

MELSEC-ST PROFIBUS-DP
Head Module

User's Manual

mitsubishi

MELSEC-ST
MELSEC-ST

MELSEC-ST

ST1H-PB

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

The precautions given in this manual are concerned with this product. Refer to the user's manual of the network system to use for a description of the network system safety precautions.


These SAFETY PRECAUTIONS classify the safety precautions into two categories: "DANGER" and "CAUTION".



Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by  CAUTION may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

DANGER

- If a communication error occurs in the network, the error station (MELSEC-ST system) shows the following behavior. All outputs turn OFF. (In the MELSEC-ST system, the output status at the time of error can be set to clear/hold/preset by using user parameters of each slice module. As "clear" is set by default, the outputs turn OFF when an error occurs. In the case where the system operates safely with the output set to "hold" or "preset", change the parameter settings.) Create in the program an interlock circuit that will ensure the system operates safely based on the communication status information. Failure to do so may cause an accident due to mis-output or malfunction.
- Create an external fail safe circuit that will ensure the MELSEC-ST system operates safely, even when the external power supply or the system fails.
Accident may occur due to output error or malfunctioning.
 - (1) The status of output changes depending on the setting of various functions that control the output. Take sufficient caution when setting for those functions.
 - (2) Normal output may not be obtained due to malfunctions of output elements or the internal circuits. Configure a circuit to monitor signals which may lead to a serious accident.

[DESIGN PRECAUTIONS]

CAUTION

- Make sure to initialize the network system after changing parameters of the MELSEC-ST system or the network system. If unchanged data remain in the network system, this may cause malfunctions.
- Do not install the control wires or communication cables together with the main circuit or power wires. Keep a distance of 100 mm (3.94 inch) or more between them. Not doing so could result in malfunctions due to noise.

[INSTALLATION PRECAUTIONS]

CAUTION

- Use the MELSEC-ST system in the general environment specified in the MELSEC-ST system users manual. Using this MELSEC-ST system in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Mount the head module and base module on the DIN rail securely (one rail for one module) referring to the MELSEC-ST system users manual and then fix them with stoppers. Incorrect mounting may result in a fall of the module, short circuits or malfunctions.
- Secure the module with several stoppers when using it in an environment of frequent vibration. Tighten the screws of the stoppers within the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- Make sure to externally shut off all phases of the power supply for the whole system before mounting or removing a module. Failure to do so may damage the module.
 - (1) Online replacement of the power distribution module and/or the base module is not available. When replacing either of the modules, shut off all phases of the external power supply.

Failure to do so may result in damage to all devices of the MELSEC-ST system.
 - (2) The I/O modules and the intelligent function modules can be replaced online.

Since online replacement procedures differ depending on the module type, be sure to make replacement as instructed.

For details, refer to the chapter describing the online module change in the user's manual of the head module (for the I/O module) or the corresponding intelligent function module.
- Do not directly touch the module's conductive parts or electronic components. Doing so may cause malfunctions or failure of the module.

[INSTALLATION PRECAUTIONS]

CAUTION

- Make sure to securely connect each cable connector. Failure to do so may cause malfunctions due to poor contact.
- DIN rail must be conductive; make sure to ground it prior to use. Failure to do so may cause electric shocks or malfunctions. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

[WIRING PRECAUTIONS]

DANGER

- Completely turn off the external power supply when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.

CAUTION

- Make sure to ground the control panel where the MELSEC-ST system is installed in the manner specified for the MELSEC-ST system. Failure to do so may cause electric shocks or malfunctions.
- Check the rated voltage and the terminal layout and wire the system correctly. Connecting an inappropriate power supply or incorrect wiring could result in fire or damage.
- Tighten the terminal screws within the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Overtightening may cause damages to the screws and/or the module, resulting in short circuits or malfunction.
- Prevent foreign matter such as chips or wiring debris from entering the module. Failure to do so may cause fires, damage, or erroneous operation.
- When connecting the communication and power supply cables to the module, always run them in conduits or clamp them. Not doing so can damage the module and cables by pulling a dangling cable accidentally or can cause a malfunction due to a cable connection fault.
- When disconnecting the communication and power supply cables from the module, do not hold and pull the cable part. Disconnect the cables after loosening the screws in the portions connected to the module. Pulling the cables connected to the module can damage the module and cables or can cause a malfunction due to a cable connection fault.

[STARTUP AND MAINTENANCE PRECAUTIONS]

DANGER

- Do not touch the terminals while power is on.
Doing so could cause shock or erroneous operation.
- Make sure to shut off all phases of the external power supply for the system before cleaning the module or tightening screws.
Not doing so can cause the module to fail or malfunction.

[STARTUP AND MAINTENANCE PRECAUTIONS]

CAUTION

- Do not disassemble or modify the modules.
Doing so could cause failure, erroneous operation, injury, or fire.
- Do not drop or give a strong impact to the module since its case is made of resin. Doing so can damage the module.
- Make sure to shut off all phases of the external power supply for the system before mounting/removing the module onto/from the control panel. Not doing so can cause the module to fail or malfunction.
- Before handling the module, make sure to touch a grounded metal object to discharge the static electricity from the human body.
Failure to do so can cause a failure or malfunctions of the module.
- When using any radio communication device such as a cellular phone, keep a distance of at least 25cm (9.85 inch) away from the MELSEC-ST system.
Not doing so can cause a malfunction.

[DISPOSAL PRECAUTIONS]

CAUTION

- When disposing of this product, treat it as industrial waste.

REVISIONS

* The manual number is given on the bottom left of the back cover.

| Print Date | * Manual Number | Revision |
|------------|--------------------|---------------|
| Dec., 2003 | SH(NA)-080436ENG-A | First edition |
| | | |

Japanese Manual Version SH-080435-A

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INTRODUCTION

Thank you for choosing the ST1H-PB MELSEC-ST PROFIBUS-DP head module.
Before using the module, please read this manual carefully to fully understand the functions and performance of the ST1H-PB MELSEC-ST PROFIBUS-DP head module and use it correctly.

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About Manuals

The following manuals are related to this product.
Referring to this list, please request the necessary manuals.

Relevant Manuals

| Manual Name | Manual Number (Model Code) |
|--|-------------------------------|
| MELSEC-ST System User's Manual Explains the system configuration of the MELSEC-ST system and the performance specifications, functions, handling, wiring and troubleshooting of the power distribution modules, base modules and I/O modules. (Sold separately) | SH-080456ENG (13JR72) |
| GX Configurator-ST Version 1 Operating Manual Explains how to operate GX Configurator-ST, how to set the intelligent function module parameters, and how to monitor the MELSEC-ST system. (Sold separately) | SH-080439ENG (13JU47) |

Compliance with the EMC Directive and the Low Voltage Directive

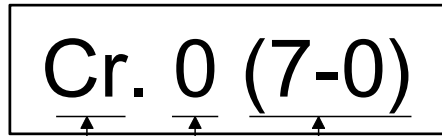
When incorporating the Mitsubishi MELSEC-ST system that is compliant with the EMC directive and the low voltage directive into other machine or equipment and making it comply with the EMC directive and the low voltage directive, refer to "EMC Directive and Low Voltage Directive" of the MELSEC-ST System User's Manual. The CE logo is printed on the rating plate of the MELSEC-ST system products compliant to the EMC Directive and the Low Voltage Directive. For making this product comply with the EMC directive and the low voltage directive, please refer to "EMC Directive and Low Voltage Directive" of the MELSEC-ST System User's Manual.

How to Read Manual

This manual explains each area for input data and output data using the following symbols.

(1) Data symbol

<Example: Cr Command result area>



Range
In the case of 1-word (16 bit) data, this shows the corresponding range.
(0) : Shows 0 bit position
(7-0): Shows 0-7 bit range

Detail data No.

Abbreviated data symbol

For details of detail data No. and abbreviated data symbol, refer to (2) and (3)

(2) Input data

| Data symbol | Area | Unit | Detail data No. notation |
|--|--|------------------------|--------------------------|
| Br | Br.00 to Br.FF | Bit Input Area | Hexadecimal |
| Er | Er.00 to Er.FF | Error Information Area | Hexadecimal |
| Mr | Mr.0 to Mr.127 | Module Status Area | Decimal |
| Cr | *1 | Command Result Area | Decimal |
| Wr | Wr.00 to Wr.33 | Word Input Area | Hexadecimal |

*1: Following shows the data symbols and the corresponding detail areas within the command result area.

| Data symbol | Area |
|--|--|
| Cr.0 | Cr.0 (15 - 8) Command Execution Area |
| | Cr.0 (7 - 0) Start Slice No. of Execution Target |
| Cr.1 | Executed Command No. |
| Cr.2 | Response Data 1 |
| Cr.3 | Response Data 2 |

(3) Output data

| Data symbol | | Area | Unit | Detail data No. notation |
|-------------|------------------------------|------------------------|-----------------|--------------------------|
| <u>Bw</u> | <u>Bw.00</u> to <u>Bw.FF</u> | Bit Output Area | 1 bit/1 signal | Hexadecimal |
| <u>Ew</u> | <u>Ew.00</u> to <u>Ew.FF</u> | Error Clear Area | 1 bit/1 signal | Hexadecimal |
| <u>Sw</u> | <u>Sw.0</u> to <u>Sw.7</u> | System Area | 1 word/1 signal | Decimal |
| <u>Cw</u> | *1 | Command Execution Area | 1 word/1 signal | Decimal |
| <u>Ww</u> | <u>Ww.00</u> to <u>Ww.33</u> | Word Output Area | 1 word/1 signal | Hexadecimal |

*1: Following shows the data symbols and the corresponding detail areas within the command execution area.

| Data symbol | Area |
|-------------|-------------------------------------|
| <u>Cw.0</u> | Start Slice No. of Execution Target |
| <u>Cw.1</u> | Command No. to be Executed |
| <u>Cw.2</u> | Argument 1 |
| <u>Cw.3</u> | Argument 2 |

About the Generic Terms and Abbreviations

Unless otherwise specified, this manual uses the following generic terms and abbreviations to explain the head module.

| Generic Term/Abbreviation | Description |
|-----------------------------|--|
| Head module | ST1H-PB, MELSEC-ST PROFIBUS-DP compatible head module. |
| PROFIBUS-DP | PROFIBUS-DP network. |
| Bus refreshing module | Module that distributes the external SYS. power supply and external AUX. power supply among the head module and slice modules. |
| Power feeding module | Module that distributes external AUX. power supply among slice modules. |
| Power distribution module | Bus refreshing module and Power feeding module. |
| Base module | Module that transfers data/connects between the head module and slice modules, and between slice modules and external devices. |
| Input module | Module that handles input data in bit units. |
| Output module | Module that handles output data in bit units. |
| Intelligent function module | Module that handles input/output data in word units. |
| I/O module | Input module and output module. |
| Slice module | Module that can be mounted to the base module: power distribution module, I/O module and intelligent function module. |
| MELSEC-ST system | System that consists of head module, slice modules, end plates and end brackets. |
| GX Configurator-ST | SWnD5C-STPB-E type products. (n: 1 or later) |
| Configuration software | Software used to set slave parameters for head module and slice modules.(e.g., GX Configurator-DP) |

Term definition

The following explains the meanings and definitions of the terms used in this manual.

| Term | Definition |
|---------------------------------|---|
| Master station | Class 1 master station that communicates I/O data with slave stations. |
| Slave station | Device that communicates I/O data with the master station. |
| Repeater | Device that connects PROFIBUS-DP segments. |
| Bus terminator | Terminator that is connected to both ends of each PROFIBUS-DP segment |
| FDL address | Address assigned to the master station/slave station. |
| Extended diagnostic information | Information that is notified from the slave station to the master station when an error occurs at a slave station. |
| Slave parameter | The slave station parameter (including user parameter) set by the master station. The setting items are described in the GSD file. |
| GSD file | The electronic file that includes description of the slave station parameter. The file is used to set slave parameters by the master station. |
| Input data | Data sent from the head module to the master station. The data consists of the following areas. <ul style="list-style-type: none"> ▪ Br Bit Input Area ▪ Information Area <ul style="list-style-type: none"> Er Error Information Area Mr Module Status Area Cr Command Result Area ▪ Wr Word Input Area |
| Output data | Data that the head module receives from the master station. The data consists of the following areas. <ul style="list-style-type: none"> ▪ Bw Bit Output Area ▪ Request Area <ul style="list-style-type: none"> Ew Error Clear Area Sw System Area Cw Command Execution Area ▪ Ww Word Output Area |
| I/O data | Data (input data, output data) transferred between the head module and the master station. |
| Br.n bit input | Bit input data of each module. |
| Bw.n bit output | Bit output data of each module |
| Wr.n word input | Word (16-bit) input data of an intelligent function module. In the case of analog input module, the digital output data value is stored. |
| Ww.n word output | Word (16-bit) output data of an intelligent function module. In the case of analog output module, the digital setting data value is stored. |
| Information area | Bit/Word input data for checking each module status and command execution results. |
| Request area | Bit/Word output data for requesting each module to clear errors/to execute commands. |
| Number of occupied I/O points | The area, that is equivalent to the occupied I/O points, is occupied in Br Bit Input Area/ Bw Bit Output Area. |
| Slice No. | No. assigned to every 2 occupied I/O points of each module. This numbering starts by assigning "0" to the head module and then proceeds in ascending order. (The maximum value No. is 127). The No. is used for specifying the execution target. |
| Command | Requesting from the master station in order to read the module status, to set/control the intelligent function module command parameters. |
| ST bus cycle time | Processing time for the head module to refresh the input/output status of each slice module. |
| Bus cycle time | PROFIBUS-DP processing time for the master station to perform cyclic transfer with each slave station. |

Packing List

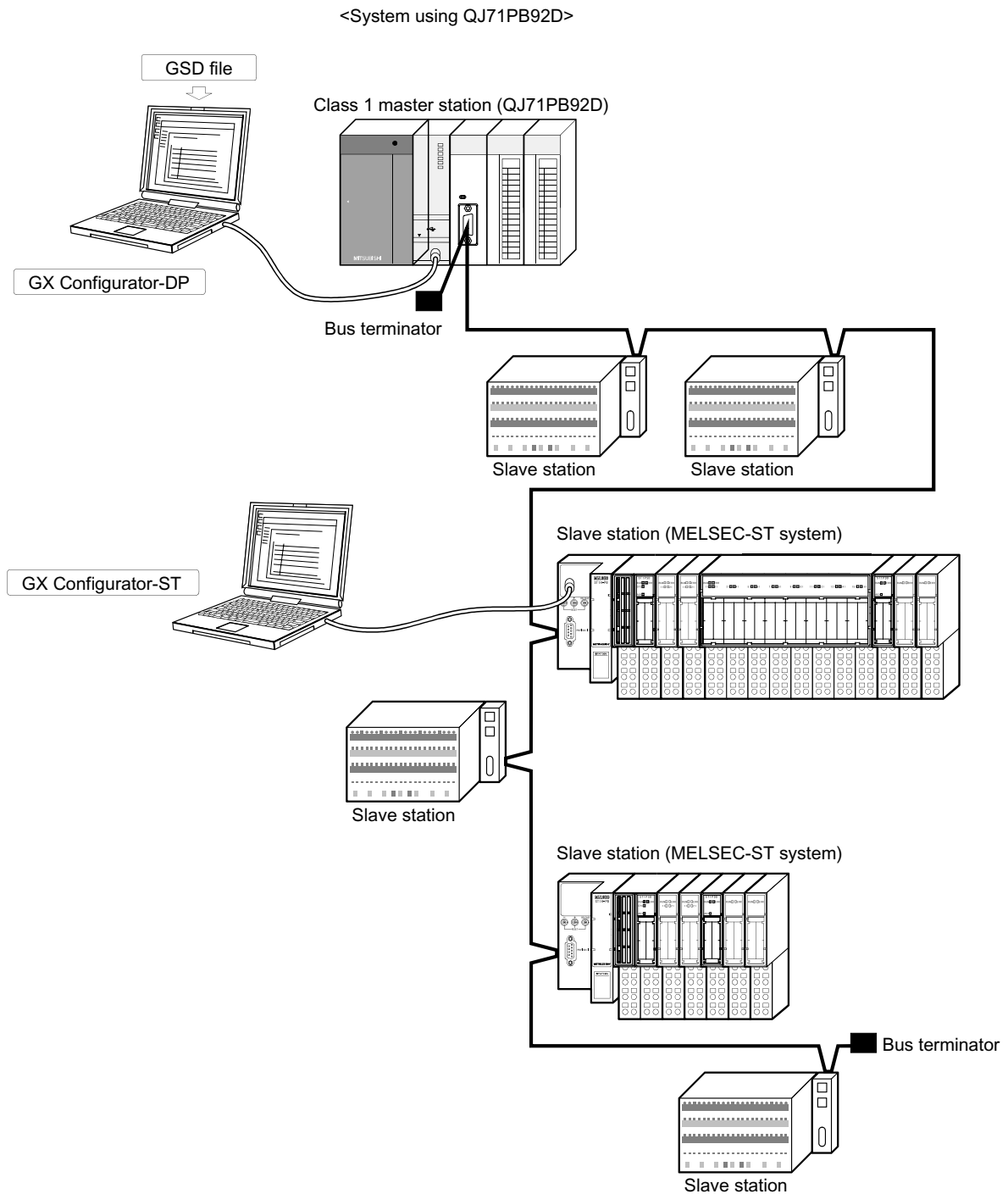
The following gives the packing list of the head module.

| Model name | Product | Quantity |
|------------|---|----------|
| ST1H-PB | ST1H-PB MELSEC-ST PROFIBUS-DP head module | 1 |
| ST1A-EPL | ST1A-EPL end plate | 1 |
| ST1A-EBR | ST1A-EBR end bracket | 2 |

1 OVERVIEW

This manual explains the specifications, functions, pre-operation procedures and troubleshooting of the ST1H-PB MELSEC-ST PROFIBUS-DP head module (hereafter referred to as the head module).

The head module is used to connect a MELSEC-ST system to a PROFIBUS-DP network. (The head module operates as a slave station of a PROFIBUS-DP network.)

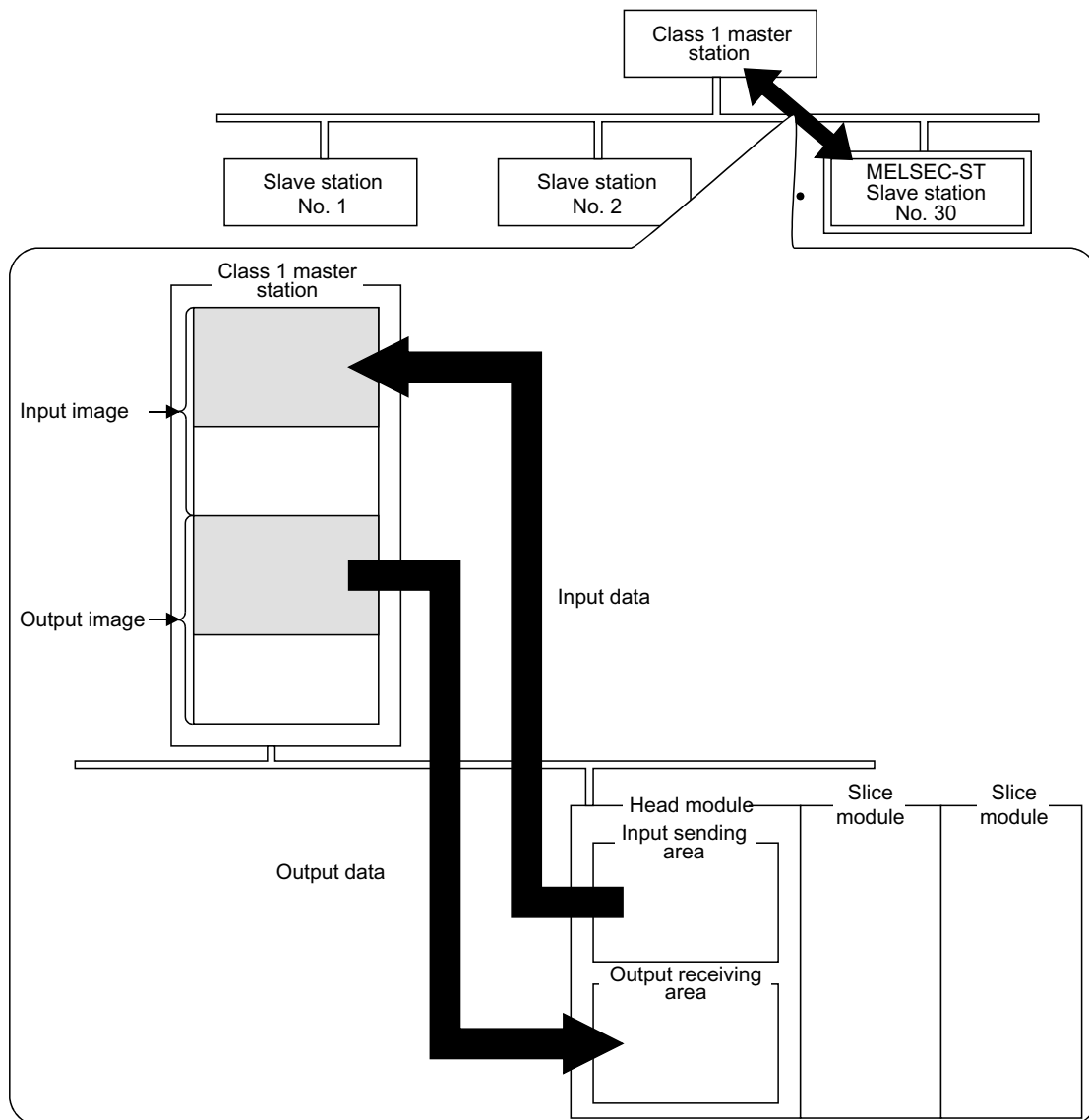


1.1 Features

1

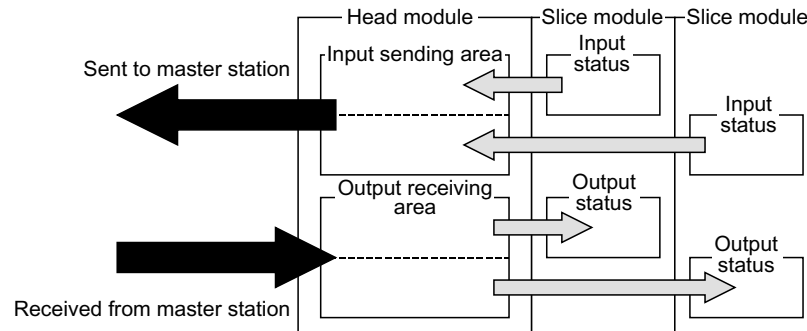
The head module has the following features.

- (1) MELSEC-ST system can be connected to PROFIBUS-DP network
 By mounting this module as the head module of a MELSEC-ST system, the MELSEC-ST system can be connected to the PROFIBUS-DP network. The head module complies with EN50170 Volume 2 (Part 1, 2, 3, 4, 8) and communicates with the master station as a PROFIBUS-DP slave station.



(2) Controlling the MELSEC-ST system

The head module receives data output from the master station, stores the data into the output receiving area, and uses them to control each slice module. Also, the head module gathers various information such as the input status data from each slice module into the input sending area, and sends them to the master station as input data.

**(3) Functions for communication with master station**

Using the following functions, the head module can communicate with the master station.

(a) I/O data size selection

The head module uses input data (head module → master station) and output data (master station → head module) to communicate with the master station.

By selecting the maximum input/output points appropriate for the MELSEC-ST system configuration on the head module, the input/output data communicated with the master station can be adjusted to the optimum size. Also, the maximum I/O points can be set to a slightly larger size for future expansion of the MELSEC-ST system. (Refer to Section 6.1.1.)

(b) Supporting the global control functions

The head module supports the global control functions.

Using the commands (SYNC, UNSYNC, FREEZE, UNFREEZE) sent by the master station, the refresh of the head module I/O data can be controlled from the master station. (Refer to Section 4.2.2.)

(c) Extended diagnostic information notification function

When an error occurs in a slice module, the master station can be notified of the error as extended diagnostic information.

When the slice module is restored to normal, the master station is also notified of it. (Refer to Section 4.2.3.)

(d) Swapping of I/O data or extended diagnostic information bytes

When I/O data are sent to or received from the master station or when extended diagnostic information is sent to the master station, their high and low bytes can be swapped in word units.

This function eliminates the need for a high/low byte swapping program on the master station side, simplifying the program. (Refer to Section 4.2.4.)

(4) Controlling various slice modules

The head module can control various MELSEC-ST slice modules in the same system.

(a) Up to 63 slice modules can be mounted

The head module accepts up to 63 slice modules (up to 26 intelligent function modules).

(b) Error status and mounting status of each slice module can be checked

In each of input data area in the head module, the error status, mounting status, etc. of each slice module can be checked.

(c) Commands can be executed from master station

By executing commands from the master station using the command execution area of output data, the following is available.

- Confirming the operating statuses of the head module and each slice module
- Reading error codes of the head module and/or each slice module
- Reading the head module error history
- Setting intelligent function module command parameters

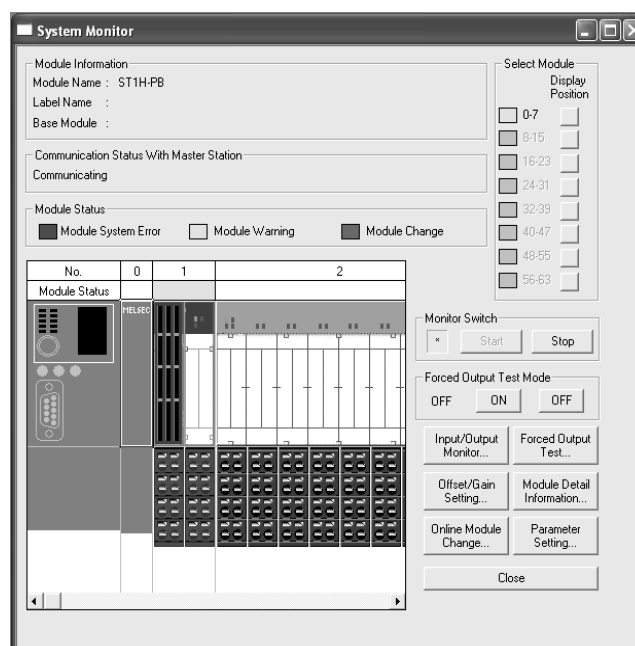
(d) Output status at module error

Whether the refresh of output data to the other normally-operating slice module will be stopped or continued when an error occurs in a slice module can be preset. (Refer to Section 4.3.1.)

(5) GX Configurator-ST available

Using the personal computer where optional GX Configurator-ST is preinstalled and connecting it to the head module, such operations as parameter setting, system monitor, forced output test and online module change can be performed easily for the MELSEC-ST system.

Refer to Section 4.1 for the functions available for GX Configurator-ST.

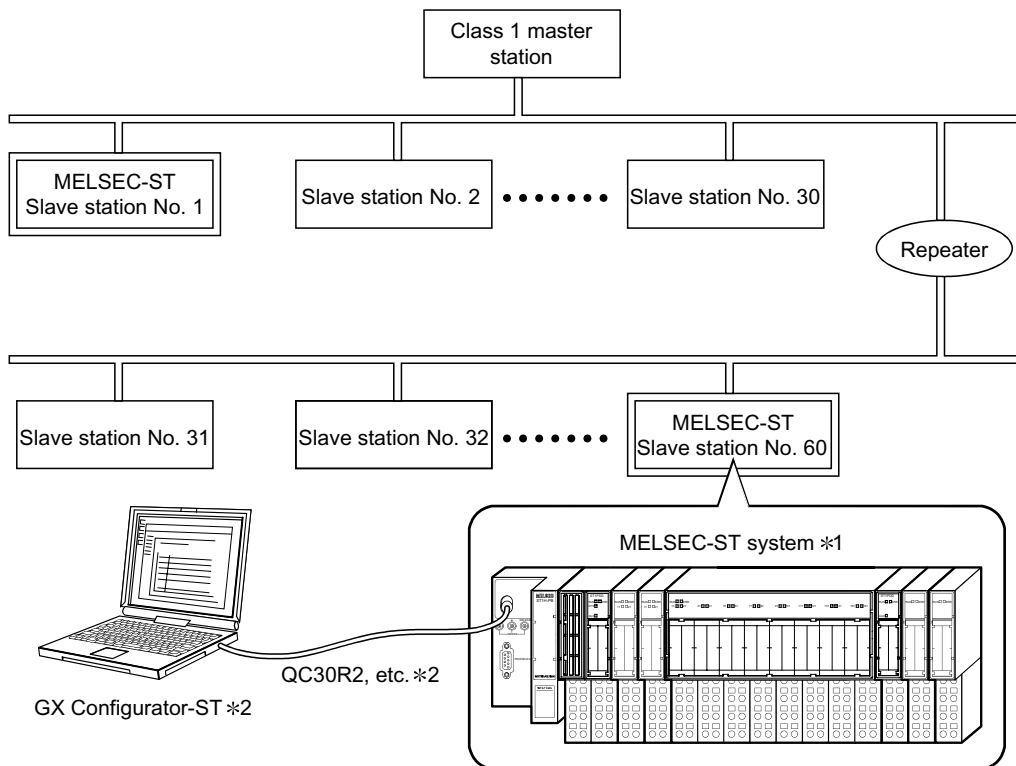


(6) Online module change

The I/O modules and intelligent function modules can be replaced without stopping the MELSEC-ST system. (Refer to Section 4.4.)

2 SYSTEM CONFIGURATION

This chapter explains the system configuration in which the head module is used.



*1: For the MELSEC-ST system configuration, refer to the MELSEC-ST System User's Manual.

*2: For the system configuration for use of GX Configurator-ST, refer to the GX Configurator-ST Manual.

REMARK

Prepare the PROFIBUS cable and bus terminator on the user side.
Refer to Section 5.5 for PROFIBUS cable wiring and bus terminal.

3 SPECIFICATIONS

This chapter explains the performance specifications of the head module.

For the general specifications of the head module, refer to the MELSEC-ST System User's Manual.

3.1 Performance Specifications

This section explains the performance specifications of the head module.

| Item | | Specifications |
|---|-------------|--|
| PROFIBUS-DP station type | | Slave station (compliant with EN50170 Volume 2 (Part 1, 2, 3, 4, 8)) |
| Applicable FDL address | | 0 to 99 *1 |
| Maximum input/output points | | 32-point mode/64-point mode/128-point mode/256-point mode |
| I/O data size | | Varies depending on the maximum input output points. (Refer to (1) in this section) |
| Maximum number of connected slice modules | | — |
| In 32-point mode | | 14 modules *2 |
| In 64-point mode | | 30 modules *2 |
| In 128-point mode | | 62 modules *2 |
| In 256-point mode | | 63 modules *2 |
| Number of occupied I/O points | | 4 input and 4 output points |
| Number of occupied slices | | 2 |
| Information amount | Input data | $\overline{Br.n}$: Number of occupancy 4, $\overline{Er.n}$: Number of occupancy 4, $\overline{Mr.n}$: Number of occupancy 2, $\overline{Wr.n}$: Number of occupancy 0 |
| | Output data | $\overline{Bw.n}$: Number of occupancy 4, $\overline{Ew.n}$: Number of occupancy 4, $\overline{Ww.n}$: Number of occupancy 0 |
| Transmission specifications | | — |
| Electrical standards and characteristics | | EIA-RS485 compliant |
| Applicable cable | | Shielded twisted pair cable (Type A) *3 |
| Network configuration | | Bus type (tree type when repeaters are used) |
| Data link method | | Polling |
| Transmission encoding method | | NRZ |
| Transmission speed *4 | | 9.6kbps to 12Mbps (refer to (2) in this section) |
| Transmission distance | | Varies depending on the transmission speed. (refer to (2) in this section) |
| Maximum number of repeaters | | 3 repeaters per network |
| Maximum number of stations | | 32 stations (including repeaters) per segment |
| Number of connection nodes | | 32 nodes per segment |
| 5V DC internal current consumption | | 0.530A |
| External dimensions | | 114.5 (4.51 in.) (H) × 50.5 (1.99 in.) (W) × 74.5 (2.93 in.) (D) [mm] |
| Weight | | 0.10 kg |

*1: Factory-set to "FDL address 0".

*2: Configure the system within the range where the conditions in Section 6.1 (1) are satisfied.

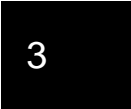
*3: Refer to Section 5.5.1 for details of the cable.

*4: Within $\pm 0.3\%$ for transmission speed control (EN50170 Volume 2 compliant)

(1) I/O data sizes

The following table indicates the data sizes for maximum input/output points.
Refer to Section 3.2.1 and Section 3.2.2 for the I/O data offset addresses.

| Item | Maximum input/output points | | 32-point mode | | 64-point mode | | 128-point mode | | 256-point mode | |
|--------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|----------------|--------|
| | Input | Output | Input | Output | Input | Output | Input | Output | Input | Output |
| Bit I/O points | 32 bits | 32 bits | 64 bits | 64 bits | 128 bits | 128 bits | 256 bits | 256 bits | | |
| Word I/O points | Max. 52 words (Variable) | Max. 52 words (Variable) | Max. 52 words (Variable) | Max. 52 words (Variable) | Max. 52 words (Variable) | Max. 52 words (Variable) | Max. 32 words (Variable) | Max. 32 words (Variable) | | |
| Request/Information area | 14 bytes | 14 bytes | 20 bytes | 20 bytes | 32 bytes | 32 bytes | 56 bytes | 56 bytes | | |
| Total | Max. 122 bytes | Max. 122 bytes | Max. 132 bytes | Max. 132 bytes | Max. 152 bytes | Max. 152 bytes | Max. 152 bytes | Max. 152 bytes | | |



(2) Transmission distance

| Transmission speed | Transmission distance [m/segment] | Maximum transmission distance when using repeater [m/network] *1 |
|--------------------|-----------------------------------|--|
| 9.6kbps | 1200m(3937 ft.)/segment | 4800m(15748 ft.)/network |
| 19.2kbps | | |
| 45.45kbps | | |
| 93.75kbps | | |
| 187.5kbps | 1000m(3281 ft.)/segment | 4000m(13123 ft.)/network |
| 500kbps | 400m(1312 ft.)/segment | 1600m(5249 ft.)/network |
| 1.5Mbps | 200m(656 ft.)/segment | 800m(2625 ft.)/network |
| 3Mbps | 100m(328 ft.)/segment | 400m(1312 ft.)/network |
| 6Mbps | | |
| 12Mbps | | |

*1: The maximum transmission distance in the above table is based on the example of using 3 repeaters.

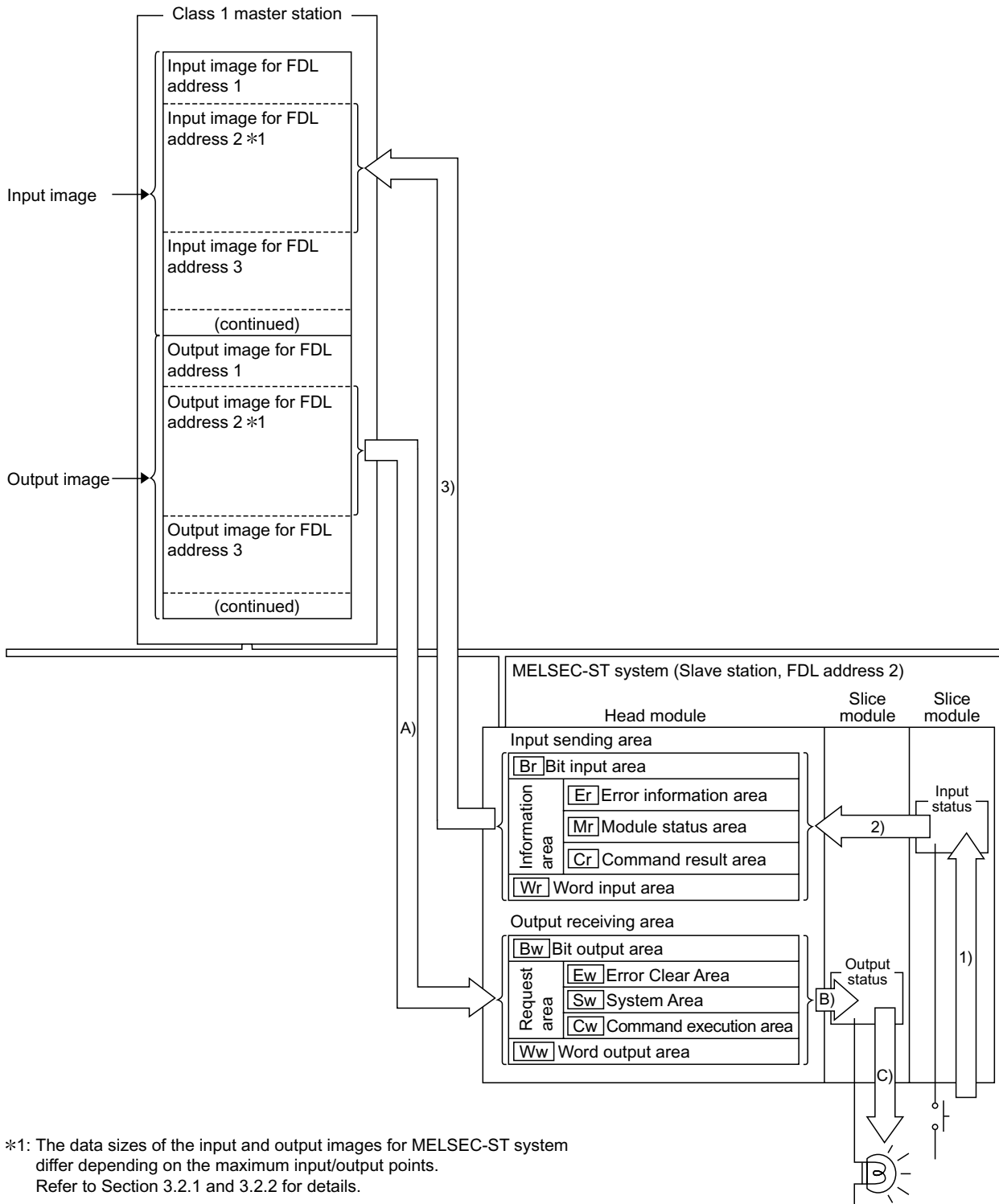
Use the following expression when increasing the transmission distance using repeaters.

Maximum transmission distance [m/number of networks] =

$$(\text{number of repeaters} + 1) \times \text{transmission distance [m/segment]}$$

3.2 Communication between Master Station and MELSEC-ST System

For communication between the master station and MELSEC-ST system, use input data sent from the head module to the master station and output data sent from the master station to the head module.



*1: The data sizes of the input and output images for MELSEC-ST system differ depending on the maximum input/output points. Refer to Section 3.2.1 and 3.2.2 for details.

[Processing outline of MELSEC-ST system → Master station]

- 1) The status data of the external device are imported to the input status area of the slice module.
- 2) The input status data of each slice module is stored into the input sending area of the head module.
- 3) The input data in the input sending area is sent to the corresponding input image area in the master station.

[Processing outline of Master station → MELSEC-ST system]

- A) The corresponding output image is sent from the master station to the head module.
- B) The output data received in the output receiving area of the head module is refreshed to the output status area of the corresponding slice module.
- C) The output status data of the slice module is output to the external device.

(1) Input data

The following table indicates the construction of input data.

Refer to Section 3.2.1 and Section 3.2.3 for the data sizes of input data, the details of the areas, and the areas used by the head module.

| Data name | | Description | |
|------------|----------------------|--|---|
| Input data | [Br] Bit input area | Stores the ON/OFF information of [Br.n] Bit inputs entered from the head module and slice modules. | |
| | Information area | [Er] Error information area | Stores the statuses (error information) of the head module and slice modules. |
| | | [Mr] Module status area | Stores the information of the slice modules recognized by the head module. |
| | | [Cr] Command result area | Stores the results of executing a command to the head module or corresponding slice module. |
| | [Wr] Word input area | Stores [Wr.n] Word input values received from the intelligent function modules in order of the mounted position. | |

(2) Output data

The following table indicates the construction of output data.

Refer to Section 3.2.2 and Section 3.2.3 for the data sizes of output data, the details of the areas, and the areas used by the head module.

| Data name | | Description | |
|-------------|-----------------------|---|---|
| Output data | [Bw] Bit output area | Stores the ON/OFF information of [Bw.n] Bit outputs provided to the head module and slice modules. | |
| | Request area | [Ew] Error clear area | Stores the error information clear requests of the head module and slice modules. |
| | | [Sw] System area | System area used by the head module. |
| | | [Cw] Command execution area | Stores the command for controlling the head module or corresponding slice module. |
| | [Ww] Word output area | Stores [Ww.n] Word output values sent to the intelligent function modules in order of the mounted position. | |

3.2.1 Input data specifications

This section explains the data sizes of input data and the details of each area.

POINT

In this manual, input data addresses (input image addresses on the master station side) are indicated as offset addresses (word unit).
 [Offset address]
 Denotes a data position in word units, relative to the first address of the input image assigned for the MELSEC-ST system on the master station side.

(1) Input data sizes

The input data sizes differ depending on the setting of the maximum I/O points. The input data sizes for the maximum I/O points are indicated below. Refer to Section 6.1 for details of the maximum I/O points.

(a) 32-point mode

| Offset address (Decimal) | Application | | Data size | |
|--------------------------|--------------------|-----------------------------|--|--|
| +0 | [Br.00] to [Br.1F] | [Br] Bit input area | 2 words | . . . Refer to (2) in this section. |
| +1 | | | | |
| +2 | [Er.00] to [Er.1F] | [Er] Error information area | 2 words | . . . Refer to (3) in this section. |
| +3 | | | | |
| +4 | [Mr.0] to [Mr.15] | [Mr] Module status area | 1 word | . . . Refer to (4) in this section. |
| +5 | [Cr.0] to [Cr.3] | [Cr] Command result area | 4 words | . . . Refer to (5) in this section. |
| to | | | | |
| +8 | | | | |
| +9 | [Wr.00] to [Wr.33] | [Wr] Word input area | Minimum size : 0 words Maximum size: 52 words | Size variable *1 . . . Refer to (6) in this section. |
| to | | | | |
| +60 | | | | |

*1: The data size of the [Wr] Word input area is a sum total of the [Wr] Word input area sizes used by the mounted intelligent function modules. This data size is 0 when no intelligent function modules are mounted.

(b) 64-point mode

| Offset address (Decimal) | Application | | Data size | |
|--------------------------|--------------------|-----------------------------|--|--|
| +0 | [Br.00] to [Br.3F] | [Br] Bit input area | 4 words | . . . Refer to (2) in this section. |
| to | | | | |
| +3 | | | | |
| +4 | [Er.00] to [Er.3F] | [Er] Error information area | 4 words | . . . Refer to (3) in this section. |
| to | | | | |
| +7 | | | | |
| +8 | [Mr.0] to [Mr.31] | [Mr] Module status area | 2 words | . . . Refer to (4) in this section. |
| to | | | | |
| +9 | | | | |
| +10 | [Cr.0] to [Cr.3] | [Cr] Command result area | 4 words | . . . Refer to (5) in this section. |
| to | | | | |
| +13 | | | | |
| +14 | [Wr.00] to [Wr.33] | [Wr] Word input area | Minimum size : 0 words Maximum size: 52 words | Size variable *1 . . . Refer to (6) in this section. |
| to | | | | |
| +65 | | | | |

*1: The data size of the [Wr] Word input area is a sum total of the [Wr] Word input area sizes used by the mounted intelligent function modules.
This data size is 0 when no intelligent function modules are mounted.

(c) 128-point mode

| Offset address (Decimal) | Application | | Data size | |
|--------------------------|--------------------|-----------------------------|--|--|
| +0 | [Br.00] to [Br.7F] | [Br] Bit input area | 8 words | . . . Refer to (2) in this section. |
| to | | | | |
| +7 | | | | |
| +8 | [Er.00] to [Er.7F] | [Er] Error information area | 8 words | . . . Refer to (3) in this section. |
| to | | | | |
| +15 | | | | |
| +16 | [Mr.0] to [Mr.63] | [Mr] Module status area | 4 words | . . . Refer to (4) in this section. |
| to | | | | |
| +19 | | | | |
| +20 | [Cr.0] to [Cr.3] | [Cr] Command result area | 4 words | . . . Refer to (5) in this section. |
| to | | | | |
| +23 | | | | |
| +24 | [Wr.00] to [Wr.33] | [Wr] Word input area | Minimum size : 0 words Maximum size: 52 words | Size variable *1 . . . Refer to (6) in this section. |
| to | | | | |
| +75 | | | | |

*1: The data size of the [Wr] Word input area is a sum total of the [Wr] Word input area sizes used by the mounted intelligent function modules.
This data size is 0 when no intelligent function modules are mounted.

(d) 256-point mode

| Offset address (Decimal) | Application | | Data size | |
|--------------------------|---|---|--|--|
| +0 | to Br.00 to Br.FF | Br Bit input area | 16 words | · · · Refer to (2) in this section. |
| +15 | | | | |
| +16 | to Er.00 to Er.FF | Er Error information area | 16 words | · · · Refer to (3) in this section. |
| +31 | | | | |
| +32 | to Mr.0 to Mr.127 | Mr Module status area | 8 words | · · · Refer to (4) in this section. |
| +39 | | | | |
| +40 | to Cr.0 to Cr.3 | Cr Command result area | 4 words | · · · Refer to (5) in this section. |
| +43 | | | | |
| +44 | to Wr.00 to Wr.1F | Wr Word input area | Minimum size : 0 words Maximum size: 32 words | Size variable *1 · · · Refer to (6) in this section. |
| +95 | | | | |

*1: The data size of the Wr Word input area is a sum total of the Wr Word input area sizes used by the mounted intelligent function modules.
This data size is 0 when no intelligent function modules are mounted.

(2) **Br** Bit input area

The **Br** Bit input area stores the ON/OFF information of the **Br.n** bit inputs entered from the head module and slice modules.

Each of the head module and slice modules occupies 2 bits per slice.

The construction of the **Br** Bit input area is shown below.

| Maximum input/output points | | | | Slice No. Br Bit input area | | | | | | | | | | | | | | | |
|-----------------------------|----------------|---------------|---------------|------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | b15 | | | | | | | | | | | | b0 | | | |
| Used area | Used area | Used area | Used area | Br.0F | Br.0E | Br.0D | Br.0C | Br.0B | Br.0A | Br.09 | Br.08 | Br.07 | Br.06 | Br.05 | Br.04 | Br.03 | Br.02 | Br.01 | Br.00 |
| | | | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | | | | | |
| | | | | Br.1F | Br.1E | Br.1D | Br.1C | Br.1B | Br.1A | Br.19 | Br.18 | Br.17 | Br.16 | Br.15 | Br.14 | Br.13 | Br.12 | Br.11 | Br.10 |
| | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | | | | | | | | |
| | | | | Br.2F | Br.2E | Br.2D | Br.2C | Br.2B | Br.2A | Br.29 | Br.28 | Br.27 | Br.26 | Br.25 | Br.24 | Br.23 | Br.22 | Br.21 | Br.20 |
| | | | | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | | | | | | | | |
| | | | | Br.3F | Br.3E | Br.3D | Br.3C | Br.3B | Br.3A | Br.39 | Br.38 | Br.37 | Br.36 | Br.35 | Br.34 | Br.33 | Br.32 | Br.31 | Br.30 |
| | | | | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | | | | | | | | |
| | | | | Br.4F | Br.4E | Br.4D | Br.4C | Br.4B | Br.4A | Br.49 | Br.48 | Br.47 | Br.46 | Br.45 | Br.44 | Br.43 | Br.42 | Br.41 | Br.40 |
| | | | | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | | | | | | | | |
| | | | | Br.5F | Br.5E | Br.5D | Br.5C | Br.5B | Br.5A | Br.59 | Br.58 | Br.57 | Br.56 | Br.55 | Br.54 | Br.53 | Br.52 | Br.51 | Br.50 |
| | | | | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | | | | | | | | |
| | | | | Br.6F | Br.6E | Br.6D | Br.6C | Br.6B | Br.6A | Br.69 | Br.68 | Br.67 | Br.66 | Br.65 | Br.64 | Br.63 | Br.62 | Br.61 | Br.60 |
| | | | | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | | | | | | | | |
| | | | | Br.7F | Br.7E | Br.7D | Br.7C | Br.7B | Br.7A | Br.79 | Br.78 | Br.77 | Br.76 | Br.75 | Br.74 | Br.73 | Br.72 | Br.71 | Br.70 |
| | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | | | | | | | | | | | |
| | Br.8F | Br.8E | Br.8D | Br.8C | Br.8B | Br.8A | Br.89 | Br.88 | Br.87 | Br.86 | Br.85 | Br.84 | Br.83 | Br.82 | Br.81 | Br.80 | | | |
| | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 | | | | | | | | | | | |
| | Br.9F | Br.9E | Br.9D | Br.9C | Br.9B | Br.9A | Br.99 | Br.98 | Br.97 | Br.96 | Br.95 | Br.94 | Br.93 | Br.92 | Br.91 | Br.90 | | | |
| | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 | | | | | | | | | | | |
| | Br.AF | Br.AE | Br.AD | Br.AC | Br.AB | Br.AA | Br.A9 | Br.A8 | Br.A7 | Br.A6 | Br.A5 | Br.A4 | Br.A3 | Br.A2 | Br.A1 | Br.A0 | | | |
| | 87 | 86 | 85 | 84 | 83 | 82 | 81 | 80 | | | | | | | | | | | |
| | Br.BF | Br.BE | Br.BD | Br.BC | Br.BB | Br.BA | Br.B9 | Br.B8 | Br.B7 | Br.B6 | Br.B5 | Br.B4 | Br.B3 | Br.B2 | Br.B1 | Br.B0 | | | |
| | 95 | 94 | 93 | 92 | 91 | 90 | 89 | 88 | | | | | | | | | | | |
| | Br.CF | Br.CE | Br.CD | Br.CC | Br.CB | Br.CA | Br.C9 | Br.C8 | Br.C7 | Br.C6 | Br.C5 | Br.C4 | Br.C3 | Br.C2 | Br.C1 | Br.C0 | | | |
| | 103 | 102 | 101 | 100 | 99 | 98 | 97 | 96 | | | | | | | | | | | |
| | Br.DF | Br.DE | Br.DD | Br.DC | Br.DB | Br.DA | Br.D9 | Br.D8 | Br.D7 | Br.D6 | Br.D5 | Br.D4 | Br.D3 | Br.D2 | Br.D1 | Br.D0 | | | |
| 111 | 110 | 109 | 108 | 107 | 106 | 105 | 104 | | | | | | | | | | | | |
| Br.EF | Br.EE | Br.ED | Br.EC | Br.EB | Br.EA | Br.E9 | Br.E8 | Br.E7 | Br.E6 | Br.E5 | Br.E4 | Br.E3 | Br.E2 | Br.E1 | Br.E0 | | | | |
| 119 | 118 | 117 | 116 | 115 | 114 | 113 | 112 | | | | | | | | | | | | |
| Br.FF | Br.FE | Br.FD | Br.FC | Br.FB | Br.FA | Br.F9 | Br.F8 | Br.F7 | Br.F6 | Br.F5 | Br.F4 | Br.F3 | Br.F2 | Br.F1 | Br.F0 | | | | |
| 127 | 126 | 125 | 124 | 123 | 122 | 121 | 120 | | | | | | | | | | | | |

(3) **Er** Error information area

The **Er** Error information area stores the statuses (error information) of the head module and slice modules.

Each of the head module and slice modules occupies 2 bits per slice.

