
	b2	Alarm demand current	Non-Alarm state	Alarm state	○	○	—	○
	b3	Alarm demand electric power	Non-Alarm state	Alarm state	○	○	—	○
	b4	Contact input	OFF (Open)	ON (Close)	—	○	—	—
	b5	Alarm (Total)	Non-Alarm state	Alarm state	○	○	—	○
	b6	Alarm current unbalance rate	Non-Alarm state	Alarm state	○	○	—	○
	b7	Alarm voltage unbalance rate	Non-Alarm state	Alarm state	○	○	—	○
High data	b8	Alarm voltage	Non-Alarm state	Alarm state	○	○	—	○
	b9	Alarm1 leak current	Non-Alarm state	Alarm state	—	—	○	—
	b10	Alarm2 leak current	Non-Alarm state	Alarm state	—	—	○	—
	b11	Alarm1 leak current for resistance	Non-Alarm state	Alarm state	—	—	○	—
	b12	Alarm2 leak current for resistance	Non-Alarm state	Alarm state	—	—	○	—
	b13	Alarm power factor	Non-Alarm state	Alarm state	○	○	—	○
	b14	Unused	—	—	—	—	—	—
	b15	Unused	—	—	—	—	—	—

Note1: b0 (Alarm Pulse conversion count) is available only when External input signal setting value of EMU4-HM1-MB is set as “pulse input”.

Note2: Alarm Pulse conversion count is monitorable by both alarm1 and alarm2.

Note3: b4 (Contact input) is available only when External input signal setting value of EMU4-HM1-MB is set as “contact input.”

	Bit	Set data			EMU4-AX4	EMU4-PX4
		Description	OFF(0)	ON(1)		
High data	b0	Upper and lower alarm(CH1)	Non-Alarm state	Alarm state	○	○
	b1	Upper and lower alarm(CH2)	Non-Alarm state	Alarm state	○	○
	b2	Upper and lower alarm(CH3)	Non-Alarm state	Alarm state	○	○
	b3	Upper and lower alarm(CH4)	Non-Alarm state	Alarm state	○	○
	b4	Contact input(CH1)	OFF (Open)	ON (Close)	—	○
	b5	Alarm (Total)	Non-Alarm state	Alarm state	○	○
	b6	Contact input(CH2)	OFF (Open)	ON (Close)	—	○
	b7	Contact input(CH3)	OFF (Open)	ON (Close)	—	○
High data	b8	Contact input(CH4)	OFF (Open)	ON (Close)	—	○
	b9	Unused	—	—	—	—
	b10	Unused	—	—	—	—
	b11	Unused	—	—	—	—
	b12	Unused	—	—	—	—
	b13	Unused	—	—	—	—
	b14	Unused	—	—	—	—
	b15	Unused	—	—	—	—

Note1: b0 to b3 (Upper and lower limit alarm) is available only for upper limit alarm as for EMU4-PX4

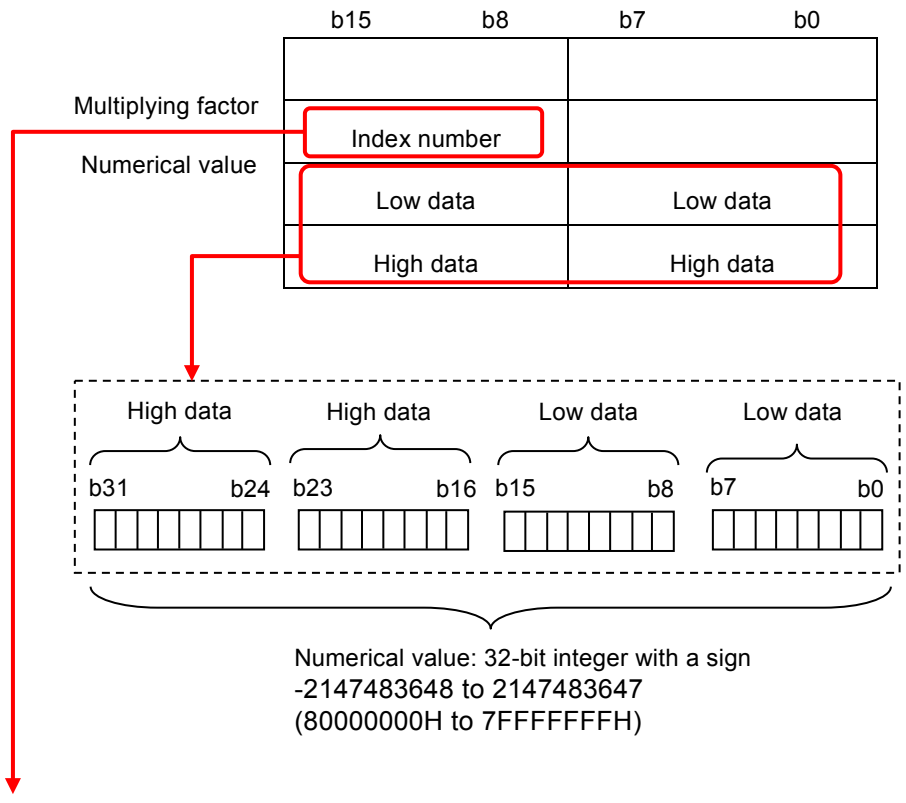
Note2: As to EMU4-PX4, b0 to b3 (Upper limit alarm) is available only when External input signal setting of each CH is set as “Pulse input.” Besides, bit b4, b6 to b8 (Contact input) are available only when External input signal setting of each CH is set as “Contact input.”

