MELSEC-ST
Digital-Analog Converter Module

MITSUBISHI

User's Manual

(CC-Link)

MELSEC-ST

ST1DA2-V
ST1DA2-V-F01
ST1DA1-I
ST1DA1-I-F01

●SAFETY PRECAUTIONS●

(Read these precautions before using.)

When using this product, 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 only. Refer to the user's manual of the network system to use for a description of the network system safety precautions.
These SAFETY PRECAUTIONS are classified into two categories: "DANGER" and "CAUTION".

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

● Createan interlock circuit on the program so that the system will operate safely based on the communication status information. Failure to do so may cause an accident due to an erroneous output or malfunction.
When an error occurs, all outputs are turned off in the MELSEC-ST system. (At default)
However, I/O operations of the head module and respective slice modules can be selected for the following errors:
(1) Communication error (☞MELSEC-ST CC-Link Head Module User's Manual "4.3.1 Output status setting for module error")
(2) Slice module error
The output status for the case of an error can be set to Clear, Hold, or Preset with a command parameter of each slice module. (For whether the setting is available, refer to each slice module manual.)
Since the parameter is set to Clear by default, outputs will be turned off when an error occurs.
This parameter setting can be changed to Hold or Preset when the system safety is ensured by holding or presetting the output. (☞Section 3.3.2 Combinations of various functions)

[DESIGN PRECAUTIONS]

⚠ DANGER

- Create an external failsafe circuit so that the MELSEC-ST system will operate safely, even when the external power supply or the system fails.
  Failure to do so may cause an accident due to an erroneous output or malfunction.
  (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) Outputs may be kept ON or OFF due to malfunctions of output elements or the internal circuits. For signals which may cause a serious accident, configure an external monitoring circuit.

⚠ 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.
- At the time of power ON or OFF, a voltage or current may be instantaneously output from output terminals. Therefore, ensure stable analog outputs before starting the control.

[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.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- 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 of online module change in this manual.
- Do not directly touch the module's conductive parts or electronic components. Doing so may cause malfunctions or failure of the module.
- 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.
- Use applicable solderless terminals and tighten them with the specified torque. If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- 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.

[WIRING PRECAUTIONS]

⚠ CAUTION

- 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. 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.

⚠ 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 say 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
Apr.,2008	SH(NA)-080756ENG-A	First edition

Japanese Manual Version SH-080750-A

INTRODUCTION

Thank you for choosing the ST1DA2-V/ST1DA1-I/ST1DA2-V-F01/ST1DA1-I-F01 MELSEC-ST digital-analog converter module.
Before using the module, please read this manual carefully to fully understand the functions and performance of the ST1DA2-V/ST1DA1-I/ST1DA2-V-F01/ST1DA1-I-F01 MELSEC-ST digital-analog converter module and use it correctly.

CONTENTS

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)
MELSEC-ST CC-Link Head Module User's Manual Explains the system configuration, specifications, functions, handling, wiring and troubleshooting of the ST1H-BT. (Sold separately)	SH-080754ENG-A (13JZ11)
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)
CC-Link System Master/Local Module User's Manual Describes the system configurations, performance specifications, functions, handling, wiring and troubleshooting of the QJ61BT11N. (Sold separately)	SH080394E (13JR64)

Compliance with the EMC and Low Voltage Directives

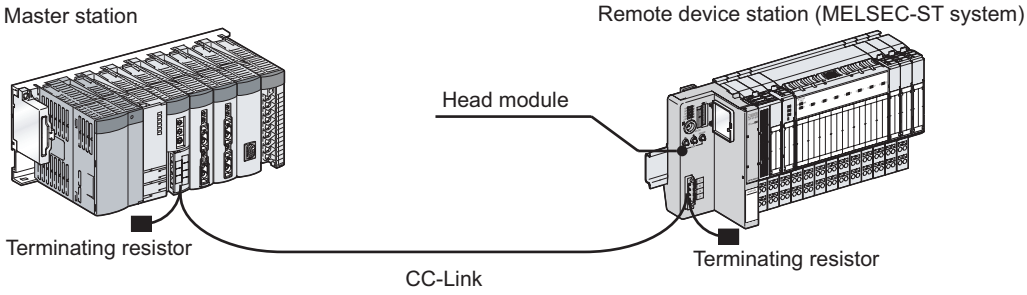
(1) For MELSEC-ST system

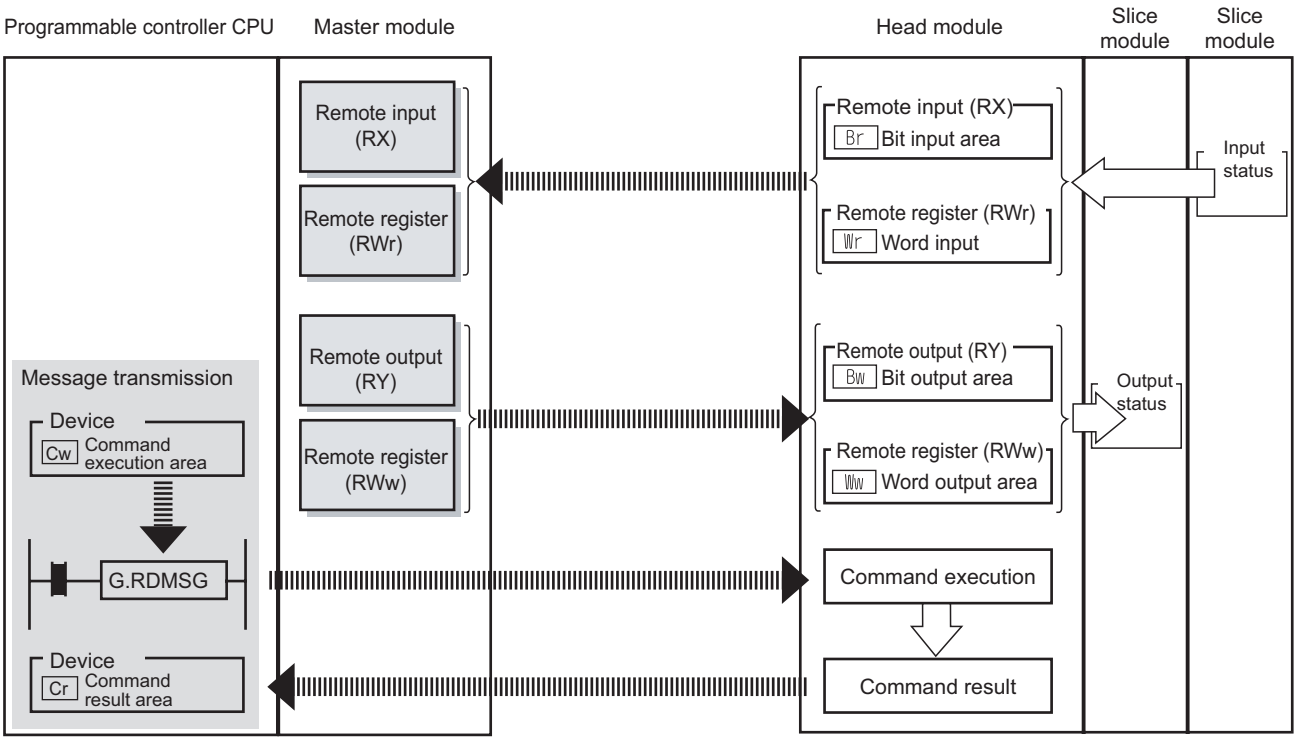
To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi MELSEC-ST system (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 11 "EMC and Low Voltage Directives" of the MELSEC-ST System User's Manual.
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the MELSEC-ST system.

(2) For this product

No additional measures are necessary for the compliance of this product with the EMC and Low Voltage Directives.

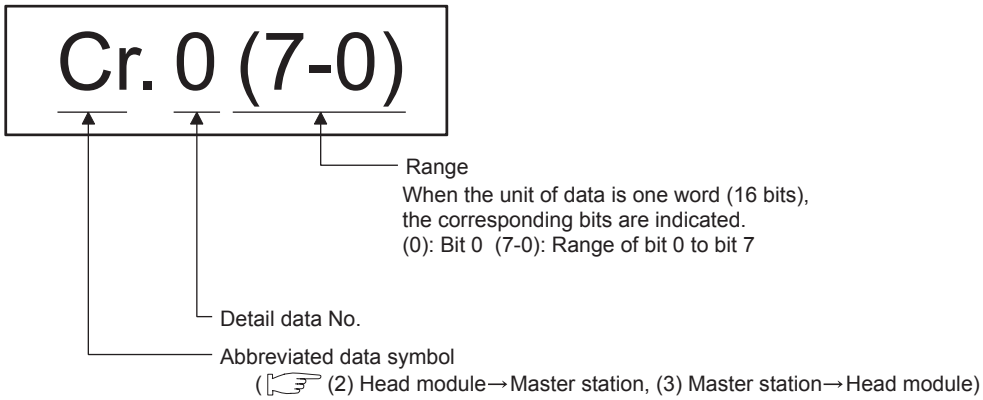
This manual explains each area for the CC-Link remote I/O. remote registers, and message transmission using Br, Wr, Cr, Bw, Ww, and Cw.





(1) Data symbol

<Example of Cr Command result area>



(2) Head module → Master station

(a) Remote input (RX)

Data symbol		Area	Unit	Detail data No. notation
Br	Br.00 to Br.n	Bit Input Area	1 bit/symbol	Hexadecimal

(b) Remote register (RWr)

Data symbol		Area	Unit	Detail data No. notation
Wr	Wr.00 to Wr.n	Word Input Area	1 word/symbol	Hexadecimal

(c) Message transmission

Data symbol		Area	Unit	Detail data No. notation
Cr	Cr.0 to Cr.n	Command Result Area	1 word/symbol	Decimal

(3) Master station → Head module

(a) Remote output (RY)

Data symbol		Area	Unit	Detail data No. notation
Bw	Bw.00 to Bw.n	Bit Input Area	1 bit/symbol	Hexadecimal

(b) Remote register (RWw)

Data symbol		Area	Unit	Detail data No. notation
Ww	Wn.00 to Wn.n	Word Input Area	1 word/symbol	Hexadecimal

(c) Message transmission

Data symbol		Area	Unit	Detail data No. notation
Cw	Cn.0 to Cn.n	Command Result Area	1 word/symbol	Decimal

ABOUT THE GENERIC TERMS AND ABBREVIATIONS

This manual uses the following generic terms and abbreviations to describe the ST1DA, unless otherwise specified.

Generic Term/Abbreviation	Description
ST1DA2-V	General term for ST1DA2-V and ST1DA2-V-F01 MELSEC-ST digital-analog converter modules.
ST1DA2-V-F01	Abbreviation for ST1DA2-V-F01 type MELSEC-ST digital-analog converter module.
ST1DA1-I	General term for ST1DA1-I and ST1DA1-I-F01 MELSEC-ST digital-analog converter modules.
ST1DA1-I-F01	Abbreviation for ST1DA1-I-F01 MELSEC-ST digital-analog converter module.
ST1DA	Generic term for ST1DA2-V and ST1DA1-I.
Head module	Abbreviation for the ST1H-BT MELSEC-ST CC-Link head module.
Bus refreshing module	Module that distributes external system power and auxiliary power to the head module and slice modules.
Power feeding module	Module that distributes external auxiliary power to slice modules.
Power distribution module	Generic term for the bus refreshing module and power feeding module.
Base module	Generic term for a module that transfers data between the head module and slice module, and between the slice module and external devices (including wiring).
Input module	Generic term for modules that handle input data in units of bits.
Output module	Generic term for modules that handle output data in units of bits.
Intelligent function module	Generic term for modules that handle input/output data in units of words.
I/O module	Generic term for input modules and output modules.
Slice module	Generic term for power distribution modules, I/O modules, and intelligent function modules that can be mounted on a base module.
MELSEC-ST system	Generic term for a system that is composed of a head module, slice modules, an end plate and end brackets.
GX Configurator-ST	Configuration software dedicated to the MELSEC-ST system. The general name of SWnD5C-STPB-E type products.(n=1 or later)
CC-Link	Abbreviation for Control and Communication Link system.
Master module	Abbreviation for the QJ61BT11N when it is used as a master station.
RDMSG	Abbreviation for dedicated instruction of master station.

TERM DEFINITION

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

Term	Definition
Cyclic transmission	A communication method by which remote I/O data and remote register data are transferred periodically.
Message transmission	A transmission method for writing parameters from the master station to a remote device station and reading the remote device station status.
Master station	This station controls the entire data link system. One master station is required for one system.
Remote I/O station	A remote station that can only use bit data. (Input from or output to external devices) (AJ65BTB1-16D, AJ65SBTB1-16D, etc.)
Remote device station	A remote station that can use both bit and word data. (Input from or output to external devices, or analog data conversion) (ST1H-BT, AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64AI, etc.)
SB	Link special relay (for CC-Link). Bit data that indicate the module operating status and data link status of the master/local station.
SW	Link special register (for CC-Link). Data in units of 16 bits, which indicate the module operating status and data link status of the master/local station.
RX	Remote input (for CC-Link). Bit data that are input from remote stations to the master station.
RY	Remote output (for CC-Link) Bit data that are output from the master station to remote stations.
RWr	Remote register. (CC-Link data read area) 16-bit word data that are input from remote device stations to the master station.
RWw	Remote register. (CC-Link data write area) 16-bit word data that are output from the master station to remote device stations.
Remote net Ver.1 mode	Select this mode when extended cyclic setting is not needed or when the QJ61BT11 is replaced with the QJ61BT11N.
Remote net Ver.2 mode	Select this mode when creating a new system with extended cyclic setting.
I/O data	Data that are sent/received between the head module and the master station. Generic term for RX, RY, RWr, and RWw.
Br.n bit input area	Bit input data of each module. Input data are sent from the head module to the master station through the remote input (RX).
Bw.n bit output area	Bit output data of each module. Output data are sent from the master station to the head module through the remote output (RY).
Wr.n word input area	Word (16-bit) input data of an intelligent function module. Input data are sent from the head module to the master station through the remote register (RWr).
Ww.n word output area	Word (16-bit) output data of an intelligent function module. Output data are sent from the master station to the head module through the remote register (RWw).
Cr.n command result area	An area for the information that indicates a command result. This information is stored in Setting data ((D1)+1 and after) of the RDMSG instruction of the master station.
Cw.n command execution area	An area for the information for executing a command. This information is stored in Setting data ((S2)+1 and after) of the RDMSG instruction of the master station.

Term	Definition
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.	The number assigned to every 2 occupied I/O points of each module. The numbers are assigned in ascending order, starting from "0" of the head module. (The maximum value is 127.) This is used for specifying a command execution target.
Slice position No.	The number that shows where the slice module is physically installed. The numbers are assigned in ascending order, starting from "0" of the head module. (The maximum value is 63.) This is used for specifying a command execution target.
Start slice No.	The start slice No. assigned to the head module and slice modules.
Command	Generic term for requests that are executed by the master station for reading each module's operation status, setting intelligent function module command parameters or various controls.
Command parameter	Generic term for parameters set in commands or GX Configurator-ST. All of the parameters set for the head module and slice modules are command parameters.

Packing list

One of the following ST1DA products is included.

Model name	Product name	Quantity
ST1DA2-V	ST1DA2-V MELSEC-ST digital-analog converter module	1
ST1DA1-I	ST1DA1-I MELSEC-ST digital-analog converter module	1
ST1DA2-V-F01	ST1DA2-V-F01 MELSEC-ST digital-analog converter module	1
ST1DA1-I-F01	ST1DA1-I-F01 MELSEC-ST digital-analog converter module	1

CHAPTER1 OVERVIEW

This User's Manual provides the specifications, handling, programming methods, etc. for the ST1DA2-V and ST1DA2-V-F01 MELSEC-ST digital-analog converter modules (hereinafter referred to as the ST1DA2-V) and ST1DA1-I and ST1DA1-I-F01 MELSEC-ST digital-analog converter modules (hereinafter referred to as the ST1DA1-I).
In this manual, the ST1DA2-V, ST1DA2-V-F01, ST1DA1-I, and ST1DA1-I-F01 are collectively referred to as the ST1DA.
This manual describes only the ST1DA.
For information on the MELSEC-ST system, refer to the following manual.
☞MELSEC-ST System User's Manual

Remark

Only the differences between the ST1DA2-V and ST1DA2-V-F01 and between the ST1DA1-I and ST1DA1-I-F01 are default values of the D/A conversion enable/disable function. (☞Section 3.3.1 Function list)
- ST1DA2-V and ST1DA1-I: D/A conversion disabled for channels
- ST1DA2-V-F01 and ST1DA1-I-F01: D/A conversion enabled for all channels

1.1 Features

(1) Available models

- ST1DA2-V·····2-channel voltage output type.
- ST1DA1-I·····1-channel current output type.

(2) Up to 26 modules can be mounted

For one head module, up to 26 ST1DA modules (ST1DA2-V: 52 channels, ST1DA1-I: 26 channels) can be mounted.

(3) Output range can be changed for each channel

The analog output range[*1] can be changed for each channel to change the I/O conversion characteristic.

* 1 The output range refers to the type of offset/gain settings. The most frequently used range is set as the default, but the user can make offset/gain settings according to the purpose.

(4) Clear/Hold/Preset functions

The analog output provided at a communication error or module fault can be selected.
(☞Section 3.3.2 Combinations of various functions)
- Clear : Outputs an offset value.
- Hold : Holds the latest analog value output from each channel.
- Preset : Outputs the preset value.

(5) Command function

By writing command parameters to the ROM using a command, D/A conversion can be made without setting the command parameters at a module start (power-on).

(6) High-speed conversion processing

Conversion processing is performed at a speed of 0.1ms/channel.

(7) High accuracy

This module performs D/A conversion at the accuracy of ± 0.8% relative to the maximum analog output value.

(8) Online module change

The module can be changed without the system being stopped.

(9) Easy settings using the GX Configurator-ST

The optional software package (GX Configurator-ST) is available.
GX Configurator-ST is not necessarily required for the system.
However, using GX Configurator-ST, allows on-screen parameter setting and offset/gain setting, which reduces programs of master station and makes the setting/operating status check easier.

CHAPTER2 SYSTEM CONFIGURATION

This chapter describes the system configuration for use of the ST1DA.

2.1 Overall Configuration

The overall configuration for use of the ST1DA is shown below.

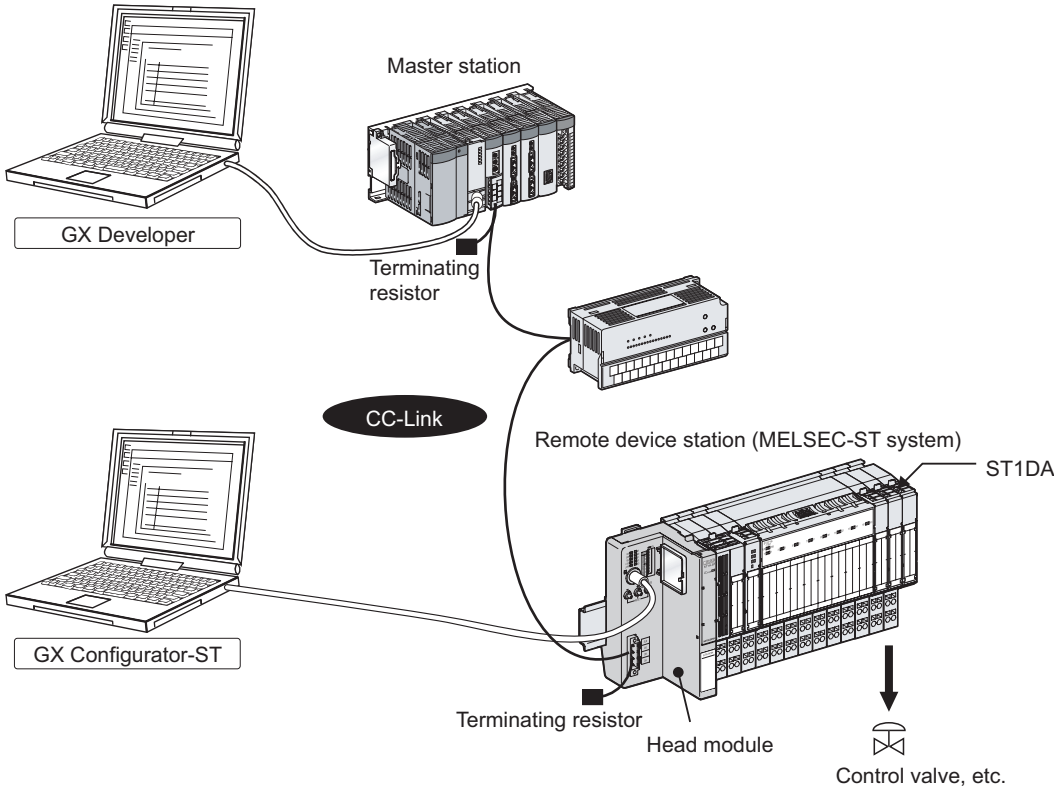


Figure 2.1 Overall system configuration

2.2 Applicable System

This section explains the applicable system.

2.2.1 Applicable head module

The head module applicable to the ST1DA is indicated below.

Table 2.1 Applicable head module

Product name	Model name
MELSEC-ST CC-Link Head Module	ST1H-BT

2.2.2 Applicable base module

The base modules applicable to the ST1DA are indicated below.

Table 2.2 Applicable base module

Type	Model name
Spring Clamp Type	ST1B-S4IR2
Screw Clamp Type	ST1B-E4IR2

2.2.3 Applicable coding element

The coding elements applicable for the ST1DA are indicated below.
The coding element is fitted before shipment.
It is also available as an option in case it is lost.

Table 2.3 Applicable coding element

Description	Model name
Coding element for ST1DA2-V or ST1DA2-V-F01	ST1A-CKY-11
Coding element for ST1DA1-I or ST1DA1-I-F01	ST1A-CKY12

2.2.4 Applicable software package

he software package applicable to the ST1DA is indicated below.

Table 2.4 Applicable software package

Product name	model name	Supported Version
GX Configurator-ST*1	SW1D5C-STPB-E	Ver.1.06G or later

* 1 GX Configurator-ST is optional.

2.3 Precautions for System Configuration

For precautions for ST1DA system configuration, refer to the following.

☞MELSEC-ST System User's Manual, "3.4 Precautions for System Configuration"

2.4 Checking Hardware and Software Versions

The hardware and software versions of the ST1DA can be checked on the DATE section on the rating plate, which is situated on the side of the module.

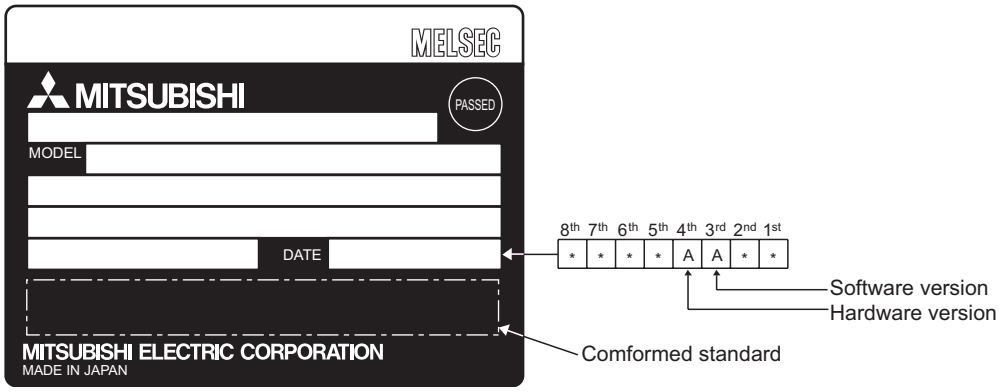


Figure 2.2 Rating plate

CHAPTER3 SPECIFICATIONS

This chapter provides the specifications of the ST1DA.
For the general specifications of the ST1DA, refer to the following manual.

☞ MELSEC-ST System User's Manual

3.1 Performance Specifications

Table 3.1 indicates the general specifications of the ST1DA.

Table 3.1 Performance specifications list

Item		Specification	
Model name		ST1DA2-V ST1DA2-V-F01	ST1DA1-I ST1DA1-I-F01
Number of analog output points		2 points (2 channels)	1 point (1 channel)
Digital input		16-bit signed binary (-4096 to 4095)	16-bit signed binary (0 to 4095)
Analog output	Voltage	-10 to 10 V DC (External load resistance value: 1 kΩ to 1MΩ)	----
	Current	----	0 to 20 mA DC (External load resistance value: 0 to 500Ω *1)
I/O characteristics, Maximum resolution		See the table below	
Accuracy (Accuracy in respect to maximum analog output value)	Ambient temperature 0 to 55℃	Within ± 0.8 % (± 80mV)	Within ± 0.8 % (± 160 μA)
Conversion speed		0.1 ms/channel	
Settling time		1 ms (maximum change within the range)	
Absolute maximum output	Voltage	± 12 V	----
	Current	----	21 mA
ROM write count		ROM write count of user range or parameter setting: Maximum 10,000 times	
Number of occupied I/O points		4 points for each of input and output	
Number of occupied slices		2	
Information amount	Input data	Br.n : Number of input data: 4, Wr.n : Number of input data: 0	
	Output data	Bw.n : Number of output data: 4, Ww.n : Number of output data: 2	
Isolation specifications		See the table below	
Applicable base module		Spring clamp type: ST1B-S4IR2, Screw clamp type: ST1B-E4IR2	
Applicable coding element		ST1A-CKY-11 (blue)	ST1A-CKY-12 (blue)

Analog output range		Digital input value	Maximum resolution
ST1DA2-V ST1DA2-V-F01 (Voltage)	0 to 10 V	0 to 4000	2.5 mV
	0 to 5 V		1.25 mV
	1 to 5 V		1.0 mV
	-10 to 10V	-4000 to 4000	2.5 mV
	User range setting		1.0 mV
ST1DA1-I ST1DA1-I-F01 (Current)	0 to 20 mA	0 to 4000	5 μA
	4 to 20 mA		4 μA
	User range setting		4 μA

Specific isolated area	Isolation method	Dielectric withstand	Insulation resistance
Between analog output terminals and internal bus	Photo coupler insulation	560V AC rms/3 cycles (elevation 2000m)	500V DC 10MΩ or more
Between analog output channels	No insulation	----	----

Table 3.1 Performance specifications list

Item	Specification
External AUX. power supply	24V DC (+20%/-15%, ripple ratio within 5%)
	24V DC current: 0.065 A
5V DC internal current consumption	0.095 A (0.10A is shown on the rating plate of the module.)
External dimensions	77.6 (3.06 in.)(H) × 12.6 (0.50 in.)(W) × 55.4 (2.18 in.)(D) [mm]
Weight	0.04 kg

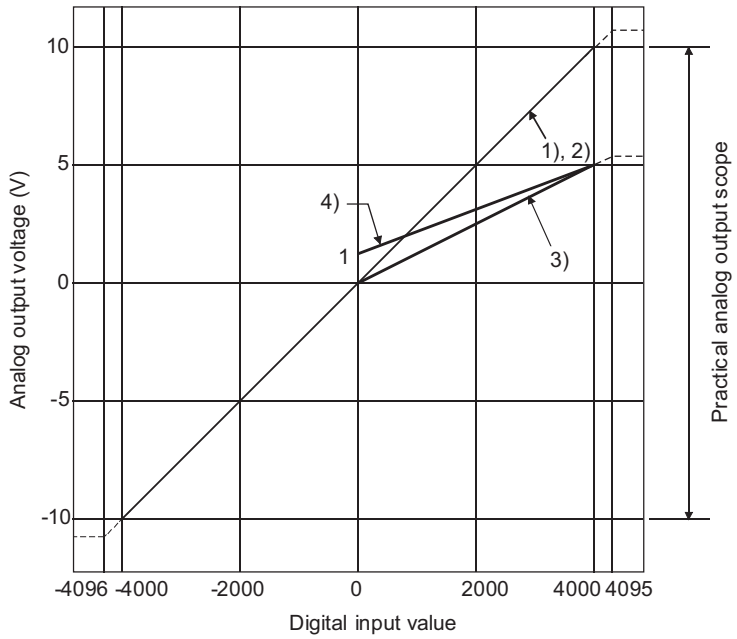
* 1 When the hardware version is C or earlier, it is 100 to 500 Ω.

3.2 I/O Conversion Characteristics

The I/O conversion characteristic indicates an inclination of a straight line that connects an offset value and a gain value at the time when the digital value written from the master station is converted into an analog value (voltage or current output).
The offset value is an analog value (voltage or current) output when the digital value is 0.
The gain value is an analog value (voltage or current) output when the digital value is 4000.

3.2.1 Output characteristics of ST1DA2-V

A graph of the ST1DA2-V output characteristic is shown below.



Number	Analog Output Range Setting	Offset Value	Gain Value	Digital Input Value	Maximum Resolution
1)	-10 to +10V	0V	10V	-4000 to 4000	2.5mV
2)	0 to 10V	0V	10V	0 to 4000	
3)	0 to 5V	0V	5V		1.25mV
4)	1 to 5V	1V	5V		1.0mV
--	User range setting	*1	*1	-4000 to 4000	1.0mV

Figure 3.1 Output characteristics of ST1DA2-V

POINT

(1) Within the digital input and analog output scopes of each output range, the maximum resolution and accuracy are within the performance specification range. Outside those scopes, however, they may not fall within the performance specification range. (Avoid using the dotted line part in Figure 3.1.)

(2) Set the offset/gain values for the user setting range *1 within a range in which the following conditions are satisfied.

(a) Offset/gain value setting range: -10 to 10V

(b) (Gain value) $>$ (Offset value)

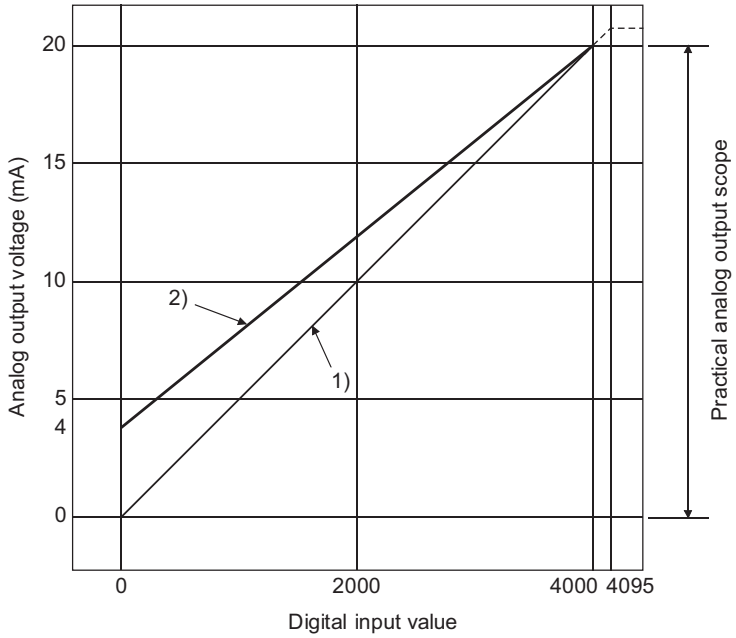
(c) { (Gain value) - (Offset value) } $\geqq$ 4V

If condition (b) is not satisfied, ERR.LED turns on, the value will not be written to the module.

