M I T S U B I S H I

Electronic Multi-Measuring Instrument

Programming Manual (CC-Link)

Model

ME96NSR-MB or ME96NSR with optional Plug-in Module : ME-0040C-NS96

LEN080334

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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 the Electronic Multi-Measuring Instrument (called ME96NSR from here on) with the PC CPU through Control & Communication Link (abbreviated as CC-Link from here on).
In programming, read the following related manuals in addition to this mannual.

Table 1.1 Related Manuals

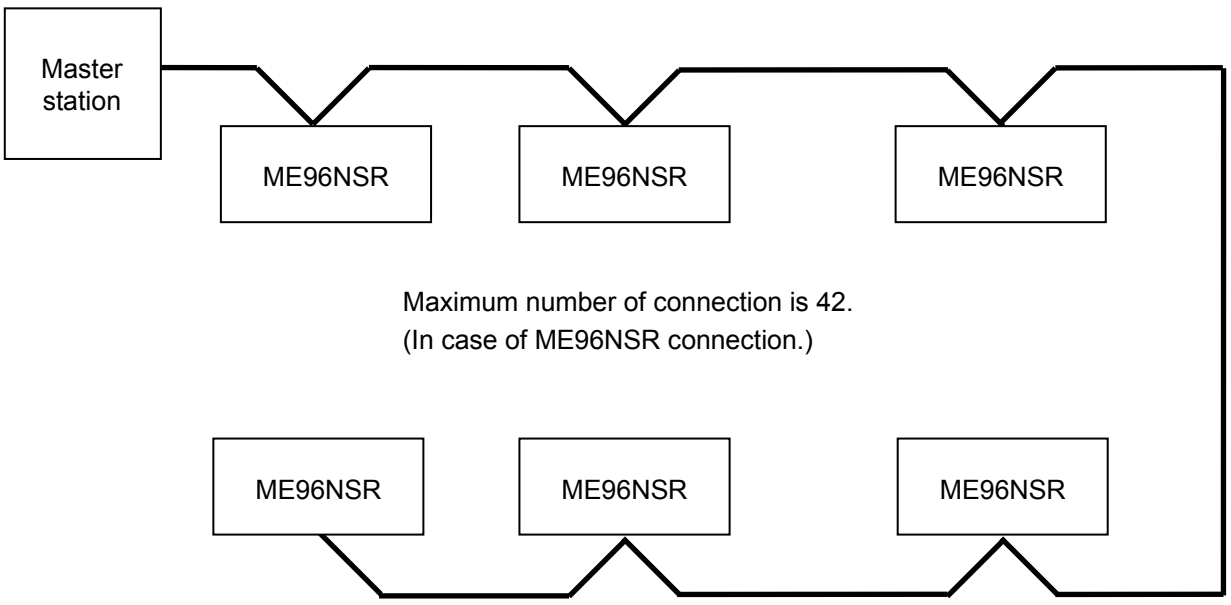
Manual Name	Manual No.
CC-Link System Master/Local Module User's Manual Type:QJ61BT11	SH(NA)-080016
CC-Link System Master/Local Module User's Manual Type:QJ61BT11N	SH(NA)-080394
User's Manual for ME96NSR	Supplied with product

2. Specification

ME96NSR specification is shown in Table 2.1.

Table 2.1 ME96NSR Specification

Item	Specification
Station type	Remote device station
Number of occupied stations	1 station
Maximum number of stations per master station	42 stations (In case of connecting only remote device station occupied by 1 station.)
Transmission speed	156kbps/625kbps/2.5Mbps/5Mbps/10Mbps
RX, Ry	32 points each
RWw, RWr	4 points each



System Configration (CC-Link)

3. Configuration Conditions of CC-Link System

A total of 64 remote I/O stations, remote device stations, or local stations can be connected for one master station. Station type of ME96NSR is remote device station, and the number of occupied stations is 1 station.

However, the following conditions must be satisfied:

(1) { (1×a) + (2×b) + (3×c) + (4×d) } ≦ 64

a : Number of modules occupying 1 station (ME96NSR is applied.)

b : Number of modules occupying 2 stations

c : Number of modules occupying 3 stations

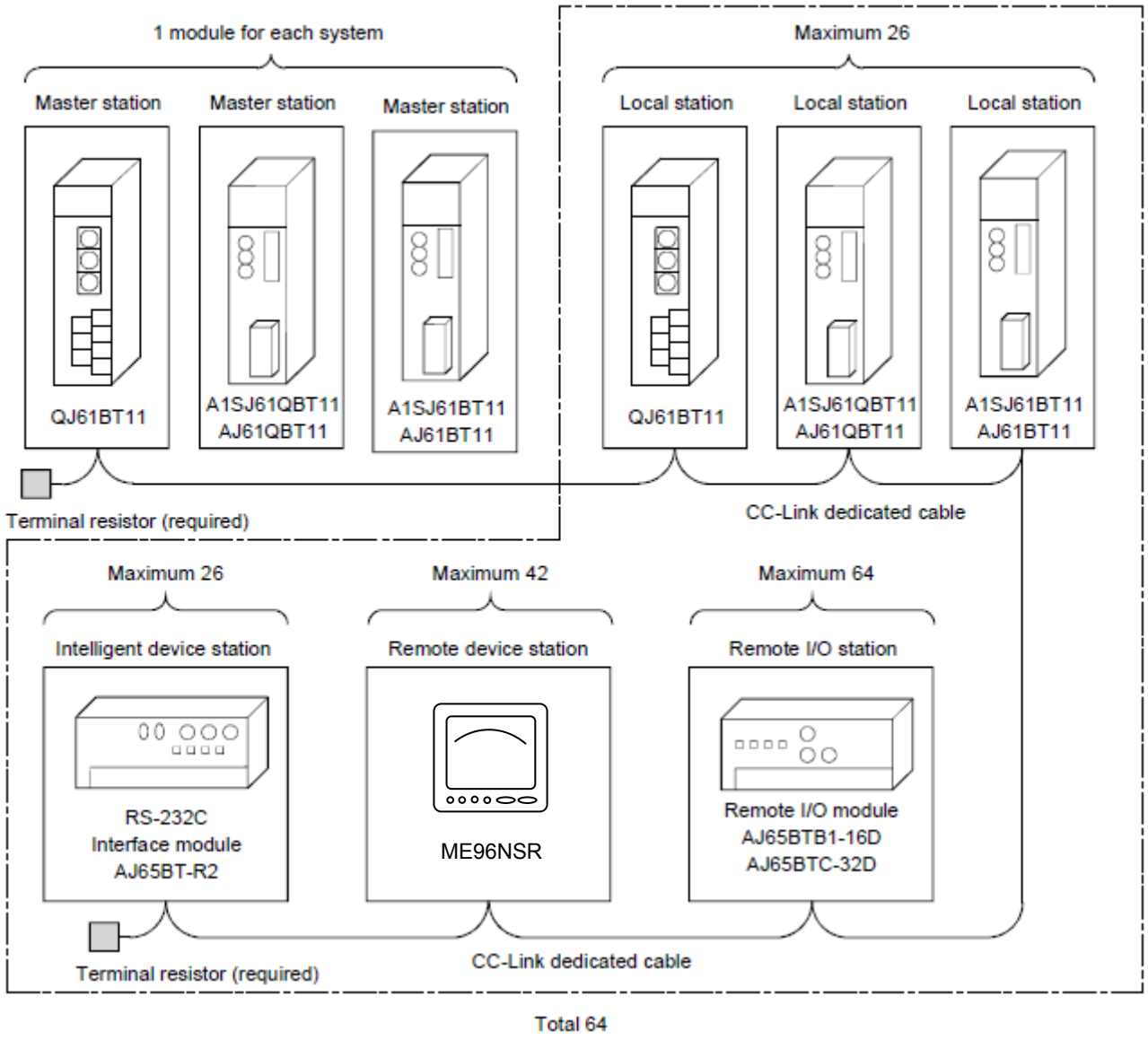
d : Number of modules occupying 4 stations

(2) { (16×A) + (54×B) + (88×C) } ≦ 2304

A : Number of remote I/O stations ≦ 64

B : Number of remote device stations (ME96NSR is applied.) ≦ 42

C : Number of local stations, standby master stations and intelligent device stations ≦ 26



4. Parameter Settings

4.1 Procedure from Parameter Settings to Data Link Startup

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

4.1.1 CPU Parameter Area and Master Module Parameter Memory

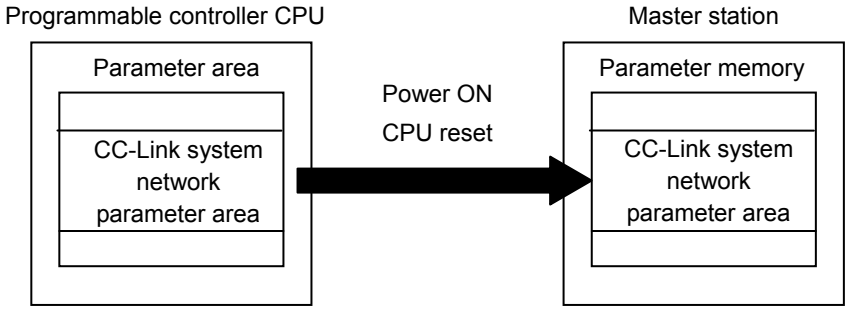
(1) CPU Parameter Area

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

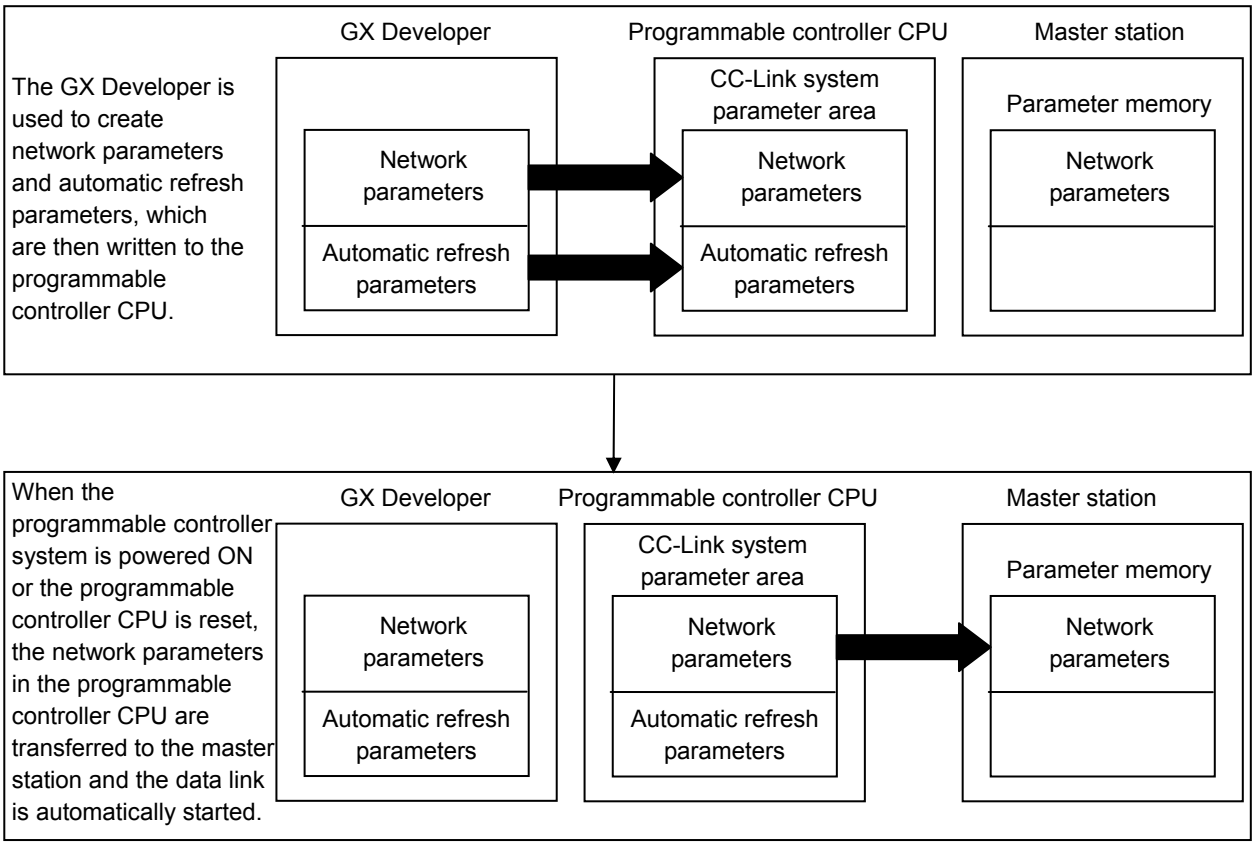
This area stores the network parameters for the CC-Link system.

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



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

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



4.2 Parameter Setting Items

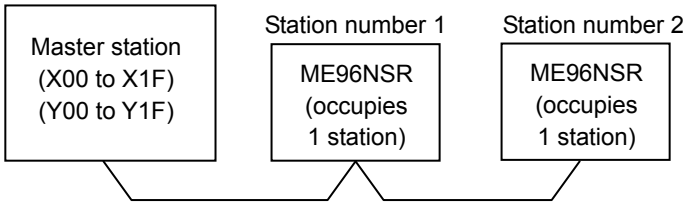
The following lists the items to be stored in the master station parameter memory.

Setting item	Description
Number of connected modules	Sets the total number of remote stations, local stations, intelligent device stations and standby master station that are connected to the master station (including reserved stations). Default value : 64 (modules) Setting range : 1 to 64 (modules)
Number of retries	Sets the number of retries when a communication error occurs. Default value : 3 (times) Setting range : 1 to 7 (times)
Number of automatic return modules	Sets the total number of remote stations, local stations, intelligent device stations and standby master stations that can be returned to system operation by a single link scan. Default value : 1 (module) Setting range : 1 to 10 (modules)
Standby master station specification	Specifies the station number of the standby master station. Default value : Blank (no standby master station specified) Setting range : Blank, 1 to 64 (Blank: No standby master station specified)
Operation specification when CPU is down	Specifies the data link status when a master station programmable controller CPU error occurs. Default value : Stop Setting range : Stop, Continue
Scan mode specification	Specifies either synchronous or asynchronous mode for sequence scan. Default value : Asynchronous Setting range : Asynchronous, Synchronous
Delay setting	Sets 0 for the delay time.
Reserved station specification	Specifies the reserved station. Default value : Not specified Setting range : Not specified, Specified
Error invalid station specification	Specifies the error invaled station. Default value : Not specified Setting range : Not specified, Specified
Station information	Sets the station information according to the connected remote station, local station, intelligent device station, and standby master station. Default value : Ver.1 remote I/O station, occupies 1 station, Station number 1 to Ver.1 remote I/O station, occupies 1 station, station number 64 Setting range station type : Remote I/O station, remote device station, intelligent device station/Ver.1, Ver.2 (single, double, quadruple, octuple) Number of occupied stations : 1 to 4 Station number : 1 to 64

4.3 Example of Parameter Settings with GX Developer

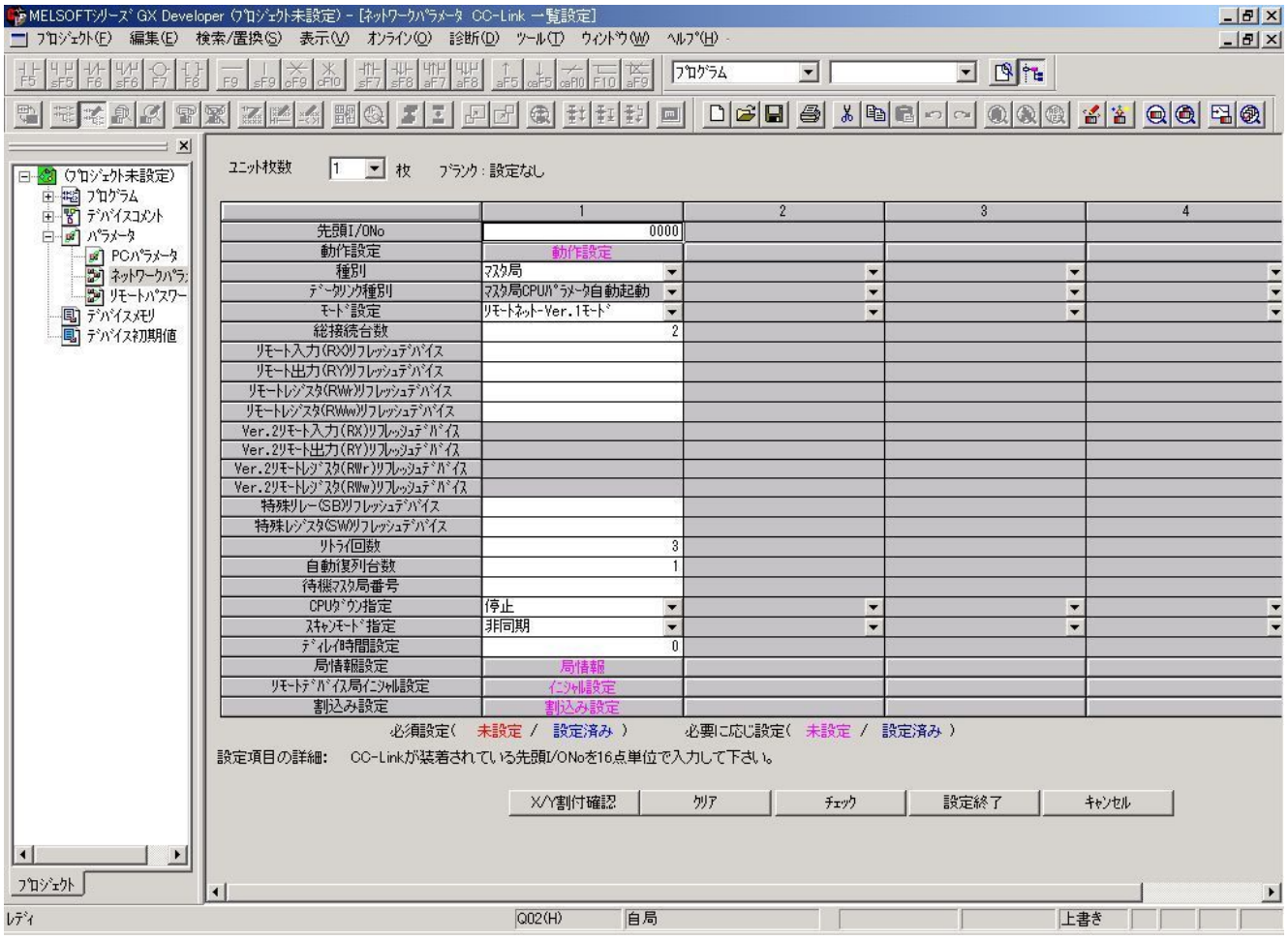
This section explains the parameter settings using the GX Developer. In the setting parameters used with GX Developer, the setting of master station network parameters and the setting of automatic refresh parameters are done. For more details on the GX Developer operation, refer to the GX Developer Operating Manual.

The explanations in this section are based on the follwing example of the system configuration.



4.3.1 Master Station Network Parameter Settings

(1) The follwing describes an example of the parameter settings. See (2) for actual settings.



(2) Set the network parameters using the following procedure.

(a) Set the “No. of boards in module” for which the network parameters are to be set.

Default value : None

Setting range : 0～8 (Boards)

※Modules for the parameter setting with the G(P).RLPASET instruction should not be included in the setting for “No. of boards in module”.

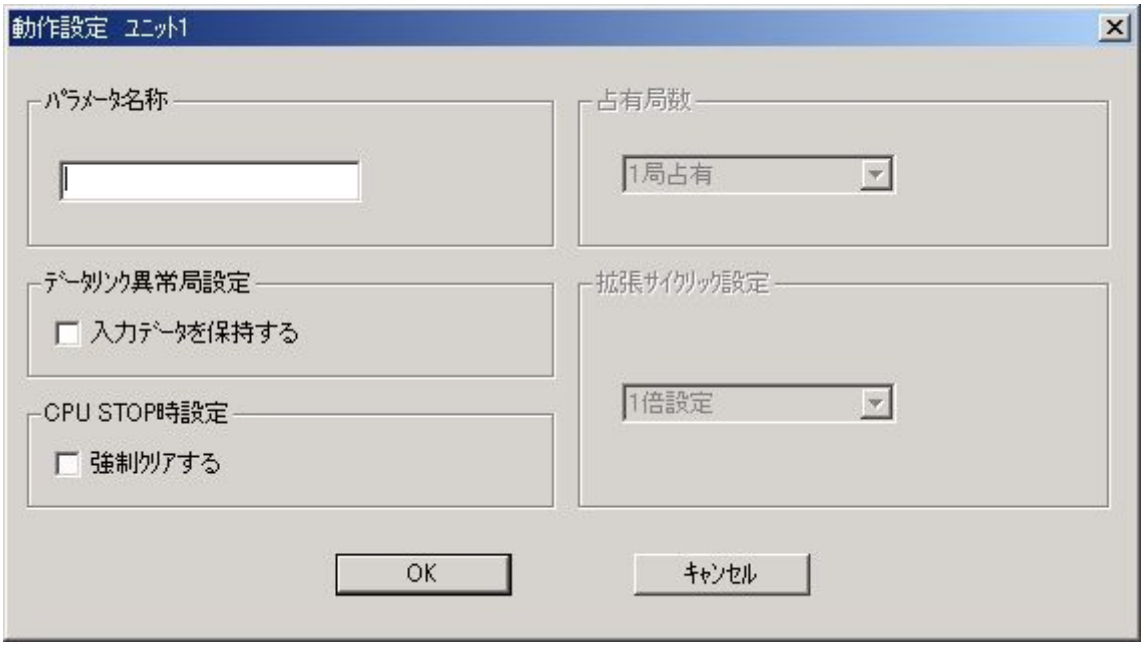
Example) Set 1 (Board).

(b) Set the “Start I/O No.” for the master station.

Default value : None

Setting range : 0000～0FE0

Example) Set 0000.



(c) Set the Parameter name in “Operational Settings.”

Even if the Parameter name is not set, this will not affect the operation of the CC-Link system.

Default value : None

Setting range : 8 characters or less

Example) Set “None“.

(d) Set the input status for the data link error station in “Operation settings”.

Default value : Clear (“Hold input data” not checked)

Setting range : Hold (“Hold input data” checked)

Clear (“Hold input data” not checked)

Example) Set to Clear (“Hold input data” not checked).

(e) Set the slave station refresh/compulsory clear setting at programmable controller CPU STOP in “Operational settings”.

Default value : Refresh (“Clears compulsorily” not checked)

Setting range : Refresh (“Clears compulsorily” not checked)

Clears compulsorily (“Clears compulsorily” checked)

Example) Set to Refresh (“Clears compulsorily” not checked).

(f) Set the station type for “Type”.

Default value : Master station

Setting range : Master station, Mastar station(Duplex function), Local station, Standby master station

Example) Set the Master station.

(g) Set the CC-Link mode for “Mode”.

Default value : Remote net (Ver.1 mode)

Setting range : Remote net (Ver.1 mode), Remote net (Ver.2 mode), Remote net (Additional mode), Remote I/O net mode, Off line

Example) Set to Remote net (Ver.1 mode).