②Alarm state 2

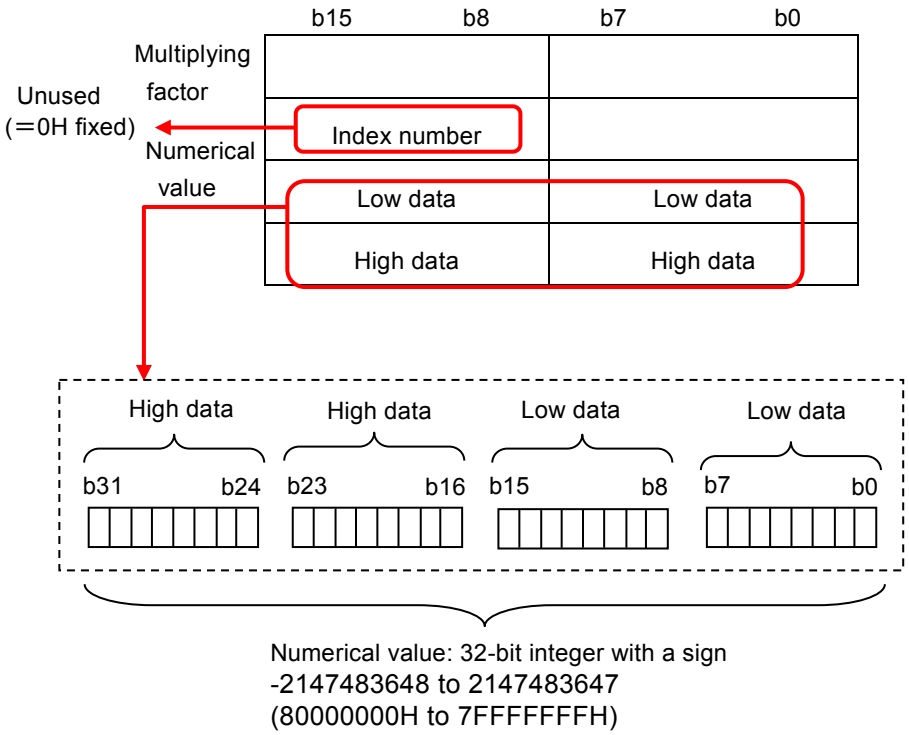
	Bit	Set data			EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	EMU4-A2 EMU4-VA2
		Description	OFF(0)	ON(1)				
High data	b0	Alarm Pulse conversion count	Non-Alarm state	Alarm state	—	○	—	—
	b1	Unused	—	—	—	—	—	—
	b2	Alarm demand current (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
	b3	Alarm demand electric power (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
	b4	Unused	—	—	—	—	—	—
	b5	Alarm (Total) (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
	b6	Unused	—	—	—	—	—	—
	b7	Unused	—	—	—	—	—	—
High data	b8	Alarm voltage	Non-Alarm state	Alarm state	○	○	—	○
	b9	Io 1 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
	b10	Io 2 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
	b11	Ior 1 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
	b12	Ior 2 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
	b13	Alarm power factor (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
	b14	Unused	—	—	—	—	—	—
	b15	Unused	—	—	—	—	—	—

Note 1： b0(Alarm Pulse conversion count) is available only when External input signal setting value of the EMU4-HM1-MB is set as “pulse input.”

Note2: Alarm Pulse conversion count is monitorable by both alarm1 and alarm2.

Data	Data Format
Setup data Primary current Primary voltage (L-L) Primary voltage (L-N) Secondary voltage (L-L/L-N) Format ④	 <Multiplicand> Multiplying factor is fixed for every item according to settings of primary current, primary voltage. Refer to [5.6]. Effective Range corresponding to the setup value. The setup value is arranged according to the Effective Range. Index number is changed. <Example: Primary current, Primary voltage>

Set-up value	Set-up description	Multiplying factor	Numerical value
Primary current,	Set-up value = 100. 00A (Effective range = 2 digits after the decimal point)	$\times 10^{-2} \Rightarrow$FEH	10000⇒00002710H
	Set-up value = 400.0A (Effective range = 1 digit after the decimal point)	$\times 10^{-1} \Rightarrow$FFH	4000⇒00000FA0H
Primary voltage	Set-up value = 110. 0V (Effective range = 1 digit after the decimal point)	$\times 10^{-1} \Rightarrow$FFH	1100⇒0000044CH
	Set-up value = 3300V (Effective range = integer)	$\times 1 \Rightarrow$00H	3300⇒00000CE4H

Data	Data Format
Setup data Phase wiring Time constant for DA Time constant for DW Model code 5A/Direct Set-up value, etc. Format ⑤	 Numerical value: 32-bit integer with a sign -2147483648 to 2147483647 (80000000H to 7FFFFFFFH) < Data (Numerical value)> ① Phase wiring ② Time constant for DA, Time constant for DW Set as the range from 0 sec (= 0H) to 1800 sec (= 708H). ③ Model code ④ 5A/Direct

① Phase wiring

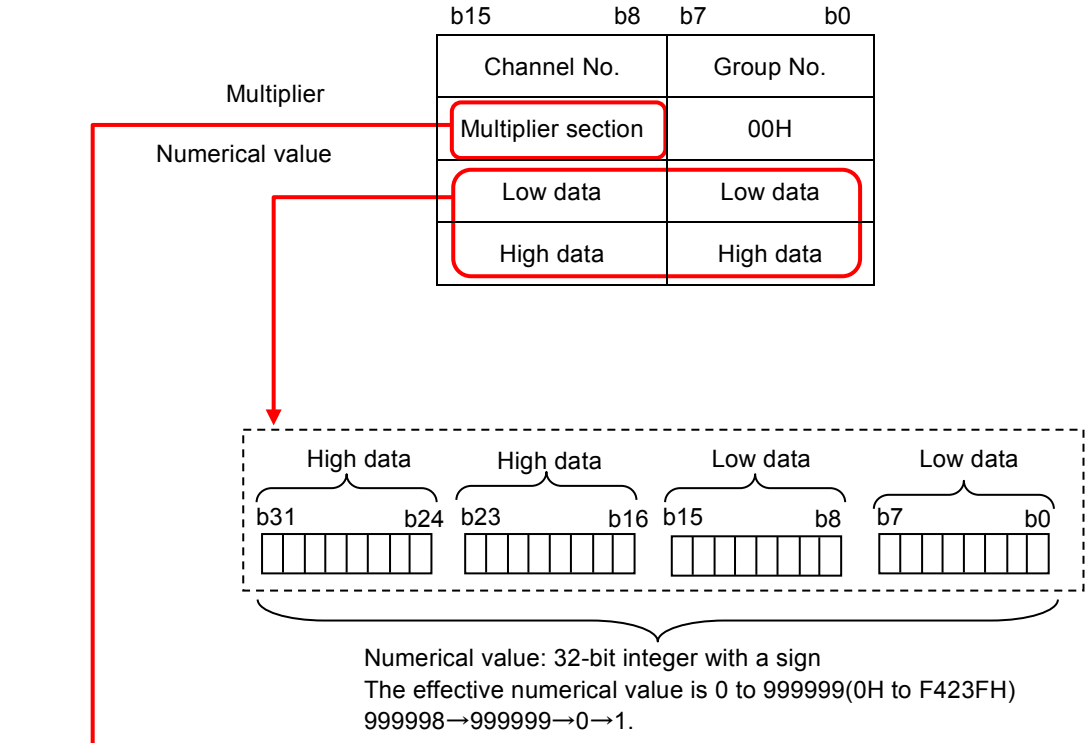
Phase wiring	Data
Single phase 2 wire(1P2W)	1H
Single phase 3 wire(1P3W)	2H
Three phase 3 wire(3P3W)	3H
Three phase 4 wire(3P4W)	4H