When the setting is outside the condition in (c), conversion is made but the resolution is within the maximum resolution range of the performance specifications.

3.2.2 Output characteristics of ST1DA1-I

A graph of the ST1DA1-I output characteristic is shown below.



Number	Analog Output Range Setting	Offset Value	Gain Value	Digital Input Value	Maximum Resolution
1)	0 to 20mA	0mA	20mA	0 to 4000	5 μA
2)	4 to 20mA	4mA	20mA		4 μA
--	User range setting	*1	*1		4 μA

Figure 3.2 Output characteristics of ST1DA1-I

POINT

(1) Within the digital input and analog output scopes of each output range, the maximum resolution and accuracy are within the performance specification range. Outside those scopes, however, they may not fall within the performance specification range. (Avoid using the dotted line part in Figure 3.2.)

(2) Set the offset/gain values for the user setting range *1 within a range in which the following conditions are satisfied.

(a) Offset/gain value setting range: 0 to 20mA

(b) (Gain value) ＞ (Offset value)

(c) { (Gain value) - (Offset value) } ≧ 16mA

If condition (b) is not satisfied, ERR.LED turns on, the value will not be written to the module.

When the setting is outside the condition in (c), conversion is made but the resolution is within the maximum resolution range of the performance specifications.

3.2.3 Relation between offset/gain setting and analog output value

The resolution of ST1DA can be set arbitrarily by modifying the setting of the offset value and gain value.
The following shows how to calculate the analog value resolution and the analog output value for a given digital input value when the settings of the offset value and gain value are changed.

(1) Resolution

Find the resolution with the following expression.

$$\text{(Analog resolution)} = \frac{\text{(Gain value) - (Offset value)}}{4000}$$

(2) Analog output value

Find the analog output value with the following expression.

(Analog output) = (Analog resolution) × (Digital input value) + (Offset value)

3.2.4 Accuracy

Accuracy is relative to the maximum value of the analog output value.
If you change the offset/gain setting or output range to change the output characteristic, accuracy does not change and is held within the range indicated in the performance specifications.

(1) Accuracy of ST1DA2-V

The accuracy of the ST1DA2-V is relative to the maximum value (10V) of the analog output value.

Analog output is provided at the accuracy of within ±0.8% (±80mV).

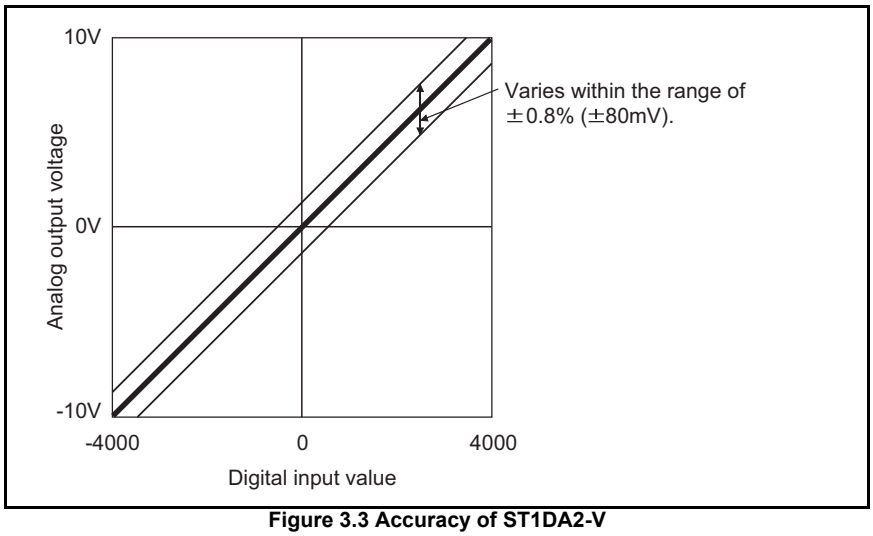


Figure 3.3 Accuracy of ST1DA2-V

(2) Accuracy of ST1DA1-I

The accuracy of the ST1DA1-I is relative to the maximum value (20mA) of the analog output value.

Analog output is provided at the accuracy of within ±0.8% (±160 μA).

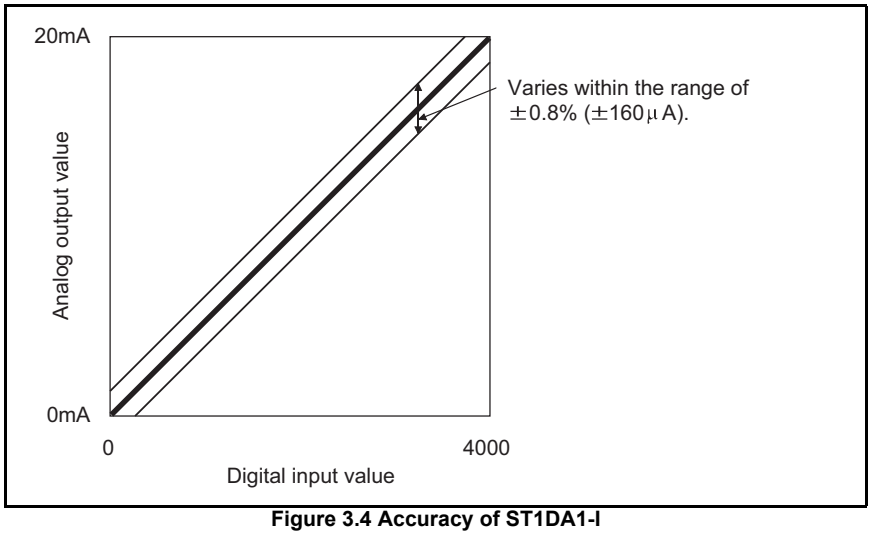


Figure 3.4 Accuracy of ST1DA1-I

3.2.5 Conversion speed

The conversion speed of the ST1DA is 0.1ms × number of conversion enabled channels.

3.2.6 Intelligent function module processing time

The intelligent function module processing time of the ST1DA is 0.1ms × number of conversion enabled channels.

For the output transmission delay time, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual

3.3 Function

This section explains the functions of the ST1DA.

3.3.1 Function list

The functions of the ST1DA are listed below.

Table 3.2 ST1DA function list

<table>
<tr><th>Item</th><th>Function</th><th>Reference section</th></tr>
<tr><td>D/A conversion enable/ disable function</td><td>(1) Specifies whether to enable or disable the D/A conversion for each channel.
(2) By disabling the D/A conversion for the unused channels, the conversion speed can be shortened.
(3) The Default varies depending on the model.
• ST1DA2-V, ST1DA1-I: D/A conversion disabled for all channels
• ST1DA2-V-F01, ST1DA1-I-F01: D/A conversion enabled for all channels
[Setting method]
• GX Configurator-ST (☞ Section 5.3 Parameter Setting)
• Dedicated instruction (RDMSG) from the master station
☞ Section 8.5.1 D/A conversion enable/disable setting (Command No.: A200H/2200H)</td><td>----</td></tr>
<tr><td>D/A output enable/disable function</td><td>(1) Specifies whether to enable or disable D/A conversion value output for each channel.
(2) The conversion speed is constant regardless of whether D/A output is enabled or disabled.
(3) By default, the D/A output for all channels is disabled.
[Setting method]
• Master station program (Bw.n+3 , Bw.n+2 output enable/disable flag)
☞ Section 3.4.2 Bit output area</td><td>----</td></tr>
<tr><td>Output range changing function</td><td>(1) The analog output range can be set for each to change the I/O conversion characteristics.
(2) The output range is selectable from the following.
<table>
<tr><th>Model</th><th>Output range</th></tr>
<tr><td rowspan="5">ST1DA2-V</td><td>-10 to 10V (default)</td></tr>
<tr><td>0 to 10V</td></tr>
<tr><td>0 to 5V</td></tr>
<tr><td>1 to 5V</td></tr>
<tr><td>User range setting</td></tr>
<tr><td rowspan="3">ST1DA1-I</td><td>4 to 20mA (default)</td></tr>
<tr><td>0 to 20 mA</td></tr>
<tr><td>User range setting</td></tr>
</table>
[Setting method]
• GX Configurator-ST (☞ Section 5.3 Parameter Setting)
• Dedicated instruction (RDMSG) from the master station
☞ Section 8.3.1 Initial data batch write request (Command No.: 8106H)
☞ Section 8.3.2 Initial data individual write request (Command No.: 8107H/0107H)</td><td>----</td></tr>
</table>

Table 3.2 ST1DA function list

Item	Function	Reference section
Clear/Hold/Preset functions	(1) The analog output provided at a communication error or module fault can be selected. • Clear: Outputs an offset value. • Hold: Holds the latest analog value output from each channel. • Preset: Outputs the preset value. (2) When Preset is selected, the preset value must be set. (3) When Clear/Hold/Preset is specified, all channels are cleared by default. (4) By default, the preset value is 4000. [Clear/Hold/Preset setting method] • Dedicated instruction (RDMSG) from the master station ☞ Section 8.3.1 Initial data batch write request (Command No.: 8106H) ☞ Section 8.3.2 Initial data individual write request (Command No.: 8107H/0107H) • GX Configurator-ST (☞ Section 5.3 Parameter Setting) [Preset value setting method] • GX Configurator-ST (☞ Section 5.3 Parameter Setting) • CH□ preset value write ☞ Section 8.5.2 CH[ ] preset value write (Command No.: A201H, A202H/2201H, 2202H)	Section 3.3.2
Command	(1) Using commands, command parameters can be set, and the parameter settings can be written from RAM to ROM and read from ROM to RAM.	CHAPTER 8
Offset/gain settings	(1) Setting of any offset value/gain value optimizes the I/O conversion characteristic according to the system. [Setting method] • GX Configurator-ST • Dedicated instruction (RDMSG) from the master station ☞ Section 8.6.4 Offset channel specification (Command No.: B203H/3203H) ☞ Section 8.6.5 Gain channel specification (Command No.: B204H/3204H)	Section 4.5 Section 5.6
Online module change	(1) A module can be replaced without the system being stopped. [Execution procedure] • GX Configurator-ST • Button operation of head module	CHAPTER 7

3.3.2 Combinations of various functions

By using D/A conversion enable/disable setting, Bw.n+3 , Bw.n+2 output enable/disable flag, and Clear/Hold/Preset setting (user parameter), analog outputs can be set as indicated below.
Configure settings for your system application.

Table 3.3 List of analog output status combinations in normal mode

Setting combination / Execution status	D/A conversion enable/disable	Enable				Disable
	Output enable/disable	Enable			Disable	Enable or disable
	Clear/Hold/Preset setting	Hold	Clear	Preset	Clear/Hold/Preset	Clear/Hold/Preset
When normal (other than the following execution statuses)		The analog value converted from the digital value set from the master station is output.			Offset value	0V/0mA
When the head module detects a communication error between the master station and head module		The analog value prior to a communication error is held.	Offset value	Preset value	Offset value	0V/0mA
When the other slice module does not respond	The operating status setting of the head module is stop setting	The analog value prior to a response stop is held.	Offset value	Preset value	Offset value	0V/0mA
	The operating status setting of the head module is continue setting	The analog value converted from the digital value set from the master station is output.			Offset value	0V/0mA
When an internal bus error occurs		The analog value prior to error occurrence is held.	Offset value	Preset value	Offset value	0V/0mA
When a digital value setting error occurs		Output of the maximum or minimum analog value.			Offset value	0V/0mA
When a watchdog timer error*1 occurs		0V/0mA				

* 1 This occurs when program operations are not completed within the predetermined time due to a hardware problem of the ST1DA.

Table 3.4 List of analog output status combinations in offset/gain setting mode

Setting combination / Execution status	D/A conversion enable/disable	Enable				Disable
	Output enable/ disable	Enable			Disable	Enable or disable
	Clear/Hold/Preset setting	Hold	Clear	Preset	Clear/Hold/Preset	Clear/Hold/Preset
When normal (other than the following execution statuses)		The offset/gain setting is output.				
When the head module detects a communication error between the master station and head module		The offset/gain setting is output.				
When the other slice module does not respond	The operating status setting of the head module is stop setting	The offset/gain setting is output.				
	The operating status setting of the head module is continue setting	The offset/gain setting is output.				
When an internal bus error occurs		The offset/gain setting is output.				
When a watchdog timer error*1 occurs		0V/0mA				

* 1 This occurs when program operations are not completed within the predetermined time due to a hardware problem of the ST1DA.

3.4 I/O Data

The ST1DA has the areas for data transfer with the head module as indicated below.
This section explains the composition of each area.

Table 3.5 I/O data list

Transfer direction	Item	Number of Occupancy	Default value	Refer section
ST1DA → Head module (Input Data)	Br Bit Input Area	4	0	Section 3.4.1
	Wr Word Input Area	0	0	----
Head module → ST1DA (Output Data)	Bw Bit Output Area	4	0	Section 3.4.2
	Ww Word Output Area	2	0	Section 3.4.3

3.4.1 Bit Input Area

This section explains the Br bit input area.

(1) "Br.n" Module ready

(a) Turns on (1) as soon as D/A conversion becomes ready when the MELSEC-ST system (ST1DA) is powered on or the head module is reset.

(b) When the Br.n Module ready signal is off (0), D/A conversion processing is not performed.

(c) Br.n Module ready turns off (0) in the following situations:
- During offset/gain setting mode
- When watchdog timer error occured
- During online module change

(☞ CHAPTER 7 ONLINE MODULE CHANGE)

(2) "Br.n+1" Convert setting completed flag

(a) After Bw.n+1 convert setting request has turned on (1), this turns on (1) when command parameter setting check is completed. (Also, turns on (1) if a setting error is detected.)

[When parameter setting check result is normal]

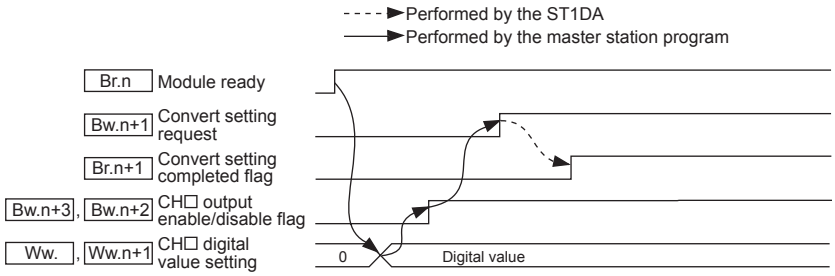


Figure 3.5 When parameter setting check result is normal

[When parameter setting check result is abnormal]

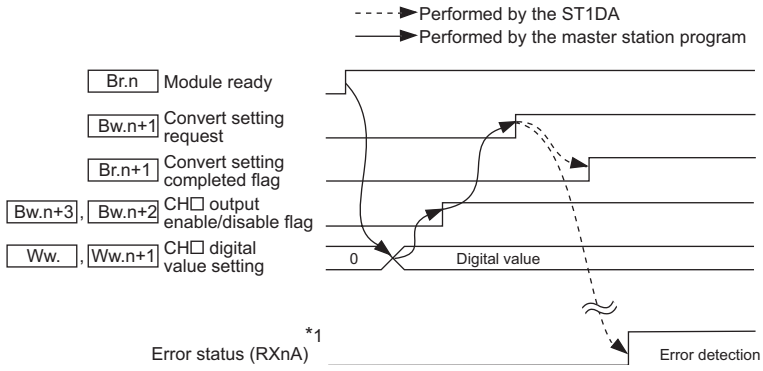


Figure 3.6 When parameter setting check result is abnormal

* 1 The error status (RXnA) means that of the remote input in the head module. For details of the error status (RXnA), refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "3.4 Remode I/O and Remote Registers"

(3) "Br.n+3", "Br.n+2" System area

(a) Use of this area is prohibited (fixed to 0).

3.4.2 Bit output area

This section explains the [Bw] bit output area.

(1) "Bw.n" System area

(a) Use of this area is prohibited (fixed to 0).

(2) "Bw.n+1" Convert setting request

(a) This turns on (1) when starting D/A conversion of a channel that is set to Enable in D/A conversion enable/disable setting.
When turned off (0), D/A conversion is stopped.
- OFF(0): Conversion stop (Default)
- ON (1): Conversion start

(b) This turns from off (0) to on (1) to validate the command parameter settings.

1) When writing the command parameters, turn off (0) the [Bw.n+1] convert setting request to stop the conversion.
When it is on (1), the command parameters cannot be written.

2) Regardless of whether the [Bw.n+1] convert setting request is on or off, the output setting and Clear/Hold/Preset setting are written but not validated. (Turn the [Bw.n+1] convert setting request from off (0) to on (1).)

(c) For the on (1)/off (0) timing, refer to the [Br.n+1] description in Section 3.4.1.

(3) "Bw.n+2" CH1 output enable/disable flag, "Bw.n+3" CH2 output enable/disable flag

(a) Set whether to enable or disable D/A conversion value output for each channel.
- OFF (0): Output disabled (Default)
- ON (1): Output enabled

(b) The conversion speed is constant regardless of the output enable/disable setting.

(c) For the ST1DA1-I, [Bw.n+3] is fixed to off (0). Any other set value is invalid.

(d) For the on (1)/off (0) timing, refer to the [Br.n+1] description in Section 3.4.1.

3.4.3 Word output area

This section explains the Ww word output area.

(1) "Ww.n" CH1 digital value setting, "Ww.n+1" CH2 digital value setting

(a) In this area, digital values to be converted into analog values are written from the master station.

(b) The digital value that may be set is a 16-bit signed binary within the setting range which matches the output range setting.
If a digital value outside the setting range is set, the data indicated in the following table is used to perform D/A conversion.

Table 3.6 Output range and available setting range

Output range	Available setting range	Digital value that is set when a value outside the valid range is written
-10 to 10V User range setting (ST1DA2-V)	-4096 to 4095 (Practical scope: -4000 to 4000)	4096 or more: 4095 -4097 or less: -4096
0 to 10V 0 to 5V 1 to 5V 0 to 20mA 4 to 20mA User range setting (ST1DA1-I)	0 to 4095 (Practical scope: 0 to 4000)	4096 or more: 4095 -1 or less: 0

(c) In the case of the ST1DA1-I, setting to Ww.n+1 is invalid.

3.5 Memory and Parameters

This section explains the memory and parameters of the ST1DA.

3.5.1 Memory

RAM and ROM are available as the parameter storage memory of the ST1DA.

(1) RAM

(a) The ST1DA operates based on the parameter settings stored in the RAM.

(b) The parameter settings stored in the RAM become valid when the Bw.n+1 convert setting request turns from OFF to ON.

(2) ROM

(a) The ROM stores the parameters.
The stored parameters are not erased at power-off.

(b) The parameters stored in the ROM are transferred to the RAM when:
- The MELSEC-ST system (ST1DA) is powered off, then on;
- The head module is reset;
- Parameter setting read from ROM (command No.: B200H/ 3200H) is executed.

3.5.2 Parameters

The setting items for the ST1DA operation are referred to as command parameters.

(1) Setting command parameters

Use either of the following methods to set the command parameters.

(a) GX Configurator-ST

Using GX Configurator-ST allows easy on-screen setting and can reduce the master station's programs.

The set values used for MELSEC-ST system startup must be written to the ROM for saving. (Writing to the RAM is used temporarily for testing.)

(b) Command

1) With the dedicated instruction (RDMSG) of the master station, write set values to the ST1DA's RAM.
2) Write the values written to the RAM to the ROM using the Parameter setting write to ROM (command No.: B201H/3201H).
3) Writing command parameters to the ROM in advance will reduce the master station's programs.

(2) Command parameter list

Command parameters and corresponding command numbers, which are used when using the dedicated instruction, are listed below.

These command parameters can be also set in GX Configurator-ST.

Table 3.7 Command parameter list

Setting item	Command No.
Output range setting	8106H
	B107H/0107H
Clear/Hold/Preset setting	8106H
	8107H/0107H
D/A conversion enable/disable setting	A200H/2200H
Preset value setting	A201H/2201H
	A202H/2202H

POINT

For commands with the number 8000H and greater, determine the head module and slice modules with their slice position number.

And for commands with the number 7FFFH and lower, determine them with their start slice number.

CHAPTER4 SETUP AND PROCEDURES BEFORE OPERATION

4.1 Handling Precautions

(1) Do not drop the module or give it hard impact 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, malfunction injury or fire.

(3) Be careful not to let foreign particles such as swarf or wire chips enter the module.
They may cause a fire, mechanical failure or malfunction.

4.2 Setup and Procedure before Operation

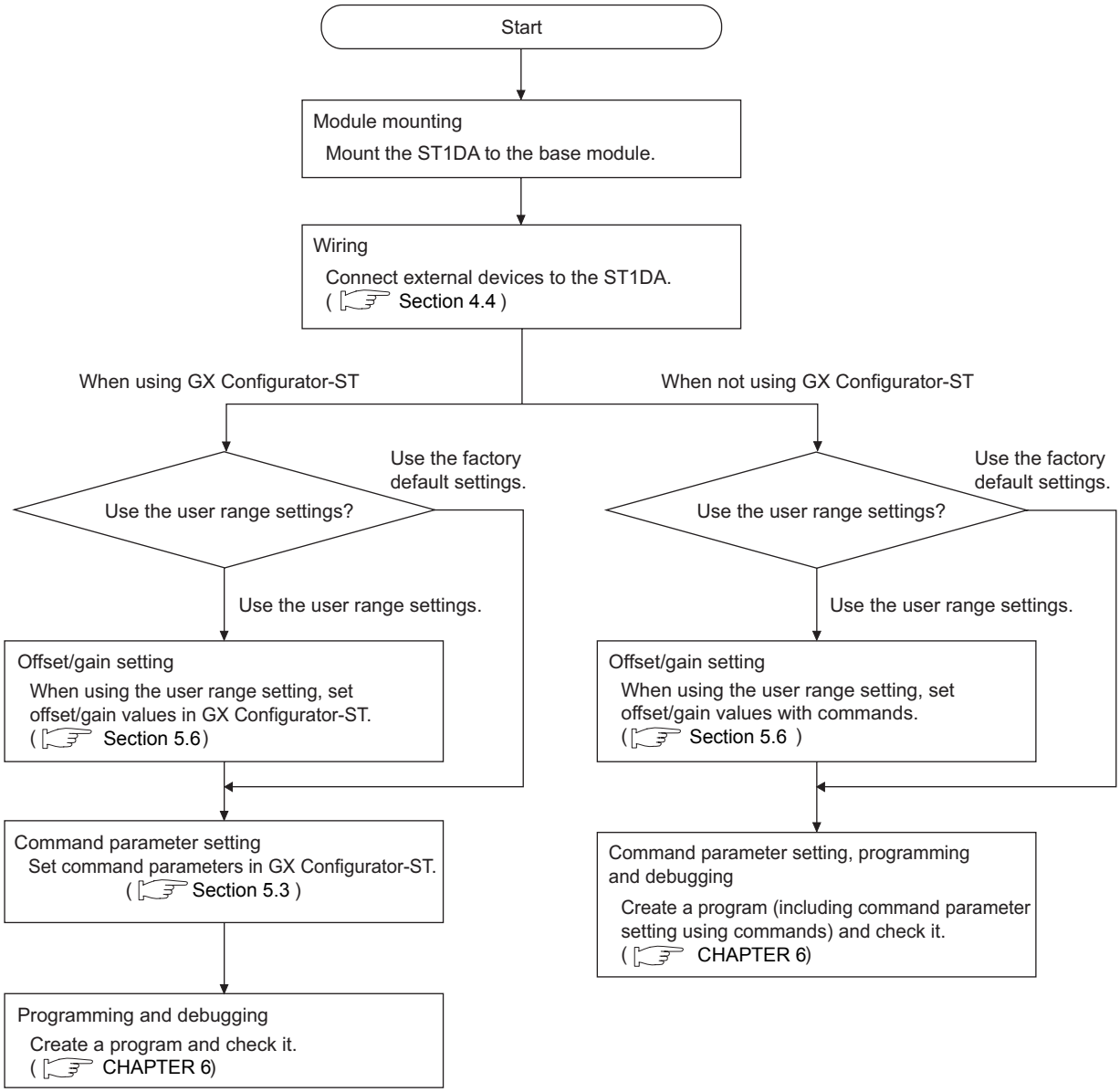


Figure 4.1 Setup and procedure before operation

4.3 Part Names

The name of each part in the ST1DA is listed below.
The following shows the ST1DA mounted on the spring clamp type base module.
Appearances of the ST1DA2-V-F01 and ST1DA1-I-F01 are the same as below, except for the model name parts.

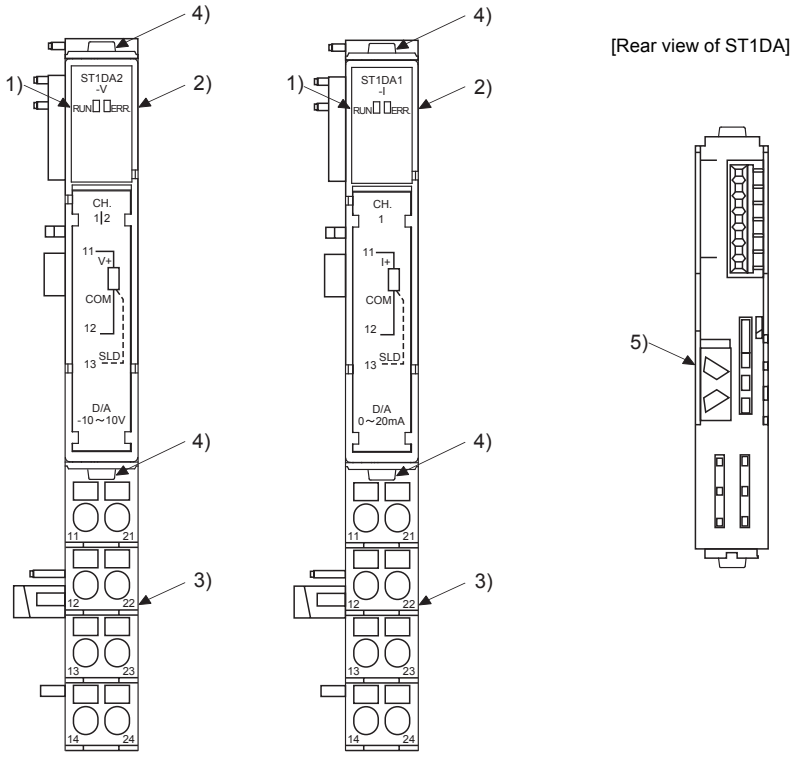


Figure 4.2 Part names

Table 4.1 Part names and functions

No.	Name and appearance	Description
1)	RUN LED	RUN LED and ERR. LED (on/flashing/off) indicate various statuses of the ST1DA (☞ Section 4.3.1 Status confirmation by LED indicators).
2)	ERR. LED	
3)	Terminal block	The output signals of the ST1DA are wired to the terminal block of the base module. [Applicable base modules] Spring Clamp Type: ST1B-S4IR2 Screw Clamp Type: ST1B-E4IR2
4)	Slice module fixing hooks (at both ends)	Used for mounting/dismounting the ST1DA to/from the base module. While the hooks at both ends are pressed, mount/dismount the ST1DA.
5)	Coding element	Prevents the module from being mounted incorrectly. The coding element consists of two pieces, and its shape changes depending on the model name. When the ST1DA is mounted on the base module and then dismounted, one piece of the coding element remains on the base module, and the other remains on the ST1DA. The ST1DA can be mounted onto the base module that matches the ST1DA coding element. [Applicable coding element] ST1DA2-V or ST1DA2-V-F01: ST1A-CKY-11 ST1DA1-I or ST1DA1-I-F01: ST1A- CKY-12

POINT

In order to ensure safety, make sure to attach the coding element to the base module and ST1DA.

Table 4.2 Terminal number assignment

Terminal No.	Signal name			
	ST1DA2-V		ST1DA1-I	
11	CH1	V +	CH1	I +
12		COM		COM
13		SLD		SLD
14		Vacancy		Vacancy
21	CH2	V +	Vacancy	
22		COM	Vacancy	
23		SLD	Vacancy	
24		Vacancy	Vacancy	

4.3.1 Status confirmation by LED indicators

Table 4.3 explains the LED indications.

Table 4.3 LED indications

LED indication		Operating status
RUN LED	ERR.LED	
On	Off	Module is operating normally.
	Flashing (0.5s interval)	Warning has occurred.
	On	System error has occurred.
Flashing (1s interval)	Off	Cyclic transmission is stopped between the master module and head module, a parameter communication error has occurred between the master module and head module, another slice module is faulty, or an internal bus error has occurred.
	Flashing (0.5s interval)	Cyclic transmission is stopped between the master module and head module, a parameter error has occurred between the master module and head module, another slice module is faulty, or an internal bus error or a warning has occurred.
	On	Cyclic transmission is stopped between the master module and head module, a parameter error has occurred between the master module and head module, another slice module is faulty, or an internal bus error or a system error has occurred.
Flashing (0.5s interval)	Off	Module is in offset/gain setting mode.
	Flashing (0.5s interval)	Warning has occurred in offset/gain setting mode.
	On	System error has occurred in offset/gain setting mode.
Flashing (0.25s interval)	Off	Module is selected as the target of online module change.
	Flashing (0.5s interval)	Warning occurred when the module is selected as the target of online module change.
	On	System error occurred when the module is selected as the target of online module change.
Off	Off	Power is off or the module is being replaced online.
	Flashing (0.5s interval)	Warning occurred during online module change.
	On	System error has occurred during online module change.

4.4 Wiring

The wiring precautions and examples of module connection are provided below.

4.4.1 Wiring precautions

In order to optimize the functions of the ST1DA and ensure system reliability, external wiring, that is protected from noise, is required.
Please observe the following precautions for external wiring:

(1) Use separate cables for the AC control circuit and the external input signals of the ST1DA to avoid the influence of the AC side surges and inductions.

(2) Do not bring/install the cables closer to/together with the main circuit line, a high-voltage cable or a load cable from other than the MELSEC-ST system. This may increase the effects of noise, surges and induction.

(3) Though it is not required to ground the SLD terminal, grounding it may provide higher accuracy depending on noise conditions.

4.4.2 External wiring

Wire the cables to the base module (sold separately).

(1) For ST1DA2-V

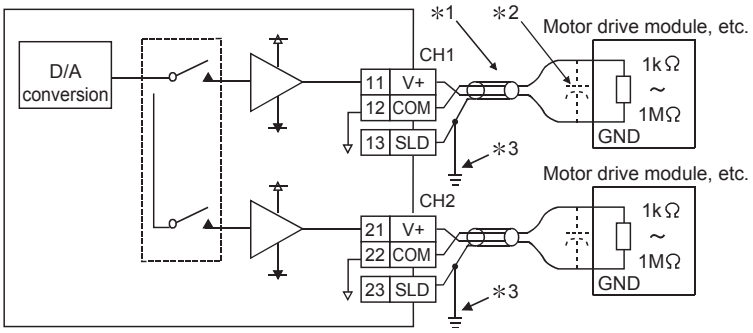


Figure 4.3 External wiring of ST1DA2-V

* 1 Use a twisted two core shielded wire for the power wire.
* 2 When using an external device with high frequency response, connect a 0.01 to 0.47 μF 25V capacitor between its terminals.
* 3 Though it is not required to ground the SLD terminal, grounding it may provide higher accuracy depending on noise conditions.
  Make sure to use a cable clamp or terminal block to ground the SLD terminal.
  The SLD terminal is not grounded to the FG of power distribution module inside the module.

