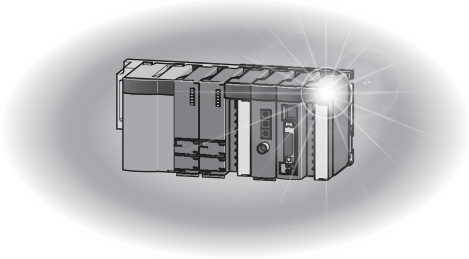
MITSUBISHI ELECTRIC

Mitsubishi Programmable Controller

MELSEC Q series

Channel Isolated Digital-Analog Converter Module User's Manual

-Q62DA-FG
-GX Configurator-DA (SW2D5C-QDAU-E)



• SAFETY PRECAUTIONS •

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.
In this manual, the safety precautions are classified into two levels: "⚠ WARNING " and "⚠ CAUTION".

⚠ WARNING	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 minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠ WARNING

- Do not write data into the "System area" of the buffer memory of intelligent function modules. Also, do not use any "Use prohibited" signals as an output signal to an intelligent function module from the programmable controller CPU.
  Writing data into the "System area" or outputting a signal for "Use prohibited" may cause a programmable controller system malfunction.

⚠ CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100mm(3.9inch) or more from each other.
  Not doing so could result in noise that may cause malfunction.
- At power-on, a voltage may be applied or a current may flow between output terminals for a moment. In such case, wait until the analog output becomes stable to start controlling the external device.

[Installation Precautions]

⚠ CAUTION

- Use the programmable controller in an environment that meets the general specifications contained in the user's manual of the CPU module to use.
  Using this programmable controller in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- While pressing the installation lever at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops.
  Improper installation may result in malfunction, breakdown or the module coming loose and dropping.
  Securely fix the module with screws if it is subject to vibration during use.
- Tighten the screws within the range of specified torque.
  If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.
  If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.
  Not doing so may cause damage to the module.
  In the system where a CPU module supporting Online module change is used and on the MELSECNET/H remote I/O stations, modules can be replaced online (during energizing).
  However, there are some restrictions on replaceable modules and the replacement procedures are predetermined for each module.
  For details, refer to the chapter of Online module change in this manual.
- Do not directly touch the conductive area or electronic components of the module.
  Doing so may cause malfunction or failure in the module.

[Wiring Precautions]

⚠ WARNING

- After wiring, attach the included terminal cover to the module before turning it on for operation.
  Failure to do so may result in electric shock.

⚠ CAUTION

- Individually ground the FG terminal of the programmable controller with a ground resistance of 100Ω or less.
  There is a risk of electric shock or malfunction.
- 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.
- Tighten the terminal screws within the specified torque range.
  Undertightening can cause short circuit, fire, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

⚠ CAUTION

- Be careful not to let foreign matter such as sawdust or wire chips get inside the module.
  They may cause fires, failure or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring.
  Do not remove the film during wiring.
  Remove it for heat dissipation before system operation.

[Starting and Maintenance Precautions]

⚠ WARNING

- Do not touch any terminal while power is on.
  Doing so will cause electric shock or malfunction.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws or module mounting screws.
  Failure to do so may cause the module to fail or malfunction.
  Undertightening can cause drop of the screw, short circuit, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

⚠ CAUTION

- Do not disassemble or modify the modules.
  Doing so could cause failure, malfunction injury or fire.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the module.
  Not doing so may cause failure or malfunction of the module.
  In the system where a CPU module supporting Online module change is used and on the MELSECNET/H remote I/O stations, modules can be replaced online (during energizing).
  However, there are some restrictions on replaceable modules and the replacement procedures are predetermined for each module.
  For details, refer to the chapter of Online module change in this manual.
- Do not install/remove the module to/from the base unit, or the terminal block to/from the module more than 50 times after the first use of the product. (IEC 61131-2 compliant)
  Failure to do so may cause malfunction.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.
  Failure to do so may cause a failure or malfunctions of the module.

[Disposal Precautions]

⚠ CAUTION
• When disposing of this product, treat it as industrial waste.

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• CONDITIONS OF USE FOR THE PRODUCT •

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

REVISIONS

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

Print Date	* Manual Number	Revision
May, 2002	SH (NA)-080281E-A	First printing
Feb., 2003	SH (NA)-080281E-B	Correction Safety precautions, Section 2.1, 3.2.2, 3.4.1, 3.4.19, 5.1, 5.2.2, 5.6.3, 7.3.3, 7.3.4, 7.3.5, 7.3.6, 7.4, Appendix 1.2, Appendix 1.3
May, 2003	SH (NA)-080281E-C	Correction Section 2.2, 3.4.1, 3.4.18, 3.4.19, 4.5, 4.6, 5.3.1
May, 2004	SH (NA)-080281E-D	Addition Section 8.2.5 Correction Section 2.2, 3.1.3, 3.2.1, 3.4.4, 7.1, 7.3.1 to 7.3.6
Aug., 2004	SH (NA)-080281E-E	Correction Section 1.1, 5.1, 5.2.1, 5.2.2, 5.3.1, 5.3.2, 5.3.3, 5.6.1, 5.6.2 Addition Section 5.6.3, 5.7, 5.8
Oct., 2004	SH (NA)-080281E-F	Correction Safety precautions, Section 2.1, 3.1.1, 4.1, 6.3.1
Sep., 2005	SH (NA)-080281E-G	Correction Safety precautions, Section 2.1, 5.2.2, 6.3.2
Mar., 2006	SH (NA)-080281E-H	Correction Safety precautions, Appendix 1
Jan., 2007	SH (NA)-080281E-I	Correction Section 3.2.1, 3.4.2, 4.5, 4.6, 6.2.1, 6.2.2, 6.3.1, 6.3.2
Jan., 2008	SH (NA)-080281E-J	Addition Section 2.2 Correction SAFETY PRECAUTIONS, About the Generic Terms and Abbreviations Section 1.1, Section 2.1, Section 2.3, Section 4.1, Section 4.6, Section 5.2.1, Section 5.2.2, Section 7.3.3, Section 7.3.5, Section 8.1, Appendix 1, Appendix 1.1, Appendix 2, Appendix 2.1, Appendix 2.2, Appendix 2.3
May, 2008	SH (NA)-080281E-K	Correction SAFETY PRECAUTIONS, Compliance with the EMC and Low Voltage Directives, About the Generic Terms and Abbreviations, Section 2.1, Section 4.1, Section 5.2.1, Section 5.2.2, Section 5.3.1, Section 5.3.3, Chapter 7, Section 7.1

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

Print Date	* Manual Number	Revision
Nov., 2010	SH (NA)-080281E-L	Addition CONDITIONS OF USE FOR THE PRODUCT, Section 3.4.17, Section 3.4.18, Section 3.4.19, Section 3.4.20, Appendix 3 Correction SAFETY PRECAUTIONS, INTRODUCTION, Compliance with the EMC and Low Voltage Directives, About the Generic Terms and Abbreviations, Section 1.1, Sections 2.1 to 2.3, Section 3.1, Section 3.1.1, Section 3.1.2, Section 3.2, Section 3.2.1 to 3.2.6, Section 3.3.2, Section 3.4.1 to 3.4.17, Section 3.4.19 to 3.4.23, Section 4.1, Section 4.3, Section 4.4.2, Section 4.5, Section 4.6, Section 5.1, Section 5.2.1, Section 5.3.1, Section 5.3.3, Section 5.4, Section 5.5, Section 5.6.1, Section 5.6.2, Section 5.7, Chapter 6, Section 6.1, Section 6.2, Section 6.2.1, Section 6.3, Section 6.3.1, Section 6.3.2, Chapter 7, Section 7.1, Section 7.2, Section 7.3, Sections 7.3.1 to 7.3.6, Section 7.4, Section 7.5, Section 8.1, Section 8.2.1 to 8.2.4, Section 8.2.5, Section 8.2.6, Appendices 1.1 to 1.3, Appendix 2, Appendix 3, Appendix 4
May, 2015	SH (NA)-080281E-M	Correction SAFETY PRECAUTIONS, Related Manuals, Compliance with the EMC and Low Voltage Directives, About the Generic Terms and Abbreviations, Section 2.1, Section 2.3, Section 3.1.2, Section 3.2.2, Section 3.4.23, Section 4.3, Section 4.6, Section 5.2, Section 5.2.1, Section 5.2.2, Section 6.2.2, Chapter 7, Section 7.1, Section 8.1, Appendix 4

Japanese Manual Version SH-080280-P

INTRODUCTION

Thank you for purchasing the MELSEC-Q series programmable controller.
Before using the product, please read this manual carefully to develop full familiarity with the functions and performance of the Q series programmable controllers to ensure correct use.

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ABOUT MANUALS

The following manuals are also related to this product.

If necessary, order them by quoting the details in the tables below.

Related Manuals

Manual Name	Manual Number (Model Code)
GX Developer Version 8 Operating Manual Describes the methods of using GX Developer to create a program and print out, monitor, and debug the program. (Sold separately)	SH-080373E (13JU41)
GX Developer Version 8 Operating Manual (Function Block) Describes the methods of using GX Developer to create a function block and print out the function block. (Sold separately)	SH-080376E (13JU44)
GX Works2 Version 1 Operating Manual (Common) Describes the system configuration, parameter settings, and online operations (common to Simple project and Structured project) of GX Works2 (Sold separately)	SH-080779E (13JU63)
GX Works2 Version 1 Operating Manual (Intelligent Function Module) Describes how to operate the parameter settings, monitor, predefined protocol support function, and others of the intelligent function modules on GX Works2 (Sold separately)	SH-080921E (13JU69)

REMARK

If you would like to obtain a manual individually, printed matters are available separately. Order the manual by quoting the manual number on the table above (model code).

COMPLIANCE WITH THE EMC AND LOW VOLTAGE DIRECTIVES

(1) For programmable controller system

To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- QCPU User's Manual (Hardware Design, Maintenance and Inspection)
- Safety Guidelines

(This manual is included with the CPU module or base unit.)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) For the product

For the compliance of this product with the EMC and Low Voltage Directives, refer to the "CC-Link module" section in the "EMC AND LOW VOLTAGE DIRECTIVES" chapter of the User's Manual for the CPU module used.

ABOUT THE GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations.

Abbreviation/general terms	Description of the abbreviation/general terms
DOS/V personal computer	IBM PC/AT® or compatible computer with DOS/V.
GX Developer	Product name of the software package for the MELSEC programmable controllers.
GX Works2	
GX Configurator-DA	Generic term for digital-analog conversion module setting and monitor tool GX Configurator-DA (SW2D5C-QDAU-E).
QCPU (Q mode)	Generic term for Basic model QCPU, High Performance model QCPU, Process CPU, Redundant CPU, and Universal model QCPU.
Basic model QCPU	Generic term for Q00JCPU, Q00CPU, and Q01CPU.
High Performance model QCPU	Generic term for Q02CPU, C02HCPU, Q06HCPU, Q12HCPU, and Q25HCPU.
Process CPU	Generic term for Q02PHCPU, Q06PHCPU, Q12PHCPU and Q25PHCPU.
Redundant CPU	Generic term for the Q12PRHCPU and Q25PRHCPU.
Universal model QCPU	Generic term for Q00UJCPU, Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q03UDVCPU, Q03UDECPU, Q04UDHCPU, Q04UDVCPU, Q04UDEHCPU, Q06UDHCPU, Q06UDVCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q13UDHCPU, Q13UDVCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q26UDHCPU, Q26UDVCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU.
Personal computer	Generic term for DOS/V personal computer.
Industrial shipment setting	Generic term for analog input ranges 0 to 5V, 1 to 5V, -10 to 10V, 0 to 20mA and 4 to 20mA.
FB	Abbreviation of function block.
Windows Vista®	Generic term for the following: Microsoft® Windows Vista® Home Basic Operating System, Microsoft® Windows Vista® Home Premium Operating System, Microsoft® Windows Vista® Business Operating System, Microsoft® Windows Vista® Ultimate Operating System, Microsoft® Windows Vista® Enterprise Operating System
Windows® XP	Generic term for the following: Microsoft® Windows® XP Professional Operating System, Microsoft® Windows® XP Home Edition Operating System
Windows® 7	Generic term for the following: Microsoft® Windows® 7 Starter Operating System, Microsoft® Windows® 7 Home Premium Operating System, Microsoft® Windows® 7 Professional Operating System, Microsoft® Windows® 7 Ultimate Operating System, Microsoft® Windows® 7 Enterprise Operating System Note that the 32-bit version is specified as "32-bit Windows® 7", and the 64-bit version is specified as "64-bit Windows® 7".

PRODUCT STRUCTURE

The product structure of this product is given in the table below.

Manual Name	Product name	Quantity
Q62DA-FG	Q62DA-FG Model Channel Isolated Digital-Analog Converter module	1
SW2D5C-QDAU-E	GX Configurator-DA Version 2(1-license product) (CD-ROM)	1
SW2D5C-QDAU-EA	GX Configurator-DA Version 2(Multiple-license product) (CD-ROM)	1

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1 OVERVIEW

This User's Manual describes the specifications, handling and programming methods for the Q62DA-FG type channel isolated digital-analog converter module (hereinafter referred to as the Q62DA-FG) which are used in conjunction with MELSEC-Q series CPU module (hereinafter referred to as the programmable controller CPU).

1.1 Features

(1) Channel isolated

The module is isolated between the channels and between the external supply power and channels.

(2) High accuracy

The reference accuracy*1 is as high as ±0.1% and the temperature coefficient*2 is as high as ±80ppm/°C.

*1: Accuracy attained at the ambient temperature when offset/gain setting has been made

*2: Accuracy per temperature change of 1°C
Example) Accuracy when the ambient temperature varies from 25°C to 30°C
0.1% (reference accuracy) + 0.008%/°C (temperature coefficient) × 5°C (temperature variation difference) = 0.14%

(3) Output range switching

The output range*1 switching can be set easily from GX Developer.

*1: The output range indicates the offset/gain setting type. Besides the generally often used output ranges available as defaults, the user can make offset/gain settings and use the values.

(4) Analog output HOLD/CLEA function

This function is used to set whether the analog output value will be held or cleared when the CPU module is in a STOP status or when a stop error occurs.

(5) Output monitor function

The analog output value output by D/A conversion is reconverted into a digital value within the Q62DA-FG and the result is stored into the buffer memory as an output monitor value.

(6) Warning output function

A warning is output if a digital input value falls outside the setting range.

(7) Rate control function

The increment and decrement of the analog output value per conversion cycle can be restricted.

(8) Disconnection detection function

When the analog output range is 4 to 20mA, 4 to 20mA (Extended mode), or user range setting 1, the output monitor value is watched to detect disconnection.

(9) Online module change

Further, the specifications can be handed down to the new Q62DA-FG by the followings:

- Succession of offset/gain settings to the new Q62DA-FG replaced by Online module change.
- Transfer of offset/gain setting values to the other Q62DA-FG mounted on the other slots.

(10) Offset/gain setting

GX Configurator-DA, dedicated instruction (G(P). OFFGAN) or Mode switching setting allows a shift to the offset/gain setting mode easily.

(11) Easy settings with GX Configurator-DA

The number of sequence programs can be reduced since GX Configurator-DA (sold separately) allows the Q62DA-FG settings on the dialog box.
Also, GX Configurator-DA simplifies checking of the module settings and operation status.
In addition, FB ＊1 can be automatically created from intelligent function module parameters set in advance to use them in a sequence program.

＊1 FB is the function for making a circuit block used in a sequence program repeatedly a part (FB) to use it in the sequence program.
This function can improve the efficiency of program development and minimize program bugs to improve program qualities.

For the details of FB, refer to "GX Developer Version 8 Operating Manual (Function Block)."

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2 SYSTEM CONFIGURATION

This chapter explains the system configuration of the Q62DA-FG.

2.1 Applicable Systems

This section describes the applicable systems.

(1) Applicable modules and base units, and No. of modules

(a) When mounted with a CPU module

For the applicable modules, the number of modules, and base units applicable to the Q62DA-FG, refer to the user's manual for the CPU module used.

Note the following when the Q62DA-FG is mounted with a CPU module.

- Depending on the combination with other modules or the number of mounted modules, power supply capacity may be insufficient. Pay attention to the power supply capacity before mounting modules, and if the power supply capacity is insufficient, change the combination of modules.
- Mount a module within the number of I/O points for the CPU module. If the number of slots is within the available range, the module can be mounted on any slot.

REMARK

When the module is used with a C Controller module, refer to the user's manual for the C Controller module.

(b) Mounting to a MELSECNET/H remote I/O station

For the MELSECNET/H remote I/O station, the number of modules, and base units applicable to the Q62DA-FG, refer to the Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O network).

REMARK

The Basic model QCPU or C Controller module cannot create the MELSECNET/H remote I/O network.

(2) Support of multiple CPU system

The function version of the Q62DA-FG has been "C" from the first release, supporting the multiple CPU system.

When using the Q62DA-FG in a multiple CPU system, refer to the following manual first.

• QCPU User's Manual (Multiple CPU System)

(3) Support of Online module change

The function version of the Q62DA-FG has been "C" from the first release, supporting Online module change.
For details, refer to CHAPTER 7.

(4) Supported software packages

Relation between the system containing the Q62DA-FG and software package is shown in the following table.
GX Developer or GX Works2 is necessary when using the Q62DA-FG.

		Software Version		
		GX Developer	GX Configurator-DA	GX Works2
Q00J/Q00/Q01CPU	Single CPU system	Version 7 or later	Version 1.14Q or later	Refer to the GX Works2 Version 1 Operating Manual (Common).
	Multiple CPU system	Version 8 or later		
Q02/Q02H/Q06H/ Q12H/Q25HCPU	Single CPU system	Version 4 or later		
	Multiple CPU system	Version 6 or later		
Q02PH/Q06PHCPU	Single CPU system	Version 8.68W or later		
	Multiple CPU system			
Q12PH/Q25PHCPU	Single CPU system	Version 7.10L or later		
	Multiple CPU system			
Q12PRH/ Q25PRHCPU	Redundant CPU system	Version 8.45X or later	Version 1.15R or later	
Q00UJ/Q00U/ Q01UCPU	Single CPU system	Version 8.78G or later	Version 2.06G or later	
	Multiple CPU system			
Q02U/Q03UD/ Q04UDH/ Q06UDHCPU	Single CPU system	Version 8.48A or later		
	Multiple CPU system			
Q10UDH/ Q20UDHCPU	Single CPU system	Version 8.78G or later		
	Multiple CPU system			
Q13UDH/ Q26UDHCPU	Single CPU system	Version 8.62Q or later		
	Multiple CPU system			
Q03UDE/Q04UDEH/ Q06UDEH/Q13UDEH/ Q26UDEHCPU	Single CPU system	Version 8.68W or later		
	Multiple CPU system			
Q10UDEH/ Q20UDEHCPU	Single CPU system	Version 8.78G or later		
	Multiple CPU system			
CPU modules other than the above	Single CPU system	Not supported	Not supported	
	Multiple CPU system			
If installed in a MELSECNET/H remote I/O station		Version 6 or later	Version 1.14Q or later	

POINT

(1) Function versions A and B are not available for the Q62DA-FG. Function version C indicates that the module supports the multiple CPU configuration and Online module change.

(2) Depending on the version of GX Configurator-DA, CPU modules and functions of the Q62DA-FG differ.

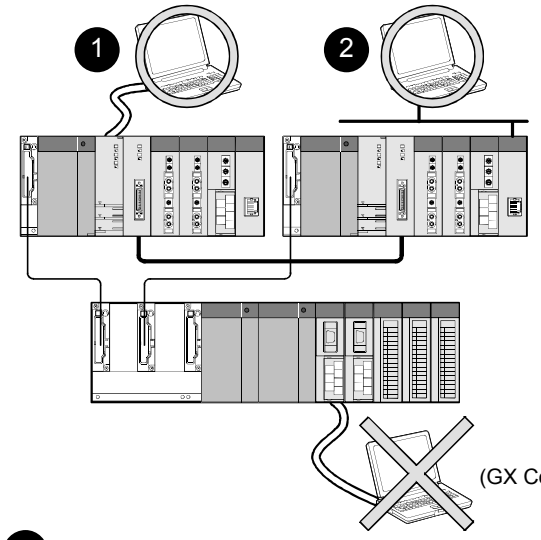
(3) When using GX Works2, refer to the following.
- GX Works2 Version 1 Operating Manual (Common)
- GX Works2 Version 1 Operating Manual (Intelligent Function Module)

2.2 Precautions on System Configuration

(1) Using the Q62DA-FG with Redundant CPU

(a) Dedicated instruction
The dedicated instruction cannot be used.

(b) GX Configurator-DA
GX Configurator-DA cannot be used when accessing the Redundant CPU via an intelligent function module on an extension base unit from GX Developer.
Connect a personal computer to the Redundant CPU with a communication path indicated below.



1 Direct connection to the CPU

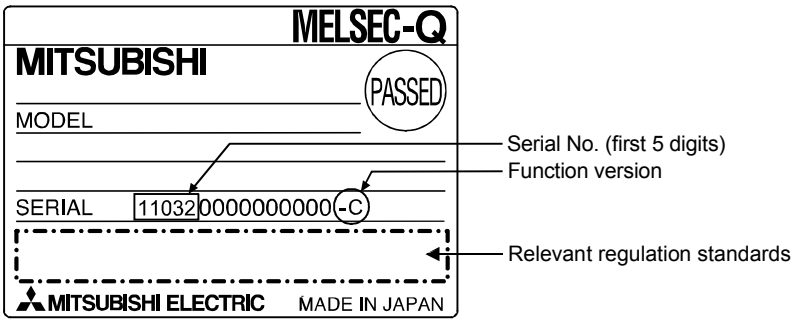
2 Connection through an intelligent function module on the main base unit
(Through Ethernet module, MELSECNET/H module, or CC-Link module)

2.3 Checking Function Version, Serial Number, and Software Version

(1) Checking the function version and serial number of the Q62DA-FG

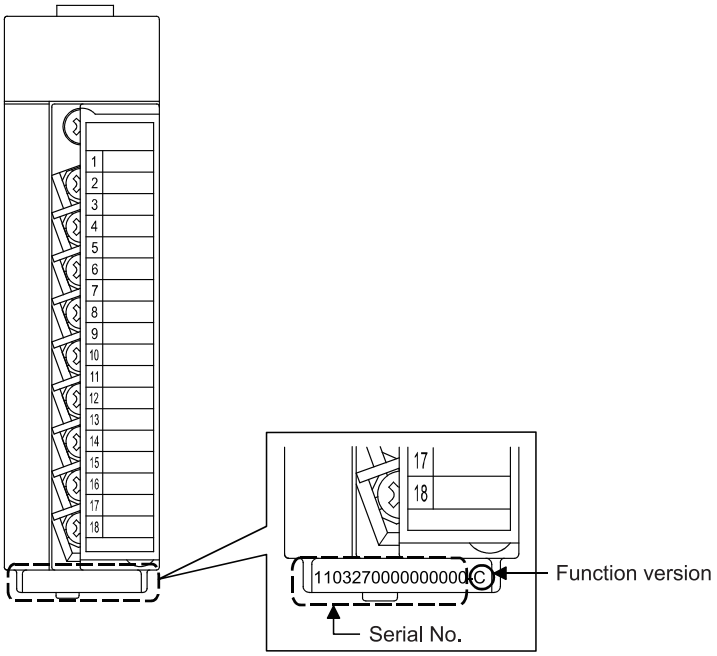
The serial number and function version of the Q62DA-FG are described in the rating plate, on the front part of the module, or displayed in the System monitor dialog box of GX Developer.

(a) Checking on the rating plate on the side of the Q62DA-FG



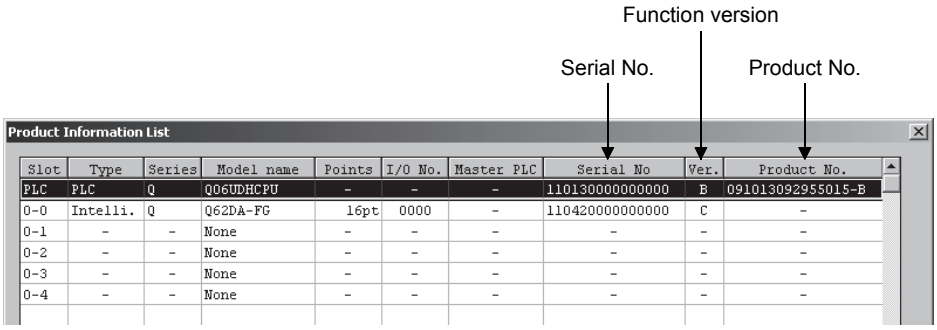
(b) Checking on the front of the module

The serial number and function version on the rating plate is shown on the front (at the bottom) of the module.



(c) Checking on the System monitor dialog box (Product Information List)

To display the system monitor, select [Diagnostics] - [System monitor] and click the Product Information List button of GX Developer.



Slot	Type	Series	Model name	Points	I/O No.	Master PLC	Serial No	Ver.	Product No.
PLC	PLC	Q	Q06UDHCPU	-	-	-	110130000000000	B	091013092955015-B
0-0	Intelli.	Q	Q62DA-FG	16pt	0000	-	110420000000000	C	-
0-1	-	-	None	-	-	-	-	-	-
0-2	-	-	None	-	-	-	-	-	-
0-3	-	-	None	-	-	-	-	-	-
0-4	-	-	None	-	-	-	-	-	-

1) Displaying the product No.

Since the Q62DA-FG does not support the display function, "-" is displayed in the "Product No." field.

POINT

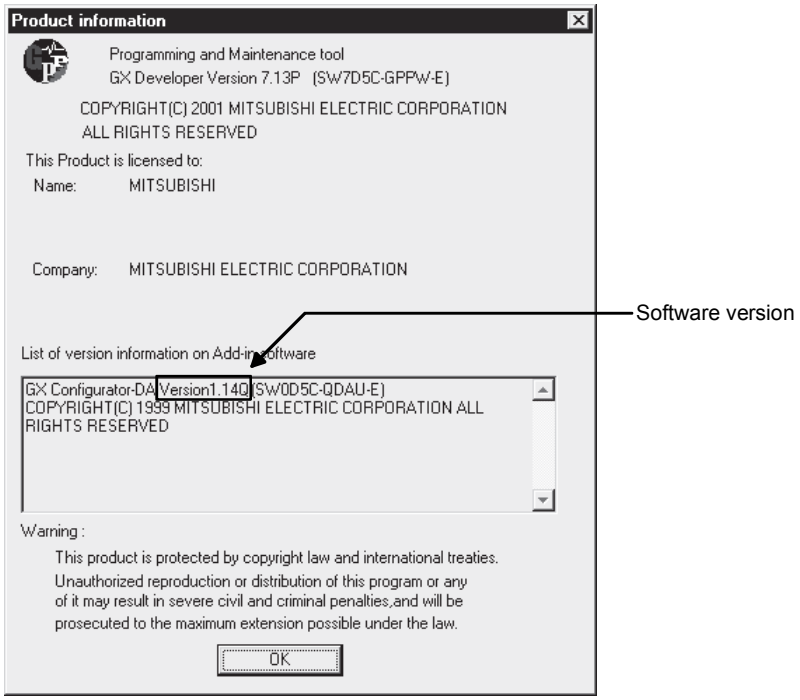
The serial number displayed on the Product information list dialog box of GX Developer may differ from that on the rating plate and on the front of the module.

- The serial number on the rating plate and front part of the module indicates the management information of the product.
- The serial number displayed on the Product information list dialog box of GX Developer indicates the function information of the product.

The function information of the product is updated when a new function is added.

(2) Checking the software version of GX Configurator-DA

The software version of GX Configurator- PT can be checked by selecting [Help]-[Product information] of GX Developer.



(In the case of GX Developer Version 7)

REMARK

The version indication for the GX Configurator-DA has been changed as shown below from the SW0D5C-QDAU-E 60G upgrade product.

Previous product		Upgrade and subsequent versions
SW0D5C-QDAU-E 60G	→	GX Configurator-DA Version 1.10L

MEMO

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3 SPECIFICATIONS

3.1 Performance Specifications

3.1.1 Performance specifications list

Table 3.1 Performance specifications list

Item \ Type		Q62DA-FG
Number of analog outputs		2 points (2 channels)
Digital input		16-bit signed binary (-12288 to 12287, -16384 to 16383)
Analog output	Voltage	-12 to 12VDC (External load resistance: 1k to 1MΩ)
	Current	0 to 20mADC (External load resistance: 0 to 600Ω) 0 to 22mADC ＊3
I/O characteristics maximum resolution ＊4		See the table below
Accuracy (Accuracy relative to maximum analog output value)	Reference accuracy＊1	Within ± 0.1% (Voltage: ± 10mV, Current: ± 20 μA)
	Temperature coefficient＊2	± 80ppm/ °C (± 0.008%/ °C)
Conversion speed		10ms/2 channels
Absolute maximum output	Voltage	± 13V
	Current	23mA
Output monitor	Resolution	12bit
	Reference accuracy＊1	± 0.2%
	Temperature coefficient＊2	160ppm/ °C (± 0.016%/ °C)
Maximum number of writes for E^2PROM		100,000
Output short-circuit protection		Available
Isolation specifications		See the table below
Number of I/O occupied points		16 points (I/O assignment: Intelligent 16 points)
Connected terminal		18 points terminal block
Applicable wire size		0.3 to 0.75mm^2
Applicable solderless terminals		R1.25-3 (Solderless terminals with sleeves are not applicable)

Analog output range		Digital input value	Maximum resolution
Voltage	0 to 5V	0 to 12000	0.416mV
	1 to 5V		0.333mV
	-10 to 10V	-16000 to 16000	0.625mV
	1 to 5V (Extended mode) ＊5	-3000 to 13500	0.333mV
	User range setting 2	-12000 to 12000	0.366mV
	User range setting 3		0.183mV
Current	0 to 20mA	0 to 12000	1.66 μA
	4 to 20mA		1.33 μA
	4 to 20mA (Extended mode) ＊5	-3000 to 13500	1.33 μA
	User range setting 1	-12000 to 12000	0.671 μA

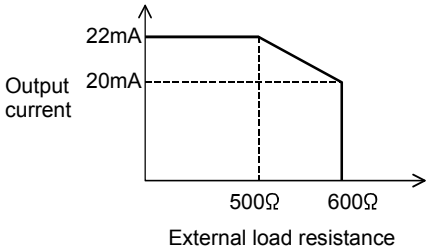
Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance
Between the I/O terminal and programmable controller power supply	Photocoupler isolation	1780VAC rms/3 cycles (elevation 2000m)	500VDC 10MΩ or more
Between analog output channels	Transformer isolation		
Between external supply power and analog output cannel	Transformer isolation		

Item \ Type	Q62DA-FG
External supply power	24VDC, +20%, -15%
	Ripple, spike within 500 mV p-p
	Inrush current: 5.2A, within 300 μs
	0.3A
Internal current consumption (5 VDC)	0.37A
Weight	0.20kg

*1 Accuracy of offset/gain setting at ambient temperature
The Q62DA-FG needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).

*2 Accuracy per temperature change of 1 °C
Example: Accuracy when temperature changes from 25 to 30 °C
0.1% (Reference accuracy) + 0.008%/ °C (temperature coefficient) × 5 °C (temperature change difference) = 0.14%

*3 The following indicates the external load resistance when output current is 20mA or more.



*4 For the details of the I/O conversion characteristic, refer to Section 3.2.1.

*5 GX Configurator-DA is not available with extended mode range settings.

REMARK

Refer to the user's manual for the CPU module being used for the general specifications for the Q62DA-FG.

3.1.2 I/O conversion characteristics

I/O conversion characteristics are used for converting the digital value written from the programmable controller CPU to an analog output value (voltage or current output), and represented by inclined straight lines when offset and gain values are included.

Offset value

The offset value is the analog output value (voltage or current) when the digital input value set from the programmable controller CPU is 0.

Gain value

The gain value denotes the analog output value (voltage or current) when the digital input value set from the programmable controller CPU is
12000 (when 1 to 5V, 0 to 5V, 4 to 20 mA, 0 to 20 mA or the user range setting1 to 3 is selected),
16000 (when -10 to 10V is selected).

(1) Voltage output characteristic

Figure 3.1 shows a graph of the voltage output characteristic.

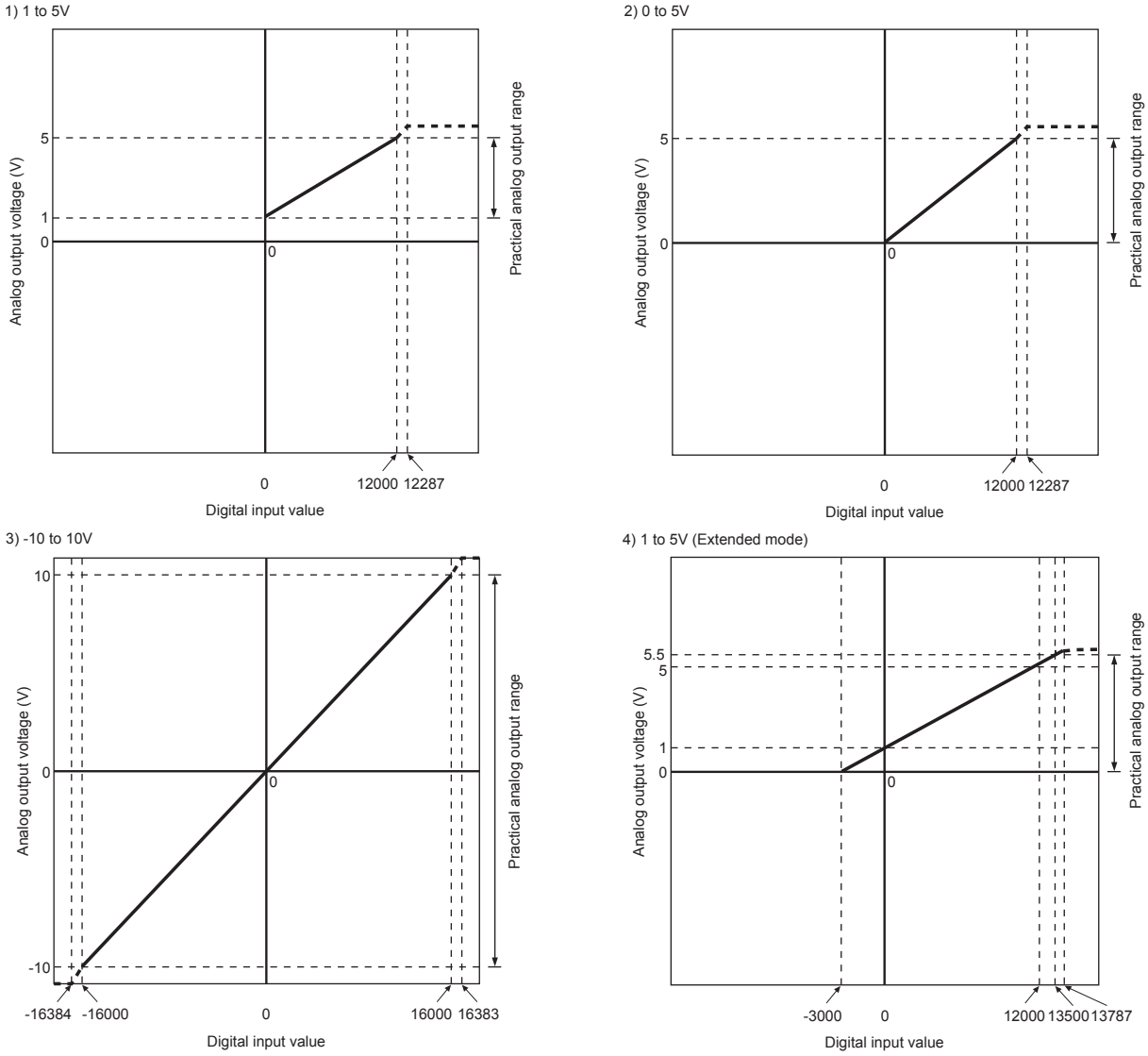


Figure 3.1 Voltage output characteristic

POINT

(1) Set within the digital input range and analog output range for each output range.
If these ranges are exceeded, the maximum resolution and accuracy may not fall within the performance specifications. (Avoid using the dotted line area shown in Figures 3.1.)

(2) Set the offset/gain values for the user range setting2 ✻ within a range in which the following conditions are satisfied.

(a) Setting range is from –12 to 12 V.

(b) { (Gain value) – (Offset value) } > 4.5A

(3) Set the offset/gain values for the user range setting3 ✻ within a range in which the following conditions are satisfied.

(a) Setting range is from 0.5 to 6 V.

(b) { (Gain value) – (Offset value) } > 3A

(2) Current output characteristic

Figure 3.2 shows a graph of the current output characteristic.

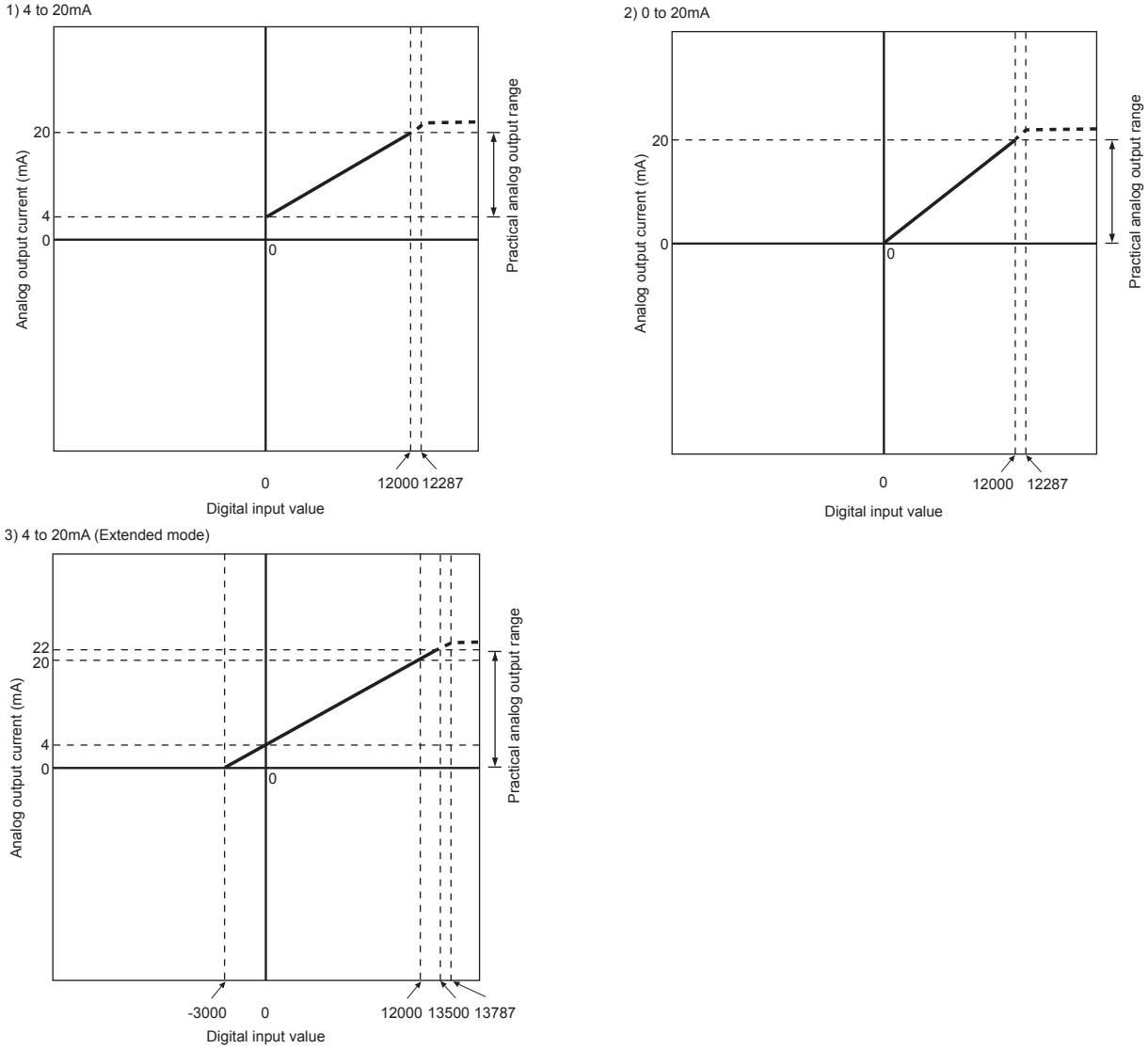


Figure 3.2 Current output characteristic

POINT

(1) Set within the digital input range and analog output range for each output range.
If these ranges are exceeded, the maximum resolution and accuracy may not fall within the performance specifications. (Avoid using the dotted line area shown in Figures 3.2.)

(2) Set the offset/gain values for the user range setting1 ＊ within a range in which the following conditions are satisfied.

(a) Setting range is from 0 to 22 mA

(b) { (Gain value) – (Offset value) } > 10mA

3.1.3 Accuracy

The reference accuracy is the accuracy at the ambient temperature for offset/gain setting.
The temperature coefficient is the accuracy per temperature variation of 1°C.
The reference accuracy is the accuracy relative to the maximum value of the analog output value.
Even if the offset/gain setting or analog output range is changed to change the output characteristic, the reference accuracy and temperature coefficient do not vary and are kept within the ranges given in the performance specifications.

Example) Accuracy when the temperature varies from 25°C to 30°C
0.1% (reference accuracy) + 0.008%/°C (temperature coefficient) × 5°C (difference in temperature variation) = 0.14%

3.2 Function List

Table 3.2 shows the function of the Q62DA-FG.

Table 3.2 Function list

Item	Function	Reference section
D/A conversion enable/disable function	• Specifies whether to enable or disable the D/A conversion for each channel. • The conversion speed is 10ms constant despite the number of D/A conversion enabled channels.	Section 3.4.2
D/A output enable/disable function	• Specifies whether to output the D/A converted value or output the offset value for each channel. • The conversion speed is 10ms constant independently of whether the output is enabled or disabled.	Section 3.3.1
Analog output HOLD/CLEAR function	• The output analog value can be retained when the programmable controller CPU module is placed in the STOP status or when an error occurs.	Section 3.2.1
Analog output test during programmable controller CPU STOP	• When CH□ Output enable/disable flag (Y1, Y2) is forced on during programmable controller CPU STOP, the D/A converted analog value is output.	Section 3.2.2
Output monitor function	• The analog output value output by D/A conversion is reconverted into a digital value within the Q62DA-FG and the result is stored into the buffer memory as an output monitor value.	Section 3.2.3
Warning output function	• A warning is output if a digital input value falls outside the setting range.	Section 3.2.4
Rate control function	• The increment and decrement of the analog output value per conversion cycle can be restricted.	Section 3.2.5
Disconnection detection function	• When the output range is 4 to 20mA, 4 to 20mA (Extended mode), or user range setting 1, the output monitor value is watched to detect disconnection. • When the range is set to 4 to 20mA (Extended mode), users can choose the method of setting the disconnection detection value from either arbitrarily or automatically.	Section 3.2.6
Online module change	• The module can be changed without the system being stopped. However, when a user changes modules from an analog output range extended mode compatible to a non-compatible one, while in analog output range extended mode setting, an intelligent function module switch error occurs.	Chapter 7

3.2.1 Analog output HOLD/CLEAR function

(1) For the case where the programmable controller CPU is placed in STOP or in a stop error status, whether to hold (HOLD) or clear (CLEAR) the analog output value can be set.

(2) Set the HOLD/CLEAR in "Switch 3" (HOLD/CLEAR function setting) cell of Switch setting for I/O and intelligent function module dialog box. (Refer to Section 4.5 (1))

(3) Depending on combinations of the HOLD/CLEAR setting, D/A conversion enable/disable setting (buffer memory address 0: Un\G0), and CH□ Output enable/disable flag (Y1, Y2), the analog output status varies as shown in Table 3.3.

Table 3.3 Analog output status combination list

Setting combination execution status	D/A conversion enable/disable setting (buffer memory address 0: Un\G0)	Enable			Disable
	CH□ Output enable/disable flag (Y1, Y2)	Enable		Disable	Enable or disable
	HOLD/CLEAR setting	HOLD	CLEAR	HOLD or CLEAR	HOLD or CLEAR
Analog output status when programmable controller CPU is RUN		Output analog values converted from digital values. ＊2		Offset	0 V/0 mA
Analog output status when programmable controller CPU is STOP		Hold	Offset	Offset	0 V/0 mA
Analog output status when a programmable controller CPU stop error occurs		Hold	Offset	Offset	0 V/0 mA
Analog output status when a watchdog timer error ＊1 occurs in the Q62DA-FG		0 V/0 mA	0 V/0 mA	0 V/0 mA	0 V/0 mA

＊1 This occurs when program operations are not completed within the scheduled time due to a hardware problem of the Q62DA-FG. When a watchdog timer error occurs, Module ready (X0) turns off and the Q62DA-FG RUN LED turns off.

＊2 Rate control function is activated.

POINT

The following conditions should be satisfied when the analog output HOLD/CLEAR function is used on a MELSECNET/H remote I/O station.

- The master module of function version D or later and the remote I/O module of function version D or later are required.
- Validate the station unit block guarantee of the send side cyclic data.
- The setting for holding the Q62DA-FG output in the case of a link error must be made in the "Error time output mode in the I/O assignment setting". (Refer to Section 4.5 (2).) The HOLD/CLEAR setting by the intelligent function module switch is invalid.
  This setting is validated on a per-module basis, and is not made on a per-channel basis. Therefore, to make the output status at a stop error or STOP of the programmable controller CPU matched with the output status at a link error, set the same .HOLD/CLEAR setting to all channels. (Refer to the table below.)

	Error time output mode	HOLD/CLEAR setting (Same setting to all channels)
Hold analog output	Hold	HOLD
Clear analog output (Output offset value)	Clear	CLEAR

For the station unit block guarantee of the cyclic data, refer to the Q Corresponding MELSECNET/H
Network System Reference Manual (Remote I/O Network).

3.2.2 Analog output test during programmable controller CPU STOP

(1) During the programmable controller CPU STOP, an analog output test as shown in Table 3.4 can be performed.

(2) The analog output test performs the following operations in GX Developer device testing or GX Configurator-DA selection testing described in Section 5.6.1.

(a) Set D/A conversion enable/disable setting (buffer memory address 0: Un\G0) of the channel to be tested to enable.

(b) Turn Operating condition setting request (Y9) from off to on. (Refer to Section 3.3.2.)

(c) Check that Operating condition setting completed flag (X9) turns off, and then turn Operating condition setting request (Y9) from on to off.