The construction of the **Er** Error information area is shown below.

| Maximum input/output points | | | | Slice No. | | | | | | | | | | | | | | | | | |
|-----------------------------|----------------|---------------|---------------|----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | Er Error information area | | | | | | | | | | | | | | | | | |
| | | | | b15 | | | | | | | | | | | | | b0 | | | | |
| Used area | Used area | Used area | Used area | Er.0F | Er.0E | Er.0D | Er.0C | Er.0B | Er.0A | Er.09 | Er.08 | Er.07 | Er.06 | Er.05 | Er.04 | Er.03 | Er.02 | Er.01 | Er.00 | | |
| | | | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | | | | | | | |
| | | | | Er.1F | Er.1E | Er.1D | Er.1C | Er.1B | Er.1A | Er.19 | Er.18 | Er.17 | Er.16 | Er.15 | Er.14 | Er.13 | Er.12 | Er.11 | Er.10 | | |
| | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | | | | | | | | | | |
| | | | | Er.2F | Er.2E | Er.2D | Er.2C | Er.2B | Er.2A | Er.29 | Er.28 | Er.27 | Er.26 | Er.25 | Er.24 | Er.23 | Er.22 | Er.21 | Er.20 | | |
| | | | | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | | | | | | | | | | |
| | | | | Er.3F | Er.3E | Er.3D | Er.3C | Er.3B | Er.3A | Er.39 | Er.38 | Er.37 | Er.36 | Er.35 | Er.34 | Er.33 | Er.32 | Er.31 | Er.30 | | |
| | | | | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | | | | | | | | | | |
| | | | | Er.4F | Er.4E | Er.4D | Er.4C | Er.4B | Er.4A | Er.49 | Er.48 | Er.47 | Er.46 | Er.45 | Er.44 | Er.43 | Er.42 | Er.41 | Er.40 | | |
| | | | | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | | | | | | | | | | |
| | | | | Er.5F | Er.5E | Er.5D | Er.5C | Er.5B | Er.5A | Er.59 | Er.58 | Er.57 | Er.56 | Er.55 | Er.54 | Er.53 | Er.52 | Er.51 | Er.50 | | |
| | | | | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | | | | | | | | | | |
| | | | | Er.6F | Er.6E | Er.6D | Er.6C | Er.6B | Er.6A | Er.69 | Er.68 | Er.67 | Er.66 | Er.65 | Er.64 | Er.63 | Er.62 | Er.61 | Er.60 | | |
| | | | | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | | | | | | | | | | |
| | | | | Er.7F | Er.7E | Er.7D | Er.7C | Er.7B | Er.7A | Er.79 | Er.78 | Er.77 | Er.76 | Er.75 | Er.74 | Er.73 | Er.72 | Er.71 | Er.70 | | |
| | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | | | | | | | | | | | | | |
| | Er.8F | Er.8E | Er.8D | Er.8C | Er.8B | Er.8A | Er.89 | Er.88 | Er.87 | Er.86 | Er.85 | Er.84 | Er.83 | Er.82 | Er.81 | Er.80 | | | | | |
| | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 | | | | | | | | | | | | | |
| | Er.9F | Er.9E | Er.9D | Er.9C | Er.9B | Er.9A | Er.99 | Er.98 | Er.97 | Er.96 | Er.95 | Er.94 | Er.93 | Er.92 | Er.91 | Er.90 | | | | | |
| | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 | | | | | | | | | | | | | |
| | Er.AF | Er.AE | Er.AD | Er.AC | Er.AB | Er.AA | Er.A9 | Er.A8 | Er.A7 | Er.A6 | Er.A5 | Er.A4 | Er.A3 | Er.A2 | Er.A1 | Er.A0 | | | | | |
| | 87 | 86 | 85 | 84 | 83 | 82 | 81 | 80 | | | | | | | | | | | | | |
| | Er.BF | Er.BE | Er.BD | Er.BC | Er.BB | Er.BA | Er.B9 | Er.B8 | Er.B7 | Er.B6 | Er.B5 | Er.B4 | Er.B3 | Er.B2 | Er.B1 | Er.B0 | | | | | |
| | 95 | 94 | 93 | 92 | 91 | 90 | 89 | 88 | | | | | | | | | | | | | |
| | Er.CF | Er.CE | Er.CD | Er.CC | Er.CB | Er.CA | Er.C9 | Er.C8 | Er.C7 | Er.C6 | Er.C5 | Er.C4 | Er.C3 | Er.C2 | Er.C1 | Er.C0 | | | | | |
| | 103 | 102 | 101 | 100 | 99 | 98 | 97 | 96 | | | | | | | | | | | | | |
| | Er.DF | Er.DE | Er.DD | Er.DC | Er.DB | Er.DA | Er.D9 | Er.D8 | Er.D7 | Er.D6 | Er.D5 | Er.D4 | Er.D3 | Er.D2 | Er.D1 | Er.D0 | | | | | |
| 111 | 110 | 109 | 108 | 107 | 106 | 105 | 104 | | | | | | | | | | | | | | |
| Er.EF | Er.EE | Er.ED | Er.EC | Er.EB | Er.EA | Er.E9 | Er.E8 | Er.E7 | Er.E6 | Er.E5 | Er.E4 | Er.E3 | Er.E2 | Er.E1 | Er.E0 | | | | | | |
| 119 | 118 | 117 | 116 | 115 | 114 | 113 | 112 | | | | | | | | | | | | | | |
| Er.FF | Er.FE | Er.FD | Er.FC | Er.FB | Er.FA | Er.F9 | Er.F8 | Er.F7 | Er.F6 | Er.F5 | Er.F4 | Er.F3 | Er.F2 | Er.F1 | Er.F0 | | | | | | |
| 127 | 126 | 125 | 124 | 123 | 122 | 121 | 120 | | | | | | | | | | | | | | |

(4) **Mr** Module Status area

The **Mr** Module Status area stores the information of the slice modules recognized by the head module.

Each of the head module and slice modules occupies 1 bit per slice.

The construction of the **Mr** Module Status area is shown below.

| Maximum input/output points | | | | Slice No. → | | | | | | | | | | | | | | | | | |
|-----------------------------|----------------|---------------|---------------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|------|----|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | Mr Module status | | | | | | | | | | | | | | | | | |
| | | | Used area | b15 | Mr.15 | Mr.14 | Mr.13 | Mr.12 | Mr.11 | Mr.10 | Mr.9 | Mr.8 | Mr.7 | Mr.6 | Mr.5 | Mr.4 | Mr.3 | Mr.2 | Mr.1 | Mr.0 | b0 |
| Used area | Used area | Used area | Used area | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | ← | |
| | | | | Mr.31 | Mr.30 | Mr.29 | Mr.28 | Mr.27 | Mr.26 | Mr.25 | Mr.24 | Mr.23 | Mr.22 | Mr.21 | Mr.20 | Mr.19 | Mr.18 | Mr.17 | Mr.16 | ← | |
| | | | | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | | |
| | | | | Mr.47 | Mr.46 | Mr.45 | Mr.44 | Mr.43 | Mr.42 | Mr.41 | Mr.40 | Mr.39 | Mr.38 | Mr.37 | Mr.36 | Mr.35 | Mr.34 | Mr.33 | Mr.32 | | |
| | | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | | | | |
| | | Mr.63 | Mr.62 | Mr.61 | Mr.60 | Mr.59 | Mr.58 | Mr.57 | Mr.56 | Mr.55 | Mr.54 | Mr.53 | Mr.52 | Mr.51 | Mr.50 | Mr.49 | Mr.48 | | | | |
| | | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | | | | |
| | | Mr.79 | Mr.78 | Mr.77 | Mr.76 | Mr.75 | Mr.74 | Mr.73 | Mr.72 | Mr.71 | Mr.70 | Mr.69 | Mr.68 | Mr.67 | Mr.66 | Mr.65 | Mr.64 | | | | |
| | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 | | | | | |
| | Mr.95 | Mr.94 | Mr.93 | Mr.92 | Mr.91 | Mr.90 | Mr.89 | Mr.88 | Mr.87 | Mr.86 | Mr.85 | Mr.84 | Mr.83 | Mr.82 | Mr.81 | Mr.80 | | | | | |
| | 95 | 94 | 93 | 92 | 91 | 90 | 89 | 88 | 87 | 86 | 85 | 84 | 83 | 82 | 81 | 80 | | | | | |
| | Mr.111 | Mr.110 | Mr.109 | Mr.108 | Mr.107 | Mr.106 | Mr.105 | Mr.104 | Mr.103 | Mr.102 | Mr.101 | Mr.100 | Mr.99 | Mr.98 | Mr.97 | Mr.96 | | | | | |
| | 111 | 110 | 109 | 108 | 107 | 106 | 105 | 104 | 103 | 102 | 101 | 100 | 99 | 98 | 97 | 96 | | | | | |
| | Mr.127 | Mr.126 | Mr.125 | Mr.124 | Mr.123 | Mr.122 | Mr.121 | Mr.120 | Mr.119 | Mr.118 | Mr.117 | Mr.116 | Mr.115 | Mr.114 | Mr.113 | Mr.112 | | | | | |
| | 127 | 126 | 125 | 124 | 123 | 122 | 121 | 120 | 119 | 118 | 117 | 116 | 115 | 114 | 113 | 112 | | | | | |

(5) **Cr** Command result area

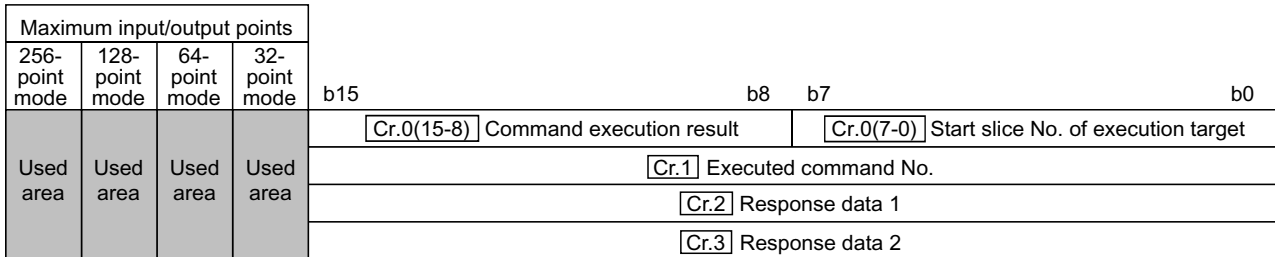
The **Cr** Command result area stores the results of executing a command to the head module or each slice module.

The values stored in the **Cr** Command execution area all turn to 0 when the **Bw.03** Command execution request is turned off.

Refer to Chapter 8 for details of the commands.

(a) Construction of **Cr** Command result area

The construction of the **Cr** Command result area is shown below.



(b) Data stored into **Cr** Command result area

Data stored into the **Cr** Command result area are described below.

| Cr Command result area | Information | Description |
|-------------------------------|---|---|
| Cr.0 | Cr.0 (15-8) Command execution result | Stores the command execution result. |
| | Cr.0 (7-0) Start slice No. of execution target | Stores the start slice No. of the execution target head module or slice module. |
| Cr.1 | Executed command No. | Stores the command No. of the executed command. |
| Cr.2 | Response data 1 | Stores the response data from the execution target head module or slice module. |
| Cr.3 | Response data 2 | |

(6) **Wr** Word input area

The **Wr** Word input area stores **Wr.n** Word input values received from the intelligent function modules in order of the mounted position.

(a) Construction of **Wr** Word input area

The construction of the **Wr** Word input area is shown below.

| Maximum input/output points | | | | b15 | b0 |
|-----------------------------|----------------|---------------|---------------|---|----|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | | |
| Used area | Used area | Used area | Used area | Wr.00 Intelligent function module word input data 1 | |
| | | | | Wr.01 Intelligent function module word input data 2 | |
| | | | | • | |
| | | | | • | |
| | | | | • | |
| | | | | Wr.1E Intelligent function module word input data 31 | |
| | | | | Wr.1F Intelligent function module word input data 32 | |
| | | | | • | |
| | | | | • | |
| | | | | • | |
| | | | | Wr.32 Intelligent function module word input data 51 | |
| | | | | Wr.33 Intelligent function module word input data 52 | |

(b) Data size of **Wr** Word input area

Calculate the data size of the **Wr** Word input area as described below according to the mounting conditions of the intelligent function modules.

1) When no intelligent function modules are used

The data size of the **Wr** Word input area is 0.

- 2) When intelligent function modules are used
 Reserve the \boxed{Wr} Word input area for as many as the $\boxed{Wr.n}$ Word input points used by the intelligent function modules.
 The \boxed{Wr} Word input area is assigned in order of mounting the intelligent function modules.

< \boxed{Wr} Word input area assignment example>

1) System example

| Start slice No. | Mounted module | | | |
|-----------------|--------------------------------|---------------------------|----------------------------------|---------------------------------|
| | Module type | Number of Occupied Slices | $\boxed{Wr.n}$ Word input points | \boxed{Wr} Word input area |
| 0 | Head module | 2 | — | — |
| 2 | Bus refreshing module | 1 | — | — |
| 3 | Input module | 1 | — | — |
| 4 | Output module | 1 | — | — |
| 5 | Power feeding module | 1 | — | — |
| 6 | Intelligent function module 1) | 2 | 2 words | $\boxed{Wr.00}$ $\boxed{Wr.01}$ |
| 8 | Intelligent function module 2) | 2 | 2 words | $\boxed{Wr.02}$ $\boxed{Wr.03}$ |
| 10 | Intelligent function module 3) | 2 | 2 words | $\boxed{Wr.04}$ $\boxed{Wr.05}$ |

2) \boxed{Wr} Word input area assignment example

In the system example in above 1), the \boxed{Wr} Word input area is assigned as shown below.

| | |
|-----------------|--|
| $\boxed{Wr.00}$ | Intelligent function module 1) word input data 1 |
| $\boxed{Wr.01}$ | Intelligent function module 1) word input data 2 |
| $\boxed{Wr.02}$ | Intelligent function module 2) word input data 1 |
| $\boxed{Wr.03}$ | Intelligent function module 2) word input data 2 |
| $\boxed{Wr.04}$ | Intelligent function module 3) word input data 1 |
| $\boxed{Wr.05}$ | Intelligent function module 3) word input data 2 |

POINT

For the intelligent function module that can be operated by only the $\boxed{Ww.n}$ Word output, the number of $\boxed{Wr.n}$ Word input points can be changed to 0 by the slave parameter setting.

Refer to Section 6.1.4 for the setting in the case where the $\boxed{Wr.n}$ Word input is not used for the intelligent function module.

3.2.2 Output data specifications

This section explains the data sizes of output data and the details of each area.

| |
|--|
| POINT |
| In this manual, output data addresses (output image addresses on the master station side) are indicated as offset addresses (word unit). [Offset address] Denotes a data position in word units, relative to the first address of the output image assigned for the MELSEC-ST system on the master station side. |

(1) Output data sizes

The output data sizes differ depending on the setting of the maximum I/O points. The output data sizes for the maximum I/O points are indicated below. Refer to Section 6.1 for details of the maximum I/O points.

(a) 32-point mode

| Offset address (Decimal) | Application | | Data size |
|--------------------------|--------------------|-----------------------------|---|
| +0 | [Bw.00] to [Bw.1F] | [Bw] Bit output area | 2 words |
| +1 | | | |
| +2 | [Ew.00] to [Ew.1F] | [Ew] Error clear area | 2 words |
| +3 | | | |
| +4 | [Sw.0] | [Sw] System Area | 1 words |
| +5 | [Cw.0] to [Cw.3] | [Cw] Command execution area | 4 words |
| to | | | |
| +8 | | | |
| +9 | [Ww.00] to [Ww.33] | [Ww] Word output area | Minimum size: 0 words Maximum size: 52 words |
| to | | | |
| +60 | | | |

• • • Refer to (2) in this section.

• • • Refer to (3) in this section.

• • • Refer to (4) in this section.

• • • Refer to (5) in this section.

Size variable *1 • • • Refer to (6) in this section.

*1: The data size of the [Ww] Word output area is a sum total of the [Ww] Word output area sizes used by the mounted intelligent function modules. This data size is 0 when no intelligent function modules are mounted.

(b) 64-point mode

| Offset address (Decimal) | Application | | Data size |
|--------------------------|--------------------|-----------------------------|---|
| +0 | | | |
| to | [Bw.00] to [Bw.3F] | [Bw] Bit output area | 4 words |
| +3 | | | |
| +4 | | | |
| to | [Ew.00] to [Ew.3F] | [Ew] Error clear area | 4 words |
| +7 | | | |
| +8 | | | |
| to | [Sw.0] to [Sw.1] | [Sw] System Area | 2 words |
| +9 | | | |
| +10 | | | |
| to | [Cw.0] to [Cw.3] | [Cw] Command execution area | 4 words |
| +13 | | | |
| +14 | | | |
| to | [Ww.00] to [Ww.33] | [Ww] Word output area | Minimum size: 0 words Maximum size: 52 words |
| +65 | | | |

• • • Refer to (2) in this section.

• • • Refer to (3) in this section.

• • • Refer to (4) in this section.

• • • Refer to (5) in this section.

Size variable *1 • • • Refer to (6) in this section.

*1: The data size of the [Ww] Word output area is a sum total of the [Ww] Word output area sizes used by the mounted intelligent function modules.
This data size is 0 when no intelligent function modules are mounted.

(c) 128-point mode

| Offset address (Decimal) | Application | | Data size |
|--------------------------|--------------------|-----------------------------|---|
| +0 | | | |
| to | [Bw.00] to [Bw.7F] | [Bw] Bit output area | 8 words |
| +7 | | | |
| +8 | | | |
| to | [Ew.00] to [Ew.7F] | [Ew] Error clear area | 8 words |
| +15 | | | |
| +16 | | | |
| to | [Sw.0] to [Sw.3] | [Sw] System Area | 4 words |
| +19 | | | |
| +20 | | | |
| to | [Cw.0] to [Cw.3] | [Cw] Command execution area | 4 words |
| +23 | | | |
| +24 | | | |
| to | [Ww.00] to [Ww.33] | [Ww] Word output area | Minimum size: 0 words Maximum size: 52 words |
| +75 | | | |

• • • Refer to (2) in this section.

• • • Refer to (3) in this section.

• • • Refer to (4) in this section.

• • • Refer to (5) in this section.

Size variable *1 • • • Refer to (6) in this section.

*1: The data size of the [Ww] Word output area is a sum total of the [Ww] Word output area sizes used by the mounted intelligent function modules.
This data size is 0 when no intelligent function modules are mounted.

(d) 256-point mode

| Offset address (Decimal) | Application | | Data size | |
|--------------------------|-----------------------|-----------------------------|---|--|
| +0 | to [Bw.00] to [Bw.FF] | [Bw] Bit output area | 16 words | . . . Refer to (2) in this section. |
| +15 | | | | |
| +16 | to [Ew.00] to [Ew.FF] | [Ew] Error clear area | 16 words | . . . Refer to (3) in this section. |
| +31 | | | | |
| +32 | to [Sw.0] to [Sw.7] | [Sw] System Area | 8 words | . . . Refer to (4) in this section. |
| +39 | | | | |
| +40 | to [Cw.0] to [Cw.3] | [Cw] Command execution area | 4 words | . . . Refer to (5) in this section. |
| +43 | | | | |
| +44 | to [Ww.00] to [Ww.1F] | [Ww] Word output area | Minimum size: 0 words Maximum size: 32 words | Size variable *1 . . . Refer to (6) in this section. |
| +95 | | | | |

*1: The data size of the [Ww] Word output area is a sum total of the [Ww] Word output area sizes used by the mounted intelligent function modules.
This data size is 0 when no intelligent function modules are mounted.

(2) **Bw** Bit output area

The **Bw** Bit output area stores the ON/OFF information of the **Bw.n** Bit outputs provided to the head module and slice modules.

Each of the head module and slice modules occupies 2 bits per slice.

The construction of the **Bw** Bit output area is shown below.

| Maximum input/output points | | | | Slice No. → | | | | | | | | | | | | | | | | | |
|-----------------------------|----------------|---------------|---------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|--|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | Bw Bit output area | | | | | | | | | | | | | | | | | |
| | | | | b15 | | | | | | | | | | | | | b0 | | | | |
| Used area | Used area | Used area | Used area | Bw.0F | Bw.0E | Bw.0D | Bw.0C | Bw.0B | Bw.0A | Bw.09 | Bw.08 | Bw.07 | Bw.06 | Bw.05 | Bw.04 | Bw.03 | Bw.02 | Bw.01 | Bw.00 | | |
| | | | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | | | | | | | |
| | | | | Bw.1F | Bw.1E | Bw.1D | Bw.1C | Bw.1B | Bw.1A | Bw.19 | Bw.18 | Bw.17 | Bw.16 | Bw.15 | Bw.14 | Bw.13 | Bw.12 | Bw.11 | Bw.10 | | |
| | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | | | | | | | | | | |
| | | | | Bw.2F | Bw.2E | Bw.2D | Bw.2C | Bw.2B | Bw.2A | Bw.29 | Bw.28 | Bw.27 | Bw.26 | Bw.25 | Bw.24 | Bw.23 | Bw.22 | Bw.21 | Bw.20 | | |
| | | | | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 | | | | | | | | | | |
| | | | | Bw.3F | Bw.3E | Bw.3D | Bw.3C | Bw.3B | Bw.3A | Bw.39 | Bw.38 | Bw.37 | Bw.36 | Bw.35 | Bw.34 | Bw.33 | Bw.32 | Bw.31 | Bw.30 | | |
| | | | | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 | | | | | | | | | | |
| | | | | Bw.4F | Bw.4E | Bw.4D | Bw.4C | Bw.4B | Bw.4A | Bw.49 | Bw.48 | Bw.47 | Bw.46 | Bw.45 | Bw.44 | Bw.43 | Bw.42 | Bw.41 | Bw.40 | | |
| | | | | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 | | | | | | | | | | |
| | | | | Bw.5F | Bw.5E | Bw.5D | Bw.5C | Bw.5B | Bw.5A | Bw.59 | Bw.58 | Bw.57 | Bw.56 | Bw.55 | Bw.54 | Bw.53 | Bw.52 | Bw.51 | Bw.50 | | |
| | | | | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | | | | | | | | | | |
| | | | | Bw.6F | Bw.6E | Bw.6D | Bw.6C | Bw.6B | Bw.6A | Bw.69 | Bw.68 | Bw.67 | Bw.66 | Bw.65 | Bw.64 | Bw.63 | Bw.62 | Bw.61 | Bw.60 | | |
| | | | | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | | | | | | | | | | |
| | | | | Bw.7F | Bw.7E | Bw.7D | Bw.7C | Bw.7B | Bw.7A | Bw.79 | Bw.78 | Bw.77 | Bw.76 | Bw.75 | Bw.74 | Bw.73 | Bw.72 | Bw.71 | Bw.70 | | |
| | | | | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | | | | | | | | | | |
| | | | | Bw.8F | Bw.8E | Bw.8D | Bw.8C | Bw.8B | Bw.8A | Bw.89 | Bw.88 | Bw.87 | Bw.86 | Bw.85 | Bw.84 | Bw.83 | Bw.82 | Bw.81 | Bw.80 | | |
| | | | | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 | | | | | | | | | | |
| | | | | Bw.9F | Bw.9E | Bw.9D | Bw.9C | Bw.9B | Bw.9A | Bw.99 | Bw.98 | Bw.97 | Bw.96 | Bw.95 | Bw.94 | Bw.93 | Bw.92 | Bw.91 | Bw.90 | | |
| | | | | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 | | | | | | | | | | |
| | | | | Bw.AF | Bw.AE | Bw.AD | Bw.AC | Bw.AB | Bw.AA | Bw.A9 | Bw.A8 | Bw.A7 | Bw.A6 | Bw.A5 | Bw.A4 | Bw.A3 | Bw.A2 | Bw.A1 | Bw.A0 | | |
| | | | | 87 | 86 | 85 | 84 | 83 | 82 | 81 | 80 | | | | | | | | | | |
| | | | | Bw.BF | Bw.BE | Bw.BD | Bw.BC | Bw.BB | Bw.BA | Bw.B9 | Bw.B8 | Bw.B7 | Bw.B6 | Bw.B5 | Bw.B4 | Bw.B3 | Bw.B2 | Bw.B1 | Bw.B0 | | |
| | | | | 95 | 94 | 93 | 92 | 91 | 90 | 89 | 88 | | | | | | | | | | |
| | | | | Bw.CF | Bw.CE | Bw.CD | Bw.CC | Bw.CB | Bw.CA | Bw.C9 | Bw.C8 | Bw.C7 | Bw.C6 | Bw.C5 | Bw.C4 | Bw.C3 | Bw.C2 | Bw.C1 | Bw.C0 | | |
| | | | | 103 | 102 | 101 | 100 | 99 | 98 | 97 | 96 | | | | | | | | | | |
| | | | | Bw.DF | Bw.DE | Bw.DD | Bw.DC | Bw.DB | Bw.DA | Bw.D9 | Bw.D8 | Bw.D7 | Bw.D6 | Bw.D5 | Bw.D4 | Bw.D3 | Bw.D2 | Bw.D1 | Bw.D0 | | |
| 111 | 110 | 109 | 108 | 107 | 106 | 105 | 104 | | | | | | | | | | | | | | |
| Bw.EF | Bw.EE | Bw.ED | Bw.EC | Bw.EB | Bw.EA | Bw.E9 | Bw.E8 | Bw.E7 | Bw.E6 | Bw.E5 | Bw.E4 | Bw.E3 | Bw.E2 | Bw.E1 | Bw.E0 | | | | | | |
| 119 | 118 | 117 | 116 | 115 | 114 | 113 | 112 | | | | | | | | | | | | | | |
| Bw.FF | Bw.FE | Bw.FD | Bw.FC | Bw.FB | Bw.FA | Bw.F9 | Bw.F8 | Bw.F7 | Bw.F6 | Bw.F5 | Bw.F4 | Bw.F3 | Bw.F2 | Bw.F1 | Bw.F0 | | | | | | |
| 127 | 126 | 125 | 124 | 123 | 122 | 121 | 120 | | | | | | | | | | | | | | |

(3) **Ew** Error clear area

The **Ew** Error clear area stores the error information clear requests of the head module and slice modules.

This area is used to clear the corresponding error information (turn off the bit) of the head module or slice module after the error is remedied.

Each of the head module and slice modules occupies 2 bits per slice.

The construction of the **Ew** Error clear area is shown below.

| Maximum input/output points | | | | Slice No. Ew Error clear area | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|----------------|---------------|---------------|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----|-----|-----|-----|-----|-----|-----|-----|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | b15 | | | | | | | | | | | | b0 | | | | | | | | | | | |
| Used area | Used area | Used area | Used area | Ew.0F | Ew.0E | Ew.0D | Ew.0C | Ew.0B | Ew.0A | Ew.09 | Ew.08 | Ew.07 | Ew.06 | Ew.05 | Ew.04 | Ew.03 | Ew.02 | Ew.01 | Ew.00 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| | | | | Ew.1F | Ew.1E | Ew.1D | Ew.1C | Ew.1B | Ew.1A | Ew.19 | Ew.18 | Ew.17 | Ew.16 | Ew.15 | Ew.14 | Ew.13 | Ew.12 | Ew.11 | Ew.10 | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 |
| | | | | Ew.2F | Ew.2E | Ew.2D | Ew.2C | Ew.2B | Ew.2A | Ew.29 | Ew.28 | Ew.27 | Ew.26 | Ew.25 | Ew.24 | Ew.23 | Ew.22 | Ew.21 | Ew.20 | 23 | 22 | 21 | 20 | 19 | 18 | 17 | 16 |
| | | | | Ew.3F | Ew.3E | Ew.3D | Ew.3C | Ew.3B | Ew.3A | Ew.39 | Ew.38 | Ew.37 | Ew.36 | Ew.35 | Ew.34 | Ew.33 | Ew.32 | Ew.31 | Ew.30 | 31 | 30 | 29 | 28 | 27 | 26 | 25 | 24 |
| | | | | Ew.4F | Ew.4E | Ew.4D | Ew.4C | Ew.4B | Ew.4A | Ew.49 | Ew.48 | Ew.47 | Ew.46 | Ew.45 | Ew.44 | Ew.43 | Ew.42 | Ew.41 | Ew.40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 | 32 |
| | | | | Ew.5F | Ew.5E | Ew.5D | Ew.5C | Ew.5B | Ew.5A | Ew.59 | Ew.58 | Ew.57 | Ew.56 | Ew.55 | Ew.54 | Ew.53 | Ew.52 | Ew.51 | Ew.50 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 |
| | | | | Ew.6F | Ew.6E | Ew.6D | Ew.6C | Ew.6B | Ew.6A | Ew.69 | Ew.68 | Ew.67 | Ew.66 | Ew.65 | Ew.64 | Ew.63 | Ew.62 | Ew.61 | Ew.60 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 |
| | | | | Ew.7F | Ew.7E | Ew.7D | Ew.7C | Ew.7B | Ew.7A | Ew.79 | Ew.78 | Ew.77 | Ew.76 | Ew.75 | Ew.74 | Ew.73 | Ew.72 | Ew.71 | Ew.70 | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 |
| | | | | Ew.8F | Ew.8E | Ew.8D | Ew.8C | Ew.8B | Ew.8A | Ew.89 | Ew.88 | Ew.87 | Ew.86 | Ew.85 | Ew.84 | Ew.83 | Ew.82 | Ew.81 | Ew.80 | 71 | 70 | 69 | 68 | 67 | 66 | 65 | 64 |
| | | | | Ew.9F | Ew.9E | Ew.9D | Ew.9C | Ew.9B | Ew.9A | Ew.99 | Ew.98 | Ew.97 | Ew.96 | Ew.95 | Ew.94 | Ew.93 | Ew.92 | Ew.91 | Ew.90 | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 |
| | | | | Ew.AF | Ew.AE | Ew.AD | Ew.AC | Ew.AB | Ew.AA | Ew.A9 | Ew.A8 | Ew.A7 | Ew.A6 | Ew.A5 | Ew.A4 | Ew.A3 | Ew.A2 | Ew.A1 | Ew.A0 | 87 | 86 | 85 | 84 | 83 | 82 | 81 | 80 |
| | | | | Ew.BF | Ew.BE | Ew.BD | Ew.BC | Ew.BB | Ew.BA | Ew.B9 | Ew.B8 | Ew.B7 | Ew.B6 | Ew.B5 | Ew.B4 | Ew.B3 | Ew.B2 | Ew.B1 | Ew.B0 | 95 | 94 | 93 | 92 | 91 | 90 | 89 | 88 |
| | | | | Ew.CF | Ew.CE | Ew.CD | Ew.CC | Ew.CB | Ew.CA | Ew.C9 | Ew.C8 | Ew.C7 | Ew.C6 | Ew.C5 | Ew.C4 | Ew.C3 | Ew.C2 | Ew.C1 | Ew.C0 | 103 | 102 | 101 | 100 | 99 | 98 | 97 | 96 |
| | | | | Ew.DF | Ew.DE | Ew.DD | Ew.DC | Ew.DB | Ew.DA | Ew.D9 | Ew.D8 | Ew.D7 | Ew.D6 | Ew.D5 | Ew.D4 | Ew.D3 | Ew.D2 | Ew.D1 | Ew.D0 | 111 | 110 | 109 | 108 | 107 | 106 | 105 | 104 |
| | | | | Ew.EF | Ew.EE | Ew.ED | Ew.EC | Ew.EB | Ew.EA | Ew.E9 | Ew.E8 | Ew.E7 | Ew.E6 | Ew.E5 | Ew.E4 | Ew.E3 | Ew.E2 | Ew.E1 | Ew.E0 | 119 | 118 | 117 | 116 | 115 | 114 | 113 | 112 |
| | | | | Ew.FF | Ew.FE | Ew.FD | Ew.FC | Ew.FB | Ew.FA | Ew.F9 | Ew.F8 | Ew.F7 | Ew.F6 | Ew.F5 | Ew.F4 | Ew.F3 | Ew.F2 | Ew.F1 | Ew.F0 | 127 | 126 | 125 | 124 | 123 | 122 | 121 | 120 |

(4) **Sw** System area

The **Sw** System area is used by the head module system.

Store 0 (fixed) into the **Sw** System area.

The construction of the **Sw** System area is shown below.

| Maximum input/output points | | | | | | |
|-----------------------------|----------------|---------------|---------------|----------------------|----------------------|--|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | b15 | b0 | |
| Used area | Used area | Used area | Used area | [Sw.0] System Area 1 | | |
| | | | | [Sw.1] System Area 2 | | |
| | | | | | [Sw.2] System Area 3 | |
| | | | | | [Sw.3] System Area 4 | |
| | | | | | [Sw.4] System Area 5 | |
| | | | | | [Sw.5] System Area 6 | |
| | | | | | [Sw.6] System Area 7 | |
| | | | | | [Sw.7] System Area 8 | |

(5) **Cw** Command execution area

The **Cw** Command execution area stores the information of the command to be executed for the head module or each slice module.

Refer to Chapter 8 for details of the commands.

(a) Construction of **Cw** Command execution area

The construction of the **Cw** Command execution area is shown below.

| Maximum input/output points | | | |
|---|----------------|---------------|---------------|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode |
| Used area | Used area | Used area | Used area |
| b15 b0 | | | |
| Cw.0 Start slice No. of execution target | | | |
| Cw.1 Command No. to be executed | | | |
| Cw.2 Argument 1 | | | |
| Cw.3 Argument 2 | | | |

(b) Data stored into **Cw** Command execution area

Data stored into the **Cw** Command execution area are described below.

| Cw Command execution area | Information | Description |
|----------------------------------|-------------------------------------|---|
| Cw.0 | Start slice No. of execution target | Stores the start slice No. of the execution target head module or slice module. |
| Cw.1 | Command No. to be executed | Stores the command No. of the command to be executed. |
| Cw.2 | Argument 1 | Stores the argument used in the command. |
| Cw.3 | Argument 2 | |

(6) **Ww** Word output area

Stores the **Ww.n** Word output values of the intelligent function modules in order of the mounted position.

(a) Construction of **Ww** Word output area

The construction of the **Ww** Word output area is shown below.

| Maximum input/output points | | | | |
|-----------------------------|----------------|---------------|---------------|---|
| 256-point mode | 128-point mode | 64-point mode | 32-point mode | |
| | | | | b15 b0 |
| Used area | Used area | Used area | Used area | Ww.00 Intelligent function module word input data 1 |
| | | | | Ww.01 Intelligent function module word input data 2 |
| | | | | • |
| | | | | • |
| | | | | • |
| | | | | Ww.1E Intelligent function module word input data 31 |
| | | | | Ww.1F Intelligent function module word input data 32 |
| | | | | • |
| | | | | • |
| | | | | • |
| | | | | Ww.32 Intelligent function module word input data 51 |
| | | | | Ww.33 Intelligent function module word input data 52 |

(b) Data size of **Ww** Word output area

Calculate the data size of the **Ww** Word output area as described below according to the mounting conditions of the intelligent function modules.

1) When no intelligent function modules are used

The data size of the **Ww** Word output area is 0.

2) When intelligent function modules are used

Reserve the $[Ww]$ Word output area for as many as the $[Ww.n]$ Word output points used by the intelligent function modules.

The $[Ww]$ Word output area is assigned in order of mounting the intelligent function modules.

< $[Ww]$ Word output area assignment example >

1) System example

| Start slice No. | Mounted module | | | |
|-----------------|--------------------------------|---------------------------|-----------------------------|-------------------------|
| | Module type | Number of Occupied Slices | $[Ww.n]$ Word output points | $[Ww]$ Word output area |
| 0 | Head module | 2 | — | — |
| 2 | Bus refreshing module | 1 | — | — |
| 3 | Input module | 1 | — | — |
| 4 | Output module | 1 | — | — |
| 5 | Power feeding module | 1 | — | — |
| 6 | Intelligent function module 1) | 2 | 2 words | $[Ww.00]$ $[Ww.01]$ |
| 8 | Intelligent function module 2) | 2 | 2 words | $[Ww.02]$ $[Ww.03]$ |
| 10 | Intelligent function module 3) | 2 | 2 words | $[Ww.04]$ $[Ww.05]$ |

2) $[Ww]$ Word output area assignment example

In the system example in above 1), the $[Ww]$ Word output area is assigned as shown below.

| |
|---|
| $[Ww.00]$ Intelligent function module 1) word output data 1 |
| $[Ww.01]$ Intelligent function module 1) word output data 2 |
| $[Ww.02]$ Intelligent function module 2) word output data 1 |
| $[Ww.03]$ Intelligent function module 2) word output data 2 |
| $[Ww.04]$ Intelligent function module 3) word output data 1 |
| $[Ww.05]$ Intelligent function module 3) word output data 2 |

POINT

For the intelligent function module that can be operated by only the $[Wr.n]$ Word input, the number of $[Ww.n]$ Word output points can be changed to 0 by the slave parameter setting.

Refer to Section 6.1.4 for the setting in the case where the $[Ww.n]$ Word output is not used for the intelligent function module.

3.2.3 I/O data used by head module

This section explains the areas used for I/O data by the head module and their applications and information.

REMARK

For the applications of the areas assigned to each slice module, refer to the manual of each slice module.

(1) Input data

(a) **Br** Bit input area

The following table describes the applications of the **Br** Bit input area used by the head module.

The head module uses the first 4 bits (**Br.00** to **Br.03**) of the **Br** Bit input area.

| Br.n Bit input | Application | Br.n Bit input status |
|-----------------------|---|--|
| Br.00 | Module READY Stores the information on whether the head module can communicate with the master station. | 0: MELSEC-ST system being prepared or error occurred 1: MELSEC-ST system ready |
| Br.01 | Forced output test mode Stores the information on whether the head module is in the forced output test mode. | 0: Waiting for forced output test mode to be executed 1: Forced output test mode being executed |
| Br.02 | Online module change (OMC) Stores the information on whether the MELSEC-ST system is ready for online module change. | 0: Waiting for online module change to be executed 1: Online module change being executed |
| Br.03 | Command execution Stores the information on the execution status of the command requested in the Cw Command execution area. | 0: Command being executed or waiting for command request 1: Command execution |

0: OFF, 1: ON

(b) **Er** Error information area

The following table indicates the information of the **Er** Error information area used by the head module and the error codes corresponding to the error information.

The head module uses the first 4 bits (**Er.00** to **Er.03**) of the **Er** Error information area.

Read the error code from the head module by any of the following methods. (Refer to Section 9.2.1)

- Extended diagnostic information notification function
- Command
- GX Configurator-ST

The stored error information can be cleared by turning ON the **Ew.00** Error Clear Request.

| Er.n Error information | | | | Information | Error code *1 |
|-------------------------------|--------------|--------------|--------------|---|----------------|
| Er.03 | Er.02 | Er.01 | Er.00 | | |
| 0 | 0 | 0 | 0 | Normal | — |
| 0 | 0 | 0 | 1 | FDL address change error | F201H |
| 1 | 0 | 1 | 1 | User parameter setting error | F203H |
| 1 | 1 | 0 | 0 | Module error | F200H |
| 1 | 1 | 0 | 1 | Parameter read error (Online module change) | C101H to C13FH |
| 1 | 1 | 1 | 0 | Replaced module error (Online module change) | C201H to C23FH |

0: OFF, 1: ON

*1: Refer to Section 9.2.2 for the error codes.

(c) **Mr** Module status area

The following table indicates the information of the **Mr** Module status area used by the head module.

The head module uses the first 2 bits (**Mr.0** to **Mr.1**) of the **Mr** Module status area.

| Mr.n Module status | | Information | Description |
|---------------------------|-------------|----------------|---|
| Mr.1 | Mr.0 | | |
| 0 | 0 | Hardware fault | A hardware fault occurred in the head module. |
| 1 | 1 | Normal | The head module is operating normally. |

0: OFF, 1: ON

(2) Output data

(a) **Bw** Bit output area

The following table describes the applications of the **Bw** Bit output area used by the head module.

The head module uses the first 4 bits (**Bw.00** to **Bw.03**) of the **Bw** Bit output area.

| Bw.n Bit output | Application | Bw.n Bit output status |
|------------------------|--|--|
| Bw.00 | System area Use prohibited | 0 (Fixed) |
| Bw.01 | | |
| Bw.02 | | |
| Bw.03 | Command request The command sent from the master station is requested to be executed. | 0: Command not requested 1: Command requested |

0: OFF, 1: ON

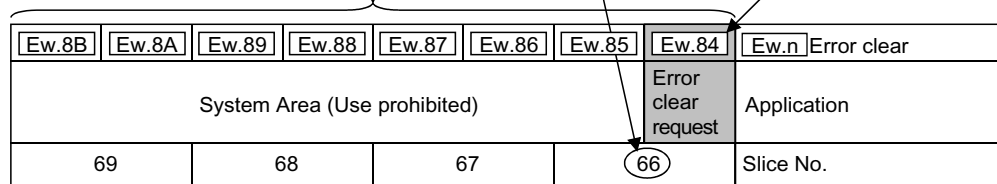
(b) **Ew** Error clear area

1) **Ew** Error clear area of each slice module

The error clear request bit of each slice module is the first bit of the assigned **Ew** Error clear area.

<Example>

When the number of occupied slices is "4" and the start slice No. is "66", the error clear request bit is **Ew.84**



2) **Ew** Error clear area of head module

The following table indicates the information of the **Ew** Error clear area used by the head module.

The head module uses the first 4 bits (**Ew.00** to **Ew.03**) of the **Ew** Error clear area.

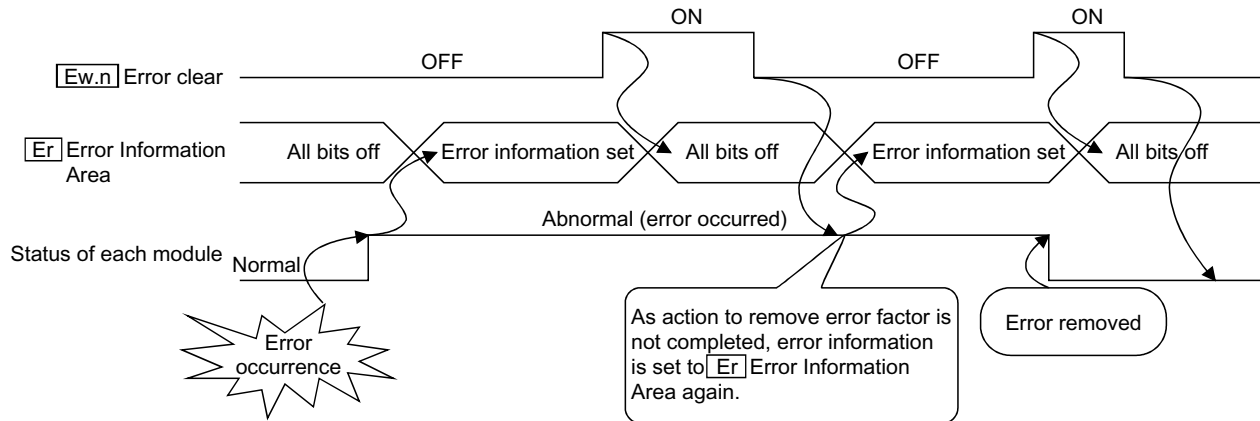
| Ew.n Error clear | Application | Ew.n Error clear status |
|-------------------------|---|--|
| Ew.00 | Error clear request Stores the error information clear request of the head module. | 0: Error clear not requested 1: Error clear requested |
| Ew.01 | System area Use prohibited | 0 (Fixed) |
| Ew.02 | | |
| Ew.03 | | |

0: OFF, 1: ON

3) Precautions for using the **[Ew.n]** error clear

If an error cause has not yet been eliminated when the error clear request bit is turned off, the error information is set to the **[Er]** Error information area again.

(While the **[Ew.n]** Error clear is on, the corresponding bits of the **[Er]** Error information area all turn off.)



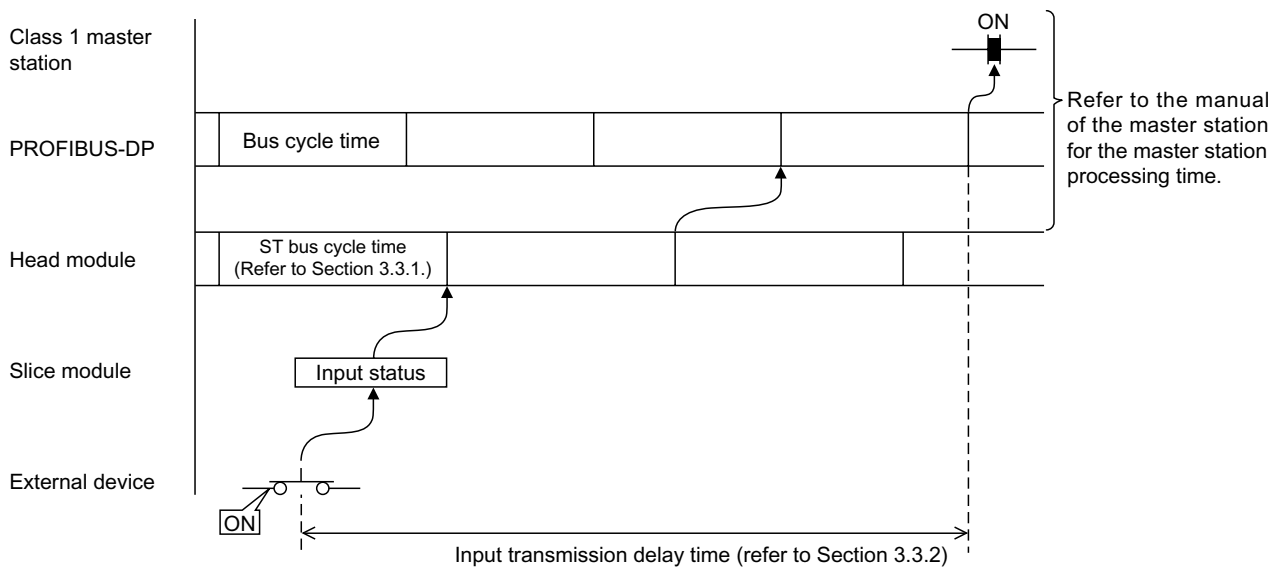
3.3 Head Module Processing Time

This section explains the processing time of the head module in the MELSEC-ST system.

Communication processings between the master station and MELSEC-ST system are outlined below.

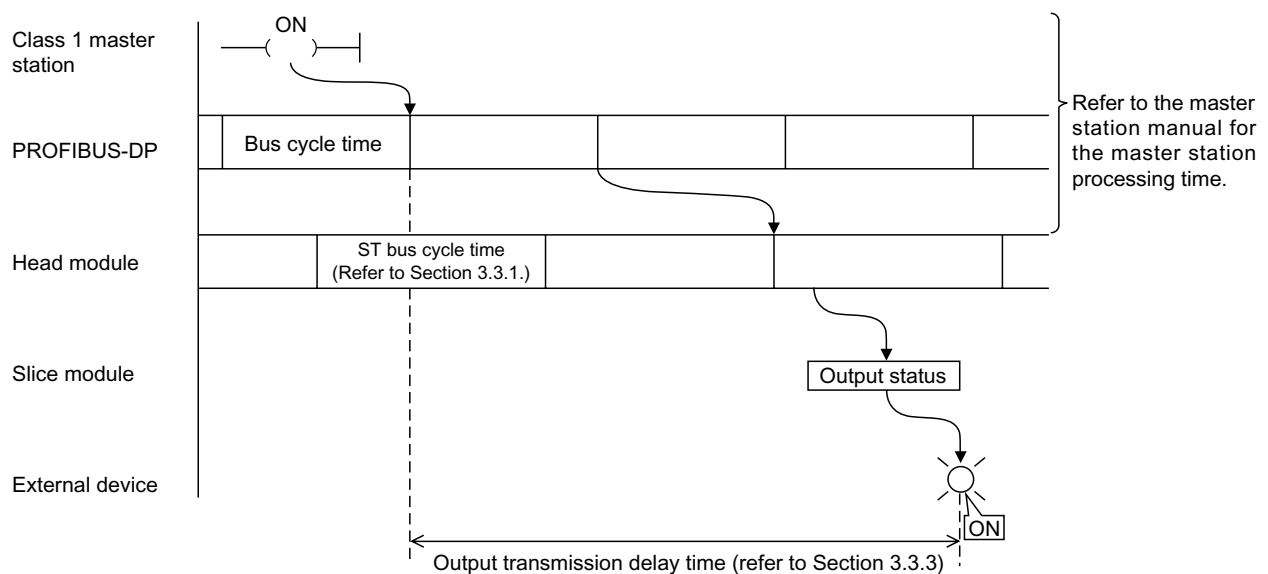
(1) Input data processing outline

How input data from an external device is sent to the master station is shown below.



(2) Output data processing outline

How output data from the master station is output to an external device is shown below.



3.3.1 ST bus cycle time

ST bus cycle time is the time required for the head module to refresh input or output data for the slice modules.

This section explains the ST bus cycle time expression and processing time example.

(1) ST bus cycle time expression

The expression for calculating the ST bus cycle time is given below.

$$\text{ST bus cycle time } [\mu\text{s}] = \{24 \times (1) + 2\}^{*1} \\ + (157 \times \text{number of mounted intelligent function modules}) + (\text{internal processing time}^{*2})$$

*1: Calculate 1) and 2) by the following expressions.

- When there are slice modules whose occupied I/O points are equal to or less than 4 points
1) = number of mounted slice modules
- When there are slice modules whose occupied I/O points are greater than 4 points
2) = (number of occupied I/O points / 4) × number of mounted slice modules

<Example>

When there are three slice modules having 2 occupied I/O points, two slice modules having 4 points, and three slice modules having 16 points
 $1) + 2) = 5 + (16 / 4) \times 3 = 17$

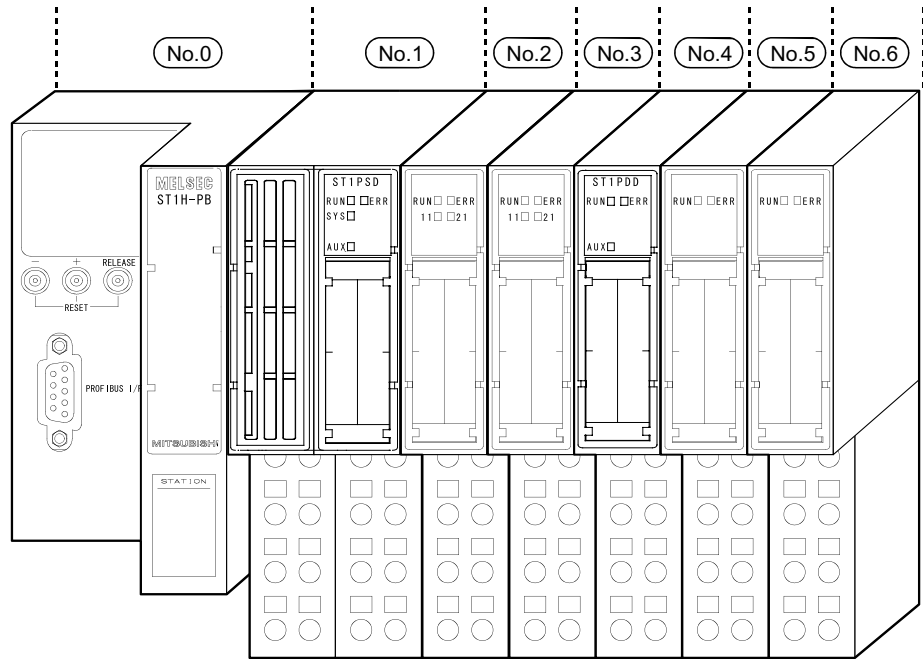
*2: The internal processing time changes depending on the maximum input/output points.

- 32-point mode: 385 μs
- 64-point mode: 400 μs
- 128-point mode: 430 μs
- 256-point mode: 490 μs

(2) Processing time example

The following system configuration example is used to explain a processing time example of ST bus cycle time.

(The following table uses the maximum input/output points sheet provided in Appendix 2.1.)



| No. | Module name | Number of Occupied I/O Points | Start Slice No. (Number of occupied slices) | I/O Points | | 5V DC Internal Current Consumption (Total) | 24V DC Current (Total) | Slot Width (Total) |
|-------|-------------|-------------------------------|---|------------|--------|--|------------------------|--------------------|
| | | | | [Wr.n] | [Ww.n] | | | |
| 0 | ST1H-PB | 4 | 0(2) | — | — | 0.530A(0.530A) | 0A(0A) | — |
| 1 | ST1PSD | 2 | 2(1) | — | — | — | — | 25.2mm(25.2mm) |
| 2 | ST1X2-DE1 | 2 | 3(1) | — | — | 0.085A(0.615A) | *1 | 12.6mm(37.8mm) |
| 3 | ST1Y2-TE2 | 2 | 4(1) | — | — | 0.090A(0.705A) | *1 | 12.6mm(50.4mm) |
| 4 | ST1PDD | 2 | 5(1) | — | — | 0.060A(0.765A) | — | 12.6mm(63.0mm) |
| 5 | ST1AD2-V | 4 | 6(2) | 2 | 2 | 0.110A(0.875A) | *1 | 12.6mm(75.6mm) |
| 6 | ST1DA2-V | 4 | 8(2) | 2 | 2 | 0.095A(0.970A) | *1 | 12.6mm(88.2mm) |
| Total | | 20 | — | 4 | 4 | — | — | — |

*1: The 24V DC current changes depending on the external device connected to each slice module.

Confirm the current consumption of the external device connected to each slice module, and calculate the total value. Refer to the MELSEC-ST System User's Manual for details of current consumption calculation.

Number of mounted intelligent function modules: 2

Maximum input/output points: 32-point mode

$$\text{ST bus cycle time} = \{24 \times (6 + 0)\} + (157 \times 2) + 385 \doteq 843 [\mu\text{s}]$$

3.3.2 Input transmission delay time

This section explains the time required from when the slice module receives input data from the external device until it outputs that data onto the PROFIBUS-DP line.

(1) Average delay time

Average input transmission delay time is indicated below.

$$\text{Input transmission delay time} = 1) + (1.5 \times \text{ST bus cycle time}) \\ + (0.5 \times \text{bus cycle time})$$

1): For input module ▪ ▪ ▪ Input module response time

For intelligent function module ▪ ▪ Intelligent function module processing time

For details, refer to the MELSEC-ST System User's Manual or intelligent function module manual.

ST bus cycle time: Refer to Section 3.3.1.

Bus cycle time: Refer to the manual of the master station.

(2) Maximum delay time

Maximum input transmission delay time is indicated below.

$$\text{Input transmission delay time} = 1) + (2.0 \times \text{ST bus cycle time}) \\ + (1.0 \times \text{bus cycle time})$$

1): For input module ▪ ▪ ▪ Input module response time

For intelligent function module ▪ ▪ Intelligent function module processing time

For details, refer to the MELSEC-ST System User's Manual or intelligent function module manual.

ST bus cycle time: Refer to Section 3.3.1.

Bus cycle time: Refer to the manual of the master station.

3.3.3 Output transmission delay time

This section explains the time required from when the head module receives output data from the master station until the slave module outputs data to the external device.

(1) Average delay time

Average output transmission delay time is indicated below.

Output transmission delay time = $(1.0 \times \text{ST bus cycle time}) + 1$

ST bus cycle time: Refer to Section 3.3.1.

1): For output module • • • Output module response time

For intelligent function module • • Intelligent function module processing time

For details, refer to the MELSEC-ST System User's Manual or intelligent function module manual.

(2) Maximum delay time

Maximum output transmission delay time is indicated below.