③ Model code

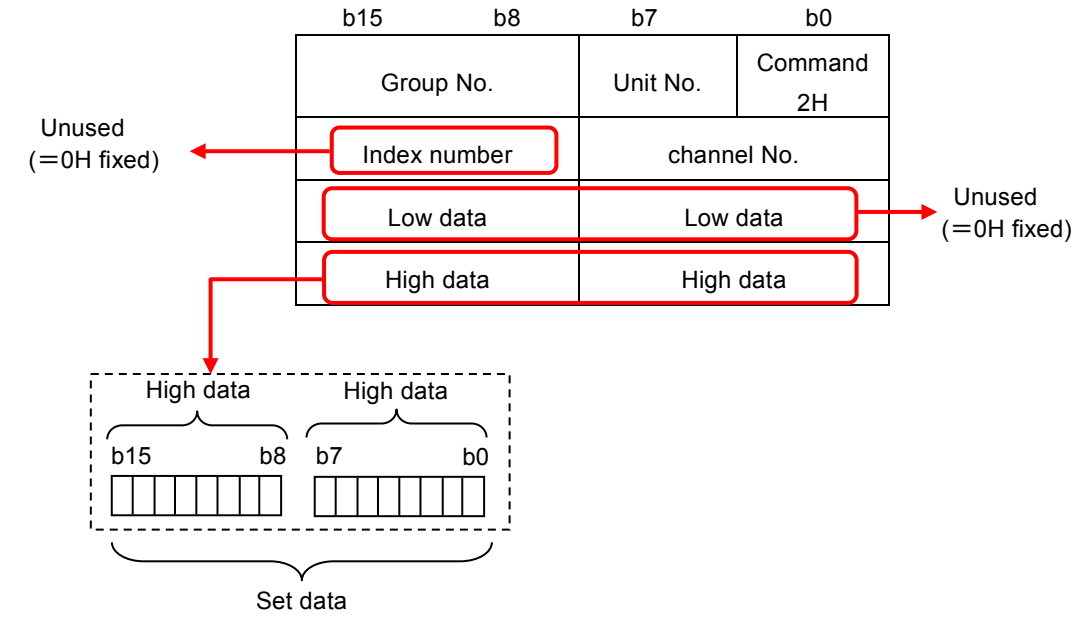
Model	Data
EMU4-BD1-MB	1H
EMU4-HD1-MB	2H
EMU4-FD1-MB	BH
EMU4-BM1-MB	3H
EMU4-HM1-MB	4H
EMU4-A2	5H
EMU4-VA2	6H
EMU4-LG1-MB	7H
EMU4-AX4	9H
EMU4-PX4	AH

④ 5A/Direct

Setting	Data
Direct sensor	0H
5A sensor	2H

Data	Data Format
Measurement Pulse count Operating time Alarm count etc. Format ⑥	 Numerical value: 32-bit integer with a sign The effective numerical value is 0 to 999999(0H to F423FH) 999998→999999→0→1. < Multiplier description> Multiplier section = 00H(fixed)： Multiplying factor×1 (Numerical value×1 is real number) <Example: Measured data>

Set-up value	Multiplying factor	Numerical value	Actual value
Pulse count	00H⇒×1	000000FFH⇒255	255×1＝255 [pulse]
Operating time	00H⇒×1	0000003CH⇒60	60×1＝60 [hour]

Data	Data Format
Setup data 16bit set register Format ⑦	 Note: Do not set value other than 0H for 0H fixed. 16bit set register: refer to below table

	Bit	Data			EMU4-BD1-MB	EMU4-HD1-MB	EMU4-FD1-MB	Note
		Description	OFF(0)	ON(1)				
High data	b0	Reset of all alarm	Not reset	executed	—	○	○	
	b1	Reset of all max/min value and counting of energy	Not reset	executed	○	○	○	Note 1
	b2	Reset of all max/min value	—	—	—	—	—	
	b3	Reset alarm count	—	—	—	—	—	
	b4	Unusable	—	—	—	—	—	
	b5	Unusable	—	—	—	—	—	
	b6	Unusable	—	—	—	—	—	
	b7	Unusable	—	—	—	—	—	
High data	b8	Clear contact input latch	Not clear	clear	—	○	○	
	b9	Reset external input	Not reset	executed	—	○	○	Note2
	b10	Unusable	—	—	—	—	—	
	b11	Unusable	—	—	—	—	—	
	b12	Unusable	—	—	—	—	—	
	b13	Unusable	—	—	—	—	—	
	b14	Reset active energy	Not reset	executed	○	○	○	
	b15	Unusable	—	—	—	—	—	

Note 1: Integrated value is reset depending on the models as below:

EMU4-BD1-MB: Active energy, Reactive energy, Operating time.

EMU4-HD1-MB: Active energy, Reactive energy, Pulse count, Operating time, Periodic active energy, CO2 conversion value.

EMU4-FD1-MB: Active energy, Reactive energy, Pulse count, Operating time, Periodic active energy, CO2 conversion value.