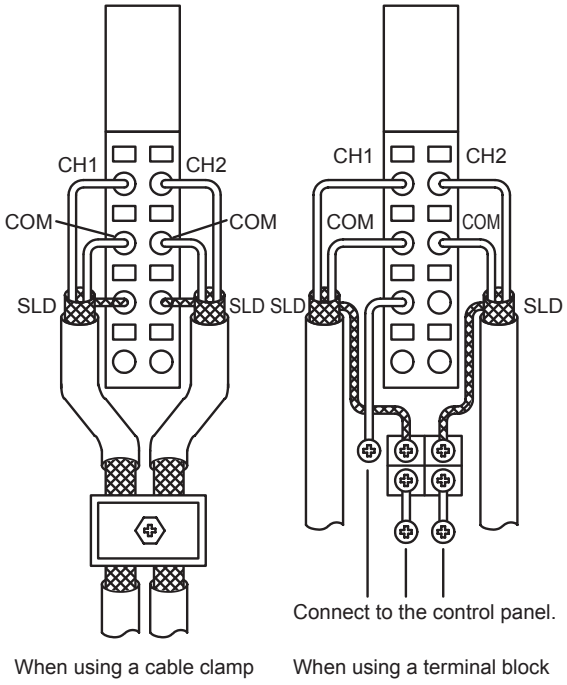


Figure 4.4 Terminal block wiring diagram

(2) For ST1DA1-I

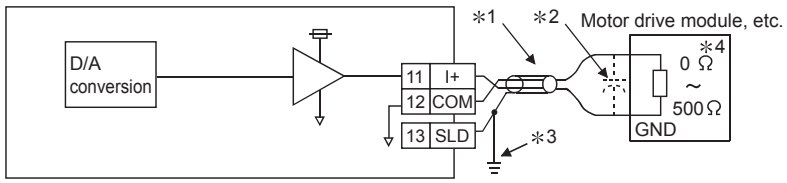


Figure 4.5 External wiring of ST1DA1-I

* 1 Use a twisted two core shielded wire for the power wire.
* 2 When using an external device with high frequency response, connect a 0.01 to 0.47 μF 25V capacitor between its terminals.
* 3 Though it is not required to ground the SLD terminal, grounding it may provide higher accuracy depending on noise conditions.
  Make sure to use a cable clamp or terminal block to ground the SLD terminal.
  The SLD terminal is not grounded to the FG of power distribution module inside the module.
* 4 "100 Ω to 500 Ω" for the ST1DA1-I hardware version C or earlier.

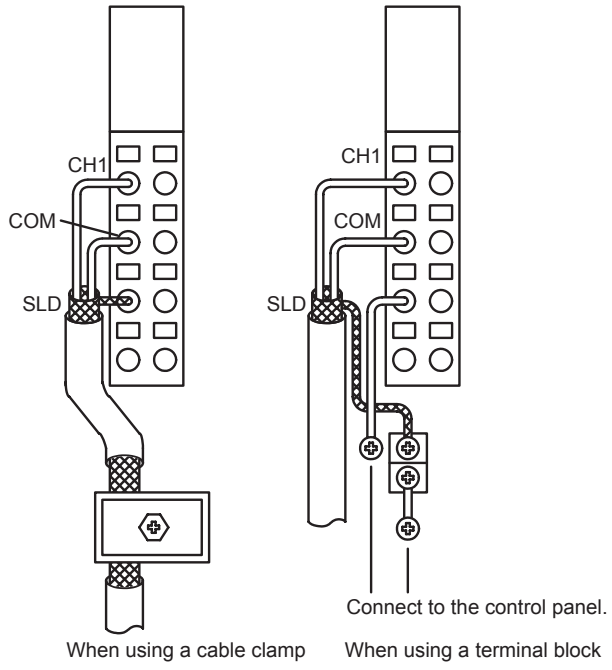


Figure 4.6 Terminal block wiring diagram

4.5 Offset/Gain Settings

To use the user range setting, configure the offset/gain settings.
When the factory default setting is used, offset/gain settings are not required.
Following methods for offset/gain settings are available.

(1) Setting offset/gain values with GX Configurator-ST

Configure offset/gain settings in GX Configurator-ST.

☞Section 5.6 Offset/Gain Setting

(2) Setting offset/gain values using commands

Set offset/gain values as shown in Figure 4.7.

(a) Offset/gain setting procedure

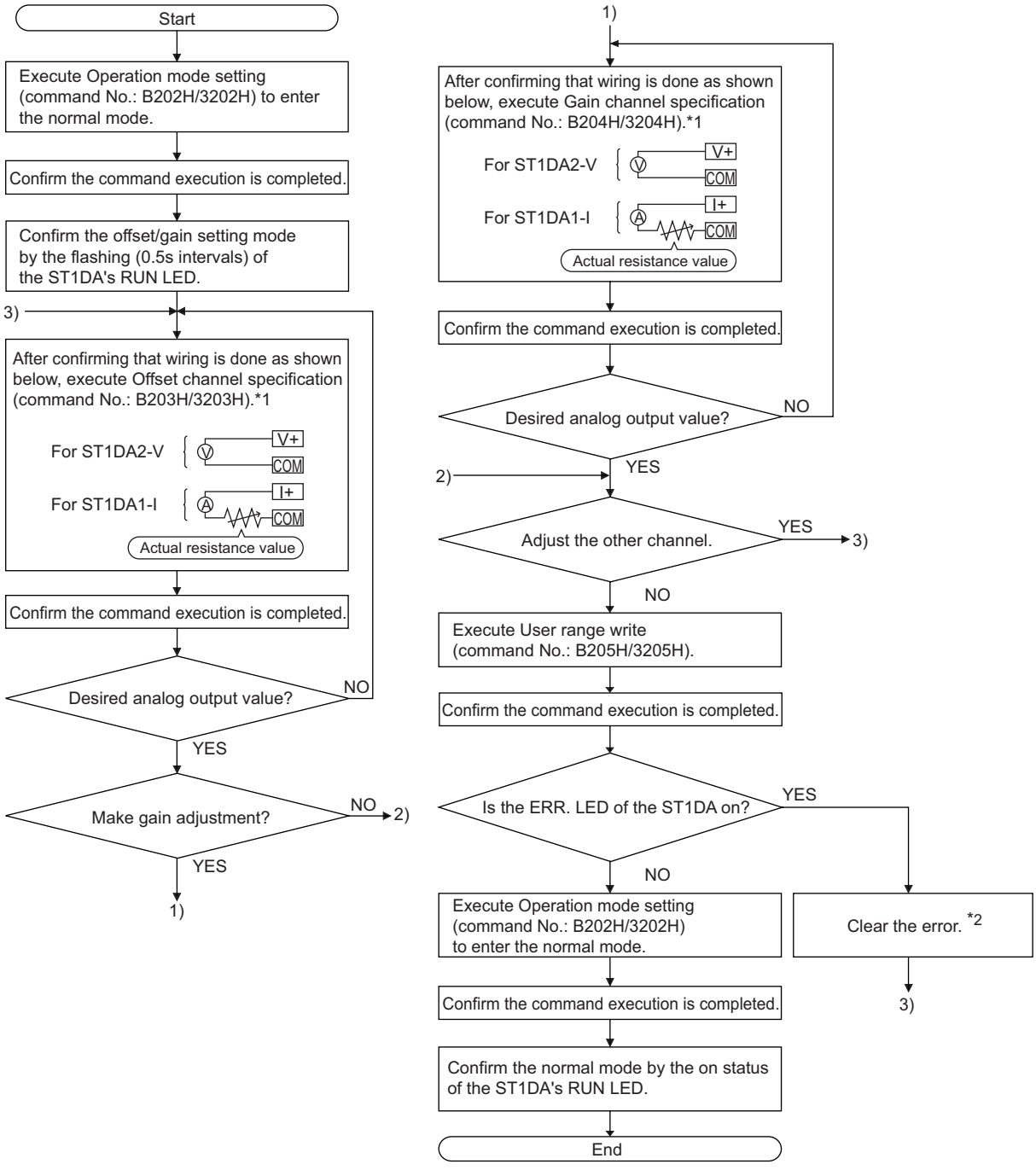


Figure 4.7 Offset/gain setting procedure

* 1: When the command is executed, the analog output value is adjusted according to the argument 1/ argument 2 setting.
* 2: The error can be cleared by either of the following methods:
  • Error clear request (command No.: 8104H/0104H)
  • Error reset request (RYnA)
  For details of the above methods, refer to the following.
  ☞ MELSEC-ST CC-Link Head Module User's Manual, "8.2.5 Error clear request (Command No.: 8104H/0104H)
  ☞ MELSEC-ST CC-Link Head Module User's Manual, "3.4 Remote I/O, Remote Registers"

☒POINT

(1) Make the offset/gain setting in the ranges that satisfy the conditions indicated in POINT (2) of Section 3.2.1 or POINT (2) of Section 3.2.2.
When the setting exceeds this range, the maximum resolution or total accuracy may not be within the range indicated in the performance specification.

(2) Set the offset/gain values according to the real application situation.
After the setting is completed, confirm that the offset/gain values are set correctly in the real application.

(3) The offset and gain values are stored into the ROM and are not erased at power-off.

(4) When making the offset/gain setting, write the values to the ROM using User range write (command No.: B205H/3205H).
Data can be written to the ROM up to 10,000 times.
To prevent accidental write to the ROM, write to ROM is counted, starting at power-on.

(5) If an error occurs during offset/gain setting, the offset and gain values are not written to the ST1DA.
Set the correct offset and gain values again.

(b) Programming

The program example given here contains mode switching (between normal mode and offset/gain setting mode), specification of the offset/gain setting channel, offset/gain value adjustment, and offset/gain value writing to the ST1DA.
The following program example is based on the system configuration given in Section 6.2.
For parameter settings and I/O data assignments, refer to Section 6.2.

(c) Device allocation in the program example

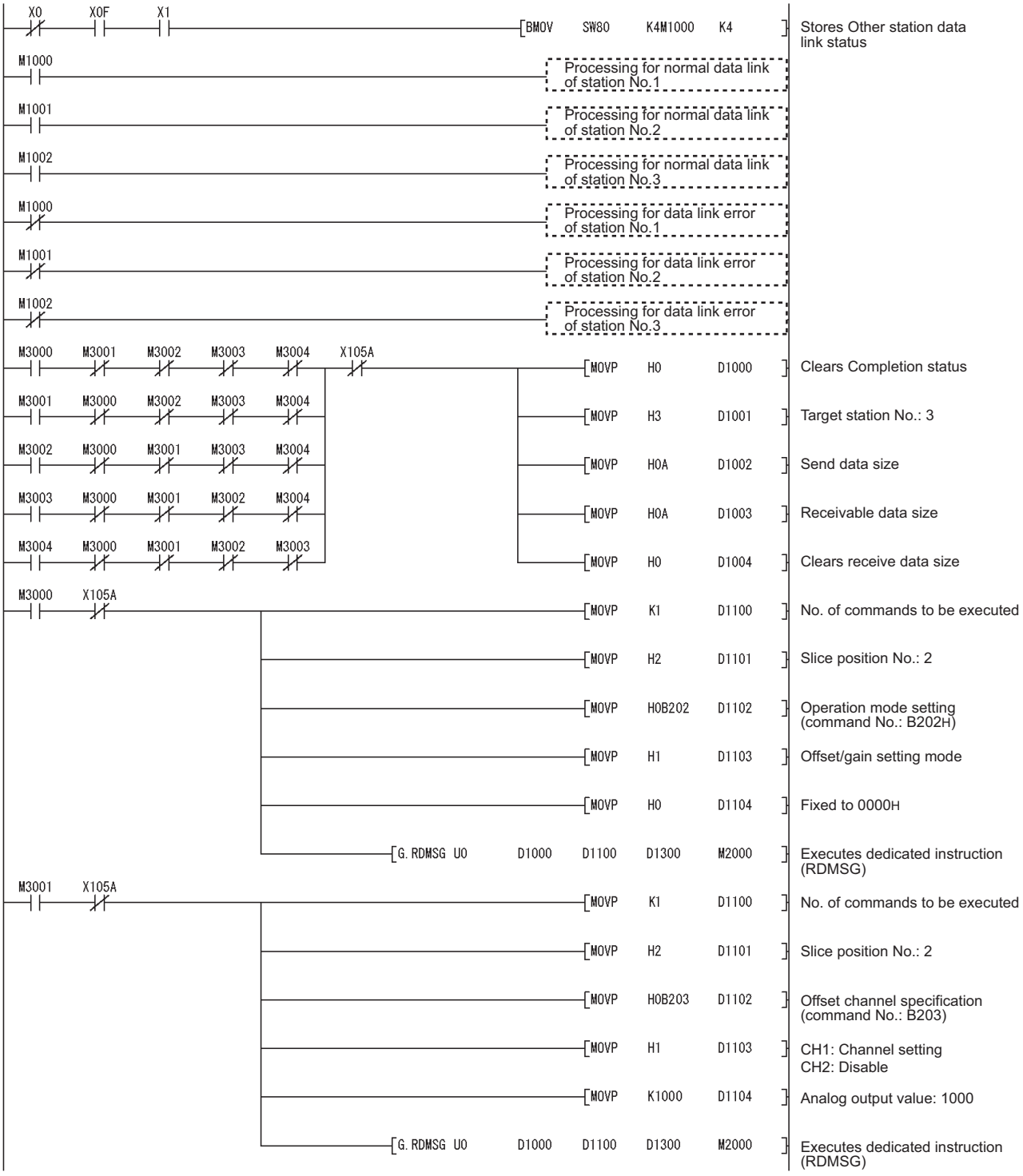
For devices used in common with other program examples, refer to the following.
☞Section 6.4 (1) Device assignments in program examples

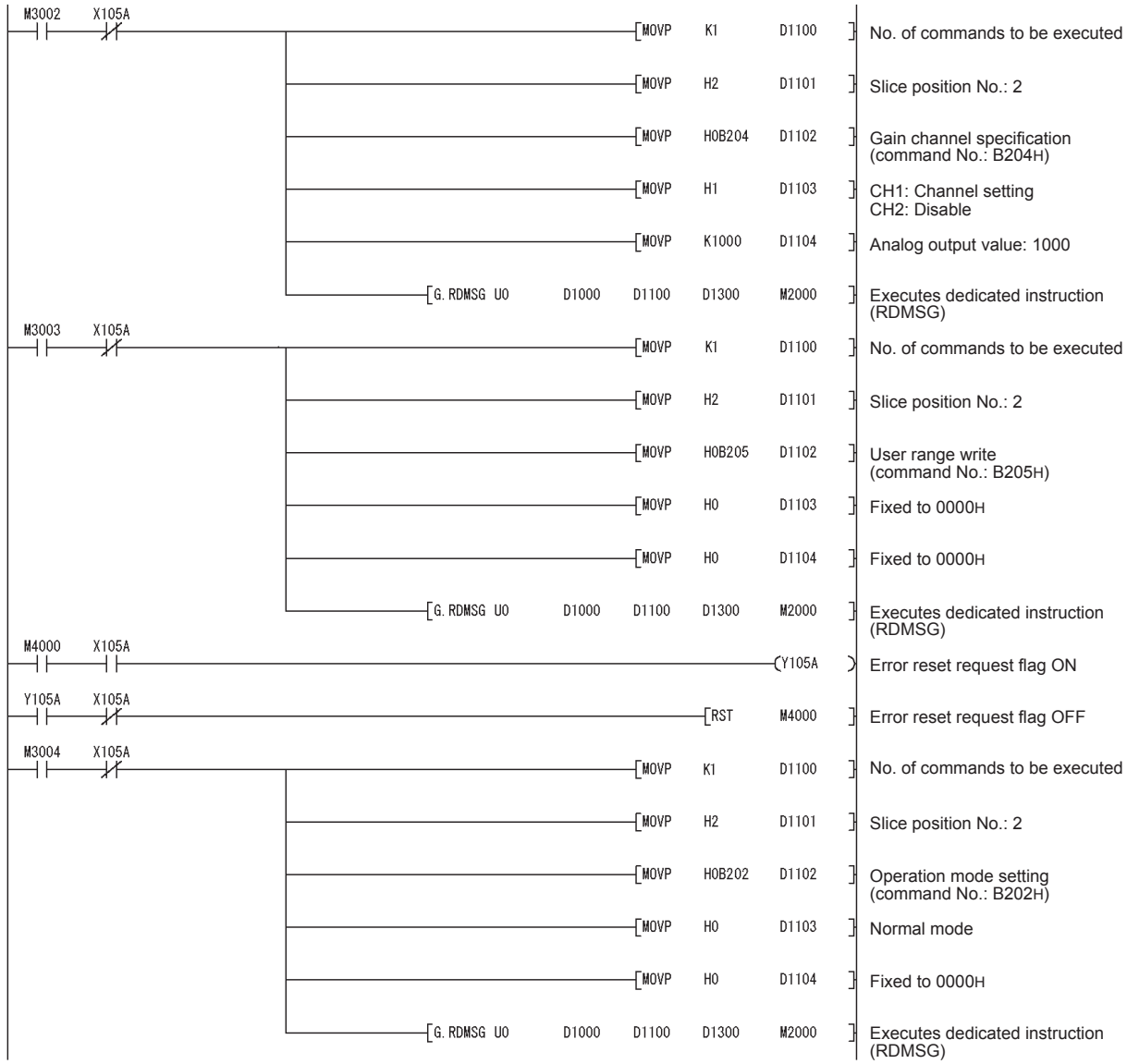
1) Device allocation in the program example

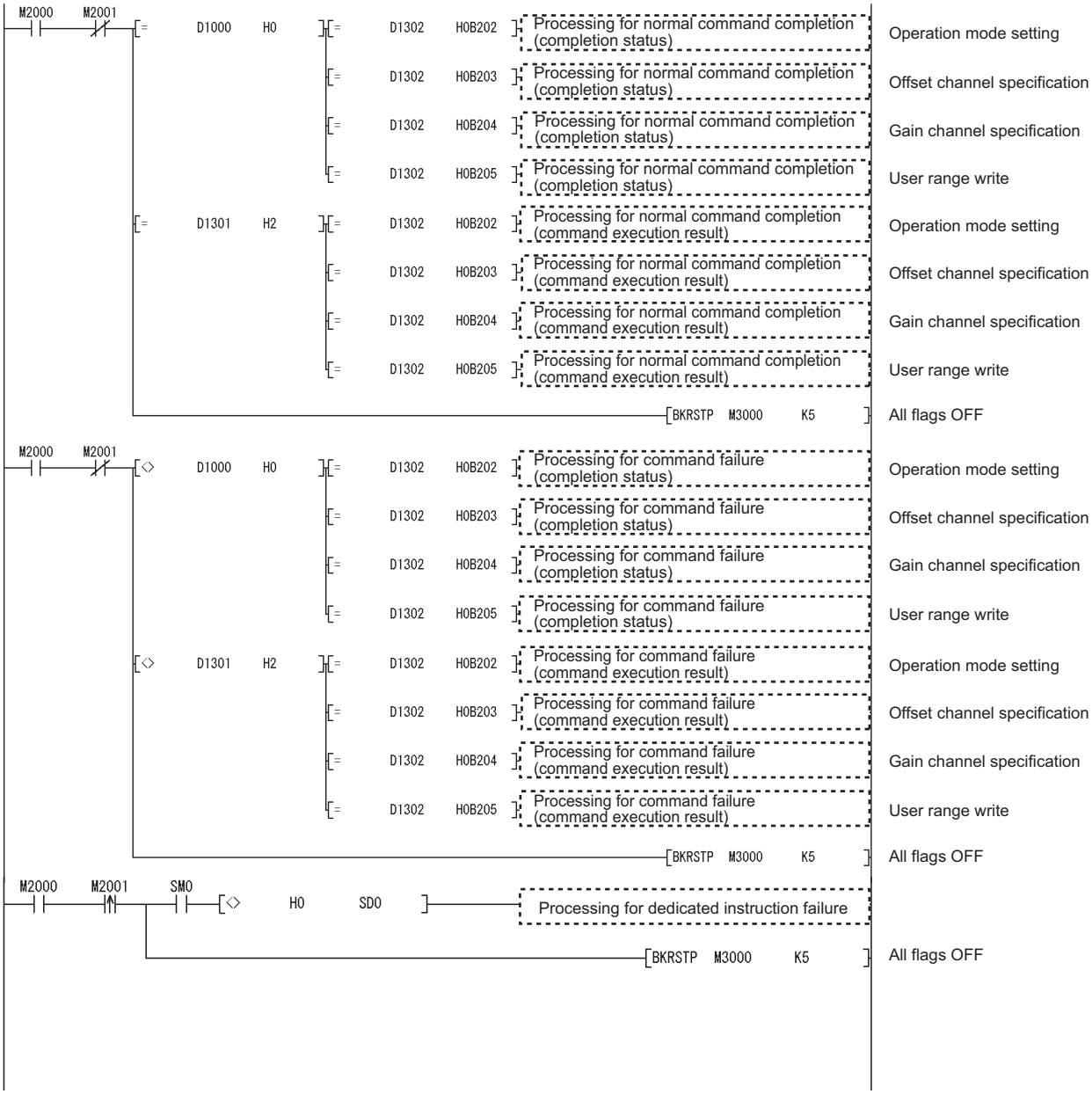
Table 4.4 Setting for initial data write command

Device	Application	Device	Application
M1000	Other station data link status (Station No.1)	D1000 to D1004	Control data
M1001	Other station data link status (Station No.2)	D1100 to D1104	Send data (execution data of the command)
M1002	Data link status of ST1H-BT (Station No.3)	D1300 to D1304	Receive data (result data of the command)
M2000	Completion device	-	-
M2001	Completion status indicator device		
M3000	Offset/gain setting mode switching flag		
M3001	Offset channel specification flag		
M3002	Gain channel specification flag		
M3003	User range write flag		
M3004	Normal mode switching flag		
M4000	Error reset request flag		

2) Program example




M3002 X105A
MOVP K1 D1100
No. of commands to be executed
MOVP H2 D1101
Slice position No.: 2
MOVP H0B204 D1102
Gain channel specification (command No.: B204H)
MOVP H1 D1103
CH1: Channel setting CH2: Disable
MOVP K1000 D1104
Analog output value: 1000
G.RDMSG U0 D1000 D1100 D1300 M2000
Executes dedicated instruction (RDMSG)
M3003 X105A
MOVP K1 D1100
No. of commands to be executed
MOVP H2 D1101
Slice position No.: 2
MOVP H0B205 D1102
User range write (command No.: B205H)
MOVP H0 D1103
Fixed to 0000H
MOVP H0 D1104
Fixed to 0000H
G.RDMSG U0 D1000 D1100 D1300 M2000
Executes dedicated instruction (RDMSG)
M4000 X105A
Y105A
Error reset request flag ON
Y105A X105A
RST M4000
Error reset request flag OFF
M3004 X105A
MOVP K1 D1100
No. of commands to be executed
MOVP H2 D1101
Slice position No.: 2
MOVP H0B202 D1102
Operation mode setting (command No.: B202H)
MOVP H0 D1103
Normal mode
MOVP H0 D1104
Fixed to 0000H
G.RDMSG U0 D1000 D1100 D1300 M2000
Executes dedicated instruction (RDMSG)


M2000 M2001
= D1000 H0
= D1302 H0B202 Processing for normal command completion (completion status) Operation mode setting
= D1302 H0B203 Processing for normal command completion (completion status) Offset channel specification
= D1302 H0B204 Processing for normal command completion (completion status) Gain channel specification
= D1302 H0B205 Processing for normal command completion (completion status) User range write
= D1301 H2
= D1302 H0B202 Processing for normal command completion (command execution result) Operation mode setting
= D1302 H0B203 Processing for normal command completion (command execution result) Offset channel specification
= D1302 H0B204 Processing for normal command completion (command execution result) Gain channel specification
= D1302 H0B205 Processing for normal command completion (command execution result) User range write
BKRSTP M3000 K5 All flags OFF
M2000 M2001
<> D1000 H0
= D1302 H0B202 Processing for command failure (completion status) Operation mode setting
= D1302 H0B203 Processing for command failure (completion status) Offset channel specification
= D1302 H0B204 Processing for command failure (completion status) Gain channel specification
= D1302 H0B205 Processing for command failure (completion status) User range write
<> D1301 H2
= D1302 H0B202 Processing for command failure (command execution result) Operation mode setting
= D1302 H0B203 Processing for command failure (command execution result) Offset channel specification
= D1302 H0B204 Processing for command failure (command execution result) Gain channel specification
= D1302 H0B205 Processing for command failure (command execution result) User range write
BKRSTP M3000 K5 All flags OFF
M2000 M2001 SM0
<> H0 SD0 Processing for dedicated instruction failure
BKRSTP M3000 K5 All flags OFF

CHAPTER5 GX Configurator-ST

This chapter explains the functions of GX Configurator-ST used with the ST1DA.
For details of GX Configurator-ST, refer to the following.
☞ GX Configurator-ST Operating Manual

5.1 GX Configurator-ST Functions

Table 5.1 lists the GX Configurator-ST functions used with the ST1DA.

Table 5.1 List of GX Configurator-ST Functions Used with ST1DA

Item	Description	Reference section
Parameter Setting	(1) The following parameter items can be set on GX Configurator-ST. •CH□ output range setting •CH□ Clear/Hold/Preset setting •CH□ D/A conversion enable/disable setting •CH□ Preset Value (2) Specify the area (RAM or ROM) where parameter setting will be registered. (3) Using GX Configurator-ST, parameter setting can be made while online module change is performed.	Section 5.3
Input/output monitor	(1) The I/O data of the ST1DA can be monitored.	Section 5.4
Forced output test	(1) Test can be conducted with the values set in the Bw bit output area and Ww word output area of the ST1DA.	Section 5.5
Offset/gain setting	(1) The offset and gain values of the user range can be easily set on-screen. (2) Using GX Configurator-ST, gain/offset setting can be made while online module change is performed.	Section 5.6
Online module change	(1) A module change is made without the system being stopped.	CHAPTER 7

5.2 Creating a project

(1) Creating a project

A new project can be created by reading the real MELSEC-ST system from the communication port and by creating it offline if there is no MELSEC-ST system.
For more details about creating a project, refer to the following.

☞ GX Configurator-ST Operating Manual

(2) Selecting a head module

To create a project offline, "CC-Link (ST1H-BT)" must be selected in the next screen, and then click the Next button.

(3) Display/setting screen

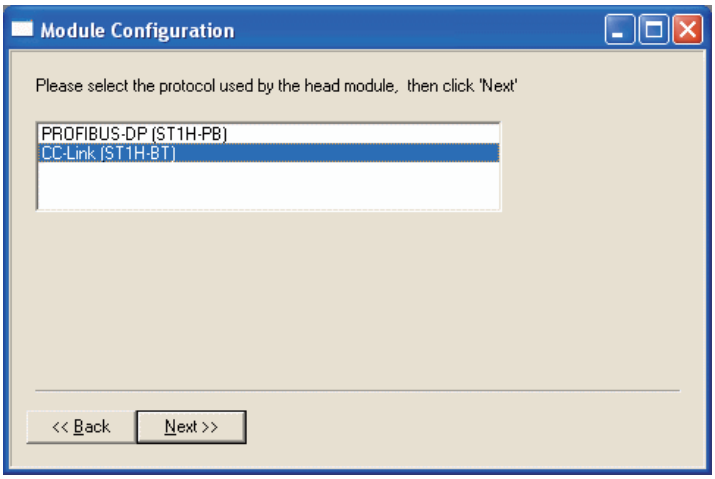


Figure 5.1 Selecting a head module

5.3 Parameter Setting

This section explains how to set the parameters.
If the parameters are set with GX-Configurator ST, the programs used to set the parameters is not required anymore.
The setting values used for MELSEC-ST system startup must be written to the ROM for saving. (Writing to the RAM is used temporarily for testing.)

(1) Mode changing

The mode need not be changed.
Parameter setting is available in both edit and diagnosis modes.

(2) "Parameter Setting" screen display

1) Select ST1DA on the "Configuration" or "System Monitor" screen.
2) Click [Edit] → [Parameter Setting].

(3) Display/setting screen

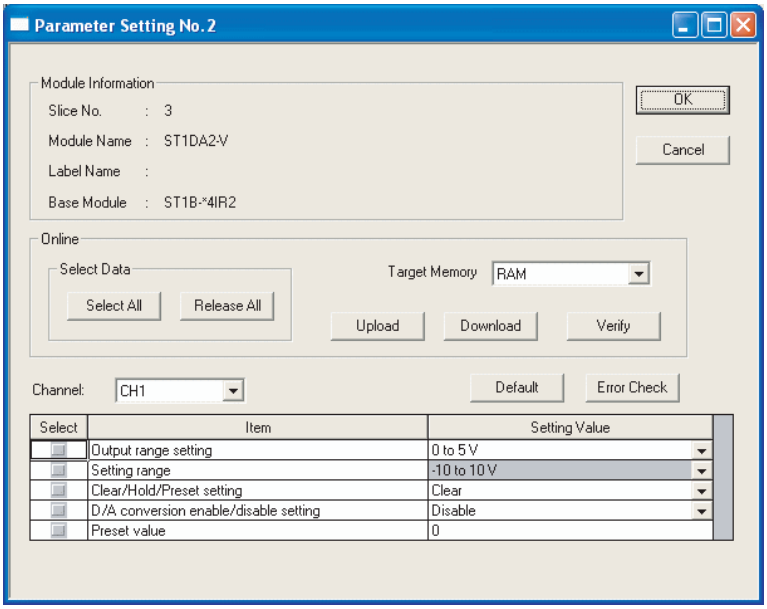


Figure 5.2 Parameter setting screen

(4) Display/setting details

The parameters listed below can be set for each channel. If you need to set these parameter in all channels, you have to set it separately for each channel.

(a) Output range setting
Set the output range.
Select an output range from the following types.

Table 5.2 Output range

Model	Output range
ST1DA2-V	-10 to 10V
	0 to 10V
	0 to 5V
	1 to 5V
	User range setting
ST1DA1-I	4 to 20mA
	0 to 20mA
	User range setting

(b) Setting range
The actual output range setting used in the ST1DA is showed here, and cannot be changed here.

(c) Clear/Hold/Preset setting
Specify Clear, Hold or Preset.

(d) D/A conversion enable/disable setting
Set whether to enable or disable the D/A conversion.
Disable: Conversion disabled
Enable: Conversion enabled

(e) Preset value
Enter a preset value.
The preset value setting range is indicated below.
ST1DA2-V: -4000 to 4000
ST1DA1-I : 0 to 4000

(5) Parameter writing operation

1) In Input/Output Monitor of GX Configurator-ST, check that Bw.n+1 convert setting request is OFF (0)(☞ Section 5.4 Input/Output Monitor (2)).
2) From the "Channel:" pull-down menu, select a channel for parameter setting.
3) Select parameter items to be written to the ST1DA by checking the corresponding "Select" check boxes.
4) Setting values in the "Setting Value" fields.
5) Select the target memory (RAM or ROM) from the pull-down menu of "Target Memory".