Output transmission delay time = $(1.5 \times \text{ST bus cycle time}) + 1$

ST bus cycle time: Refer to Section 3.3.1.

1): For output module • • • Output module response time

For intelligent function module • • Intelligent function module processing time

For details, refer to the MELSEC-ST System User's Manual or intelligent function module manual.

4 FUNCTIONS

This chapter explains the head module functions.

4.1 Function List

The head module functions are listed below.

(1) Network functions

The following table describes the head module functions used in the PROFIBUS-DP network.

To use the following functions, set the user parameters on the configuration software of the master station.

| Function name | Description | Reference section |
|---|--|-------------------|
| I/O data communication function | Communicates I/O data with the master station. | Section 4.2.1 |
| Global control function | Controls the inputs/outputs of slave stations in the specified group simultaneously by multicasting (broadcasting) from the master station. | Section 4.2.2 |
| Extended diagnostic information notification function | Notifies the master station of head module and slice module errors as extended diagnostic information. | Section 4.2.3 |
| Swap function | Swaps the high and low bytes in word units when input or output data are sent to or received from the master station or when extended diagnostic information is sent to the master station. When the master station handles the high and low bytes of word data in reverse to the head module, using this function allows data communication without creating a high/low byte swapping program. | Section 4.2.4 |
| I/O data consistency function | Prevents data inconsistency between the communication data of PROFIBUS-DP and the I/O data of the head module. | Section 4.2.5 |

(2) Control functions

The following table describes the functions used by the head module to control the slice modules.

| Function name | Description | Operation method | | | | Reference section |
|--|--|------------------|----|----|----|-------------------|
| | | 1) | 2) | 3) | 4) | |
| Setting of output status at module error | Sets whether the refresh of data output to the other normally operating output modules and intelligent function modules will be stopped or continued when an error occurs in a slice module. | ○ | × | × | × | Section 4.3.1 |
| Information monitor | Monitors various information of the head module and slice modules. | × | × | × | ○ | *1 |
| Status monitor | Monitors the operating statuses of the slice modules and the error history, etc. of the head module. | × | × | ○ | ○ | Section 4.3.2 |
| Online module change | The I/O modules and intelligent function modules can be replaced without stopping the MELSEC-ST system. | × | ○ | × | ○ | Section 4.4 |
| Forced output test function | Forcibly outputs the Bw.n Bit Output, Ew.n Error Clear and Ww.n Word Output of the head module and each slice module. | × | × | × | ○ | *1 |
| Intelligent function module parameter read/write | Reads or writes parameters from or to the ROM or RAM of the intelligent function module. | △*2 | × | ○ | ○ | Section 4.3.3 |
| Head module reset | Resets the MELSEC-ST system. | × | ○ | × | ○ | Section 5.3.2 |
| Head module parameter read | Reads the MELSEC-ST system parameters sent from the master station to the head module. | × | × | × | ○ | *1 |
| PROFIBUS-DP network parameter read | Reads the PROFIBUS-DP network parameters sent from the master station to the head module. | × | × | × | ○ | *1 |
| PROFIBUS-DP communication data read | Reads the input data sent from the head module to the master station and the output data sent from the master station to the head module. | × | × | × | ○ | *1 |
| Self-diagnostics | Runs a hardware test on the single head module. | × | ○ | × | × | Section 5.4 |
| Command execution | Executes a command requested by the master station. | × | × | ○ | × | Chapter 8 |

○: Can be executed, ×: Cannot be executed

1) Use the configuration software of the master station to set the user parameter.

2) Use the button or switch of the head module to perform operation.

3) Execute a command from the master station.

4) Use GX Configurator-ST to perform operation.

*1: For the operation of GX Configurator-ST, refer to the GX Configurator-ST Operating Manual.

*2: Setting from the configuration software of the master station allows the user parameters to be written to only the RAM of the intelligent function module.

4.2 Network Functions

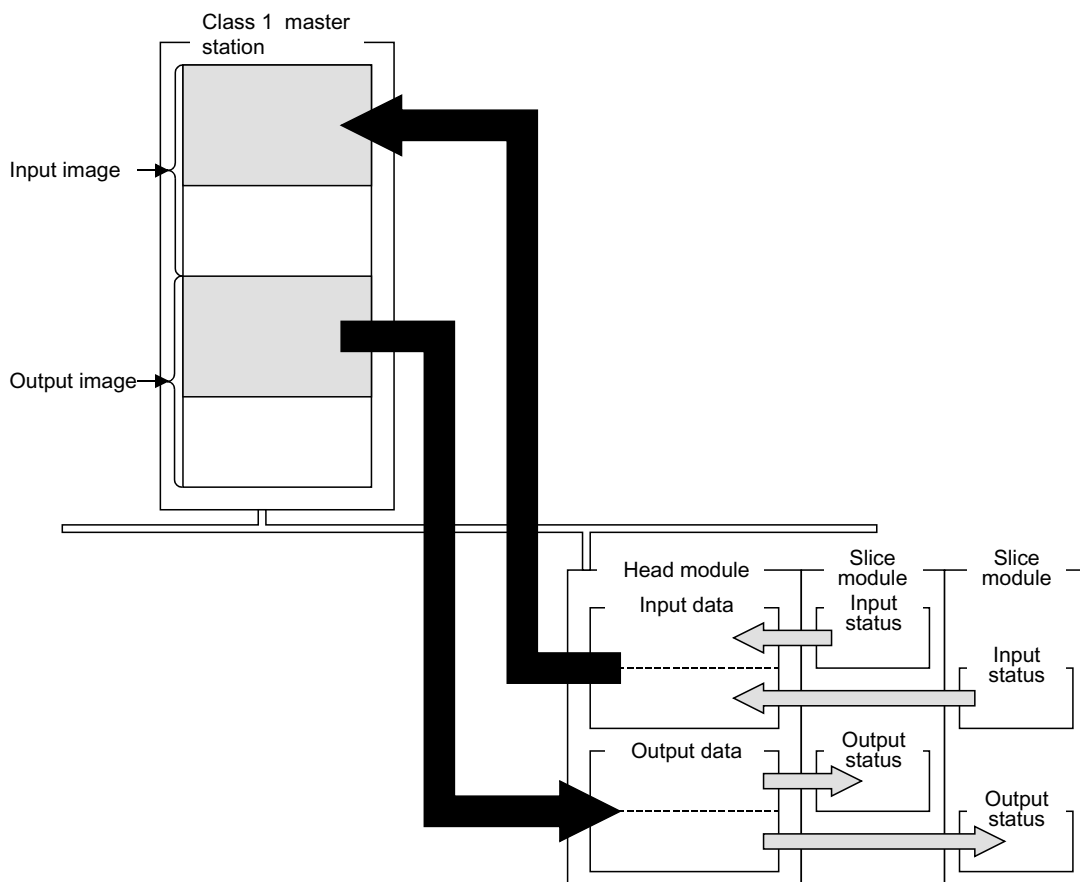
This section explains the head module functions used in the PROFIBUS-DP network.

4.2.1 I/O data communication function

(1) I/O data communication function

I/O data can be communicated with the Class 1 master station (master station that makes cyclic data communication with slave stations) of PROFIBUS-DP.

The head module can exchange up to 304-byte data in total with the master station: up to 152-byte input data (head module → master station) and up to 152-byte output data (master station → head module).



(2) I/O data size

The size of I/O data communicated with the master station changes depending on the maximum input/output points.

Refer to Chapter 6 for the maximum input/output points.

Refer to Section 3.2.1 and Section 3.2.2 for the I/O data size for the maximum input/output points.

(3) I/O status when the CPU stop error has occurred in master station

If an error (PLC CPU stop error) has occurred in a master station, the I/O status of the master station varies with the master station used.

The following table shows the I/O status when an error has occurred in a master station for each model.

| Maser station model | Master station I/O status | | Communication status |
|----------------------------------|--|---|----------------------|
| | Input data | Output data | |
| QJ71PB92D | The input data sent from slave stations are refreshed. | The output data sent to slave stations when the CPU stops are held. | Continued |
| AJ71PB92D, A1SJ71PB92D | The input data sent from slave stations when the CPU stops are held. | Cleared | Stopped |
| Master stations other than above | Refer to the manual for the master station | | |

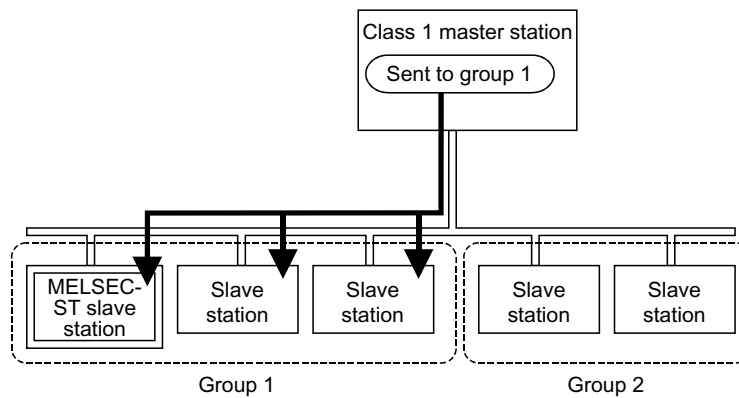
4.2.2 Global control function

(1) Global control function

The inputs/outputs of slave stations are controlled simultaneously for each specified group by multicasting (broadcasting) from the master station.

The head module that executes the global control function belongs to one or more groups specified by the master station.

Set the group number of the head module using the configuration software of the master station.



(2) Global control services available for head module

The following table describes the global control services available for the global control function of the head module.

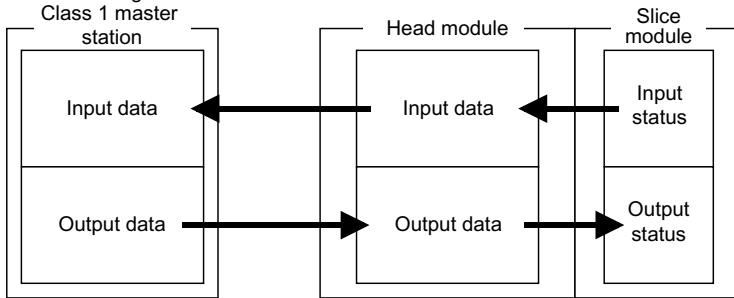
| Service name | Description |
|--------------|--|
| SYNC | Starts the SYNC (output synchronization) mode. During the SYNC mode, the output status is refreshed every time the SYNC service is received. The output status is held as long as the SYNC service is not received. |
| UNSYNC | Ends the SYNC (output synchronization) mode. |
| FREEZE | Starts the FREEZE (input synchronization) mode. During the FREEZE mode, the input status is refreshed every time the FREEZE service is received. The input status is held as long as the FREEZE service is not received. |
| UNFREEZE | Ends the FREEZE (input synchronization) mode. |

(3) Outline of service operations

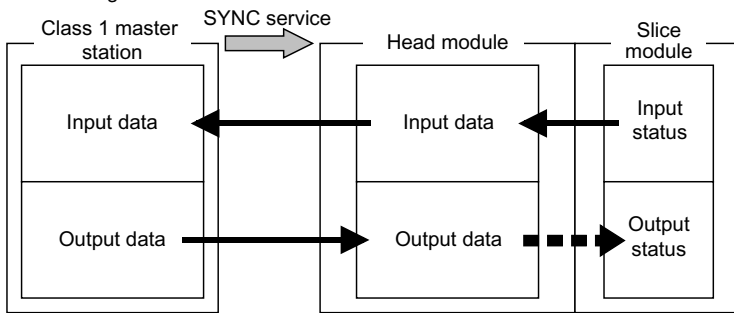
The following shows the outline of the SYNC and UNSYNC services and FREEZE and UNFREEZE services.

(a) When receiving SYNC and UNSYNC services

1) Before receiving SYNC service

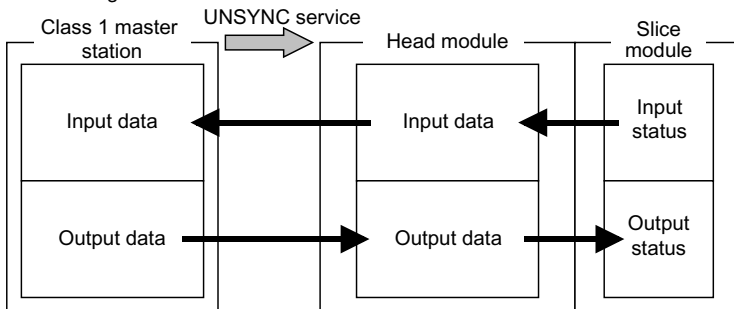


2) After receiving SYNC service



- When receiving the SYNC service, the head module enters the SYNC mode, and stops refresh from its output receiving area to the output status area of the slice module.
- During the SYNC mode, the SYN. LED of the head module is on.
- When the SYNC service is received during the SYNC mode, refresh to the output status area is performed only once.

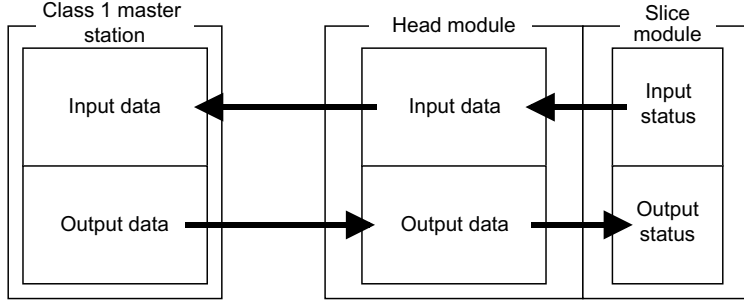
3) After receiving UNSYNC service



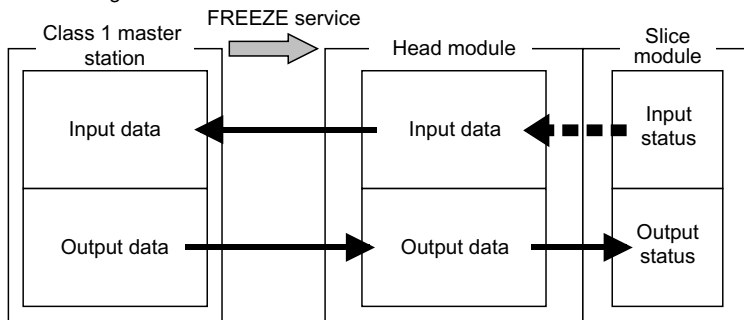
- Even during the SYNC mode, refresh from the input status area to the input sending area is executed continuously.
- When receiving the UNSYNC service, the head module ends the SYNC mode and resumes refresh from its output receiving area to the output status area of the slice module.
- When the UNSYNC service is received and the SYNC mode is ended, the SYN. LED of the head module turns off.

(b) When receiving FREEZE and UNFREEZE services

1) Before receiving FREEZE service

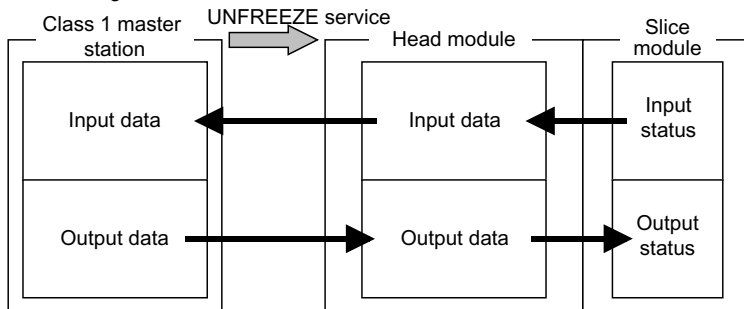


2) After receiving FREEZE service



- When receiving the FREEZE service, the head module enters the FREEZE mode, and stops refresh from the input status area of the slice module to the input sending area of the head module.
- During the FREEZE mode, the FRE. LED of the head module is on.
- When the FREEZE service is received during the FREEZE mode, refresh to the input sending area is performed only once.
- Even during the FREEZE mode, refresh from the output receiving data to the output status area is executed continuously.

3) After receiving UNFREEZE service



- When receiving the UNFREEZE service, the head module ends the FREEZE mode, and resumes refresh from the input status area of the slice module to the input sending area area of the head module.
- When the UNFREEZE service is received and the FREEZE mode is ended, the FRE. LED of the head module turns off.

(4) Group selection

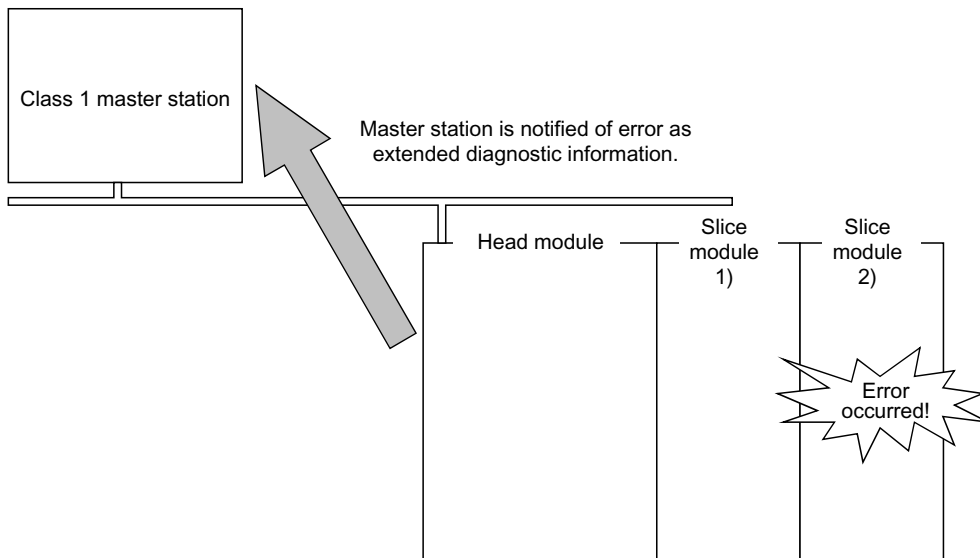
There are a total of 8 groups from 1 to 8.

The head module is allowed to belong to any of the 8 groups. (Specify the group using the configuration software of the master station.)

4.2.3 Extended diagnostic information notification function

(1) Extended diagnostic information notification function

When errors occur in the head module and/or slice modules, this function can notify the master station of the errors of up to 2 modules in chronological order. When the head module has notified the master station of extended diagnostic information, the DIA LED of the head module is on. When the head module and/or slice modules return to normal, the master station is notified and the DIA LED of the head module turns off.



(2) Setting of extended diagnostic information notification function

The extended diagnostic information notification function defaults to "Enable (Notified)".

When the master station is not notified of extended diagnostic information, the extended diagnostic information notification function setting must be changed on the configuration software of the master station.

Use the "Ext_Diag information" user parameter to set this function.

The setting items of Ext_Diag information are as follows.

| Item | Description |
|------------------|---|
| Enable (Default) | Notifies the master station of head module and/or slice module errors as extended diagnostic information. |
| Disable | If errors occur in the head module and/or slice modules, does not notify the master station of extended diagnostic information. |

(3) Extended diagnostic information data

(a) Data sent to master station

When the extended diagnostic information notification function is set to "Enable (notified)", the head module sends the following data to the extended diagnostic information area of the master station.

Refer to the manual of the master station for the extended diagnostic information area of the master station.

| Offset address (Unit: Word) | Name | | |
|--------------------------------|--------------------------------------|---------------------|---------------------|
| + 0 | Head module error code | | |
| + 1 | | First module | Error slice No. |
| + 2 | | | Detail error code 1 |
| + 3 | Error slice module information *1 | | Detail error code 2 |
| + 4 | | | Second module |
| + 5 | | Detail error code 1 | |
| + 6 | | Detail error code 2 | |

*1: The error slice module information of two modules is stored in chronological order.

REMARK

Depending on the master station, the high and low bytes of the extended diagnostic information data sent from the head module may be reverse to those of the extended diagnostic information area of the master station.

In that case, use the swap function of the head module.

Refer to Section 4.2.4 for details.

(b) Details of sending data area

1) Head module error code area

Stores an error code corresponding to the error that occurred in the head module.

Refer to Section 9.2.2 for the error codes of the head module.

2) Error slice module information area

Stores the information of up to 2 error slice modules in chronological order.

The details of the error slice module information area are described below.

| Name | Description |
|---------------------|---|
| Error slice No. | Stores the start slice No. of the slice module where an error occurred. (Stores 0000H when no error has occurred.) |
| Detail error code 1 | Stores the error code ^{*1} ^{*2} of the slice module where an error occurred. (Stores 0000H when no error has occurred.) |
| Detail error code 2 | |

*1: The error code stored into this area is the same as the value stored into the **Cr** Command result area when the command (0101H) is executed. For error codes of the intelligent function module, refer to the manual of the intelligent function module.

When an error occurred in the power distribution module or I/O module, an error code of the head module is stored.

*2: If a hardware or similar fault occurs in the slice module, FFFFH is stored into Detail error code 1.

In that case, please consult your local Mitsubishi representative, explaining a detailed description of the problem.

REMARK

When the master station is not notified of the extended diagnostic information, confirm the error information in the **Er** Error information area of each module, and execute the command (0101H) to read the error code.

4.2.4 Swap function

(1) Swap function

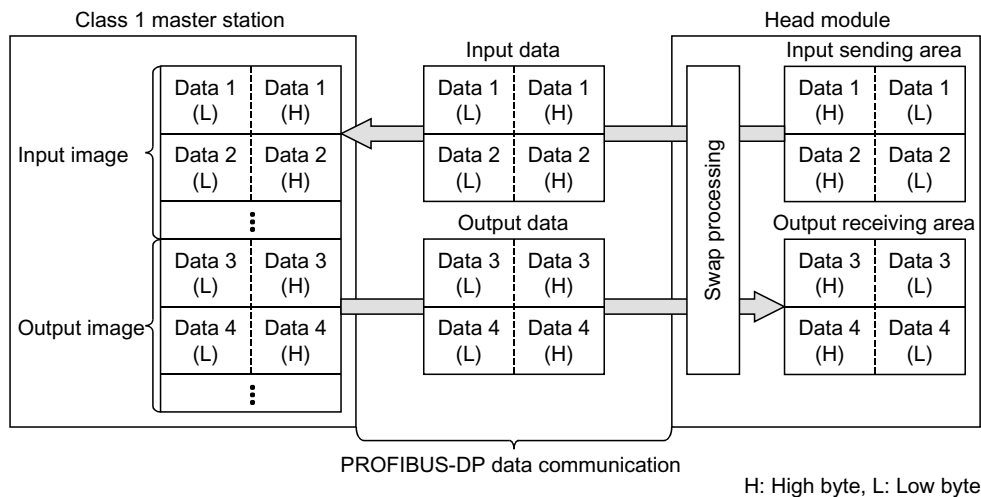
The high and low bytes are swapped in word units when input or output data are sent to or received from the master station or when extended diagnostic information is sent to the master station.

When the relevant user parameter of the head module is set to "Enable (swapped)", the following processing is executed.

- I/O data The data stored in the input sending area are sent to the master station after their high and low bytes have been swapped. The data received from the master station are stored into the output receiving area after their high and low bytes have been swapped.
- Extended diagnostic information The extended diagnostic information data are sent to the master station after their high and low bytes have been swapped.

Use this function when the used master station handles the high and low bytes of word data in reverse to those of the head module.

Data can be swapped for communication without the need for creating a program for swapping the high and low bytes.



(2) Setting and operation outline for I/O data swapping

The following describes the setting for I/O data swapping, the swap function setting by the master station type, and operation outline.

(a) Setting at master station

To swap I/O data, swap setting must be made on the configuration software of the master station.

Make the swap setting of I/O data using the "Swap of input/output data" user parameter.

The setting items of Swap of input/output data are as follows.

| Item | Description |
|-------------------|---|
| Enable | The high and low bytes are swapped in word unit when I/O data are sent or received. |
| Disable (Default) | Swap is not executed when I/O data are sent or received. |

(b) Swap function setting by master station type

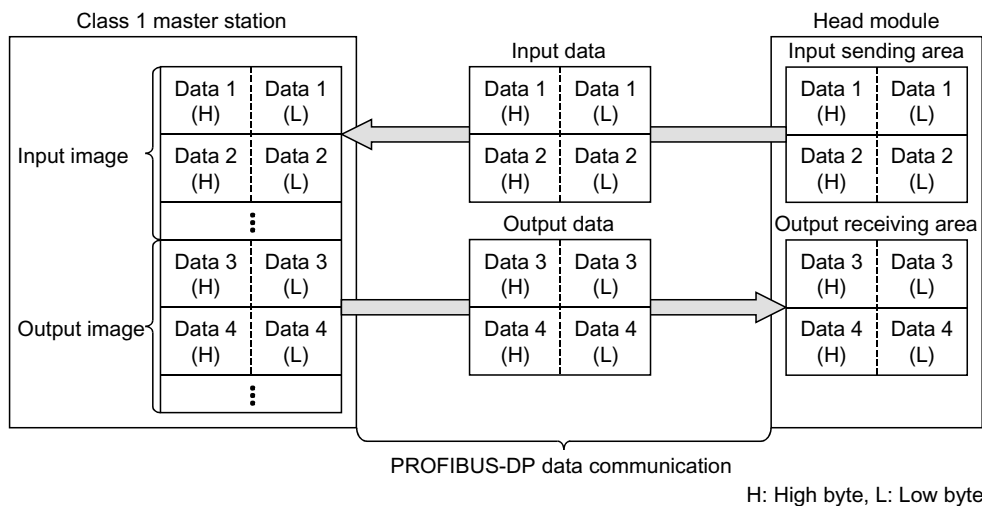
The swap function setting changes depending on the master station type as described below.

| Master station type | | Swap function setting of head module |
|------------------------|--|---|
| AJ71PB92D, A1SJ71PB92D | | Disable (Not swapped) |
| QJ71PB92D | When swap is not executed on master station side (Default setting) | Disable (Not swapped) |
| | When swap is not executed on master station side | Enable (Swapped) |
| Other master station | | Set according to the specifications of the master station |

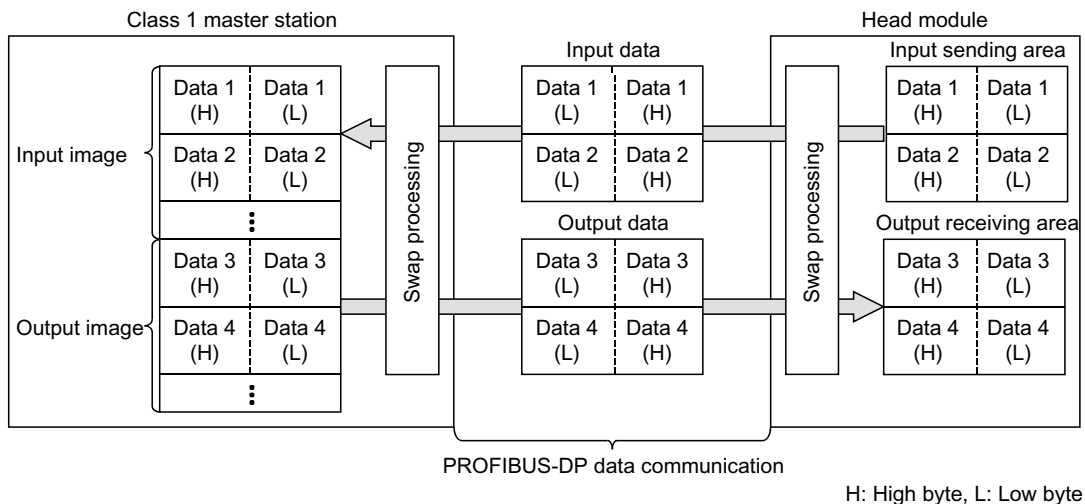
(c) Operation outline

When the AJ71PB92D, A1SJ71PB92D or QJ71PB92D is used as the master station, the operation outline is as shown below.

1) When the master station is the AJ71PB92D, A1SJ71PB92D or QJ71PB92D (not swapped)



2) When the master station is the QJ71PB92D (swapped)



(3) Setting and operation outline for extended diagnostic information swapping

The following describes the setting for extended diagnostic information swapping and the data construction of the extended diagnostic information.

(a) Setting at master station

To swap extended diagnostic information, swap setting must be made on the configuration software of the master station.

Make the swap setting of extended diagnostic information using the "Swap of Ext_Diag information" user parameter.

The setting items of Swap of Ext_Diag information are as follows.

| Item | Description |
|-------------------|--|
| Enable | The high and low bytes are swapped in word units when extended diagnostic information is sent. |
| Disable (Default) | Swap is not executed when extended diagnostic information is sent. |

(b) Swap function setting by master station type

The swap function setting changes depending on the master station type as described below.

| Master station type | Swap function setting of head module |
|-----------------------------------|---|
| AJ71PB92D, A1SJ71PB92D, QJ71PB92D | Disable (Not swapped) |
| Other master station | Set according to the specifications of the master station |

(c) Data construction of extended diagnostic information

The data construction of extended diagnostic information is shown below.

<When "Disable (not swapped)" is selected>

| Offset address (Unit: Word) | Extended diagnostic information |
|-----------------------------|--|
| +0 | Head module error code H L |
| +1 | First module error slice No. H L |
| +2 | First module detail error code 1 H L |
| +3 | First module detail error code 2 H L |
| +4 | Second module error slice No. H L |
| +5 | Second module detail error code 1 H L |
| +6 | Second module detail error code 2 H L |

<When "Enable (swapped)" is selected>

| Offset address (Unit: Word) | Extended diagnostic information |
|-----------------------------|--|
| +0 | Head module error code L H |
| +1 | First module error slice No. L H |
| +2 | First module detail error code 1 L H |
| +3 | First module detail error code 2 L H |
| +4 | Second module error slice No. L H |
| +5 | Second module detail error code 1 L H |
| +6 | Second module detail error code 2 L H |

H: High byte, L: Low byte

4.2.5 I/O data consistency function

(1) I/O data consistency function

This function prevents data inconsistency between the communication data of PROFIBUS-DP and the I/O data of the head module.

When using either or both of the following items in the MELSEC-ST system, make the data consistency function setting.

- When intelligent function modules are used in the MELSEC-ST system
- When the master station requests the MELSEC-ST system to send a command

(2) Input data consistency

The input data to be sent from the head module to the master station are processed in the head module to prevent inconsistency.

No setting is required for input data consistency.

(3) Output data consistency

For the output data sent from the master station to the head module, the consistency function setting must be made using the configuration software of the master station.

(a) Setting at master station

Use the "Consistency function" user parameter to set the consistency function.

The setting items of Consistency function are as follows.

Refer to (3) (b) in this section for the selection of the consistency function.

| Item | Description |
|------------------|---|
| Enable (Default) | Consistency processing of the head module and intelligent function module control operations is executed in the head module and intelligent function modules. |
| Disable | Consistency processing of the head module and intelligent function module control operations is not executed. *1 |

*1: When the consistency function is set to "Disable", the time required for the command request to the head module and the control operation of the intelligent function module is shortened by one bus cycle time.

(b) Consistency function

Select Modules of the head module and the output data consistency function of the master station must be considered to set the consistency function.

A consistency function selection table is given below.

| Select Modules of head module Master station specifications | ST1H-PB **pts.-whole consistent | ST1H-PB **pts.-word consistent |
|--|---|--------------------------------|
| | When master station can prevent inconsistency of whole output data *1 | Disable |
| When master station cannot prevent inconsistency of whole output data *1 | Enable | |

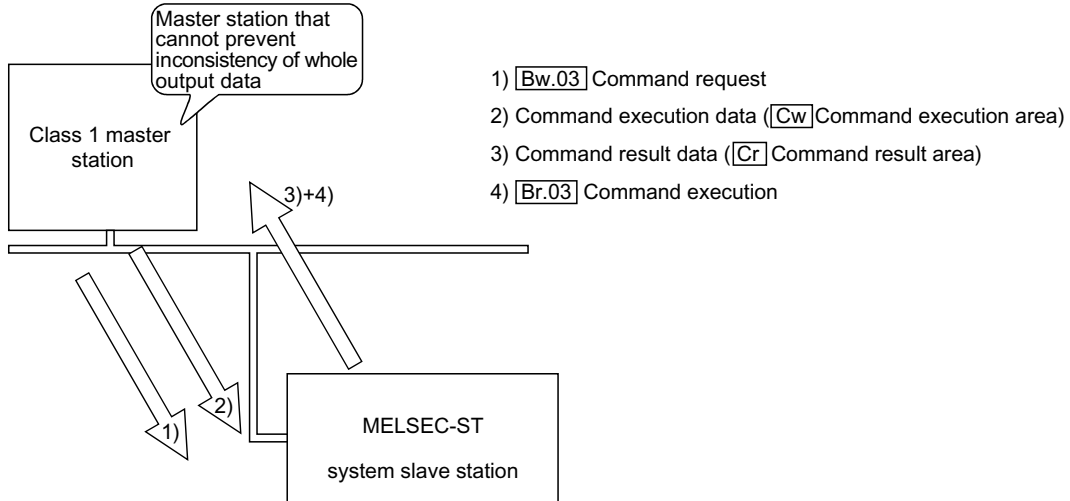
*1: The size of output data changes depending on the maximum input/output points of the head module. Refer to Section 3.2.2 for the output data size.

(4) Difference between operations depending on setting

The following shows a difference between head module and intelligent function module operations depending on the setting.

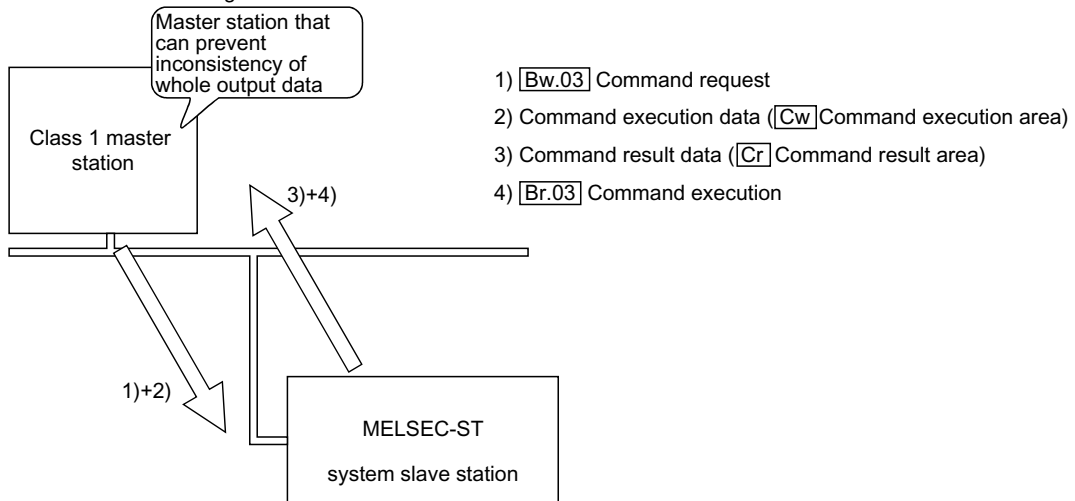
(a) Example of command execution

<When head module setting is "Enable">



- When a command request is received by the head module
After receiving 1), the head module accepts 2) in the next ST bus cycle and executes the command.
- When a command result is sent from the head module
The head module sends 3) and 4) in the same ST bus cycle.

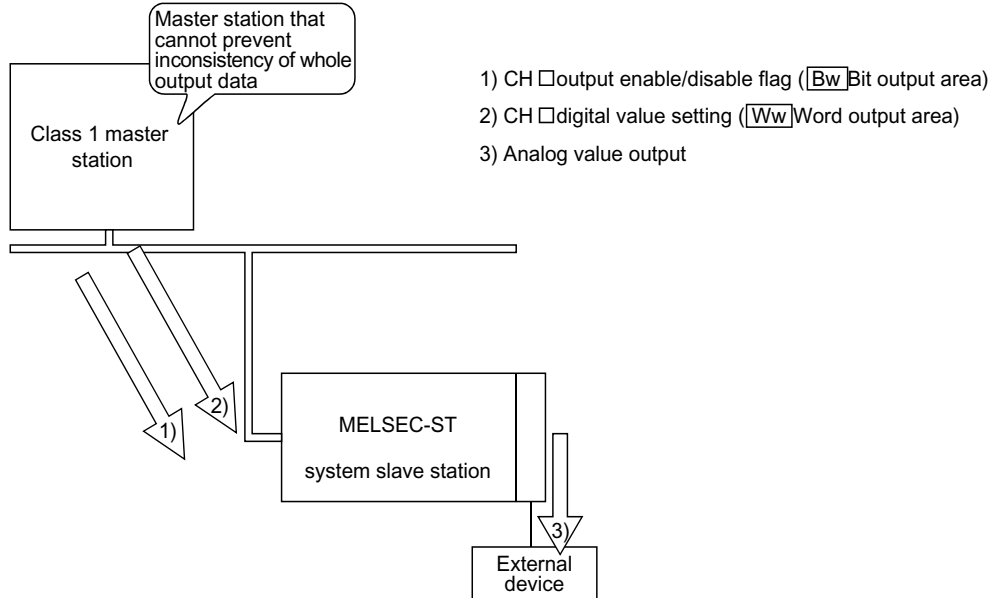
<When head module setting is "Disable">



- When a command request is received by the head module
The head module accepts 1) and 2) in the same ST bus cycle and executes the command.
- When a command result is sent from the head module
The head module sends 3) and 4) in the same ST bus cycle.

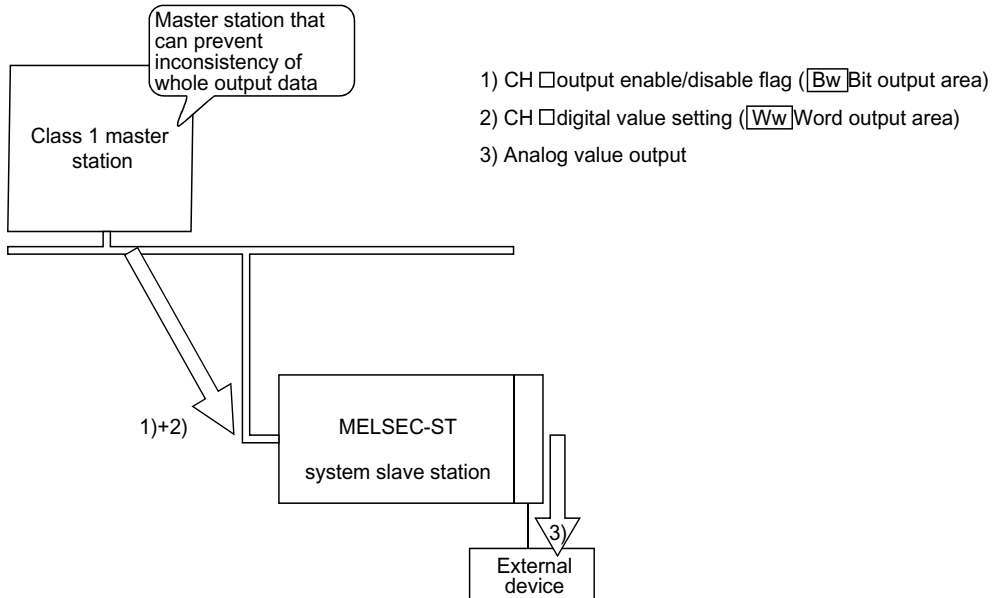
(b) Example of communication with intelligent function module (digital-analog conversion module)

<When head module setting is "Enable (valid)">



- When receiving the CH □ output enable/disable flag, the intelligent function module receives 1) and then receives 2) in the next ST bus cycle.
- After receiving 2), the intelligent function module outputs 3) to the external device.

<When head module setting is "Disable (invalid)">



- When receiving the CH □ output enable/disable flag, the intelligent function module receives 1) and 2) in the same ST bus cycle.
- After receiving 1) and 2), the intelligent function module outputs 3) to the external device.

4.3 Control Functions

This section explains the functions used to control each slice module.

4.3.1 Setting of output status at module error

(1) Setting of output status at module error

This is set to determine whether the refresh of output data to the other normally-operating output modules and intelligent function modules will be stopped or continued when an error occurs in a slice module (except the power distribution module).

This function is executed when the head module or slice module is in either of the following statuses.

- When the slice module fails to respond due to a hardware fault, etc.
- When the slice module is removed forcibly while the external power supply is on

| POINT | |
|-------|--|
| | (1) The output status of the slice module where an error occurred changes to the status set with its user parameter. |
| | (2) The input data are kept refreshed even if an error occurs in the slice module. |

(2) Setting at master station

To use the Setting of output status at module error, the output status in the event of a module error must be set on the configuration software of the master station. Use the "Output status at module error" user parameter to make this setting.

The setting items of Output status at module error are as follows.

| Item | Description |
|-------------------|--|
| Stop (Default) | When a slice module error occurs, the output data of the normally operating output module and intelligent function module are brought into the statuses preset by the user parameters *1 of the corresponding slice modules. |
| Continue | When a slice module error occurs, the output data of the normally operating output module and intelligent function module are kept refreshed. |

*1: For the user parameters of the output module and intelligent function module, refer to the relevant manuals.

(3) I/O status at error occurrence

(a) When communication timeout occurs between head module and master station

The following shows the I/O statuses of the normally operating slice modules when a communication timeout occurs between the head module and the master station.

In order to detect a communication timeout with the master station, the communication watchdog timer must be preset using configuration software on the master station.

For details, refer to Section 6.2.

| Type | Slice module | I/O status (RUN LED flicker (1s interval)) |
|--------|-----------------------------|---|
| Output | Output module | Hold/Clear |
| | Intelligent function module | Hold/Clear/Preset *1 |
| Input | Input module | Refresh |
| | Intelligent function module | |

*1: The Hold/Clear/Preset status changes depending on the **Bw.n** Bit output status prior to error occurrence.

For details, refer to the manual of the intelligent function module.

REMARK

If the communication watchdog timer has not been set, no communication timeout will be detected.

The slice module I/O status will be in the refresh status (RUN LED on).

(b) When error occurs in other slice module

When an error occurs in the other slice module, the I/O statuses of the normally operating slice modules are as indicated below.

| Type | Slice module | I/O status | |
|--------|-----------------------------|--|---|
| | | When "Stop" is selected (RUN LED flicker (1s interval)) | When "Continue" is selected (RUN LED on) |
| Output | Output module | Hold/Clear *1 | Refresh |
| | Intelligent function module | Hold/Clear/Preset *1 *2 | |
| Input | Input module | Refresh | Refresh |
| | Intelligent function module | | |

*1: When other faulty slice module is replaced with a normal one by the online module change, the Hold/Clear/Preset status is turned into the refresh status (RUN LED on) upon completion of the online module change.

*2: The Hold/Clear/Preset status changes depending on the **Bw.n** Bit output status prior to error occurrence.
For details, refer to the manual of the intelligent function module.

4.3.2 Status monitor

(1) Status monitor

Various information of the head module and slice modules can be monitored using input data, a command request from the master station or GX Configurator-ST.

(2) Items that can be monitored

The following table indicates various information that can be monitored by the status monitor.

| Monitored item | Monitoring method | | |
|---|-------------------|----|----|
| | 1) | 2) | 3) |
| Operating status of each module (Input data: Br Bit input area) | ○ | × | ○ |
| Existence and information of error that occurred in each module (Input data: Er Error information area) | ○ | × | ○ |
| Mounting status of each module (Input data: Mr Module status area) | ○ | × | ○ |
| Error code of error that occurred in each module | × | ○ | ○ |
| Error history of head module | × | ○ | ○ |

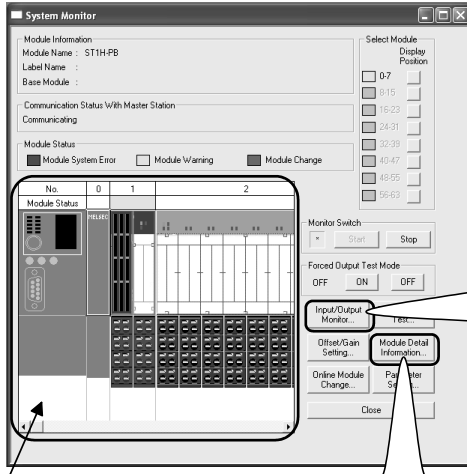
1) Confirmation using I/O data (refer to Section 3.2.3)

2) Confirmation by execution of command from master station (refer to Chapter 8)

3) Confirmation using GX Configurator-ST (refer to (3) in this section)

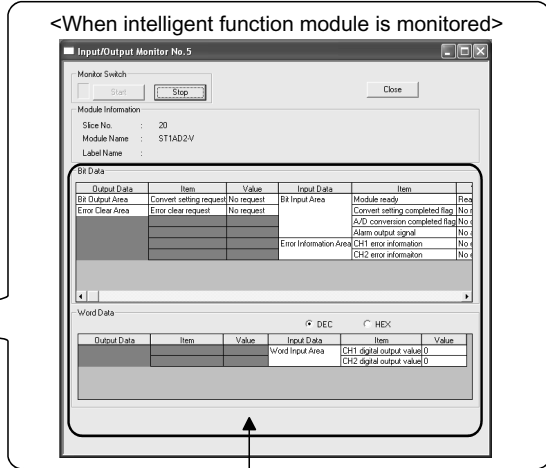
- (3) When using GX Configurator-ST for monitoring
 When monitoring each module from GX Configurator-ST, activate the System Monitor screen.
 For details, refer to the GX Configurator-ST Manual.

<System Monitor>



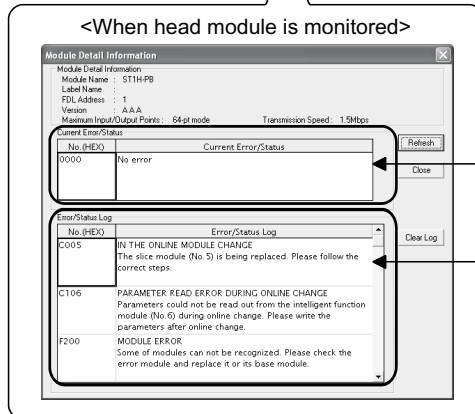
Each module operating status can be checked.

<When intelligent function module is monitored>



I/O data statuses can be confirmed.

<When head module is monitored>



Error code of current error is shown.

Error history can be confirmed.

4.3.3 Intelligent function module parameter read/write

(1) Intelligent function module parameter read/write

Parameters can be read from or written to the ROM or RAM of the intelligent function module.

(2) Intelligent function module parameter read/write operation

Read or write the intelligent function module parameters as described below.

(a) User parameters

1) Reading the user parameters

Read the user parameters in either of the following methods.

- Execute a command from the master station.
- Use GX Configurator-ST.

2) Writing the user parameters

Write the user parameters in either of the following methods.

- Make setting using the configuration software of the master station.
- When testing the MELSEC-ST system singly, make setting using GX Configurator-ST.

(b) Command parameters

1) Reading the command parameters

Read the command parameters in either of the following methods.

- Execute a command from the master station.
- Use GX Configurator-ST.

2) Writing the command parameters

Write the command parameters in either of the following methods.

- Execute a command from the master station.
- Make setting using GX Configurator-ST.

REMARK

For details of intelligent function module parameter read/write, refer to the manual of the intelligent function module.

4.4 Online module change

(1) Online module change function

The I/O modules and intelligent function modules can be replaced without stopping the MELSEC-ST system.

An online module change can be executed by operation of the head module buttons or from GX Configurator-ST.

4.4.1 Precautions for the online module change

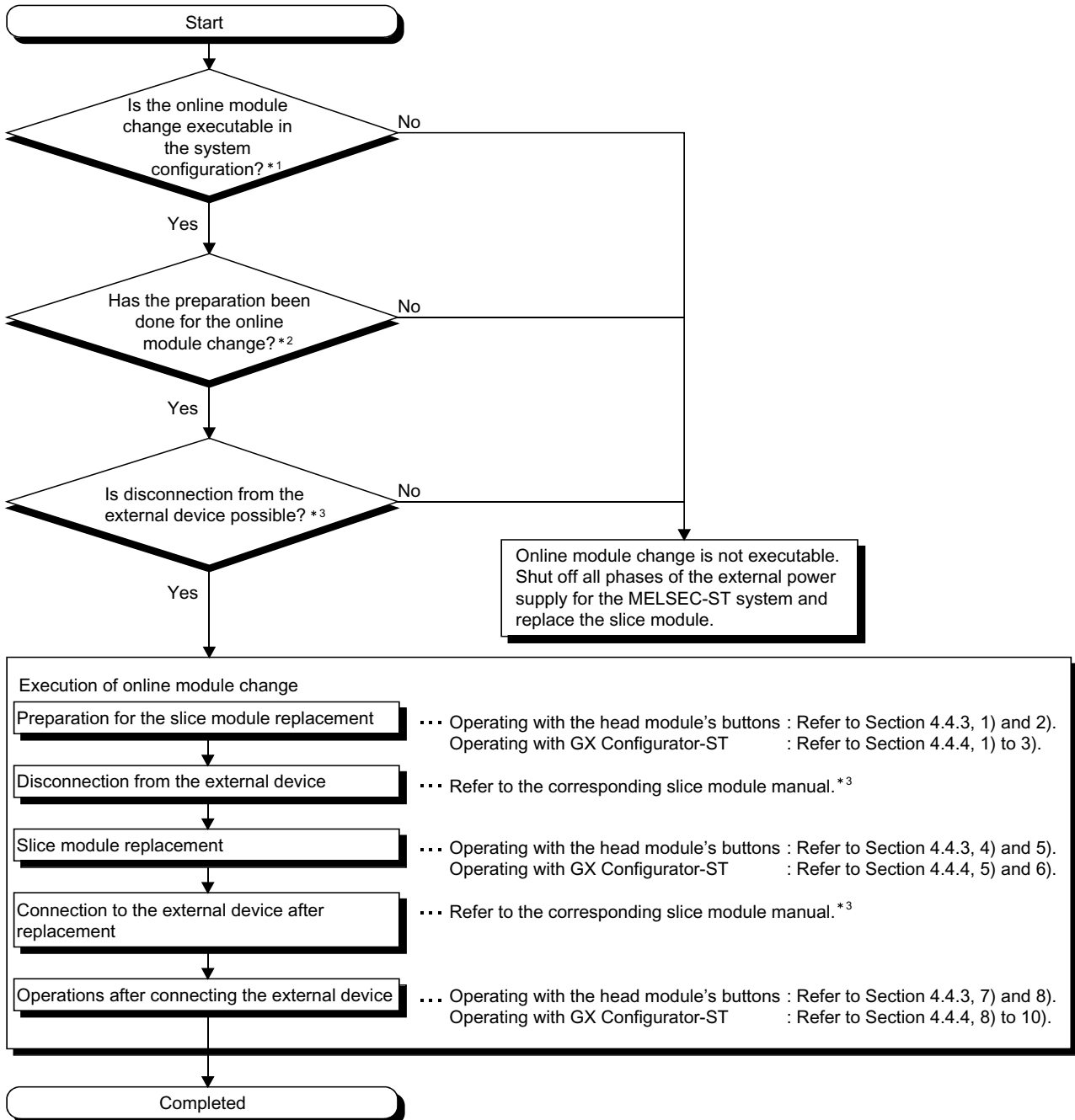
The precautions for the online module change are given below.

- (1) To perform the online module change, the system configuration must be appropriate for execution of the online module change.
For details, refer to the MELSEC-ST System User's Manual, "3.4 Precautions for System Configuration".
Executing the online module change in an inappropriate system configuration may result in malfunction or failure.
In such a system configuration, shut off all phases of the external power supply for the MELSEC-ST system to replace a slice module.
- (2) Be sure to perform an online module change in the procedure given in section 4.4.2.
Failure to do so can cause a malfunction or failure.
- (3) Before starting an online module change, confirm that the external device connected with the slice module to be removed will not malfunction.
It is recommended to set 0 (OFF) to **Bw.n** Bit output and **Ww.n** Word output of the slice module to be replaced in advance.
- (4) Only the slice modules of the same model name can be replaced online. It is not possible to replace with the slice module of different model name and addition of slice modules is not allowed.
- (5) Only one slice module can be replaced in a single online module change.
To replace multiple slice modules, perform an online module change for each module.
- (6) This function is available for I/O module and intelligent function module; not available for power distribution module and base module.
Shut off all phases of the external power supply before installing or removing the power distribution module and/or the base module.
Failure to do so may result in damage to all devices of the MELSEC-ST system.
- (7) While an online module change is being executed (while the REL. LED of the head module is on), no command can be executed from the master station to the slice module being replaced online.
To do so will cause an error.

- (8) While the slice module is being replaced online (while the head module's REL. LED is on), change its user parameter setting from the master station after the online module change is completed.
If the user parameter setting is changed from the master station during the online module change, the new setting is not validated since the user parameters saved in the head module are written over the new user parameter values when the online module change is finished.
- (9) During an online module change, the ERR. LED of the head module turns on only when an error related to the online module change occurs.
It will not turn on or flicker when any other error occurs.
- (10) While an online module change is being executed (while the REL. LED of the head module is on), the following data of the slice module being replaced online all turn to 0 (OFF).
- **Br.n** Bit input
 - **Er.n** Error information
 - **Mr.n** Module status
 - **Wr.n** Word input
- (11) When the communication with the master station is disconnected, replacing the output module online, whose CLEAR/HOLD setting is set to HOLD, turns the **Bw.n** Bit Output value to 0 (OFF).
After the online module change is finished, the **Bw.n** Bit Output value will not return to the held value.
- (12) When the forced output test is executed on the slice module being replaced online, only **Ew.n** Error Clear can be tested.
Bw.n Bit Output and **Ww.n** Word Output cannot be tested.

4.4.2 Procedures for online module change

This section explains the procedures for the online module change.
 Replace a module online as shown below.



