



Energy Measuring Unit Programming Manual (CC-Link) For ver.2 remote device station

MODEL

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

- Before operating the instrument, you should first read thoroughly this operation manual for safe operation and optimized performance of the product. Deliver this user's manual to the end user.

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1. General Description

This manual describes the programming methods that should be created by the user for monitoring measurement value of Energy Measuring Unit (called Measuring Unit from here on) with the CC-Link (in remote net ver2 mode or remote net additional mode).

In programming, read the following related manuals in addition to this manual.

Table 1.1 Related Manual

Manual Name	Manual No.
CC-Link System Master/Local Module User's Manual type QJ61BT11N	SH-080394E (13JR64)
MELSEC-L CC-Link System Master/Local Module User's Manual	SH-080895ENG (13JZ41)
User's Manual for Measuring Unit	Supplied with product or download.

NOTICE

When using EcoMonitorLight (EMU4-BD1-MB, EMU4-HD1-MB) or EcoMonitorPlus(EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB), Optional Plug-in Module "EMU4-CM-C" is necessary. CC-Link communication is not available without the optional plug-in module. In this manual, EcoMonitorLight (EMU4-BD1-MB, MU4-HD1-MB), EcoMonitorPlus(EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB) means the main device of EMU4 with the optional plug-in module.

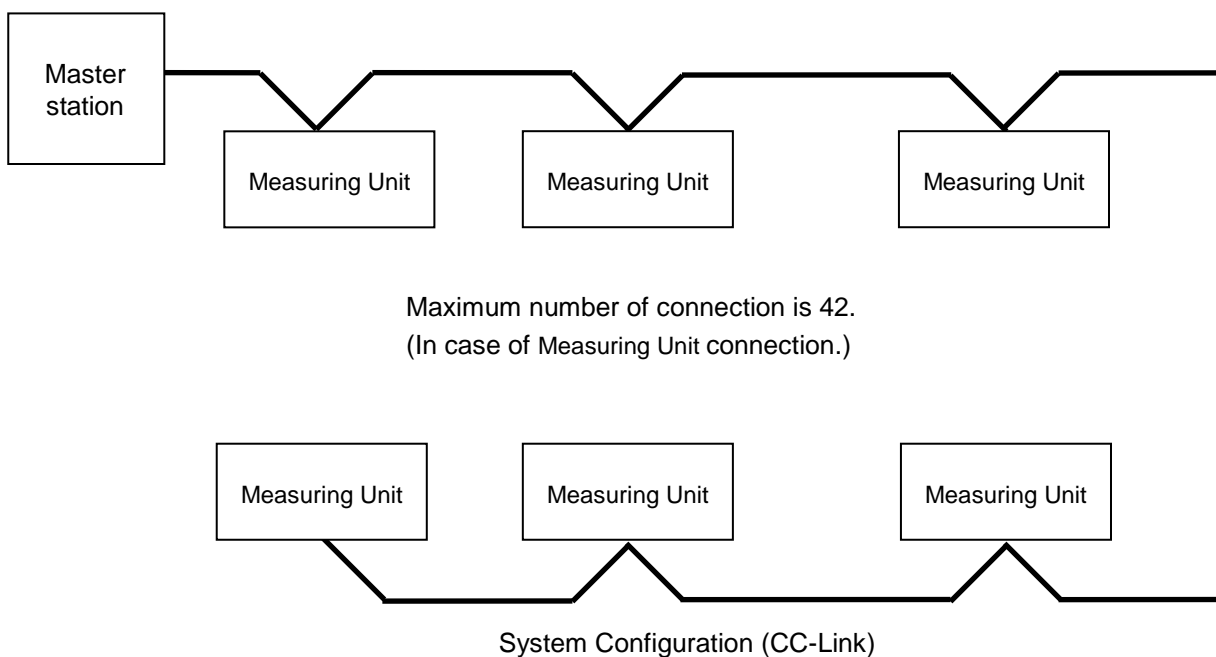
POINT	
The EMU4-BD1-MB,EMU4-HD1-MB,EMU4-BM1-MB,EMU4-HM1-MB,EMU4-LG1,EMU4-A2,EMU4-VA2 must be handled after setting of the remote device station version. Set the remote device station version with the "Setting Menu 7" of the EMU4-BD1-MB,EMU4-HD1-MB,EMU4-BM1-MB,EMU4-HM1-MB, EMU4-LG1,EMU4-A2,EMU4-VA2.	
Use the following as a guideline in setting the remote device station version and set the version at Energy measuring unit.	
Mode select setting	Guideline for selection
Ver.1 remote device station (Ver.1 compatible slave station)	Select this when utilizing the conventional program, because of compatibility with EcoMonitorPro,EMU3-DP1-C.
Ver.2 remote device station (Ver.2 compatible slave station)	Select this when configuring a new system or the being newly added to the existing system in combination with the applicable master module.
This programming manual is for ver.2 remote device station.	
For use in the ver.1 remote device station (Ver.1 compatible slave station), refer to the following manual.	
·Energy Measuring Unit Programing Manual (CC-Link)(For ver.1 remote device station)..... LEN160305	

2. Specification

CC-Link specification is shown in Table 2.1 when Measuring Unit is set the "Ver2.00" (ver.2 remote device station).

Table 2.1 CC-Link Specification (For Ver2.00)

Item	Specification
CC-Link station type	Remote device station (ver.2 remote device station)
Number of occupied stations	1 station (Expanded cyclic setting: Octuplet)
Maximum number of stations per master station	42 stations (In case of connecting only remote device station occupied by 1 station (Octuplet).)
Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps
Remote I/O (RX, RY)	128 points each
Remote register (RWw, RWr)	32 points each



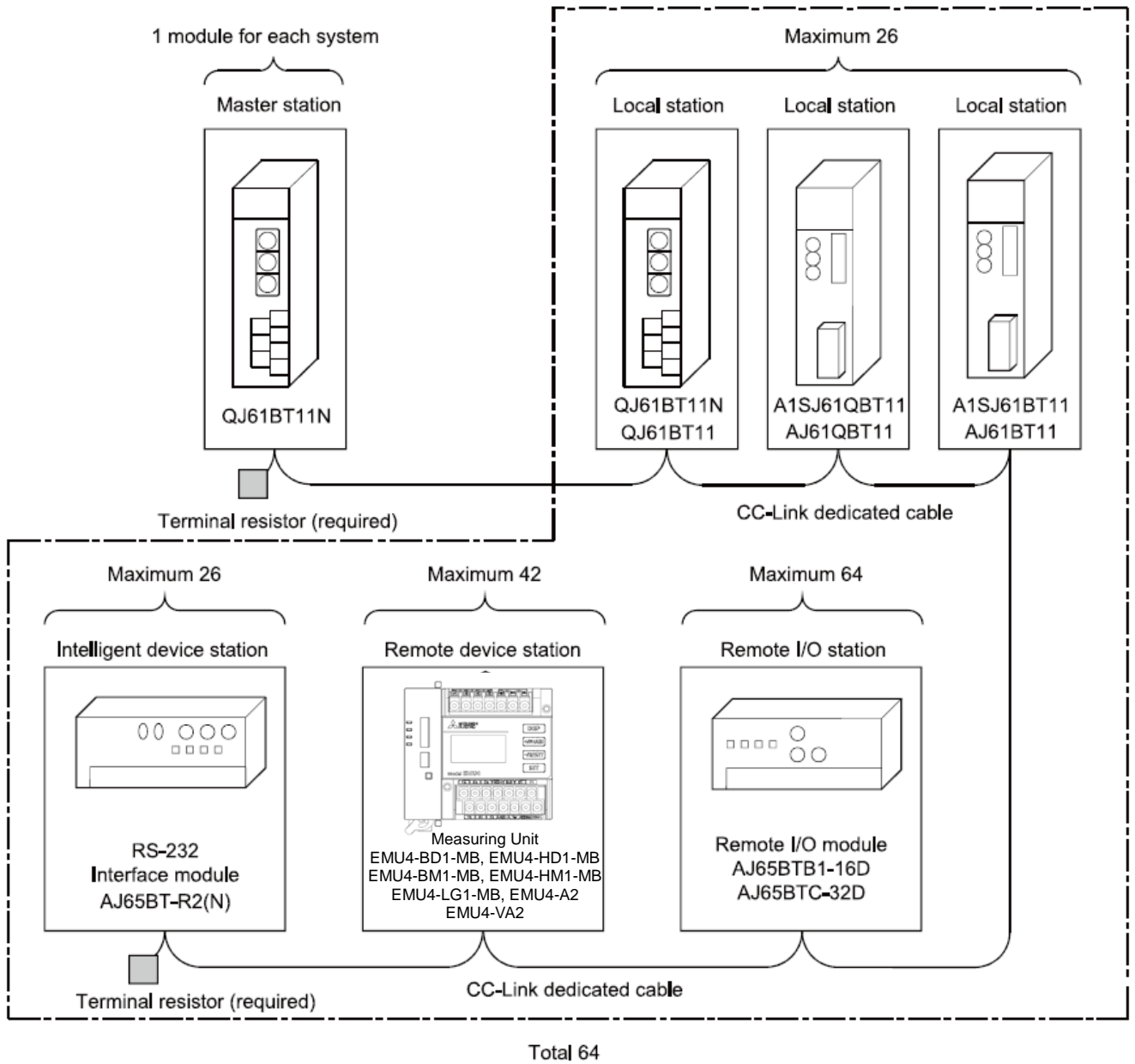
3. Configuration Conditions of CC-Link System

3.1 Remote net ver.2 mode, remote net additional mode

A total of 64 remote I/O stations, remote device stations, local stations, standby master stations, or intelligent device stations can be connected to a single master station.

However, the following conditions must all be satisfied.

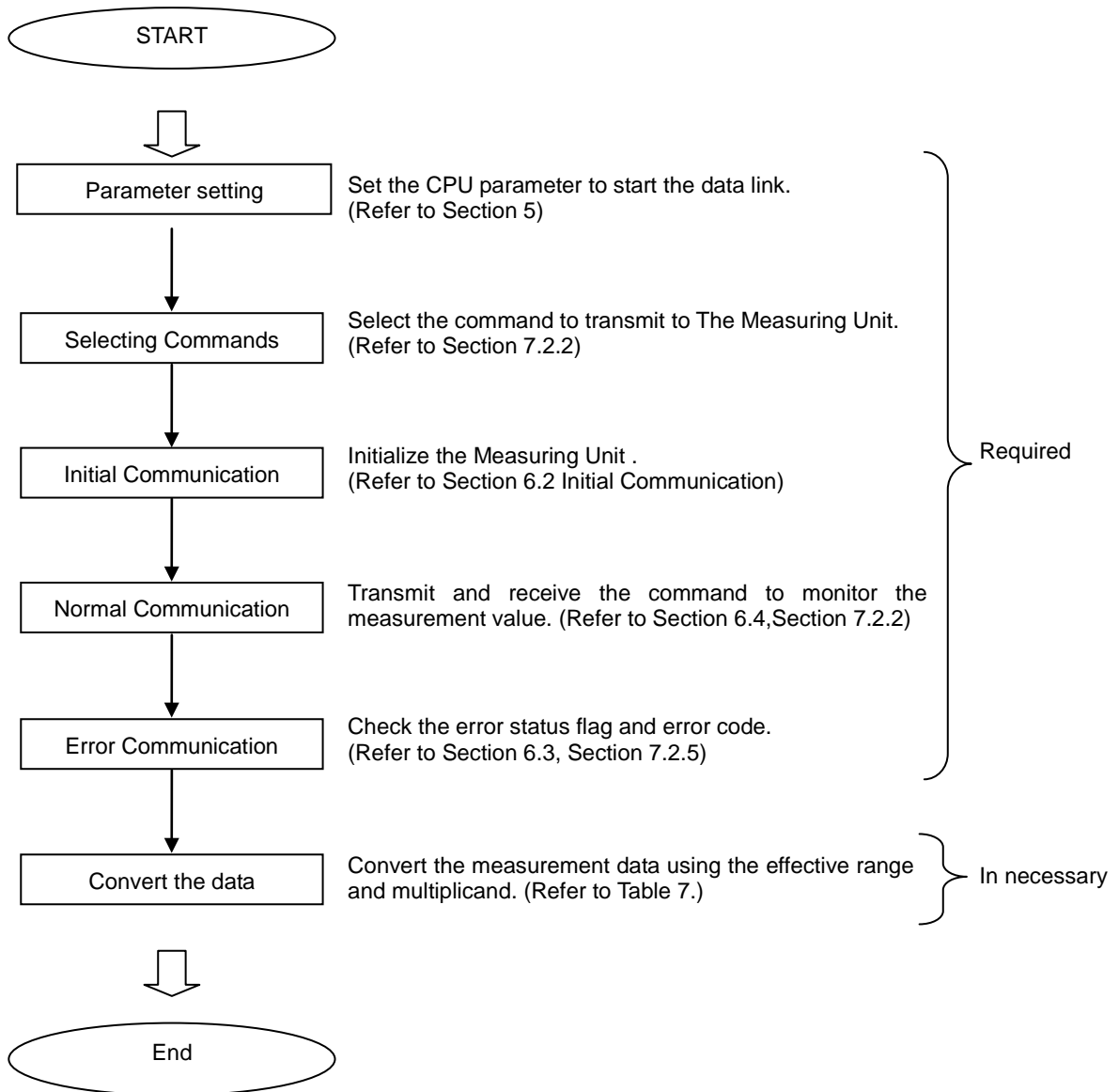
Condition 1	$\begin{aligned} & \{(a+a2+a4+a8) \\ & + (b+b2+b4+b8) \times 2 \\ & + (c+c2+c4+c8) \times 3 \\ & + (d+d2+d4+d8) \times 4\} \leq 64 \end{aligned}$	<p>a: The total number of ver.1 compatible slave stations that occupy 1 station, and ver.2 compatible slave stations that occupy 1 station which are set to "Single".</p>
Condition 2	$\begin{aligned} & [\{(a \times 32) + (a2 \times 32) + (a4 \times 64) + (a8 \times 128)\} \\ & + \{(b \times 64) + (b2 \times 96) + (b4 \times 192) + (b8 \times 384)\} \\ & + \{(c \times 96) + (c2 \times 160) + (c4 \times 320) + (c8 \times 640)\} \\ & + \{(d \times 128) + (d2 \times 224) + (d4 \times 448) + (d8 \times 896)\}] \\ & \leq 8192 \end{aligned}$	<p>b: The total number of ver.1 compatible slave stations that occupy 2 stations, and ver.2 compatible slave stations that occupy 2 stations which are set to "Single".</p> <p>c: The total number of ver.1 compatible slave stations that occupy 3 stations, and ver.2 compatible slave stations that occupy 3 stations which are set to "Single".</p> <p>d: The total number of ver.1 compatible slave stations that occupy 4 stations, and ver.2 compatible slave stations that occupy 4 stations which are set to "Single".</p>
Condition 3	$\begin{aligned} & [\{(a \times 4) + (a2 \times 8) + (a4 \times 16) + (a8 \times 32)\} \\ & + \{(b \times 8) + (b2 \times 16) + (b4 \times 32) + (b8 \times 64)\} \\ & + \{(c \times 12) + (c2 \times 24) + (c4 \times 48) + (c8 \times 96)\} \\ & + \{(d \times 16) + (d2 \times 32) + (d4 \times 64) + (d8 \times 128)\}] \\ & \leq 2048 \end{aligned}$	<p>a2: The number of ver.2 compatible stations that occupy 1 station which are set to "Double".</p> <p>b2: The number of ver.2 compatible stations that occupy 2 stations which are set to "Double".</p> <p>c2: The number of ver.2 compatible stations that occupy 3 stations which are set to "Double".</p> <p>d2: The number of ver.2 compatible stations that occupy 4 stations which are set to "Double".</p> <p>a4: The number of ver.2 compatible stations that occupy 1 station which are set to "Quadruple".</p> <p>b4: The number of ver.2 compatible stations that occupy 2 stations which are set to "Quadruple".</p> <p>c4: The number of ver.2 compatible stations that occupy 3 stations which are set to "Quadruple".</p> <p>d4: The number of ver.2 compatible stations that occupy 4 stations which are set to "Quadruple".</p> <p>a8: The number of ver.2 compatible stations that occupy 1 station which are set to "Octuplet". (Energy measuring unit is applied)</p> <p>b8: The number of ver.2 compatible stations that occupy 2 stations which are set to "Octuplet".</p> <p>c8: The number of ver.2 compatible stations that occupy 3 stations which are set to "Octuplet".</p> <p>d8: The number of ver.2 compatible stations that occupy 4 stations which are set to "Octuplet".</p>
Condition 4	$\{(16 \times A) + (54 \times B) + (88 \times C)\} \leq 2304$	<p>A: Number of remote I/O stations ≤ 64</p> <p>B: Number of remote device stations ≤ 42 (Measuring Unit is applied.)</p> <p>C: Number of local stations, standby master stations and intelligent device stations ≤ 26</p>



4. Programming

4.1 Programming Procedure

Create a program which executes the "Monitoring of the measurement values" by following the procedure below:



5. Parameter Settings

5.1 Procedure from Parameter Settings to Data Link Startup

The following explains the procedure from setting the parameters to starting the data link.

5.1.1 CPU Parameter Area and Master Module Parameter Memory

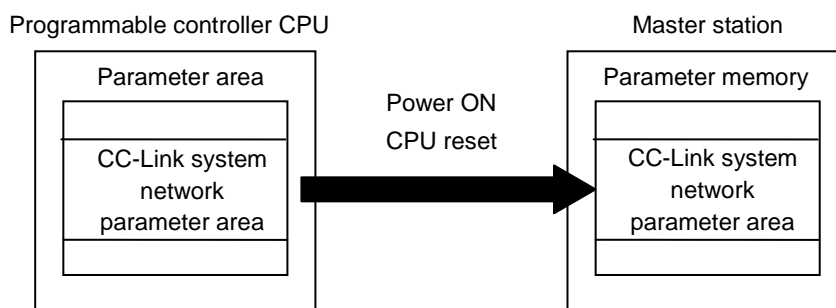
(1) CPU Parameter Area

This area is used to set the basic values for controlling the programmable controller system and the network parameters that control the CC-Link system.

(2) Master Station Parameter Memory

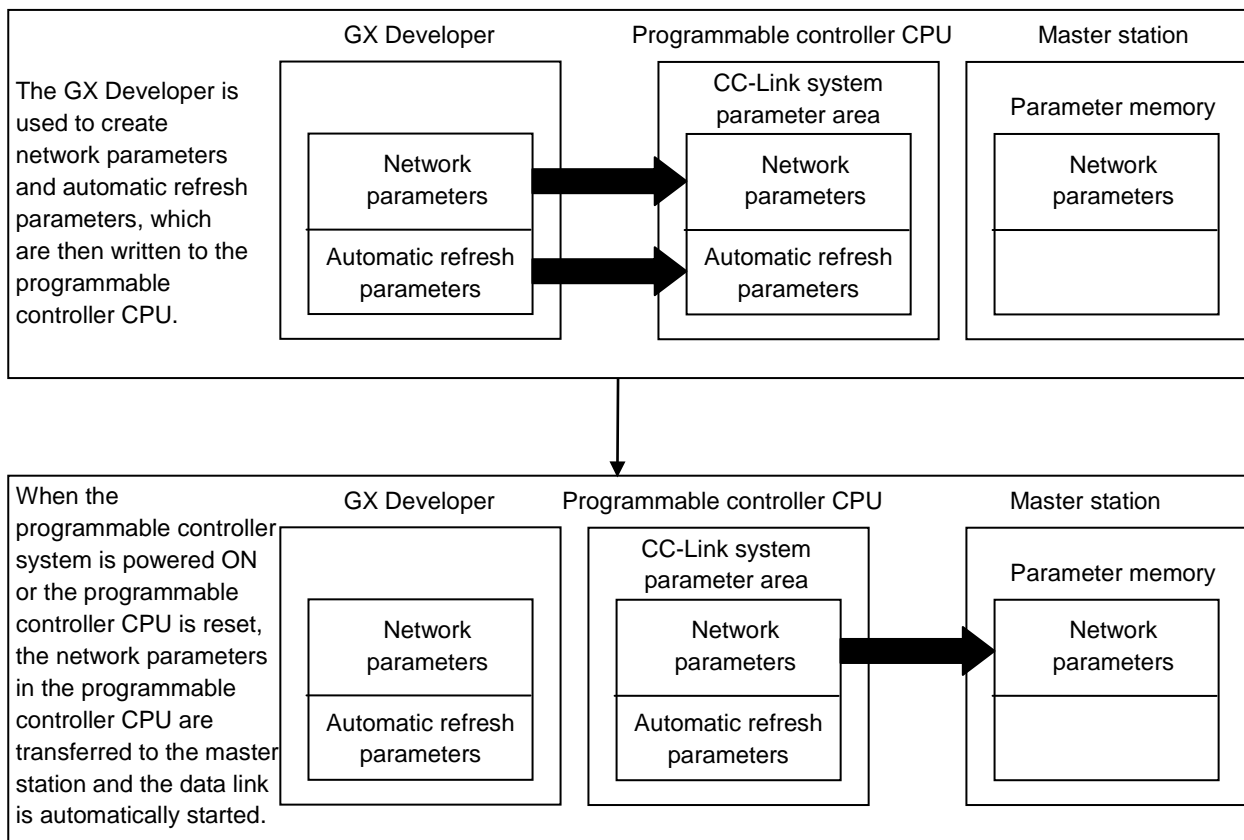
This area stores the network parameters for the CC-Link system.

When the module is powered OFF or the programmable controller CPU is reset, the network parameters are erased.



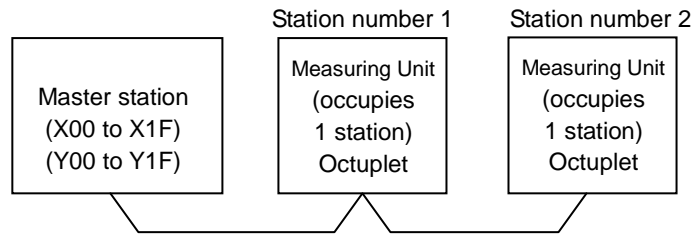
5.1.2 Procedure for Parameter Settings to Data Link Startup with GX Developer

Follow the procedure below for parameter settings to data link startup:



5.2 Example of Parameter Settings with GX Developer (Remote net ver.2 mode)

This section explains the parameter settings using the GX Developer. For more details on the GX Developer operation, refer to the GX Developer Operating Manual. The explanations in this section are based on the following example of the system configuration.



5.2.1 Master Station Network Parameter Settings

- 1) Double-click on the "Network param".
- 2) Click on the "CC-Link" on the "Network parameter" screen.
- 3) Set the parameters as required.

The following describes an example of the parameter settings.

The screenshot shows the 'Network parameters Setting the CC-Link list.' window in MELSOFT GX Developer. The interface includes a project tree on the left, a 'Network parameter' dialog box, and a main parameter table.

Network parameter dialog box:

- Buttons: Ethernet/CC IE/MELSECNET, MELSECNET / MINI, **CC-Link** (2), Cancel

Main parameter table:

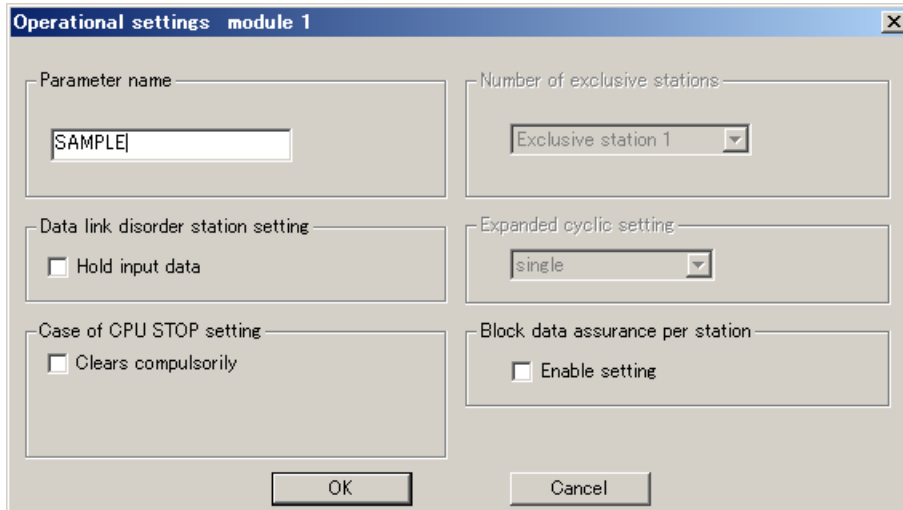
	1	2
Start I/O No	0000	
Operational setting	Operational settings	
Type	Master station	
Master station data link type	PLC parameter auto start	
Mode	Remote net(Ver.2 mode)	
All connect count	2	
Remote input(RX)	X1000	
Remote output(RY)	Y1000	
Remote register(RW/r)	w0	
Remote register(RW/w)	w1000	
Ver.2 Remote input(RX)		
Ver.2 Remote output(RY)		
Ver.2 Remote register(RW/r)		
Ver.2 Remote register(RW/w)		
Special relay(SB)	S80	
Special register(SW)	SW0	
Retry count	3	
Automatic reconnection station count	1	
Stand by master station No.		
PLC down select	Stop	
Scan mode setting	Asynchronous	
Delay information setting	0	
Station information setting	Station information	
Remote device station initial setting	Initial settings	
Interrupt setting	Interrupt settings	

Indispensable settings (No setting / Already set) Set if it is needed (No setting / Alre)

Setting Item	Description	Example for settings	Remarks
No.of boards in module	Set the "No. of boards in module " for which the network parameters are to be set.	1	
Start I/O No	Set the "Start I/O No." for the master station.	0000	Set the same setting of Start XY in PC parameters setting.
Operational settings	Set the following: ·Parameter name ·Data link err station setting ·Case of CPU Stop setting ·Block data assurance per station	Refer to next page	Even if the Parameter name is not set, this will not affect the operation of the CC-Link system
Type	Set the station type.	Master station	
Mode	Set the CC-Link mode.	Remote net (Ver.2 mode)	"Remote net ver.2 mode " and "Remote net additional mode" can be also used in case of the QJ61BT11N.
All connect count	Set the total number of connected stations in the CC-Link system including reserved stations.	2 (modules)	Set the total number of connected stations in the CC-Link system including reserved stations.
Remote input (RX)	Set the remote input (RX) refresh device.	X1000	Device name - Select from X, M, L, B, D, W, R or ZR. Device number - Within the range of the device points that the CPU has.
Remote output (RY)	Set the remote output (RY) refresh device.	Y1000	Device name - Select from Y, M, L, B, T, C, ST, D, W, R or ZR. Device number - Within the range of the device points that the CPU has.
Remote register (RWr)	Set the remote register (RWr) refresh device.	W0	Device name - Select from M, L, B, D, W, R, or ZR. Device number - Within the range of the device points that the CPU has.
Remote register (RWw)	Set the remote register (RWw) refresh device.	W1000	Device name - Select from M, L, B, T, C, ST, D, W, R, or ZR. Device number - Within the range of the device points that the CPU has.
Special relay (SB)	Set the link special relay (SB) refresh device.	SB0	Device name - Select from M, L, B, D, W, R, SB or ZR. Device number - Within the range of the device points that the CPU has.
Special register (SW)	Set the link special register (SW) refresh device.	SW0	Device name - Select from M, L, B, D, W, R, SW or ZR. Device number - Within the range of the device points that the CPU has.
Retry count	Set the number of retries for "Retry count", when a communication error occurs.	3	
Automatic reconnection station count	Set the number of modules that can return to system operation by a single link scan.	1	
Standby master station No.	Set the station number for the standby master station	Blank	Blank: No standby master station specified.
PLC down select	Set the data link status for "PLC down select", when a master station programmable controller CPU error occurs.	Stop	
Scan mode setting	Set whether the link scan for the sequence scan is synchronous or asynchronous.	Asynchronous	
Delay information setting	Set for the link scan delay time.	0	Unit:50 μ s
Station information settings	Set the station data.	Refer to the next page.	

POINT
<p>(1) For the automatic refresh parameter setting, set the start device only. Devices are automatically assigned until the last station number including reserved stations and occupied stations. In the example of the system configuration in this section, the last station number is "2". Therefore, total of remote I/O points is 256 points (128 x 2 = 256) and total of remote registers points is 64 points (32 x 2 = 64). If refresh device of remote input (RX) is set to "X1000" and that of remote registers (RWr) is set to "W0", the end devices will be "X10FF" and "W3F" respectively.</p> <p>(2) When setting X, Y, B, W, SB and SW as refresh devices, make setting so that they do not overlap with the device numbers used on the other networks, etc.</p>

《Example for Operational settings》



Setting Item	Description	Example for settings	Remarks
Parameter name	Set the Parameter name.	"SAMPLE"	Even if the Parameter name is not set, this will not affect the operation of the CC-Link system
Data link disorder station setting	Set the input status for the data link error station.	Clear ("Hold input data" not checked)	
Case of CPU Stop setting	Set the slave station refresh/compulsory clear setting at programmable controller CPU STOP.	Refresh ("Clears compulsorily" not checked)	
Block data assurance per station	Set the block guarantee of cyclic data per station.	Disable ("Enable setting" not checked)	

《Example for Station information settings》

CC-Link station information. Module 1								
Station No.	Station type	Expanded cyclic setting	Exclusive station count	Remote station points	Reserve/invalid station select	Intelligent buffer select(word)		
						Send	Receive	Automatic
1/1	Ver.2Remote device station	octuple	Exclusive station 1	128 points	No setting			
2/2	Ver.2Remote device station	octuple	Exclusive station 1	128 points	No setting			

Setting Item	Description	Example for settings	Remarks
Station type	Set the station data.	Ver2. Remote device station	Set the "ver2.00" in Setting Menu 7 of Measuring Unit.
Expanded cyclic setting		octuplet	Measuring Unit cannot use other than "octuplet".
Number of occupied stations *		Occupies 1 station	Set the "Occupies 1 station" in case of the Measuring Unit.
Remote station points		128 points	Set the "128 points" in case of the Measuring Unit.
Reserved/invalid station select		No setting	

* "Number of exclusive stations" on the screen is described as "Number of occupied stations" in this manual.

"Exclusive station 1" on the screen is described as "Occupies 1 station" in this manual

6. Communication Between the Master Station and Measuring Unit

6.1 Communication Guideline

There are three communication statuses (Initial Communication, Normal Communication, and Error Communication) between the Master station and Measuring Unit.

In the normal communication, alarm status and digital input status of Measuring Unit can be monitored using bit data (remote input RX). Furthermore, the following can be performed by using remote input, remote output and remote registers.

- Monitoring by Pattern
- Monitoring by Command (1H).
- Setting by Command (2H).

For a monitoring by pattern, some measuring values can be monitored by selecting a bit of RY. Measuring values which can be monitored have been already grouping in Measuring Unit in advance. Please select the necessary group in a bit of RY.

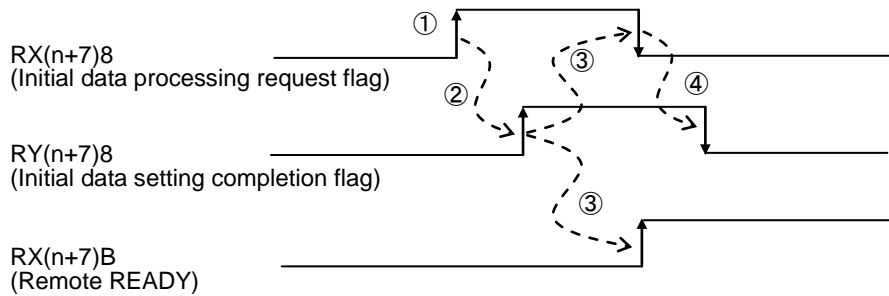
For a monitoring by command (1H), you can select any measurement items to be monitored. Measuring Unit has unique codes (called unit No., group No. and channel No.) for each measurement items. You can monitor the selected measurement items by writing these codes to the remote registers.

For a setting by command (2H), you can set for Measuring Unit settings.

* All measuring items can be monitored even when it is not displayed in Measuring Unit.

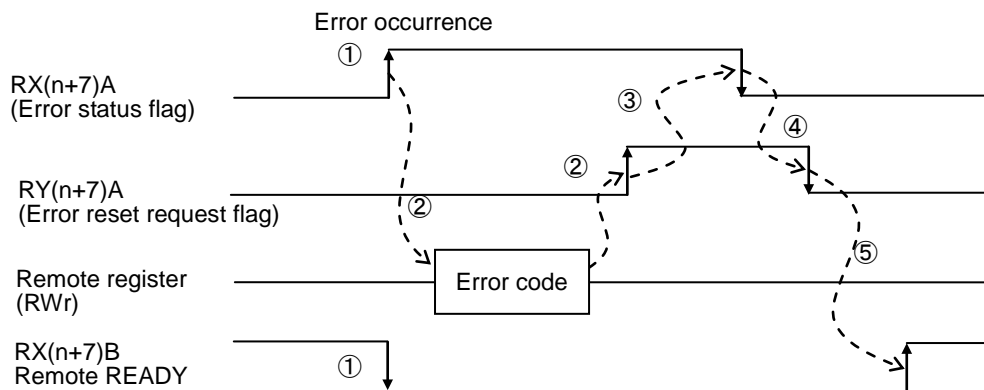
6.2 Initial Communication

Initial communication is performed at the beginning after the power supply is turned on or hardware is reset. Refer to section 7.1 about the remote input RX and the remote output RY.



- ① After the power supply is turned on, or hardware is reset, the initial data processing request flag is turned on by Measuring Unit.
- ② After the initial data processing request flag is turned on, turn on the initial data setting completion flag.
- ③ After the initial data setting completion flag is turned on, the initial data processing request flag is turned off and the remote READY is turned on.
- ④ After the initial data processing request flag is turned off, turn off the initial data setting completion flag.

6.3 Error Communication



- ① When an error occurs in Measuring Unit, error status flag is turned on and the remote READY is turned off.
- ② When the error status flag is turned on, read the error code from the remote register RWr. Eliminate the cause of the error while referring to the red error code. When resuming communication with Measuring Unit, turn on the error reset request flag.
- ③ After the error reset request flag is turned on, the error status flag is turned off.
- ④ After the error status flag is turned off, turn off the error reset request flag.
- ⑤ After the error reset request flag is turned off, the remote READY is turned on and normal communication is resumed.

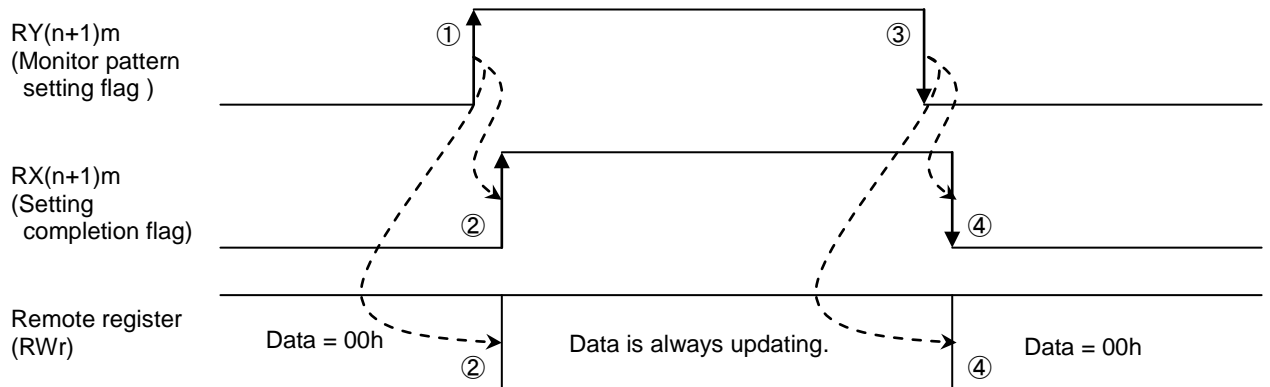
Note: Refer to "7.2.5 About error occurrence" for error code.

6.4 Normal Communication

After initial data processing is complete, allows the monitoring by pattern, monitoring by command (1H) and setting by command (2H).

6.4.1 Monitoring by Pattern

Up to 16 measuring values can be monitored by setting a bit of RY. Measuring values which can be monitored have been already grouping in Measuring Unit in advance. Therefore, select the necessary group in a bit of RY. (Refer to section 7.1.2)



(1) Start of monitor

① Turns on monitor pattern setting flag(RY(n+1)m) which will be monitored.

② Corresponding setting completion flag(RX(n+1)m) is turned on when the measuring values can be monitored at Measuring Unit. At this time, Measuring values are stored in remote registers (RWr) each time the measuring data of Measuring Unit is updating.

(2) End of monitor

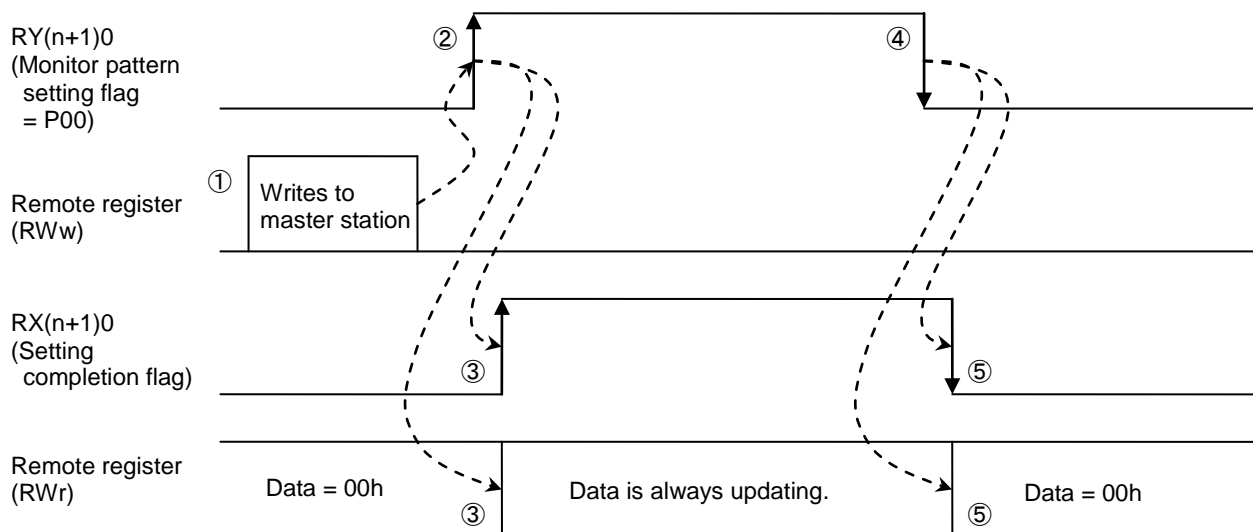
③ Turns off monitor pattern setting flag(RY(n+1)m).

④ Corresponding setting completion flag(RX(n+1)m) is turned off and remote registers are 00h.

Note: When turns on multiple monitor pattern setting flag (RY (n+1)*), setting completion flag is not turned on. At this time, error status flag (RX (n+7)A) is turned on, and remote READY (RX (n+7)B) is turned off.

6.4.2 Monitoring by Command (1H)

Up to 8 measuring values can be monitored by setting the unique codes (called unit No., group No. and channel No.).