6) Click the Download button.

When writing the parameters of multiple channels to the ST1DA, perform the steps 2) to 6) for each channel.

POINT

Before writing parameters, make sure that Bw.n+1 convert setting request is OFF (0).

If Bw.n+1 convert setting request is ON (1), parameters cannot be written.

5.4 Input/Output Monitor

This section explains how to monitor the I/O data of the ST1DA.

(1) Mode changing

Click [Mode] → [Diagnosis].

(2) "Input/Output Monitor" screen display

1) Select ST1DA on the "System Monitor" screen.

2) Click the Input/Output Monitor Monitor button.
Monitoring starts as soon as the "Input/Output Monitor" screen is displayed.

(3) Display/setting screen

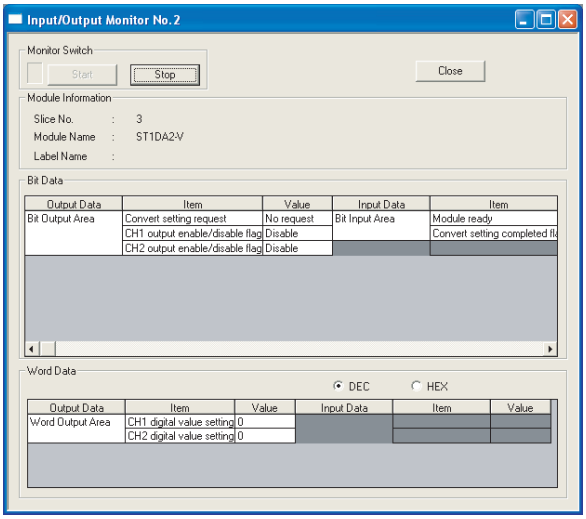


Figure 5.3 I/O data

(4) Display/setting details

(a) Bit Data

Table 5.3 Bit data list

Input/Output Data	Item	Description
Bit Output Area	Convert setting request	The status of Bw.n+1 convert setting request is displayed.
	CH□ output enable/disable flag	The status of Bw.n+3, Bw.n+2 CH□ output enable/ disable flag is displayed.
Bit Input Area	Module ready	The status of Br.n module ready is displayed.
	Convert setting completed flag	The status of Br.n+1 convert setting completed flag is displayed.

(b) Word Data

The display format (decimal/hexadecimal) can be changed.

Table 5.4 Bit data list

Input/Output Data	Item	Description
Word Output Area	CH□ digital value setting	The value of Ww.n, Ww.n+1 CH□ digital value setting is displayed.

5.5 Forced Output Test

This section explains a forced output test.
Setting values in the bit output area or word output area of the ST1DA to conduct the test.

(1) Mode changing

Click [Mode] → [Diagnosis].

(2) "Forced Output Test" screen display

1) Select ST1DA on the "System Monitor" screen.

2) Click the Forced Output Test button.

(3) Display/setting screen

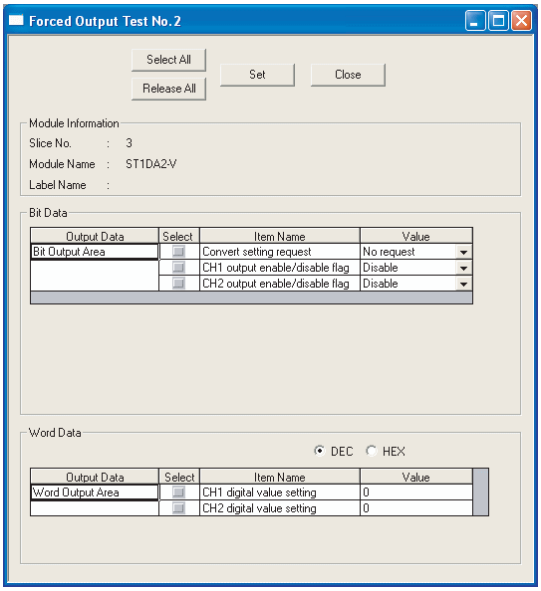


Figure 5.4 Forced output test screen

(4) Display/setting details

(a) Bit Data

Table 5.5 Bit data list

Output Data	Item	Description
Bit Output Area	Convert setting request	The setting of [Bw.n+1] convert setting request can be changed.
	CH□ output enable/disable flag	The setting of [Bw.n+3], [Bw.n+2] CH□ output enable/ disable flag can be changed.

(b) Word Data

The input format (decimal/hexadecimal) can be changed.

Table 5.6 Word data list

Output Data	Item	Description
Word Output Area	CH□ digital value setting	The setting of [Ww.n], [Ww.n+1] CH□ digital value setting can be changed.

(5) Test operation

1) Select items by checking the corresponding "Select" check boxes.

2) Setting values in the "Value" fileds.

3) Click the [Set] button.*1

Clicking the [Set] button executes the test.

* 1: When the module is not in the forced output test mode, a screen appears asking whether to switch to the forced output test mode. Click the [OK] button to switch to the forced output test mode. When the module is switched to the forced output test mode, the RUN LED of the head module flashes.

POINT

(1) If any of [Bw.n+1] convert setting request, [Bw.n+3], [Bw.n+2] CH□ output enable/disable flag's ON/OFF, and [Ww.n], [Ww.n+1] CH□ digital value setting is changed in the forced output test, analog outputs will change. Therefore, fully ensure the safety before starting the test.

(2) After exiting the forced output test mode, make sure that the RUN LED of the head module is on.

5.6 Offset/Gain Setting

This section explains how to make offset/gain setting.

(1) Mode changing

Click the [Mode] → [Diagnosis].

(2) "Offset/Gain Setting" screen display

1) Select ST1DA on the "System Monitor" screen.

2) Click the Offset/Gain Setting button. *1

* 1 : When the module is not in the forced output test mode, a screen appears asking whether to switch to the forced output test mode. Click the OK button to switch to the forced output test mode. When the module is switched to the forced output test mode, the RUN LED of the head module flashes.

3) As a screen appears asking whether to switch to the offset/gain setting mode, click the OK button to switch to the offset/gain setting mode. After switched to the offset/gain setting mode, the RUN LED of the ST1DA flashes (0.5s interval) and the operation stops.

(3) Display/setting screen

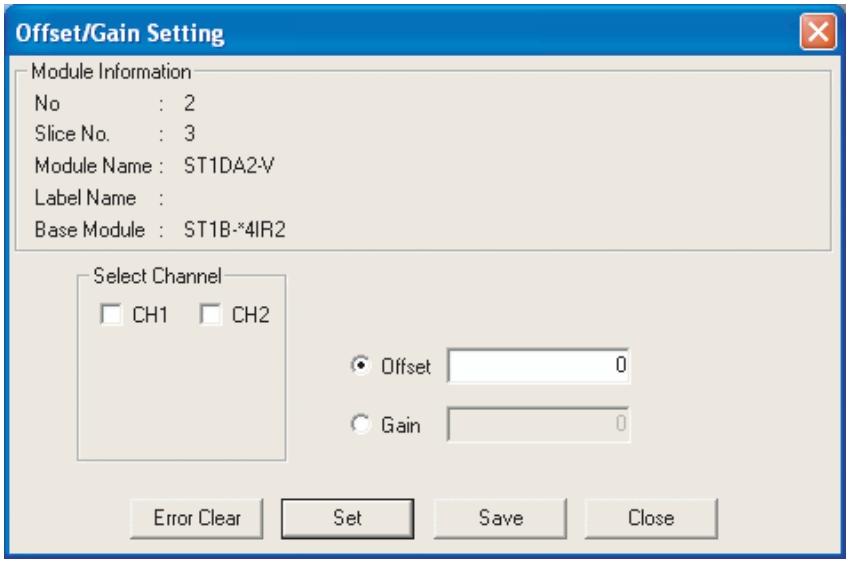


Figure 5.5 Offset/gain setting screen

(4) Offset/gain setting operation

When setting different offset and gain values for different channels, perform the operations in (a), (b) for each channel.
Perform the operation in (c) only once at the end since it writes the offset/gain settings of all channels to the ST1DA.

(a) Offset value setting operation

1) Select a channel for offset value setting by checking the corresponding "Select Channel" check box.
By checking multiple check boxes, values can be set to multiple channels at the same time.

2) Specify "Offset".

3) Set an adjustment amount and click the Set button.
The adjustment amount can be set within the range of -3000 to 3000.
When the setting is 1000, the analog output value can be adjusted about 0.33V for the ST1DA2-V or about 0.76mA* for the ST1DA1-I.
When the Set button is clicked, the analog output value is adjusted according to the setting.
Repeat the operation in Step 3) until the desired offset value is reached.

(b) Gain value setting operation

1) Select a channel for gain value setting by checking the corresponding "Select Channel" check box.
By checking multiple check boxes, values can be set to multiple channels at the same time.

2) Specify "Gain".

3) Set an adjustment amount and click the Set button.
The adjustment amount can be set within the range of -3000 to 3000.
When the setting is 1000, the analog output value can be adjusted about 0.33V for the ST1DA2-V or about 0.76mA* for the ST1DA1-I.
When the Set button is clicked, the analog output value is adjusted according to the setting.
Repeat the operation in Step 3) until the desired gain value is reached.
* 1When the hardware version is C or earlier, it is approx. 0.38mA.

(c) Offset/gain setting writing operation

Click the Save button.
The offset/gain settings of all channels are written to the ST1DA.

POINT

(1) An error occurs if the [Save] button is clicked when the offset value is equal to or greater than the gain value.
In this case, click the [Error Clear] button to clear the error, and make setting again.

(2) When the offset/gain setting screen is closed, a screen appears asking whether to change to the normal mode. Click the [OK] button to change to the normal mode.
When the module is put in the normal mode, the RUN LED of the ST1DA turns on.

(3) After exiting the forced output test mode, make sure that the RUN LED of the head module is on.

CHAPTER6 PROGRAMMING

This chapter describes example programs available when the QJ61BT11N is used as a master station.

Remark

For details of the QJ61BT11N, refer to the following manual.

☞ CC-Link System Master/Local Module User's Manual

6.1 Programming Procedure

The following procedure describes how to create a project that will execute D/A conversion of ST1DA.

When applying any of the program examples introduced in this chapter to the actual system, verify the applicability and confirm that no problems will occur in the system control.

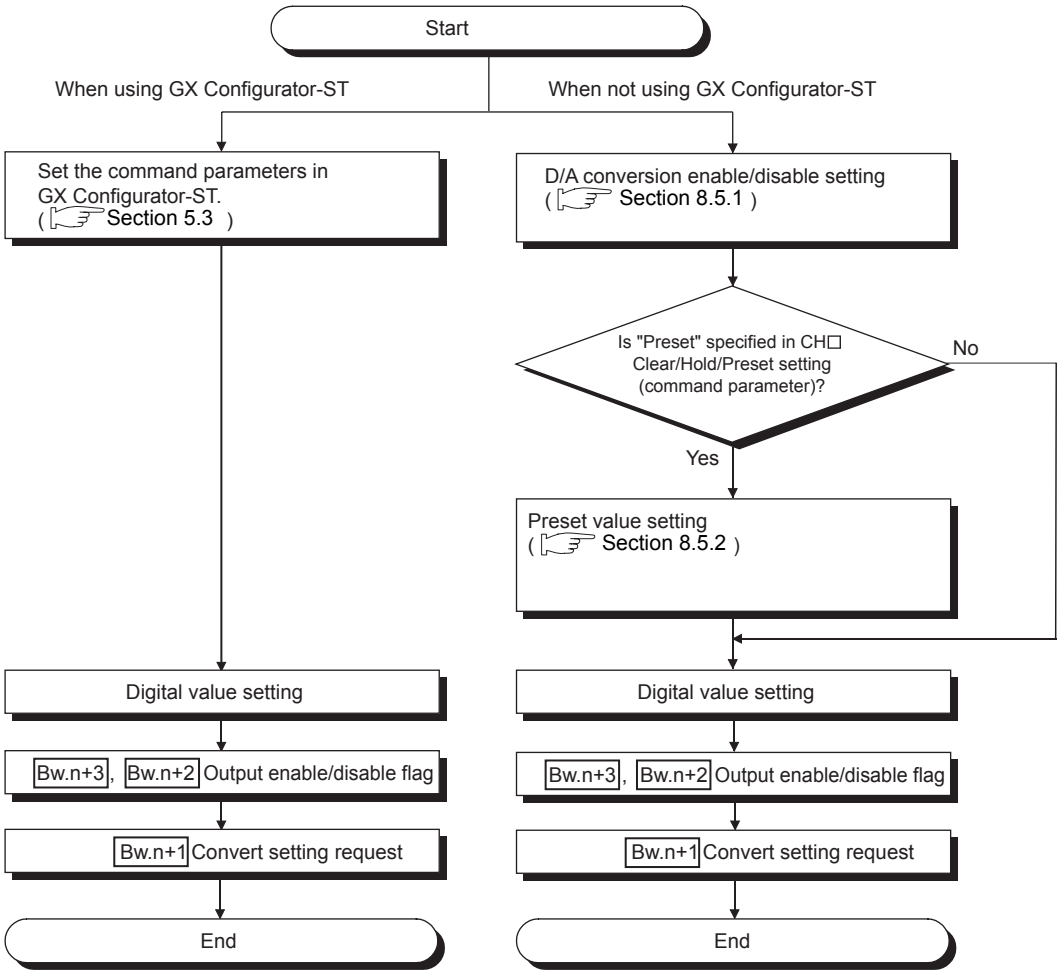


Figure 6.1 Programming procedure

POINT

(1) With one dedicated instruction (RDMSG), up to eight commands can be simultaneously executed.
However, the following commands cannot be executed with any other command at the same time.
Initial data batch write request (command No.: 8106H)
Initial data individual write request (command No.: 8107H/0107H)
If executed simultaneously, an error will occur.

(2) The sizes of Cw Command execution area and Cr Command result area vary depending on the command.

(3) In the following cases, commands cannot be executed. Therefore, execute the command after following cases finished.
- The head module is executing the self-diagnostics function.
- A slice module is being replaced online.
- Another command is in execution. (The dedicated instruction (RDMSG) is not completed.)

(4) For online module change, advance preparation may be required depending on the operating conditions. For details, refer to the following.
☞ Section 7.2 Preparations for Online Module Change

6.2 System Configuration Example

The following system example is used for the programs described in this chapter.

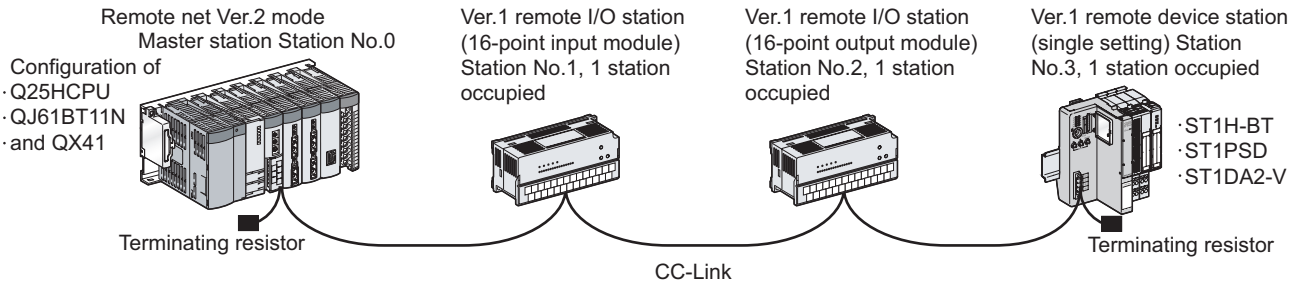


Figure 6.2 System configuration example

(1) System configuration of master station

Table 6.1 System configuration of master station

Module	Input signal	Output signal
Q25HCPU	-	-
QJ61BT11N	X00 to X1F	Y00 to Y1F
QX41	X20 to X3F	-

(2) MELSEC-ST system configuration

Table 6.2 I/O points sheet

Slice position No.	Start slice No. (No. of occupied slices)	Module name	Br.n	Bw.n	Wr.n	Ww.n	5V DC internal current consumption (Total)	24V DC current (Total)	Slot width (Total)
0	0(2)	ST1H-BT	0	0	0	0	0.410A(0.410A)	0A(0A)	-
1	2(1)	ST1PSD	0	0	0	0	-	-	25.2mm (25.2mm)
2	3(2)	ST1DA2-V	4	4	0	2	0.095A(0.505A)	*1	12.6mm (37.8mm)
Total			4 (252 bits or less)*2	4 (252 bits or less)*2	0 (52 words or less)	2 (52 words or less)	-	-	37.8mm (850mm or less)

* 1 The 24V DC current varies depending on the external device connected to each slice module. Check the current consumption of the external device connected to each slice module, and calculate the total value. (☞ MELSEC-ST System User's Manual)

* 2 The available points will decrease by two points for each additional power distribution module.

6.3 Settings and Communication Data

After determining the system configuration, set parameters of the programmable controller CPU of the master station.

(1) Setting PLC parameters (I/O assignment)

Connect GX Developer to the programmable controller CPU of the master station, and set PLC parameters as shown below.

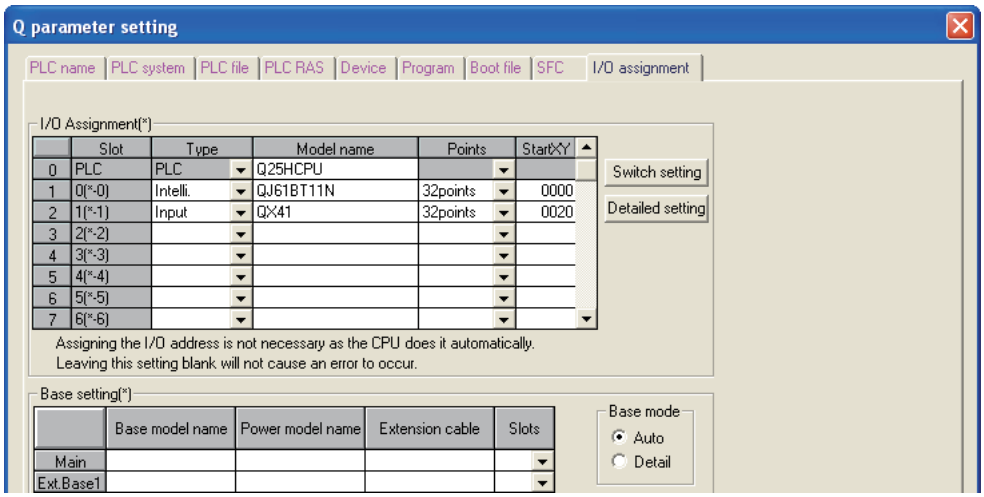


Figure 6.3 I/O assignment

(2) Network parameters

Connect GX Developer to the programmable controller CPU of the master station, and set network parameters as shown below.

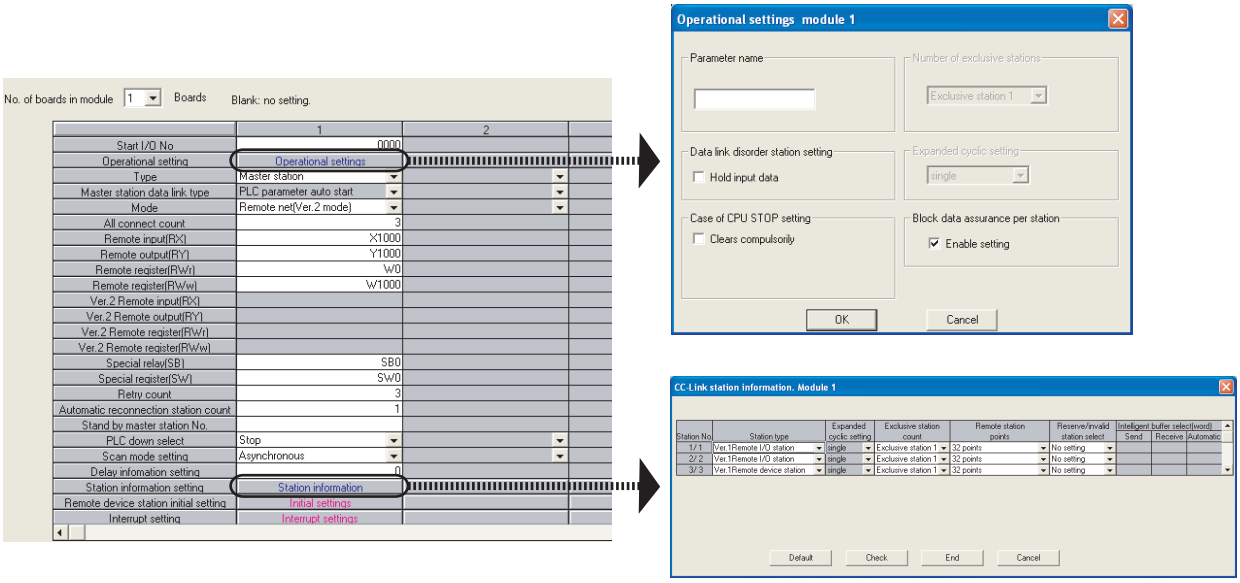


Figure 6.4 Setting network parameters

(3) I/O data assignment

The following are I/O data assignment results for the system configuration example in this chapter.

The I/O points sheet is useful for I/O data assignment.

For details of the I/O data assignment sheet, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "Appendix 3.2 Input data assignment sheet, Appendix 3.3 Output data assignment sheet"

(a) "Br" Bit input area (remote input (RX))

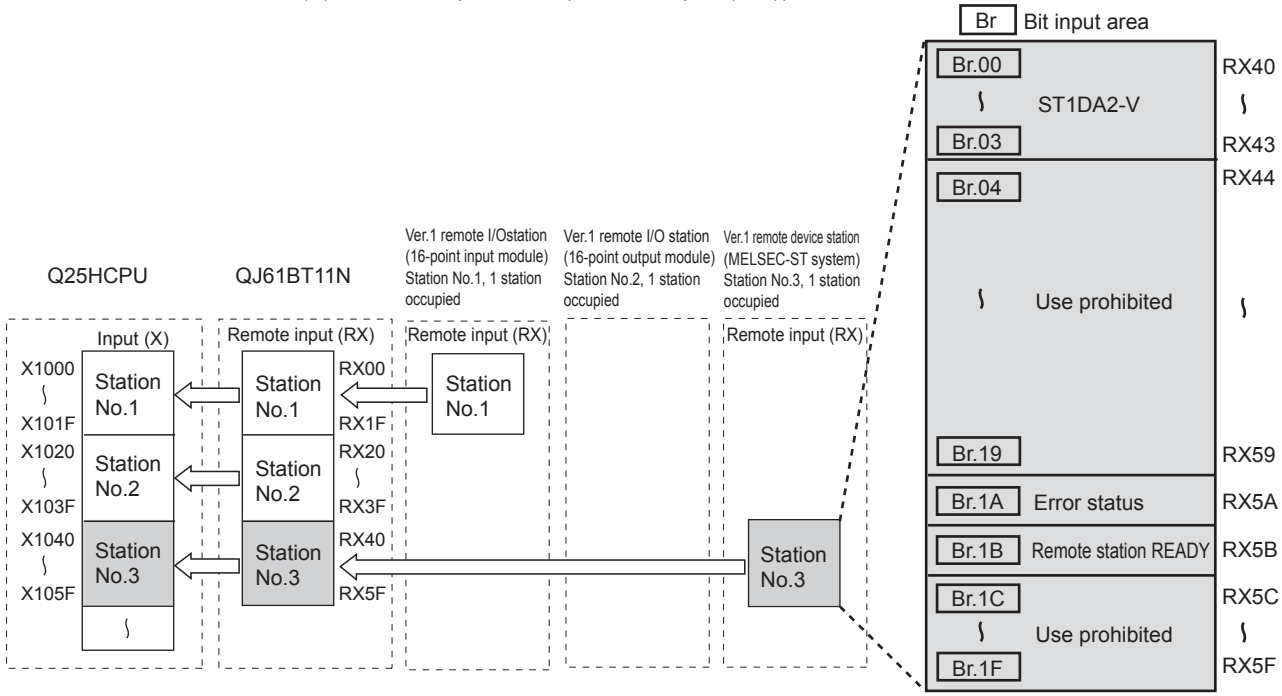


Figure 6.5 "Br" Bit input area (remote input (RX))

Table 6.3 Br Bit input area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote input (RX)	Slice position No.	Module name	Br.n	Data name
X1040	RX40	2	ST1DA2-V	Br.00	Module READY
X1041	RX41			Br.01	Convert setting completion flag
X1042	RX42			Br.02	Use prohibited
X1043	RX43			Br.03	Use prohibited
X1044	RX44	-	-	Br.04	Use prohibited
to		to			
X1059	RX59	-	-	Br.19	Use prohibited
X105A	RX5A	-	-	Br.1A	Error status*1
X105B	RX5B	-	-	Br.1B	Remote station READY *1
X105C	RX5C	-	-	Br.1C	Use prohibited
to		to			
X105F	RX5F	-	-	Br.1F	Use prohibited.

* 1 Error status (RXnA) and Remote station READY (RXnB) are remote input areas of the head module. For details of remote input, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "3.4 Remote I/O, Remote Registers"

(b) "Bw" Bit output area (remote output (RY))

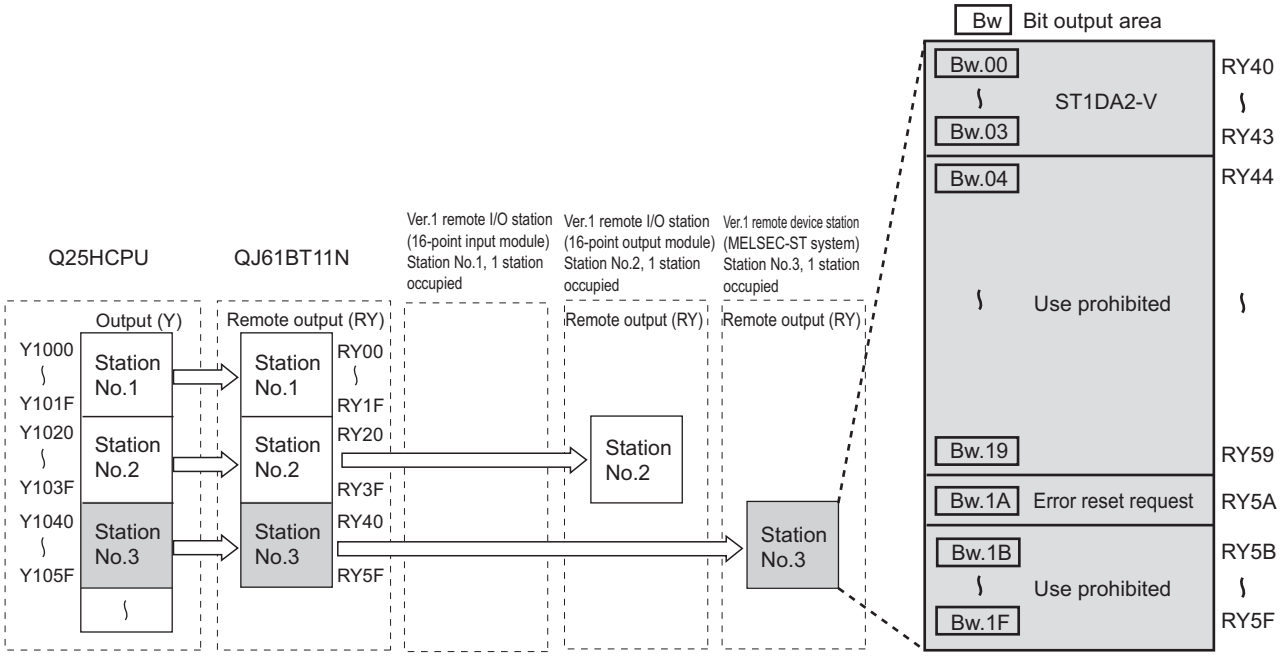


Figure 6.6 "Bw" Bit output area (remote output (RY))

Table 6.4 Bw Bit output area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote output (RY)	Slice position No.	Module name	Bw.n	Data name
Y1040	RY40	2	ST1DA2-V	Bw.00	Use prohibited
Y1041	RY41			Bw.01	Convert setting request
Y1042	RY42			Bw.02	CH1 output enable/disable flag
Y1043	RY43			Bw.03	CH2 output enable/disable flag
Y1044	RY44	-	-	Bw.04	Use prohibited
to		to			
Y1059	RY59	-	-	Br.19	Use prohibited
Y105A	RY5A	-	-	Br.1A	Error reset request *1
Y105B	RY5B	-	-	Bw.1B	Use prohibited
to		to			
Y105F	RY5F	-	-	Bw.1F	Use prohibited

* 1 Error reset request (RYnA) is a remote output of the head module. For details of Error reset request (RYnA), refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "3.4 Remote I/O, Remote Registers"

(c) "Ww" Word output area (remote output (RWw))

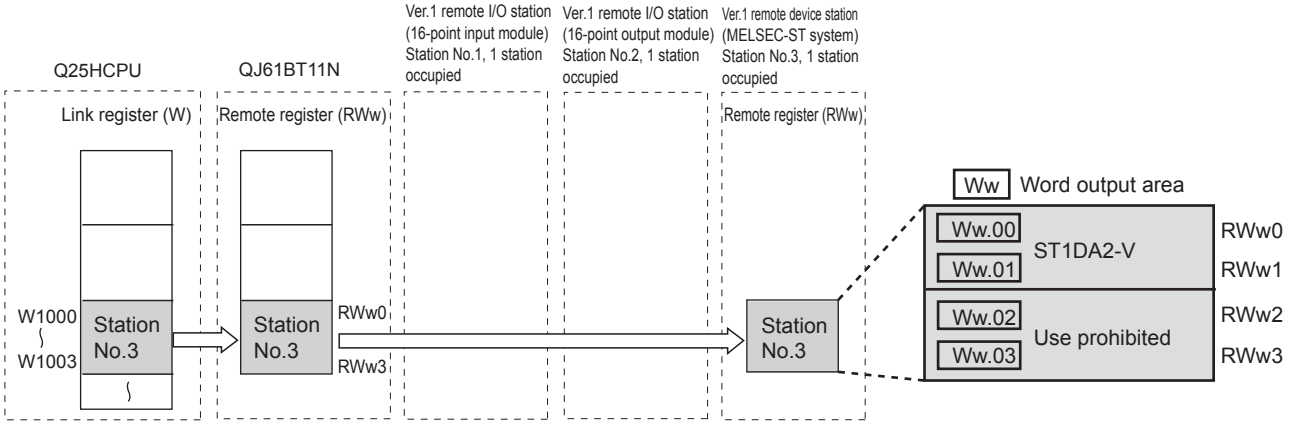


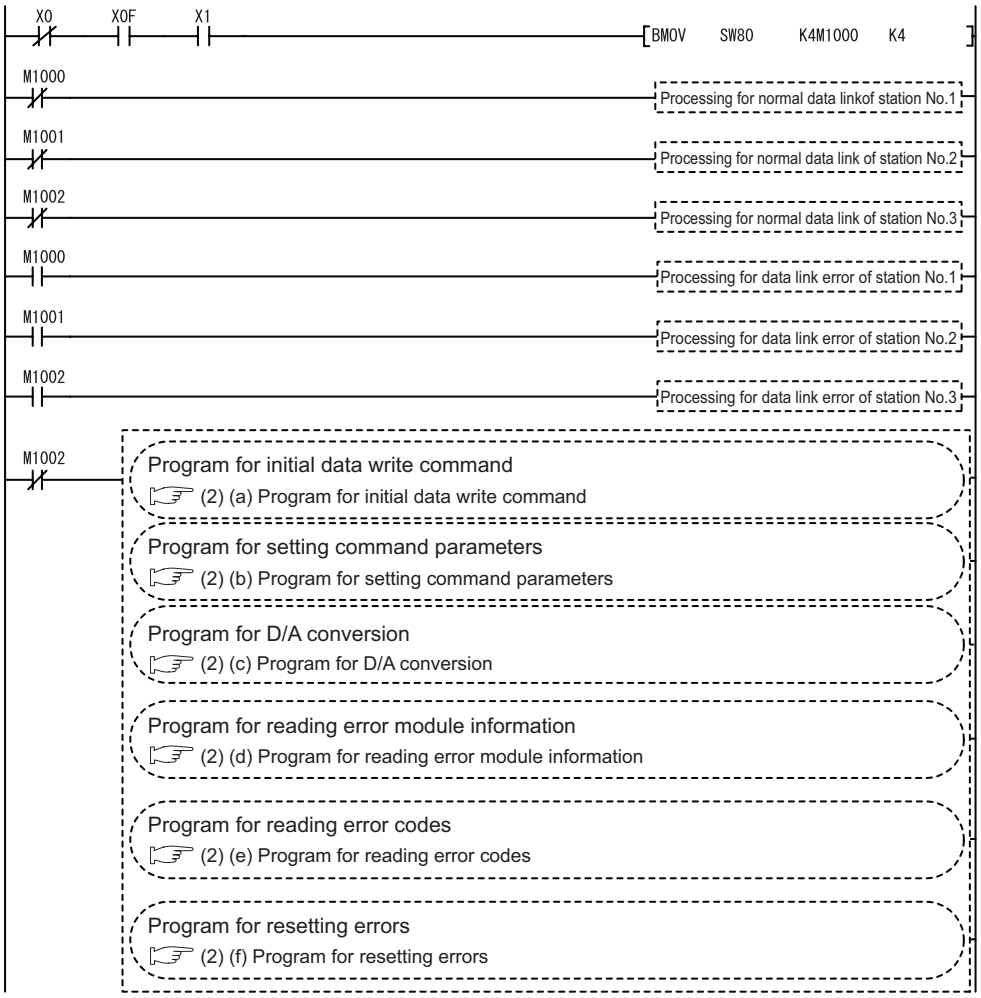
Figure 6.7 "Ww" Word output area (remote output (RWw))

Table 6.5 Ww Word output area assignment sheet

Master station		Remote device station (MELSEC-ST system)			
Device	Remote register (RWw)	Slice position No.	Module name	Ww.n	Data name
W1000	RWw0	2	ST1DA2-V	Ww.00	CH1 digital value setting
W1001	RWw1			Ww.01	CH2 digital value setting
W1002	RWw2	-	-	Ww.02	Use prohibited
W1003	RWw3			Ww.03	Use prohibited

6.4 Program Examples

A program example is shown below.