(d) Enable (off → on) Output enable/disable flag (Y1, Y2) of the channel where the test is to be conducted.

(e) Write a digital value corresponding to the desired analog output value in CH□ Digital value (buffer memory address 1, 2: Un\G1, Un\G2) in the buffer memory.

Table 3.4 List of analog output test

Setting combination	D/A conversion enable/disable setting (buffer memory address 0: Un\G0)	Enable		Disable	
	CH□ Output enable/disable flag (Y1, Y2)	Enable	Disable	Enable	disable
Analog output test		Allowed	Not allowed	Not allowed *1	

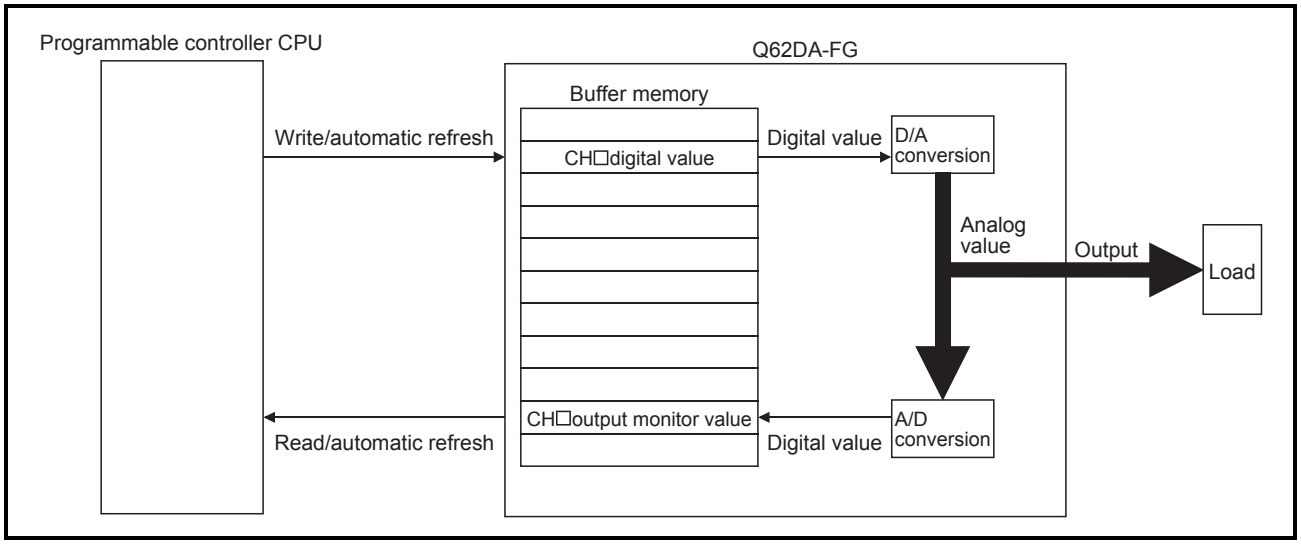
*1 Perform the analog output test after changing D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to enable.

POINT

When the digital value storage device has been set in the automatic refresh setting of GX Configurator-DA, the buffer memory is overwritten since automatic refresh is performed if the programmable controller CPU is during STOP.
In this case, write a digital value to the digital value storage device instead of the buffer memory.

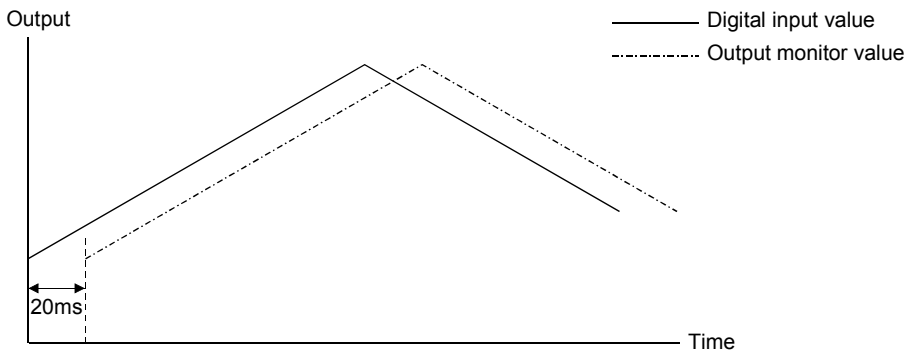
3.2.3 Output monitor function

To check the actually output analog value, the analog output value is converted into a digital value within the Q62DA-FG and the result is stored at the buffer memory address 38, 39 (Un\G38, Un\G39) as CH□ Output monitor value.
Monitor start flag (X8) is turned on when the A/D conversion of the analog output value is completed.
A/D conversion is performed on the D/A conversion-enabled channel to update the output monitor value.



POINT

CH□ Output monitor value (buffer memory address 38, 39: Un\G38, Un\G39) is stored into the buffer memory a maximum of two conversion cycles (20ms) after the digital input value has been written.
Hence, the digital input value and output monitor value compared immediately after write will not be the same.



3.2.4 Warning output function

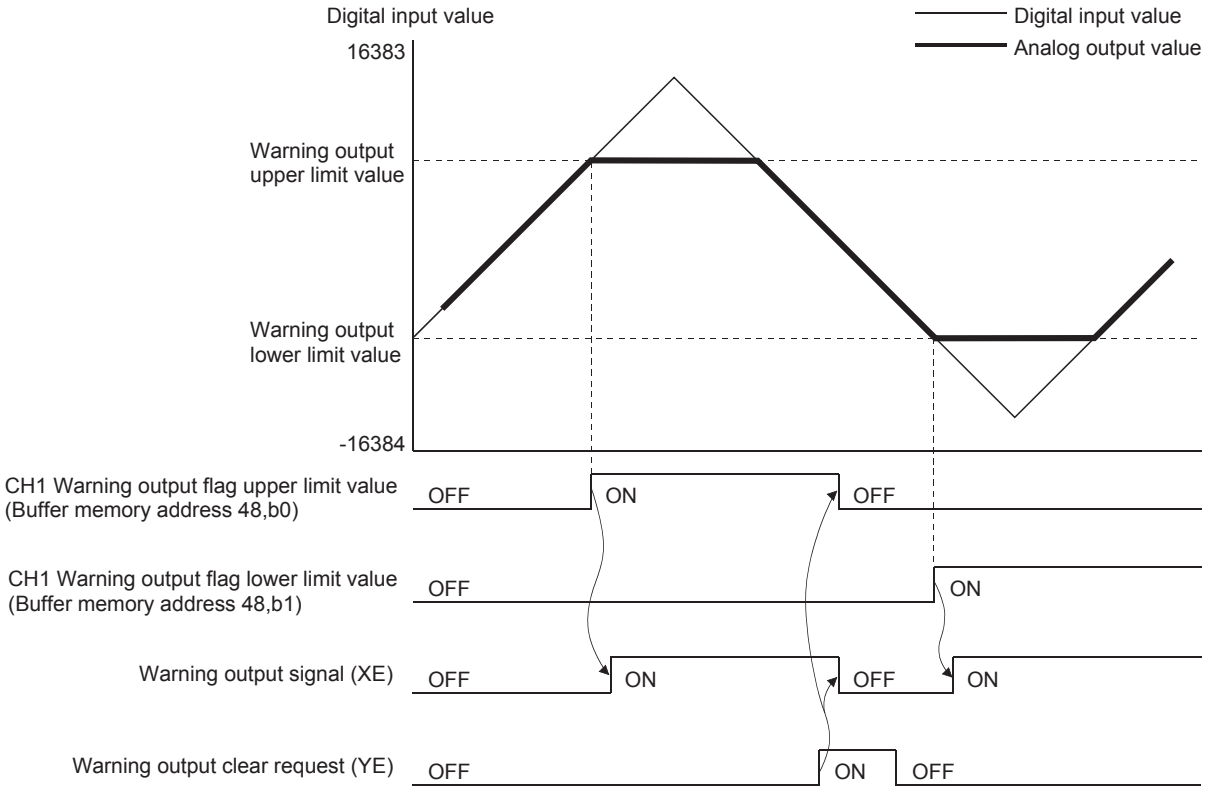
(1) When the digital value stored in the buffer memory is greater than the warning output upper limit value or less than the warning output lower limit value, a warning is informed by Warning output flag (buffer memory address 48: Un\G48), Warning output signal (XE), and the ALM LED lighting.
The warning is output for the D/A conversion enabled channel only.

(2) At occurrence of the warning, the analog output value is converted from the digital value at the warning output upper limit value or warning output lower limit value.

(3) Warning output flag (buffer memory address 48: Un\G48) and Warning output signal (XE) turn off when Operating condition setting request (Y9) or Warning output clear request (YE) turns on.

(4) For the warning output function, Disconnection detection/Warning output setting (buffer memory address 47: Un\G47) allows enable/disable of the warning output to be specified for each channel. To enable the warning output, write "0" to the bit position corresponding to the channel number and turn on Operating condition setting request (Y9). The default is all-channel disable.

(5) Set CH□ Warning output upper/lower limit value to the buffer memory address 86 to 89: Un\G86 to Un\G89.



POINT

(1) When a warning is output immediately after D/A conversion is enabled, operate Warning output clear request after writing digital values between the warning output upper limit value and warning output lower limit value.

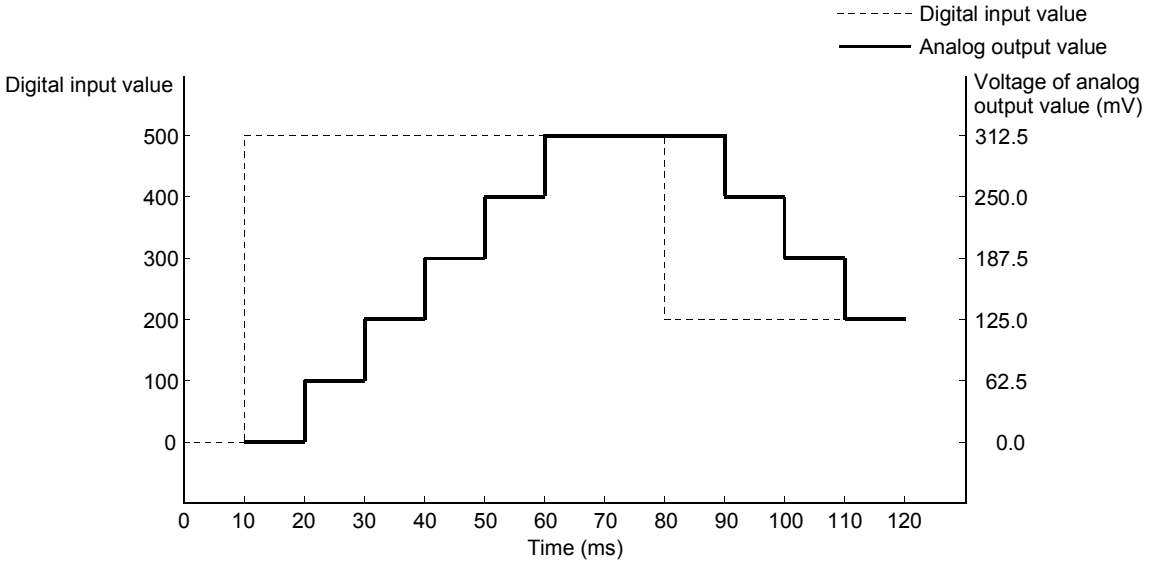
(2) During the analog output test, the warning output function is invalid.

3.2.5 Rate control function

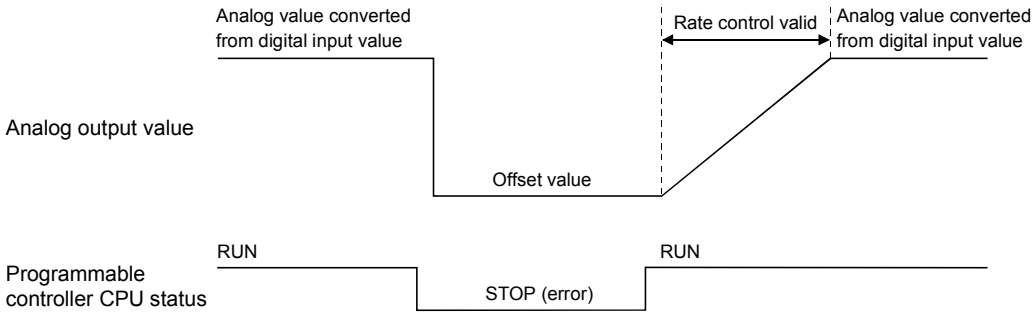
(1) The increase and decrease in analog output values per conversion cycle (10ms) can be limited to prevent rapid changes of the values.

(2) For the rate control function, Rate control enable/disable setting (buffer memory address 46: Un\G46) allows enable/disable of the rate control to be specified for each channel.
To enable the rate control, write "0" to the bit position corresponding to the channel number and turn on Operating condition setting request (Y9). The default is all-channel disable.

(3) Set CH□ Increase/Decrease digital limit value (buffer memory address 70 to 73: Un\G70 to Un\G73).
Example) The control example in the following case is indicated below.
Output range: -10 to 10V
Increase digital limit value: 100
Decrease digital limit value: 100



(4) If the operation of the programmable controller CPU varies at the setting of D/A conversion enable, D/A output enable and analog output clear, the rate control function is as indicated below.
- If the programmable controller CPU has switched from RUN to STOP (error): Rate control does not function.
- If the programmable controller CPU has switched from STOP (error) to RUN: Rate control functions.

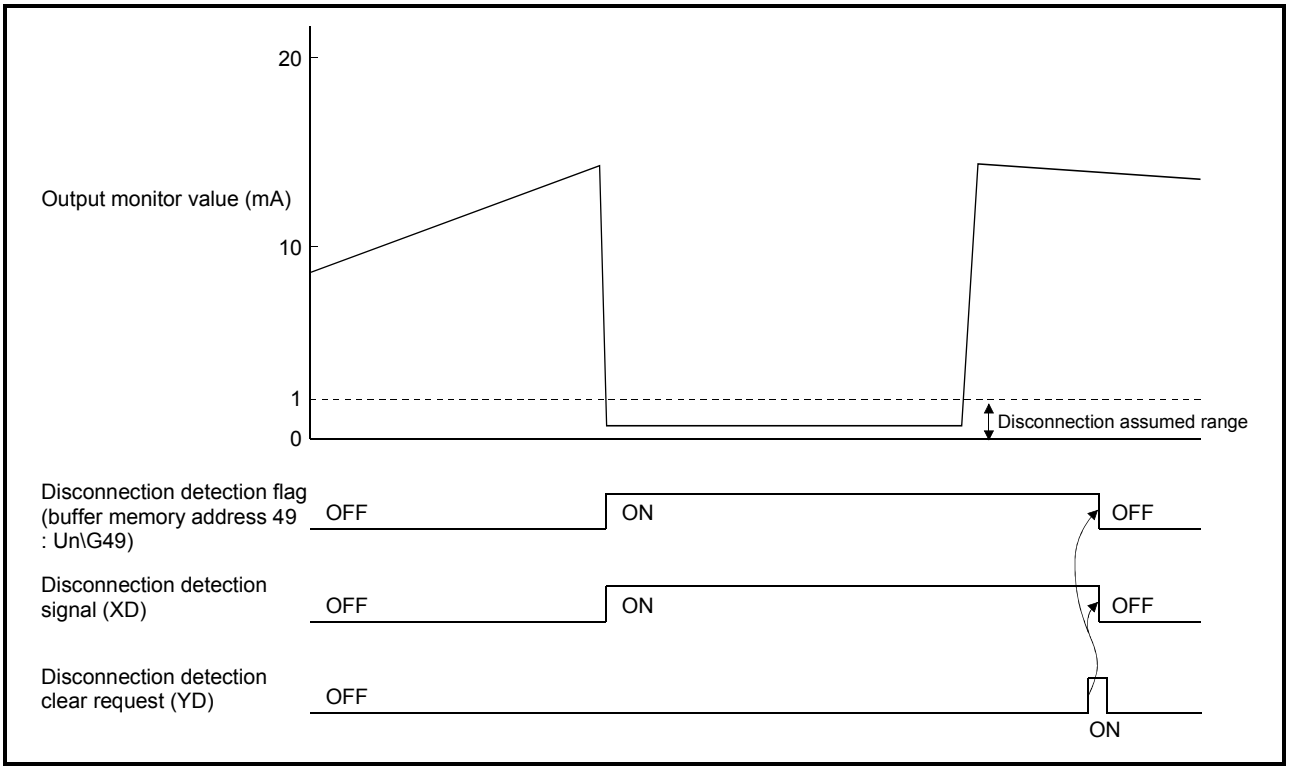


3.2.6 Disconnection detection function

(1) When the Q62DA-FG, whose output range is set to either 4 to 20mA, 4 to 20mA (Extended mode), or user range setting 1, detects disconnection at output monitor value of 1mA (with an accuracy of ±1.0%) or lower, the module notifies the disconnection with Disconnection detection flag (buffer memory address 49: Un\G49), Disconnection detection signal (XD), and by flashing of the ALM LED. Disconnection is detected only on the channel set for D/A conversion enable and D/A output enable.

(2) Disconnection detection flag (buffer memory address 49: Un\G49) and Disconnection detection signal (XD) turn off when Operating condition setting request (Y9) or Disconnection detection clear request (YD) turns on.

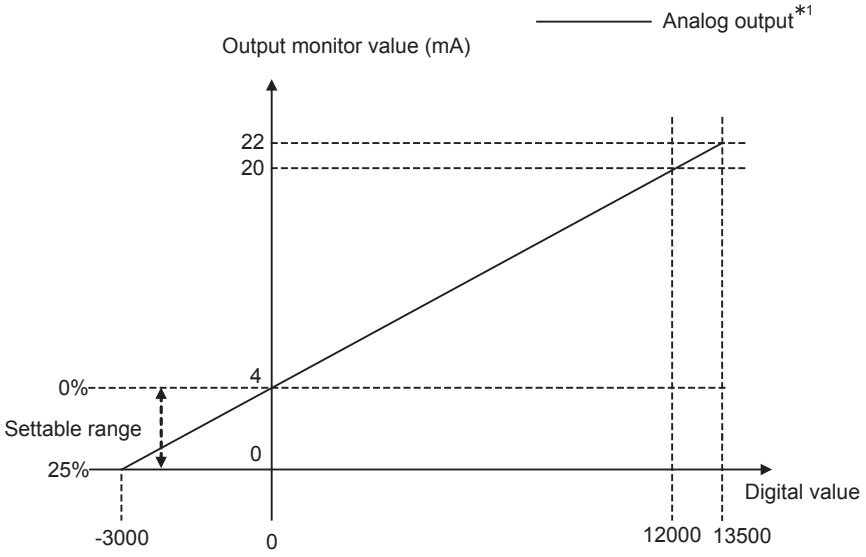
(3) For the disconnection detection function, Disconnection detection/Warning output setting (buffer memory address 47: Un\G47) allows enable/disable of the disconnection detection to be specified for each channel. To enable the disconnection detection, write "0" to the bit position corresponding to the channel number and turn on Operating condition setting request (Y9). The default is all-channel disable.



(4) Disconnection detection mode can be selected from the followings only when the output range is set to 4 to 20mA (extended mode).
The default is "fixed".

(a) Fixed
The Q62DA-FG detects disconnection at output monitor value of 1mA (with an accuracy of ±1.0%) or lower.

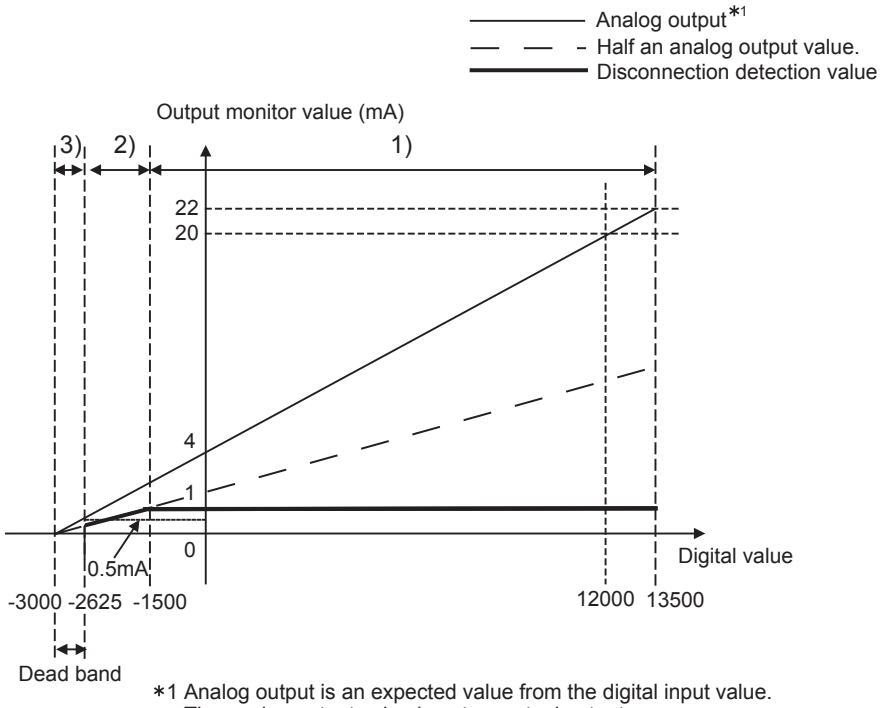
(b) Arbitrarily setting
The disconnection detection value can be set arbitrarily by a user.
Set CH□ Disconnection detection setting value (buffer memory address 142, 143: Un\G142, 143) for each channel.
The disconnection detection values are ranged from 0 to 25.0% (4 to 0mA).



*1 Analog output is an expected value from the digital input value.
The analog output value is not an actual output.

(c) Auto setting

As shown from 1) to 3), the Q62DA-FG automatically changes the disconnection detection values according to the expectable analog output values.



*1 Analog output is an expected value from the digital input value. The analog output value is not an actual output.

1) The expectable analog output value is greater than 2mA. : Q62DA-FG sets the disconnection detection value to 1mA.

2) The expectable analog output value is within the range of 0.5 to 2mA. : Q62DA-FG sets the disconnection detection value to the half of the expectable analog output value.

3) The expectable analog output value is less than 0.5mA. : Q62DA-FG regards the range as a dead band and does not detect the disconnection.

POINT

(1) Even if the sensor has been connected properly, the Q62DA-FG detects the disconnection at its output monitor value is lower than 1mA or lower when either of the following ranges is set to the module.
- 4 to 20mA (Extended mode) with the disconnection detection mode set to "fixed",
- User range setting 1.

When the output monitor value is 1mA or lower, perform one among the followings:
- Set the disconnection detection mode to either "arbitrarily" or "auto setting" or
- Set the disconnection detection function to "disconnection detection disabled".

(2) In case of the "auto setting" is set to disconnection mode and the Q62DA-FG analog value is anywhere between 0.5mA and 2mA (or digital values of -2625 and -1500 respectively), the formula to calculate the output monitor value at the disconnection detection is as shown below:

$$\text{The output monitor value at the disconnection detection} = \text{Digital value} + \left(\frac{\text{-3000- digital value}}{2}\right)$$

(3) When the disconnection detection function is activated, "1" is stored to the bit of the corresponding channel in Disconnection detection operation flag (buffer memory address 139: Un\G139).
In the case of the "auto setting", if digital values are set within the dead band, the disconnection is not detected and "0" is stored to the bit of the corresponding channel in Disconnection detection operation flag (buffer memory address 139: Un\G139).

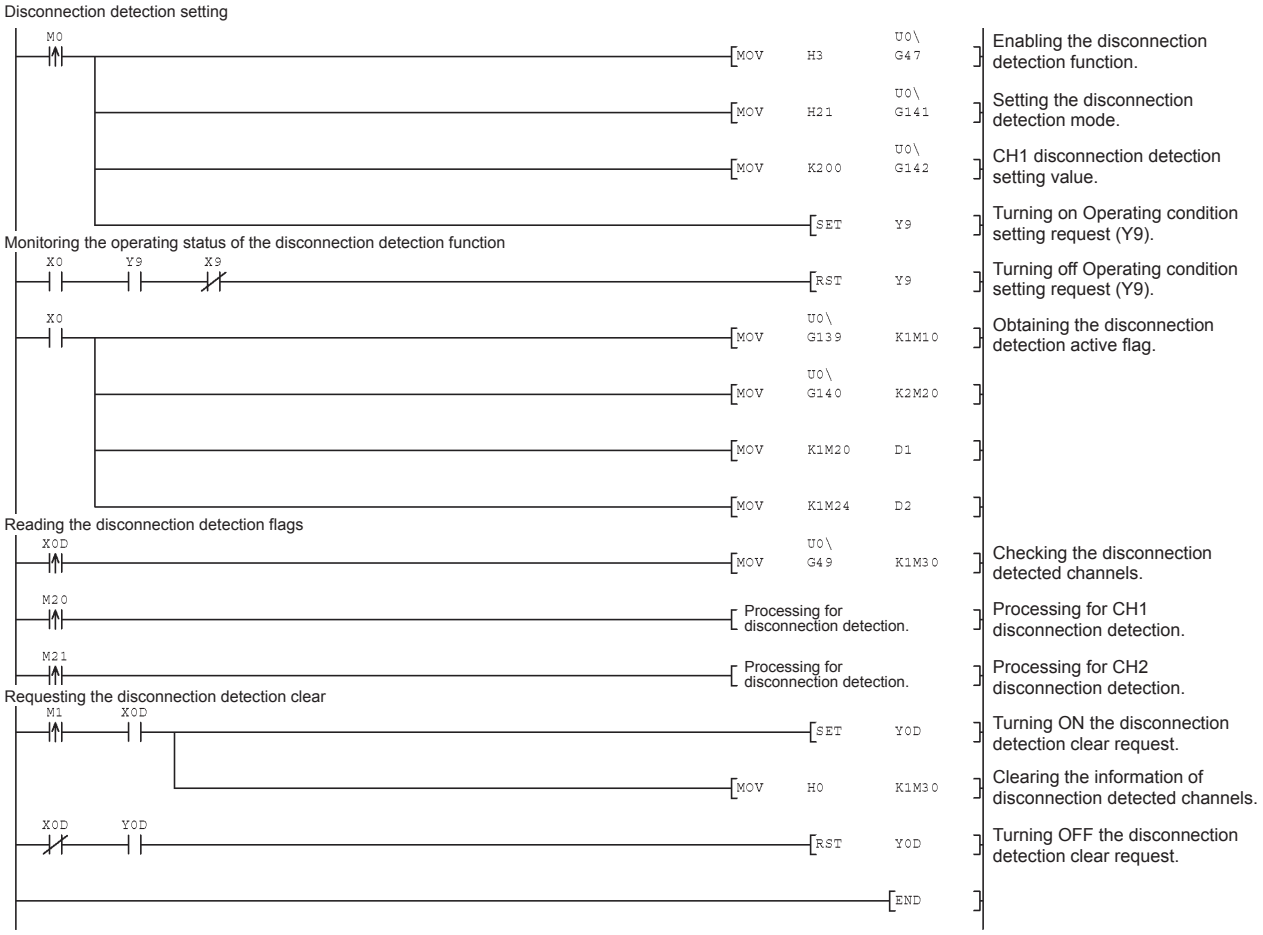
(d) Program examples of using disconnection detection mode

1) System configuration
The system configuration is the same as shown in "For Use in Normal System Configuration". (Refer to Section 6.2 (1))

2) Initial settings
- Disconnection detection enabled channels: CH1, CH2
- Arbitrarily setting mode: CH1 (disconnection detection setting value: 20% (0.8mA))
- Auto setting mode: CH2

3) User devices
- Disconnection detection setting flag: M0
- Disconnection detection resetting flag: M1
- Disconnection detection active flag: M10, M11
- Disconnection detection flag: M20, M21

4) Program example



3.3 I/O Signals for the Programmable Controller CPU

3.3.1 List of I/O signals

Table 3.5 shows a list of the I/O signals for the Q62DA-FG.
Note that I/O numbers (X/Y) shown in this chapter and thereafter are the values when the start I/O number for the Q62DA-FG is set to 0.

Table 3.5 List of I/O signal

Signal direction	Q62DA-FG → CPU module	Signal direction	CPU module ← Q62DA-FG
Device No	Signal name	Device No.	Signal name
X0	Module ready	Y0	Use prohibited ＊1
X1	Use prohibited ＊1	Y1	CH1 Output enable/disable flag
X2		Y2	CH2 Output enable/disable flag
X3		Y3	Use prohibited ＊1
X4		Y4	
X5		Y5	
X6		Y6	
X7		Y7	
X8	Monitor start flag	Y8	
X9	Operating condition setting completed flag	Y9	Operating condition setting request
XA	Offset/gain setting mode flag	YA	User range writing request
XB	Channel change completed flag	YB	Channel change request
XC	Set value change completed flag	YC	Set value change request
XD	Disconnection detection signal	YD	Disconnection detection clear request
XE	Warning output signal	YE	Warning output clear request
XF	Error flag	YF	Error clear request

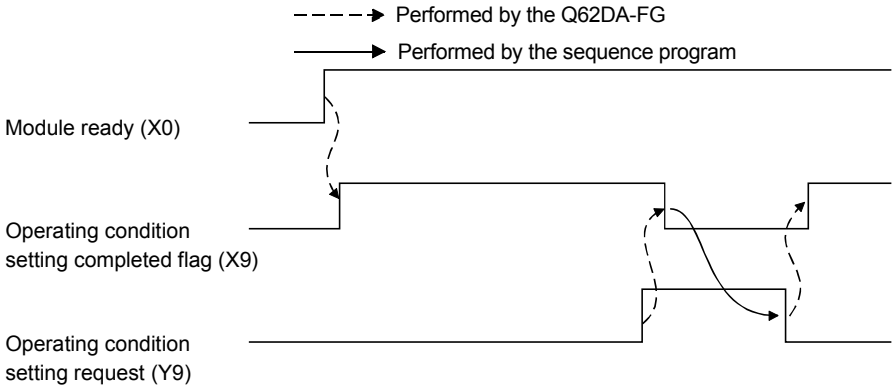
POINT

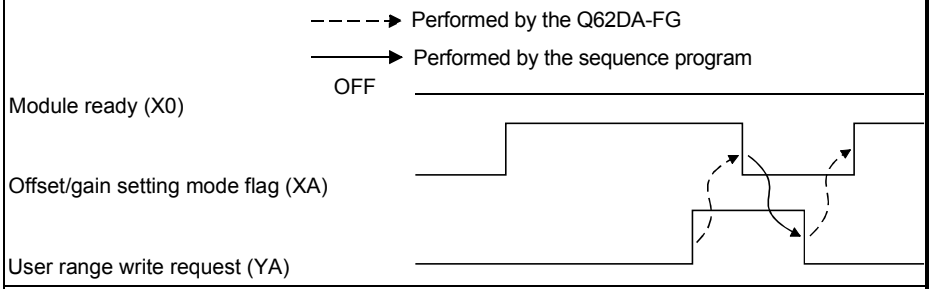
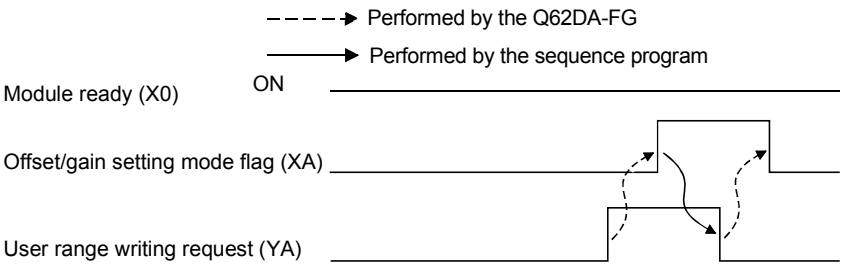
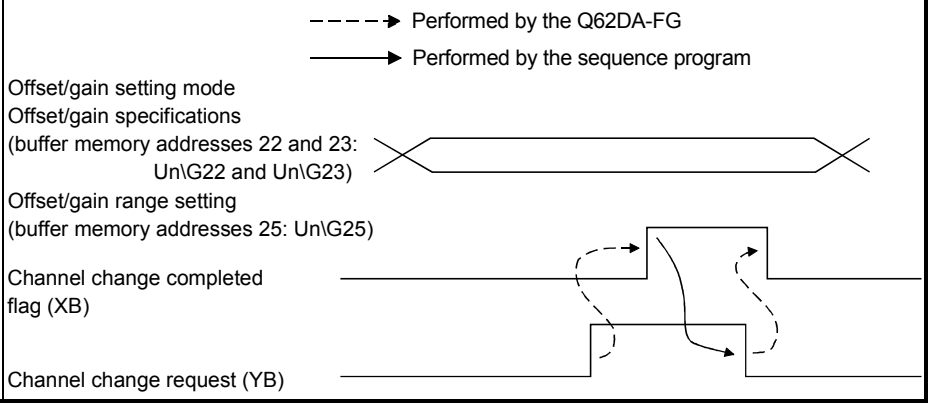
＊1 These signals cannot be used by the user since they are used by the system. If these are turned on/off by the sequence program, the function of the Q62DA-FG cannot be guaranteed.

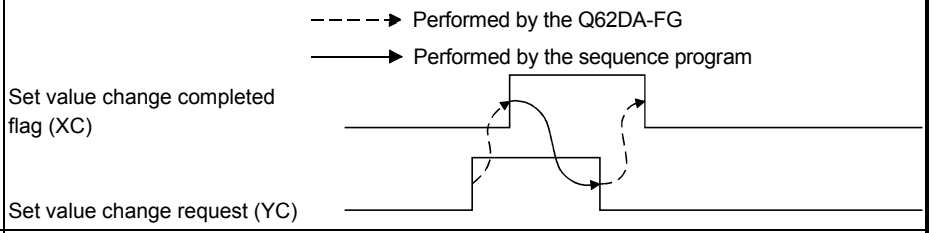
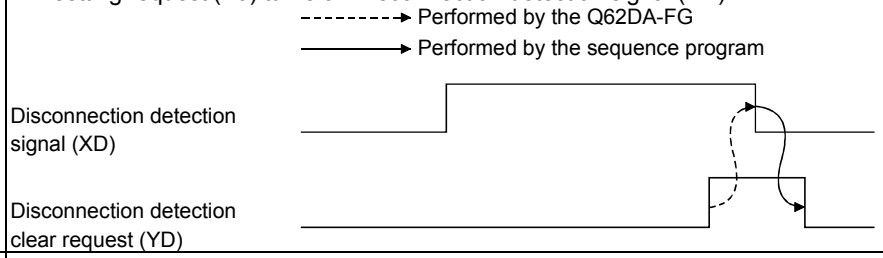
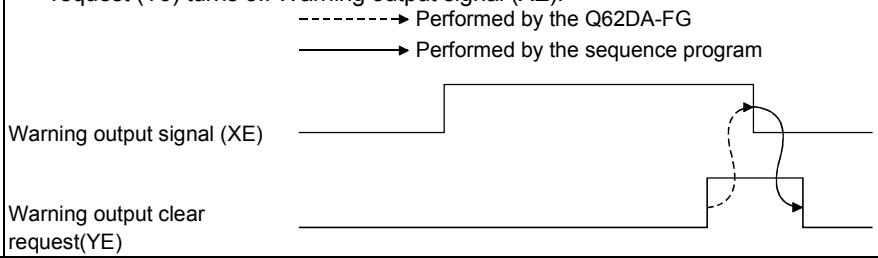
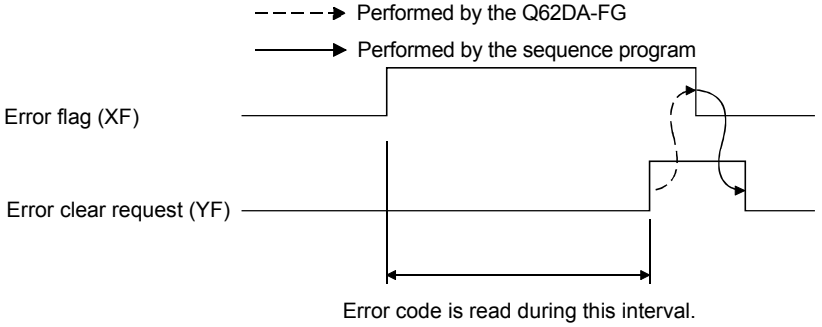
3.3.2 Details of I/O signals

I/O signals for the Q62DA-FG are explained in detail below.

(1) Input signals

Device No.	Signal name	Description
X0	Module ready	(1) When the programmable controller CPU is powered on or reset, this signal turns on once the preparation for D/A conversion has been completed, and D/A conversion processing is then performed. (2) When Module ready (X0) signal is off, D/A conversion processing is not performed. Module ready (X0) turns off in the following situations: • During offset/gain setting mode • When the Q62DA-FG has a watchdog timer error
X8	Monitor start flag	(1) The monitor start flag turns on at the A/D conversion completion of the analog output value and the converted value is stored to CH□ Output monitor value (buffer memory address 38, 39: Un\G38, Un\G39). (2) Monitor start flag (X8) turns off when Operating condition setting request (Y9) turns on.
X9	Operating condition setting completed flag	(1) This is used as an interlock condition for turning on/off Operating condition setting request (Y9) when any of the following settings is changed. • D/A conversion enable/disable setting (buffer memory address 0: Un\G0) • Rate control enable/disable setting (buffer memory address 46: Un\G46) • Disconnection detection/Warning output setting (buffer memory address 47: Un\G47) • CH□ Increase/Decrease digital limit value (buffer memory address 70 to 73: Un\G70 to 73) • Disconnection detection mode setting (buffer memory address 141: Un\G141) • CH□ Disconnection detection setting value (buffer memory address 142,143: Un\G142, Un\G143) (2) Under the following conditions, Operating condition setting completed flag (X9) turns off. • When Operating condition setting request (Y9) is on 

<table>
<tr><th>Device No.</th><th>Signal name</th><th>Description</th></tr>
<tr><td rowspan="2">XA</td><td rowspan="2">Offset/gain setting mode flag</td><td>[In offset/gain setting mode]
(1) This is used as an interlock condition for setting User range writing request (YA) to on/off when registering the value after adjustment of the offset/gain settings have been completed.
(2) Refer to Section 4.6 regarding the offset/gain settings.
 
</td></tr>
<tr><td>[In normal mode]
(1) This signal is used as an interlock condition to run on/off User range writing request (YA) when the user range is restored.
(2) Refer to Chapter 7 regarding the user range restoration.
 
</td></tr>
<tr><td>XB</td><td>Channel change completed flag</td><td>(1) This is used as an interlock condition for turning on/off Channel change request (YB) when changing the channel where offset/gain settings will be performed or changing the offset/gain range settings.
(2) Refer to Section 4.6 regarding the offset/gain settings.
 
</td></tr>
</table>

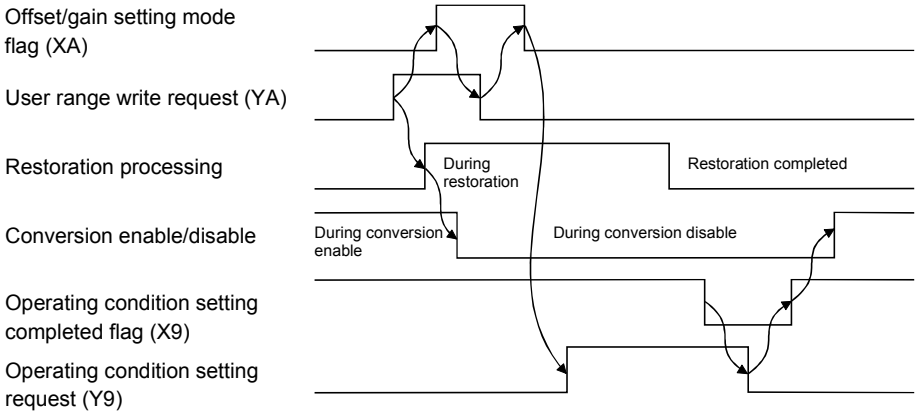
Device No.	Signal name	Description
XC	Set value change completed flag	(1) This is used as an interlock condition for setting Set value change request (YC) to on/off when adjusting the offset/gain settings. (2) Refer to Section 4.6 regarding the offset and gain settings. 
XD	Disconnection detection signal	(1) Disconnection detection signal (XD) turns on when the Q62DA-FG detects disconnection at any channel when either of the analog output range of 4 to 20mA, 4 to 20mA (Extended mode), or user range setting 1. (2) Turning on Disconnection detection clear request (YD) or Operating condition setting request (Y9) turns off Disconnection detection signal (XD). 
XE	Warning output signal	(1) This turns on if the digital input value on any of the channels enabled for D/A conversion rises to or above the warning output upper limit value or falls below the warning output lower limit value. (2) Turning on Warning output clear request (YE) or Operating condition setting request (Y9) turns off Warning output signal (XE). 
XF	Error flag	(1) Error flag (XF) turns on when a write error occurs. (2) To turn Error flag (XF) off, remove the cause of the error and set Error clear request (YF) to on. Error code (buffer memory address 19: Un\G19) changes to 0 and the ERR. LED turns off. 

(2) Output signals

Device No.	Signal name	Description
Y1 to Y2	CH□ Output enable/disable flag	(1) Specifies whether to output the D/A converted value or offset value for each channel. on: D/A converted value off: Offset value (2) The D/A conversion speed is constant regardless of whether the output enable/disable flag is on or off.
Y9	Operating condition setting request	(1) Turn on this signal when changing any of the following settings and making the setting valid. • D/A conversion enable/disable setting (buffer memory address 0: Un\G0) • Rate control enable/disable setting (buffer memory address 46: Un\G46) • Disconnection detection/Warning output setting (buffer memory address 47: Un\G47) • CH□ Increase/Decrease digital limit value (buffer memory address 70 to 73: Un\G70 to 73) • Disconnection detection mode setting (buffer memory address 141: Un\G141) • CH□ Disconnection detection setting value (buffer memory address 142,143: Un\G142, Un\G143) (2) Refer to the X9 column for the on/off timing.
YA	User range writing request	[In offset/gain setting mode] (1) This turns on when the values for the adjusted offset/gain settings are registered in the Q62DA-FG. (2) Refer to the XA column for the on/off timing. Refer to Section 4.6 for offset/gain settings.
		[In normal mode] (1) Turn on this signal when restoring the user range. (2) Refer to the XA column for the on/off timing. Refer to Chapter 7 for the user range restoration.
YB	Channel change request	(1) Turn on this signal when changing the channel where the offset/gain settings will be performed or changing the offset/gain range settings. (2) Refer to the XB column for the on/off timing.
YC	Set value change request	(1) This turns on/off when increasing or decreasing the analog output value during adjustment of the offset/gain settings. (2) By turning this signal on, the analog output value increases or decreases by the value stored in Offset/gain adjustment value specification (buffer memory address 24: Un\G24).
YD	Disconnection detection clear request	(1) Turn on this signal when clearing the disconnection detection. (2) Refer to the XD column for the on/off timing.
YE	Warning output clear request	(1) Turn on this signal when clearing the warning output. (2) Refer to the XE column for the on/off timing.
YF	Error clear request	(1) This turns on when a write error is cleared. (2) Refer to the XF column for on/off timing.

POINT

When User range writing request (YA) is turned on with D/A conversion enabled in the normal mode, the Q62DA-FG restores the user range.



During restoration: D/A conversion disable
After restoration : D/A conversion processing can be executed in the restored user range

3.4 Buffer Memory

3.4.1 Buffer memory assignment

Table 3.6 indicates the buffer memory assignment of the Q62DA-FG.

POINT

Do not write data from System area or sequence program to the buffer memory area where writing is disabled. Doing so may cause malfunction.

Table 3.6 Buffer memory assignment (1/3)

Address		Description	Default ＊1	Read/write ＊2	Reference section
Hexadecimal	Decimal				
0H	0	D/A conversion enable/disable setting	0003H	R/W	Section 3.4.2
1H	1	CH1 Digital value	0	R/W	Section 3.4.3
2H	2	CH2 Digital value	0	R/W	
3H to AH	3 to 10	System area	—	—	—
BH	11	CH1 Set value check code	0	R	Section 3.4.4
CH	12	CH2 Set value check code	0	R	
DH to 12H	13 to 18	System area	—	—	—
13H	19	Error code	0	R	Section 3.4.5
14H	20	Setting range (CH1, CH2)	0	R	Section 3.4.6
15H	21	System area	—	—	—
16H	22	Offset/gain setting mode Offset specification	0	R/W	Section 3.4.7
17H	23	Offset/gain setting mode Gain specification	0	R/W	
18H	24	Offset/gain adjustment value specification	0	R/W	Section 3.4.8
19H	25	Offset/gain range setting	0	R/W	Section 3.4.9
1AH to 25H	26 to 37	System area	—	—	—
26H	38	CH1 Output monitor value	0	R	Section 3.4.10
27H	39	CH2 Output monitor value	0	R	
28H to 2DH	40 to 45	System area	—	—	—
2EH	46	Rate control enable/disable setting	0003H	R/W	Section 3.4.11
2FH	47	Disconnection detection/Warning output setting	3003H	R/W	Section 3.4.12

＊1 This is the initial value set after the power is turned on or the programmable controller CPU is reset.
＊2 Indicates whether reading from and writing to a sequence program are enabled.
R : Reading enabled W : Writing enabled

Table 3.6 Buffer memory assignment (2/3)

Address		Description	Default ＊1	Read/write ＊2	Reference section
Hexadecimal	Decimal				
30H	48	Warning output flag	0	R	Section 3.4.13
31H	49	Disconnection detection flag	0	R	Section 3.4.14
32H to 45H	50 to 69	System area	—	—	—
46H	70	CH1 Increase digital limit value	32000	R/W	Section 3.4.15
47H	71	CH1 Decrease digital limit value	32000	R/W	
48H	72	CH2 Increase digital limit value	32000	R/W	
49H	73	CH2 Decrease digital limit value	32000	R/W	
4AH to 55H	74 to 85	System area	—	—	—
56H	86	CH1 Warning output upper limit value	0	R/W	Section 3.4.16
57H	87	CH1 Warning output lower limit value	0	R/W	
58H	88	CH2 Warning output upper limit value	0	R/W	
59H	89	CH2 Warning output lower limit value	0	R/W	
5AH to 8AH	90 to 138	System area	—	—	—
8BH	139	Disconnection detection operation flag	0	R	Section 3.4.17
8CH	140	Disconnection detection mode monitor	0	R	Section 3.4.18
8DH	141	Disconnection detection mode setting	0	R/W	Section 3.4.19
8EH	142	CH1 Disconnection detection setting value	187	R/W	Section 3.4.20
8FH	143	CH2 Disconnection detection setting value	187	R/W	
90H to 9DH	144 to 157	System area	—	—	—
9EH	158	Mode switching setting	0	R/W	Section 3.4.21
9FH	159		0	R/W	
A0H to C7H	160 to 199	System area	—	—	—
C8H	200	Pass data classification setting ＊3	0	R/W	Section 3.4.22
C9H	201	System area	—	—	—
CAH	202	CH1 Industrial shipment settings offset value (used for D/A) ＊3	0	R/W	Section 3.4.23
CBH	203	CH1 Industrial shipment settings gain value (used for D/A) ＊3	0	R/W	
CCH	204	CH2 Industrial shipment settings offset value (used for D/A) ＊3	0	R/W	

＊1 This is the initial value set after the power is turned on or the programmable controller CPU is reset.
＊2 Indicates whether reading from and writing to a sequence program are enabled.
R : Reading enabled W : Writing enabled
＊3 Areas used to restore the user range settings offset/gain values when online module change is made.
Refer to chapter 7 for details of online module change.