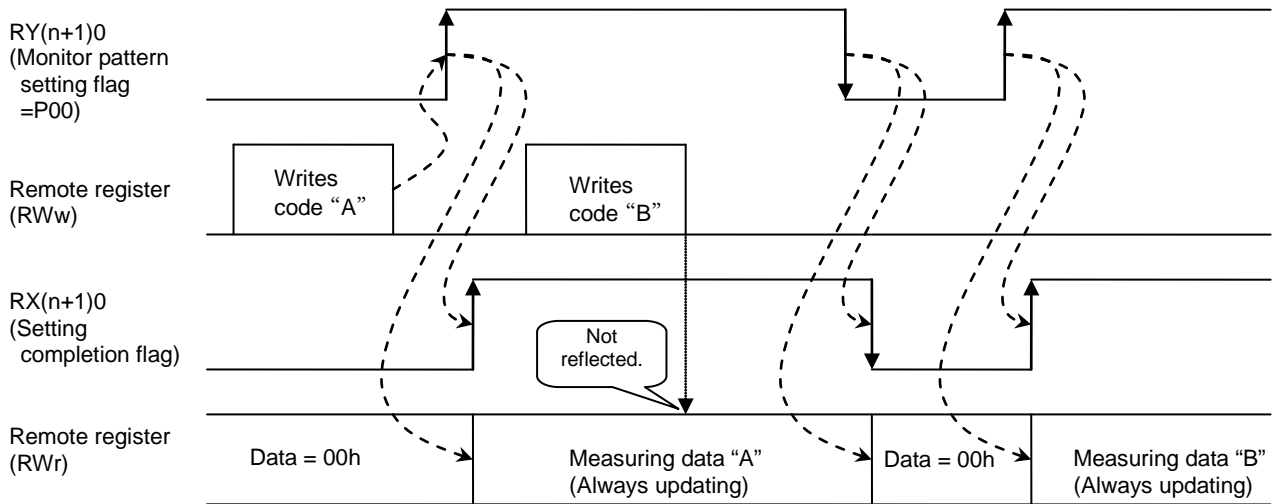
(1) Start of monitor

- ① Writes the Unit No., group No. and channel No. for measuring items to be monitored to remote registers(RWw).
- ② Turns on monitor pattern setting flag(RY(n+1)0).
- ③ When the measuring values can be monitored with Measuring Unit, corresponding setting completion flag(RX(n+1)0) is turned on. At this time, Measuring values are stored in remote registers (RWr) each time the measuring data of Measuring Unit is updating.

(2) End of monitor

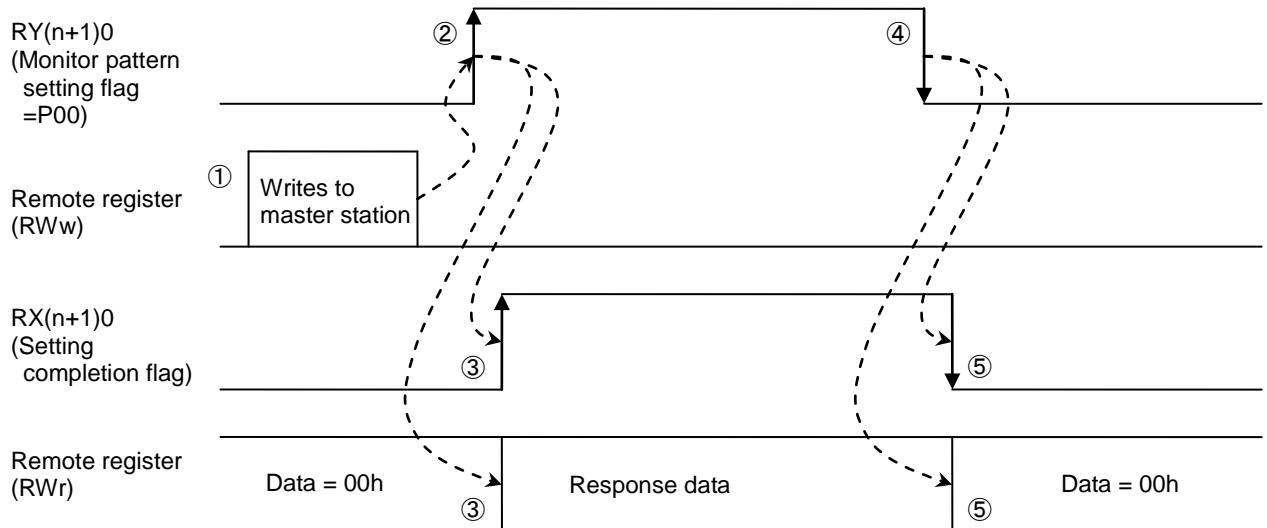
- ④ Turns off monitor pattern setting flag(RY(n+1)0).
- ⑤ Corresponding setting completion flag(RX(n+1)m) is turned off and remote registers are 00h.

Note: When monitor pattern setting flag (RY(n+1)0) remains on, measuring items in remote registers(RWr) is not reflected if remote registers (RWw) is changed. To change measuring items, turns on monitor pattern setting flag (RY (n+1)0) after changing remote registers (RWw).



6.4.3 Setting by Command (2H)

A setting item of Measuring Unit can be set by setting the unique codes (called unit No., group No. and channel No.) and setting data.



(1) Setting

- ①Writes the Unit No., group No, channel No. and setting data to remote registers(RWw).
- ②Turns on monitor pattern setting flag(RY(n+1)0).
- ③After checking for data at Measuring Unit, corresponding setting completion flag(RX(n+1)0) is turned on. At this time, response data are stored in remote registers(RWw).

(2) End of setting

- ④Turns off monitor pattern setting flag(RY(n+1)0).
- ⑤Corresponding setting completion flag(RX(n+1)m) is turned off and remote registers are 00h.

Note: When monitor pattern setting flag (RY (n+1)0) remains on, setting data of Measuring Unit is not reflected if remote registers (RWw) is changed. To change setting data, turns on monitor pattern setting flag (RY (n+1)0) after writing remote registers (RWw).

7. Remote I/O and Remote Register

7.1 Remote Input RX, Remote Output RY

The remote input RX and remote output RY are used to communicate for bit data between the master station and Measuring Unit.

7.1.1 Remote input RX

The allocation of the remote input RX of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-BD1-MB	EMU4-HD1-MB	Description		Note
				OFF(0)	ON(1)	
RXn0	Alarm of Pulse	—	○	Non-Alarm state	Alarm state	Note2 Note3
RXn1	Reserved	—	—	—	—	
RXn2	Alarm of Demand current	—	○	Non-Alarm state	Alarm state	Note 2
RXn3	Alarm of Demand Active power	—	○	Non-Alarm state	Alarm state	Note 2
RXn4	Contact input	—	○	OFF(OPEN)	ON(CLOSE)	Note 4
RXn5	Alarm (total)	—	○	Non-Alarm state	Alarm state	Note 2
RXn6	Reserved	—	—	—	—	
RXn7	Reserved	—	—	—	—	
RXn8	Alarm of Voltage	—	○	Non-Alarm state	Alarm state	Note 2
RXn9 to RXnC	Reserved	—	—	—	—	
RXnD	Alarm of Power factor	—	○	Non-Alarm state	Alarm state	Note 2
RXnE	Reserved	—	—	—	—	
RXnF	Reserved	—	—	—	—	
RX(n+1)0	Setting completion flag P00	○	○	Not receiving	Receiving	
RX(n+1)1 to RX(n+1)7	Reserved	—	—	—	—	
RX(n+1)8	Setting completion flag P08	○	○	Not receiving	Receiving	
RX(n+1)9	Setting completion flag P09	○	○	Not receiving	Receiving	
RX(n+1)A	Setting completion flag P10	—	○	Not receiving	Receiving	Note 5
RX(n+1)B	Setting completion flag P11	○	○	Not receiving	Receiving	
RX(n+1)C	Setting completion flag P12	—	○	Not receiving	Receiving	Note 5
RX(n+1)D to RX(n+7)7	Reserved	—	—	—	—	
RX(n+7)8	Initial data processing request flag	○	○	Power OFF, remote READY ON, or error status flag ON	Power supply is turned ON or hardware reset	Note 1
RX(n+7)9	Reserved	—	—	—	—	
RX(n+7)A	Error status flag	○	○	No error occurrence	Error occurrence	Note 1
RX(n+7)B	Remote READY	○	○	Monitoring or setting are not possible	Normally communication status	Note 1
RX(n+7)C to RX(n+7)F	Reserved	—	—	—	—	

Note 1: For the details, refer to "6.Communication Between the Master Station and Measuring Unit".

Note 2: This is only output when alarm use in measuring unit.

Note 3: Alarm of Pulse count is available only when Setting of external input signal of EMU4-HD1-MB is setup Pulse input. .

Note 4: Contact Input is available only when Setting of external input signal of EMU4-HD1-MB is setup Contact input.

Note 5: This is only available when phase wire system is 3P4W in EMU4-HD1-MB.

The allocation of the remote input RX of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	Description		Note
					OFF(0)	ON(1)	
RXn0	Alarm of Pulse	—	○	—	Non-Alarm state	Alarm state	Note2 Note3
RXn1	Reserved	—	—	—	—	—	
RXn2	Alarm of Demand current	○	○	—	Non-Alarm state	Alarm state	Note 2
RXn3	Alarm of Demand Active power	○	○	—	Non-Alarm state	Alarm state	Note 2
RXn4	Contact input	—	○	—	OFF(OPEN)	ON(CLOSE)	Note 4
RXn5	Alarm (total)	—	○	—	Non-Alarm state	Alarm state	Note 2
RXn6	Alarm of current unbalance rate	○	○	—	Non-Alarm state	Alarm state	Note 2
RXn7	Alarm of voltage unbalance rate	○	○	—	Non-Alarm state	Alarm state	Note 2
RXn8	Alarm of Voltage	○	○	—	Non-Alarm state	Alarm state	Note 2
RXn9	Leak current 1 alarm	—	—	○	Non-Alarm state	Alarm state	Note 2
RXnA	Leak current 2 alarm	—	—	○	Non-Alarm state	Alarm state	Note 2
RXnB	Leak current for resistance 1 alarm	—	—	○	Non-Alarm state	Alarm state	Note 2
RXnC	Leak current for resistance 2 alarm	—	—	○	Non-Alarm state	Alarm state	Note 2
RXnD	Alarm of Power factor	○	○	—	Non-Alarm state	Alarm state	Note 2
RXnE	Reserved	—	—	—	—	—	
RXnF	Reserved	—	—	—	—	—	
RX(n+1)0	Setting completion flag P00	○	○	○	Not receiving	Receiving	
RX(n+1)1 to RX(n+1)7	Reserved	—	—	—	—	—	
RX(n+1)8	Setting completion flag P08	○	○	—	Not receiving	Receiving	
RX(n+1)9	Setting completion flag P09	○	○	—	Not receiving	Receiving	
RX(n+1)A	Setting completion flag P10	—	○	—	Not receiving	Receiving	Note 5
RX(n+1)B	Setting completion flag P11	○	○	—	Not receiving	Receiving	
RX(n+1)C	Setting completion flag P12	—	○	—	Not receiving	Receiving	Note 5
RX(n+1)D	Setting completion flag P13	—	—	○	Not receiving	Receiving	
RX(n+1)E to RX(n+7)7	Reserved	—	—	—	—	—	
RX(n+7)8	Initial data processing request flag	○	○	○	Power OFF, remote READY ON, or error status flag ON	Power supply is turned ON or hardware reset	Note 1
RX(n+7)9	Reserved	—	—	—	—	—	
RX(n+7)A	Error status flag	○	○	○	No error occurrence	Error occurrence	Note 1
RX(n+7)B	Remote READY	○	○	○	Monitoring or setting are not possible	Normally communication status	Note 1
RX(n+7)C to RX(n+7)F	Reserved	—	—	—	—	—	

Note 1: For the details, refer to “6.2 Initial communication t”, “6.3 Error communication”

Note 2: This is only output when alarm use in measuring unit.

Note 3: Alarm of Pulse count is available only when Setting of external input signal of EMU4-HM1-MB is setup Pulse input.

Note 4: Contact Input is available only when Setting of external input signal of EMU4-HM1-MB is setup Contact input.

Note 5: This is only available when phase wire system is 3P4W in EMU4-HM1-MB, EMU4-A2, EMU4-VA2.

The allocation of the remote input RX of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Description		Note
				OFF(0)	ON(1)	
RXn0 ~ RX(n+1)F	Reserved	—	—	—	—	
RX(n+2)0	Setting completion flag P16	○	—	Not receiving	Receiving	
RX(n+2)1	Setting completion flag P17	○	—	Not receiving	Receiving	
RX(n+2)2	Setting completion flag P18	○	—	Not receiving	Receiving	Note1
RX(n+2)3	Setting completion flag P19	○	—	Not receiving	Receiving	
RX(n+2)4	Setting completion flag P20	○	—	Not receiving	Receiving	Note1
RX(n+2)5	Setting completion flag P21	—	○	Not receiving	Receiving	
RX(n+2)6	Reserved	—	—	—	—	
RX(n+2)7	Reserved	—	—	—	—	
RX(n+2)8	Setting completion flag P24	○	—	Not receiving	Receiving	
RX(n+2)9	Setting completion flag P25	○	—	Not receiving	Receiving	
RX(n+2)A	Setting completion flag P26	○	—	Not receiving	Receiving	Note1
RX(n+2)B	Setting completion flag P27	○	—	Not receiving	Receiving	
RX(n+2)C	Setting completion flag P28	○	—	Not receiving	Receiving	Note1
RX(n+2)D	Setting completion flag P29	—	○	Not receiving	Receiving	
RX(n+2)E	Reserved	—	—	—	—	
RX(n+2)F	Reserved	—	—	—	—	
RX(n+3)0	Setting completion flag P32	○	—	Not receiving	Receiving	
RX(n+3)1	Setting completion flag P33	○	—	Not receiving	Receiving	
RX(n+3)2	Setting completion flag P34	○	—	Not receiving	Receiving	Note1
RX(n+3)3	Setting completion flag P35	○	—	Not receiving	Receiving	
RX(n+3)4	Setting completion flag P36	○	—	Not receiving	Receiving	Note1
RX(n+3)5	Setting completion flag P37	—	○	Not receiving	Receiving	
RX(n+3)6	Reserved	—	—	—	—	
RX(n+3)7	Reserved	—	—	—	—	
RX(n+3)8	Setting completion flag P40	○	—	Not receiving	Receiving	
RX(n+3)9	Setting completion flag P41	○	—	Not receiving	Receiving	
RX(n+3)A	Setting completion flag P42	○	—	Not receiving	Receiving	Note1
RX(n+3)B	Setting completion flag P43	○	—	Not receiving	Receiving	
RX(n+3)C	Setting completion flag P44	○	—	Not receiving	Receiving	Note1
RX(n+3)D	Setting completion flag P45	—	○	Not receiving	Receiving	
RX(n+3)E	Reserved	—	—	—	—	
RX(n+3)F	Reserved	—	—	—	—	

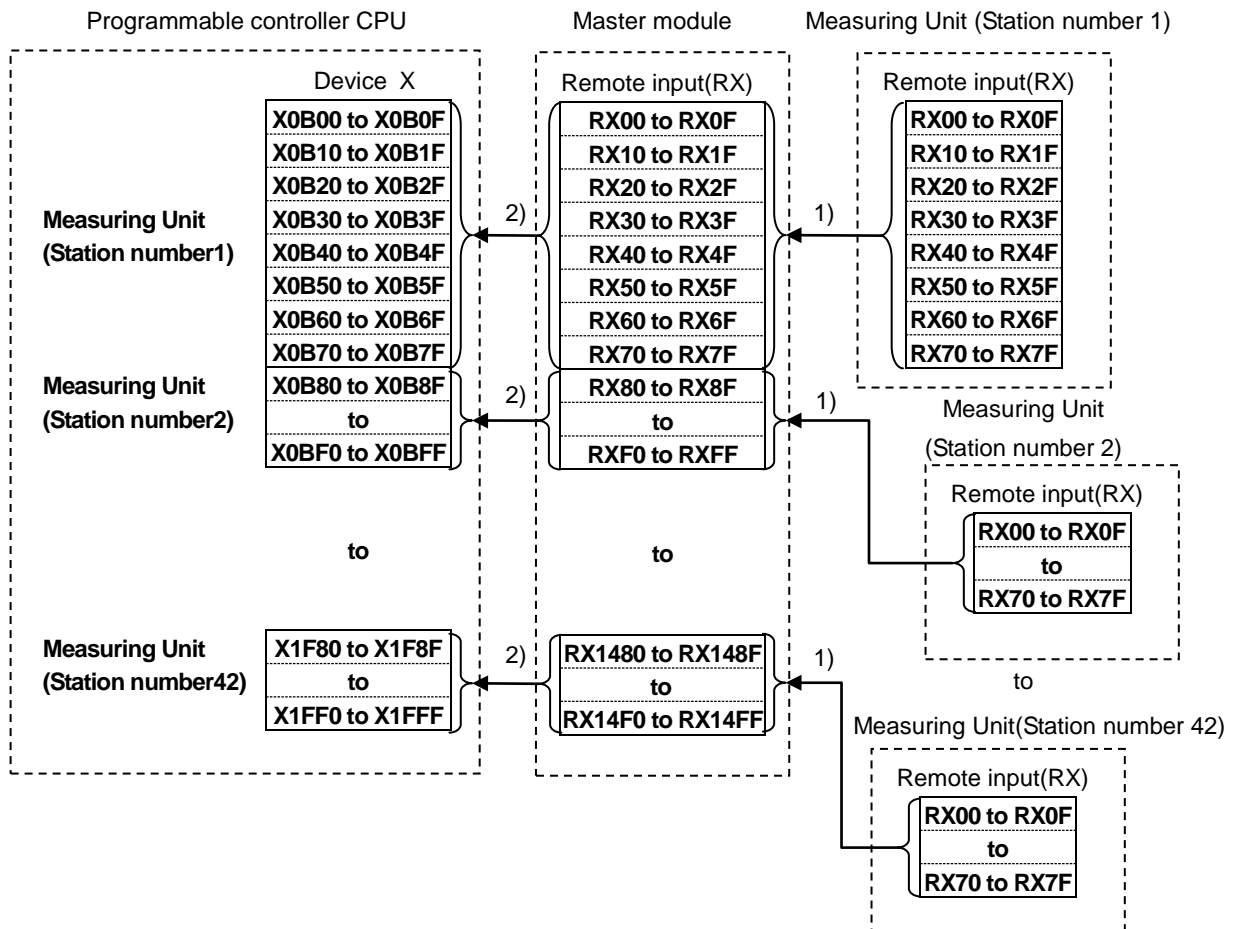
Note1: This is available only when wire phase system is 3P4W.

*: Lead RXn0 depends on station number of measuring unit and CC-Link system configuration.

Please refer to User's manual of CC-Link master station for more details.

(1) Relationships between programmable controller CPU, master module and Measuring Unit(RX)

- 1) The input status of Measuring Unit is stored automatically (for each link scan) in the master station's "remote input RX" buffer memory.
- 2) The input status stored in the "remote input RX" buffer memory is stored in the CPU device set with the automatic refresh parameters.



Station number	Device No.	Station number	Device No.	Station number	Device No.
1	X0B00 to X0B7F	15	X1200 to X127F	29	X1900 to X197F
2	X0B80 to X0BFF	16	X1280 to X12FF	30	X1980 to X19FF
3	X0C00 to X0C7F	17	X1300 to X137F	31	X1A00 to X1A7F
4	X0C80 to X0CfF	18	X1380 to X13FF	32	X1A80 to X1AFF
5	X0D00 to X0D7F	19	X1400 to X147F	33	X1B00 to X1B7F
6	X0D80 to X0DFF	20	X1480 to X14FF	34	X1B80 to X1BFF
7	X0E00 to X0E7F	21	X1500 to X157F	35	X1C00 to X1C7F
8	X0E80 to X0EFF	22	X1580 to X15FF	36	X1C80 to X1CFF
9	X0F00 to X0F7F	23	X1600 to X167F	37	X1D00 to X1D7F
10	X0F80 to X0FFF	24	X1680 to X16FF	38	X1D80 to X1DFF
11	X1000 to X107F	25	X1700 to X177F	39	X1E00 to X1E7F
12	X1080 to X10FF	26	X1780 to X17FF	40	X1E80 to X1EFF
13	X1100 to X117F	27	X1800 to X187F	41	X1F00 to X1F7F
14	X1180 to X11FF	28	X1880 to X18FF	42	X1F80 to X1FFF

Device No. is determined to "X0B00 to X1FFF" if refresh device of remote input (RX) is set to "X0B00".

7.1.2 Remote Output RY

The allocation of the remote output RY of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-BD1-MB	EMU4-HD1-MB	Description		Note
				ON (1) → OFF (0)	OFF (0) → ON (1)	
RYn0 to RYnF	Reserved	—	—	—	—	
RX(n+1)0	Monitor pattern setting flag P00	○	○	Not setting	Setting	
RY(n+1)1 to RY(n+1)7	Reserved	—	—	—	—	
RY(n+1)8	Monitor pattern setting flag P08	○	○	Not setting	Setting	
RY(n+1)9	Monitor pattern setting flag P09	○	○	Not setting	Setting	
RY(n+1)A	Monitor pattern setting flag P10	—	○	Not setting	Setting	Note 2
RY(n+1)B	Monitor pattern setting flag P11	○	○	Not setting	Setting	
RY(n+1)C	Monitor pattern setting flag P12	—	○	Not setting	Setting	Note 2
Ry(n+1)D to RY(n+7)7	Reserved	—	—	—	—	
RY(n+7)8	Initial data process request flag	○	○	Power OFF, remote READY ON, or error status flag ON	Power supply is turned ON or hardware reset	
RY(n+7)9	Reserved	—	—	—	—	
RY(n+7)A	Error status flag	○	○	No error occurrence	Error occurrence	
RY(n+7)B to RY(n+7)F	Reserved	—	—	—	—	

Note 1: For the details, refer to “6.2 Initial communication”, “6.3 Error communication”.

Note 2: This is only available when phase wire system is 3P4W in EMU4-HD1-MB.

The allocation of the remote output RY of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	Description		Note
					ON (1) → OFF (0)	OFF (0) → ON (1)	
RYn0 to RYnF	Reserved	—	—	—	—	—	
RY(n+1)0	Monitor pattern setting flag P00	○	○	○	Not setting	Setting	
RY(n+1)1 to RY(n+1)7	Reserved	—	—	—	—	—	
RY(n+1)8	Monitor pattern setting flag P08	○	○	—	Not setting	Setting	
RY(n+1)9	Monitor pattern setting flag P09	○	○	—	Not setting	Setting	
RY(n+1)A	Monitor pattern setting flag P10	—	○	—	Not setting	Setting	Note 2
RY(n+1)B	Monitor pattern setting flag P11	○	○	—	Not setting	Setting	
RY(n+1)C	Monitor pattern setting flag P12	—	○	—	Not setting	Setting	Note 2
RY(n+1)D	Monitor pattern setting flag P13	—	—	○	Not setting	Setting	
RY(n+1)E to RY(n+7)7	Reserved	—	—	—	—	—	
RY(n+7)8	Initial data process completion flag	○	○	○	Initial data process completion flag is turned OFF	Initial data process completion	Note 1
RY(n+7)9	Reserved	—	—	—	—	—	
RY(n+7)A	Error reset status flag	○	○	○	Turn OFF error status flag	Error status reset request	Note 1
RY(n+7)B to RY(n+7)F	Reserved	—	—	—	—	—	

Note 1: For the details, refer to “6.2 Initial communication t”, “6.3 Error communication”

Note 2: This is only available when phase wire system is 3P4W.

*: Lead RYn0 depends on station number of measuring unit and CC-Link system configuration.

Please refer to User's manual of CC-Link master station for more details.

Point
Do not read or write to reserved remote registers. If reading or writing is performed, the functions of Measuring Unit are not guaranteed.

The allocation of the remote output RY of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Description		Note
				ON (1) → OFF (0)	OFF (0) → ON (1)	
RYn0 to RYnF	Reserved	—	—	—	—	
RY(n+2)0	Monitor pattern setting flag P16	○	—	Not setting	Setting	
RY(n+2)1	Monitor pattern setting flag P17	○	—	Not setting	Setting	
RY(n+2)2	Monitor pattern setting flag P18	○	—	Not setting	Setting	Note1
RY(n+2)3	Monitor pattern setting flag P19	○	—	Not setting	Setting	
RY(n+2)4	Monitor pattern setting flag P20	○	—	Not setting	Setting	Note1
RY(n+2)5	Monitor pattern setting flag P21	—	○	Not setting	Setting	
RY(n+2)6	Reserved	—	—	—	—	
RY(n+2)7	Reserved	—	—	—	—	
RY(n+2)8	Monitor pattern setting flag P24	○	—	Not setting	Setting	
RY(n+2)9	Monitor pattern setting flag P25	○	—	Not setting	Setting	
RY(n+2)A	Monitor pattern setting flag P26	○	—	Not setting	Setting	Note1
RY(n+2)B	Monitor pattern setting flag P27	○	—	Not setting	Setting	
RY(n+2)C	Monitor pattern setting flag P28	○	—	Not setting	Setting	Note1
RY(n+2)D	Monitor pattern setting flag P29	—	○	Not setting	Setting	
RY(n+2)E	Reserved	—	—	—	—	
RY(n+2)F	Reserved	—	—	—	—	
RY(n+3)0	Monitor pattern setting flag P32	○	—	Not setting	Setting	
RY(n+3)1	Monitor pattern setting flag P33	○	—	Not setting	Setting	
RY(n+3)2	Monitor pattern setting flag P34	○	—	Not setting	Setting	Note1
RY(n+3)3	Monitor pattern setting flag P35	○	—	Not setting	Setting	
RY(n+3)4	Monitor pattern setting flag P36	○	—	Not setting	Setting	Note1
RY(n+3)5	Monitor pattern setting flag P37	—	○	Not setting	Setting	
RY(n+3)6	Reserved	—	—	—	—	
RY(n+3)7	Reserved	—	—	—	—	
RY(n+3)8	Monitor pattern setting flag P40	○	—	Not setting	Setting	
RY(n+3)9	Monitor pattern setting flag P41	○	—	Not setting	Setting	
RY(n+3)A	Monitor pattern setting flag P42	○	—	Not setting	Setting	Note1
RY(n+3)B	Monitor pattern setting flag P43	○	—	Not setting	Setting	
RY(n+3)C	Monitor pattern setting flag P44	○	—	Not setting	Setting	Note1
RY(n+3)D	Monitor pattern setting flag P45	—	○			
RY(n+3)E	Reserved	—	—	—	—	
RY(n+3)F	Reserved	—	—	—	—	

} For circuit2

} For circuit3

} For circuit4

} For circuit5

The allocation of the remote output RY of Measuring Unit is shown in the table below.

Device No.	Signal name	EMU4-A2 EMU4-VA2	EMU4-AX4 EMU4-PX4	Description		Note
				ON (1) → OFF (0)	OFF (0) → ON (1)	
RY(n+4)0	Monitor pattern setting flag P48	○	—	Not setting	Setting	
RY(n+4)1	Monitor pattern setting flag P49	○	—	Not setting	Setting	
RY(n+4)2	Monitor pattern setting flag P50	○	—	Not setting	Setting	Note1
RY(n+4)3	Monitor pattern setting flag P51	○	—	Not setting	Setting	
RY(n+4)4	Monitor pattern setting flag P52	○	—	Not setting	Setting	Note1
RY(n+4)5	Monitor pattern setting flag P53	—	○	Not setting	Setting	
RY(n+4)6	Reserved	—	—	—	—	
RY(n+4)7	Reserved	—	—	—	—	
RY(n+4)8	Monitor pattern setting flag P56	○	—	Not setting	Setting	
RY(n+4)9	Monitor pattern setting flag P57	○	—	Not setting	Setting	
RY(n+4)A	Monitor pattern setting flag P58	○	—	Not setting	Setting	Note1
RY(n+4)B	Monitor pattern setting flag P59	○	—	Not setting	Setting	
RY(n+4)C	Monitor pattern setting flag P60	○	—	Not setting	Setting	Note1
RY(n+4)D	Reserved	—	—	—	—	
RY(n+4)E	Reserved	—	—	—	—	
RY(n+4)F	Reserved	—	—	—	—	
RY(n+5)0 ~ RY(n+7)F	Reserved	—	—	—	—	

For circuit6

For circuit7

Note 1: This is only available when phase wire system is 3P4W.

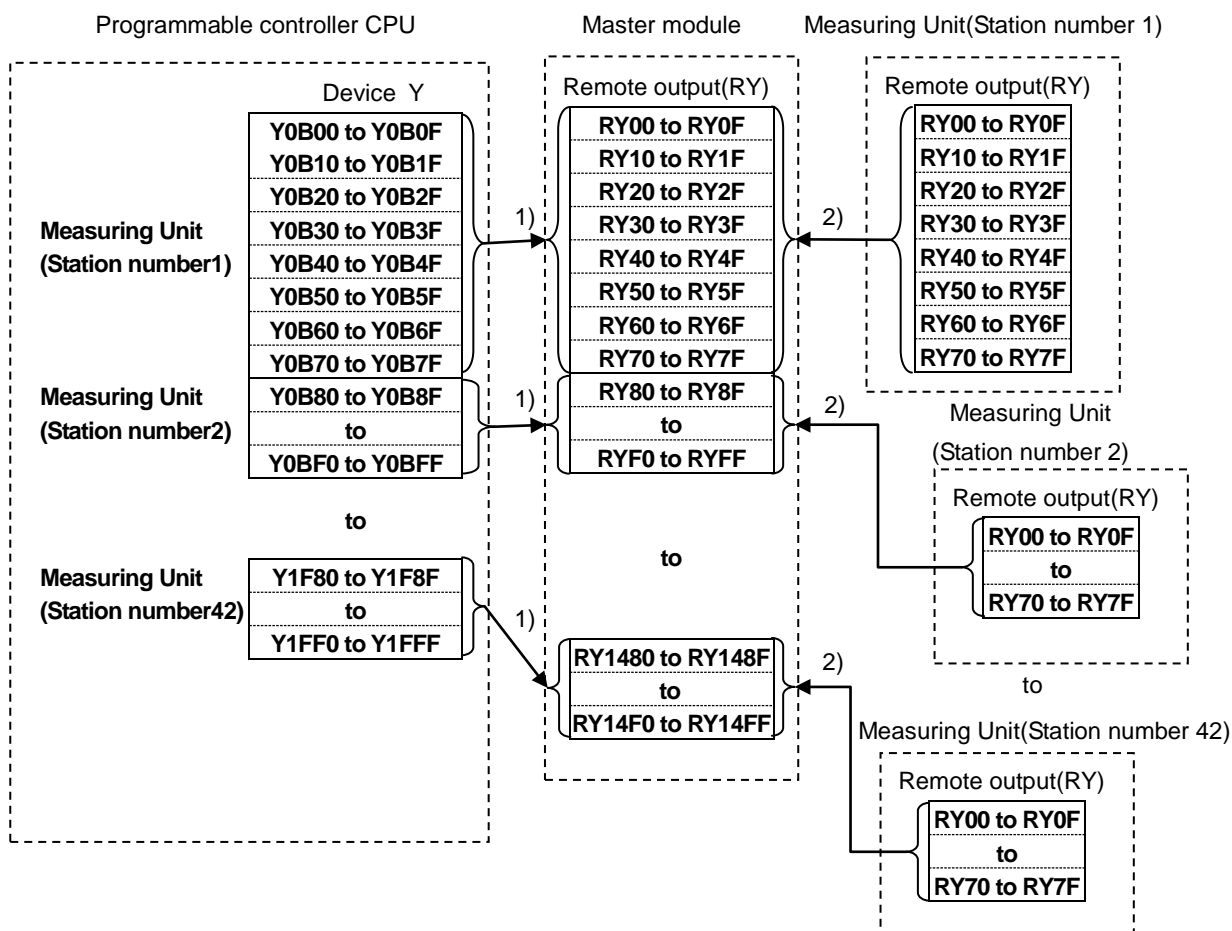
Lead RYn0 depends on station number of measuring unit and CC-Link system configuration.

Please refer to User's manual of CC-Link master station for more details.

Point
Do not read or write to reserved remote registers. If reading or writing is performed, the functions of Measuring Unit are not guaranteed.

Relationships between programmable controller CPU, master module and Measuring Unit (RY)

- 1) The on/off data of the CPU device set with the automatic refresh parameters is stored in the "remote output RY" buffer memory.
- 2) Remote output RY is automatically set to on/off (for each link scan) according to the output status stored in the "remote output RY" buffer memory.



Station number	Device No.	Station number	Device No.	Station number	Device No.
1	Y0B00 to Y0B7F	15	Y1200 to Y127F	29	Y1900 to Y197F
2	Y0B80 to Y0BFF	16	Y1280 to Y12FF	30	Y1980 to Y19FF
3	Y0C00 to Y0C7F	17	Y1300 to Y137F	31	Y1A00 to Y1A7F
4	Y0C80 to Y0CfF	18	Y1380 to Y13FF	32	Y1A80 to Y1A7F
5	Y0D00 to Y0D7F	19	Y1400 to Y147F	33	Y1B00 to Y1B7F
6	Y0D80 to Y0DFF	20	Y1480 to Y14FF	34	Y1B80 to Y1B7F
7	Y0E00 to Y0E7F	21	Y1500 to Y157F	35	Y1C00 to Y1C7F
8	Y0E80 to Y0EFF	22	Y1580 to Y15FF	36	Y1C80 to Y1C7F
9	Y0F00 to Y0F7F	23	Y1600 to Y167F	37	Y1D00 to Y1D7F
10	Y0F80 to Y0FFF	24	Y1680 to Y16FF	38	Y1D80 to Y1D7F
11	Y1000 to Y107F	25	Y1700 to Y177F	39	Y1E00 to Y1E7F
12	Y1080 to Y10FF	26	Y1780 to Y177F	40	Y1E80 to Y1EFF
13	Y1100 to Y117F	27	Y1800 to Y187F	41	Y1F00 to Y1F7F
14	Y1180 to Y11FF	28	Y1880 to Y18FF	42	Y1F80 to Y1FFF

Device No. is determined to "Y0B00 to Y1FFF" if refresh device of remote output (RY) is set to "Y0B00".

7.2 Remote Register (RW_r, RW_w)

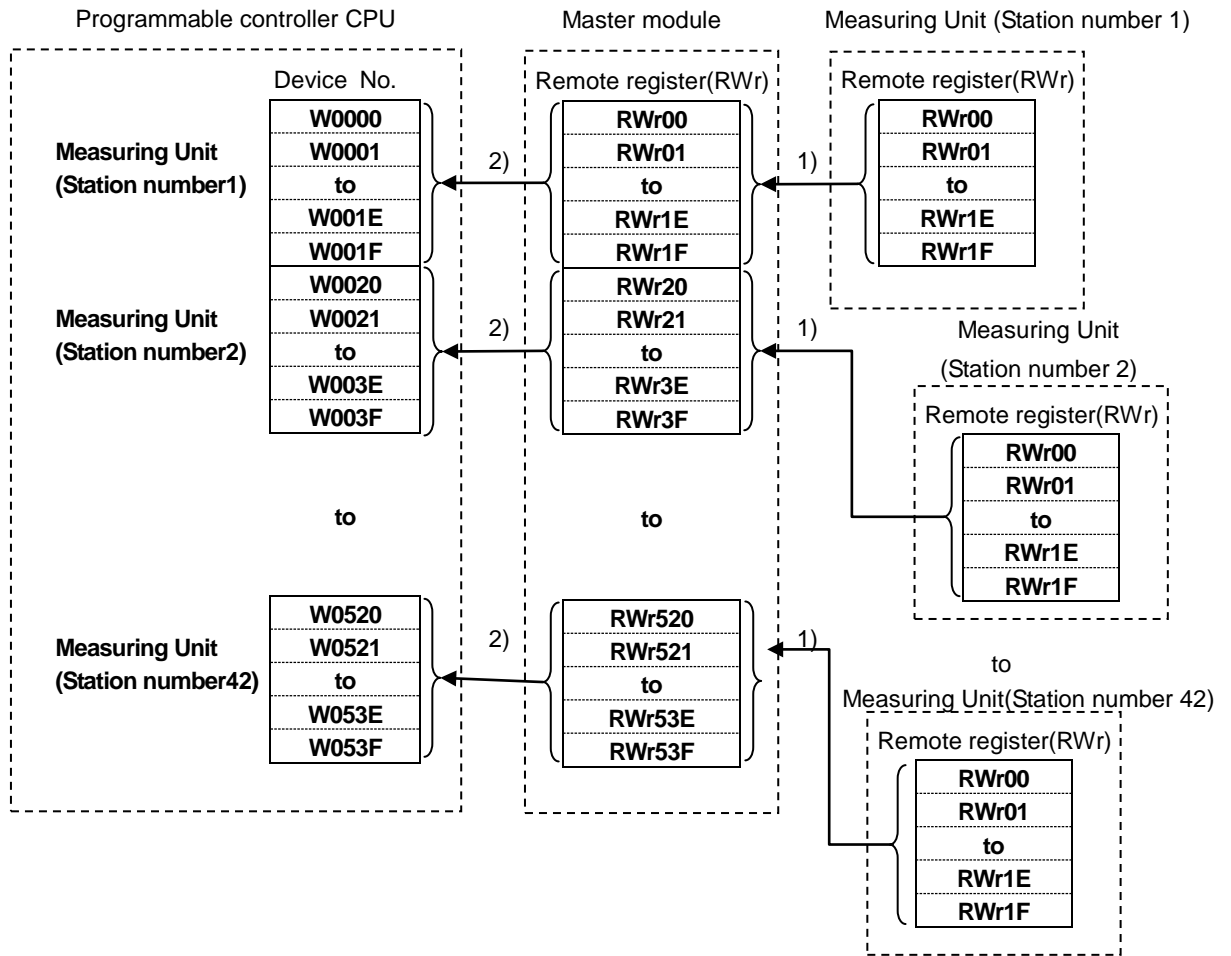
The remote registers RW_r and RW_w are used to communicate word data between the master station and Measuring Unit. Because it occupies 1 station (Expanded cyclic setting: octuplet), the remote registers RW_r and RW_w each have 32 words in length.

For monitoring by pattern, it is not necessary to use remote registers (RW_w). Selected measuring values which are set a bit of RY are stored in remote registers (RW_r).

For monitoring by command (1H) and setting by command (2H), it is necessary to use remote registers (RW_w). Measuring Unit has unique codes (called unit No., group No. and channel No.) for each measurement items and setting items. It becomes possible to monitor each measurement values or set each parameter by writing into the remote registers (RW_w) of the master station command and the related data allocated to the item you want to monitor or set.

Relationships between programmable controller CPU, master module and Measuring Unit(RWr)

- 1) The remote registers RWr data of a remote device station is automatically stored in the "remote registers RWr" buffer memory of the master station.
- 2) The remote registers RWr data of Measuring Unit stored in the "remote registers RWr" buffer memory is stored in the CPU device set with the automatic refresh parameters.