Note 2: Items are reset depending on the models as below:

EMU4-BD1-MB: Operating time.

EMU4-HD1-MB: Pulse count, Operating time, Periodic active energy, CO2 conversion value.

EMU4-FD1-MB: Pulse count, Operating time, Periodic active energy, CO2 conversion value.

	Bit	Set data			EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	EMU4-A2 EMU4-VA2	Note
		Description	OFF(0)	ON(1)					
High data	b0	Reset of all alarm	Not reset	executed	○	○	○	○	
	b1	Reset of all max/min value and counting of energy	Not reset	executed	○	○	—	○	Note 1
	b2	Reset of all max/min value	—	—	○	○	○	○	
	b3	Reset alarm count	—	—	—	—	○	—	
	b4	Unusable	—	—	—	—	—	—	
	b5	Unusable	—	—	—	—	—	—	
	b6	Unusable	—	—	—	—	—	—	
	b7	Unusable	—	—	—	—	—	—	
High data	b8	Clear contact input latch	Not clear	clear	—	○	—	—	
	b9	Reset external input	Not reset	executed	—	○	—	—	Note2
	b10	Unusable	—	—	—	—	—	—	
	b11	Unusable	—	—	—	—	—	—	
	b12	Unusable	—	—	—	—	—	—	
	b13	Unusable	—	—	—	—	—	—	
	b14	Reset active energy	Not reset	executed	○	○	—	○	
	b15	Unusable	—	—	—	—	—	—	

Note 1: Integrated value is reset depending on the models as below:

EMU4-BM1-MB:Active energy, Reactive energy, Operating time.

EMU4-HM1-MB：Active energy, Reactive energy, Pulse count, Pulse conversion value, Operating time, Periodic active energy, Active energy converted.

EMU4-A2, EMU4-VA2：Active energy, Reactive energy, Operating time, Active energy converted.

Note 2: Items are reset depending on the models as below:

EMU4-BM1-MB：Operating time.

EMU4-HM1-MB：Pulse count, Pulse conversion value, Operating time, Periodic active energy, Active energy converted.

EMU4-A2, EMU4-VA2：Operating time, Active energy converted.

	Bit	Set data			EMU4-AX4	Note
		Description	OFF(0)	ON(1)		
High data	b0	Alarm reset	Not reset	Reset	○	
	b1	Unused	—	—	—	
	b2	Reset max and min value	Not reset	Reset	○	
	b3	Unused	—	—	—	
	b4	Number over Limit A to D (All channel)	Not reset	Reset	○	
	b5	Contact output	OFF(Open)	ON(Close)	○	Note 3
	b6	Unused	—	—	—	
	b7	Unused	—	—	—	
High data	b8	Unused	—	—	—	
	b9	Unused	—	—	—	
	b10	Unused	—	—	—	
	b11	Unused	—	—	—	
	b12	Unused	—	—	—	
	b13	Unused	—	—	—	
	b14	Unused	—	—	—	
	b15	Unused	—	—	—	

Note3: This is available only when external output signal setting is set as “Contact output.”

	Bit	Set data			EMU4-PX4	Note
		Description	OFF(0)	ON(1)		
High data	b0	Alarm reset	Not reset	Reset	○	
	b1	Reset integrated value	Not reset	Reset	○	Note 1
	b2	Unused	—	—	—	
	b3	Unused	—	—	—	
	b4	Unused	—	—	—	
	b5	Contact output	OFF(Open)	ON(Close)	○	Note 3
	b6	Unused	—	—	—	
	b7	Unused	—	—	—	
High data	b8	Clear contact input latch	Not clear	Clear	○	
	b9	Reset external input	Not reset	Reset	○	Note 2
	b10	Unused	—	—	—	
	b11	Unused	—	—	—	
	b12	Unused	—	—	—	
	b13	Unused	—	—	—	
	b14	Unused	—	—	—	
	b15	Unused	—	—	—	

Note1: Integrated value is reset as below.

Pulse count, Pulse conversion value, Operating time

Note2: Contents are reset as below.

Pulse count, Pulse conversion value, Operating time

Note3: This is available only when external output signal setting is set as “Contact output.”

5.6. Effective Range and Multiplicand

The conditions of multiplying factor by setup of each element are shown below.

Element	Condition	Mode	Multiplying factor
Active power Active power demand Reactive power Apparent power	Refer to (1) Data format of Electric power, Active power demand, Reactive power and Apparent power.		
Active energy Reactive energy Periodic active energy Active energy converted	Refer to (2) Data format of Active energy, Reactive energy, Periodic active energy and Active energy converted.		
Voltage Harmonics voltage	Refer to (3) Data format of Voltage and Harmonics voltage.		
Current Current demand Harmonics current	Refer to (4) Data format of Current, Current demand and Harmonics current.		
Pulse conversion	Refer to (5) Data format of Pulse conversion.		
Frequency	-	-	×0.1
Power factor	-	-	×0.1
Content rate Harmonics distortion	-	-	×0.1
Leak current Leak current for resistance	Measuring mode	Low SENS	×1
		High SENS	×0.01
Alarm count	-	-	×1
Number over limit A to D	Number over limit multiplying factor setting	×1	×1
		×10	×10
		×100	×100
		×1000	×1000

* SENS: Sensitivity

(1) As to data format of Active power, Active power demand, Reactive power and Apparent power
Multiplicand of Active power, Active power demand, Reactive power and Apparent power is depending on the Full load power as below:

$$\text{Full load power [kW]} = \frac{\alpha \times (\text{Primary voltage}) \times (\text{Primary current})}{1000}$$

α:		
	1	1P2W
	2	1P3W
	$\sqrt{3}$	3P3W
	3	3P4W

*1 VT Primary voltage is calculated by 110V upon setting of 1P3W.
*2 Direct voltage is used for calculation upon setting of direct voltage.
*3 Primary voltage is calculated by phase voltage upon setting of 3P4W.