*1: Refer to the MELSEC-ST System User's Manual, "3.4 Precautions for System Configuration".

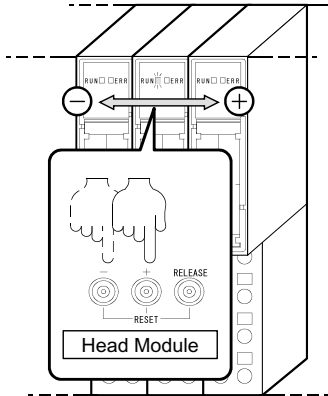
*2: Refer to "Preparation for online module change" in the corresponding slice module manual.

*3: Refer to "External device connection and disconnection procedures for online module change".

4.4.3 Online module change using head module buttons

This section explains the procedures for the replacing a module online by operating the buttons on the head module.

Before replacing slice module

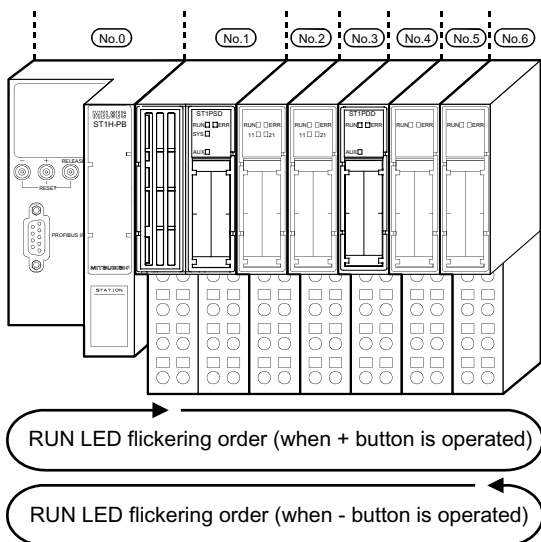


- 1) Specify the module to be replaced online.
 Press the "+" button of the head module. Then, the RUN LED of the bus refreshing module mounted next to the head module flickers at intervals of 0.25 seconds.
 By pressing the "+" and/or "-" buttons, make the target module's RUN LED flicker (at 0.25s intervals). *1
 When terminating the online module change, press the "+" and/or "-" buttons until the RUN LED of the head module flickers (at 0.25s intervals) again.
 For the "+", "-" button operation, refer to the **REMARK** below.

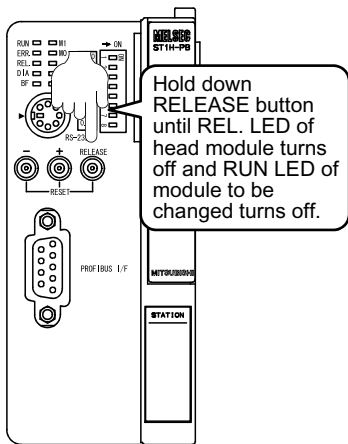
- *1: If the RUN LED does not flicker (at 0.25s intervals), the slice module may have a hardware fault. Use GX the Configurator-ST to perform the online module change.
 When not using the GX Configurator-ST, specify the slice module to be replaced as follows:
- By making the RUN LEDs of both adjacent slice modules flicker (at 0.25s intervals), confirm the module to be replaced.

REMARK

The following explains how to operate the + and - buttons of the head module.



- <When + button is pressed>
- 1) When the + button is pressed, the RUN LED of the No. 1 (bus refreshing module on the right of the head module) flickers (at 0.25s intervals).
 - 2) Every time the + button is pressed, the RUN LED flickers (at 0.25s intervals) in order of the No. 2 to No. 6.
 - 3) After the RUN LED of the No. 6 slice module has flickered (at 0.25s intervals), further pressing the + button returns to the head module. Note that the ON status of the head module's RUN LED does not change. Refer to Section 5.3 (1) for the flickering status of the head module's RUN LED.
- <When - button is pressed>
- 1) When the - button is pressed, the RUN LED of the No. 6 (right-end slice module of the MELSEC-ST system) flickers (at 0.25s intervals).
 - 2) Every time the - button is pressed, the RUN LED flickers (at 0.25s intervals) in order of the No. 5 to No. 1.
 - 3) After the RUN LED of the No. 1 slice module has flickered (at 0.25s intervals), further pressing the - button returns to the head module. Note that the status of the head module's RUN LED does not change. Refer to Section 5.3 (1) for the flickering status of the head module's RUN LED.



- 2) Keep pressing the RELEASE button of the head module until its REL. LED lights up.

When the REL. LED turns on, the head module saves the user parameters and command parameters from the target slice module into the head module.

Since the following conditions means the online module change is available, release the RELEASE button.

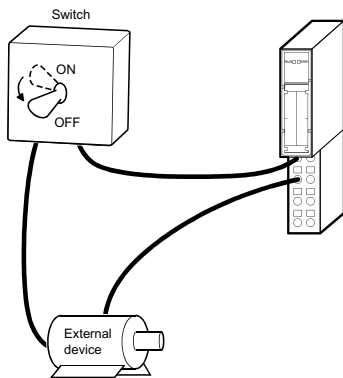
- The REL. LED of the head module turns on. *2
- The RUN LED of the slice module to be replaced turns OFF.

*2: If the REL. and ERR. LEDs turn on, an error may have occurred during online module change.

Check the error and take corrective actions.

For error code reading and details, refer to Section 9.2.

Disconnection from external device



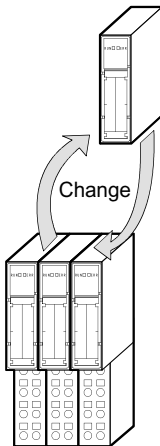
- 3) Disconnect the external device from the slice module to be replaced online.

For details, refer to "External device connection and disconnection procedures for online module change" in the corresponding slice module manual.

POINT

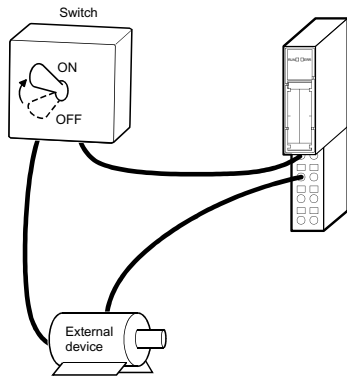
If the disconnection procedure given in the relevant slice module manual cannot be executed, shut off all phases of the external power supply for the MELSEC-ST system to replace the slice module.

Replacing slice module



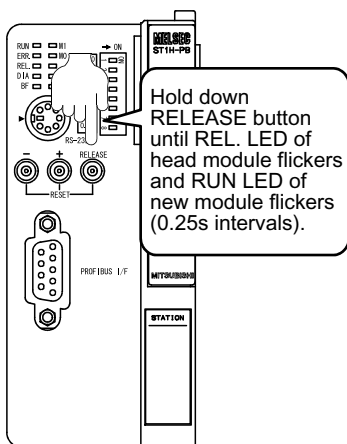
- 4) Remove the slice module to be replaced from the base module.
- 5) Mount a new slice module with the same model name as the one of the removed.

Connection to external device after replacement



- 6) After mounting a new slice module, connect it to the external device. For details, refer to "External device connection and disconnection procedures for online module change".

Operations after external device connection



- 7) After mounting the new slice module, press the RELEASE button of the head module until its REL. LED flickers. When the REL. LED flickers, the head module starts writing the saved user parameters and command parameters into the new slice module. When the following conditions are confirmed, release the RELEASE button.

- The REL. LED of the head module flickers. *3 *4
- The RUN LED of the newly mounted slice module flickers (at 0.25s intervals).

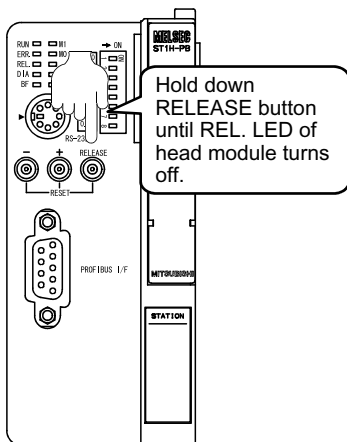
*3: If the REL. and ERR. LEDs turn on, an error may have occurred during online module change.

Check the error and take corrective actions.

For error code reading and details, refer to Section 9.2.

*4: When an error has occurred in step 2) (Error code C101H to C13FH), the REL. LED flickers and the ERR. LED turns on.

When step 8) has completed in this status, the intelligent function module starts its operation with the command parameters set as default.



- 8) Press the RELEASE button again and hold it until the REL. LED turns off. *5

When the REL. LED turns off, the online module is complete. *6 Release the RELEASE button.

After the REL. LED turns off, the head module enters the normal mode and resumes the operation such as I/O data refreshing.

*5: If the RELEASE button is released before the REL. LED turns off, the following status (status after completion of operation in step 2)) will result.

- The REL. LED of the head module turns on.
 - The RUN LED of the slice module changed online turns off.
- Operations can be retried from step 4).

*6: If the REL. and ERR. LEDs turn on, an error may have occurred during online module change.

Check the error and take corrective actions.

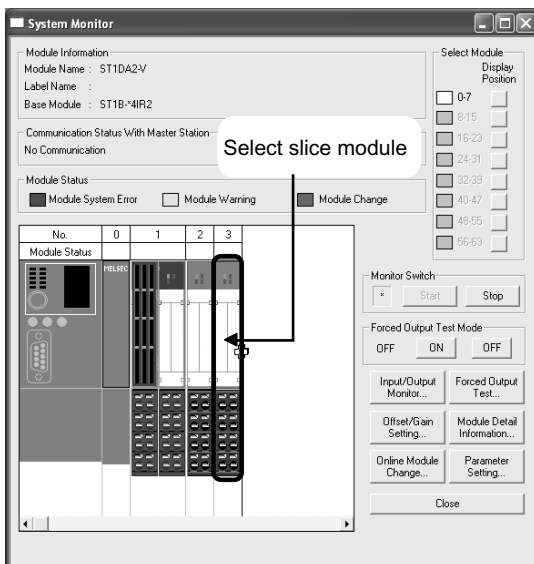
For error code reading and details, refer to Section 9.2.

4.4.4 Online module change from GX Configurator-ST

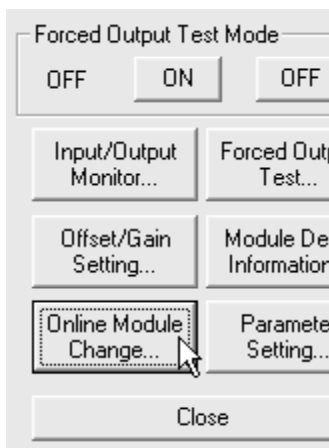
Here is an explanation of how to replace a module online from GX Configurator-ST.

| |
|---|
| POINT |
| <p>If a slice module different from the target one is selected by mistake, restart the operation as instructed below.</p> <p>(1) To restart the operation at step 3) Click the Cancel button on the screen to terminate online module change.</p> <p>(2) To restart the operation at step 4) Click the Next button without executing online module change, continue to step 10) and then terminate online module change.</p> <p>(3) To restart the operation at step 8) Mount the removed slice module again, click the Next button, continue to step 10) and then terminate online module change.</p> |

Preparation for replacing slice module



- 1) Select the slice module to be replaced online on the "System Monitor" screen.



- 2) Click the **Online Module Change** button on the "System Monitor" screen.
Then, confirm that the RUN LED of the selected slice module is flashing at 0.25s intervals.

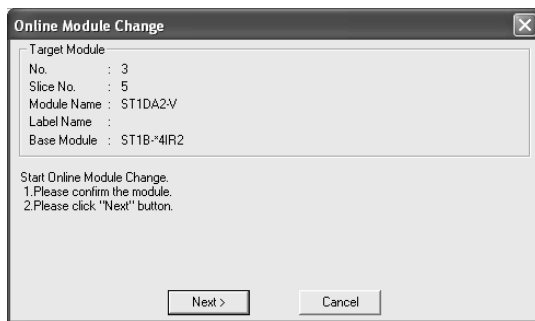
REMARK

In addition to above, the following operations are also available.

- Select [Diagnostics] → [Online Module Change].
- Right-click the slice module selected at step 1), and click [Online Module change] on the menu.

(Continued to next page.)

(From the previous page.)



3) Confirm that the slice module displayed as "Target Module" is the slice module to be replaced and click the **Next** button.

(a) Clicking the **Next** button validates the settings and the following will be performed.

- Puts the head module into the online module change mode.
- Transfers the user parameters and command parameters of the target slice module to the head module.

(b) After clicking the **Next** button, confirm the following module statuses.

- The REL. LED of the head module is on.
- The RUN LED of the target slice module is off.
- The "Module Status" indicator of the target module has turned purple. This applies only when monitoring from the "System Monitor" screen.

(c) If the user parameters and command parameters cannot be read from the slice module, both REL. LED and ERR. LED of the head module turns on, and the error message will appear on the screen at step 8).

In this case, confirm the error details and take corrective action. For how to read error codes and error code details, refer to Section 9.2.

When not executing online module change, click the **Cancel** button.

(a) Clicking the **Cancel** button causes the screen to show that online module change is cancelled.

Clicking the **Exit** button returns to the step 2).

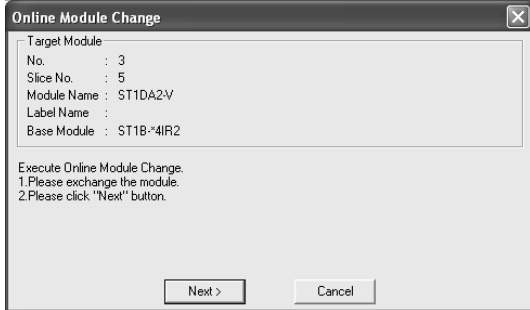


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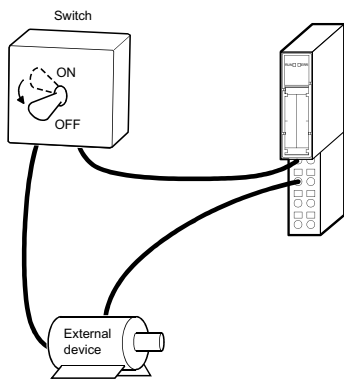
Disconnection from external device



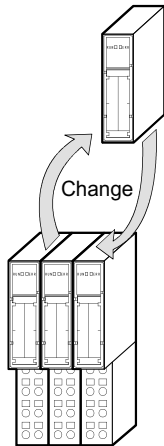
- 4) When the left screen appears, disconnect the external device from the slice module to be replaced online. For details, refer to "External device connection and disconnection procedures for online module change" in the corresponding slice module manual.

POINT

If the disconnection procedure given in the relevant slice module manual cannot be executed, shut off all phases of the external power supply for the MELSEC-ST system to replace the slice module.



Replacing slice module



- 5) Remove the slice module to be replaced from the base module.
- 6) Mount a new slice module with the same model name as the one of the removed.

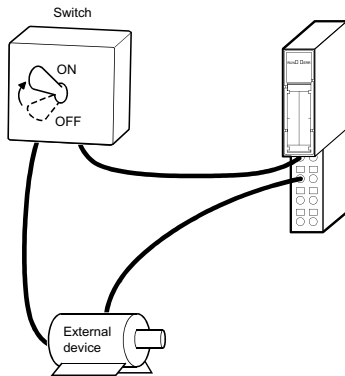


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Connection to external device after replacement

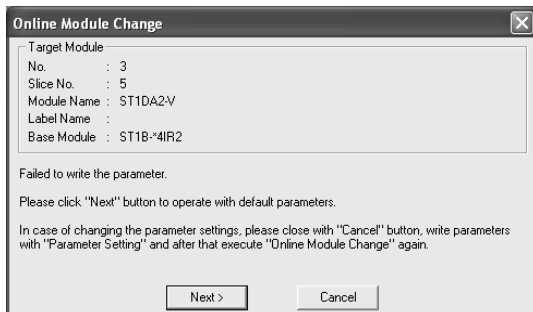


- 7) After mounting a new slice module, connect it to the external device.
For details, refer to "External device connection and disconnection procedures for online module change".

Operations after external device connection

- 8) After connecting the external device, click the **Next** button on the screen in step 4).
- (a) Clicking the **Next** button performs the following.
- Checks whether the module name of the newly mounted slice module is the same as that of the removed one.
 - Writes the user parameters and command parameters transferred to the head module (at step 3)) to the newly mounted slice module.
- (b) After clicking the **Next** button, confirm the following module statuses.
- The REL. LED of the head module is flashing.
 - The RUN LED of the newly mounted slice module is flashing (at 0.25s intervals).

Clicking the **Cancel** button, i.e., interrupting online module change returns to step 1) In this case, select the same slice module as selected before, and complete online module change. Note that selecting different one causes an error.



(Continued to next page.)

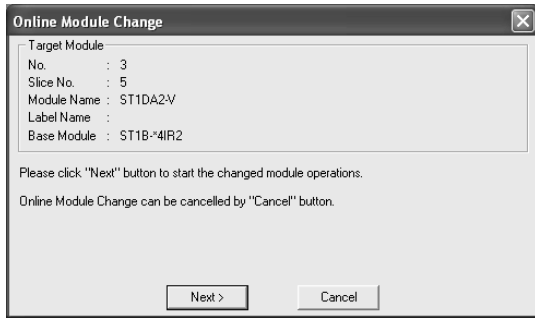
When the user parameters and command parameters could not be read from the old slice module by the operation in step 3), the REL. LED and ERR. LED of the head module turn on and the screen shown on the left appears on GX Configurator-ST.

In this case, confirm the error details and take corrective action.

For how to read error codes and error code details, refer to Section 9.2.

When step 10) has completed in this status, the intelligent function module starts its operation with the command parameters set as default.

(From the previous page.)



9) Clicking the **Next** button releases the head module from the online module change mode.

(a) Clicking the **Next** button performs the following.

- Releases the head module from the online module change mode.
- Restarts refreshing the I/O data, etc.

(b) After clicking the **Next** button, confirm the following module statuses.

- The REL. LED of the head module is off.
- The RUN LED of the newly mounted slice module is on.
- The "Module Status" indicator of the target slice module has turned white. This applies only when monitoring from the "System Monitor" screen.

(c) If the head module cannot be released from the online module change mode, both REL. LED and ERR. LED of the head module turn on.

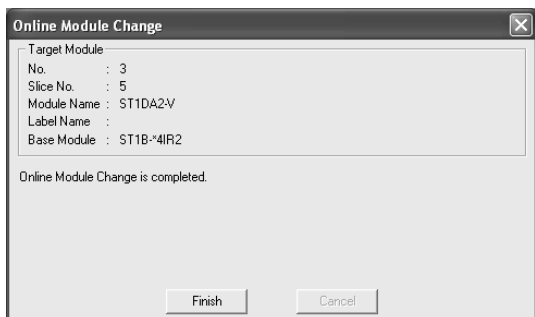
In this case, confirm the error details and take corrective action.

For how to read error codes and error code details, refer to Section 9.2.

When interrupting online module change, click the **Cancel** button.

(a) Clicking the **Cancel** button, i.e., interrupting online module change returns to step 1). In this case, select the same slice module as selected before, and complete online module change.

Note that selecting different one causes an error.



(Completed)

10) The left screen appears showing that online module change has been completed.

Click the **Finish** button.

5 PRE-OPERATION PROCEDURE AND SETTING

This chapter explains the procedure and setting method for operating the head module in the MELSEC-ST system.

5.1 Mounting and Installation

This section explains the handling precautions on procedures from product unpacking to mounting.

For the mounting and installation of the MELSEC-ST system, refer to the MELSEC-ST System User's Manual.

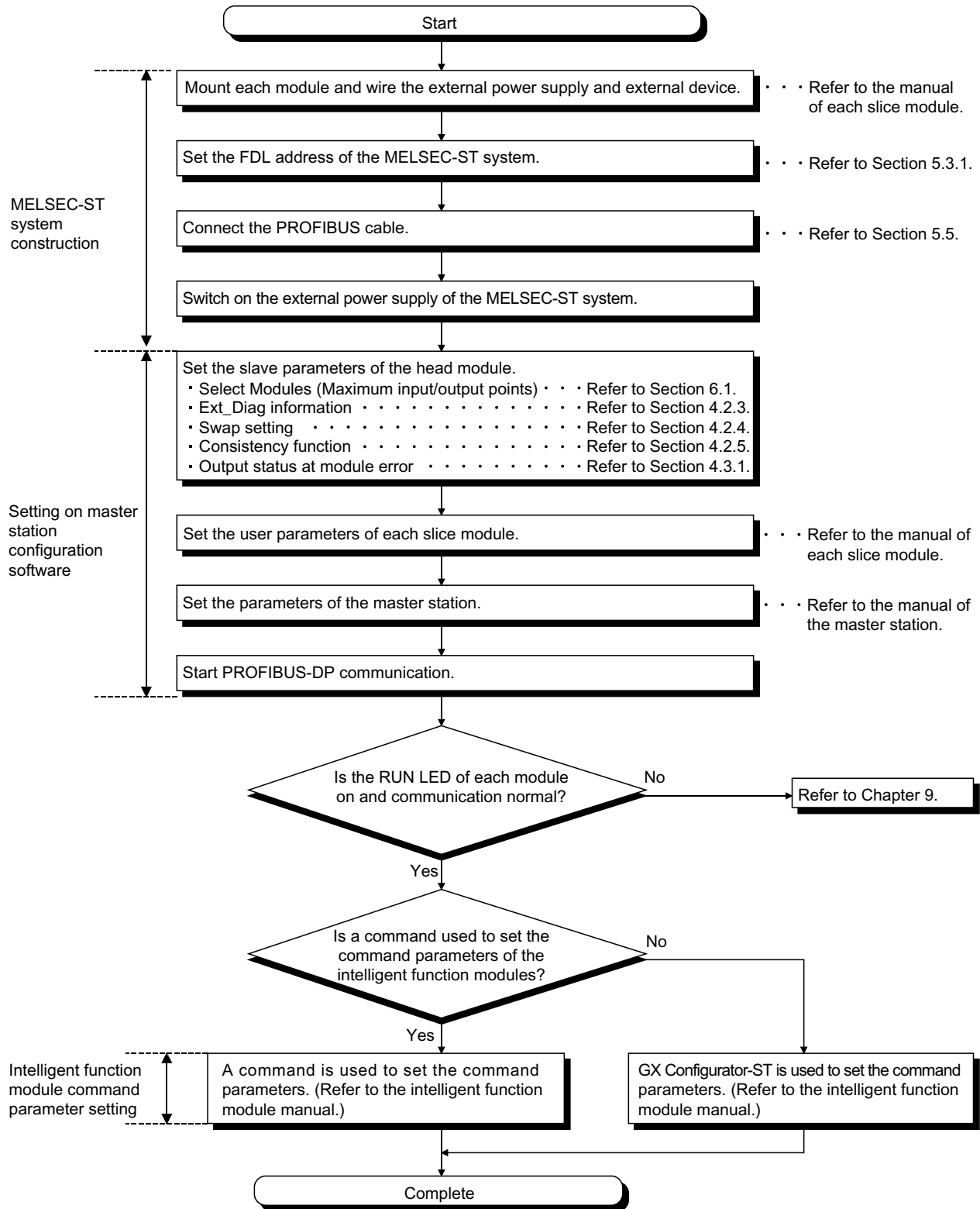
5.1.1 Handling precautions

This section explains the precautions for handling the head module singly.

- (1) Do not drop or give a strong impact to the module since its case is made of resin. Doing so can damage the module.
- (2) Do not disassemble or modify the modules. Doing so could cause failure, erroneous operation, injury, or fire.
- (3) Prevent foreign matter such as chips or wiring debris from entering the module. Failure to do so may cause fires, damage, or erroneous operation.

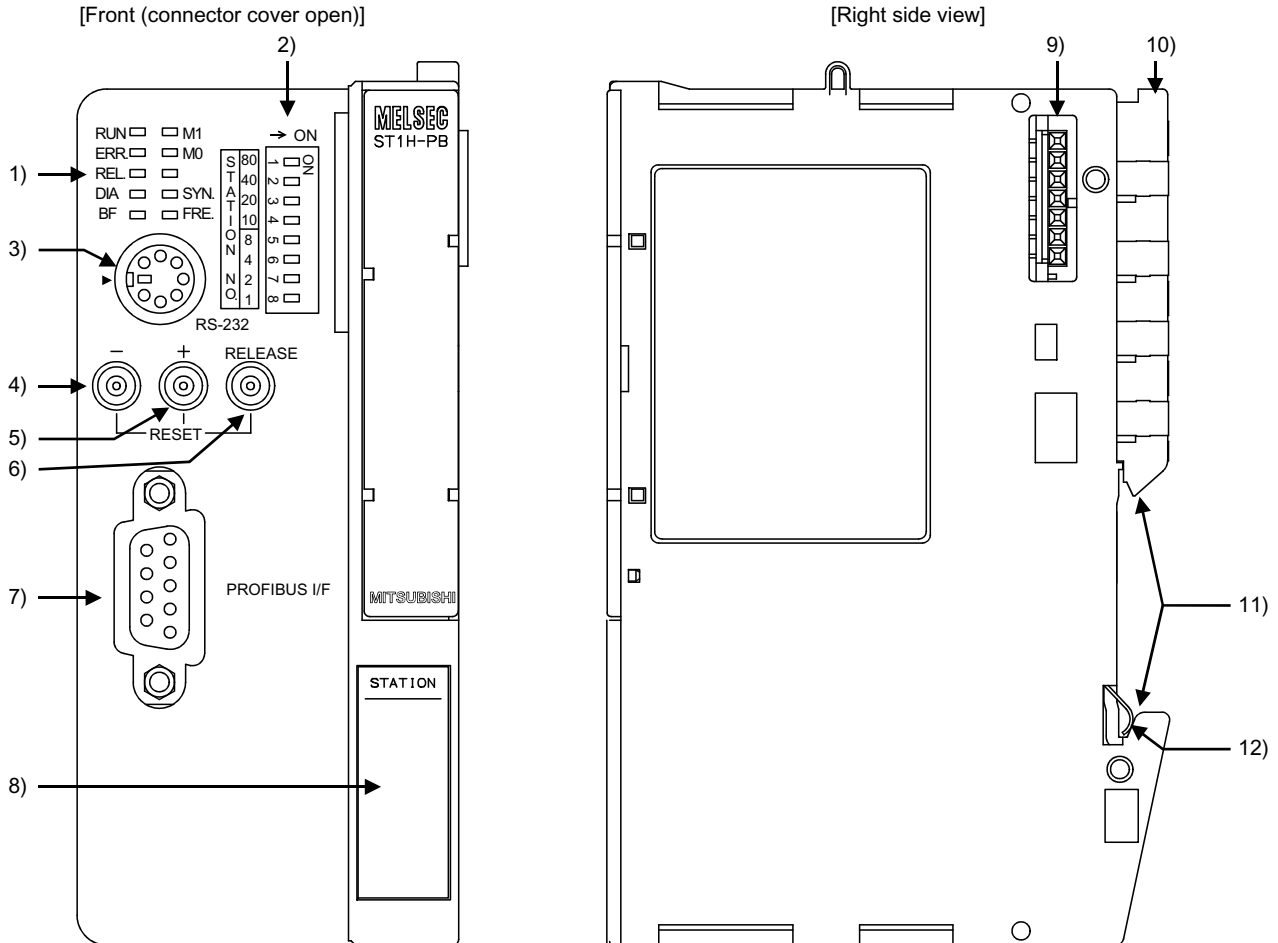
5.2 Pre-operation Procedure and Setting

A rough pre-operation procedure is given below.



5.3 Part Names and Settings

This section explains the part names and settings of the head module.



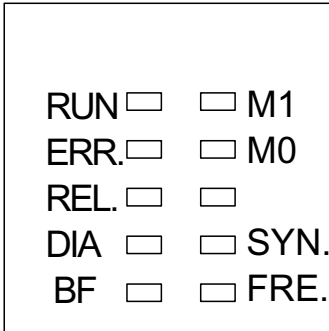
| | Name | Description |
|----|---------------------------------|---|
| 1) | Operating status LED | Indicates the operating status of the head module. Refer to (1) in this section for details. |
| 2) | FDL address setting switches | Sets the FDL address of the head module and the selection of the self-diagnostics. FDL address setting range: 0 to 99 (factory setting: 0) Selection of self-diagnostics: 150 Refer to Section 5.3.1 for the FDL address setting method. |
| 3) | RS-232 interface connector | Connects the personal computer when using GX Configurator-ST *1. |
| 4) | - button | Used to make online module change and reset the head module. Refer to Section 4.4 for online module change operation. |
| 5) | + button | |
| 6) | RELEASE button | Refer to Section 5.3.2 for head module reset operation. |
| 7) | PROFIBUS-DP interface connector | Connects the PROFIBUS cable to the head module. |

(To next page)

*1: For the system configuration for use of GX Configurator-ST, refer to the GX Configurator-ST Operating Manual.

| | Name | Description |
|-----|--------------------------|---|
| 8) | Display plate | Write the FDL address, etc. of the head module. |
| 9) | Base module connector | Connects the power distribution module base next to the right of the head module. |
| 10) | Lock lever | Dismounts the head module from the DIN rail. |
| 11) | DIN rail mounting groove | Mounts the module to the DIN rail. |
| 12) | FG contact | Grounding metal spring. When the module is mounted on the DIN rail, the function ground (FG1) of the corresponding base unit is connected via the DIN rail. |

(1) Operating status LED



| LED indication | LED status *1 | Description | | | | | | | | | | | | | | | | | | |
|----------------|---------------|--|--|-----------------------------|------------|--|----|----|---------------|-----|-----|---------------|-----|----|----------------|----|-----|----------------|----|----|
| RUN | On | Normally operating | | | | | | | | | | | | | | | | | | |
| | Flickering | Self-diagnostics or forced output test mode being executed | | | | | | | | | | | | | | | | | | |
| | Off | Watchdog time error occurred or external power-off | | | | | | | | | | | | | | | | | | |
| ERR. | On | Error occurred in head module or slice module (Refer to Section 9.2) | | | | | | | | | | | | | | | | | | |
| | Flickering | Communication error or FDL address change error occurred (Refer to Section 9.2) | | | | | | | | | | | | | | | | | | |
| | Off | Head module and slice module normal | | | | | | | | | | | | | | | | | | |
| REL. | On | Module being changed online (Refer to Section 4.4) | | | | | | | | | | | | | | | | | | |
| | Flickering | | | | | | | | | | | | | | | | | | | |
| | Off | Online module change completed or not yet executed | | | | | | | | | | | | | | | | | | |
| DIA | On | Extended diagnostic information being sent to master station (Refer to Section 4.2.3) | | | | | | | | | | | | | | | | | | |
| | Flickering | Self-diagnostics of head module being executed | | | | | | | | | | | | | | | | | | |
| | Off | No extended diagnostic information | | | | | | | | | | | | | | | | | | |
| BF | On | PROFIBUS-DP data communication stop | | | | | | | | | | | | | | | | | | |
| | Off | PROFIBUS-DP data communication normal | | | | | | | | | | | | | | | | | | |
| M1 | — | The M0 LED and M1 LED indicate the maximum input/output points setting status of the head module. The M0 LED and M1 LED statuses are indicated below. | | | | | | | | | | | | | | | | | | |
| M0 | | | <table border="1"> <thead> <tr> <th rowspan="2">Maximum input/output points</th> <th colspan="2">LED status</th> </tr> <tr> <th>M1</th> <th>M0</th> </tr> </thead> <tbody> <tr> <td>32-point mode</td> <td>Off</td> <td>Off</td> </tr> <tr> <td>64-point mode</td> <td>Off</td> <td>On</td> </tr> <tr> <td>128-point mode</td> <td>On</td> <td>Off</td> </tr> <tr> <td>256-point mode</td> <td>On</td> <td>On</td> </tr> </tbody> </table> | Maximum input/output points | LED status | | M1 | M0 | 32-point mode | Off | Off | 64-point mode | Off | On | 128-point mode | On | Off | 256-point mode | On | On |
| | | | Maximum input/output points | | LED status | | | | | | | | | | | | | | | |
| | | | | M1 | M0 | | | | | | | | | | | | | | | |
| | | | 32-point mode | Off | Off | | | | | | | | | | | | | | | |
| 64-point mode | Off | On | | | | | | | | | | | | | | | | | | |
| 128-point mode | On | Off | | | | | | | | | | | | | | | | | | |
| 256-point mode | On | On | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| SYN. | On | SYNC mode | | | | | | | | | | | | | | | | | | |
| | Off | Normal mode | | | | | | | | | | | | | | | | | | |
| FRE. | On | FREEZE mode | | | | | | | | | | | | | | | | | | |
| | Off | Normal mode | | | | | | | | | | | | | | | | | | |

*1: All LEDs are off during reset processing.

5.3.1 Setting of FDL address setting switches

This section explains the applications, setting ranges and setting method of the head module's FDL address setting switches.

(1) Applications

Use the FDL address setting switches of the head module for the following:

- Setting the FDL address as a PROFIBUS-DP slave station.
- Executing the self-diagnostics of the head module.

(2) Setting range

Set the FDL address setting switches within the following ranges.

They are factory-set to 0 (all OFF).

- When setting the FDL address of the slave station: 0 to 99
- When executing the self-diagnostics: 150

REMARK

Set the FDL address setting switches within the ranges given in (2) in this section. Failure to do so will cause an error when the external power supply of the head module is switched on or the head module is reset.

(3) Setting method

The sum of the switch Nos. of the FDL address setting switches that are set to ON is registered as the FDL address of the head module.

Set the tens place of the FDL address with any of the STATION NO. "10", "20", "40" and "80" switches.

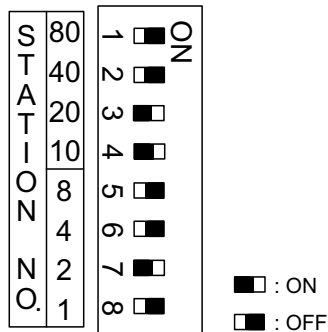
Set the units place of the FDL address with any of the STATION NO. "1", "2", "4" and "8" switches.

| FDL address | STATION NO. | | | | | | | |
|-------------|-------------|-----|-----|-----|----------|-----|-----|-----|
| | 10s place | | | | 1s place | | | |
| | 80 | 40 | 20 | 10 | 8 | 4 | 2 | 1 |
| 0 | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| 1 | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON |
| 2 | OFF | OFF | OFF | OFF | OFF | OFF | ON | OFF |
| 3 | OFF | OFF | OFF | OFF | OFF | OFF | ON | ON |
| 4 | OFF | OFF | OFF | OFF | OFF | ON | OFF | OFF |
| : | : | : | : | : | : | : | : | : |
| 10 | OFF | OFF | OFF | ON | OFF | OFF | OFF | OFF |
| 11 | OFF | OFF | OFF | ON | OFF | OFF | OFF | ON |
| : | : | : | : | : | : | : | : | : |
| 98 | ON | OFF | OFF | ON | ON | OFF | OFF | OFF |
| 99 | ON | OFF | OFF | ON | ON | OFF | OFF | ON |

When setting the head module FDL address to "32", set the switches as shown below.

| FDL address | STATION NO. | | | | | | | |
|-------------|-------------|-----|----|----|----------|-----|----|-----|
| | 10s place | | | | 1s place | | | |
| | 80 | 40 | 20 | 10 | 8 | 4 | 2 | 1 |
| 32 | OFF | OFF | ON | ON | OFF | OFF | ON | OFF |

→ ON



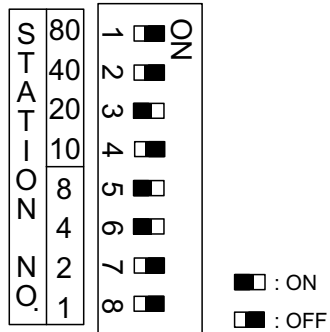
REMARK

Never set the switches as shown below (a sum of the switch Nos. in the units place is 10 or more).

To do so will cause an error in the head module.

| FDL address | STATION NO. | | | | | | | |
|-------------|-------------|-----|----|-----|----------|----|-----|-----|
| | 10s place | | | | 1s place | | | |
| | 80 | 40 | 20 | 10 | 8 | 4 | 2 | 1 |
| 32 | OFF | OFF | ON | OFF | ON | ON | OFF | OFF |

→ ON



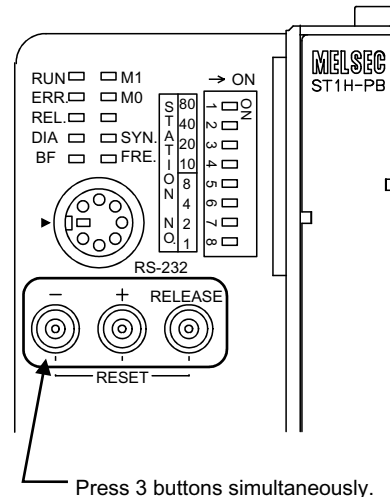
5.3.2 Reset operation

This section explains how to reset the head module using its RELEASE, + and - buttons.

(1) Reset method

Reset the head module as described below.

- 1) Press the RELEASE, + and - buttons at the same time.



- 2) When all LEDs turn off, reset processing is completed.
Release the RELEASE, + and - buttons.

(2) Reset application

Perform this reset operation when changing the FDL address from 150 to any slave station FDL address (switching from the self-diagnostics to the normal mode) while the external power supply is on.

REMARK

The head module can also be reset from the GX Configurator-ST.
In this case, choose [Online] → [Reset Head Module].
Refer to the GX Configurator-ST Manual for details.

5.4 Self-diagnostics

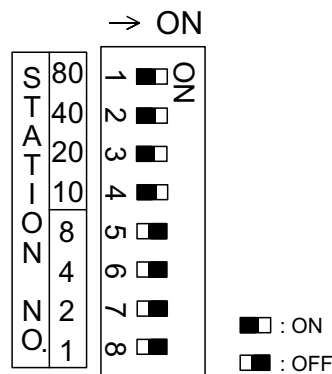
Self-diagnostics tests the head module singly.

(1) Self-diagnostics execution procedure

Execute the self-diagnostics in the following procedure.

- (a) When the external power supply of the MELSEC-ST system is on, switch it off.
- (b) Disconnect the PROFIBUS cable from the head module.
- (c) Set the FDL address of the head module to 150 as shown below.

| FDL address | STATION NO. | | | | | | | |
|-------------|-------------|----|----|----|---------|-----|-----|-----|
| | 10 place | | | | 1 place | | | |
| | 80 | 40 | 20 | 10 | 8 | 4 | 2 | 1 |
| 150 | ON | ON | ON | ON | OFF | OFF | OFF | OFF |



- (d) Switch on the external power supply of the MELSEC-ST system.
- (e) The self-diagnostics are then started automatically.
While the self-diagnostics are being executed, the RUN LED and DIA LED are flickering.
When the self-diagnostics end, the RUN LED turns on (normal termination) or off (abnormal termination).

(2) Self-diagnostics result

(a) RUN LED turns on (at normal termination)

After the self-diagnostics are executed, the RUN LED turns on to indicate a normal termination.
Change the current setting of the head module to the FDL address for a slave station.

(b) RUN LED turns off (at abnormal termination)

After the self-diagnostics are executed, the RUN LED turns off to indicate an abnormal termination.
Execute the self-diagnostics again.
If an error results again, it suggests a hardware fault of the head module. Please check whether the REL. LED, DIA LED and BF LED are on/off after the self-diagnostics, and consult your local Mitsubishi representative, explaining a detailed description of the problem.

5.5 Wiring

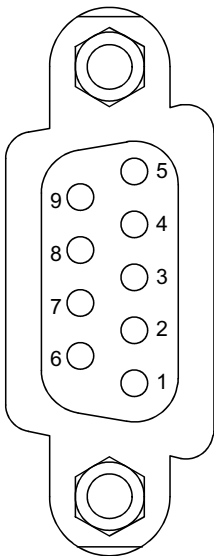
This section explains PROFIBUS cable wiring and wiring precautions.

5.5.1 PROFIBUS cable wiring

This section explains the PROFIBUS-DP interface connector pin-outs of the head module, the wiring specifications of the PROFIBUS cable, and the bus terminator.

(1) PROFIBUS-DP interface connector pin-outs

The PROFIBUS-DP interface connector (D-sub 9-pin female connector) pin-outs of the head module are indicated below.



| Pin No. | Signal symbol | Name | Application |
|---------|---------------|-----------|--------------------------|
| 1 | — | SHIELD *1 | Shield, protective earth |
| 2 | — | M24V *1 | Free |
| 3 | B/B' | RxD/TxD-P | Received/sent data-P |
| 4 | — | CNTR-P *1 | Free |
| 5 | C/C' | DGND *2 | Data earth |
| 6 | — | VP *2 | Voltage+ |
| 7 | — | P24V *1 | Free |
| 8 | A/A' | RxD/TxD-N | Received/sent data-N |
| 9 | — | CNTR-N *1 | Free |

*1: Optional signal.

*2: Signal used to connect the bus terminator.

(2) PROFIBUS cable

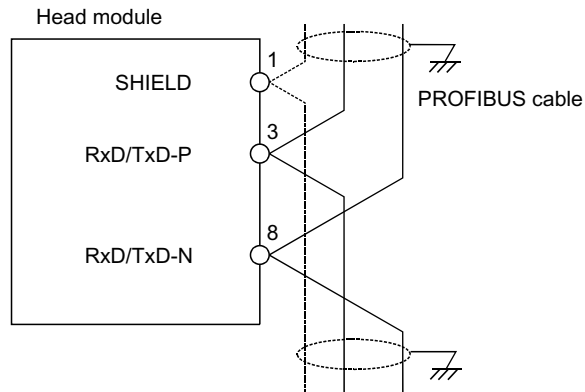
The following indicates the PROFIBUS cable specifications and wiring specifications.

(a) PROFIBUS cable

Use the PROFIBUS cable (EN50170 Volume 2: Type A compliant) that satisfies the following specifications.

| Item | Transmission line |
|-------------------------|--------------------------------|
| Applicable cable | Shielded twisted pair cable |
| Impedance | 130 to 165 Ω (f = 3 to 20 MHz) |
| Capacity | Less than 30pF/m |
| Conductor resistance | Less than 110 Ω/km |
| Conductor cross section | 0.34mm ² or more |

(b) Wiring specifications

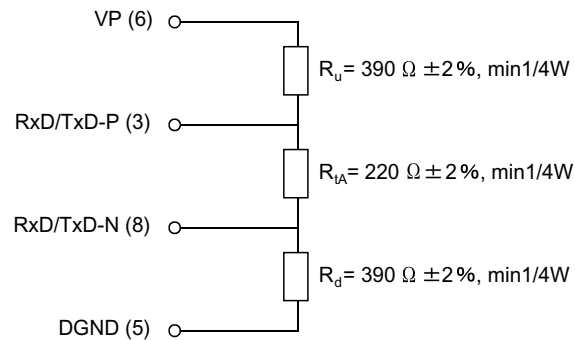


(c) Connector

Use a D-Sub 9-pin male connector for the PROFIBUS cable.
The applicable screw size is #4-40 UNC.

(3) Bus terminator

The bus terminator is user-prepared.



5.5.2 Wiring precautions

As one of the conditions to make full use of the head module functions and configure a reliable system, the influence of noise must be minimized in the external wiring.

The following gives the precautions for external wiring of the head module.

- (1) Do not install the PROFIBUS cable together with the main circuit and power cables or the load wires used for other than the MELSEC-ST system.
To do so will cause the head module to be affected by noise and surge induction.
- (2) Separate the PROFIBUS cable as far away as possible from the I/O module wires.

6 PARAMETER SETTING

This chapter explains the head module parameters.

Each of the modules that comprise the MELSEC-ST system has the following parameters.

| Parameter | | Description | Setting item | | | |
|-------------------|-----------------------|---|--------------|----|----|----|
| | | | 1) | 2) | 3) | 4) |
| Slave parameter | Select Modules * 1 | Parameters for storing the mounting status (Module Configuration) of each module set by the configuration software of the master station. By setting this parameter, the user parameter setting of each module is enabled. | ○ | ○ | ○ | ○ |
| | User parameter | Can be set by the configuration software of the master station to use the functions of each module. For the intelligent function module, they can also be set from GX Configurator-ST. | ○ | × | ○ | ○ |
| Command parameter | | Parameters of the intelligent function module that can be set using a command or GX Configurator-ST. | × | × | × | ○ |

○: With setting items ×: Without setting items

- 1) Head module
- 2) Power distribution module
- 3) I/O module
- 4) Intelligent function module

*1: For the Select Modules, be sure to set the model name same as that of the actual module used in the system.

| |
|---------------|
| REMARK |
|---------------|

For details of the head module's slave parameters, refer to Section 6.1 and 6.2.
For the parameters of each slice module, refer to the manual of the corresponding slice module.

6.1 Select Modules

To set the "Select Modules" slave parameter, the configuration of the MELSEC-ST system and the maximum input/output points of the head module must be taken into consideration.

(1) MELSEC-ST system construction

Construct the MELSEC-ST systems within the ranges where the head module and slice modules satisfy the following conditions 1) to 4).

| Condition | Description | Range | Reference section |
|-----------|---|---|-------------------|
| 1) | Slice module mounting restriction | 63 or less modules (26 or less modules for the intelligent function modules) | — |
| 2) | Sum total of occupied I/O points | 256 points or less | Section 6.1.1 |
| 3) | Sum total of <input type="text" value="Wr.n"/> Word inputs | 32 words or less or 52 words or less | |
| | Sum total of <input type="text" value="Ww.n"/> Word outputs | 32 words or less or 52 words or less | |
| 4) | Sum total of user parameter sizes | 97 bytes or less | Section 6.1.2 |

REMARK

When the MELSEC-ST system is mounted with no intelligent function modules, the above condition 3) need not be considered.

(2) Selection of maximum input/output points

Select the maximum input/output points setting according to the conditions 2) and 3) in (1) of this section.

The maximum input/output points determine the sizes of the input data and output data.

Refer to Section 6.1.1 for the selection and setting of the maximum input/output points.

6.1.1 Selection and setting of maximum input/output points

To use the head module, the maximum input/output points must be set in consideration of the following items.

- [A] Sum total of occupied I/O points of MELSEC-ST system (Refer to (1) in this section)
- [D] Maximum word input/output points used by intelligent function modules (Refer to (2) in this section)

(1) Number of occupied I/O points of MELSEC-ST system

Up to 256 points are allowed for [A] Sum total of occupied I/O points of MELSEC-ST system.

Using the following expression, calculate the [A] Sum total of occupied I/O points of MELSEC-ST system.

$$4^{*1} + \text{sum total of occupied I/O points of slice modules}^{*2} = [A] \leq 256$$

*1: Occupied I/O points of head module

*2: Bus refreshing module on the right of the head module is included.

(2) Sum total of $\boxed{\text{Wr.n}}$ Word inputs and $\boxed{\text{Ww.n}}$ Word outputs used by intelligent function modules

To mount intelligent function modules in the MELSEC-ST system, the [B] Sum total of $\boxed{\text{Wr.n}}$ Word inputs and [C] Sum total of $\boxed{\text{Ww.n}}$ Word outputs used by the intelligent function modules must be calculated.

Choose the [B] or [C] value, whichever is greater, as the [D] Maximum word input/output points to make it as the selection target of the maximum input/output points.

REMARK

To the intelligent function module, both the $\boxed{\text{Wr}}$ Word input area and $\boxed{\text{Ww}}$ Word output area are assigned in the standard setting.

To make effective use of these two areas, only the $\boxed{\text{Wr.n}}$ Word inputs or $\boxed{\text{Ww.n}}$ Word outputs can be assigned.

Refer to Section 6.1.4 for details.

(3) Selection of maximum input/output points

Set the maximum input/output points to the head module within the range that satisfies the "[A] Sum total of occupied I/O points" and "[D] Maximum word input/output points" obtained in (1) and (2).

The following gives a maximum input/output points selection table.

| Sum total of occupied I/O points | Maximum word input/output points | | | | | | | |
|----------------------------------|----------------------------------|---------------|----------------|----------------|----------------|---------------|----------------|---|
| | 0 to 32 words | | | | 33 to 52 words | | | |
| 4 to 32 points | 32-point mode | 64-point mode | 128-point mode | 256-point mode | 32-point mode | 64-point mode | 128-point mode | — |
| 33 to 64 points | — | 64-point mode | 128-point mode | 256-point mode | — | 64-point mode | 128-point mode | — |
| 65 to 128 points | — | | 128-point mode | 256-point mode | — | | 128-point mode | — |
| 129 to 256 points | — | | | 256-point mode | — | | | |

Select the shaded setting when planning an expansion of the MELSEC-ST system for the future.

(4) Setting of maximum input/output points

After the maximum input/output points used in the MELSEC-ST system are selected, they must be set to the head module.

The maximum input/output points determine the I/O data size. (Refer to Section 3.2.)

Set the maximum input/output points using the slave parameter (Select Modules) of the master station.

The setting item of Select Modules is determined by the maximum input/output points and master station's consistency function.

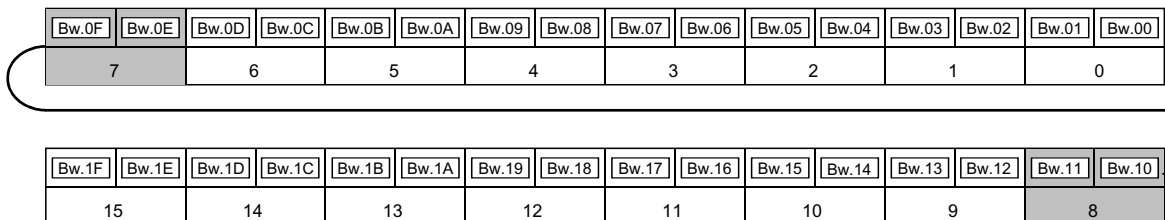
| Maximum input/output points | Consistency of master station *1 | Select Modules setting |
|-----------------------------|---|----------------------------------|
| 32-point mode | Module unit (9-word or more consistency allowed) | ST1H-PB 32pts.-whole consistent |
| | Word unit | ST1H-PB 32pts.-word consistent |
| 64-point mode | Module unit (14-word or more consistency allowed) | ST1H-PB 64pts.-whole consistent |
| | Word unit | ST1H-PB 64pts.-word consistent |
| 128-point mode | Module unit (24-word or more consistency allowed) | ST1H-PB 128pts.-whole consistent |
| | Word unit | ST1H-PB 128pts.-word consistent |
| 256-point mode | Module unit (44-word or more consistency allowed) | ST1H-PB 256pts.-whole consistent |
| | Word unit | ST1H-PB 256pts.-word consistent |

*1: When using the master station that cannot prevent inconsistency of each module, choose a word consistent setting item.

When the word unit item is set, consistency of data is not guaranteed if the data is split across the word units as shown in the following example.

<When data are not guaranteed>

When [Bw.n] Bit outputs and [Ew.n] Error clear of the slice module are assigned to 2 words



When the start slice No. is "7" and the number of occupied slices is "2", data are not guaranteed since the [Bw.n] Bit output information of the slice module are assigned to 2 words.

6.1.2 User parameter size

To construct a MELSEC-ST system, the sum total of [E] User parameter size must be considered.

Construct the MELSEC-ST system so that the [E] User parameter size does not exceed 97 bytes.

The following is the expression for calculating the maximum user parameter size.

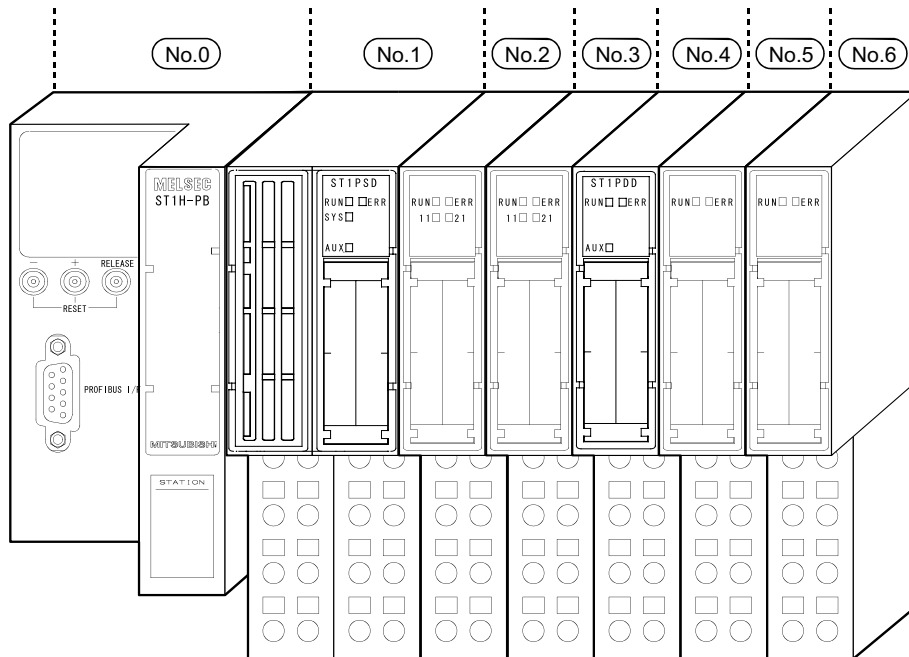
$$2 + \text{number of mounted slice modules} + \text{sum total of occupied slices of intelligent function modules} = [E] \leq 97$$

6.1.3 Parameter setting example

The following system configuration example is used to explain a parameter setting example and I/O data assignment.

(1) System configuration example

The following system configuration example is used to make explanation in this section.



(2) Setting of maximum input/output points

In the system configuration example in (1) of this section, the "[A] Sum total of occupied I/O points" and "[D] Maximum word input/output points" are as listed below.