(h) Set the total number of connected stations in the CC-Link system including reserved stations for “All connect count”.

Default value : 64 (modules)

Setting range : 1 to 64 (modules)

Example) Set to 2 (modules).

(i) Set the number of retries for “Retry count”, when communication error occurs.

Default value : 3 (times)

Setting range : 1 to 7 (times)

Example) Set to 3 (times).

(j) Set the number of modules that can return to system operation by a single link scan for “Automatic reconnection station count”.

Default value : 1 (module)

Setting range : 1 to 10 (modules)

Example) Set to 1 (module).

(k) Set the station number for the standby master station for “Standby master station No.”.

Default value : Blank (No standby master station specified)

Setting range : Blank, 1 to 64 (Blank: No standby master station specified)

Example) Set to Blank (No standby master station specified).

(l) Set the data link status for “PLC down select”, when a master station programmable controller CPU error occurs.

Default value : Stop

Setting range : Stop, Continue

Example) Set to Stop.

(m) Set whether the link scan for the sequence scan is synchronous or asynchronous for “Scan mode setting”.

Default value : Asynchronous

Setting range : Asynchronous, Synchronous

Example) Set to Asynchronous.

(n) Set 0 for the delay time.

(o) Set the station data for “Station information settings”.

Dafault value : Remote I/O station, single, Occupies 1 station, 32 points, or no setting for reserved stations/error invalid.

Setting range : Station type - No setting
Remote I/O station
Remote device station
Intelligent device station
(including local staton and standby master station)

Expanded cyclic setting (cannot be changed) -
single

Number of occupied stations -
No setting
Occupies 1 station
Occupies 2 stations
Occupies 3 stations
Occupies 4 stations

Remote station points (cannot be changed) -
32 points [when occupies 1 station]
64 points [when occupies 2 station]
96 points [when occupies 3 station]
128 points [when occupies 4 station]

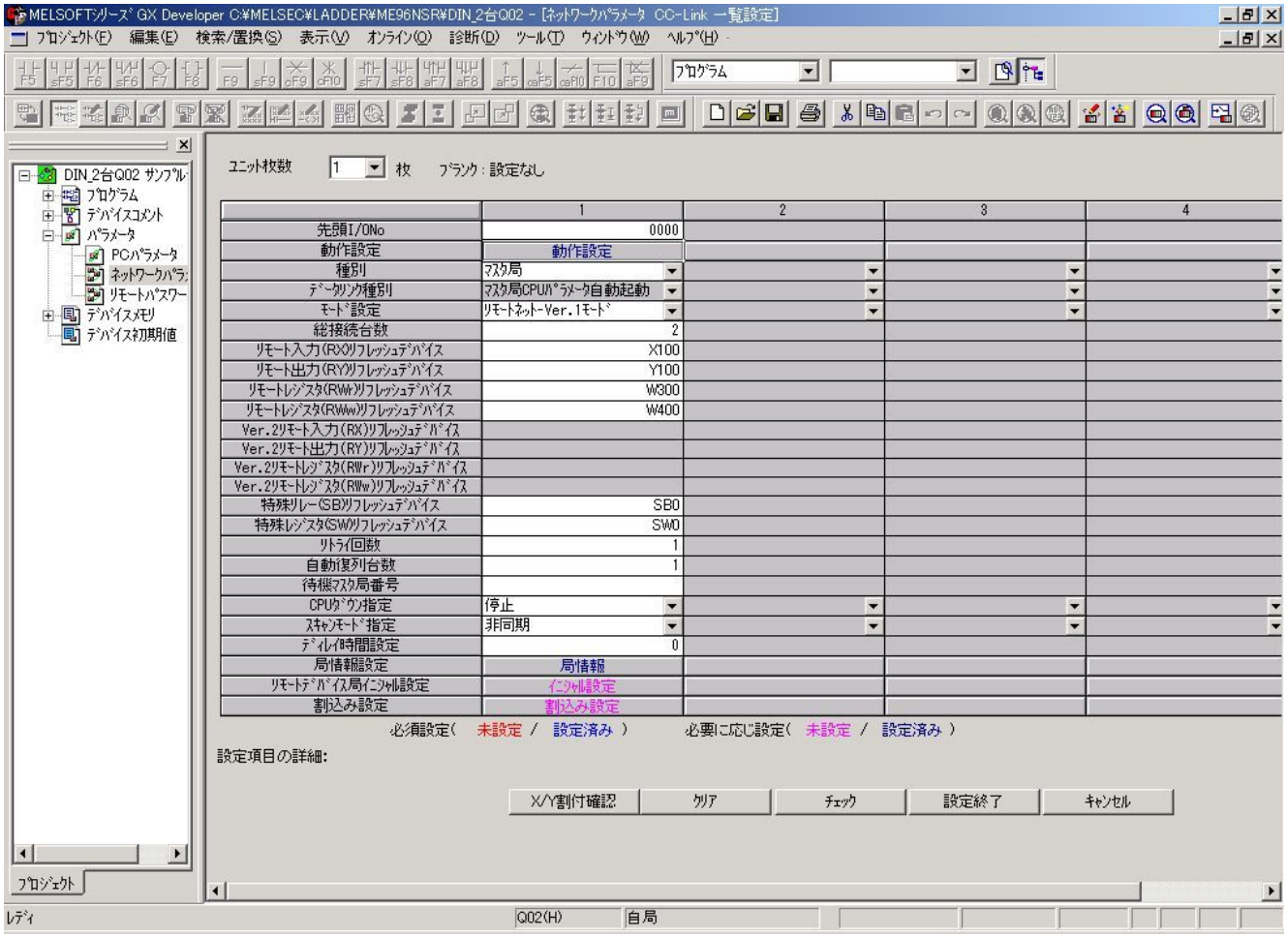
Reserved/invalid station select -
No setting
Reserved station
Invalid station (error invalid station)

Intelligent buffer select -
No setting
Send 0, 64 to 4096
Receive 0, 64 to 4096
Automatic 0, 128 to 4096

Example) Set the station data according to the system configuration specified in Section 4.3.
As ME96NSR is remote device station, and the number of occupied stations is 1 station, it becomes the following.

4.3.2 Master Station Automatic Refresh Parameter Settings

(1) The following shows an example of the parameter settings. See (2) for actual settings.



(2) Set the automatic refresh parameters using the following procedure.

(a) Set the remote input (RX) refresh device for “Remote input (RX)”.

Default value : None

Setting range : 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.

Example) Set to X100

(b) Set the remote output (RY) refresh device for “Remote output (RY)”.

Default value : None

Setting range : 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.

Example) Set to Y100.

(c) Set the remote register (RWr) refresh device for “Remote register (RWr)”.

Default value : None

Setting range : 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.

Example) Set to W300.

(d) Set the remote register (RWw) refresh device for “Remote register (RWw)”.

Default value : None

Setting range : 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.

Example) Set to W400.

(e) Set the link special relay (SB) refresh device for “Special relay (SB)”.

Default value : None

Setting range : 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.

Example) Set to SB0.

(f) Set the link special register (SW) refresh device for “Special register (SW)”.

Default value : None

Setting range : 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.

Example) Set to SW0.

POINT

(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.

(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.

5. Communication Between the Master Station and ME96NSR

5.1 Communication Guideline

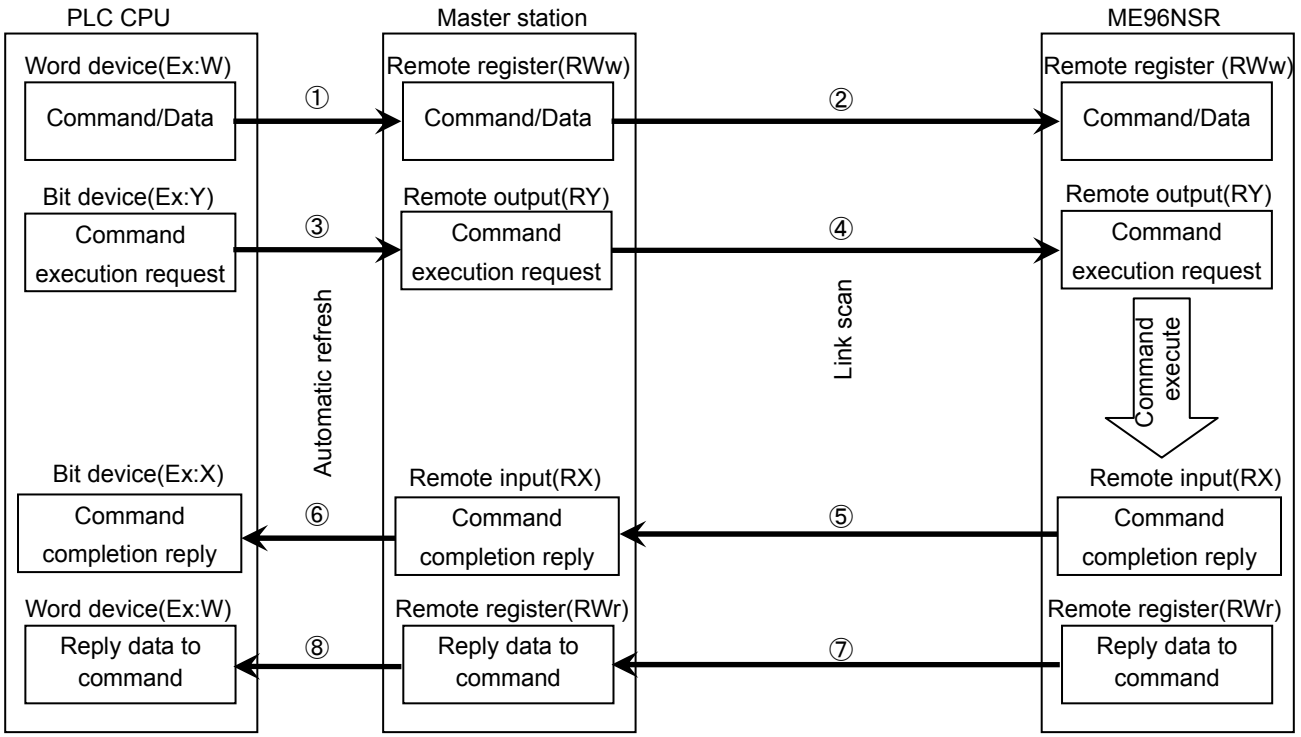
There are three communication statuses (Initial Communication, Normal Communication, Error Communication) between the Master station and ME96NSR.

The following can be performed at normal communication.

- Monitoring of the measurement values such as the current, voltage and energy, etc.
- Monitoring of the bit data of the alarm state and the digital input state.
- Setting the set data of the time constant for current demand.

ME96NSR has a special-purpose command for each measurement items and each setting items. It becomes possible to monitor measurement value or to set the setting value by writing the command into the remote register RWw of the master station.

Overview of the Command Communication to ME96NSR



① By automatic refresh, command and data stored in the word device of PLC CPU are stored in the "remote register RWw" of the master station.

② By link scan, command and data stored in the "remote register RWw" of the master station are sent to ME96NSR, and is stored in the "remote register RWw" of the ME96NSR.

③ By automatic refresh, command execution request stored in the bit device of PLC CPU is stored in the "remote output RY" of the master station.

④ By link scan, command execution request stored in the "remote output RY" of the master station is sent to ME96NSR, and is stored in the "remote output RY" of the ME96NSR. And then ME96NSR executes the command and data.

⑤ By link scan, command completion reply stored in the "remote input RX" of the ME96NSR is sent to the master station, and is stored in the "remote input RX" of the master station.

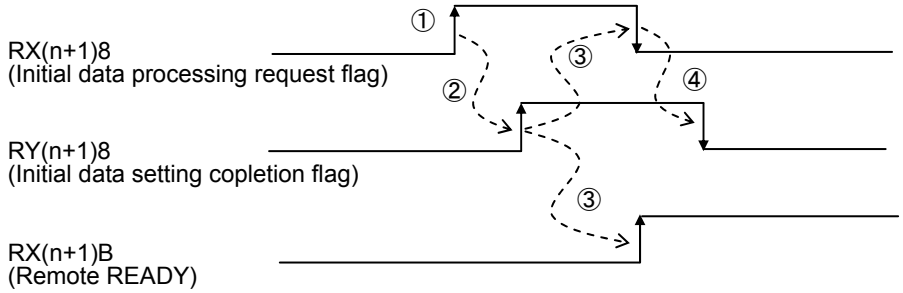
⑥ By automatic refresh, command completion reply stored in the "remote input RX" of the master station is stored in the bit device of the PLC CPU.

⑦ By link scan, reply data to command stored in the "remote register RWr" of the ME96NSR is sent to the master station, and is stored in the "remote register RWr" of the master station.

⑧ By automatic refresh, reply data to command stored in the "remote register RWr" of the master station is stored in the word device of the PLC CPU.

5.2 Initial Communication

Initial communication is performed at the beginning after the power supply is turned on or hardware is reset.
Refer to section 6.1 about the remote input RX and the remote output RY.



①After the power supply is turned on, or hardware is reset, the initial data processing request flag is turned on by ME96NSR.

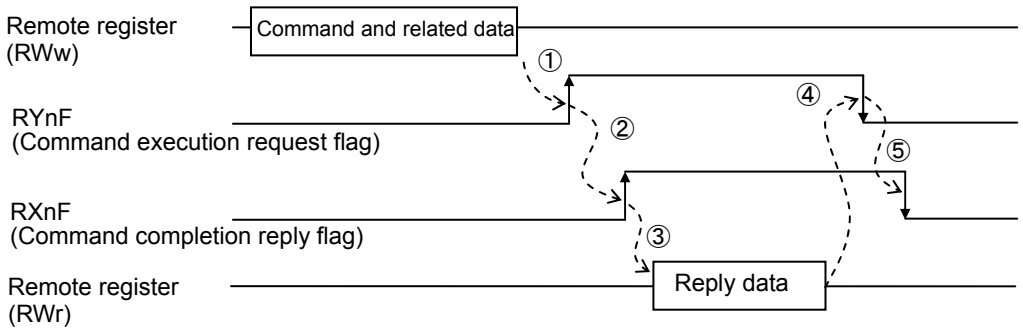
②After the initial data processing request flag is turned on, turn on the initial data setting completion flag.

③After 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.

④After the initial data processing request flag is turned off, turned off the initial data setting completion flag.

5.3 Normal Communication

After initial data processing is complete, the normally communication is performed to monitor the measurement values and to set the parameters.



①After writing the command and related data into the remote register RWw, turn on the command execution request flag.

②After receiving the reply data corresponding to the command, the command completion reply flag turned on.

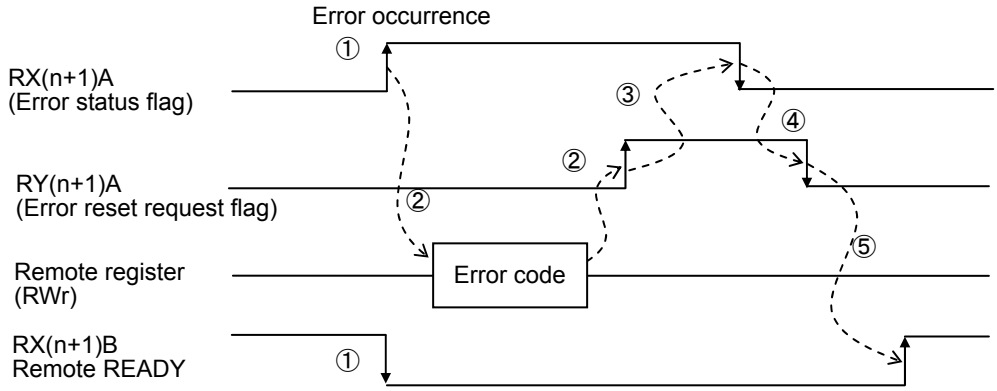
③After the command completion reply flag is turned on, read the reply data from the remote register RWw.

④After reading the reply data, cancel the command execution request by turning off the command execution request flag.

⑤After the command execution request flag is turned off, the command completion reply flag is turned off.

Note: When sending commands successively, repeat ① to ⑤ above.
The command can be sent only when the remote READY is ON.

5.4 Error Communication



①When an error occurs in ME96NSR, error status flag is turned on and the remote READY is turned off.

②When 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 ME96NSR, turn on the error reset request flag.

③After the error reset request flag is turned on, the error status flag is turned off.

④After the error status flag is turned off, turn off the error reset request flag.

⑤After the error reset request flag is turned off, the remote READY is turned on and normal communication is resumed.

Note: Refer to “6.2.3 About error occurrence” for error code.

6. Remote I/O and Remote Register

6.1 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 ME96NSR.

6.1.1 Remote input RX

The allocation of the remote input RX of ME96NSR is shown in the table below.

Device No.	Signal name	Description		Note
		OFF(0)	ON(1)	
RXn0	Digital input 1 (DI1)	OFF	ON	
RXn1	Digital input 2 (DI2)	OFF	ON	
RXn2	Digital input 3 (DI3)	OFF	ON	
RXn3	Digital input 4 (DI4)	OFF	ON	
RXn4	Unusable	—	—	
RXn5	Alarm (total)	Non-Alarm state	Alarm state	Note 2
RXn6	Alarm of Demmand current	Non-Alarm state	Alarm state	Note 2
RXn7	Unusable	—	—	
RXn8	Alarm of Voltage	Non-Alarm state	Alarm state	Note 2
RXn9	Alarm of Current	Non-Alarm state	Alarm state	Note 2
RXnA	Alarm of Active power	Non-Alarm state	Alarm state	Note 2
RXnB	Alarm of Reactive power	Non-Alarm state	Alarm state	Note 2
RXnC	Alarm of Frequency	Non-Alarm state	Alarm state	Note 2
RXnD	Alarm of Power factor	Non-Alarm state	Alarm state	Note 2
RXnE	Alarm of T.H.D (Voltage)	Non-Alarm state	Alarm state	Note 2
RXnF	Command completion reply flag	No receiving of reply date	Receiving of reply data	Note 1, 4
RX(n+1)0	Unusable	—	—	
RX(n+1)1	Unusable	—	—	
RX(n+1)2	Unusable	—	—	
RX(n+1)3	Unusable	—	—	
RX(n+1)4	Unusable	—	—	
RX(n+1)5	Unusable	—	—	
RX(n+1)6	Unusable	—	—	
RX(n+1)7	Unusable	—	—	
RX(n+1)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+1)9	Unusable	—	—	
RX(n+1)A	Error status flag	No error occurrence	Error occurrence	Note 1
RX(n+1)B	Remote READY	Command sending not possible	Normally communication status (Command sending possible)	Note 1
RX(n+1)C	Unusable	—	—	
RX(n+1)D	Unusable	—	—	
RX(n+1)E	Unusable	—	—	
RX(n+1)F	Unusable	—	—	

n: it can be obtained by converting “(station number -1)×2” to hexadecimal.

Note 1: For the details, refer to “5.Communication Between the Master Station and ME96NSR”

Note 2: “ON(1)” shows the state where the upper limit or the lower limit is exceeded.

Note 3: The number of alarms which can monitor are 4 items set up at ME96NSR.

Note 4: Alarm of harmonics current cannot be shown by remote input RX.

6.1.2 Remote Output RY

The allocation of the remote output RY of ME96NSR is shown in the table below.

Device No.	Signal name	Description		Note
		ON (1) →OFF (0)	OFF (0) →ON (1)	
RYn0	Unusable	－	－	
RYn1	Unusable	－	－	
RYn2	Unusable	－	－	
RYn3	Unusable	－	－	
RYn4	Unusable	－	－	
RYn5	Unusable	－	－	
RYn6	Unusable	－	－	
RYn7	Unusable	－	－	
RYn8	Unusable	－	－	
RYn9	Unusable	－	－	
RYnA	Unusable	－	－	
RYnB	Unusable	－	－	
RYnC	Unusable	－	－	
RYnD	Unusable	－	－	
RYnE	Unusable	－	－	
RYnF	Command execution request flag	Cancel command request	Command request	Note 1
RY(n+1)0	Unusable	－	－	
RY(n+1)1	Unusable	－	－	
RY(n+1)2	Unusable	－	－	
RY(n+1)3	Unusable	－	－	
RY(n+1)4	Unusable	－	－	
RY(n+1)5	Unusable	－	－	
RY(n+1)6	Unusable	－	－	
RY(n+1)7	Unusable	－	－	
RY(n+1)8	Initial data setting completion flag	Cancel normal communication request	Normal communication request	Note 1
RY(n+1)9	Unusable	－	－	
RY(n+1)A	Error reset request flag	Cancel error reset request	Error reset request	Note 1
RY(n+1)B	Unusable	－	－	
RY(n+1)C	Unusable	－	－	
RY(n+1)D	Unusable	－	－	
RY(n+1)E	Unusable	－	－	
RY(n+1)F	Unusable	－	－	

n: it can be obtained by converting “(station number -1)×2” to hexadecimal.

Note 1: For the details, refet to “5.Communication Between the Master Station and ME96NSR”

Point
Do not read or write to unusable remote registers. If reading or writing is performed, the functions of ME96NSR are not guaranteed.

6.2 Remote Register (RWr, RWw)

The remote register RWr and RWw are used to communicate word data between the master station and ME96NSR. Because it occupiers 1 station, the remote registers RWr and RWw each have 4 words in length.

ME96NSR has the special-purpose commands for each measurement items and setting items.It becomes possible to monitor each measurement values or set each parameters by writing into the remote register RWw of the master station command and the related data allocated to the item you want to monitor or set.

6.2.1 Supported Command

The commands supported by ME96NSR are listed in the table below. For the details of each commands, refer to “6.2.2 Details of Commands“.