(1) Device assignments in program examples

The devices used common to the program examples in (2) are shown below.
For devices used for each program example, refer to the following.

☞ (2) Program examples in this section

(a) Special relay (SM) and special register (SD)

Table 6.6 Special relay (SM) and special register (SD)

Device	Application	Device	Application
SM0	Diagnostic error	SD0	Diagnostic error

(b) Devices used by the QJ61BT11N (master station)

Table 6.7 Devices used by the QJ61BT11N (master station)

Device	Application	Device	Application
X00	Module error	-	
X01	Own data link status		
X0F	Module READY		
SB0 to SB1FF	Link special relay (SB) of the QJ61BT11N	SW0 to SW1FF	Link special register (SW) of the QJ61BT11N

(c) Devices used by the user

Table 6.8 Devices for checking Other station data link status

Device	Application	Device	Application
M1000	Other station data link status (station No.1)	M1002	Data link status of the ST1H-BT (Station No.3)
M1001	Other station data link status (station No.2)	-	

(2) Program examples

(a) Program for initial data write command

Execute Initial data individual write request (command No.: 8107H) with the dedicated instruction (RDMSG) of the master station to set command parameters.

1) Setting details of command parameters

In this program, the following command parameters are set.

Table 6.9 Setting details of command parameters

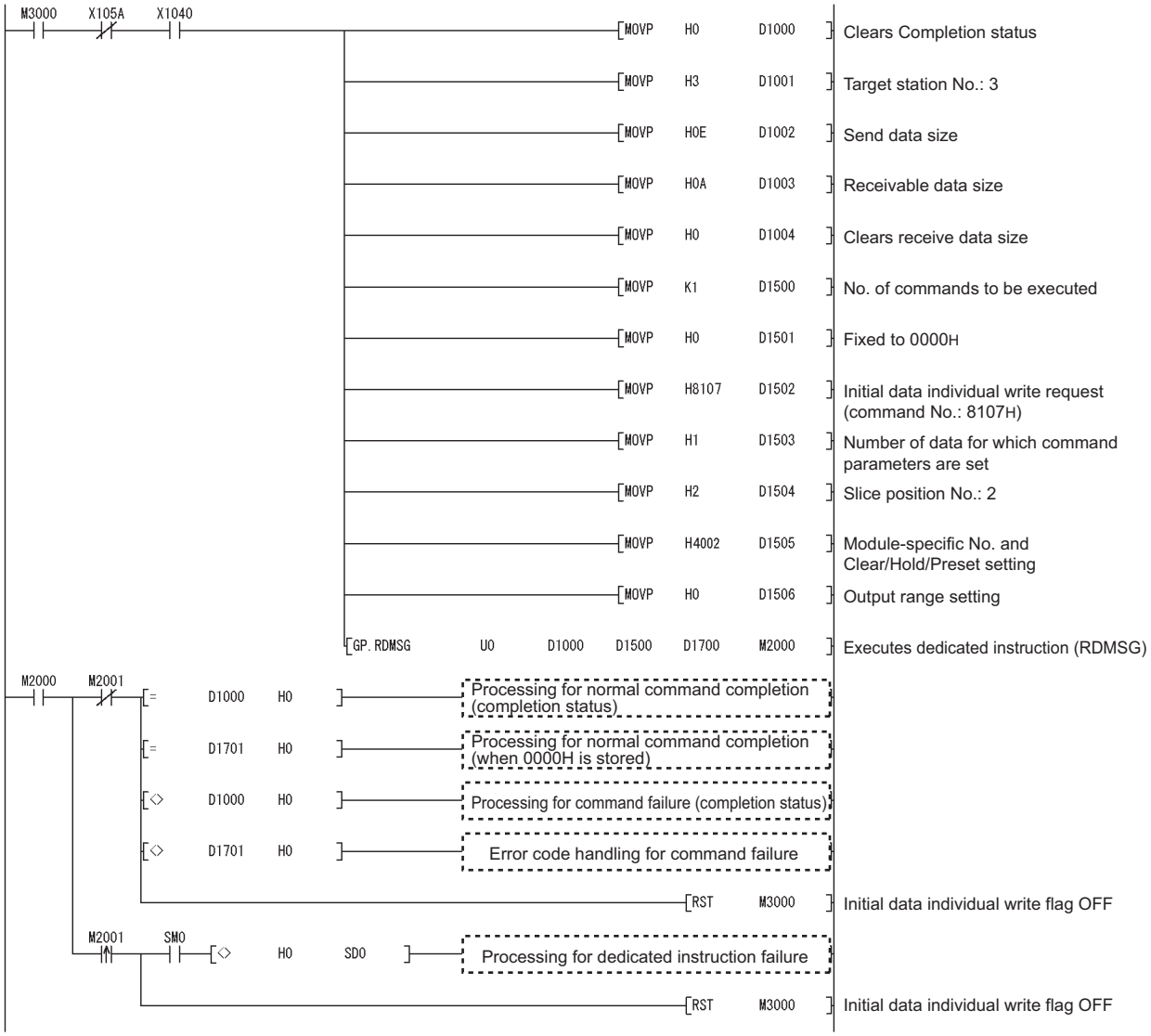
Item		Setting	Reference section
ST1DA2-V	CH1 Clear/Hold/Preset setting	Preset	Section 8.3.2
	CH2 Clear/Hold/Preset setting	Clear	
	CH1 Output range setting	-10 to 10V	
	CH2 Output range setting	-	

2) Device assignments in the program example

Table 6.10 Initial data write command setting

Device	Application	Device	Application
M2000	Completion device	D1000 to D1004	Control data
M2001	Completion status indicator device	D1500 to D1506	Send data (execution data of the command)
M3000	Initial data individual write flag	D1700 to D1704	Receive data (result data of the command)

3) Program example



(b) Program for setting command parameters
Execute a command of the ST1DA with the dedicated instruction (RDMSG) of the master station to set command parameters.

1) Setting details of command parameters
In this program, the following command parameters are set.

Table 6.11 Setting details of command parameters

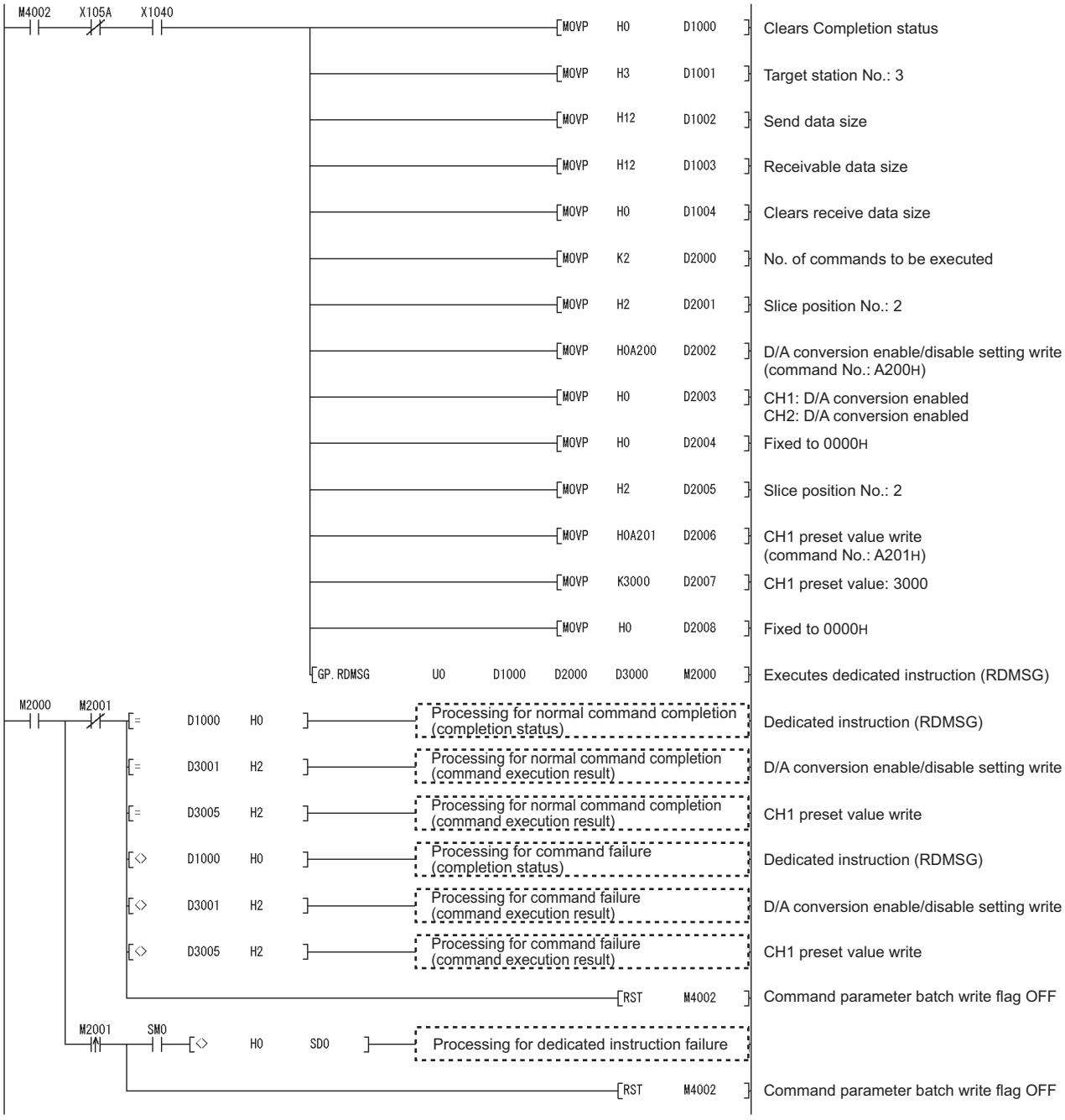
Item		Setting	Reference section
ST1DA2-V	CH1 D/A conversion enable/disable setting	D/A conversion enabled	Section 8.5.1
	CH2 D/A conversion enable/disable setting	D/A conversion enabled	
	CH1 Preset value	3000	Section 8.5.2
	CH2 Preset value	-	

2) Device assignments in the program example

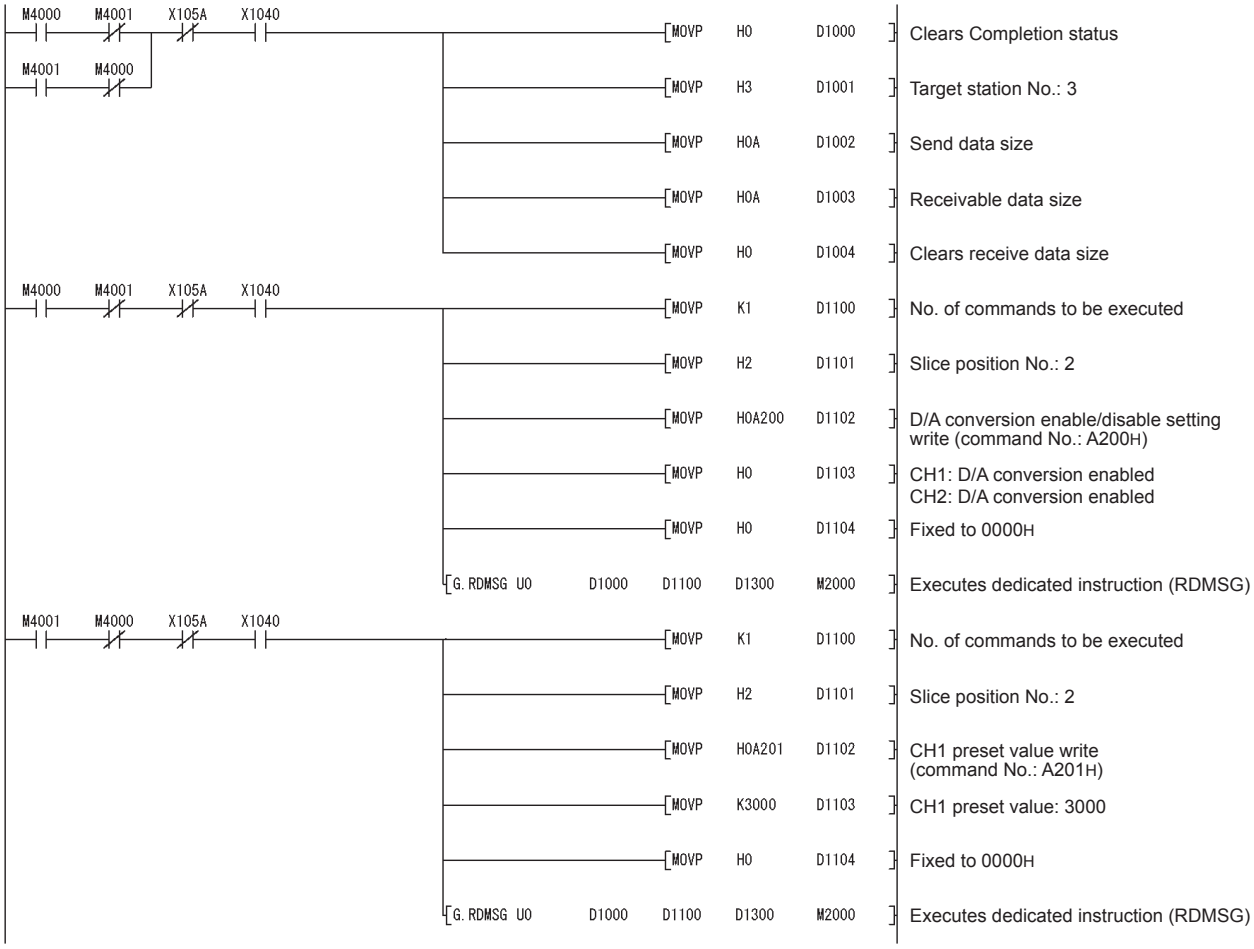
Table 6.12 Initial data write command setting

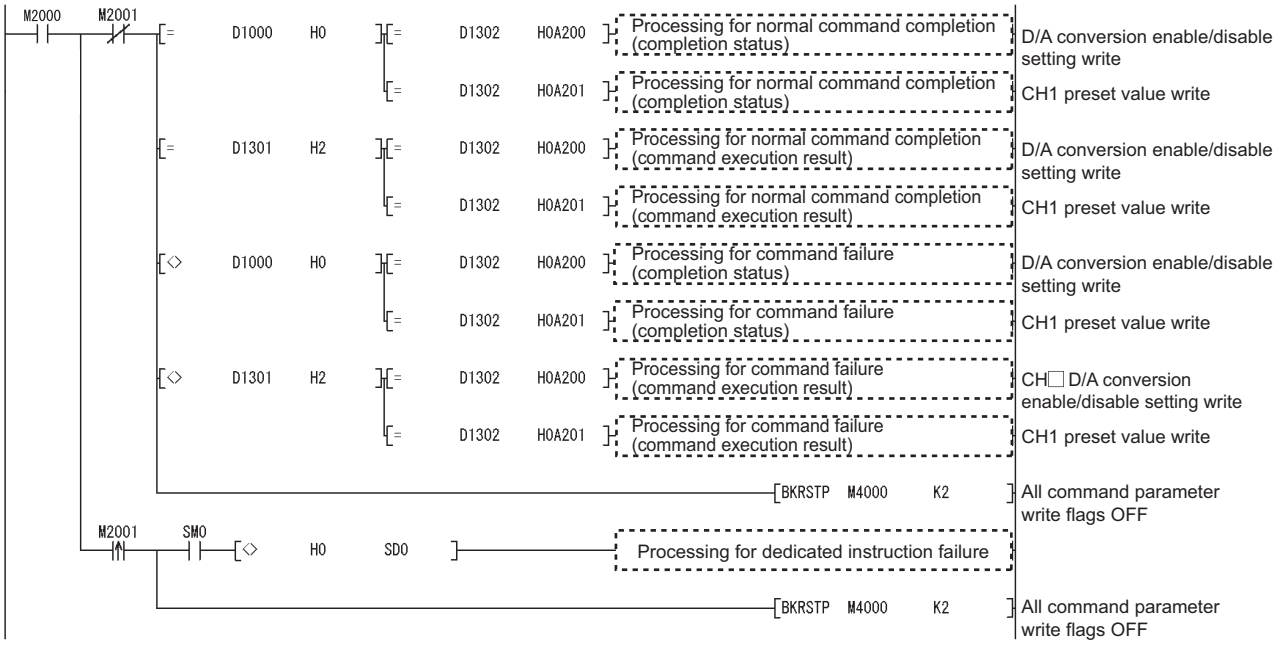
Device	Application	Device	Application
M2000	Completion device	D1000 to D1004	Control data
M2001	Completion status indicator device	D1100 to D1104	Send data (execution data for each command execution)
M4000	D/A conversion enable/disable setting write flag	D1300 to D1304	Receive data (execution data for each command execution)
M4001	CH1 preset value write flag	D2000 to D2008	Send data (When multiple commands are simultaneously executed)
M4002	Command parameter write flag (when multiple commands are simultaneously executed)	D3000 to D3008	Receive data (When multiple commands are simultaneously executed)
-	-		

3) Program example (when multiple commands are simultaneously executed)
The following is a program example for simultaneous execution of multiple commands.



4) Program example (when one command at a time is executed)
The following is a program example for executing a command at a time.




M2000
M2001
= D1000 H0
= D1302 H0A200
Processing for normal command completion (completion status)
D/A conversion enable/disable setting write
= D1302 H0A201
Processing for normal command completion (completion status)
CH1 preset value write
= D1301 H2
= D1302 H0A200
Processing for normal command completion (command execution result)
D/A conversion enable/disable setting write
= D1302 H0A201
Processing for normal command completion (command execution result)
CH1 preset value write
<> D1000 H0
= D1302 H0A200
Processing for command failure (completion status)
D/A conversion enable/disable setting write
= D1302 H0A201
Processing for command failure (completion status)
CH1 preset value write
<> D1301 H2
= D1302 H0A200
Processing for command failure (command execution result)
CH□ D/A conversion enable/disable setting write
= D1302 H0A201
Processing for command failure (command execution result)
CH1 preset value write
BKRSTP M4000 K2
All command parameter write flags OFF
M2001
SM0
<> H0 SD0
Processing for dedicated instruction failure
BKRSTP M4000 K2
All command parameter write flags OFF

(c) Program for D/A conversion

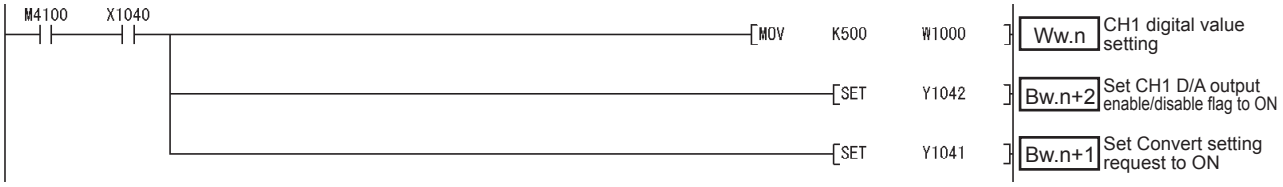
Using Bw.n+2 D/A output enable/disable flag, D/A conversion is executed.

1) Device assignments in the program example

Table 6.13 D/A conversion

Device	Application	Device	Application
M4100	D/A conversion enable/disable setting write flag		

2) Program example



(d) Program for reading error module information

Execute Error module information read request (command No.: 0103H) with the dedicated instruction (RDMSG) of the master station to read the error module information.

Error module information read request is a command of the head module. For details of the command, refer to the following.

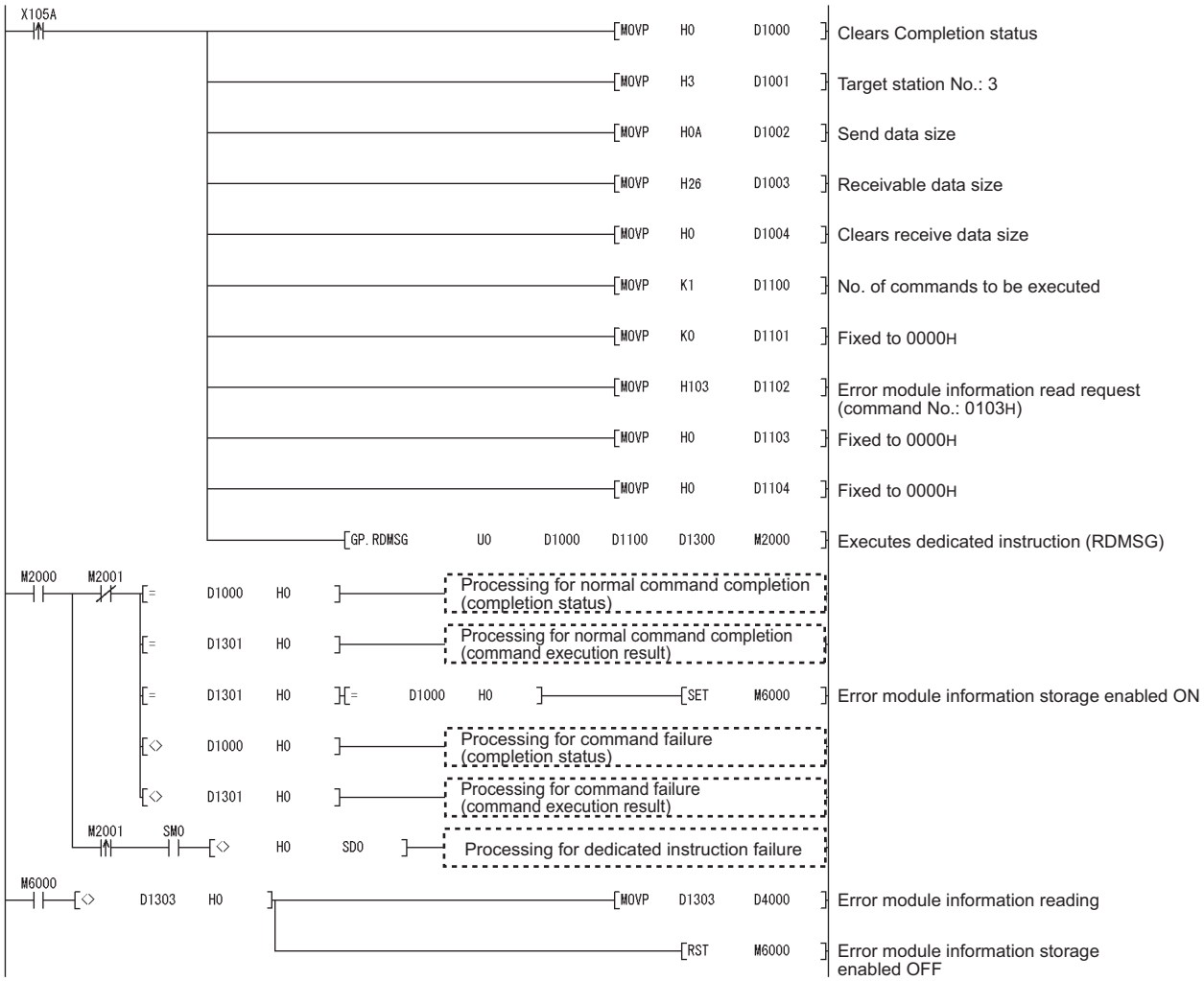
☞ MELSEC-ST CC-Link Head Module User's Manual, "8.2.4 Error module information read request"

1) Device assignments in the program example

Table 6.14 Reading error module information

Device	Application	Device	Application
M2000	Completion device	D1000 to D1004	Control data
M2001	Completion status indicator device	D1100 to D1106	Send data (execution data of the command)
M5000	Error module information read flag	D1300 to D1304	Receive data (result data of the command)
-	-	D4000	Error module information read target

2) Program example



(e) Program for reading error codes

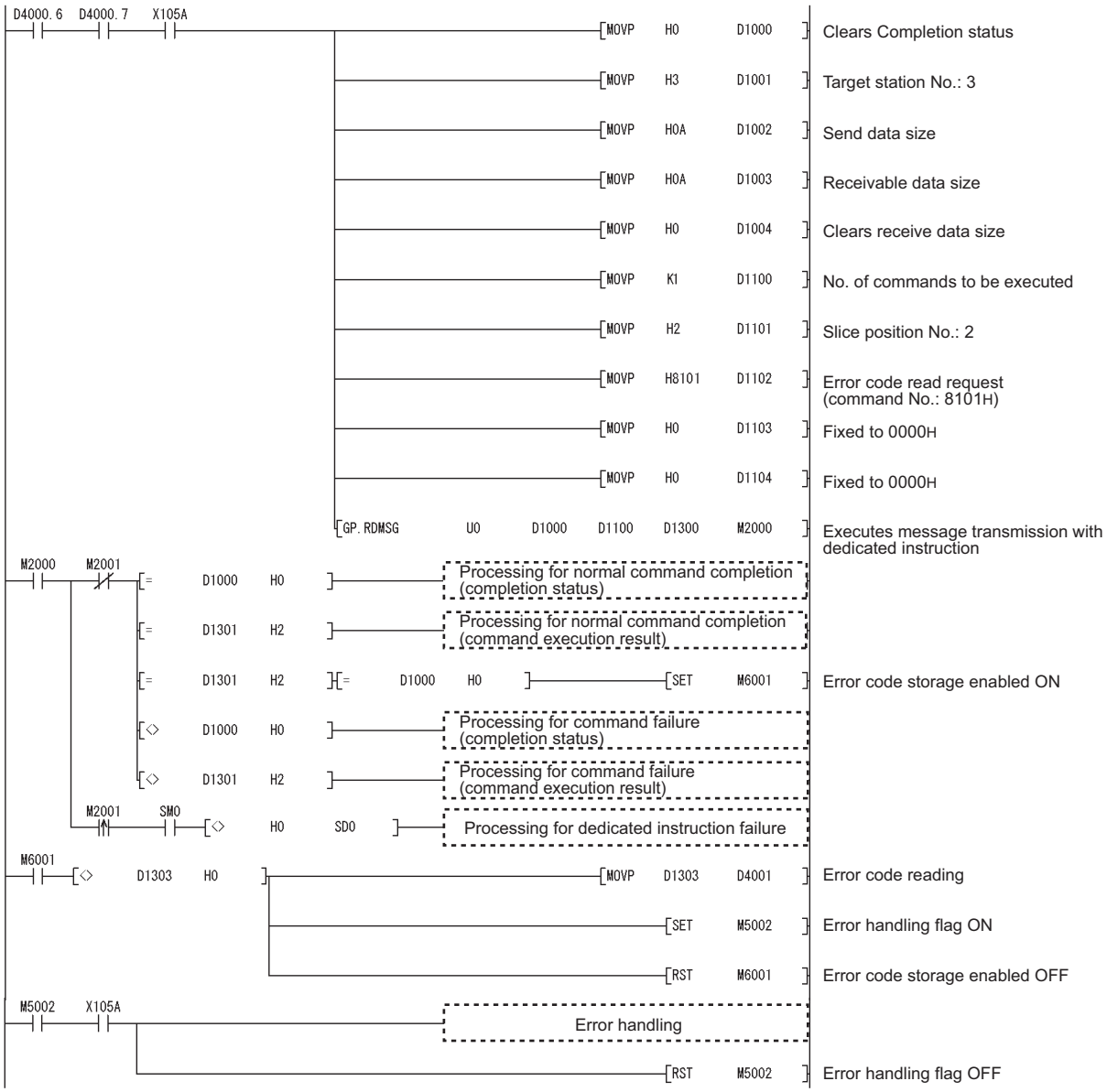
Execute Error code read request (command No.: 8101H/0101H) with the dedicated instruction (RDMSG) of the master station to read an error code.