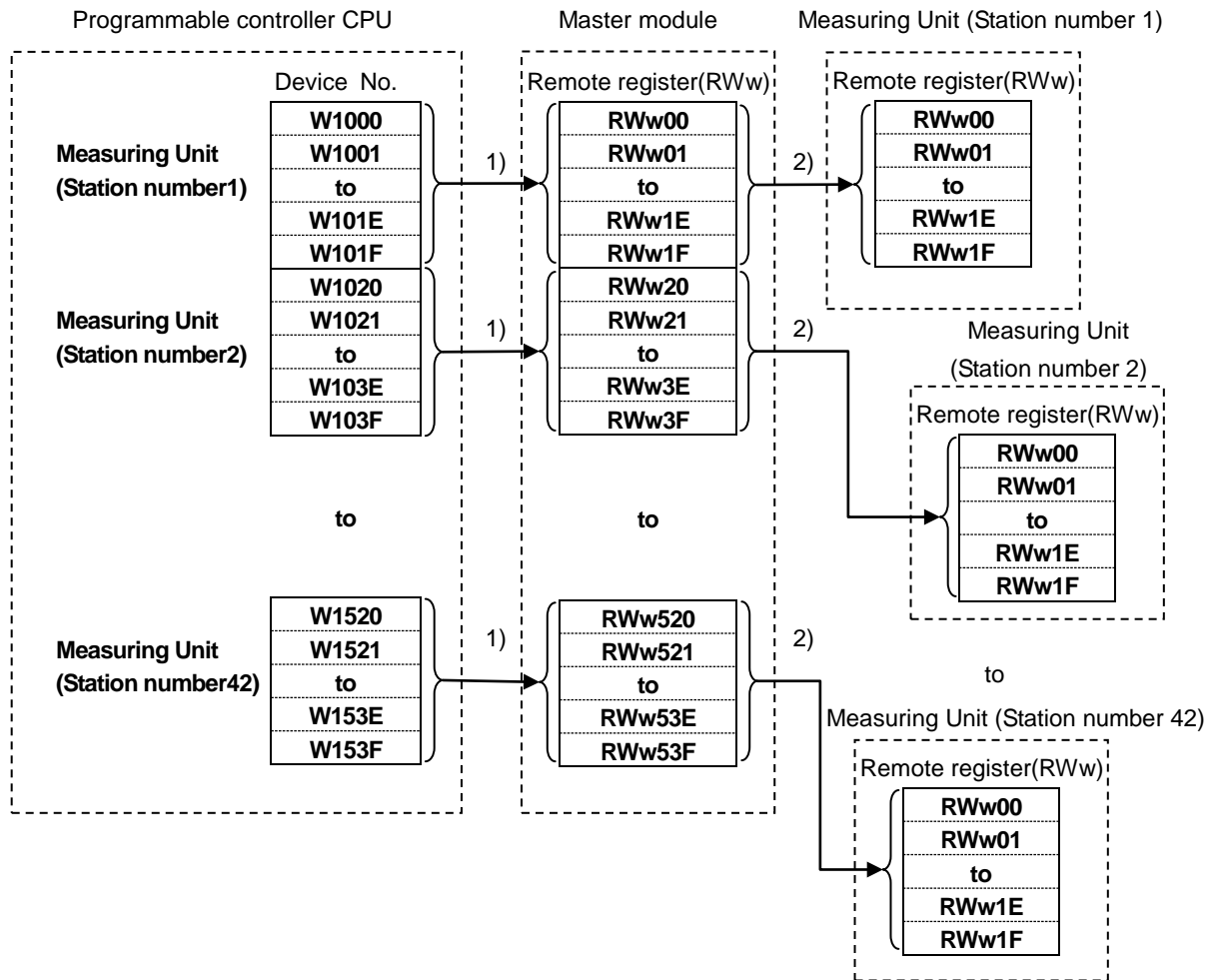


Station number	Device No.	Station number	Device No.	Station number	Device No.
1	W0000 to W001F	15	W01C0 to W01DF	29	W0380 to W039F
2	W0020 to W003F	16	W01E0 to W01FF	30	W03A0 to W03BF
3	W0040 to W005F	17	W0200 to W021F	31	W03C0 to W03DF
4	W0060 to W007F	18	W0220 to W023F	32	W03E0 to W03FF
5	W0080 to W009F	19	W0240 to W025F	33	W0400 to W041F
6	W00A0 to W00BF	20	W0260 to W027F	34	W0420 to W043F
7	W00C0 to W00DF	21	W0280 to W029F	35	W0440 to W045F
8	W00E0 to W00FF	22	W02A0 to W02BF	36	W0460 to W047F
9	W0100 to W011F	23	W02C0 to W02DF	37	W0480 to W049F
10	W0120 to W013F	24	W02E0 to W02FF	38	W04A0 to W04BF
11	W0140 to W015F	25	W0300 to W031F	39	W04C0 to W04DF
12	W0160 to W017F	26	W0320 to W033F	40	W04E0 to W04FF
13	W0180 to W019F	27	W0340 to W035F	41	W0500 to W051F
14	W01A0 to W01BF	28	W0360 to W037F	42	W0520 to W053F

Device No. is determined to "W0000 to W053F" if refresh device of remote registers (RWr) is set to "W0".

(1) Relationships between programmable controller CPU, master module and Measuring Unit(RWw)

- 1) The transmission data of the CPU device set with the automatic refresh parameters is stored in the "remote registers RWw" buffer memory.
- 2) The data stored in the "remote registers RWw" buffer memory is automatically sent to the remote registers RWw of each remote device station.



Station number	Device No.	Station number	Device No.	Station number	Device No.
1	W1000 to W101F	15	W11C0 to W11DF	29	W1380 to W139F
2	W1020 to W103F	16	W11E0 to W11FF	30	W13A0 to W13BF
3	W1040 to W105F	17	W1200 to W121F	31	W13C0 to W13DF
4	W1060 to W107F	18	W1220 to W123F	32	W13E0 to W13FF
5	W1080 to W109F	19	W1240 to W125F	33	W1400 to W141F
6	W10A0 to W10BF	20	W1260 to W127F	34	W1420 to W143F
7	W10C0 to W10DF	21	W1280 to W129F	35	W1440 to W145F
8	W10E0 to W10FF	22	W12A0 to W12BF	36	W1460 to W147F
9	W1100 to W111F	23	W12C0 to W12DF	37	W1480 to W149F
10	W1120 to W113F	24	W12E0 to W12FF	38	W14A0 to W14BF
11	W1140 to W115F	25	W1300 to W131F	39	W14C0 to W14DF
12	W1160 to W117F	26	W1320 to W133F	40	W14E0 to W14FF
13	W1180 to W119F	27	W1340 to W135F	41	W1500 to W151F
14	W11A0 to W11BF	28	W1360 to W137F	42	W1520 to W153F

Device No. is determined to "W1000 to W153F" if refresh device of remote registers (RWw) is set to "W1000".

7.2.1 Monitor Pattern

The following table shows correspondence between RY and grouped measuring items.

Table 7.1 Correspondence between RY and grouped measuring items.

(Model: EMU4-BD1-MB, EMU4-HD1-MB, EMU4-BM1-MB, EMU4-HM1-MB)

Device.	P08	P09	P10(*1)	P11	P12(*1)		
	RY(n+1)8	RY(n+1)9	RY(n+1)A	RY(n+1)B	RY(n+1)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				Phase 2 current (Inst.)[A]	Phase N current demand (Inst.)[A]		
RWr02				Phase 3 current (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 3 current (Inst.)[A]	1-N Voltage (Inst.)[V]
RWr03						Phase 1 current demand (Inst.)[A]	2-N Voltage (Inst.)[V]
RWr04	Phase 2 current (Inst.)[A]	Phase 2 current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 2 current demand (Inst.)[A]	3-N Voltage (Inst.)[V]		
RWr05				Phase 3 current demand (Inst.)[A]	Average current demand (Inst.)[A]		
RWr06				1-2 Voltage (Inst.)[V]	Total active power demand (Inst.)[kW]	Phase 2 current demand (Inst.)[A]	Average current demand (Inst.)[A]
RWr07						Phase 3 current demand (Inst.)[A]	Average L-L voltage (Inst.)[V]
RWr08	Phase 3 current (Inst.)[A]	Phase 3 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 3 current demand (Inst.)[A]	Average L-N voltage (Inst.)[V]		
RWr09				2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	Phase 3 current demand (Inst.)[A]	00h (No items)
RWr0A						Total active power (Inst.)[kW]	00h (No items)
RWr0B				2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	3-N Voltage (Inst.)[V]	Phase 3 current demand (Inst.)[A]
RWr0C	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	1-2 Voltage (Inst.)[V]				00h (No items)
RWr0D			Total active power demand (Inst.)[kW]				00h (No items)
RWr0E	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	00h (No items)				2-3 Voltage (Inst.)[V]
RWr0F				Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	3-1 Voltage (Inst.)[V]	00h (No items)
RWr10						Total power factor (Inst.)[%]	00h (No items)
RWr11				Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	Total active power demand (Inst.)[kW]
RWr12	Active energy import[kWh]	Reactive energy import lag [kvarh]	Total reactive power (Inst.)[kvar]				00h (No items)
RWr13			Frequency (Inst.)[Hz]				00h (No items)
RWr14	Active energy import[kWh]	Reactive energy import lag [kvarh]	00h (No items)				Total power factor (Inst.)[%]
RWr15				Active energy import[kWh]	Reactive energy import lag [kvarh]	Frequency (Inst.)[Hz]	00h (No items)
RWr16						Active energy import[kWh]	00h (No items)
RWr17				Reactive energy import lag [kvarh]	00h (No items)		
RWr18	①	①	①	②	②		

Inst.: Instantaneous value

Note: [] shows the unit of measuring element in upper table.

Note: 2 phase current (demand), 3 phase current (demand), V23-line voltage, V31 line voltage are turned to 00h when phase wire system is 1P2W in EMU4-BD1-MB, EMU4-HD1-MB.

Note: 2 phase current (demand), V31 line voltage are turned to 00h when phase wire system is 1P2W in EMU4-BM1-MB, EMU4-HM1-MB.

Note: For the power factor, "+" is showed lag, "-" is showed lead as with Measuring Unit's display.

*1: P10, P12 is available only when phase wire system is 3P4W.

Table 7.2 Correspondence between RY and grouped measuring items.

						(*1)		(*1)		
Circuit2	P16	RY(n+2)0	P17	RY(n+2)1	P18	RY(n+2)2	P19	RY(n+2)3	P20	RY(n+2)4
Circuit3	P24	RY(n+2)8	P25	RY(n+2)9	P26	RY(n+2)A	P27	RY(n+2)B	P28	RY(n+2)C
Circuit4	P32	RY(n+3)0	P33	RY(n+3)1	P34	RY(n+3)2	P35	RY(n+3)3	P36	RY(n+3)4
Circuit5	P40	RY(n+3)8	P41	RY(n+3)9	P42	RY(n+3)A	P43	RY(n+3)B	P44	RY(n+3)C
Circuit6	P48	RY(n+4)0	P49	RY(n+4)1	P50	RY(n+4)2	P51	RY(n+4)3	P52	RY(n+4)4
Circuit7	P56	RY(n+4)8	P57	RY(n+4)9	P58	RY(n+4)A	P59	RY(n+4)B	P60	RY(n+4)C
RWr00	Phase 1 current (Inst.)[A]	Phase 1 current demand (Inst.)[A]	Phase N current (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]	Phase 1 current (Inst.)[A]	Phase N current (Inst.)[A]
RWr01										
RWr02										
RWr03										
RWr04	Phase 2 current (Inst.)[A]	Phase 2 current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 3 current (Inst.)[A]	Phase N current demand (Inst.)[A]	Phase 3 current (Inst.)[A]	Phase 1 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	
RWr05										
RWr06										
RWr07										
RWr08	Phase 3 current (Inst.)[A]	Phase 3 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	1-N Voltage (Inst.)[V]	Phase 2 current demand (Inst.)[A]	1-N Voltage (Inst.)[V]	Phase 2 current demand (Inst.)[A]	Phase 3 current demand (Inst.)[A]	3-N Voltage (Inst.)[V]	
RWr09										
RWr0A										
RWr0B										
RWr0C	1-2 Voltage (Inst.)[V]	Total active power demand (Inst.)[kW]	2-N Voltage (Inst.)[V]	2-N Voltage (Inst.)[V]	1-2 Voltage (Inst.)[V]	2-N Voltage (Inst.)[V]	1-2 Voltage (Inst.)[V]	2-3 Voltage (Inst.)[V]	Average current demand (Inst.)[A]	
RWr0D										
RWr0E										
RWr0F										
RWr10	2-3 Voltage (Inst.)[V]	Total power factor (Inst.)[%]	3-N Voltage (Inst.)[V]	3-N Voltage (Inst.)[V]	3-1 Voltage (Inst.)[V]	3-N Voltage (Inst.)[V]	3-1 Voltage (Inst.)[V]	Total active power (Inst.)[kW]	Average L-N voltage (Inst.)[V]	
RWr11										
RWr12										
RWr13										
RWr14	3-1 Voltage (Inst.)[V]	Frequency (Inst.)[Hz]	00h (No items)	00h (No items)	Total active power demand (Inst.)[kW]	00h (No items)	Total active power demand (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	
RWr15										
RWr16										
RWr17										
RWr18	Total active power (Inst.)[kW]	Total reactive power (Inst.)[kvar]	00h (No items)	00h (No items)	Total power factor (Inst.)[%]	00h (No items)	Total power factor (Inst.)[%]	Frequency (Inst.)[Hz]	00h (No items)	
RWr19										
RWr1A										
RWr1B										
RWr1C	Active energy import[kWh]	Reactive energy import lag [kvarh]	00h (No items)	00h (No items)	Active energy import[kWh]	00h (No items)	Active energy import[kWh]	Reactive energy import lag [kvarh]	00h (No items)	
RWr1D										
RWr1E										
RWr1F										
Group format	①	①	①	①	②	②	②	②	②	

Inst.: Instantaneous value

Note:[] shows the unit of measuring element in upper table.

Note: 2 phase current (demand), V31 line voltage are turned to 00h when phase wire system is 1P2W in EMU4-A2, EMU4-VA2.

Note: For the power factor, "+" is showed lag, "-" is showed lead as with Measuring Unit's display.

*1: P18,P26,P34,P42,P50,P58, P20,P28,P36,P44,P52,P60 is available only when phase wire system is 3P4W.

Error state flag RX(n+7)A turn to ON and RWr00~RWr1F turn to 00h when phase wire system is not 3P4W.

Table 7.3 Correspondence between RY and grouped measuring items.

(Model: EMU4-LG1-MB)

Device.	P13
	RY(n+1)D
RWr00	Leak current [mA]
RWr01	
RWr02	Leak current demand [mA]
RWr03	
RWr04	Leak current for resistance [mA]
RWr05	
RWr06	Leak current for resistance demand [mA]
RWr07	
RWr08	Leak current for resistance differential conversion value [mA]
RWr09	
RWr0A	00h
RWr0B	
RWr0C	
RWr0D	
RWr0E	
RWr0F	
RWr10	
RWr11	
RWr12	
RWr13	
RWr14	
RWr15	
RWr16	
RWr17	
RWr18	
RWr19	
RWr1A	
RWr1B	
RWr1C	
RWr1D	
RWr1E	
RWr1F	
Group format	②

Table 7.4 Correspondence between RY and grouped measuring items.
(Model: EMU4-AX4)

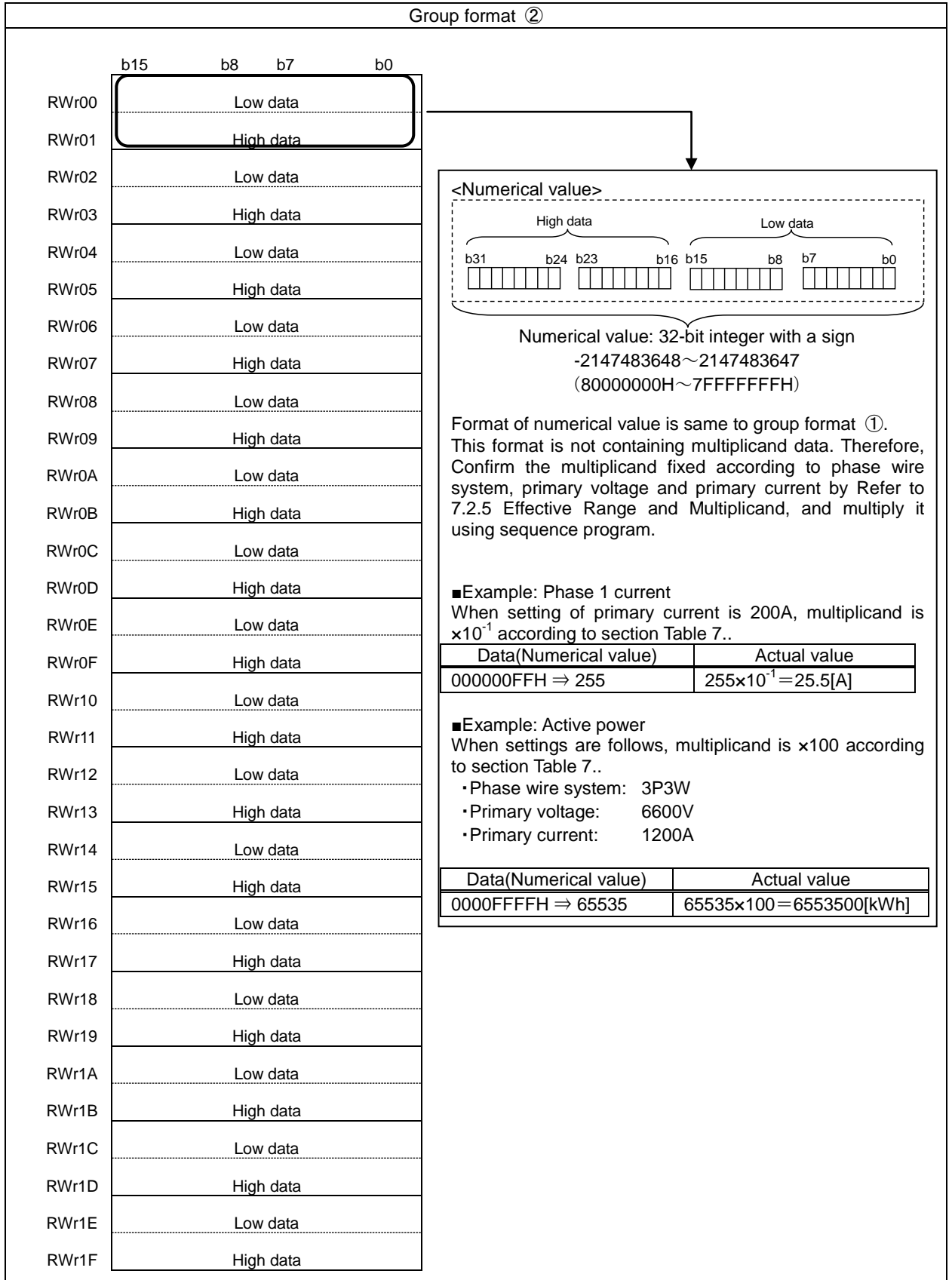
Circuit2	P21	RY(n+2)5
Circuit3	P29	RY(n+2)D
Circuit4	P37	RY(n+3)5
Circuit5	P45	RY(n+3)D
Circuit6	P53	RY(n+4)5
RWr00	AD conversion value(CH1)	
RWr01		
RWr02	AD conversion value (CH2)	
RWr03		
RWr04	AD conversion value (CH3)	
RWr05		
RWr06	AD conversion value (CH4)	
RWr07		
RWr08	Scaling value(CH1)	
RWr09		
RWr0A	Scaling value (CH2)	
RWr0B		
RWr0C	Scaling value (CH3)	
RWr0D		
RWr0E	Scaling value (CH4)	
RWr0F		
RWr10	00h	
RWr11		
RWr12		
RWr13		
RWr14		
RWr15		
RWr16		
RWr17		
RWr18		
RWr19		
RWr1A		
RWr1B		
RWr1C		
RWr1D		
RWr1E		
RWr1F		
Group format	②	

Table 7.5 Correspondence between RY and grouped measuring items.
(Model: EMU4-PX4)

Circuit2	P21	RY(n+2)5
Circuit3	P29	RY(n+2)D
Circuit4	P37	RY(n+3)5
Circuit5	P45	RY(n+3)D
Circuit6	P53	RY(n+4)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	
RWr11		
RWr12		
RWr13		
RWr14		
RWr15		
RWr16		
RWr17		
RWr18		
RWr19		
RWr1A		
RWr1B		
RWr1C		
RWr1D		
RWr1E		
RWr1F		
Group format	②	

(2) Group format ②

For group format ②, Up to 16 measuring items can be monitored per a group. 2 words are used per measuring item. However, it is necessary to be multiplied by using Table 7. because there is no multiplicand data .



7.2.2 When Monitoring by Command(1H)

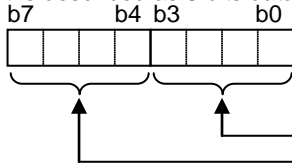
Up to 8 measuring values can be monitored by setting the unit No., group No. and channel No. to remote registers (RWw). Monitor pattern setting flag (RX (n+1)0) is used to send the command. (For details, refer to section 6.4.2)

The command can be sent only when the remote READY (RX (n+7)B) is ON.

Remote register RWw (Programmable controller→Measuring Unit)				Remote register RWr (Measuring Unit→Programmable controller)						
	b15	b8	b7	b0		b15	b8	b7	b0	
RWw00	Group No.		Unit No.	1H	} Item 1	RWr00	Channel No.		Group No.	} Item 1
RWw01	00H		Channel No.			RWr01	Index number		(Error code)	
RWw02	00H		00H			RWr02	Low data			
RWw03	00H		00H			RWr03	High data			
RWw04	Group No.		Unit No.	1H	} Item 2	RWr04	Channel No.		Group No.	} Item 2
RWw05	00H		Channel No.			RWr05	Index number		(Error code)	
RWw06	00H		00H			RWr06	Low data			
RWw07	00H		00H			RWr07	High data			
to	to				to	to				
RWw1C	Group No.		Unit No.	1H	} Item 8	RWr1C	Channel No.		Group No.	} Item 8
RWw1D	00H		Channel No.			RWr1D	Index number		(Error code)	
RWw1E	00H		00H			RWr1E	Low data			
RWw1F	00H		00H			RWr1F	High data			

* At normal communication, Error code is 00h.
About the other error code, refer to Table 7.14.

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



Command: Data range is 0H to 7H
 Unit No.: Data range is 0H to 7H
 Unit No. is 1H when use EMU4-BD1-MB, EMU4-HD1-MB, EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB.
 Input circuit No.(ch No.) is Unit No. when use EMU4-A2, EMU4-VA2, EMU4-AX4, EMU4-PX4.

For example, When the unit No. is 0H and the command is 1H, it becomes "01H".

- Measuring Unit can monitor the value of measurement items which are not displayed.
- The measurement items are assigned Unit No., Group No. and Channel No. (Refer to Table 7.2)
- Store the unused space to 00H when monitoring items are fewer than 8.
- The details of data format are shown in the Table 7.6 to Table 7.12
- The monitoring items are changed with the setting of phase wire system.(Refer to Table 7.2)
- When combined command(2H), an error occurs.
- In case of monitoring the present value and its maximum continuously according to the renewal data timing of Measuring Unit, the maximum may be smaller than the present value.

Table 7. 2 Group Channel List for Data Monitor Command (1H) (1/16)

Group (H)	Channel (H)	Data type	Content name			EMU4-BD1-MB	EMU4-HD1-MB	Data format		
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	1C		Secondary voltage (L-L/L-N)	V		○	○			
E0	13		Phase wire system			○	○	⑤		
02	E0		Time constant for DA	sec		○	○			
08	E0		Time constant for DW	sec		○	○			
E0	92		5A/Direct			○	○			
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.	—	○			
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	Measurement		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	Measurement	1-2 harmonic voltage			V	RMS.	Total	—	①
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	Measurement	1-2 voltage THD			%	Inst.	Total	—	①
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	—	

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (2/16)

Group (H)	Channel (H)	Data type	Content name				EMU4-BD1-MB	EMU4-HD1-MB	Data format
63	41	Measurement	2-3 harmonic voltage	V	RMS.	Total	—	○	①
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	Measurement	2-3 voltage THD	%	Inst.	Total	—	○	①
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	Measurement	1-N harmonic voltage	V	RMS.	Total	—	○	①
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	—	○	
77	86	Measurement	1-N voltage THD	%	Inst.	Total	—	○	①
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	—	○	

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (3/16)

Group (H)	Channel (H)	Data type	Content name				EMU4-BD1-MB	EMU4-HD1-MB	Data format
4B	41	Measurement	2-N harmonic voltage	V	RMS.	Total	—	○	①
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	Measurement	2-N voltage THD	%	Inst.	Total	—	○	①
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	Measurement	3-N harmonic voltage	V	RMS.	Total	—	○	①
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	Measurement	3-N voltage THD	%	Inst.	Total	—	○	①
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	—	○		
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	Measurement	Phase 1 current THD	%	Inst.	Total	—	○	①
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	—	○	

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (4/16)

Group (H)	Channel (H)	Data type	Content name				EMU4-BD1-MB	EMU4-HD1-MB	Data format
33	41	Measurement	Phase 2 harmonic current	A	RMS.	Total	—	○	①
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	Measurement	Phase 2 current THD	%	Inst.	Total	—	○	①
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	Measurement	Phase 3 harmonic current	A	RMS.	Total	—	○	①
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	Measurement	Phase 3 current THD	%	Inst.	Total	—	○	①
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	—	○	
1D	81	Measurement	Phase N harmonic current	A	RMS.	1st	—	○	①
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	Measurement	Phase N current THD	%	Inst.	Total	—	○	①
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.

Table 7.2 Group Channel List for Data Monitor Command (1H) (5/16)

Group (H)	Channel (H)	Note	Data type	Content name			EMU4-BD1-MB	EMU4-HD1-MB	Data format	
80	01		Measurement	Active energy (import)	kWh	count	○	○	②	
80	63			Active energy (export)	kWh	count	○	○		
81	01			Reactive energy (import lag)	kvar	count	○	○		
80	64			Active energy (import)	kWh	count	expand	○		○
80	65			Active energy (export)	kWh	count	expand	○		○
81	66			Reactive energy (import lag)	kvar	count	expand	○		○
83	01			Pulse count	pulse	count	—	○		
87	01			Operating time	min	count	○	○		
8B	01			Periodic active energy	kWh	count	—	○		
83	01			Pulse count	pulse	count	—	○		
87	01			Operating time	hour		○	○	⑥	
A0	31			Alarm state	Alarm state	Alarm	—	○	③	

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (6/16)

Group (H)	Channel (H)	Data type	Content name	EMU4-BM1-MB	EMU4-HM1-MB	EMU4-A2 EMU4-VA2	Data format	
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	1C		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					
E0	98		External input reset mode					
E0	99		External output signal					
E0	9A		External output signal target					
83	E6		Unit of pulse output					
87	E2		Operating time					
8E	E2		Operating time(3side)					
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)	%				⑤
83	E4		Pulse converted					①
83	E5		Unit of pulse converted					⑤
80	E4		Electric energy converted rate					
8A	E4		Electric energy converted rate (3side)					
80	E5		Unit of electric energy converted					
8A	E5		Unit of electric energy converted(3side)					①
E0	9C		Alarm					⑤
E0	A6		Alarm(3side)					
E0	9D		Alarm elements					
E0	A7		Alarm elements(3side)					
E0	9E		Alarm value					①
E0	A8	Alarm value(3side)					⑤	
E0	9F	Alarm mask						
E0	A9	Alarm mask(3side)						
E0	A0	Alarm reset						
E0	AA	Alarm reset(3side)					①	
E0	AB	Simple measuring						
E0	AC	Power factor in simple measuring						
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.			

Table 7.2 Group Channel List for Data Monitor Command (1H) (7/16)

Group (H)	Channel (H)	Data type	Content name				EMU4-BM1-MB	EMU4-HM1-MB	EMU4-A2 EMU4-VA2	Data format
03	21	Measurement	1-N voltage	V	Inst.		—	○	○	①
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)				○	○	○	
09	01		Reactive power	kvar	Inst.	Total	○	○	○	
09	61		Reactive power(3side)				○	○	○	
0B	01		Apparent power	kVA	Inst.	Total	—	○	○	
0D	01		Power factor	%	Inst.	Total	○	○	○	
0D	61		Power factor(3side)				○	○	○	
0F	01	Frequency	Hz	Inst.		○	○	○		
63	21	Measurement	1-2 harmonic voltage	V	RMS.	Total	—	○	○	①
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	Measurement	1-2 voltage THD	%	Inst.	Total	—	○	○	①
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	—	○	○		

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (8/16)

Group (H)	Channel (H)	Data type	Content name			EMU4-BM1-MB	EMU4-HM1-MB	EMU4-A2 EMU4-VA2	Data format
63	41	Measurement	2-3 harmonic voltage	V	RMS.	Total	—	○	①
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	Measurement	2-3 voltage THD	%	Inst.	Total	—	○	①
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		Measurement	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	—	○	
77	86	Measurement	1-N voltage THD	%	Inst.	Total	—	○	①
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	—	○	

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (9/16)

Group (H)	Channel (H)	Data type	Content name				EMU4-BM1-MB	EMU4-HM1-MB	EMU4-A2 EMU4-VA2	Data format
4B	41	Measurement	2-N harmonic voltage	V	RMS.	Total	—	○	○	①
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	Measurement	2-N voltage THD	%	Inst.	Total	—	○	○	①
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	Measurement	3-N harmonic voltage	V	RMS.	Total	—	○	○	①
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	Measurement	3-N voltage THD	%	Inst.	Total	—	○	○	①
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	—	○	○		
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	Measurement	Phase 1 current THD	%	Inst.	Total	—	○	○	①
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	—	○	○		

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

Table 7.2 Group Channel List for Data Monitor Command (1H) (10/16)

Group (H)	Channel (H)	Data type	Content name				EMU4-BM1-MB	EMU4-HM1-MB	EMU4-A2 EMU4-VA2	Data format
33	41	Measurement	Phase 2 harmonic current	A	RMS.	Total	—	○	○	①
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	Measurement	Phase 2 current THD	%	Inst.	Total	—	○	○	①
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	Measurement	Phase 3 harmonic current	A	RMS.	Total	—	○	○	①
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	Measurement	Phase 3 current THD	%	Inst.	Total	—	○	○	①
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	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	—	○	○		
75	C8	Measurement	Phase N current THD	%	Inst.	Total	—	○	○	①
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.

Table 7.2 Group Channel List for Data Monitor Command (1H) (11/16)

Group (H)	Channel (H)	Data type	Content name			EMU4-BM1-MB	EMU4-HM1-MB	EMU4-A2 EMU4-VA2	Data format	
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)	kvar	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)	kvar	count	expand	○	○		○
8B	01		Periodic power	kvar	count	expand	—	○		○
90	01		Periodic power(3side)	kvar	count	expand	—	○		—
80	6A		Electric energy converted	*1	count	expand	—	○		○
8A	6A		Electric energy converted(3side)	*1	count	expand	—	○		○
83	6A		Pulse conversion	*1			—	○		—
83	01		Pulse count	pulse	count		—	○		○
87	01		Operating time	min	count		○	○		○
8E	01	Operating time(3side)	kWh	count		—	○	○	②	
A0	31	Alarm state	Alarm state1	—	Alarm	—	○	○	③	
A1	35		Alarm state2	—	Alarm		○	○		○

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

*1: Electric energy converted, Electric energy converted(3side), Pulse conversion have different units according to each setup value.

Please refer to Table 7.3 Group Channel List for Data Set Command (2H) for more details.

Table 7.2 Group Channel List for Data Monitor Command (1H) (12/16)

Group (H)	Channel (H)	Data type	Content name	EMU4-LG1-MB	Data format
F0	02	Set-up	Model setup value	-	○
E0	13		Phase wire system	-	○
12	E0		Leak current demand	sec	○
E0	9F		Alarm mask	-	○
E0	A0		Alarm reset	-	○
E0	AF		Measuring mode	-	○
7A	81		Differential conversion	-	○
7A	88		Differential conversion value	mA	○
11	89		Alarm of leak current monitoring element	-	○
7A	89		Alarm of leak current for resistance monitoring element	-	○
11	86		Leak current alarm1	mA	○
11	87		Leak current alarm2	mA	○
7A	86		Leak current alarm1 value	mA	○
7A	87		Leak current alarm2 value	mA	○
11	8A		Count of leak current alarm1	Times	○
11	8B		Count of leak current alarm2	Times	○
7A	8A		Count of leak current alarm1 value	Times	○
7A	8B		Count of leak current alarm2 value	Times	○
E0	B0		External output alarm	-	○
11	01		Measurement	Leak current	mA
12	01	Leak current demand		mA	○
7A	01	Leak current for resistance		mA	○
7B	01	Leak current for resistance demand		mA	○
7A	82	Differential conversion of leak current for resistance		mA	○
11	84	Count of alarm1 of leak current		Times	○
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	-	○
A1	35		Alarm state monitoring 2	-	○

Table 7.2 Group Channel List for Data Monitor Command (1H) (13/16)

Group (H)	Channel (H)	Note	Data type	Content name	Unit	EMU4-AX4	Data format
F0	02		Set-up	Model code	-	○	⑤
65	EB			Conversion rate setting	-	○	⑤
65	EC			AD Conversion use or non-use setting(Ch1)	-	○	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)	-	○	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)	-	○	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)	-	○	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)	-	○	⑤
67	F0			Scaling unit(Ch2)	-	○	
69	F0			Scaling unit(Ch3)	-	○	
6B	F0			Scaling unit(Ch4)	-	○	
66	EF			Moving average(Ch1)	times	○	⑤
68	EF			Moving average(Ch2)	times	○	
6A	EF			Moving average(Ch3)	times	○	
6C	EF			Moving average(Ch4)	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 monitoring factor (Ch1)	-	○	①
91	F1			Number over limit monitoring factor (Ch2)	-	○	
91	F2		Number over limit monitoring factor (Ch3)	-	○		
91	F3		Number over limit monitoring factor (Ch4)	-	○		

Table 7.2 Group Channel List for Data Monitor Command (1H) (14/16)

Group (H)	Channel (H)	Note	Data type	Content name	Unit	EMU4-AX4	Data format
E0	99		Set-up	External output setting		○	⑤
E0	9A			External output Channel		○	⑤
E0	B0			External output alarm		○	⑤
E0	9C			Upper limit alarm (Ch1)		○	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)		○	①
E0	A3			Upper limit value (Ch2)		○	
E0	A8			Upper limit value (Ch3)		○	
E0	B4			Upper limit value (Ch4)		○	
E0	B7			Lower limit alarm (Ch1)		○	⑤
E0	B9			Lower limit alarm (Ch2)		○	
E0	BB			Lower limit alarm (Ch3)		○	
E0	BD			Lower limit alarm (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			Delay (Ch1)		○	⑤
E0	A4			Delay (Ch2)		○	
E0	A9			Delay (Ch3)		○	
E0	B5			Delay (Ch4)		○	
E0	A0			Alarm reset mode (Ch1)		○	⑤
E0	A5			Alarm reset mode (Ch2)		○	
E0	AA			Alarm reset mode (Ch3)		○	
E0	B6			Alarm reset mode (Ch4)		○	

Table 7.2 Group Channel List for Data Monitor Command (1H) (15/16)

Group (H)	Channel (H)	Note	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		Measurement	Scaling value (Ch1)	-	○	①
67	21			Scaling value (Ch2)	-	○	
69	21			Scaling value (Ch3)	-	○	
6B	21			Scaling value (Ch4)	-	○	
91	00		Measurement	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	Monitoring alarm state	-	○	②

Table 7.2 Group Channel List for Data Monitor Command (1H) (16/16)

Group (H)	Channel (H)	Note	Data type	Content name	Unit	EMU4-PX4	Data format	
F0	02		Set-up	Model code		○	⑤	
87	E2			Operating time measuring (CH1)		○	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)		○	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 setting value		○	⑤	
E0	9A			External output channel		○	⑤	
E0	9C			Upper limit alarm (Ch1)		○	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)	*1	○	②	
E0	A3			Upper limit value (Ch2)	*1	○		
E0	A8			Upper limit value (Ch3)	*1	○		
E0	B4			Upper limit value (Ch4)	*1	○		
E0	97			External input setting (CH1)		○	⑤	
E0	BF			External input setting (CH2)		○		
E0	C0			External input setting (CH3)		○		
E0	C1			External input setting (CH4)		○		
E0	98			Contact input reset mode (CH1)		○	⑤	
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				Monitoring alarm state		○	③

*1: Unit is different by the setting of pulse conversion unit.

Please refer to "Group Channel List for Data Set Command (2H)"

7.2.3 When Setting by Command (2H)

Settings of Measuring Unit can be set by communication.

Monitor pattern setting flag (RX (n+1)0) is used to send the command. (For details, refer to section 6.4.2)

The command can be sent only when the remote READY (RX (n+7)B) is ON.

2H	Data Set																																																																																																																																																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Remote register RWw (Programmable controller→Unit)</th> <th style="width: 50%; text-align: center;">Remote register RWr (Unit→Programmable controller)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 15%; text-align: center;">b15</th> <th style="width: 15%; text-align: center;">b8</th> <th style="width: 15%; text-align: center;">b7</th> <th style="width: 15%; text-align: center;">b0</th> </tr> </thead> <tbody> <tr> <td>RWw00</td> <td style="text-align: center;">Group No.</td> <td style="text-align: center;">Unit No.</td> <td colspan="2" style="text-align: center;">Command 2H</td> </tr> <tr> <td>RWw01</td> <td colspan="2" style="text-align: center;">Index number</td> <td colspan="2" style="text-align: center;">Channel No.</td> </tr> <tr> <td>RWw02</td> <td colspan="4" style="text-align: center;">Low data</td> </tr> <tr> <td>RWw03</td> <td colspan="4" style="text-align: center;">High data</td> </tr> <tr> <td>RWw04</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td>RWw05</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td>RWw06</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td>RWw07</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td style="text-align: center;">to</td> <td colspan="4" style="text-align: center;">to</td> </tr> <tr> <td>RWw1C</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td>RWw1D</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td>RWw1E</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> <tr> <td>RWw1F</td> <td style="text-align: center;">00H</td> <td colspan="3" style="text-align: center;">00H</td> </tr> </tbody> </table> </td> <td style="text-align: center;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 15%; text-align: center;">b15</th> <th style="width: 15%; text-align: center;">b8</th> <th style="width: 15%; text-align: center;">b7</th> <th style="width: 15%; text-align: center;">b0</th> </tr> </thead> <tbody> <tr> <td>RWr00</td> <td colspan="2" style="text-align: center;">Channel No.</td> <td colspan="2" style="text-align: center;">Group No.</td> </tr> <tr> <td>RWr01</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">(Error code)</td> </tr> <tr> <td>RWr02</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr03</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr04</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr05</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr06</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr07</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td style="text-align: center;">to</td> <td colspan="4" style="text-align: center;">to</td> </tr> <tr> <td>RWr1C</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr1D</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr1E</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> <tr> <td>RWr1F</td> <td colspan="2" style="text-align: center;">00H</td> <td colspan="2" style="text-align: center;">00H</td> </tr> </tbody> </table> <p style="font-size: small;">* At normal communication, Error code is 00h. 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<ul style="list-style-type: none"> ▪ A setting item of Measuring Unit can be set by storing Group No., Channel No. and setting data to remote register(RWw). ▪ About Group No. and Channel No., refer to Table 7. ▪ The details of data format are shown in the Table 7.6 to Table 7.12 <p style="font-size: small;">* After writing the set-up value, about 0.5 seconds (max 2 seconds) is needed to restart the measurement based on new set-up value.</p>																																																																																																																																																		

Table 7.3 Group Channel List for Data Set Command (2H) (1/7)

Hex		Content name	EMU4-BD1-MB EMU4-HD1-MB		Data format
Group	Channel		Range	Setting unit	
E0	11	Primary current	5.0A to 6000.0A	(Note1)	④
E0	12	Primary voltage (L-L)	1V to 6600V	(Note2)	④
E0	1B	Primary voltage (L-N)	1V to 6600V (EMU4-HD1-MB 3P4W only)	(Note3)	④
E0	1C	Secondary voltage (L-L/L-N)	1V to 220V	1V	④
E0	13	Phase Wire system	1: 1P2W 2: 1P3W 3: 3P3W 4: 3P4W (EMU4-HD1-MB only)	—	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 input switch	0: Direct sensor 2: 5A sensor	—	⑤
80	01	Active energy (import)	0 to 999999×Multiplicand (Note5)	1×Multiplicand	②
80	63	Active energy (export)	0 to 999999×Multiplicand (Note5)	1×Multiplicand	②
81	01	Reactive energy (import lag)	0 to 999999×Multiplicand (Note5)	1×Multiplicand	②
A1	3A	16bit set register	Refer to 7.2.4	—	⑦

Note 1: Effective value of 5A input switch setup is follows.