Table 6.1 Suppoted Commands

Command	Name	Descriprion	Note	page
1H	Data Monitor	For monitoring measurement		19
2H	Data Set	For setting measurement		31

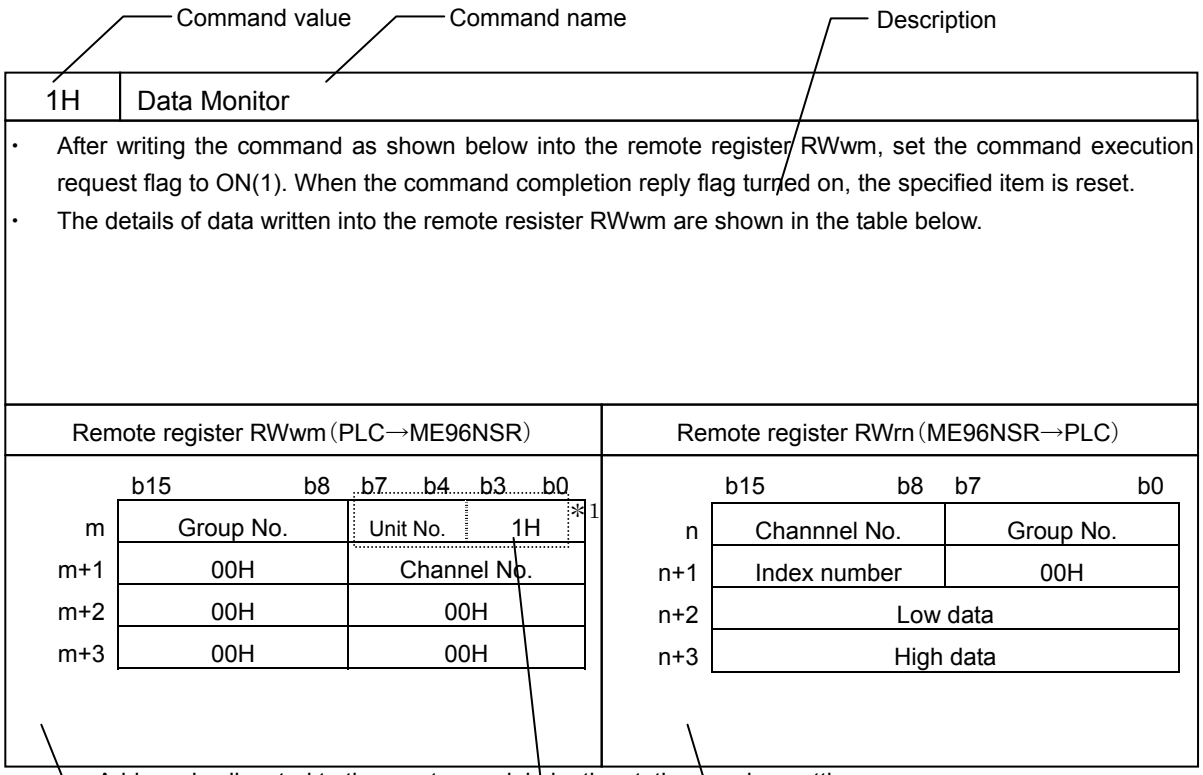
Note) 1: The command can be sent only when the remote READY is ON.

2: The command execution request flag and command completion reply flag are used to send the command and receive replay data. For details of each flag, refer to “5.3 Normal Communication”.

3: In case of monitoring the present value and its maximum continuously according to the renewal data timing of ME96NSR, the maximum may be smaller than the present value.

6.2.2 Details of Commands

The details of the command and reply data supported by ME96NSR are described here.
How to view the details of each command described is the following page is shown below.



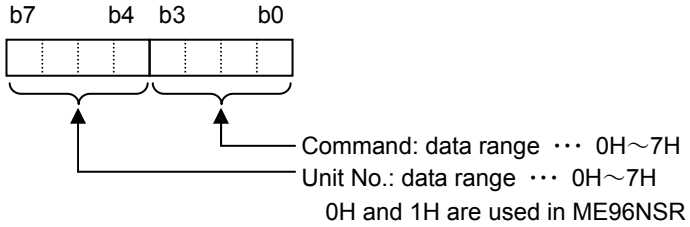
m, n: Address is allocated to the master module by the station number setting.

Command

Contents of the resister sent from the master station to the remote device station (ME96NSR).
The command value should be stored in the 1st byte of the resister to be transmitted.
Because the length of transmission data is fixed to 4 words, 00H should be stored in areas in which no data is contained.

Contents of the resister received by the master station from the remote device station (ME96NSR).
Because the length of receive data is fixed to 4 words, 00H is stored in areas in which no reply data is contained.

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



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

(1) Data Monitor Command (1H)

1H	Data Monitor

- After writing the command as shown below into the remote register RWwm, set the command excution request flag to ON(1). When the command completion reply frag is turned on, the item specified is reset.
- The details of the data written into the remote resister RWwm are shown in the table Table 6.2 to Table 6.10.
- The item can carry out monitor changes with phase and wiring types. (Refer to Table 6.2 to Table 6.4)

Remote register RWwm (PLC→ME96NSR)

	b15 b8	b7 b4	b3 b0
m	Group No.	Unit No.	1H
m+1	00H	Channel No.	
m+2	00H	00H	
m+3	00H	00H	

(※) 0H and 1H is used in the unit No. of ME96NSR

Remote register RWrn (ME96NSR→PLC)

	b15 b8	b7 b0
n	Channel No.	Group No.
n+1	Index number	00H
n+2	Low data	
n+3	High data	

m, n : Address is allocated to the master module by the station number setting.

Note: ME96NSR can monitor the data of the measurement item which is not displayed.

Table 6.2 Group Channel List (1/3)

Unit No.	Group (h)	Ch. (h)	Name of Channel			Data Type	Note
0	F0	2	Model code			⑤	
0	E0	11	Primary current			④	
0	E0	12	Primary voltage(L-L)			④	
0	E0	1B	Primary voltage(L-N)			④	＊2
0	E0	1C	Secondary voltage(L-N)			④	
0	E0	13	Phase & Wiring			⑤	
0	E0	18	Alarm Items			⑥	
0	E0	19	Byte monitor			⑤	
0	E0	1A	reserved				
0	2	E0	Time constant for DA	sec.		⑤	
0	1	1	Average current	A	Inst.	①	
0	1	21	Phase 1 current	A	Inst.	①	
0	1	41	Phase 2 current	A	Inst.	①	
0	1	61	Phase 3 current	A	Inst.	①	
0	1	81	Phase N current	A	Inst.	①	＊2
0	1	2	Average current	A	max.	①	
0	1	22	Phase 1 current	A	max.	①	
0	1	42	Phase 2 current	A	max.	①	
0	1	62	Phase 3 current	A	max.	①	
0	1	82	Phase N current	A	max.	①	＊2
0	1	5	Average current	A	min.	①	
0	1	25	Phase 1 current	A	min.	①	
0	1	45	Phase 2 current	A	min.	①	
0	1	65	Phase 3 current	A	min.	①	
0	1	85	Phase N current	A	min.	①	＊2
0	2	1	Average current demand	A	Inst.	①	
0	2	21	Phase 1 current demand	A	Inst.	①	
0	2	41	Phase 2 current demand	A	Inst.	①	
0	2	61	Phase 3 current demand	A	Inst.	①	
0	2	81	Phase N current demand	A	Inst.	①	＊2
0	2	2	Average current demand	A	max.	①	
0	2	22	Phase 1 current demand	A	max.	①	
0	2	42	Phase 2 current demand	A	max.	①	
0	2	62	Phase 3 current demand	A	max.	①	
0	2	82	Phase N current demand	A	max.	①	＊2
0	2	5	Average current demand	A	min.	①	
0	2	25	Phase 1 current demand	A	min.	①	
0	2	45	Phase 2 current demand	A	min.	①	
0	2	65	Phase 3 current demand	A	min.	①	
0	2	85	Phase N current demand	A	min.	①	＊2
0	5	1	Average L-L voltage	V	Inst.	①	
0	5	21	1-2 voltage	V	Inst.	①	
0	5	41	2-3 voltage	V	Inst.	①	
0	5	61	3-1 voltage	V	Inst.	①	
0	5	2	Average L-L voltage	V	max.	①	
0	5	22	1-2 voltage	V	max.	①	
0	5	42	2-3 voltage	V	max.	①	
0	5	62	3-1 voltage	V	max.	①	
0	5	5	Average L-L voltage	V	min.	①	
0	5	25	1-2 voltage	V	min.	①	
0	5	45	2-3 voltage	V	min.	①	
0	5	65	3-1 voltage	V	min.	①	

Unit No.	Group (h)	Ch. (h)	Name of Channel			Data Type	Note
0	3	1	Average L-N voltage	V	Inst.	①	＊2
0	3	21	1-N voltage	V	Inst.	①	＊2
0	3	41	2-N voltage	V	Inst.	①	＊2
0	3	61	3-N voltage	V	Inst.	①	＊2
0	3	2	Average L-N voltage	V	max.	①	＊2
0	3	22	1-N voltage	V	max.	①	＊2
0	3	42	2-N voltage	V	max.	①	＊2
0	3	62	3-N voltage	V	max.	①	＊2
0	3	5	Average L-N voltage	V	min.	①	＊2
0	3	25	1-N voltage	V	min.	①	＊2
0	3	45	2-N voltage	V	min.	①	＊2
0	3	65	3-N voltage	V	min.	①	＊2
0	7	1	Total active power	kW	Inst.	①	
0	7	21	Phase 1 active power	kW	Inst.	①	＊2
0	7	41	Phase 2 active power	kW	Inst.	①	＊2
0	7	61	Phase 3 active power	kW	Inst.	①	＊2
0	7	2	Total active power	kW	max.	①	
0	7	22	Phase 1 active power	kW	max.	①	＊2
0	7	42	Phase 2 active power	kW	max.	①	＊2
0	7	62	Phase 3 active power	kW	max.	①	＊2
0	7	5	Total active power	kW	min.	①	
0	7	25	Phase 1 active power	kW	min.	①	＊2
0	7	45	Phase 2 active power	kW	min.	①	＊2
0	7	65	Phase 3 active power	kW	min.	①	＊2
0	9	1	Total reactive power	kvar	Inst.	①	
0	9	21	Phase 1 reactive power	kvar	Inst.	①	＊2
0	9	41	Phase 2 reactive power	kvar	Inst.	①	＊2
0	9	61	Phase 3 reactive power	kvar	Inst.	①	＊2
0	9	2	Total reactive power	kvar	max.	①	
0	9	22	Phase 1 reactive power	kvar	max.	①	＊2
0	9	42	Phase 2 reactive power	kvar	max.	①	＊2
0	9	62	Phase 3 reactive power	kvar	max.	①	＊2
0	9	5	Total reactive power	kvar	min.	①	
0	9	25	Phase 1 reactive power	kvar	min.	①	＊2
0	9	45	Phase 2 reactive power	kvar	min.	①	＊2
0	9	65	Phase 3 reactive power	kvar	min.	①	＊2
1	0B	1	Total apparent power	kVA	Inst.	①	＊2
1	0B	21	Phase 1 apparent power	kVA	Inst.	①	＊2
1	0B	41	Phase 2 apparent power	kVA	Inst.	①	＊2
1	0B	61	Phase 3 apparent power	kVA	Inst.	①	＊2
1	0B	2	Total apparent power	kVA	max.	①	＊2
1	0B	22	Phase 1 apparent power	kVA	max.	①	＊2
1	0B	42	Phase 2 apparent power	kVA	max.	①	＊2
1	0B	62	Phase 3 apparent power	kVA	max.	①	＊2
1	0B	5	Total apparent power	kVA	min.	①	＊2
1	0B	25	Phase 1 apparent power	kVA	min.	①	＊2
1	0B	45	Phase 2 apparent power	kVA	min.	①	＊2
1	0B	65	Phase 3 apparent power	kVA	min.	①	＊2

＊1: Cannot be used by 3P4W.
＊2: Can only be used by 3P4W.
H.A: Current Harmonics
H.V: Voltage Harmonics
D.ratio: Distortion ratio
Inst.: Instantaneous value

Table 6.3 Group Channel List (2/3)

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	Note
0	0D	1	Total power factor	%	Inst.		①	
0	0D	21	Phase 1 power factor	%	Inst.		①	＊2
0	0D	41	Phase 2 power factor	%	Inst.		①	＊2
0	0D	61	Phase 3 power factor	%	Inst.		①	＊2
0	0D	2	Total power factor	%	max.		①	
0	0D	22	Phase 1 power factor	%	max.		①	＊2
0	0D	42	Phase 2 power factor	%	max.		①	＊2
0	0D	62	Phase 3 power factor	%	max.		①	＊2
0	0D	5	Total power factor	%	min.		①	
0	0D	25	Phase 1 power factor	%	min.		①	＊2
0	0D	45	Phase 2 power factor	%	min.		①	＊2
0	0D	65	Phase 3 power factor	%	min.		①	＊2
0	0F	1	Frequency	Hz	Inst.		①	
0	0F	2	Frequency	Hz	max.		①	
0	0F	5	Frequency	Hz	min.		①	
0	63	21	1-2 H.V	V	Inst.	Total	①	＊1
0	4D	21	1-2 H.V	V	Inst.	1st	①	＊1
0	4F	21	1-2 H.V	V	Inst.	3rd	①	＊1
0	51	21	1-2 H.V	V	Inst.	5th	①	＊1
0	53	21	1-2 H.V	V	Inst.	7th	①	＊1
0	55	21	1-2 H.V	V	Inst.	9th	①	＊1
0	57	21	1-2 H.V	V	Inst.	11th	①	＊1
0	59	21	1-2 H.V	V	Inst.	13th	①	＊1
0	76	86	1-2 H.V D. ratio	%	Inst.	Total	①	＊1
0	76	73	1-2 H.V D. ratio	%	Inst.	3rd	①	＊1
0	76	75	1-2 H.V D. ratio	%	Inst.	5th	①	＊1
0	76	77	1-2 H.V D. ratio	%	Inst.	7th	①	＊1
0	76	79	1-2 H.V D. ratio	%	Inst.	9th	①	＊1
0	76	7B	1-2 H.V D. ratio	%	Inst.	11th	①	＊1
0	76	7D	1-2 H.V D. ratio	%	Inst.	13th	①	＊1
0	63	41	2-3 H.V	V	Inst.	Total	①	＊1
0	4D	41	2-3 H.V	V	Inst.	1st	①	＊1
0	4F	41	2-3 H.V	V	Inst.	3rd	①	＊1
0	51	41	2-3 H.V	V	Inst.	5th	①	＊1
0	53	41	2-3 H.V	V	Inst.	7th	①	＊1
0	55	41	2-3 H.V	V	Inst.	9th	①	＊1
0	57	41	2-3 H.V	V	Inst.	11th	①	＊1
0	59	41	2-3 H.V	V	Inst.	13th	①	＊1
0	76	9C	2-3 H.V D. ratio	%	Inst.	Total	①	＊1
0	76	89	2-3 H.V D. ratio	%	Inst.	3rd	①	＊1
0	76	8B	2-3 H.V D. ratio	%	Inst.	5th	①	＊1
0	76	8D	2-3 H.V D. ratio	%	Inst.	7th	①	＊1
0	76	8F	2-3 H.V D. ratio	%	Inst.	9th	①	＊1
0	76	91	2-3 H.V D. ratio	%	Inst.	11th	①	＊1
0	76	93	2-3 H.V D. ratio	%	Inst.	13th	①	＊1
0	76	DE	L-L H.V D. ratio	%	max.	Total	①	＊1
0	4D	A2	L-L H.V	V	max.	1st	①	＊1
0	76	CB	L-L H.V D. ratio	%	max.	3rd	①	＊1
0	76	CD	L-L H.V D. ratio	%	max.	5th	①	＊1
0	76	CF	L-L H.V D. ratio	%	max.	7th	①	＊1
0	76	D1	L-L H.V D. ratio	%	max.	9th	①	＊1
0	76	D3	L-L H.V D. ratio	%	max.	11th	①	＊1
0	76	D5	L-L H.V D. ratio	%	max.	13th	①	＊1

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	Note
0	4B	21	1-N H.V	V	Inst.	Total	①	＊2
0	35	21	1-N H.V	V	Inst.	1st	①	＊2
1	37	21	1-N H.V	V	Inst.	3rd	①	＊2
1	39	21	1-N H.V	V	Inst.	5th	①	＊2
1	3B	21	1-N H.V	V	Inst.	7th	①	＊2
1	3D	21	1-N H.V	V	Inst.	9th	①	＊2
1	3F	21	1-N H.V	V	Inst.	11th	①	＊2
1	41	21	1-N H.V	V	Inst.	13th	①	＊2
0	77	86	1-N H.V D. ratio	%	Inst.	Total	①	＊2
0	77	73	1-N H.V D. ratio	%	Inst.	3rd	①	＊2
0	77	75	1-N H.V D. ratio	%	Inst.	5th	①	＊2
0	77	77	1-N H.V D. ratio	%	Inst.	7th	①	＊2
0	77	79	1-N H.V D. ratio	%	Inst.	9th	①	＊2
0	77	7B	1-N H.V D. ratio	%	Inst.	11th	①	＊2
0	77	7D	1-N H.V D. ratio	%	Inst.	13th	①	＊2
0	4B	41	2-N H.V	V	Inst.	Total	①	＊2
0	35	41	2-N H.V	V	Inst.	1st	①	＊2
1	37	41	2-N H.V	V	Inst.	3rd	①	＊2
1	39	41	2-N H.V	V	Inst.	5th	①	＊2
1	3B	41	2-N H.V	V	Inst.	7th	①	＊2
1	3D	41	2-N H.V	V	Inst.	9th	①	＊2
1	3F	41	2-N H.V	V	Inst.	11th	①	＊2
1	41	41	2-N H.V	V	Inst.	13th	①	＊2
0	77	9C	2-N H.V D. ratio	%	Inst.	Total	①	＊2
0	77	89	2-N H.V D. ratio	%	Inst.	3rd	①	＊2
0	77	8B	2-N H.V D. ratio	%	Inst.	5th	①	＊2
0	77	8D	2-N H.V D. ratio	%	Inst.	7th	①	＊2
0	77	8F	2-N H.V D. ratio	%	Inst.	9th	①	＊2
0	77	91	2-N H.V D. ratio	%	Inst.	11th	①	＊2
0	77	93	2-N H.V D. ratio	%	Inst.	13th	①	＊2
0	4B	61	3-N H.V	V	Inst.	Total	①	＊2
0	35	61	3-N H.V	V	Inst.	1st	①	＊2
1	37	61	3-N H.V	V	Inst.	3rd	①	＊2
1	39	61	3-N H.V	V	Inst.	5th	①	＊2
1	3B	61	3-N H.V	V	Inst.	7th	①	＊2
1	3D	61	3-N H.V	V	Inst.	9th	①	＊2
1	3F	61	3-N H.V	V	Inst.	11th	①	＊2
1	41	61	3-N H.V	V	Inst.	13th	①	＊2
0	77	B2	3-N H.V D. ratio	%	Inst.	Total	①	＊2
0	77	9F	3-N H.V D. ratio	%	Inst.	3rd	①	＊2
0	77	A1	3-N H.V D. ratio	%	Inst.	5th	①	＊2
0	77	A3	3-N H.V D. ratio	%	Inst.	7th	①	＊2
0	77	A5	3-N H.V D. ratio	%	Inst.	9th	①	＊2
0	77	A7	3-N H.V D. ratio	%	Inst.	11th	①	＊2
0	77	A9	3-N H.V D. ratio	%	Inst.	13th	①	＊2
0	77	DE	L-N H.V D. ratio	%	max.	Total	①	＊2
0	35	A2	L-N H.V	V	max.	1st	①	＊2
0	77	CB	L-N H.V D. ratio	%	max.	3rd	①	＊2
0	77	CD	L-N H.V D. ratio	%	max.	5th	①	＊2
0	77	CF	L-N H.V D. ratio	%	max.	7th	①	＊2
0	77	D1	L-N H.V D. ratio	%	max.	9th	①	＊2
0	77	D3	L-N H.V D. ratio	%	max.	11th	①	＊2
0	77	D5	L-N H.V D. ratio	%	max.	13th	①	＊2

＊1: Cannot be used by 3P4W.
＊2: Can only be used by 3P4W.
H.A: Current Harmonics
H.V: Voltage Harmonics
D.ratio: Distortion ratio
Inst.: Instantaneous value

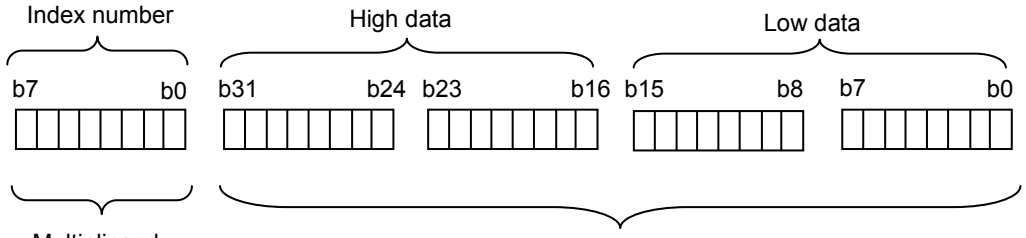
Table 6.4 Group Channel List (3/3)

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	Note
0	33	21	Phase 1 H.A	A	Inst.	Total	①	
0	1D	21	Phase 1 H.A	A	Inst.	1st	①	
0	1F	21	Phase 1 H.A	A	Inst.	3rd	①	
0	21	21	Phase 1 H.A	A	Inst.	5th	①	
0	23	21	Phase 1 H.A	A	Inst.	7th	①	
0	25	21	Phase 1 H.A	A	Inst.	9th	①	
0	27	21	Phase 1 H.A	A	Inst.	11th	①	
0	29	21	Phase 1 H.A	A	Inst.	13th	①	
0	75	86	Phase 1 H.A D. ratio	%	Inst.	Total	①	
1	75	73	Phase 1 H.A D. ratio	%	Inst.	3rd	①	
1	75	75	Phase 1 H.A D. ratio	%	Inst.	5th	①	
1	75	77	Phase 1 H.A D. ratio	%	Inst.	7th	①	
1	75	79	Phase 1 H.A D. ratio	%	Inst.	9th	①	
1	75	7B	Phase 1 H.A D. ratio	%	Inst.	11th	①	
1	75	7D	Phase 1 H.A D. ratio	%	Inst.	13th	①	
0	33	41	Phase 2 H.A	A	Inst.	Total	①	
0	1D	41	Phase 2 H.A	A	Inst.	1st	①	
0	1F	41	Phase 2 H.A	A	Inst.	3rd	①	
0	21	41	Phase 2 H.A	A	Inst.	5th	①	
0	23	41	Phase 2 H.A	A	Inst.	7th	①	
0	25	41	Phase 2 H.A	A	Inst.	9th	①	
0	27	41	Phase 2 H.A	A	Inst.	11th	①	
0	29	41	Phase 2 H.A	A	Inst.	13th	①	
0	75	9C	Phase 2 H.A D. ratio	%	Inst.	Total	①	
1	75	89	Phase 2 H.A D. ratio	%	Inst.	3rd	①	
1	75	8B	Phase 2 H.A D. ratio	%	Inst.	5th	①	
1	75	8D	Phase 2 H.A D. ratio	%	Inst.	7th	①	
1	75	8F	Phase 2 H.A D. ratio	%	Inst.	9th	①	
1	75	91	Phase 2 H.A D. ratio	%	Inst.	11th	①	
1	75	93	Phase 2 H.A D. ratio	%	Inst.	13th	①	
0	33	61	Phase 3 H.A	A	Inst.	Total	①	
0	1D	61	Phase 3 H.A	A	Inst.	1st	①	
0	1F	61	Phase 3 H.A	A	Inst.	3rd	①	
0	21	61	Phase 3 H.A	A	Inst.	5th	①	
0	23	61	Phase 3 H.A	A	Inst.	7th	①	
0	25	61	Phase 3 H.A	A	Inst.	9th	①	
0	27	61	Phase 3 H.A	A	Inst.	11th	①	
0	29	61	Phase 3 H.A	A	Inst.	13th	①	
0	75	B2	Phase 3 H.A D. ratio	%	Inst.	Total	①	
1	75	9F	Phase 3 H.A D. ratio	%	Inst.	3rd	①	
1	75	A1	Phase 3 H.A D. ratio	%	Inst.	5th	①	
1	75	A3	Phase 3 H.A D. ratio	%	Inst.	7th	①	
1	75	A5	Phase 3 H.A D. ratio	%	Inst.	9th	①	
1	75	A7	Phase 3 H.A D. ratio	%	Inst.	11th	①	
1	75	A9	Phase 3 H.A D. ratio	%	Inst.	13th	①	
0	33	81	Phase N H.A	A	Inst.	Total	①	＊2
0	1D	81	Phase N H.A	A	Inst.	1st	①	＊2
0	1F	81	Phase N H.A	A	Inst.	3rd	①	＊2
0	21	81	Phase N H.A	A	Inst.	5th	①	＊2
0	23	81	Phase N H.A	A	Inst.	7th	①	＊2
0	25	81	Phase N H.A	A	Inst.	9th	①	＊2
0	27	81	Phase N H.A	A	Inst.	11th	①	＊2
0	29	81	Phase N H.A	A	Inst.	13th	①	＊2
0	75	C8	Phase N H.A D. ratio	%	Inst.	Total	①	＊2
1	75	B5	Phase N H.A D. ratio	%	Inst.	3rd	①	＊2
1	75	B7	Phase N H.A D. ratio	%	Inst.	5th	①	＊2
1	75	B9	Phase N H.A D. ratio	%	Inst.	7th	①	＊2
1	75	BB	Phase N H.A D. ratio	%	Inst.	9th	①	＊2
1	75	BD	Phase N H.A D. ratio	%	Inst.	11th	①	＊2
1	75	BF	Phase N H.A D. ratio	%	Inst.	13th	①	＊2