1) Device assignments in the program example

Table 6.15 Error code reading

Device	Application	Device	Application
M2000	Completion device	D1000 to D1004	Control data
M2001	Completion status indicator device	D1100 to D1104	Send data (execution data of the command)
M5002	Error handling flag	D1300 to D1304	Receive data (result data of the command)
M6001	Error code storage enabled	D4000	Error module information read target ☞(2)(d) Program for reading error module information in this section
-	-	D4001	Error code read target

2) Program example



(f) Program for resetting errors

Execute Error clear request (command No.: 8104H/0104H) with the dedicated instruction (RDMSG) of the master station to reset errors.

Error clear request is a command of the head module. For details of the command, refer to the following.

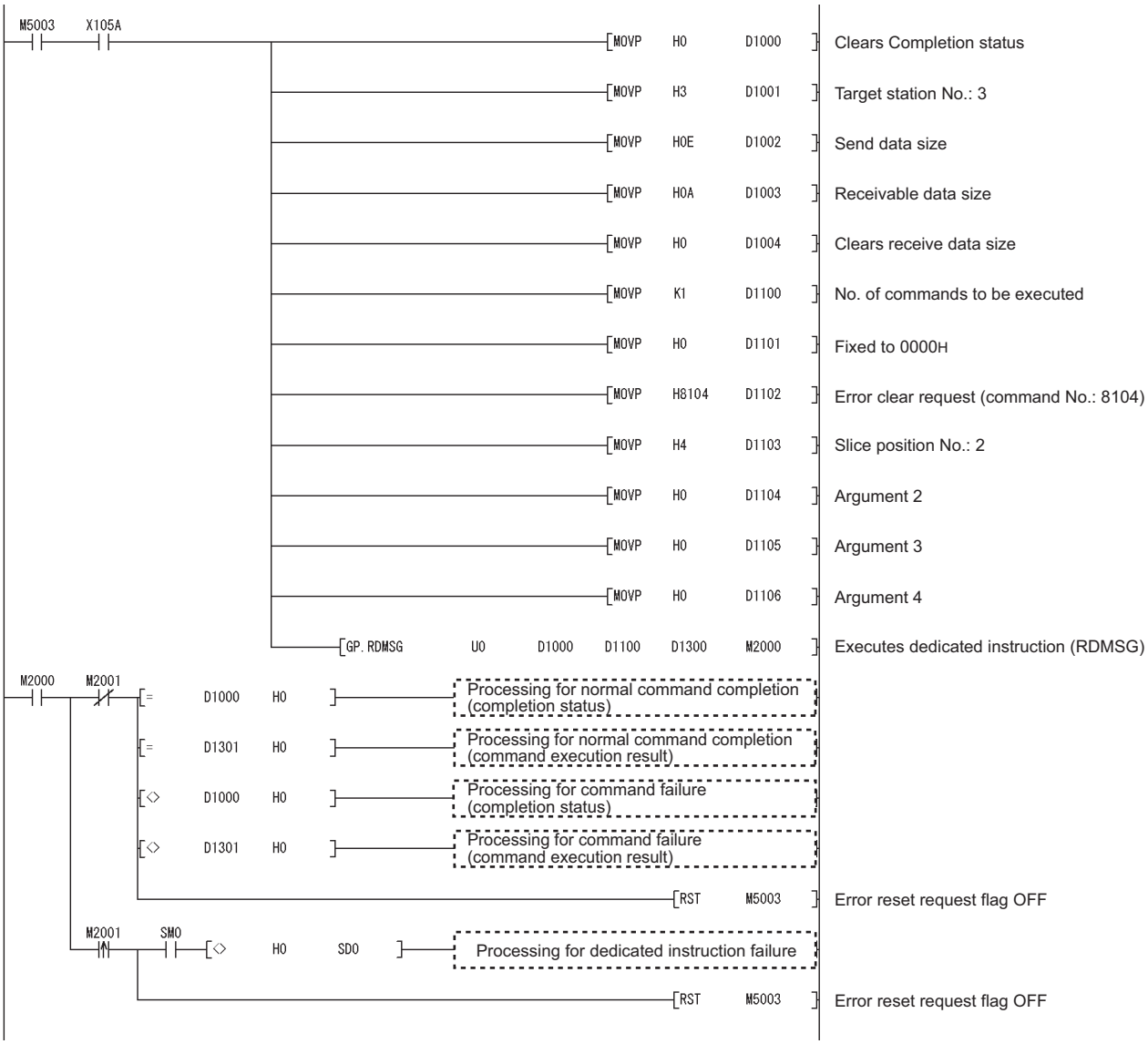
☞ MELSEC-ST CC-link Head Module User's Manual, "8.2.5 Error clear request"

1) Device assignments in the program example

Table 6.16 Error resetting

Device	Application	Device	Application
M2000	Completion device	D1000 to D1004	Control data
M2001	Completion status indicator device	D1100 to D1106	Send data (execution data of the command)
M5003	Error reset request flag	D1300 to D1304	Receive data (result data of the command)

2) Program example



CHAPTER7 ONLINE MODULE CHANGE

Before performing online module change, always read through the "Online module change" section in the head module user's manual.
MELSEC-ST CC-Link Head Module User's Manual, "4.6 Online Module Change Function"
☞ MELSEC-ST CC-Link Head Module User's Manual, "4.6 Online Module Change Function"
This chapter describes the specifications of online module change.

(1) Perform online module change with the buttons of the head module or using GX Configurator-ST.

(2) The command parameters and offset/gain setting values in the user range setting are automatically loaded into the new module.

(3) Using GX Configurator-ST allows offset/gain setting during online module change.
When higher accuracy is required, perform offset/gain setting during online module change using GX Configurator-ST.

7.1 Precautions for Online Module Change

The following are the precautions for online module change.

(1) System configuration in which online module change is executable

To perform the online module change, the system configuration must be appropriate for execution of the online module change.
For details, refer to the following manual.
☞ 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 an inappropriate system configuration, shut off all phases of the external power supply for the MELSEC-ST system to replace a slice module.

(2) Online module change procedure

Be sure to perform an online module change by the procedure described below.
☞ Section 7.4.1 When parameter setting or offset/gain setting is performed using GX Configurator-ST during online module change
☞ MELSEC-ST CC-Link Head Module User's Manual, "4.6 Online Module Change Function"
Failure to do so can cause a malfunction or failure.

(3) Precaution for external devices at online module change

Before starting online module change, confirm that the external device connected to the slice module to be removed will not malfunction.

(4) Replaceable slice module

Only the slice modules of the same model name can be replaced online. Replacing a slice module with a different slice module model and adding a new slice module is not allowed.

(5) Number of replaceable slice modules

Only one slice module can be replaced in a single online module change.
To replace multiple slice modules, perform a separate online module change for each module.

(6) Command execution during online module change

While an online module change is being executed (while the REL. LED of the head module is on), no command can be executed to the slice module being replaced online.
An attempt to execute a command in such a case will cause an error.

(7) Parameter change during online module change

To change a command parameter of the slice module, which is being changed online (the head module's REL. LED is on), from the master station, wait until the online module change is completed.

(8) The ERR. LED of the head module in online module change status

The ERR. LED of the head module in online module change status will turn on only when an error related to the online module change occurs.
It will not turn on or flicker when any other error occurs.

(9) I/O data during online module change

While online module change is being executed for a slice module (while the REL. LED of the head module is on), all the Br.n Bit input area data of the slice module turn to 0 (OFF).

(10) User setting range accuracy after online module change

After online module change, the accuracy of the user range setting is about three times lower than that before the online module change.
When the user range setting is used, set the offset and gain values again as necessary.

(11) Mode for online module change

Perform online module change in the normal mode.

(12) When Hold is set for the Clear/Hold setting

If an intelligent function module, for which "Hold" has been selected in the "Clear/Hold/Preset setting, is replaced online while communication with the master station is disconnected, the Ww.n word output value becomes "0".

Even after this online module change is completed, the Ww.n word output value will not return to the value held.

(13)Forced output test during online module change

The forced output test of GX Configurator-ST cannot be used for the module being changed online.

After completion of online module change, perform the forced output test.

7.2 Preparations for Online Module Change

Have GX Configurator-ST ready to use when replacing the ST1DA online.
Depending on the module failure status, the command parameters and offset/gain setting values in the user range setting may not be saved into the head module.
For the procedure for setting parameters and offset/gain values during online module change, refer to the following.

☞ Section 7.4.1 When parameter setting or offset/gain setting is performed using GX Configurator-ST during online module change

When GX Configurator-ST is unavailable, make the preparations described below.
Failure to do so may cause the values such as offset/gain setting values in the user range setting not be imported to the new module, if they cannot be saved to the head module.

(1) Command parameters

When GX Configurator-ST is unavailable, the command parameters must be set by the commands after completion of online module change.
Provide a command parameter setting program in the master station program.
For the command parameter setting program, refer to the following.

☞ Section 6.4 Program Examples

(2) Offset/gain setting values

When the user range setting is used and GX Configurator-ST is unavailable, offset/gain values must be set by commands after completion of online module change.
Provide an offset/gain setting program in the master station program.
For the offset/gain setting program, refer to the following.

☞ Section 4.5 Offset/Gain Settings

POINT

When GX Configurator-ST is unavailable, set the command parameters and offset/gain setting values after the module has operated once by default.

7.3 Disconnecting/connecting the External Device for Online Module Change

Disconnect and connect the external device according to the following procedure.

(1) Disconnection

Power off the external device.

(2) Connection

Power on the external device.

7.4 Online Module Change Procedure

This section explains how to set the command parameters or offset/gain values set in the user range setting during online module change when they could not be saved in the head module or when higher accuracy is required with the user range setting used.
For other online module change procedures, refer to the following manual.
☞ MELSEC-ST CC-Link Head Module User's Manual "4.6 Online Module Change Function"

7.4.1 When parameter setting or offset/gain setting is performed using GX Configurator-ST during online module change

POINT

If a slice module different from the target one is selected by mistake, restart the operation as instructed below.

(1) On the screen shown in (c)

Click the Cancel button on the screen to terminate online module change.

(2) On the screen shown in (d) or (f)

Do not change the slice module , click the Next button, and perform the operations in steps (g), (l), and (m) to complete the online module change once.

(3) During operation (g)

Mount the removed slice module again, click the Next button, and perform the operations (l) and (m) to complete the online module change once.

[Preparation for replacing ST1DA]

(a) Select the ST1DA to be replaced online on the "System Monitor" screen.

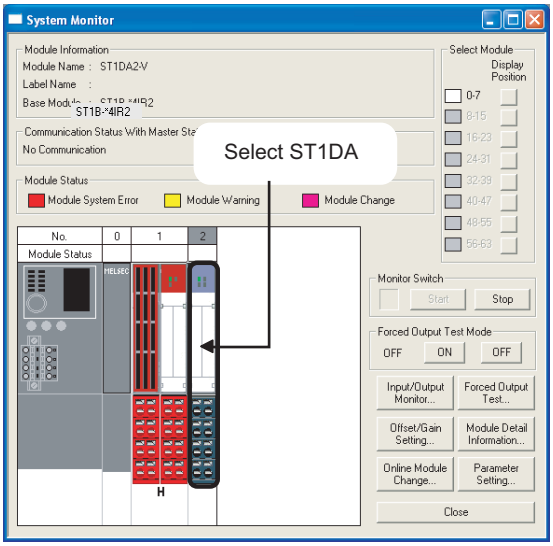


Figure 7.1 System Monitor screen

(b) Click the Online Module Change button on the "System Monitor" screen. Then, confirm that the RUN LED of the selected ST1DA is flashing at 0.25s intervals.

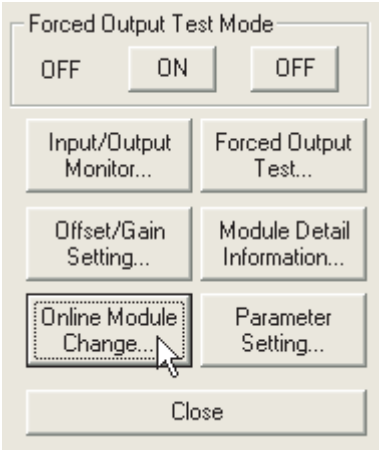


Figure 7.2 Online Module Change **button**

Remark

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

- Select [Diagnostics] → [Online Module Change].
- Right-click the ST1DA selected in (a), and click [Online Module change] on the menu.

(c) Confirm that the ST1DA displayed as "Target Module" is the ST1DA to be replaced and click the Next button.

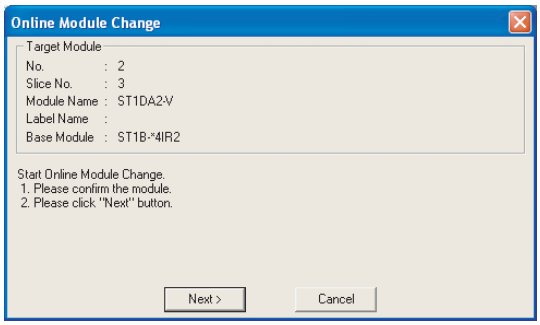


Figure 7.3 online module change screen

1) Clicking the Next button validates the settings and the following will be performed.
   - The head module is placed into the online module change mode.
   - The command parameters and user range setting's offset/gain setting values of the ST1DA to be changed are saved into the head module.

   Clicking the Cancel button stops online module change.

   Clicking the Exit button returns the screen back to the status before performing (b).

2) After clicking the Next button, confirm the following module states.
   - The REL. LED of the head module is on.
   - The RUN LED of the target ST1DA is off.
   - The "Module Status" indicator of the target module has turned purple. This applies only when monitoring from the "System Monitor" screen.

3) If the command parameters and user range setting's offset/gain setting values could not be read from the ST1DA, the REL. LED and ERR. LED of the head module turn on and an error message is displayed on the screen in step (g). Identify the error and take action.(☞ Section 9.1 Error Code List)
   For details of the error code reading and error codes of the head module, refer to the following.
   To set parameters and offset/gain values for a new ST1DA, perform the operations described in (d) and later.

[Disconnection from external device]

(d) As the following screen appears, power off the external device connected to the ST1DA to be removed.

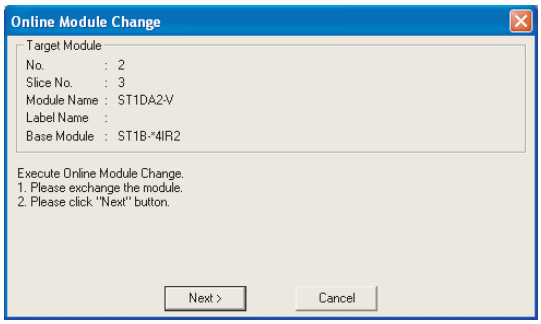


Figure 7.4 Connection to external device after replacement

POINT

If the external device cannot be powered off, shut off all phases of the external power for the MELSEC-ST system and replace the ST1DA.

[Replacing ST1DA]

(e) Remove the ST1DA and replace with a new one.

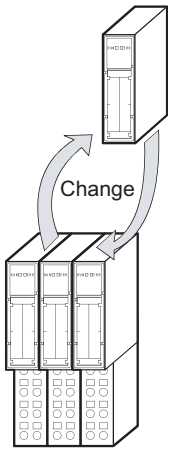


Figure 7.5 Replacing ST1DA

[Connection to external device after replacement]

(f) Mount a new ST1DA. And then, power on the external device.

[Operations after external device connection]

(g) After connecting to the external device, click the Next button on the screen in (d).

1) Clicking the Next button performs the following.
   - Checking whether the module name of the newly mounted slice module is the same as that of the removed one.
   - Writing the command parameters and user range setting's offset/gain setting values, which were saved in the head module in (c), to the mounted ST1DA.

   Clicking the Cancel button stops online module change.
   Terminate the online module change by the following procedure.
   - On the restarted screen shown in (a), select the same slice module. If a different module is selected, an error occurs.
   - Perform the operation in (b) to display the screen in (k), and click the Next button to terminate the online module change.

2) 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 ST1DA is flashing (at 0.25s intervals).

If the parameter settings or user range setting's offset/gain setting values could not be written to the ST1DA, the REL. LED and ERR. LED of the head module turn on and the following screen appears.

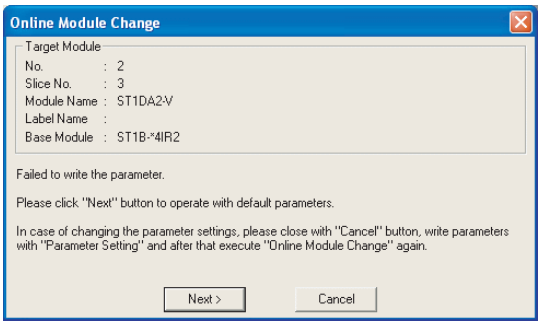


Figure 7.6 Error screen

Confirm the error and take corrective actions.
For details of the error code reading and error codes of the head module, refer to the following. (☞ MELSEC-ST CC-Link Head Module User's Manual, "9.7 Error Codes")

[Parameter setting/offset/gain setting]

(h) Click the Cancel button to stop the online module change.

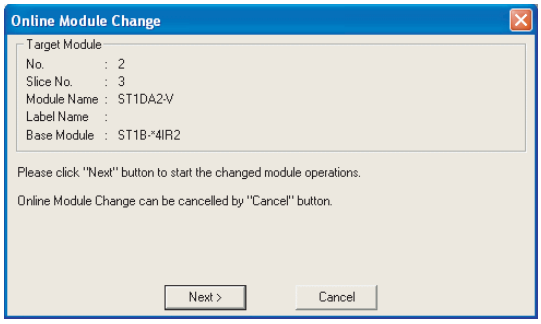


Figure 7.7 Stop of online module change

(i) Click the OK button.

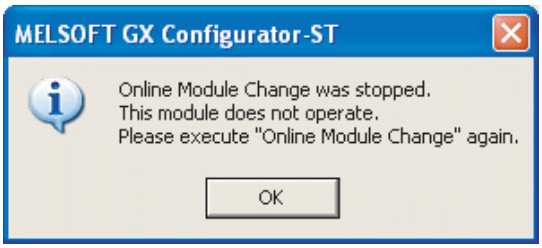


Figure 7.8 Confirmation dialog

(j) Set parameters or offset/gain values.
Take the following procedures.

☞ Section 5.3 Parameter Setting

☞ Section 5.6 Offset/Gain Setting

The following describes the notes on the parameter setting and offset/gain setting during online module change.

POINT

(1) As the system is already in the diagnostic mode, the mode need not be changed.

(2) When setting the parameters during an online module change, write them to both the RAM and ROM.
After the control resumes, the module will operates with the setting written on the RAM.

(3) If the parameter settings and user range setting's offset/gain setting values could not be read from the old ST1DA, command parameters must have been written during operation (g).
Using GX Configurator-ST, check whether the command parameters have been written.

(4) When offset/gain setting was made during online module change, the RUN LED of the ST1DA flickers at 0.25s intervals even in the offset/gain setting mode.

[Processing after parameter setting or offset/gain setting]

(k) After parameter setting or offset/gain setting, execute the operations (a) and (b) to resume the online module change.
* Select the same ST1DA as the one selected before the online module change was stopped.
If the selected ST1DA is different, an error will occur.

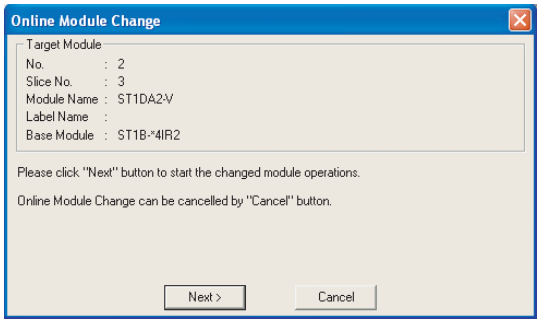


Figure 7.9 Online Module Change window

(l) Clicking the Next button releases the head module from the online module change mode.

1) Clicking the Next button performs the following.
- The head module exits the online module change mode.
- I/O data refresh is started.

Clicking the Cancel button stops online module change.
When stopped, the screen in (a) is displayed.
Terminate the online module change by the following procedure.
- On the restarted screen shown in (a), select the same slice module. If a different module is selected, an error occurs.
- Follow the instructions in (b) to display the screen in (c), and click the Cancel button.

2) 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 ST1DA is on.
- The "Module Status" indicator of the target ST1DA has turned white. This applies only when monitoring from the "System Monitor" screen.

3) If the head module cannot exit the online module change mode, both the REL. LED and ERR. LED of the head module turn on.
Confirm the error and take corrective actions.
(☞ MELSEC-ST CC-Link Head Module User's Manual, "9.7.2 Error code list")

[Completion]

(m) The following screen appears showing that online module change has been completed.

Click the Finish button.

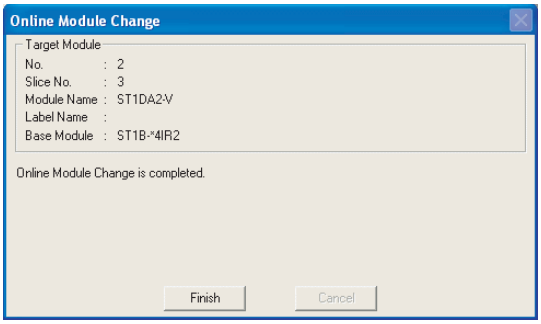


Figure 7.10 Completion of online module change

CHAPTER8 COMMANDS

This chapter explains the commands.

8.1 Command List

(1) About commands

A command is executed by transmitting a message to the MELSEC-ST system with a dedicated instruction (RDMSG) of the master station.
For the command execution procedure, refer to the following manual.
☞ MELSEC-ST CC-Link Head Module User's Manual, "8.1 Command excecusion method and procedures"

(2) When two command numbers are assigned to one command

Use command number 8000H or higher.
Commands, with the number 7FFFH and smaller, are used for importing existing sequence programs from the ST1H-PB (MELSEC-ST PROFIBUS-DP head module) to ST1H-BT (MELSEC-ST CC-Link head module).

(3) Command list

The list of commands that are executable in the ST1DA and conditions for respective command executions are shown below.

Table 8.1 Command list

Command			Description	Execution condition	Reference section
Command type	Command No.	Command name			
Common command	8100H 0100H	Operating status read request	Reads the operating status of the ST1DA.	-	Section 8.2.1
	8101H 0101H	Error code read request	Reads an error code of the ST1DA.	-	Section 8.2.2
Initial data write command	8106H 0106H	Initial data batch write request	Writes command parameters to multiple ST1DAs all at once.	Condition 1	Section 8.3.1
	8107H 0107H	Initial data individual write request	Writes command parameters to a single ST1DA.	Condition 1	Section 8.3.2
ST1DA parameter setting read command	9200H 1200H	D/A conversion enable/disable setting read	Reads the D/A conversion enable/disable setting from RAM of the ST1DA.	-	Section 8.4.1
	9201H 1201H	CH1 preset value read	Reads the preset value from RAM of the ST1DA.	-	Section 8.4.2
	9202H*1 1202H*1	CH2 preset value read			
	9209H 1209H	Output range setting read	Reads the output range setting and Clear/Hold/Preset setting from RAM of the ST1DA.	-	Section 8.4.3

Table 8.1 Command list

Command			Description	Execution condition	Reference section
Command type	Command No.	Command name			
ST1DA parameter setting write command	A200H 2200H	D/A conversion enable/disable setting write	Writes the D/A conversion enable/disable setting to RAM of the ST1DA.	Condition 1	Section 8.5.1
	A201H 2201H	CH1 preset value write	Writes the preset value to RAM of the ST1DA.	Condition 1	Section 8.5.2
	A202H*1 2202H*1	CH2 preset value write			
ST1DA control command	B200H 3200H	Parameter setting read from ROM	Reads parameters from ROM to RAM in the ST1DA.	Condition 1	Section 8.6.1
	B201H 3201H	Parameter setting write to ROM	Writes parameters from RAM to ROM in the ST1DA.	Condition 1	Section 8.6.2
	B202H 3202H	Operation mode setting	Switches the mode of the ST1DA.	Condition 2	Section 8.6.3
	B203H 3203H	Offset channel specification	Specifies an offset channel of offset/gain setting and adjusts the offset value.	Condition 3	Section 8.6.4
	B204H 3204H	Gain channel specification	Specifies a gain channel of offset/gain setting and adjusts the gain value.	Condition 3	Section 8.6.5
	B205H 3205H	User range write	Writes adjusted offset/gain settings to ROM of the ST1DA.	Condition 3	Section 8.6.6

* 1 If an execution is attempted to the ST1DA1-I, it will fail and "01H" is stored in Cr.0(15-8) Command execution result.

Table 8.2 Conditions for command execution

Condition	Description
-	Commands are always executable.
Condition 1	Commands are executable in normal mode and when Bw.n+1 Convert setting request is OFF (0).
Condition 2	Commands are only executable in normal mode and when Bw.n+1 Convert setting request is OFF (0), or in offset/gain mode.
Condition 3	Commands are executable only in offset/gain mode.

POINT

If a command execution is attempted while the required condition does not meet, it will fail and "06H" or "13H" will be stored in Cr.n(15-8) Command execution result.

8.2 Common Commands

8.2.1 Operating status read request (Command No. : 8100H/0100H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads the operating status of the ST1DA.

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

Table 8.3 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.8100H] Set the slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.0100H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (8100H/0100H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.4 Values stored in "Cr" Command result area (When completed normally)

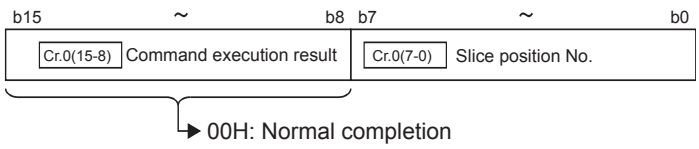
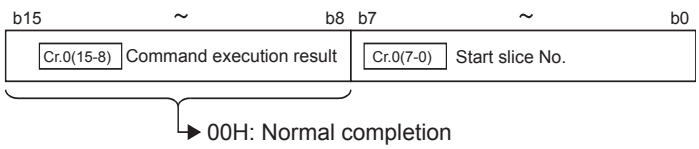
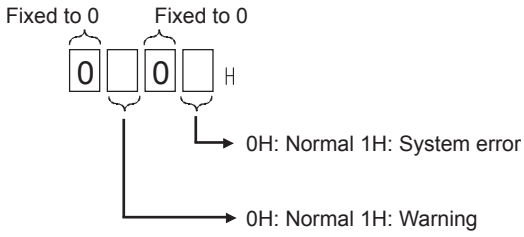
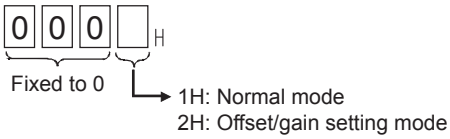
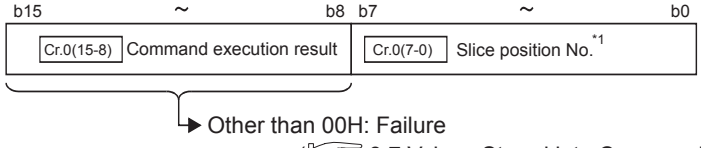
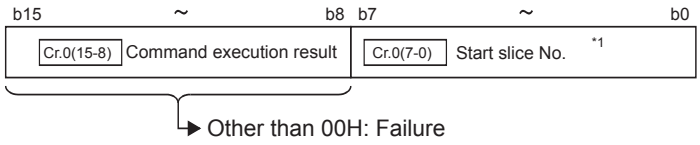
Cr Command result area	Result details
Cr.0	[For execution of command No.8100H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0100H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 

Table 8.4 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.1	The executed command No. (8100H/0100H) is stored. (Hexadecimal)
Cr.2	The operating status of the ST1DA is stored. 
Cr.3	The current operation mode of the ST1DA is stored. 

(b) When failed "Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.5 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.8100H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.0100H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8100H/0100H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.2.2 Error code read request (Command No.: 8101H/0101H)

	Data size
Cn	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads an error code of the ST1DA.

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

Table 8.6 Values set to "Cw" Command execution area

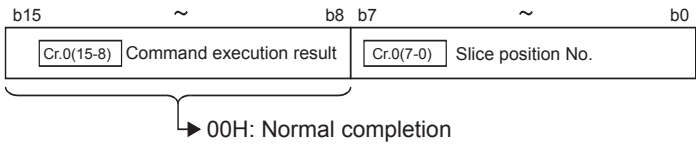
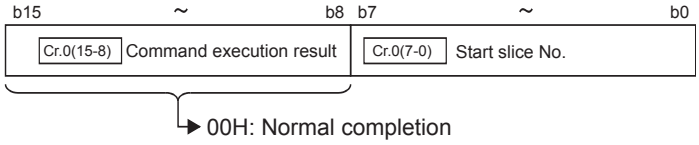
Cw Command execution area	Setting value
Cw.0	[For execution of command No.8101H] Set the slice position No. of the target ST1DA. (Hexadecimal).
	[For execution of command No.0101H] Set the start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (8100H/0100H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

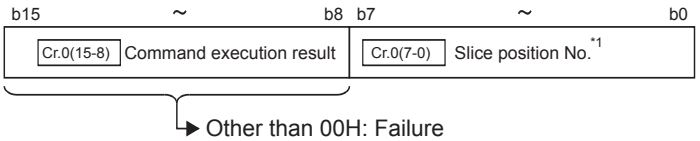
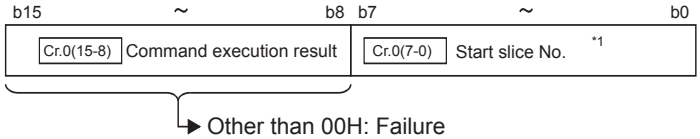
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.7 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.8101H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.0101H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (8101H/0101H) is stored. (Hexadecimal)
Cr.2	The error code of the error that is currently occurring in the ST1DA is stored. (Hexadecimal) For details of error codes, refer to the following. ☞ Section 9.1 Error Code List When no error is detected, 0000H is stored.
Cr.3	0000H is stored.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.8 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.8101H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.0101H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (8101H/0101H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.3 Initial Data Write Command

8.3.1 Initial data batch write request (Command No.: 8106H)

	Data size
Cw	6 to 20 words (12 to 40 bytes)
Cr	6 words (12 bytes)

This command batch-writes command parameters to the following modules of the same type.

- Head module
- Input moduleì
- Output module
- Intelligent function module

The Clear/Hold/Preset and output range settings are written to RAMs of multiple ST1DAs all at once.