Primary current when setup value is 5A input switch is 0:Direct Sensor.	50A,100A,250A,400A,600A
Primary current when setup value is 5A input switch 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 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	400V	230/400V
173V	100/173V	415V	240/415V
182V	105/182V	420V	242/420V
190V	110/190V	430V	250/430V
199V	115/199V	440V	254/440V
208V	120/208V	460V	265/460V
220V	127/220V	480V	277/480V
380V	220/380V		

*From the most significant digit to 3 figures can be freely set up in the range.

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
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, please 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 7.2.4.

Table 7.3 Group Channel List for Data Set Command (2H) (2/7)

Hex		Content name	EMU4-BM1-MB, EMU4-HM1-MB EMU4-A2, EMU4-VA2		Data format
Group (H)	Channel (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 (EMU4-HM1-MB 3P4W, EMU4-A2 3P4W, EMU4-VA2 3P4W only)	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 (EMU4-HM1-MB, EMU4-A2, EMU4-VA2 only)	—	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)			
08	E0	Time constant for DW			
08	E7	Time constant for DW(3side)			
E0	92	5A input switch	00H: Direct sensor 02H: 5A sensor	—	⑤
E0	97	External input	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	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)			
87	E3	Counting method of operating time	00H:Current input 01H:Contact input	—	⑤
8E	E3	Counting method of operating time(3side)			
01	E8	Cut-off	0.1 to 50.0	0.1 step	①
01	EA	Cut-off(3side)			
03	E4	Pulse conversion	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	Electric energy conversion	0.001 to 10000	Note6	①
8A	E4	Electric energy conversion(3side)			
80	E5	Electric energy 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
8A	E5	Electric energy conversion unit(3side)			
E0	9C	Upper and lower limit alarm extence	00H:non-use 01H:use	—	⑤
E0	A6	Upper and lower limit alarm extence(3side)			
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:Electric power demand upper limit 08H:Electric 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)			
E0	9E	Upper and lower limit alarm value	Note7	Note7	
E0	A8	Upper and lower limit alarm value(3side)			

Table 7.3 Group Channel List for Data Set Command (2H) (3/7)

Hex		Content name	EMU4-BM1-MB, EMU4-HM1-MB EMU4-A2, EMU4-VA2		Data format
Group (H)	Channel (H)		Range	Setting unit	
E0	9F	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	A9	Alarm delay time(3side)			
E0	A0	Alarm reset method	01H:AUTO	—	⑤
E0	AA	Alarm reset method(3side)	02H:HOLD		
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%	①
E0	AD	Power factor setup in simple measuring (3side)	-0.1 to 100.0 to 0.0%	0.1%	①
E0	B1	2 circuits measuring	00H: non-use 01H: use	—	⑤
80	01	Active energy (import)	0 to 999999×Multiplicand (Note8)	1×Multiplicand	②
8A	01	Active energy (import)(3side)	0 to 999999×Multiplicand (Note8)	1×Multiplicand	②
80	63	Active energy (export)	0 to 999999×Multiplicand (Note8)	1×Multiplicand	②
8A	63	Active energy (export)(3side)	0 to 999999×Multiplicand (Note8)	1×Multiplicand	②
81	01	Reactive energy (import lag)	0 to 999999×Multiplicand (Note8)	1×Multiplicand	②
A1	3A	16bit set register	Refer to Data format of Monitoring by Command (1H) and Setting by Command (2H)		⑤

Note 1: Effective value of 5A/Direct setup is follows.

Primary current when setup value is 5A input switch is 0:Direct Sensor.	50A,100A,250A,400A,600A
Primary current when setup value is 5A input switch 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 follows.

3P3W or 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 use EMU4-BM1-MB.

110V and 220V is valid when use 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.) About setting range,

please refer to each user's manuals.

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 in below.

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

- 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:

Target of alarm	Setting range
Current demand upper limit alarm	0~120% of primary current
Current demand lower limit alarm	
Line voltage upper limit alarm Phase voltage upper limit alarm	15/11x0~100% of primary voltage
Line voltage lower limit alarm Phase voltage lower limit alarm	
Electric energy demand upper limit alarm	-120~120% of Full load power
Electric energy demand lower limit alarm	
Power factor upper limit alarm	-5~100~5%
Power factor lower limit alarm	
Pulse conversion upper limit alarm	1~999999.999
Current unbalance rate upper limit alarm	0.01~999.99
Voltage unbalance rate upper limit alarm	

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

(For details, refer to Table 3 Effective Ranges and Multiplicand)

Table 7.3 Group Channel List for Data Set Command (2H) (4/7)

Hex		Content name	EMU4-LG1-MB		Data format
Group (H)	Channel (H)		Range	Setting unit	
E0	13	Phase wire system	01H:1P2W, 02H: 1P3W 03H: 3P3W, 04H:3P4W	-	⑤
E0	AF	Measuring mode	00H: Low sense, 01H: High sense	-	
12	E0	Leak current demand time	0 to 1800 sec	Note1	
7A	81	Differential conversion	Low sense: 0 to 1000mA High sense: 0 to 100.00mA	Note2	
7A	88	Differential conversion value	00H: present value, 01H demand value	-	
11	89	Alarm element of leak current	00H: present value, 01H: demand value 02H: Differential conversion value	-	⑤
7A	89	Alarm element of leak current for resistance	Low sense: 0 to 1000mA High sense: 0 to 100.00mA	Note2	
11	86	Leak current Alarm1	Low sense: 0 to 1000mA High sense: 0 to 100.00mA	Note2	①
11	87	Leak current Alarm2	Low sense: 0 to 1000mA High sense: 0 to 100.00mA	Note2	
7A	86	Leak current for resistance Alarm1	Low sense: 0 to 1000mA High sense: 0 to 100.00mA	Note2	
7A	87	Leak current for resistance Alarm2	Low sense: 0 to 1000mA High sense: 0 to 100.00mA	Note2	
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	
7A	8A	Count of leak current for resistance alarm1	0 to 999999	1 step	
7A	8B	Count of leak current for resistance alarm2	0 to 999999	1 step	
E0	B0	External output signal target	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 mask	00H: 0, 01H: 5, 02H: 10, 03H: 20, 04H: 30, 05H: 40, 06H: 50, 07H: 60, 08H: 120, 09H: 180, 0AH: 240 0BH: 300	-	
E0	9F	Alarm reset	01H: Auto 02H: Hold	-	
A1	3A	ON/OFF output of 16bits	Refer to 7.2.3Data format of Monitoring by Command (1H) and Setting by Command (2H) for more details.	-	

Note 1: The set value is the second unit value. (For example of 2 minutes, set as 120 seconds.) About setting range, please refer to each user's manuals.

Note 2: Effective value is follows.

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

Table 7.3 Group Channel List for Data Set Command (2H) (5/7)

Hex		Content name	EMU4-AX4		Data format
Group(H)	Channel(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)	-32767~32767	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)	-32767~32767	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: Non, 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	Number of moving average setting (Ch1)	1~100 times	1 step	⑤
68	EF	Number of moving average setting (Ch2)			
6A	EF	Number of moving average setting (Ch3)			
6C	EF	Number of moving average setting (Ch4)			
91	E0	Limit A setting (Ch1)	-32767~32767 Within the range from the lower limit value to the 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 monitoring factor (CH1)	00H: Integer 01H: Integer (x10) 02H: Integer (x100) 03H: Integer (x1000)	—	⑤
91	F1	Number over limit monitoring factor (CH2)			
91	F2	Number over limit monitoring factor (CH3)			
91	F3	Number over limit monitoring factor (CH4)			

Table 7.3 Group Channel List for Data Set Command (2H) (6/7)

Hex		Content name	EMU4-AX4		Data format
Group(H)	Channel (H)		Range	Setting Unit	
E0	99	External output signal setting	00H: Non 02H: Alarm output 03H: Contact output	—	⑤
E0	9A	External output target circuit	00H: Non 01H: CH1, 02H: CH2, 03H: CH3, 04H: CH4	—	⑤
E0	B0	External output target alarm	00H: Upper or Lower limit 01H: Upper limit 02H: Lower limit	—	⑤
E0	9C	Upper limit alarm extence (CH1)	00H: Non-Monitoring 01H: Monitoring	—	⑤
E0	A1	Upper limit alarm extence (CH2)			
E0	A6	Upper limit alarm extence (CH3)			
E0	B2	Upper limit alarm extence (CH4)			
E0	9E	Upper limit alarm value(CH1)	-32767~32767	1 step	①
E0	A3	Upper limit alarm value (CH2)	Within the range from the lower limit value to the upper limit value		
E0	A8	Upper limit alarm value (CH3)			
E0	B4	Upper limit alarm value (CH4)			
E0	B7	Lower limit alarm extence (CH1)	00H: Non-Monitoring 01H: Monitoring	—	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)	-32767~32767	1 step	①
E0	BA	Lower limit value (CH2)	Within the range from the lower limit value to the upper limit value		
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)			

Table 7.3 Group Channel List for Data Set Command (2H) (7/7)

Hex		Content name	EMU4-PX4		Data format
Group(H)	Group(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 (CH1)	0.001~10000	1xMultiplier	①
84	E4	Pulse conversion (CH2)	Valid for up to four digits. Truncates after five digit.		
85	E4	Pulse conversion (CH3)			
86	E4	Pulse conversion (CH4)			
83	E5	Pulse conversion unit (CH1)		00H: Non, 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: \$	—
84	E5	Pulse conversion unit (CH2)			
85	E5	Pulse conversion unit (CH3)			
86	E5	Pulse conversion unit (CH4)			
E0	99	External output setting value	00H: Non 02H: Alarm output 03H: Contact output	—	⑤
E0	9A	External output channel	00H: Non, 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)	0.001~999999000	1xMultiplier	②
E0	A3	Upper limit value (Ch2)			
E0	A8	Upper limit value (Ch3)			
E0	B4	Upper limit value (Ch4)			
E0	97	External input setting (CH1)	00H: Non 01H: Pulse input 02H: Contact input	—	⑤
E0	BF	External input setting (CH2)			
E0	C0	External input setting (CH3)			
E0	C1	External input 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)	0~999999	1 step	⑥
84	01	Pulse count (CH2)			
85	01	Pulse count (CH3)			
86	01	Pulse count(CH4)			
87	01	Operating time (CH1)	0~999999	1 step	⑥
88	01	Operating time (CH2)			
8D	01	Operating time (CH3)			
8E	01	Operating time (CH4)			

7.2.4 Data format of Monitoring by Command (1H) and Setting by Command (2H)

Data	Data Format ①																																		
<p style="text-align: center;">Measurement</p> <p style="text-align: center;">Current, Voltage, Active power, Reactive power, Apparent power, Power factor, Frequency, etc.</p> <p style="text-align: center;">Setup data</p> <p style="text-align: center;">Cutoff Pulse conversion Alarm, etc.</p> <p style="text-align: center;">Format①</p>	<div style="text-align: center;"> <p style="text-align: center;">Numerical value: 32-bit integer with a sign -2147483648~2147483647 (80000000H~7FFFFFFFH)</p> </div> <p>< Multiplicand ></p> <p>Multiplicand is fixed for every item according to settings of primary current, primary voltage, and phase wiring. (Refer to 7.2.5 Effective Range and Multiplicand)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Index number</th> <th style="width: 20%;">Multiplicand</th> <th style="width: 60%;">Remarks</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">01H</td> <td style="text-align: center;">×10</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">Actual value = Numerical value × Multiplicand</td> </tr> <tr> <td style="text-align: center;">00H</td> <td style="text-align: center;">×1</td> </tr> <tr> <td style="text-align: center;">FFH</td> <td style="text-align: center;">×10⁻¹</td> </tr> <tr> <td style="text-align: center;">FEH</td> <td style="text-align: center;">×10⁻²</td> </tr> <tr> <td style="text-align: center;">FDH</td> <td style="text-align: center;">×10⁻³</td> </tr> </tbody> </table> <p>< Example: Active power ></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">Data</th> <th style="width: 15%;">Multiplicand</th> <th style="width: 20%;">Numerical value</th> <th style="width: 50%;">Actual value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">FF000000FFH</td> <td style="text-align: center;">FFH⇒×10⁻¹</td> <td style="text-align: center;">000000FFH⇒255</td> <td style="text-align: center;">255×10⁻¹= 25.5[kW]</td> </tr> <tr> <td style="text-align: center;">00000000FFH</td> <td style="text-align: center;">00H⇒×1</td> <td style="text-align: center;">000000FFH⇒255</td> <td style="text-align: center;">255×1 = 255[kW]</td> </tr> <tr> <td style="text-align: center;">FFFFFFFFF01H</td> <td style="text-align: center;">FFH⇒×10⁻¹</td> <td style="text-align: center;">FFFFFFF01H⇒-255</td> <td style="text-align: center;">-255×10⁻¹= -25.5[kW]</td> </tr> <tr> <td style="text-align: center;">00FFFFFFFF01H</td> <td style="text-align: center;">00H⇒×1</td> <td style="text-align: center;">FFFFFFF01H⇒-255</td> <td style="text-align: center;">-255×1 = -255[kW]</td> </tr> </tbody> </table> <p>Note: For the active power (demand) and reactive power, ±1638.3MW (Mvar) becomes the upper (lower) value. Note: For the power factor, “+” is showed lag, “-“ is showed lead as with Measuring Unit's display.</p>	Index number	Multiplicand	Remarks	01H	×10	Actual value = Numerical value × Multiplicand	00H	×1	FFH	×10 ⁻¹	FEH	×10 ⁻²	FDH	×10 ⁻³	Data	Multiplicand	Numerical value	Actual value	FF000000FFH	FFH⇒×10 ⁻¹	000000FFH⇒255	255×10 ⁻¹ = 25.5[kW]	00000000FFH	00H⇒×1	000000FFH⇒255	255×1 = 255[kW]	FFFFFFFFF01H	FFH⇒×10 ⁻¹	FFFFFFF01H⇒-255	-255×10 ⁻¹ = -25.5[kW]	00FFFFFFFF01H	00H⇒×1	FFFFFFF01H⇒-255	-255×1 = -255[kW]
Index number	Multiplicand	Remarks																																	
01H	×10	Actual value = Numerical value × Multiplicand																																	
00H	×1																																		
FFH	×10 ⁻¹																																		
FEH	×10 ⁻²																																		
FDH	×10 ⁻³																																		
Data	Multiplicand	Numerical value	Actual value																																
FF000000FFH	FFH⇒×10 ⁻¹	000000FFH⇒255	255×10 ⁻¹ = 25.5[kW]																																
00000000FFH	00H⇒×1	000000FFH⇒255	255×1 = 255[kW]																																
FFFFFFFFF01H	FFH⇒×10 ⁻¹	FFFFFFF01H⇒-255	-255×10 ⁻¹ = -25.5[kW]																																
00FFFFFFFF01H	00H⇒×1	FFFFFFF01H⇒-255	-255×1 = -255[kW]																																

Data Measurement	Data Format ②																																				
Active energy Reactive energy Format②	<div style="text-align: center;"> <p>Numerical value: 32-bit integer with a sign However, the effective numerical value is 0~999999 (0H~F423FH) (999999 next to 0.)</p> </div> <p>< Multiplicand ></p> <p>Multiplicand is fixed for every item according to settings of primary current, primary voltage, and phase wire system. (Refer to 7.2.5 Effective Range and Multiplicand)</p> <table border="1" data-bbox="430 1003 1460 1460"> <thead> <tr> <th>Index number</th> <th>Multiplicand</th> <th>Remarks</th> </tr> </thead> <tbody> <tr><td>04H</td><td>$\times 10^4$</td><td rowspan="10">Actual value = Numerical value \times Multiplicand</td></tr> <tr><td>03H</td><td>$\times 10^3$</td></tr> <tr><td>02H</td><td>$\times 10^2$</td></tr> <tr><td>01H</td><td>$\times 10$</td></tr> <tr><td>00H</td><td>$\times 1$</td></tr> <tr><td>FFH</td><td>$\times 10^{-1}$</td></tr> <tr><td>FEH</td><td>$\times 10^{-2}$</td></tr> <tr><td>FDH</td><td>$\times 10^{-3}$</td></tr> <tr><td>FCH</td><td>$\times 10^{-4}$</td></tr> <tr><td>FBH</td><td>$\times 10^{-5}$</td></tr> </tbody> </table> <p>< Example: Active Energy ></p> <table border="1" data-bbox="427 1541 1460 1684"> <thead> <tr> <th>Data</th> <th>Multiplicand</th> <th>Numerical value</th> <th>Actual value</th> </tr> </thead> <tbody> <tr> <td>FF000000FFH</td> <td>FFH $\Rightarrow \times 10^{-1}$</td> <td>000000FFH $\Rightarrow 255$</td> <td>$255 \times 10^{-1} = 25.5$[kWh]</td> </tr> <tr> <td>00000000FFH</td> <td>00H $\Rightarrow \times 1$</td> <td>000000FFH $\Rightarrow 255$</td> <td>$255 \times 1 = 255$[kWh]</td> </tr> </tbody> </table> <p>Note: For active energy export and reactive energy export (lag/lead), communication data is unsigned.</p>	Index number	Multiplicand	Remarks	04H	$\times 10^4$	Actual value = Numerical value \times Multiplicand	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	$\times 10^{-5}$	Data	Multiplicand	Numerical value	Actual value	FF000000FFH	FFH $\Rightarrow \times 10^{-1}$	000000FFH $\Rightarrow 255$	$255 \times 10^{-1} = 25.5$ [kWh]	00000000FFH	00H $\Rightarrow \times 1$	000000FFH $\Rightarrow 255$	$255 \times 1 = 255$ [kWh]
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Alarm state <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px 0;">Format③</div>	<div style="text-align: center; margin-bottom: 20px;"> </div> <p>< The allocation of the alarm state 1 ></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">Bit</th> <th rowspan="2">Content</th> <th colspan="2">Set data</th> <th rowspan="2">EMU4-BD1-MB</th> <th rowspan="2">EMU4-HD1-MB</th> </tr> <tr> <th>OFF(0)</th> <th>ON(1)</th> </tr> </thead> <tbody> <tr><td>b0</td><td>Alarm Pulse count</td><td>Non-Alarm state</td><td>Alarm state</td><td>—</td><td>○</td></tr> <tr><td>b1</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b2</td><td>Alarm demand current</td><td>Non-Alarm state</td><td>Alarm state</td><td>—</td><td>○</td></tr> <tr><td>b3</td><td>Alarm demand electric power</td><td>Non-Alarm state</td><td>Alarm state</td><td>—</td><td>○</td></tr> <tr><td>b4</td><td>Contact input</td><td>OFF(Open)</td><td>ON(Close)</td><td>—</td><td>○</td></tr> <tr><td>b5</td><td>Alarm (Total)</td><td>Non-Alarm state</td><td>Alarm state</td><td>—</td><td>○</td></tr> <tr><td>b6</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b7</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b8</td><td>Alarm voltage</td><td>Non-Alarm state</td><td>Alarm state</td><td>—</td><td>○</td></tr> <tr><td>b9</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b10</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b11</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b12</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b13</td><td>Alarm Power factor</td><td>Non-Alarm state</td><td>Alarm state</td><td>—</td><td>○</td></tr> <tr><td>b14</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> <tr><td>b15</td><td>Reserved</td><td>—</td><td>—</td><td>—</td><td>—</td></tr> </tbody> </table> <p>Note1: b0(Alarm pulse count) is only available when External input signal setup of EMU4-HD1-MB is pulse input.</p> <p>Note2:b4(Contact input) is only available when External input signal setup of EMU4-HD1-MB is contact input.</p>	Bit	Content	Set data		EMU4-BD1-MB	EMU4-HD1-MB	OFF(0)	ON(1)	b0	Alarm Pulse count	Non-Alarm state	Alarm state	—	○	b1	Reserved	—	—	—	—	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	Reserved	—	—	—	—	b7	Reserved	—	—	—	—	b8	Alarm voltage	Non-Alarm state	Alarm state	—	○	b9	Reserved	—	—	—	—	b10	Reserved	—	—	—	—	b11	Reserved	—	—	—	—	b12	Reserved	—	—	—	—	b13	Alarm Power factor	Non-Alarm state	Alarm state	—	○	b14	Reserved	—	—	—	—	b15	Reserved	—	—	—	—
Bit	Content			Set data				EMU4-BD1-MB	EMU4-HD1-MB																																																																																																
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Bit	Set data			EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	EMU4-A2 EMU4-VA2
	Content	OFF(0)	ON(1)				
b0	Alarm Pulse conversion count	Non-Alarm state	Alarm state	—	○	—	—
b1	Reserved	—	—	—	—	—	—
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	○	○	—	○
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	Non-Alarm state	Alarm state	—	—	○	—
b13	Alarm Power factor for resistance	Non-Alarm state	Alarm state	○	○	—	○
b14	Reserved	—	—	—	—	—	—
b15	Reserved	—	—	—	—	—	—

Note1: b0(Alarm pulse count) is only available when External input signal setup of EMU4-HM1-MB is pulse input.

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

Note3: b4(Contact input) is only available when External input signal setup of EMU4-HM1-MB is contact input.

Bit	Set data			EMU4-AX4	EMU4-PX4
	Content	OFF(0)	ON(1)		
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	Upper and lower alarm (Total)	Non-Alarm state	Alarm state	○	○
b6	Contact input(CH2)	OFF (Open)	ON (Close)	—	○
b7	Contact input(CH3)	OFF (Open)	ON (Close)	—	○
b8	Contact input(CH4)	OFF (Open)	ON (Close)	—	○
b9	Reserved	—	—	—	—
b10	Reserved	—	—	—	—
b11	Reserved	—	—	—	—
b12	Reserved	—	—	—	—
b13	Reserved	—	—	—	—
b14	Reserved	—	—	—	—
b15	Reserved	—	—	—	—

Note1: b0-b3(Upper and lower limit alarm is only available upper limit alarm in EMU4-PX4

Note2: b0-b3 (Upper limit alarm) is only available when External input signal setup of is Pulse input. b6-b8 (Contact input) is only available when External input signal setup of is Contact input.

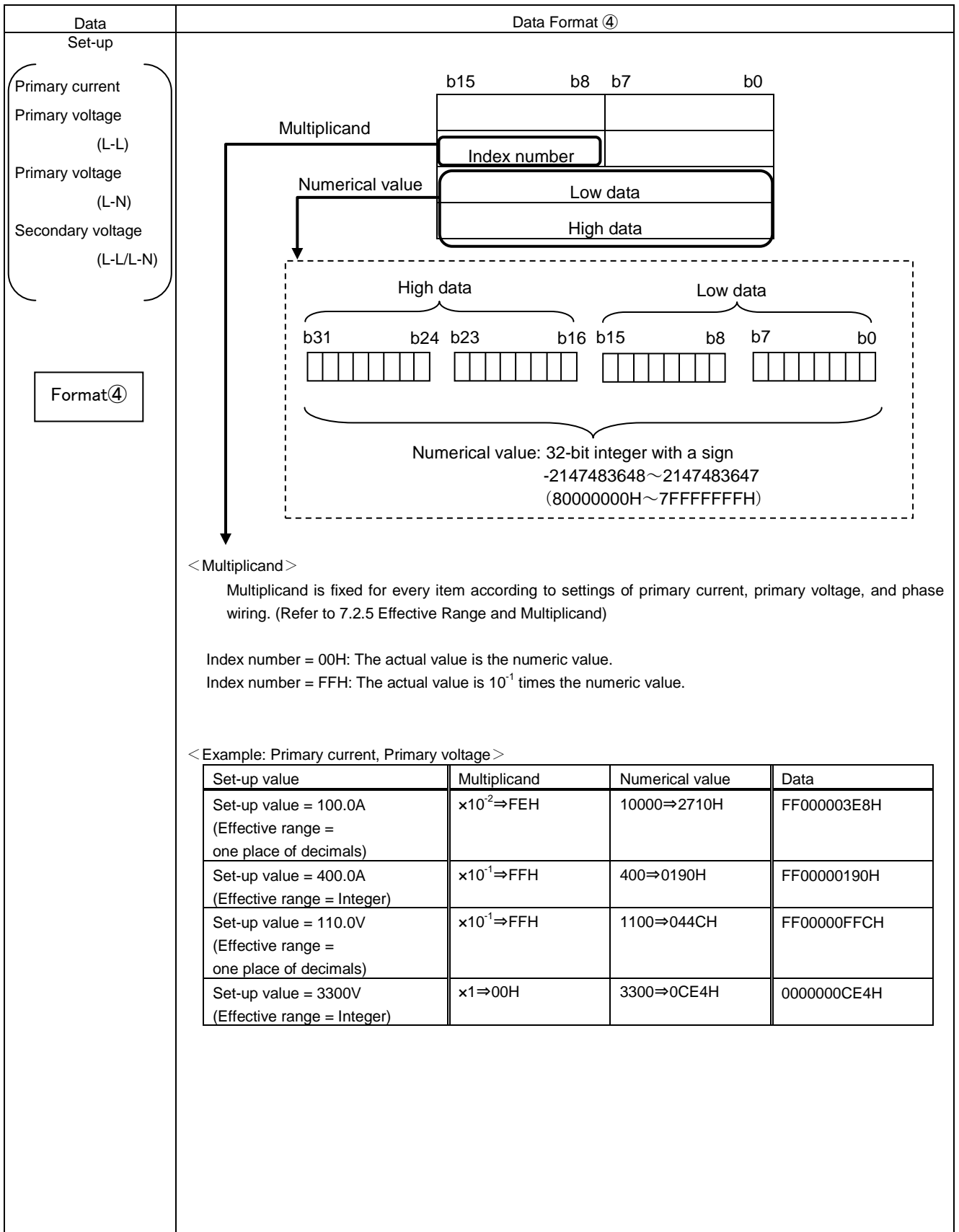
< The allocation of the alarm state 2 >

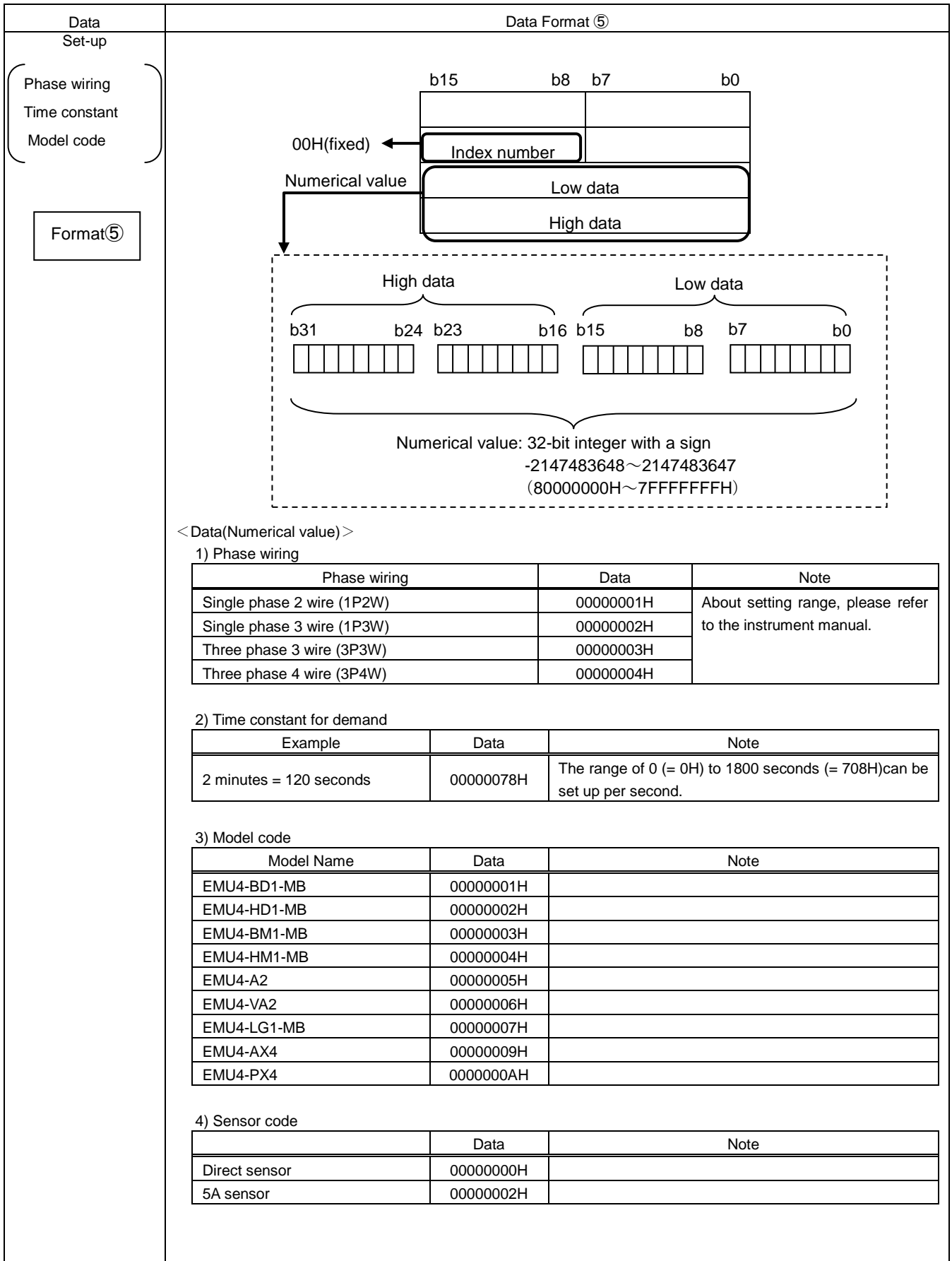
Bit	Content	Set data		EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	EMU4-A2 EMU4-VA2
		OFF(0)	ON(1)				
b0	Alarm Pulse conversion	Non-Alarm state	Alarm state	—	○	—	—
b1	Reserved	—	—	—	—	—	—
b2	Alarm demand current (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
b3	Alarm demand electric power (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
b4	Contact input	OFF(Open)	ON(Close)	—	○	—	—
b5	Alarm (Total) (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
b6	Reserved	—	—	○	○	—	○
b7	Reserved	—	—	○	○	—	○
b8	Alarm voltage	Non-Alarm state	Alarm state	○	○	—	○
b9	lo 1 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
b10	lo 2 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
b11	lor 1 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
b12	lor 2 alarm Alarm count	Non-Alarm state	Alarm state	—	—	○	—
b13	Alarm Power factor (3 side in 1P2W)	Non-Alarm state	Alarm state	○	○	—	○
b14	Reserved	—	—	—	—	—	—
b15	Reserved	—	—	—	—	—	—

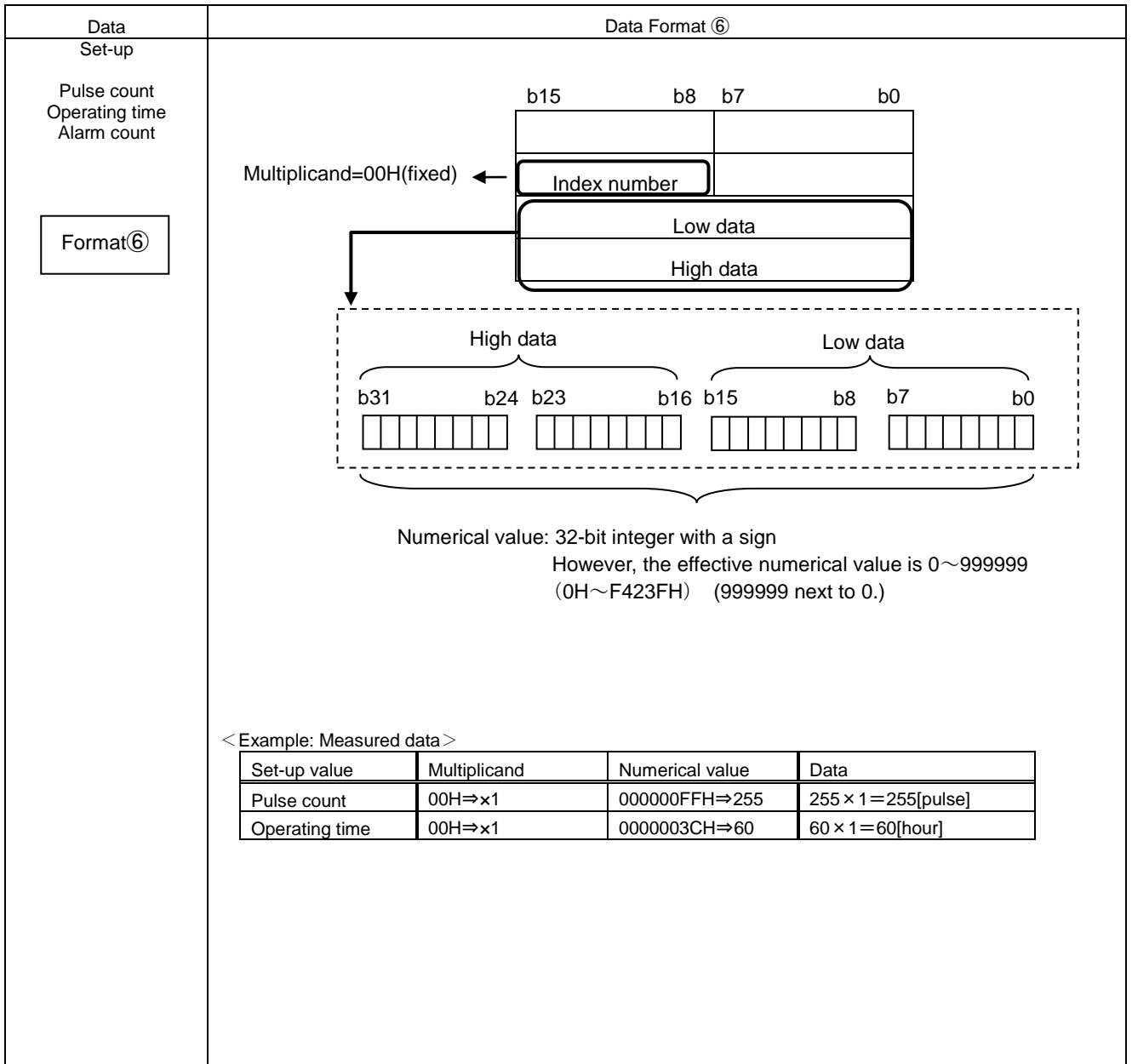
Note1: b0(Alarm pulse conversion) is only available when External input signal setup of EMU4-HM1-MB is pulse input.

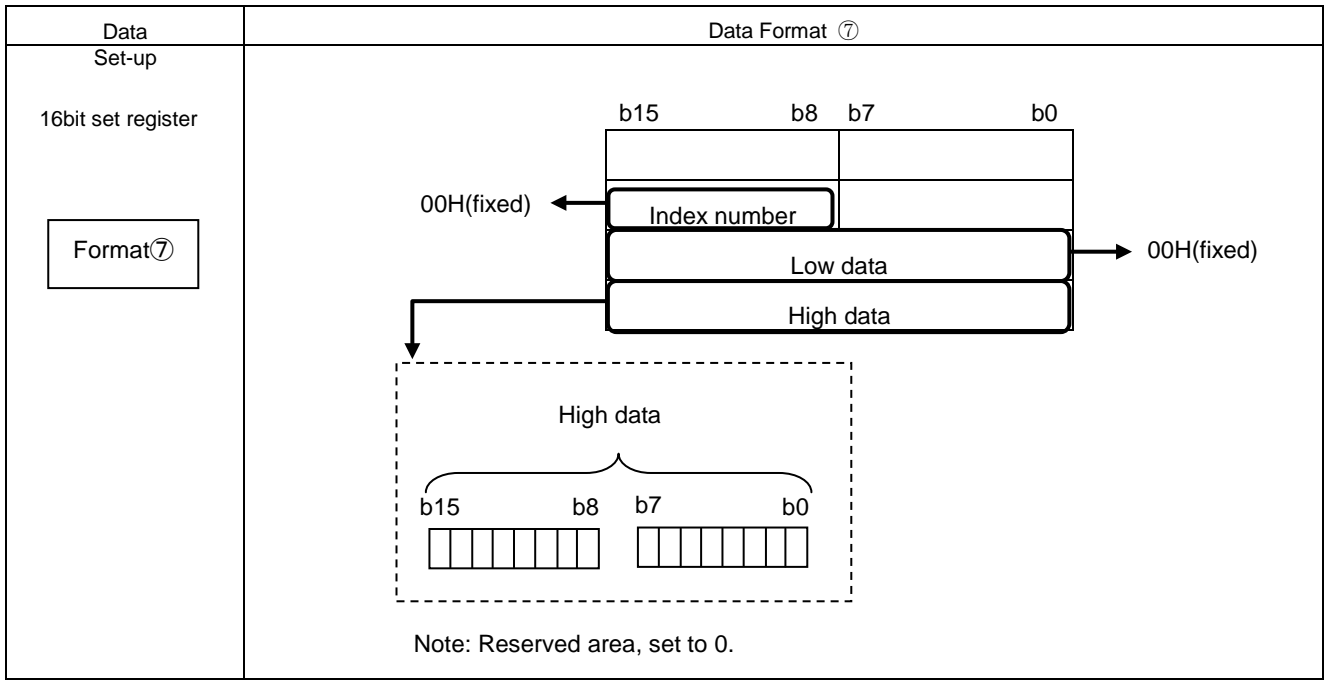
Note2: Alarm Pulse conversion is monitorable by alarm1 and alarm2.

Note3: b4(Contact input) is only available when External input signal setup of EMU4-HM1-MB is contact input.