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	Note
0	33	A2	H.A	A	max.	Total	①	
0	1D	A2	H.A	A	max.	1st	①	
0	1F	A2	H.A	A	max.	3rd	①	
0	21	A2	H.A	A	max.	5th	①	
0	23	A2	H.A	A	max.	7th	①	
0	25	A2	H.A	A	max.	9th	①	
0	27	A2	H.A	A	max.	11th	①	
0	29	A2	H.A	A	max.	13th	①	
1	33	82	Phase N H.A	A	max.	Total	①	＊2
1	1D	82	Phase N H.A	A	max.	1st	①	＊2
1	1F	82	Phase N H.A	A	max.	3rd	①	＊2
1	21	82	Phase N H.A	A	max.	5th	①	＊2
1	23	82	Phase N H.A	A	max.	7th	①	＊2
1	25	82	Phase N H.A	A	max.	9th	①	＊2
1	27	82	Phase N H.A	A	max.	11th	①	＊2
1	29	82	Phase N H.A	A	max.	13th	①	＊2
0	80	1	active energy import	kWh	count		②	
0	80	63	active energy export	kWh	count		②	
0	80	64	active energy import	kWh	count	expand	②	
0	80	65	active energy export	kWh	count	expand	②	
0	81	1	reactive energy import lag	kvar	count		②	
0	81	63	reactive energy export lag	kvar	count		②	
0	81	64	reactive energy import lead	kvar	count		②	
0	81	65	reactive energy export lead	kvar	count		②	
0	81	66	reactive energy import lag	kvar	count	expand	②	
0	81	67	reactive energy export lag	kvar	count	expand	②	
0	81	68	reactive energy import lead	kvar	count	expand	②	
0	81	69	reactive energy export lead	kvar	count	expand	②	
0	1	14	current upper limit	A	Alarm		①	
0	1	15	current lower limit	A	Alarm		①	
0	1	94	current upper limit	A	Alarm	PhaseN	①	＊2
0	2	14	current demand upper limit	A	Alarm		①	
0	2	15	current demand lower limit	A	Alarm		①	
0	2	94	current demand upper limit	A	Alarm	PhaseN	①	＊2
0	5	14	voltage upper limit(L-L)	V	Alarm		①	
0	5	15	voltage lower limit(L-L)	V	Alarm		①	
0	3	14	voltage upper limit(L-N)	V	Alarm		①	＊2
0	3	15	voltage lower limit(L-N)	V	Alarm		①	＊2
0	7	14	active power upper limit	kW	Alarm		①	
0	7	15	active power lower limit	kW	Alarm		①	
0	9	14	reactive power upper limit	kvar	Alarm		①	
0	9	15	reactive power lower limit	kvar	Alarm		①	
0	0D	14	power factor upper limit	%	Alarm		①	
0	0D	15	power factor lower limit	%	Alarm		①	
0	0F	14	Frequency upper limit	Hz	Alarm		①	
0	0F	15	Frequency lower limit	Hz	Alarm		①	
0	77	E1	H.V(L-N) upper limit	%	Alarm	Total	①	＊2
0	76	E1	H.V(L-L) upper limit	%	Alarm	Total	①	＊1
0	75	E1	H.A upper limit	A	Alarm	Total	①	
0	75	F1	H.A upper limit(Phase N)	A	Alarm	Total	①	＊2
0	A0	31	Alarm state		Alarm		③	
0	A0	35	Alarm state2		Alarm		③	

＊1: Cannot be used by 3P4W.
＊2: Can only be used by 3P4W.
H.A: Current Harmonics
H.V: Voltage Harmonics
D.ratio: Distortion ratio
Inst.: Instantaneous value

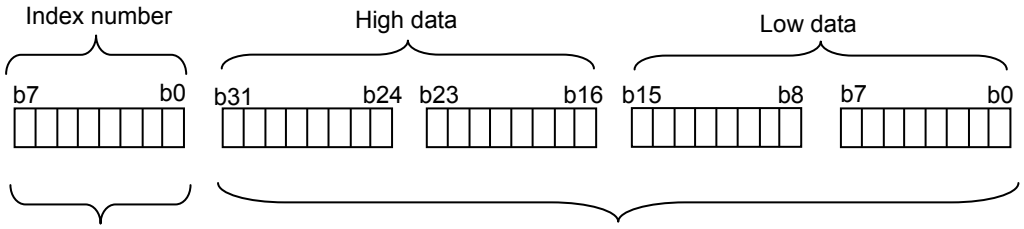
Table 6.5 Data Format (1/6)

Data	Data Format ①
Measurement Items Current, Voltage, Active power, Reactive power, Apparent power, Power factor, Frequency, etc. Format①	 ＜Multiplicand＞ Multiplicand is fixed for every item according to primary current, primary voltage, and phase wiring. (Refer to p. 30.) Index number = 03H: The actual value is 1000 times the numeric value. Index number = 02H: The actual value is 100 times the numeric value. Index number = 01H: The actual value is 10 times the numeric value. Index number = 00H: The actual value is the numeric value. Index number = FFH: The actual value is 1/10 times the numeric value. Index number = FEH: The actual value is 1/100 times the numeric value. Index number = FDH: The actual value is 1/1000 times the numeric value. ＜Example: Active power＞

Data	Multiplicand	Numeric value	Actual value
FF000000FFH	FFH⇒1/10	000000FFH⇒255	255×1/10 = 25.5[kW]
00000000FFH	00H⇒1	000000FFH⇒255	255×1 = 255[kW]
FFFFFFFF01H	FFH⇒1/10	FFFFFF01H⇒-255	-255×1/10 = -25.5[kW]
00FFFFFF01H	00H⇒1	FFFFFF01H⇒-255	-255×1 = -255[kW]

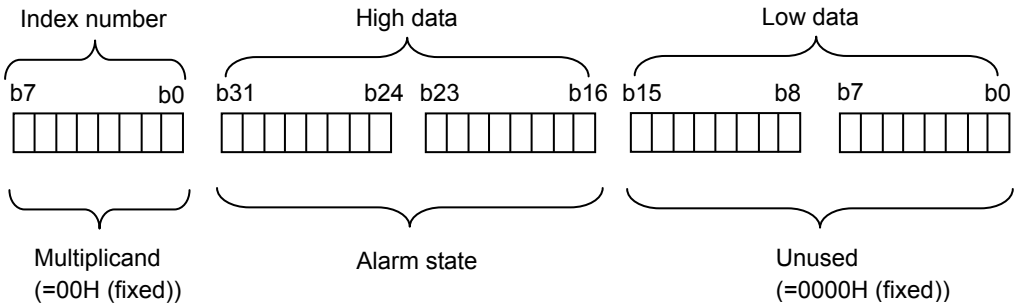
Note: When the elements are active power and reactive power in case of a data monitor, ±1638.3MW becomes the upper(lower) value.

Table 6.6 Data Format (2/6)

Data	Data Format ②
Measurement Items Active energy Reactive energy Format②	 Numeric value: 32-bit integer with a sign However, the effective numerical value is 0～999999 （0H～F423FH） ＜Multiplicand＞ Multiplicand is fixed for every item according to primary current, primary voltage, and phase wiring. (Refer to p. 30.) Index number = 03H: The actual value is 1000 times the numeric value. Index number = 02H: The actual value is 100 times the numeric value. Index number = 01H: The actual value is 10 times the numeric value. Index number = 00H: The actual value is the numeric value. Index number = FFH: The actual value is 1/10 times the numeric value. Index number = FEH: The actual value is 1/100 times the numeric value. Index number = FDH: The actual value is 1/1000 times the numeric value. Index number = FCH: The actual value is 1/10000 times the numeric value. Index number = FBH: The actual value is 1/100000 times the numeric value. ＜Example: Active Energy＞

Data	Multiplicand	Numeric value	Actual value
FF000000FFH	FFH⇒1/10	000000FFH⇒255	255×1/10 = 25.5[kWh]
00000000FFH	00H⇒1	000000FFH⇒255	255×1 = 255[kWh]

Table 6.7 Data Format (3/6)

Data	Data Format ③
Alarm state Format③	

＜The allocation of the alarm state 1＞

Bit	Data		
	Content	OFF(0)	ON(1)
b16	Digital input 1 (DI1)	OFF	ON
b17	Digital input 2 (DI2)	OFF	ON
b18	Digital input 3 (DI3)	OFF	ON
b19	Digital input 4 (DI4)	OFF	ON
b20	Unusable	–	–
b21	Alarm (total)	Non-Alarm	Alarm
b22	Alarm of Demand current (*1)	Non-Alarm	Alarm
b23	Unusable	–	–
b24	Alarm of Voltage (*1)	Non-Alarm	Alarm
b25	Alarm of Current (*1)	Non-Alarm	Alarm
b26	Alarm of Active power (*1)	Non-Alarm	Alarm
b27	Alarm of Reactive power (*1)	Non-Alarm	Alarm
b28	Alarm of Frequency	Non-Alarm	Alarm
b29	Alarm of Power factor (*1)	Non-Alarm	Alarm
b30	Alarm of T.H.D(Voltage) (*1)	Non-Alarm	Alarm
b31	Alarm of Harmonics current (*1)	Non-Alarm	Alarm

*1: As for the alarm judging items, refer to next page.

＜The allocation of the alarm state 2＞

Bit	Data		
	Content	OFF(0)	ON(1)
b16	Upper limit alarm of current (phase 1)	Non-Alarm	Alarm
b17	Upper limit alarm of current (phase 2)	Non-Alarm	Alarm
b18	Upper limit alarm of current (phase 3)	Non-Alarm	Alarm
b19	Upper limit alarm of current (phase N)	Non-Alarm	Alarm
b20	Upper limit alarm of current (total) (*2)	Non-Alarm	Alarm
b21	Lower limit alarm of current (total) (*2)	Non-Alarm	Alarm
b22	Upper limit alarm of L-L Voltage (total)	Non-Alarm	Alarm
b23	Lower limit alarm of L-L Voltage (total)	Non-Alarm	Alarm
b24	Upper limit alarm of L-N Voltage (1-N)	Non-Alarm	Alarm
b25	Upper limit alarm of L-N Voltage (2-N)	Non-Alarm	Alarm
b26	Upper limit alarm of L-N Voltage (3-N)	Non-Alarm	Alarm
b27	Upper limit alarm of L-N Voltage (total)	Non-Alarm	Alarm
b28	Lower limit alarm of L-N Voltage (1-N)	Non-Alarm	Alarm
b29	Lower limit alarm of L-N Voltage (2-N)	Non-Alarm	Alarm
b30	Lower limit alarm of L-N Voltage (3-N)	Non-Alarm	Alarm
b31	Lower limit alarm of L-N Voltage (total)	Non-Alarm	Alarm

*2: As for the alarm judging items, refer to next page.

<Continuation>

Data	Data Format ③
Alarm state Format③	

■Alarm judging items of each phase wiring is shown in the following.

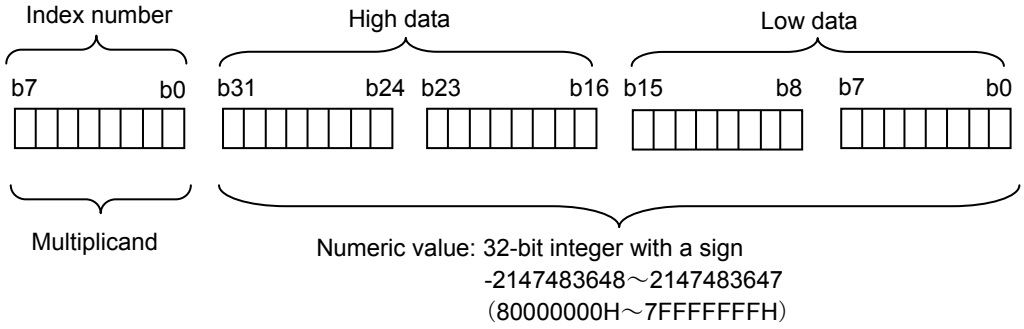
・Alarm judging items for 3P3W

	Upper limit	Lower limit
Demand current	Phase 1, 2, 3	Phase 1, 2, 3
Voltage	Phase 1-2, 2-3, 3-1	Phase 1-2, 2-3, 3-1
Current	Phase 1, 2, 3	Phase 1, 2, 3
Active power	ΣW	ΣW
Reactive power	Σvar	Σvar
Power factor	ΣPF	ΣPF
Harmonics voltage	Phase 1-2, 2-3	-
Harmonics current	Phase 1, 2, 3	-

・Alarm judging items for 3P4W

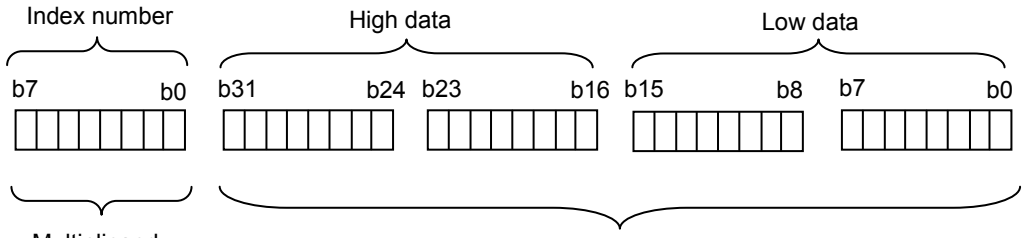
	Upper limit	Lower limit
Demand current	Phase 1, 2, 3, N	Phase 1, 2, 3
Voltage	Phase 1-2, 2-3, 3-1, Phase 1-N, 2-N, 3-N	Phase 1-2, 2-3, 3-1, Phase 1-N, 2-N, 3-N
Current	Phase 1, 2, 3, N	Phase 1, 2, 3
Active power	ΣW	ΣW
Reactive power	Σvar	Σvar
Power factor	ΣPF	ΣPF
Harmonics voltage	Phase 1-N, 2-N, 3-N	-
Harmonics current	Phase 1, 2, 3, N	-

Table 6.8 Data Format (4/6)

Data	Data Format ④
Set-up Primary current Primari voltage (L-L) Primary voltage (L-N) Secondary volatage (L-N) Format④	 ＜Multiplicand＞ Multiplicand is fixed for every item according to primary current, primary voltage, and phase wiring. (Refer to p. 30.) Index number = 00H: The actual value is the numeric value. Index number = FFH: The actual value is 1/10 times the numeric value. ＜Example: Primary current, Primary voltage＞

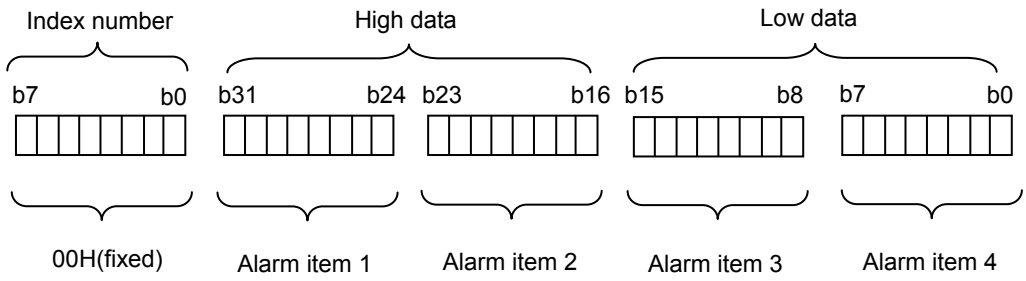
Set-up value	Multiplicand	Numeric value	Data
Set-up value = 100.0A (Effective range = one place of decimals)	1/10times⇒FFH	1000⇒03E8H	FF000003E8H
Set-up value = 400A (Effective range = Integer)	1 times⇒00H	400⇒0190H	0000000190H
Set-up value = 110.0V (Effective range = one place of decimals)	1/10times⇒FFH	1100⇒044CH	FF00000FFCH
Set-up value = 3300V (Effective range = Integer)	1 times⇒00H	3300⇒0CE4H	0000000CE4H

Table 6.9 Data Format (5/6)

Data	Data Format ⑤
Set-up Phase wiring Time constant for DA Model code 16bit set register Format⑤	 Multiplicand (=00H(fixed)) Numeric value: 32-bit integer with a sign -2147483648～2147483647 （80000000H～7FFFFFFFH） ＜Data(Numeric value)＞ ■Phase wiring :3P3W_2CT = 03H :3P4W = 04H :3P3W_3CT = 06H ※b31～b8: 0 fixed ■Time constant for demand : The range of 0(= 0H) to 1800 seconds(= 708H)can be set up per second ■Model code : 10H ← Model code of ME96NSR.(Fixed data) ※b31～b8: 0 fixed ■16bit set register

Bit	Data		
	Content	OFF(0)	ON(1)
b16	Reset of all alarm	—	executed
b17	Reset of all max/min value and counting of energy	—	executed
b18	Reset of all max/min value	—	executed
b19	Unusable	—	—
b20	Unusable	—	—
b21	Unusable	—	—
b22	Unusable	—	—
b23	Unusable	—	—
b24	Reset of all digital input latch	—	executed
b25	Unusable	—	—
b26	Unusable	—	—
b27	Unusable	—	—
b28	Unusable	—	—
b29	Unusable	—	—
b30	Reset of counting of all energy	—	executed
b31	Unusable	—	—

Table 6.10 Data Format (6/6)

Data	Data Format ⑥
Set-up Alarm item Format⑥	 Note: The numbers of alarms which can set are 4 items. ＜Content of alarm items＞

Data	Explanation
00H	No alarm
01H	The upper limit alarm of current
02H	The lower limit alarm of current
03H	The upper limit alarm of phase N current
09H	The upper limit alarm of current demand
0AH	The lower limit alarm of current demand
0BH	The upper limit alarm of phase N current demand
11H	The upper limit alarm of L-L voltage
12H	The lower limit alarm of L-L voltage
13H	The upper limit alarm of L-N voltage
14H	The lower limit alarm of L-N voltage
15H	The upper limit alarm of active power
16H	The lower limit alarm of active power
19H	The upper limit alarm of reactive power
1AH	The lower limit alarm of reactive power
1BH	The upper limit alarm of power factor
1CH	The lower limit alarm of power factor
1DH	The upper limit alarm of frequency
1EH	The lower limit alarm of frequency
1FH	The upper limit alarm of current harmonics
20H	The upper limit alarm of voltage harmonics
21H	The upper limit alarm of phase N current harmonics

■Effective Range and Multiplicand

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

Element	Condition		Multiplying factor
Voltage Harmonics voltage	Primary voltage	0V～440V less than	×0.1
		440V or more	×1
Current Current demand Harmonics current	Primary current	0A～4A less than	×0.001
		4A～40A less than	×0.01
		40A～400A less than	×0.1
		400A or more	×1
Actige power Reactive power Apparent power	Primary rated power	0kW～1.2kW less than	×0.0001
		1.2kW～12kW less than	×0.001
		12kW～120kW less than	×0.01
		120kW～1200kW less than	×0.1
		1200kW～12000kW less than	×1
		12000kW～120000kW less than	×10
		120000kW or more	×100
Active energy Reactive energy	Primary rated power	0kW～10kW less than	×0.01
		10kW～100kW less than	×0.1
		100kW～1000kW less than	×1
		1000kW～10000kW less than	×10
		10000kW～100000kW less than	×100
		100000kW or more	×1000
Active energy (extended) Reactive energy (extended)	Primary rated power	0kW～10kW less than	×0.00001
		10kW～100kW less than	×0.0001
		100kW～1000kW less than	×0.001
		1000kW～10000kW less than	×0.01
		10000kW～100000kW less than	×0.1
		100000kW or more	×1
Frequency	—	—	×0.1
Power foctor	—	—	×0.1
Harmonics distortion	—	—	×0.1

※How to calculate primary rated power.

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

α : 3 3P3W_2CT, 3P3W_3CT

$\sqrt{3}$ 3P4W

(2) Data Set Command (2H)

2H	Data Set

- After writing the command as shown below into the remote register RWwm, set the command execution request flag to ON (1). When the command completion reply flag is turned on, the specified item is reset.
- The details of the data written into the remote resister RWwm are shown in the Table 6.5 to Table 6.11.

※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.

※If you write the set-up value continuously, please give about 0.5 seconds (max 2 seconds) between the set −up value.

Remote register RWwm（PLC→ME96NSR）

	b15 – b8	b7 – b4	b3 – b0
m	Group No.	0H (Unit No)	2H
m+1	Index number	Channel No.	
m+2	Low data		
m+3	High data		

（※）At data set , Unit No. is fixed 0H in ME96NSR.

Remote register RWrn（ME96NSR→PLC）

	b15 – b8	b7 – b0
n	Channel No.	Group No.
n+1	00H	00H
n+2	00H	00H
n+3	00H	00H

m, n : Address is allocated to the master module by the station number setting.