(The following table uses the maximum input/output points setting sheet provided in Appendix 2.1.)

| No. | Module Name | Number of Occupied I/O Points | Start Slice No. (Number of occupied slices) | Wr.n | Ww.n | 5V DC Internal Current Consumption (Total) | 24V DC Current (Total) | Slot Width (Total) |
|-------|-----------------------|-------------------------------|---|------|------|--|------------------------|--------------------|
| 0 | ST1H-PB | 4 | 0(2) | — | — | 0.530A(0.530A) | 0A(0A) | — |
| 1 | ST1PSD | 2 | 2(1) | — | — | — | — | 25.2mm(25.2mm) |
| 2 | ST1X2-DE1 | 2 | 3(1) | — | — | 0.085A(0.615A) | * 1 | 12.6mm(37.8mm) |
| 3 | ST1Y2-TE2 | 2 | 4(1) | — | — | 0.090A(0.705A) | * 1 | 12.6mm(50.4mm) |
| 4 | ST1PDD | 2 | 5(1) | — | — | 0.060A(0.765A) | — | 12.6mm(63.0mm) |
| 5 | ST1AD2-V (without Ww) | 4 | 6(2) | 2 | 0 | 0.110A(0.875A) | * 1 | 12.6mm(75.6mm) |
| 6 | ST1DA2-V | 4 | 8(2) | 2 | 2 | 0.095A(0.970A) | * 1 | 12.6mm(88.2mm) |
| Total | | 20 | — | 4 | 2 | — | — | — |

* 1: The 24V DC current changes depending on the external device connected to each slice module.

Confirm the current consumption of the external device connected to each slice module, and calculate the total value.

Refer to the MELSEC-ST System User's Manual for details of current consumption calculation.

According to the above table

▪ [A] Sum total of occupied I/O points = 20

▪ [D] Maximum word input/output points = 4

By applying the [A] and [D] values to the maximum input/output points selection table in Section 6.1.1 (3), the "32-point mode" can be selected.

Also, since the [E] User parameter size is as follows:

$$[E] = 2 + \text{number of mounted slice modules} + \text{sum total of occupied slices of intelligent function modules} \\ = 2 + 6 + (2 + 2) = 12 \leq 97$$

the MELSEC-ST system can be constructed.

Refer to the next section (3) for I/O data assignment under the "32-point mode" setting in the system configuration example in the previous section (1).

(3) I/O data assignment

The following shows the I/O data assignment result in the system configuration example in (1) of this section.

(a) Input data

| Offset address | b15 | | | | b8 | | | | b7 | | | | b0 | | | | | | | | | | | | | | | | | | | |
|----------------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|-------|-------|--|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|
| +0 | Br.0F | Br.0E | Br.0D | Br.0C | Br.0B | Br.0A | Br.09 | Br.08 | Br.07 | Br.06 | Br.05 | Br.04 | Br.03 | Br.02 | Br.01 | Br.00 | } Br Bit input area | | | | | | | | | | | | | | | |
| | No.5 | | | | No.4 | | | | No.3 | | | | No.2 | | | | | No.1 | | | | No.0 | | | | | | | | | | |
| +1 | Br.1F | Br.1E | Br.1D | Br.1C | Br.1B | Br.1A | Br.19 | Br.18 | Br.17 | Br.16 | Br.15 | Br.14 | Br.13 | Br.12 | Br.11 | Br.10 | } Br Bit input area | | | | | | | | | | | | | | | |
| | 0 | | | | | | | | No.6 | | | | | | | | | | | | | | | | | | | | | | | |
| +2 | Er.0F | Er.0E | Er.0D | Er.0C | Er.0B | Er.0A | Er.09 | Er.08 | Er.07 | Er.06 | Er.05 | Er.04 | Er.03 | Er.02 | Er.01 | Er.00 | } Er Error information area | | | | | | | | | | | | | | | |
| | No.5 | | | | No.4 | | | | No.3 | | | | No.2 | | | | | No.1 | | | | No.0 | | | | | | | | | | |
| +3 | Er.1F | Er.1E | Er.1D | Er.1C | Er.1B | Er.1A | Er.19 | Er.18 | Er.17 | Er.16 | Er.15 | Er.14 | Er.13 | Er.12 | Er.11 | Er.10 | } Er Error information area | | | | | | | | | | | | | | | |
| | 0 | | | | | | | | No.6 | | | | | | | | | | | | | | | | | | | | | | | |
| +4 | Mr.15 | Mr.14 | Mr.13 | Mr.12 | Mr.11 | Mr.10 | Mr.9 | Mr.8 | Mr.7 | Mr.6 | Mr.5 | Mr.4 | Mr.3 | Mr.2 | Mr.1 | Mr.0 | } Mr Module existence information area | | | | | | | | | | | | | | | |
| | 0 | | | | No.6 | | | | No.5 | | | | No.4 | | | | | No.3 | | | | No.2 | | | | No.1 | | | | No.0 | | |
| +5 | Cr.0(15-8) Command execution result | | | | | | | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | } Cr Command result area | | | | | | | | | | | | | | | |
| +6 | Cr.1 Executed command No. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +7 | Cr.2 Response data 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +8 | Cr.3 Response data 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +9 | Wr.00 For No. 5 | | | | | | | | | | | | | | | | } Wr Word input area | | | | | | | | | | | | | | | |
| +10 | Wr.01 For No. 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +11 | Wr.02 For No. 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| +12 | Wr.03 For No. 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

- No. 0: Head module (ST1H-PB)
- No. 1: Bus refreshing module (ST1PSD)
- No. 2: Input module (ST1X2-DE1)
- No. 3: Output module (ST1Y2-TE2)
- No. 4: Power feeding module (ST1PDD)
- No. 5: Intelligent function module (ST1AD2-V (without Ww))
- No. 6: Intelligent function module (ST1DA2-V)

(b) Output data

| Offset address | b15 | b8 | b7 | b0 | | | | | | | | | | | | | |
|----------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------------------|
| +0 | Bw.0F | Bw.0E | Bw.0D | Bw.0C | Bw.0B | Bw.0A | Bw.09 | Bw.08 | Bw.07 | Bw.06 | Bw.05 | Bw.04 | Bw.03 | Bw.02 | Bw.01 | Bw.00 | } Bw Bit output area |
| | No.5 | | | | No.4 | | No.3 | | No.2 | | No.1 | | No.0 | | | | |
| +1 | Bw.1F | Bw.1E | Bw.1D | Bw.1C | Bw.1B | Bw.1A | Bw.19 | Bw.18 | Bw.17 | Bw.16 | Bw.15 | Bw.14 | Bw.13 | Bw.12 | Bw.11 | Bw.10 | } Error clear area |
| | 0 | | | | | | | | | | | No.6 | | | | | |
| +2 | Ew.0F | Ew.0E | Ew.0D | Ew.0C | Ew.0B | Ew.0A | Ew.09 | Ew.08 | Ew.07 | Ew.06 | Ew.05 | Ew.04 | Ew.03 | Ew.02 | Ew.01 | Ew.00 | } Sw System Area |
| | No.5 | | | | No.4 | | No.3 | | No.2 | | No.1 | | No.0 | | | | |
| +3 | Ew.1F | Ew.1E | Ew.1D | Ew.1C | Ew.1B | Ew.1A | Ew.19 | Ew.18 | Ew.17 | Ew.16 | Ew.15 | Ew.14 | Ew.13 | Ew.12 | Ew.11 | Ew.10 | } Cw Command execution area |
| | 0 | | | | | | | | | | | No.6 | | | | | |
| +4 | Sw.0 System Area 1 | | | | | | | | | | | | | | | | } Ww Word output area |
| +5 | Cw.0 Start slice No. of execution target | | | | | | | | | | | | | | | | |
| +6 | Cw.1 Command No. to be executed | | | | | | | | | | | | | | | | |
| +7 | Cw.2 Argument 1 | | | | | | | | | | | | | | | | |
| +8 | Cw.3 Argument 2 | | | | | | | | | | | | | | | | |
| +9 | Ww.00 For No. 6 | | | | | | | | | | | | | | | | |
| +10 | Ww.01 For No. 6 | | | | | | | | | | | | | | | | |

- No. 0: Head module (ST1H-PB)
- No. 1: Bus refreshing module (ST1PSD)
- No. 2: Input module (ST1X2-DE1)
- No. 3: Output module (ST1Y2-TE2)
- No. 4: Power feeding module (ST1PDD)
- No. 5: Intelligent function module (ST1AD2-V (without Ww))
- No. 6: Intelligent function module (ST1DA2-V)

6.1.4 Word input/output points of intelligent function modules

To the intelligent function module, both the \boxed{Wr} Word input area and \boxed{Ww} Word output area are assigned in the standard setting.

To make effective use of these two areas, only the $\boxed{Wr.n}$ Word inputs or $\boxed{Ww.n}$ Word outputs can be assigned.

(1) Changing the word input/output points of intelligent function module

(a) Intelligent function module not using $\boxed{Ww.n}$ Word outputs

For the intelligent function module that can be operated by only the $\boxed{Wr.n}$ Word inputs, the points of the \boxed{Ww} Word output area can be changed to 0 by the configuration software of the master station.

When not using the $\boxed{Ww.n}$ Word outputs, select the model name provided with a comment "(without Ww)" when selecting the module on the configuration software of the master station.

(b) Intelligent function module not using $\boxed{Wr.n}$ Word inputs

For the intelligent function module that can be operated by only the $\boxed{Ww.n}$ Word outputs, the points of the \boxed{Wr} Word input area can be changed to 0 by the configuration software of the master station.

When not using the $\boxed{Wr.n}$ Word inputs, select the model name provided with a comment "(without Wr)" when selecting the module on the configuration software of the master station.

(2) Example of changing the word input/output points

In the system configuration example in (2) (a) of this section, it is desired to set the maximum input/output points to the 256-point mode since the [A] Sum total of occupied input/output points are 146.

However, it is not possible because the [D] Maximum word input/output points exceed 32 words.

If the word input/output points of the intelligent function module are changed as in (2) (b) of this section, the [D] Maximum word input/output points are 18 words and the 256-point mode can be set.

(b) Example of changing the word input/output points in system configuration example in (a)

1) System configuration example



2) Setting of maximum input/output points

The following table uses the maximum input/output points setting sheet given in Appendix 2.1.

| No. | Module Name | Number of Occupied I/O Points | Start Slice No. (Number of occupied slices) | [Wr.n] | [Ww.n] | 5V DC Internal Current Consumption (Total) | 24V DC Current (Total) | Slot Width (Total) |
|-------|-------------|-------------------------------|---|--------|--------|--|------------------------|--------------------|
| 0 | ST1H-PB | 4 | 0(2) | — | — | 0.530A(0.530A) | 0A(0A) | — |
| 1 | ST1PSD | 2 | 2(1) | — | — | — | — | 25.2mm(25.2mm) |
| 2 | ST1X16-DE1 | 16 | 3(8) | — | — | 0.120A(0.650A) | *1 | 101.0mm(126.2mm) |
| 3 | ST1Y16-TE2 | 16 | 11(8) | — | — | 0.150A(0.800A) | *1 | 101.0mm(227.2mm) |
| 4 | ST1PSD | 2 | 19(1) | — | — | — | — | 25.2mm(252.4mm) |
| 5 | ST1AD2-V | 4 | 20(2) | 2 | 0 | 0.110A(0.110A) | *1 | 12.6mm(265.0mm) |
| 6 | ST1AD2-V | 4 | 22(2) | 2 | 0 | 0.110A(0.220A) | *1 | 12.6mm(277.6mm) |
| 7 | ST1AD2-V | 4 | 24(2) | 2 | 0 | 0.110A(0.330A) | *1 | 12.6mm(290.2mm) |
| 8 | ST1AD2-V | 4 | 26(2) | 2 | 0 | 0.110A(0.440A) | *1 | 12.6mm(302.8mm) |
| 9 | ST1AD2-V | 4 | 28(2) | 2 | 0 | 0.110A(0.550A) | *1 | 12.6mm(315.4mm) |
| 10 | ST1AD2-V | 4 | 30(2) | 2 | 0 | 0.110A(0.660A) | *1 | 12.6mm(328.0mm) |
| 11 | ST1AD2-V | 4 | 32(2) | 2 | 0 | 0.110A(0.770A) | *1 | 12.6mm(340.6mm) |
| 12 | ST1AD2-V | 4 | 34(2) | 2 | 0 | 0.110A(0.880A) | *1 | 12.6mm(353.2mm) |
| 13 | ST1AD2-V | 4 | 36(2) | 2 | 0 | 0.110A(0.990A) | *1 | 12.6mm(365.8mm) |
| 14 | ST1AD2-V | 4 | 38(2) | 2 | 0 | 0.110A(1.100A) | *1 | 12.6mm(378.4mm) |
| 15 | ST1AD2-V | 4 | 40(2) | 2 | 0 | 0.110A(1.210A) | *1 | 12.6mm(391.0mm) |
| 16 | ST1AD2-V | 4 | 42(2) | 2 | 0 | 0.110A(1.320A) | *1 | 12.6mm(403.6mm) |
| 17 | ST1AD2-V | 4 | 44(2) | 2 | 0 | 0.110A(1.430A) | *1 | 12.6mm(416.2mm) |
| 18 | ST1PSD | 2 | 46(1) | — | — | — | — | 25.2mm(441.4mm) |
| 19 | ST1DA2-V | 4 | 47(2) | 0 | 2 | 0.095A(0.095A) | *1 | 12.6mm(454.0mm) |
| 20 | ST1DA2-V | 4 | 49(2) | 0 | 2 | 0.095A(0.190A) | *1 | 12.6mm(466.6mm) |
| 21 | ST1DA2-V | 4 | 51(2) | 0 | 2 | 0.095A(0.285A) | *1 | 12.6mm(479.2mm) |
| 22 | ST1DA2-V | 4 | 53(2) | 0 | 2 | 0.095A(0.380A) | *1 | 12.6mm(491.8mm) |
| 23 | ST1DA2-V | 4 | 55(2) | 0 | 2 | 0.095A(0.475A) | *1 | 12.6mm(504.4mm) |
| 24 | ST1DA2-V | 4 | 57(2) | 0 | 2 | 0.095A(0.570A) | *1 | 12.6mm(517.0mm) |
| 25 | ST1DA2-V | 4 | 59(2) | 0 | 2 | 0.095A(0.665A) | *1 | 12.6mm(529.6mm) |
| 26 | ST1DA2-V | 4 | 61(2) | 0 | 2 | 0.095A(0.760A) | *1 | 12.6mm(542.2mm) |
| 27 | ST1DA2-V | 4 | 63(2) | 0 | 2 | 0.095A(0.855A) | *1 | 12.6mm(554.8mm) |
| 28 | ST1DA2-V | 4 | 65(2) | 0 | 2 | 0.095A(0.950A) | *1 | 12.6mm(567.4mm) |
| 29 | ST1DA2-V | 4 | 67(2) | 0 | 2 | 0.095A(1.045A) | *1 | 12.6mm(580.0mm) |
| 30 | ST1DA2-V | 4 | 69(2) | 0 | 2 | 0.095A(1.140A) | *1 | 12.6mm(592.6mm) |
| 31 | ST1DA2-V | 4 | 71(2) | 0 | 2 | 0.095A(1.235A) | *1 | 12.6mm(605.2mm) |
| Total | | 146 | — | 26 | 26 | — | — | — |

*1: The 24V DC current changes depending on the external device connected to each slice module.

Confirm the current consumption of the external device connected to each slice module, and calculate the total value.

Refer to the MELSEC-ST System User's Manual for details of current consumption calculation.

When the word input/output points of the intelligent function modules are set as in above 1), the [D] Maximum word input/output points are 26 words and the 256-point mode can be set.

6.2 User Parameters

The following table describes the user parameters to be set by the configuration software of the master station.

For the user parameters of each slice module, refer to the relevant manual.

| Item | Description | Reference section |
|-------------------------------|---|-------------------|
| FDL address | Enter the FDL address of the head module. [Setting range] 0 to 99 | Section 5.3.1 |
| Watchdog time | Set the watchdog time. (Set value × 10ms) [Setting range] 0 : Watchdog time invalid 2 to 65025 : Watchdog time valid | *1 |
| min T_sdr | Set the minimum response time to be used until a response frame can be sent to the master station. [Setting range] 1 to 255 | *1 |
| Group identification number | Set the group to which the head module will belong. The head module is allowed to belong to multiple groups (Grp 1 to Grp 8). | *1 |
| Output status at module error | Set the output status at a head module error. [Setting range] Stop : Stop (Default) Continue: Continue | Section 4.3.1 |
| Ext_Diag information | Set whether the master station will be notified of extended diagnostic information. [Setting range] Disable: Not notified Enable: Notified (Default) | Section 4.2.3 |
| Swap of input/output data | Set the swap of high and low bytes of I/O data. [Setting range] Disable: Not swapped (Default) Enable: Swapped | Section 4.2.4 |
| Swap of Ext_Diag information | Set the swap of high and low bytes of extended diagnostic information. [Setting range] Disable: Not swapped (Default) Enable: Swapped | Section 4.2.4 |
| Consistency function | Set the consistency function. [Setting range] Disable: Consistency disabled Enable: Consistency enabled (Default) | Section 4.2.5 |

*1: Refer to the manual of the master station configuration software.

7 PROGRAMMING

This chapter explains program examples available when the QJ71PB92D and AJ71PB92D/A1SJ71PB92D are used as the master station.

REMARK

Refer to the following manuals for details of the QJ71PB92D and AJ71PB92D/A1SJ71PB92D.

<QJ71PB92D>

- PROFIBUS-DP Interface Module User's Manual
- SH-080127 (13JR22)

<AJ71PB92D/A1SJ71PB92D>

- PROFIBUS-DP Interface Module type AJ71PB92D/A1SJ71PB92D User's Manual
- IB-66773 (13JL20)

7.1 When Using QJ71PB92D as Master Station

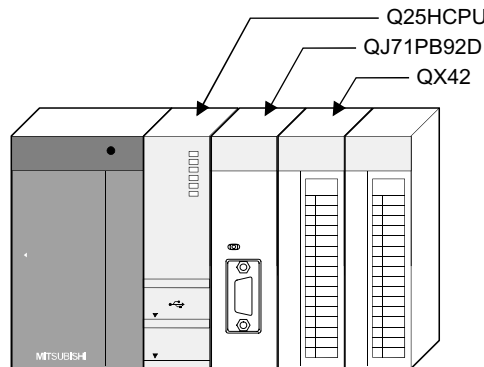
This section explains program examples available when the QJ71PB92D is used as the master station.

Section 7.1.1 and 7.1.2 uses the following system configuration example for explanation.

(1) System configuration of master station (QJ71PB92D)

The system configuration of the master station (QJ71PB92D) used in this section is shown below.

(a) System configuration of master station (QJ71PB92D)



(b) Settings of master station (QJ71PB92D)

| Item | Setting | |
|--|--------------------------------|--|
| I/O signals | X/Y000 to X/Y01F | |
| Operation mode | Extended service mode (MODE E) | |
| I/O data area (buffer memory) for FDL address 1 (MELSEC-ST system) | Input data | 0(0 _H) to 12(0C _H) |
| | Output data | 960(3C0 _H) to 972(3CC _H) |

REMARK

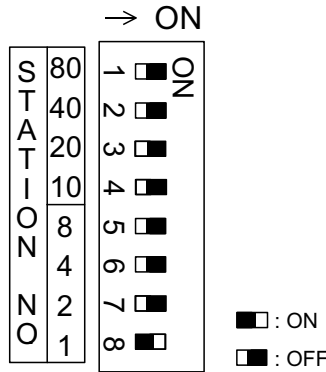
The MELSEC-ST system changes in I/O data size depending on the maximum input/output point setting and the number of mounted intelligent function modules. Hence, the master station operation mode is set to the extended service mode (MODE E) variable in data size.

(2) System configuration of MELSEC-ST system

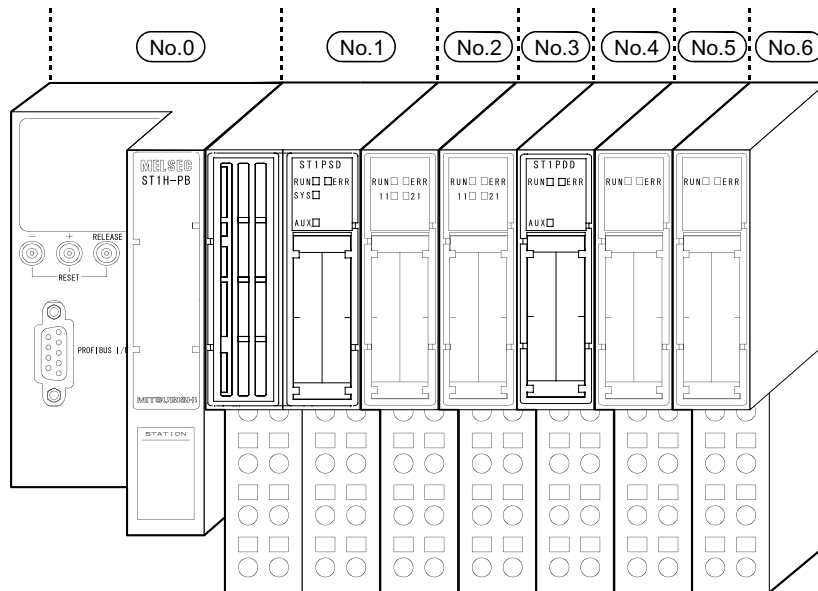
The following system configuration is used as the MELSEC-ST system for explanation.

(a) System configuration of slave station (MELSEC-ST system)

1) FDL address: 1



2) Maximum input/output points: 32-point mode

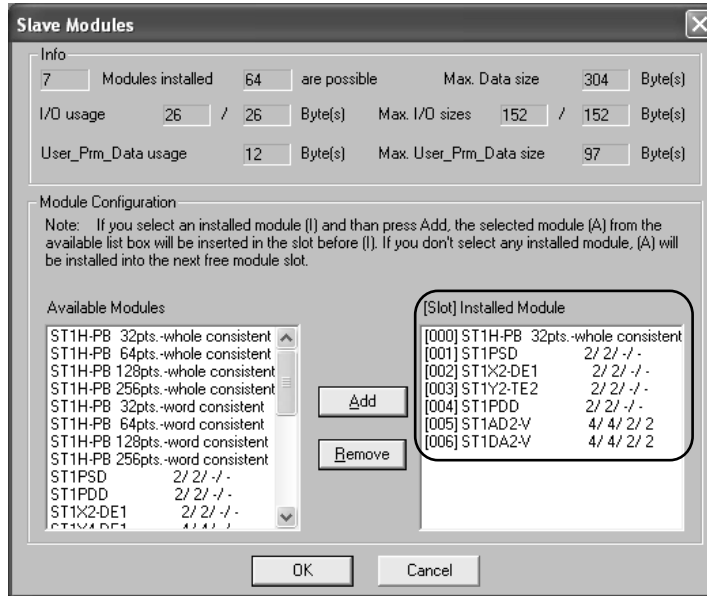


The following table uses the maximum input/output points setting sheet given in Appendix 2.1.

| No. | Module Name | Number of Occupied I/O Points | Start Slice No. (Number of occupied slices) | W | | 5V DC Internal Current Consumption (Total) | 24V DC Current (Total) | Slot Width (Total) |
|-------|-------------|-------------------------------|---|------|------|--|------------------------|--------------------|
| | | | | Wr,n | Ww,n | | | |
| 0 | ST1H-PB | 4 | 0(2) | — | — | 0.530A(0.530A) | 0A(0A) | — |
| 1 | ST1PSD | 2 | 2(1) | — | — | — | — | 25.2mm(25.2mm) |
| 2 | ST1X2-DE1 | 2 | 3(1) | — | — | 0.085A(0.615A) | *1 | 12.6mm(37.8mm) |
| 3 | ST1Y2-TE2 | 2 | 4(1) | — | — | 0.090A(0.705A) | *1 | 12.6mm(50.4mm) |
| 4 | ST1PDD | 2 | 5(1) | — | — | 0.060A(0.765A) | — | 12.6mm(63.0mm) |
| 5 | ST1AD2-V | 4 | 6(2) | 2 | 2 | 0.110A(0.875A) | *1 | 12.6mm(75.6mm) |
| 6 | ST1DA2-V | 4 | 8(2) | 2 | 2 | 0.095A(0.970A) | *1 | 12.6mm(88.2mm) |
| Total | | 20 | — | 4 | 4 | — | — | — |

*1: The 24V DC current changes depending on the external device connected to each slice module. Confirm the current consumption of the external device connected to each slice module, and calculate the total value. Refer to the MELSEC-ST System User's Manual for details of current consumption calculation.

(b) GX Configurator-DP setting



(3) I/O data assignment

The following shows the I/O data assignment result in the system configuration example given in (2) in this section.

(a) Input data

Buffer memory address
Decimal (Hexadecimal)

| | b15 | | | | b8 | | | | b7 | | | | b0 | | | | | | | | | | | | | | | | | | | |
|--------|-------------------------------------|-------|-------|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|-------|-------|-----------------------------|------|--|--|--|------|--|--|--|------|--|--|--|------|--|--|
| 0(0H) | Br.0F | Br.0E | Br.0D | Br.0C | Br.0B | Br.0A | Br.09 | Br.08 | Br.07 | Br.06 | Br.05 | Br.04 | Br.03 | Br.02 | Br.01 | Br.00 | } Br Bit input area | | | | | | | | | | | | | | | |
| | No.5 | | | | No.4 | | | | No.3 | | | | No.2 | | | | | No.1 | | | | No.0 | | | | | | | | | | |
| 1(1H) | Br.1F | Br.1E | Br.1D | Br.1C | Br.1B | Br.1A | Br.19 | Br.18 | Br.17 | Br.16 | Br.15 | Br.14 | Br.13 | Br.12 | Br.11 | Br.10 | } Er Error information area | | | | | | | | | | | | | | | |
| | 0 | | | | | | | | No.6 | | | | | | | | | | | | | | | | | | | | | | | |
| 2(2H) | Er.0F | Er.0E | Er.0D | Er.0C | Er.0B | Er.0A | Er.09 | Er.08 | Er.07 | Er.06 | Er.05 | Er.04 | Er.03 | Er.02 | Er.01 | Er.00 | } Mr Module status area | | | | | | | | | | | | | | | |
| | No.5 | | | | No.4 | | | | No.3 | | | | No.2 | | | | | No.1 | | | | No.0 | | | | | | | | | | |
| 3(3H) | Er.1F | Er.1E | Er.1D | Er.1C | Er.1B | Er.1A | Er.19 | Er.18 | Er.17 | Er.16 | Er.15 | Er.14 | Er.13 | Er.12 | Er.11 | Er.10 | } Cr Command result area | | | | | | | | | | | | | | | |
| | 0 | | | | | | | | No.6 | | | | | | | | | | | | | | | | | | | | | | | |
| 4(4H) | Mr.15 | Mr.14 | Mr.13 | Mr.12 | Mr.11 | Mr.10 | Mr.9 | Mr.8 | Mr.7 | Mr.6 | Mr.5 | Mr.4 | Mr.3 | Mr.2 | Mr.1 | Mr.0 | } Wr Word input area | | | | | | | | | | | | | | | |
| | 0 | | | | No.6 | | | | No.5 | | | | No.4 | | | | | No.3 | | | | No.2 | | | | No.1 | | | | No.0 | | |
| 5(5H) | Cr.0(15-8) Command execution result | | | | | | | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | | | | | | | | |
| 6(6H) | Cr.1 Executed command No. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7(7H) | Cr.2 Response data 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8(8H) | Cr.3 Response data 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9(9H) | Wr.00 For No. 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10(AH) | Wr.01 For No. 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11(BH) | Wr.02 For No. 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12(CH) | Wr.03 For No. 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

- No. 0: Head module (ST1H-PB)
- No. 1: Bus refreshing module (ST1PSD)
- No. 2: Input module (ST1X2-DE1)
- No. 3: Output module (ST1Y2-TE2)
- No. 4: Power feeding module (ST1PDD)
- No. 5: Intelligent function module (ST1AD2-V)
- No. 6: Intelligent function module (ST1DA2-V)

(b) Output data

Buffer memory address
Decimal (Hexadecimal)

| | b15 | | | | b8 | | | | b7 | | | | b0 | | | | | | | | | | | |
|------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------------------------------|------|--|--|--|------|--|--|
| 960(3C0 _H) | Bw.0F | Bw.0E | Bw.0D | Bw.0C | Bw.0B | Bw.0A | Bw.09 | Bw.08 | Bw.07 | Bw.06 | Bw.05 | Bw.04 | Bw.03 | Bw.02 | Bw.01 | Bw.00 | } Bw Bit output area | | | | | | | |
| | No.5 | | | | No.4 | | | | No.3 | | | | No.2 | | | | | No.1 | | | | No.0 | | |
| 961(3C1 _H) | Bw.1F | Bw.1E | Bw.1D | Bw.1C | Bw.1B | Bw.1A | Bw.19 | Bw.18 | Bw.17 | Bw.16 | Bw.15 | Bw.14 | Bw.13 | Bw.12 | Bw.11 | Bw.10 | } Bw Bit output area | | | | | | | |
| | 0 | | | | | | | | No.6 | | | | | | | | | | | | | | | |
| 962(3C2 _H) | Ew.0F | Ew.0E | Ew.0D | Ew.0C | Ew.0B | Ew.0A | Ew.09 | Ew.08 | Ew.07 | Ew.06 | Ew.05 | Ew.04 | Ew.03 | Ew.02 | Ew.01 | Ew.00 | } Ew Error clear area | | | | | | | |
| | No.5 | | | | No.4 | | | | No.3 | | | | No.2 | | | | | No.1 | | | | No.0 | | |
| 963(3C3 _H) | Ew.1F | Ew.1E | Ew.1D | Ew.1C | Ew.1B | Ew.1A | Ew.19 | Ew.18 | Ew.17 | Ew.16 | Ew.15 | Ew.14 | Ew.13 | Ew.12 | Ew.11 | Ew.10 | } Ew Error clear area | | | | | | | |
| | 0 | | | | | | | | No.6 | | | | | | | | | | | | | | | |
| 964(3C4 _H) | } Sw.0 System Area 1 | | | | | | | | | | | | | | | | } Sw System Area | | | | | | | |
| 965(3C5 _H) | } Cw.0 Start slice No. of execution target | | | | | | | | | | | | | | | | | | | | | | | |
| 966(3C6 _H) | } Cw.1 Command No. to be executed | | | | | | | | | | | | | | | | } Cw Command execution area | | | | | | | |
| 967(3C7 _H) | } Cw.2 Argument 1 | | | | | | | | | | | | | | | | | | | | | | | |
| 968(3C8 _H) | } Cw.3 Argument 2 | | | | | | | | | | | | | | | | | | | | | | | |
| 969(3C9 _H) | } Ww.00 For No. 5 | | | | | | | | | | | | | | | | } Ww Word output area | | | | | | | |
| 970(3CA _H) | } Ww.01 For No. 5 | | | | | | | | | | | | | | | | | | | | | | | |
| 971(3CB _H) | } Ww.02 For No. 6 | | | | | | | | | | | | | | | | | | | | | | | |
| 972(3CC _H) | } Ww.03 For No. 6 | | | | | | | | | | | | | | | | | | | | | | | |

- No. 0: Head module (ST1H-PB)
- No. 1: Bus refreshing module (ST1PSD)
- No. 2: Input module (ST1X2-DE1)
- No. 3: Output module (ST1Y2-TE2)
- No. 4: Power feeding module (ST1PDD)
- No. 5: Intelligent function module (ST1AD2-V)
- No. 6: Intelligent function module (ST1DA2-V)

(4) Device assignment in program examples

The program examples in Section 7.1.1 and 7.1.2 use the following device assignment.

(a) Devices used by QJ71PB92D

| Device | Application | Device | Application |
|--------|-----------------------------|--------|-------------------------------|
| X0 | Exchange start end signal | Y0 | Exchange start request signal |
| X1B | Communication READY signal | — | — |
| X1D | Module READY signal | | |
| X1F | Watchdog timer error signal | | |

(b) Devices used by user

| Device | Application | Device | Application |
|--------|--|--------|---|
| X20 | PROFIBUS-DP exchange start command | M0 | Refresh start request |
| X30 | ST1H-PB error clear request signal | M100 | ST1H-PB error handling start signal |
| X31 | ST1PSD error clear request signal | M110 | ST1PSD external AUX. power supply error handling start signal |
| X32 | ST1X2-DE1 error clear request signal | M120 | ST1X2-DE1 error handling start signal |
| X33 | ST1Y2-TE2 error clear request signal | M130 | ST1Y2-TE2 error handling start signal |
| X34 | ST1PDD error clear request signal | M140 | ST1PDD external AUX. power supply error handling start signal |
| X35 | ST1AD2-V error clear request signal | M150 | ST1AD2-V error handling start signal |
| X36 | ST1DA2-V error clear request signal | M160 | ST1DA2-V error handling start signal |
| X40 | Output condition for ST1Y2-TE2 first output point | M200 | ST1H-PB error clear signal |
| X41 | Output condition for ST1Y2-TE2 second output point | M210 | ST1PSD error clear signal |
| X42 | ST1AD2-V convert setting request condition | M220 | ST1X2-DE1 error clear signal |
| X43 | ST1DA2-V convert setting request condition | M230 | ST1Y2-TE2 error clear signal |
| D100 | ST1AD2-V CH1 digital output value read destination | M240 | ST1PDD error clear signal |
| D101 | ST1AD2-V CH2 digital output value read destination | M250 | ST1AD2-V error clear signal |
| — | — | M260 | ST1DA2-V error clear signal |
| | | M300 | Command execution start flag |
| | | M301 | Processing flag for normal command execution result |

(c) Devices used by I/O data

1) **Br** Bit Input Area

| Br.n | Bit Input | Information | Master Station Side Device | Slice No. | Module Name |
|-------|-----------|-----------------------------------|----------------------------|-----------|-------------|
| Br.00 | | Module READY | D0.0 | 0 | ST1H-PB |
| Br.01 | | Forced output test mode | D0.1 | | |
| Br.02 | | Module being changed online | D0.2 | 1 | |
| Br.03 | | Command execution | D0.3 | | |
| Br.04 | | External power supply status | D0.4 | 2 | ST1PSD |
| Br.05 | | | D0.5 | | |
| Br.06 | | Input status (first point) | D0.6 | 3 | ST1X2-DE1 |
| Br.07 | | Input status (second point) | D0.7 | | |
| Br.08 | | System Area (0 fixed) | D0.8 | 4 | ST1Y2-TE2 |
| Br.09 | | System Area (0 fixed) | D0.9 | | |
| Br.0A | | External AUX. power supply status | D0.A | 5 | ST1PDD |
| Br.0B | | | D0.B | | |
| Br.0C | | Module READY | D0.C | 6 | ST1AD2-V |
| Br.0D | | Convert setting completed flag | D0.D | | |
| Br.0E | | A/D conversion completed flag | D0.E | 7 | |
| Br.0F | | Alarm output signal | D0.F | | |
| Br.10 | | Module READY | D1.0 | 8 | ST1DA2-V |
| Br.11 | | Convert setting completed flag | D1.1 | | |
| Br.12 | | System Area (0 fixed) | D1.2 | 9 | |
| Br.13 | | System Area (0 fixed) | D1.3 | | |
| Br.14 | | — | D1.4 | — | — |
| to | | | | | |
| Br.1F | | — | D1.F | — | — |

2) **Er** Error Information Area

| Er.n | Error Information | Information | Master Station Side Device | Slice No. | Module Name |
|-------|---|-------------|----------------------------|-----------|-------------|
| Er.00 | Head module error information | | D2.0 | 0 | ST1H-PB |
| Er.01 | | | D2.1 | | |
| Er.02 | | | D2.2 | 1 | |
| Er.03 | | | D2.3 | | |
| Er.04 | Bus refreshing module error information | | D2.4 | 2 | ST1PSD |
| Er.05 | | | D2.5 | | |
| Er.06 | Module error information | | D2.6 | 3 | ST1X2-DE1 |
| Er.07 | | | D2.7 | | |
| Er.08 | Module error information | | D2.8 | 4 | ST1Y2-TE2 |
| Er.09 | | | D2.9 | | |
| Er.0A | Power feeding module error information | | D2.A | 5 | ST1PDD |
| Er.0B | | | D2.B | | |
| Er.0C | CH1 error information | | D2.C | 6 | ST1AD2-V |
| Er.0D | | | D2.D | | |
| Er.0E | CH2 error information | | D2.E | 7 | |
| Er.0F | | | D2.F | | |
| Er.10 | CH1 error information | | D3.0 | 8 | ST1DA2-V |
| Er.11 | | | D3.1 | | |
| Er.12 | CH2 error information | | D3.2 | 9 | |
| Er.13 | | | D3.3 | | |
| Er.14 | — | | D3.4 | — | — |
| to | | | | | |
| Er.1F | — | | D3.F | — | — |

3) **Mr** Module Status Area

| Mr.n Module Status | Information | Master Station Side Device | Slice No. | Module Name |
|---------------------------|------------------------------|----------------------------|-----------|-------------|
| Mr.0 | Head module status | D4.0 | 0 | ST1H-PB |
| Mr.1 | | D4.1 | 1 | |
| Mr.2 | Bus refreshing module status | D4.2 | 2 | ST1PSD |
| Mr.3 | ST1X2-DE1 module status | D4.3 | 3 | ST1X2-DE1 |
| Mr.4 | ST1Y2-TE2 module status | D4.4 | 4 | ST1Y2-TE2 |
| Mr.5 | Power feeding module status | D4.5 | 5 | ST1PDD |
| Mr.6 | ST1AD2-V module status | D4.6 | 6 | ST1AD2-V |
| Mr.7 | | D4.7 | 7 | |
| Mr.8 | ST1DA2-V module status | D4.8 | 8 | ST1DA2-V |
| Mr.9 | | D4.9 | 9 | |
| Mr.10 | — | D4.A | — | — |
| to | | | | |
| Mr.15 | — | D4.F | — | — |

4) **Cr** Command Result Area

| Cr.n Command Result Area | Information | Master Station Side Device | Slice No. | Module Name |
|---------------------------------|---|----------------------------|-----------|-------------|
| Cr.0 | Cr.0(15-8) Command Execution Result, Cr.0(7-0) Start Slice No. of Execution Target | D5 | — | — |
| Cr.1 | Executed Command No. | D6 | — | — |
| Cr.2 | Response Data 1 | D7 | — | — |
| Cr.3 | Response Data 2 | D8 | — | — |

5) **Wr** Word Input Area

| Wr.n Word Input | Information | Master Station Side Device | Slice No. | Module Name |
|------------------------|---|----------------------------|-----------|-------------|
| Wr.00 | CH1 Digital Output Value (Wr.n) | D9 | 6 | ST1AD2-V |
| Wr.01 | CH2 Digital Output Value (Wr.n+1) | D10 | | |
| Wr.02 | CH1 Digital Value (Wr.n) | D11 | 8 | ST1DA2-V |
| Wr.03 | CH2 Digital Value (Wr.n+1) | D12 | | |

6) **Bw** Bit Output Area

| Bw.n Bit Output | Information | Master Station Side Device | Slice No. | Module Name |
|------------------------|--------------------------------|----------------------------|-----------|-------------|
| Bw.00 | System Area (0 fixed) | D1000.0 | 0 | ST1H-PB |
| Bw.01 | System Area (0 fixed) | D1000.1 | | |
| Bw.02 | System Area (0 fixed) | D1000.2 | 1 | |
| Bw.03 | Command request | D1000.3 | | |
| Bw.04 | System Area (0 fixed) | D1000.4 | 2 | ST1PSD |
| Bw.05 | System Area (0 fixed) | D1000.5 | | |
| Bw.06 | System Area (0 fixed) | D1000.6 | 3 | ST1X2-DE1 |
| Bw.07 | System Area (0 fixed) | D1000.7 | | |
| Bw.08 | Output status (first point) | D1000.8 | 4 | ST1Y2-TE2 |
| Bw.09 | Output status (second point) | D1000.9 | | |
| Bw.0A | System Area (0 fixed) | D1000.A | 5 | ST1PDD |
| Bw.0B | System Area (0 fixed) | D1000.B | | |
| Bw.0C | System Area (0 fixed) | D1000.C | 6 | ST1AD2-V |
| Bw.0D | Convert setting request | D1000.D | | |
| Bw.0E | System Area (0 fixed) | D1000.E | 7 | |
| Bw.0F | System Area (0 fixed) | D1000.F | | |
| Bw.10 | System Area (0 fixed) | D1001.0 | 8 | ST1DA2-V |
| Bw.11 | Convert setting request | D1001.1 | | |
| Bw.12 | CH1 output enable/disable flag | D1001.2 | 9 | |
| Bw.13 | CH2 output enable/disable flag | D1001.3 | | |
| Bw.14 | — | D1001.4 | — | — |
| to | | | | |
| Bw.1F | — | D1001.F | — | — |

7) **Ew** Error Clear Area

| Ew.n Error Clear | Information | Master Station Side Device | Slice No. | Module Name |
|-------------------------|-----------------------|----------------------------|-----------|-------------|
| Ew.00 | Error Clear Request | D1002.0 | 0 | ST1H-PB |
| Ew.01 | System Area (0 fixed) | D1002.1 | | |
| Ew.02 | System Area (0 fixed) | D1002.2 | 1 | |
| Ew.03 | System Area (0 fixed) | D1002.3 | | |
| Ew.04 | Error Clear Request | D1002.4 | 2 | ST1PSD |
| Ew.05 | System Area (0 fixed) | D1002.5 | | |
| Ew.06 | Error Clear Request | D1002.6 | 3 | ST1X2-DE1 |
| Ew.07 | System Area (0 fixed) | D1002.7 | | |
| Ew.08 | Error Clear Request | D1002.8 | 4 | ST1Y2-TE2 |
| Ew.09 | System Area (0 fixed) | D1002.9 | | |
| Ew.0A | Error Clear Request | D1002.A | 5 | ST1PDD |
| Ew.0B | System Area (0 fixed) | D1002.B | | |
| Ew.0C | Error Clear Request | D1002.C | 6 | ST1AD2-V |
| Ew.0D | System Area (0 fixed) | D1002.D | | |
| Ew.0E | System Area (0 fixed) | D1002.E | 7 | |
| Ew.0F | System Area (0 fixed) | D1002.F | | |
| Ew.10 | Error Clear Request | D1003.0 | 8 | ST1DA2-V |
| Ew.11 | System Area (0 fixed) | D1003.1 | | |
| Ew.12 | System Area (0 fixed) | D1003.2 | 9 | |
| Ew.13 | System Area (0 fixed) | D1003.3 | | |
| Ew.14 | — | D1003.4 | — | — |
| to | | | | |
| Ew.1F | — | D1003.F | — | — |

8) **Sw** System Area

| Sw System Area | Information | Master Station Side Device | Slice No. | Module Name |
|-----------------------|-----------------------|----------------------------|-----------|-------------|
| Sw.0 | System Area (0 fixed) | D1004 | — | — |

9) **Cw** Command Execution Area

| Cw Command Execution Area | Information | Master Station Side Device | Slice No. | Module Name |
|----------------------------------|-------------------------------------|----------------------------|-----------|-------------|
| Cw.0 | Start Slice No. of Execution Target | D1005 | — | — |
| Cw.1 | Command No. to be Executed | D1006 | — | — |
| Cw.2 | Argument 1 | D1007 | — | — |
| Cw.3 | Argument 2 | D1008 | — | — |

10) **Ww** Word Output Area

| Ww.n Word Output | Information | Master Station Side Device | Slice No. | Module Name |
|-------------------------|--|----------------------------|-----------|-------------|
| Ww.00 | System Area (0 fixed) | D1009 | 6 | ST1AD2-V |
| Ww.01 | System Area (0 fixed) | D1010 | | |
| Ww.02 | CH1 digital value setting (Ww.n) | D1011 | 8 | ST1DA2-V |
| Ww.03 | CH2 digital value setting (Ww.n+1) | D1012 | | |

7.1.1 Program example available when auto refresh is used in QJ71PB92D

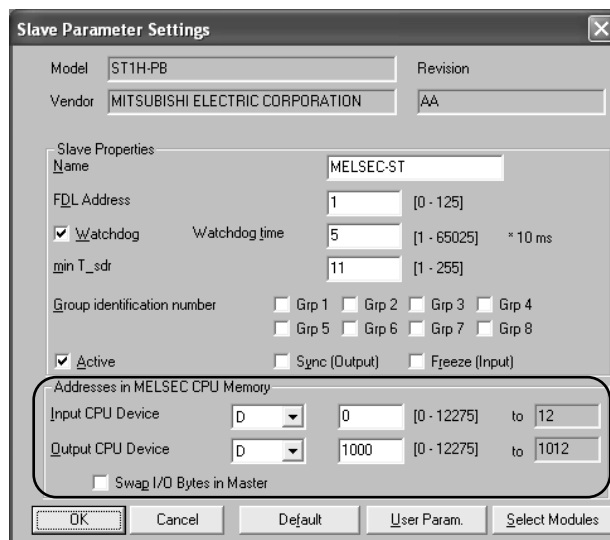
This section explains a program example available when auto refresh is used in the QJ71PB92D to communicate with the MELSEC-ST system.

The program example in this section is based on the system configuration in Section 7.1.

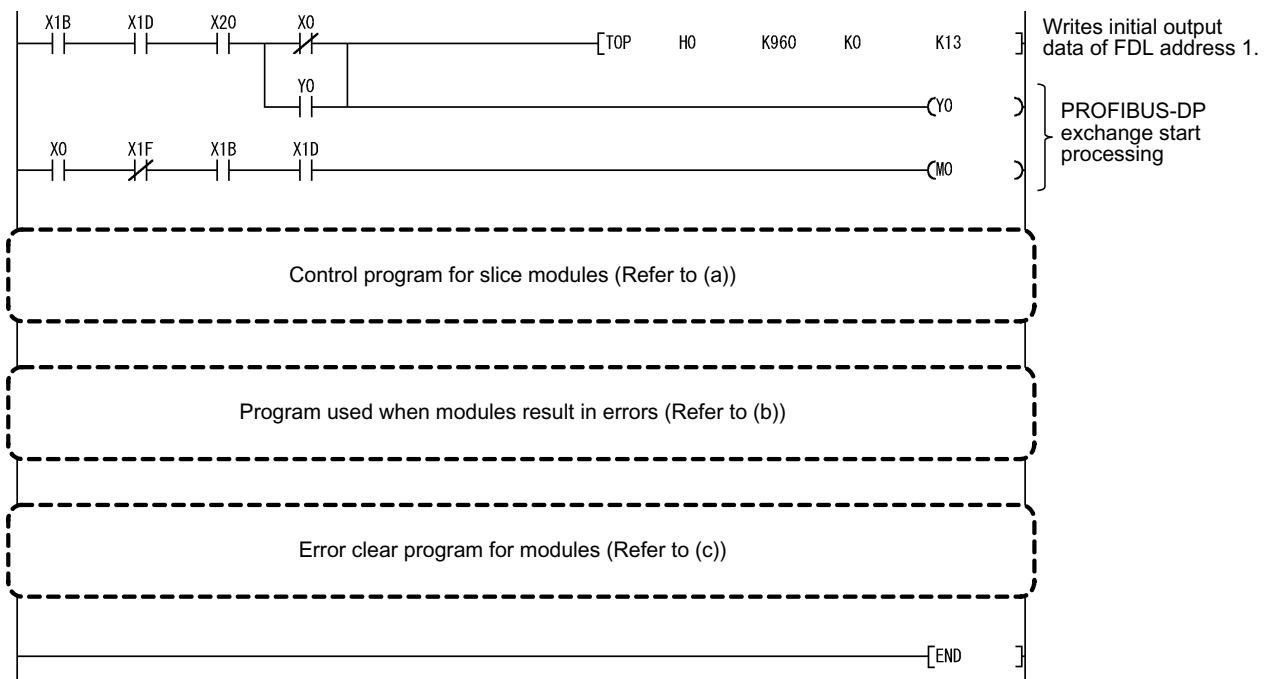
The command parameters of the ST1AD2-V and ST1DA2-V are assumed to have already been written.

(1) Auto refresh setting

To use auto refresh, setting must be made on GX Configurator-DP. Refer to the GX Configurator-DP Manual for details.