Full load power [kW]		Multiplying factor
	Less than 12	0.001
12 or more	Less than 120	0.01
120 or more	Less than 1200	0.1
1200 or more	Less than 12000	x 1
12000 or more	Less than 120000	x 10
120000 or more	Less than 1200000	x 100

(2) As to data format of Active energy, Reactive energy, Periodic active energy and Active energy converted.
Multiplicand of Active energy, Reactive energy, Periodic active energy and Active energy converted is depending on the full load power as below:
* Refer to (1) for the formula:

Full load power [kW]		Multiplying factor	Data digit
	Less than 12	0.01	0 to 9999.99kWh
12 or more	Less than 120	0.1	0 to 99999.9kWh
120 or more	Less than 1200	x 1	0 to 999999kWh
1200 or more	Less than 12000	x 10	0 to 9999990kWh
12000 or more	Less than 120000	x 100	0 to 99999900kWh
120000 or more	Less than 1200000	x 1000	0 to 999999000kWh
1200000 or more		(Note 1)	(Note 2)

Note 1: Multiplying factor is ×1000 for Active energy, Reactive energy, Periodic active energy, ×10000 for Active energy converted.
Note 2: Data digit is 0 to 999999000kWh for Active energy, Reactive energy, Periodic active energy, 0 to 9999990000kWh for Active energy converted.

(3) Voltage and Harmonics voltage data format

①EcoMonitorLight

Primary voltage (Note 1)		EMU4-BD1-MB EMU4-HD1-MB EMU4-FD1-MD
	Less than 300V	Decimal 1 digit
300V or more		Intenger×1

Note 1 ： This value is primary voltage (phase voltage) when wire phase system is 3P4W.

②EcoMonitorPlus

Primary voltage (Note 1)		EMU4-BM1-MB EMU4-HM1-MB EMU4-A2 EMU4-VA2
	Less than 300V	Decimal 1 digit
300V or more	Less than 3000V	Intenger×1
3000V or more		Intenger×10

Note 1 ： This value is primary voltage (phase voltage) when wire phase system is 3P4W.

(4) Current, demand current, harmonics current data format

Primary current		EMU4-BD1-MB EMU4-HD1-MB EMU4-FD1-MB EMU4-BM1-MB EMU4-HM1-MB EMU4-A2 EMU4-VA2
	Less than 40A	Decimal 3 digit
40A or more	Less than 400A	Decimal 2 digit
400A or more	Less than 4000A	Decimal 1 digit
4000A or more		Intenger×1

(5) Pulse conversion data

Pulse conversion rate		EMU4-HM1-MB EMU4-PX4
0.001 or more	Less than 0.01	Decimal 3 digit
0.01 or more	Less than 0.1	Decimal 2 digit
0.1 or more	Less than 1	Decimal 1 digit
1 or more	Less than 10	Intenger×1
10 or more	Less than 100	Intenger×10
100 or more	Less than 1000	Intenger×100
1000 or more	Less than 10000	Intenger×1000

5.7. Error code list

Error codes shown below are returned to the link device RWr as reply data, when a command sent to the measuring unit and related data thereof are error.

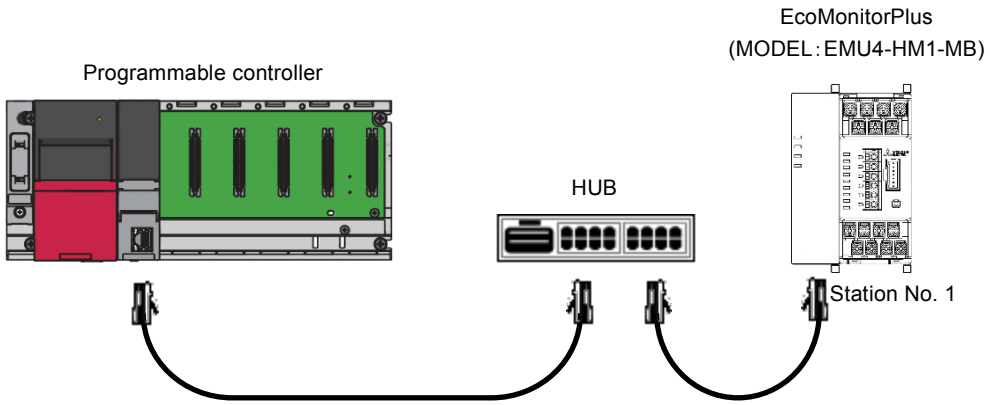
Error Description	Error Code (Hex.)
Illegal command or packet length	40H
Invalid group number	41H
Invalid channel number	42H
Measuring Unit is in set-up mode	43H
	44H
Invalid unit number	45H
Invalid data for set-up	51H

6. Sample program

6.1. Sample program for setting the measuring unit

Sample program for various setting of the measuring unit via CC-Link IEFB.
This sample program is not needed for setting by the measuring unit itself (EcoMonitorLight: Display and button built into the main body, EcoMonitorPlus: Display unit).
(1) Setting of network configuration:

- The number of unit to be connected.
  1 unit (model:EMU4-HM1-MB)
- Timeout period.
  300ms
- Count
  3 times



(2) Refresh setting:

- Parameter allocation:
  RX:X1000
  RY:Y1000
  RWr:W0
  RWw:W1000

(3)Device allocation:

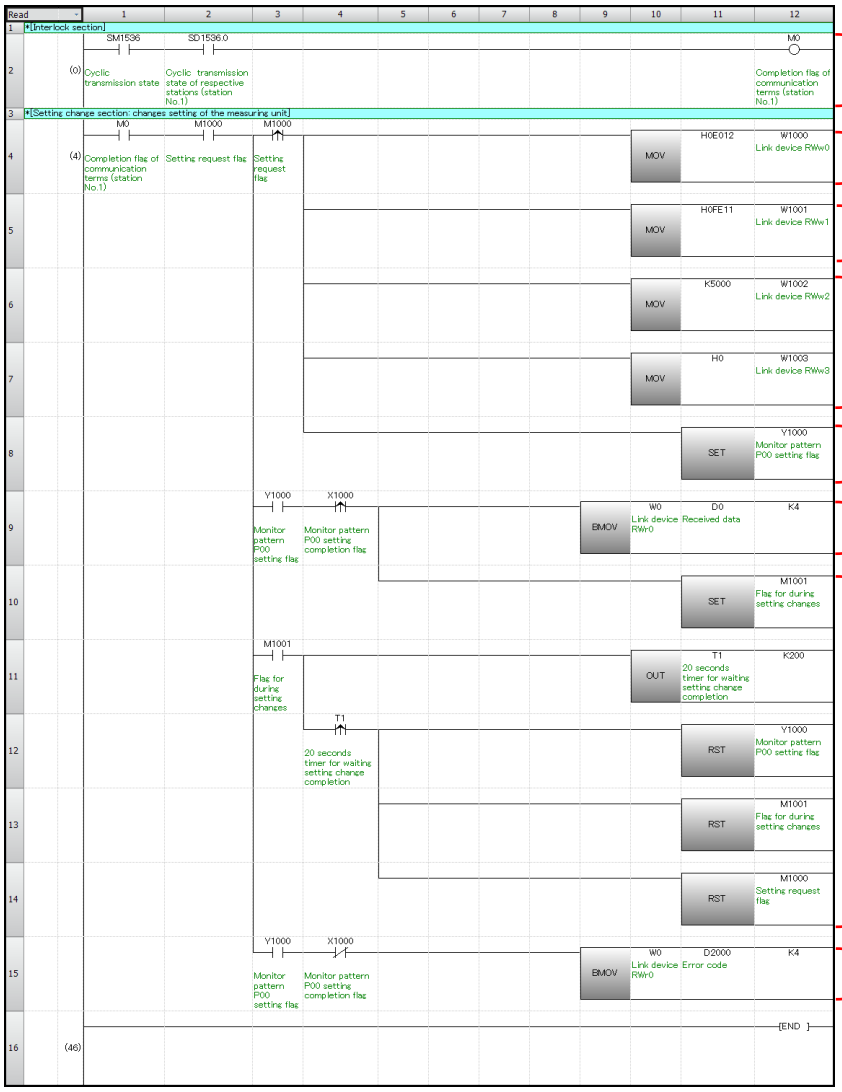
Device	Details
SM1536	It turns ON when starting cyclic transmission. *It varies according to series of programmable controller. Refer to [CC-Link IE Field Network Basic Reference Manual]
SD1536.0	It stores the state of cyclic transmission of the master station and slave station (station No.1). * It varies according to series of programmable controller. Refer to [CC-Link IE Field Network Basic Reference Manual]
M0	Internal device (changeable by user). It is an interlocking for executing processing at the timing of when cyclic transmission is normally performed between the master station and slave station.
M1000	Internal device (changeable by user). The measuring unit is set by turning this device ON.
M1001	It can counts waiting time (20 seconds) until setting change of the measuring unit is completed.
T1	
Y1000	Monitor pattern P00 setting flag
X1000	Monitor pattern P00 setting completion flag
W0 to W1F	Link devices RWr.
W1000 to W101F	Link devices RWw
D0 to D3	Device for storing data from the measuring unit
D2000 to D2003	Device for storing error codes

(4) Sample program

Program example for setting below data to the measuring unit.

station No.		1
unit No.		1
setting contents		setting value for primary current
	group No.	E0H
	channel No.	11H
	index number	10^{-2}(FEH)
	setting value	50A(K5000)

6. Sample program



It is an interlocking for indicating execution of processing at the timing of when cyclic transmission is normally performed between the master station and slave station.

Store the following into W1000(RWw00)
[Group No.+ unit No.+ command(2H)]
→E0+1+2→E012H

Store the following into W1001(RWw01)
[Index number + channel No.]
→FE+11→FE11H

Store the following into W1002, 1003(RWw02, 03)
[Setting value]
W1002：K5000
W1003：0000H

ON the monitor pattern setting completion flag P00 for sending commands to the measuring unit

When the monitor pattern setting flag P00 is ON and monitor pattern setting completion flag P00 is ON, data stored from W0 to W3 (RWr00 to RWr03) is stored from D0 to D3.

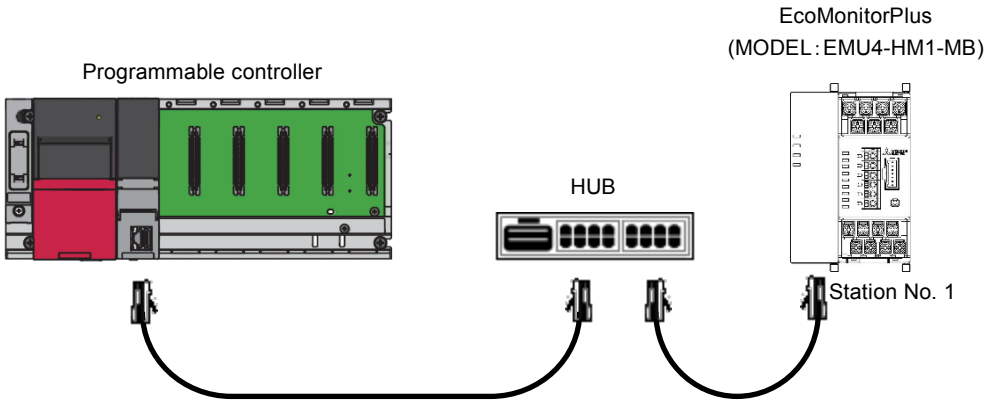
It can wait for 20 seconds until setting change of the measuring unit is completed after monitor pattern P00 setting completion flag is ON.

Where monitor pattern P00 setting flag is ON, and monitor pattern P00 setting completion flag is OFF, error code stored in W0 to W3(RWr00 to RWr03) is stored into D2000 to D2003.