Table 6.11 List of Group and Channel for Set-up

Hex.		Content name	Range	Setting unit	Data Type
Group	Channel				
E0	11	Primary current	(Note1)	—	④
E0	12	Primary voltage(L-L)	(Note2)	—	④
E0	1B	Primary voltage(L-N)	(Note3)	—	④
E0	1C	Secondary voltage	63.5V,100V,110V,115V,120V,220V	3P3W：100V，110V，220V 3P4W：Except for 220V	④
E0	13	Phase & Wiring	3P3W_2CT,3P3W_3CT,3P4W	—	⑤
E0	18	Alarm Items	Refer to Table 6.10	—	⑥
02	E0	Time constant for DA	0～1800s	(Note4)	⑤
80	01	active energy import	0～999999×Multiplicand(Note5)	1×Multiplicand	②
80	63	active energy expoer	0～999999×Multiplicand(Note5)	1×Multiplicand	②
81	01	reactive energy import LAG	0～999999×Multiplicand(Note5)	1×Multiplicand	②
81	63	reactive energy export LAG	0～999999×Multiplicand(Note5)	1×Multiplicand	②
81	64	reactive energy import LEAD	0～999999×Multiplicand(Note5)	1×Multiplicand	②
81	65	reactive energy export LEAD	0～999999×Multiplicand(Note5)	1×Multiplicand	②
01	14	current upper limit	5% to 120% of primary current	1%step Initial value: 100%	①
01	15	current lower limit	3% to 95% of primary current	1%step Initial value: 10%	①
01	94	current upper limit(Phase N)	5% to 120% of primary current	1%step Initial value: 100%	①
02	14	current demand upper limit	5% to 120% of primary current	1%step Initial value: 100%	①
02	15	current demand lower limit	3% to 95% of primary current	1%step Initial value: 10%	①
02	94	current demand upper limit (Phase N)	5% to 120% of primary current	1%step Initial value: 100%	①
05	14	voltage upper limit (L-L)	25% to 135% of primary voltage	1%step Initial value: 110%	①
05	15	voltage lower limit (L-L)	20% to 95% of primary voltage	1%step Initial value: 70%	①
03	14	voltage upper limit (L-N)	25% to 135% of primary voltage	1%step Initial value: 110%	①
03	15	voltage lower limit (L-N)	20% to 95% of primary voltage	1%step Initial value: 70%	①
07	14	active power upper limit	-95% to 120% of rated active power	1%step Initial value: 100%	①
07	15	active power lower limit	-120% to 95% of rated active power	1%step Initial value: 3%	①
09	14	reactive power upper limit	-95% to 120% of rated reactive power	1%step Initial value: 100%	①
09	15	reactive power lower limit	-120% to 95% of rated reactive power	1%step Initial value: 3%	①
0D	14	power factor upper limit	-0.05 to 1.000 to 0.05	0.05 step Initial value: 1.000	①
0D	15	power factor lower limit	-0.05 to 1.000 to 0.05	0.05 step Initial value: -0.50	①
0F	14	Frequency upper limit	45.0 to 65.0Hz	1Hz step Initial value: 65Hz	①
0F	15	Frequency lower limit	45.0 to 65.0Hz	1Hz step Initial value: 45Hz	①
77	E1	H.V(L-N) upper limit	0.5% to 20.0%	0.5%step Initial value: 3.5%	①
76	E1	H.V(L-L) upper limit	0.5% to 20.0%	0.5%step Initial value: 3.5%	①
75	E1	H.A upper limit	5% to 120%	1%step Initial value:35%	①
75	F1	H.A upper limit (Phase N)	5% to 120%	1%step Initial value:35%	①
A1	3A	16bit set register	Refer to Table 6.9	—	⑤

When the group No. or channel No. of the above is not specified, the error code of invalid number is replied.
When out of the range is set, the error code of invalid data is replied, and set-up value is not changed.

Note1: From the most significant digit to 2 figures can be freely set up in the range of 5A to 30000A.

Note2: The set-up range is different by setting of phase wiring.

- At 3P4W

  Corresponds to only 190V, 415V, 440V, setting vaule is changed as follows.

Setting value	Using VT/ Direct input	Direct Voltage	VT secondary Voltage	VT primary Voltage
190V	Direct input	110V/190V	—	—
415V	Using VT	—	63.5V/110V	240V/415V
440V	Using VT	—	63.5V/110V	254V/440V

- At 3P3W_2CT, 3P3W_3CT
  - ◆ When set in the range from 221V to 750000V

    It is set “Using VT”, and sets the primary voltage which is transmitted.

    From the most significant digit to 3 figures can be freely set up in the range of 221V to 750000V.
  - ◆ At 110V or 220V

    It is set “Direct input”, and sets the primary voltage which is transmitted as the direct input voltage.

Note3: The set-up range is different by setting of phase wiring.

- At 3P4W
  - ◆ When set in the range from 278V to 750000V

    It is set “Using VT”, and sets the primary voltage which is transmitted.

    From the most significant digit to 3 figures can be freely set up in the range of 278V to 750000V.
  - ◆ At the 63.5V, 100V, 110V, 220V, 240V, 254V or 277V

    It is set “Direct input”, and sets the primary voltage which is transmitted as the direct input voltage.

- At 3P3W_2CT, 3P3W_3CT

  The error code of invalid channel number is replied.

Note4: The range of time constant is as follows. It is set by seconds.

0s, 10s, 20s, 30s, 40s, 50s, 1min, 2min, 3min, 4min, 5min, 6min, 7min, 8min, 9min, 10min, 15min, 20min, 25min, 30min.

Note5: The multiplicand value is changed by the set-up value of phase wiring, primary voltage, and primary current.

(Refer to P. 30)

6.2.3 About Error Occurrence

When the command and related data transmitted to ME96NSR is improper or ME96NSR is in H/W error, RX(n+1)A (Error status flag) becomes 1(ON), the error code shown in Table 6.12 is returned as reply data.

Table 6.12 Error Code

Error Description	Error Code (Hex.)
Illegal command or packet length	40h
Invalid group number	41h
Invalid channel number	42h
ME96NSR is in set-up mode or test mode	43h, 44h
Invalid data for set-up	51h
It is not set the item of alarm	55h

If an error occurs, the error code is written into the RWrn as shown in the figure below, and RX(n+1)A (error status flag) is turned on (error occurrence) and RX(n+1)B (remote READY) is turned off (normal communication stop). For the error resetting method, refer to “5.4 Error Communication”.

(1) At the command No. is in range

Remote register RWrn

	b15 b8	b7 b0
n	Channel No.	Group No.
n+1	00H	00H
n+2	00H	Error code
n+3	00H	00H

(2) At the command No. is out of range

Remote register RWrn

	b15 b8	b7 b0
n	00H	Error code
n+1	00H	00H
n+2	00H	00H
n+3	00H	00H

7. 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 perfom transient transmission.
RX	Remote input
RY	Remote output
RWw	Remote resister (write area)
RWr	Remote resister (read area)
Command	Identification code allocated to items to be monitored or set. ME96NSR uses a special-purpose command that is transmitted to monitor each measurement value or set each parameter.
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.

8. Program Example

8.1 Program Content

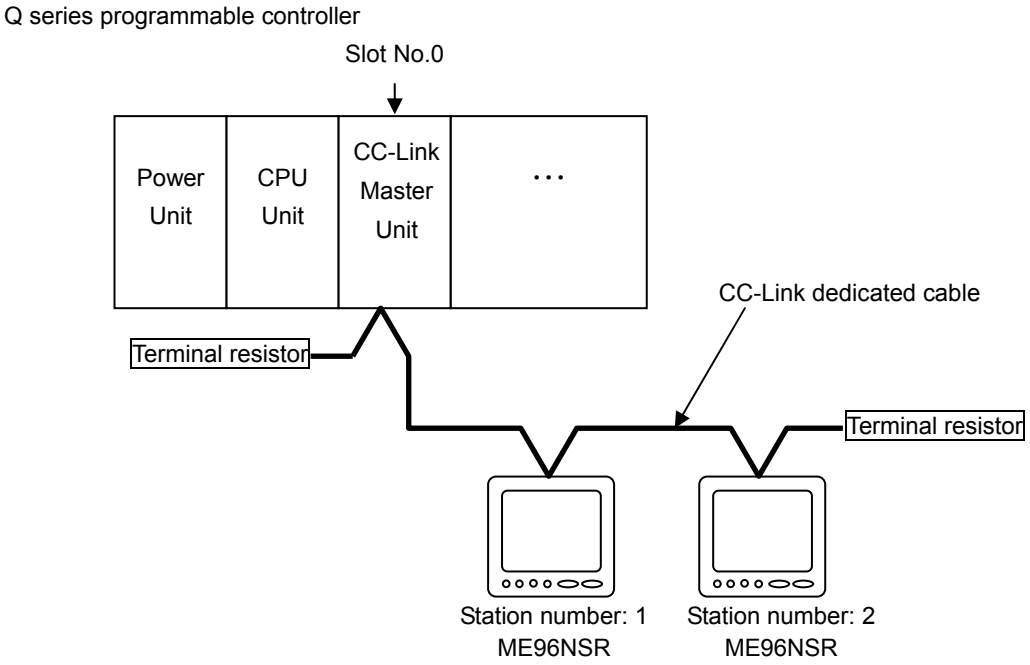
This program example is assumed the system configuration in below.

In the program, at first, the parameters of the linked number and station information are set, and the data link with the parameter of buffer memory startes up.

Next, the reading data shown in below is monitored continuously.

Also, this program is made by using “SW8D5C-GPPW GX Developer”.

8.2 System Configuration



※Reading data

Station number 1: ME96NSR	Phase 1 current, Phase 2 current, Phase 3 current, 1-N voltage, 2-N voltage, 3-N voltage, Phase 1 active power, Phase 2 active power, Phase 3 active power
Station number 2: ME96NSR	Active energy (import), Average current, Average L-N voltage, Total active power, Total reactive power, Total power factor, Frequency

8.3 Device Allocation

Allocation of transmitted device

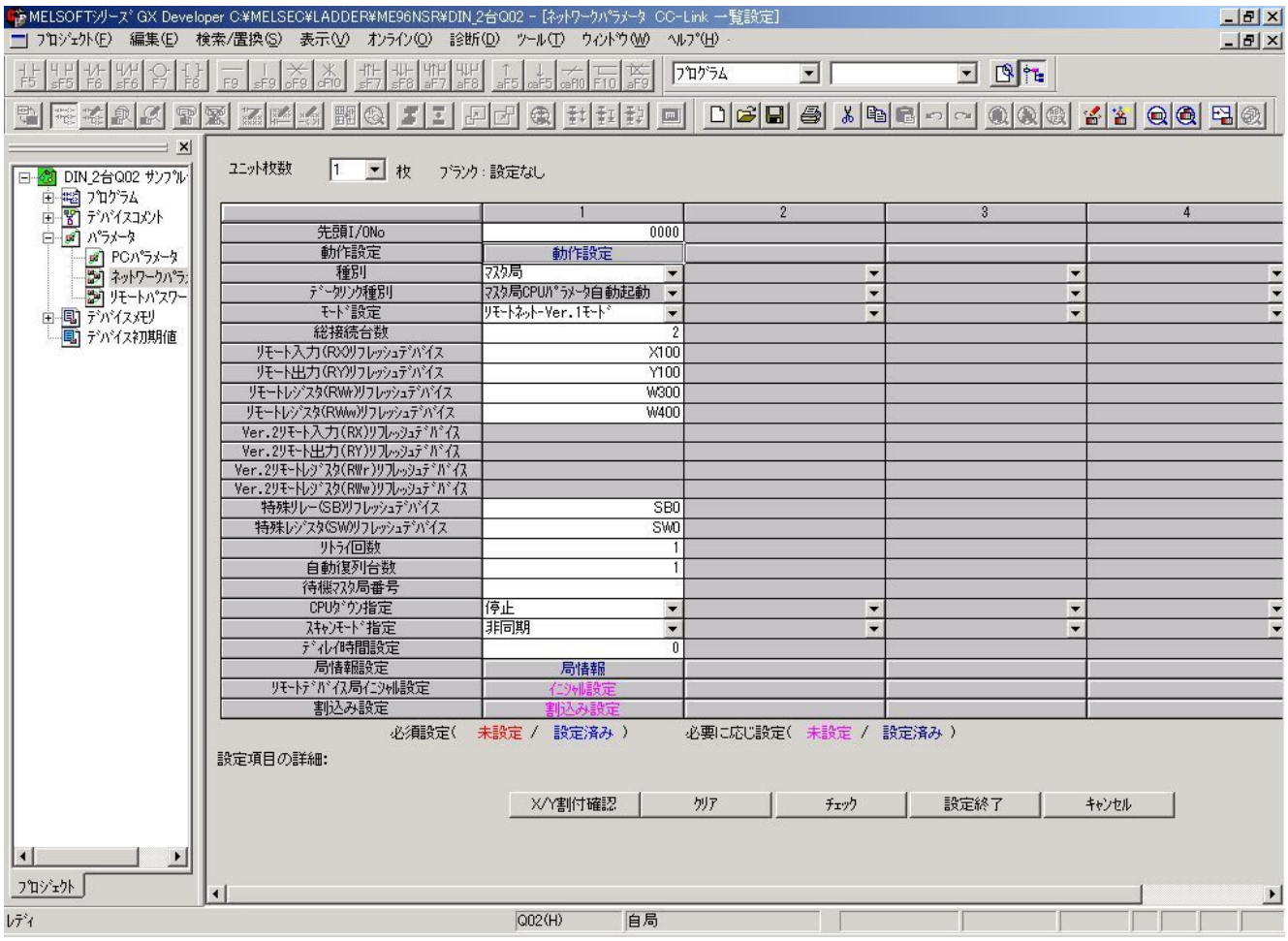
Items	Contents	Device No.	Note
Remote input(RX)	Station number 1:Remote input (RX00 to RX1F)	X100 to X11F	Set X100 to remote input(RX) refresh device.
	Station number 2:Remote input (RX20 to RX3F)	X120 to X13F	
Remote output(RY)	Station number 1:Remote output (RY00 to RY1F)	Y100 to Y11F	Set Y100 to remote output(RY) refresh device.
	Station number 2:Remote output (RY20 to RY3F)	Y120 to Y13F	
Remote register(RWr)	Station number 1:Remote register(RWr0 to RWr3)	W300 to W303	Set W300 to remote register(RWr) refresh device.
	Station number 2:Remote register (RWr4 to RWr7)	W304 to W307	
Remote register(RWw)	Station number 1:Remote register (RWw0 to RWw3)	W400 to W403	Set W400 to remote register(RWw) refresh device.
	Station number 2:Remote register (RWw4 to RWw7)	W404 to W407	
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.
Number of taking items	Station number 1: Number of monitoring items	D0	Number of items are mentioned in section 8.2.
	Station number 2: Number of monitoring items	D1	
Number of taken items	Station number 1: For calculation of number of taken items.	D10	
	Station number 2: For calculation of number of taken items.	D11	
Send data items	Station number 1: Send data for monitoring	D100 to D117	Content of items are mentioned in section 8.2.
	Station number 2: Send data for monitoring	D120 to D133	
Writing send data	Station number 1: Data for writing RWw	D400 to D403	
	Station number 2: Data for writing RWw	D404 to D407	
Reading recive data	Station number 1: Data for reading RWr	D300 to D303	
	Station number 2: Data for reading RWr	D304 to D307	
Error code	Station number 1: Error code	D500 to D503	
	Station number 2: Error code	D504 to D504	
Monitor data	Station number 1: Monitor data (only numeric value)	R0 to R17	
	Station number 2: Monitor data (only numeric value)	R40 to R33	
Data link status	Station number 1: Data link status	M0	
	Station number 2: Data link status	M1	
Command setting	Station number 1: Command setting completion flag	M100	
	Station number 2: Command setting completion flag	M110	
Transmitting completion	Station number 1: Transmitting completion flag	M101	
	Station number 2: Transmitting completion flag	M111	

8.4 Parameter Settings

Parameter settings are set as following with GX Developer.

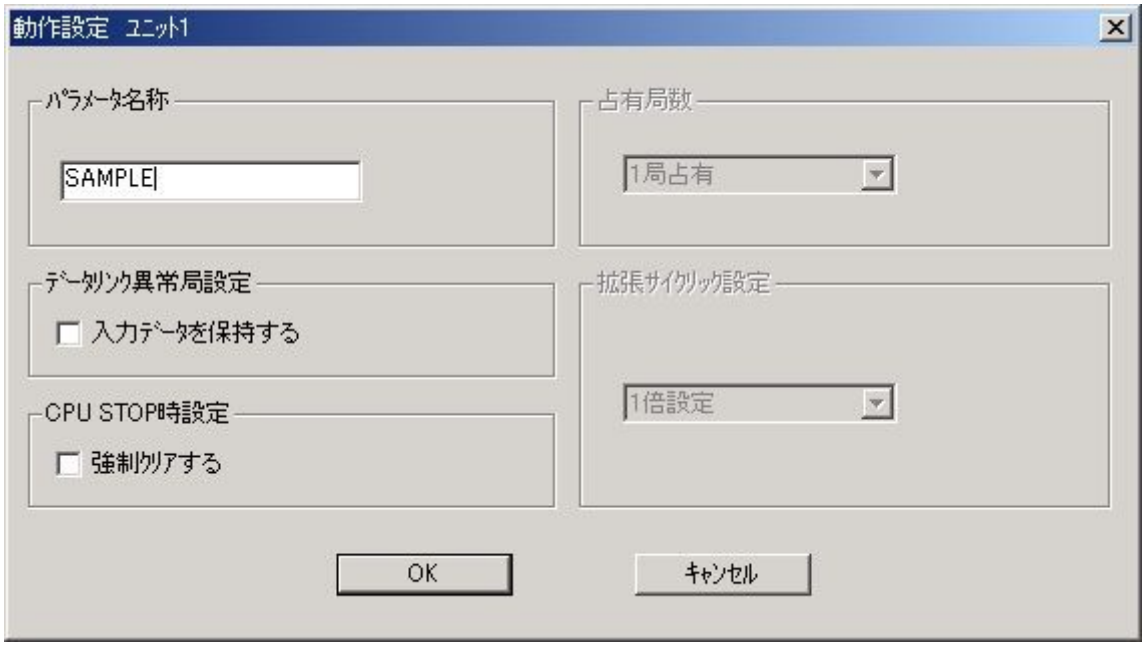
8.4.1 Network Parameter Settings and Auto Refresh Parameter Settings

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



8.4.2 Operational Settings

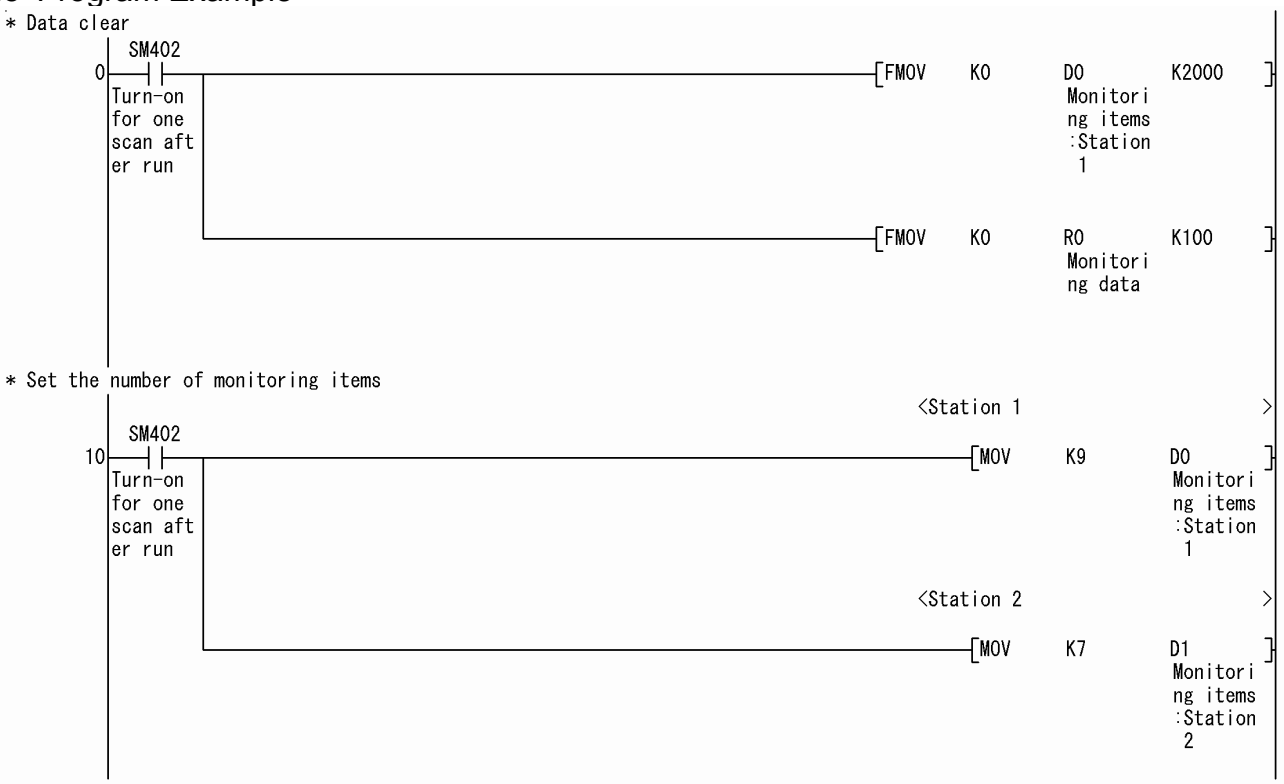
Operational settings are as follows.