Bit	Data			EMU4-BD1-MB	EMU4-HM1-MB	EMU4-BM1-MB	EMU4-HM1-MB	EMU4-LG1-MB	EMU4-A2 EMU4-VA2	Note	
	Content	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	○	○	○	○	—	○	Note1
	b2	Reset of all max/min value	—	—	—	—	○	○	○	○	
	b3	Reset alarm count			—	—	—	—	○	—	
	b4	Unusable	—	—	—	—	—	—	—	—	
	b5	Unusable	—	—	—	—	—	—	—	—	
	b6	Unusable	—	—	—	—	—	—	—	—	
	b7	Unusable	—	—	—	—	—	—	—	—	
	b8	Reset of all digital input latch	Not clear	clear	—	○	—	○	—	—	
	b9	Reset external input	Not reset	executed	—	○	—	○			Note2
	b10	Unusable	—	—	—	—	—	—	—	—	
	b11	Unusable	—	—	—	—	—	—	—	—	
	b12	Unusable	—	—	—	—	—	—	—	—	
	b13	Unusable	—	—	—	—	—	—	—	—	
	b14	Reset of counting of all energy	Not reset	executed	○	○	○	○	—	○	
b15	Unusable	—	—	—	—	—	—	—			

Note1: Below integrated value is reset depending on the models.

EMU4-BD1-MB: Electric Energy, Reactive energy, Operating time

EMU4-HD1-MB: Electric Energy, Reactive energy, Pulse count, Operating time , Periodic Energy, Electric Power converted

EMU4-BM1-MB: Electric Energy, Reactive energy, Operating time

EMU4-HM1-MB: Electric Energy, Reactive energy, Pulse count, Pulse converted, Operating time , Periodic Energy, Electric Energy converted

EMU4-A2, EMU4-VA2, : Electric Energy, Reactive energy, Operating time, Electric Energy converted

Note2: Below items is reset depending on the models.

EMU4-BD1-MB: Operating time

EMU4-HD1-MB: Pulse count, Operating time, Periodic Energy, Electric power converted

EMU4-BM1-MB: Operating time

EMU4-HM1-MB Pulse count, Pulse converted, Operating time, Periodic Energy, Electric Energy converted

EMU4-A2, EMU4-VA2, : Operating time, Electric Energy converted

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

Bit	Set data			EMU4-PX4	Note
	Content	OFF(0)	ON(1)		
b0	Alarm reset	Not reset	Reset	○	
b1	Reset integrated value	Not reset	Reset	○	Note1
b2	Reserved	—	—	—	
b3	Reserved	—	—	—	
b4	Reserved	—	—	—	
b5	Contact output	OFF(Open)	ON(Close)	○	Note 3
b6	Reserved	—	—	—	
b7	Reserved	—	—	—	
b8	Contact input clear	Not clear	Clear	○	
b9	External input reset	Not reset	Reset	○	Note 2
b10	Reserved	—	—	—	
b11	Reserved	—	—	—	
b12	Reserved	—	—	—	
b13	Reserved	—	—	—	
b14	Reserved	—	—	—	
b15	Reserved	—	—	—	

Note1: Below integrated value is reset.

Pulse count, Pulse conversion, Operating time

Note2: Below contents are reset.

Pulse count, Pulse conversion, Operating time

Note3: This is only available when external output signal setting is contact output.

7.2.5 Effective Range and Multiplicand

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

Table 7.3 Effective Ranges and Multiplicand

Element	Condition	Mode	Multiplying factor
Voltage Harmonics voltage	Please refer to (3) Voltage and Harmonics voltage data format for more details.		
Current Current demand Harmonics current	Please refer to (4) Current, demand current, harmonics current data format for more details.		
Active power Active power demand Reactive power Apparent power	Please refer to (1) Electric power and Reactive power data for more details.		
Active energy Reactive energy Energy conversion	Please refer to (2) Electric energy, reactive energy and electric energy conversion for more details.		
Pulse conversion	Please refer to (5) Pulse conversion data (EMU4-HM1-MB only) for more details.		
Frequency	-	-	$\times 10^{-1}$
Power factor	-	-	$\times 10^{-1}$
Content rate Harmonics distortion	-	-	$\times 10^{-1}$
Leak current Leak current for resistance	Measuring mode	Low SENS	$\times 1$
		High SENS	$\times 10^{-2}$
Number over limit A to D	Number over limit Monitoring factor	$\times 1$	$\times 1$
		$\times 10$	$\times 10$
		$\times 100$	$\times 100$
		$\times 1000$	$\times 1000$
Alarm count	-	-	$\times 1$

Note1: Data is primary voltage (phase voltage) when phase wire system is 3P4W.

Phase Wire system	3P4W																
	V	63.5 110	100 173	105 182	110 190	115 199	120 208	127 220	200 346	220 380	230 400	240 415	242 420	250 430	254 440	265 460	277 480
5	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
6	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
7.5	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
8	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
10	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
12	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
15	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit
20	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
25	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
30	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
40	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
50	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
60	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
75	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
80	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
100	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
120	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
150	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit
200	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
250	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
300	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
400	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
500	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
600	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
750	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
800	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
1000	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
1200	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
1500	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1
1600	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1
2000	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
2500	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
3000	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
4000	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
5000	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
6000	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1

Note : Phase wire system : 3P4W is EMU4-HD1-MB only.

Note : 3 digit means three decimal places ($\times 10^{-3}$) and 2 digit means two decimal places ($\times 10^{-2}$) and 1 digit means 1 decimal places ($\times 10^{-1}$)

Note : x1 means integerx1 and x10 means integerx10.

Note : Reply error of out of range of channel according upper table.

Phase Wire system	3P4W																
	V	63.5 110	100 173	105 182	110 190	115 199	120 208	127 220	200 346	220 380	230 400	240 415	242 420	250 430	254 440	265 460	277 480
5	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
6	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
7.5	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
8	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
10	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
12	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit
15	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit
20	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
25	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
30	3digit	3digit	3digit	3digit	3digit	3digit	3digit	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
40	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
50	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
60	3digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
75	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
80	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
100	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
120	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
150	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit
200	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
250	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
300	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
400	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
500	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
600	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
750	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
800	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
1000	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
1200	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
1500	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1
1600	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1
2000	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
2500	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
3000	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
4000	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
5000	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
6000	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
7500	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
8000	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
10000	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
12000	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
20000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
25000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
30000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10

Note : Phase wire system : 3P4W is EMU4-HM1-MB, EMU4-A2, EMU4-VA2 only.

Note : 3 digit means three decimal places ($\times 10^{-3}$) and 2 digit means two decimal places ($\times 10^{-2}$) and 1 digit means 1 decimal places ($\times 10^{-1}$)

Note : x1 means integer $\times 1$ and x10 means integer $\times 10$.

Note : Reply error of out of range of channel according upper table.

(1) Electric energy, reactive energy and electric energy conversion

< EMU4-BD1-MB, EMU4-HD1-MB >

Phase wire system	1P2W								1P3W	3P3W								
	V	110	220	440	690	1100	2200	3300	6600	110	110	220	440	690	1100	2200	3300	6600
A																		
5		2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit
6		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit
7.5		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit
8		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit
10		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit
12		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1
15		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1
20		2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	x1
25		2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1
30		2digit	2digit	1digit	1digit	1digit	1digit	1digit	x1	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1
40		2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1
50		2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1
60		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	1digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1
75		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1
80		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1
100		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1
120		1digit	1digit	1digit	1digit	x1	x1	x1	x1	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10
150		1digit	1digit	1digit	1digit	x1	x1	x1	x1	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10
200		1digit	1digit	1digit	x1	x1	x1	x1	x10	1digit	1digit	1digit	x1	x1	x1	x1	x1	x10
250		1digit	1digit	1digit	x1	x1	x1	x1	x10	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10
300		1digit	1digit	x1	x1	x1	x1	x1	x10	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10
400		1digit	1digit	x1	x1	x1	x1	x10	x10	1digit	1digit	x1	x1	x1	x1	x10	x10	x10
500		1digit	1digit	x1	x1	x1	x1	x10	x10	1digit	1digit	x1	x1	x1	x1	x10	x10	x10
600		1digit	x1	x1	x1	x1	x10	x10	x10	x1	1digit	x1	x1	x1	x1	x10	x10	x10
750		1digit	x1	x1	x1	x1	x10	x10	x10	x1	x1	x1	x1	x1	x10	x10	x10	x10
800		1digit	x1	x1	x1	x1	x10	x10	x10	x1	x1	x1	x1	x1	x10	x10	x10	x10
1000		1digit	x1	x1	x1	x1	x10	x10	x10	x1	x1	x1	x1	x1	x10	x10	x10	x10
1200		x1	x1	x1	x1	x10	x10	x10	x10	x1	x1	x1	x1	x10	x10	x10	x10	x100
1500		x1	x1	x1	x1	x10	x10	x10	x10	x1	x1	x1	x1	x10	x10	x10	x10	x100
1600		x1	x1	x1	x1	x10	x10	x10	x10	x1	x1	x1	x10	x10	x10	x10	x10	x100
2000		x1	x1	x1	x10	x10	x10	x10	x100	x1	x1	x1	x10	x10	x10	x10	x10	x100
2500		x1	x1	x1	x10	x10	x10	x10	x100	x1	x1	x1	x10	x10	x10	x10	x100	x100
3000		x1	x1	x10	x10	x10	x10	x10	x100	x1	x1	x1	x10	x10	x10	x10	x100	x100
4000		x1	x1	x10	x10	x10	x10	x100	x100	x1	x1	x10	x10	x10	x10	x100	x100	x100
5000		x1	x1	x10	x10	x10	x10	x100	x100	x1	x1	x10	x10	x10	x10	x100	x100	x100
6000		x1	x10	x10	x10	x10	x100	x100	x100	x10	x1	x10	x10	x10	x10	x100	x100	x100

Phase wire system	• 3P4W																
	V	63.5 110	100 173	105 182	110 190	115 199	120 208	127 220	200 346	220 380	230 400	240 415	242 420	250 430	254 440	265 460	277 480
5	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
6	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
7.5	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
8	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
10	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
12	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
15	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit
20	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
25	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
30	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
40	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
50	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
60	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
75	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
80	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
100	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
120	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
150	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1
200	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
250	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
300	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
400	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
500	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
600	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
750	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
800	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
1000	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
1200	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
1500	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10
1600	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10
2000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
2500	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
3000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
4000	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
5000	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
6000	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10

Note : Phase wire system is only EMU4-HD1-MB.

Note : 2 digit means two decimal places ($\times 10^{-2}$) and 1 digit means 1 decimal places ($\times 10^{-1}$)

Note : x1 means integer $\times 1$ and x10 means integer $\times 10$ and x100 means integer $\times 100$.

< EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2 >

Phase wire system	1P2W																			1P3W		
	V	110	220	440	690	1100	2200	3300	6600	11000	13200	13800	15000	16500	22000	24000	33000	66000	77000	110000	110	220
A																						
5		2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	2digit	2digit
6		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	2digit	2digit
7.5		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	2digit	2digit
8		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	2digit	2digit
10		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	2digit	2digit
12		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	2digit	2digit
15		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	2digit	2digit
20		2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	2digit	2digit
25		2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	2digit	2digit
30		2digit	2digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	2digit	1digit
40		2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	2digit	1digit
50		2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	2digit	1digit
60		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	1digit	1digit
75		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	1digit	1digit
80		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	1digit	1digit
100		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	1digit	1digit
120		1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	1digit	1digit
150		1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	1digit	1digit
200		1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	1digit	1digit
250		1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	1digit	1digit
300		1digit	1digit	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	1digit	x1
400		1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	1digit	x1
500		1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	1digit	x1
600		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x1	x1
750		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x1	x1
800		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x1	x1
1000		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1	x1
1200		x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1	x1
1500		x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1	x1
1600		x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1	x1
2000		x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1	x1
2500		x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1	x1
3000		x1	x1	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1	x10
4000		x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1	x10
5000		x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1	x10
6000		x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x10	x10
7500		x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x10	x10
8000		x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x10	x10
10000		x1	x10	x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x10	x10
12000		x10	x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	x10	x10
20000		x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1	*1	x10	x10
25000		x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1	*1	x10	x10
30000		x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1	*1	x10	x100

(*1): Electric energy is x1000, Electric energy conversion is x10000.

Phase wire system	3P3W																			
	V	110	220	440	690	1100	2200	3300	6600	11000	13200	13800	15000	16500	22000	24000	33000	66000	77000	110000
A																				
5		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1
6		2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
7.5		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10
8		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10
10		2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10
12		2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10
15		2digit	2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10
20		2digit	2digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10
25		2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10
30		2digit	2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10
40		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10
50		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10
60		2digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
75		1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100
80		1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100
100		1digit	1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100
120		1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100
150		1digit	1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100
200		1digit	1digit	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100
250		1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100
300		1digit	1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100
400		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100
500		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100
600		1digit	x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100
750		x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000
800		x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000
1000		x1	x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000
1200		x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000
1500		x1	x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000
1600		x1	x1	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000
2000		x1	x1	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000
2500		x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000
3000		x1	x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000
4000		x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000
5000		x1	x10	x10	x10	x10	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000
6000		x1	x10	x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000
7500		x10	x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1
8000		x10	x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1
10000		x10	x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1
12000		x10	x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1
20000		x10	x10	x100	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1
25000		x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1	*1
30000		x10	x10	x100	x100	x100	x100	x1000	x1000	x1000	x1000	x1000	x1000	x1000	x1000	*1	*1	*1	*1	*1

(*1): Electric energy is x1000, Electric energy conversion is x10000.

Phase wire system	3P4W																
	V	63.5 110	100 173	105 182	110 190	115 199	120 208	127 220	200 346	220 380	230 400	240 415	242 420	250 430	254 440	265 460	277 480
5	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
6	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
7.5	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
8	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
10	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
12	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit
15	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit
20	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
25	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
30	2digit	2digit	2digit	2digit	2digit	2digit	2digit	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
40	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
50	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
60	2digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
75	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
80	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
100	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
120	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit
150	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1
200	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
250	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
300	1digit	1digit	1digit	1digit	1digit	1digit	1digit	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1
400	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
500	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
600	1digit	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
750	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
800	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
1000	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
1200	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1
1500	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10
1600	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10
2000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
2500	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
3000	x1	x1	x1	x1	x1	x1	x1	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10
4000	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
5000	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
6000	x1	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
7500	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
8000	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
10000	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
12000	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10	x10
20000	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100
25000	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100
30000	x10	x10	x10	x10	x10	x10	x10	x10	x100	x100	x100	x100	x100	x100	x100	x100	x100

Note : Phase wire system is only EMU4-HM1-MB, EMU4-A2 and EMU4-VA2.

Note : 2 digit means two decimal places ($\times 10^{-2}$) and 1 digit means 1 decimal places ($\times 10^{-1}$)

Note : x1 means integer $\times 1$ and x10 means integer $\times 10$ and x100 means integer $\times 100$ and x1000 means integer $\times 1000$ and x10000 means integer $\times 10000$.

(2) Voltage and Harmonics voltage data format

< EcoMonitorLight >

Primary voltage	EMU4-BD1-MB EMU4-HD1-MB
Less than 300V	Decimal 1 digit
300V or more	Intenger×1

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

< EcoMonitorPlus >

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

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

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

< EMU4-BD1-MB, EMU4-HD1-MB, EMU4-BM1-MB, EMU4-HM1-MB, EMU4-A2, EMU4-VA2 >

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

(4) Pulse conversion data

Pulse converted 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

7.2.6 About Error Occurrence

When the command and related data transmitted to Measuring Unit is improper or Measuring Unit is in H/W error, RX (n+7)A (Error status flag) becomes 1 (ON), the error code shown in Table 7.4 is returned as reply data.

Table 7.4 Error Code

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

If an error occurs, the error code is written into the RW_n as shown in the figure below, and RX(n+7)A (error status flag) is turned on (error occurrence) and RX(n+7)B (remote READY) is turned off (normal communication stop).

For the error resetting method, refer to "6.3 Error Communication".

8. Abbreviations and Special Terms

Abbreviations and special terms used in this manual are shown below:

Abbreviation and Special Terms	Description
Master station	Station which controls remote stations and local stations. One station is required for one system.
Local station	Station with the CPU which can communicate with master station and other local stations.
Remote I/O station	Remote station which deals with bit information only.
Remote device station	Remote station which deals with bit information and word information.
Remote station	General name for remote I/O station and remote device station. Controlled by a master station.
Intelligent device station	Station that can perform transient transmission.
RX	Remote input
RY	Remote output
RWw	Remote register (write area)
RWr	Remote register (read area)
Demand value	The demand value is an approximate average value during the demand time period. When it is set to 0, each demand present value becomes equivalent to the present value.
Command	Identification code allocated to items to be monitored or set. Energy measuring unit uses a special-purpose command that is transmitted to monitor each measurement value or set each parameter.

9. Program Example

9.1 Sample program 1

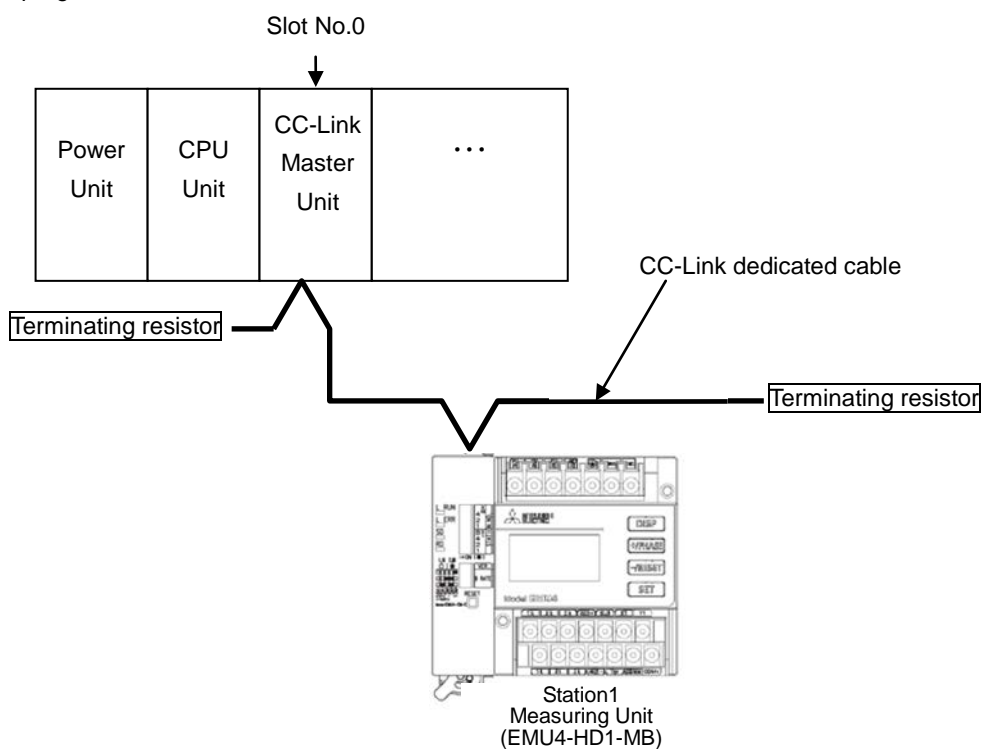
(1) Program Content

This program example is assumed the system configuration in below.

- CC-Link master unit: Mounting in Slot No.0.
- CC-Link master unit: First XY: 0000.
- CC-Link parameter setting: Please refer to (3) Parameter Settings.
- No. of Measuring unit (EMU4-HD1-MB): 1
- Station No. of Measuring unit (EMU4-HD1-MB): 1

(2) System Configuration

Q series programmable controller

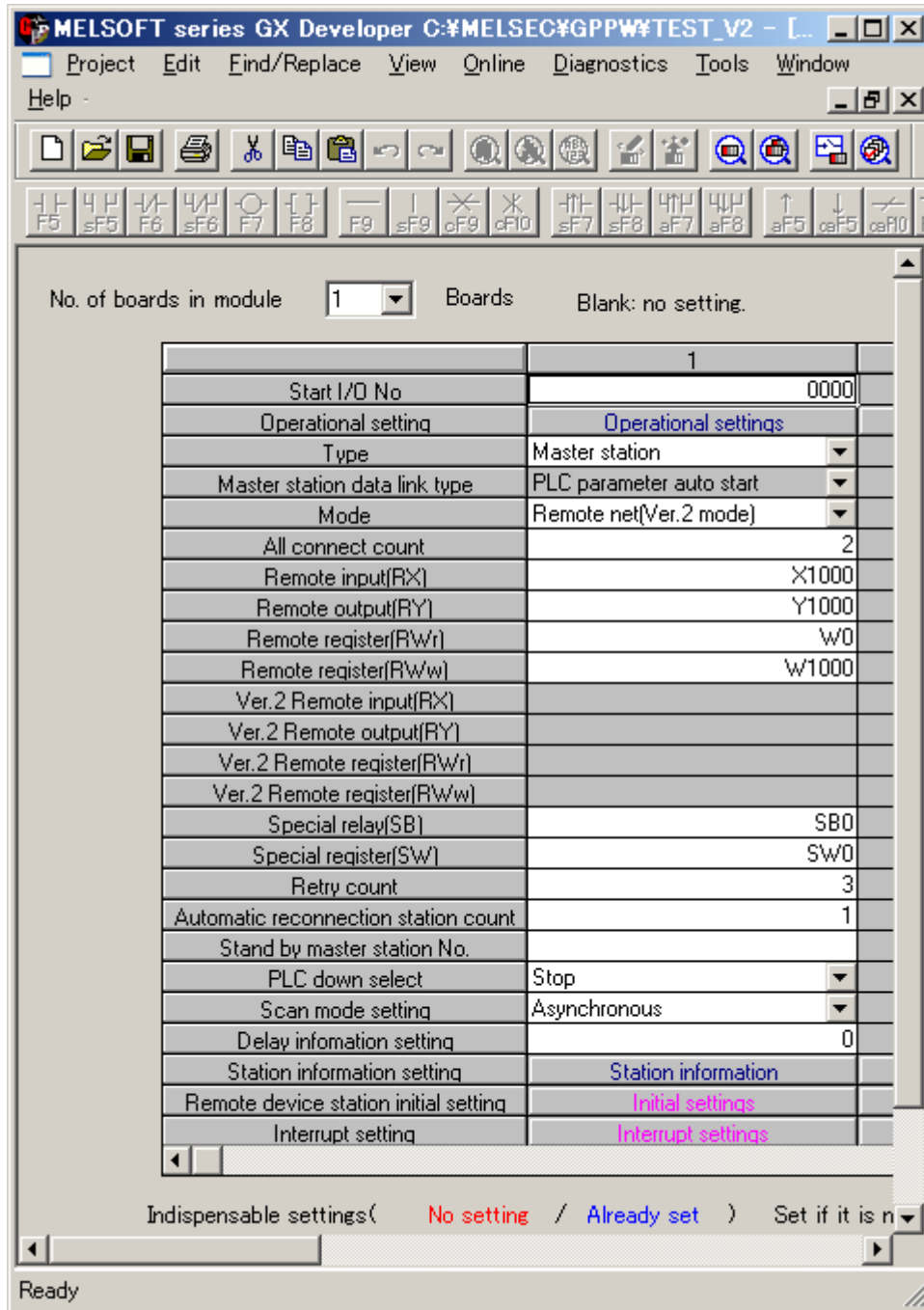


(3) Parameter Settings

Parameter settings are set as following with GX Developer.

9.1.1 Network Parameter Settings and Auto Refresh Parameter Settings

The following is shown CC-Link network parameter settings and auto refresh parameter settings.



Setting Item	Description	Example for settings	Remarks
No.of boards in Module	Set the "No. of boards in module" for which the network parameters are to be set.	1	
Start I/O No	Set the "Start I/O No." for the master station	0000	Set the same setting of Start XY in PC parameter setting
Type	Set the station type.	Master station	
Mode	Set the CC-Link mode.	Remote net (Ver.2 mode)	"Remote net ver.2 mode" and "Remote net additional mode" can be also used in case of the QJ61BT11N.
All connect count	Set the total number of connected stations in the CC-Link system including reserved stations	1	
Remote input (RX)	Set the remote input (RX) refresh device.	X100	Device name - Select from X, M, L, B, D, W, R or ZR. Device number - Within the range of the device points that the CPU has.
Remote output (RY)	Set the remote output (RY) refresh device.	Y100	Device name - Select from Y, M, L, B, T, C, ST, D, W, R or ZR. Device number - Within the range of the device points that the CPU has.
Remote register (RWr)	Set the remote register (RWr) refresh device.	W300	Device name - Select from M, L, B, D, W, R, or ZR. Device number - Within the range of the device points that the CPU has.
Remote register (RWw)	Set the remote register (RWw) refresh device.	W400	Device name - Select from M, L, B, T, C, ST, D, W, R, or ZR. Device number - Within the range of the device points that the CPU has.
Special relay (SB)	Set the link special relay (SB) refresh device.	SB0	Device name - Select from M, L, B, D, W, R, SB or ZR. Device number - Within the range of the device points that the CPU has.
Special register (SW)	Set the link special register (SW) refresh device.	SW0	Device name - Select from M, L, B, D, W, R, SW or ZR. Device number - Within the range of the device points that the CPU has.
Retry count	Set the number of retries for "Retry count", when a communication error occurs.	3	
Automatic reconnection station count	Set the number of modules that can return to system operation by a single link scan.	1	
Standby master station No.	Set the station number for the standby master station	Blank	Blank: No standby master station specified.
PLC down select	Set the data link status for "PLC down select", when a master station programmable controller CPU error occurs	Stop	
Scan mode setting	Set whether the link scan for the sequence scan is synchronous or asynchronous	Asynchronous	
Delay information setting	Set for the link scan delay time.	0	50μs

9.1.2 Operational Settings

Operational settings are as follows.

Operational settings module 1

Parameter name:

Number of exclusive stations:

Data link disorder station setting: Hold input data

Expanded cyclic setting:

Case of CPU STOP setting: Clears compulsorily

Block data assurance per station: Enable setting

OK Cancel

9.1.3 Station Information Settings

Station information settings are as follows.

CC-Link station information. Module 1

Station No.	Station type	Expanded cyclic setting	Exclusive station count	Remote station points	Reserve/invalid station select	Intelligent buffer select(word)		
						Send	Receive	Automatic
1/1	Ver.2Remote device station	octuple	Exclusive station 1	128 points	No setting			

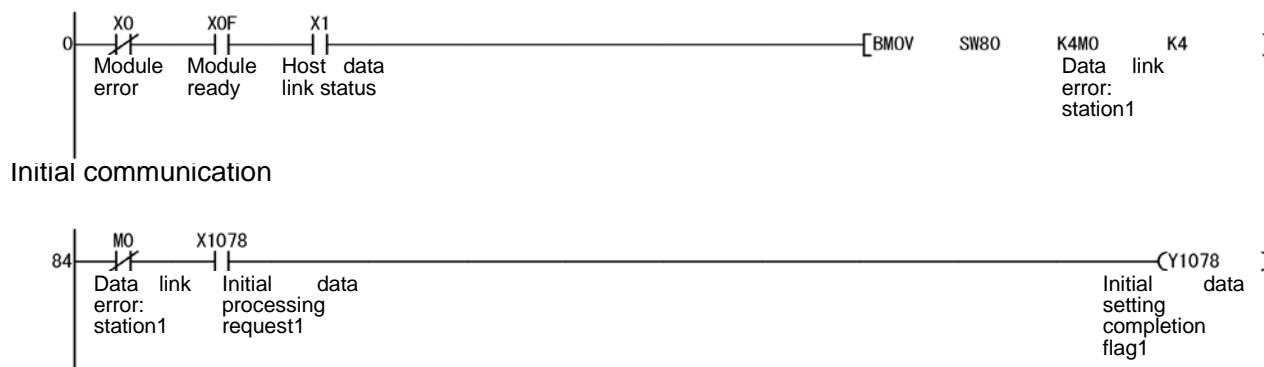
Default Check End Cancel

9.1.4 Parameter Settings

(1) Initial communication sample program

Sample program measuring unit turn ON or initial processing after reset.

Measuring unit data link status



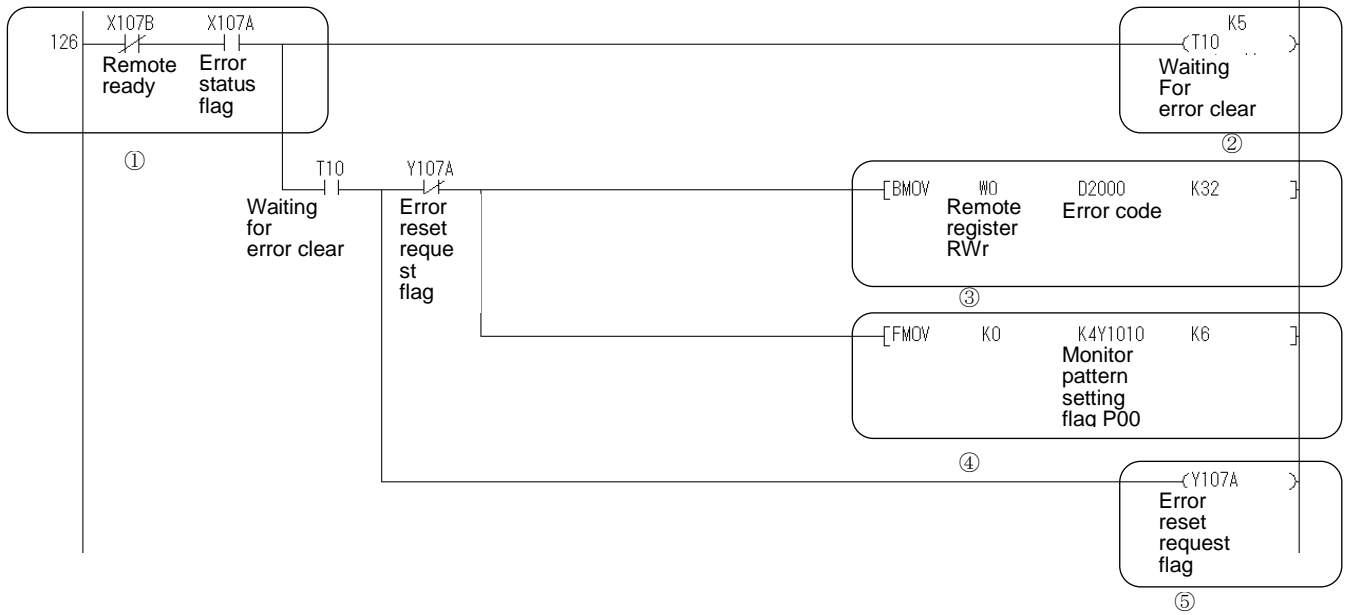
- 1) Check data link status in each station.
- 2) Initial data setting completion flag (Y1078) turns to ON after Initial data processing request (X1078) turns to ON.
- 3) Initial data processing request (X1078) turns to OFF after Initial data setting completion flag (Y1078) turns to ON.

Device allocation

Device No.	Contents	Note																														
X0	Status of CC-Link master station OFF: Unit normal ON: Unit error	Device No. is changed by the input number of CC-Link master unit. <Example> When Input No. is "X/Y30" of CC-Link master unit. X0 → X30, X1 → X31, XF → X3F																														
X1	Data status of CC-Link master station OFF: Data link stop ON: Data link																															
X0F	Unit ready of CC-Link master station OFF: 1) Error in setting of SW in Unit. 2) When the Unit error signal (Xn0) turns to ON. ON: It turns to ON automatically when unit is moveable.																															
X1078	Remote input: RX(n+7)8 Initial data setting completion flag	It is changed by the setting of the remote input (RX) refresh device (CC-Link parameter setting) and station No. of leak current monitoring device. Please refer to 7.1.1 for more details.																														
Y1078	Remote output: RY(n+7)8 Initial data processing completion flag	It is changed by the setting of the remote output (RY) refresh device (CC-Link parameter setting) and station No. of leak current monitoring device. Please refer to 7.1.2 for more details.																														
SW80 to SW83	Data link status 0: normal 1: data link error <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>b15</th> <th>b14</th> <th>~</th> <th>b1</th> <th>b0</th> </tr> </thead> <tbody> <tr> <td>SW80</td> <td>16</td> <td>15</td> <td>~</td> <td>2</td> <td>1</td> </tr> <tr> <td>SW81</td> <td>32</td> <td>31</td> <td>~</td> <td>18</td> <td>17</td> </tr> <tr> <td>SW82</td> <td>48</td> <td>47</td> <td>~</td> <td>34</td> <td>33</td> </tr> <tr> <td>SW83</td> <td>64</td> <td>63</td> <td>~</td> <td>50</td> <td>49</td> </tr> </tbody> </table>		b15	b14	~	b1	b0	SW80	16	15	~	2	1	SW81	32	31	~	18	17	SW82	48	47	~	34	33	SW83	64	63	~	50	49	It is changed by the setting of link relay (SW) refresh device (CC-Link parameter setting). Please refer to manual of each CC-Link system.
	b15	b14	~	b1	b0																											
SW80	16	15	~	2	1																											
SW81	32	31	~	18	17																											
SW82	48	47	~	34	33																											
SW83	64	63	~	50	49																											
M0 to M63	Data link error in each station OFF: normal ON: data link error	Device																														

(2) Error communication sample program

Error communication



- ① Confirming remote ready (X107B) turns to OFF and Error status flag (X107A) turns to ON when error occurred in measuring unit.
- ② Waiting time from error occurred to error reset.
- ③ Error code is received to remote register (RWr) W000 to W001F. Read received error code to device D2000 to D2031.
- ④ Monitor pattern setting flag (Y1010 to Y106F) after error occurred.
- ⑤ Turn ON the error reset flag (Y107A) after reset.
- ⑥ Error status flag turns to OFF after error reset. Error reset flag (Y107A) turns to OFF.
Restart communication to measuring unit after error reset flag (Y107A) turns to OFF and remote ready (X107B) turns to ON.

Device allocation

Device No.	Contents	Note
X107A	Remote input of measuring unit: RX(n+7)A Error status flag	It is changed by the setting of the remote input (RX) refresh device (CC-Link parameter setting) and station No. of measuring unit. Please refer to 7.1.1 for more details.
X107B	Remote input of measuring unit: RX(n+7)B Remote READY	
Y107A	Remote output: RY(n+7)A Error reset status flag	It is changed by the setting of the remote output (RY) refresh device (CC-Link parameter setting) and station No. measuring unit. Please refer to 7.1.2 for more details.
W0000 to W001F	Remote register: RWr Data for reading	It is changed by the setting of the remote register (RWr) refresh device (CC-Link parameter setting) and station No. measuring unit. Please refer to 7.1.2 for more details.
D2000 to D2032	Error code for receiving	Device (Selectable) Refer to table 7.2 error code for more details.

(3) Normal communication sample program

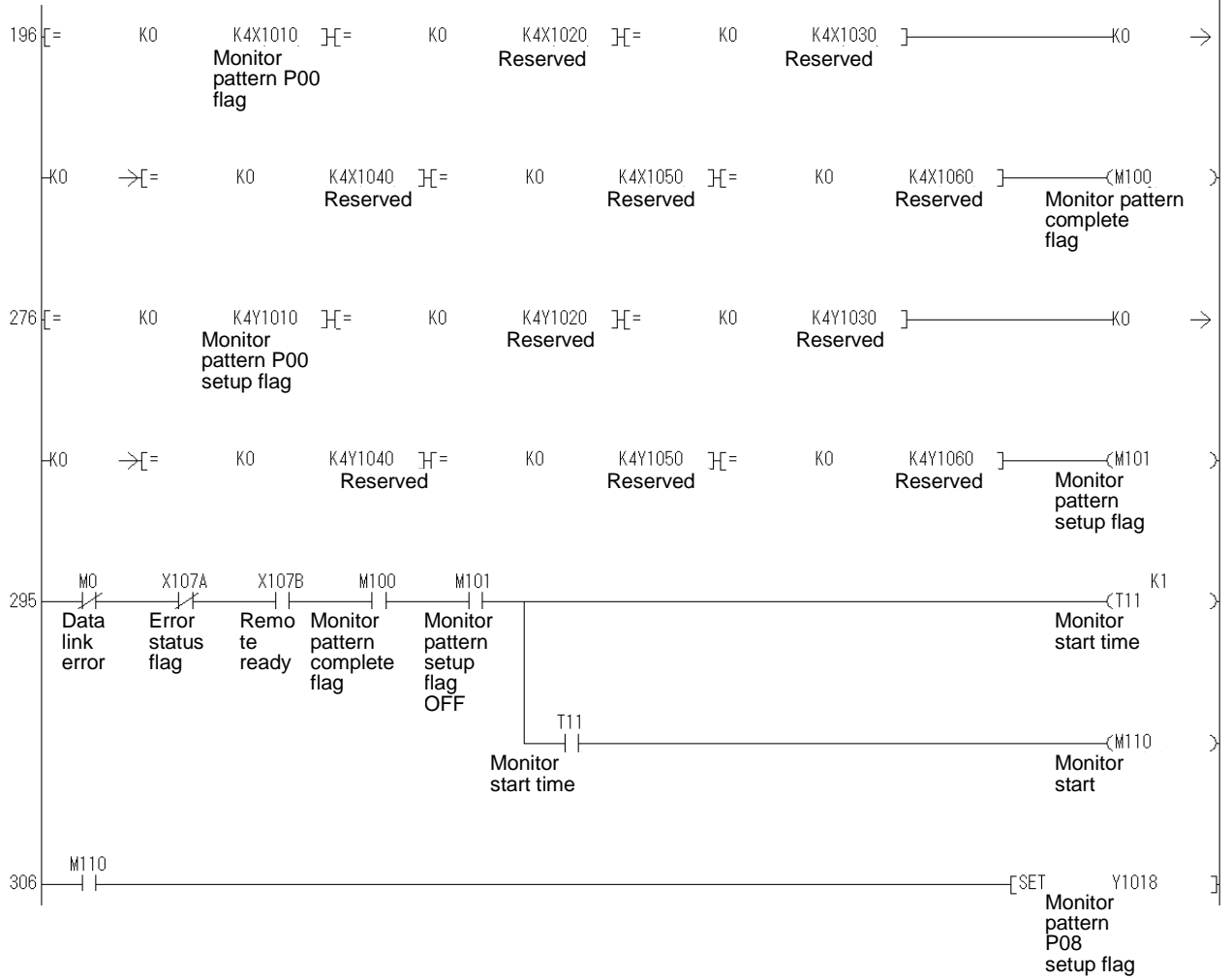
After initial communication, you can monitor the measured value and setup the setting value when normal communication status is normal (Remote ready is ON)

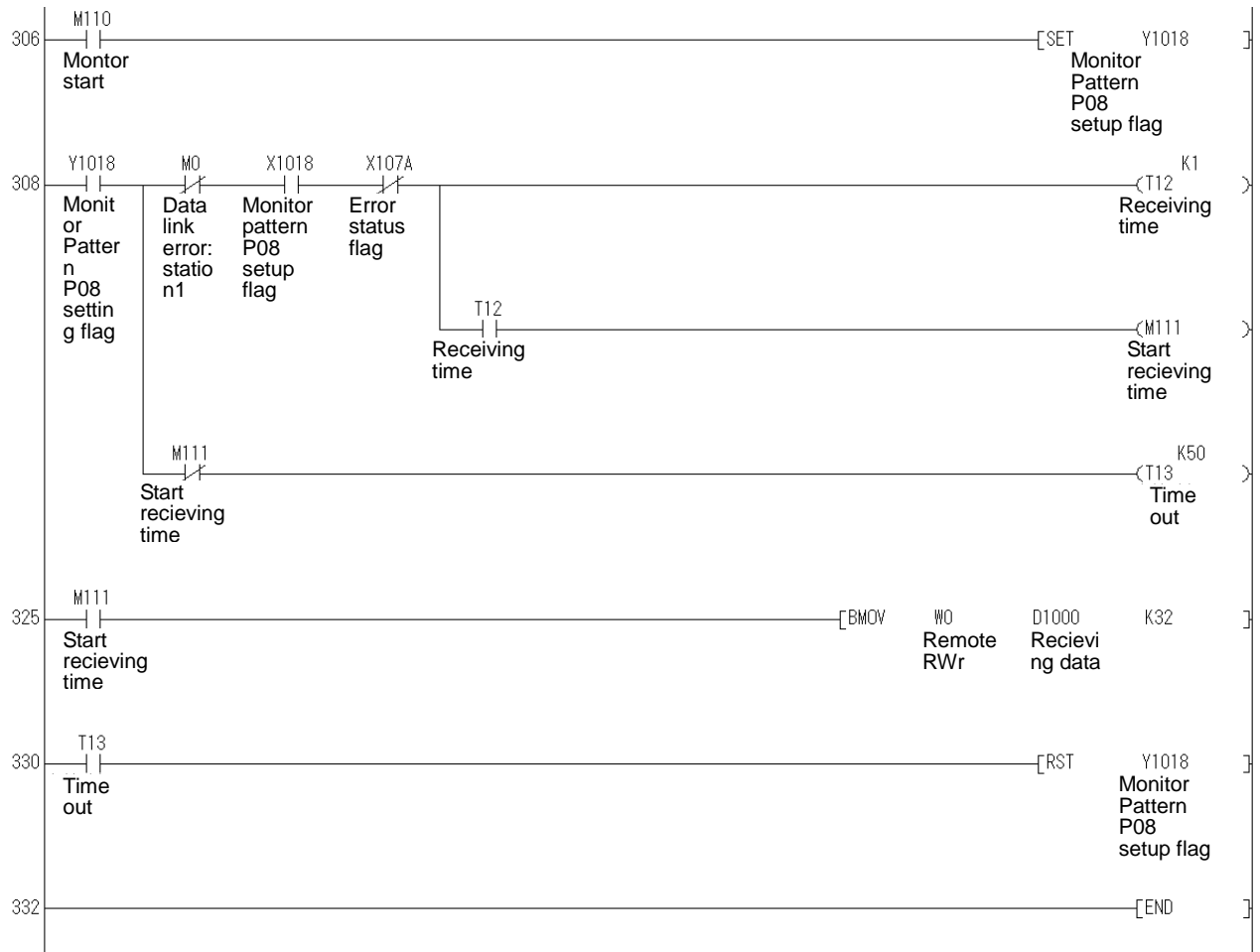
Describing following 3 programs as a sample program.