6.2. Sample program for obtaining measurement value by [monitor pattern communication]

Sample program for obtaining measurement value of the measuring unit using monitor pattern communication.
(1) Setting of network configuration:

- The number of unit to be connected.
  1 unit (model：EMU4-HM1-MB)
- Timeout period.
  300ms
- Count
  3 times



(2) Refresh setting:

- Parameter allocation:
  RX：X1000
  RY：Y1000
  RWr：W0
  RWw：W1000

(3) Device allocation:

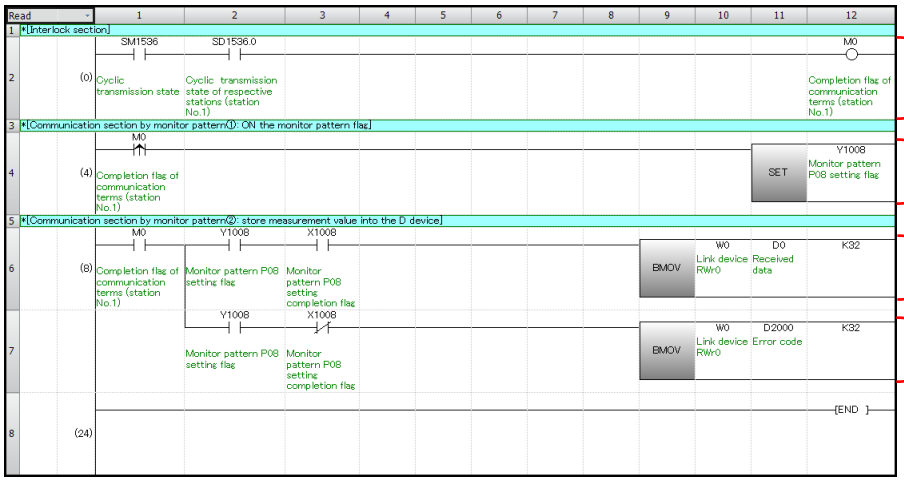
Device	Details
SM1536	It turns ON when starting cyclic transmission. *It varies according to series of programmable controller. Refer to [CC-Link IE Field Network Basic Reference Manual]
SD1536.0	It stores the state of cyclic transmission of the master station and slave station (station No.1). * It varies according to series of programmable controller. Refer to [CC-Link IE Field Network Basic Reference Manual]
M0	Internal device (changeable by user). It is an interlocking for executing processing at the timing of when cyclic transmission is normally performed between the master station and slave station.
Y1008	Monitor pattern P08 setting flag
X1008	Monitor pattern P08 setting completion flag
W0 to W1F	Link devices RWr
D0 to D31	Device for storing data obtained by monitor pattern communication. Data to be stored varies depending on monitor pattern. Data obtained by monitor pattern P08 of this program as following:
D2000 to D2031	Devices for storing an error code.

Device D0 to D31	Description		Remarks
D0	Phase 1 current (Inst)	2101H	Channel No.(21H), Group No.(01H)
D1		Index number	Measurement value = data area × multiplying factor
D2, D3		Data area	
D4	Phase 2 current (Inst)	4101H	Channel No.(41H), Group No.(01H)
D5		Index number	Measurement value = data area × multiplying factor
D6, D7		Data area	
D8	Phase 3 current (Inst)	6101H	Channel No.(61H), Group No.(01H)
D9		Index number	Measurement value = data area × multiplying factor
D10, D11		Data area	
D12	1-2 voltage (Inst)	2105H	Channel No.(21H), Group No.(05H)
D13		Index number	Measurement value = data area × multiplying factor
D14, D15		Data area	
D16	2-3 voltage (Inst)	4105H	Channel No.(41H), Group No.(05H)
D17		Index number	Measurement value = data area × multiplying factor
D18, D19		Data area	
D20	3-1 voltage (Inst)	6105H	Channel No.(61H), Group No.(05H)
D21		Index number	Measurement value = data area × multiplying factor
D22, D23		Data area	
D24	Active power (Inst)	0107H	Channel No.(01H), Group No.(07H)
D25		Index number	Measurement value = data area × multiplying factor
D26, D27		Data area	
D28	Active energy(import)	0180H	Channel No.(01H), Group No.(80H)
D29		Index number	Measurement value = data area × multiplying factor
D30, D31		Data area	

* Inst.: Instantaneous value.

(4) Sample program

Sample program for reading measurement items on the device of programmable controller using monitor pattern P08.



It is an interlocking for indicating execution of processing at the timing of when cyclic transmission is normally performed between the master station and slave station

ON the monitor pattern P08 setting flag.

When the monitor pattern P08 setting flag is ON, and monitor pattern setting completion flag P08 is ON, data stored in W0 to W1F(RWr00 to RWr1F) is stored into D0 to D31.

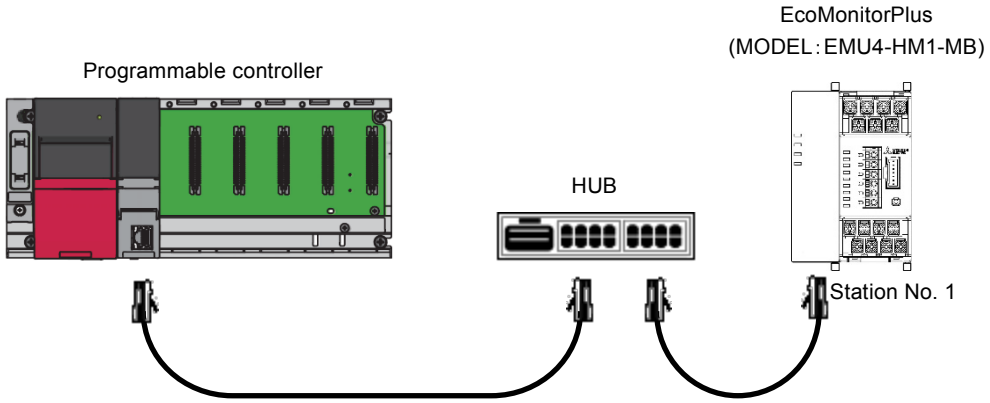
When the monitor pattern P08 setting flag is ON and monitor pattern P08 setting completion flag is OFF, an error code stored in W0 to W1F(RWr00 to RWr1F) is stored in D2000 to D2031.

6.3. Sample program for obtaining data by [Communication by command]

Sample program for obtaining data of the measuring unit using command.