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Table 3.6 Buffer memory assignment (3/3)

Address		Description	Default ＊1	Read/write ＊2	Reference section
Hexadecimal	Decimal				
CDH	205	CH2 Industrial shipment settings gain value (used for D/A) ＊3	0	R/W	Section 3.4.23
CEH	206	CH1 Industrial shipment settings offset value (used for monitor output) ＊3	0	R/W	
CFH	207	CH1 Industrial shipment settings gain value (used for monitor output) ＊3	0	R/W	
D0H	208	CH2 Industrial shipment settings offset value (used for monitor output) ＊3	0	R/W	
D1H	209	CH2 Industrial shipment settings gain value (used for monitor output) ＊3	0	R/W	
D2H	210	CH1 User range settings offset value (used for D/A) ＊3	0	R/W	
D3H	211	CH1 User range settings gain value (used for D/A) ＊3	0	R/W	
D4H	212	CH2 User range settings offset value (used for D/A) ＊3	0	R/W	
D5H	213	CH2 User range settings gain value (used for D/A) ＊3	0	R/W	
D6H	214	CH1 User range settings offset value (used for monitor output) ＊3	0	R/W	
D7H	215	CH1 User range settings gain value (used for monitor output) ＊3	0	R/W	
D8H	216	CH2 User range settings offset value (used for monitor output) ＊3	0	R/W	
D9H	217	CH2 User range settings gain value (used for monitor output) ＊3	0	R/W	

＊1 This is the initial value set after the power is turned on or the programmable controller CPU is reset.
＊2 Indicates whether reading from and writing to a sequence program are enabled.
R : Reading enabled W : Writing enabled
＊3 Areas used to restore the user range settings offset/gain values when Online module change is made.
Refer to chapter 7 for details of Online module change.

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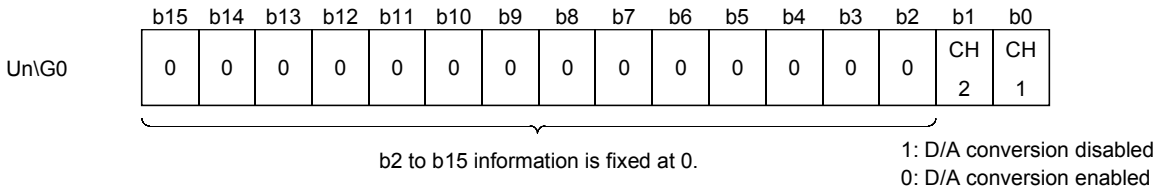
3.4.2 D/A conversion enable/disable setting (buffer memory address 0: Un\G0)

(1) Set whether D/A conversion is enabled or disabled for each channel.

(2) It is necessary to set Operating condition setting request (Y9) to on/off to validate D/A conversion enable/disable setting. (refer to Section 3.3.2.)

(3) By default, all channels are set to D/A conversion disabled.



POINT

Design the system so that D/A conversion enable/disable setting (buffer memory address 0 : Un\G0) changes to "Enable" after the external power (Refer to Section 4.3.) is supplied.
Analog output may not properly be performed if the external power is not at the specified voltage.

3.4.3 Digital value (buffer memory address 1, 2: Un\G1, Un\G2)

(1) This area is used to write digital values for performing D/A conversion from the programmable controller CPU as 16-bit signed binary code.

(2) If a value outside the settable range is written, the upper or lower limit value of the range is used for D/A conversion. (Refer to Table 3.7.) Then, a check code is stored in CH□ Set value check code (buffer memory address 11, 12: Un\G11, Un\G12) and an error (Error code: 60□) occurs.

Table 3.7 Output range settings and valid range

Output range setting	Valid range (practical range)	Digital value that is set when a value outside the valid range is written
0: 4 to 20 mA	0 to 12287 (Practical range: 0 to 12000)	12288 or larger: 12287 –1 or smaller: 0
1: 0 to 20 mA		
2: 1 to 5 V		
3: 0 to 5 V		
4: –10 to 10 V	-16384 to 16383 (Practical range: -16000 to 16000)	16384 or larger: 16383 –16385 or smaller: –16384
A: 4 to 20 mA (Extended mode)	-3000 to 13787 (Practical range: -3000 to 13500)	13788 or larger: 13787 –3001 or smaller: –3000
B: 1 to 5 V (Extended mode)		
D: User range setting 3	-12288 to 12287 (Practical range: -12000 to 12000)	12288 or larger: 12287 –12289 or smaller: –12288
E: User range setting 2		
F: User range setting 1		

3.4.4 Set value check code (buffer memory address 11, 12: Un\G11, Un\G12)

(1) This area stores the result of checking whether a digital value that was set is within or outside the valid range.

(2) When a digital value outside the valid range (refer to Table 3.7) is written, one of the check codes listed in Table 3.8 is stored.

Table 3.8 Check code list

Check code	Description
000F$_H$	A digital value exceeding the valid range was written.
00F0$_H$	A digital value that falls short of the valid range was written.
00FF$_H$	A digital value that either falls short or exceeds the valid range was written. For example, the 00FF$_H$ check code is stored if a digital value exceeding the valid range is written, and then, without the check code being reset, a digital value that falls short of the valid range is written.

(3) Once a check code is stored, it will not be reset even if the digital value is within the valid range.

(4) To reset CH□ Set value check code, set Error clear request (YF) to on after rewriting the digital value so that it is within the valid range.

3.4.5 Error code (buffer memory address 19: Un\G19)

(1) The error codes detected by the Q62DA-FG are stored.

(2) Refer to Section 8.1 for more details of Error code.

3.4.6 Setting range (buffer memory address 20: Un\G20)

(1) This area is used to confirm the setting range of the Q62DA-FG.

	b15 to b12	b11 to b8	b7 to b4	b3 to b0
Un\G20 (setting range CH1, CH2)	0_H	0_H	CH2	CH1

b8 to b15 information is fixed at 0.

Output range	Setting value
4 to 20 mA	0_H
0 to 20 mA	1_H
1 to 5 V	2_H
0 to 5 V	3_H
–10 to 10 V	4_H
4 to 20 mA (Extended mode)	A_H
1 to 5 V (Extended mode)	B_H
User range setting3	D_H
User range setting2	E_H
User range setting1	F_H

POINT

The output range cannot be changed by using Setting range (buffer memory address 20: Un\G20).
Change the output range in the switch setting for I/O and intelligent function module dialog box. (Refer to Section 4.5.)

3.4.7 Offset/gain setting mode Offset/gain specification (buffer memory address 22, 23: Un\G22, Un\G23)

(1) Specifies the channel to be adjusted for the offset/gain settings.

(2) Channel change request (YB) is required to be turned on/off to validate the offset/gain setting offset specification or gain specification. (Refer to Section 3.3.2.)

(3) Specification can be made for 1 channel only.
If more than one channels are set at the same time, an error (Error code: 500) occurs.

(4) Refer to Section 4.6 for the details of the offset/gain settings.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G22 Offset/gain setting mode Offset specification	0	0	0	0	0	0	0	0	0	0	0	0	0	0	CH2	CH1
Un\G23 Offset/gain setting mode Gain specification	0	0	0	0	0	0	0	0	0	0	0	0	0	0	CH2	CH1

b2 to b15 information is fixed at 0.

1: Channel to be set
0: Invalid

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3.4.8 Offset/gain adjustment value specification (buffer memory address 24: Un\G24)

(1) This area is used to set the amount of adjustment for analog output values in the offset/gain setting mode.

(2) Turning Set value change request (YC) from off to on increments or decrements the analog output value by the adjustment value.

(3) The valid input range is from –3000 to 3000.
When the input value is 1000, the analog output values can be adjusted by about 0.33 V (user range setting 2) and about 0.18 V (user range setting 3) for voltage output and about 0.67 mA for current output.

(4) Refer to Section 4.6 for the details of the offset/gain settings.

3.4.9 Offset/gain range specification (buffer memory address 25: Un\G25)

(1) This area is used to change the output range in the offset/gain setting mode.
Turning on Channel change request (YB) changes the output range into the set one.
If a value outside the setting range is set, an error (Error code: 60□) occurs.

Output range	Set value
User range setting 1	$000F_H$
User range setting 2	$000E_H$
User range setting 3	$000D_H$

(2) Channel change request (YB) is required to be turned on/off to validate the offset/gain range setting. (Refer to Section 3.3.2.)

(3) Refer to Section 4.6 for details of offset/gain setting.

3.4.10 Output monitor value (buffer memory address 38, 39: Un\G38, Un\G39)

(1) The analog value being output is always reconverted into a digital value within the Q62DA-FG and the result is stored. (Refer to Section 3.2.3.)

Output range setting	Output monitor value
0 to 20 mA	0 to 12000
4 to 20 mA	
User range setting 1	
1 to 5 V	
0 to 5 V	
–10 to 10 V	–16000 to 16000
4 to 20 mA (Extended mode)	–3000 to 13500
1 to 5 V (Extended mode)	
User range setting 2	–12000 to 12000
User range setting 3	0 to 12000

(2) Turning on Operating condition setting request (Y9) clears the output monitor value.

3.4.11 Rate control enable/disable setting (buffer memory address 46: Un\G46)

(1) Set whether to enable or disable the rate control on each channel. (Refer to Section 3.2.5.)

(2) Operating condition setting request (Y9) is required to be turned on/off to validate Rate control enable/disable setting. (Refer to Section 3.3.2.)

(3) The default setting is all-channel rate control disable.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	CH2	CH1

b2 to b15 information is fixed at 0.

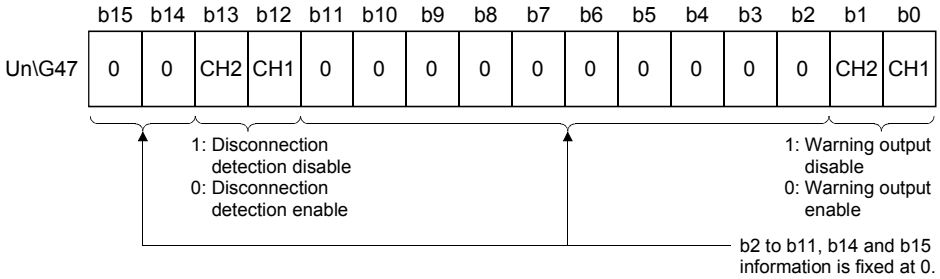
1: Rate control disable
0: Rate control enable

3.4.12 Disconnection detection/Warning output setting (buffer memory address 47: Un\G47)

(1) Set whether to enable or disable the disconnection detection and warning output on each channel. (Refer to Section 3.2.4 and Section 3.2.6.)

(2) Operating condition setting request (Y9) is required to be turned on/off to validate the disconnection detection/warning output setting. (Refer to Section 3.3.2.)

(3) The default setting is all-channel disconnection detection/warning output disable.



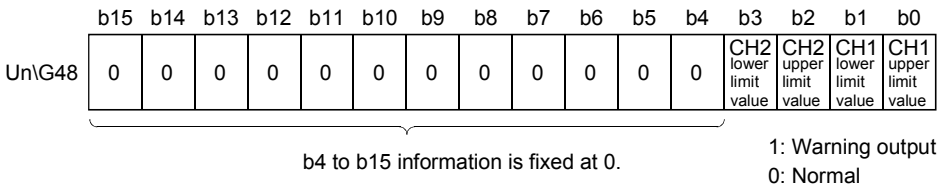
3.4.13 Warning output flag (buffer memory address 48: Un\G48)

(1) When the digital input value falls outside CH□ Warning output upper/lower limit value (buffer memory address 86 to 89: Un\G86 to Un\G89) range, the bit corresponding to the channel turns to "1". (Refer to Section 3.2.4.)

(2) Whether the warning is the upper or lower limit value warning can be checked on each channel.

(3) If the warning is detected on any of the channels enabled for conversion, Warning output signal (XE) also turns on.

(4) Turning on Operating condition setting request (Y9) or Warning output clear request (YE) clears Warning output flag.



3.4.14 Disconnection detection flag (buffer memory address 49: Un\G49)

(1) If the disconnection occurs in the output range of either 4 to 20mA, 4 to 20mA (Extended mode), or when the user range setting 1 is set to the channel, the bit corresponding to each channel turns to "1". (Refer to Section 3.2.6.)

(2) If disconnection is detected on any one channel, Disconnection detection signal (XD) also turns on.

(3) Turning on Operating condition setting request (Y9) or Disconnection detection clear request (YD) clears the disconnection detection flag.

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	CH2	CH1

b2 to b15 information is fixed at 0.

1: Disconnection
0: Normal

3.4.15 Increase/Decrease digital limit value (buffer memory address 70 to 73: Un\G70 to Un\G73)

(1) For rate control, set the range where the digital value can be incremented and decremented in a single conversion cycle (10ms). (Refer to Section 3.2.5.)

(2) The setting range is 0 to 32000.
If any value outside the setting range is set, an error (Error code: 80☐) occurs.

(3) Operating condition setting request (Y9) is required to be turned on/off to validate the increase digital limit values and decrease digital limit values. (Refer to Section 3.3.2.)

3.4.16 Warning output upper/lower limit value (buffer memory address 86 to 89: Un\G86 to Un\G89)

(1) Set the upper and lower limit values of the digital input value for providing the warning output. (Refer to Section 3.2.4.)

(2) The setting range is -16384 to 16383.
Make setting so that the upper limit value is greater than the lower limit value.
If any value outside the setting range is set, an error (Error code: 61☐) occurs.

(3) Operating condition setting request (Y9) must be turned on/off to validate the warning output upper and lower limit values. (Refer to Section 3.3.2.)

3.4.17 Disconnection detection operation flag (buffer memory address 139: Un\G139)

(1) When the disconnection detection function is operated, "1" is stored to the bit of the corresponding channel in this area.

In the following cases, "0" is stored to the bit of the corresponding channel.
- Disconnection detection function is "disabled".
- An analog output value is within the dead band when "auto setting" is set to the disconnection detection mode.
- D/A conversion enable/disable setting (buffer memory address 0: Un\G0) is set to "D/A conversion disable".

	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
Un\G139	0	0	0	0	0	0	0	0	0	0	0	0	0	0	CH2	CH1

b2 to b15 information is fixed at 0.

1: Disconnection detection function is active
0: Disconnection detection function is stopped

3.4.18 Disconnection detection mode monitor (buffer memory address 140: Un\G140)

(1) This area shows the disconnection detection mode under operation by channels.

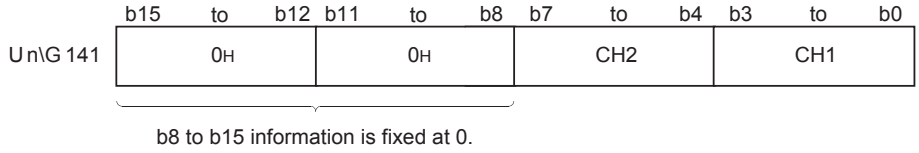
	b15 to b12	b11 to b8	b7 to b4	b3 to b0
Un\G140	0H	0H	CH2	CH1

b8 to b15 information is fixed at 0.

Disconnection detection mode	Set value
Fixed	0H
Arbitrarily setting	1H
Auto setting	2H

3.4.19 Disconnection detection mode setting (buffer memory address 141: Un\G141)

(1) The disconnection detection mode is set by channels.



Disconnection detection mode	Descriptions	Set value
Fixed	When the analog output value is lower than 1mA, the disconnection is detected.	0_H
Arbitrarily setting	When the analog output value is lower than the disconnection detection set by CH□ Disconnection detection setting value (buffer memory address 142, 143: Un\G142, Un\G143), the disconnection is detected.	1_H
Auto setting	When the analog output value is lower than the disconnection detected value set automatically, the disconnection is detected.	2_H

(2) To validate the settings, on/off of Operating condition setting request (Y9) is required. (Refer to Section 3.3.2.)

(3) If other than 0_H, 1_H, 2_H is set, an error (Error code: 63□) occurs.

(4) The default is set in all-channel "0_H" (fixed).

3.4.20 Disconnection detection setting value (buffer memory address 142, 143: Un\G142, Un\G143)

(1) These are areas to set the disconnection detection values.

(2) The setting values are ranged from 0 to 250 (corresponds to 4 to 0mA). Set the values in 0.1% increments.
Use the following formula to find the setting values from the current value to detect the disconnection.

Disconnection detection value = 62.5 × (4 – current value)

[Example]
Set "175" to detect the disconnection at the output monitor value of 1.2mA.

(3) To validate the settings, on/off of Operating condition setting request (Y9) is required.
(Refer to Section 3.3.2.)

(4) If values out of the range from 0 to 250 are set, an error (Error code: 64□) occurs.

(5) The default setting is "187" (or equivalent to 1mA).

3.4.21 Mode switching setting (buffer memory address 158, 159: Un\G158, Un\G159)

(1) Set the values of the mode to which you want to switch.

(2) After setting the values, turning Operating condition setting request (Y9) from off to on switches to that mode.

(3) When Mode switching is performed, this area is cleared to zero and Operating condition setting completed flag (X9) turns off.
After confirming that Operating condition setting completed flag (X9) has turned off, turn off Operating condition setting request (Y9).

Mode to be switched to	Set values	
	Buffer memory address 158	Buffer memory address 159
Normal mode	0964_H	4144_H
Offset/gain setting mode	4144_H	0964_H

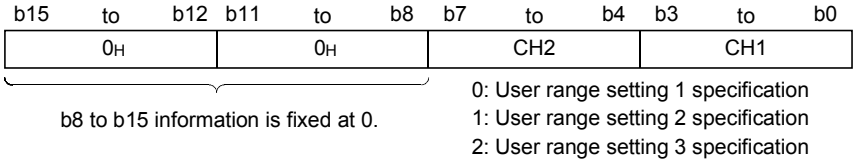
POINT

If the values written are other than the above, mode switching is not performed and only the operating condition is changed.

3.4.22 Pass data classification setting (buffer memory address 200: Un\G200)

(1) Areas used to restore the user range settings offset/gain values when Online module change is made.
Refer to Chapter 7 for details of Online module change.

(2) Specify the user range setting to be saved/restored when saving/restoring the offset/gain values of any of the user range settings 1 to 3.



POINT

(1) Refer to Section 4.6 for the offset/gain value setting method.

(2) D/A conversion aborts if the data is written to this area in the new Q62DA-FG and User range writing request (YA) is turned on.
To resume D/A conversion, turn Operating condition setting request (Y9) from off to on, then to off again.

3.4.23 Industrial shipment settings offset/gain value and User range settings offset/gain value (buffer memory address 202 to 217: Un\G202 to Un\G217)

(1) Areas used to restore the user range settings offset/gain values when online module change is made.
Refer to Chapter 7 for details of online module change.

(2) When the offset/gain values of the user range setting are restored, the used data are stored.
The data are stored (saved) when:
• Writing initial setting by the utility package,
• Turning Operating condition setting request (Y9) from off to on *1,
• Turning User range write request (YA) from off to on in the offset/gain setting mode.
*1 The data are not saved when values have been written to Mode switching setting (buffer memory address 158, 159: Un\G158, Un\G159).

(3) When restoring the offset/gain values of the user range setting, set the data saved here similarly into the corresponding area of the module where the data will be restored.

(4) Buffer memory saving recording procedure for Online module change
1) Set Pass data classification setting (buffer memory address 200: Un\G200).
2) Turn Operating condition setting request (Y9) from off to on.
3) Compare CH□ Industrial shipment settings offset/gain value and CH□ User range settings offset/gain value (buffer memory address 202 to 217: Un\G202 to Un\G217) with the range reference values. Refer to Section 7.4 for the range reference values.
4) If the values are proper, record the offset/gain values of Pass data classification setting, industrial shipment settings and user range settings.

POINT
(1) Refer to Section 4.6 for the offset/gain value setting method. (2) D/A conversion aborts if the data is written to this area in the new Q62DA-FG and User range writing request (YA) is turned on. To resume D/A conversion, turn Operating condition setting request (Y9) from off to on, then to off again.

4 SETUP AND PROCEDURES BEFORE OPERATION

4.1 Handling Precautions

(1) Do not drop the module case or subject it to heavy impact.

(2) Do not remove the PCB of the module from its case. Doing so may cause the module to fail.

(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) The top surface of the module is covered with a protective film to prevent foreign objects such as wire burrs from entering the module during wiring. Do not remove this film until the wiring is complete. Before operating the system, be sure to remove the film to provide adequate heat ventilation.

(5) Tighten the screws such as module fixing screws within the following ranges. Loose screws may cause short circuits, failures, or malfunctions.

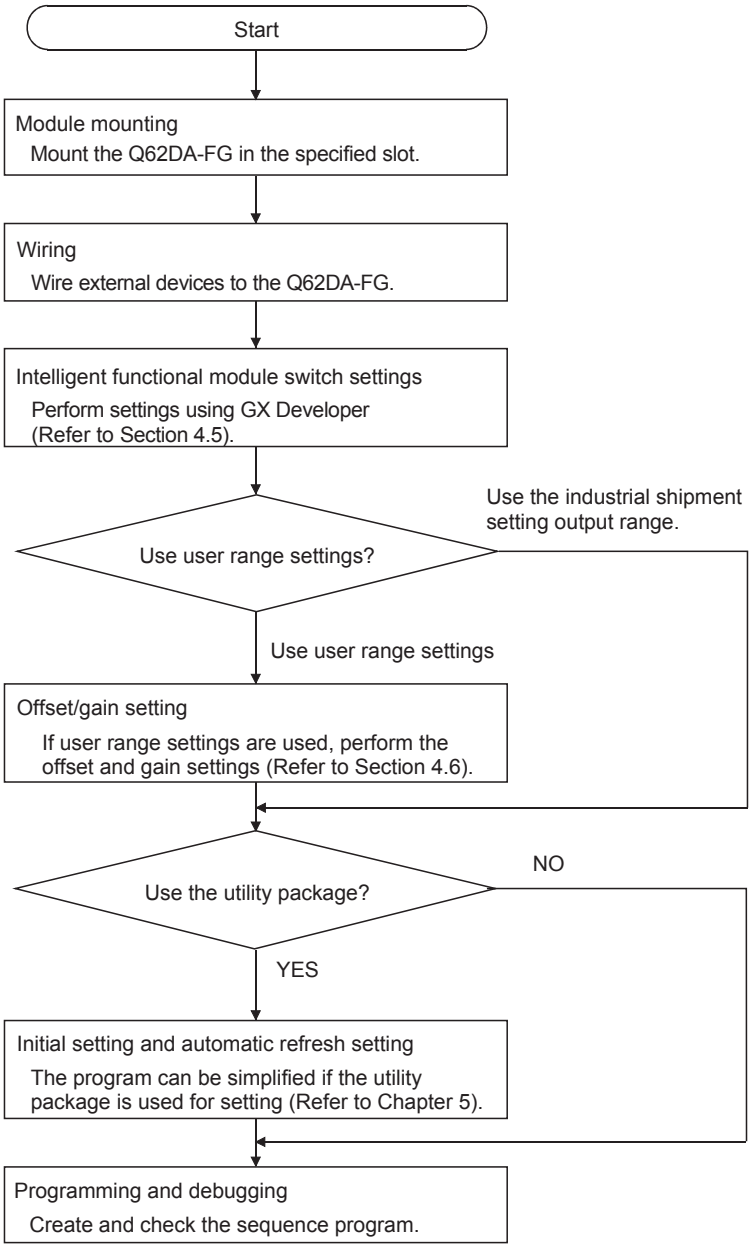
Screw location	Tightening torque range
Module fixing screw (M3 screw) ∗1	0.36 to 0.48 N · m
Terminal block screw (M3 screw)	0.42 to 0.58 N · m
Terminal block mounting screw (M3.5 screw)	0.66 to 0.89 N · m

∗1 The module can be easily fixed onto the base unit using the hook at the top of the module.
However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

(6) While pressing the installation lever at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Improper installation may result in malfunction, breakdown or the module coming loose and dropping.

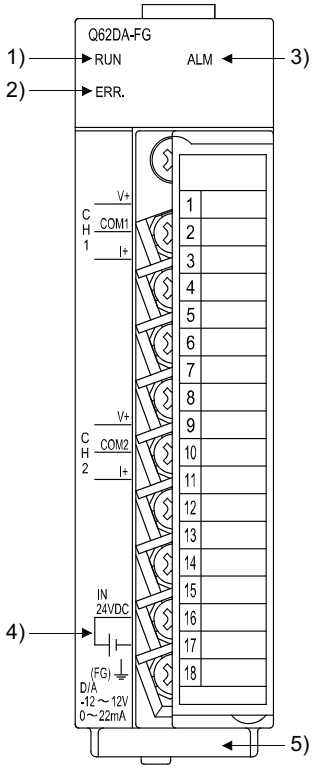
4 - 1

4.2 Setup and Procedures before Operation



4.3 Part Identification Nomenclature

The name of each part in the Q62DA-FG is listed below.



Number	Name	Description
1)	RUN LED	Displays the operating status of the Q62DA-FG. On : Normal operation Flashing : During offset/gain setting mode Off : 5V power supply interrupted, watch dog timer error, 5V power switched off, watchdog timer error occurred, or Online module change enabled.
2)	ERR. LED	Displays the error status of the Q62DA-FG. On : Error ∗1 Flashing : Error in switch settings Switch No. 5 of the intelligent function module has been set to a value other than zero "0". Off : Normal operation
3)	ALM LED	Indicates the warning status of the Q62DA-FG. On : During warning output occurrence Flashing : During disconnection detection Off : Normal operation
4)	External power supply terminal	This is the terminal for connecting the 24 V DC external power supply.
5)	Serial number plate	Indicates the serial No. of the Q62DA-FG.

∗1 Check Error code for details.

POINT

When two or more errors have occurred, the latest error found by the Q62DA-FG is displayed on the LED.

Terminal number	Signal name	
1	CH1	V +
2		COM1
3		I +
4	Vacant	
5	Vacant	
6	Vacant	
7	Vacant	
8	Vacant	
9	CH2	V +
10		COM2
11		I +
12	Vacant	
13	Vacant	
14	Vacant	
15	Vacant	
16	24V	
17	24G	
18	FG	

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 Q62DA-FG 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 alternating-current control circuit and the external output signals and external supply power of the Q62DA-FG in order to avoid AC surges and induction effects.

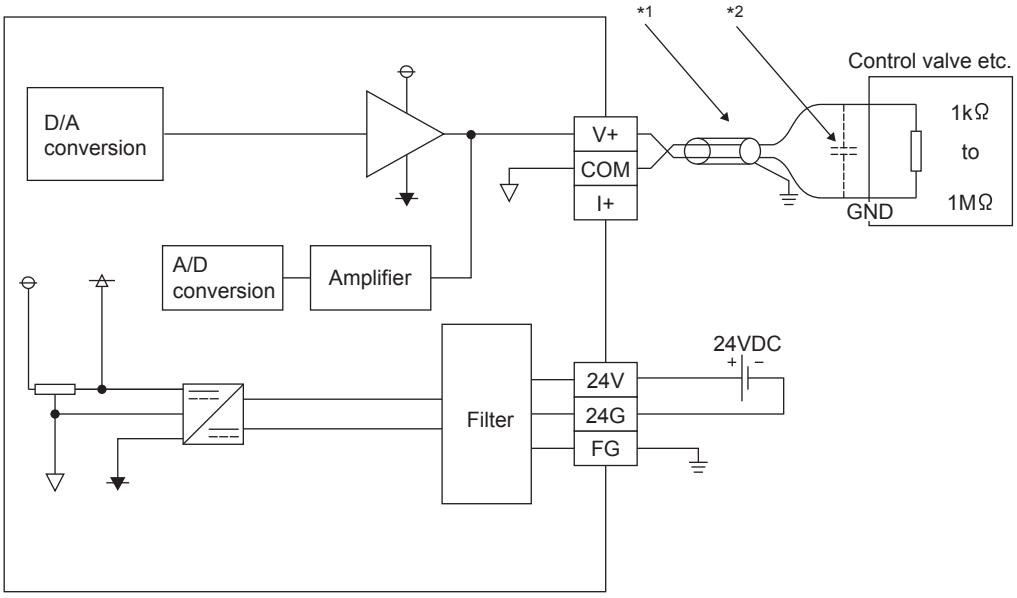
(2) Do not mount the cables close to or bundle them with the main circuit line, a high-voltage cable or a load cable from other than the programmable controller. This may increase the effects of noise, surges and induction.

(3) Perform a one-point grounding for shielded lines and the shields of sealed cables.

(4) A solderless terminal with insulating sleeve cannot be used for the terminal block. Covering the cable- connection portion of the solderless terminal with a marked tube or an insulation tube is recommended.

4.4.2 External wiring

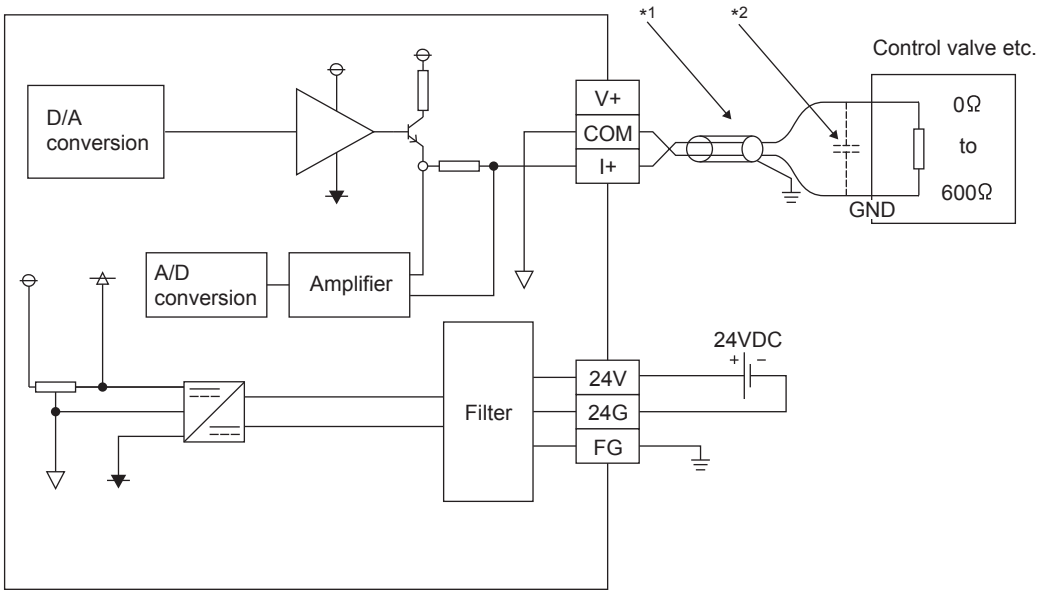
(1) For voltage output



∗1 Use a twisted two core shielded wire for the power wire.

∗2 If there is noise or ripples in the external wiring, connect a 0.1 to 0.47 F25V capacitor between the V+ terminal and COM terminal.

(2) For current output



∗1 Use a twisted two core shielded wire for the power wire.

∗2 If there is noise or ripples in the external wiring, connect a 0.1 to 0.47 F25V capacitor between the I+ terminal and COM terminal.

POINT

The Q62DA-FG needs to be powered on 30 minutes prior to operation for compliance to the specification (accuracy).
Therefore, power on 30 minutes prior to offset/gain setting or after Online module change.

4.5 Switch Setting for Intelligent Function Module

The settings for the intelligent function module are performed using the I/O assignment settings of GX Developer.

(1) Setting item

The intelligent function module switches consist of switches 1 to 5 and are set using 16 bit data. When the intelligent function module switches are not set, the default value for switches 1 to 5 is 0.

Table 4.1 Switch setting item for intelligent function module

<table>
<tr><th></th><th>Setting item</th></tr>
<tr><td>Switch 1</td><td>Output range setting
□ □ □ □ H
CH2 CH1
00H: Fixed

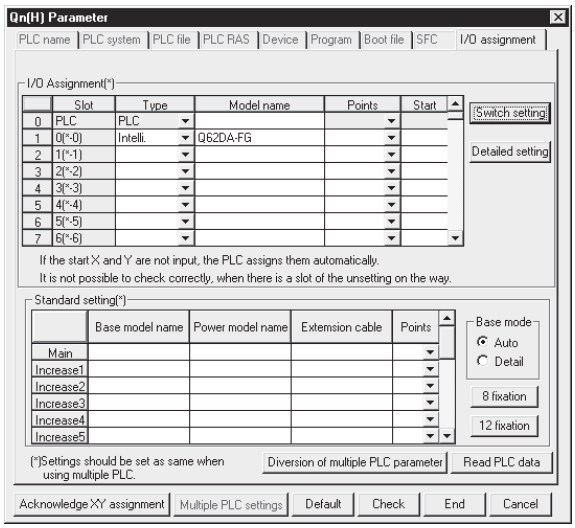
<table><tr><th>Analog output range</th><th>Output range setting value</th></tr><tr><td>4 to 20 mA</td><td>0H</td></tr><tr><td>0 to 20 mA</td><td>1H</td></tr><tr><td>1 to 5 V</td><td>2H</td></tr><tr><td>0 to 5 V</td><td>3H</td></tr><tr><td>– 10 to 10 V</td><td>4H</td></tr><tr><td>4 to 20 mA (Extended mode)</td><td>AH</td></tr><tr><td>1 to 5 V (Extended mode)</td><td>BH</td></tr><tr><td>User range setting3</td><td>DH</td></tr><tr><td>User range setting2</td><td>EH</td></tr><tr><td>User range setting1</td><td>FH</td></tr></table></td></tr>
<tr><td>Switch 2</td><td>Not used</td></tr>
<tr><td>Switch 3</td><td>□ □ □ □ H
CH2 CH1
00H: Fixed

HOLD/CLEAR function setting
0H : CLEAR
1H to FH (numeric value other than 0H) : HOLD</td></tr>
<tr><td>Switch 4</td><td>□ □ □ □ H
000H: Fixed
0H : Normal mode (D/A conversion processing)
1H to FH (numeric value other than 0H)*1 : Offset/gain setting mode</td></tr>
<tr><td>Switch 5</td><td>0H : Fixed</td></tr>
</table>

*1 Setting any value within the setting range will provide the same operation. When the setting range is 1H to FH, set 1H for example.

(2) Operating procedure

Start the settings with GX Developer I/O assignment setting dialog box.



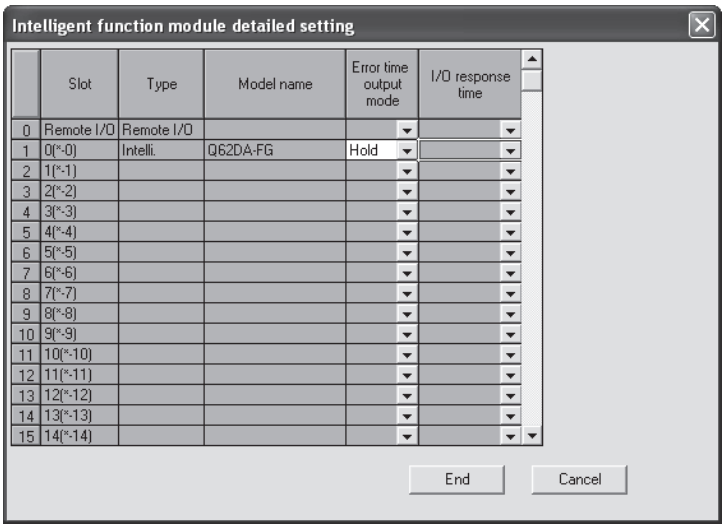
(a) I/O assignment setting screen

Set the following for the slot in which the D/A converter module is mounted.
The type setting is required; set other items as needed.

Type : Select "intelli."
Model name : Enter the module model name.
Points : Select 16 points.
Start XY : Enter the start I/O number for the Q62DA-FG.

Detailed setting:

1) When using in the standard system configuration (on the main or extension base), specify the control CPU of the Q62DA-FG.
   It is unnecessary to set the "Error time output mode" or "H/W error time PLC operation mode" since these settings are invalid for the Q62DA-FG.
2) When using on a remote I/O station, if the analog output is to be held in the case of a link error, "Error time output mode" must be set to "Hold".

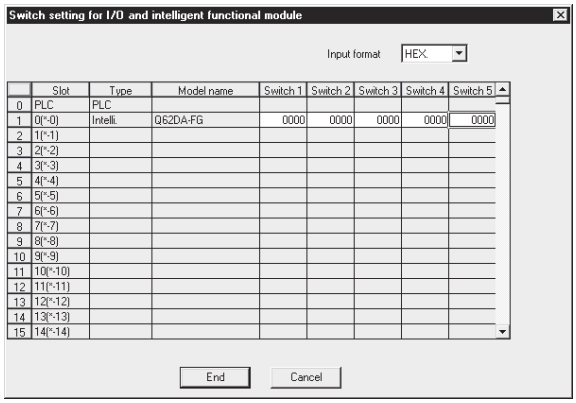


(b) Switch setting for intelligent function module dialog box

Click on [Switch setting] on the I/O assignment setting dialog box to display the dialog box shown at the under, then set switches 1 to 5.

The switches can easily be set if values are entered in hexadecimal.

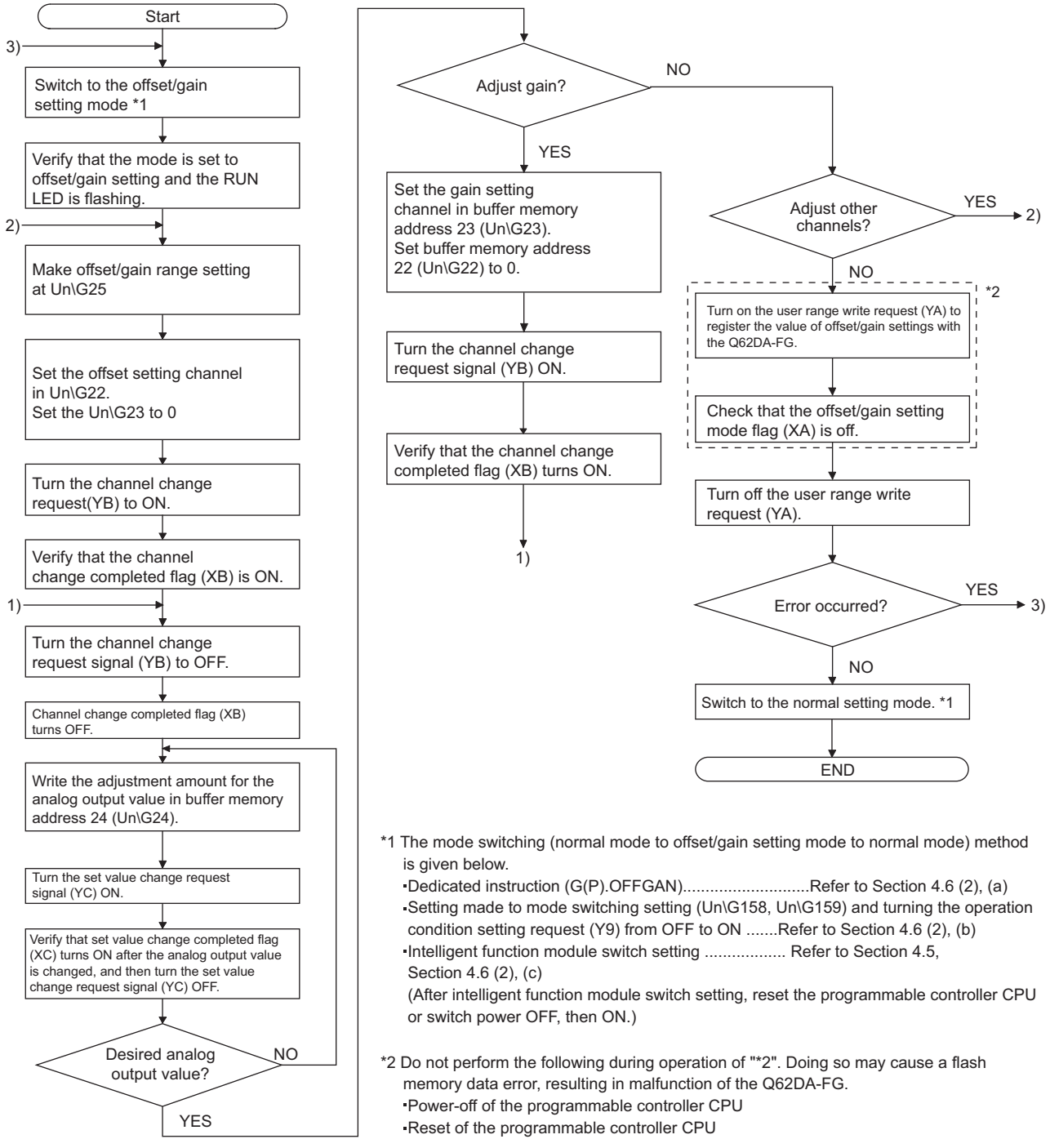
Change the entry format to hexadecimal and then enter the values.



4.6 Offset/Gain Settings

When the user range setting is used, perform the offset and gain settings according to the following procedure.
When the industrial shipment setting is used, offset/gain setting is not necessary.
If the utility package is installed, perform the offset/gain settings according to the procedure described in Section 5.6.2.

(1) Offset/gain setting procedure



*1 The mode switching (normal mode to offset/gain setting mode to normal mode) method is given below.
- ▪Dedicated instruction (G(P).OFFGAN).....Refer to Section 4.6 (2), (a)
- ▪Setting made to mode switching setting (Un\G158, Un\G159) and turning the operation condition setting request (Y9) from OFF to ON .....Refer to Section 4.6 (2), (b)
- ▪Intelligent function module switch setting ..... Refer to Section 4.5, Section 4.6 (2), (c)

(After intelligent function module switch setting, reset the programmable controller CPU or switch power OFF, then ON.)

*2 Do not perform the following during operation of "*2". Doing so may cause a flash memory data error, resulting in malfunction of the Q62DA-FG.
- ▪Power-off of the programmable controller CPU
- ▪Reset of the programmable controller CPU

POINT

(1) Perform the offset/gain settings in the range that satisfies the conditions specified in Section 3.1.2, (1) and (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) Perform the offset/gain settings separately for each channel. If channels are set in buffer memory address 22 (Un\G22) and 23 (Un\G23) at the same time, an error will occur and the ERR. LED will be lit.

(3) After the offset and gain settings are completed, verify that the offset and gain values have been set correctly under actual usage conditions.

(4) The offset and gain values are stored into the E^2PROM and are not erased at power-off.

(5) At the time of offset/gain setting, turn on User range writing request (YA) to write the values to the E^2PROM.
Data can be written to the E^2PROM up to 100 thousand times.
To prevent unnecessary write to the E^2PROM, an error (Error code: 162) occurs when values are written 26 times continuously.

(6) If an error (Error code: 40 □ *1) occurs during offset/gain setting, re-set the correct offset/gain value.
The offset/gain value of the channel where the error has occurred is not written to the Q62DA-FG. (*1 □ indicates the corresponding channel number.)

(7) Module ready (X0) turns from off to on when the offset/gain setting mode switches to the normal mode by the dedicated instruction (G(P).OFFGAN) or the setting of Mode switching setting (buffer memory address 158, 159: Un\G158, Un\G159).
Note that initial setting processing will be executed if there is a sequence program that makes initial setting when Module ready (X0) turns on.

(8) D/A conversion is discontinued if the mode is switched (from the normal mode to the offset/gain setting mode or from the offset/gain setting mode to the normal mode) by the dedicated instruction (G(P).OFFGAN) or the setting of Mode switching setting (buffer memory address 158, 159: Un\G158, Un\G159). To resume DA conversion, switch to the normal mode, then, turn on Operating condition setting request (Y9).

(9) Buffer memory address 200 (Un\G200), 202 to 217 (Un\G202 to Un\G217) are the areas used to restore the user range settings offset/gain values when Online module change is made.
Refer to chapter 7 for details of Online module change.