	Note	Measuring items	Page
Monitoring example by pattern	Sample program reading measuring items to programmable controller devices using monitor pattern P08 setting flag (RY (n+1)8) Measured value is stored in programable controller device	Phase 1 current Phase 2 current Phase 3 current 1-2 voltage 2-3 voltage 3-1 voltage Active power Active energy(import)	97
Monitoring example by command (1H)	Sample program reading measuring items to programmable controller devices using monitor pattern P00 setting flag (RY(n+1)0) writing command (channel group) to remote register RWw. Measured value is stored in programable controller device	Phase 1 current 1-2 voltage Active power Reactive power Power factor Frequency Active energy(import) Reactive energy(import lag)	101
Monitoring example by command (2H)	Sample program reset all alarms using monitor pattern P00 setting flag (RY(n+1)0)	Alarm all reset	106

(a) Monitoring sample using pattern

Normal communication (Monitoring by pattern)





- ① Confirming monitor pattern setting completion flag (X1010 to X106F) is OFF.
- ② Confirming monitor pattern setting flag (Y1010 to Y106F) is OFF.
- ③ Start monitor communication (M110) after confirming monitorable condition (M0 OFF), X107A is OFF, X101B is ON (remote ready), M100 is ON and M101 is ON.
- ④ Monitor pattern P08 setting flag (Y1018) turns to ON when Starting monitor communication (M110).
- ⑤ Monitor pattern P08 setting completion flag (X1018) turns to ON after monitor pattern P08 setting flag (Y1018) turns to ON and replay the data.
- ⑥ Measured data is transmitting to receiving data (D1000 to D1031) from remoter register RWr (W1000 to W101F) after monitor communication starting (M110) is ON
 * While monitor pattern P08 setting flag (Y1018) is ON, measured data in remote register RWr (W0000 to W001F) is update.
- ⑦ Monitor pattern setting completion flag (X1018) turns to OFF when time out (T13) turns to ON.

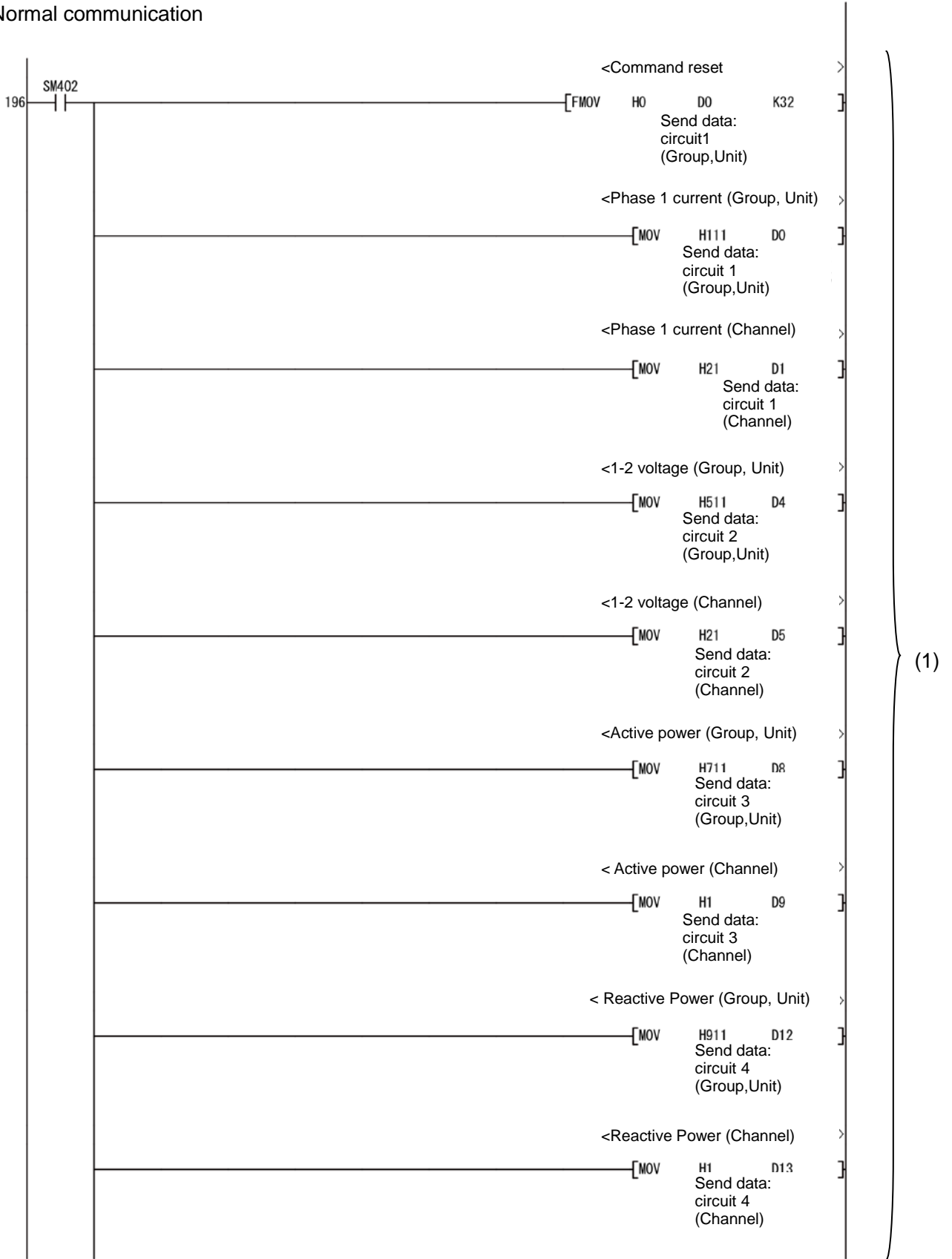
Device allocation

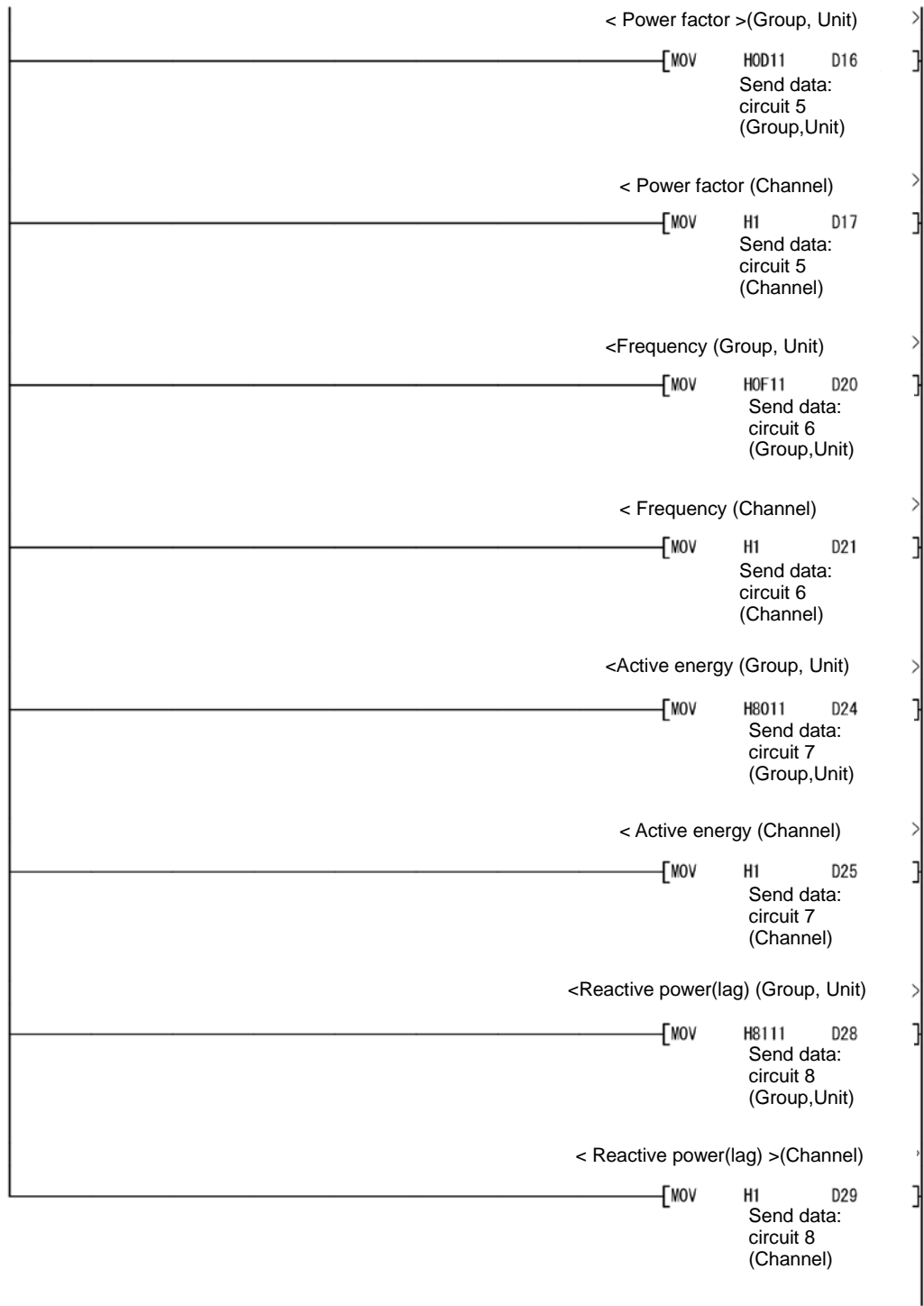
Device	Contents	Note
X1010	Monitor pattern P00 completion flag	Using monitor pattern P08 in sample program. Please change X1018 when using other monitor pattern. Setup Remote input (RX) refresh device. Please refer to Remote input RX.
X1011 to X1017	Reserved	
X1018	Monitor pattern P08 completion flag	
X1019	Monitor pattern P09 completion flag	
X101A	Monitor pattern P10 completion flag	
X101B	Monitor pattern P11 completion flag	
X101C	Monitor pattern P12 completion flag	
X101D to X1077	Reserved	
X107A	Error status flag	
X107B	Remote ready	
M100	Confirming the monitor pattern completion flag turns to OFF Confirming X1010 to X106F turns to OFF.	Devices in a CPU module.(User selectable) . Use as interlock in monitor start.
Y1010	Monitor pattern P00 completion flag	Using monitor pattern P08 in sample program. Please change Y1018 when using other monitor pattern. Setup Remote input (RY) refresh device. Please refer to Remote output RY.
Y1011 to Y1017	Reserved	
Y1018	Monitor pattern P08 completion flag	
Y1019	Monitor pattern P09 completion flag	
Y101A	Monitor pattern P10 completion flag	
Y101B	Monitor pattern P11 completion flag	
Y101C	Monitor pattern P12 completion flag	
Y101D to Y1077	Reserved	
M101	Confirming the monitor pattern flag turns to OFF Confirming X1010 to X106F turns to OFF.	Devices in a CPU module.(User selectable). Use as interlock in monitor start.
M0	Data link error : station1	Devices in a CPU module.(User selectable). Please setup same device in (a) Initial program
T11	Monitor pattern receiving time	Devices in a CPU module.(User selectable).
M111	Start data receiving	Devices in a CPU module.(User selectable).
T12	Monitor pattern receiving time	Devices in a CPU module.(User selectable).
M112	Start data receiving	Devices in a CPU module.(User selectable).
T13	Time out	Devices in a CPU module.(User selectable).
W0000 to W0001F	Remote register RWr Storing reply data	Remote register changed according to setup of remote register refresh device and station No. of measuring unit.
D1000 to D1031	Receiving data	Devices in a CPU module.(User selectable).

Device	Contents	Note
Content of receive data depends on monitor pattern. Data details of monitor pattern P08 showed in below table.		
Device	Contents	Note
D1000	Phase 1 current	H2101
D1001		Multiplying factor
D1002, D1003		Data
D1004	Phase 1 current	H4101
D1005		Multiplying factor
D1006, D1007		Data
D1008	Phase 1 current	H6101
D1009		Multiplying factor
D1010, D1011		Data
D1012	1-2 voltage	H2105
D1013		Multiplying factor
D1014, D1015		Data
D1016	2-3 voltage	H4105
D1017		Multiplying factor
D1018, D1019		Data
D1020	3-1 voltage	H6105
D1021		Multiplying factor
D1022, D1023		Data
D1024	Electric power	H0107
D1025		Multiplying factor
D1026, D1027		Data
D1028	Electric Energy	H0180
D1029		Multiplying factor
D1030, D1031		Data

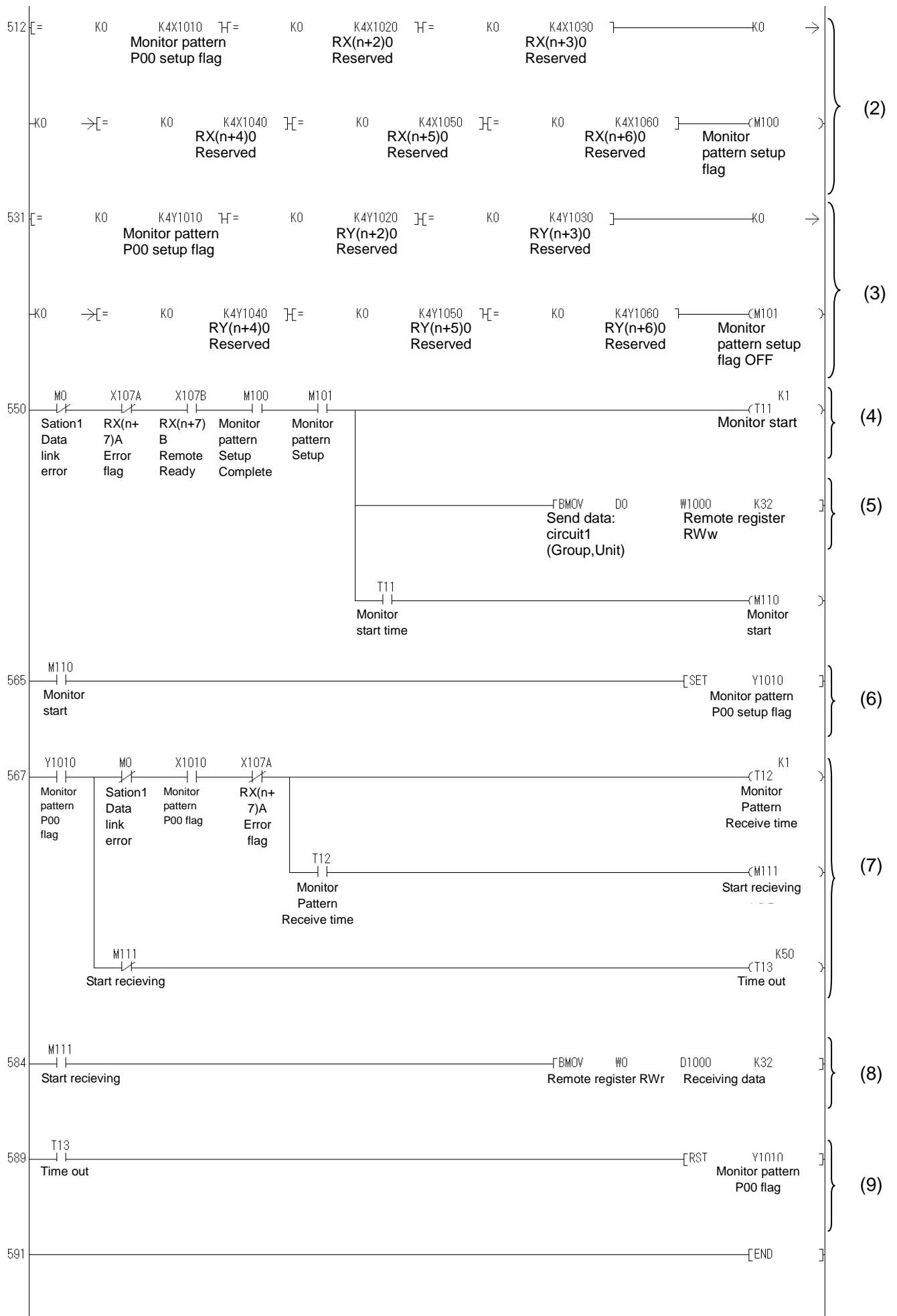
(b) Monitoring sample using command (1H)

*Normal communication





(1)



- (1) Write command send to measuring unit in device.
- (2) Confirm the monitor pattern setup complete flag (X1010-X106F) is OFF.
- (3) Confirm the monitor pattern setup flag (Y1010-Y106F) is OFF.
- (4) Monitoring start after confirm X107A is OFF, X101B is ON, M100 is ON, M101 is ON.
- (5) Write send command at (1) in remote register RWw (W1000-W101F).
- (6) Monitor pattern P00 setup flag turn to ON in monitor start (M110).
- (7) After Monitor pattern P00 setup flag (Y1010) turns to ON and reply data according to monitor pattern, Monitor pattern P00 setup complete flag (X1010) turns ON.
After confirming monitor pattern P00 setup complete flag (X1010), Error flag (X107A) is not ON, time out is conducted.
- (8) Transfer the measured data to receive data (D1000-D1031) when monitor start (M110)is ON.
- (9) After Time out (T13) is ON, Monitor pattern P00 setup flag (Y1010) turns to OFF.

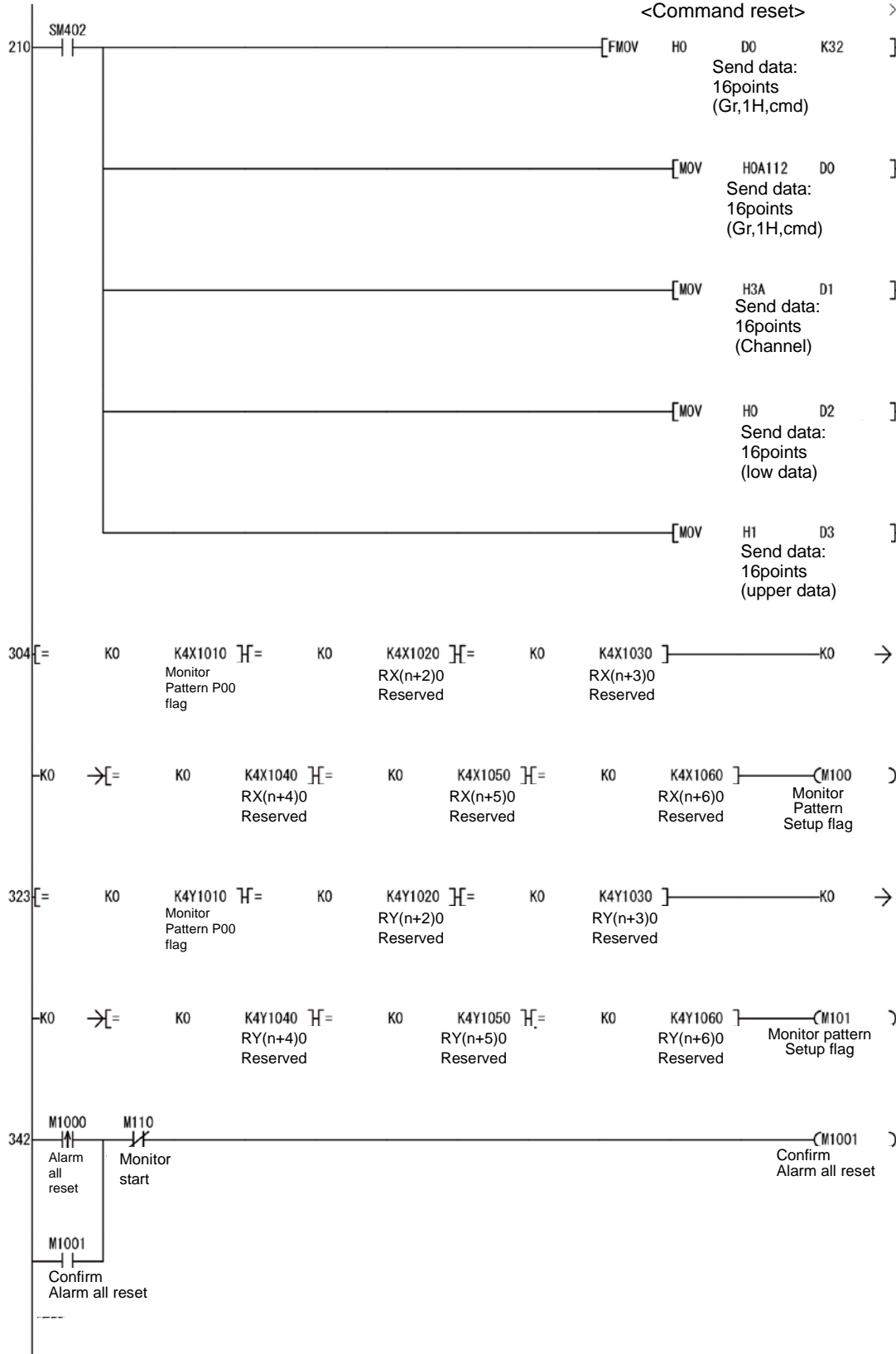
Device allocation

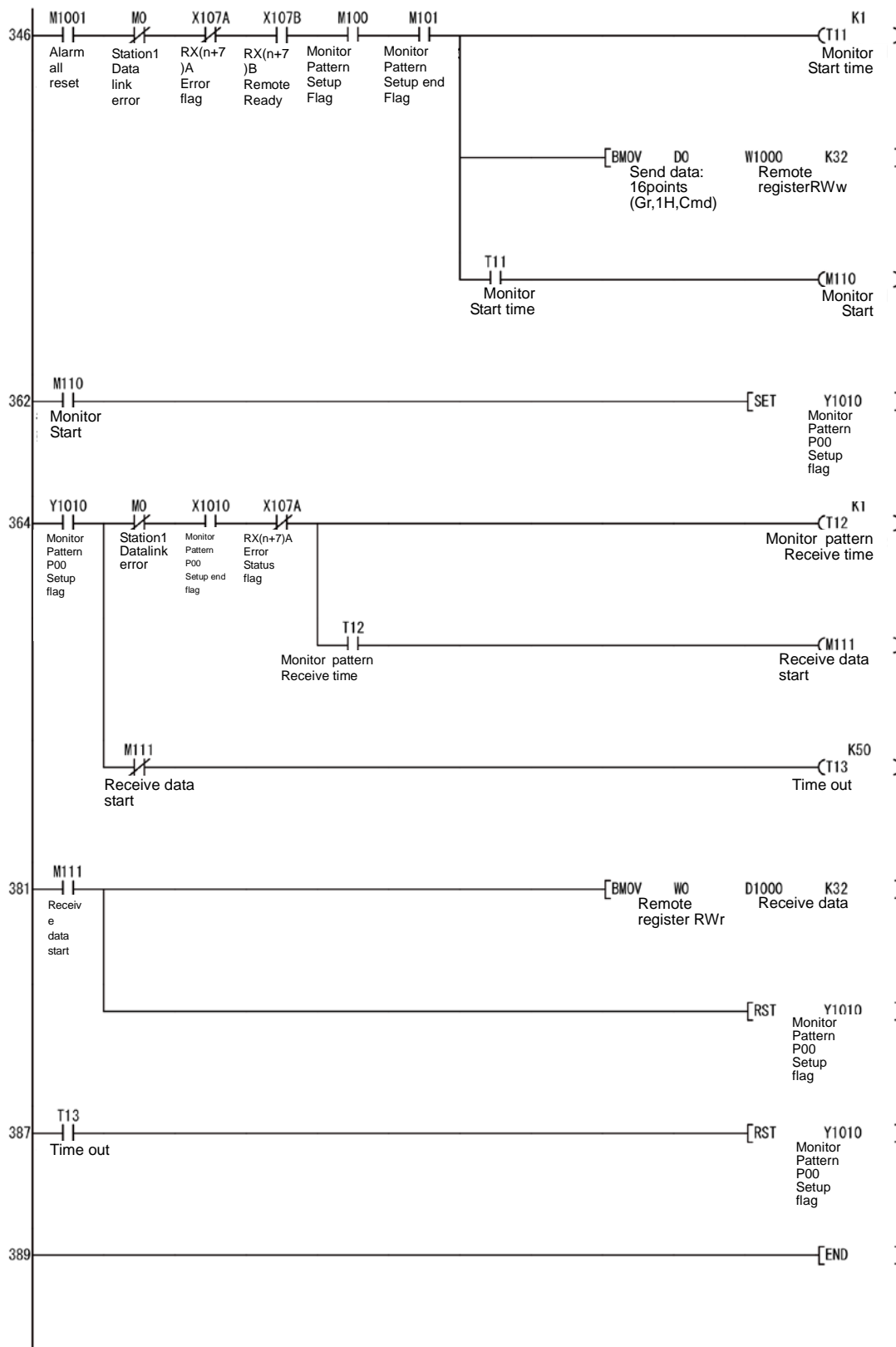
Device	Contents	Note
X1010	Monitor pattern P00 completion flag	Using monitor pattern P00 in sample program. Please change X1010 when using other monitor pattern. Setup Remote input (RX) refresh device. Please refer to Remote input RX.
X1011 to X1017	Reserved	
X1018	Monitor pattern P08 completion flag	
X1019	Monitor pattern P09 completion flag	
X101A	Monitor pattern P10 completion flag	
X101B	Monitor pattern P11 completion flag	
X101C	Monitor pattern P12 completion flag	
X101C to X106F	Reserved	
X107A	Error status flag	
X107B	Remote ready	
M100	Confirming the monitor pattern completion flag turns to OFF Confirming X1010 to X106F turns to OFF.	
Y1010	Monitor pattern P00 completion flag	Using monitor pattern P08 in sample program. Please change Y1018 when using other monitor pattern. Setup Remote input (RY) refresh device. Please refer to Remote output RY.
Y1011 to Y1017	Reserved	
Y1018	Monitor pattern P08 completion flag	
Y1019	Monitor pattern P09 completion flag	
Y101A	Monitor pattern P10 completion flag	
Y101B	Monitor pattern P11 completion flag	
Y101C	Monitor pattern P12 completion flag	
Y101C to Y106F	Reserved	
M101	Confirming the monitor pattern flag turns to OFF Confirming X1010 to X106F turns to OFF.	Devices in a CPU module.(User selectable). Use as interlock in monitor start.
M0	Data link error : station1	Devices in a CPU module.(User selectable). Please setup same device in (a) Initial program
T11	Monitor pattern receiving time	Devices in a CPU module.(User selectable).
M111	Start data receiving	Devices in a CPU module.(User selectable).
T12	Monitor pattern receiving time	Devices in a CPU module.(User selectable).
M112	Start data receiving	Devices in a CPU module.(User selectable).
T13	Time out	Devices in a CPU module.(User selectable).
W1000 to W1001F	Remote register RWr Storing reply data	Remote register changed according to setup of remote register refresh device and station No. of measuring unit.
W0000 to W001F	Remote register RWr Storing reply data	Remote register changed according to setup of remote register refresh device and station No. of measuring unit.

Device	Contents	Note		
D0 to D31	Send data	Internal device		
	Write Group No., Channel No., command that monitored in receiving data			
	Device	Content	Note	
	D0	Phase 1 current	H0111	
	D1		H0021	
	D2, D3		H0000	
	D4	1-2 voltage	H0511	
	D5		H0021	
	D6, D7		H0000	
	D8	Active power	H0711	
	D9		H0021	
	D10, D11		H0000	
	D12	Reactive power	H0911	
	D13		H0021	
	D14, D15		H0000	
	D16	Power factor	H0D11	
	D17		H0021	
	D18, D19		H0000	
	D20	Frequency	H0F11	
	D21		H0021	
	D22, D23		H0000	
	D24	Active energy	H8011	
	D25		H0001	
	D26, D27		H0000	
	D28	Reactive energy	H8111	
	D29		H0001	
	D30, D31		H0000	
	D1000 to D1031	Receive data	Internal device	
		Receive data is different by monitor pattern.		
		Device	Content	Note
		D1000	Phase 1 current	H2101
		D1001		Multiple factor
D1002, D1003		Data		
D1004		1-2 voltage	H2105	
D1005			Multiple factor	
D1006, D1007			Data	
D1008		Active power	H0107	
D1009			Multiple factor	
D1010, 10D11			Data	
D1012		Reactive power	H0109	
D1013			Multiple factor	
D1014, D1015			Data	
D1016		Power factor	H01D1	
D1017			Multiple factor	
D1018, D1019			Data	
D1020		Frequency	H01F1	
D1021			Multiple factor	
D1022, D1023			Data	
D1024		Active energy	H0180	
D1025			Multiple factor	
D1026, 10D27			Data	
D1028		Reactive energy	H0181	
D1029			Multiple factor	
D1030, D1031			Data	

(c) Monitoring sample using command (2H)

*Normal communication (2H)





- (1) Write command send to measuring unit in device.
- (2) Confirm the monitor pattern setup complete flag (X1010-X106F) is OFF.
- (3) Confirm the monitor pattern setup flag (Y1010-Y106F) is OFF.
- (4) Confirm the alarm all reset M1001 is ON when M1000 is ON.
M1001 turns to OFF when X101B is ON in (6)
- (5) Command is written to remote register RWw (W000 to W001F) after M1001 is ON, M0 is OFF, CX107A is OFF, X101B is ON.
- (6) M110 turns to ON after (5).
- (7) Y1010 turns to ON in M110.
- (8) After Monitor pattern P00 setup flag (Y1010) turns to ON and reply data according to monitor pattern, Monitor pattern P00 setup complete flag (X1010) turns ON.
After confirming monitor pattern P00 setup complete flag (X1010), Error flag (X107A) is not ON, time out is conducted.
- (9) Transfer the measured data to receive data (D1000-D1031) when monitor start (M110) is ON.
- (10) After Time out (T13) is ON, Monitor pattern P00 setup flag (Y1010) turns to OFF.

Device allocation

Device	Contents	Note
X1010	Monitor pattern P00 completion flag	
X1011 to X1017	Reserved	
X1018	Monitor pattern P08 completion flag	
X1019	Monitor pattern P09 completion flag	
X101A	Monitor pattern P10 completion flag	
X101B	Monitor pattern P11 completion flag	
X101C	Monitor pattern P12 completion flag	
X101C to X106F	Reserved	
X107A	Error status flag	
X107B	Remote ready	
M100	Confirming the monitor pattern completion flag turns to OFF Confirming X1010 to X106F turns to OFF.	
Y1010	Monitor pattern P00 completion flag	
Y1011 to Y1017	Reserved	
Y1018	Monitor pattern P08 completion flag	
Y1019	Monitor pattern P09 completion flag	
Y101A	Monitor pattern P10 completion flag	
Y101B	Monitor pattern P11 completion flag	
Y101C	Monitor pattern P12 completion flag	
Y101C to Y106F	Reserved	
M101	Confirming the monitor pattern flag turns to OFF Confirming X1010 to X106F turns to OFF.	
M0	Data link error : station1	
T11	Monitor pattern receiving time	
M111	Start data receiving	
T12	Monitor pattern receiving time	
M112	Start data receiving	
T13	Time out	

Device	Contents	Note	
W1000 to W1001F	Remote register RWr Storing reply data		
W0000 to W001F	Remote register RWr Storing reply data		
D0 to D31	Send data Internal device		
	Write Group No., Channel No., command that monitored in receiving data		
	Device	Content	Note
	D0	Alarm all reset	HA112
	D1		H003A
	D2		H0000
D3	H0001		
D4 to D31	H0000		
D1000 to D1031	Receive data Internal device		
	Receive data is different by monitor pattern.		
	Device	Content	Note
	D1000	Alarm all reset	H3AA1
	D1001 to D1003		H0000
D1004 to D1031	H0000		

9.2 Sample program 2

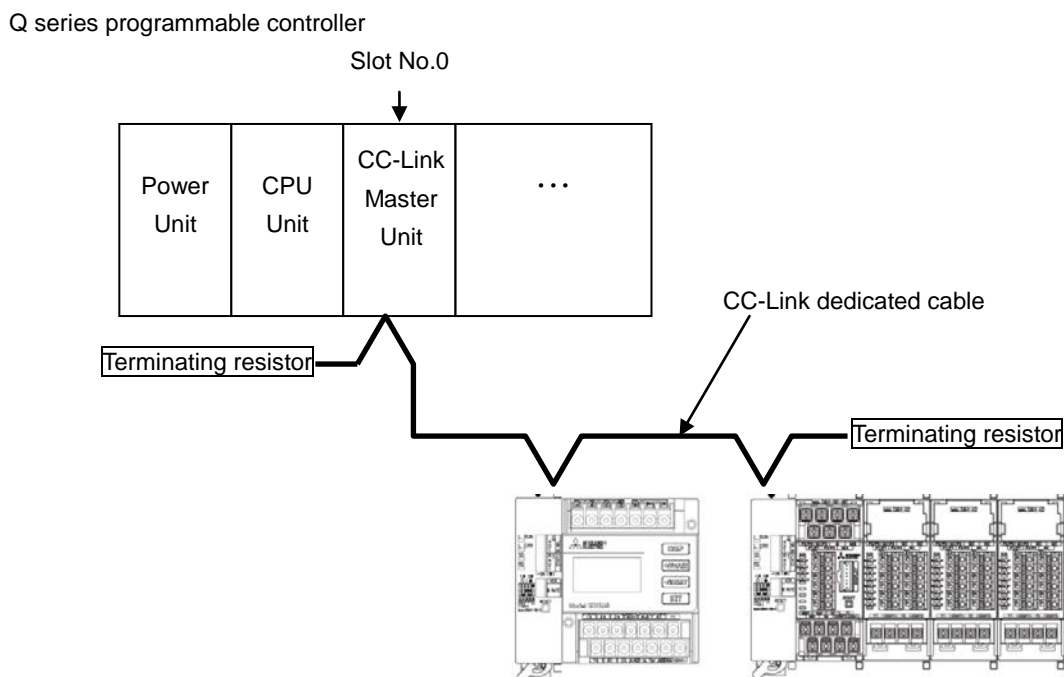
(1) Program Content

This program example is assumed the system configuration in below.

- CC-Link master unit: Mounting in Slot No.0.
- CC-Link master unit: First XY: 0000.
- Station No. of Measuring unit (EMU4-HD1-MB): 1
- Station No. of Measuring unit (EMU4-HM1-MB + EMU4-A2x3): 2

Note: The refresh set with the automatic refresh parameters and the refresh executed with the FROM/TO instructions cannot be performed simultaneously.

(2) System Configuration



*Read data

Station	Model	Circuit No.	Data
Station1	EMU4-HD1-MB	-	<Monitor using monitor pattern P08> Phase 1 current, Phase 2 current, Phase 3 current, 1-2 voltage, 2-3 voltage, 3-1 voltage, Active power, Active energy
Station2	EMU4-HM1-MB	Circuit 1	<Monitor using monitor pattern P00> Reactive power, Power factor, Reactive energy(LAG)
	EMU4-A2	Circuit 2,3	<Monitor using monitor pattern P08> Phase 1 current, Phase 2 current, Phase 3 current, 1-2 voltage, 2-3 voltage, 3-1 voltage, Active power, Active energy(import)
	EMU4-A2	Circuit 4,5	<Monitor using monitor pattern P17,25,33,41,49,57> Phase 1 current demand, Phase 2 current demand, Phase 3 current demand, Active power demand, Power factor, Frequency, Reactive power, Reactive energy.
	EMU4-A2	Circuit 6,7	

(3) Parameter Settings

Parameter settings are set as following with GX Developer.

9.2.1 Network Parameter Settings and Auto Refresh Parameter Settings

The following is shown CC-Link network parameter settings and auto refresh parameter settings.

The screenshot shows the 'Network Parameter Settings' dialog box in MELSOFT GX Developer. The 'No. of boards in module' is set to 1. The 'Start I/O No.' is 0000. The 'Operational setting' section includes: Type (Master station), Master station data link type (PLC parameter auto start), Mode (Remote net(Ver.2 mode)), All connect count (2), Remote input(RX) (X1000), Remote output(RY) (Y1000), Remote register(RW/r) (W0), Remote register(RW/w) (W1000), Ver.2 Remote input(RX), Ver.2 Remote output(RY), Ver.2 Remote register(RW/r), Ver.2 Remote register(RW/w), Special relay(SB) (SB0), Special register(SW) (SW0), and Retry count (3). The 'Automatic reconnection station count' is 1. The 'Stand by master station No.' is blank. The 'PLC down select' is Stop, and the 'Scan mode setting' is Asynchronous. The 'Delay information setting' is 0. The 'Station information setting' is highlighted in blue. The 'Remote device station initial setting' is highlighted in pink. The 'Interrupt setting' is highlighted in pink. The status bar shows 'Indispensable settings(No setting / Already set) Set if it is n' and 'Ready'.