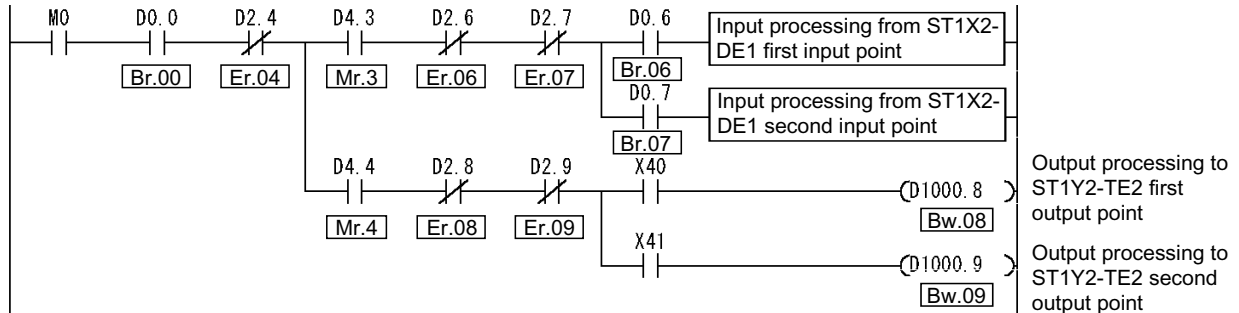


(2) Program example

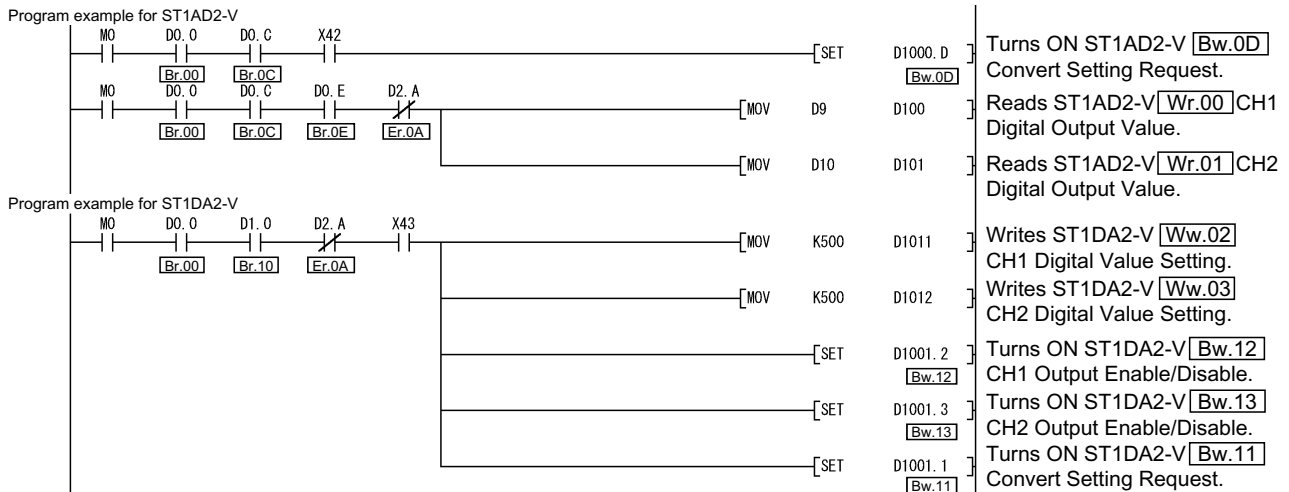


(a) Control program examples for slice modules

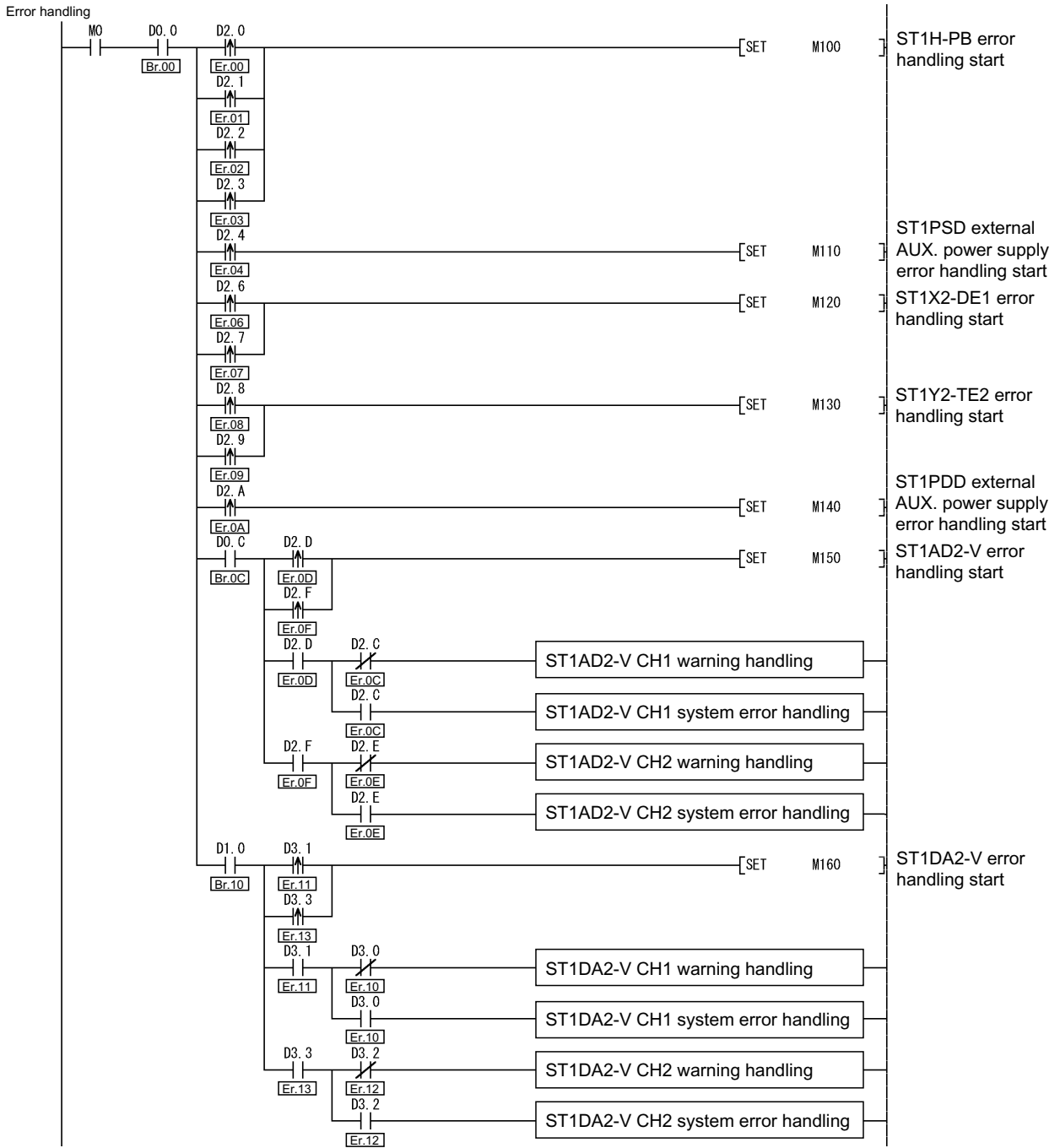
1) Program example for input module (ST1X2-DE1) and output module (ST1Y2-TE2)



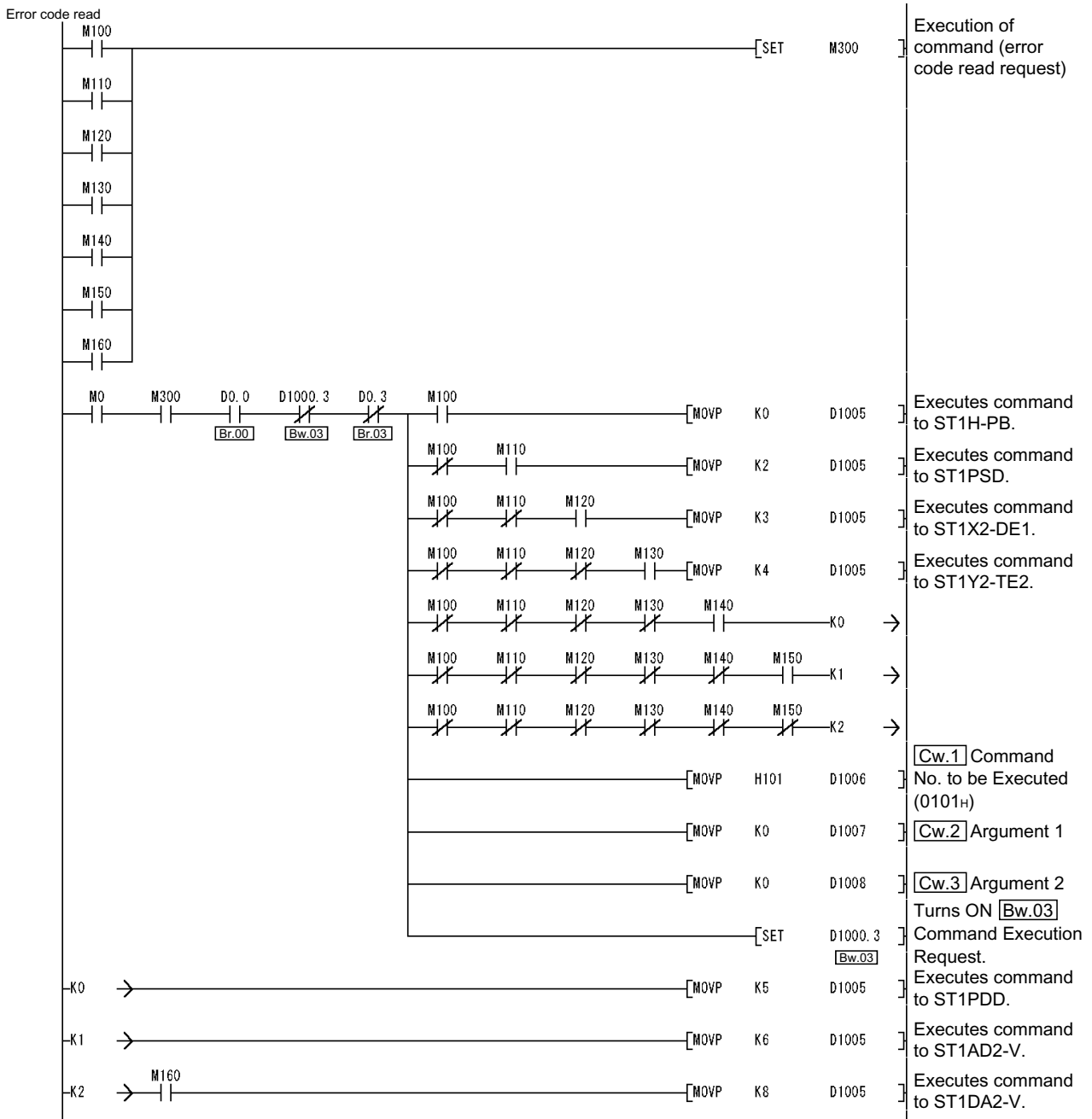
2) Program example for intelligent function modules (ST1AD2-V, ST1DA2-V)



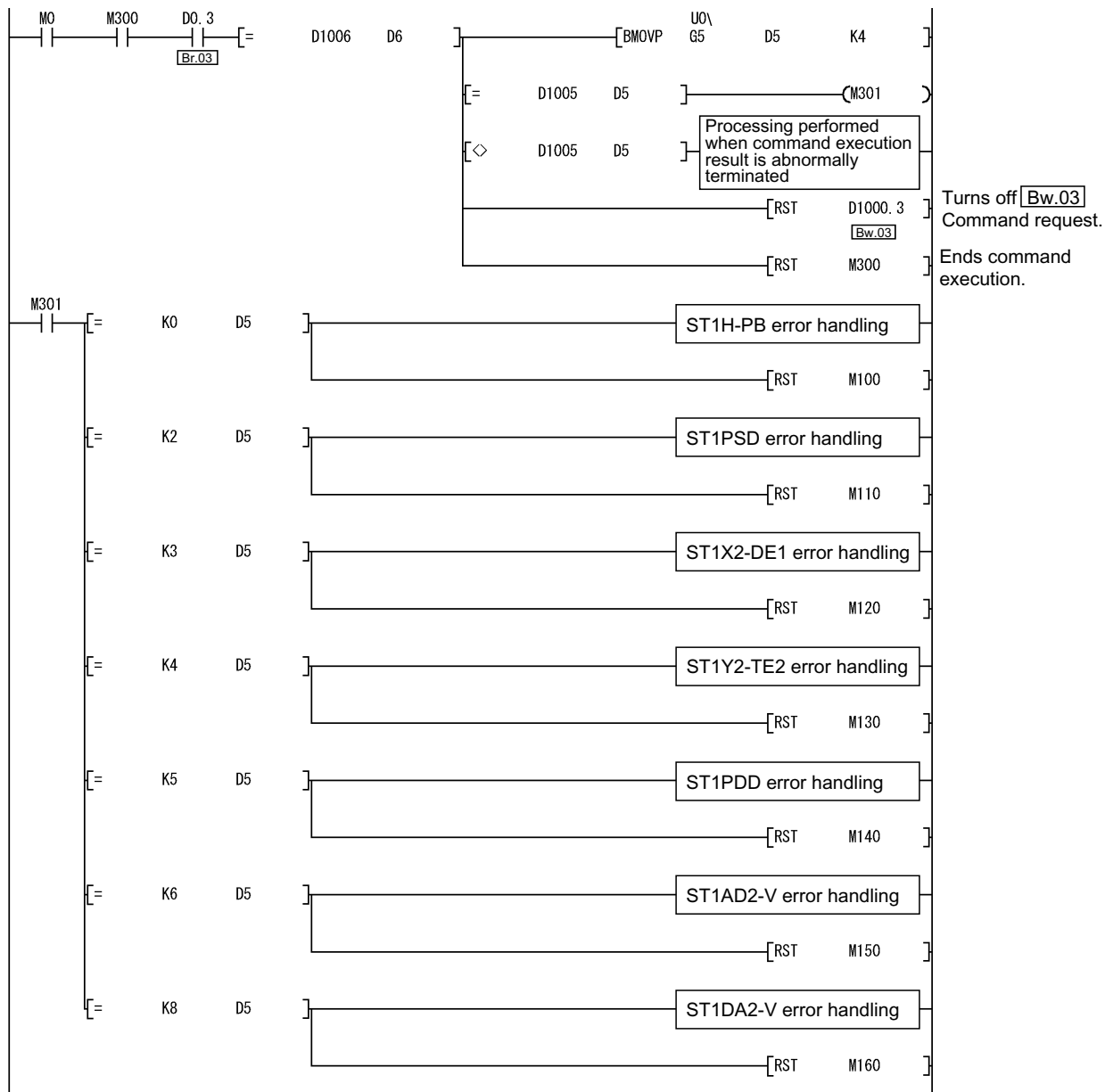
(b) Program example used when modules result in errors



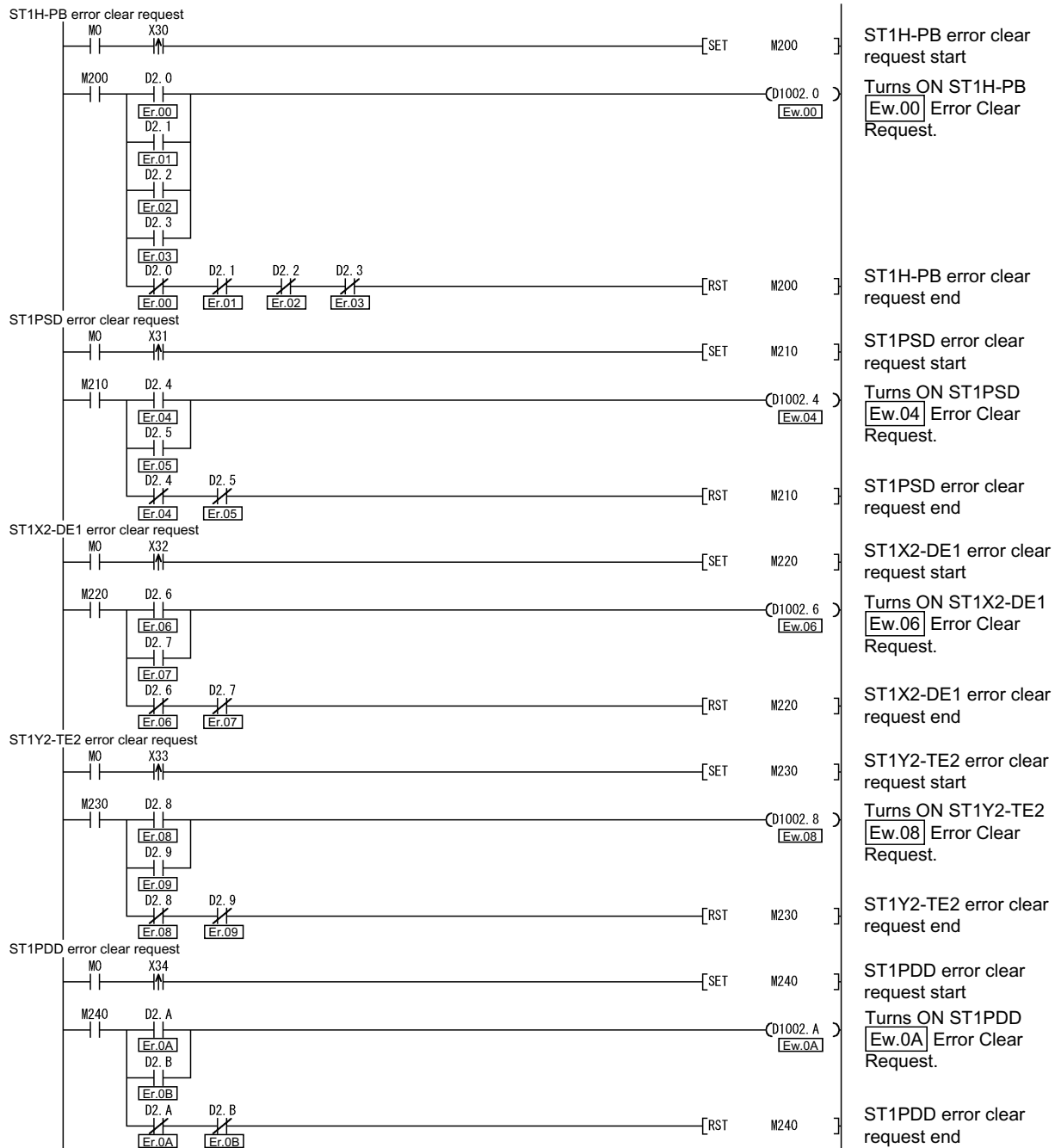
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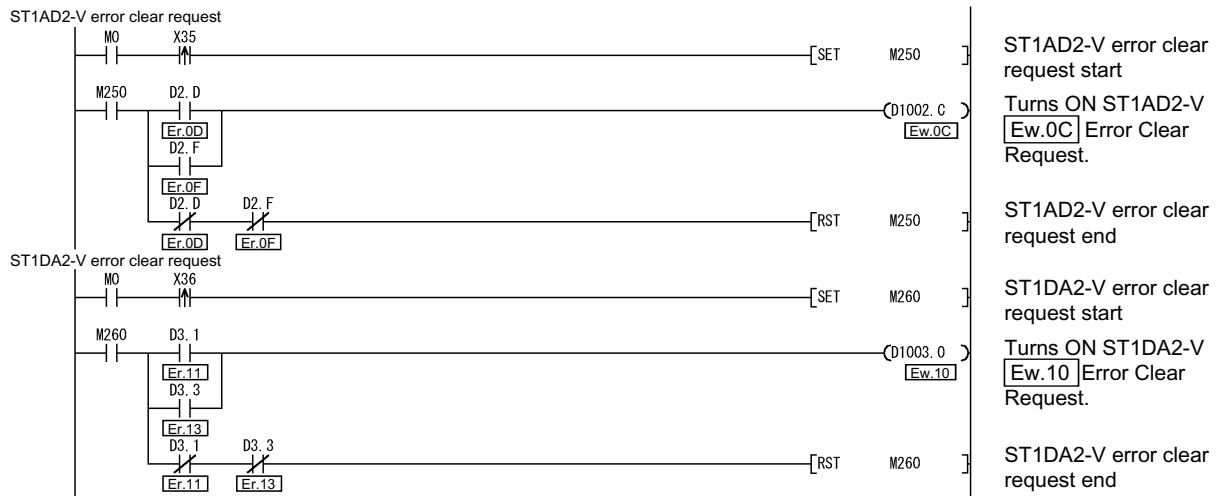
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(c) Error clear program for modules



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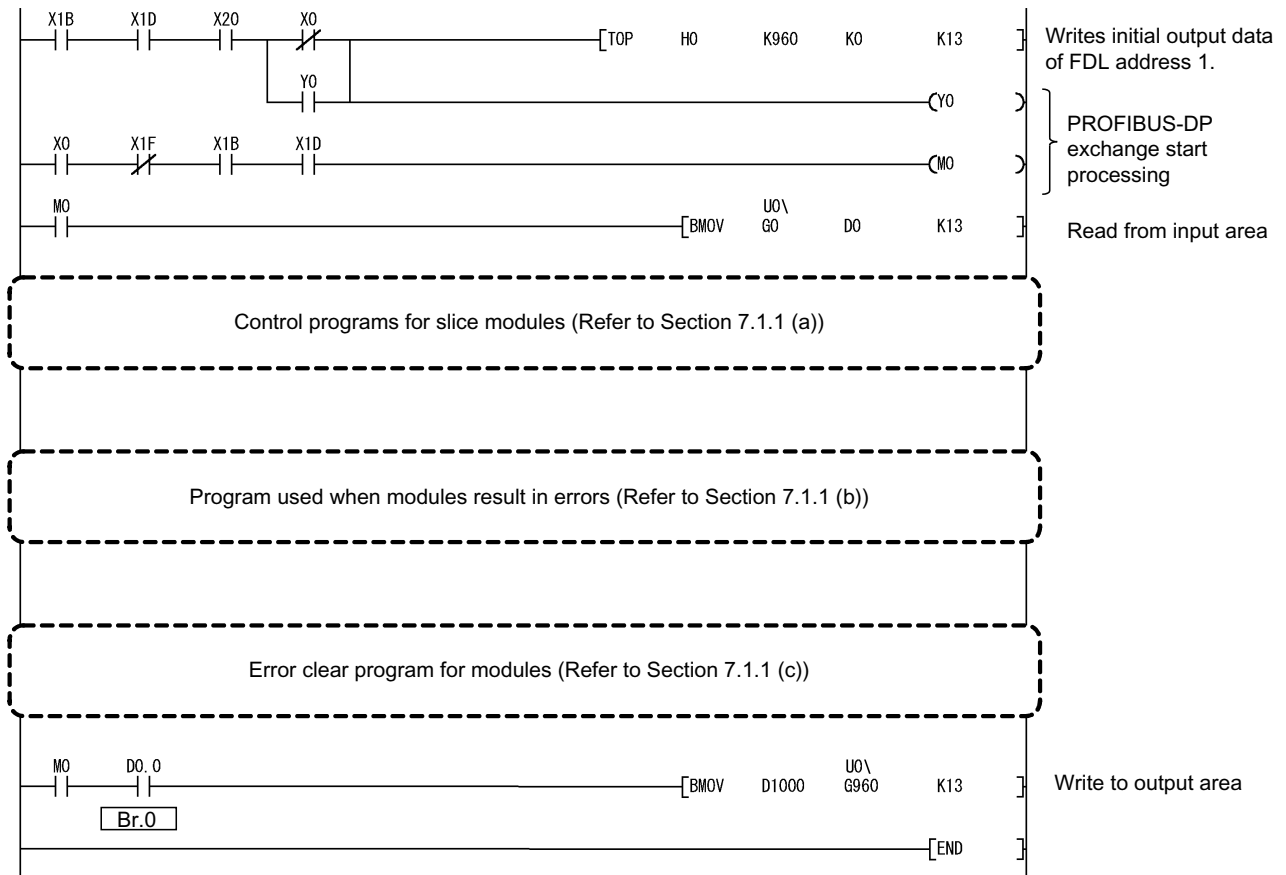


7.1.2 Program example available when auto refresh is not used in QJ71PB92D

This section explains a program example available when auto refresh is not used in the QJ71PB92D to communicate with the MELSEC-ST system.

The program example in this section is based on the system configuration in Section 7.1.

The command parameters of the ST1AD2-V and ST1DA2-V are assumed to have already been written.



7.2 When Using AJ71PB92D/A1SJ71PB92D as Master Station

This section explains a program example available when the AJ71PB92D/A1SJ71PB92D is used as the master station.

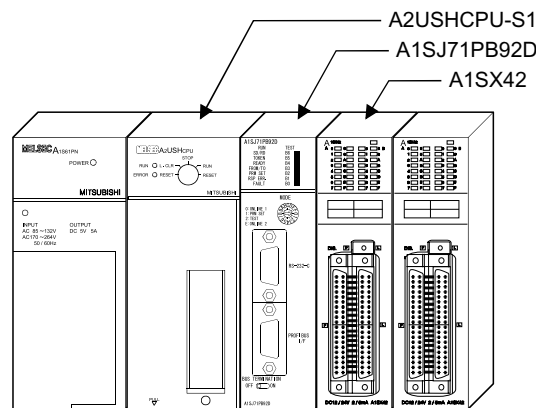
This section provides the program example available when the A1SJ71PB92D is used as the master station.

The command parameters of the ST1AD2-V and ST1DA2-V are assumed to have already been written.

(1) System configuration of master station (A1SJ71PB92D)

The system configuration of the master station (A1SJ71PB92D) used in this section is shown below.

(a) System configuration of master station (A1SJ71PB92D)



(b) Settings of master station (A1SJ71PB92D)

| Item | | Setting |
|--|-------------|--------------------------------|
| I/O signals | | X/Y000 to X/Y01F |
| Operation mode | | Extended service mode (MODE E) |
| I/O data area (buffer memory) for FDL address 1 (MELSEC-ST system) | Input data | 0(0H) to 12(0CH) |
| | Output data | 960(3C0H) to 972(3CCH) |

REMARK

The MELSEC-ST system changes in I/O data size depending on the maximum input/output point setting and the number of mounted intelligent function modules. Hence, the master station operation mode is set to the extended service mode (MODE E) variable in data size.

(2) System configuration of MELSEC-ST system

The MELSEC-ST system has the system configuration as described in Section 7.1 (2).

(3) I/O data assignment

The I/O data assignment result is the same as that described in Section 7.1 (3).

(4) Device assignment in program example

The program example in this section uses the following device assignment.

(a) Devices used by A1SJ71PB92D

| Device | Application | Device | Application |
|--------|-----------------------------|--------|-------------------------------|
| X0 | Exchange start end signal | Y0 | Exchange start request signal |
| X0D | Watchdog timer error signal | | — |
| X1B | Communication READY signal | | |
| X1D | Module READY signal | | |

(b) Devices used by user

| Device | Application | Device | Application |
|--------|---|--------|---|
| X20 | PROFIBUS-DP exchange start command | M0 | Refresh start request |
| X30 | ST1H-PB error clear request signal | M100 | ST1H-PB error handling start signal 1 |
| X31 | ST1PSD error clear request signal | M101 | ST1H-PB error handling start signal 2 |
| X32 | ST1X2-DE1 error clear request signal | M110 | ST1PSD external AUX. power supply error handling start signal 1 |
| X33 | ST1Y2-TE2 error clear request signal | M111 | ST1PSD external AUX. power supply error handling start signal 2 |
| X34 | ST1PDD error clear request signal | M120 | ST1X2-DE1 error handling start signal 1 |
| X35 | ST1AD2-V error clear request signal | M121 | ST1X2-DE1 error handling start signal 2 |
| X36 | ST1DA2-V error clear request signal | M130 | ST1Y2-TE2 error handling start signal 1 |
| X40 | Output condition for ST1Y2-TE2 first output point | M131 | ST1Y2-TE2 error handling start signal 2 |
| X41 | Output condition for ST1Y2-TE2 second output point | M140 | ST1PDD external AUX. power supply error handling start signal 1 |
| X42 | ST1AD2-V convert setting request condition | M141 | ST1PDD external AUX. power supply error handling start signal 2 |
| X43 | ST1DA2-V convert setting request condition | M150 | ST1AD2-V error handling start signal 1 |
| D100 | ST1AD2-V CH1 digital output value read destination | M151 | ST1AD2-V error handling start signal 2 |
| D101 | ST1AD2-V CH2 digital output value read destination | M160 | ST1DA2-V error handling start signal 1 |
| | — | M161 | ST1DA2-V error handling start signal 2 |
| | | M200 | ST1H-PB error clear signal 1 |
| | | M201 | ST1H-PB error clear signal 2 |
| | | M210 | ST1PSD error clear signal 1 |
| | | M211 | ST1PSD error clear signal 2 |
| | | M220 | ST1X2-DE1 error clear signal 1 |
| | | M221 | ST1X2-DE1 error clear signal 2 |
| | | M230 | ST1Y2-TE2 error clear signal 1 |
| | | M231 | ST1Y2-TE2 error clear signal 2 |
| | | M240 | ST1PDD error clear signal 1 |
| | | M241 | ST1PDD error clear signal 2 |
| | | M250 | ST1AD2-V error clear signal 1 |
| | | M251 | ST1AD2-V error clear signal 2 |
| | | M260 | ST1DA2-V error clear signal 1 |
| | | M261 | ST1DA2-V error clear signal 2 |
| M300 | Command execution start flag | | |
| M301 | Processing flag for normal command execution result | | |

(c) Devices used by I/O data

1) **Br** Bit Input Area

| Br.n | Bit Input | Information | Master Station Side Device | Slice No. | Module Name |
|-------|-----------|-----------------------------------|----------------------------|-----------|-------------|
| Br.00 | | Module READY | B0 | 0 | ST1H-PB |
| Br.01 | | Forced output test mode | B1 | | |
| Br.02 | | Module being changed online | B2 | 1 | |
| Br.03 | | Command execution | B3 | | |
| Br.04 | | External power supply status | B4 | 2 | ST1PSD |
| Br.05 | | | B5 | | |
| Br.06 | | Input status (first point) | B6 | 3 | ST1X2-DE1 |
| Br.07 | | Input status (second point) | B7 | | |
| Br.08 | | System Area (0 fixed) | B8 | 4 | ST1Y2-TE2 |
| Br.09 | | System Area (0 fixed) | B9 | | |
| Br.0A | | External AUX. power supply status | BA | 5 | ST1PDD |
| Br.0B | | | BB | | |
| Br.0C | | Module READY | BC | 6 | ST1AD2-V |
| Br.0D | | Convert setting completed flag | BD | | |
| Br.0E | | A/D conversion completed flag | BE | 7 | |
| Br.0F | | Alarm output signal | BF | | |
| Br.10 | | Module READY | B10 | 8 | ST1DA2-V |
| Br.11 | | Convert setting completed flag | B11 | | |
| Br.12 | | System Area (0 fixed) | B12 | 9 | |
| Br.13 | | System Area (0 fixed) | B13 | | |
| Br.14 | | — | B14 | — | — |
| to | | | | | |
| Br.1F | | — | B1F | — | — |

2) **Er** Error Information Area

| Er.n | Error Information | Information | Master Station Side Device | Slice No. | Module Name |
|--------------|---|-------------|----------------------------|-----------|-------------|
| Er.00 | Head module error information | | B20 | 0 | ST1H-PB |
| Er.01 | | | B21 | | |
| Er.02 | | | B22 | 1 | |
| Er.03 | | | B23 | | |
| Er.04 | Bus refreshing module error information | | B24 | 2 | ST1PSD |
| Er.05 | | | B25 | | |
| Er.06 | Module error information | | B26 | 3 | ST1X2-DE1 |
| Er.07 | | | B27 | | |
| Er.08 | Module error information | | B28 | 4 | ST1Y2-TE2 |
| Er.09 | | | B29 | | |
| Er.0A | Power feeding module error information | | B2A | 5 | ST1PDD |
| Er.0B | | | B2B | | |
| Er.0C | CH1 error information | | B2C | 6 | ST1AD2-V |
| Er.0D | | | B2D | | |
| Er.0E | CH2 error information | | B2E | 7 | |
| Er.0F | | | B2F | | |
| Er.10 | CH1 error information | | B30 | 8 | ST1DA2-V |
| Er.11 | | | B31 | | |
| Er.12 | CH2 error information | | B32 | 9 | |
| Er.13 | | | B33 | | |
| Er.14 | — | | B34 | — | — |
| to | | | | | |
| Er.1F | — | | B3F | — | — |

3) **Mr** Module Status Area

| Mr.n Module Status | Information | Master Station Side Device | Slice No. | Module Name |
|---------------------------|------------------------------|----------------------------|-----------|-------------|
| Mr.0 | Head module status | B40 | 0 | ST1H-PB |
| Mr.1 | | B41 | 1 | |
| Mr.2 | Bus refreshing module status | B42 | 2 | ST1PSD |
| Mr.3 | ST1X2-DE1 module status | B43 | 3 | ST1X2-DE1 |
| Mr.4 | ST1Y2-TE2 module status | B44 | 4 | ST1Y2-TE2 |
| Mr.5 | Power feeding module status | B45 | 5 | ST1PDD |
| Mr.6 | ST1AD2-V module status | B46 | 6 | ST1AD2-V |
| Mr.7 | | B47 | 7 | |
| Mr.8 | ST1DA2-V module status | B48 | 8 | ST1DA2-V |
| Mr.9 | | B49 | 9 | |
| Mr.10 | — | B4A | — | — |
| to | | | | |
| Mr.15 | — | B4F | — | — |

4) **Cr** Command Result Area

| Cr Command Result Area | Information | Master Station Side Device | Slice No. | Module Name |
|-------------------------------|---|----------------------------|-----------|-------------|
| Cr.0 | Cr.0(15-8) Command Execution Result, Cr.0(7-0) Start Slice No. of Execution Target | W0 | — | — |
| Cr.1 | Executed Command No. | W1 | — | — |
| Cr.2 | Response Data 1 | W2 | — | — |
| Cr.3 | Response Data 2 | W3 | — | — |

5) **Wr** Word Input Area

| Wr.n Word Input | Information | Master Station Side Device | Slice No. | Module Name |
|------------------------|---|----------------------------|-----------|-------------|
| Wr.00 | CH1 Digital Output Value (Wr.n) | W4 | 6 | ST1AD2-V |
| Wr.01 | CH2 Digital Output Value (Wr.n+1) | W5 | | |
| Wr.02 | CH1 Digital Value (Wr.n) | W6 | 8 | ST1DA2-V |
| Wr.03 | CH2 Digital Value (Wr.n+1) | W7 | | |

6) **Bw** Bit Output Area

| Bw.n Bit Output | Information | Master Station Side Device | Slice No. | Module Name |
|------------------------|--------------------------------|----------------------------|-----------|-------------|
| Bw.00 | System Area (0 fixed) | B1000 | 0 | ST1H-PB |
| Bw.01 | System Area (0 fixed) | B1001 | | |
| Bw.02 | System Area (0 fixed) | B1002 | 1 | |
| Bw.03 | Command request | B1003 | | |
| Bw.04 | System Area (0 fixed) | B1004 | 2 | ST1PSD |
| Bw.05 | System Area (0 fixed) | B1005 | | |
| Bw.06 | System Area (0 fixed) | B1006 | 3 | ST1X2-DE1 |
| Bw.07 | System Area (0 fixed) | B1007 | | |
| Bw.08 | Output status (first point) | B1008 | 4 | ST1Y2-TE2 |
| Bw.09 | Output status (second point) | B1009 | | |
| Bw.0A | System Area (0 fixed) | B100A | 5 | ST1PDD |
| Bw.0B | System Area (0 fixed) | B100B | | |
| Bw.0C | System Area (0 fixed) | B100C | 6 | ST1AD2-V |
| Bw.0D | Convert setting request | B100D | | |
| Bw.0E | System Area (0 fixed) | B100E | 7 | |
| Bw.0F | System Area (0 fixed) | B100F | | |
| Bw.10 | System Area (0 fixed) | B1010 | 8 | ST1DA2-V |
| Bw.11 | Convert setting request | B1011 | | |
| Bw.12 | CH1 output enable/disable flag | B1012 | 9 | |
| Bw.13 | CH2 output enable/disable flag | B1013 | | |
| Bw.14 | — | B1014 | — | — |
| to | | | | |
| Bw.1F | — | B101F | — | — |

7) **Ew** Error Clear Area

| Ew.n Error Clear | Information | Master Station Side Device | Slice No. | Module Name |
|-------------------------|-----------------------|----------------------------|-----------|-------------|
| Ew.00 | Error Clear Request | B1020 | 0 | ST1H-PB |
| Ew.01 | System Area (0 fixed) | B1021 | | |
| Ew.02 | System Area (0 fixed) | B1022 | 1 | |
| Ew.03 | System Area (0 fixed) | B1023 | | |
| Ew.04 | Error Clear Request | B1024 | 2 | ST1PSD |
| Ew.05 | System Area (0 fixed) | B1025 | | |
| Ew.06 | Error Clear Request | B1026 | 3 | ST1X2-DE1 |
| Ew.07 | System Area (0 fixed) | B1027 | | |
| Ew.08 | Error Clear Request | B1028 | 4 | ST1Y2-TE2 |
| Ew.09 | System Area (0 fixed) | B1029 | | |
| Ew.0A | Error Clear Request | B102A | 5 | ST1PDD |
| Ew.0B | System Area (0 fixed) | B102B | | |
| Ew.0C | Error Clear Request | B102C | 6 | ST1AD2-V |
| Ew.0D | System Area (0 fixed) | B102D | | |
| Ew.0E | System Area (0 fixed) | B102E | 7 | |
| Ew.0F | System Area (0 fixed) | B102F | | |
| Ew.10 | Error Clear Request | B1030 | 8 | ST1DA2-V |
| Ew.11 | System Area (0 fixed) | B1031 | | |
| Ew.12 | System Area (0 fixed) | B1032 | 9 | |
| Ew.13 | System Area (0 fixed) | B1033 | | |
| Ew.14 | — | B1034 | — | — |
| to | | | | |
| Ew.1F | — | B103F | — | — |

8) **Sw** System Area

| Sw System Area | Information | Master Station Side Device | Slice No. | Module Name |
|-----------------------|-----------------------|----------------------------|-----------|-------------|
| Sw.0 | System Area (0 fixed) | B1040 to B104F | — | — |

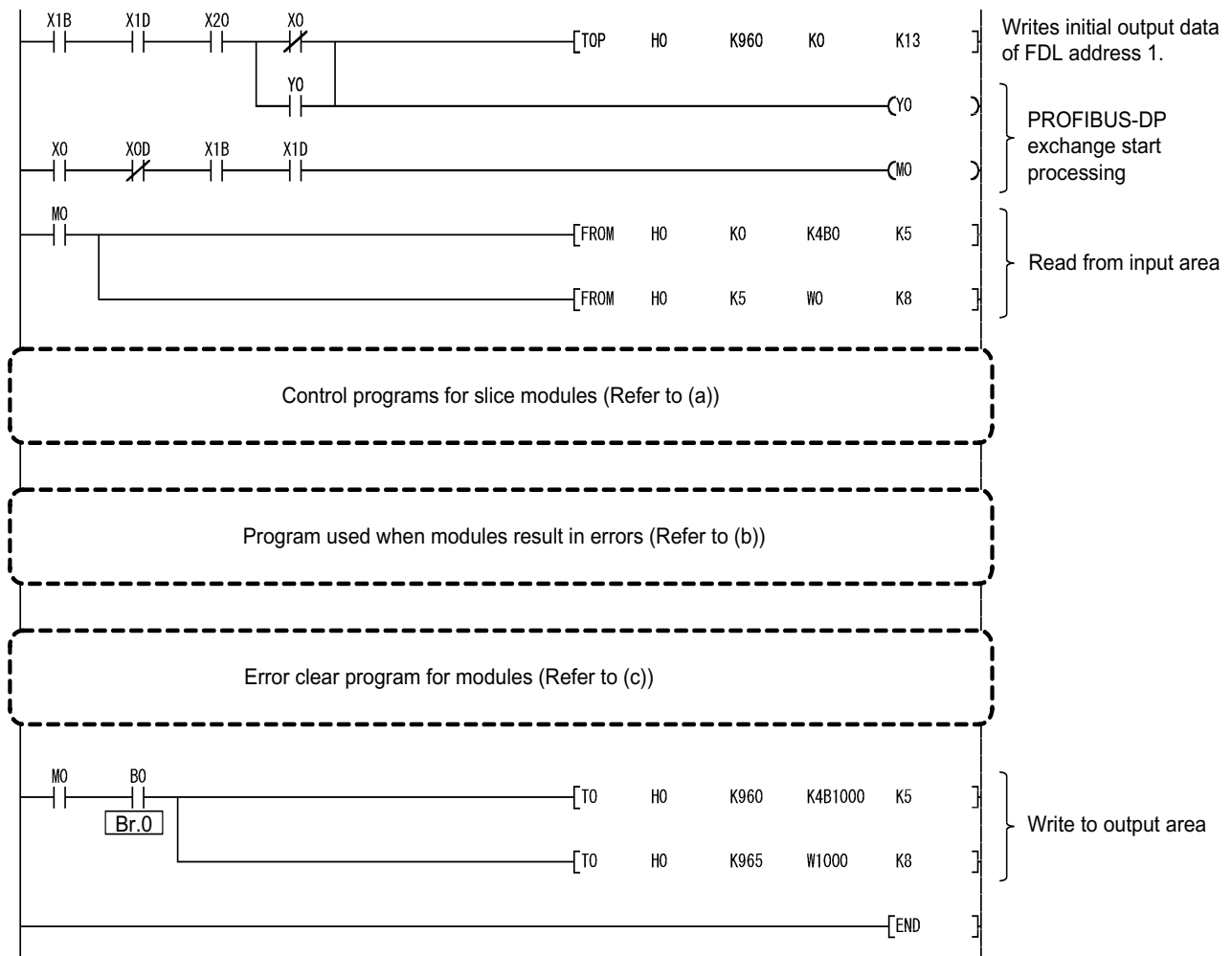
9) **Cw** Command Execution Area

| Cw Command Execution Area | Information | Master Station Side Device | Slice No. | Module Name |
|----------------------------------|-------------------------------------|----------------------------|-----------|-------------|
| Cw.0 | Start Slice No. of Execution Target | W1000 | — | — |
| Cw.1 | Command No. to be Executed | W1001 | — | — |
| Cw.2 | Argument 1 | W1002 | — | — |
| Cw.3 | Argument 2 | W1003 | — | — |

10) **Ww** Word Output Area

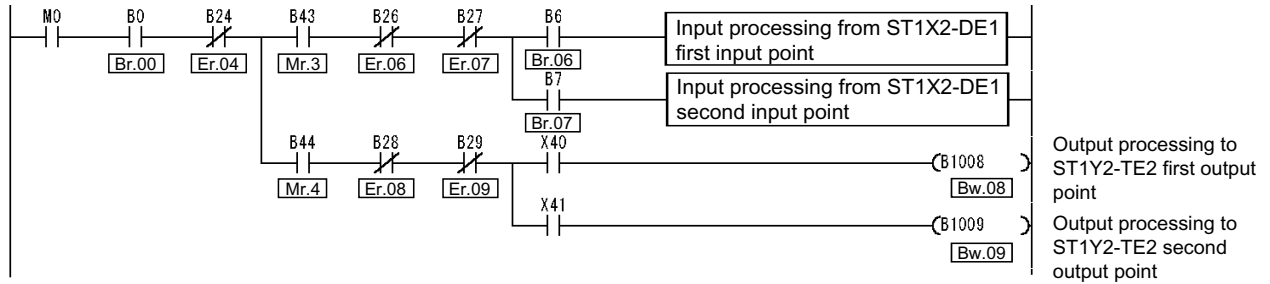
| Ww.n Word Output | Information | Master Station Side Device | Slice No. | Module Name |
|-------------------------|--|----------------------------|-----------|-------------|
| Ww.00 | System Area (0 fixed) | W1004 | 6 | ST1AD2-V |
| Ww.01 | System Area (0 fixed) | W1005 | | |
| Ww.02 | CH1 digital value setting (Ww.n) | W1006 | 8 | ST1DA2-V |
| Ww.03 | CH2 digital value setting (Ww.n+1) | W1007 | | |

(5) Program example

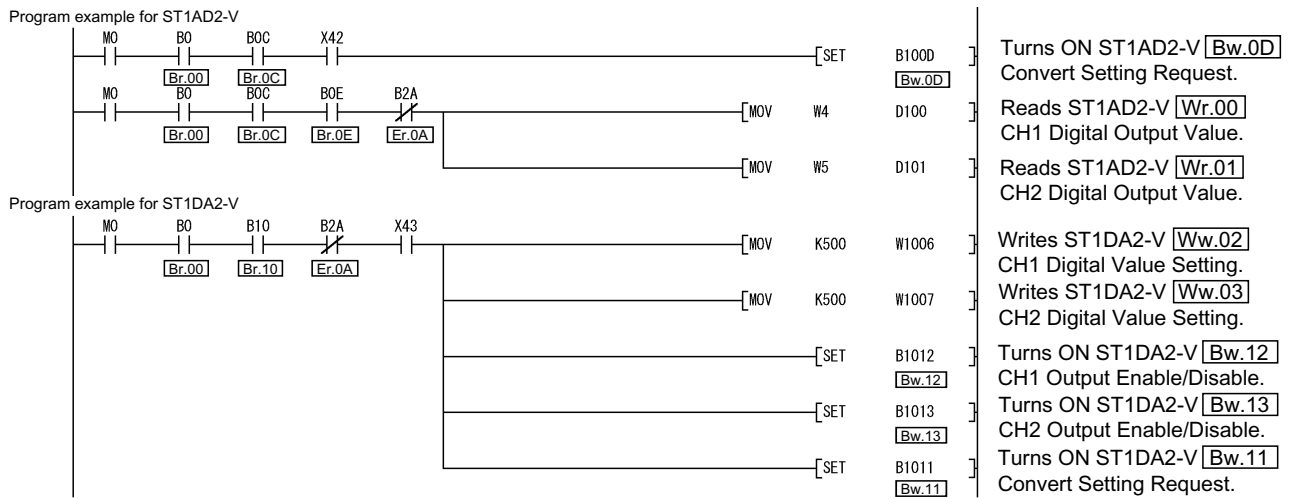


(a) Control program examples for slice modules

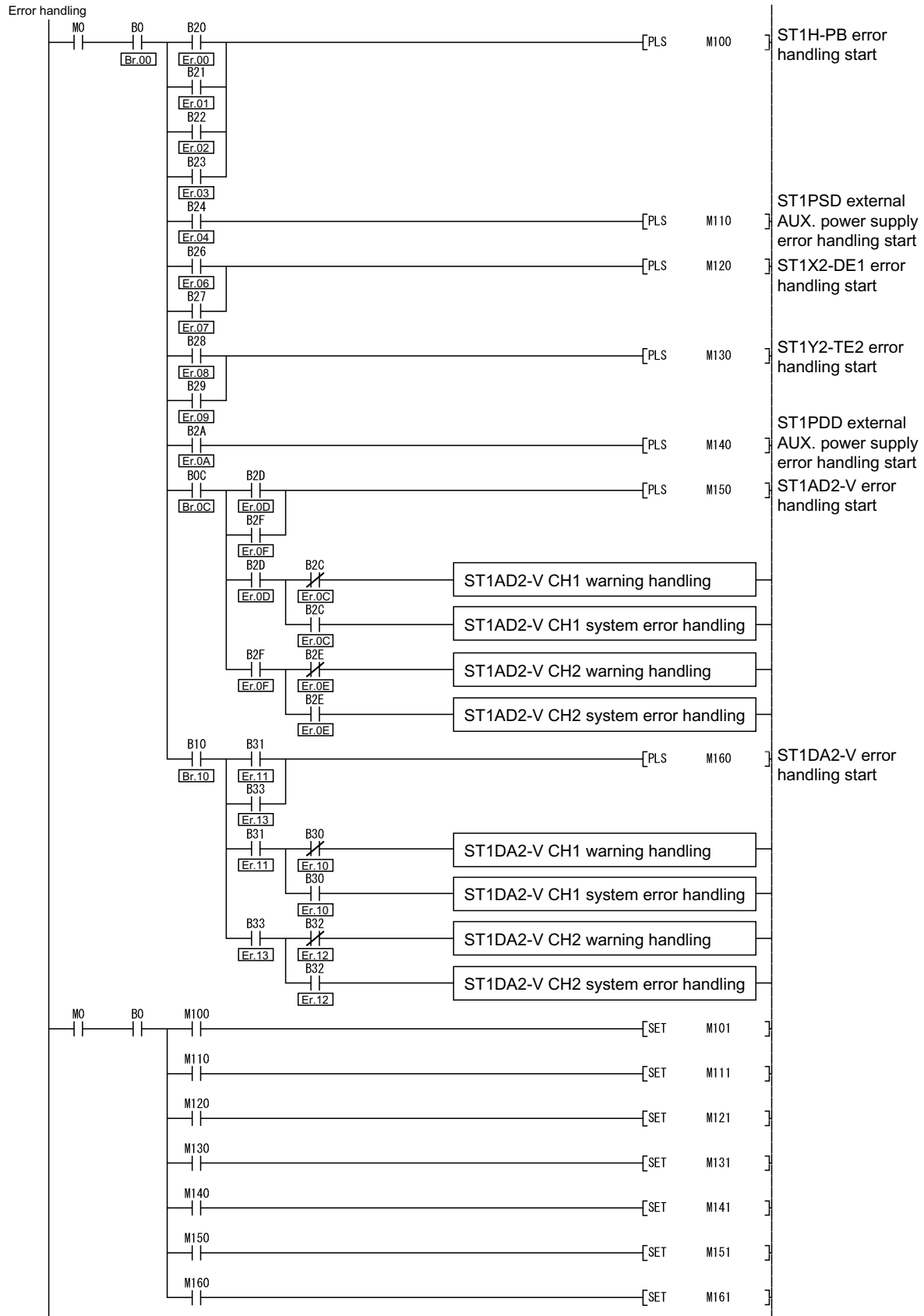
1) Program example for input module (ST1X2-DE1) and output module (ST1Y2-TE2)



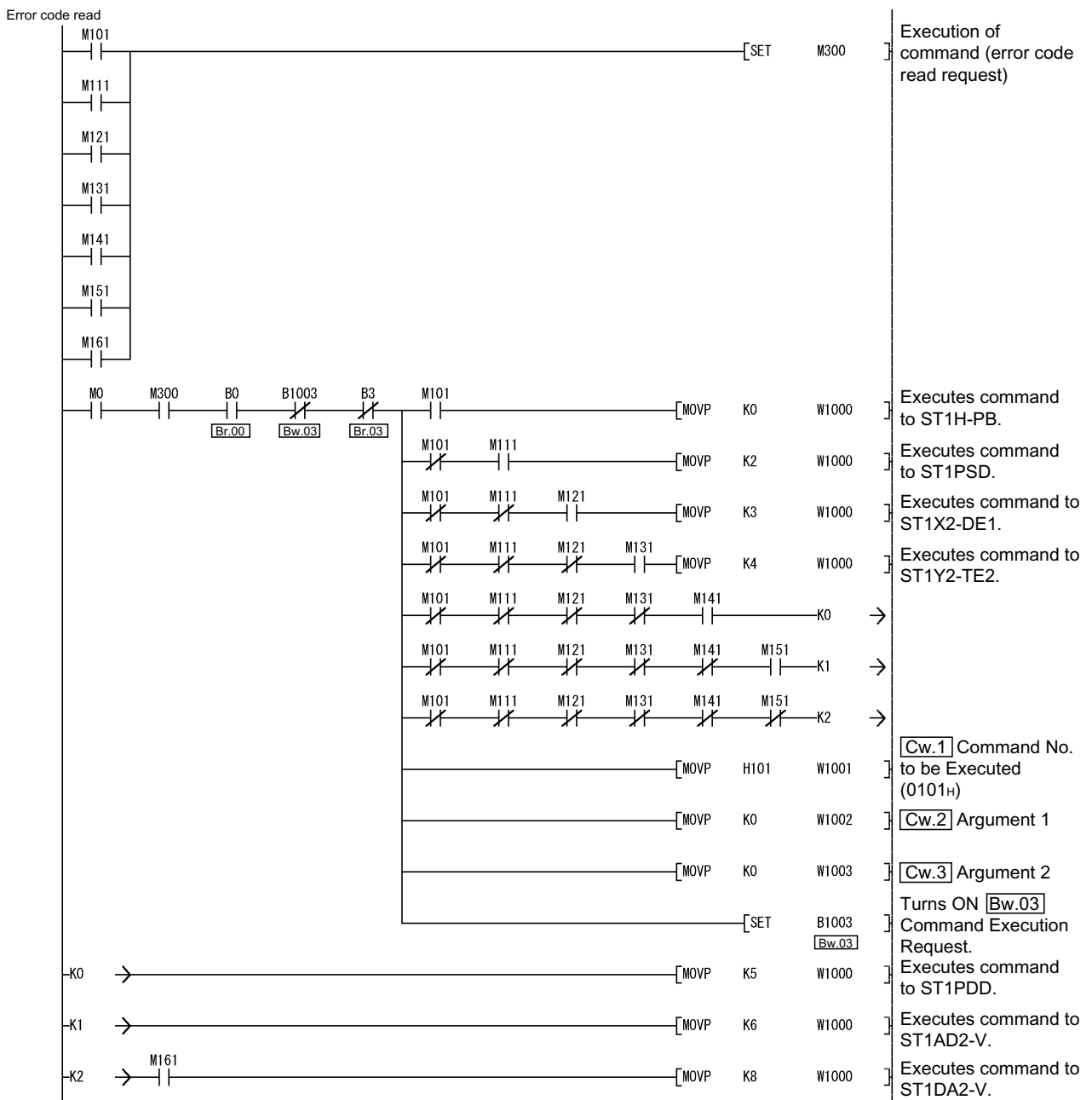
2) Program example for intelligent function modules (ST1AD2-V, ST1DA2-V)



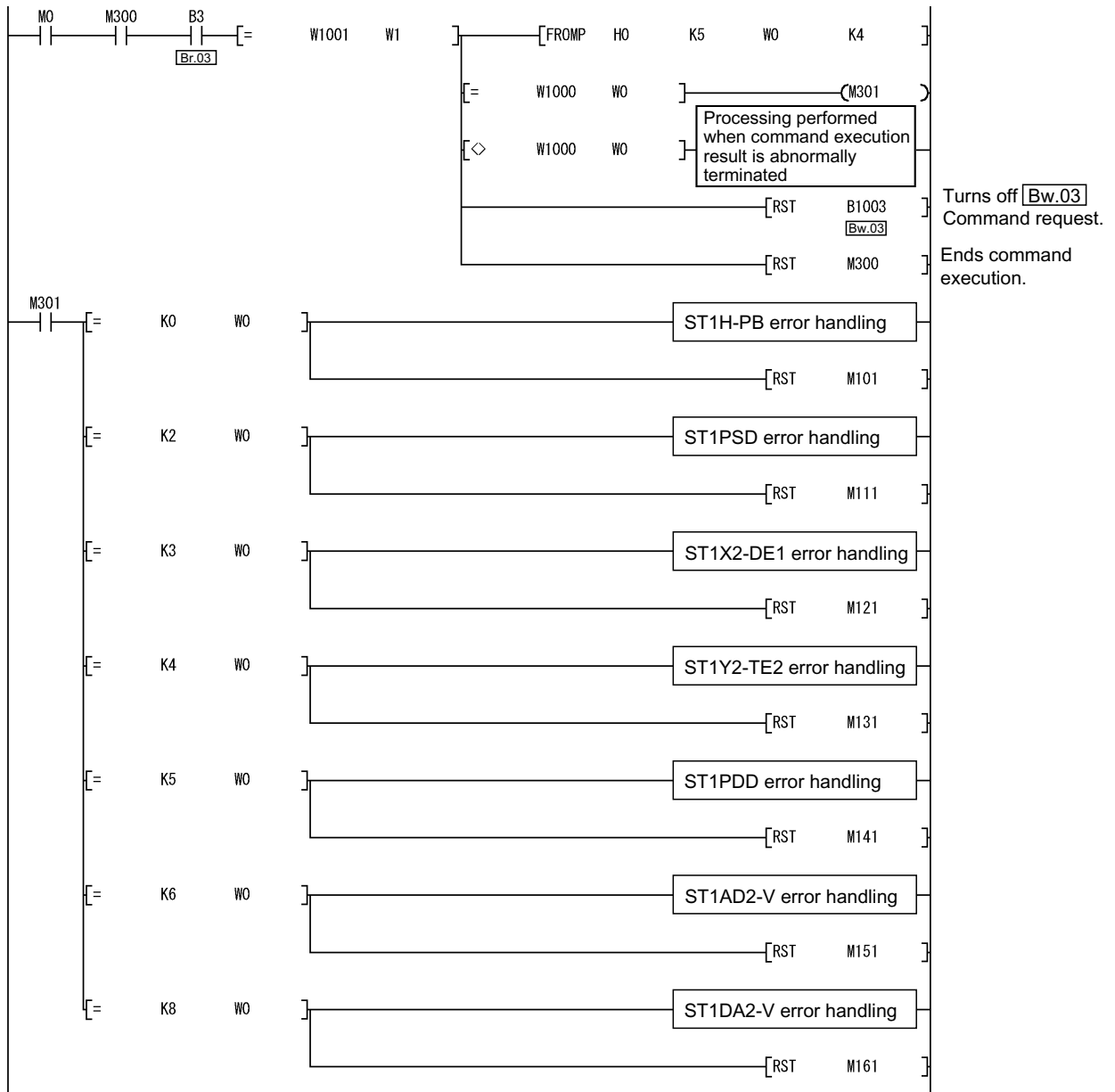
(b) Program example used when modules result in errors



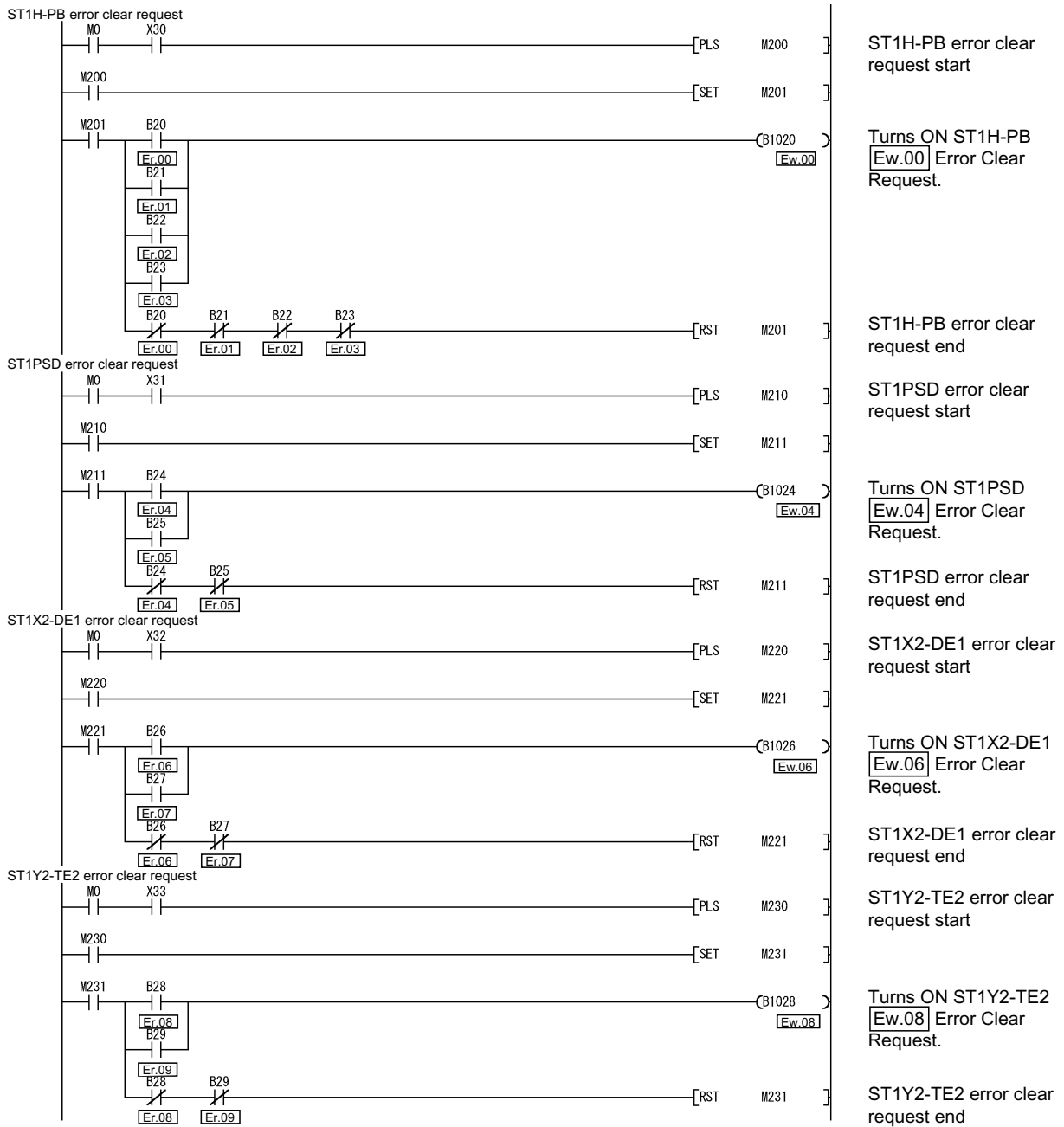
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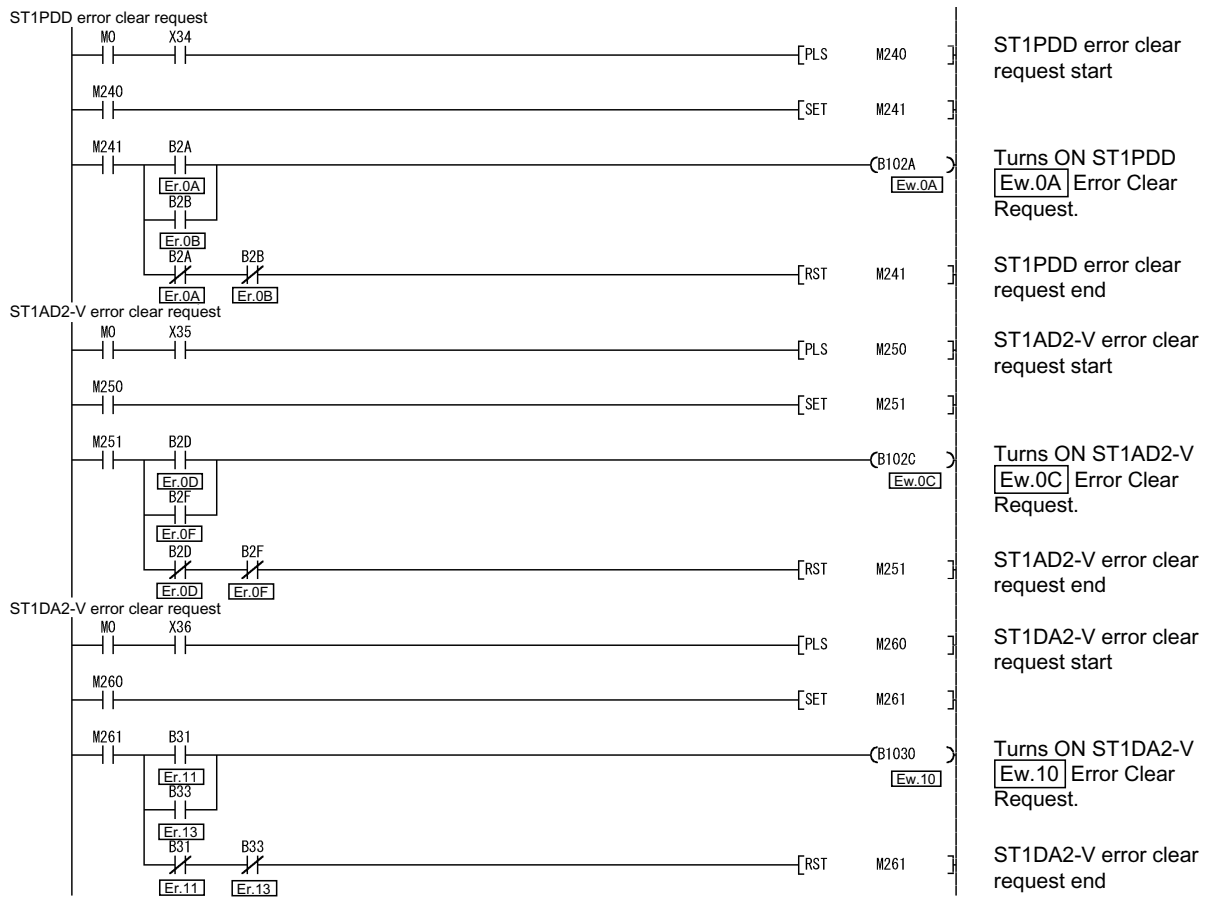
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(c) Error clear program for modules



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8 COMMANDS

This chapter explains the commands executed in the head module and slice modules.