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

Table 8.9 Values set to "Cw" Command execution area

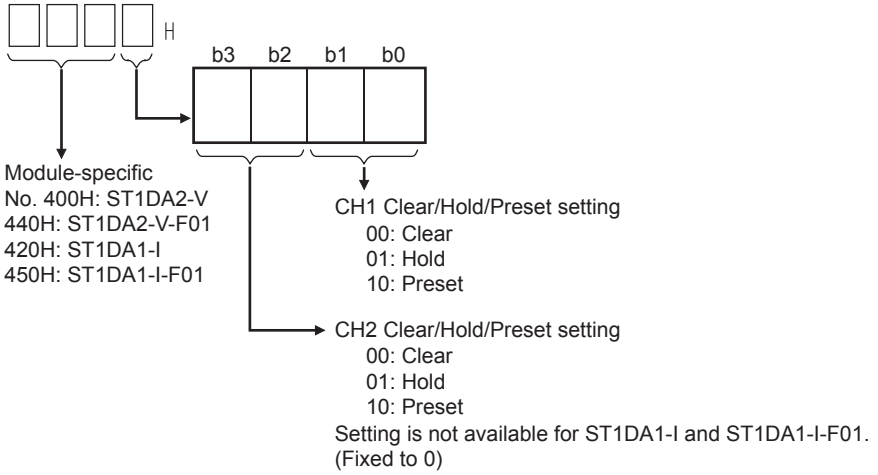
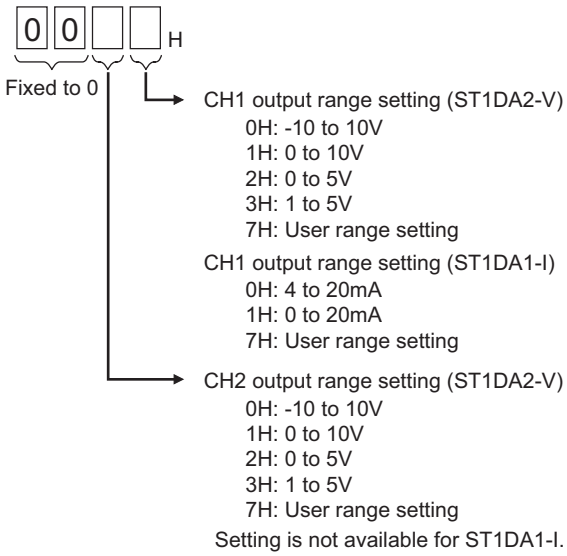
Cw Command execution area	Setting value
Cw.0	Fixed to 0000H.
Cw.1	Set a command number to be executed (8106H). (Hexadecimal)
Cw.2	Set command parameters of the head module. (Hexadecimal)*1
Cw.3	Set command parameters of input modules. (Hexadecimal)*1
Cw.4	Set command parameters of output modules. (Hexadecimal)*1
Cw.5	Set the number of the command parameter settings for intelligent function modules in Cw.6 to Cw.19 (number of module types: 0 to 7).
Cw.6	Set a number specific to the ST1DA module and command parameters. (Hexadecimal) This setting is required only when one or more value is set in Cw.5 . 

Table 8.9 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.7	Set command parameters of the ST1DA. (Hexadecimal) This setting is required only when one or more value is set in Cw.5 . 
Cw.8 to Cw.19	In the same way as in Cw.7 , set command parameters for other ST1DAs and intelligent function modules. (Two words each) *2

* 1 For settings of each module, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "8.2.7 Initial data batch write request (Command No.: 8106H)

* 2 For settings of intelligent function modules other than the ST1DA, refer to the following.

☞ Intelligent Function Module User's Manual, "Initial data batch write request (Command No.: 8106H)

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0 .

(a) When completed normally ("Cr.0" is 0000H.)

Table 8.10 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	Error code (0000H when completed normally)
Cr.1	The executed command No. (8106H) is stored. (Hexadecimal)
Cr.2 Cr.3 Cr.4 Cr.5	The command parameter setting status after writing is stored for each slice module.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Cr.2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Cr.3	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Cr.4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Cr.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48

← Each bit indicates the corresponding slice position No.

0: Parameters not set
1: Parameters set

(b) When failed ("Cr.0" is other than 0000H.)

Table 8.11 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Setting value
Cr.0	An error code is stored. (Hexadecimal)*1
Cr.1	The executed command No. (8106H) is stored. (Hexadecimal)
Cr.2 Cr.3 Cr.4 Cr.5	The command parameter setting status after writing is stored for each slice module.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Cr.2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Cr.3	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
Cr.4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
Cr.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48

← Each bit indicates the corresponding slice position No.

0: Parameters not set
1: Parameters set

* 1 For details of error codes, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "9.7.2 Error code list"

POINT

(1) In Cw.6 to Cw.19 , intelligent function module's command parameter settings exceeding the quantity set in are not executed.

(2) Initial data batch write request (Command No.: 8106H) cannot be executed with another command at the same time.
Doing so will cause an error.

8.3.2 Initial data individual write request (Command No.: 8107H/0107H)

	Data size
Cw	6 to 99 words (12 to 198 bytes)
Cr	4 to 35 words (8 to 70 bytes)

This command writes command parameters of the following modules to RAM for each module.

- Head module
- Input module
- Output module
- Intelligent function module

The Clear/Hold/Preset and output range settings are written to RAM of a single ST1DA.

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

Table 8.12 Values set to "Cw" Command execution area

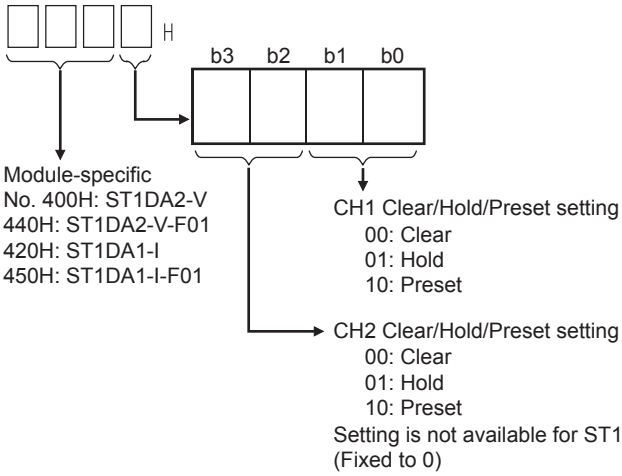
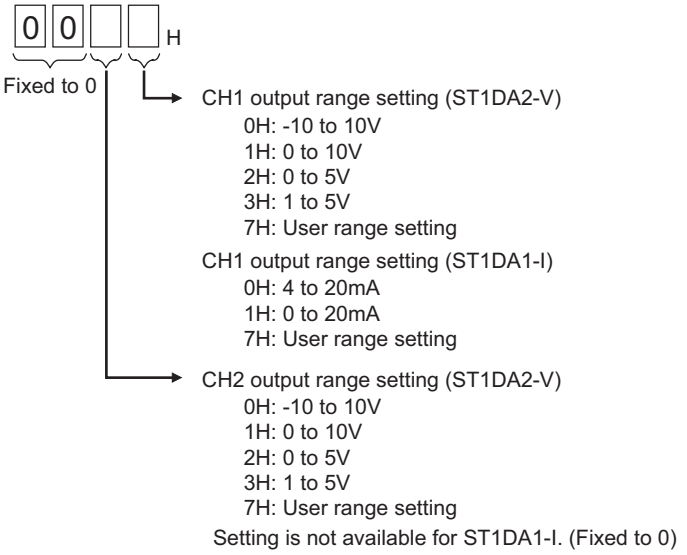
Cw Command execution area	Setting value
Cw.0	Fixed to 0000H.
Cw.1	Set a command number to be executed (8107H/0107H). (Hexadecimal)
Cw.2	Set the number of the command parameter settings for slice modules (number of the modules: 1 to 32). (Hexadecimal)
Cw.3	[For execution of command No.8107H] Set the slice position No. of the command target ST1DA. (Hexadecimal) [For execution of command No.0107H] Set the start slice No. of the command target ST1DA. (Hexadecimal)
Cw.4	Set a number specific to the ST1DA module and command parameters. (Hexadecimal) 

Table 8.12 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.5	Set command parameters of the ST1DA. (Hexadecimal) 
Cw.6 to Cw.98	In the same way as in Cw.3 to Cw.5 , set command parameters of each module individually.*1 (Three words each)

* 1 For settings of the head module and I/O modules, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "8.2.8 Initial data individual write request (Command No.: 8107H/0107H)"

For settings of intelligent function modules other than the ST1DA, refer to the following.

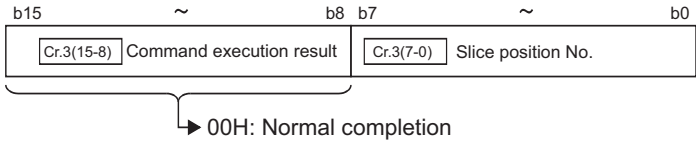
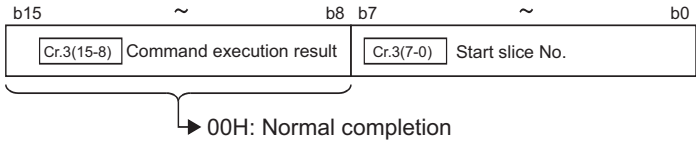
☞ Intelligent Function Module User's Manual, "Initial data individual write request (Command No.: 8107H/0107H)

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the data (normal completion or failure) in Cr.0 .

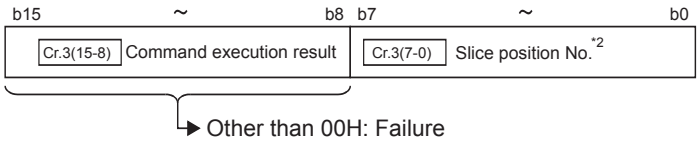
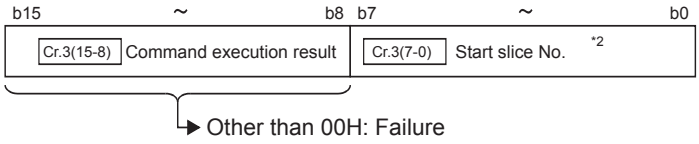
(a) When completed normally ("Cr.0" is 0000H.)

Table 8.13 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	Error code (0000H when completed normally)
Cr.1	The executed command No. (8107H/0107H) is stored. (Hexadecimal)
Cr.2	The number of command parameter settings of the intelligent function module is stored.
Cr.3	[For execution of command No.8107H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  [For execution of command No.0107H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.4 to Cr.34	The detailed results for the number of intelligent function modules set in Cw.2 are stored in the same way as in Cr.3 . (One word each)

(b) When failed ("Cr.0" is other than 0000H.)

Table 8.14 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Setting value
Cr.0	An error code is stored. (Hexadecimal)*1
Cr.1	The executed command No. (8107H/0107H) is stored. (Hexadecimal)
Cr.2	The number of command parameter settings of the intelligent function module is stored.
Cr.3	[For execution of command No.8107H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.0107H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.4 to Cr.34	The detailed results for the number of intelligent function modules set in Cw.2 are stored in the same way as in Cr.3. (One word each)

* 1 For details of error codes, refer to the following.
☞ MELSEC-ST CC-Link Head Module User's Manual, "9.7.2 Error code list"

* 2 When 0FH is stored in Cr.3(15-8) Command execution result, 00H (start slice No. or slice position No. of the head module) is stored in Cr.3(7-0) Start slice No. or slice position No.

POINT

(1) In Cw.3 to Cw.98, intelligent function module's command parameter settings exceeding the quantity set in Cw.2 are not executed.
(2) Initial data individual write request (Command No.: 8107H/0107H) cannot be executed with another command at the same time.
(3) When the slice position No. or start slice No. is duplicated, the module with the duplicate setting is detected as an error module.

8.4 ST1DA Parameter Setting Read Commands

8.4.1 D/A conversion enable/disable setting read (Command No. : 9200H/1200H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads the D/A conversion enable/disable setting from RAM of the ST1DA.

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

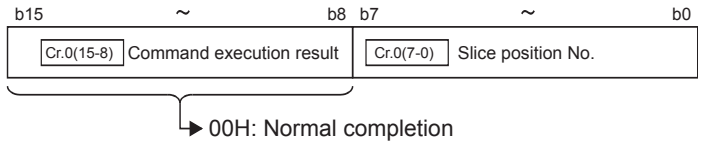
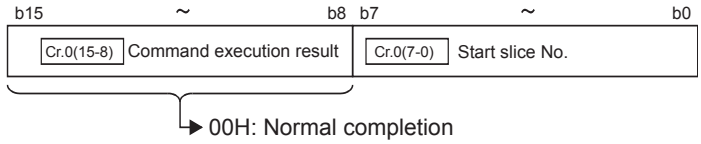
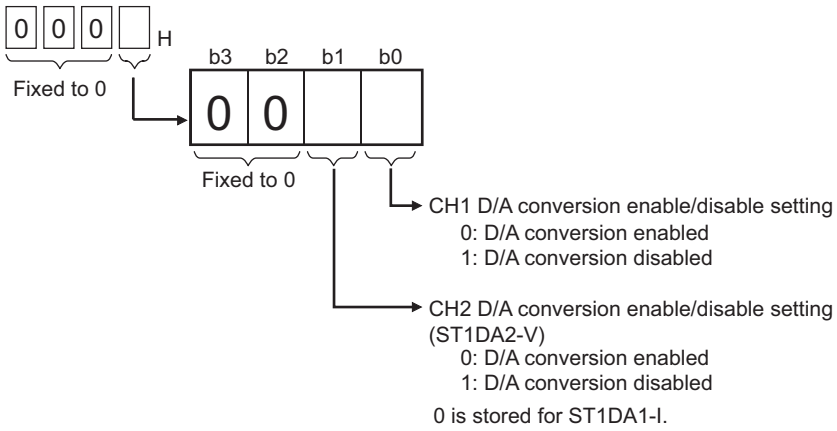
Table 8.15 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.9200H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.1200H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (9200H/1200H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

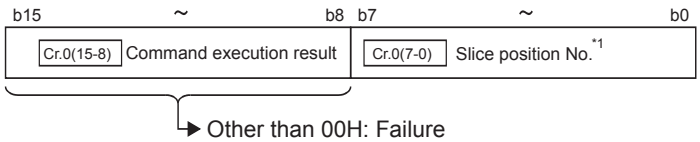
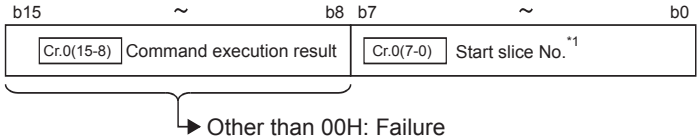
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.16 Values stored in "Cr" Command result area (When completed normally)

Cw Command result area	Result details
Cr.0	[For execution of command No.9200H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  [For execution of command No.1200H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (9200H/1200H) is stored. (Hexadecimal)
Cr.2	The D/A conversion enable/disable setting is stored. 
Cr.3	0000H is stored.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.17 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.9200H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.1200H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (9200H/1200H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.4.2 CH[ ] preset value read (Command No.: 9201H, 9202H/1201H, 1202H)

Data size	
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads preset values from RAM of the ST1DA.

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

Table 8.18 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.9201H, 9202H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.1201H, 1202H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed. (Hexadecimal) CH1 preset value read: 9201H, 1201H CH2 preset value read: 9202H, 1202H *1
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

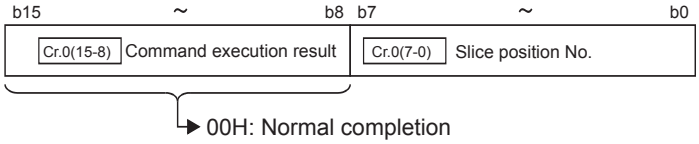
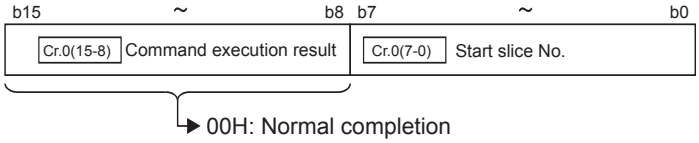
* 1 An execution to the ST1DA1-I will fail, and "01H" will be stored in Cr.0(15-8) Command execution result.

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

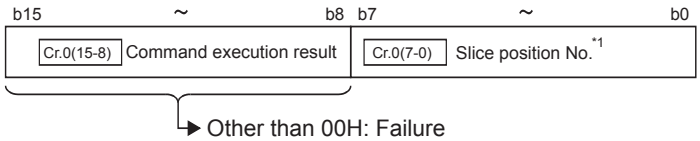
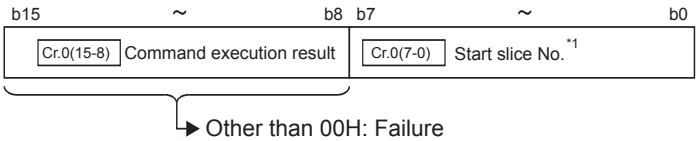
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.19 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.9201H, 9202H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.1201H, 1202H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (9201H/1201H, 9202H/1202H) is stored. (Hexadecimal)
Cr.2	A CH□ preset value is stored. (16-bit signed binary) The value ranges are as follows: ST1DA2-V: -4000 to 4000 ST1DA1-I: 0 to 4000
Cr.3	0000H is stored.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.20 Values stored in "Cr." Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.9201H, 9202H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.1201H, 1202H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (9201H/1201H, 9202H/1202H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cr.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.4.3 Output range set value read (Command No.: 9209H/1209H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads the Clear/Hold/Preset setting from RAM of the ST1DA.

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

Table 8.21 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.9209H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.1209H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (9209H/1209H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.22 Values stored in "Cr" Command result area (When completed normally)

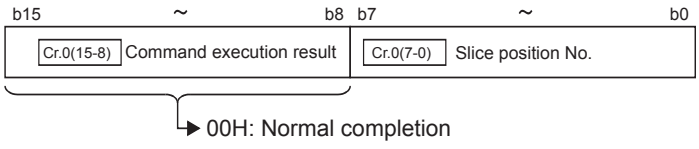
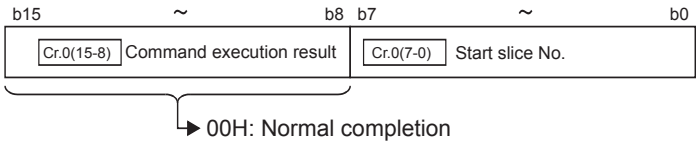
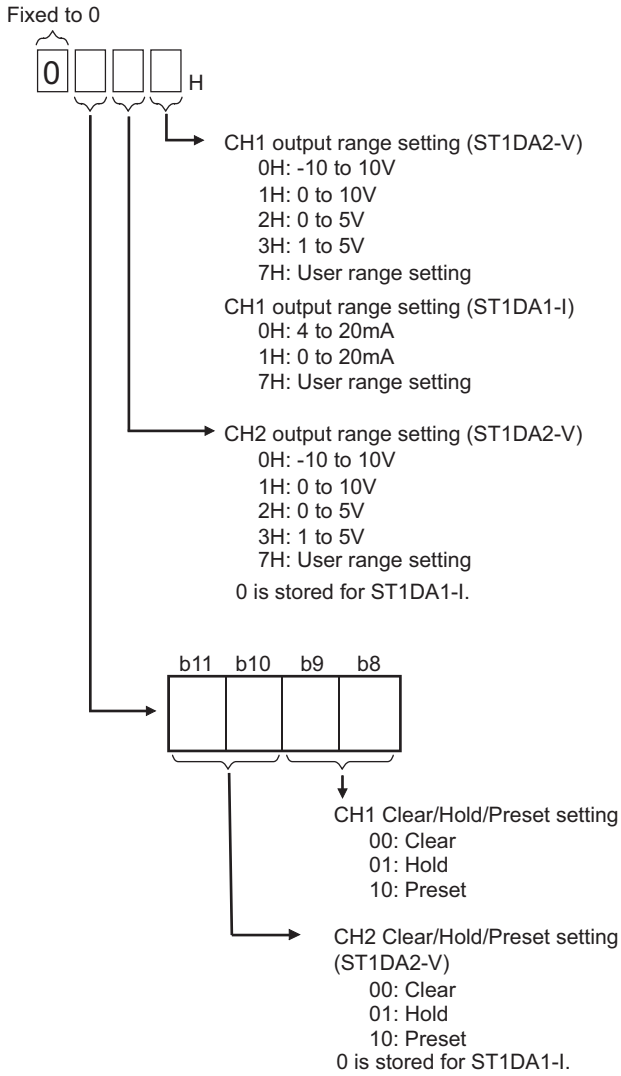
Cr Command result area	Result details
Cr.0	[For execution of command No.9209H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.1209H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (9209H/1209H) is stored. (Hexadecimal)

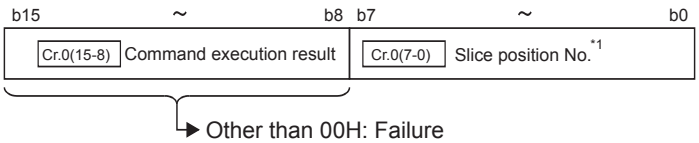
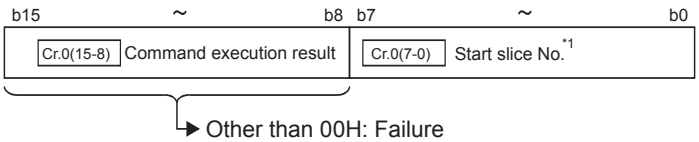
Table 8.22 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.2 *1	The output range and Clear/Hold/Preset settings written on the RAM are stored for each channel. 
Cr.3 *1	Set values of the currently effective output range and Clear/Hold/Preset settings are stored for each channel. Stored values are the same as in Cr.2 Response data 1.

* 1 If stored values differ Cr.2 from Cr.3 , the parameters written to the RAM with the command have not been made effective in the module. Set Bw.n+1 Convert setting request to ON (1) to make them effective.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.23 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.9209H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.1209H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (9209H/1209H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.5 ST1DA Parameter Setting Write Commands

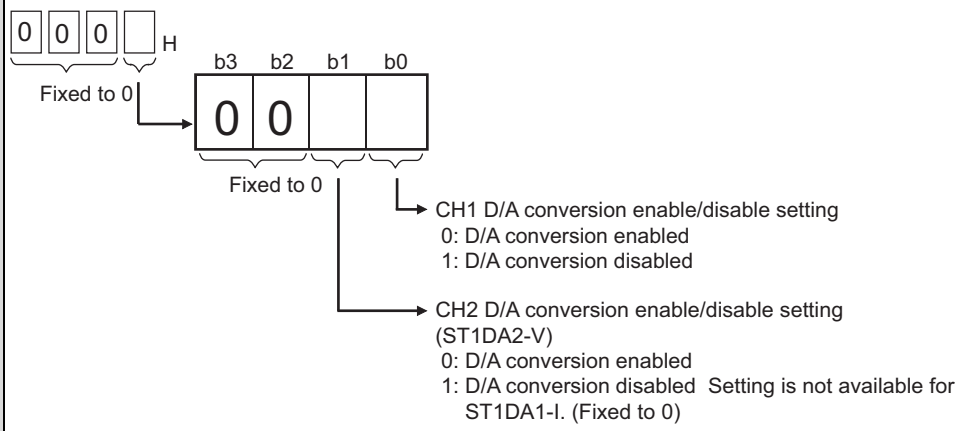
8.5.1 D/A conversion enable/disable setting (Command No.: A200H/2200H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command writes the D/A conversion enable/disable setting to RAM of the ST1DA, and can be executed only in normal mode and when Bw.n+1 Convert setting request is off (0).

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

Table 8.24 Values set to "Cw" Command execution area

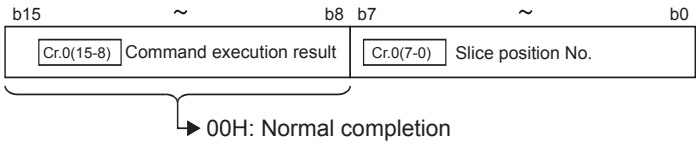
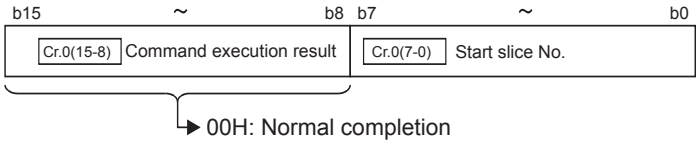
Cw Command execution area	Setting value
Cw.0	[For execution of command No.A200H] Set a slice position No. of the target ST1DA. (Hexadecimal) [For execution of command No.2200H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (A200H/2200H). (Hexadecimal)
Cw.2	Set a D/A conversion enable/disable setting for each channel. 
Cw.3	Fixed to 0000H. (Any other value is treated as 0000H.)

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

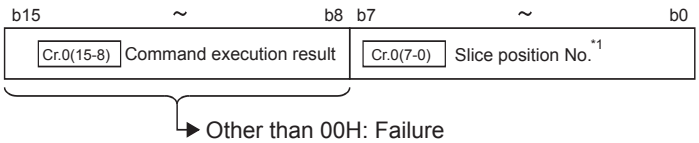
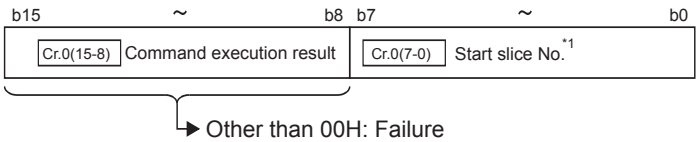
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.25 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.A200H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.2200H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (A200H/2200H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	0000H is stored.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.26 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.A200H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.2200H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (A200H/2200H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.5.2 CH[ ] preset value write (Command No.: A201H, A202H/2201H, 2202H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command writes preset values to RAM of the ST1DA, and can be executed only in normal mode and when Bw.n+1 Convert setting request is off (0).

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

Table 8.27 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.A201H, A202H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.2201H, 2202H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed. (Hexadecimal) CH1 preset value write: A201H, 2201H CH2 preset value write: A202H, 2202H*1
Cw.2	A CH□ preset value is stored. (16-bit signed binary) The value ranges are as follows: ST1DA2-V: -4000 to 4000 ST1DA1-I: 0 to 4000
Cw.3	Fixed to 0000H. (Any other value is treated as 0000H.)

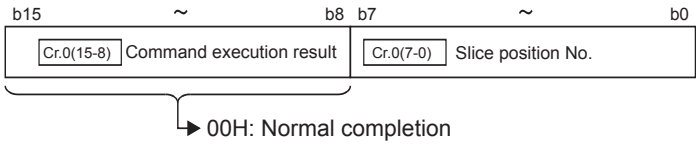
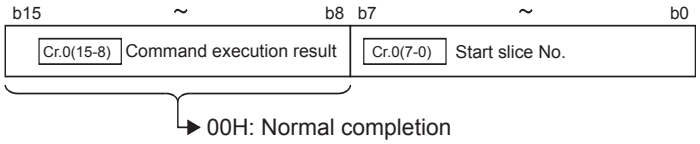
* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

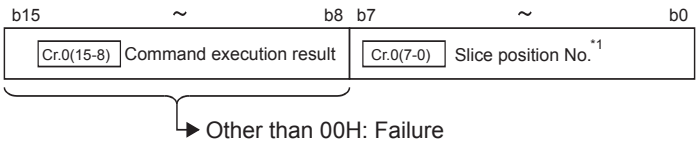
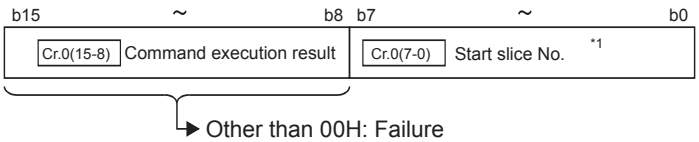
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.28 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.A201H, A202H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.2201H, 2202H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (A201H/2201H, A202H/2202H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	0000H is stored.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.29 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.A201H, A202H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.2201H, 2202H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (A201H/2201H, A202H/2202H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.6 ST1DA Control Commands

8.6.1 Parameter setting read from ROM (Command No.:B200H/3200H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command reads parameters from ROM to RAM in the ST1DA, and can be executed only in normal mode and when Bw.n+1 Convert setting request is off (0).

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

Table 8.30 Values set to "Cw" Command execution area

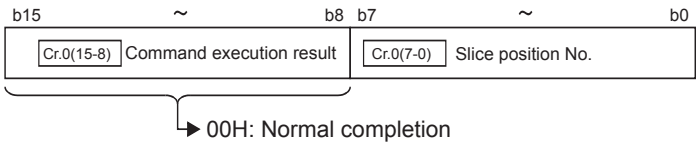
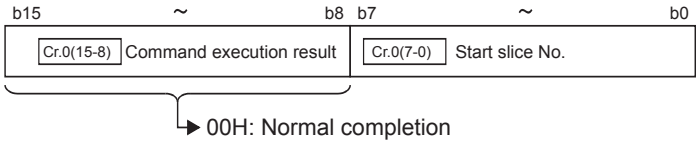
Cw Command execution area	Setting value
Cw.0	[For execution of command No.B200H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.3200H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (B200H/3200H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

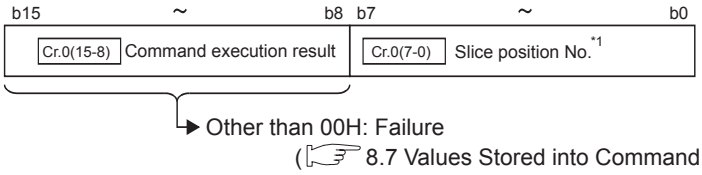
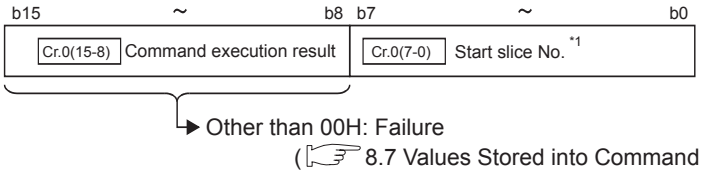
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.31 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.B200H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3200H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (B200H/3200H) is stored. (Hexadecimal)
Cr.2	0000H is stored.
Cr.3	

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.32 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.B200H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.3200H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (B200H/3200H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.6.2 Parameter setting write to ROM (Command No.: B201H/3201H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command writes parameters from RAM to ROM in the ST1DA, and can be executed only in normal mode and when Bw.n+1 Convert setting request is off (0).

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

Table 8.33 Values set to "Cw" Command execution area

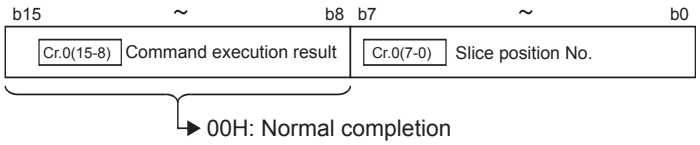
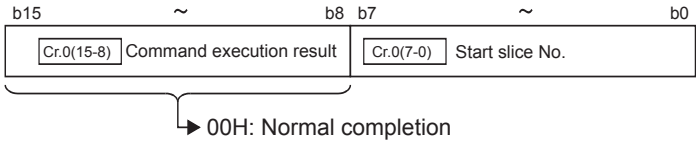
Cw Command execution area	Setting value
Cw.0	[For execution of command No.B201H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.3201H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (B201H/3201H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

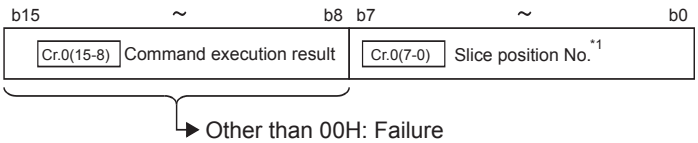
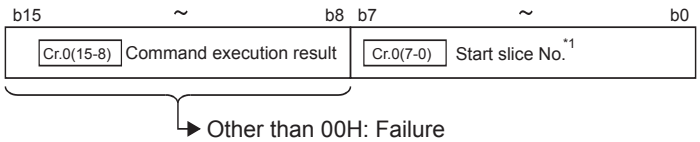
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.34 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.B201H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3201H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (B201H/3201H) is stored. (Hexadecimal)
Cr.2	0000H is stored.
Cr.3	

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.35 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.B201H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.3201H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (B201H/3201H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

POINT

Before executing Parameter setting write to ROM (command No.: B201H/3201H), check that the system operates normally with the set values written to the RAM.