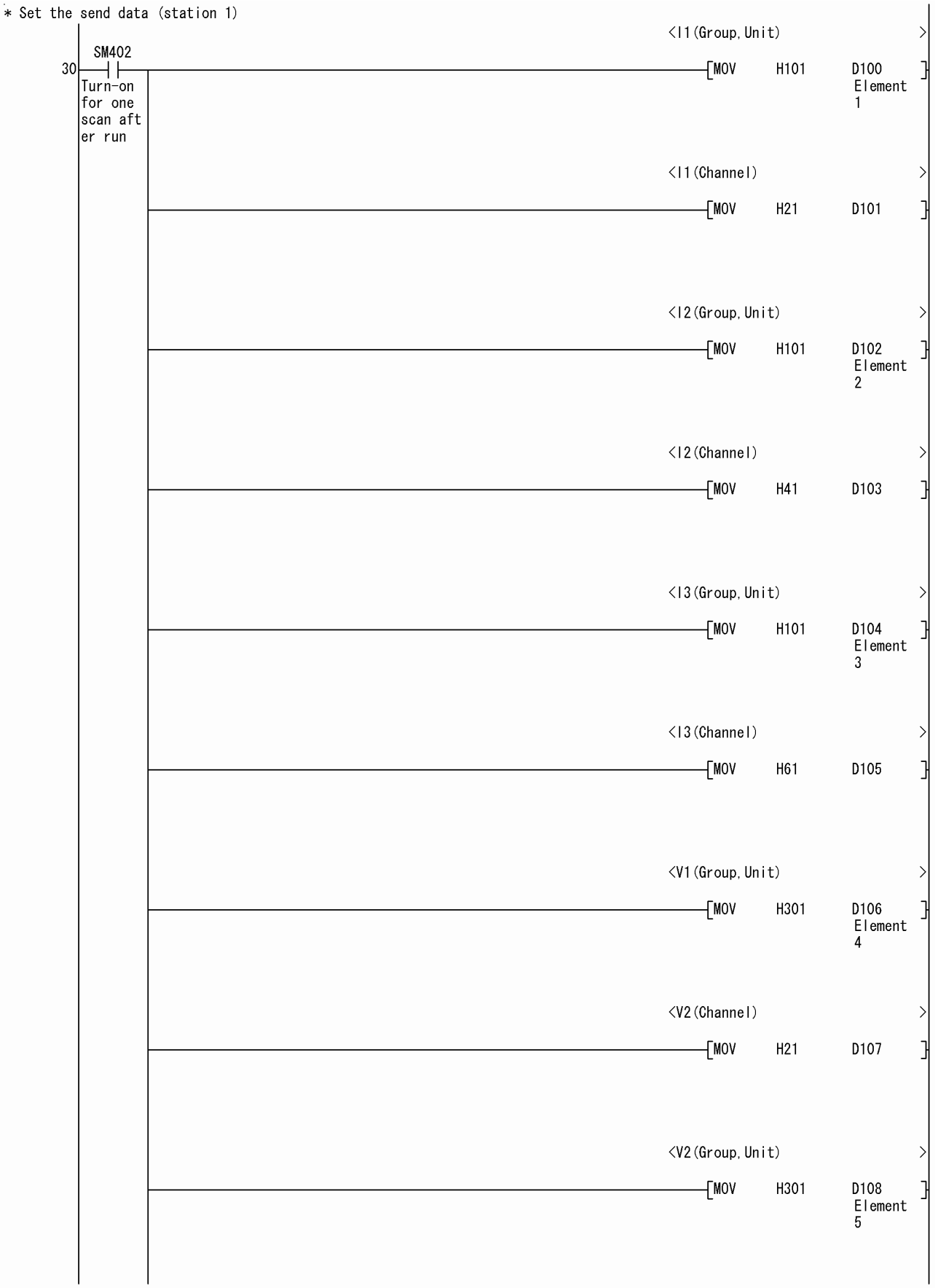


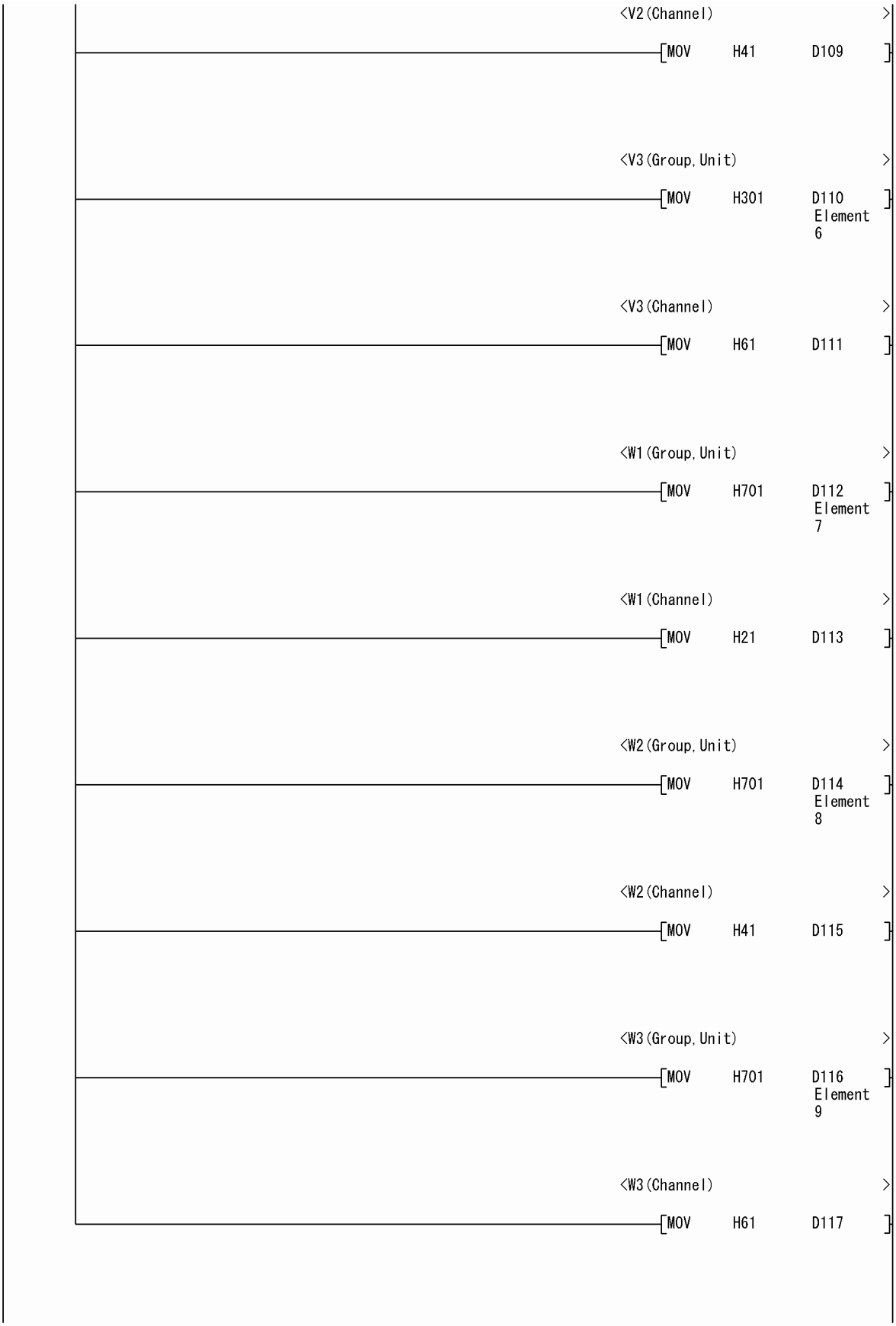
8.4.3 Station Information Settings

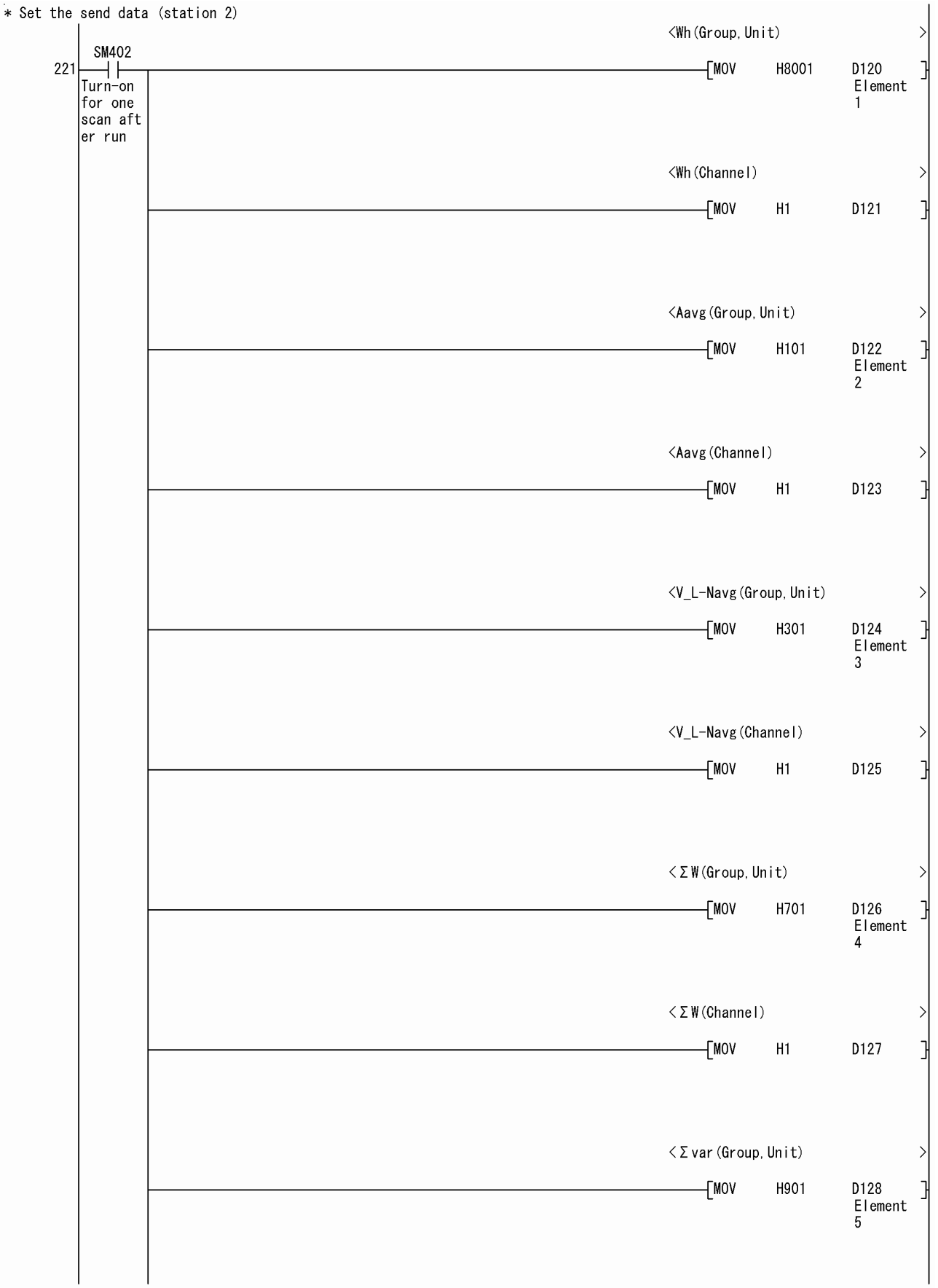
Station information settings are as follows.

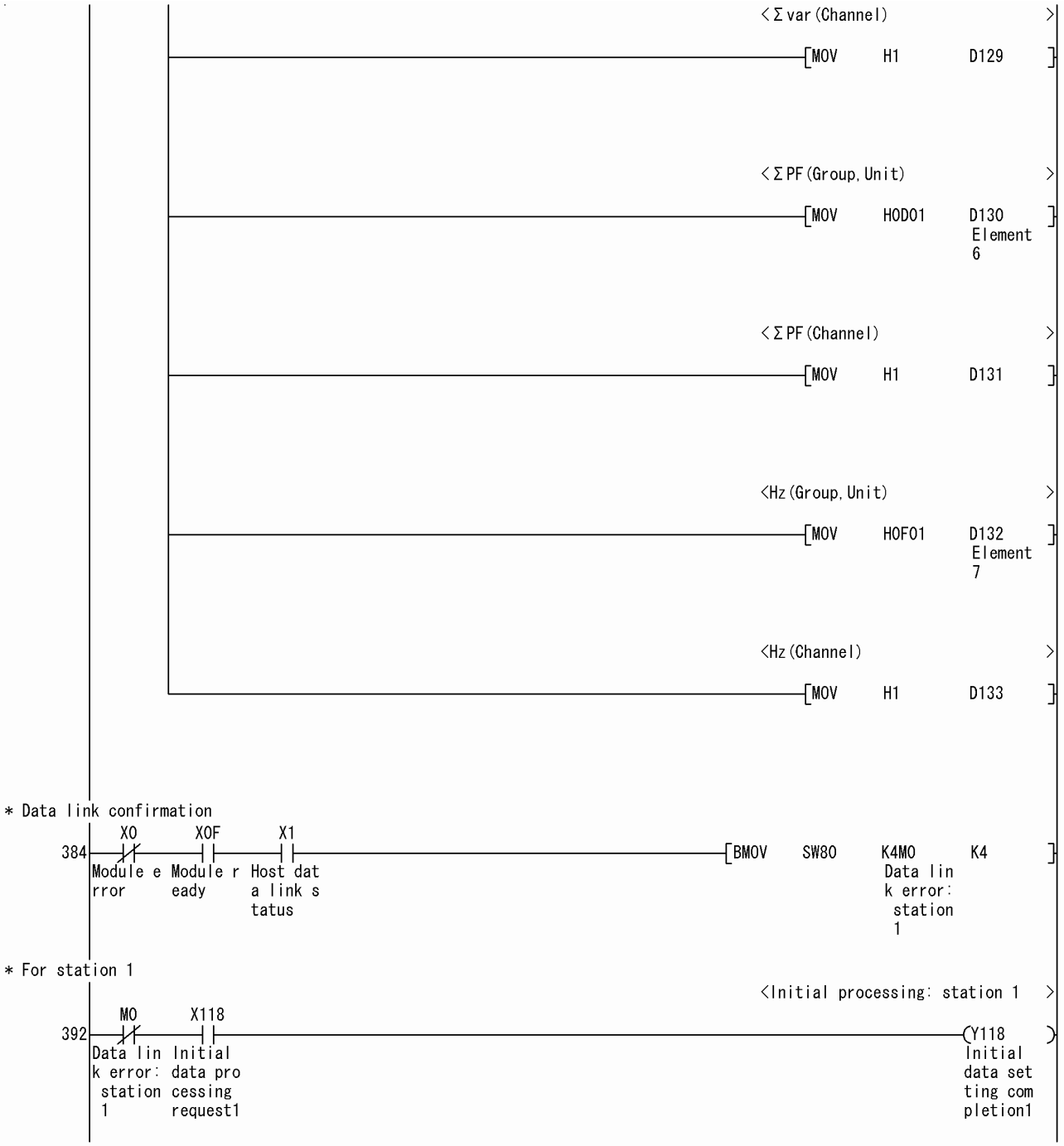
8.5 Program Example

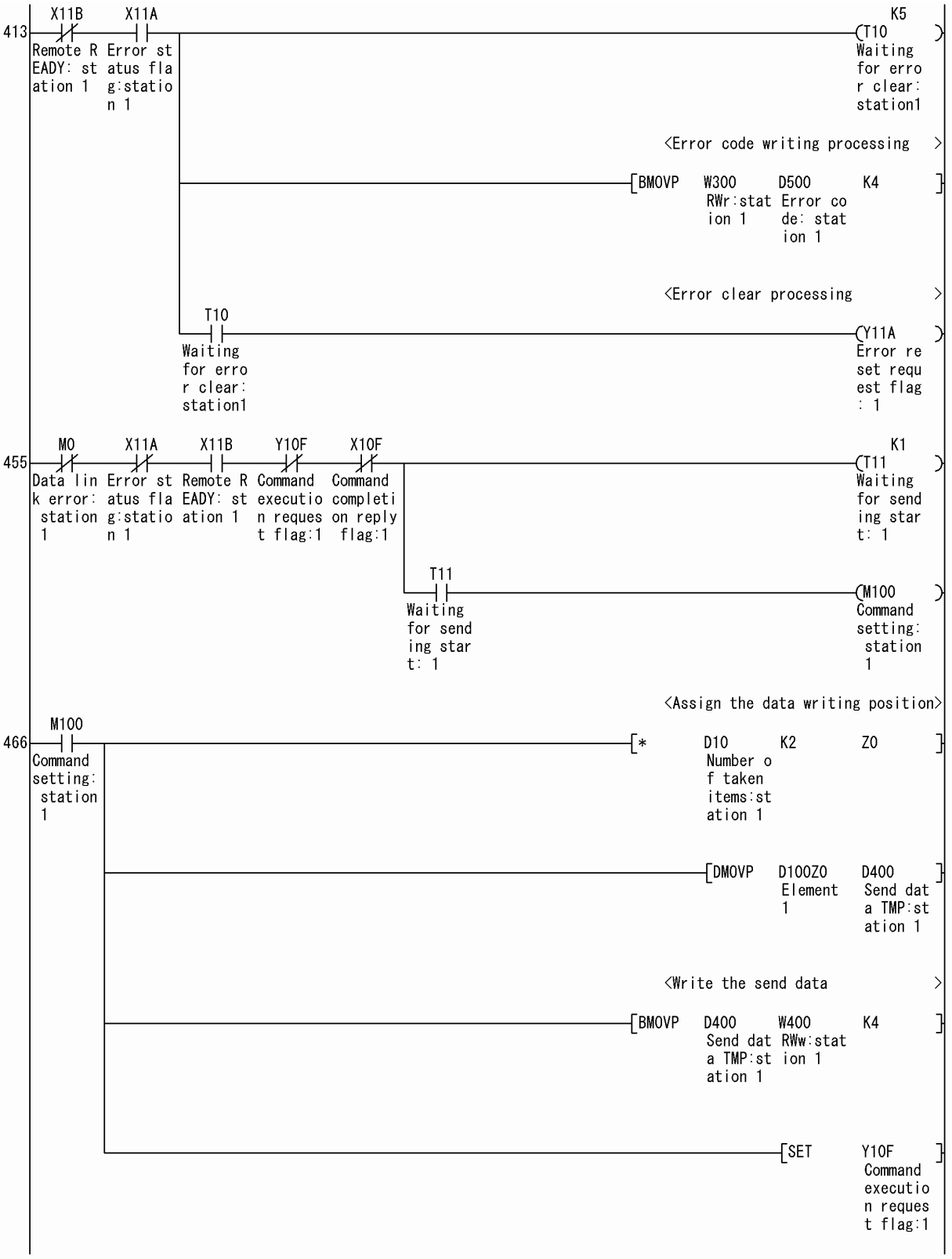


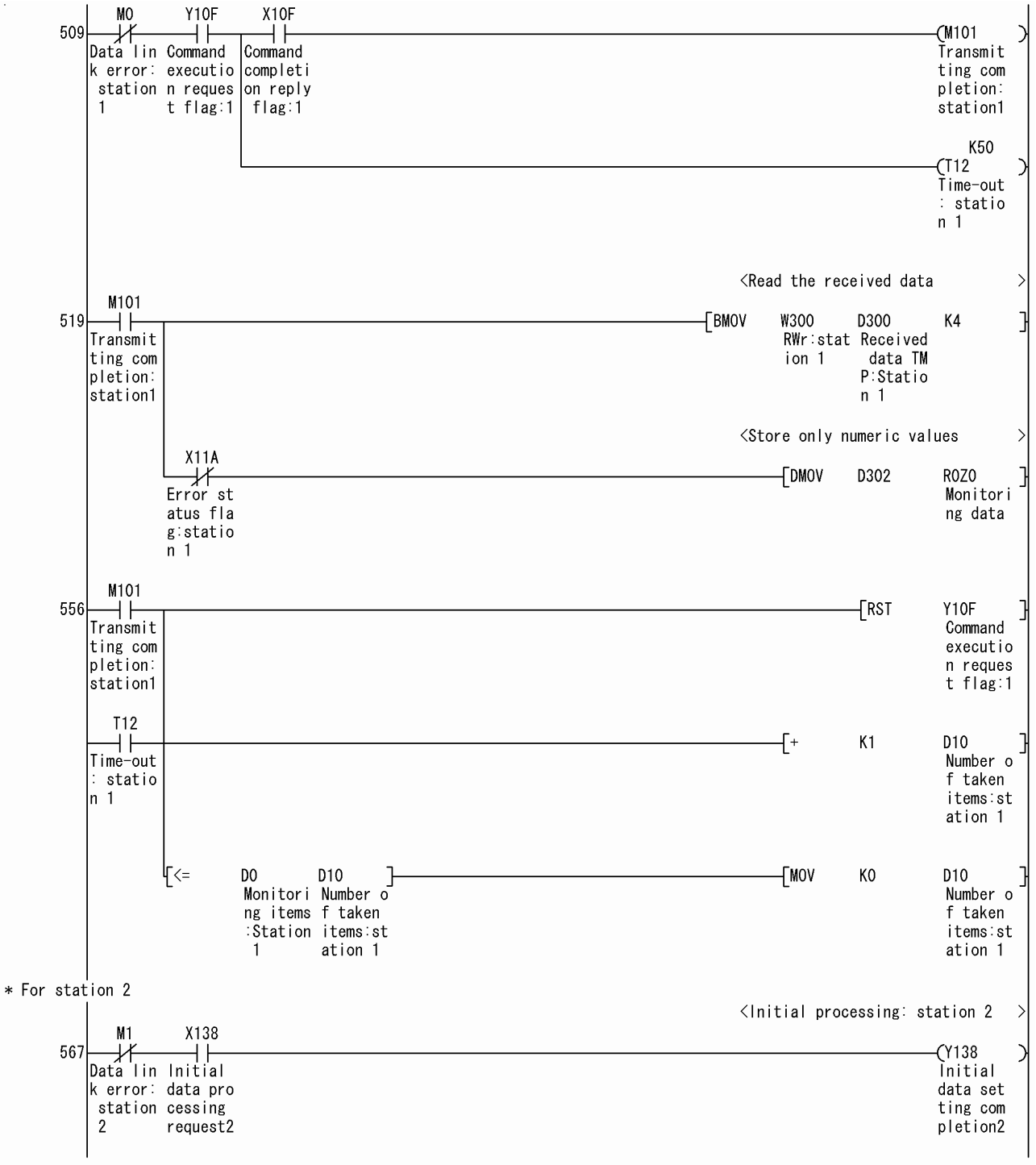

* Set the send data (station 1)
<I1(Group,Unit)
30
SM402
Turn-on for one scan after run
MOV H101 D100 Element 1
<I1(Channel)
MOV H21 D101
<I2(Group,Unit)
MOV H101 D102 Element 2
<I2(Channel)
MOV H41 D103
<I3(Group,Unit)
MOV H101 D104 Element 3
<I3(Channel)
MOV H61 D105
<V1(Group,Unit)
MOV H301 D106 Element 4
<V2(Channel)
MOV H21 D107
<V2(Group,Unit)
MOV H301 D108 Element 5

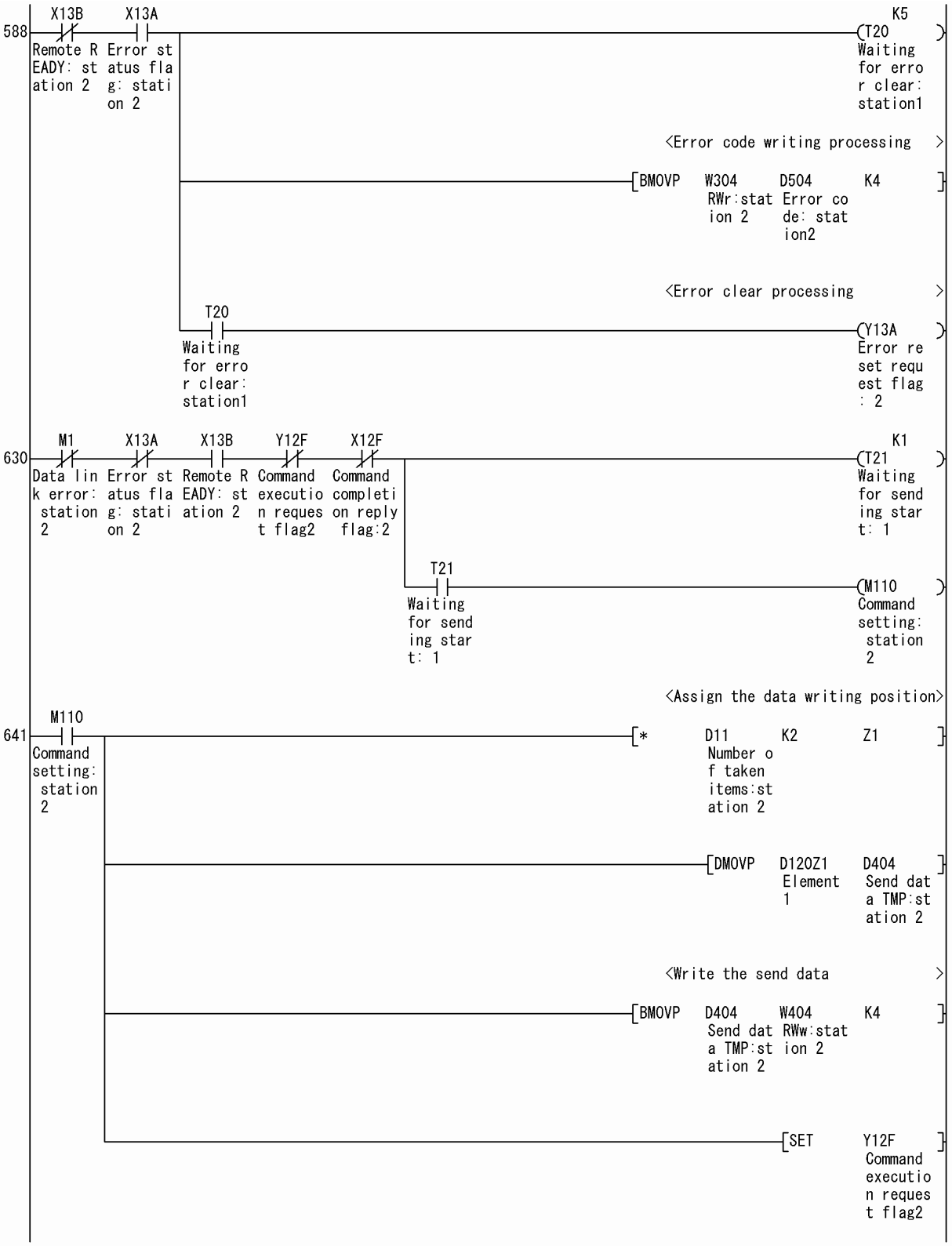

<V2(Channel)
MOV H41 D109
<V3(Group,Unit)
MOV H301 D110
Element
6
<V3(Channel)
MOV H61 D111
<W1(Group,Unit)
MOV H701 D112
Element
7
<W1(Channel)
MOV H21 D113
<W2(Group,Unit)
MOV H701 D114
Element
8
<W2(Channel)
MOV H41 D115
<W3(Group,Unit)
MOV H701 D116
Element
9
<W3(Channel)
MOV H61 D117