8.1 Command Overview

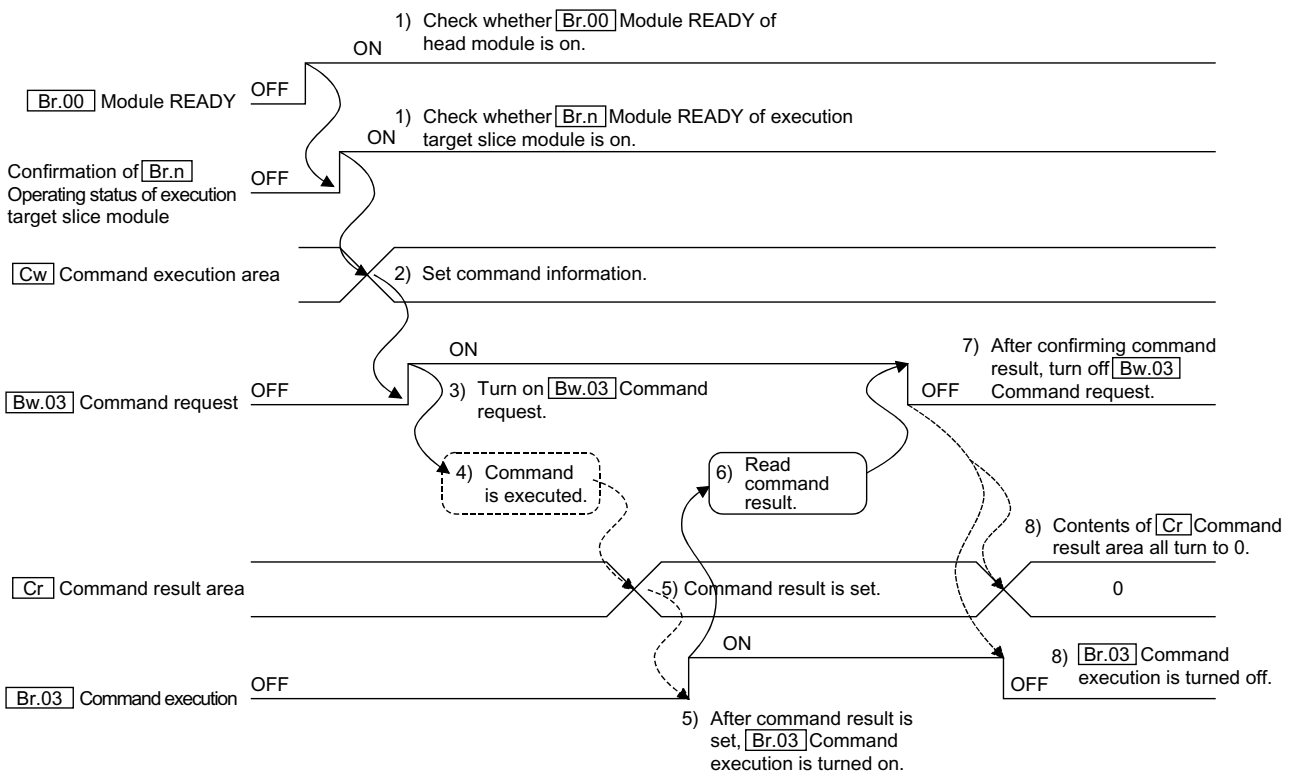
By sending a command from the master station to the head module, the operating status or error code of the head module can be read and the command parameters of the intelligent function module can be set.

(1) Procedure for using command

Use a command in the following procedure.

- 1) Before executing a command, check that the **Br.00** Module READY and the operating status of target slice module **Br.n** are on.
- 2) After confirmation, write the command to the **Cw** Command execution area of the output image assigned to the head module. *1
- 3) Turn on **Bw.03** Command request assigned to the **Bw** Bit output area of the head module.
- 4) The command is executed in the head module and/or corresponding module.
- 5) The command execution result is stored into the **Cr** Command Result Area, and **Br.03** Command Execution assigned to the **Br** Bit Input Area of the head module is turned ON.
- 6) Read the result stored in the **Cr** Command result area.
- 7) After reading the result from the **Cr** Command result area, turn off **Bw.03** Command request.
- 8) When **Bw.03** Command request is turned off, **Br.03** Command execution turns off and the contents of the **Cr** Command result area all turn to 0 automatically.

*1: When the command to be executed is the same as the previous one, it is not necessary to write the command information to the **Cw** Command execution area again.



<**Cr** Command result area>

| | |
|--|--|
| b15 | b8 b7 b0 |
| Cr.0(15-8) Command execution result | Cr.0(7-0) Start slice No. of execution target |
| Cr.1 Executed command No. | |
| Cr.2 Response data 1 | |
| Cr.3 Response data 2 | |

<**Cw** Command execution area>

| | |
|---|----|
| b15 | b0 |
| Cw.0 Start slice No. of execution target | |
| Cw.1 Command No. to be executed | |
| Cw.2 Argument 1 | |
| Cw.3 Argument 2 | |

(2) Precautions for command execution

- (a) When the head module is in the self-diagnostics operation mode, the command cannot be executed for the corresponding module.
- (b) When a slice module is being replaced online (when the REL. LED is on), the command cannot be executed for the slice module.
- (c) While a command is being executed, other command is not executable. Also, a command can be executed for only one module.

When executing the same command for multiple modules or executing several kinds of commands, provide an interlock in the program using **Br.03** Command execution and **Bw.03** Command request as shown below.

<Example>

Executing 2 commands (Commands 1 and 2) consecutively

- 1) Confirm that **Br.03** Command execution and **Bw.03** Command request are off. (Interlock for other commands)
 - 2) Write the command information of Command 1 to **Cw** Command execution area.
 - 3) Turn on **Bw.03** Command request.
 - 4) After **Br.03** Command execution turns on, read the result of Command 1 from **Cr** Command result area.
 - 5) Turn off **Bw.03** Command request.
-
- 6) Confirm that **Br.03** Command execution and **Bw.03** Command request are off. (Interlock for other commands)
 - 7) Write the command information of Command 2 to **Cw** Command execution area.
 - 8) Turn on **Bw.03** Command request.
 - 9) After **Br.03** Command execution turns on, read the result of Command 2 from **Cr** Command result area.
 - 10) Turn off **Bw.03** Command request.

Processing of
Command 1

Processing of
Command 2

If a command is executed without any interlock, the following status will be generated.

- 1) When turning off **Bw.03** Command request before completion of the command:
 - **Br.03** Command execution does not turn on.
 - The command result is not stored in **Cr** Command result area.
 - The command requested once may be executed.
- 2) When executing a command inadvertently during execution of other command:

The command is executed based on the information written in **Cw** Command execution area at the time that **Bw.03** Command request turns on.

8.2 Commands

This section explains the commands for the head module, power distribution module and I/O modules.

(1) Command list

The following table lists the commands that can be sent from the master station.

| Command No. | Command name/classification | Description | Target module | Reference section |
|----------------|---|--|--|-------------------|
| 0100H | Operating status read request | Reads the operating status of the head module and each slice module. | Head module Bus refreshing module Power feeding module Input module Output module Intelligent function module | Section 8.2.1 *1 |
| 0101H | Error code read request | Reads the error code of the head module and each slice module. | Head module Bus refreshing module Power feeding module Input module Output module Intelligent function module | Section 8.2.2 *1 |
| 0102H | Error history read request | Reads the error history of the head module. | Head module | Section 8.2.3 |
| 1000H to 1□□□H | Intelligent function module parameter read command | Reads the parameters set to the intelligent function module. | Intelligent function module | *1 |
| 2000H to 2□□□H | Intelligent function module parameter write command | Writes the parameters to be set to the intelligent function module. | Intelligent function module | *1 |
| 3000H to 3□□□H | Intelligent function module control command | Controls the intelligent function module. | Intelligent function module | *1 |

*1: For the commands for the intelligent function module, refer to the manual of the intelligent function module.

(2) How to use the manual

The following shows how to use the manual between Section 8.2.1 and Section 8.2.3.

(1) Values set to **[Cw]** Command execution area
Explains the values set to the **[Cw]** Command execution area for executing command.

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8.2.3 Error history read request (Command No.: 0102H)
Reads the error history of the head module.

(1) Values set to **[Cw]** Command execution area

| [Cw] Command execution area | Set value |
|-----------------------------|---|
| [Cw.0] | Set the start slice No. (0000H) of the head module. (Hexadecimal) |
| [Cw.1] | 0102H |
| [Cw.2] | |
| [Cw.3] | 0000H-fixed (Entry of any other value will result in an error.) |

(2) Execution result of **[Cr]** Command result area
The command result area status differs depending on the result (normally terminated or abnormally terminated) in the **[Cr.0(15-8)]** Command Execution Result.

(a) When the command is normally terminated (When **[Cr.0(15-8)]** Command execution result is 00H)

| [Cr] Command result area | Result |
|--------------------------|--|
| [Cr.0] | Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below. b15 to b8 b7 to b0 [Cr.0(15-8)] Command execution result [Cr.0(8-0)] Start slice No. of execution target ↳ 00H: Normally terminated ↳ 00H: Head module's start slice No. |
| [Cr.1] | Stores the executed command No. (0102H). (Hexadecimal) |
| [Cr.2] | Stores the error code of the latest error that occurred in the head module. (Hexadecimal) 0000H is stored when the module is normal. Refer to Section 9.2.2 for details of the error code. |
| [Cr.3] | Stores the error code of the second error from the last that occurred in the head module. (Hexadecimal) Refer to Section 9.2.2 for details of the error code. |

(b) When the command is abnormally terminated (When **[Cr.0(15-8)]** Command execution result is other than 00H)

| [Cr] Command result area | Result |
|--------------------------|--|
| [Cr.0] | Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below. b15 to b8 b7 to b0 [Cr.0(15-8)] Command execution result [Cr.0(8-0)] Start slice No. of execution target ↳ Other than 00H: Abnormally terminated (Refer to Section 8.4) ↳ 00H: Head module's start slice No. |
| [Cr.1] | Stores the executed command No. (0102H). (Hexadecimal) |
| [Cr.2] | Stores the [Cw.2] Argument 1 at command execution. |
| [Cr.3] | Stores the [Cw.3] Argument 2 at command execution. |

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(2) Execution result of **[Cr]** Command result area
Explains the values stored into the **[Cr]** Command result area after execution of the command.

8.2.1 Operating status read request (Command No.: 0100H)

Reads the operating status of the head module, power distribution module or I/O module.

(1) Values set to **Cw** Command execution area

The same values must be written for the head module, power distribution module or I/O module except for **Cw.0**.

| Cw Command execution area | Set value |
|----------------------------------|---|
| Cw.0 | Set the start slice No. of the module for which the command will be executed. (Hexadecimal) |
| Cw.1 | 0100H |
| Cw.2 | 0000H fixed (Any other value is ignored.) |
| Cw.3 | |

(2) Execution result of **Cr** Command result area

The command result area status differs depending on the result (normally terminated or abnormally terminated) in the **Cr.0(15-8)** Command Execution Result.

(a) When the command is executed for the head module

1) When the command is normally terminated (When **Cr.0(15-8)** Command execution result is 00H)

| Cr Command result area | Result | | | | | | | | | | | | | | | | |
|--|---|--|------|-----|----|------|------|--|------|--|----|----------------|----------------|----------------|----------------|---------------|---------------|
| Cr.0 | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <p>b15 to b8 b7 to b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="8">Cr.0(15-8) Command execution result</td> <td colspan="8">Cr.0(7-0) Start slice No. of execution target</td> </tr> </table> <p>→ 00H: Normally terminated → 00H: Head module's start slice No.</p> | Cr.0(15-8) Command execution result | | | | | | | | Cr.0(7-0) Start slice No. of execution target | | | | | | | |
| Cr.0(15-8) Command execution result | | | | | | | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | |
| Cr.1 | Stores the executed command No. (0100H). (Hexadecimal) | | | | | | | | | | | | | | | | |
| Cr.2 | <p>Stores the LED statuses of the head module into the high byte, and the setting status of the maximum input/output points into the low byte.</p> <p>b15 b14 b13 b12 b11 b10 b9 b8 b7 b6 b5 b4 b3 b2 b1 b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>ERR.</td><td>REL.</td><td>DIA</td><td>BF</td><td>0</td><td>0</td><td>SYN.</td><td>FRE.</td><td>0</td><td>0</td><td>0</td><td>0</td><td>256-point mode</td><td>128-point mode</td><td>64-point mode</td><td>32-point mode</td> </tr> </table> <p>→ 0: Off 1: On</p> <p>→ I/O data consistency setting 0: Whole (-whole consistent) 1: Word unit (-word consistent)</p> <p>→ 0: Not set 1: Set</p> | ERR. | REL. | DIA | BF | 0 | 0 | SYN. | FRE. | 0 | 0 | 0 | 0 | 256-point mode | 128-point mode | 64-point mode | 32-point mode |
| ERR. | REL. | DIA | BF | 0 | 0 | SYN. | FRE. | 0 | 0 | 0 | 0 | 256-point mode | 128-point mode | 64-point mode | 32-point mode | | |
| Cr.3 | <p>Stores the settings of the head module's user parameters.</p> <p>b15 to b5 b4 b3 b2 b1 b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="5">0</td> <td>5)</td><td>4)</td><td>3)</td><td>2)</td><td>1)</td> </tr> </table> <p>1) Output status at module error 0: Stop 1: Continue</p> <p>2) Ext_Diag Information 0: Disable 1: Enable</p> <p>3) Swap of Input/Output Data 0: Disable 1: Enable</p> <p>4) Swap of Ext_Diag Information 0: Disable 1: Enable</p> <p>5) Consistency Function 0: Disable 1: Enable</p> | 0 | | | | | 5) | 4) | 3) | 2) | 1) | | | | | | |
| 0 | | | | | 5) | 4) | 3) | 2) | 1) | | | | | | | | |

2) When the command is abnormally terminated (When **Cr.0(15-8)** Command execution result is other than 00H)

| Cr Command result area | Result | | | | | | | | | | | | | | | | |
|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Cr.0 | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <p>b15 to b8 b7 to b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="8">Cr.0(15-8) Command execution result</td> <td colspan="8">Cr.0(7-0) Start slice No. of execution target</td> </tr> </table> <p>→ Other than 00H: Abnormally terminated (Refer to Section 8.4) → 00H: Head module's start slice No.</p> | Cr.0(15-8) Command execution result | | | | | | | | Cr.0(7-0) Start slice No. of execution target | | | | | | | |
| Cr.0(15-8) Command execution result | | | | | | | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | |
| Cr.1 | Stores the executed command No. (0100H). (Hexadecimal) | | | | | | | | | | | | | | | | |
| Cr.2 | Stores the Cw.2 Argument 1 at command execution. | | | | | | | | | | | | | | | | |
| Cr.3 | Stores the Cw.3 Argument 2 at command execution. | | | | | | | | | | | | | | | | |

(b) When the command is executed for the power distribution module or I/O module

- 1) When the command is normally terminated (When Cr.0(15-8) Command execution result is 00_H)

| Cr Command result area | Result | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|---|----|----|----|----|----|---|---|---|---|--|----|--|-----|----|----|----|----|----|----|----|----|---|--|----|---|--|----|----|--|-----|----|-----|----|----|----|----|----|----|---|--|----|----|---|--|----|--|-----|----|-----|----|----|----|----|----|----|---|--|----|---|---|--|----|--|
| Cr.0 | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; text-align: center;">Cr.0(15-8) Command execution result</td> <td colspan="4" style="border: 1px solid black; text-align: center;">Cr.0(7-0) Start slice No. of execution target</td> </tr> </table> <p style="margin-left: 40px;">→ 00_H: Normally terminated</p> | b15 | to | b8 | b7 | to | b0 | Cr.0(15-8) Command execution result | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b15 | to | b8 | b7 | to | b0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cr.0(15-8) Command execution result | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cr.1 | <p>Stores the executed command No. (0100_H). (Hexadecimal)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cr.2 | <p>Stores the operating status of the slice module for which the command was executed. Stores a minor error into the high byte, and a major error into the low byte.</p> <p><For input module></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b1</td> <td style="text-align: center;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td colspan="2" style="border: 1px solid black; text-align: center;">1)</td> </tr> </table> <p style="margin-left: 40px;">1) 0: Normal 1: Hardware fault</p> <p><For output module></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b9</td> <td style="text-align: center;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b2</td> <td style="text-align: center;">b1</td> <td style="text-align: center;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td style="border: 1px solid black; text-align: center;">3)</td> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td style="border: 1px solid black; text-align: center;">2)</td> <td colspan="2" style="border: 1px solid black; text-align: center;">1)</td> </tr> </table> <p style="margin-left: 40px;">1) 0: Normal 1: Hardware fault 2) 0: Fuse not blown 1: Fuse blown 3) 0: Protective function inactive/not provided 1: Protective function active</p> <p><For bus refreshing module></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b10</td> <td style="text-align: center;">b9</td> <td style="text-align: center;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b1</td> <td style="text-align: center;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td style="border: 1px solid black; text-align: center;">3)</td> <td style="border: 1px solid black; text-align: center;">2)</td> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td colspan="2" style="border: 1px solid black; text-align: center;">1)</td> </tr> </table> <p style="margin-left: 40px;">1) 0: Normal 1: Hardware fault 2) 0: External SYS. power supply normal 1: External SYS. power supply low 3) 0: External AUX. power supply normal 1: External AUX. power supply low</p> <p><For power feeding module></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b10</td> <td style="text-align: center;">b9</td> <td style="text-align: center;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: center;">b1</td> <td style="text-align: center;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td style="border: 1px solid black; text-align: center;">2)</td> <td style="border: 1px solid black; text-align: center;">0</td> <td colspan="2" style="border: 1px solid black; text-align: center;">0</td> <td colspan="2" style="border: 1px solid black; text-align: center;">1)</td> </tr> </table> <p style="margin-left: 40px;">1) 0: Normal 1: Hardware fault 2) 0: External AUX. power supply normal 1: External AUX. power supply low</p> | b15 | to | b8 | b7 | to | b1 | b0 | 0 | | 0 | | 1) | | b15 | to | b9 | b8 | b7 | to | b2 | b1 | b0 | 0 | | 3) | 0 | | 2) | 1) | | b15 | to | b10 | b9 | b8 | b7 | to | b1 | b0 | 0 | | 3) | 2) | 0 | | 1) | | b15 | to | b10 | b9 | b8 | b7 | to | b1 | b0 | 0 | | 2) | 0 | 0 | | 1) | |
| b15 | to | b8 | b7 | to | b1 | b0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | | 0 | | 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b15 | to | b9 | b8 | b7 | to | b2 | b1 | b0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | | 3) | 0 | | 2) | 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b15 | to | b10 | b9 | b8 | b7 | to | b1 | b0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | | 3) | 2) | 0 | | 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| b15 | to | b10 | b9 | b8 | b7 | to | b1 | b0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | | 2) | 0 | 0 | | 1) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

(To next page)

| [Cr] Command result area | Result | | | | | | | | | | | | | | | | |
|--------------------------|---|---|--|----|---|----|---|---|--|--|--|----|---|---|---|---|--|
| [Cr.3] | <p>Stores the user parameter settings of the slice module for which the command was executed.</p> <p><For input module></p> <p>b15 to b3 b2 to b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="4">0</td> <td colspan="2">1)</td> </tr> </table> <p>1) Filter constant 0H: 1.5ms 1H: 0.5ms</p> <p><For output module></p> <p>b15 to b4 b3 b2 b1 b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="4">0</td> <td>1)</td> <td>1</td> <td>1</td> <td>1</td> </tr> </table> <p>1) Output status Clear/Hold setting 0: CLEAR 1: HOLD</p> <p><For bus refreshing module, power feeding module></p> <p>b15 to b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td colspan="2">0</td> </tr> </table> | 0 | | | | 1) | | 0 | | | | 1) | 1 | 1 | 1 | 0 | |
| 0 | | | | 1) | | | | | | | | | | | | | |
| 0 | | | | 1) | 1 | 1 | 1 | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | | | | |

2) When the command is abnormally terminated (When [Cr.0(15-8)] Command execution result is other than 00H)

| [Cr] Command result area | Result | | |
|---------------------------------------|--|---------------------------------------|--|
| [Cr.0] | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <p>b15 to b8 b7 to b0</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>[Cr.0(15-8)] Command execution result</td> <td>[Cr.0(7-0)] Start slice No. of execution target *1</td> </tr> </table> <p style="text-align: center;"> Other than 00H: Abnormally terminated (Refer to Section 8.4) </p> <p>* 1: When 0FH is stored into the [Cr.0(15-8)] Command Execution Result, 00H (start slice No. of head module) is stored into the [Cr.0(7-0)] Start Slice No. of Execution Target.</p> | [Cr.0(15-8)] Command execution result | [Cr.0(7-0)] Start slice No. of execution target *1 |
| [Cr.0(15-8)] Command execution result | [Cr.0(7-0)] Start slice No. of execution target *1 | | |
| [Cr.1] | Stores the executed command No. (0100H). (Hexadecimal) | | |
| [Cr.2] | Stores the [Cw.2] Argument 1 at command execution. | | |
| [Cr.3] | Stores the [Cw.3] Argument 2 at command execution. | | |

8.2.2 Error code read request (Command No.: 0101H)

Reads the error code of the head module, power distribution module or I/O module.

(1) Values set to **Cw** Command execution area

The same values must be written for the head module, power distribution module or I/O module except for **Cw.0**.

| Cw Command execution area | Set value |
|----------------------------------|---|
| Cw.0 | Set the start slice No. of the module for which the command will be executed. (Hexadecimal) |
| Cw.1 | 0101H |
| Cw.2 | 0000H fixed (Any other value is ignored.) |
| Cw.3 | |

(2) Execution result of [Cr] Command result area

The command result area status differs depending on the result (normally terminated or abnormally terminated) in the [Cr.0(15-8)] Command Execution Result.

(a) When the command is executed for the head module

1) When the command is normally terminated (When [Cr.0(15-8)] Command execution result is 00H)

| [Cr] Command result area | Result |
|--------------------------|--|
| [Cr.0] | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <p>b15 to b8 b7 to b0</p> <p>[Cr.0(15-8)] Command execution result [Cr.0(7-0)] Start slice No. of execution target</p> <p>00H: Normally terminated 00H: Head module's start slice No.</p> |
| [Cr.1] | Stores the executed command No. (0101H). (Hexadecimal) |
| [Cr.2] | Stores the error code of the error currently occurring in the head module. (Hexadecimal) 0000H is stored when the module is normal. Refer to Section 9.2.2 for details of the error code. |
| [Cr.3] | 0000H |

2) When the command is abnormally terminated (When [Cr.0(15-8)] Command execution result is other than 00H)

| [Cr] Command result area | Result |
|--------------------------|--|
| [Cr.0] | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <p>b15 to b8 b7 to b0</p> <p>[Cr.0(15-8)] Command execution result [Cr.0(7-0)] Start slice No. of execution target</p> <p>Other than 00H: Abnormally terminated (Refer to Section 8.4) 00H: Head module's start slice No.</p> |
| [Cr.1] | Stores the executed command No. (0101H). (Hexadecimal) |
| [Cr.2] | Stores the [Cw.2] Argument 1 at command execution. |
| [Cr.3] | Stores the [Cw.3] Argument 2 at command execution. |

- (b) When the command is executed for the power distribution module or I/O module
 - 1) When the command is normally terminated (When Cr.0(15-8) Command execution result is 00_H)

| Cr Command result area | Result | | | | | | | | | | | | | | | | | | |
|---|---|---|---|----|---|----|---|----|----|---|----|----|---|----|---|----|---|---|----|
| Cr.0 | Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below. <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> b15 to b8 b7 to b0 </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 50%; text-align: center;">Cr.0(15-8) Command execution result</td> <td style="width: 50%; text-align: center;">Cr.0(7-0) Start slice No. of execution target</td> </tr> </table> <div style="margin-left: 40px;"> <p>00_H: Normally terminated</p> </div> | Cr.0(15-8) Command execution result | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | |
| Cr.0(15-8) Command execution result | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | | | |
| Cr.1 | Stores the executed command No. (0101 _H). (Hexadecimal) | | | | | | | | | | | | | | | | | | |
| Cr.2 | Stores the operating status of the slice module for which the command was executed. <For input module> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> b15 to b8 b7 to b1 b0 </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 50%; text-align: center;">0</td> <td style="width: 25%; text-align: center;">0</td> <td style="width: 25%; text-align: center;">1)</td> </tr> </table> <div style="margin-left: 40px;"> 1) 0: Normal 1: Hardware fault </div> <For output module> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> b15 to b9 b8 b7 to b2 b1 b0 </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 33%; text-align: center;">0</td> <td style="width: 33%; text-align: center;">3)</td> <td style="width: 16%; text-align: center;">0</td> <td style="width: 16%; text-align: center;">2)</td> <td style="width: 4%; text-align: center;">1)</td> </tr> </table> <div style="margin-left: 40px;"> 1) 0: Normal 1: Hardware fault 2) 0: Fuse not blown 1: Fuse blown 3) 0: Protective function inactive/not provided 1: Protective function active </div> <For bus refreshing module> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> b15 to b10 b9 b8 b7 to b1 b0 </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 33%; text-align: center;">0</td> <td style="width: 16%; text-align: center;">3)</td> <td style="width: 16%; text-align: center;">2)</td> <td style="width: 33%; text-align: center;">0</td> <td style="width: 4%; text-align: center;">1)</td> </tr> </table> <div style="margin-left: 40px;"> 1) 0: Normal 1: Hardware fault 2) 0: External SYS. power supply normal 1: External SYS. power supply low 3) 0: External AUX. power supply normal 1: External AUX. power supply low </div> <For power feeding module> <div style="display: flex; justify-content: space-between; margin-bottom: 5px;"> b15 to b10 b9 b8 b7 to b1 b0 </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 5px;"> <tr> <td style="width: 33%; text-align: center;">0</td> <td style="width: 16%; text-align: center;">2)</td> <td style="width: 16%; text-align: center;">0</td> <td style="width: 33%; text-align: center;">0</td> <td style="width: 4%; text-align: center;">1)</td> </tr> </table> <div style="margin-left: 40px;"> 1) 0: Normal 1: Hardware fault 2) 0: External AUX. power supply normal 1: External AUX. power supply low </div> | 0 | 0 | 1) | 0 | 3) | 0 | 2) | 1) | 0 | 3) | 2) | 0 | 1) | 0 | 2) | 0 | 0 | 1) |
| 0 | 0 | 1) | | | | | | | | | | | | | | | | | |
| 0 | 3) | 0 | 2) | 1) | | | | | | | | | | | | | | | |
| 0 | 3) | 2) | 0 | 1) | | | | | | | | | | | | | | | |
| 0 | 2) | 0 | 0 | 1) | | | | | | | | | | | | | | | |
| Cr.3 | 0000 _H | | | | | | | | | | | | | | | | | | |

- 2) When the command is abnormally terminated (When Cr.0(15-8) Command execution result is other than 00H)

| Cr Command result area | Result |
|--|---|
| Cr.0 | <p>Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below.</p> <p style="text-align: center;">b15 to b8 b7 to b0</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> Cr.0(15-8) Command execution result Cr.0(7-0) Start slice No. of execution target *1 </div> <p style="text-align: center;"> └─ Other than 00H : Abnormally terminated (Refer to Section 8.4) </p> <p>* 1: When 0FH is stored into the Cr.0(15-8) Command Execution Result, 00H (start slice No. of head module) is stored into the Cr.0(7-0) Start Slice No. of Execution Target.</p> |
| Cr.1 | Stores the executed command No. (0101H). (Hexadecimal) |
| Cr.2 | Stores the Cw.2 Argument 1 at command execution. |
| Cr.3 | Stores the Cw.3 Argument 2 at command execution. |

8.2.3 Error history read request (Command No.: 0102H)

Reads the error history of the head module.

(1) Values set to **Cw** Command execution area

| Cw Command execution area | Set value |
|----------------------------------|---|
| Cw.0 | Set the start slice No. (0000H) of the head module. (Hexadecimal) |
| Cw.1 | 0102H |
| Cw.2 | 0000H fixed (Entry of any other value will result in an error.) |
| Cw.3 | |

(2) Execution result of **Cr** Command result area

The command result area status differs depending on the result (normally terminated or abnormally terminated) in the **Cr.0(15-8)** Command Execution Result.

- (a) When the command is normally terminated (When **Cr.0(15-8)** Command execution result is 00H)

| Cr Command result area | Result | | | | | | | | | | | | | | | | | | |
|--|---|--|----|----|----|----|----|--|--|--|--|--|--|-----------------------------|--|---------------------------------------|--|--|--|
| Cr.0 | Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below. <div style="text-align: center;"> <table style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: right;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: left;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: left;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; padding: 2px;">Cr.0(15-8) Command execution result</td> <td colspan="4" style="border: 1px solid black; padding: 2px;">Cr.0(7-0) Start slice No. of execution target</td> </tr> <tr> <td colspan="2" style="text-align: center;">└─ 00H: Normally terminated</td> <td colspan="4" style="text-align: center;">└─ 00H: Head module's start slice No.</td> </tr> </table> </div> | b15 | to | b8 | b7 | to | b0 | Cr.0(15-8) Command execution result | | Cr.0(7-0) Start slice No. of execution target | | | | └─ 00H: Normally terminated | | └─ 00H: Head module's start slice No. | | | |
| b15 | to | b8 | b7 | to | b0 | | | | | | | | | | | | | | |
| Cr.0(15-8) Command execution result | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | | |
| └─ 00H: Normally terminated | | └─ 00H: Head module's start slice No. | | | | | | | | | | | | | | | | | |
| Cr.1 | Stores the executed command No. (0102H). (Hexadecimal) | | | | | | | | | | | | | | | | | | |
| Cr.2 | Stores the error code of the latest error that occurred in the head module. (Hexadecimal) 0000H is stored when the module is normal. Refer to Section 9.2.2 for details of the error code. | | | | | | | | | | | | | | | | | | |
| Cr.3 | Stores the error code of the second error from the last that occurred in the head module. (Hexadecimal) Refer to Section 9.2.2 for details of the error code. | | | | | | | | | | | | | | | | | | |

- (b) When the command is abnormally terminated (When **Cr.0(15-8)** Command execution result is other than 00H)

| Cr Command result area | Result | | | | | | | | | | | | | | | | | | |
|---|---|--|----|----|----|----|----|--|--|--|--|--|--|---|--|---------------------------------------|--|--|--|
| Cr.0 | Stores the command execution result into the high byte, and the start slice No. of execution target into the low byte in hexadecimal as shown below. <div style="text-align: center;"> <table style="margin: auto; border-collapse: collapse;"> <tr> <td style="text-align: right;">b15</td> <td style="text-align: center;">to</td> <td style="text-align: left;">b8</td> <td style="text-align: center;">b7</td> <td style="text-align: center;">to</td> <td style="text-align: left;">b0</td> </tr> <tr> <td colspan="2" style="border: 1px solid black; padding: 2px;">Cr.0(15-8) Command execution result</td> <td colspan="4" style="border: 1px solid black; padding: 2px;">Cr.0(7-0) Start slice No. of execution target</td> </tr> <tr> <td colspan="2" style="text-align: center;">└─ Other than 00H: Abnormally terminated (Refer to Section 8.4)</td> <td colspan="4" style="text-align: center;">└─ 00H: Head module's start slice No.</td> </tr> </table> </div> | b15 | to | b8 | b7 | to | b0 | Cr.0(15-8) Command execution result | | Cr.0(7-0) Start slice No. of execution target | | | | └─ Other than 00H: Abnormally terminated (Refer to Section 8.4) | | └─ 00H: Head module's start slice No. | | | |
| b15 | to | b8 | b7 | to | b0 | | | | | | | | | | | | | | |
| Cr.0(15-8) Command execution result | | Cr.0(7-0) Start slice No. of execution target | | | | | | | | | | | | | | | | | |
| └─ Other than 00H: Abnormally terminated (Refer to Section 8.4) | | └─ 00H: Head module's start slice No. | | | | | | | | | | | | | | | | | |
| Cr.1 | Stores the executed command No. (0102H). (Hexadecimal) | | | | | | | | | | | | | | | | | | |
| Cr.2 | Stores the Cw.2 Argument 1 at command execution. | | | | | | | | | | | | | | | | | | |
| Cr.3 | Stores the Cw.3 Argument 2 at command execution. | | | | | | | | | | | | | | | | | | |

8.3 Program Examples

Program examples for commands are shown here.

The program example in this section is based on the system configuration in Section 7.1.

In this program example, the operation status read request (command No.: 0100_H) is executed for the head module (start slice No.: 0) without use of auto refresh in the QJ71PB92D.

(1) Device assignment in program example

The program example in this section uses the following device assignment.

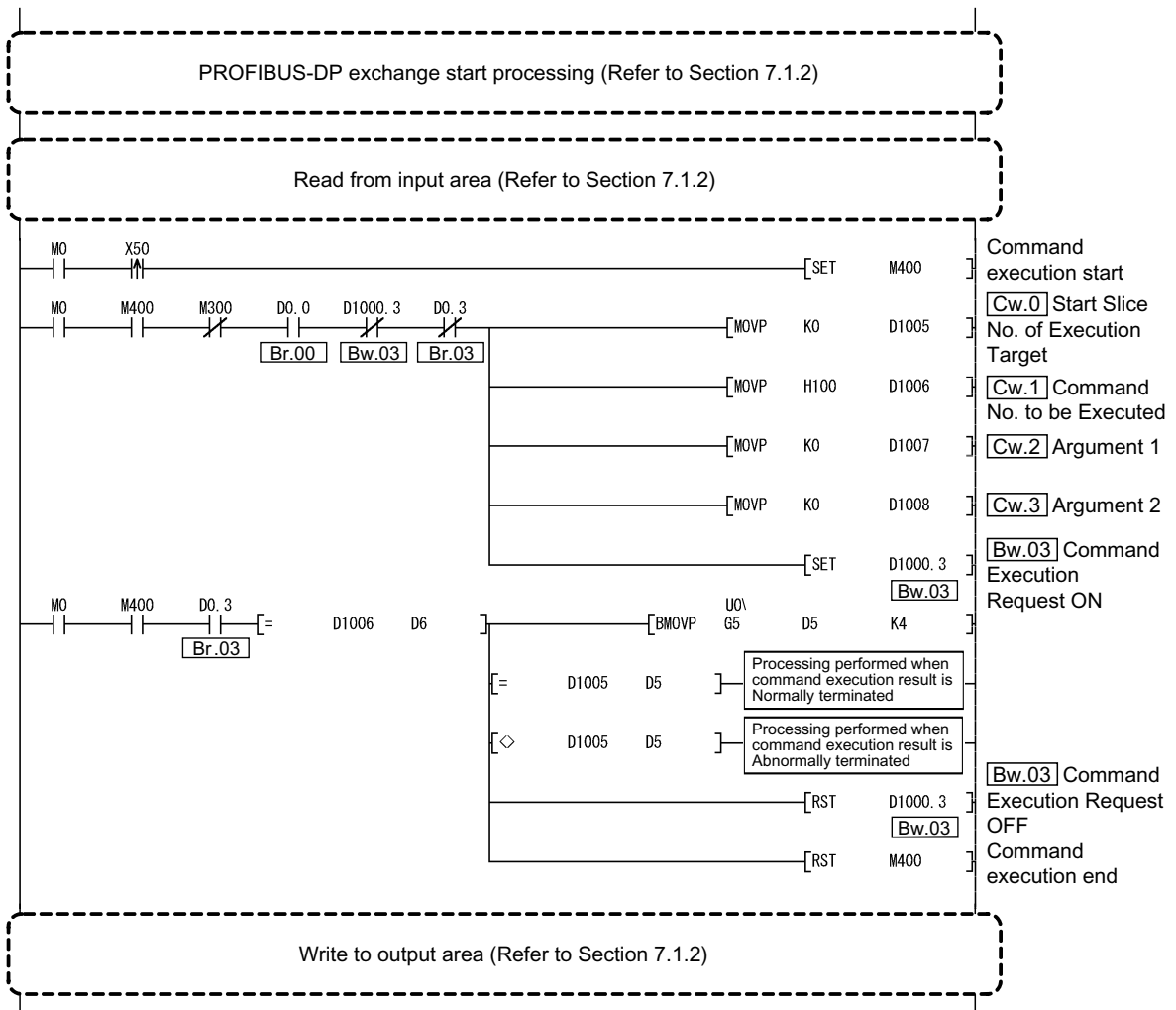
(a) Devices used by user

| Device | Application | Device | Application |
|--------|--|--------|--|
| X50 | Command execution start request signal | M0 | Refresh start request |
| | — | M300 | Command execution start flag at error occurrence (Refer to Section 7.1) |
| | | M400 | Command execution start flag |

(b) Devices used in I/O data

The devices used in the I/O data are the same as those given in Section 7.1 (4).

(2) Program example



8.4 Values Stored into Command Execution Result

The following table describes the values stored into the $\boxed{\text{Cr.0(15-8)}}$ Command execution result of the $\boxed{\text{Cr}}$ Command result area.

| $\boxed{\text{Cr.0(15-8)}}$ Command execution result | Description | Corrective action |
|--|---|--|
| 00H | Normally terminated | — |
| 01H | The requested command is not available for the specified module. | Check whether the request command is available for the module specified by the $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target. |
| 02H | The value set in $\boxed{\text{Cw.2}}$ Argument 1 or $\boxed{\text{Cw.3}}$ Argument 2 is outside the range. | Check whether the value set in $\boxed{\text{Cw.2}}$ Argument 1 or $\boxed{\text{Cw.3}}$ Argument 2 of the $\boxed{\text{Cw}}$ Command execution area is within the range available for the requested command. |
| 03H | The $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target is wrong. | Check whether the corresponding module is mounted at the $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target. Check whether $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target is the start slice No. of the corresponding module. |
| 04H | There is no response from the specified module. | Check whether the intelligent function module specified by the $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target can use the requested command. When the requested command can be used, the possible cause is an intelligent function module failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| 05H | No communication is available with the specified module. | The possible cause is a slice module failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| 06H | The requested command is not executable in the current operating status (operation mode) of the module. | Check the operating status of the head module or intelligent function module, and change the operating status so that the requested command can be executed. |
| 07H | The module has already been in the specified mode. | The operation mode of the intelligent function module specified by the $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target is already in the requested mode. Continue the specified operation mode. |
| 08H | The module cannot be changed into the specified mode. | Check the operation mode of the intelligent function module specified by the $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target, and change the status so that the mode can be set to the requested one. |
| 09H | The specified module is in the online module change status. | Execute the command after online module change is completed. |
| 0FH | The value of $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target is outside the applicable range. | Check whether the value set at $\boxed{\text{Cw.0}}$ Start Slice No. of Execution Target is within 7FH. |
| 10H | Parameters cannot be read from the specified module. | Execute the command again. If the problem still persists, the possible cause is an intelligent function module failure. |
| 11H | Parameters cannot be written to the specified module. | Please consult your local Mitsubishi representative, explaining a detailed description of the problem. |
| 13H | The specified module is not in the status available for parameter writing. | Enable parameter writing. |

9 TROUBLESHOOTING

This chapter explains corrective actions to be taken and the error codes displayed when problems occur in the head module.

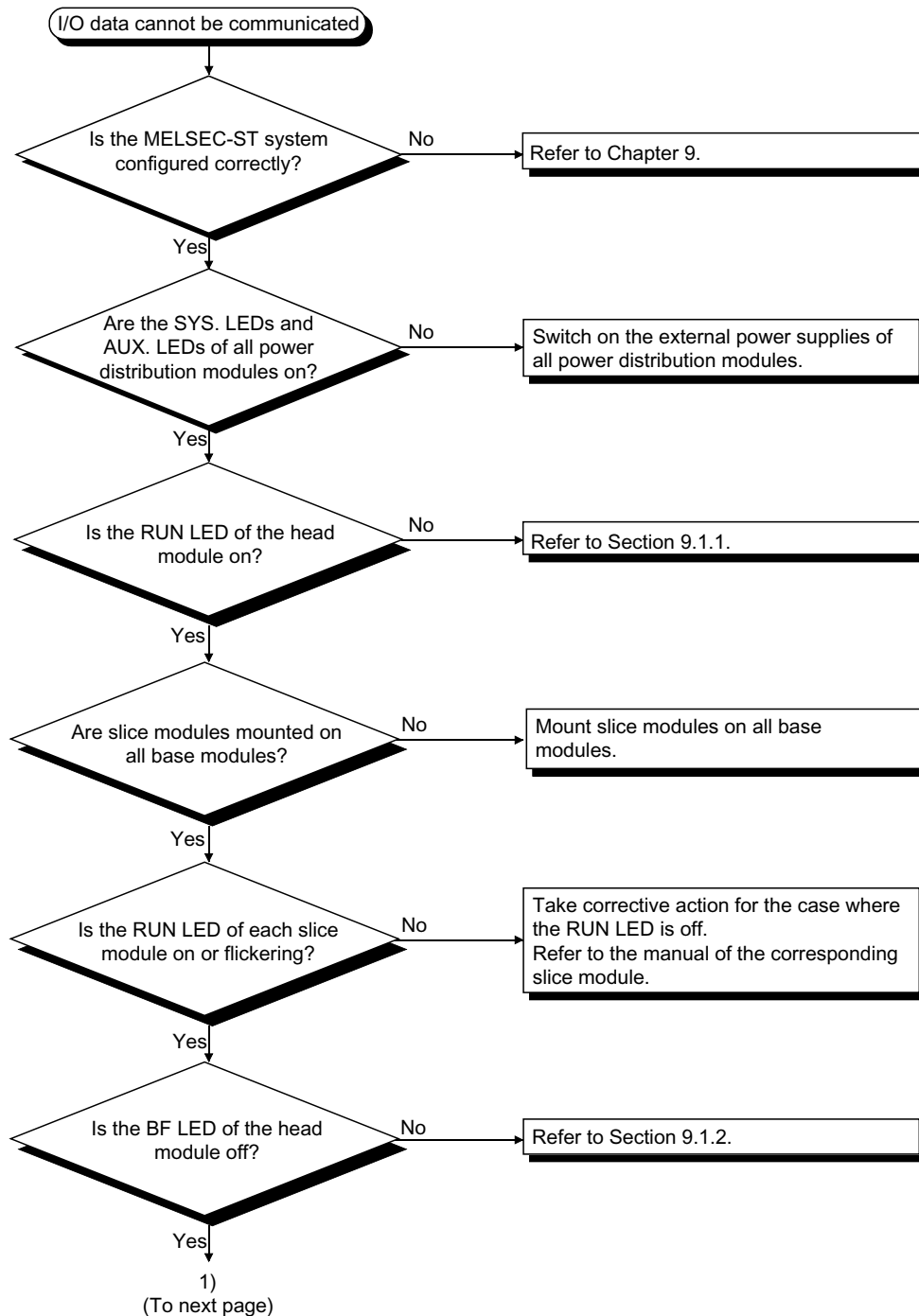
Before starting the troubleshooting in any of Section 9.1 to 9.3, check whether the MELSEC-ST system is configured correctly.

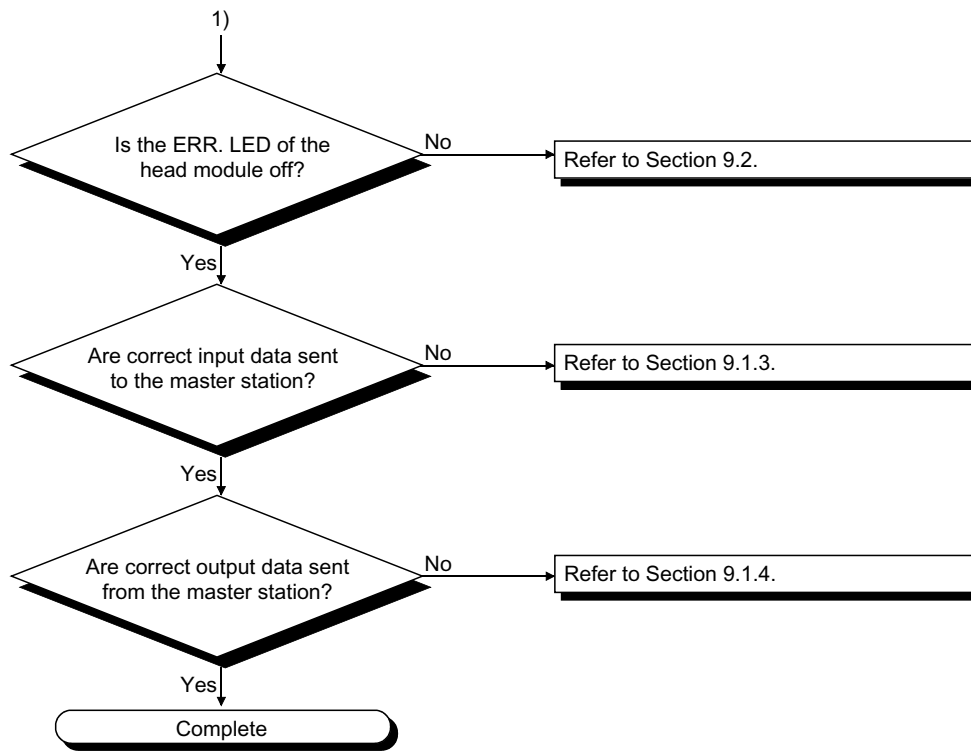
The following provides the items for checking whether the MELSEC-ST system is configured correctly.

- (1) **Check that a proper number of slice modules are mounted.**
Check whether 63 or less slice modules are used with the head module.
When intelligent function modules are mounted, check whether the number of the intelligent function modules is 26 or less.
If the range is exceeded, the RUN LEDs of invalid slice modules are off.
- (2) **Check that total number of occupied I/O points is within 256.**
Check whether the total number of occupied I/O points of the modules comprising the MELSEC-ST system is 256 or less.
If the range is exceeded, the RUN LEDs of invalid slice modules are off.
For details, refer to Section 6.1.
- (3) **Check that slice modules are mounted on base modules**
Before switching on the external power supplies of the MELSEC-ST system, check whether slice modules are mounted on all base modules.
- (4) **Check the combination of slice modules and base modules.**
Check whether the slice modules are mounted on the applicable base modules.
For details of the applicable base modules, refer to the corresponding slice module manual.
- (5) **Check that the total slot width of slice modules is within 85cm.**
Check whether the total slot width of the slice modules (without the head module) comprising the MELSEC-ST system is within 85cm.
For details, refer to the MELSEC-ST System User's Manual.
- (6) **Check that the total 5V DC internal current consumption and total 24V DC current are within the capacity of the power distribution modules.**
Calculate the total 5V DC internal current consumption and total 24V DC current, and check whether they are within the capacity of the power distribution modules.
For the calculation, refer to the MELSEC-ST System User's Manual.