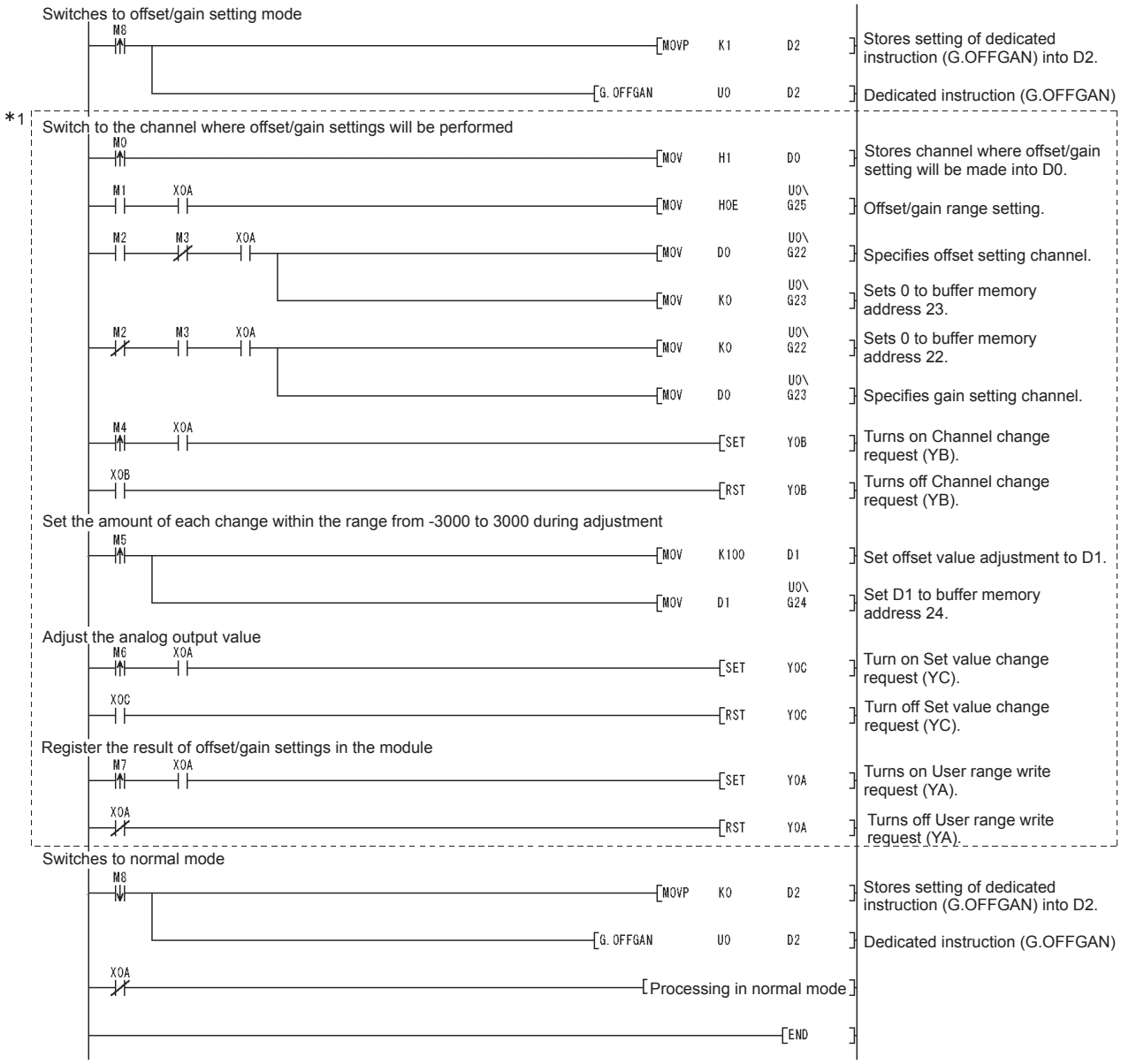
(2) Program examples

The program in the dotted area of (a) is common to (a), (b) and (c).
In this example, the I/O signals for the Q62DA-FG are X/Y0 to X/YF.

- Channel selection ····· M0
- Offset/gain range setting····· M1
- Offset setting ····· M2
- Gain setting ····· M3
- Channel change command ····· M4
- Writing the adjustment amount ····· M5
- Analog output value adjust command ····· M6
- Offset/gain setting value write command to the module ····· M7
- Mode switching····· M8
- Normal mode checking signal····· M50
- Channel designation storage device····· D0
- Dedicated instruction (G(P).OFFGAN) setting storage device····· D2
- Offset/gain adjustment storage device····· D1

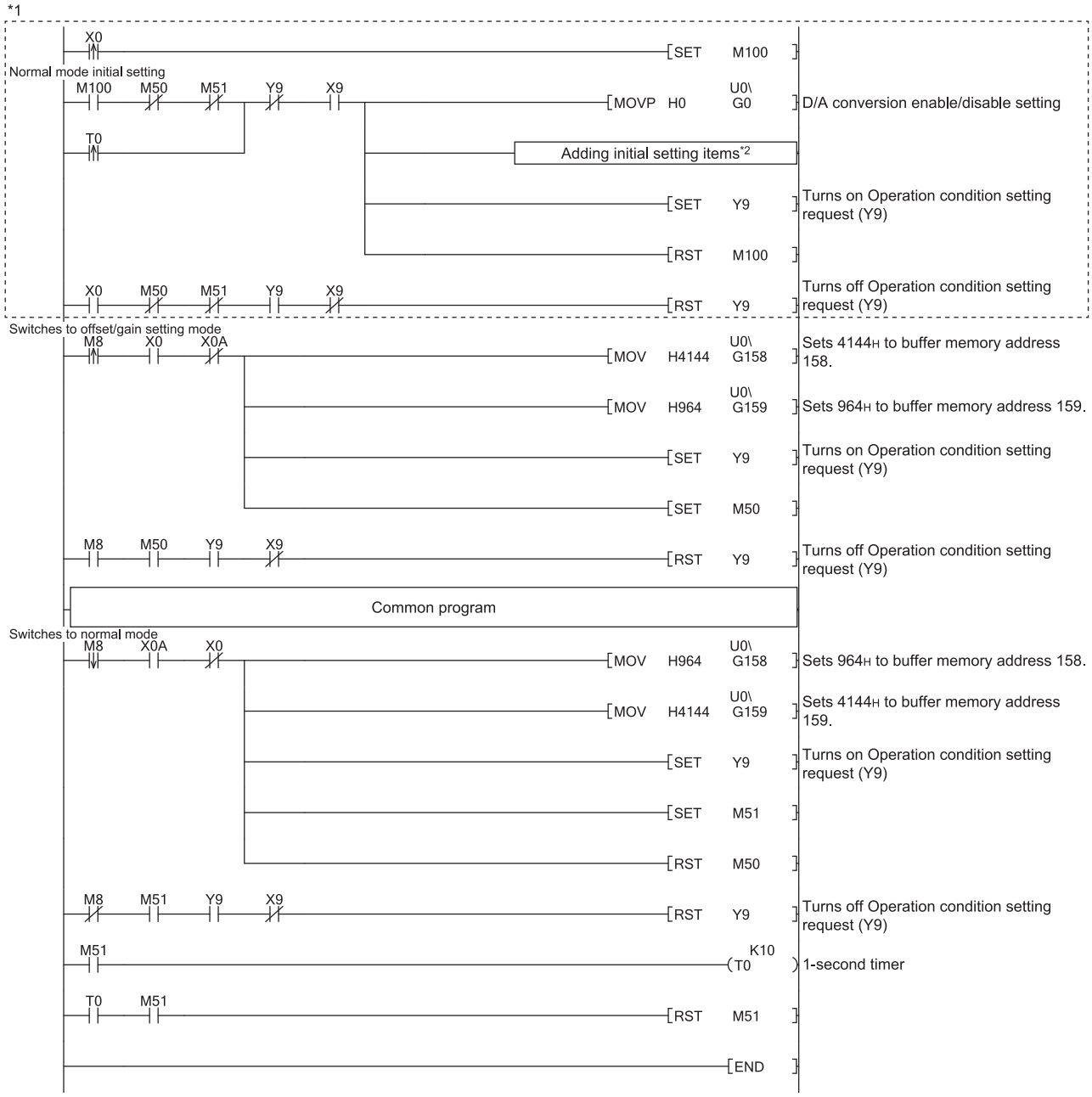
(a) When switching the mode using the dedicated instruction (G(P).OFFGAN)

The following sample program switches to the offset/gain setting mode with the dedicated instruction (G(P).OFFGAN), changes the channel where offset/gain setting will be made, adjusts the offset/gain values, and writes the offset/gain values to the Q62DA-FG.



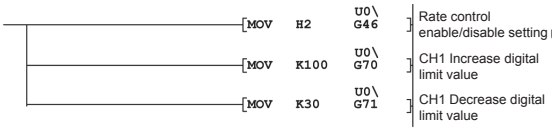
*1 The program in the dotted area is a common program.

(b) When switching the mode using the setting of Mode switching setting (buffer memory address 158, 159: Un\G158, Un\G159) and Operating condition setting request (Y9)



POINT

When running this program together with the normal-mode D/A conversion program (shown in Section 6.2.2), use *1 of this program as the initial setting program.
When using functions of the Q62DA-FG with the D/A conversion program in the normal mode, add the respective initial setting items to the functions to be used to *2 in this program. (For the example with *2, refer to the following.)
*2 Example of adding initial setting items (Rate control function)



Note) When adding this program to the normal-mode D/A conversion program (shown in Section 6.2.2), replace the existing initial setting program with the program marked *1.

(c) When switching the mode by making intelligent function module switch setting

Only the common program is necessary.

5 UTILITY PACKAGE (GX Configurator-DA)

5.1 Utility Package Functions

Table 5.1 shows an overview of the utility package functions.

Table 5.1 Utility package (GX Configurator-DA) function list

Item	Description	Reference section
Initial setting ＊1	(1) Set the following items that require initial setting. • D/A conversion enable/disable setting • Rate control enable/disable setting • Increase/decrease digital limit values • Disconnection detection setting ＊2 • Warning output setting • Warning output upper limit value/lower limit value (2) The data for which initial setting has been completed is registered in the parameters for the programmable controller CPU, and automatically written to the Q62DA-FG when the programmable controller CPU changes to RUN status.	Section 5.4
Auto refresh setting ＊1	(1) Sets automatic refresh for the Q62DA-FG buffer memory. (2) The buffer memory that was set for automatic refresh is automatically read and written to the specified device when the END command for the programmable controller CPU is executed.	Section 5.5
Monitor/Test	(1) Monitor/Test The buffer memory and I/O signals for the Q62DA-FG are monitored and tested. (2) Operating condition setting Changes the initial setting during operation. (3) Offset/gain setting When setting the offset/gain to a value selected by the user (when the analog output range setting is user range setting), the offset and gain can be easily set while viewing the screen. (4) Pass data The pass data (Pass data classification setting, Industrial shipment settings offset/gain values, User range settings offset/gain value) can be monitored and set.	Section 5.6
FB conversion	Generates FB automatically from the intelligent function module parameter (initial setting/auto refresh setting).	Section 5.7

POINT

＊1 If initial setting and automatic refresh setting are performed, the intelligent function module parameters require a maximum of 24 bytes per module.

＊2 Disconnection detection mode and Disconnection detection setting value cannot be set by GX Configurator-DA.
Use sequence programs for the setting.

5.2 Installing and Uninstalling the Utility Package

For how to install or uninstall the utility package, refer to "Method of installing the MELSOFT Series" included in the utility package.

5.2.1 Handling precautions

The following explains the precautions on using the GX Configurator-DA.

(1) For safety

Since GX Configurator-DA is add-in software for GX Developer, read "Safety Precautions" and the basic operating procedures in the GX Developer Operating Manual.

(2) About installation

GX Configurator-DA is add-in software for GX Developer Version 4 or later. Therefore, GX Configurator-DA must be installed on the personal computer that has already GX Developer Version 4 or later installed.

(3) Screen error of Intelligent function module utility

Insufficient system resource may cause the screen to be displayed inappropriately while using the Intelligent function module utility. If this occurs, close the Intelligent function module utility, GX Developer (program, comments, etc.), and other applications, and then start GX Developer and Intelligent function module utility again.

(4) To start the Intelligent function module utility

(a) In GX Developer, select "QCPU (Q mode)" for programmable controller series and specify a project.
If any programmable controller series other than "QCPU (Q mode)" is selected, or if no project is specified, the Intelligent function module utility will not start.

(b) Multiple Intelligent function module utilities can be started.
However, [Open parameters] and [Save parameters] operations under [Intelligent function module parameter] are allowed for one Intelligent function module utility only. Only the [Monitor/test] operation is allowed for the other utilities.

(5) Switching between two or more Intelligent function module utilities

When two or more Intelligent function module utility screens cannot be displayed side by side, select a screen to be displayed on the top of others using the task bar.

(6) Number of parameters that can be set in GX Configurator-DA

When multiple intelligent function modules are mounted, the number of parameter setting must not exceed the following limit.

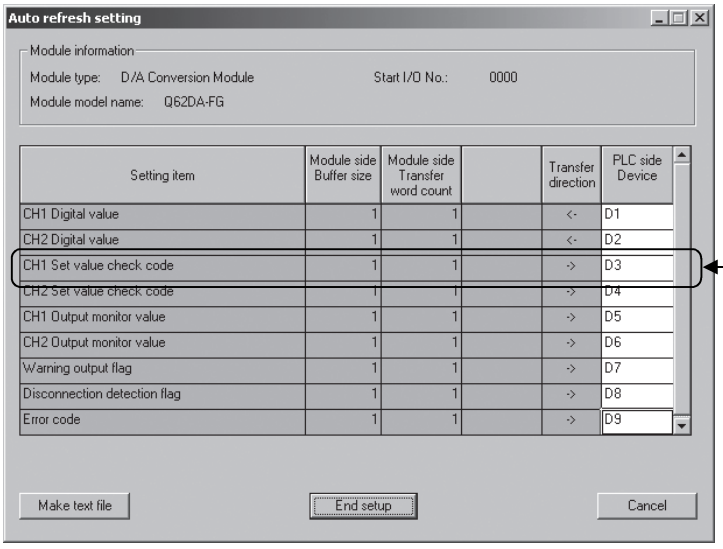
When intelligent function modules are installed to:	Maximum number of parameter settings	
	Initial setting	Auto refresh setting
Q00J/Q00/Q01CPU	512	256
Q02/Q02H/Q06H/Q12H/Q25HCPU	512	256
Q02PH/Q06PH/Q12PH/Q25PHCPU	512	256
Q12PRH/Q25PRHCPU	512	256
Q00UJ/Q00U/Q01UCPU	512	256
Q02UCPU	2048	1024
Q03UD/Q04UDH/Q06UDH/Q10UDH/ Q13UDH/Q20UDH/Q26UDH/ Q03UDE/Q04UDEH/Q06UDEH/Q10UDEH/ Q13UDEH/Q20UDEH/Q26UDEH	4096	2048
CPU modules other than the above	Not supported	Not supported
MELSECNET/H remote I/O station	512	256

For example, if multiple intelligent function modules are installed to the MELSECNET/H remote I/O station, configure the settings in GX Configurator-DA so that the number of parameter settings for all the intelligent function modules does not exceed the limit of the MELSECNET/H remote I/O station.

Calculate the total number of parameter settings separately for the initial setting and for the auto refresh setting.
The number of parameters that can be set for one module in GX Configurator-DA is as shown below.

Target module	Initial setting	Auto refresh setting
Q62DA-FG	4 (Fixed)	9 (Max.)

Example) Counting the number of parameter settings in Auto refresh setting



This one row is counted as one setting.
Blank rows are not counted.
Count up all the setting items on this screen, and add the total to the number of settings for other intelligent function modules to get a grand total.

5.2.2 Operating environment

This section describes the operating environment of the personal computer that runs GX Configurator-DA.

Item		Description
Installation (add-in) target ＊1		GX Developer Version 4 (English version) or later ＊2
Personal computer		Personal computer running one of the following operating systems.
	CPU	Refer to the next page "Operating system and performance required for a personal computer".
	Required memory	
Available hard disk capacity	For installation	65 MB or more
	For operation	20 MB or more
Monitor		Resolution of 800 × 600 pixels or higher ＊3
Operating system		Microsoft® Windows® 95 Operating System Microsoft® Windows® 98 Operating System Microsoft® Windows® Millennium Edition Operating System Microsoft® Windows NT® Workstation Operating System Version 4.0 Microsoft® Windows® 2000 Professional Operating System Microsoft® Windows® XP Professional Operating System SP1 or later Microsoft® Windows® XP Home Edition Operating System SP1 or later Microsoft® Windows Vista® Home Basic Operating System Microsoft® Windows Vista® Home Premium Operating System Microsoft® Windows Vista® Business Operating System Microsoft® Windows Vista® Ultimate Operating System Microsoft® Windows Vista® Enterprise Operating System Microsoft® Windows® 7 Starter Operating System ＊4 Microsoft® Windows® 7 Home Premium Operating System ＊4 Microsoft® Windows® 7 Professional Operating System ＊4 Microsoft® Windows® 7 Ultimate Operating System ＊4 Microsoft® Windows® 7 Enterprise Operating System ＊4

＊1 Install GX Configurator-DA in GX Developer Version 4 or later in the same language.
GX Developer (English version) and GX Configurator-DA (Japanese version) or GX Developer (Japanese version) and GX Configurator-DA (English version) cannot be used in combination.

＊2 GX Configurator-DA is not applicable to GX Developer Version 3 or earlier.
In addition, GX Developer Version 8 or later is required to use the FB conversion function.

＊3 For Windows Vista® and Windows® 7, the recommended resolution is 1024 × 768 pixels or higher.

＊4 For Windows® 7 (32-bit edition), install GX Configurator-DA Version 2.11M or later as an add-in to GX Developer Version 8.91V or later.
For Windows® 7 (64-bit edition), install GX Configurator-DA Version 2.11M or later as an add-in to GX Developer Version 8.98C or later.

Operating system and performance required for a personal computer

Operating system	Performance required for a personal computer	
	CPU	Memory
Windows® 95	Pentium® 133MHz or more	32MB or more
Windows® 98	Pentium® 133MHz or more	32MB or more
Windows® Me	Pentium® 150MHz or more	32MB or more
Windows NT® Workstation 4.0	Pentium® 133MHz or more	32MB or more
Windows® 2000 Professional	Pentium® 133MHz or more	64MB or more
Windows® XP	Pentium® 300MHz or higher	128MB or more
Windows Vista®	Pentium® 1GHz or higher	1GB or more
Windows® 7	Pentium® 1GHz or higher	1GB or more (for 32-bit edition)
		2GB or more (for 64-bit edition)

POINT

- The following functions cannot be used when the computer is running under Windows® XP, Windows Vista® , and Windows® 7.
  If these functions are used, this product may not perform properly.
  Activating the application with Windows® compatible mode
  Simplified user switch-over
  Remote desktop
  Large font size (Advanced setting of Display Properties)
  DPI setting other than 100%
  In addition, Windows® XP (64-bit edition) and Windows Vista® (64-bit edition) are not supported.
- On Microsoft Vista® and Windows® 7, the user should have USER authority or higher.
- The following functions cannot be used under Windows® 7:
  Windows XP Mode
  Windows Touch

5.3 Utility Package Operation

5.3.1 Common utility package operations

(1) Control keys

Special keys that can be used for operation of the utility package and their applications are shown in the table below.

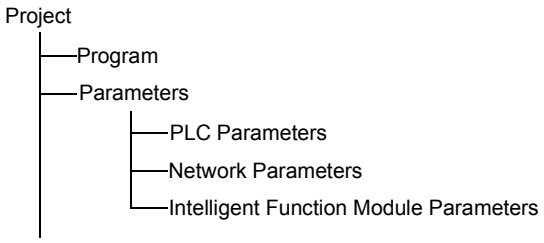
Key	Application
Esc	Cancels the current entry in a cell. Closes the window.
Tab	Moves between controls in the window.
Ctrl	Used in combination with the mouse operation to select multiple cells for test execution.
Delete	Deletes the character where the cursor is positioned. When a cell is selected, clears all of the setting contents in the cell.
Back Space	Deletes the character where the cursor is positioned.
↑ ↓ ← →	Moves the cursor.
Page Up	Moves the cursor one page up.
Page Down	Moves the cursor one page down.
Enter	Completes the entry in the cell.

(2) Data created with the utility package

The following data or files that are created with the utility package can be also handled in GX Developer. Figure 5.1 shows respective data or files are handled in which operation.

(a) Intelligent function module parameter

This represents the data created in Auto refresh setting, and they are stored in an intelligent function module parameter file in a project created by GX Developer.



(b) Text files

A text file can be created by clicking the Make text file button on the initial setting, Auto refresh setting, or Monitor/Test screen.
The text files can be utilized to create user documents.

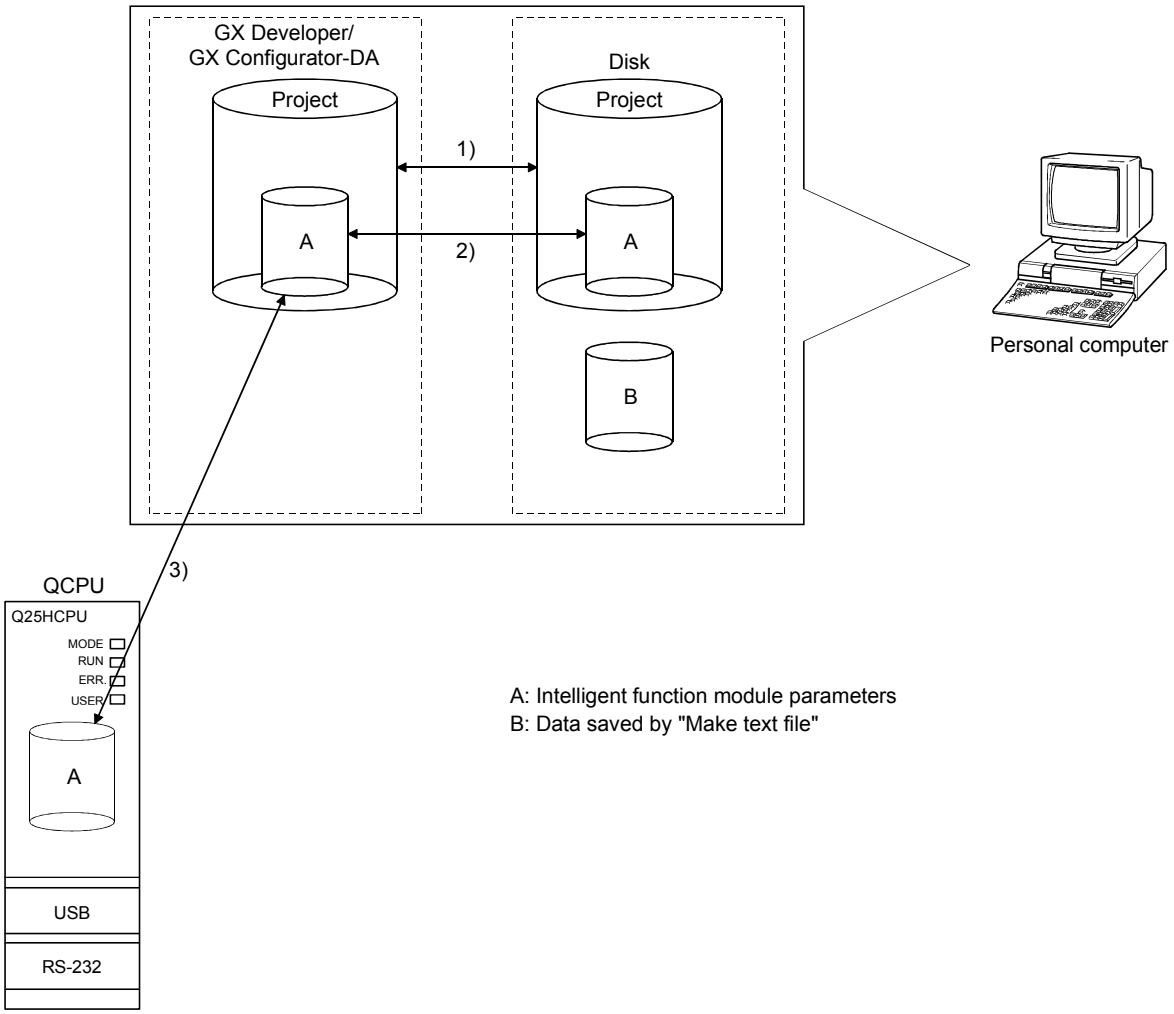


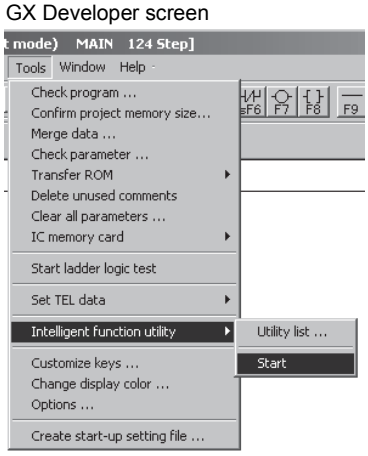
Figure 5.1 Correlation chart for data created with the utility package

Steps 1) to 3) shown in Figure 5.1 are performed as follows:

1) From GX Developer, select:
   [Project] → [Open project]/[Save]/[Save as]
2) On the intelligent function module selection screen of the utility, select:
   [Intelligent function module parameter] → [Open parameters]/[Save parameters]
3) From GX Developer, select:
   [Online] → [Read from PLC]/[Write to PLC] → "Intelligent function module parameters"
   Alternatively, from the intelligent function module selection screen of the utility, select:
   [Online] → [Read from PLC]/[Write to PLC]

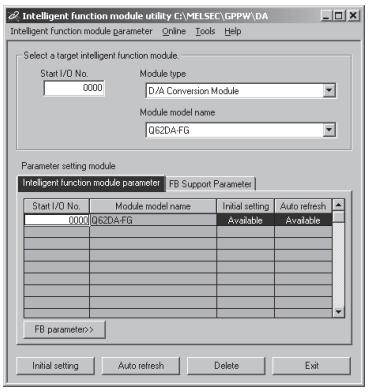
5.3.2 Operation overview

GX Developer screen



[Tools] – [Intelligent function utility] – [Start]

Screen for selecting a target intelligent function module



1)

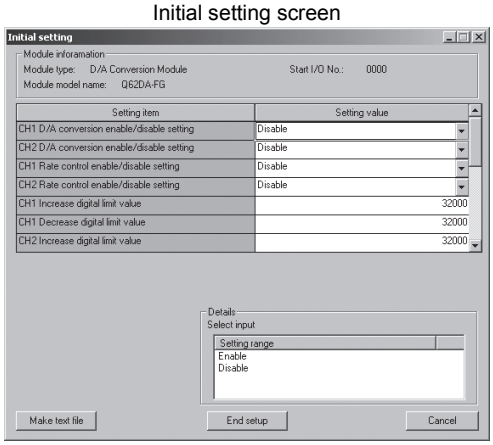
Refer to Section 5.3.3.

Enter "Start I/O No.", and select "Module type" and "Module model name".

Initial setting

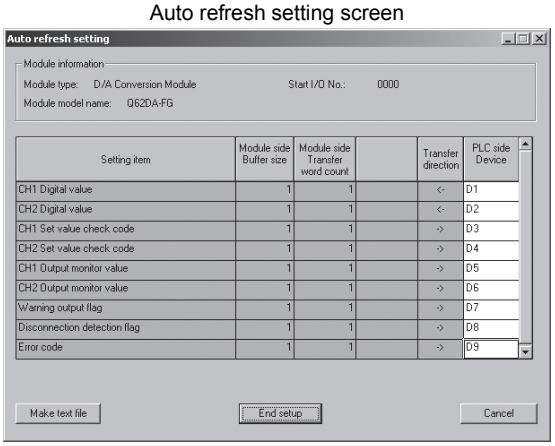
Auto refresh

Initial setting screen



Refer to Section 5.4.

Auto refresh setting screen

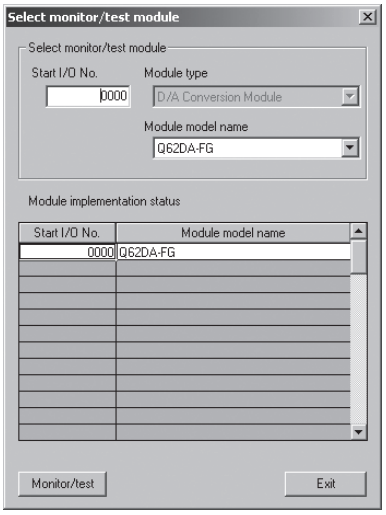


Refer to Section 5.5.

1)

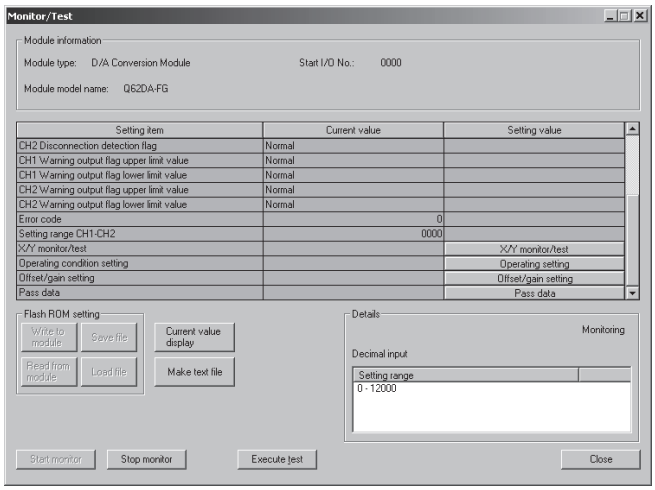
[Online] – [Monitor/Test]

Selecting monitor/test module screen



Select a module to be monitored/tested.

Monitor/Test



Refer to Section 5.6.

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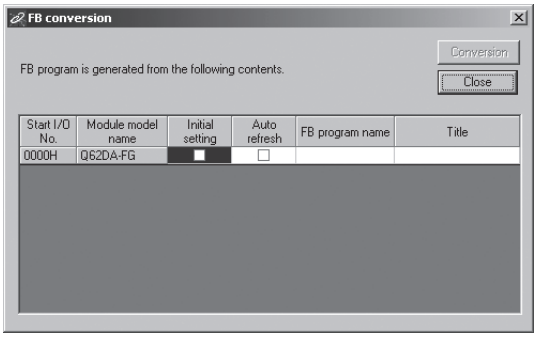
<<FB support parameter>> tab – FB conversion

FB conversion screen



Refer to Section 5.7.

5.3.3 Starting the intelligent function module utility

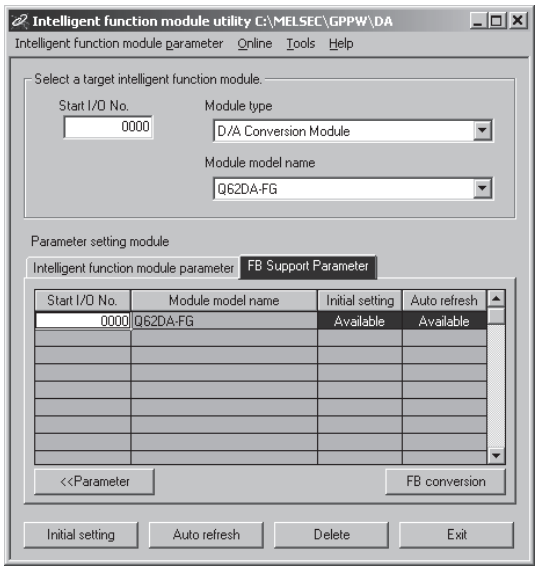
[Operating procedure]

Intelligent function module utility is started from GX Developer.

[Tools] → [Intelligent function utility] → [Start]

[Setting screen]

Display when the <<FB support parameter>> tab is selected



[Explanation of items]

(1) Activation of other screens

Following screens can be displayed from the intelligent function module utility screen.

Common operations to the <<Intelligent function module parameter>> tab and <<FB support parameter>> tab

(a) Initial setting screen

"Start I/O No.*1" → "Module type" → "Module model name" → [Initial setting]

(b) Auto refresh setting screen

"Start I/O No.*1" → "Module type" → "Module model name" → [Auto refresh]

(c) Select monitor/test module screen

[Online] → [Monitor/Test]

*1 Enter the start I/O No. in hexadecimal.

On the <<FB support parameter>> tab

(a) FB conversion screen

<<FB support parameter>> tab → [FB conversion]

For details, refer to section 5.7.

POINT
The <<FB support parameter>> tab is displayed when the project which is being edited is a label project.

(2) Command buttons

Common operations to the <<Intelligent function module parameter>> tab and <<FB support parameter>> tab

[Delete] Deletes the initial setting and auto refresh setting of the selected module.
However, if initial setting and auto refresh setting have been prepared and the cell of "Initial setting" or "Auto refresh" is selected and executed, only the setting of the selected cell is deleted.

[Exit] Closes this screen.

When the <<FB support parameter>> tab is selected

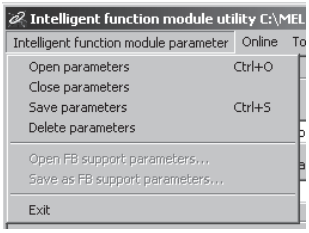
[<<Parameter] Moves the setting of the selected line to the <<Intelligent function module parameter>> tab.

When the <<Intelligent function module parameter>> tab is selected

[FB parameter>>] Moves the setting of the selected line to the <<FB support parameter>> tab.

(3) Menu bar

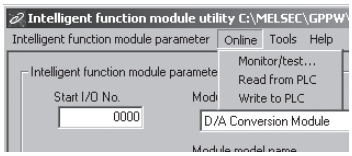
(a) File menu



Intelligent function module parameters of the project opened by GX Developer are handled.

[Open parameters]: Reads a parameter file.
[Close parameters]: Closes the parameter file. If any data are modified, a dialog asking for file saving will appear.
[Save parameters]: Saves the parameter file.
[Delete parameters]: Deletes the parameter file.
[Open FB support parameters]: Opens the FB support parameter file.
[Save as FB support parameters]: Saves the FB support parameter file.
[Exit]: Closes this screen.

(b) Online menu



[Monitor/Test]: Activates the Select monitor/test module screen.
[Read from PLC]: Reads intelligent function module parameters from the CPU module.
[Write to PLC]: Writes intelligent function module parameters to the CPU module.

POINT

(1) Saving intelligent function module parameters in a file
Since intelligent function module parameters cannot be saved in a file by the project saving operation of GX Developer, save them on the shown module selection screen for intelligent function module parameter setting.

(2) Reading/writing intelligent function module parameters from/to a programmable controller CPU using GX Developer

(a) Intelligent function module parameters can be read from and written into a programmable controller after having been saved in a file.

(b) Set a target programmable controller CPU in GX Developer: [Online] → [Transfer setup].

(c) When the Q62DA-FG is installed to the remote I/O station, use "Read from PLC" and "Write to PLC".

(3) Checking the required utility
While the start I/O is displayed on the Intelligent function module utility setting screen, "*" may be displayed for the model name.
This means that the required utility has not been installed or the utility cannot be started from GX Developer.
Check the required utility, selecting [Tools] - [Intelligent function utility] - [Utility list...] in GX Developer.

5.4 Initial Setting

[Purpose]

Set the following items in the initial setting parameters.

- D/A conversion enable/disable setting
- Rate control enable/disable setting
- Increase/decrease digital limit values
- Disconnection detection setting*1
- Warning output setting
- Warning output upper limit value/lower limit value

Setting parameters in the Initial setting screen can omit parameter settings with sequence program.

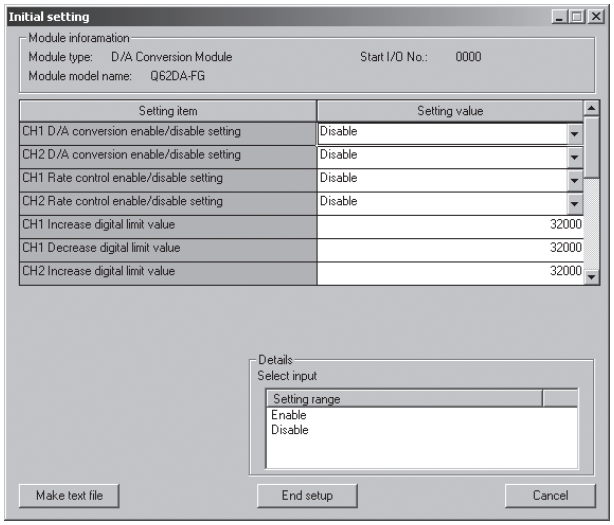
*1 The disconnection detection mode and disconnection detection setting value cannot be set by GX Configurator-DA.
Use sequence programs for the setting.

[Operating procedure]

"Start I/O No.*2" → "Module type" → "Module model name" →
Initial setting

*2 Enter the start I/O No. in hexadecimal.

[Setting screen]



[Explanation of items]

(1) Setting contents

Set D/A conversion enable/disable setting, Rate control enable/disable setting and others for each channel.

(2) Command button

Make text file	Creates a file containing the screen data in text file format.
End setup	Saves the set data and ends the operation.
Cancel	Cancels the setting and ends the operation.

POINT

Initial settings are stored in an intelligent function module parameter file.
After being written to the CPU module, the initial setting is made effective by either (1) or (2).

(1) Cycle the RUN/STOP switch of the CPU module: STOP → RUN → STOP → RUN.

(2) With the RUN/STOP switch set to RUN, turn off and then on the power or reset the CPU module.

When writing the initial settings using a sequence program, the initial setting parameter value is written under the situation of that CPU module status changes from STOP to RUN. So, execute the initial setting using the sequence program again.

5.5 Auto Refresh Setting

[Purpose]

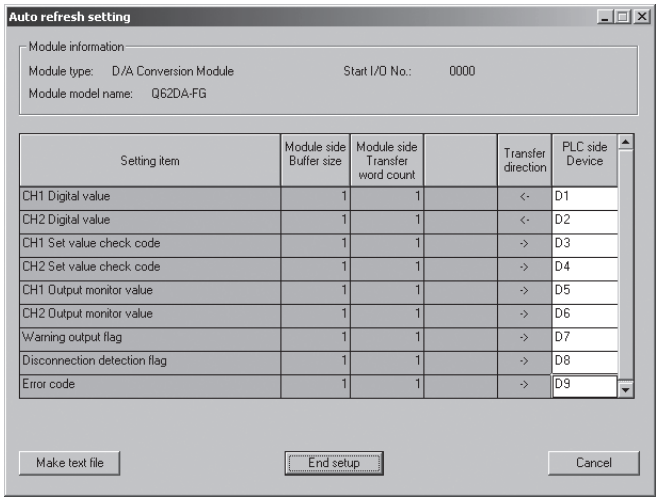
Configure the Q62DA-FG buffer memory for automatic refresh.

[Operating procedure]

"Start I/O No.*1" → "Module type" → "Module model name" → Auto refresh

*1 Enter the start I/O No. in hexadecimal.

[Setting screen]



[Items]

(1) Contents of the screen display

Module side Buffer size : Displays the buffer memory size of the setting item. (fixed at one word).

Module side Transfer word count : Displays the number of words to be transferred to the CPU devices from the designated address (fixed at one word).

Transfer direction : "←" indicates that data are written from the device to the buffer memory.
"→" indicates that data are loaded from the buffer memory to the device.

PLC side Device : Enter a CPU module side device that is to be automatically refreshed.
Applicable devices are X, Y, M, L, B, T, C, ST, D, W, R and ZR.
When using bit devices X, Y, M, L or B, set a number that can be divided by 16 points (examples: X10, Y120, M16, etc.)
Also, buffer memory data are stored in a 16-point area, starting from the specified device number.
For example, if X10 is entered, data are stored in X10 to X1F.

(2) Command button

Make text file	Creates a file containing the screen data in text file format.
End setup	Saves the set data and ends the operation.
Cancel	Cancels the setting and ends the operation.

POINT

The auto refresh settings are stored in an intelligent function module parameter file.

After being written to the CPU module, the auto refresh setting takes effect by either (1) or (2).

(1) Cycle the RUN/STOP switch of the CPU module: STOP → RUN → STOP → RUN.

(2) With the RUN/STOP switch set to RUN, turn off and then on the power or reset the CPU module.

The auto refresh settings cannot be changed from sequence programs.

However, processing equivalent to auto refresh can be added using the FROM/TO instruction in the sequence program.

5.6 Monitor/Test

5.6.1 Monitor/test screen

[Purpose]

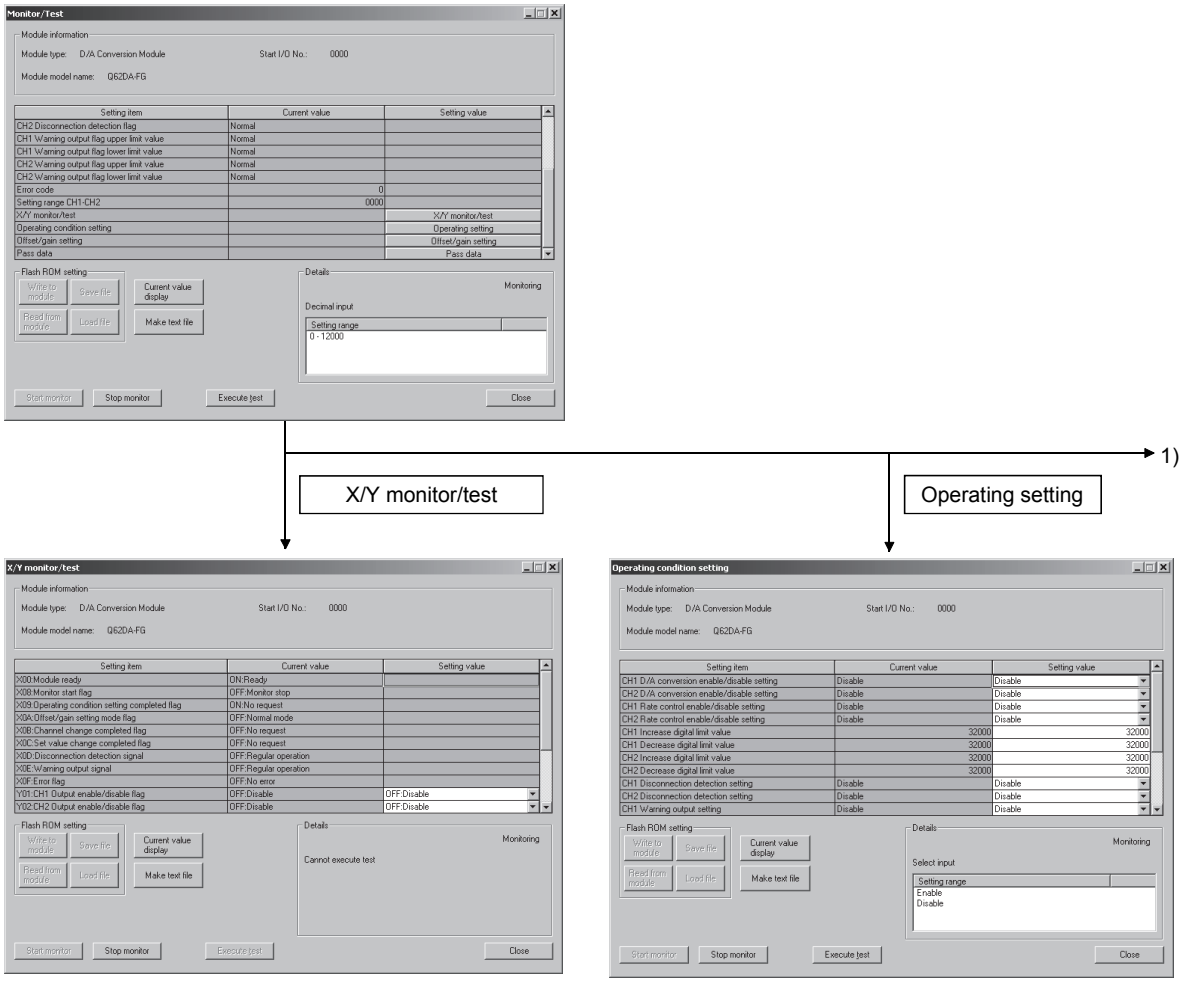
Start buffer memory monitoring/testing and I/O signal monitoring/testing, operating condition setting, offset/gain settings (refer to Section 5.6.2), pass data (refer to Section 5.6.4)from this screen.

[Operating procedure]

Select monitor/test module screen → "Start I/O No.*1" → "Module type" → "Module model name" → Monitor/test

*1 Enter the start I/O No. in hexadecimal.
The screen can also be started from System monitor of GX Developer Version 6 or later.
Refer to the GX Developer Operating Manual for details.

[Setting screen]



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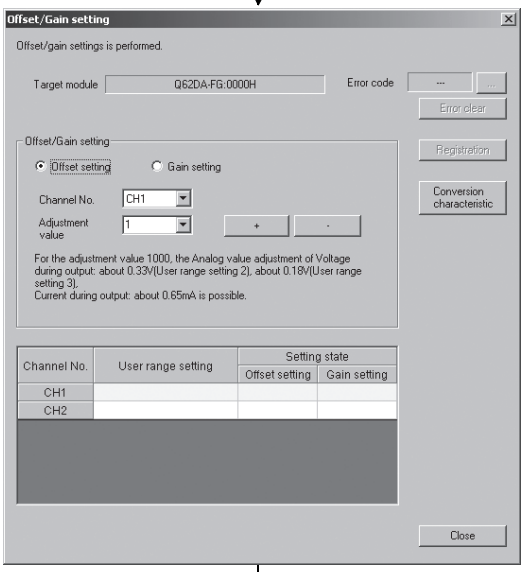
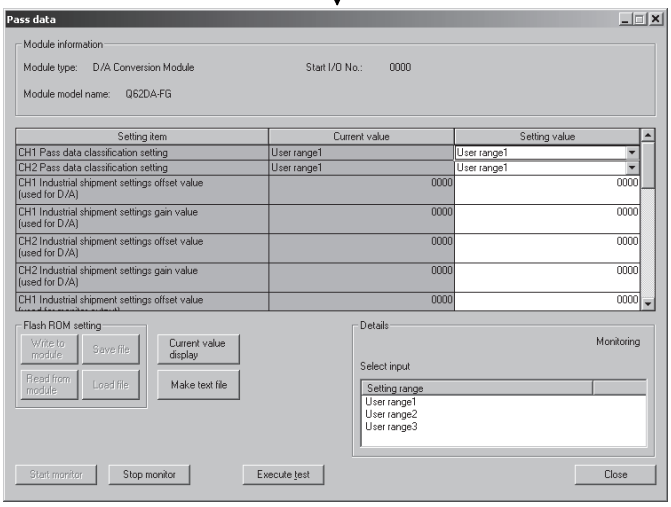
1)

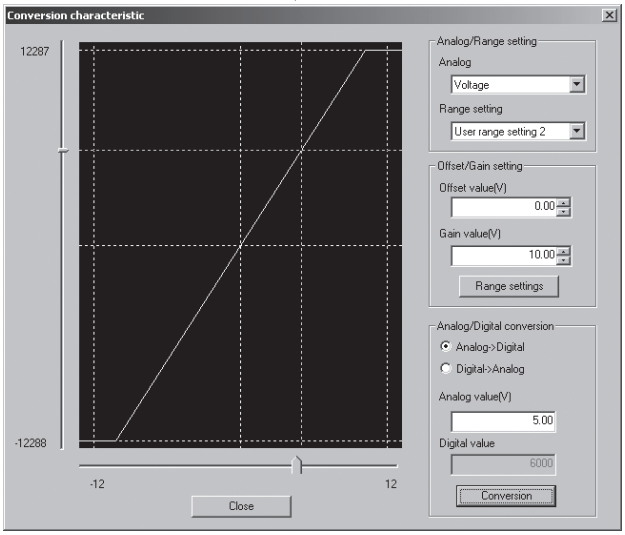
Offset/gain setting

Pass data





Conversion characteristic



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[Explanation of items]

(1) Items

Setting item : Displays buffer memory names.
Current value : Monitors the present buffer memory values.
Setting value : Enter or select values to be written into the buffer memory for test operation.