Parameter	Value
No. of boards in module	1
Start I/O No	0000
Operational setting	Operational settings
Type	Master station
Master station data link type	PLC parameter auto start
Mode	Remote net(Ver.2 mode)
All connect count	2
Remote input(RX)	X1000
Remote output(RY)	Y1000
Remote register(RW/r)	W0
Remote register(RW/w)	W1000
Ver.2 Remote input(RX)	
Ver.2 Remote output(RY)	
Ver.2 Remote register(RW/r)	
Ver.2 Remote register(RW/w)	
Special relay(SB)	SB0
Special register(SW)	SW0
Retry count	3
Automatic reconnection station count	1
Stand by master station No.	
PLC down select	Stop
Scan mode setting	Asynchronous
Delay information setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

9.2.2 Operational Settings

Operational settings are as follows.

9.2.3 Station Information Settings

Station information settings are as follows.

Station No.	Station type	Expanded cyclic setting	Exclusive station count	Remote station points	Reserve/invalid station select	Intelligent buffer select(word)		
						Send	Receive	Automatic
1/1	Ver.2Remote device station	octuple	Exclusive station 1	128 points	No setting			
2/2	Ver.2Remote device station	octuple	Exclusive station 1	128 points	No setting			

9.2.4 Device Allocation

Allocation of transmitted device

Items	Contents	Device No.	Note
Remote input (RX)	Station number 1: Remote input (RX00 to RX7F)	X1000 to X107F	Set X1000 to remote input (RX) refresh device.
	Station number 2: Remote input (RX00 to RX7F)	X1080 to X10FF	
Remote output (RY)	Station number 1: Remote output (RY00 to RY7F)	Y1000 to Y107F	Set Y1000 to remote output (RY) refresh device.
	Station number 2: Remote output (RY00 to RY7F)	Y1080 to Y10FF	
Remote register (RWr)	Station number 1: Remote register(RWr0 to RWr3)	W0000 to W001F	Set W0000 to remote register (RWr) refresh device.
	Station number 2: Remote register (RWr0 to RWr3)	W0020 to W003F	
Remote register (RWw)	Station number 1: Remote register (RWw0 to RWw3)	W1000 to W101F	Set W1000 to remote register (RWw) refresh device.
	Station number 2: Remote register (RWw0 to RWw3)	W1020 to W103F	
Link special relay (SB)	Link special relay of master station (SB0 to SB01FF)	SB0 to SB01FF	Set SB0 to link special relay (SB) refresh device.
Link special register (SW)	Link special register of master station (SW0 to SW01FF)	SW0 to SW01FF	Set SW0 to link special register (SW) refresh device.
Items of sending data	Sending data for monitoring	D0 to D31	Items are mentioned in section (2).
Error code	For station number 1:	D1000 to D1031	
	For station number 2:	D1050 to D1081	
Station error	For station number 1:	M0	0: Normal 1: Data link error occurred
	For station number 2:	M1	
Check of setting completion flag	For station number 1:	M100	To check the OFF.
	For station number 2:	M200	
Check of setting flag	For station number 1:	M101	
	For station number 2:	M201	
Monitor start	Monitor start for station number 1	M110	
	Monitor start for station number 2 (Circuit 1)	M210	
	Monitor start for station number 2 (Circuit 1)	M211	
	Monitor start for station number 2 (Circuit 2)	M212	
	Monitor start for station number 2 (Circuit 3)	M213	
	Monitor start for station number 2 (Circuit 4)	M214	
	Monitor start for station number 2 (Circuit 5)	M215	
	Monitor start for station number 2 (Circuit 6)	M216	
	Monitor start for station number 2 (Circuit 7)	M217	

Items	Contents	Device No.	Note
Receive start	Monitor start for station number 1	M120	
	Monitor start for station number 2 (Circuit 1)	M220	
	Monitor start for station number 2 (Circuit 1)	M221	
	Monitor start for station number 2 (Circuit 2)	M222	
	Monitor start for station number 2 (Circuit 3)	M223	
	Monitor start for station number 2 (Circuit 4)	M224	
	Monitor start for station number 2 (Circuit 5)	M225	
	Monitor start for station number 2 (Circuit 6)	M226	
	Monitor start for station number 2 (Circuit 7)	M227	
Monitor flag	Monitor start for station number 2 (Circuit 1)	M250	
	Monitor start for station number 2 (Circuit 1)	M251	
	Monitor start for station number 2 (Circuit 2)	M252	
	Monitor start for station number 2 (Circuit 3)	M253	
	Monitor start for station number 2 (Circuit 4)	M254	
	Monitor start for station number 2 (Circuit 5)	M255	
	Monitor start for station number 2 (Circuit 6)	M256	
	Monitor start for station number 2 (Circuit 7)	M257	
Error clear	Error clear time for station number 1	T10	
	Error clear time for station number 2	T20	
Monitor start time	Monitor start time for station number 1	T11	
	Monitor start time for station number 2 (Circuit 1)	T30	
	Monitor start time for station number 2 (Circuit 1)	T31	
	Monitor start time for station number 2 (Circuit 2)	T32	
	Monitor start time for station number 2 (Circuit 3)	T33	
	Monitor start time for station number 2 (Circuit 4)	T34	
	Monitor start time for station number 2 (Circuit 5)	T35	
	Monitor start time for station number 2 (Circuit 6)	T36	
	Monitor start time for station number 2 (Circuit 7)	T37	
Monitor pattern receive	Monitor pattern receive for station number 1	T12	
	Monitor pattern receive for station number 2 (Circuit 1)	T40	
	Monitor pattern receive for station number 2 (Circuit 1)	T41	
	Monitor pattern receive for station number 2 (Circuit 2)	T42	
	Monitor pattern receive for station number 2 (Circuit 3)	T43	
	Monitor pattern receive for station number 2 (Circuit 4)	T44	
	Monitor pattern receive for station number 2 (Circuit 5)	T45	
	Monitor pattern receive for station number 2 (Circuit 6)	T46	
	Monitor pattern receive for station number 2 (Circuit 7)	T47	

Items	Contents	Device No.	Note
Time out	Time out for station number 1	T13	
	Time out for station number 2 (Circuit 1)	T50	
	Time out for station number 2 (Circuit 1)	T51	
	Time out for station number 2 (Circuit 2)	T52	
	Time out for station number 2 (Circuit 3)	T53	
	Time out for station number 2 (Circuit 4)	T54	
	Time out for station number 2 (Circuit 5)	T55	
	Time out for station number 2 (Circuit 6)	T56	
	Time out for station number 2 (Circuit 7)	T57	

Item	Content		Device	Note				
Receive data	Station1	Phase 1 current	Multiple,H00	R1	Measured data = Data * multiple			
			Data	R2,R3				
		to						
		Active power	Multiple,H00	R29				
	Data		R30,R31					
	Station2 (Circuit 1)	Reactive power	Multiple,H00	R101		Measured data = Data * multiple		
			Data	R102,R103				
		Power factor	Multiple,H00	R105				
			Data	R106,R107				
		Reactive energy	Multiple,H00	R109				
			Data	R110,R111				
		Phase 1 current	Multiple,H00	R133				
			Data	R134,R135				
		to						
		Active energy	Multiple,H00	R161				
	Data		R162,R163					
	Station2 (Circuit 2)	Phase 1 current demand	Multiple,H00	R165	Measured data = Data * multiple			
			Data	R166,R167				
		to						
		Reactive energy	Multiple,H00	R193				
	Data		R194,R195					
	Station2 (Circuit 3)	Phase 1 current demand	Multiple,H00	R197		Measured data = Data * multiple		
			Data	R198,R199				
		to						
		Reactive energy	Multiple,H00	R225				
	Data		R226,R227					
	Station2 (Circuit 4)	Phase 1 current demand	Multiple,H00	R229			Measured data = Data * multiple	
			Data	R230,R231				
		to						
		Reactive energy	Multiple,H00	R257				
Data	R258,R259							
Station2 (Circuit 5)	Phase 1 current demand	Multiple,H00	R261	Measured data = Data * multiple				
		Data	R262,R263					
	to							
	Reactive energy	Multiple,H00	R289					
Data		R290,R291						
Station2 (Circuit 6)	1phase demand current	Multiple,H00	R293		Measured data = Data * multiple			
		Data	R294,R295					
	to							
	Reactive energy	Multiple,H00	R321					
Data		R322,R323						
Station2 (Circuit 7)	Phase 1 current demand	Multiple,H00	R325			Measured data = Data * multiple		
		Data	R326,R327					
	to							
	Reactive energy	Multiple,H00	R353					
Data		R354,R355						

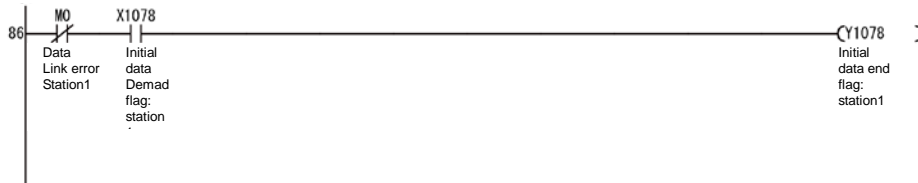
(1) Sample program

Detect data link error of measuring unit

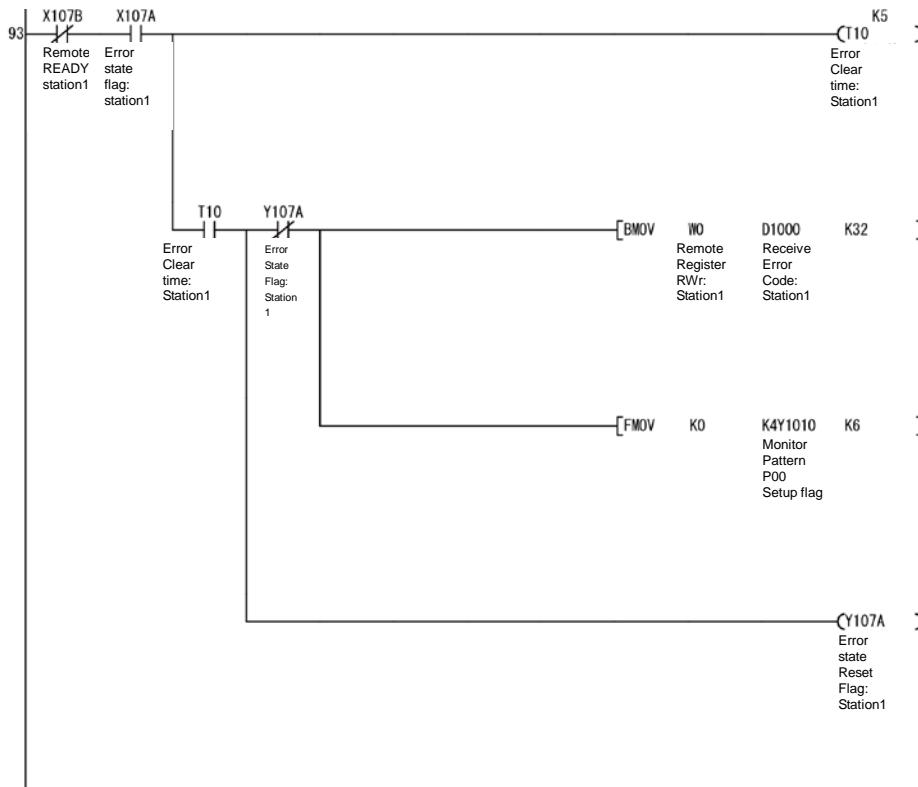


Communication for station1

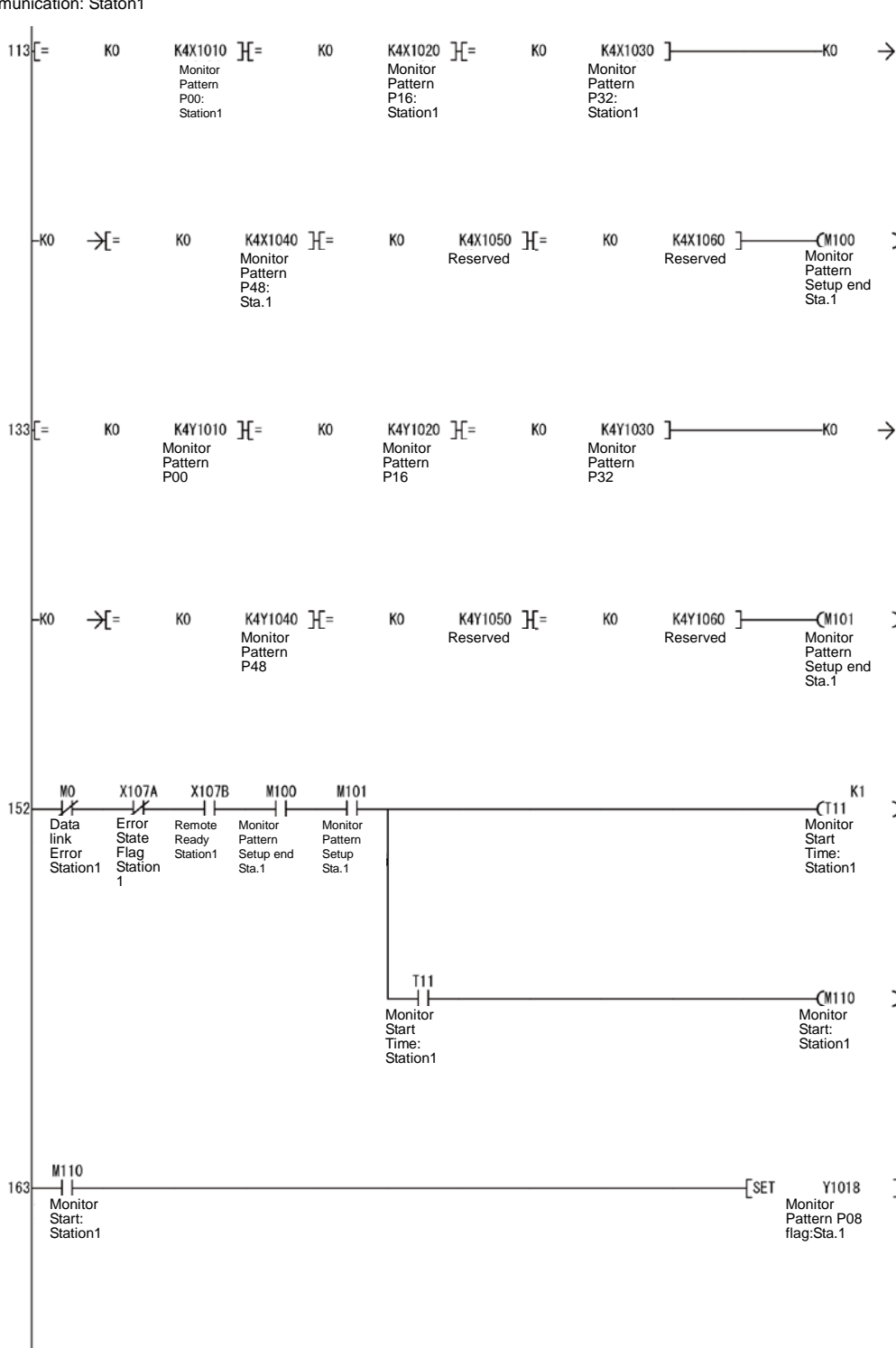
Initial communication: station1

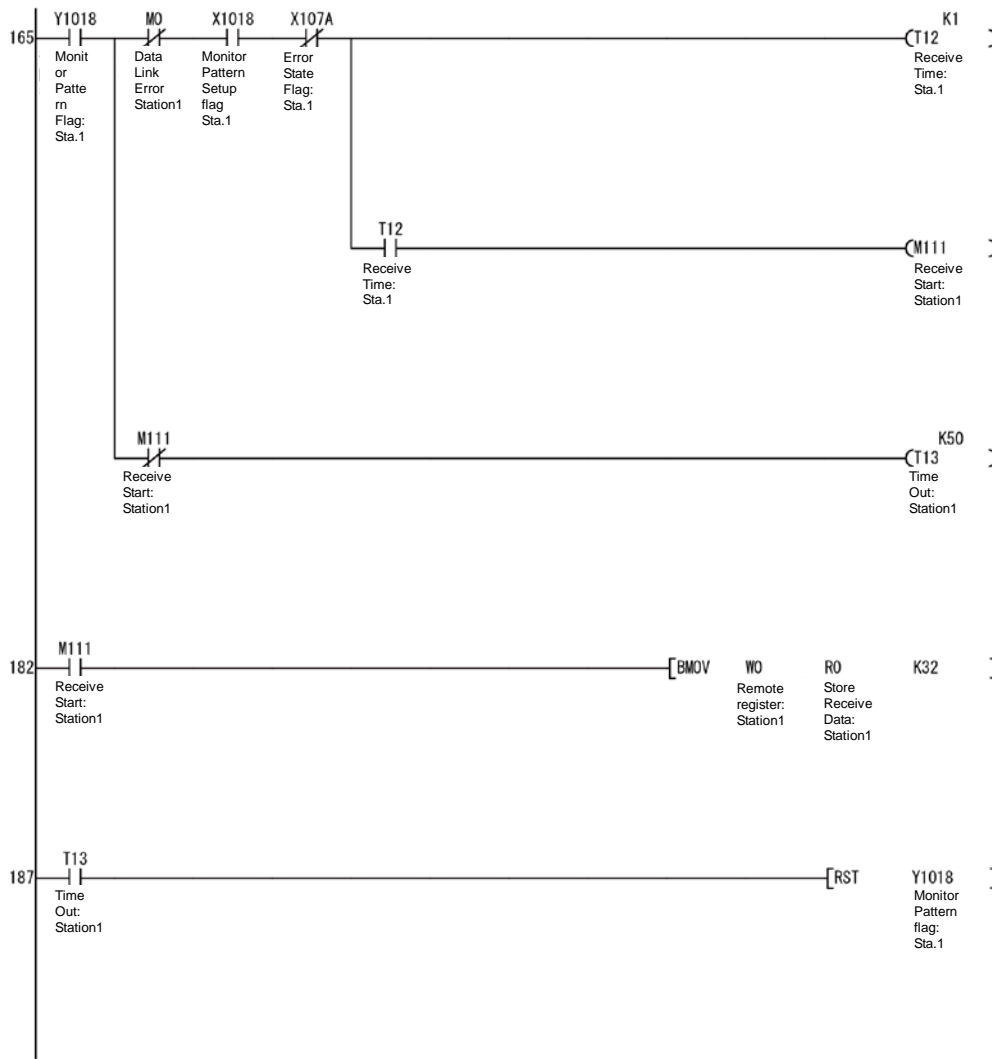


Error communication: station1

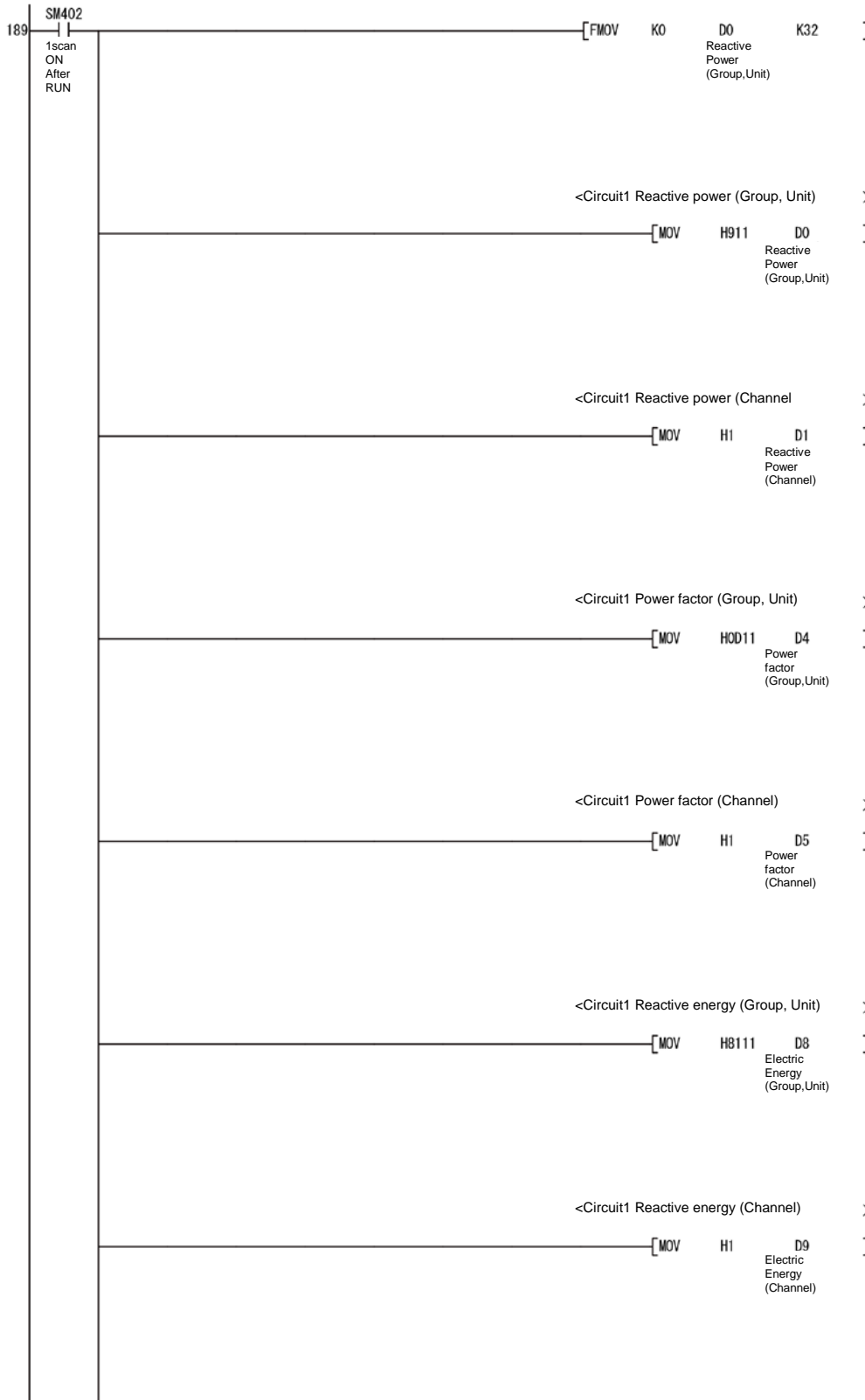


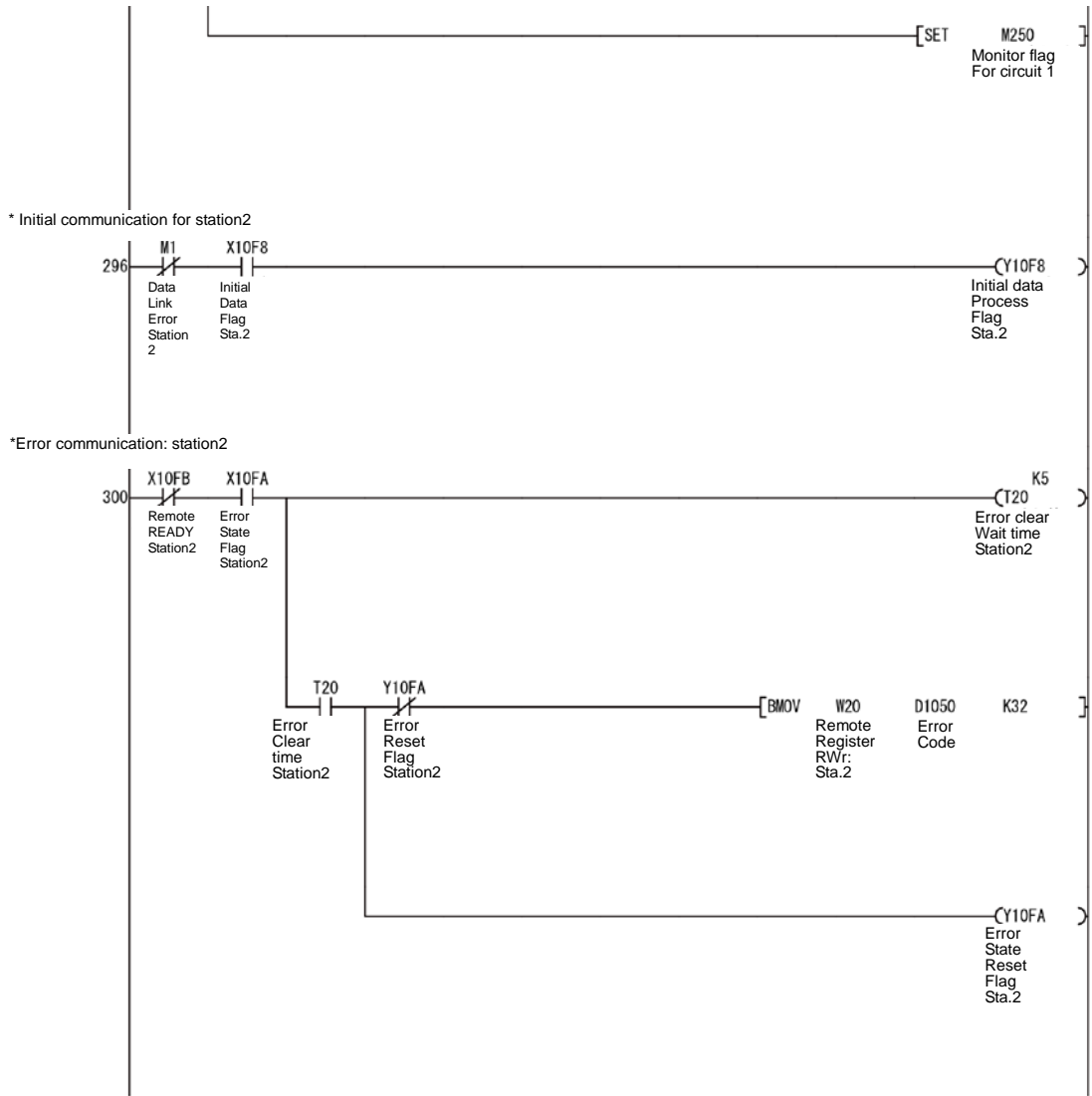
Normal communication: Station1



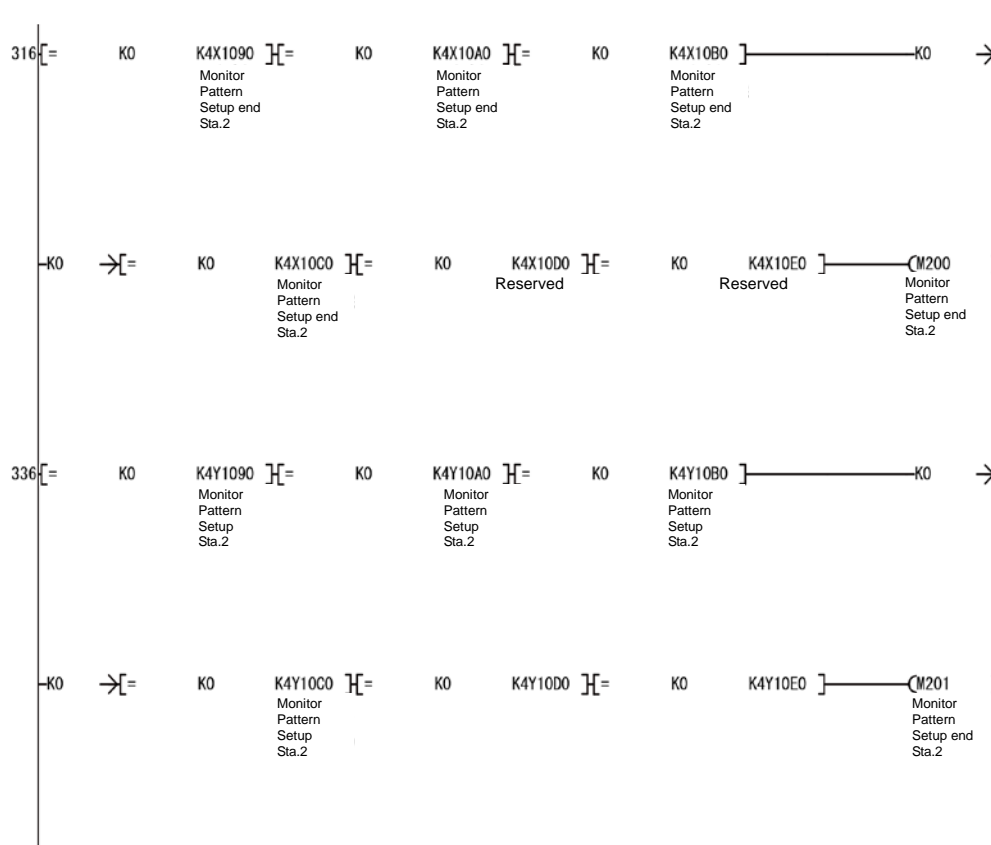


Setup for send data using pattern monitor P00 (Circuit1)

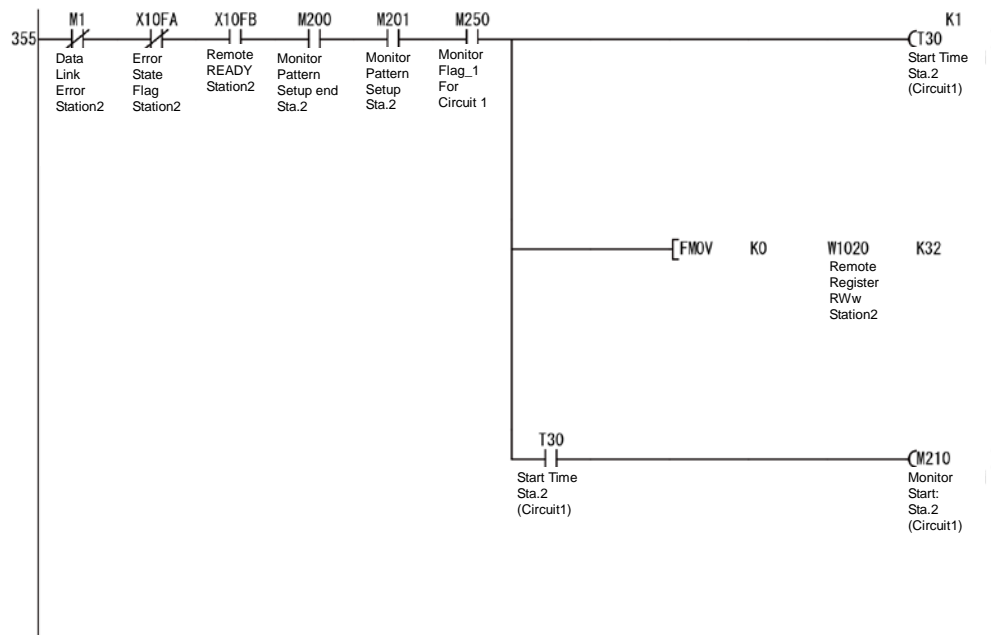


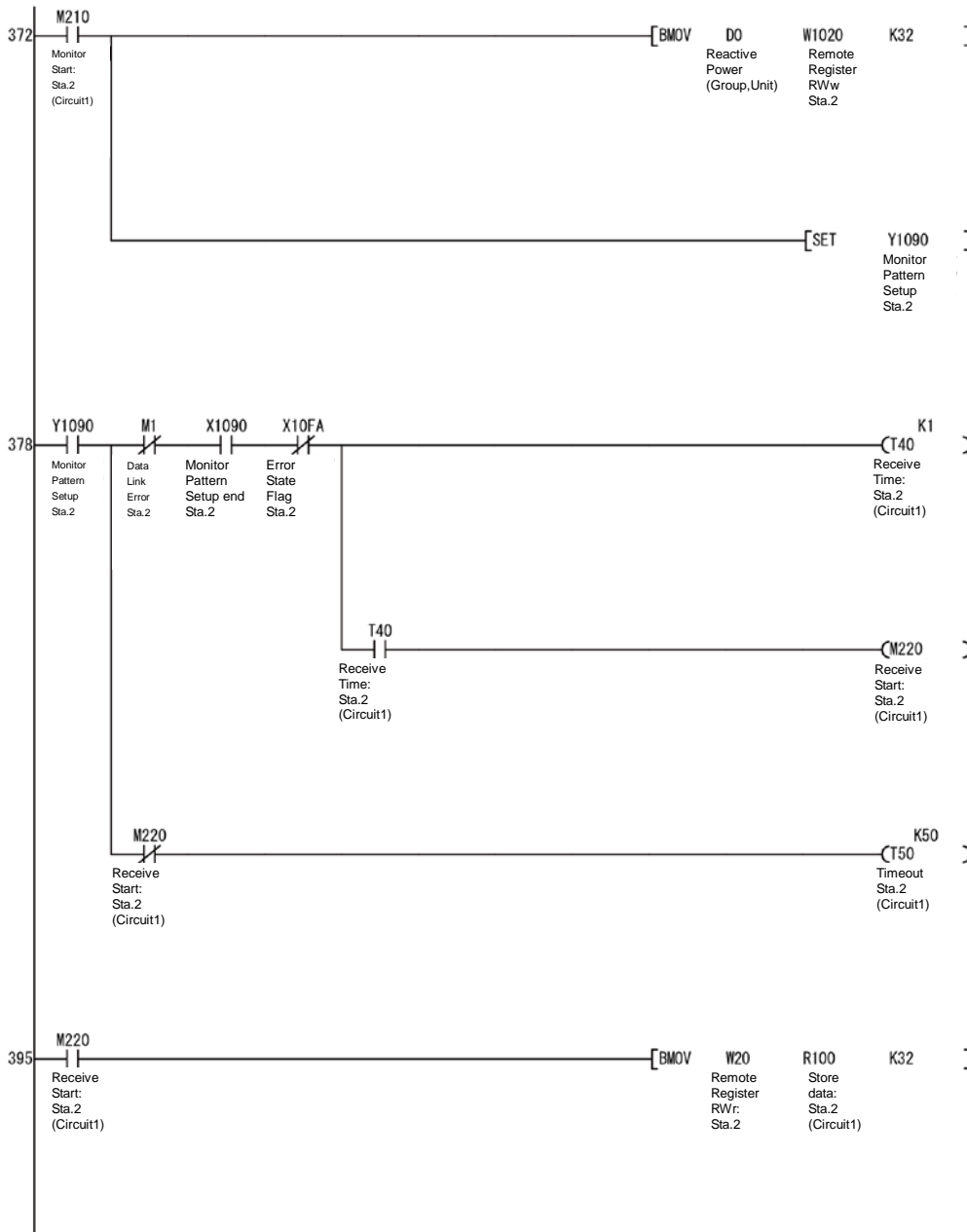


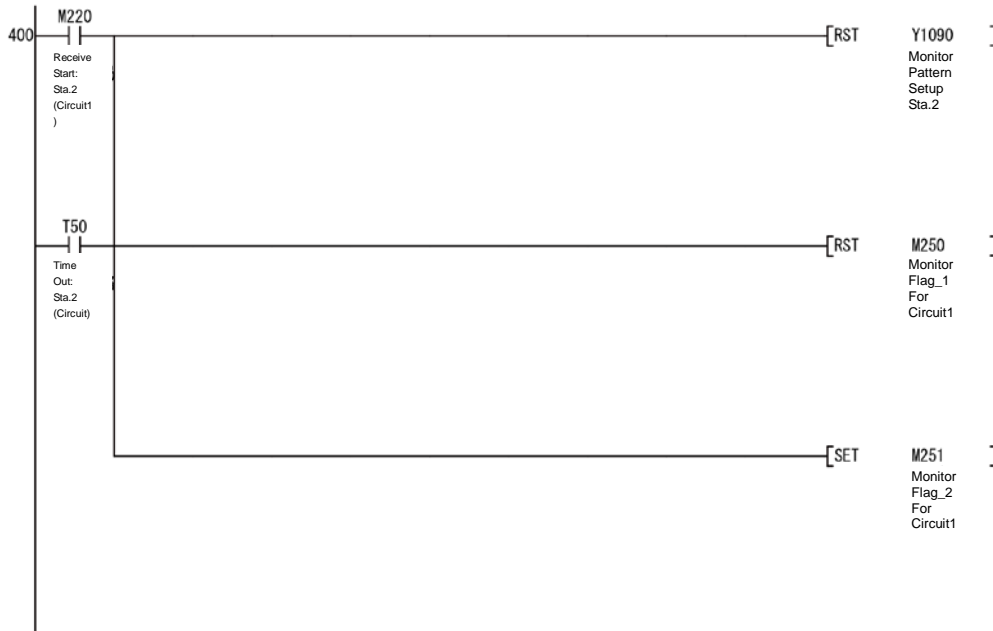
*Normal communication for station2



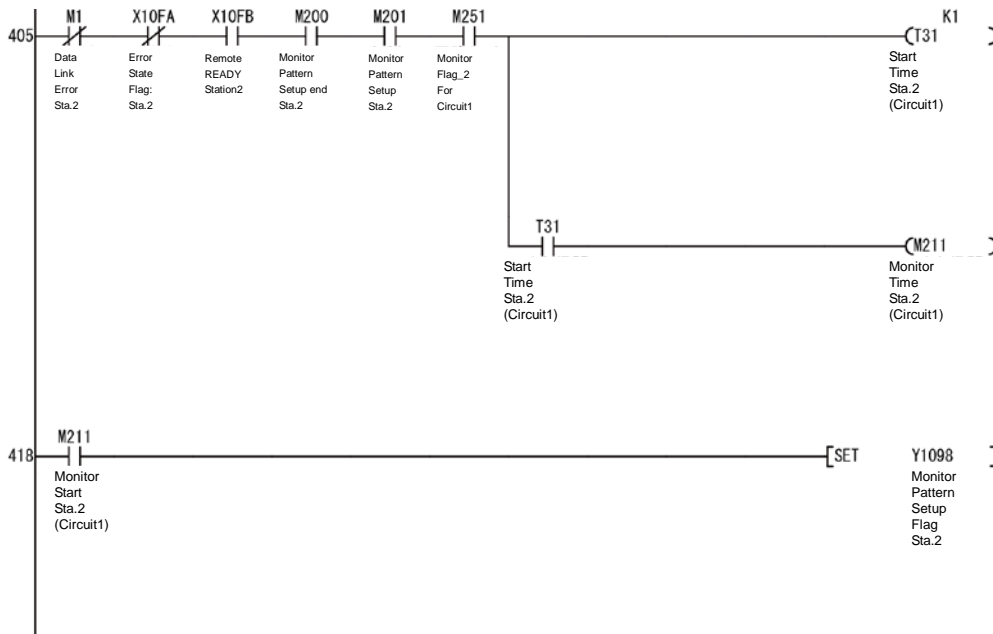
* Monitor using monitor pattern P00: Station2(Circuit1)