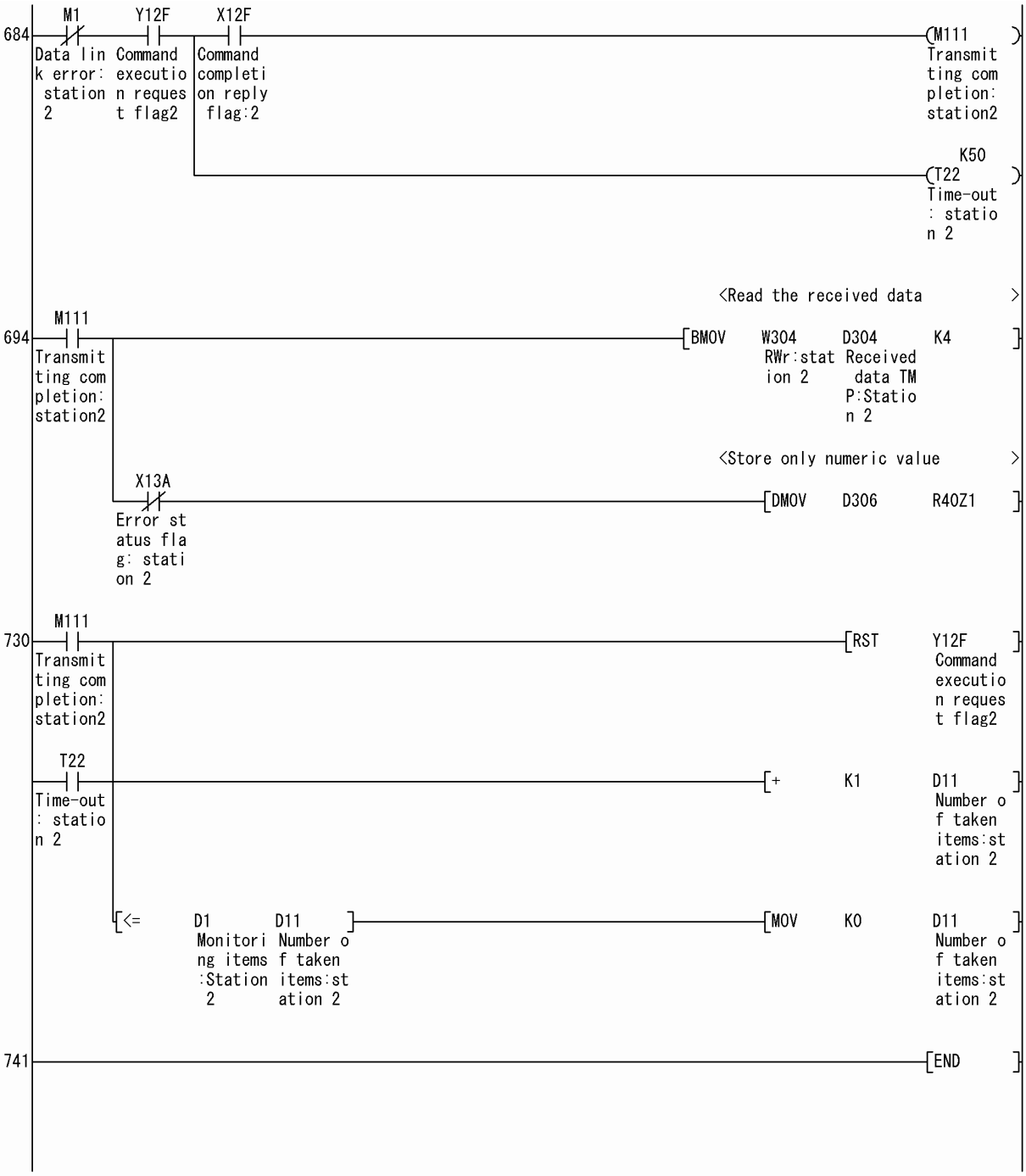

* Set the send data (station 2)
<Wh(Group,Unit)
SM402
221
MOV H8001 D120 Element 1
Turn-on for one scan after run
<Wh(Channel)
MOV H1 D121
<Aavg(Group,Unit)
MOV H101 D122 Element 2
<Aavg(Channel)
MOV H1 D123
<V_L-Navg(Group,Unit)
MOV H301 D124 Element 3
<V_L-Navg(Channel)
MOV H1 D125
<ΣW(Group,Unit)
MOV H701 D126 Element 4
<ΣW(Channel)
MOV H1 D127
<Σvar(Group,Unit)
MOV H901 D128 Element 5


< Σ var (Channel)
MOV H1 D129
< Σ PF (Group, Unit)
MOV HOD01 D130
Element 6
< Σ PF (Channel)
MOV H1 D131
< Hz (Group, Unit)
MOV HOF01 D132
Element 7
< Hz (Channel)
MOV H1 D133
* Data link confirmation
384
X0
Module error
X0F
Module ready
X1
Host data link status
BMOV SW80 K4M0 K4
Data link error: station 1
* For station 1
< Initial processing: station 1
392
M0
Data link error: station 1
X118
Initial data processing request1
Y118
Initial data setting completion1


413
X11B
Remote READY: station 1
X11A
Error status flag:station 1
K5
T10
Waiting for error clear: station1
<Error code writing processing
BMOVP
W300
RWr:station 1
D500
Error code: station 1
K4
<Error clear processing
T10
Waiting for error clear: station1
Y11A
Error reset request flag: 1
455
M0
Data link error: station 1
X11A
Error status flag:station 1
X11B
Remote READY: station 1
Y10F
Command execution request flag:1
X10F
Command completion reply flag:1
K1
T11
Waiting for sending start: 1
T11
Waiting for sending start: 1
M100
Command setting: station 1
<Assign the data writing position>
466
M100
Command setting: station 1
*
D10
Number of taken items:station 1
K2
Z0
DMOVP
D100Z0
Element 1
D400
Send data TMP:station 1
<Write the send data
BMOVP
D400
Send data TMP:station 1
W400
RWw:station 1
K4
SET
Y10F
Command execution request flag:1


509
M0
Data link error: station 1
Y10F
Command execution request flag:1
X10F
Command completion reply flag:1
M101
Transmitting completion: station1
K50
T12
Time-out: station 1
<Read the received data
519
M101
Transmitting completion: station1
BMOV W300 D300 K4
RWr:station 1
Received data TMP:Station 1
<Store only numeric values
X11A
Error status flag:station 1
DMOV D302 R0Z0
Monitoring data
556
M101
Transmitting completion: station1
RST Y10F
Command execution request flag:1
T12
Time-out: station 1
+ K1 D10
Number of taken items:station 1
<= D0 D10
Monitoring items:Station 1
Number of taken items:station 1
MOV K0 D10
Number of taken items:station 1
* For station 2
<Initial processing: station 2
567
M1
Data link error: station 2
X138
Initial data processing request2
Y138
Initial data setting completion2


588
X13B
Remote READY: station 2
X13A
Error status flag: station 2
K5
T20
Waiting for error clear: station1
<Error code writing processing
BMOVP
W304
RWr:station 2
D504
Error code: station2
K4
<Error clear processing
T20
Waiting for error clear: station1
Y13A
Error reset request flag: 2
630
M1
Data link error: station 2
X13A
Error status flag: station 2
X13B
Remote READY: station 2
Y12F
Command execution request flag2
X12F
Command completion reply flag:2
K1
T21
Waiting for sending start: 1
T21
Waiting for sending start: 1
M110
Command setting: station 2
<Assign the data writing position>
641
M110
Command setting: station 2
*
D11
Number of taken items:station 2
K2
Z1
DMOVP
D120Z1
Element 1
D404
Send data TMP:station 2
<Write the send data
BMOVP
D404
Send data TMP:station 2
W404
RWw:station 2
K4
SET
Y12F
Command execution request flag2


684
M1
Data link error: station 2
Y12F
Command execution request flag2
X12F
Command completion reply flag:2
M111
Transmitting completion: station2
K50
T22
Time-out: station 2
<Read the received data
694
M111
Transmitting completion: station2
BMOV
W304
RWr:station 2
D304
Received data TMP:Station 2
K4
<Store only numeric value
X13A
Error status flag: station 2
DMOV
D306
R40Z1
730
M111
Transmitting completion: station2
RST
Y12F
Command execution request flag2
T22
Time-out: station 2
+
K1
D11
Number of taken items:station 2
<=
D1
Monitoring items :Station 2
D11
Number of taken items:station 2
MOV
K0
D11
Number of taken items:station 2
741
END

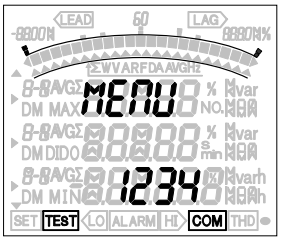
9. Test Function Mode

ME96NSR has the test function mode which the fixed values are replied if there is no input. It can be used to check the communication to PLC.

9.1 How to Test

To do the test, it is necessary to operate the main device.
Operate as follows.

①At the state of power failure, turn on the power supply while pressing the DISPLAY of main device.
②After display on the right shows up, take the normal communication.
③Data shown in the next section is replied.



When the test is finished, turn off the power supply.

9.2 Reply Data

The reply data at test function mode is shown in the next page or later.
The reply data takes the value of primary side, but the data of table 9.1 is described the secondary side.
It is necessary to convert to the value of primary side using the VT ratio and CT ratio.

(Example)At three phase 3-wire, VT: 6600V/110V, CT: 100A/5A

- ・Phase 1 current (Inst.) = reply data(secondary side)×CT ratio.
  = 4.11A × 100A/5A = 82.2A
- ・1-2 voltage (Inst.) = reply data(secondary side)×VT ratio.
  = 101.1V × 6600V/110V = 6066V
- ・Total active power (Inst.) = reply data(secondary side)×VT ratio×CT ratio.
  = 1041W × 6600V/110V × 100A/5A = 1249.2kW

Table 9.1 Reply data

Unit No.	Group (h)	Ch. (h)	Name of Channel			Data Type	3P4W reply data (Secondary side)		3P3W_2CT reply data (Secondary side)		3P3W_3CT reply data (Secondary side)		Note
							Data	Unit	Data	Unit	Data	Unit	
0	F0	2	Model code			⑤	—	—	—	—	—	—	
0	E0	11	Primary current			④	—	—	—	—	—	—	
0	E0	12	Primary voltage(L-L)			④	—	—	—	—	—	—	
0	E0	1B	Primary voltage(L-N)			④	—	—	—	—	—	—	
0	E0	1C	Secondary voltage(L-N)			④	—	—	—	—	—	—	
0	E0	13	Phase & Wiring			⑤	—	—	—	—	—	—	
0	E0	18	Alarm Items			⑥	—	—	—	—	—	—	
0	E0	19	Byte monitor			⑤	—	—	—	—	—	—	
0	E0	1A	reserved				—	—	—	—	—	—	
0	2	E0	Time constant for DA	sec.		⑤	—	—	—	—	—	—	
0	1	1	Average current	A	Inst.	①	4.31	A	4.41	A	4.31	A	
0	1	21	Phase 1 current	A	Inst.	①	4.11	A	4.11	A	4.11	A	
0	1	41	Phase 2 current	A	Inst.	①	4.21	A	4.51	A	4.21	A	
0	1	61	Phase 3 current	A	Inst.	①	4.61	A	4.61	A	4.61	A	
0	1	81	Phase N current	A	Inst.	①	4.51	A	—	—	—	—	
0	1	2	Average current	A	max.	①	4.32	A	4.42	A	4.32	A	
0	1	22	Phase 1 current	A	max.	①	4.12	A	4.12	A	4.12	A	
0	1	42	Phase 2 current	A	max.	①	4.22	A	4.52	A	4.22	A	
0	1	62	Phase 3 current	A	max.	①	4.62	A	4.62	A	4.62	A	
0	1	82	Phase N current	A	max.	①	4.52	A	—	—	—	—	
0	1	5	Average current	A	min.	①	4.30	A	4.40	A	4.30	A	
0	1	25	Phase 1 current	A	min.	①	4.10	A	4.10	A	4.10	A	
0	1	45	Phase 2 current	A	min.	①	4.20	A	4.50	A	4.20	A	
0	1	65	Phase 3 current	A	min.	①	4.60	A	4.60	A	4.60	A	
0	1	85	Phase N current	A	min.	①	4.50	A	—	—	—	—	
0	2	1	Average current demand	A	Inst.	①	4.31	A	4.41	A	4.31	A	
0	2	21	Phase 1 current demand	A	Inst.	①	4.11	A	4.11	A	4.11	A	
0	2	41	Phase 2 current demand	A	Inst.	①	4.21	A	4.51	A	4.21	A	
0	2	61	Phase 3 current demand	A	Inst.	①	4.61	A	4.61	A	4.61	A	
0	2	81	Phase N current demand	A	Inst.	①	4.51	A	—	—	—	—	
0	2	2	Average current demand	A	max.	①	4.32	A	4.42	A	4.32	A	
0	2	22	Phase 1 current demand	A	max.	①	4.12	A	4.12	A	4.12	A	
0	2	42	Phase 2 current demand	A	max.	①	4.22	A	4.52	A	4.22	A	
0	2	62	Phase 3 current demand	A	max.	①	4.62	A	4.62	A	4.62	A	
0	2	82	Phase N current demand	A	max.	①	4.52	A	—	—	—	—	
0	2	5	Average current demand	A	min.	①	4.30	A	4.40	A	4.30	A	
0	2	25	Phase 1 current demand	A	min.	①	4.10	A	4.10	A	4.10	A	
0	2	45	Phase 2 current demand	A	min.	①	4.20	A	4.50	A	4.20	A	
0	2	65	Phase 3 current demand	A	min.	①	4.60	A	4.60	A	4.60	A	
0	2	85	Phase N current demand	A	min.	①	4.50	A	—	—	—	—	
0	5	1	Average L-L voltage	V	Inst.	①	173.1	V	127.8	V	127.8	V	
0	5	21	1-2 voltage	V	Inst.	①	171.1	V	101.1	V	101.1	V	
0	5	41	2-3 voltage	V	Inst.	①	172.1	V	106.1	V	106.1	V	
0	5	61	3-1 voltage	V	Inst.	①	176.1	V	176.1	V	176.1	V	
0	5	2	Average L-L voltage	V	max.	①	173.2	V	127.9	V	127.9	V	
0	5	22	1-2 voltage	V	max.	①	171.2	V	101.2	V	101.2	V	
0	5	42	2-3 voltage	V	max.	①	172.2	V	106.2	V	106.2	V	
0	5	62	3-1 voltage	V	max.	①	176.2	V	176.2	V	176.2	V	
0	5	5	Average L-L voltage	V	min.	①	173.0	V	127.7	V	127.7	V	
0	5	25	1-2 voltage	V	min.	①	171.0	V	101.0	V	101.0	V	
0	5	45	2-3 voltage	V	min.	①	172.0	V	106.0	V	106.0	V	
0	5	65	3-1 voltage	V	min.	①	176.0	V	176.0	V	176.0	V	

Unit No.	Group (h)	Ch. (h)	Name of Channel			Data Type	3P4W reply data (Secondary side)		3P3W_2CT reply data (Secondary side)		3P3W_3CT reply data (Secondary side)		Note
							Data	Unit	Data	Unit	Data	Unit	
0	3	1	Average L-N voltage	V	Inst.	①	103.1	V	—	—	—	—	
0	3	21	1-N voltage	V	Inst.	①	101.1	V	—	—	—	—	
0	3	41	2-N voltage	V	Inst.	①	102.1	V	—	—	—	—	
0	3	61	3-N voltage	V	Inst.	①	106.1	V	—	—	—	—	
0	3	2	Average L-N voltage	V	max.	①	103.2	V	—	—	—	—	
0	3	22	1-N voltage	V	max.	①	101.2	V	—	—	—	—	
0	3	42	2-N voltage	V	max.	①	102.2	V	—	—	—	—	
0	3	62	3-N voltage	V	max.	①	106.2	V	—	—	—	—	
0	3	5	Average L-N voltage	V	min.	①	103.0	V	—	—	—	—	
0	3	25	1-N voltage	V	min.	①	101.0	V	—	—	—	—	
0	3	45	2-N voltage	V	min.	①	102.0	V	—	—	—	—	
0	3	65	3-N voltage	V	min.	①	106.0	V	—	—	—	—	
0	7	1	Total active power	kW	Inst.	①	1041	W	1041	W	1041	W	
0	7	21	Phase 1 active power	kW	Inst.	①	1011	W	—	—	—	—	
0	7	41	Phase 2 active power	kW	Inst.	①	1021	W	—	—	—	—	
0	7	61	Phase 3 active power	kW	Inst.	①	1031	W	—	—	—	—	
0	7	2	Total active power	kW	max.	①	1042	W	1042	W	1042	W	
0	7	22	Phase 1 active power	kW	max.	①	1012	W	—	—	—	—	
0	7	42	Phase 2 active power	kW	max.	①	1022	W	—	—	—	—	
0	7	62	Phase 3 active power	kW	max.	①	1032	W	—	—	—	—	
0	7	5	Total active power	kW	min.	①	1040	W	1040	W	1040	W	
0	7	25	Phase 1 active power	kW	min.	①	1010	W	—	—	—	—	
0	7	45	Phase 2 active power	kW	min.	①	1020	W	—	—	—	—	
0	7	65	Phase 3 active power	kW	min.	①	1030	W	—	—	—	—	
0	9	1	Total reactive power	kvar	Inst.	①	741	var	741	var	741	var	
0	9	21	Phase 1 reactive power	kvar	Inst.	①	711	var	—	—	—	—	
0	9	41	Phase 2 reactive power	kvar	Inst.	①	721	var	—	—	—	—	
0	9	61	Phase 3 reactive power	kvar	Inst.	①	731	var	—	—	—	—	
0	9	2	Total reactive power	kvar	max.	①	742	var	742	var	742	var	
0	9	22	Phase 1 reactive power	kvar	max.	①	712	var	—	—	—	—	
0	9	42	Phase 2 reactive power	kvar	max.	①	722	var	—	—	—	—	
0	9	62	Phase 3 reactive power	kvar	max.	①	732	var	—	—	—	—	
0	9	5	Total reactive power	kvar	min.	①	740	var	740	var	740	var	
0	9	25	Phase 1 reactive power	kvar	min.	①	710	var	—	—	—	—	
0	9	45	Phase 2 reactive power	kvar	min.	①	720	var	—	—	—	—	
0	9	65	Phase 3 reactive power	kvar	min.	①	730	var	—	—	—	—	
1	0B	1	Total apparent power	kVA	Inst.	①	1241	VA	—	—	—	—	
1	0B	21	Phase 1 apparent power	kVA	Inst.	①	1211	VA	—	—	—	—	
1	0B	41	Phase 2 apparent power	kVA	Inst.	①	1221	VA	—	—	—	—	
1	0B	61	Phase 3 apparent power	kVA	Inst.	①	1231	VA	—	—	—	—	
1	0B	2	Total apparent power	kVA	max.	①	1242	VA	—	—	—	—	
1	0B	22	Phase 1 apparent power	kVA	max.	①	1212	VA	—	—	—	—	
1	0B	42	Phase 2 apparent power	kVA	max.	①	1222	VA	—	—	—	—	
1	0B	62	Phase 3 apparent power	kVA	max.	①	1232	VA	—	—	—	—	
1	0B	5	Total apparent power	kVA	min.	①	1240	VA	—	—	—	—	
1	0B	25	Phase 1 apparent power	kVA	min.	①	1210	VA	—	—	—	—	
1	0B	45	Phase 2 apparent power	kVA	min.	①	1220	VA	—	—	—	—	
1	0B	65	Phase 3 apparent power	kVA	min.	①	1230	VA	—	—	—	—	