(1) Setting of network configuration:

- The number of unit to be connected.
  1 unit (model：EMU4-HM1-MB)
- Timeout period.
  300ms
- Count
  3 times



(2) Refresh setting:

- Parameter allocation:
  RX：X1000
  RY：Y1000
  RWr：W0
  RWw：W1000

(3) Device allocation:

Device	Details
SM1536	It turns ON when starting cyclic transmission. * It varies according to series of programmable controller. Refer to [CC-Link IE Field Network Basic Reference Manual]
SD1536.0	It stores the state of cyclic transmission of the master station and slave station (station No.1). * It varies according to series of programmable controller. Refer to [CC-Link IE Field Network Basic Reference Manual]
M0	Internal device (changeable by user). It is an interlocking for executing processing at the timing of when cyclic transmission is normally performed between the master station and slave station.
SM402	Internal device (changeable by user). Measurement data is obtained by turning this device ON.
Y1000	Monitor pattern P00 setting flag
X1000	Monitor pattern P00 setting completion flag
W0 to W1F	Link devices RWr
W1000 to W101F	Link devices RWw
D0 to D31	Device for storing data obtained by command. Data to be stored varies depending on command. Data obtained by command of this program as following:
D2000 to D2031	Device for storing error codes

Device D0 to D31	Description		Remarks
D0	Average current (Inst)	0101H	Channel No.(01H), Group No.(01H)
D1		Index number	Measurement value＝data area×multiplying factor
D2, D3		Data area	
D4	Average voltage (Inst)	0105H	Channel No.(01H), Group No.(05H)
D5		Index number	Measurement value＝data area×multiplying factor
D6, D7		Data area	
D8	Active power (Inst)	0107H	Channel No.(01H), Group No.(07H)
D9		Index number	Measurement value＝data area×multiplying factor
D10, D11		Data area	
D12	N/A	00H	－
D13			
D14, D15			
D16	N/A	00H	－
D17			
D18, D19			
D20	N/A	00H	－
D21			
D22, D23			
D24	N/A	00H	－
D25			
D26, D27			
D28	N/A	00H	－
D29			
D30, D31			

* Inst.: Instantaneous value.

(4) Sample program

(a) Sample program for obtaining data:

Sample program for obtaining below data;

station No.		1
unit No.		1
Obtained data 1		Average current
	Group No.	01H
	Channel No.	01H
Obtained data 2		Average voltage
	Group No.	05H
	Channel No.	01H
Obtained data 3		Active power
	Group No.	07H
	Channel No.	01H

It is an interlocking for indicating cyclic transmission is normally performed between the master station and slave station

Obtained data 1

Store the following into W1000(RWw00).
[Group No.+ unit No.+ command(1H)]
→01+1+1→H0111

Store the following into W1001(RWw01).
[00H+ channel No.]
→00+01→H0001

Obtained data 2

Obtained data 3

ON the monitor pattern setting completion flag P00 for sending commands to the measuring unit

When the monitor pattern P00 setting flag is ON, and monitor pattern P00 setting completion flag is ON, data stored in W0 to W1F(RWr00 to RWr1F) is stored into D0 to D31.

When the monitor pattern P00 setting flag is ON and monitor pattern P00 setting completion flag is OFF, data stored in W0 to W1F(RWr00 to RWr1F) is stored into D2000 to D2031.

7. SLMP communication

Using SLMP communication, it is possible to communicate with the measuring unit.
Refer to [SLMP reference manual] for details of SLMP communication.

7.1. Communication specifications

When communicating by SLMP, follow the setting as below.

Item	Settings
Communication method	UDP/IP
Code	Binary-code

7.2. Interactive command list

Interactive command for SLMP communication as below:

Item		Command	Subcommand	Port No.	Description
Type	Operation				
Memory	Read	0401H	0002H	61450	Obtain the Measurement value and set-up value from the measuring unit.
	Write	1401H	0002H	61450	Detects a measuring unit on the network.
Device connection	Node Search	0E30H	0000H	45237	Set the IP address to the measuring unit specified by a MAC address.
	IP Address Set	0E31H	0000H	45237	

7.3. Details for the interactive command

(1) Internal memory read (command: 0401H, Subcommand: 0002H)

(a)Request data

Command		Subcommand		00H fixed		Data area		No. of device points			
01H	04H	02H	00H	00H	00H	m	m+1	04H	00H	00H	00H

Data area				
Unit No.	1H	Group No.	Channel No.	00H fixed

* Refer to [5.5.7] for unit No.
* Refer to [5.5.4] for group No. and channel No.

(b)Response data

Data area							
Group No.	Channel No.	Error code	Index number	Low data	Low data	High data	High data

* Refer to [5.5.4] for the group No., channel No.
* Refer to [5.6] for the Index number.
* Refer to [5.5.8] for Low data / High data.

(2)Internal memory Write(command: 1401H, Subcommand: 0002H)

(a)Request data

Command		Subcommand		00H fixed		Data area		No. of device points				Data area		
01H	14H	02H	00H	00H	00H	m	m+1	03H	00H	00H	00H	m	m+1	m+2

Data area					
Index number	00H fixed	Low data	Low data	High data	High data

Data area				
Unit No.	2H	Group No.	Channel No.	00H fixed

* Refer to [5.5.7] for the unit No.
* Refer to [5.5.4] for group No. and channel No.
* Refer to [5.6] for the Index number.
* Refer to [5.5.8] for Low data / High data.

(b)Response data

Data area			
Group No.	Channel No.	Error code	00H fixed

* Refer to [5.5.4] for group No. and channel No.

(3)Device connection NodeSearch(Command: 0E30H, subcommand: 0000H)

Refer to [SLMP Reference Manual]

(4)Device connection IP Address Set(Command: 0E31H, subcommand: 0000H)

Refer to [SLMP Reference Manual]

7.4. End code of SLMP communication

End codes are shown as below upon abnormal response of the measuring unit.

End code	Error name	Error description and the cause	Remedy
C059H	command error	Error in specifying command and subcommand.	Correct command and subcommand to resend.
C05CH	request error	Request error	Correct request to resend.
C061H	request data length error	Request data length does not correspond to the number of data.	Correct request data or request data length to resend.