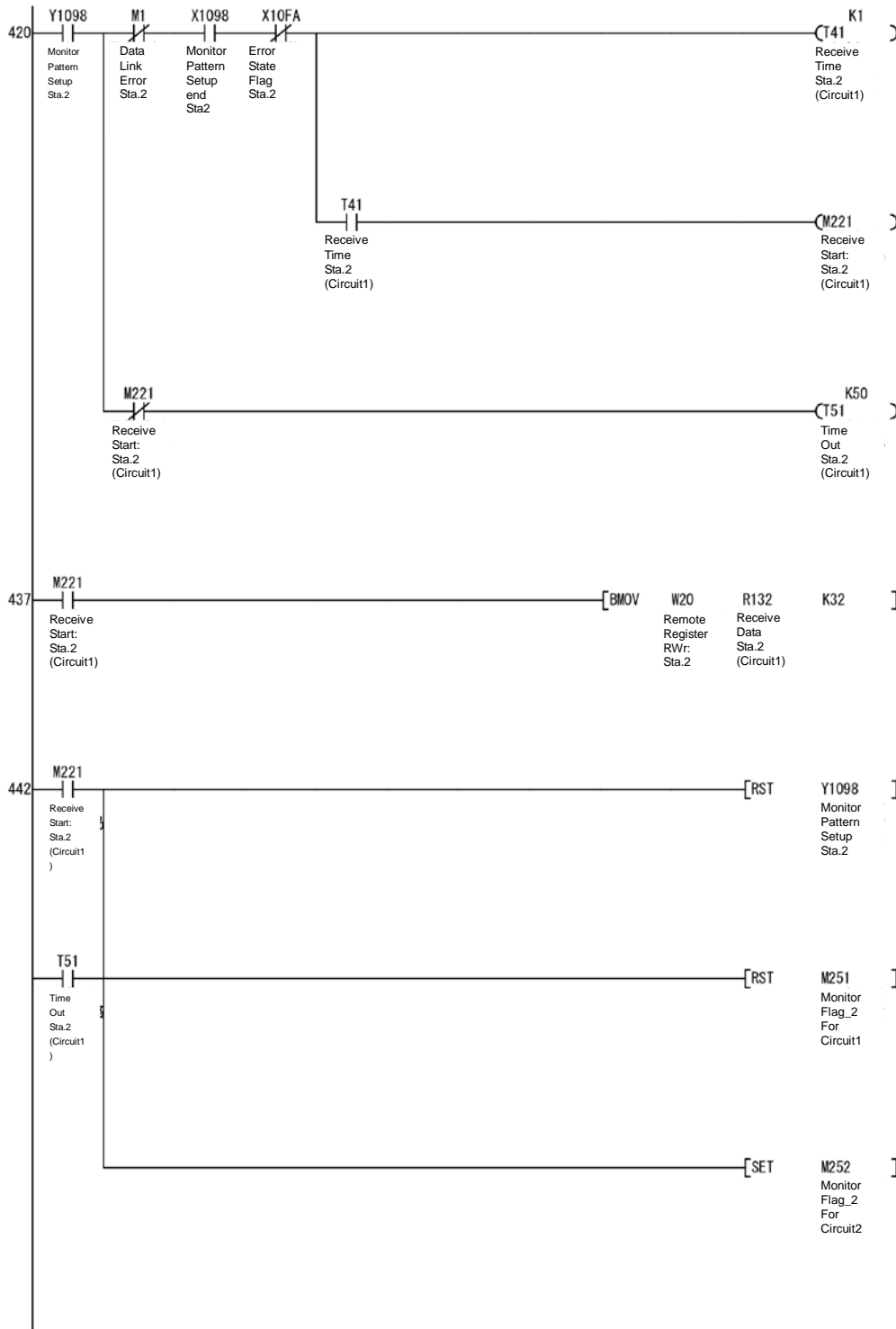




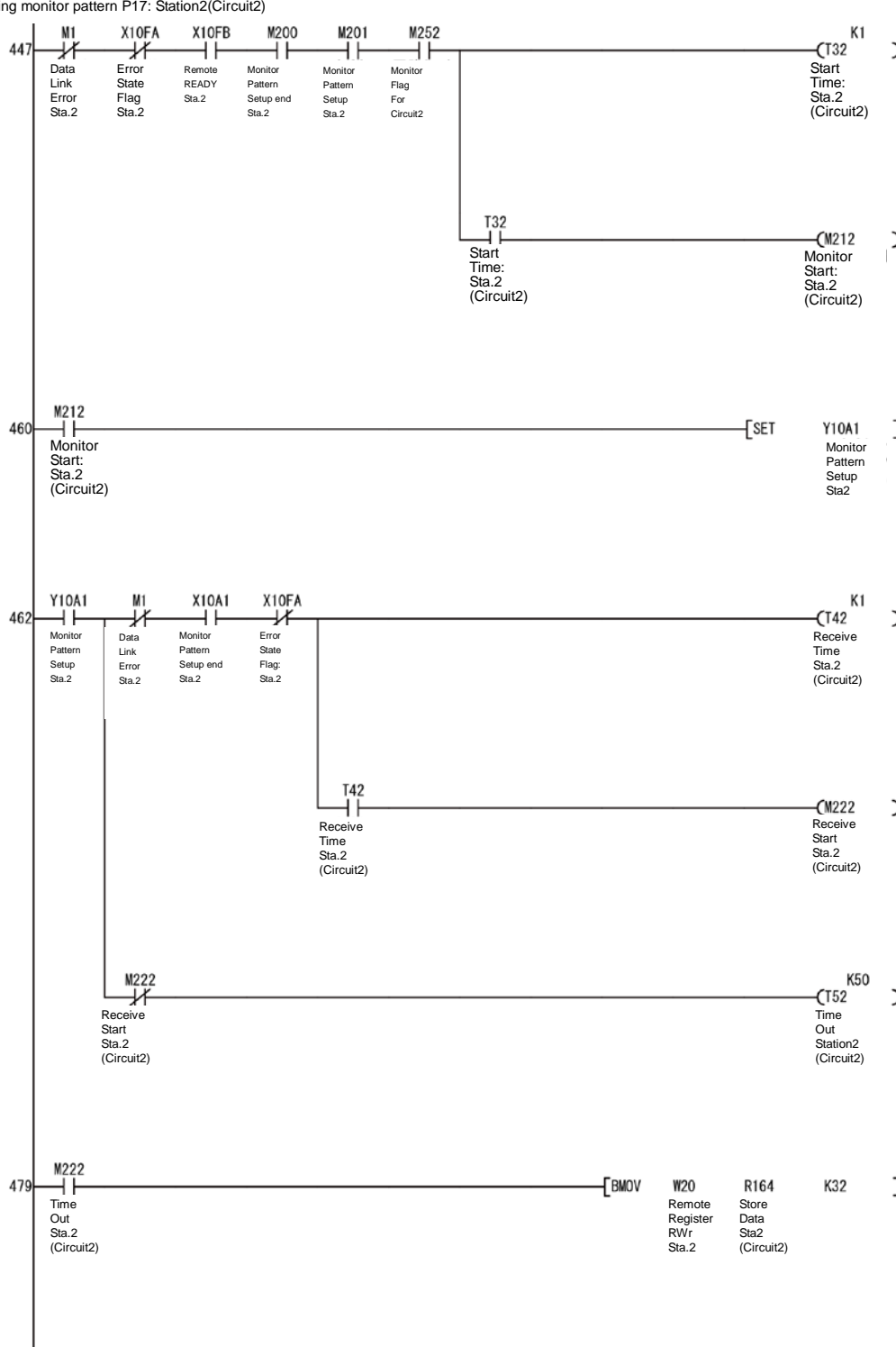


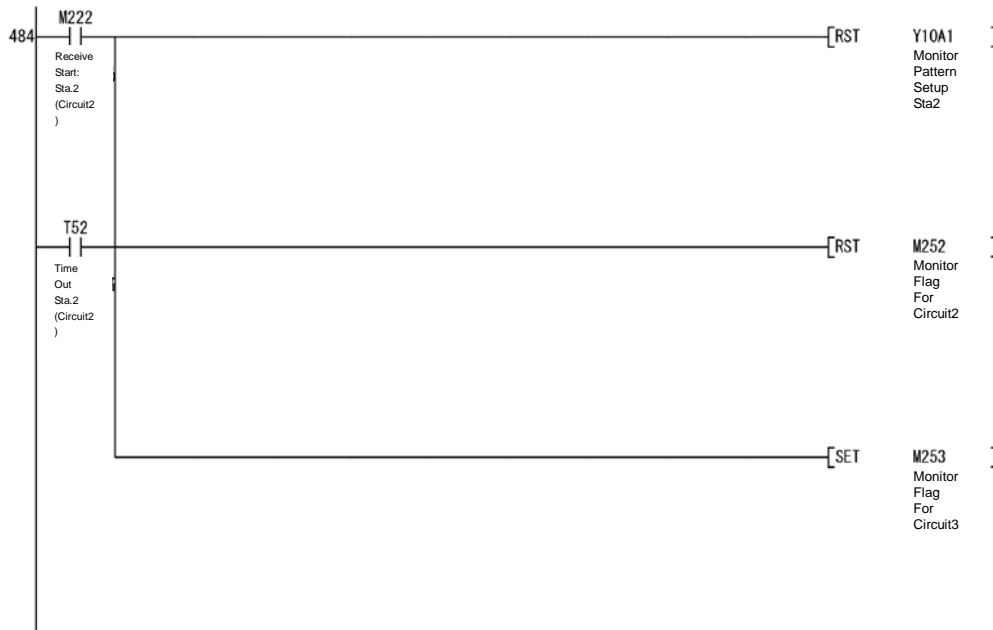
* Monitor using monitor pattern P08: Station2(Circuit1)



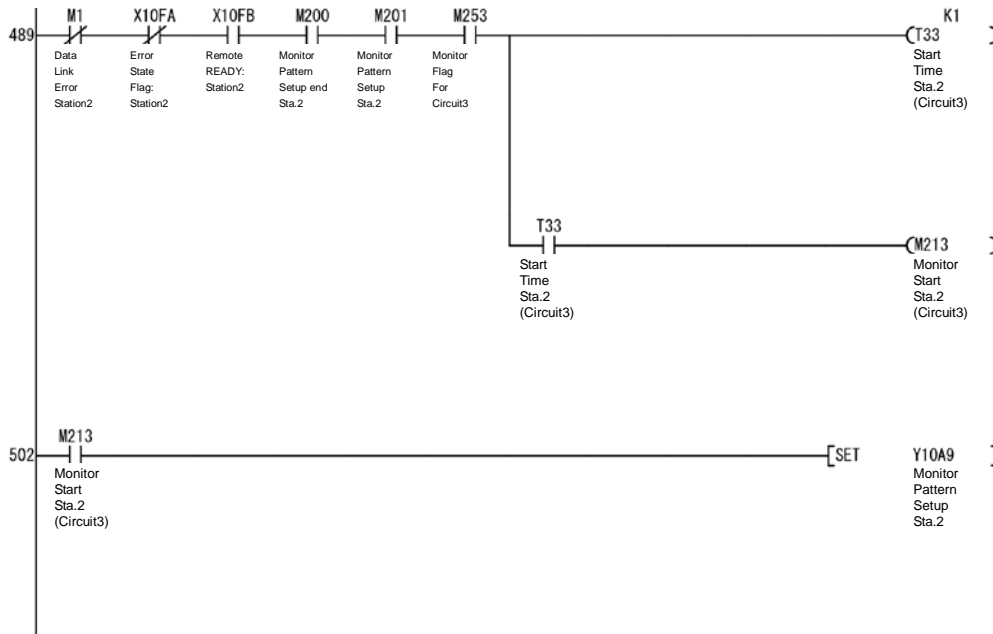


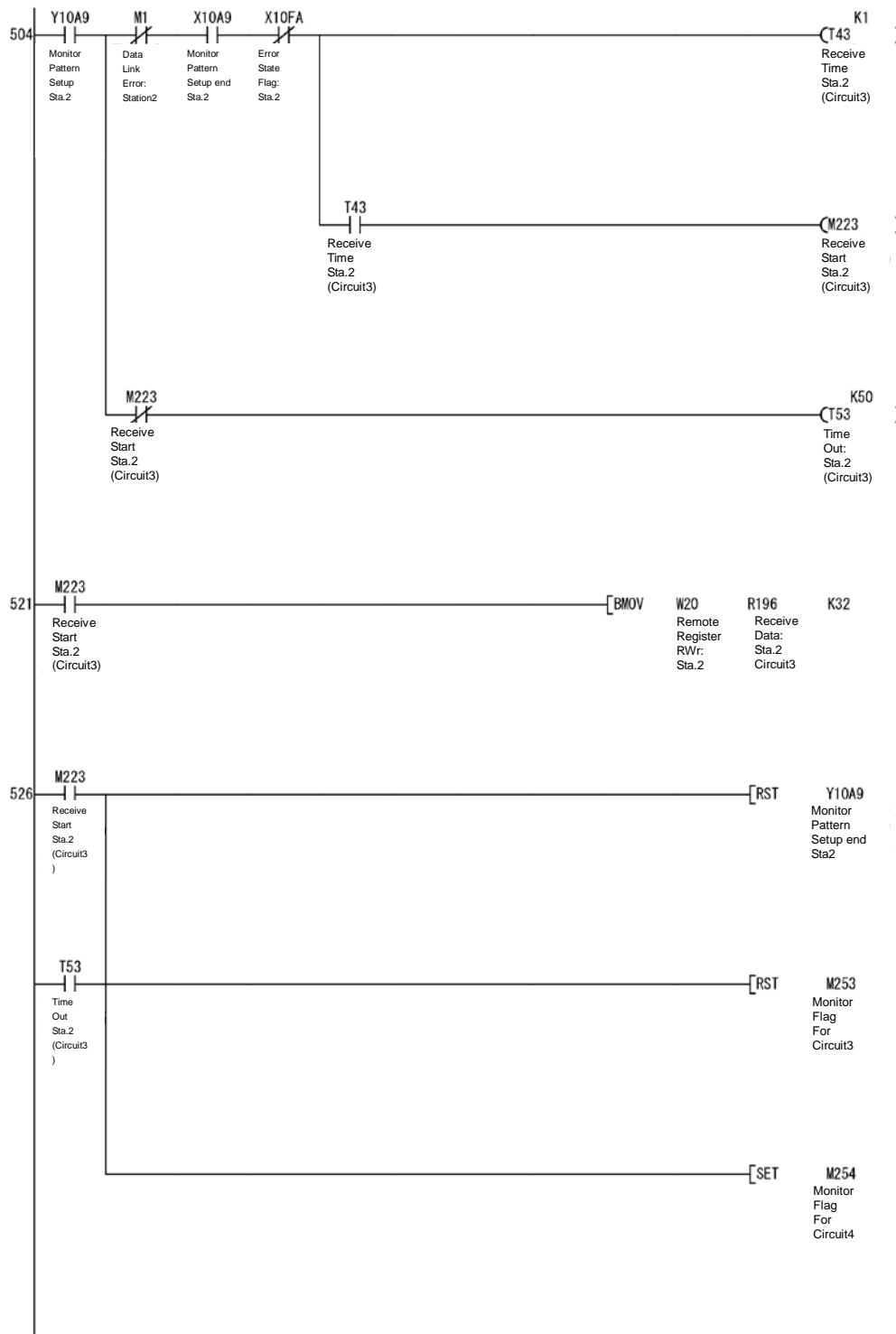
* Monitor using monitor pattern P17: Station2(Circuit2)



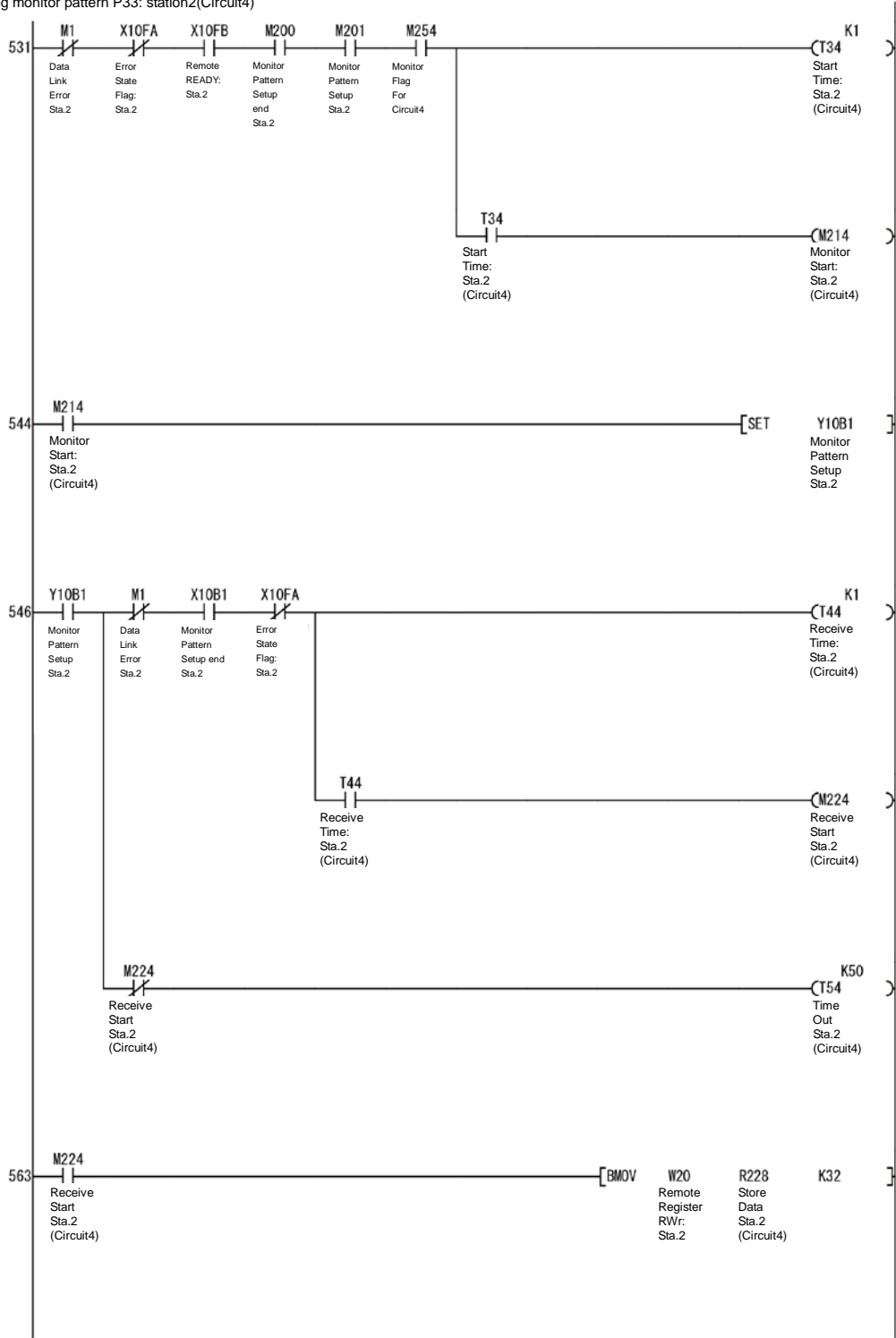


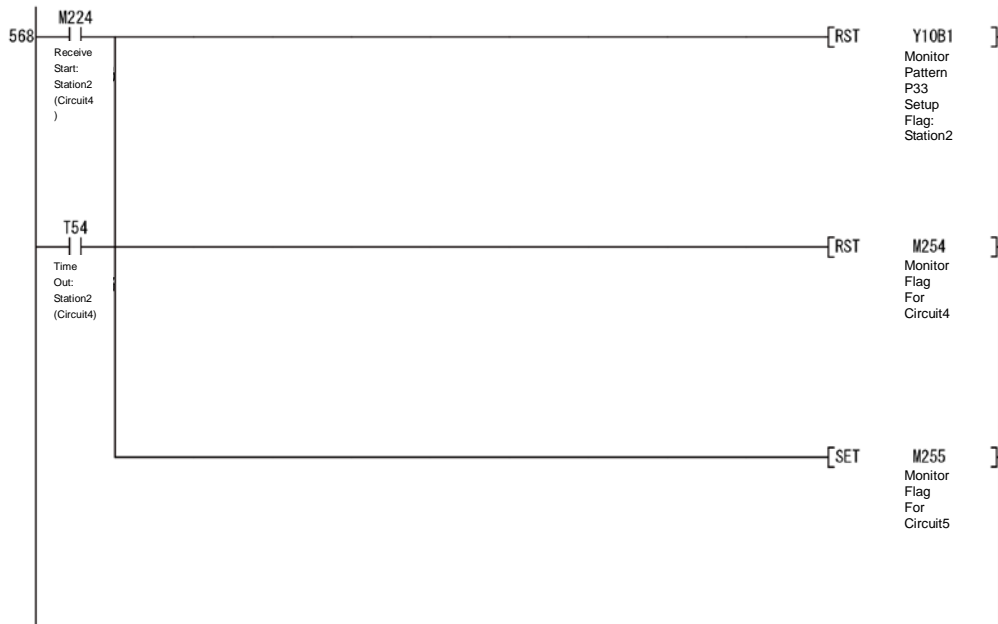
* Monitor using monitor pattern P25: Station2(Circuit3)



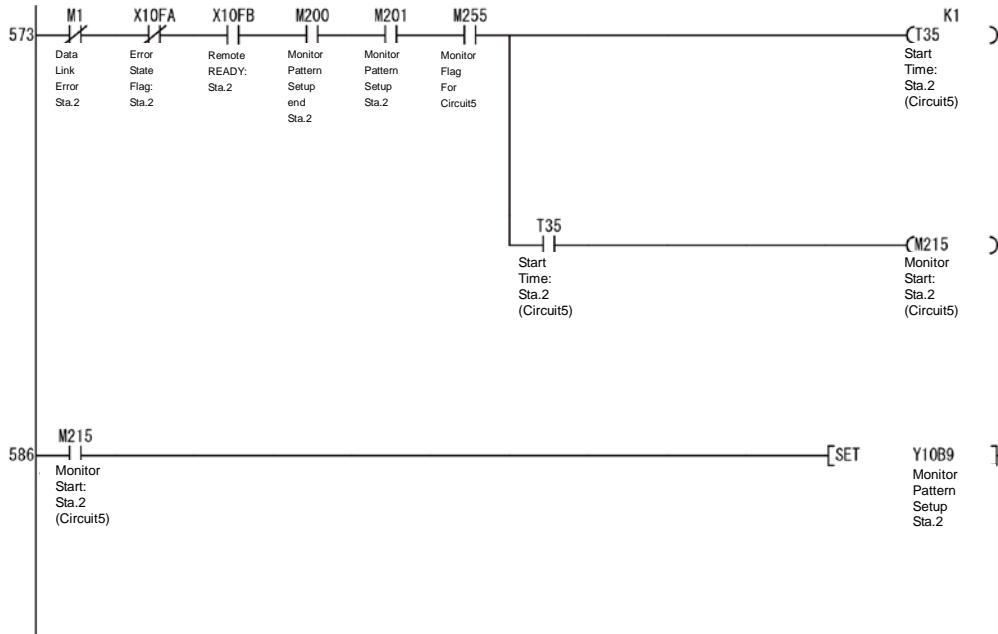


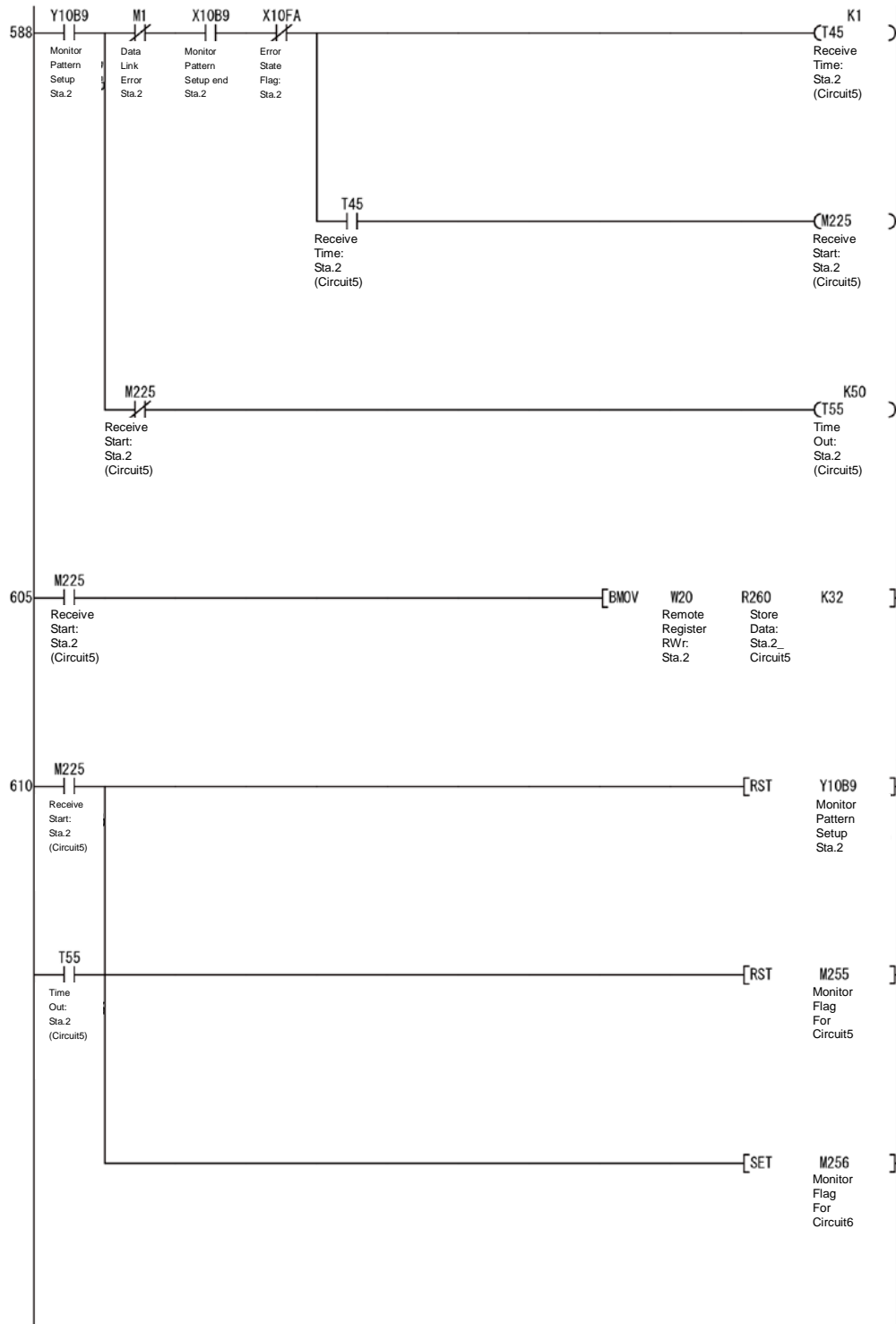
* Monitor using monitor pattern P33: station2(Circuit4)



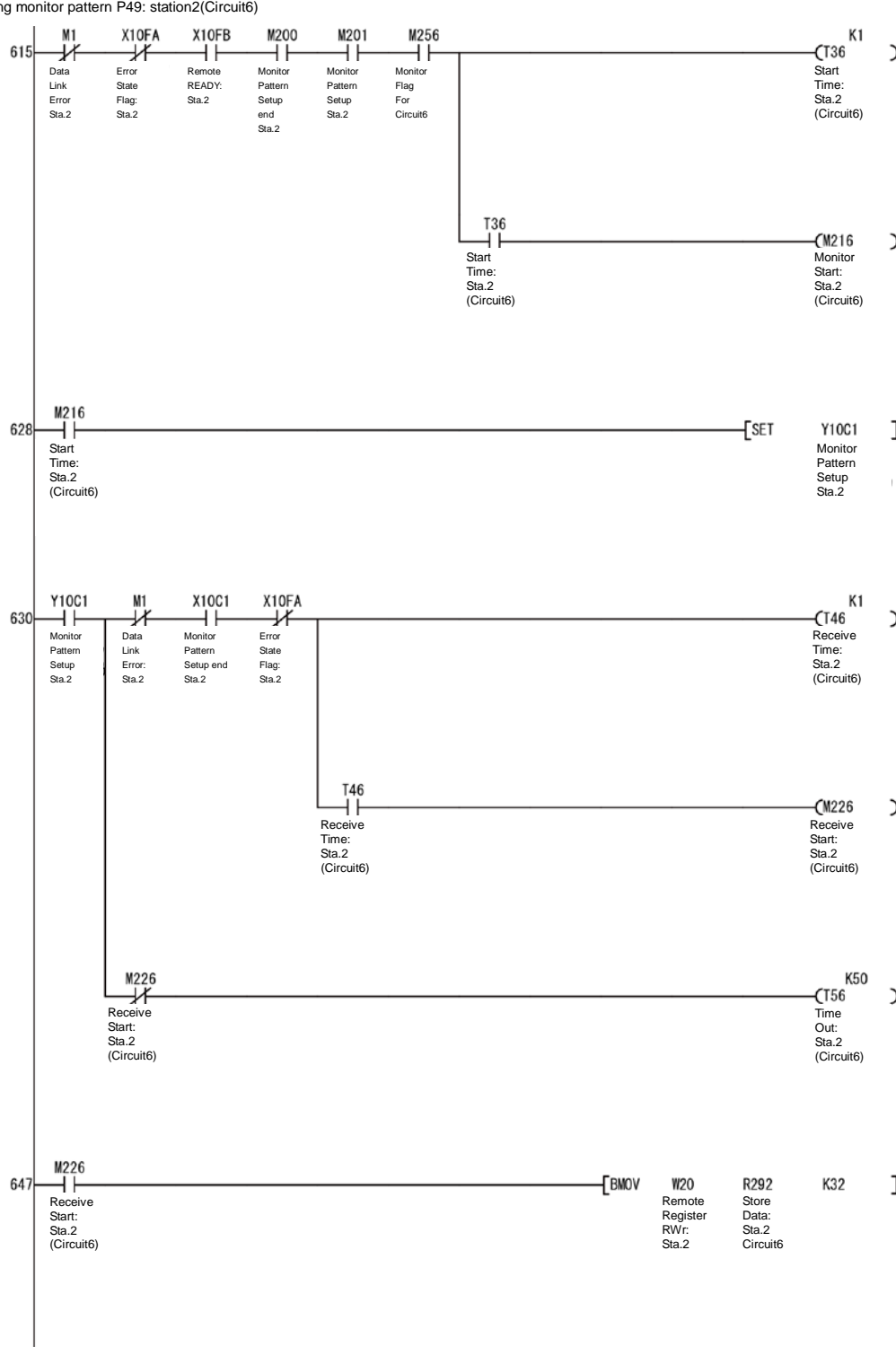


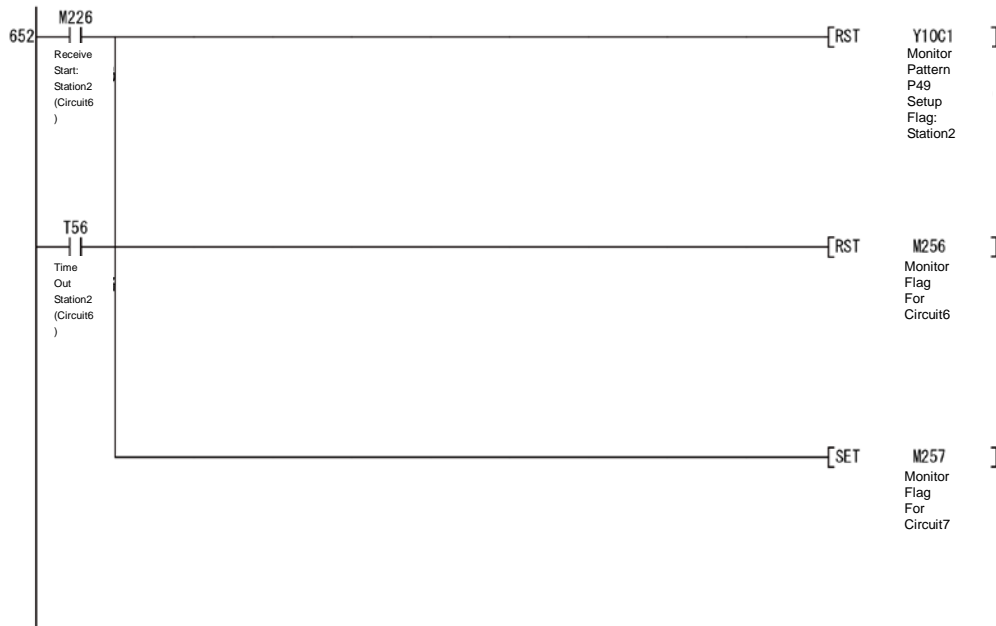
* Monitor using monitor pattern P41: station2(Circuit5)



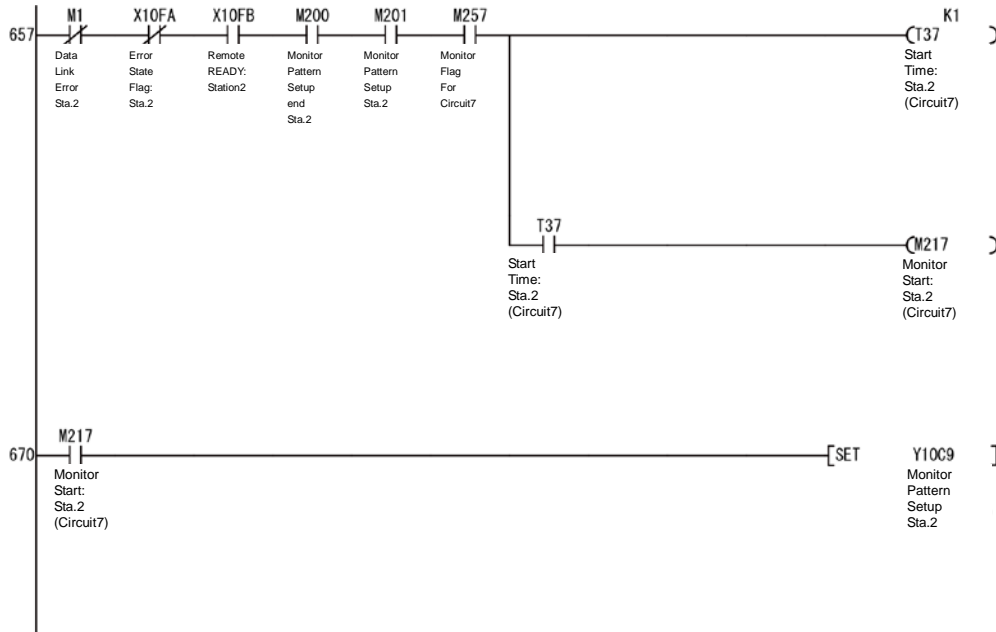


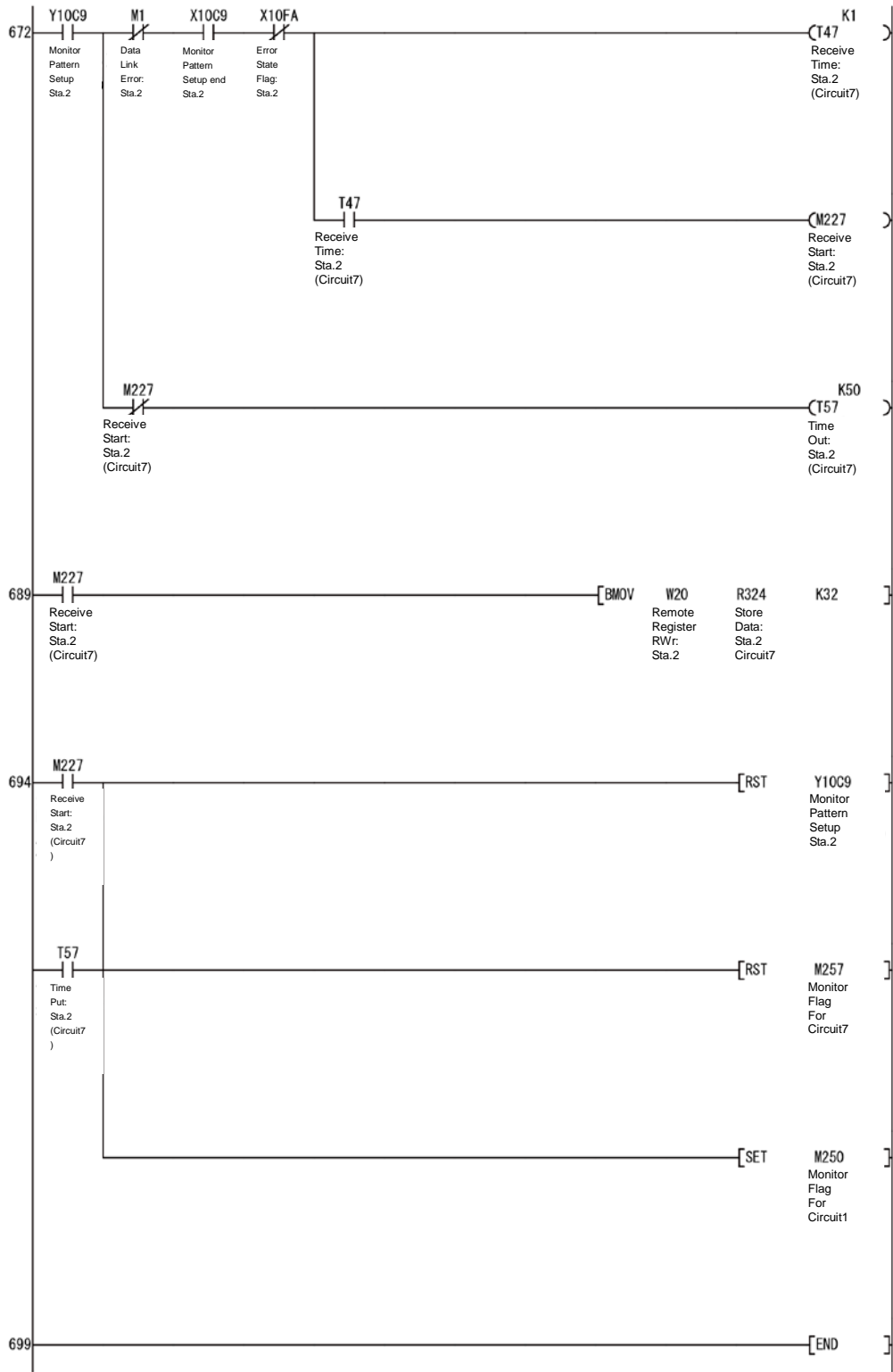
* Monitor using monitor pattern P49: station2(Circuit6)





* Monitor using monitor pattern P57: station2(Circuit7)





10. Test Mode

Measuring Unit (EMU4-BD1-MB, EMU4-HD1-MB, EMU4-BM1-MB, EMU4-HM1-MB, EMU4-LG1-MB) has the test mode which the fixed values are replied even if the voltage and current are not input. It can be used to check the communication to programmable controller.

10.1 How to Test

To do the test, it is necessary to operate the Measuring Unit.

About how to use the test mode, refer to the each instrument manual of Measuring Unit.