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	3P4W reply data (Secondary side)		3P3W_2CT reply data (Secondary side)		3P3W_3CT reply data (Secondary side)		Note
								Data	Unit	Data	Unit	Data	Unit	
0	0D	1	Total power factor	%	Inst.		①	84.1	%	84.1	%	84.1	%	
0	0D	21	Phase 1 power factor	%	Inst.		①	81.1	%	—	—	—	—	
0	0D	41	Phase 2 power factor	%	Inst.		①	82.1	%	—	—	—	—	
0	0D	61	Phase 3 power factor	%	Inst.		①	83.1	%	—	—	—	—	
0	0D	2	Total power factor	%	max.		①	84.0	%	84.0	%	84.0	%	
0	0D	22	Phase 1 power factor	%	max.		①	81.0	%	—	—	—	—	
0	0D	42	Phase 2 power factor	%	max.		①	81.9	%	—	—	—	—	
0	0D	62	Phase 3 power factor	%	max.		①	83.0	%	—	—	—	—	
0	0D	5	Total power factor	%	min.		①	84.2	%	84.2	%	84.2	%	
0	0D	25	Phase 1 power factor	%	min.		①	81.2	%	—	—	—	—	
0	0D	45	Phase 2 power factor	%	min.		①	82.2	%	—	—	—	—	
0	0D	65	Phase 3 power factor	%	min.		①	83.2	%	—	—	—	—	
0	0F	1	Frequency	Hz	Inst.		①	50.0	Hz	50.0	Hz	50.0	Hz	
0	0F	2	Frequency	Hz	max.		①	51.0	Hz	51.0	Hz	51.0	Hz	
0	0F	5	Frequency	Hz	min.		①	49.0	Hz	49.0	Hz	49.0	Hz	
0	63	21	1-2 H.V	V	Inst.	Total	①	—	—	78.9	V	78.9	V	
0	4D	21	1-2 H.V	V	Inst.	1st	①	—	—	91.1	V	91.1	V	
0	4F	21	1-2 H.V	V	Inst.	3rd	①	—	—	36.1	V	36.1	V	
0	51	21	1-2 H.V	V	Inst.	5th	①	—	—	35.1	V	35.1	V	
0	53	21	1-2 H.V	V	Inst.	7th	①	—	—	34.1	V	34.1	V	
0	55	21	1-2 H.V	V	Inst.	9th	①	—	—	33.1	V	33.1	V	
0	57	21	1-2 H.V	V	Inst.	11th	①	—	—	32.1	V	32.1	V	
0	59	21	1-2 H.V	V	Inst.	13th	①	—	—	20.1	V	20.1	V	
0	76	86	1-2 H.V D. ratio	%	Inst.	Total	①	—	—	86.6	%	86.6	%	
0	76	73	1-2 H.V D. ratio	%	Inst.	3rd	①	—	—	39.6	%	39.6	%	
0	76	75	1-2 H.V D. ratio	%	Inst.	5th	①	—	—	38.5	%	38.5	%	
0	76	77	1-2 H.V D. ratio	%	Inst.	7th	①	—	—	37.4	%	37.4	%	
0	76	79	1-2 H.V D. ratio	%	Inst.	9th	①	—	—	36.3	%	36.3	%	
0	76	7B	1-2 H.V D. ratio	%	Inst.	11th	①	—	—	35.2	%	35.2	%	
0	76	7D	1-2 H.V D. ratio	%	Inst.	13th	①	—	—	22.1	%	22.1	%	
0	63	41	2-3 H.V	V	Inst.	Total	①	—	—	79.3	V	79.3	V	
0	4D	41	2-3 H.V	V	Inst.	1st	①	—	—	91.3	V	91.3	V	
0	4F	41	2-3 H.V	V	Inst.	3rd	①	—	—	35.9	V	35.9	V	
0	51	41	2-3 H.V	V	Inst.	5th	①	—	—	34.9	V	34.9	V	
0	53	41	2-3 H.V	V	Inst.	7th	①	—	—	34.3	V	34.3	V	
0	55	41	2-3 H.V	V	Inst.	9th	①	—	—	33.3	V	33.3	V	
0	57	41	2-3 H.V	V	Inst.	11th	①	—	—	32.3	V	32.3	V	
0	59	41	2-3 H.V	V	Inst.	13th	①	—	—	21.3	V	21.3	V	
0	76	9C	2-3 H.V D. ratio	%	Inst.	Total	①	—	—	86.9	%	86.9	%	
0	76	89	2-3 H.V D. ratio	%	Inst.	3rd	①	—	—	39.3	%	39.3	%	
0	76	8B	2-3 H.V D. ratio	%	Inst.	5th	①	—	—	38.2	%	38.2	%	
0	76	8D	2-3 H.V D. ratio	%	Inst.	7th	①	—	—	37.6	%	37.6	%	
0	76	8F	2-3 H.V D. ratio	%	Inst.	9th	①	—	—	36.5	%	36.5	%	
0	76	91	2-3 H.V D. ratio	%	Inst.	11th	①	—	—	35.4	%	35.4	%	
0	76	93	2-3 H.V D. ratio	%	Inst.	13th	①	—	—	23.3	%	23.3	%	
0	76	DE	L-L H.V D. ratio	%	max.	Total	①	—	—	91.7	%	91.7	%	
0	4D	A2	L-L H.V	V	max.	1st	①	—	—	91.8	V	91.8	V	
0	76	CB	L-L H.V D. ratio	%	max.	3rd	①	—	—	40.1	%	40.1	%	
0	76	CD	L-L H.V D. ratio	%	max.	5th	①	—	—	39.1	%	39.1	%	
0	76	CF	L-L H.V D. ratio	%	max.	7th	①	—	—	37.9	%	37.9	%	
0	76	D1	L-L H.V D. ratio	%	max.	9th	①	—	—	36.8	%	36.8	%	
0	76	D3	L-L H.V D. ratio	%	max.	11th	①	—	—	35.7	%	35.7	%	
0	76	D5	L-L H.V D. ratio	%	max.	13th	①	—	—	34.8	%	34.8	%	

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	3P4W reply data (Secondary side)		3P3W_2CT reply data (Secondary side)		3P3W_3CT reply data (Secondary side)		Note
								Data	Unit	Data	Unit	Data	Unit	
0	4B	21	1-N H.V	V	Inst.	Total	①	78.9	V	—	—	—	—	
0	35	21	1-N H.V	V	Inst.	1st	①	91.1	V	—	—	—	—	
1	37	21	1-N H.V	V	Inst.	3rd	①	36.1	V	—	—	—	—	
1	39	21	1-N H.V	V	Inst.	5th	①	35.1	V	—	—	—	—	
1	3B	21	1-N H.V	V	Inst.	7th	①	34.1	V	—	—	—	—	
1	3D	21	1-N H.V	V	Inst.	9th	①	33.1	V	—	—	—	—	
1	3F	21	1-N H.V	V	Inst.	11th	①	32.1	V	—	—	—	—	
1	41	21	1-N H.V	V	Inst.	13th	①	20.1	V	—	—	—	—	
0	77	86	1-N H.V D. ratio	%	Inst.	Total	①	86.6	%	—	—	—	—	
0	77	73	1-N H.V D. ratio	%	Inst.	3rd	①	39.6	%	—	—	—	—	
0	77	75	1-N H.V D. ratio	%	Inst.	5th	①	38.5	%	—	—	—	—	
0	77	77	1-N H.V D. ratio	%	Inst.	7th	①	37.4	%	—	—	—	—	
0	77	79	1-N H.V D. ratio	%	Inst.	9th	①	36.3	%	—	—	—	—	
0	77	7B	1-N H.V D. ratio	%	Inst.	11th	①	35.2	%	—	—	—	—	
0	77	7D	1-N H.V D. ratio	%	Inst.	13th	①	22.1	%	—	—	—	—	
0	4B	41	2-N H.V	V	Inst.	Total	①	73.1	V	—	—	—	—	
0	35	41	2-N H.V	V	Inst.	1st	①	91.2	V	—	—	—	—	
1	37	41	2-N H.V	V	Inst.	3rd	①	36.2	V	—	—	—	—	
1	39	41	2-N H.V	V	Inst.	5th	①	16.8	V	—	—	—	—	
1	3B	41	2-N H.V	V	Inst.	7th	①	34.2	V	—	—	—	—	
1	3D	41	2-N H.V	V	Inst.	9th	①	33.2	V	—	—	—	—	
1	3F	41	2-N H.V	V	Inst.	11th	①	32.2	V	—	—	—	—	
1	41	41	2-N H.V	V	Inst.	13th	①	21.2	V	—	—	—	—	
0	77	9C	2-N H.V D. ratio	%	Inst.	Total	①	80.2	%	—	—	—	—	
0	77	89	2-N H.V D. ratio	%	Inst.	3rd	①	39.7	%	—	—	—	—	
0	77	8B	2-N H.V D. ratio	%	Inst.	5th	①	18.4	%	—	—	—	—	
0	77	8D	2-N H.V D. ratio	%	Inst.	7th	①	37.5	%	—	—	—	—	
0	77	8F	2-N H.V D. ratio	%	Inst.	9th	①	38.4	%	—	—	—	—	
0	77	91	2-N H.V D. ratio	%	Inst.	11th	①	35.3	%	—	—	—	—	
0	77	93	2-N H.V D. ratio	%	Inst.	13th	①	23.2	%	—	—	—	—	
0	4B	61	3-N H.V	V	Inst.	Total	①	79.3	V	—	—	—	—	
0	35	61	3-N H.V	V	Inst.	1st	①	91.3	V	—	—	—	—	
1	37	61	3-N H.V	V	Inst.	3rd	①	35.9	V	—	—	—	—	
1	39	61	3-N H.V	V	Inst.	5th	①	34.9	V	—	—	—	—	
1	3B	61	3-N H.V	V	Inst.	7th	①	34.3	V	—	—	—	—	
1	3D	61	3-N H.V	V	Inst.	9th	①	33.3	V	—	—	—	—	
1	3F	61	3-N H.V	V	Inst.	11th	①	32.3	V	—	—	—	—	
1	41	61	3-N H.V	V	Inst.	13th	①	21.3	V	—	—	—	—	
0	77	B2	3-N H.V D. ratio	%	Inst.	Total	①	86.9	%	—	—	—	—	
0	77	9F	3-N H.V D. ratio	%	Inst.	3rd	①	39.3	%	—	—	—	—	
0	77	A1	3-N H.V D. ratio	%	Inst.	5th	①	38.2	%	—	—	—	—	
0	77	A3	3-N H.V D. ratio	%	Inst.	7th	①	37.6	%	—	—	—	—	
0	77	A5	3-N H.V D. ratio	%	Inst.	9th	①	36.5	%	—	—	—	—	
0	77	A7	3-N H.V D. ratio	%	Inst.	11th	①	35.4	%	—	—	—	—	
0	77	A9	3-N H.V D. ratio	%	Inst.	13th	①	23.3	%	—	—	—	—	
0	77	DE	L-N H.V D. ratio	%	max.	Total	①	91.7	%	—	—	—	—	
0	35	A2	L-N H.V	V	max.	1st	①	91.8	V	—	—	—	—	
0	77	CB	L-N H.V D. ratio	%	max.	3rd	①	40.1	%	—	—	—	—	
0	77	CD	L-N H.V D. ratio	%	max.	5th	①	39.1	%	—	—	—	—	
0	77	CF	L-N H.V D. ratio	%	max.	7th	①	37.9	%	—	—	—	—	
0	77	D1	L-N H.V D. ratio	%	max.	9th	①	36.8	%	—	—	—	—	
0	77	D3	L-N H.V D. ratio	%	max.	11th	①	35.7	%	—	—	—	—	
0	77	D5	L-N H.V D. ratio	%	max.	13th	①	34.6	%	—	—	—	—	

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	3P4W reply data (Secondary side)		3P3W_2CT reply data (Secondary side)		3P3W_3CT reply data (Secondary side)		Note
								Data	Unit	Data	Unit	Data	Unit	
0	33	21	Phase 1 H.A	A	Inst.	Total	①	3.15	A	3.15	A	3.15	A	
0	1D	21	Phase 1 H.A	A	Inst.	1st	①	3.71	A	3.71	A	3.71	A	
0	1F	21	Phase 1 H.A	A	Inst.	3rd	①	1.63	A	1.63	A	1.63	A	
0	21	21	Phase 1 H.A	A	Inst.	5th	①	1.48	A	1.48	A	1.48	A	
0	23	21	Phase 1 H.A	A	Inst.	7th	①	1.34	A	1.34	A	1.34	A	
0	25	21	Phase 1 H.A	A	Inst.	9th	①	1.19	A	1.19	A	1.19	A	
0	27	21	Phase 1 H.A	A	Inst.	11th	①	1.04	A	1.04	A	1.04	A	
0	29	21	Phase 1 H.A	A	Inst.	13th	①	0.89	A	0.89	A	0.89	A	
0	75	86	Phase 1 H.A D. ratio	%	Inst.	Total	①	85.0	%	85.0	%	85.0	%	
1	75	73	Phase 1 H.A D. ratio	%	Inst.	3rd	①	44.0	%	44.0	%	44.0	%	
1	75	75	Phase 1 H.A D. ratio	%	Inst.	5th	①	40.0	%	40.0	%	40.0	%	
1	75	77	Phase 1 H.A D. ratio	%	Inst.	7th	①	36.0	%	36.0	%	36.0	%	
1	75	79	Phase 1 H.A D. ratio	%	Inst.	9th	①	32.0	%	32.0	%	32.0	%	
1	75	7B	Phase 1 H.A D. ratio	%	Inst.	11th	①	28.0	%	28.0	%	28.0	%	
1	75	7D	Phase 1 H.A D. ratio	%	Inst.	13th	①	24.0	%	24.0	%	24.0	%	
0	33	41	Phase 2 H.A	A	Inst.	Total	①	3.07	A	2.92	A	3.07	A	
0	1D	41	Phase 2 H.A	A	Inst.	1st	①	3.72	A	3.75	A	3.72	A	
0	1F	41	Phase 2 H.A	A	Inst.	3rd	①	1.60	A	1.54	A	1.60	A	
0	21	41	Phase 2 H.A	A	Inst.	5th	①	1.45	A	1.39	A	1.45	A	
0	23	41	Phase 2 H.A	A	Inst.	7th	①	1.30	A	1.24	A	1.30	A	
0	25	41	Phase 2 H.A	A	Inst.	9th	①	1.15	A	1.09	A	1.15	A	
0	27	41	Phase 2 H.A	A	Inst.	11th	①	1.00	A	0.94	A	1.00	A	
0	29	41	Phase 2 H.A	A	Inst.	13th	①	0.86	A	0.79	A	0.86	A	
0	75	9C	Phase 2 H.A D. ratio	%	Inst.	Total	①	82.0	%	78.0	%	82.0	%	
1	75	89	Phase 2 H.A D. ratio	%	Inst.	3rd	①	43.0	%	41.0	%	43.0	%	
1	75	8B	Phase 2 H.A D. ratio	%	Inst.	5th	①	39.0	%	37.0	%	39.0	%	
1	75	8D	Phase 2 H.A D. ratio	%	Inst.	7th	①	35.0	%	33.0	%	35.0	%	
1	75	8F	Phase 2 H.A D. ratio	%	Inst.	9th	①	31.0	%	29.0	%	31.0	%	
1	75	91	Phase 2 H.A D. ratio	%	Inst.	11th	①	27.0	%	25.0	%	27.0	%	
1	75	93	Phase 2 H.A D. ratio	%	Inst.	13th	①	23.0	%	21.0	%	23.0	%	
0	33	61	Phase 3 H.A	A	Inst.	Total	①	2.99	A	2.99	A	2.99	A	
0	1D	61	Phase 3 H.A	A	Inst.	1st	①	3.73	A	3.73	A	3.73	A	
0	1F	61	Phase 3 H.A	A	Inst.	3rd	①	1.57	A	1.57	A	1.57	A	
0	21	61	Phase 3 H.A	A	Inst.	5th	①	1.42	A	1.42	A	1.42	A	
0	23	61	Phase 3 H.A	A	Inst.	7th	①	1.27	A	1.27	A	1.27	A	
0	25	61	Phase 3 H.A	A	Inst.	9th	①	1.12	A	1.12	A	1.12	A	
0	27	61	Phase 3 H.A	A	Inst.	11th	①	0.97	A	0.97	A	0.97	A	
0	29	61	Phase 3 H.A	A	Inst.	13th	①	0.82	A	0.82	A	0.82	A	
0	75	B2	Phase 3 H.A D. ratio	%	Inst.	Total	①	80.0	%	80.0	%	80.0	%	
1	75	9F	Phase 3 H.A D. ratio	%	Inst.	3rd	①	42.0	%	42.0	%	42.0	%	
1	75	A1	Phase 3 H.A D. ratio	%	Inst.	5th	①	38.0	%	38.0	%	38.0	%	
1	75	A3	Phase 3 H.A D. ratio	%	Inst.	7th	①	34.0	%	34.0	%	34.0	%	
1	75	A5	Phase 3 H.A D. ratio	%	Inst.	9th	①	30.0	%	30.0	%	30.0	%	
1	75	A7	Phase 3 H.A D. ratio	%	Inst.	11th	①	26.0	%	26.0	%	26.0	%	
1	75	A9	Phase 3 H.A D. ratio	%	Inst.	13th	①	22.0	%	22.0	%	22.0	%	
0	33	81	Phase N H.A	A	Inst.	Total	①	2.92	A	—	—	—	—	
0	1D	81	Phase N H.A	A	Inst.	1st	①	3.75	A	—	—	—	—	
0	1F	81	Phase N H.A	A	Inst.	3rd	①	1.54	A	—	—	—	—	
0	21	81	Phase N H.A	A	Inst.	5th	①	1.39	A	—	—	—	—	
0	23	81	Phase N H.A	A	Inst.	7th	①	1.24	A	—	—	—	—	
0	25	81	Phase N H.A	A	Inst.	9th	①	1.09	A	—	—	—	—	
0	27	81	Phase N H.A	A	Inst.	11th	①	0.94	A	—	—	—	—	
0	29	81	Phase N H.A	A	Inst.	13th	①	0.79	A	—	—	—	—	
0	75	C8	Phase N H.A D. ratio	%	Inst.	Total	①	78.0	%	—	—	—	—	
1	75	B5	Phase N H.A D. ratio	%	Inst.	3rd	①	41.0	%	—	—	—	—	
1	75	B7	Phase N H.A D. ratio	%	Inst.	5th	①	37.0	%	—	—	—	—	
1	75	B9	Phase N H.A D. ratio	%	Inst.	7th	①	33.0	%	—	—	—	—	
1	75	BB	Phase N H.A D. ratio	%	Inst.	9th	①	29.0	%	—	—	—	—	
1	75	BD	Phase N H.A D. ratio	%	Inst.	11th	①	25.0	%	—	—	—	—	
1	75	BF	Phase N H.A D. ratio	%	Inst.	13th	①	21.0	%	—	—	—	—	

Unit No.	Group (h)	Ch. (h)	Name of Channel				Data Type	3P4W reply data (Secondary side)		3P3W_2CT reply data (Secondary side)		3P3W_3CT reply data (Secondary side)		Note
								Data	Unit	Data	Unit	Data	Unit	
0	33	A2	H.A	A	max.	Total	①	3.48	A	3.48	A	3.48	A	
0	1D	A2	H.A	A	max.	1st	①	3.76	A	3.76	A	3.76	A	
0	1F	A2	H.A	A	max.	3rd	①	1.66	A	1.66	A	1.66	A	
0	21	A2	H.A	A	max.	5th	①	1.56	A	1.56	A	1.56	A	
0	23	A2	H.A	A	max.	7th	①	1.46	A	1.46	A	1.46	A	
0	25	A2	H.A	A	max.	9th	①	1.36	A	1.36	A	1.36	A	
0	27	A2	H.A	A	max.	11th	①	1.26	A	1.26	A	1.26	A	
0	29	A2	H.A	A	max.	13th	①	1.16	A	1.16	A	1.16	A	
1	33	82	Phase N H.A	A	max.	Total	①	3.51	A	—	—	—	—	
1	1D	82	Phase N H.A	A	max.	1st	①	3.77	A	—	—	—	—	
1	1F	82	Phase N H.A	A	max.	3rd	①	1.67	A	—	—	—	—	
1	21	82	Phase N H.A	A	max.	5th	①	1.58	A	—	—	—	—	
1	23	82	Phase N H.A	A	max.	7th	①	1.47	A	—	—	—	—	
1	25	82	Phase N H.A	A	max.	9th	①	1.37	A	—	—	—	—	
1	27	82	Phase N H.A	A	max.	11th	①	1.28	A	—	—	—	—	
1	29	82	Phase N H.A	A	max.	13th	①	1.17	A	—	—	—	—	
0	80	1	active energy import	kW	count		②	6666.66	kWh	6666.66	kWh	6666.66	kWh	Note1
0	80	63	active energy export	kW	count		②	5555.55	kWh	5555.55	kWh	5555.55	kWh	Note1
0	80	64	active energy import	kW	count	expand	②	6.66666	kWh	6.66666	kWh	6.66666	kWh	Note1
0	80	65	active energy export	kW	count	expand	②	5.55555	kWh	5.55555	kWh	5.55555	kWh	Note1
0	81	1	reactive energy import lag	kvar	count		②	4444.44	kvar	4444.44	kvar	4444.44	kvar	Note1
0	81	63	reactive energy export lag	kvar	count		②	3333.33	kvar	3333.33	kvar	3333.33	kvar	Note1
0	81	64	reactive energy import	kvar	count		②	2222.22	kvar	2222.22	kvar	2222.22	kvar	Note1
0	81	65	reactive energy export	kvar	count		②	1111.11	kvar	1111.11	kvar	1111.11	kvar	Note1
0	81	66	reactive energy import lag	kvar	count	expand	②	4.44444	kvar	4.44444	kvar	4.44444	kvar	Note1
0	81	67	reactive energy export lag	kvar	count	expand	②	3.33333	kvar	3.33333	kvar	3.33333	kvar	Note1
0	81	68	reactive energy import	kvar	count	expand	②	2.22222	kvar	2.22222	kvar	2.22222	kvar	Note1
0	81	69	reactive energy export	kvar	count	expand	②	1.11111	kvar	1.11111	kvar	1.11111	kvar	Note1
0	1	14	current upper limit	A	Alarm		①	—	—	—	—	—	—	
0	1	15	current lower limit	A	Alarm		①	—	—	—	—	—	—	
0	1	94	current upper limit	A	Alarm	PhaseN	①	—	—	—	—	—	—	
0	2	14	current demand upper limit	A	Alarm		①	—	—	—	—	—	—	
0	2	15	current demand lower limit	A	Alarm		①	—	—	—	—	—	—	
0	2	94	current demand upper limit	A	Alarm	PhaseN	①	—	—	—	—	—	—	
0	5	14	voltage upper limit(L-L)	V	Alarm		①	—	—	—	—	—	—	
0	5	15	voltage lower limit(L-L)	V	Alarm		①	—	—	—	—	—	—	
0	3	14	voltage upper limit(L-N)	V	Alarm		①	—	—	—	—	—	—	
0	3	15	voltage lower limit(L-N)	V	Alarm		①	—	—	—	—	—	—	
0	7	14	active power upper limit	kW	Alarm		①	—	—	—	—	—	—	
0	7	15	active power lower limit	kW	Alarm		①	—	—	—	—	—	—	
0	9	14	reactive power upper limit	kvar	Alarm		①	—	—	—	—	—	—	
0	9	15	reactive power lower limit	kvar	Alarm		①	—	—	—	—	—	—	
0	0D	14	power factor upper limit	%	Alarm		①	—	—	—	—	—	—	
0	0D	15	power factor lower limit	%	Alarm		①	—	—	—	—	—	—	
0	0F	14	Frequency upper limit	Hz	Alarm		①	—	—	—	—	—	—	
0	0F	15	Frequency lower limit	Hz	Alarm		①	—	—	—	—	—	—	
0	77	E1	H.V(L-N) upper limit	%	Alarm	Total	①	—	—	—	—	—	—	
0	76	E1	H.V(L-L) upper limit	%	Alarm	Total	①	—	—	—	—	—	—	
0	75	E1	H.A upper limit	A	Alarm	Total	①	—	—	—	—	—	—	
0	75	F1	H.A upper limit(Phase N)	A	Alarm	Total	①	—	—	—	—	—	—	
0	A0	31	Alarm state		Alarm		③	Note2	—	Note2	—	Note2	—	
0	A0	35	Alarm state2		Alarm		③	Note3	—	Note3	—	Note3	—	

Note1. Counting values are replied on the values of primary side.
Note2. b21 and b24 become ON(1). b16 to b19 of digital inputs are reflected at the present state.
Note3. b23, b28 to b31 become ON(1).