(2) Command button

Current value	Displays the current value of the item selected. (This is used to check the text that cannot be displayed in the current value field. However, in this utility package, all items can be displayed in the display fields).
Make text file	Creates a file containing the screen data in text file format.
Start monitor / Stop monitor	Selects whether or not to monitor current values.
Execute test	Performs a test on the selected items. To select more than one item, select them while holding down the Ctrl key.
Close	Closes the currently open screen and returns to the previous screen.

POINT

(1) Turning the output enable/disable flag on/off or writing CH□ Digital value during test operation changes the analog output, so perform these after taking ample safety precautions.

(3) Examples of "Selection test"

The followings explain the case of forcing on CH1 Output enable/disable flag (Y1).

(a) Click the Operating condition setting button in the Monitor/Test screen.

(b) Change the setting value field for "Y01: CH1 Output enable/disable flag" to "ON: enable."
Nothing is written to the Q62DA-FG at this point.

(c) Click on the field, of which setting value has been changed in step (b). (When multiple items have been changed in operation (b), select the setting value fields where setting values were changed, while holding down the Ctrl key. Multiple fields can also be selected by dragging the mouse over them.)

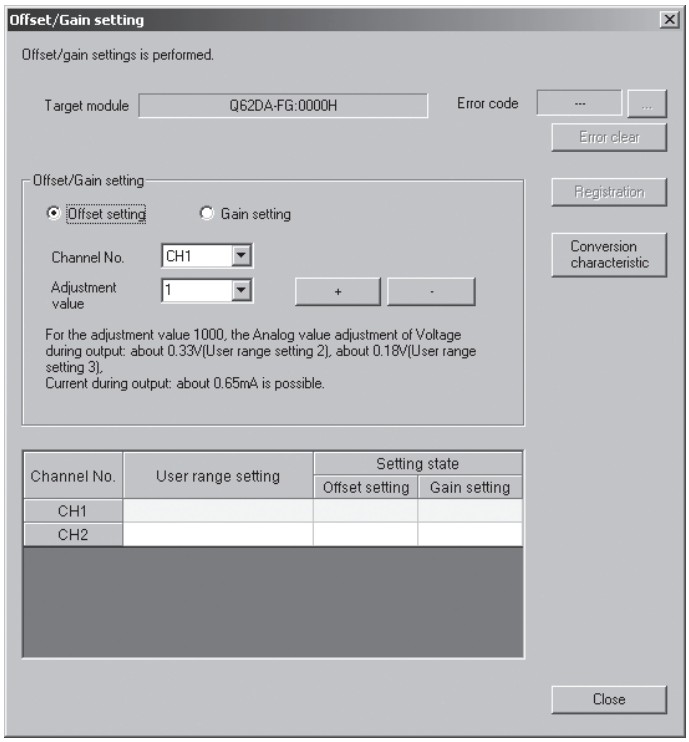
(d) Click the Execute test button to write the data.
After the writing is completed, the written values are displayed in the "Current value" field.

5.6.2 Offset/gain setting operation

Perform the offset/gain setting operation in the following sequence.

(1) Switch to the offset/gain setting screen

Perform the operation in Screen 5.6.1 to display the offset/gain setting screen. At this point, a screen to confirm the transition of the Q62DA-FG's operation mode (normal mode -> offset/gain setting mode) is displayed. Click the Yes button to transit to the offset/gain setting mode.



(2) Specify a channel

Specify the target channel of offset setting or gain setting on the channel No. combo box.

(3) Specify offset/gain setting

Specify either offset setting or gain setting on the channel specified on the channel No. combo box using the radio button.

(4) Specify the user range setting

Specify a user range used for the offset/gain setting of each channel on the combo box.

(5) Set up adjustment values

Set up an adjustment value of the offset value or gain value. Select "1," "10," "100," or "1000" on the combo box, however, you can also set up adjustment values by entering a number (1 to 3000).

(6) Fine adjustment of voltage output or current output

By clicking the [+] button or [-] button, the value of voltage output or current output for the prepared adjustment value is finely adjusted.

(7) Write settings into the Q62DA-FG

Write the content set up by operations (2) to (6) into the Q62DA-FG by clicking the [Registration] button.

(a) Precautions

Avoid the following operations during the writing of the data, which has been set up by operations (2) to (6), into the module after the click of the [Registration] button.

Doing so causes an error in the E^2PROM data and the Q62DA-FG may not operate properly.

1) Powering off the programmable controller CPU
2) Resetting the programmable controller CPU

(8) Switch to the normal mode

When the offset/gain setting screen is closed by clicking the [Close] button after the setting operation has finished, the Q62DA-FG's operation mode transits to the normal mode.

POINT

If an error code is displayed while performing the setting operation, the details and measure of the error can be confirmed by clicking the [...] button to the right of the error code display area. In addition, Error code can be cleared by clicking the [Error clear] button.

5.6.3 Confirmation of Conversion Characteristic

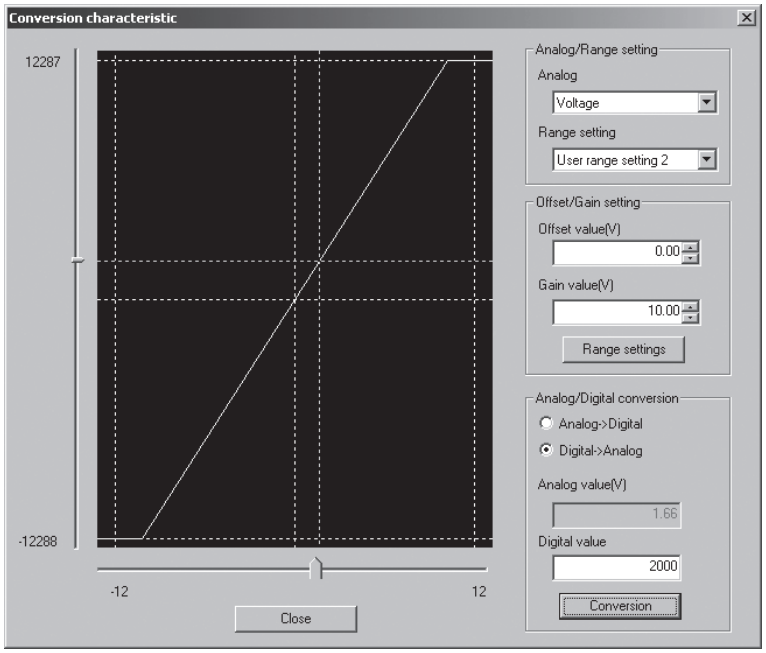
[Purpose]

The converted value of digital-analog conversion can be confirmed according to the tilt of the graph, based on the offset/gain setting.

[Operating procedure]

Monitor/test screen → Offset/gain setting → Conversion characteristic

[Setting screen]



[Explanation of items]

(1) Items

I/O characteristic diagram: Displays the I/O conversion characteristic to the prepared offset/gain setting.

(2) Setting details

Analog/Range setting

Analog:	Select the output (voltage/current) when a digital value is converted to an analog value.
Range setting:	Select either "User range setting 2" or "User range setting 3. " However, if "Current" is selected for the "Analog" item, only "User range setting 1" can be selected.

Offset/Gain setting

Offset value:	Enter an offset value to display the I/O characteristic diagram.
Gain value:	Enter a gain value to display the I/O characteristic diagram.

Analog/Digital conversion: Select a conversion type shown below for confirming the correspondence between an analog value and a digital value caused by the conversion characteristic.
- Digital → Analog
- Analog → Digital

Analog value: <When converted to a digital value>
Enter an analog value to be converted to a digital value
<When converted to an analog value>
The analog value converted from a digital value is displayed.

Digital value: <When converted to a digital value>
The digital value corresponding to an entered analog value is displayed.
<When converted to an analog value>
Enter a digital value to be converted to an analog value.

POINT

- The offset value is the analog output value (voltage or current) when a digital entry value of 0 is set from the programmable controller CPU.
- The gain value is the analog value (voltage or current) output when the digital input value set from the programmable controller CPU is as follows:
  12000 (When User range setting 1 to 3 are selected)

(3) Explanation of screen command buttons

Range setting — The entered offset/gain value is determined, and the I/O characteristic diagram is updated.

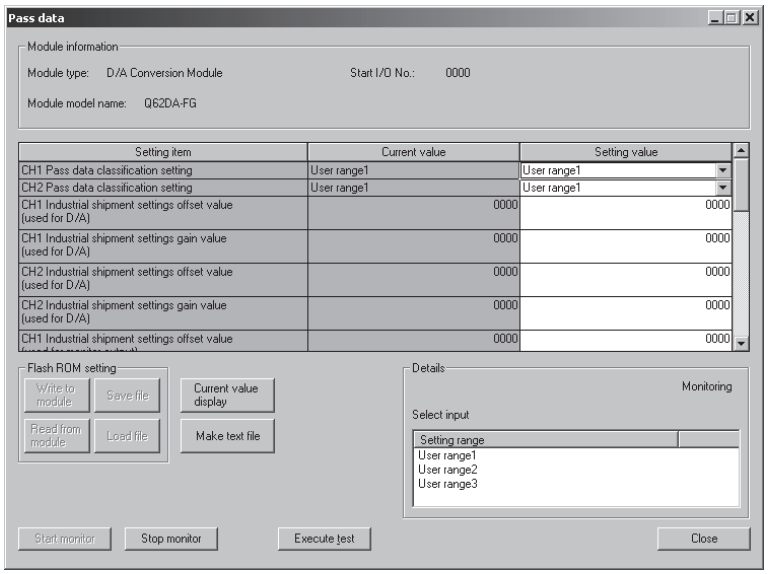
Conversion — Conversion for the entered value is performed.

5.6.4 Pass data

Perform operation in the following sequence to save/restore the user range.

(1) Switch to the pass data screen

Perform the operation in Section 5.6.1 to display the Pass data screen.



(2) User range saving

(a) Set the user range to be used in the Setting value field of CH☐ Pass data classification setting, and click the [Execute test] button.

When the user range setting is completed, the set user range is displayed in the Current value field of CH☐ Pass data classification setting.

(b) Change the Setting value field of Pass data read request to "Request", and click the [Execute test] button.

When read is completed, the values are displayed in the Current value fields of CH☐ Industrial shipment settings offset/gain values/CH☐ User range settings offset/gain values.

(c) Compare the values with those in the range reference table, and record them if they are correct.
Refer to Section 7.4 for the range reference table.

(3) User range restoration

(a) Set the user range to be used in the Setting value field of CH☐ Pass data classification setting, and click the Execute test button.

When the user range setting is completed, the set user range is displayed in the Current value field of CH☐ Pass data classification setting.

(b) Set the recorded values in the Setting value fields of CH☐ Industrial shipment settings offset/gain values/user range settings offset/gain values.

(c) Select all the Setting value fields of CH☐ Industrial shipment settings offset/gain values/user range settings offset/gain values, and click the Execute test button.

When write is completed, the set values are displayed in the Current value fields of CH☐ Industrial shipment settings offset/gain values/CH☐ User range settings offset/gain values.

(d) Change the Setting value field of Pass data write request to "Request", and click the Execute test button.

Make sure that the indication in the Current value field of Pass data write request changes from "Request" to "OFF" on completion of write.

5.7 FB Conversion of Initial Setting/Auto Refresh Setting

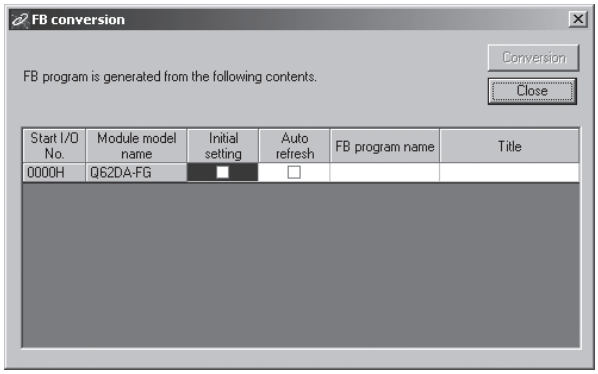
[Purpose]

FB is generated automatically from the intelligent function module parameter (initial setting/auto refresh setting).

[Operating procedure]

Intelligent Function Module Parameter Setting Module Selection Screen → <<FB Support Parameter>> tab → FB conversion

[Setting screen]



[Explanation of items]

(1) Items

Start I/O No.:
The start I/O No. of the information which is set up on the currently open intelligent function module parameter is displayed.

Module model name:
The module model name of the information which is set up on the currently open intelligent function module parameter is displayed.

Initial setting:
Set up whether to apply FB conversion to the parameter or not.
Check if you apply FB conversion to the parameter.

Auto refresh:
Set up whether to apply FB conversion to the parameter or not.
Check if you apply FB conversion to the parameter.

FB program name:
Set up the name of the converted FB program.
Up to six single-byte characters can be set up as an FB program name.
However, the characters and terms shown below cannot be set up as FB program name.
Character: \, /, :, ;, *, ?, ", <, >, |, ,, , .,
Term: COM1 to COM9, LPT1 to LPT9, AUX, PRN, CON, NUL, CLOCK$
In addition, I- is added for initial setting and A- is added for auto refresh setting respectively to the top of the FB name setting to be registered in GX Developer after FB conversion is performed.
Ex.: If the FB program name is "ABCDE, " the initial setting is "I-ABCDE" and the auto refresh setting is "A-ABCDE. "

Title: Set up a title on a converted FB program. Up to 32 single-byte characters can be set up as a title.

(2) Command buttons

Conversion	FB conversion is performed for the checked columns of initial setting and auto refresh setting.

5.8 Usage of FB

This section describes the procedure for using FB with GX Developer.
Refer to the "GX Developer Version 8 Operating Manual (Function Block)" for details.

5.8.1 Outline

The procedure for creating FB is shown below.

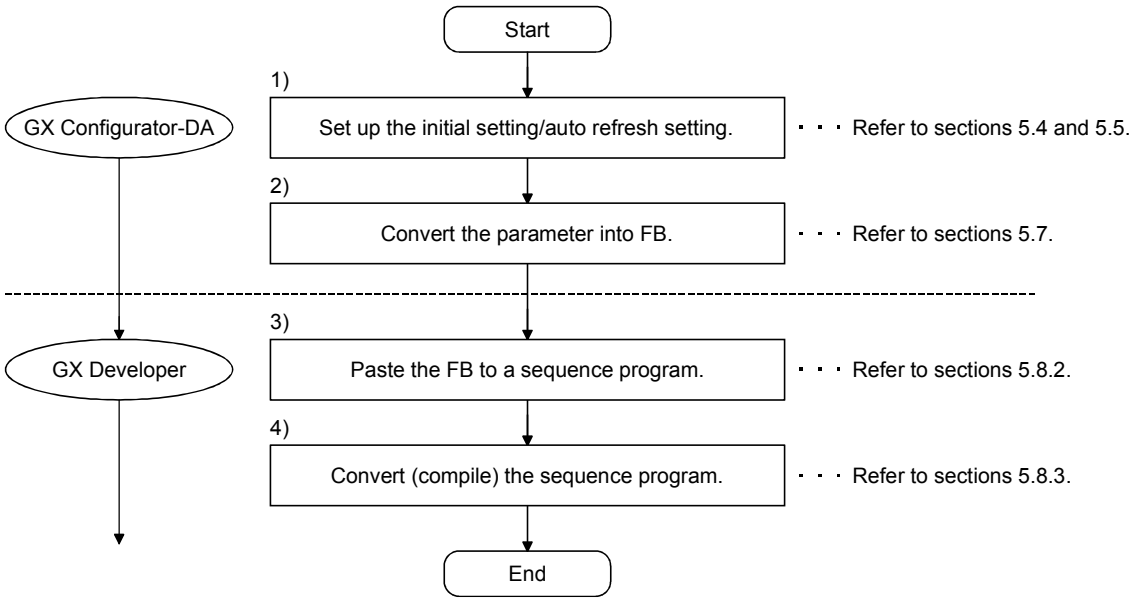
(1) Set up the intelligent function module parameter (initial setting/auto refresh setting).

(2) Convert the intelligent function module parameter into FB.

(3) Paste the FB to a sequence program.

(4) Convert (compile) the sequence program.

Next, a flowchart of procedures (1) to (4) is shown below.



POINT

The initial setting/auto refresh setting of the intelligent function module can be performed by each of the following methods.

(1) Set intelligent function parameters (Initial setting/Auto refresh setting) and write them to the programmable controller CPU.

(2) Create an FB of the intelligent function module parameter (initial setting/auto refresh setting) and paste it to the sequence program.

In accordance with the specification of the system, perform the initial setting/auto refresh setting of the intelligent function module by one of the methods above. *1

*1 The following explains the case in which both of (1) and (2) are performed.

(a) Initial setting
FB setting given in (2) is valid.

(b) Auto refresh setting
- Both (1) and (2) are valid.
- At the time of FB execution and in the END processing of the sequence program, automatic refresh is performed.
Therefore, an analog value corresponding to the specified digital value is output at each auto refresh time.

5.8.2 Paste an FB to a Sequence Program

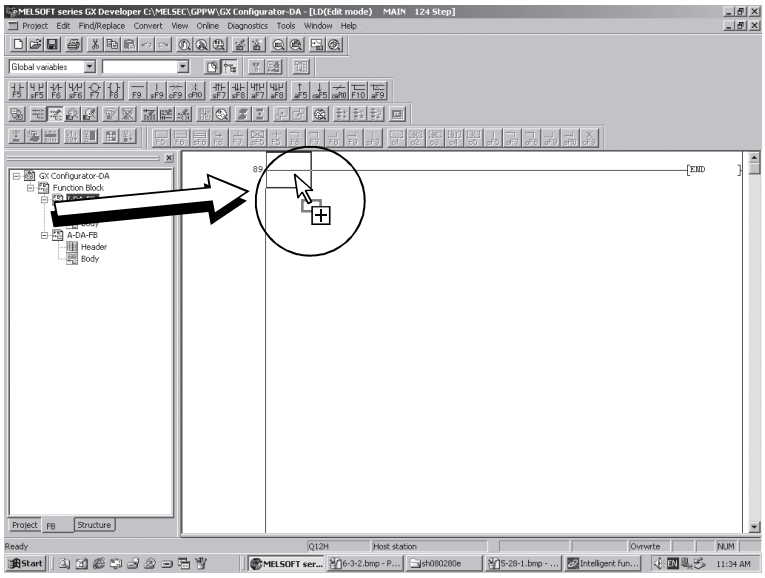
[Purpose of operation]

Paste an FB in order to use it with a sequence program.

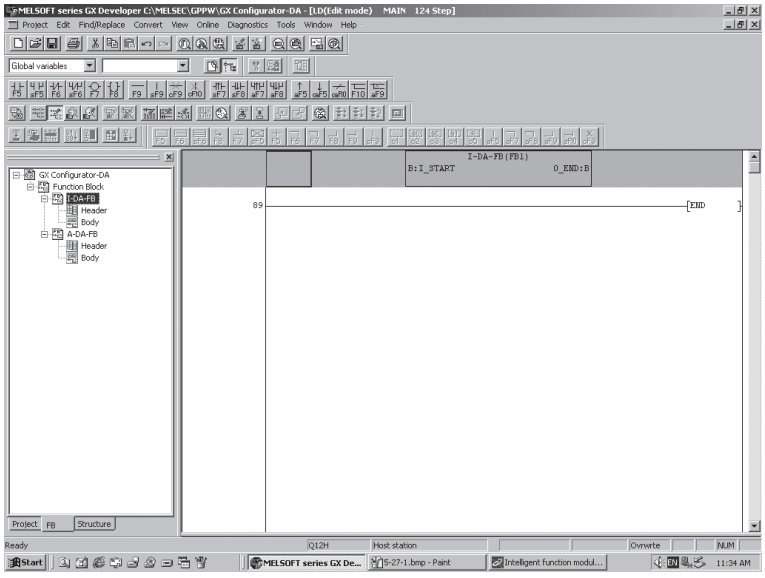
[Operation procedure]

Switch the <<Project>> tab into the <<FB>> tab on GX Developer, and drag & drop the FB to be used onto the sequence program.

Before pasting



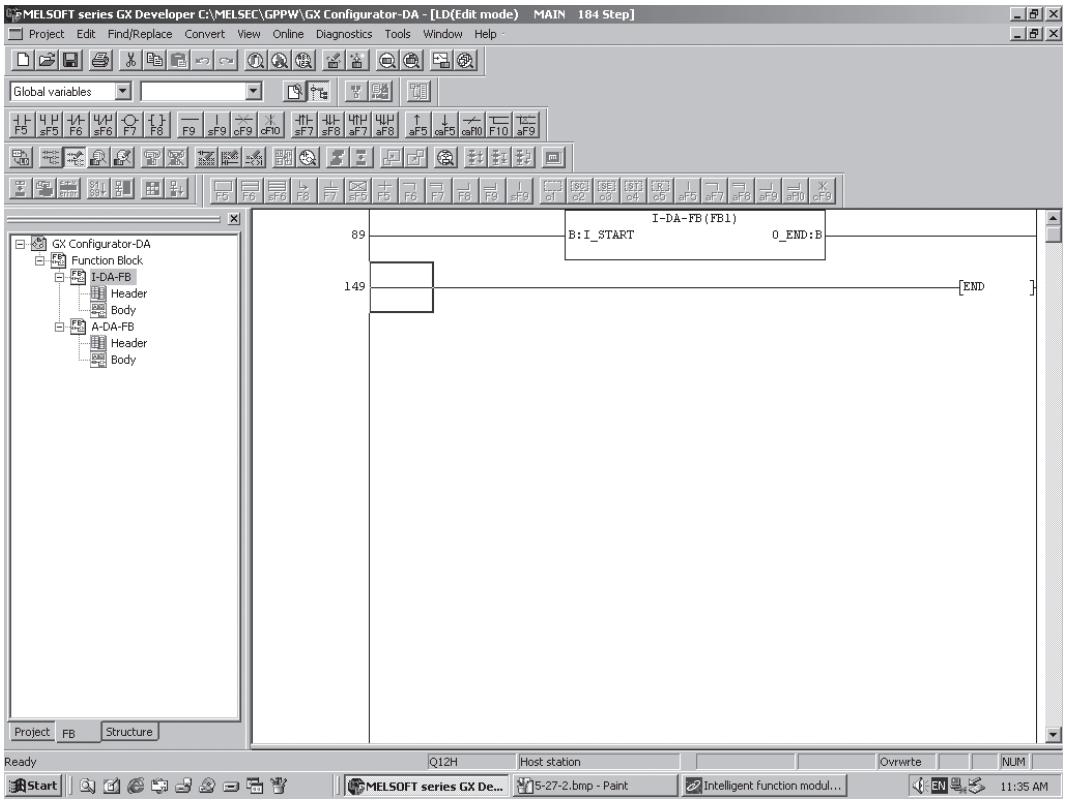
After pasting



5.8.3 Convert (Compile) a Sequence Program

[Purpose of operation]

Convert (compile) the sequence program to which an FB was pasted so that it can be executed.



[Operation procedure]

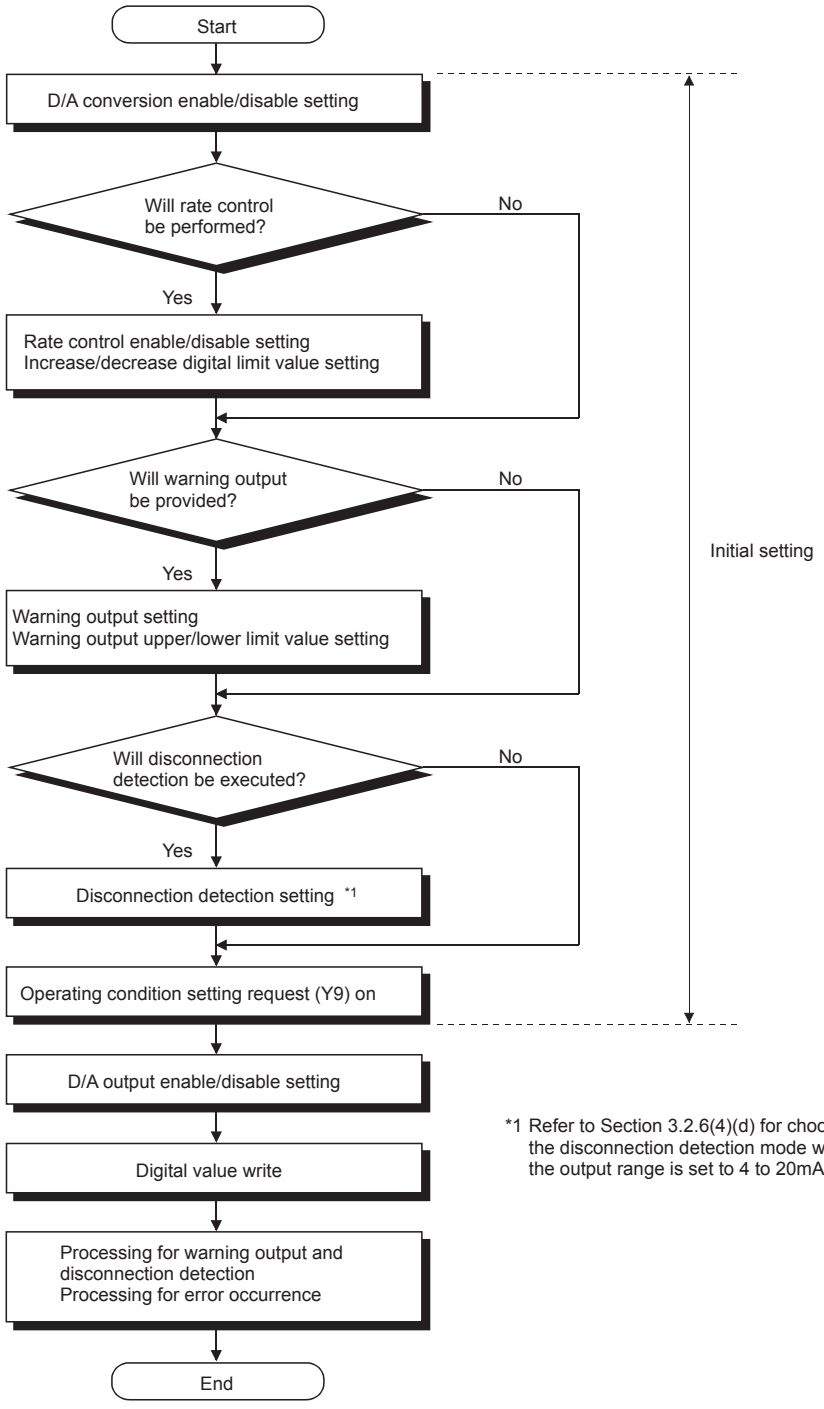
Click the [Convert] menu → [Convert/Compile] menu of GX Developer.

6 PROGRAMMING

This chapter describes the programs of the Q62DA-FG.
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.

6.1 Programming Procedure

Create the program that will execute the digital-analog conversion of the Q62DA-FG in the following procedure.



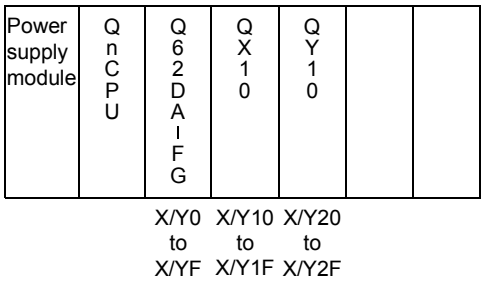
*1 Refer to Section 3.2.6(4)(d) for choosing the disconnection detection mode when the output range is set to 4 to 20mA (Extended mode).

6 - 1

6.2 For Use in Normal System Configuration

System configuration used in the program explanation

(1) System configuration



Perform the following intelligent function module switch settings in advance.

- Switch 1 0030_H (CH1: 4 to 20mA, CH2: 0 to 5V)
- Switch 2 Empty
- Switch 3 0000_H (CH1, CH2: Clear)
- Switch 4 0000_H (Normal mode (D/A conversion processing))
- Switch 5 0000_H (0: Fixed)

(2) Program conditions

The digital values of CH1 and CH2 are written and their output monitor values are read.
If a digital value write error occurs, the corresponding error code is displayed in BCD.

(a) Initial settings

- Analog output enabled channel CH1, CH2
- Rate control enabled channel ..... CH1 (increase digital limit value: 100, decrease digital limit value: 30)
- Disconnection detection enabled channel ... CH1
- Warning output enabled channel ..... CH2 (warning output upper limit value: 10000, warning output lower limit value: 3000)

(b) Devices used by user

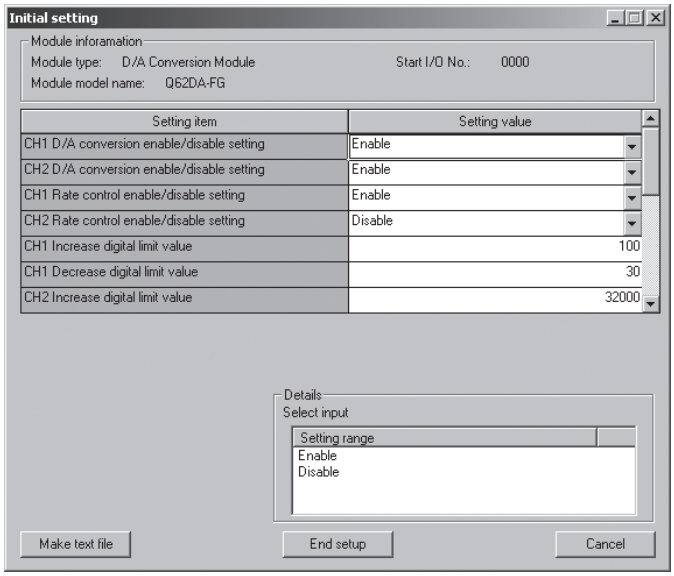
- Output enable X11
- Digital value write signal X12
- Disconnection detection reset signal X13
- Warning output reset signal X14
- Error code reset signal X15
- Error code display (BCD 3 digits) ..... Y20 to Y2B
- CH1 Digital value D11
- CH2 Digital value D12
- CH1 Output monitor value D13
- CH2 Output monitor value D14
- Disconnection detection flag D15
- Warning output flag D16
- Error code D17
- Disconnection detection channel flag M10
- Warning output channel flag M22, M23

6.2.1 Program example using the utility package

(1) Operation of utility package

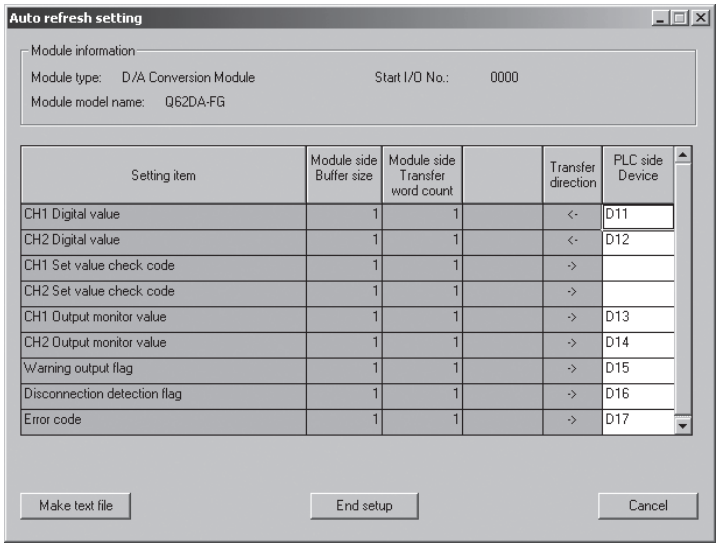
(a) Initial settings (Refer to Section 5.4)

CH1, CH2 D/A conversion enable/disable setting ...."Enable"
CH1 Rate control enable/disable setting ....."Enable"
CH1 Increase digital limit value ....."100"
CH1 Decrease digital limit value....."30"
CH1 Disconnection detection setting....."Enable"
CH2 Warning output setting....."Enable"
CH2 Warning output upper limit value....."10000"
CH2 Warning output lower limit value ....."3000"



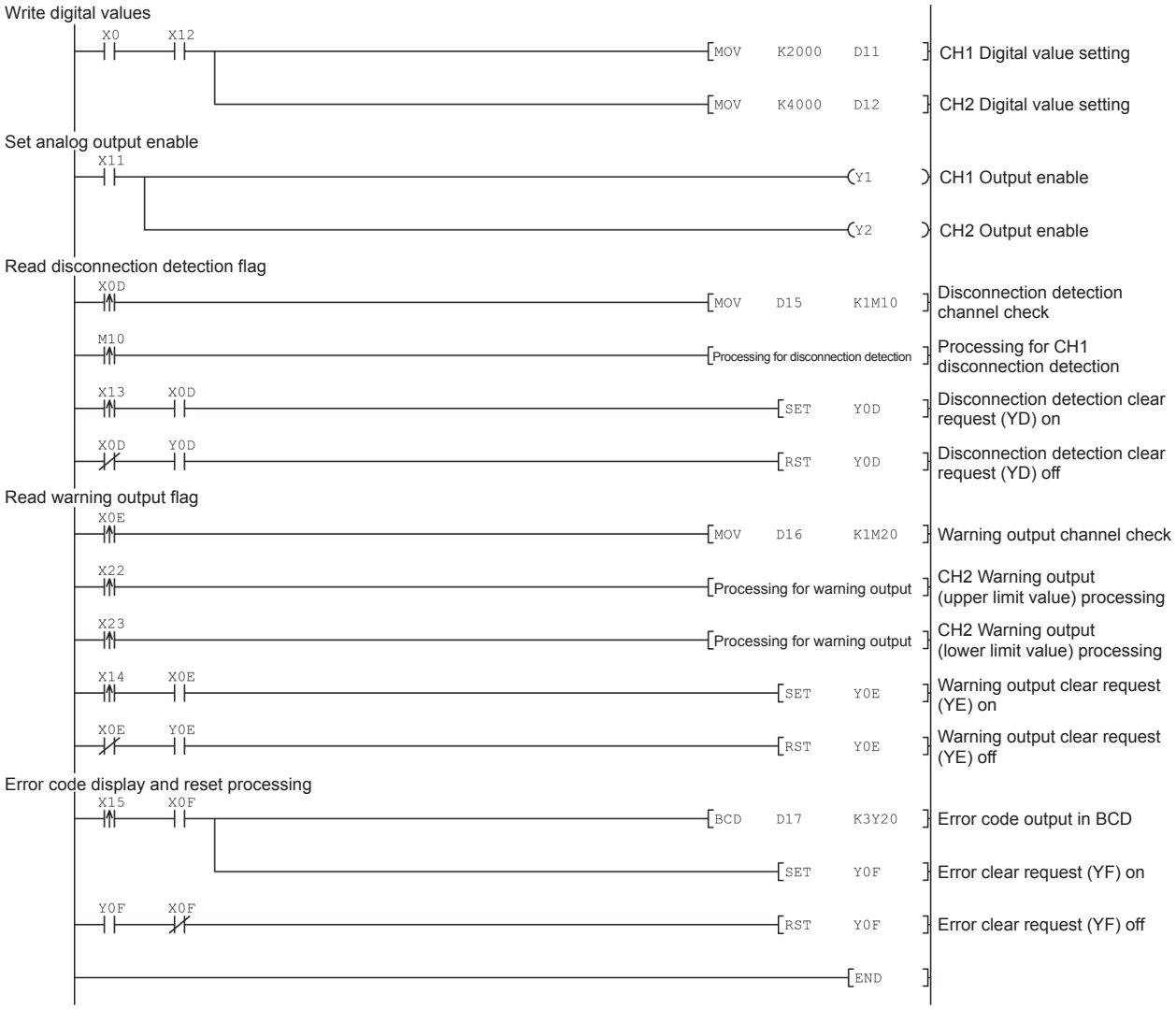
(b) Automatic refresh setting (Refer to Section 5.5)

CH1, CH2 Digital value D11, D12
CH1, CH2 Output monitor value D13, D14
Disconnection detection.....D15
Warning output D16
Error code D17

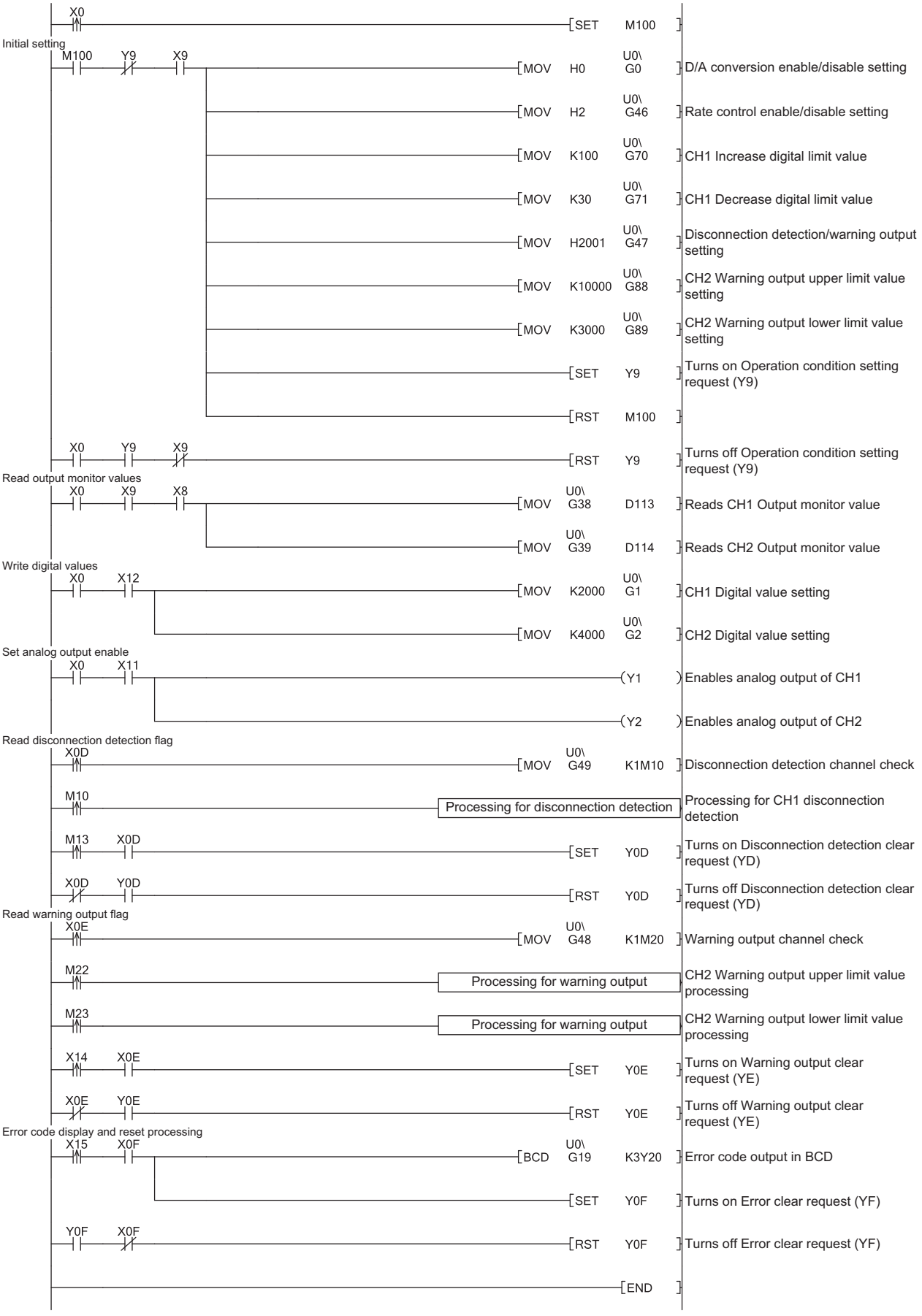


(c) Write of intelligent function module parameters (Refer to Section 5.3.3)
Write the intelligent function module parameters to the CPU module.
Perform this operation on the parameter setting module selection screen.

(2) Program example



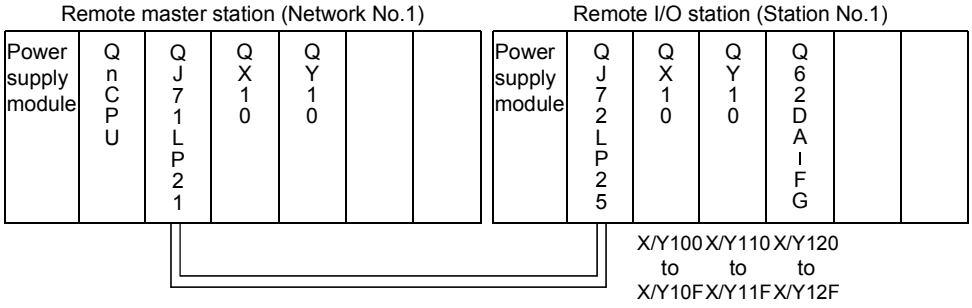
6.2.2 Programming example without using the utility package



6.3 For Use on Remote I/O Network

System configuration used in the program explanation

(1) System configuration



Perform the following intelligent function module switch settings in advance.

- Switch 1 0030H (CH1: 4 to 20mA, CH2: 0 to 5V)
- Switch 2 Empty
- Switch 3 0000H (CH1, CH2: Clear)
- Switch 4 0000H (Normal mode (D/A conversion processing))
- Switch 5 0000H (0: Fixed)

(2) Program conditions

The digital values of CH1 and CH2 of the Q62DA-FG are written and their output monitor values are read to the programmable controller CPU of the remote master station.
If a digital value write error occurs, the corresponding error code is displayed in BCD.

(a) Initial settings

- Analog output enabled channel CH1, CH2
- Rate control enabled channel ..... CH1 (increase digital limit value: 100, decrease digital limit value: 30)
- Disconnection detection enabled channel ... CH1
- Warning output enabled channel ..... CH2 (warning output upper limit value: 10000, warning output lower limit value: 3000)

(b) Devices used by user

- Initial setting request signal X20
- Output enable.....X21
- Digital value write signal X22
- Disconnection detection reset signal.....X23
- Warning output reset signal.....X24
- Error code reset signal.....X25
- Error code display (BCD 3 digits).....Y30 to Y3B
- CH1 Digital value W11
- CH2 Digital value W12
- CH1 Output monitor value W113
- CH2 Output monitor value W114
- Disconnection detection flag.....W115
- Warning output flag.....W116
- Error code.....W117
- Disconnection detection channel flag.....M10
- Warning output channel flag.....M22, M23

6.3.1 Program example using the utility package

(1) Operating GX Developer

(a) Network parameter setting

- Network type : MNET/H (remote master)
- Head I/O No. : 0000H
- Network No. : 1
- Total number of (slave) stations : 1
- Mode : Online
- Network range assignment :

StationNo.	M station -> R station						M station <- R station					
	Y			Y			X			X		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1	256	0100	01FF	256	0000	00FF	256	0100	01FF	256	0000	00FF

StationNo.	M station -> R station			M station <- R station			M station -> R station			M station <- R station		
	B			B			W			W		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1							256	0000	00FF	256	0100	01FF

- Refresh parameters :

	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	⇔	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	⇔	SW	512	0000	01FF
Random cyclic	LB				⇔				
Random cyclic	LW				⇔				
Transfer1	LB	8192	0000	1FFF	⇔	B	8192	0000	1FFF
Transfer2	LW	8192	0000	1FFF	⇔	W	8192	0000	1FFF
Transfer3	LX	512	0000	01FF	⇔	X	512	0000	01FF
Transfer4	LY	512	0000	01FF	⇔	Y	512	0000	01FF
Transfer5					⇔				
Transfer6					⇔				

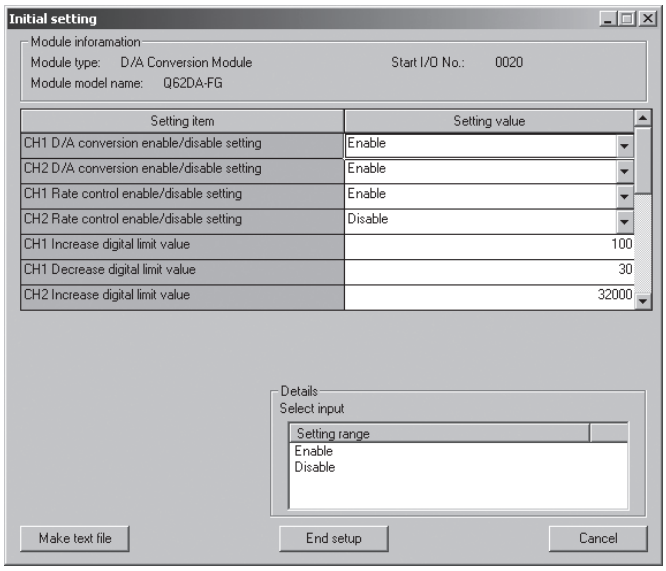
POINT

For details on the MELSECNET/H remote I/O network, refer to the Q Corresponding MELSECNET/H Network System Reference Manual (Remote I/O Network).