8.6.3 Operation mode setting (Command No.: B202H/3202H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

The mode of the ST1DA can be changed. (From normal mode to offset/gain setting mode, or from offset/gain setting mode to normal mode)

This command can be executed in normal mode and when Bw.n+1 Convert setting request is off (0), or in offset/gain setting mode.

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

Table 8.36 Values set to "Cw" Command execution area

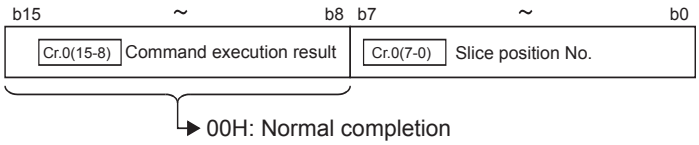
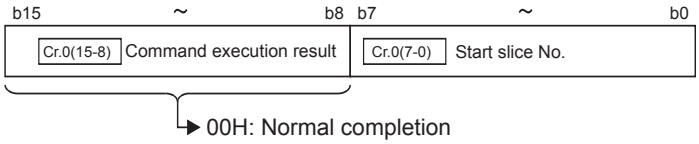
Cw Command execution area	Setting value
Cw.0	[For execution of command No.B202H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.3202H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (B202H/3202H). (Hexadecimal)
Cw.2	Set an operation mode. (Hexadecimal) 0000H: Normal mode 0001H: Offset/gain setting mode
Cw.3	Fixed to 0000H. (Any other value is treated as 0000H.)

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

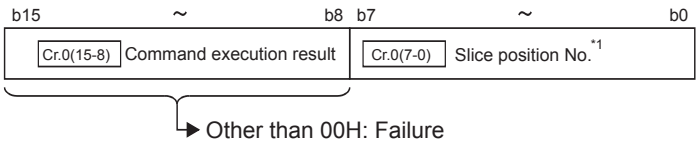
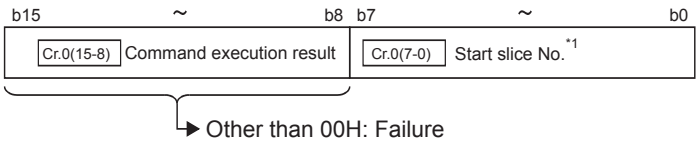
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.37 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.B202H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3202H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (B202H/3202H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	0000H is stored.

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.38 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.B202H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.3202H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (B202H/3202H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cr.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

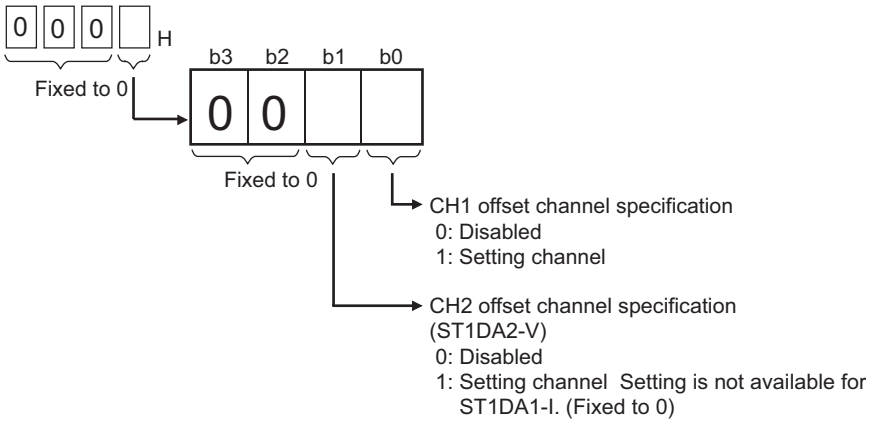
8.6.4 Offset channel specification (Command No.: B203H/3203H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command specifies a channel and adjusts the offset value for the channel, and can be executed only in offset/gain setting mode.

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

Table 8.39 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.B203H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.3203H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (B203H/3203H). (Hexadecimal)
Cw.2	Specify a channel for which values are adjusted by the offset value set in the offset/gain setting. Multiple channels can be set at the same time. 
Cw.3	Set a value to be adjusted for analog output values. The available value range is -3000 to 3000. When the set value is 1000, an analog output value of approx. 0.33V (ST1DA2-V) or 0.76mA*1 (ST1DA1-I) can be adjusted. At the time of command execution, an analog output value is adjusted according to the set value.

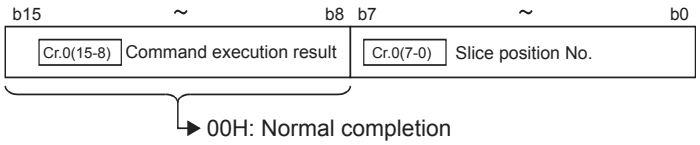
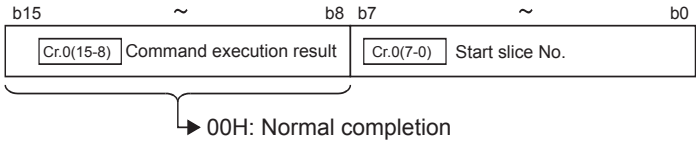
* 1 For hardware version C or earlier, the adjusted value is approx. 0.38mA.

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

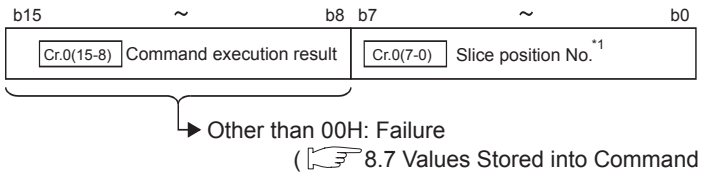
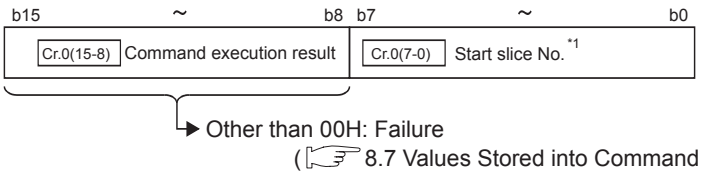
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.40 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.B203H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3203H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (B203H/3203H) is stored. (Hexadecimal)
Cr.2	0000H is stored.
Cr.3	

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.41 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.B203H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3203H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (B203H/3203H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

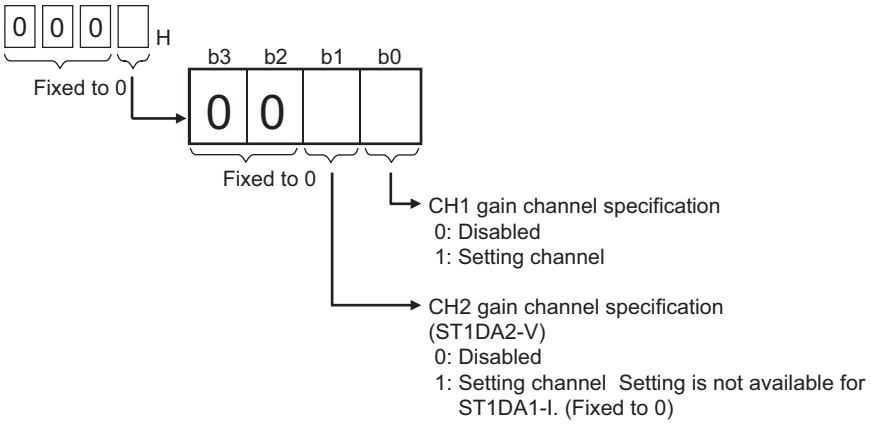
8.6.5 Gain channel specification (Command No.: B204H/3204H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command specifies a channel and adjusts the gain value for the channel, and can be executed only in offset/gain setting mode.

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

Table 8.42 Values set to "Cw" Command execution area

Cw Command execution area	Setting value
Cw.0	[For execution of command No.B204H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.3204H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (B204H/3204H). (Hexadecimal)
Cw.2	Specify a channel for which values are adjusted by the offset value set in the offset/gain setting. Multiple channels can be set at the same time. 
Cw.3	Set a value to be adjusted for analog output values. The available value range is -3000 to 3000. When the set value is 1000, an analog output value of approx. 0.33V (ST1DA2-V) or 0.76mA*1 (ST1DA1-I) can be adjusted. At the time of command execution, an analog output value is adjusted according to the set value.

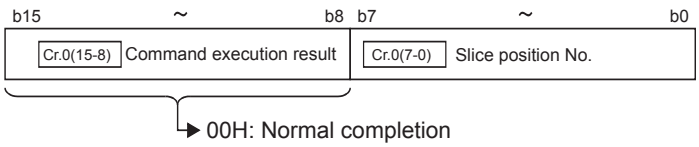
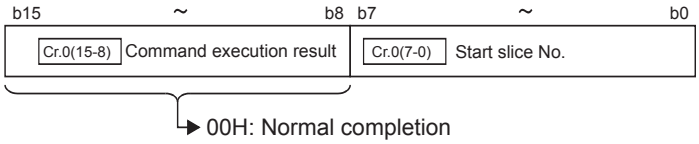
* 1 For hardware version C or earlier, the adjusted value is approx. 0.38mA.

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

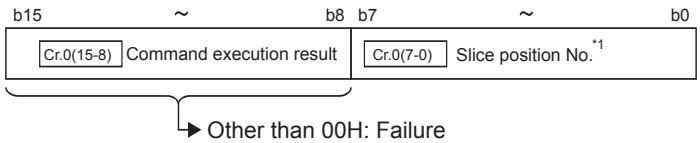
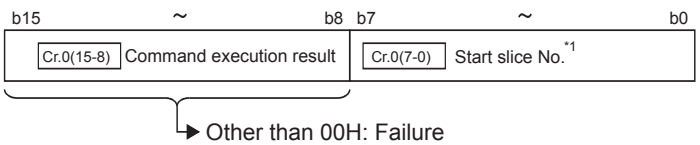
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.43 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.B204H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3204H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.0	The executed command No. (B204H/3204H) is stored. (Hexadecimal)
Cr.2	0000H is stored.
Cr.3	

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.44 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.B204H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.3204H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (B204H/3204H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.6.6 User range write (Command No.: B205H/3205H)

	Data size
Cw	4 words (8 bytes)
Cr	4 words (8 bytes)

This command writes adjusted offset/gain setting values to ROM of the ST1DA, and can be executed only in offset/gain setting mode.

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

Table 8.45 Values set to "Cw" Command execution area

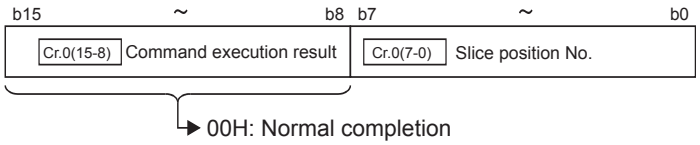
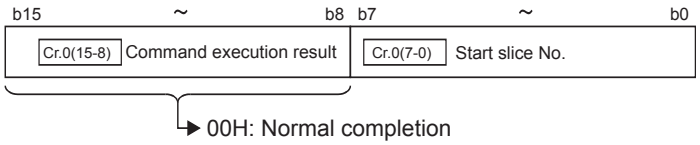
Cw Command execution area	Setting value
Cw.0	[For execution of command No.B205H] Set a slice position No. of the target ST1DA. (Hexadecimal)
	[For execution of command No.3205H] Set a start slice No. of the target ST1DA. (Hexadecimal)
Cw.1	Set a command No. to be executed (B205H/3205H). (Hexadecimal)
Cw.2	Fixed to 0000H. (Any other value is treated as 0000H.)
Cw.3	

(2) Values stored in "Cr" Command result area

The command execution result data vary depending on the result data (normal completion or failure) in Cr.0(15-8) Command execution result.

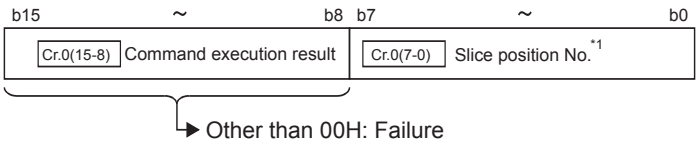
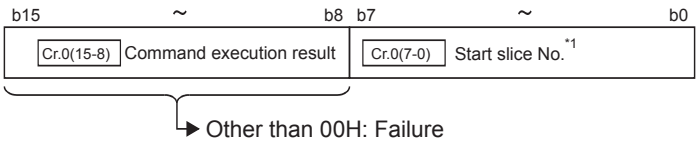
(a) When completed normally ("Cr.0(15-8)" Command execution result is 00H.)

Table 8.46 Values stored in "Cr" Command result area (When completed normally)

Cr Command result area	Result details
Cr.0	[For execution of command No.B205H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
	[For execution of command No.3205H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below. 
Cr.1	The executed command No. (B205H/3205H) is stored. (Hexadecimal)
Cr.2	0000H is stored.
Cr.3	

(b) When failed ("Cr.0(15-8)" Command execution result is other than 00H.)

Table 8.47 Values stored in "Cr" Command result area (When failed)

Cr Command result area	Result details
Cr.0	[For execution of command No.B205H] The command execution result and slice position No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
	[For execution of command No.3205H] The command execution result and start slice No. in hexadecimal are stored in the high and low bytes respectively as shown below.  (☞ 8.7 Values Stored into Command Execution Result)
Cr.1	The executed command No. (B205H/3205H) is stored. (Hexadecimal)
Cr.2	Cw.2 Argument 1 at command execution is stored.
Cr.3	Cw.3 Argument 2 at command execution is stored.

* 1 When 0FH is stored in Cr.0(15-8) Command execution result, 00H (slice position No. or start slice No. of the head module) is stored in Cr.0(7-0) Start slice No. or Slice position No.

8.7 Values Stored into Command Execution Result

The following table indicates the values stored into Cr.n(15-8) Command execution result in Cr Command result area.

Table 8.48 Command execution results and actions

Command execution result	Description	Action
00H	Normal completion	-
01H	The requested command is not available for the specified module.	Check Table 8.1 to see if the requested command No. can be used for the ST1DA or not.
		Check whether the specified Cw.0 slice position No. or start slice No. is appropriate to the ST1DA.
02H	A value is out of range.	Check whether the values set in Cw.2 and subsequent area in the command execution area are within the range available for the requested command No.
03H	The specified Cw.0 slice position No. or start slice No. is incorrect.	Check whether the ST1DA is mounted in the position specified by Cw.0 slice position No. or start slice No.
		Check whether the specified Cw.0 slice position No. or start slice No. is appropriate to the ST1DA.
04H	There is no response from the specified module.	Check Table 8.1 to see if the requested command No. is applicable for the ST1DA or not. If the requested command No. is applicable, the ST1DA may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
05H	No communication is available with the specified module.	The ST1DA may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
06H	The requested command is not executable in the current operation mode of the module.	Check Table 8.1 to see if the requested command No. can be used for the ST1DA or not.
		The number of user range writes (command No.: B205H/3205H) or parameter write to ROM (command No.: B201H/3201H) exceeded 25 after power ON (error code: 1200H). Clear the error[*1], and then execute the command.
		The offset value is equal to or greater than the gain value in the offset/gain setting (error code: 400 □H). Clear the error[*1], and then redo the offset/gain setting so that the offset value is less than the gain value.
07H	The module has already been in the specified mode.	Continue the processing since the operation mode of the ST1DA specified by Cw.0 slice position No. or start slice No. is already the requested mode.
08H	The mode of the module cannot be changed to the specified mode.	Set Bw.n+1 Convert setting request to OFF (0), and then execute the command.
09H	The specified module is in the online module change status.	Execute the command after completion of the online module change.

Table 8.48 Command execution results and actions

Command execution result	Description	Action
0AH	The specified module No. is different, or does not exist.	Check whether the command parameter setting of the intelligent function module is appropriate to the specified module No.
0FH	The value of Cw.0 slice position No. or start slice No. is out of range.	Check whether the value set for Cw.0 slice position No. or start slice No. is within the range or not.
10H	Data cannot be read from the specified module.	Execute the command again. If the problem on the left occurs again, the ST1DA may be faulty. Please consult your local Mitsubishi representative, providing a detailed description of the problem.
11H	Data cannot be written to the specified module.	
13H	The specified module is not in the status available for command parameter writing.	Set Bw.n+1 Convert setting request to OFF (0), and then execute the command.

* 1 Clear the error by either of the following methods:
- Error clear request (Command No.: 8104H/0104H)
- Error reset request (RYnA)

For details of the above method, refer to the following.

☞ MELSECNET-ST CC-Link Head Module User's Manual "8.2.5 Error clear request (Command No.: 8104H/0104H)"

☞ MELSECNET-ST CC-Link Head Module User's Manual "3.4 Remote I/O, Remote Registers"

CHAPTER9 TROUBLESHOOTING

This chapter explains the errors that may occur when the ST1DA is used, and how to troubleshoot them.

9.1 Error Code List

In the ST1DA, when an error occurs due to write of data to the master module, executing Error code read request (command No.: 8101H/0101H) stores the error code into Cr command result area of the head module.

Table 9.1 Error code list

Error code (Hexa-decimal)	Error level	Error name	Description	Corrective action
1100H	System error	ROM error	ROM fault.	Power the ST1DA off and then on, or reset the head module. If the error code given on the left is still stored, the possible cause is a ST1DA failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.
1200H	System error	ROM write count error	Parameter setting write to ROM (command No.: B201H/3201H) or User range write (command No.: B205H/3205H) was executed more than 25 times after power-on. Offset/gain settings were written to the ROM using GX Configurator-ST more than 25 times after power-on.	After power-on, execute the command for a single module, or write offset/gain settings to the ROM using GX Configurator-ST, within 25 times.
200□H	System error	Output range setting error	The value set to output range setting is outside the valid range. □ indicates the channel number causing the error.	Set a value within the valid range.
210□H	System error	Clear/Hold/ Preset error	The value set to Clear/Hold/Preset setting is outside the valid range. □ indicates the channel number causing the error.	Set a value within the valid range.
400□H	System error	User range setting error	When user range setting was made, the offset value was greater than or equal to the gain value. □ indicates the channel number causing the error.	Set so that the offset value becomes smaller than the gain value.
600□H	Warning	Digital value setting error	The value set to Ww.n, Ww.n+1 CH□ digital value setting is outside the valid range. □ indicates the channel number causing the error.	Set a value within the valid range.
700□H	Warning	Offset/ gain setting error	Cw.3 Argument 2 of offset channel specification (command No.: B203H/3203H) or gain channel specification (command No.: B204H/ 3204H) is outside the range -3000 to 3000. □ indicates the channel number causing the error.	Set a value within the valid range.
B10□H to FFFF	-	Error detected by head module	-	Referring to the following, take actions. ☞ MELSEC-ST CC-Link Head Module User's Manual, "9.7.2 Error code list"

POINT

(1) If a system error and a warning have occurred, the error code of the system error is stored with higher priority.

(2) When multiple errors of the same level occur, the code of the error first found by the ST1DA is stored.

(3) The error can be cleared by either of the following methods:

- Error clear request (command No.: 8104H/0104H)
- Error reset request (RYnA)

For details of the above methods, refer to the following.

☞ MELSEC-ST CC-Link Head Module User's Manual, "8.2.5 Error clear request (Command No.: 8104H/0104H)

☞ MELSEC-ST CC-Link Head Module User's Manual, "3.4 Remote I/O, Remote Registers"

9.2 Troubleshooting

9.2.1 When the RUN LED is flashing or turned off

(1) When flashing at 0.5s intervals

Table 9.2 When flashing at 0.5s intervals

Check item	Corrective action
Is the mode set to the offset/gain setting mode?	Execute Operation mode setting (Command Number: B202H/3202H) to select the normal mode. ☞ Section 8.6.3 Operation mode setting (Command No.: B202H/3202H)

(2) When flashing at 0.25s intervals

Table 9.3 When flashing at 0.25s intervals

Check item	Corrective action
Is the module selected as the target of online module change?	Refer to the following and take corrective action. ☞ CHAPTER 7 ONLINE MODULE CHANGE

(3) When flashing at 1s intervals

Table 9.4 When flashing at 1s intervals

Check item	Corrective action
Has cyclic transmission been stopped between the master station and head module?	Refer to the following and take corrective action. ☞ MELSEC-ST System User's Manual
Has a parameter communication error occurred between the master station and head module?	
Has an error occurred in another slice module?	
Has an internal bus error occurred?	

(4) When turned off

Table 9.5 When turned off

Check item	Corrective action
Is a module change enabled during an online module change?	Refer to the following and take corrective action. ☞ CHAPTER 7 ONLINE MODULE CHANGE
Is external SYS. power supply being supplied?	Check whether the supply voltage of the bus refreshing module is within the rated range.
Is the capacity of the bus refreshing module adequate?	Calculate the current consumption of the mounted module, and check that the power supply capacity is sufficient.
Is the ST1DA correctly mounted on the base module?	Check the mounting condition of the ST1DA.
Has a watchdog timer error occurred?	Power the ST1DA off and then on, or reset the head module, and check whether the LED turns on. If the LED still does not turn on, the possible cause is a ST1DA failure. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

9.2.2 When the RUN LED is on and the ERR. LED is on or flashing

Table 9.6 When the RUN LED is on and the ERR. LED is on or flashing

Check item	Corrective action
Has an error occurred?	Confirm the error code and take corrective action described in the error code list. ☞ Section 9.1 Error Code List

9.2.3 When an analog output value is not output

Table 9.7 When an analog output value is not output

Check item	Corrective action
Is external AUX. power supply being supplied?	Check whether the power distribution module is supplied with a 24V DC voltage.
Is there any fault with the analog signal lines such as broken or disconnected line?	Check for any abnormality on the signal lines by doing a visual check and performing a continuity check.
Are the offset/gain settings correct?	Check if the offset/gain settings are correct. •Checking by GX Configurator-ST ☞ Section 5.6 Offset/Gain Setting •Checking by commands ☞ Section 4.5 Offset/Gain Settings When the user range setting is used, switch it to the factory-set output range and check whether D/A conversion is performed correctly or not. If it is correctly performed, redo the offset/gain setting.
Is the output range setting correct?	Execute output range set value read (command No.: 9209H/1209H) and confirm the output range setting. ☞ Section 8.4.3 Output range set value read (Command No.: 9209H/ 1209H) If the output range setting is wrong, reset the output range setting in GX Configurator-ST, or modify the program for setting command parameters.
Is the D/A conversion enable/disable setting for the channel to be output set to Disable?	Execute D/A conversion enable/disable setting read (command No.: 9200H/ 1200H) and confirm the D/A conversion enable/disable setting. ☞ Section 8.4.1 D/A conversion enable/disable setting read (Command No. : 9200H/1200H) If conversion is disabled, enable conversion by GX Configurator-ST. ☞ Section 5.3 Parameter Setting, or D/A conversion enable/disable setting write (command No.: A200H/2200H). ☞ Section 8.5.1 D/A conversion enable/disable setting (Command No.: A200H/2200H)
Is the output enable/disable setting for the channel to be output set to Disable?	Check whether Bw.n+3, Bw.n+2 output enable/disable flag is on or off using the input/output monitor of GX Configurator-ST or the program of the master station. ☞ Section 5.4 Input/Output Monitor If the output enable/disable flag is off, reexamine the program of the master station. ☞ Section 3.4.2 Bit output area
Have any digital values been written to the channel to be output?	Check Ww.n, Ww.n+1 CH□ digital value setting using the input/output monitor of GX Configurator-ST or the program of the master station. ☞ Section 5.4 Input/Output Monitor
Are Bw.n+1 convert setting request and Br.n+1 convert setting completed flag on?	Check whether Bw.n+1 convert setting request and Br.n+1 convert setting completed flag are on or off using the program of the master station or the input/output monitor of GX Configurator-ST. ☞ Section 5.4 Input/Output Monitor If Bw.n+1 convert setting request or Br.n+1 convert setting completed flag isare off, reexamine the program of the master station. ☞ Section 3.4.1 Bit Input Area ☞ Section 3.4.2 Bit output area

POINT

If analog output values are not output after the proper corrective action is taken in accordance with the above, the module may be faulty.
Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

APPENDIXES

Appendix 1 Accessories

This section explains the accessories related to the ST1DA.

(1) Wiring maker

For how to use the wiring marker, refer to the following.

☞ MELSEC-ST System User's Manual, "10.2 Mounting the Modules"

Table App.1 Wiring marker list

Model name	Description	Color
ST1A-WMK-BL	Terminal marker (-, 0V, N)	Blue
ST1A-WMK-GN	Terminal marker (Shield)	Green
ST1A-WMK-BK	Terminal marker (Signal wire)	Black

(2) Coding element

The coding element is fitted before shipment.
It is also available as an option in case it is lost.

Table App.2 Coding element list

Model name	Description	Shape *		Color
		Base module side	Slice module side	
ST1A-CKY-11	Coding element for ST1DA2-V or ST1DA2-V-F01			Blue
ST1A-CKY-12	Coding element for ST1DA1-I or ST1DA1-I-F01			

* Indicates the position of the projection or hole when the coding element is viewed from above.

 : Projection  : Hole

Appendix 2 Specification Comparisons between Hardware Versions

The specification comparisons between hardware versions are show below.
For checking the hardware/software version, refer to the following.

☞ Section 2.4 Checking Hardware and Software Versions

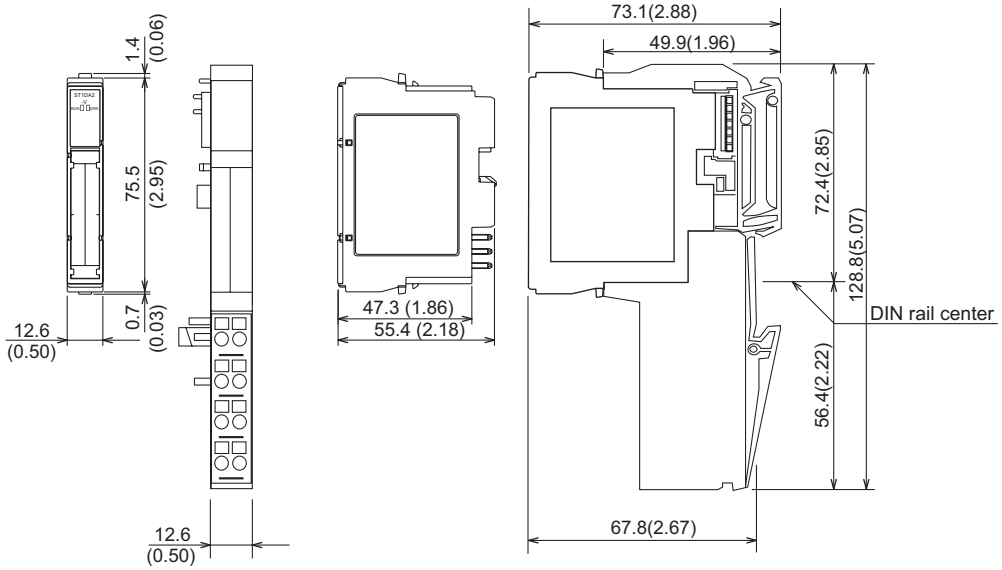
Table App.3 Specification comparisons between versions

Item	Specification comparisons between versions		Reference section
	Hardware version C or earlier	Hardware version D or later	
External load resistance of the ST1DA1-I	100 to 500Ω	0 to 500Ω	Section 3.1
Adjusted amount in the offset/gain setting of the ST1DA1-I	Approx. 0.38mA when the set value is 1000	Approx. 0.76mA when the set value is 1000	Section 5.6 Section 8.6.4 Section 8.6.5

Appendix 3 External Dimensions

(1) ST1DA2-V

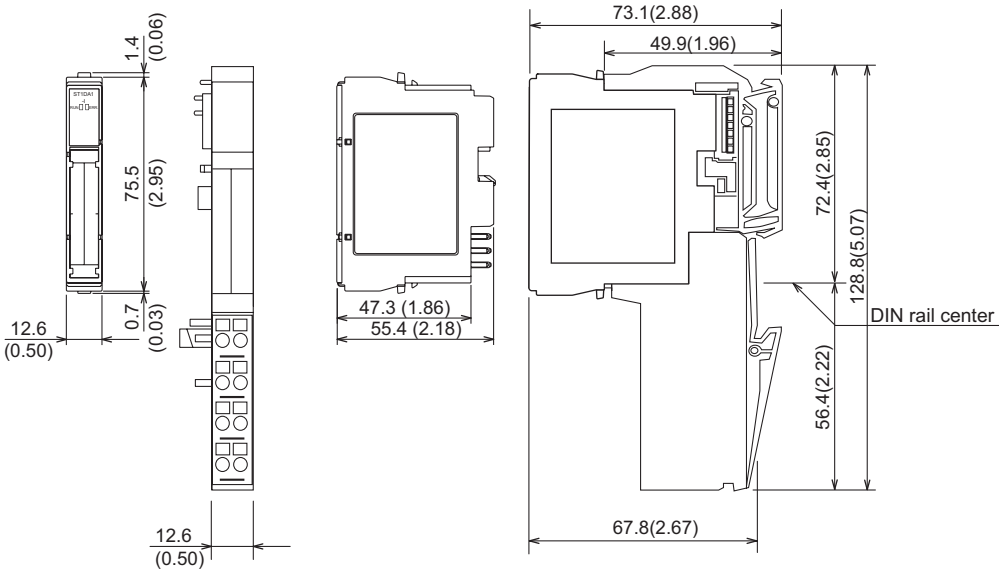
The appearance of the ST1DA2-V-F01 is almost the same as the illustration shown below except the model name part and rating plate.



Unit: mm (inch)

(2) ST1DA1-I

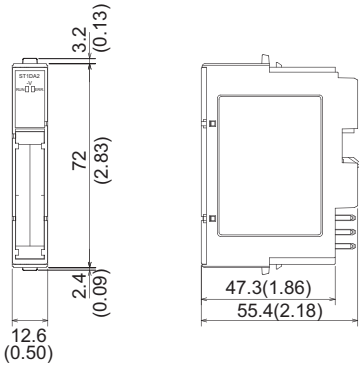
The appearance of the ST1DA1-I-F01 is almost the same as the illustration shown below except the model name part and rating plate.



Unit: mm (inch)

Remark

For ST1DA2-V of hardware version E or earlier and ST1DA1-I of hardware version D or earlier, the side face of the module is as illustrated below.



Unit: mm (inch)

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Warranty

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

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

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

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.

Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable 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 controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi programmable 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 Public service purposes shall be excluded from the programmable controller applications.

In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.

However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

MELSEC-ST Digital-Analog Converter Module

User's Manual (CC-Link)

MODEL	ST1DA-BT-U-SY-E
MODEL CODE	13JZ13
SH(NA)-080756ENG-A(0804)MEE	

MITSUBISHI ELECTRIC CORPORATION

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