9.1 When I/O data cannot be communicated

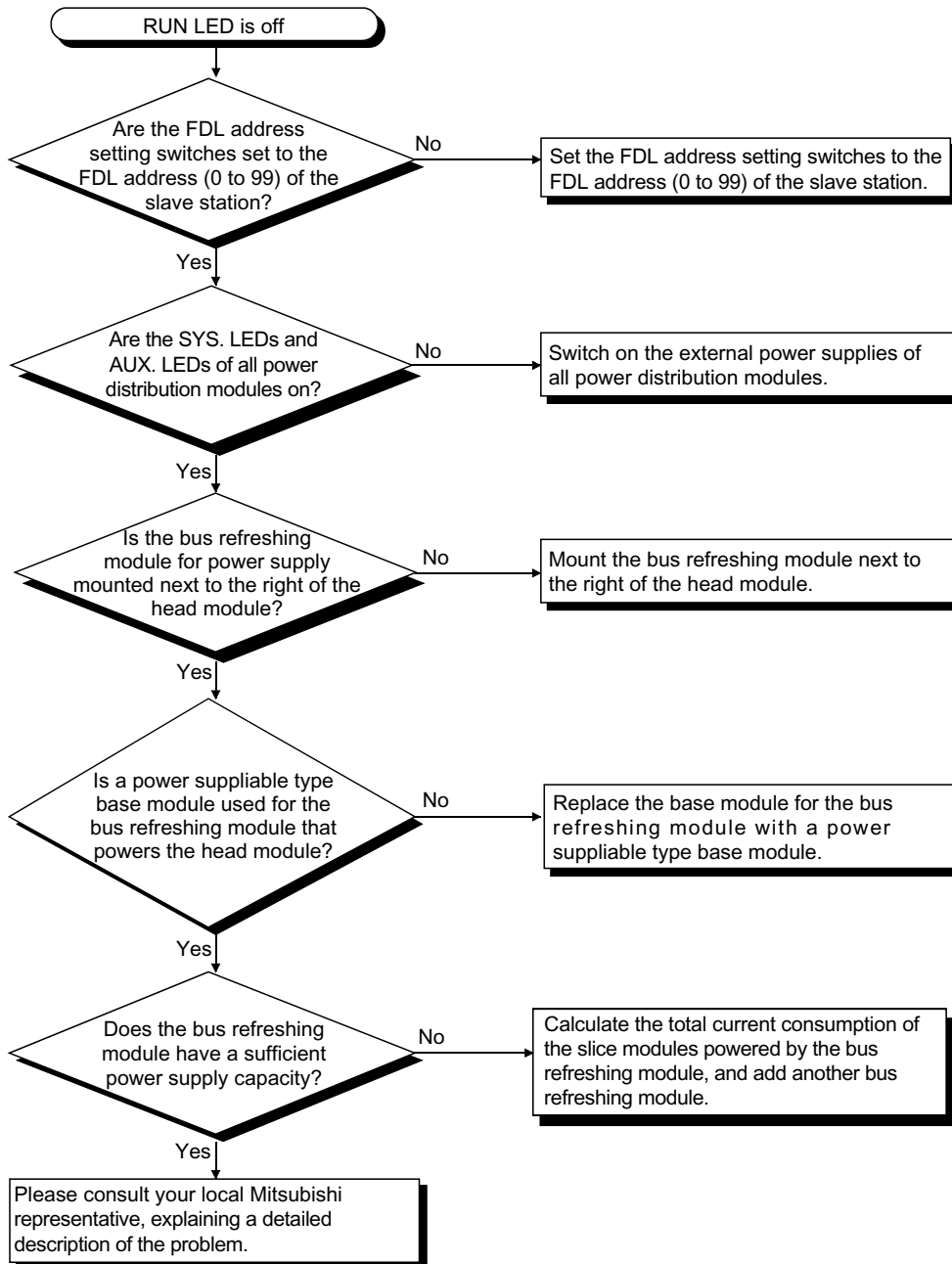
When I/O data cannot be communicated between the master station and MELSEC-ST system, troubleshoot the problem according to the following flowchart.





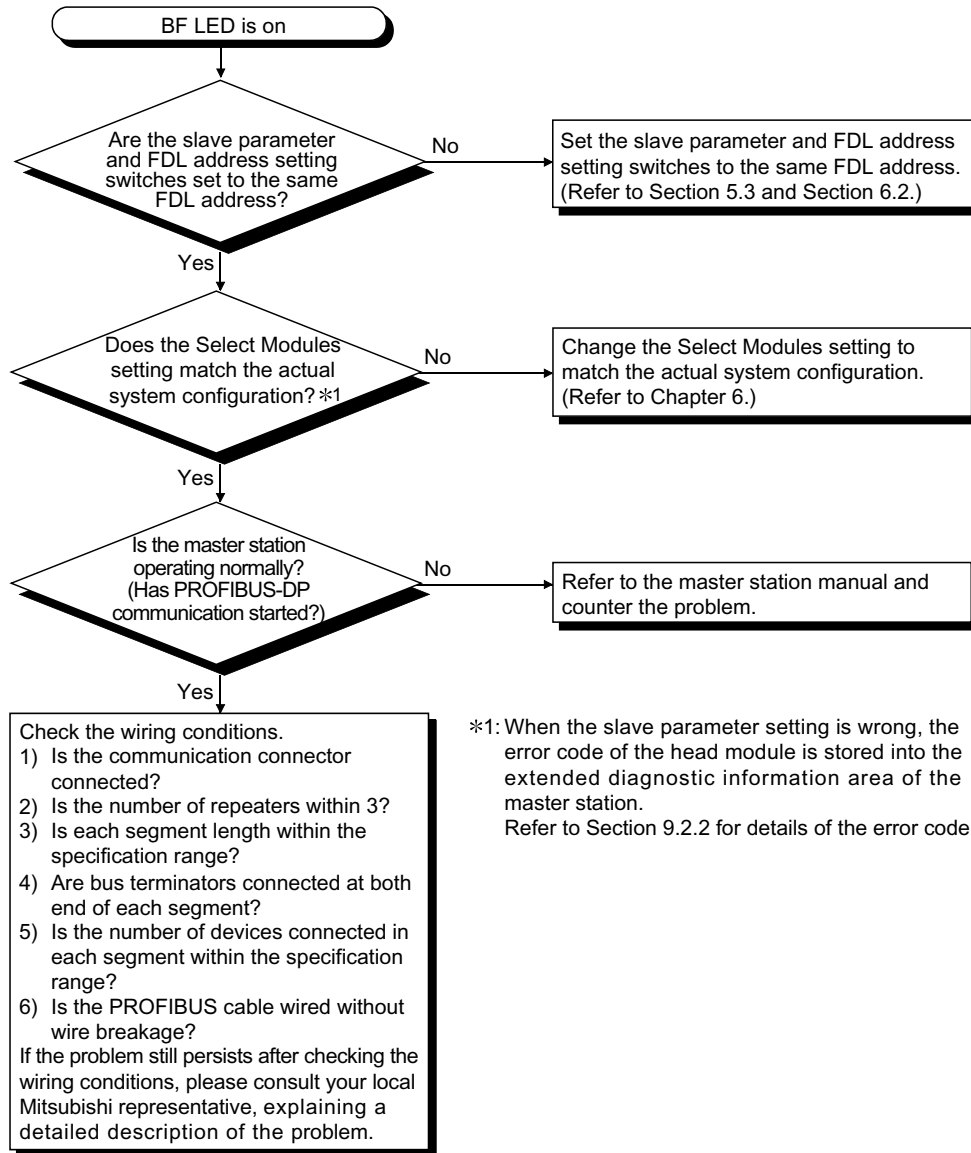
9.1.1 When RUN LED is off

When the RUN LED of the head module is off, troubleshoot the problem according to the following flowchart.



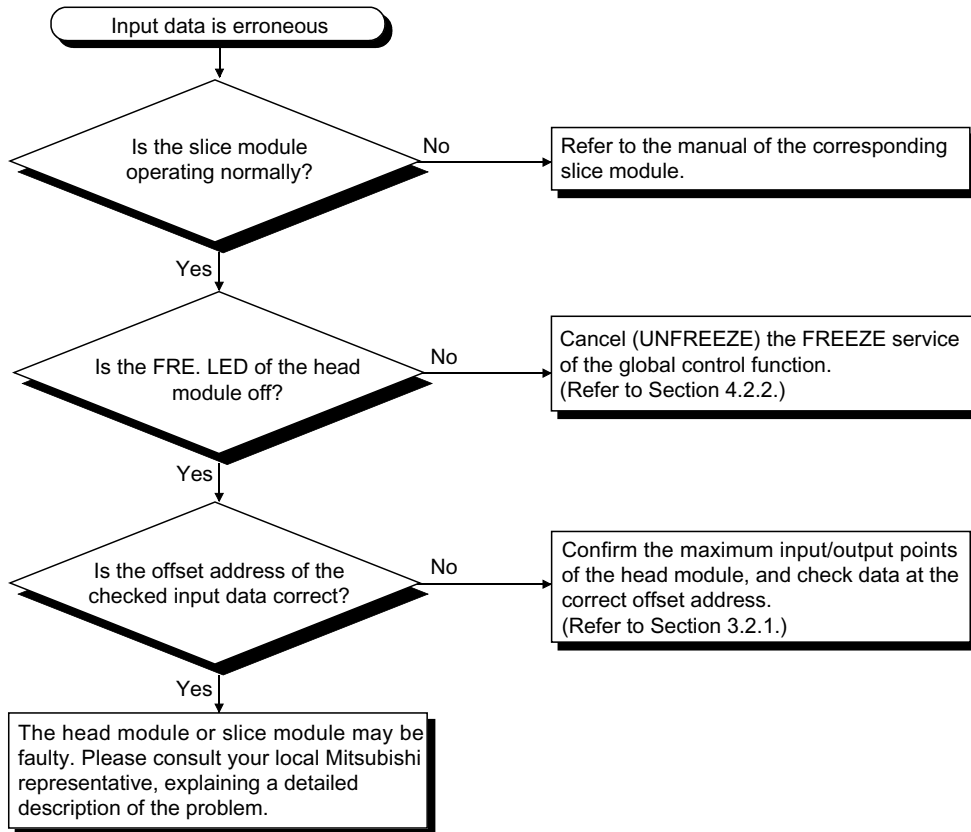
9.1.2 When BF LED is on

When the BF LED of the head module is on, troubleshoot the problem according to the following flowchart.



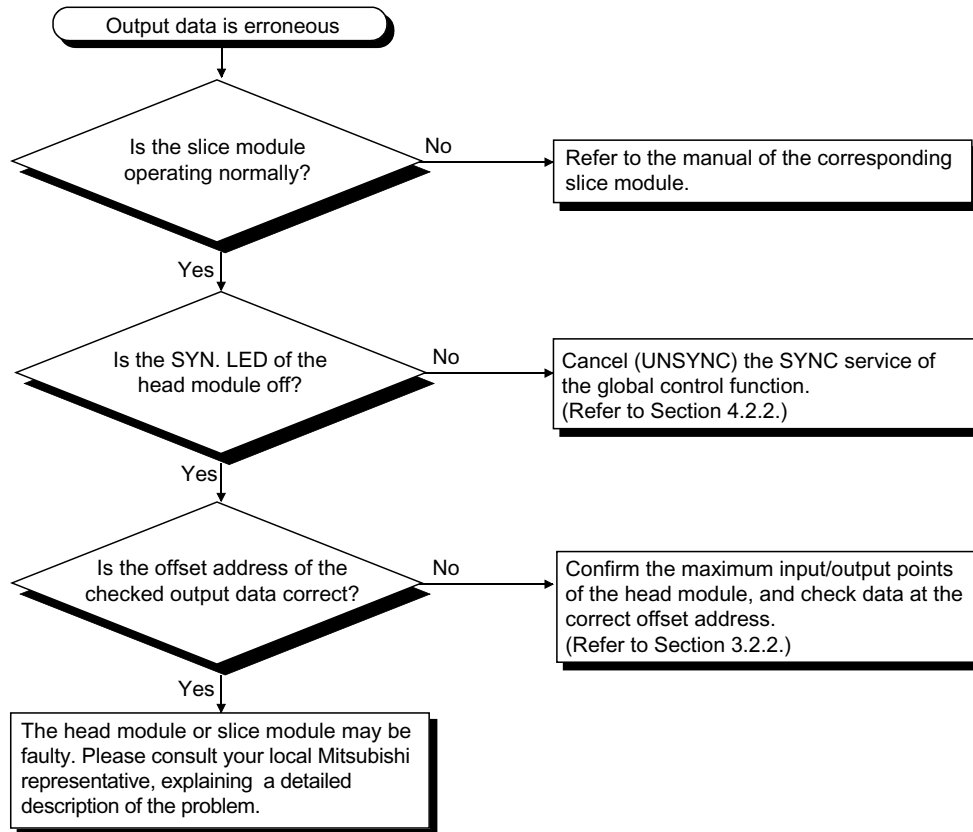
9.1.3 When input data is erroneous

When the input data sent from the head module is erroneous, troubleshoot the problem according to the following flowchart.



9.1.4 When output data is erroneous

When the output data received by the head module is erroneous, troubleshoot the problem according to the following flowchart.



9.2 When ERR. LED is on or flickering

When an error occurs in the head module, the ERR. LED turns on or flickers.

This section explains the read operation of the error code of the head module and lists the error codes.

9.2.1 Error code reading operation

This section explains the operation to read the error code.

Refer to Section 9.2.2 for details of the error code.

(1) Error code reading operation

Whether the error code can be read or not depends on the BF LED and IDA LED on/off statuses of the head module.

The following table indicates whether the error code can be read or not for each case.

| LED on/off status | | Whether error code can be read or not | | | |
|-------------------|---------|---------------------------------------|-----|-----|-----|
| BF LED | DIA LED | (a) | (b) | (c) | (d) |
| Off | Off | ○ | × | ○ | ○ |
| Off | On | ○ | ○ | ○ | ○ |
| On | Off | × | × | × | ○ |
| On | On | × | ○ | × | ○ |

○: Can be read ×: Cannot be read

(a) Using input data for checking

Confirm the error definition in the Er.n Error Information of the module whose ERR. LED is on or flickering, and take corrective action.

Refer to Section 3.2.3 for details of the Er.n Error Information of the head module.

(b) Using extended diagnostic information for checking

When the extended diagnostic information notification function is enabled in the head module, confirm the error details of the corresponding module in the extended diagnostic information area of the master station, and take corrective action.

Refer to Section 4.2.3 for details of the extended diagnostic information notification function.

(c) Using command for checking

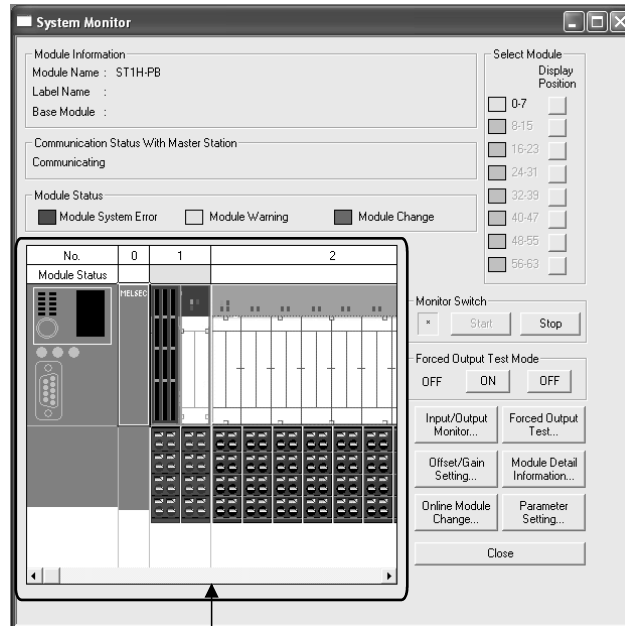
Execute the command (0101H) for the head module from the master station to read the error code of the head module, and take corrective action.

Refer to Chapter 8 for details of the command.

(d) Using GX Configurator-ST for checking

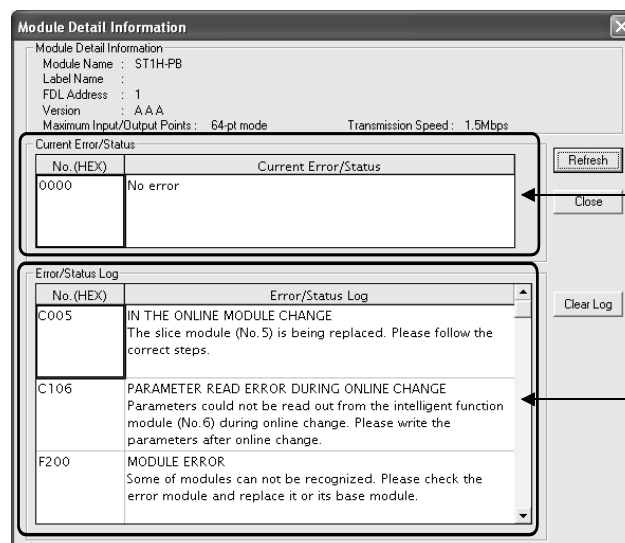
Connect the personal computer to the head module, and confirm the operating status and error code of each module from GX Configurator-ST. Check the operating status and error code of each module on the "System Monitor" and "Module Detail Information" screens of GX Configurator-ST. Refer to the GX Configurator-ST Manual for the operation on the "System Monitor" and "Module Detail Information" screens.

1) "System Monitor" screen



Operating status of each module is displayed.

2) "Module Detail Information" screen (When head module is selected)



The error code of the current error occurred in the head module is displayed.

The history of errors that occurred in the head module is displayed.

9.2.2 Error code list

The following gives the error code list of the head module.
Refer to Section 9.2.1 for the error code reading operation.

(1) Error code list

(a) Error codes for PROFIBUS-DP communication

If any of the following errors occurs during online module change, the ERR. LED status change and error code are not recorded.

| Error code (Hexadecimal) | Error Level | Error name | ERR. LED status | Detection timing | Description |
|--------------------------|--------------|------------------------------|-----------------|---|--|
| B100H | Warning | FDL address setting error | On | When external power supply is switched on or head module is reset | The FDL address is outside the setting range. |
| B101H | System error | Hardware fault | | | A hardware fault occurred. |
| B200H | Warning | Network parameter error | On | When communication starts (when parameters are received) | Watchdog time setting is illegal. (1 or less, or more than 65535) |
| B300H | Warning | User parameter error | On | When communication starts (when parameters are received) | Slave parameter setting error (value is set to the invalid area.) |
| B301H | | Configuration error | | | In the Select Modules setting, the head module is not selected as the start module. |
| B302H | | | | | Any slave parameter of the head module is illegal. |
| B303H | | | | | The points for the slice modules set in Select Modules exceed the maximum input/output points. (The sum of input/output points is outside the setting range.) |
| B304H | | | | | The points for the slice modules set in Select Modules exceed the maximum input/output points. (The sum of word input/output points is outside the setting range.) |
| B401H to B43FH * 1 | Warning | Module select error | On | When communication starts (when parameters are received) | The Select Modules setting and actually mounted slice module differ in module type or input/output points. Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| B501H to B53FH * 1 | Warning | Module select error | On | When communication starts (when parameters are received) | The Select Modules setting and actually mounted intelligent function module differ in model name. Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| B601H to B63FH * 1 | Warning | Module select error | On | When communication starts (when parameters are received) | The Select Modules setting and actually mounted intelligent function module differ in module type or word input/output points. Two or more modules were set to Select Modules. Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| E100H | Warning | Communication error | Flickering | During communication | Communication with master station stopped. |
| F200H | System error | Module error | On | Always | There is an unrecognizable slice module. |
| F201H | Warning | FDL address change error | Flickering | Always | The FDL address was changed after the head module started. |
| F202H | System error | Module composition error | On | When external power supply is switched on or head module is reset | The bus refreshing module is not mounted next to the right of the head module. |
| F203H | System error | User parameter setting error | On | When communication starts | There is a slice module whose user parameters could not be set. |
| F204H * 2 | System error | System power down | — | Always | An instantaneous power failure occurs in the bus refreshing module that powers the head module (bus refreshing module mounted next to the right of the head module). |
| F301H to F33FH * 1 | System error | System power down | — | Always | An error occurred in the bus refreshing module. Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |

* 1: The one low byte denotes the mounting position of the slice module from the right of the head module.

<Example> When the bus refreshing module is mounted in the first position: **01H

When the slice module is mounted in the 10th position: **0AH

* 2: If an instantaneous power failure occurs in the bus refreshing module that powers the head module, the error information is recorded in the error history.

| Error code (Hexadecimal) | Corrective action | Reading operation | | | |
|-----------------------------|--|-------------------|----|----|----|
| | | 1) | 2) | 3) | 4) |
| B100H | Check whether the FDL address setting switches are set within the range 0 to 99. (Refer to Section 5.3.1.) | × | × | × | ○ |
| B101H | Hardware fault. ▪ Replace the head module. ▪ Please consult your local Mitsubishi representative, explaining a detailed description of the problem. | × | × | × | ○ |
| B200H | Check the watchdog time setting. (Refer to Section 6.2.) | × | ○ | × | ○ |
| B300H | Check the slave parameters of the head module. (Refer to Chapter 6.) | × | ○ | × | ○ |
| B301H | Set the head module as the start module in Select Modules. (Refer to Section 6.1.1.) | × | ○ | × | ○ |
| B302H | Check the slave parameters of the head module. (Refer to Section 6.2.) | × | ○ | × | ○ |
| B303H | Check the head module setting in Select Modules. (Check whether the sum of input/output points of the modules is within the setting range. Refer to Section 6.1.1.) | × | ○ | × | ○ |
| B304H | Check the head module setting in Select Modules. (Check whether the sum of word input/output points of the intelligent function modules is within the setting range. Refer to Section 6.1.1.) | × | ○ | × | ○ |
| B401H to B43FH * 1 | Check the Select Modules setting. | × | ○ | × | ○ |
| B501H to B53FH * 1 | Check the Select Modules setting. | × | ○ | × | ○ |
| B601H to B63FH * 1 | Check the Select Modules setting. | × | ○ | × | ○ |
| E100H | ▪ Check the master station status. ▪ Check the network wiring conditions. ▪ Increase the watchdog time setting. | × | ○ | × | ○ |
| F200H | Change the slice module or base module whose RUN LED is off (the corresponding bit of the Mr Module Status Area is OFF). | ○ | ○ | ○ | ○ |
| F201H | ▪ If the FDL address was changed accidentally, return it to the FDL address set at the start of the head module. ▪ When it is desired to change the FDL address after the head module started, restart the head module (reset the head module or switch the external power supply off and then on again). | ○ | ○ | ○ | ○ |
| F202H | Mount the bus refreshing module next to the right of the head module. | × | ○ | ○ | ○ |
| F203H | Temporarily stop PROFIBUS-DP communication and restart communication. If the same error occurs after communication restart, replace the slice module whose RUN LED is flickering during communication with the master station. | ○ | ○ | ○ | ○ |
| F204H * 2 | Check whether an instantaneous power failure occurred in the external SYS. power supply that powers the bus refreshing module. | × | ○ | ○ | ○ |
| F301H to F33FH * 1 | ▪ Check the status of the external SYS. power supply that powers the bus refreshing module. ▪ Replace the bus refreshing module. | × | ○ | ○ | ○ |

○: Can be read ×: Cannot be read

- 1) Using input data for checking
- 2) Using extended diagnostic information for checking
- 3) Using command for checking
- 4) Using GX Configurator-ST for checking

(b) Operating status code and error codes for online module change

| Error/Operating status code (Hexadecimal) | Error Level | Error name | ERR. LED status | Detection timing | Description |
|---|--------------|----------------------------|-----------------|--|--|
| C001H to C03FH * 1 | — | — (Normal) | — | When online module change starts (when REL. LED turns on) | Module being replaced online (changeable) Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| | | | | When online module change starts (when REL. LED flickers) | Module being replaced online (intelligent function module parameters being read) Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| C101H to C13FH * 1 | System error | Online module change error | On * 2 | When module is being changed online (when REL. LED is on) | The parameters of the intelligent function module cannot be read from its ROM. (During online module change) Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| | | | | After module is changed online (when REL. LED turns off) | The parameters of the intelligent function module cannot be read from its ROM. (After end of online module change) Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |
| C201H to C23FH * 1 | System error | Online module change error | On | When slice module mounting is confirmed (when REL. LED turns on) | The model name of the current slice module differs from that of the previous slice module. Or, the intelligent function module parameters cannot be written to the ROM of the current intelligent function module. Any of 1 to 63 (01H to 3FH) denoting the mounting position of the slice module from the right of the head module is stored into the low byte. |

* 1: The one low byte denotes the mounting position of the slice module on the right of the head module.

<Example> When the bus refreshing module is mounted in the first position: **01H

When the slice module is mounted in the 10th position: **0AH

* 2: If any of C101H to C13FH occurs, the ERR. LED remains on until the next online module change.

To turn off the ERR. LED, turn on the Ew.00 Error Clear Request after online module change.

(c) Operating status code for forced output test mode

| Operating status code (Hexadecimal) | Error Level | Error name | ERR. LED status | Detection timing | Description |
|-------------------------------------|-------------|------------|-----------------|-------------------------------------|--|
| D000H | — | — (Normal) | — | When forced output test mode starts | Forced output test mode being executed |

| Error/Operating status code (Hexadecimal) | Corrective action | Reading operation | | | |
|---|--|-------------------|----|----|----|
| | | 1) | 2) | 3) | 4) |
| C001H to C03FH * 1 | Complete online module change. (Refer to Section 4.4.) | ○ | ○ | ○ | ○ |
| C101H to C13FH * 1 | After online module change, write the parameters to the intelligent function module using a command or GX Configurator-ST, with the RUN LED of the currently mounted module flickering or on. | ○ | ○ | ○ | ○ |
| C201H to C23FH * 1 | <ul style="list-style-type: none"> ▪ When the current slice module differs in type from the previous slice module, mount the slice module whose type is the same as that of the previous slice module. ▪ When the current slice module is the same in type as the previous slice module, mount the other slice module. | ○ | ○ | ○ | ○ |

○: Can be read ×: Cannot be read

- 1) Using input data for checking
- 2) Using extended diagnostic information for checking
- 3) Using command for checking
- 4) Using GX Configurator-ST for checking

| Operating status code (Hexadecimal) | Corrective action | Reading operation | | | |
|-------------------------------------|---|-------------------|----|----|----|
| | | 1) | 2) | 3) | 4) |
| D000H | When ending the forced output test mode, perform operation from GX Configurator-ST. (Refer to the GX Configurator-ST Manual.) | ○ | ○ | ○ | ○ |

○: Can be read ×: Cannot be read

- 1) Using input data for checking
- 2) Using extended diagnostic information for checking
- 3) Using command for checking
- 4) Using GX Configurator-ST for checking

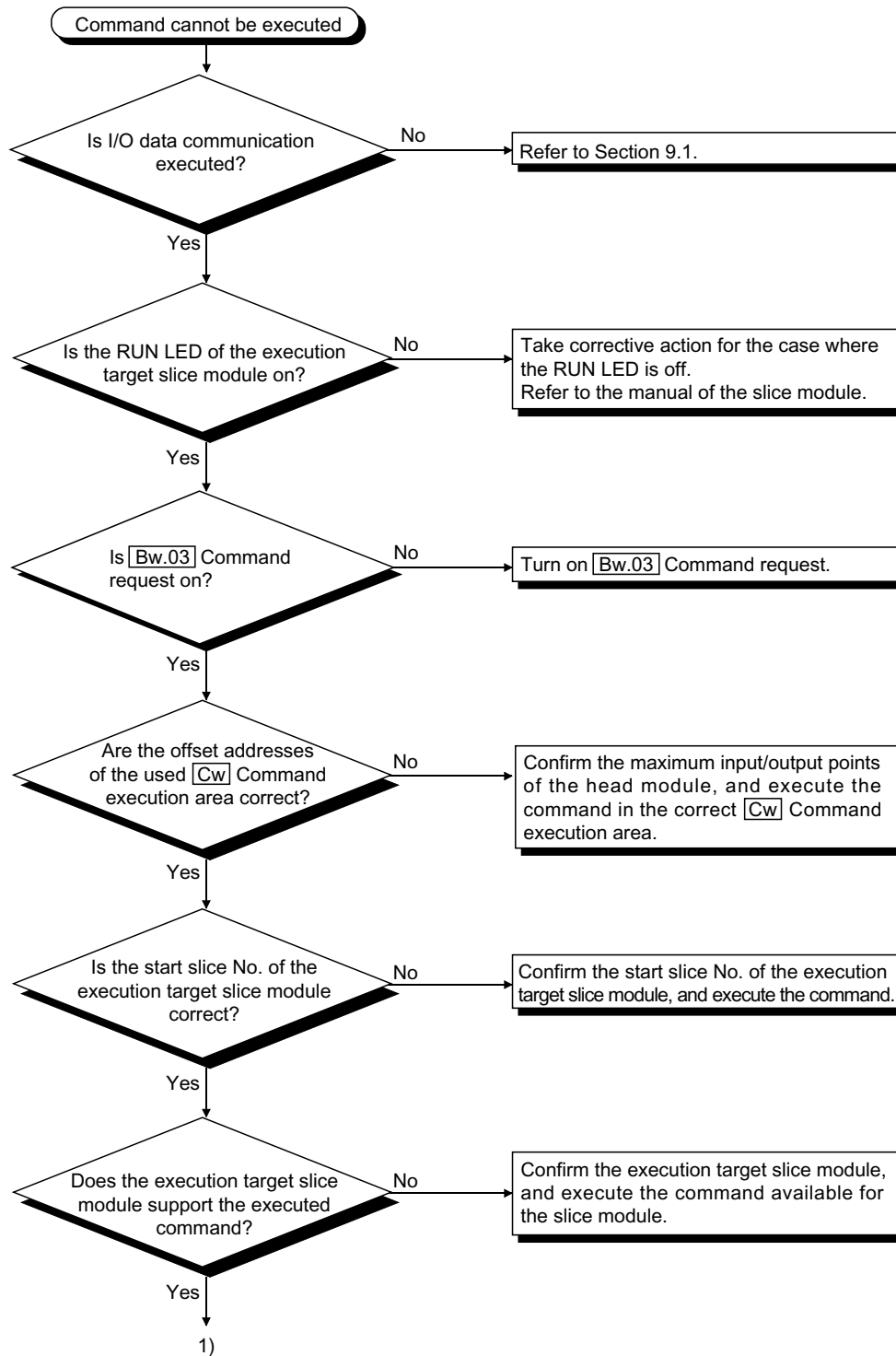
(2) When multiple errors are detected simultaneously

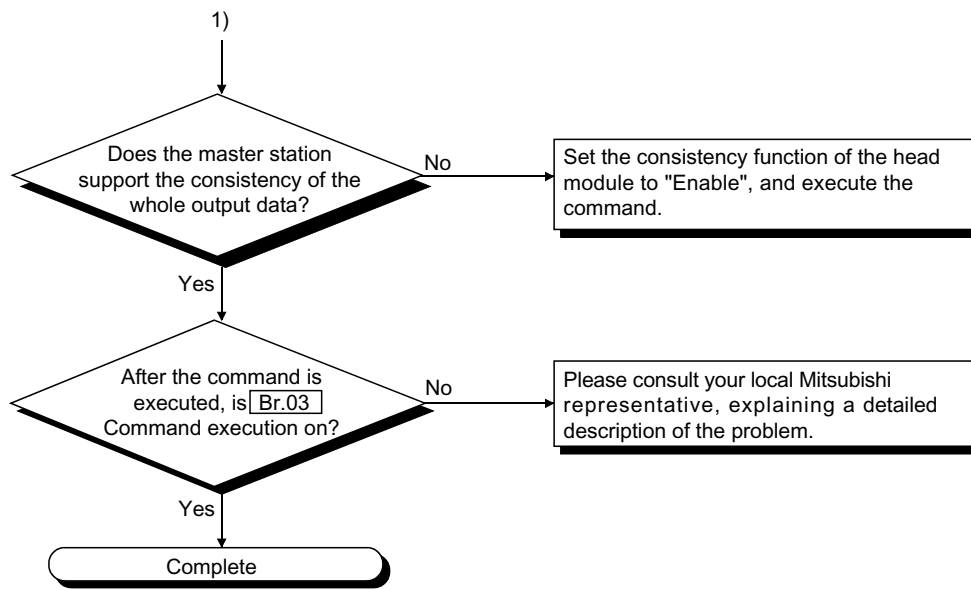
When the head module detects multiple errors simultaneously, error information is stored with the following priority.

| Priority | Error code | Error name |
|----------|----------------|--------------------------------------|
| 1 | F204H | System power down |
| | F301H to F33FH | |
| 2 | F202H | Module composition error |
| 3 | C201H to C23FH | Online module change error |
| 4 | C301H to C33FH | |
| 5 | C101H to C13FH | |
| 6 | C001H to C03FH | Module being changed online (normal) |
| 7 | F200H | Module error |
| 8 | F203H | User parameter setting error |
| 9 | F201H | FDL address change error |
| 10 | D000H | Forced output test mode (normal) |
| 11 | E100H | Communication error |
| 12 | B100H | FDL address setting error |
| 13 | B101H | Hardware fault |
| 14 | B200H | Network parameter error |
| 15 | B300H | User parameter error |
| 16 | B401H to B43FH | Module select error |
| 17 | B501H to B53FH | |
| 18 | B301H | Configuration error |
| 19 | B302H | |
| 20 | B303H | |
| 21 | B304H | |
| 22 | B601H to B63FH | Module select error |

9.3 When command cannot be executed

When the command from the master station cannot be executed, troubleshoot the problem according to the following flowchart.

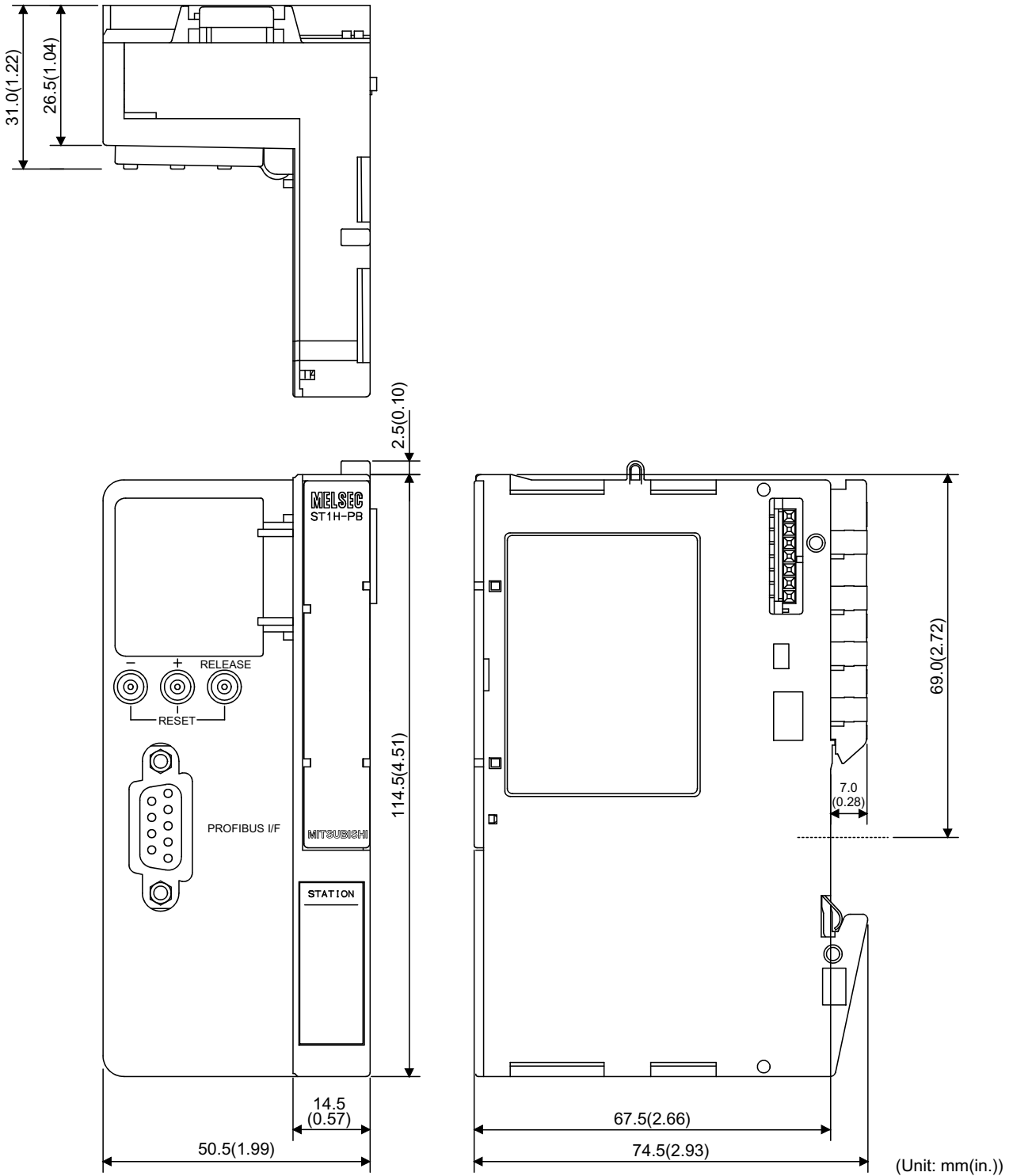




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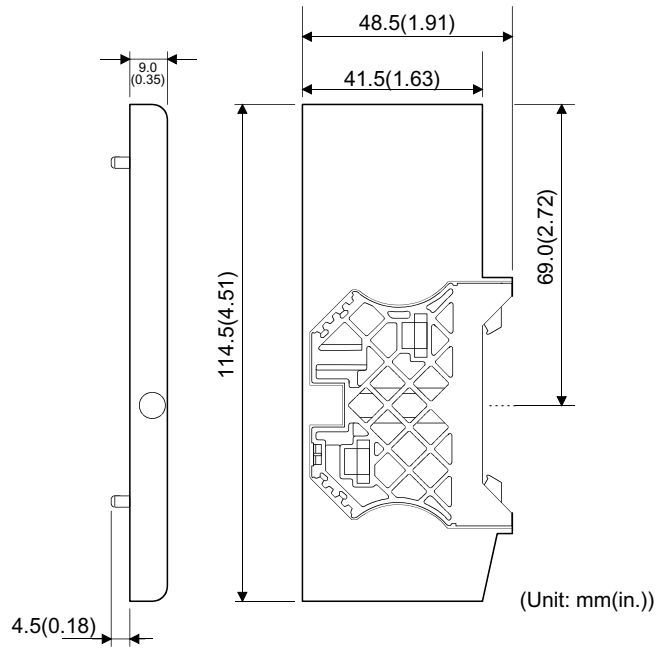
Appendix 1 External Dimensions

(1) Head module (ST1H-PB)



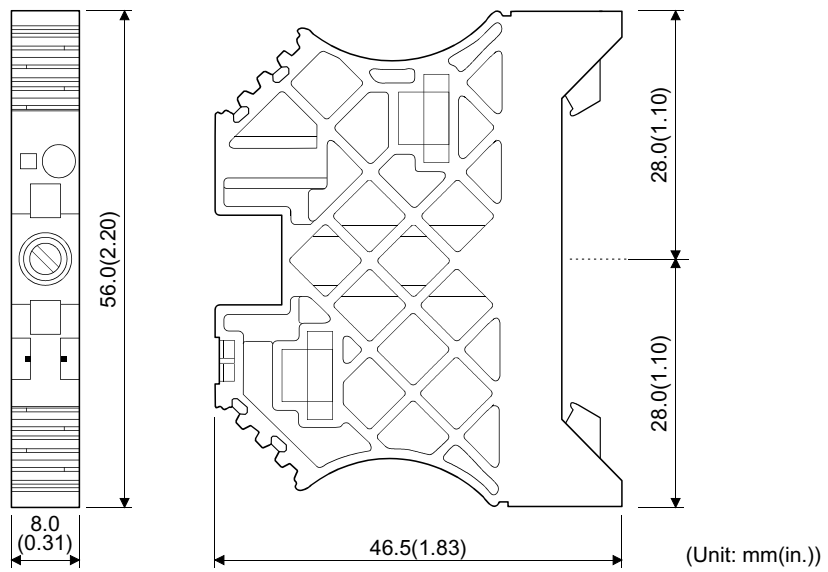
App

(2) End plate (ST1A-EPL) *1



*1. In the above drawing, the end bracket is mounted on the end plate.

(3) End bracket (ST1A-EBR)



Appendix 2 MELSEC-ST System Setting Sheet

Appendix 2.1 Maximum input/output points setting sheet

| No. | Module Name | Number of Occupied I/O Points | Start Slice No. (Number of occupied slices) | Wr.n | Ww.n | 5V DC Internal Current Consumption (Total) | 24V DC Current (Total) | Slot Width (Total) |
|-------|-------------|-------------------------------|---|------|------|--|------------------------|--------------------|
| 0 | ST1H-PB | 4 | 0(2) | — | — | 0.530A(0.530A) | 0A(0A) | — |
| 1 | ST1PSD | 2 | 2(1) | — | — | — | — | 25.2mm(25.2mm) |
| 2 | | | () | | | | | |
| 3 | | | () | | | | | |
| 4 | | | () | | | | | |
| 5 | | | () | | | | | |
| 6 | | | () | | | | | |
| 7 | | | () | | | | | |
| 8 | | | () | | | | | |
| 9 | | | () | | | | | |
| 10 | | | () | | | | | |
| 11 | | | () | | | | | |
| 12 | | | () | | | | | |
| 13 | | | () | | | | | |
| 14 | | | () | | | | | |
| 15 | | | () | | | | | |
| 16 | | | () | | | | | |
| 17 | | | () | | | | | |
| 18 | | | () | | | | | |
| 19 | | | () | | | | | |
| 20 | | | () | | | | | |
| 21 | | | () | | | | | |
| 22 | | | () | | | | | |
| 23 | | | () | | | | | |
| 24 | | | () | | | | | |
| Total | | *1 | — | *2 | *2 | — | — | — |

*1: Apply this value to [A] in the following table.

*2: Apply the value, whichever is larger, to [D] in the following table.

| [A] Sum total of occupied I/O points | [D] Maximum word input/output points | | | | | | | |
|--------------------------------------|--------------------------------------|---------------|----------------|----------------|----------------|---------------|----------------|---|
| | 0 to 32 words | | | | 33 to 52 words | | | |
| 4 to 32 points | 32-point mode | 64-point mode | 128-point mode | 256-point mode | 32-point mode | 64-point mode | 128-point mode | — |
| 33 to 64 points | — | 64-point mode | 128-point mode | 256-point mode | — | 64-point mode | 128-point mode | — |
| 65 to 128 points | — | | 128-point mode | 256-point mode | — | | 128-point mode | — |
| 129 to 256 points | — | | | 256-point mode | — | | | |

Select the shaded setting when planning an expansion of the MELSEC-ST system for the future.

Appendix 2.2 Input data assignment sheet

(1)

| |
|----|
| Br |
|----|

 Bit input area

| Br.n | Bit input | Information | Master station side device | Slice No. | Module name |
|-------|-----------|------------------------------|----------------------------|-----------|-------------|
| Br.00 | | Module READY | | 0 | ST1H-PB |
| Br.01 | | Forced output test mode | | | |
| Br.02 | | Module being changed online | | 1 | |
| Br.03 | | Command execution | | | |
| Br.04 | | External power supply status | | 2 | ST1PSD |
| Br.05 | | | | | |
| Br.06 | | | | 3 | |
| Br.07 | | | | | |
| Br.08 | | | | 4 | |
| Br.09 | | | | | |
| Br.0A | | | | 5 | |
| Br.0B | | | | | |
| Br.0C | | | | 6 | |
| Br.0D | | | | | |
| Br.0E | | | | 7 | |
| Br.0F | | | | | |

(To next page)

| Br.n Bit input | Information | Master station side device | Slice No. | Module name |
|----------------|-------------|----------------------------|-----------|-------------|
| Br. □0 | | | □□□ | |
| Br. □1 | | | | |
| Br. □2 | | | □□□ | |
| Br. □3 | | | | |
| Br. □4 | | | □□□ | |
| Br. □5 | | | | |
| Br. □6 | | | □□□ | |
| Br. □7 | | | | |
| Br. □8 | | | □□□ | |
| Br. □9 | | | | |
| Br. □A | | | □□□ | |
| Br. □B | | | | |
| Br. □C | | | □□□ | |
| Br. □D | | | | |
| Br. □E | | | □□□ | |
| Br. □F | | | | |

(2) Er Error information area

| Er.n Error information | Information | Master station side device | Slice No. | Module name |
|--|---|----------------------------|-----------|-------------|
| Er.00 | Head module error information | | 0 | ST1H-PB |
| Er.01 | | | | |
| Er.02 | | | 1 | |
| Er.03 | | | | |
| Er.04 | Bus refreshing module error information | | 2 | ST1PSD |
| Er.05 | | | | |
| Er.06 | | | 3 | |
| Er.07 | | | | |
| Er.08 | | | 4 | |
| Er.09 | | | | |
| Er.0A | | | 5 | |
| Er.0B | | | | |
| Er.0C | | | 6 | |
| Er.0D | | | | |
| Er.0E | | | 7 | |
| Er.0F | | | | |

(To next page)

| Er.n | Error information | Information | Master station side device | Slice No. | Module name |
|------|-------------------|-------------|----------------------------|-----------|-------------|
| | Er. □0 | | | □□□ | |
| | Er. □1 | | | | |
| | Er. □2 | | | □□□ | |
| | Er. □3 | | | | |
| | Er. □4 | | | □□□ | |
| | Er. □5 | | | | |
| | Er. □6 | | | □□□ | |
| | Er. □7 | | | | |
| | Er. □8 | | | □□□ | |
| | Er. □9 | | | | |
| | Er. □A | | | □□□ | |
| | Er. □B | | | | |
| | Er. □C | | | □□□ | |
| | Er. □D | | | | |
| | Er. □E | | | □□□ | |
| | Er. □F | | | | |

(3) Module status area

| <input type="text" value="Mr.n"/> Module status | Information | Master station side device | Slice No. | Module name |
|---|------------------------------|----------------------------|-----------|-------------|
| <input type="text" value="Mr. 0"/> | Head module status | | 0 | ST1H-PB |
| <input type="text" value="Mr. 1"/> | | | 1 | |
| <input type="text" value="Mr. 2"/> | Bus refreshing module status | | 2 | ST1PSD |
| <input type="text" value="Mr. 3"/> | | | 3 | |
| <input type="text" value="Mr. 4"/> | | | 4 | |
| <input type="text" value="Mr. 5"/> | | | 5 | |
| <input type="text" value="Mr. 6"/> | | | 6 | |
| <input type="text" value="Mr. 7"/> | | | 7 | |
| <input type="text" value="Mr. 8"/> | | | 8 | |
| <input type="text" value="Mr. 9"/> | | | 9 | |
| <input type="text" value="Mr.10"/> | | | 10 | |
| <input type="text" value="Mr.11"/> | | | 11 | |
| <input type="text" value="Mr.12"/> | | | 12 | |
| <input type="text" value="Mr.13"/> | | | 13 | |
| <input type="text" value="Mr.14"/> | | | 14 | |
| <input type="text" value="Mr.15"/> | | | 15 | |

| <input type="text" value="Mr.n"/> Module status | Information | Master station side device | Slice No. | Module name |
|---|-------------|----------------------------|-----------|-------------|
| <input type="text" value="Mr. □□0"/> | | | □□□ | |
| <input type="text" value="Mr. □□1"/> | | | □□□ | |
| <input type="text" value="Mr. □□2"/> | | | □□□ | |
| <input type="text" value="Mr. □□3"/> | | | □□□ | |
| <input type="text" value="Mr. □□4"/> | | | □□□ | |
| <input type="text" value="Mr. □□5"/> | | | □□□ | |
| <input type="text" value="Mr. □□6"/> | | | □□□ | |
| <input type="text" value="Mr. □□7"/> | | | □□□ | |
| <input type="text" value="Mr. □□8"/> | | | □□□ | |
| <input type="text" value="Mr. □□9"/> | | | □□□ | |

(4) Wr Word input area

| Wr.n Word input | Information | Master station side device | Slice No. | Module name |
|---|-------------|----------------------------|-----------|-------------|
| Wr. □0 | | | □□□ | |
| Wr. □1 | | | | |
| Wr. □2 | | | □□□ | |
| Wr. □3 | | | | |
| Wr. □4 | | | □□□ | |
| Wr. □5 | | | | |
| Wr. □6 | | | □□□ | |
| Wr. □7 | | | | |
| Wr. □8 | | | □□□ | |
| Wr. □9 | | | | |
| Wr. □A | | | □□□ | |
| Wr. □B | | | | |
| Wr. □C | | | □□□ | |
| Wr. □D | | | | |
| Wr. □E | | | □□□ | |
| Wr. □F | | | | |

Appendix 2.3 Output data assignment sheet

(1) Bw Bit output area

| Bw.n Bit output | Information | Master station side device | Slice No. | Module name |
|---|-----------------------|----------------------------|-----------|-------------|
| Bw.00 | System area (0 fixed) | | 0 | ST1H-PB |
| Bw.01 | System area (0 fixed) | | | |
| Bw.02 | System area (0 fixed) | | 1 | |
| Bw.03 | Command request | | | |
| Bw.04 | System area (0 fixed) | | 2 | ST1PSD |
| Bw.05 | System area (0 fixed) | | | |
| Bw.06 | | | 3 | |
| Bw.07 | | | | |
| Bw.08 | | | 4 | |
| Bw.09 | | | | |
| Bw.0A | | | 5 | |
| Bw.0B | | | | |
| Bw.0C | | | 6 | |
| Bw.0D | | | | |
| Bw.0E | | | 7 | |
| Bw.0F | | | | |

(To next page)

| Bw.n Bit output | Information | Master station side device | Slice No. | Module name |
|-----------------|-------------|----------------------------|-----------|-------------|
| Bw. □0 | | | □□□ | |
| Bw. □1 | | | | |
| Bw. □2 | | | □□□ | |
| Bw. □3 | | | | |
| Bw. □4 | | | □□□ | |
| Bw. □5 | | | | |
| Bw. □6 | | | □□□ | |
| Bw. □7 | | | | |
| Bw. □8 | | | □□□ | |
| Bw. □9 | | | | |
| Bw. □A | | | □□□ | |
| Bw. □B | | | | |
| Bw. □C | | | □□□ | |
| Bw. □D | | | | |
| Bw. □E | | | □□□ | |
| Bw. □F | | | | |

(2) Ew Error clear area

| Ew.n Error clear | Information | Master station side device | Slice No. | Module name |
|--|-----------------------|----------------------------|-----------|-------------|
| Ew. 00 | Error clear request | | 0 | ST1H-PB |
| Ew. 01 | System area (0 fixed) | | | |
| Ew. 02 | System area (0 fixed) | | | |
| Ew. 03 | System area (0 fixed) | | 1 | |
| Ew. 04 | Error clear request | | 2 | ST1PSD |
| Ew. 05 | System area (0 fixed) | | | |
| Ew. 06 | | | 3 | |
| Ew. 07 | | | | |
| Ew. 08 | | | 4 | |
| Ew. 09 | | | | |
| Ew.0A | | | 5 | |
| Ew.0B | | | | |
| Ew.0C | | | 6 | |
| Ew.0D | | | | |
| Ew.0E | | | 7 | |
| Ew.0F | | | | |

(To next page)

| Ew.n Error clear | Information | Master station side device | Slice No. | Module name |
|------------------|-------------|----------------------------|-----------|-------------|
| Ew. □0 | | | □□□ | |
| Ew. □1 | | | □□□ | |
| Ew. □2 | | | □□□ | |
| Ew. □3 | | | □□□ | |
| Ew. □4 | | | □□□ | |
| Ew. □5 | | | □□□ | |
| Ew. □6 | | | □□□ | |
| Ew. □7 | | | □□□ | |
| Ew. □8 | | | □□□ | |
| Ew. □9 | | | □□□ | |
| Ew. □A | | | □□□ | |
| Ew. □B | | | □□□ | |
| Ew. □C | | | □□□ | |
| Ew. □D | | | □□□ | |
| Ew. □E | | | □□□ | |
| Ew. □F | | | □□□ | |

(3) Ww Word output area

| Ww.n Word output | Information | Master station side device | Slice No. | Module name |
|--|-------------|----------------------------|-----------|-------------|
| Ww. □0 | | | □□□ | |
| Ww. □1 | | | | |
| Ww. □2 | | | □□□ | |
| Ww. □3 | | | | |
| Ww. □4 | | | □□□ | |
| Ww. □5 | | | | |
| Ww. □6 | | | □□□ | |
| Ww. □7 | | | | |
| Ww. □8 | | | □□□ | |
| Ww. □9 | | | | |
| Ww. □A | | | □□□ | |
| Ww. □B | | | | |
| Ww. □C | | | □□□ | |
| Ww. □D | | | | |
| Ww. □E | | | □□□ | |
| Ww. □F | | | | |

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WARRANTY

Please confirm the following product warranty details before starting use.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the dealer or Mitsubishi Service Company. Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 2. Failure caused by unapproved modifications, etc., to the product by the user.
 3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 7. Any other failure found not to be the responsibility of Mitsubishi or the user.

2. Onerous repair term after discontinuation of production

- (1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not possible after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

- (1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi general-purpose programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or National Defense purposes shall be excluded from the programmable logic controller applications.

Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.

When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

MELSEC-ST PROFIBUS-DP Head Module

User's Manual

| | |
|-----------------------------|----------------|
| MODEL | ST1H-PB-U-SY-E |
| MODEL CODE | 13JR68 |
| SH(NA)-080436ENG-A(0312)MEE | |



HEAD OFFICE : 1-8-12, OFFICE TOWER Z 14F HARUMI CHUO-KU 104-6212,JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.