(2) Operating the utility package

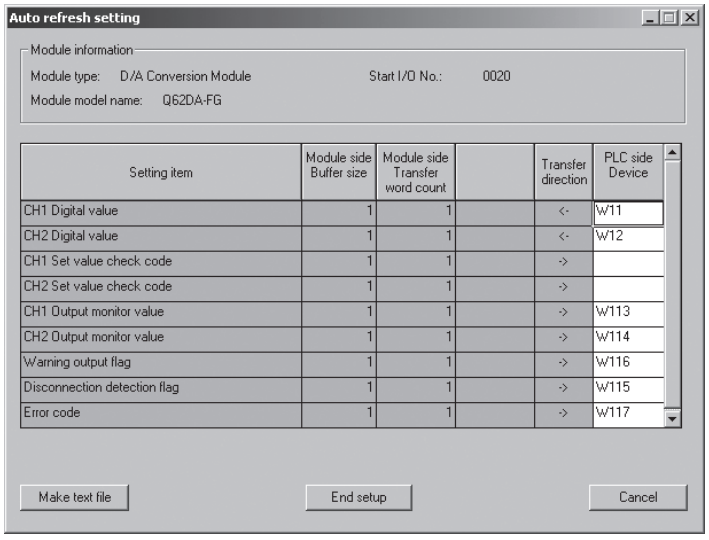
(a) Initial setting (Refer to Section 5.4)

CH1, CH2 D/A conversion enable/disable setting ....."Enable"
CH1 Rate control enable/disable setting ....."Enable"
CH1 Increase digital limit value ....."100"
CH1 Decrease digital limit value....."30"
CH1 Disconnection detection setting....."Enable"
CH2 Warning output setting....."Enable"
CH2 Warning output upper limit value....."10000"
CH2 Warning output lower limit value ....."3000"



(b) Auto refresh setting (Refer to Section 5.5)

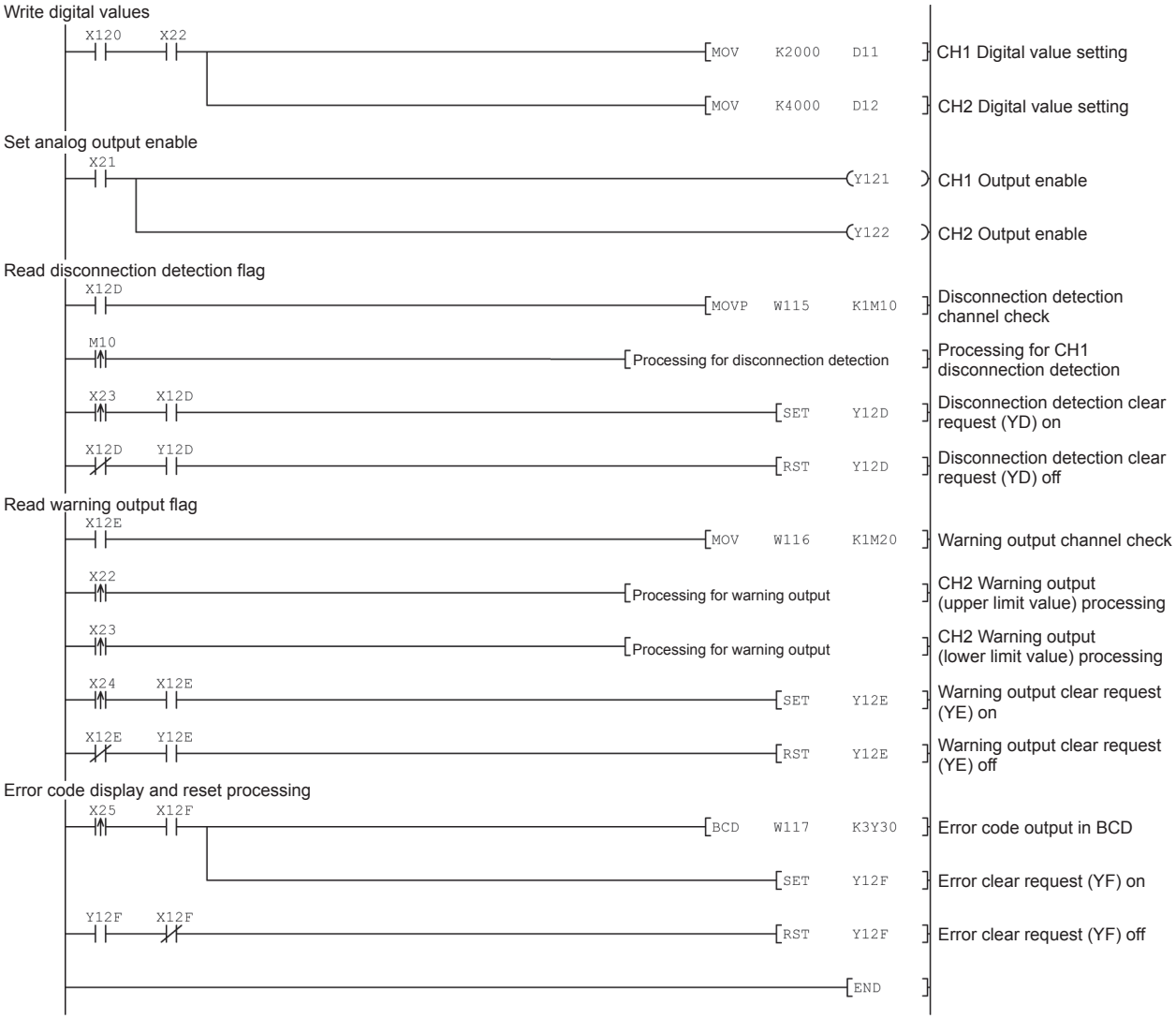
CH1, CH2 Digital value W11, W12
CH1, CH2 Output monitor value.....W113, W114
Disconnection detection.....W115
Warning output W116
Error code W117



(c) Write of intelligent function module parameters (Refer to Section 5.3.3)

The intelligent function module parameters are written to the remote I/O station.
Perform this operation on the parameter setting module selection screen.

(3) Programming example



POINT

To write the intelligent function module parameters, set the target remote I/O station from [Online] - [Transfer setup] on GX Developer.
They can be written by:

- Directly connecting GX Developer to the remote I/O station.
- Connecting GX Developer to another device such as a CPU module and passing through the network.

6.3.2 Program example without using the utility package

(1) Operation of GX Developer (Network parameter setting)

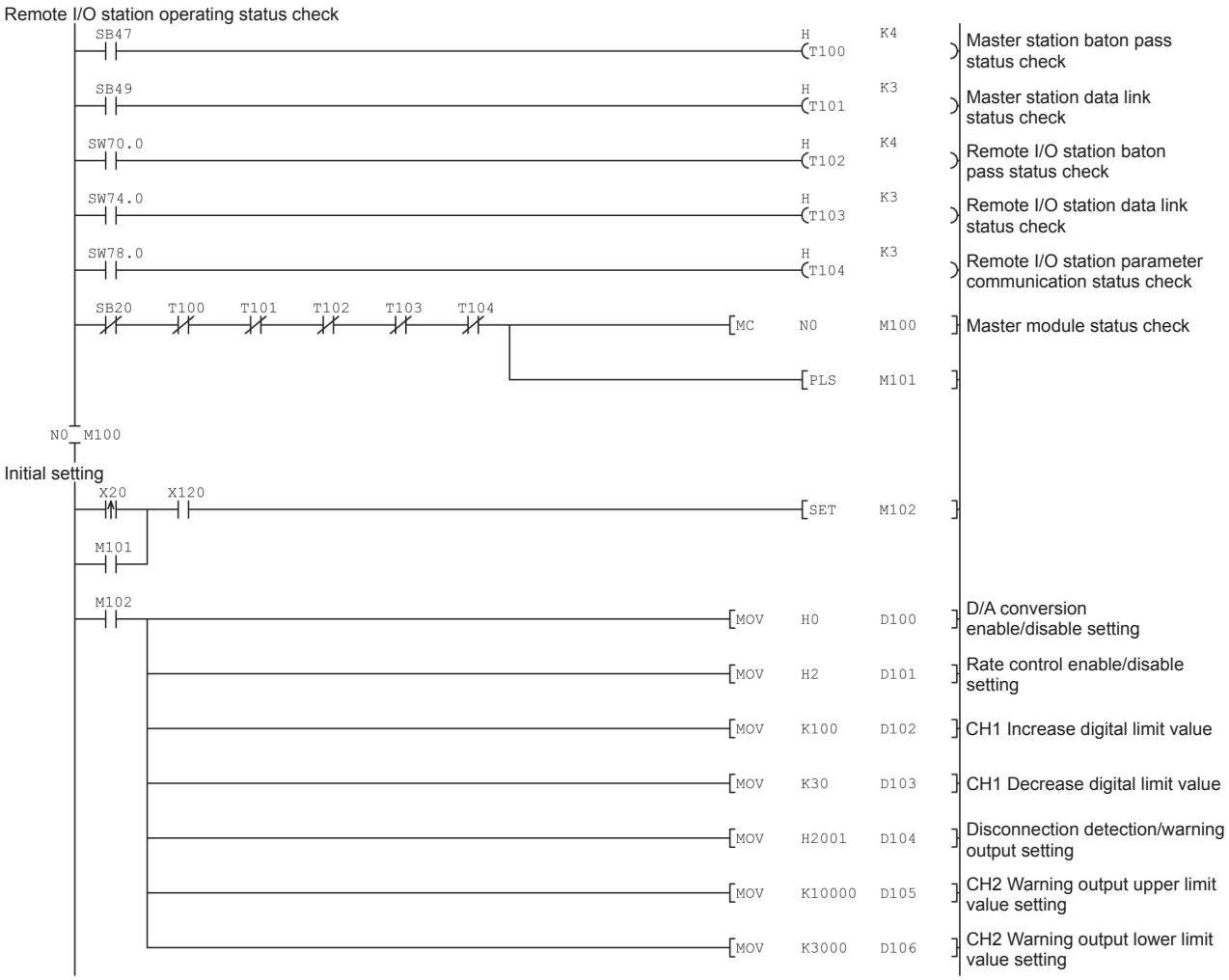
- Network type : MNET/H (remote master)
- Head I/O No. : 0000H
- Network No. : 1
- Total number of (slave) stations : 1
- Mode : Online
- Network range assignment :

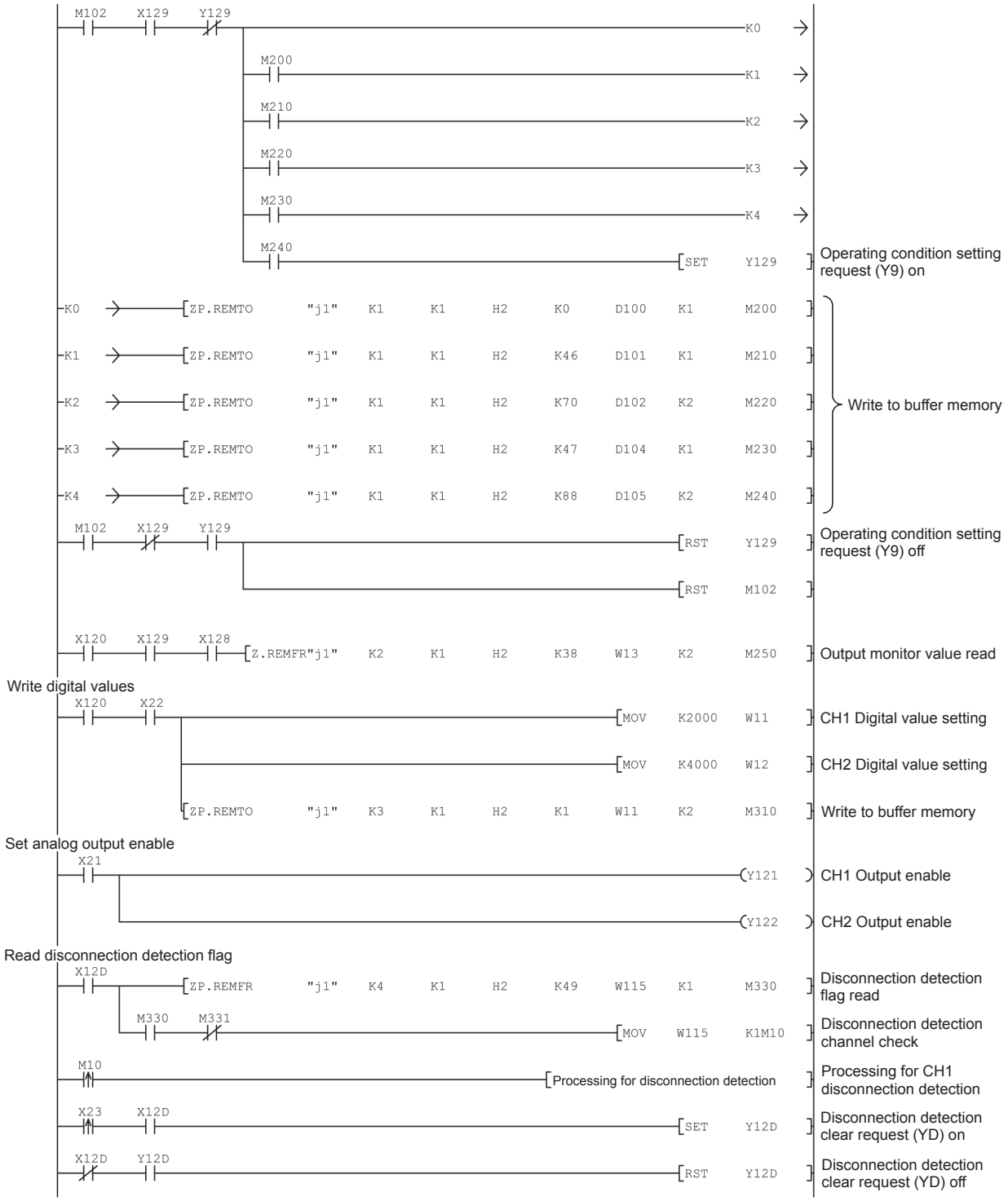
StationNo.	M station -> R station						M station <- R station					
	Y			Y			X			X		
	Points	Start	End	Points	Start	End	Points	Start	End	Points	Start	End
1	256	0100	01FF	256	0000	00FF	256	0100	01FF	256	0000	00FF

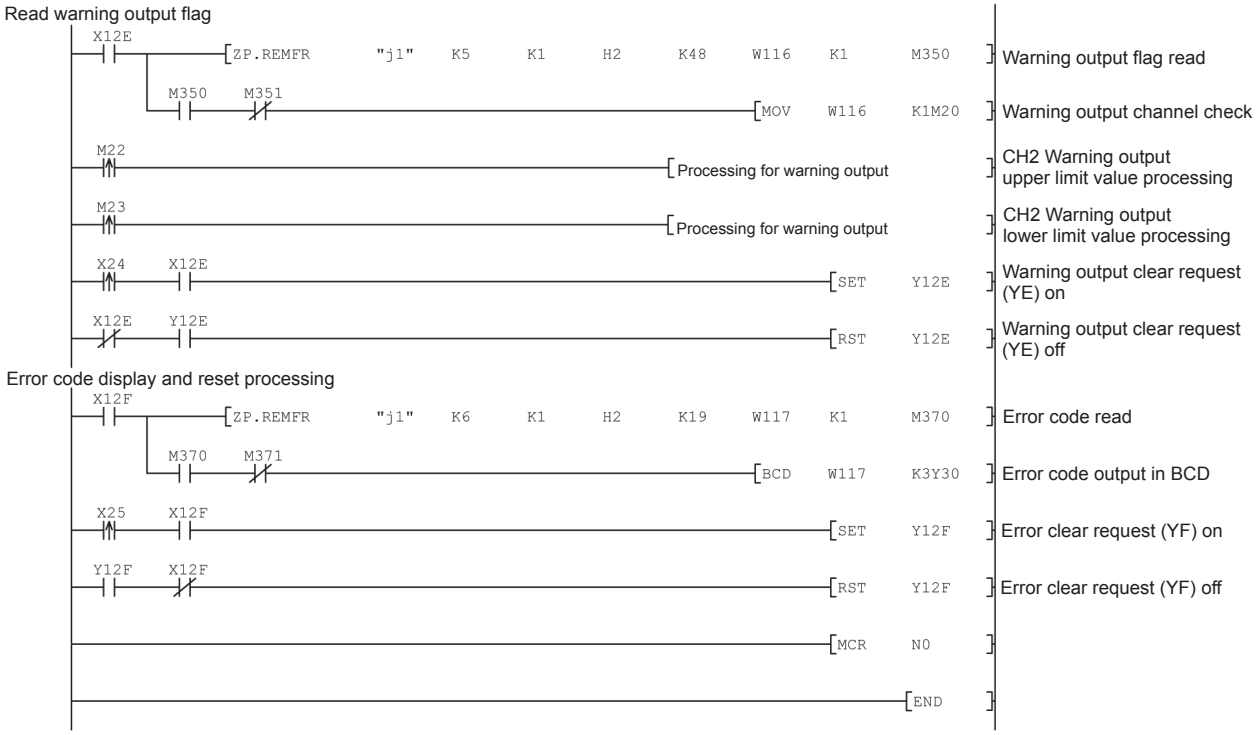
- Refresh parameters :

	Link side					PLC side			
	Dev. name	Points	Start	End		Dev. name	Points	Start	End
Transfer SB	SB	512	0000	01FF	↔	SB	512	0000	01FF
Transfer SW	SW	512	0000	01FF	↔	SW	512	0000	01FF
Random cyclic	LB				↔				
Random cyclic	LW				↔				
Transfer1	LB	8192	0000	1FFF	↔	B	8192	0000	1FFF
Transfer2	LW	8192	0000	1FFF	↔	W	8192	0000	1FFF
Transfer3	LX	512	0000	01FF	↔	X	512	0000	01FF
Transfer4	LY	512	0000	01FF	↔	Y	512	0000	01FF
Transfer5					↔				
Transfer6					↔				

(2) Programming example




M102 X129 Y129
K0
M200
K1
M210
K2
M220
K3
M230
K4
M240
SET Y129
Operating condition setting request (Y9) on
K0 ZP.REMTO "j1" K1 K1 H2 K0 D100 K1 M200
K1 ZP.REMTO "j1" K1 K1 H2 K46 D101 K1 M210
K2 ZP.REMTO "j1" K1 K1 H2 K70 D102 K2 M220
K3 ZP.REMTO "j1" K1 K1 H2 K47 D104 K1 M230
K4 ZP.REMTO "j1" K1 K1 H2 K88 D105 K2 M240
Write to buffer memory
M102 X129 Y129
RST Y129
Operating condition setting request (Y9) off
RST M102
X120 X129 X128 Z.REMFR "j1" K2 K1 H2 K38 W13 K2 M250
Output monitor value read
Write digital values
X120 X22
MOV K2000 W11
CH1 Digital value setting
MOV K4000 W12
CH2 Digital value setting
ZP.REMTO "j1" K3 K1 H2 K1 W11 K2 M310
Write to buffer memory
Set analog output enable
X21
Y121
CH1 Output enable
Y122
CH2 Output enable
Read disconnection detection flag
X12D
ZP.REMFR "j1" K4 K1 H2 K49 W115 K1 M330
Disconnection detection flag read
M330 M331
MOV W115 K1M10
Disconnection detection channel check
M10
Processing for disconnection detection
Processing for CH1 disconnection detection
X23 X12D
SET Y12D
Disconnection detection clear request (YD) on
X12D Y12D
RST Y12D
Disconnection detection clear request (YD) off


Read warning output flag
X12E
ZP.REMFR "j1" K5 K1 H2 K48 W116 K1 M350
Warning output flag read
M350 M351
MOV W116 K1M20
Warning output channel check
M22
Processing for warning output
CH2 Warning output upper limit value processing
M23
Processing for warning output
CH2 Warning output lower limit value processing
X24 X12E
SET Y12E
Warning output clear request (YE) on
X12E Y12E
RST Y12E
Warning output clear request (YE) off
Error code display and reset processing
X12F
ZP.REMFR "j1" K6 K1 H2 K19 W117 K1 M370
Error code read
M370 M371
BCD W117 K3Y30
Error code output in BCD
X25 X12F
SET Y12F
Error clear request (YF) on
Y12F X12F
RST Y12F
Error clear request (YF) off
MCR N0
END

7 ONLINE MODULE CHANGE

When performing Online module change, carefully read the following.
• QCPU User's Manual (Hardware Design, Maintenance and Inspection)
This chapter describes the specifications of Online module change.
(1) Online module change is operated by GX Developer.

(2) To ensure ease of offset/gain re-setting, there is a user range save/restoration function that is performed by executing the dedicated instruction or read/write from/to buffer memory.

POINT

(1) Perform Online module change after making sure that the system outside the programmable controller will not malfunction.
(2) To prevent an electric shock and malfunction of operating modules, provide means such as switches for powering off each of the external power supply and external devices connected to the module to be replaced online.
(3) After the module has failed, data may not be saved properly. Referring to Section 3.4.22, therefore, prerecord the data to be saved (offset/gain values of the industrial shipment settings and user range settings in the buffer memory).
(4) It is recommended to perform Online module change in the actual system in advance to ensure that it would not affect the other modules by checking the following:
• Means of cutting off the connection to external devices and its configuration are correct.
• Switching on/off does not bring any undesirable effect.
(5) Do not install/remove the module to/from the base unit, or the terminal block to/from the module more than 50 times after the first use of the product. (IEC 61131-2 compliant)
Failure to do so may cause malfunction.

(Note)
The dedicated instruction cannot be executed during Online module change. When using the dedicated instruction to execute save/restoration, therefore, execute save/restoration in the other system. *1
If the other system is unavailable, execute restoration by performing write to the buffer memory.
*1 If the module is mounted on the remote I/O station, execute save/restoration in the other system mounted on the main base unit. (Save/restoration cannot be executed in the other system mounted on the remote I/O station.)

7.1 Online Module Change Conditions

The CPU, MELSECNET/H remote I/O module, Q62DA-FG, GX Developer and base unit given below are needed to perform Online module change.

(1) CPU

The Process CPU or Redundant CPU is required.
For precautions for multiple CPU system configuration, refer to the QCPU User's Manual (Multiple CPU System).
For precautions for redundant system configuration, refer to the QnPRHCPU User's Manual (Redundant system).

(2) MELSECNET/H remote I/O module

The module of function version D or later is necessary.

(3) Q62DA-FG

The module of function version C or later is necessary.

(4) GX Developer

GX Developer of Version 7.10L or later is necessary.
GX Developer of Version 8.18U or later is required to perform Online module change on the remote I/O station.

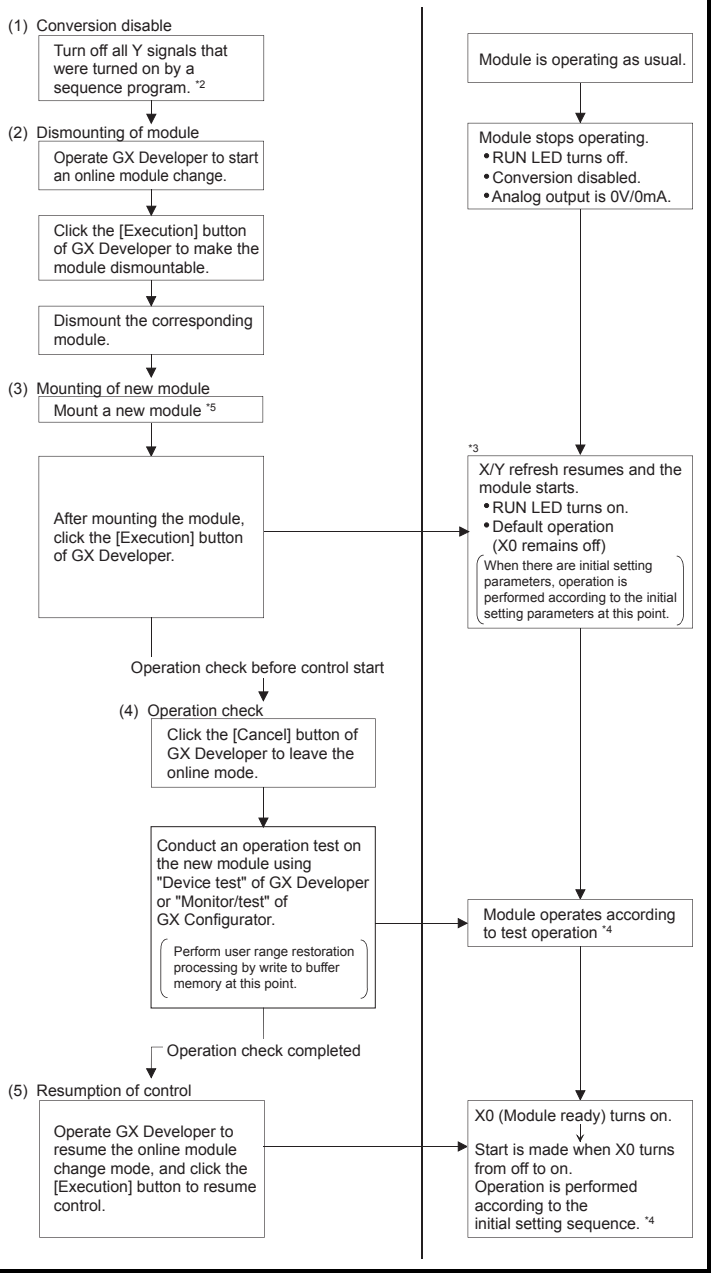
(5) Base unit

1) When the slim type main base unit (Q3□SB) is used, Online module change cannot be performed.
2) When the power supply module unnecessary type extension base unit (Q5□B) is used, Online module change cannot be performed for the modules on all the base units connected.

7.2 Online Module Change Operations

The following gives the operations performed for Online module change.

CPU operation ○: Executed ×: Not executed						(User operation)	(Intelligent function module operation)
X/Y refresh	FROM/TO instruction ＊1	Dedicated instruction	Device test	GX Configurator: Initial setting parameter	GX Configurator: Monitor/ test		
○	○	○	○	×	○		
×	×	×	×	×	×		
○	×	×	×	○	×		
○	×	×	○	×	○		
○	○	○	○	×	○		



＊1 Access to the intelligent function module device (U□\G□) is included.

＊2 Operating the intelligent function module switches (*3) starts the module and resumes X/Y refresh. When there are initial setting parameters, operation is performed according to the initial setting parameters.
Hence, if the Y signals are not turned off, analog outputs will be provided at this point. Therefore, always turn off the Y signals that were turned on by the sequence program.

＊4 In the absence of the operation marked *4, the operation of the intelligent function module is the operation performed prior to that.

＊5 If a module is replaced with the one that does not support the extended mode range with either of 4 to 20mA (Extended mode) or 1 to 5V (Extended mode) output range set an intelligent function module switch error occurs. In that case, the extended mode range cannot be used.

7.3 Online Module Change Procedure

There are the following Online module change procedures depending on whether the user range setting has been made or not, whether the initial setting of GX Configurator-DA has been made or not, and whether the other system exists or not.

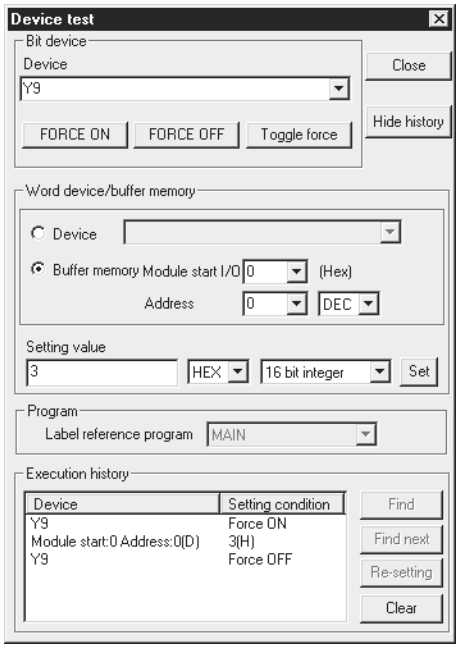
Range setting	Initial setting	Other system	Reference section
Industrial shipment setting	GX Configurator-DA	—	Section 7.3.1
Industrial shipment setting	Sequence program	—	Section 7.3.2
User range setting	GX Configurator-DA	Present	Section 7.3.3
User range setting	GX Configurator-DA	Absent	Section 7.3.4
User range setting	Sequence program	Present	Section 7.3.5
User range setting	Sequence program	Absent	Section 7.3.6

7.3.1 When industrial shipment setting is used and initial setting was made with GX Configurator-DA

(1) Conversion disable

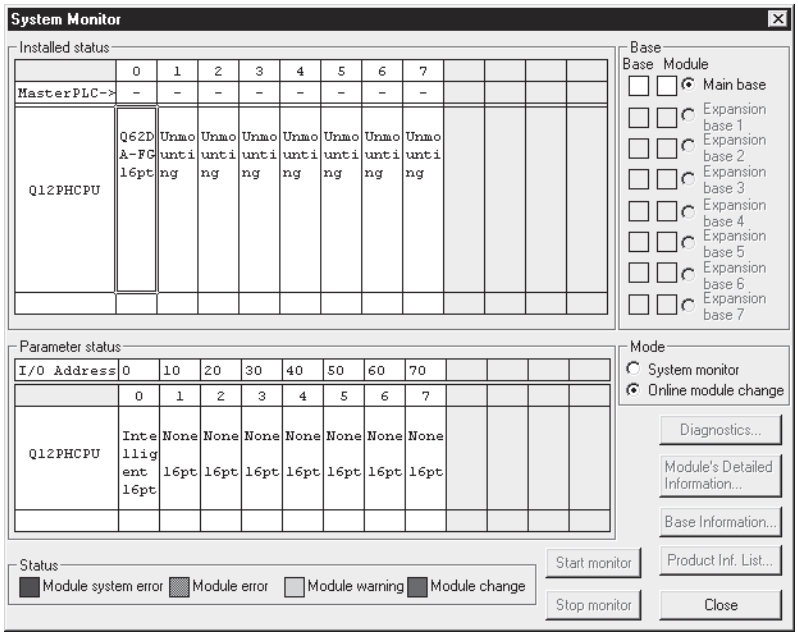
(a) Take the following steps to disable the conversion:

1) Set D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to All channel conversion disable (3_H).
2) Turn Operating condition setting request (Y9) from off to on to stop the conversion.
3) Operating condition setting completed flag (X9) turns off from on.
4) Check that the conversion is stopped by seeing the actual analog output value.
5) Turn Operating condition setting request (Y9) from on to off.

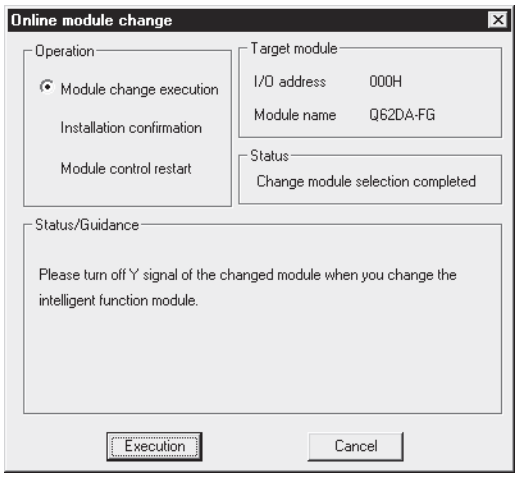


(2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.



(b) Click the "Execution" button to enable a module change.



If the following error screen appears, click the [OK] button, dismount the module as-is, and mount a new module.

(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

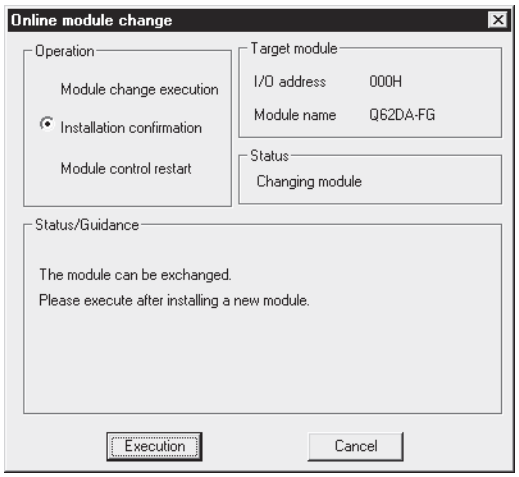
POINT

Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

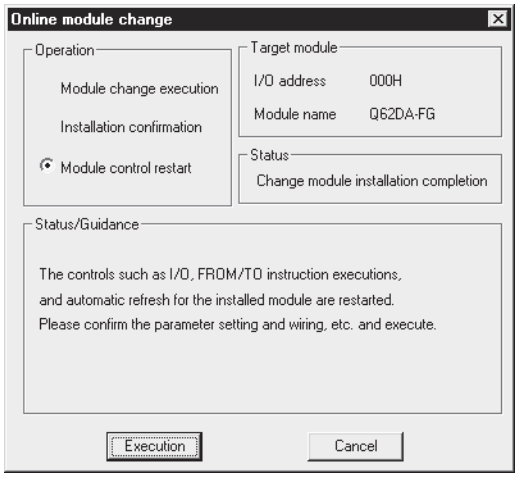
(a) Mount a new module to the same slot and install the terminal block.

(b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains off.

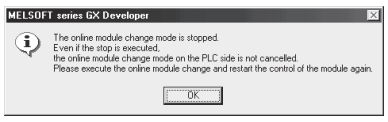


(4) Operation check

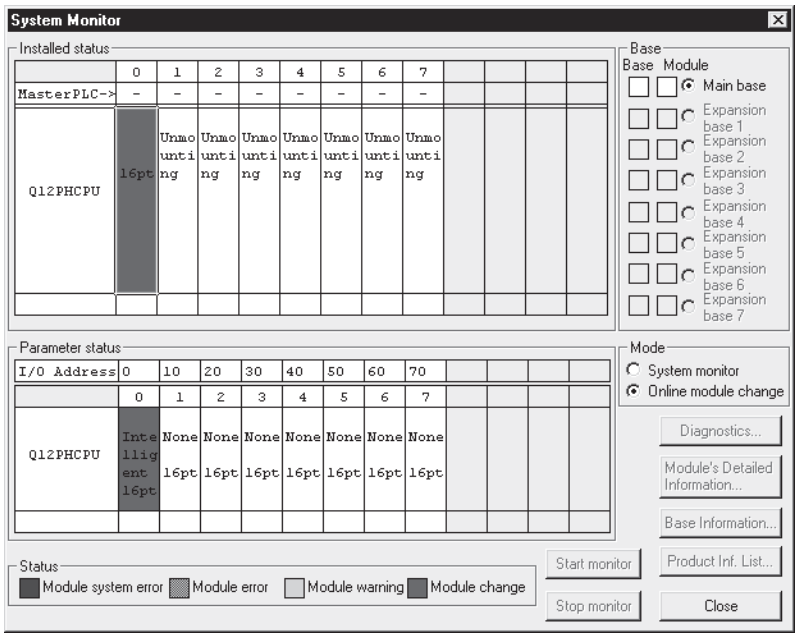
(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to stop the "Online module change" mode.



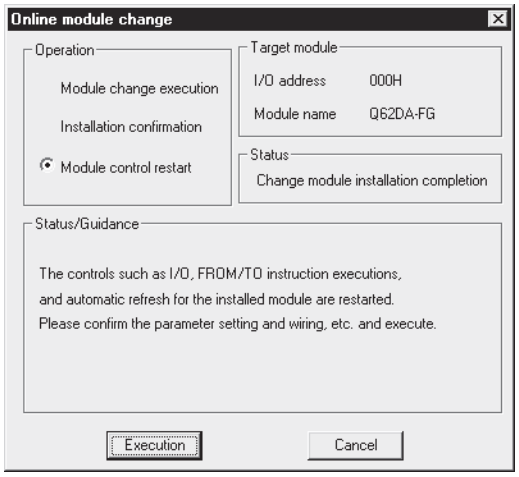
(c) Click the [Close] button to close the System monitor screen.



(d) Set digital values to CH□ Digital value (buffer memory address 1, 2: Un\G1, Un\G2) and turn Operating condition setting request (Y9) from off to on. Turn on CH□ Output enable/disable flag (Y1, Y2) of the used channel to check whether proper conversion has been made or not.
(Be careful since analog outputs are provided actually.)

(5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to display the "Online module change" screen again, click the [Execution] button to resume control. Module ready (X0) turns on.



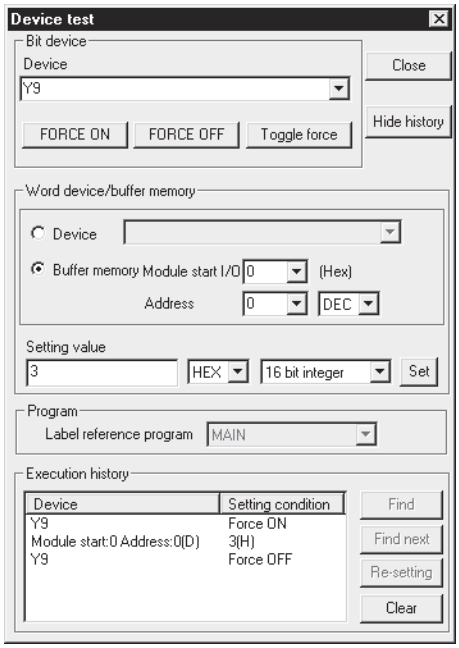
(b) The "Online module change completed" screen appears.

7.3.2 When industrial shipment setting is used and initial setting was made with sequence program

(1) Conversion disable

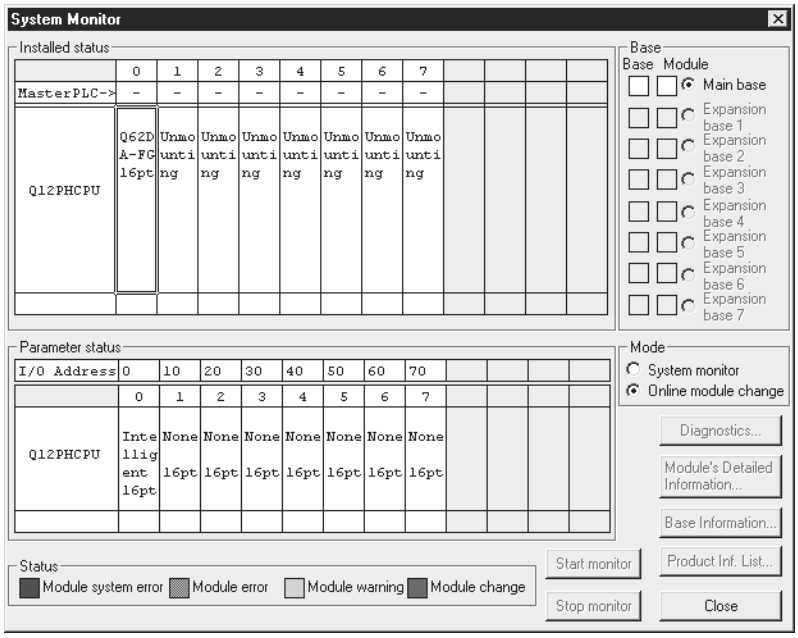
(a) Take the following steps to disable the conversion:

1) Set D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to All channel conversion disable (3_H).
2) Turn Operating condition setting request (Y9) from off to on to stop the conversion.
3) Operating condition setting completed flag (X9) turns off from on.
4) Check that the conversion is stopped by seeing the actual analog output value.
5) Turn Operating condition setting request (Y9) from on to off.

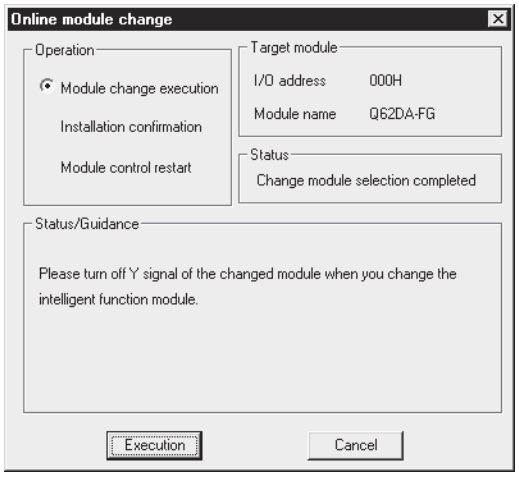


(2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.


System Monitor
Installed status
0 1 2 3 4 5 6 7
MasterPLC-> - - - - - - - -
Q12PHCPU
Q62DA-FG 16pt
Unmounting
Base
Base Module
Main base
Expansion base 1
Expansion base 2
Expansion base 3
Expansion base 4
Expansion base 5
Expansion base 6
Expansion base 7
Parameter status
I/O Address 0 10 20 30 40 50 60 70
Q12PHCPU
Intelligent 16pt
None 16pt
Mode
System monitor
Online module change
Diagnostics...
Module's Detailed Information...
Base Information...
Product Inf. List...
Status
Module system error
Module error
Module warning
Module change
Start monitor
Stop monitor
Close

(b) Click the "Execution" button to enable a module change.



If the following error screen appears, click the [OK] button, dismount the module as-is, and mount a new module.

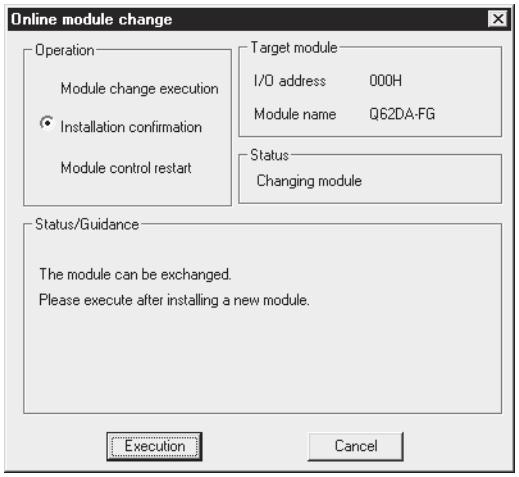
(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

POINT
Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

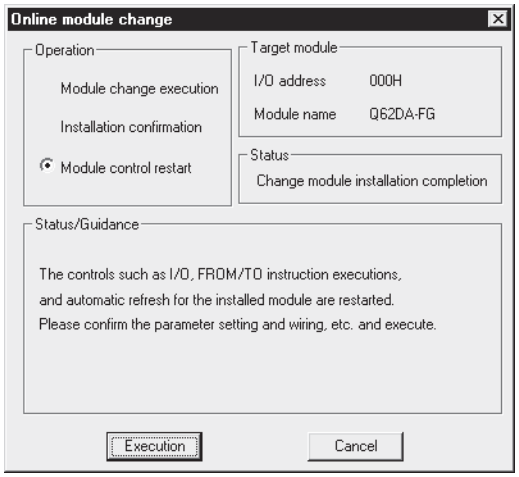
(a) Mount a new module to the same slot and install the terminal block.

(b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains off.

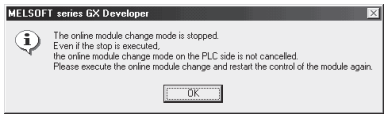


(4) Operation check

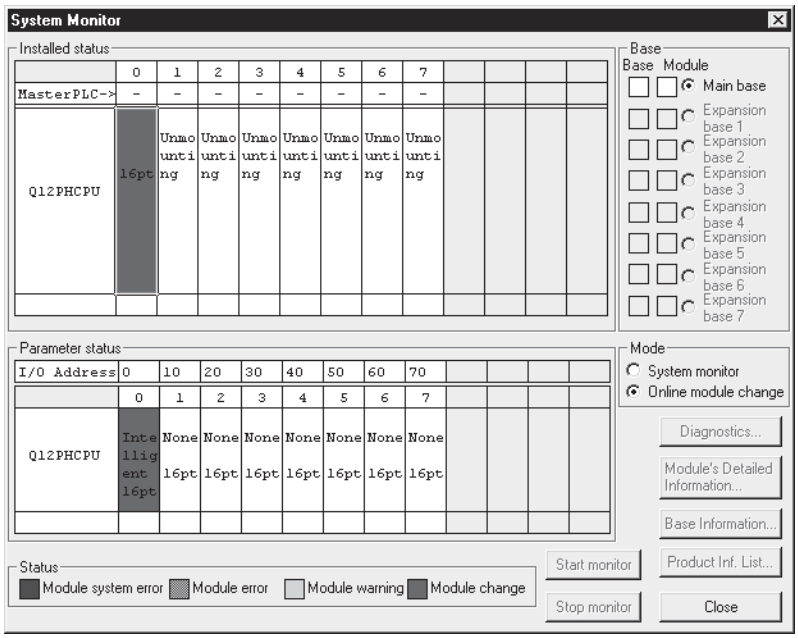
(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to stop the "Online module change" mode.



(c) Click the [Close] button to close the System monitor screen.



(d) Enable conversion using D/A conversion enable/disable setting (buffer memory address 0: Un\G0). Set a digital value to CH□ Digital value (buffer memory address 1, 2: Un\G1, Un\G2) and turn Operating condition setting request (Y9) from off to on. Turn on CH□ Output enable/disable flag (Y1, Y2) of the channel to used to check whether the conversion has been succeeded.
(Be careful since analog outputs are provided actually.)

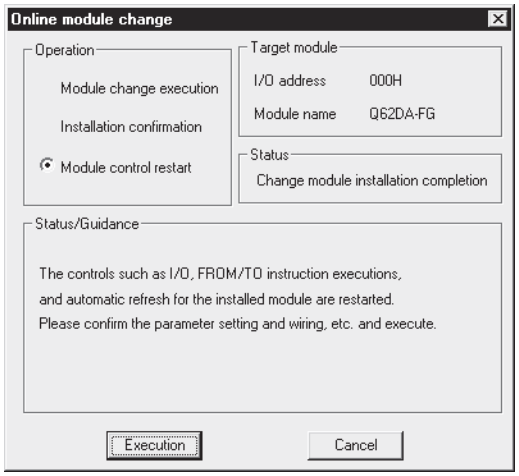
(e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
Before performing initialization, check whether the contents of the initialization program are correct or not.

1) Normal system configuration
The sequence program should perform initialization on the leading edge of Module ready (X0) of the Q62DA-FG.
When control resumption is executed, Module ready (X0) turns on and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)

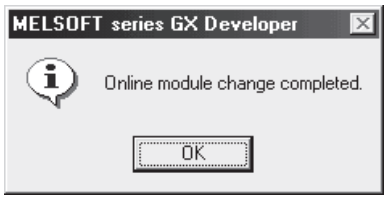
2) When used on remote I/O network
Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn on the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

(5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to display the "Online module change" screen again, click the [Execution] button to resume control. Module ready (X0) turns on.



(b) The "Online module change completed." screen appears.

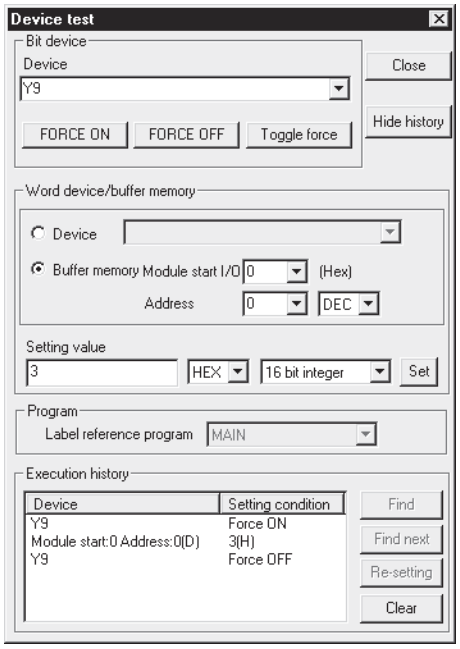


7.3.3 When user range setting is used and initial setting was made with GX Configurator-DA (other system is available)

(1) Conversion disable

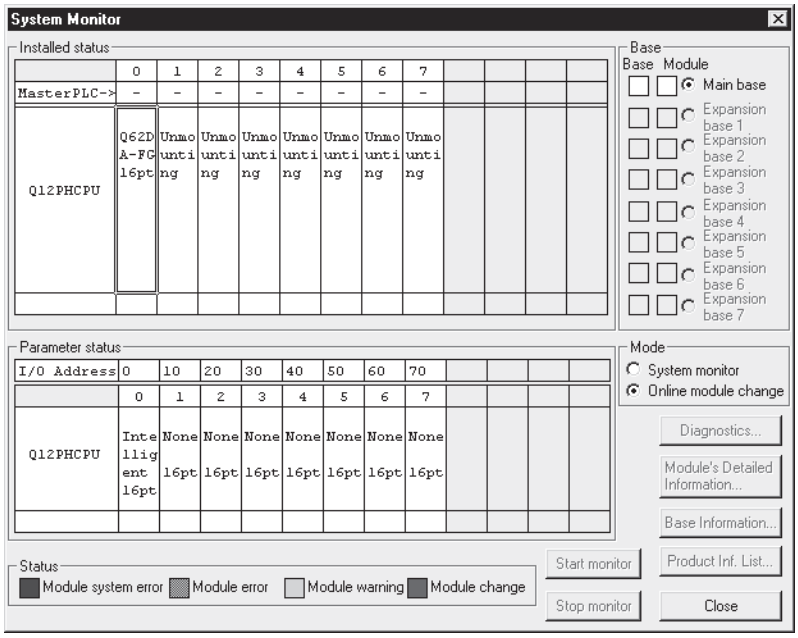
(a) Take the following steps to disable the conversion:

1) Set D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to All channel conversion disable (3_H).
2) Turn Operating condition setting request (Y9) from off to on to stop the conversion.
3) Operating condition setting completed flag (X9) turns off from on.
4) Check that the conversion is stopped by seeing the actual analog output value.
5) Turn Operating condition setting request (Y9) from on to off.

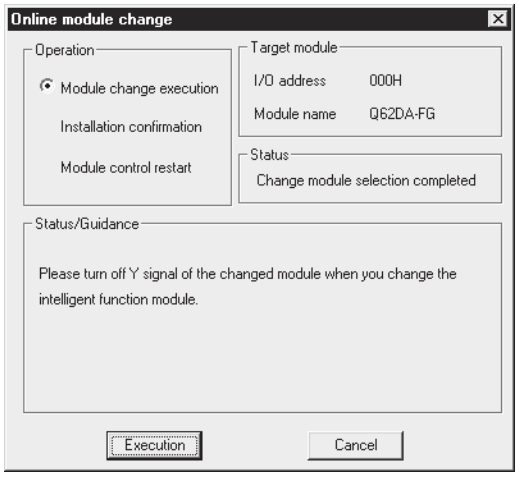


(2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.


System Monitor
Installed status
0 1 2 3 4 5 6 7
MasterPLC-> - - - - - - - -
Q12PHCPU
Q62DA-FG 16pt
Unmounting
Base
Base Module
Main base
Expansion base 1
Expansion base 2
Expansion base 3
Expansion base 4
Expansion base 5
Expansion base 6
Expansion base 7
Parameter status
I/O Address 0 10 20 30 40 50 60 70
0 1 2 3 4 5 6 7
Q12PHCPU
Intelligent 16pt
None 16pt
Mode
System monitor
Online module change
Diagnostics...
Module's Detailed Information...
Base Information...
Product Inf. List...
Status
Module system error
Module error
Module warning
Module change
Start monitor
Stop monitor
Close

(b) Click the "Execution" button to enable a module change.



If the following error screen appears, the user range cannot be saved. Click the [OK] button, and perform the operation in Section 7.3.4 (2)(c) and later.

(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

POINT
Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

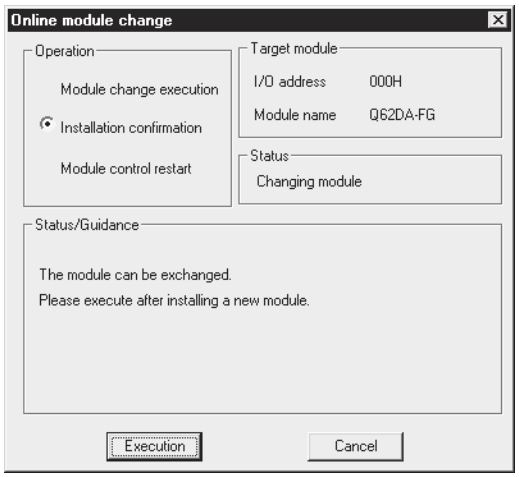
(a) Mount the dismounted module and new module to the other system.

(b) Using the G(P).OGLOAD instruction, save the user set values to the CPU device. Refer to Appendix 1.2 for the G(P).OGLOAD instruction.

(c) Using the G(P).OGSTOR instruction, restore the user set values to the module. Refer to Appendix 1.3 for the G(P).OGSTOR instruction.

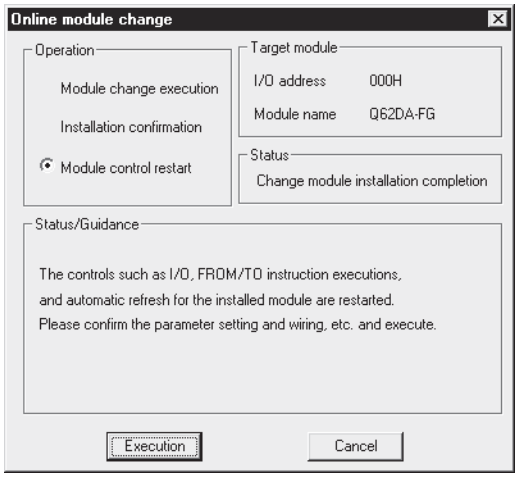
(d) Dismount the new module from the other system, mount it to the slot from where the old module was dismounted in the original system, and install the terminal block.

(e) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains off.

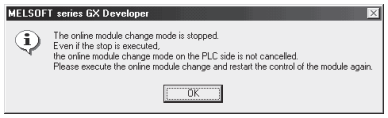


(4) Operation check

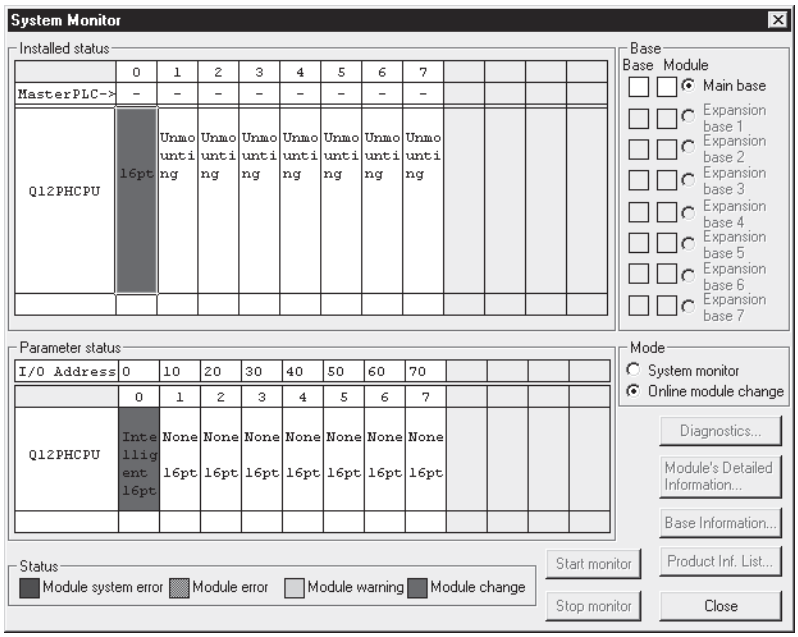
(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to stop the "Online module change" mode.



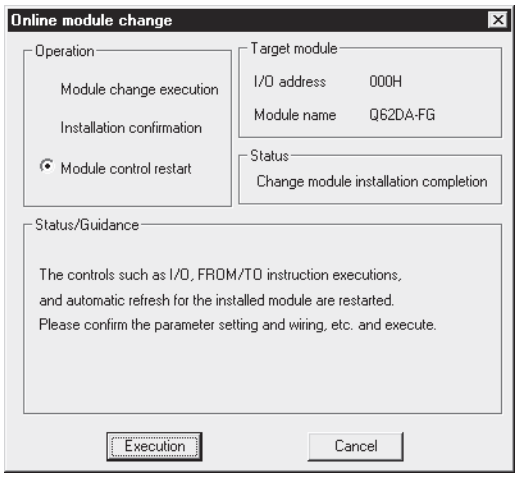
(c) Click the [Close] button to close the System monitor screen.



(d) Set digital values to CH□ Digital value (buffer memory address 1, 2: Un\G1, Un\G2) and turn Operating condition setting request (Y9) from off to on. Turn on CH□ Output enable/disable flag (Y1, Y2) of the channel to use to check whether proper conversion has been made or not.
(Be careful since analog outputs are provided actually.)

(5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to display the "Online module change" screen again, click the [Execution] button to resume control. Module ready (X0) turns on.

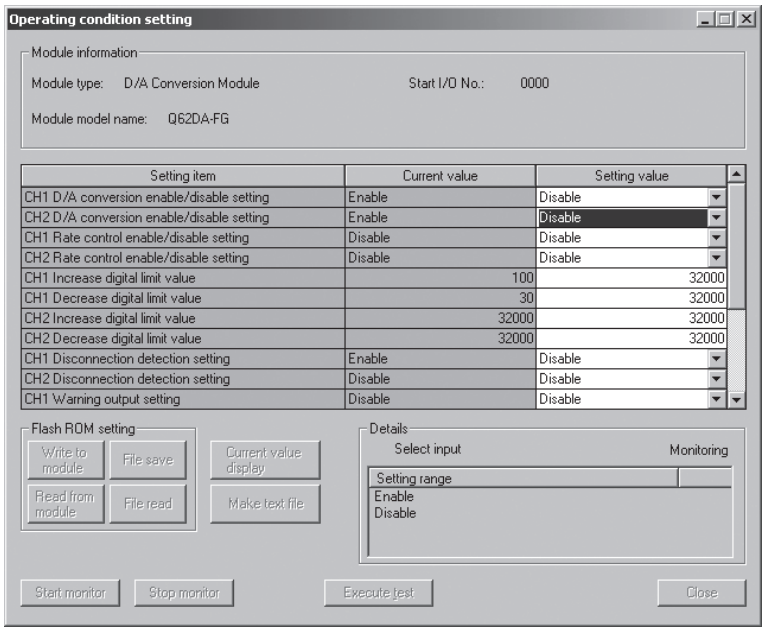


(b) The "Online module change completed." screen appears.

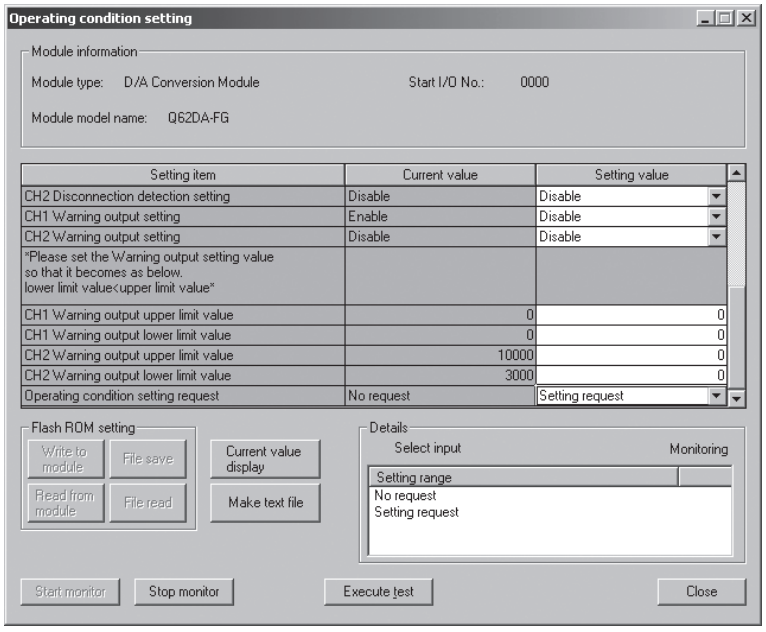
7.3.4 When user range setting is used and initial setting was made with GX Configurator-DA (other system is unavailable)

(1) Conversion disabled

(a) On the Operating condition setting screen of GX Configurator-DA, set "Disable" in the Setting value field of CH□ D/A conversion enable/disable setting, and click the [Execute test] button.



(b) After making sure that the indication in the Current value field of CH□ D/A conversion enable/disable setting is "Disable", change the Setting value field of Operating condition setting request to "Setting request", and click the [Execute test] button to stop conversion.
Confirm that conversion has stopped with the actual analog output value.



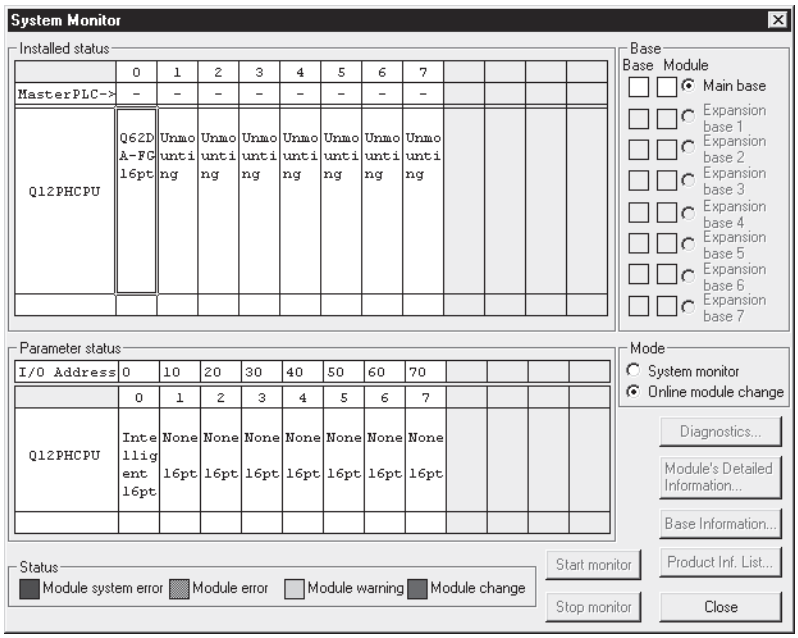
(c) If the saved buffer memory contents are not yet prerecorded, record them in the following procedure.
1) Display the pass data screen of GX Configurator-DA.
2) Select the user range used for Pass data classification setting, and make a pass data read request. (Refer to Section 5.6.3.)
3) Compare the current values of the industrial shipment settings and user range settings offset/gain values with those of the range reference table. Refer to Section 7.4 for the range reference table.
4) If the values are proper, record the offset/gain values of Pass data classification setting, industrial shipment settings and user range settings.

POINT

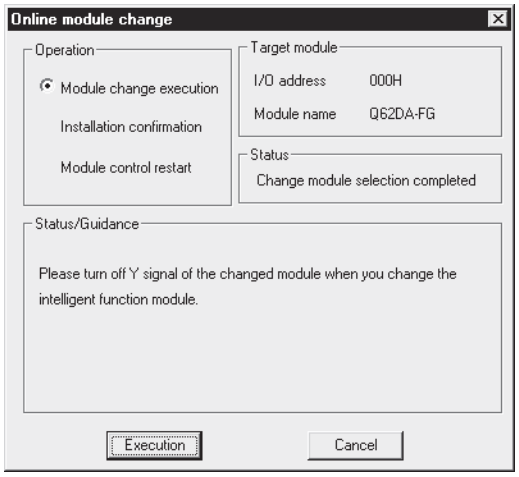
If the buffer memory values compared with the reference table are not proper, save and restoration of the user range cannot be executed.
Before executing module control resumption, make offset/gain setting in the GX Configurator-DA. (Refer to Section 5.6.2)
Note that if module control is resumed without offset/gain setting being made, operation will be performed with the default values.

(2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.



(b) Click the "Execution" button to enable a module change.



If the following error screen appears, the user range cannot be saved. Click the "OK" button, and perform the operations described in (2)(c) in this section and later.

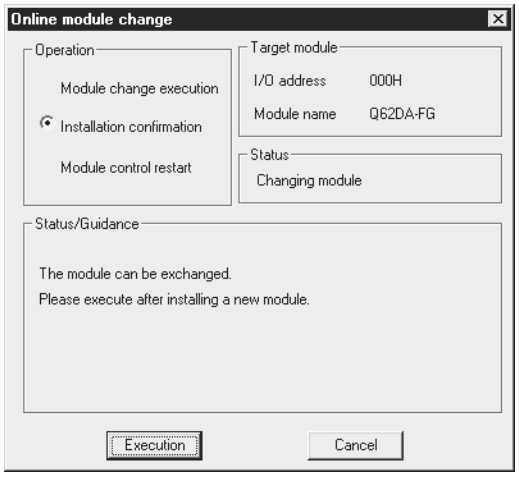
(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

POINT
Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

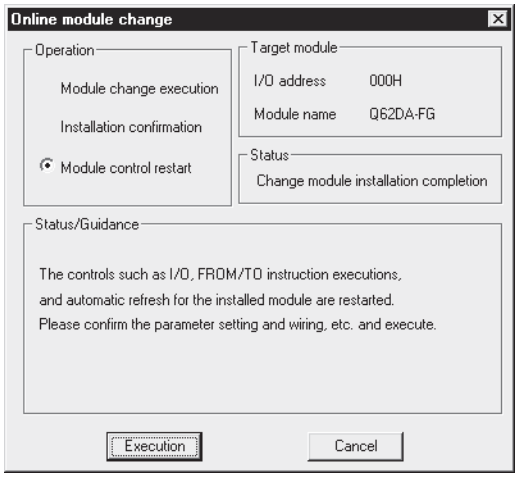
(a) Mount a new module to the same slot and install the terminal block.

(b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains off.

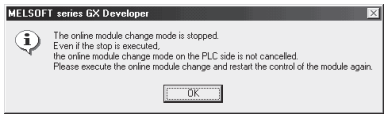


(4) Operation check

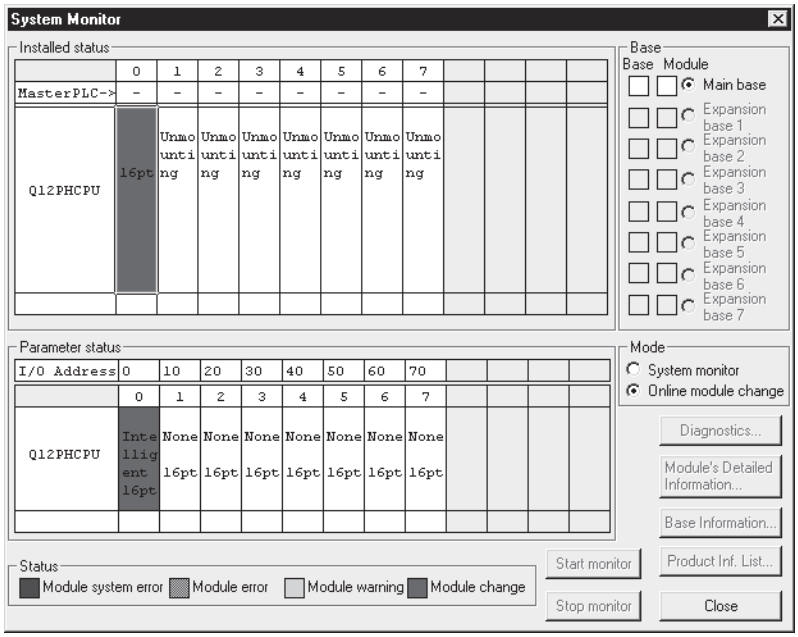
(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to stop the "Online module change" mode.



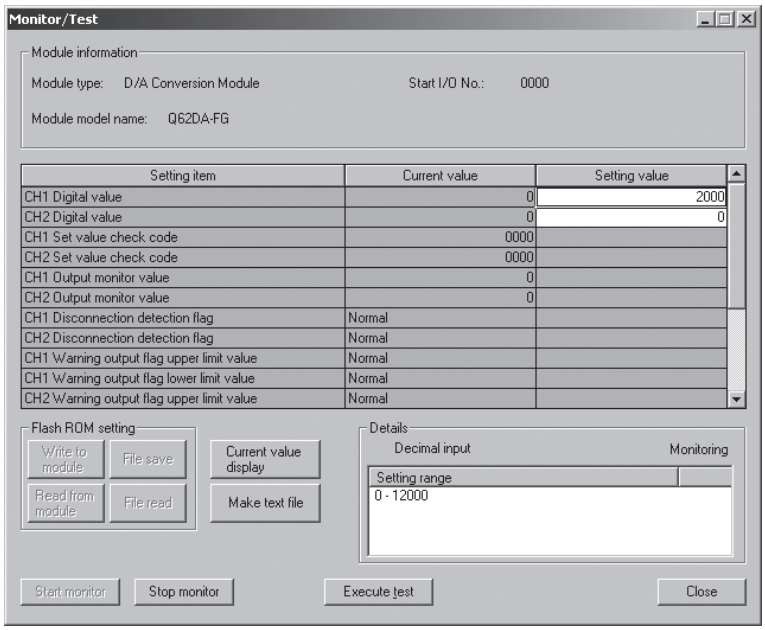
(c) Click the [Close] button to close the System monitor screen.



(d) On the pass data screen of GX Configurator-DA, set the prerecorded values and perform User range writing request. (Refer to Section 5.6.3.)

(e) On the Operating condition setting screen of GX Configurator-DA, set "Enable" in the Setting value field of used channels CH□ D/A conversion enable/disable setting.

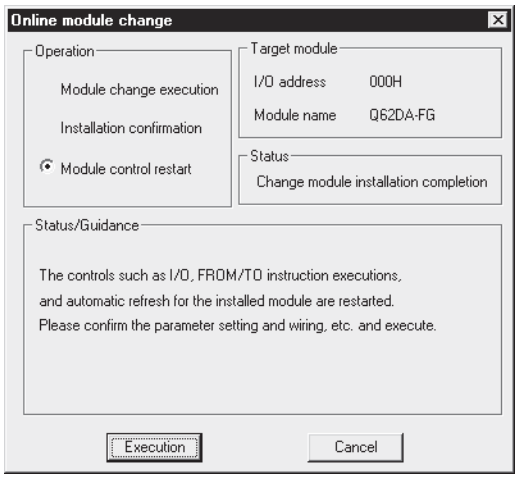
(f) On the monitor/test screen of GX Configurator-DA, set a value in the Setting value field of CH□ Digital value of the used channel, and click the [Execute test] button.



(g) Turn on CH□ Output enable/disable flag (Y1, Y2) of the used channel and check whether proper conversion has been made or not.
(Be careful since analog outputs are provided actually)

(5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to display the "Online module change" screen again, click the [Execution] button to resume control. Module ready (X0) turns on.



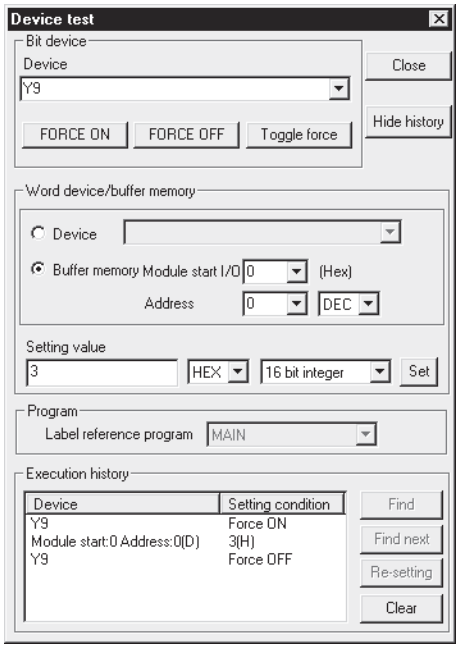
(b) The "Online module change completed." screen appears.

7.3.5 When user range setting is used and initial setting was made with sequence program (other system is available)

(1) Conversion disable

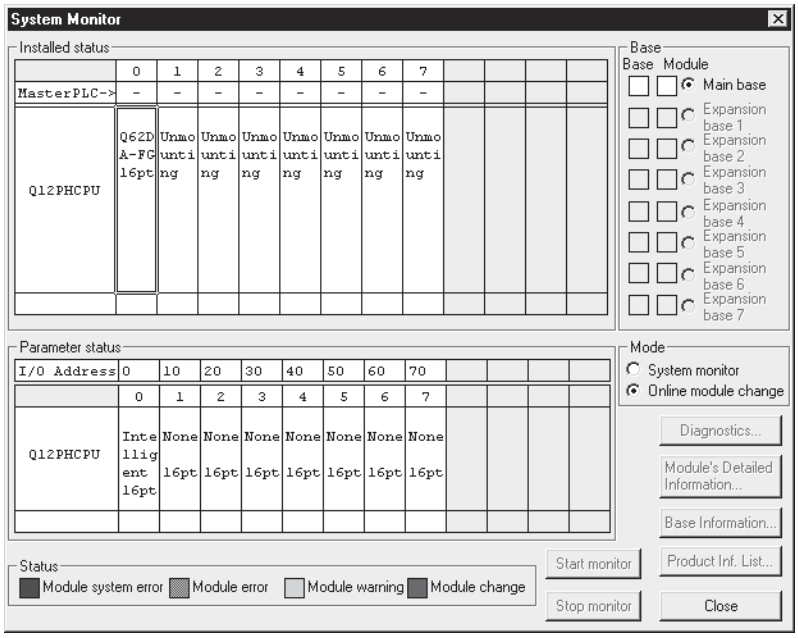
(a) Take the following steps to disable the conversion:

1) Set D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to All channel conversion disable (3_H).
2) Turn Operating condition setting request (Y9) from off to on to stop the conversion.
3) Operating condition setting completed flag (X9) turns off from on.
4) Check that the conversion is stopped by seeing the actual analog output value.
5) Turn Operating condition setting request (Y9) from on to off.



(2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.


System Monitor
Installed status
0 1 2 3 4 5 6 7
MasterPLC-> - - - - - - - -
Q12PHCPU
Q62DA-FG 16pt
Unmounting
Base
Base Module
Main base
Expansion base 1
Expansion base 2
Expansion base 3
Expansion base 4
Expansion base 5
Expansion base 6
Expansion base 7
Parameter status
I/O Address 0 10 20 30 40 50 60 70
0 1 2 3 4 5 6 7
Q12PHCPU
Intelligent 16pt
None 16pt
Mode
System monitor
Online module change
Diagnostics...
Module's Detailed Information...
Base Information...
Product Inf. List...
Status
Module system error
Module error
Module warning
Module change
Start monitor
Stop monitor
Close

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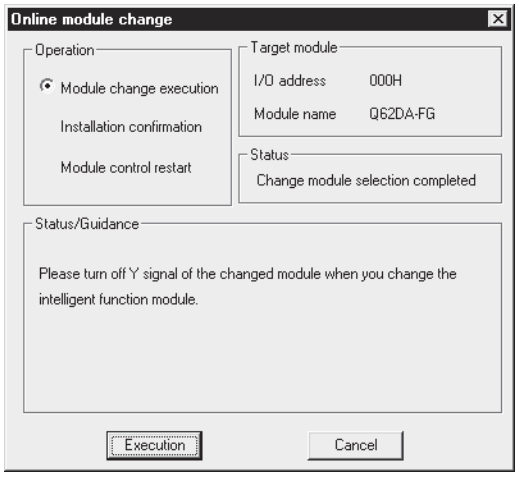
(b) Click the "Execution" button to enable a module change.



If the following error screen appears, the user range cannot be saved. Click the [OK] button, and perform the operation in Section 7.3.6 (2)(c) and later.

(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

POINT
Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

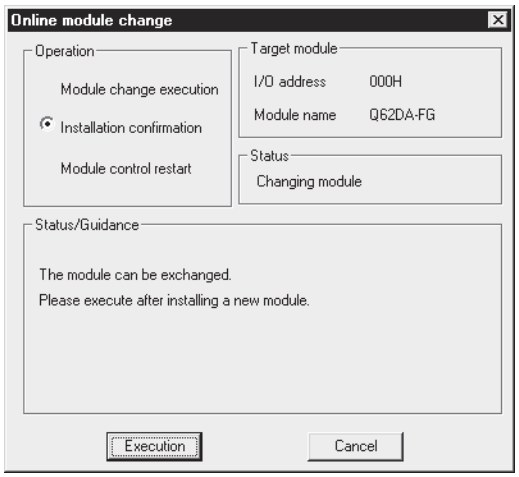
(a) Mount the dismounted module and new module to the other system.

(b) Using the G(P).OGLOAD instruction, save the user set values to the CPU device. Refer to Appendix 1.2 for the G(P).OGLOAD instruction.

(c) Using the G(P).OGSTOR instruction, restore the user set values to the module. Refer to Appendix 1.3 for the G(P).OGSTOR instruction.

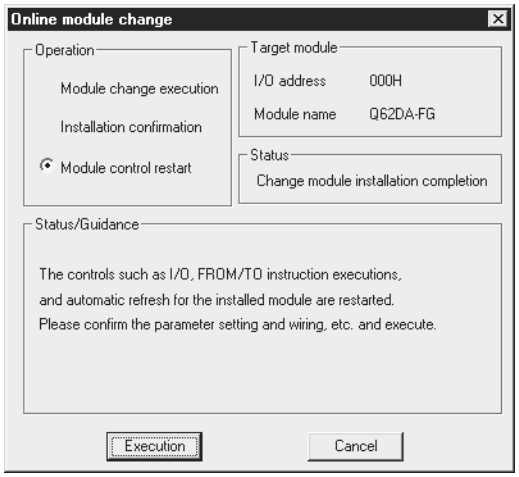
(d) Dismount the new module from the other system, mount it to the slot from where the old module was dismounted in the original system, and install the terminal block.

(e) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains off.

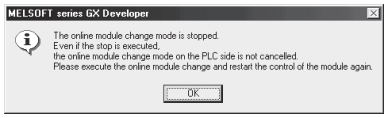


(4) Operation check

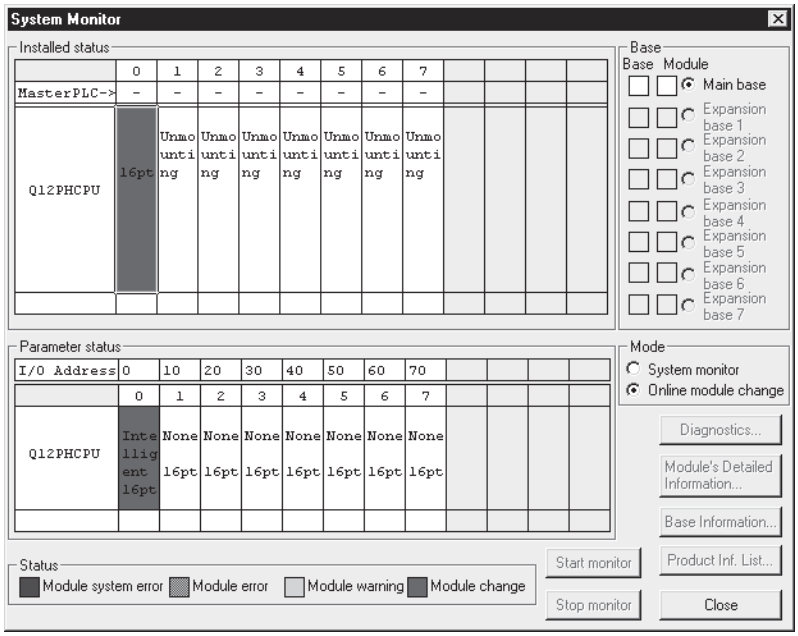
(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to stop the "Online module change" mode.



(c) Click the [Close] button to close the System monitor screen.



(d) Enable conversion using D/A conversion enable/disable setting (buffer memory address 0: Un\G0). Set digital values to CH□ Digital value (buffer memory address 1, 2: Un\G1, Un\G2) and turn Operating condition setting request (Y9) from off to on. Turn on CH□ Output enable/disable flag (Y1, Y2) of the channel to use to check whether the conversion has been succeeded.
(Be careful since analog outputs are provided actually.)

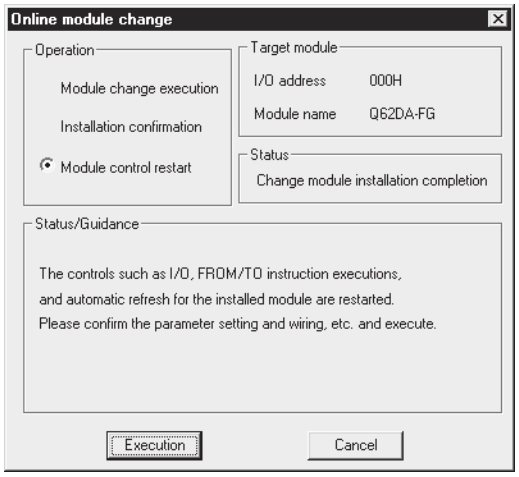
(e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
Before performing initialization, check whether the contents of the initialization program are correct or not.

1) Normal system configuration
The sequence program should perform initialization on the leading edge of Module ready (X0) of the Q62DA-FG.
When control resumption is executed, Module ready (X0) turns on and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)

2) When used on remote I/O network
Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn on the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

(5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to display the "Online module change" screen again, click the [Execution] button to resume control. Module ready (X0) turns on.



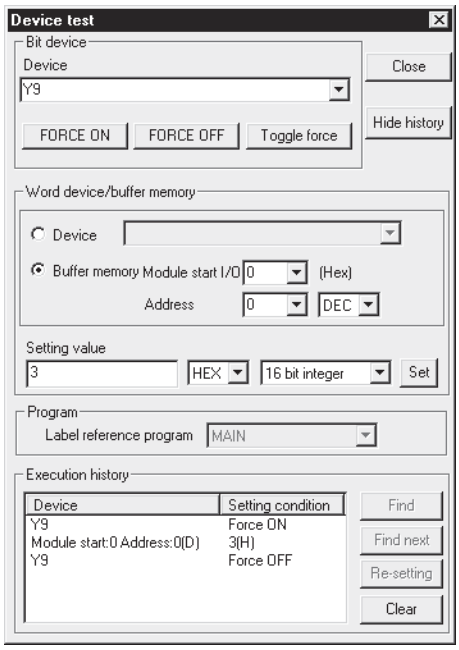
(b) The "Online module change completed" screen appears.

7.3.6 When user range setting is used and initial setting was made with sequence program (other system is unavailable)

(1) Conversion disable

(a) Take the following steps to disable the conversion:

1) Set D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to All channel conversion disable (3_H).
2) Turn Operating condition setting request (Y9) from off to on to stop the conversion.
3) Operating condition setting completed flag (X9) turns off from on.
4) Check that the conversion is stopped by seeing the actual analog output value.
5) Turn Operating condition setting request (Y9) from on to off.



(b) If the saved buffer memory contents are not yet prerecorded, record them in the following procedure.

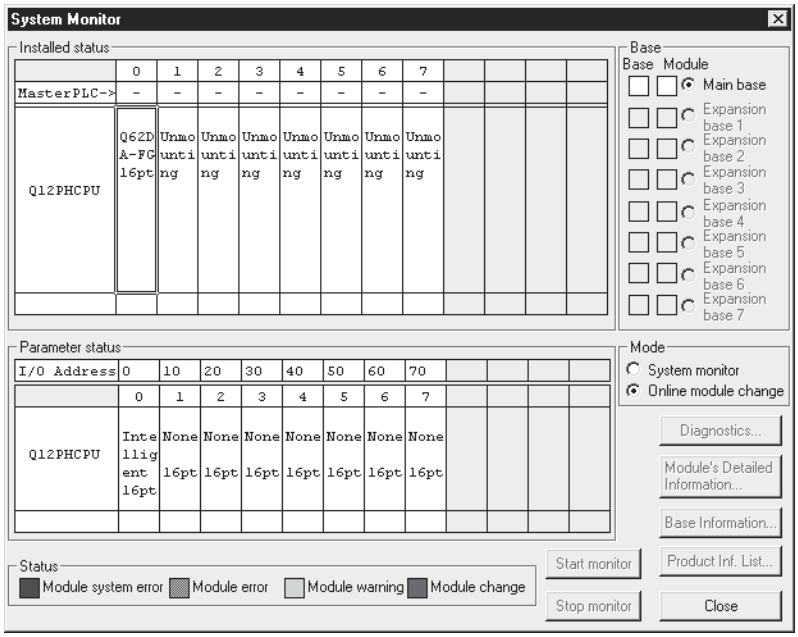
1) Perform Pass data classification setting (buffer memory address 200: Un\G200).
2) Turn Operating condition setting request (Y9) from off to on.
3) Compare the offset/gain values in CH□ Industrial shipment settings offset/gain value and CH□ User range settings offset/gain value (buffer memory address 202 to 217: Un\G202 to Un\G217) with the range reference table. Refer to Section 7.4 for the range reference table.
4) If the values are proper, record the offset/gain values of Pass data classification setting, industrial shipment settings and user range settings.

POINT

If the buffer memory values compared with the reference table are not proper, save and restoration of the user range cannot be executed.
Before executing module control resumption, follow the flowchart in Section 4.6 and make offset/gain setting in the device test of GX Developer.
Perform mode switching by making the setting of Mode switching setting (buffer memory address 158, 159: Un\G158, Un\G159) and turning Operating condition setting request (Y9) from off to on.
Note that if module control is resumed without offset/gain setting being made, operation will be performed with the default values.

(2) Dismounting of module

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.



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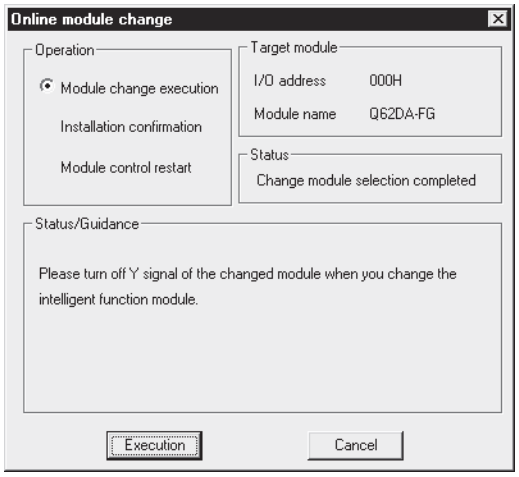
(b) Click the "Execution" button to enable a module change.



If the following error screen appears, the user range cannot be saved. Click the "OK" button, and perform the operations described (2) (c) in this section and later.

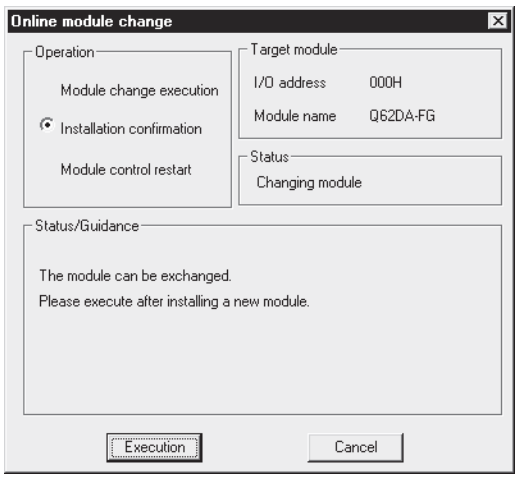
(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

POINT
Always dismount the module. If mounting confirmation is made without the module being dismounted, the module will not start properly and the "RUN" LED will not be lit.

(3) Mounting of new module

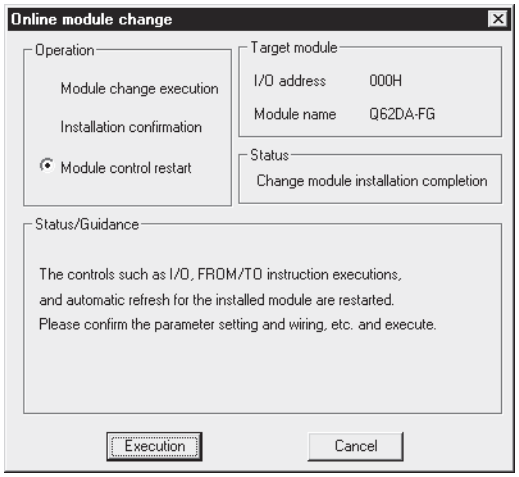
(a) Mount a new module to the same slot and install the terminal block.

(b) After mounting the module, click the [Execution] button and make sure that the "RUN" LED is lit. Module ready (X0) remains off.

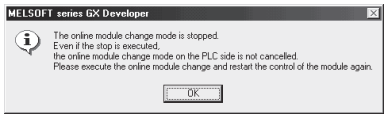


(4) Operation check

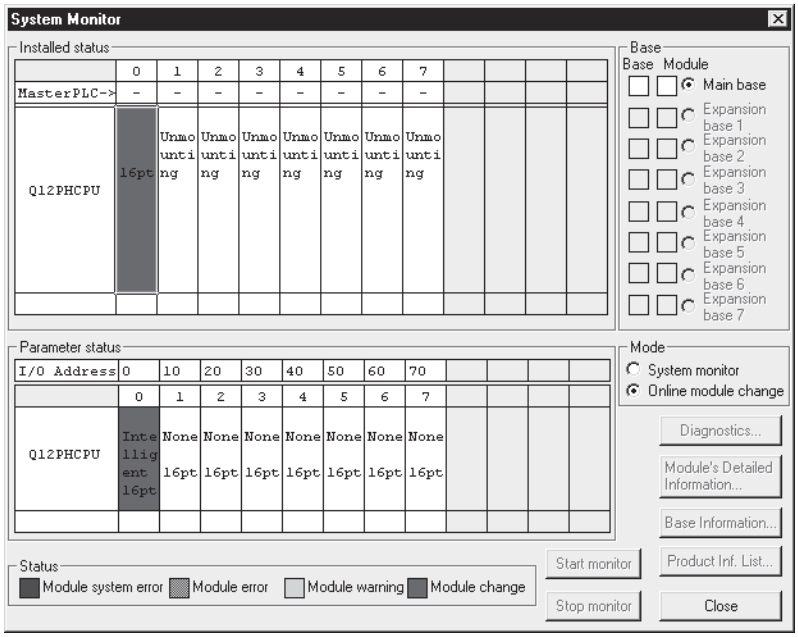
(a) To make an operation check, click the [Cancel] button to cancel control resumption.



(b) Click the [OK] button to stop the "Online module change" mode.



(c) Click the [Close] button to close the System monitor screen.



(d) Choose [Online] - [Debug] - [Device test] on GX Developer and set the values prerecorded in Section (2) to the buffer memory.

(e) Turn User range writing request (YA) from off to on to restore User set values to the module.
After confirming that Offset/gain setting mode flag (XA) is on, turn off User range writing request (YA).

(f) Set the used channels to "D/A conversion enabled" in D/A conversion enable/disable setting (buffer memory address 0: Un\G0). Set digital values to CH□ Digital value (buffer memory addresses 1, 2: Un\G1, Un\G2) and turn Operating condition setting request (Y9) from off to on. Turn on the output enable/disable flag (Y1, Y2) of the used channel to check whether proper conversion has been made. Enable conversion using D/A conversion enable/disable setting (buffer memory address 0: Un\G0). Set a digital value to CH□ Digital value (buffer memory address 1, 2: Un\G1, Un\G2) and turn Operating condition setting request (Y9) from off to on. Turn on CH□ Output enable/disable flag (Y1, Y2) of the channel to use to check whether the conversion has been succeeded.
(Be careful since analog outputs are provided actually.)

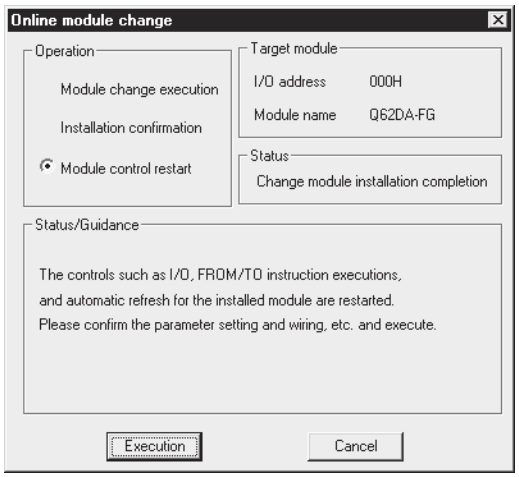
(g) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
Before performing initialization, check whether the contents of the initialization program are correct or not.

1) Normal system configuration
The sequence program should perform initialization on the leading edge of Module ready (X0) of the Q62DA-FG.
When control resumption is executed, Module ready (X0) turns on and initialization is performed. (If the sequence program performs initialization only one scan after RUN, initialization is not performed.)

2) When used on remote I/O network
Insert a user device that will execute initialization at any timing (initialization request signal) into the sequence program. After control resumption, turn on the initialization request signal to perform initialization. (If the sequence program performs initialization only one scan after a data link start of the remote I/O network, initialization is not performed.)

(5) Resumption of control

(a) After choosing [Diagnosis] - [Online module change] on GX Developer to display the "Online module change" screen again, click the [Execution] button to resume control. Module ready (X0) turns on.



(b) The "Online module change completed" screen appears.

7.4 Range Reference Table

The range reference tables are given below.

(1) Reference table for offset/gain values in CH□ Industrial shipment settings offset/gain value (buffer memory address 202 to 209: Un\G202 to Un\G209)

The reference values change depending on the setting of Pass data classification setting (buffer memory address 200: Un\G200).

Address (Decimal)		Description	Pass data classification setting	Reference value (Hexadecimal)
CH1	CH2			
202	204	Industrial shipment settings offset value (used for D/A)	User range setting 1	Approx. 7FC0H
			User range setting 2	Approx. 7FC0H
			User range setting 3	Approx. 14EAH
203	205	Industrial shipment settings gain value (used for D/A)	User range setting 1	Approx. F310H
			User range setting 2	Approx. E830H
			User range setting 3	Approx. 6895H
206	208	Industrial shipment settings offset value (used for monitor output)	User range setting 1	Approx. 0005H
			User range setting 2	Approx. 0920H
			User range setting 3	Approx. 1060H
207	209	Industrial shipment settings gain value (used for monitor output)	User range setting 1	Approx. 6665H
			User range setting 2	Approx. 519BH
			User range setting 3	Approx. 2D50H

(2) Reference table for CH□ User range settings offset/gain value (buffer memory address 210 to 217: Un\G210 to Un\G217)

Example: When the offset value of channel 1 is 4mA and its gain value is 18mA in user range settings 1, the user range settings offset/gain values are as indicated below.

- CH1 User range settings offset value (used for D/A) : Approx. 96D0H
  (Buffer memory address 210: Un\G210)
- CH1 User range settings gain value (used for D/A) : Approx. E788H
  (Buffer memory address 211: Un\G211)
- CH1 User range settings offset value (used for monitor output) : Approx. 147EH
  (Buffer memory address 214: Un\G214)
- CH1 User range settings gain value (used for monitor output) : Approx. 5C29H
  (Buffer memory address 215: Un\G215)

Offset/gain value		Reference value for D/A conversion (Hexadecimal)	Reference value for monitor output (Hexadecimal)
User range setting 1	0mA	Approx. 7FC0H	Approx. 0005H
	4mA	Approx. 96D0H	Approx. 147EH
	20mA	Approx. F310H	Approx. 6665H
User range setting 2	-10V	Approx. 6870H	Approx. C0A5H
	0V	Approx. 7FC0H	Approx. 0920H
	10V	Approx. E830H	Approx. 519BH
User range setting 3	1V	Approx. 14EAH	Approx. 01060H
	5V	Approx. 6895H	Approx. 2D50H

7.5 Precautions for Online Module Change

The followings are the precautions for Online module change.

(1) Always perform Online module change in the correct procedure. A failure to do so can cause a malfunction or failure.

(2) If Online module change is set in the user range setting, the accuracy after that will fall to about less than three times of the accuracy before that.
Re-set the offset/gain values as necessary.

(3) Do not perform Online module change in the offset/gain setting mode. (If performed, the Q62DA-FG may not operate properly.)

(4) Do not perform the following operations (a) and (b) during Online module change. (If performed, the Q62DA-FG may not operate properly.)
   (a) Power off the programmable controller CPU.
   (b) Reset the programmable controller CPU.

(5) If a module having the first five digits (product information) 11102 or later was replaced with a module having 11042 or later, the following settings are ignored.
   • Disconnection detection mode setting (buffer memory address 141: Un\G141),
   • CH□ Disconnection detection setting value (buffer memory address 142,143: Un\G142, Un\G143).
   In this case, the disconnection detection function operates by default (detect the disconnection at an output monitor value of 1mA).

8 TROUBLESHOOTING

This chapter explains the types of errors that may occur when the Q62DA-FG is used, and how to troubleshoot such errors.

8.1 Error Code List

If an error occurs in the Q62DA-FG while writing to or reading data from the programmable controller CPU, the applicable error code is written to buffer memory address 19 (Un\G19).

Table 8.1 Error code list (1/2)

Error code (decimal)	Error description	Processing
10□	The setting is outside the output range setting that can be made by the intelligent function module switch of the GX Developer. □ indicates the incorrectly specified channel number.	Reset to the correct parameter with GX Developer parameter setting. (Refer to Section 4.5.)
111	Module error at startup.	Turn the power on and off again. If the error occurs again, the module may be malfunctioning. Contact the nearest distributor or branch office with a description of the problem.
112	The value set to the intelligent function module switch 5 is other than 0.	Re-set the correct parameter value in the parameter setting of GX Developer. (Refer to Section 4.5.)
161 *1	The G(P).OGSTOR instruction was executed in the offset/gain setting mode.	Do not execute the G(P).OGSTOR instruction in the offset/gain setting mode.
162 *2	• The G(P).OGSTOR instruction was executed consecutively. • At the time of offset/gain setting, a set value was written to the E^2PROM 26 or more times.	• Execute the G(P).OGSTOR instruction only once for one module. • At the time of offset/gain setting, write a set value only once at one time.
163 *2	The G(P).OGSTOR instruction was executed for the model that differs from the model for which the G(P).OGLOAD instruction had been executed.	Execute the G(P).OGLOAD and G(P).OGSTOR instructions for the same model.
164	The value set to the G(P).OGLOAD instruction, G(P).OGSTOR instruction, or Pass data classification setting (buffer memory address 200: Un\G200) is outside the range.	Set the value within the range.
40□ *2	The offset value is equal to or larger than the gain value. □ indicates the channel number causing the error.	Reset so that the offset value becomes smaller than the gain value.
500 *2	More than one channel was set at the same time during offset/gain settings.	Set the correct value in buffer memory address 22 and 23 (Un\G22 and Un\G23).
60□ *2 *3	The specified digital value is outside the valid range. □ indicates the channel number where the error occurred.	Set a value that is within the valid range.
61□ *2	The warning output upper/lower limit value setting is outside the range -16384 to 16383. □ indicates the channel number incorrectly set.	Correct values of the buffer memory address 86 to 89 (Un\G86 to Un\G89) to the value within the range from 16384 to 16383.

Table 8.1 Error code list (2/2)

Error code (decimal)	Error description	Processing
62□ ＊2	The warning output lower limit value is equal to or greater than the warning output upper limit value. □ indicates the channel number incorrectly set.	Make setting so that the warning output upper limit value is greater than the warning output lower limit value.
63□ ＊2	The value set to Disconnection detection mode setting is other than 0H, 1H, and 2H. □ indicates an error channel number incorrectly set.	Set any of 0H, 1H, or 2H to buffer memory address 141 (Un\G141).
64□ ＊2	The value set to the disconnection detection setting value is out of the range from 0 to 250. □ indicates an error channel number incorrectly set.	Correct the values in buffer memory address 142, 143 (Un\G142, Un\G143) within the range from 0 to 250.
700 ＊2	The analog adjustment output in the offset/gain setting mode is outside the specified value range.	Change the contents of buffer memory address 24 (Un\G24) so that it is within the range from –3000 to 3000.
71□ ＊2	The offset/gain range setting is outside the range DH to FH.	Correct the contents of the buffer memory address 25 (Un\G25) to within the range DH to FH.
80□ ＊2	The increase/decrease digital limit value setting is outside the range 0 to 32000. □ indicates the channel number incorrectly set.	Correct the values of the buffer memory address 70 to 73 (Un\G70 to Un\G73) to the values within the range from 0 to 32000.

POINT

(1) When two or more errors occur, the latest error code is stored.

(2) Error code 161 marked with ＊1 is not stored in the buffer memory address 19 (Un\G19). It is written to the Completion status area, (S) + 1, of the G(P).OGSTOR instruction.

(3) Error code marked with ＊2 can be cleared by turning on Error clear request (YF).

(4) If the error marked with ＊3 occurs continuously, it is added to the error history of GX Developer in each conversion cycle.

8.2 Troubleshooting

8.2.1 When the "RUN" LED is flashing or turned off

(1) When flashing

Check item	Corrective action
Is the mode set to the offset/gain setting mode?	Reset switch 4 of the intelligent function module switch setting for GX Developer to the normal mode (Refer to Section 4.5).

(2) When off

Check item	Corrective action
Is power being supplied?	Confirm that the supply voltage for the power supply module is within the rated range.
Is the capacity of the power supply module adequate?	Calculate the current consumption of the CPU module, I/O module and intelligent function module mounted on the base unit to see if the power supply capacity is adequate.
Has a watchdog timer error occurred?	Reset the programmable controller CPU and verify that it is lit. If the RUN LED does not light even after doing this, the module may be malfunctioning. Contact the nearest distributor or branch office with a description of the problem.
Is the module correctly mounted on the base unit?	Check the mounting condition of the module.
Is a module change enabled during Online module change?	Refer to Chapter 7 and take corrective action.

8.2.2 When the "ERR." LED is on or flashing

(1) When on

Check item	Corrective action
Is an error being generated?	Confirm Error code and take corrective action described in Section 8.1.

(2) When flashing

Check item	Corrective action
Is intelligent function module setting switch 5 set to "other than 0"?	Using GX Developer parameter setting, set intelligent function module setting switch 5 to "0" (Refer to Section 4.5).

8.2.3 When the "ALM" LED is turned on or flashing

(1) When on

Check item	Corrective action
Has the warning output occurred?	Check Warning output flag (buffer memory address 48, Un\G48).

(2) When flashing

Check item	Corrective action
Has the disconnection occurred?	Check Disconnection detection flag (buffer memory address 49, Un\G49).

8.2.4 When an analog output value is not output

Check item	Action to be taken
Is 24VDC external power supply being supplied?	Verify that 24VDC voltage is being supplied to the external power supply terminals (terminal numbers 16, 17).
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.
Is the CPU module in the STOP status?	Set the CPU module to the RUN status.
Are the offset/gain settings correct?	Verify that the offset/gain settings are correct (Refer to sections 4.6 and 5.6.2). If the user range setting is set to the Q62DA-FG, switch the output range to one of defaults. Then check if D/A conversion is performed correctly. If the input is properly converted, reconfigure the offset/gain settings.
Is the output setting range correct?	Verify buffer memory address 20 (Un\G20) in GX Developer monitor. If the output range setting is incorrect, redo GX Developer intelligent function module switch settings (Refer to Section 4.5).
Is D/A conversion enable/disable setting for the channel to be output set to D/A conversion disabled?	Check D/A conversion enable/disable setting using buffer memory 0 (Un\G0) in GX Developer monitor and set it to Enable using the sequence program or utility package (Refer to Section 3.4).
Is the D/A output enable/disable setting for the channel to be output set to Disable?	Verify on/off for Output enable/disable flags (Y1, 2) in GX Developer monitor. If the output enable/disable flags are off, review the initial setting for the sequence program or utility package (Refer to Section 3.3).
Is the digital value being written to the channel to be output?	Verify buffer memory address 1, 2 (Un\G1, Un\G2) in GX Developer monitor (Refer to Section 3.4).
Has Operating condition setting request (Y9) been executed?	Set Operating condition setting request (Y9) from on to off from GX Developer and check to see if the analog output is normal. If normal analog output is obtained, review the initial setting for the sequence program or utility package (Refer to Section 3.3).

POINT

If the analog output value is not output after the proper corrective action is taken in accordance with the above check item, the possible cause is a module failure. Consult the nearest sales representative or branch.

8.2.5 When an analog output value is not held

Check item	Action to be taken
Is the HOLD/CLEAR setting correct?	Check the Switch 3 setting of the intelligent function module switch setting on GX Developer.
Is the Q62DA-FG used on a MELSECNET/H remote I/O station?	Take corrective actions, referring to POINT in Section 3.2.1.

8.2.6 Checking the Q62DA-FG status using GX Developer system monitor

When the Q62DA-FG detail information is selected in GX Developer system monitor, function version, Error code, LED on status and status of the intelligent function module switch setting can be checked.

(1) Operating the GX Developer

[Diagnostics] → [System monitor] → "Select Q62DA-FG" → Module's Detailed Information

(2) Module Detailed Information

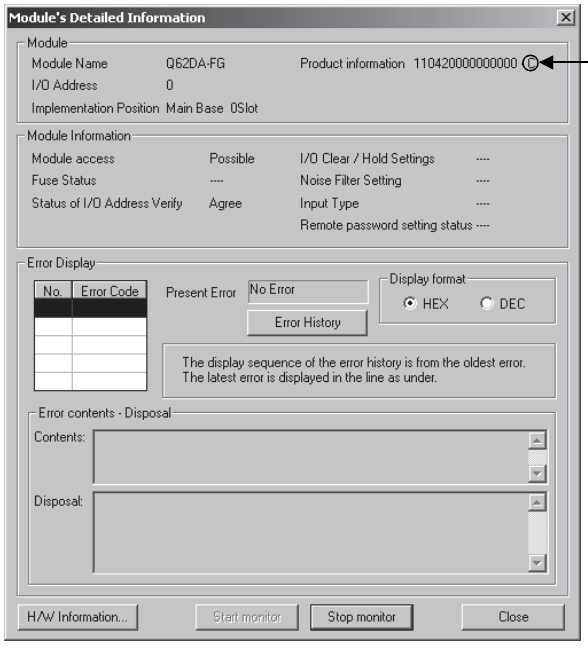
(a) Checking the function version

The function version of the Q62DA-FG is displayed in the product information field.

(b) Checking Error code

Error code stored in buffer memory address 19 (Un\G19) of the Q62DA-FG is displayed in the Present Error field.

(When the Error History button is pressed, the contents displayed in the Present Error field are displayed in the No.1 field.)



(3) H/W information

(a) H/W LED information

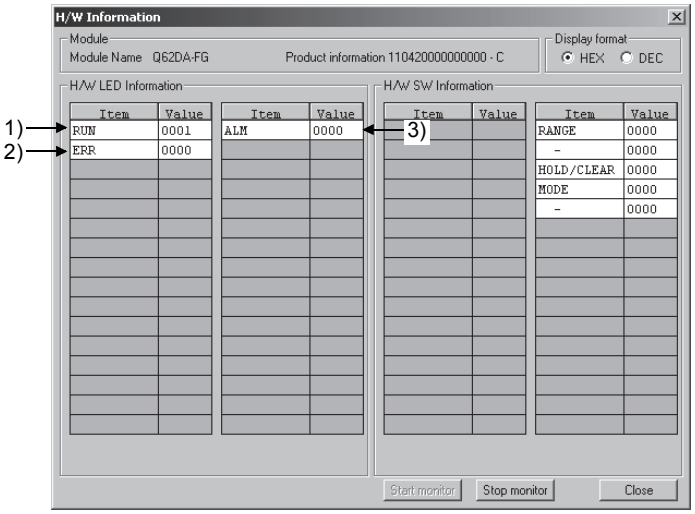
The LED status is displayed.

No.	LED name	Status
1)	RUN LED	0000_H : Indicates that LED is unlit. 0001_H : Indicates that LED is lit
2)	ERR. LED	
3)	ALM LED	

(b) H/W SW information

The status of the intelligent function module switch setting is displayed.

No.	Switch setting for intelligent function module
1	Switch 1
2	Switch 2
3	Switch 3
4	Switch 4
5	Switch 5



(In the case of GX Developer Version 8.90U)

APPENDIX

Appendix 1 Dedicated Instruction List and Available Devices

(1) Dedicated instruction list

The following table lists the dedicated instructions that can be used with the Q62DA-FG.

Instruction	Description	Reference section
G(P).OFFGAN	Switches to the offset/gain setting mode. Switches to the normal mode.	Appendix 1.1
G(P).OGLOAD	Reads the offset/gain values of the user range setting to the CPU.	Appendix 1.2
G(P).OGSTOR	Restores the offset/gain values of the user range setting stored in the CPU to the Q62DA-FG.	Appendix 1.3

POINT

When the module is mounted to a MELSECNET/H remote station, the dedicated instructions cannot be used.

(2) Available devices

The following devices are available for the dedicated instructions:

Internal devices		File register	Constant *2
Bit *1	Word		
X, Y, M, L, F, V, B	T, ST, C, D, W	R, ZR	K, H

*1 Word device bit designation can be used as bit data.
Word device bit designation is done by designating [Word device] . [Bit No.].
(Designation of bit numbers is done in hexadecimal.)
For example, bit 10 of D0 is designated as [D0.A].
However, there can be no bit designation for timers (T), retentive timers (ST) and counters (C).

*2 Available devices are given in each of the Constant field.

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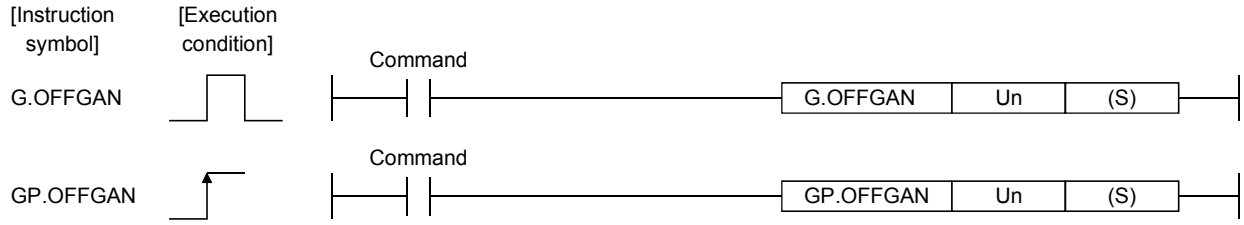
Appendix 1.1 G(P).OFFGAN

Switches the mode of the Q62DA-FG. (Normal mode to offset/gain setting mode, offset/gain setting mode to normal mode)

Setting data	Usable devices									
	Internal device (System, user)		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Z□	Constant		Others
	Bit	Word		Bit	Word			K, H	$	
(S)	—	○		—				—	—	—



Setting data

Setting data	Description	Setting range	Data type
Un	Start I/O number of the module	0 to FEH	Binary 16 bits
(S)	Mode switching 0: Switching to normal mode 1: Switching to offset/gain setting mode The setting of any other value results in "switching to offset/gain setting mode".	0 ,1	Binary 16 bits

(1) Function

Switches the mode of the Q62DA-FG.

- Normal mode to offset/gain setting mode (Offset/gain setting mode flag (XA) turns on)
- Offset/gain setting mode to normal mode (Offset/gain setting mode flag (XA) turns off)

POINT

(1) When the offset/gain setting mode is switched to the normal mode, Module ready (X0) turns from off to on.
Note that initial setting processing will be executed if there is a sequence program that makes initial setting when Module ready (X0) turns on.

(2) D/A conversion is discontinued if the mode is switched (from the normal mode to the offset/gain setting mode or from the offset/gain setting mode to the normal mode).
To resume D/A conversion, switch to the normal mode and then turn on Operating condition setting request (Y9).

(2) Operation error

No errors.

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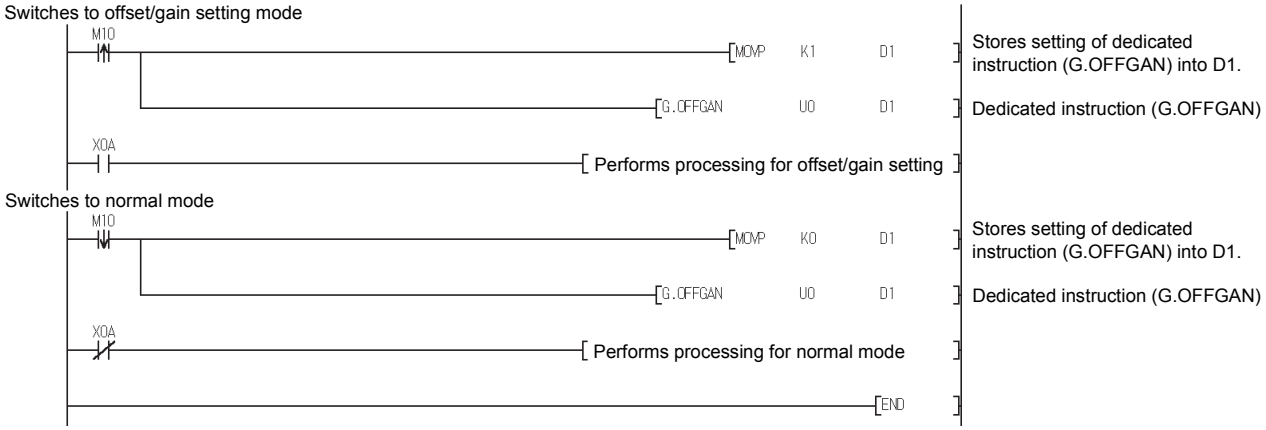
(3) Program example

The following program is designed to switch the Q62DA-FG mounted in the position of I/O number X/Y0 to X/YF to the offset/gain setting mode when M10 is turned on, and to return it to the normal mode when M10 is turned off.



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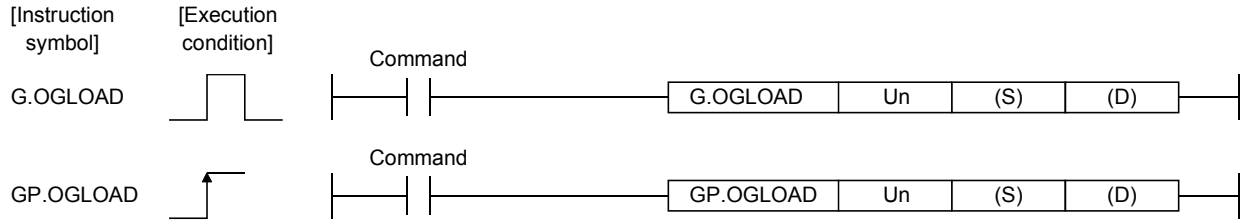
Appendix 1.2 G(P).OGLOAD

Reads the offset/gain values of the user range setting of the Q62DA-FG to the CPU.

Setting data	Usable devices									
	Internal device (System, user)		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Z□	Constant		Others
	Bit	Word		Bit	Word			K, H	$	
(S)	—	○		—				—	—	—
(D)	○			—				—	—	—



Setting data

Setting data	Description	Setting range	Data type
Un	Start I/O number of the module	0 to FEH	Binary 16 bits
(S)	Start number of the device in which control data is stored.	Within the range of the specified device	Device name
(D)	Device that is turned on 1 scan on completion of dedicated instruction processing. (D) + 1 also turns on at an abnormal completion.	Within the range of the specified device	Bit

Control data *1 (1/2)

Device	Item	Setting data	Setting range	Set by
(S)	System area	—	—	—
(S) + 1	Completion status	Stores the status when the instruction is complete. 0 : Normal completion Other than 0: Abnormal completion	—	System
(S) + 2	Pass data classification setting	Specify the user range setting where offset/gain values will be read. 0H: Use range setting 1 specified 1H: Use range setting 2 specified 2H: Use range setting 3 specified b15 to b12 | b11 to b8 | b7 to b4 | b3 to b0 0H | 0H | CH2 | CH1	—	User
(S) + 3	System area	—	—	—
(S) + 4	CH1 Industrial shipment settings offset value (used for D/A)	—	—	System
(S) + 5	CH1 Industrial shipment settings gain value (used for D/A)	—	—	System
(S) + 6	CH2 Industrial shipment settings offset value (used for D/A)	—	—	System
(S) + 7	CH2 Industrial shipment settings gain value (used for D/A)	—	—	System
(S) + 8	CH1 Industrial shipment settings offset value (used for monitor output)	—	—	System
(S) + 9	CH1 Industrial shipment settings gain value (used for monitor output)	—	—	System

*1 Set only the pass data classification setting (S)+2. If data is written to the area set by the system, the offset/gain values will not be read properly.

Control data ∗1 (2/2)

Device	Item	Setting data	Setting range	Set by
(S) + 10	CH2 Industrial shipment settings offset value (used for monitor output)	—	—	System
(S) + 11	CH2 Industrial shipment settings gain value (used for monitor output)	—	—	System
(S) + 12	CH1 User range settings offset value (used for D/A)	—	—	System
(S) + 13	CH1 User range settings gain value (used for D/A)	—	—	System
(S) + 14	CH2 User range settings offset value (used for D/A)	—	—	System
(S) + 15	CH2 User range settings gain value (used for D/A)	—	—	System
(S) + 16	CH1 User range settings offset value (used for monitor output)	—	—	System
(S) + 17	CH1 User range settings gain value (used for monitor output)	—	—	System
(S) + 18	CH2 User range settings offset value (used for monitor output)	—	—	System
(S) + 19	CH2 User range settings gain value (used for monitor output)	—	—	System

∗1 Set only Pass data classification setting (S)+2. If data is written to the area set by the system, the offset/gain values will not be read properly.

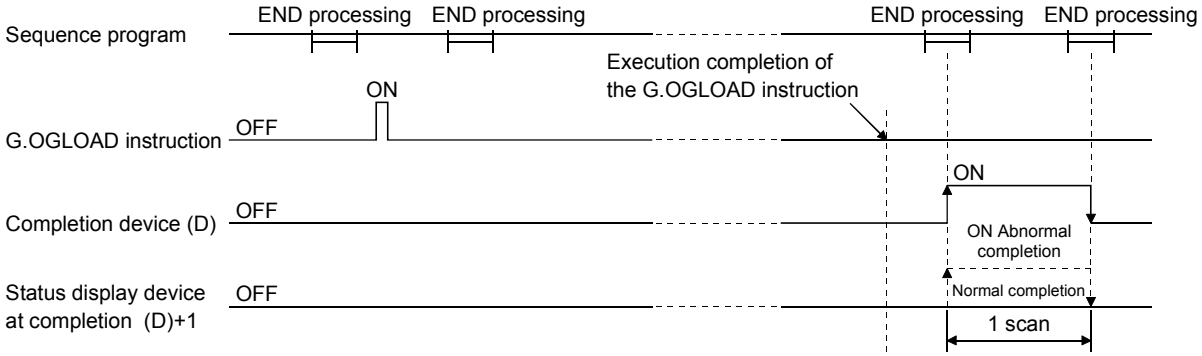
(1) Functions

(a) Reads the offset/gain values of the user range setting of the Q62DA-FG to the CPU.

(b) There are two types of interlock signals for the G(P).OGLOAD instruction: the completion device (D) and the status display device at completion (D) + 1.

1) Completion device
Turns on in the END processing of the scan where the G(P).OGLOAD instruction is completed, and turns off in the next END processing.

2) Status display device at completion
Turns on and off depending on the completion status of the G(P).OGLOAD instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on in the END processing of the scan where the G(P).OGLOAD instruction is completed, and turns off in the next END processing.



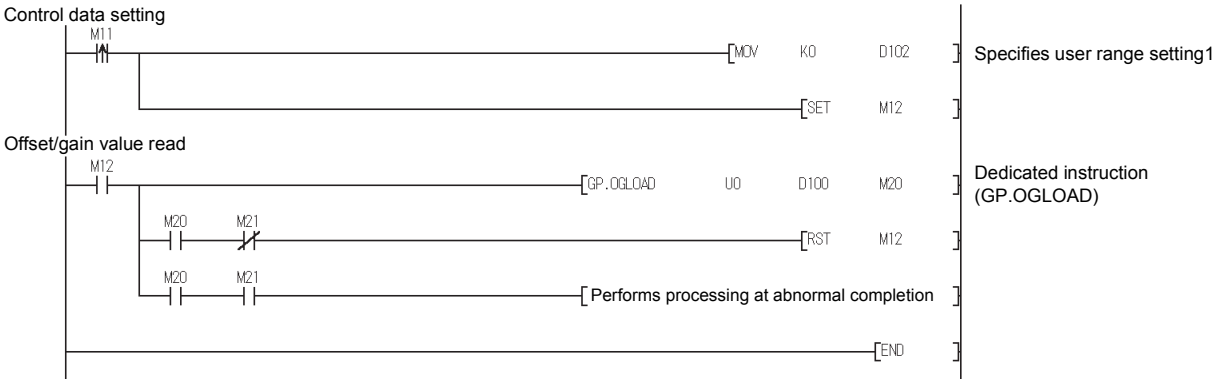
(2) Operation error

In the following case, an error occurs and the corresponding error code is stored into the completion status area (S)+1.

Error code	Case resulting in operation error
164	The value set to Pass data classification setting (S)+2 is outside the range.

(3) Program example

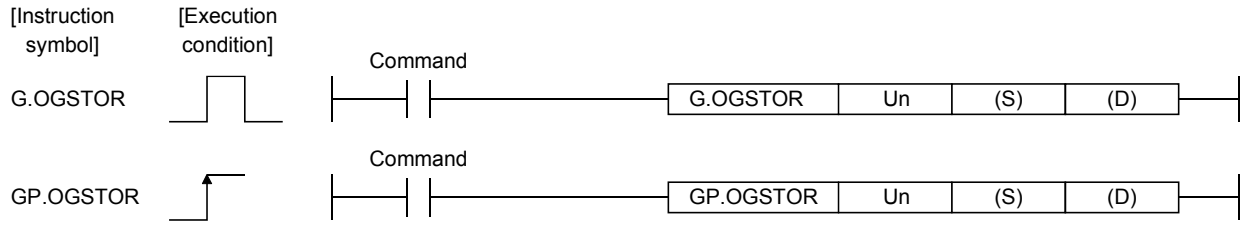
The following program is designed to read the offset/gain values of the Q62DA-FG mounted in the position of I/O number X/Y0 to X/YF when M11 is turned on.



Appendix 1.3 G(P).OGSTOR

Restores the offset/gain values of the user range setting stored in the CPU to the Q62DA-FG.

Setting data	Usable devices									
	Internal device (System, user)		File register	Link direct device J□\□		Intelligent function module device U□\G□	Index register Z□	Constant		Others
	Bit	Word		Bit	Word			K, H	$	
(S)	—	○		—				—	—	—
(D)		○		—				—	—	—



Setting data

Setting data	Description	Setting range	Data type
Un	Start I/O number of the module	0 to FEH	Binary 16 bits
(S) ＊1	Start number of the device in which control data is stored.	Within the range of the specified device	Device name
(D)	Device that is turned on 1 scan on completion of dedicated instruction processing. (D) + 1 also turns on at an abnormal completion.	Within the range of the specified device	Bit

＊1 When executing the G(P).OGLOAD instruction, specify the device designated in (S).
Do not change the data read with the G(P).OGLOAD instruction.
If it is changed, normal operation cannot be guaranteed.

Control data ＊1 (1/2)

Device	Item	Setting data	Setting range	Set by
(S)	System area	—	—	—
(S) + 1	Completion status	Stores the status when the instruction is complete. 0 : Normal completion Other than 0: Abnormal completion (Error code)	—	System
(S) + 2	Pass data classification setting	The value set to Pass data classification setting (S)+2 using the G(P).OGLOAD instruction is stored. 0H: Use range setting 1 specified 1H: Use range setting 2 specified 2H: Use range setting 3 specified b15 to b12 | b11 to b8 | b7 to b4 | b3 to b0 0H | 0H | CH2 | CH1	—	User
(S) + 3	System area	—	—	—
(S) + 4	CH1 Industrial shipment settings offset value (used for D/A)	—	—	System
(S) + 5	CH1 Industrial shipment settings gain value (used for D/A)	—	—	System
(S) + 6	CH2 Industrial shipment settings offset value (used for D/A)	—	—	System
(S) + 7	CH2 Industrial shipment settings gain value (used for D/A)	—	—	System

Control data ＊1 (2/2)

Device	Item	Setting data	Setting range	Set by
(S) + 8	CH1 Industrial shipment settings offset value (used for monitor output)	—	—	System
(S) + 9	CH1 Industrial shipment settings gain value (used for monitor output)	—	—	System
(S) + 10	CH2 Industrial shipment settings offset value (used for monitor output)	—	—	System
(S) + 11	CH2 Industrial shipment settings gain value (used for monitor output)	—	—	System
(S) + 12	CH1 User range settings offset value (used for D/A)	—	—	System
(S) + 13	CH1 User range settings gain value (used for D/A)	—	—	System
(S) + 14	CH2 User range settings offset value (used for D/A)	—	—	System
(S) + 15	CH2 User range settings gain value (used for D/A)	—	—	System
(S) + 16	CH1 User range settings offset value (used for monitor output)	—	—	System
(S) + 17	CH1 User range settings gain value (used for monitor output)	—	—	System
(S) + 18	CH2 User range settings offset value (used for monitor output)	—	—	System
(S) + 19	CH2 User range settings gain value (used for monitor output)	—	—	System

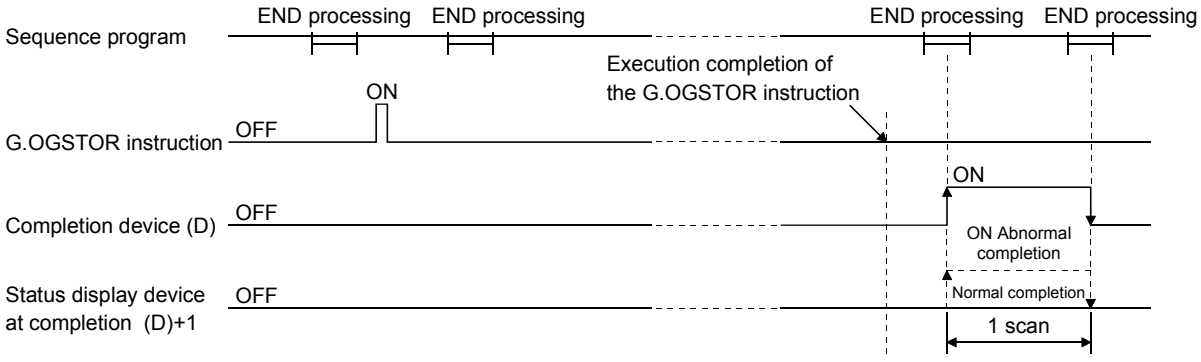
(1) Functions

(a) Restores the offset/gain values of the user range setting stored in the CPU to the Q62DA-FG.

(b) There are two types of interlock signals for the G(P).OGSTOR instruction: the completion device (D) and the status display device at completion (D) + 1.

1) Completion device
Turns on in the END processing of the scan where the G(P).OGSTOR instruction is completed, and turns off in the next END processing.

2) Status display device at completion
Turns on and off depending on the completion status of the G(P).OGSTOR instruction.
Normal completion : Stays off and does not change.
Abnormal completion: Turns on in the END processing of the scan where the G(P).OGSTOR instruction is completed, and turns off in the next END processing.



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(c) When the offset/gain values are restored, the reference accuracy falls to about less than three times of the accuracy before that.

POINT
D/A conversion is suspend if the G(P).OGSTOR instruction is executed. To resume the D/A conversion, turn Operating condition setting request (Y9) from off to on, then to off again.

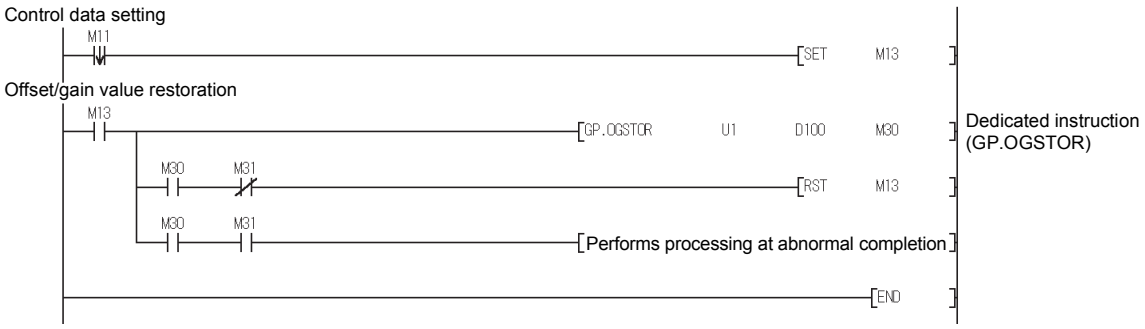
(2) Operation error

In any of the following cases, an error occurs and the corresponding error code is stored into the completion status area (S)+1.

Error code	Case resulting in operation error
161	The G(P).OGSTOR instruction was executed in the offset/gain setting mode.
162	The G(P).OGSTOR instruction was executed consecutively.
163	The G(P).OGSTOR instruction was executed for the model that differs from the model for which the G(P).OGLOAD instruction had been executed.
164	The value set to Pass data classification setting (S)+2 is outside the range.

(3) Program example

The following program is designed to read the offset/gain values of the Q62DA-FG mounted in the position of I/O number X/Y0 to X/YF when M11 is turned on.



Appendix 2 Performance Comparison between the Q62DA-FG and Q62DA

The following table indicates performance comparison between the Q62DA-FG and Q62DA.

Table Appendix. 1 Performance Comparison Table

<table>
<tr><th>Item \ Type</th><th>Q62DA-FG</th><th>Q62DA</th></tr>
<tr><td>Number of analog outputs</td><td colspan="2">2 points (2 channels)</td></tr>
<tr><td>Digital input</td><td>16-bit signed binary (-12288 to 12287, -16384 to 16383)</td><td>16-bit signed binary (normal resolution mode: -4096 to 4095, high resolution mode: -12288 to 12287, -16384 to 16383)</td></tr>
<tr><td>Analog output: Voltage</td><td>-12 to 12VDC (External load resistance: 1k to 1MΩ)</td><td>–10 to 10 V DC (External load resistance value: 1 kΩ to 1MΩ)</td></tr>
<tr><td>Analog output: Current</td><td>0 to 20mADC (External load resistance: 0 to 600Ω)
0 to 22mADC</td><td>0 to 20 mA DC
(External load resistance value: 0Ω to 600Ω)</td></tr>
<tr><td>I/ O characteristics maximum resolution</td><td>
<table>
<tr><th colspan="2">Analog output range</th><th>Digital input value</th><th>Maximum resolution</th></tr>
<tr><td rowspan="6">Voltage</td><td>0 to 5V</td><td rowspan="2">0 to 12000</td><td>0.416mV</td></tr>
<tr><td>1 to 5V</td><td>0.333mV</td></tr>
<tr><td>-10 to 10V</td><td>-16000 to 16000</td><td>0.625mV</td></tr>
<tr><td>1 to 5V (Extended mode)</td><td>-3000 to 13500</td><td>0.333mV</td></tr>
<tr><td>User range setting 2</td><td rowspan="2">-12000 to 12000</td><td>0.366mV</td></tr>
<tr><td>User range setting 3</td><td>0.183mV</td></tr>
<tr><td rowspan="4">Current</td><td>0 to 20mA</td><td rowspan="2">0 to 12000</td><td>1.66 μA</td></tr>
<tr><td>4 to 20mA</td><td>1.33 μA</td></tr>
<tr><td>4 to 20mA (Extended mode)</td><td>-3000 to 13500</td><td>1.33 μA</td></tr>
<tr><td>User range setting 1</td><td>-12000 to 12000</td><td>0.671 μA</td></tr>
</table>
</td><td>
<table>
<tr><th colspan="2">Analog output range</th><th>Digital input value*1</th><th>Maximum resolution*1</th></tr>
<tr><td rowspan="3">Voltage</td><td>0 to 5V</td><td rowspan="2">0 to 4000
(0 to 12000)</td><td>1.25mV
(0.416mV)</td></tr>
<tr><td>1 to 5V</td><td>1.0mV
(0.333mV)</td></tr>
<tr><td>-10 to 10V</td><td>-4000 to 4000
(-16000 to 16000)</td><td>2.5mV
(0.625mV)</td></tr>
<tr><td rowspan="3">Current</td><td>User range setting</td><td>-4000 to 4000
(-12000 to 12000)</td><td>0.75mV
(0.333mV)</td></tr>
<tr><td>0 to 20mA</td><td rowspan="2">0 to 4000
(0 to 12000)</td><td>5μA
(1.66μA)</td></tr>
<tr><td>4 to 20mA</td><td>4μA
(1.33μA)</td></tr>
<tr><td>User range setting</td><td>-4000 to 4000
(-12000 to 12000)</td><td>1.5μA
(0.83μA)</td></tr>
</table>
</td></tr>
<tr><td>Accuracy (Accuracy relative to maximum analog output value)</td><td>Reference accuracy:
Within ± 0.1% (Voltage: ± 10mV, Current: ± 20 μA)
Temperature coefficient: ± 80ppm/ °C (± 0.008%/ °C)</td><td>Ambient temperature 25 ± 5 °C:
Within ± 0.1 % (Voltage: ±10 mV, Current: ± 20 μA)
Ambient temperature 0 to 55 °C:
Within ± 0.3 % (Voltage: ± 30 mV, Current: ± 60 μA)</td></tr>
<tr><td>Conversion speed</td><td>10ms/2 channels</td><td>80 μs/channel</td></tr>
<tr><td>Absolute maximum output: Voltage</td><td>± 13V</td><td>± 12 V</td></tr>
<tr><td>Absolute maximum output: Current</td><td>23mA</td><td>21 mA</td></tr>
<tr><td>Output monitor: Resolution</td><td>12bit</td><td rowspan="3">—</td></tr>
<tr><td>Output monitor: Reference accuracy</td><td>± 0.2%</td></tr>
<tr><td>Output monitor: Temperature coefficient</td><td>± 160ppm/ °C (± 0.016%/ °C)</td></tr>
<tr><td>Maximum number of writes for E²PROM</td><td colspan="2">Max. 100 thousand times</td></tr>
<tr><td>Output short-circuit protection</td><td colspan="2">Available</td></tr>
<tr><td>Isolation specifications</td><td>
<table>
<tr><th>Specific isolated area</th><th>Isolation method</th><th>Dielectric withstand voltage</th><th>Insulation resistance</th></tr>
<tr><td>Between the I/O terminal and programmable controller power supply</td><td>Photocoupler isolation</td><td rowspan="3">1780VAC rms/3 cycles (elevation 2000m)</td><td rowspan="3">500VDC 10MΩ or more</td></tr>
<tr><td>Between analog output channels</td><td>Transformer isolation</td></tr>
<tr><td>Between external supply power and analog output cannel</td><td>Transformer isolation</td></tr>
</table>
</td><td>
<table>
<tr><th>Specific isolated area</th><th>Isolation method</th><th>Dielectric withstand voltage</th><th>Insulation resistance</th></tr>
<tr><td>Between the I/O terminal and programmable controller power supply</td><td>Photocoupler isolation</td><td>500VAC for 1 minute</td><td>500VDC 20MΩ or more</td></tr>
<tr><td>Between analog output channels</td><td>No insulation</td><td>—</td><td>—</td></tr>
<tr><td>Between external supply power and analog output cannel</td><td>No insulation</td><td>—</td><td>—</td></tr>
</table>
</td></tr>
<tr><td>Number of I/O occupied points</td><td colspan="2">16 points</td></tr>
<tr><td>Connected terminal</td><td colspan="2">18 points terminal block</td></tr>
<tr><td>Applicable wire size</td><td colspan="2">0.3 to 0.75mm²</td></tr>
<tr><td>Applicable solderless terminals</td><td colspan="2">R 1.25-3 (Solderless terminals with sleeves are not applicable)</td></tr>
<tr><td rowspan="4">External supply power</td><td colspan="2">24VDC, +20%, -15%</td></tr>
<tr><td colspan="2">Ripple, spike within 500 mV p-p</td></tr>
<tr><td>Inrush current: 5.2A, within 300 μs</td><td>Inrush current: 1.9A, within 300 μs</td></tr>
<tr><td>0.3A</td><td>0.12A</td></tr>
<tr><td>Internal current consumption (5 VDC)</td><td>0.37A</td><td>0.33A</td></tr>
<tr><td>Weight</td><td>0.20kg</td><td>0.19kg</td></tr>
</table>

*1 The values in parentheses are those in the high resolution mode.

Appendix 3 Functions Added or Changed by Version Upgrade

The Q62DA-FG has been upgraded with new functions and specifications.
The functions available for use of the Q62DA-FG vary according to the first five digits of product number.

Added function	Description	First 5 digits of product number	Reference section
Analog output range expanded mode	When the following output ranges are selected in the intelligent function module switch setting, the analog output ranges can be extended. • 4 to 20mA (Expanded mode) • 1 to 5V (Expanded mode) The output ranges supported by the analog output range expanded mode cannot be used for products of incompatible version.	11042 or later	Section 3.1.1 Section 4.5
Disconnection detection mode	When an output range is set to 4 to 20mA (Extended mode), disconnection detection settings can be changed by selecting either of the following. • Arbitrarily (Set a value for the disconnection detection) • Auto setting Modules that do not support this function cannot select and set values for disconnection detection. The following buffer memories are not available. • Un\G139 to Un\G143	11102 or later	Section 3.2.6

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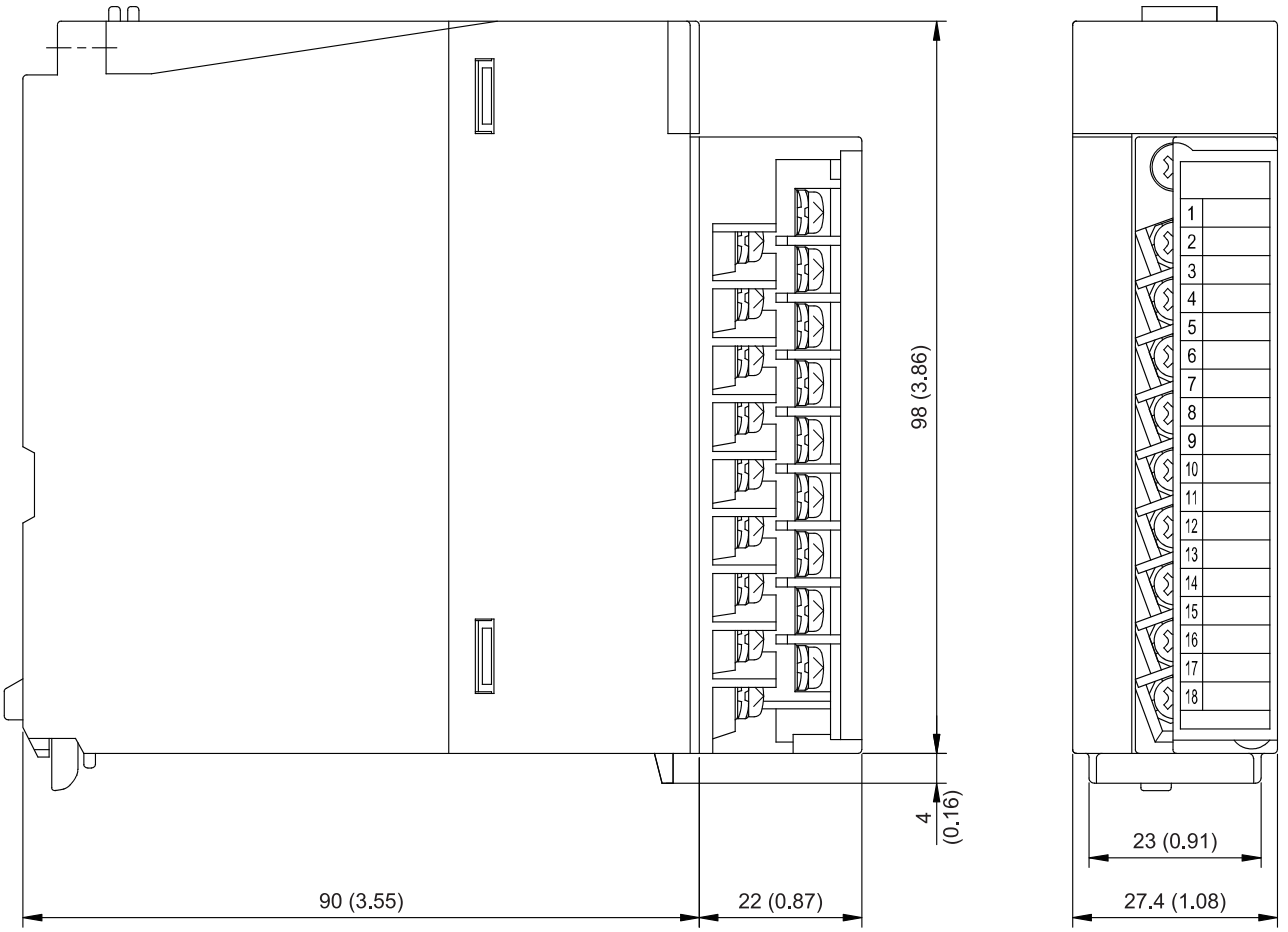
Appendix 4 External Dimension Diagram



Unit : mm (inch)

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MEMO

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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.

SH(NA)-080281E-M

SH(NA)-080281E-M(1505)MEE
MODEL: Q-D/A-FG-U-SY-E
MODEL CODE: 13JR52

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN