Channel Isolated Digital-Analog Converter Module

User's Manual

MITSUBISHI


Mitsubishi
Programmable Controller

MELSEC-Q

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

# • SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the user's manual of the CPU module to use.
In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

| | |
|---|---|
| ⚠ DANGER | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| ⚠ CAUTION | Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage. |

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

## [DESIGN PRECAUTION]

### ⚠ DANGER

- Do not write data into the "system area" of the buffer memory of intelligent function modules.
  Also, do not use any "prohibited to use" 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 "prohibited to use" 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/OFF, voltage or current may instantaneously be output from the output terminal of this module. In such case, wait until the analog output becomes stable to start controlling the external device.


A - 1

## [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 located 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 the 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 the 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]

### ⚠ CAUTION

- Always ground the FG terminal for the programmable controller.
  There is a risk of electric shock or malfunction.
- When turning on the power and operating the module after wiring is completed, always attach the terminal cover that comes with the product.
  There is a risk of electric shock if the terminal cover is not attached.
- 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 range of specified torque.
  If the terminal screws are loose, it may result in short circuits or malfunction.
  If the terminal screws are tightened too much, it may cause damage to the screw and/or the module, resulting in short circuits or malfunction.
- Be careful not to let foreign matter such as sawdust or wire chips get inside the module.
  They may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring.
  Do not remove this film until the wiring is complete.
  Before operating the system, be sure to remove the film to provide adequate ventilation.

## [STARTING AND MAINTENANCE PRECAUTIONS]

### ⚠ 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 the 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 the 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.
- Do not touch the connector while the power is on.
  Doing so may cause malfunction.
- Switch off all phases of the externally supplied power used in the system when cleaning the module or retightening the terminal or module fixing screws.
  Not doing so may cause failure or malfunction of the module.
  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 damages to the screws and/or the module, resulting in the module falling out, short circuits or 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.


A - 3

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<br>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<br>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<br>Section Section 8.2.5<br>Correction<br>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<br>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<br>Addition<br>Section 5.6.3, 5.7, 5.8 |
| Oct., 2004 | SH (NA)-080281E-F | Correction<br>Safety precautions, Section 2.1, 3.1.1, 4.1, 6.3.1 |
| Sep., 2005 | SH (NA)-080281E-G | Correction<br>Safety precautions, Section 2.1, 5.2.2, 6.3.2 |
| Mar., 2006 | SH (NA)-080281E-H | Correction<br>Safety precautions, Appendix 1 |
| Jan., 2007 | SH (NA)-080281E-I | Correction<br>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<br>Section 2.2<br>Correction<br>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<br>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 |

Japanese Manual Version SH-080280-L

INTRODUCTION

Thank you for purchasing the MELSEC-Q series programmable controller.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions and performance of the Q series programmable controller you have purchased, so as to ensure correct use.
Please forward a copy of this manual to the end user.

CONTENTS

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<br>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)<br>Describes the methods of using GX Developer to create a function block and print out the function block. (Sold separately) | SH-080376E (13JU44) |

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 configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

(2) For the product

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

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 | Generic product name for the SWnD5C-GPPW-E, SWnD5C-GPPW-EA, SWnD5C-GPPW-EV and SWnD5C-GPPW-EVA. ("n" is 4 or greater.)<br>"-A" and "-V" denote volume license product and upgraded product respectively. |
| 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 the Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU, Q02PHCPU, Q06PHCPU, Q12PHCPU, Q25PHCPU, Q12PRHCPU, Q25PRHCPU, Q02UCPU, Q03UDCPU, Q04UDHCPU, Q06UDHCPU, Q13UDHCPU, Q26UDHCPU, Q03UDECPU, Q04UDEHCPU, Q06UDEHCPU, Q13UDEHCPU, and Q26UDEHCPU |
| Process CPU | Generic term for Q02PHCPU, Q06PHCPU, Q12PHCPU and Q25PHCPU. |
| 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:<br>Microsoft® Windows Vista® Home Basic Operating System,<br>Microsoft® Windows Vista® Home Premium Operating System,<br>Microsoft® Windows Vista® Business Operating System,<br>Microsoft® Windows Vista® Ultimate Operating System,<br>Microsoft® Windows Vista® Enterprise Operating System |
| Windows® XP | Generic term for the following:<br>Microsoft® Windows® XP Professional Operating System,<br>Microsoft® Windows® XP Home Edition Operating System |

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 |


A - 10

# 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/clear 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 or user range setting 1, the output monitor value is watched to detect disconnection.

### (9) Online module change

The module can be changed without the system being stopped.
Further, the dedicated instruction (G(P). OGLOAD, G(P). OGSTOR), write to the buffer memory, or turning ON the Y signal enables "inheritance of offset/gain settings to the new Q62DA-FG replacing the old one changed online" and "transfer of offset/gain settings to the other Q62DA-FG mounted on the other slot". (These apply to the modules of the same model.)

### (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 using the utility package

A utility package is sold separately (GX Configurator-DA).
The utility package is not a required item, however, it is useful for on-screen setting of the intelligent function module parameters (initial setting/auto refresh setting). In addition, FB *1 can be generated automatically from the intelligent function module parameters that have been set up and used 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)."


1 - 2

# MEMO


1 - 3

# 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
The table below shows the CPU modules and base units applicable to the Q62DA-FG and quantities for each CPU model.
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 the modules.

| Applicable CPU module | | | No. of modules ∗1 | Base unit ∗2 | |
|---|---|---|---|---|---|
| CPU type | | CPU model | | Main base unit | Extension base unit |
| Programmable controller CPU | Basic model QCPU | Q00JCPU | Up to 16 | ○ | ○ |
| | | Q00CPU | Up to 24 | | |
| | | Q01CPU | | | |
| | High Performance model QCPU | Q02CPU | Up to 64 | ○ | ○ |
| | | Q02HCPU | | | |
| | | Q06HCPU | | | |
| | | Q12HCPU | | | |
| | | Q25HCPU | | | |
| | Process CPU | Q02PHCPU | Up to 64 | ○ | ○ |
| | | Q06PHCPU | | | |
| | | Q12PHCPU | | | |
| | | Q25PHCPU | | | |
| | Redundant CPU | Q12PRHCPU | Up to 53 | × | ○ |
| | | Q25PRHCPU | | | |
| | Universal model QCPU | Q02UCPU | Up to 36 | ○ | ○ |
| | | Q03UDCPU | Up to 64 | | |
| | | Q04UDHCPU | | | |
| | | Q06UDHCPU | | | |
| | | Q13UDHCPU | | | |
| | | Q26UDHCPU | | | |
| | | Q03UDECPU | | | |
| | | Q04UDEHCPU | | | |
| | | Q06UDEHCPU | | | |
| | | Q13UDEHCPU | | | |
| | | Q26UDEHCPU | | | |
| | Safety CPU | QS001CPU | N/A | × | × |

| Applicable CPU module | | No. of modules ∗1 | Base unit ∗2 | |
|---|---|---|---|---|
| CPU type | CPU model | | Main base unit | Extension base unit |
| C Controller module | Q06CCPU-V | Up to 64 | ○ | ○ |
| | Q06CCPU-V-B | | | |

○: Applicable, ×: N/A

∗1: Limited within the range of I/O points for the CPU module.
∗2: Can be installed to any I/O slot of a base unit.



(b) Mounting to a MELSECNET/H remote I/O station
The table below shows the network modules and base units applicable to the Q62DA-FG and quantities for each network module model.
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 the modules.

| Applicable network module | No. of modules ∗1 | Base unit ∗2 | |
|---|---|---|---|
| | | Main base unit of remote I/O station | Extension base unit of remote I/O station |
| QJ72LP25-25 | Up to 64 | ○ | ○ |
| QJ72LP25G | | | |
| QJ72LP25GE | | | |
| QJ72BR15 | | | |

○: Applicable, ×: N/A

*1: Limited within the range of I/O points for the network module.
*2: Can be installed to any I/O slot of a base unit.

REMARK

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

## (2) Compatibility with a 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)

(a) Compatible Q62DA-FG
Use a Q62DA-FG with function version C or higher if using the module in a multiple CPU system.

(b) Intelligent function module parameters
Write intelligent function module parameters to only the control CPU of the Q62DA-FG.

## (3) Compatibility with online module change

To make an online module change, use the module of function version C or later.

### (4) Supported software packages

Relation between the system containing the Q62DA-FG and software package is shown in the following table.

GX Developer is necessary when using the Q62DA-FG.

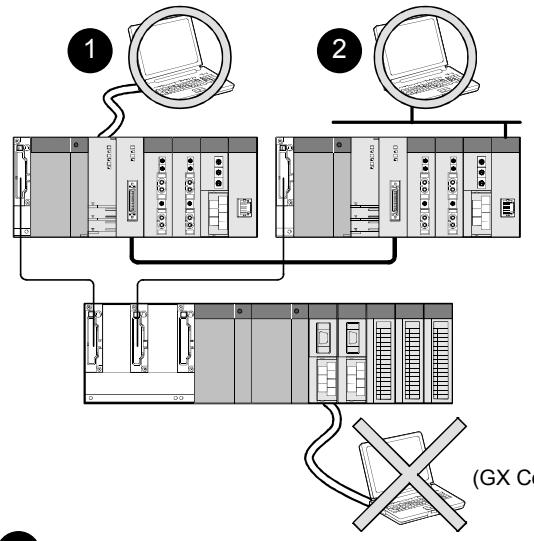
| | | Software Version | |
|---|---|---|---|
| | | GX Developer | GX Configurator-DA |
| Q00J/Q00/Q01CPU | Single CPU system | Version 7 or later | Version 1.14Q or later |
| | Multiple CPU system | Version 8 or later | |
| Q02/Q02H/Q06H/ Q12H/Q25HCPU | Single CPU system | Version 4 or later | |
| | 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 |
| Q02U/Q03UD/ Q04UDH/ Q06UDHCPU | Single CPU system Multiple CPU system | Version 8.48A or later | Version 2.06G or later |
| 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 | | |
| If installed in a MELSECNET/H remote I/O station | | Version 6 or later | Version 1.14Q or later |

## 2.2 Precautions on System Configuration

### (1) For Use with Q12PRH/Q25PRHCPU

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

(b) GX Configurator-DA connection
GX Configurator-DA cannot be used when accessing the Q12PRH/Q25PRHCPU via an intelligent function module on an extension base unit from GX Developer.
Connect a personal computer with a communication path indicated below.




1 Direct connection to the CPU

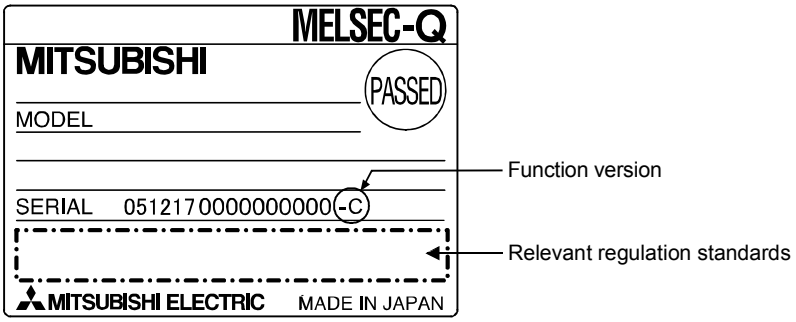
2 Connection through an intelligent function module on the main base unit
(Through Ethernet module, MELSECNET/H module, or CC-Link module)

## 2.3 How to Check the Function Version and Software Version

This section describes how to check the function version of the Q62DA-FG and the GX Configuration-DA software version.

### (1) Checking the function version of the Q62DA-FG

(a) Checking at "the SERIAL field of the rating plate" located on the side of the module



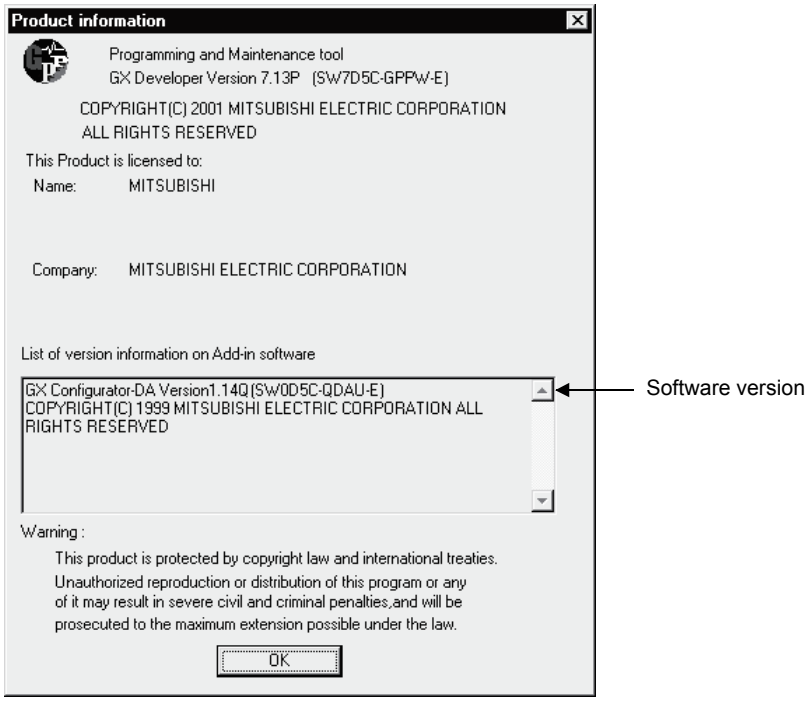

(b) To check the version using the GX Developer
See Section 8.2.6 of this manual.

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

The software version of GX Configuration-DA can be checked in GX Developer's "Product information" screen.

[Operating procedure]

GX Developer → [Help] → [Product information]




(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 |

# 3 SPECIFICATIONS

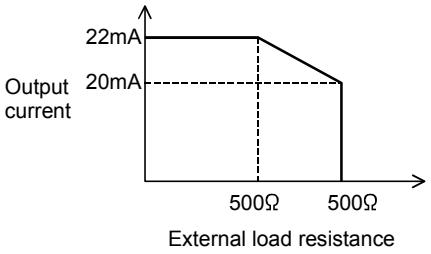
## 3.1 Performance Specifications

### 3.1.1 Performance specifications list

Table 3.1 Performance specifications list

<table>
<tr><td colspan="2">Item \ Type</td><td>Q62DA-FG</td></tr>
<tr><td colspan="2">Number of analog outputs</td><td>2 points (2 channels)</td></tr>
<tr><td colspan="2">Digital input</td><td>16-bit signed binary (-12288 to 12287, -16384 to 16383)</td></tr>
<tr><td rowspan="2">Analog output</td><td>Voltage</td><td>-12 to 12VDC (External load resistance: 1k to 1MΩ)</td></tr>
<tr><td>Current</td><td>0 to 20mADC (External load resistance: 0 to 600Ω)<br>0 to 22mADC (Please refer to Note 3)</td></tr>
<tr><td colspan="2">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="5">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>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="3">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>User range setting 1</td><td>-12000 to 12000</td><td>0.671 μA</td></tr>
</table>
</td></tr>
<tr><td rowspan="2">Accuracy (Accuracy relative to maximum analog output value)</td><td>Reference accuracy*1</td><td>Within ± 0.1% (Voltage: ± 10mV, Current: ± 20 μA)</td></tr>
<tr><td>Temperature coefficient*2</td><td>± 80ppm/ °C (0.008%/ °C)</td></tr>
<tr><td colspan="2">Conversion speed</td><td>10ms/2 channels</td></tr>
<tr><td rowspan="2">Absolute maximum output</td><td>Voltage</td><td>± 13V</td></tr>
<tr><td>Current</td><td>23mA</td></tr>
<tr><td rowspan="3">Output monitor</td><td>Resolution</td><td>12bit</td></tr>
<tr><td>Reference accuracy*1</td><td>± 0.2%</td></tr>
<tr><td>Temperature coefficient*2</td><td>± 160ppm/ °C (0.016%/ °C)</td></tr>
<tr><td colspan="2">Maximum number of writes for E²PROM</td><td>100,000</td></tr>
<tr><td colspan="2">Output short-circuit protection</td><td>Available</td></tr>
<tr><td colspan="2">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></tr>
<tr><td colspan="2">Number of I/O occupied points</td><td>16 points (I/O assignment: Intelligent 16 points)</td></tr>
<tr><td colspan="2">Connected terminal</td><td>18 points terminal block</td></tr>
<tr><td colspan="2">Applicable wire size</td><td>0.3 to 0.75mm²</td></tr>
<tr><td colspan="2">Applicable solderless terminals</td><td>R 1.25-3 (Solderless terminals with sleeves are not applicable)</td></tr>
<tr><td colspan="2" rowspan="4">External supply power</td><td>24VDC, +20%, -15%</td></tr>
<tr><td>Ripple, spike within 500 mV p-p</td></tr>
<tr><td>Inrush current: 5.2A, within 300 μs</td></tr>
<tr><td>0.3A</td></tr>
<tr><td colspan="2">Internal current consumption (5 VDC)</td><td>0.37A</td></tr>
<tr><td colspan="2">Weight</td><td>0.20kg</td></tr>
</table>

*1: Accuracy of offset/gain setting at ambient temperature
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.






REMARK

See 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

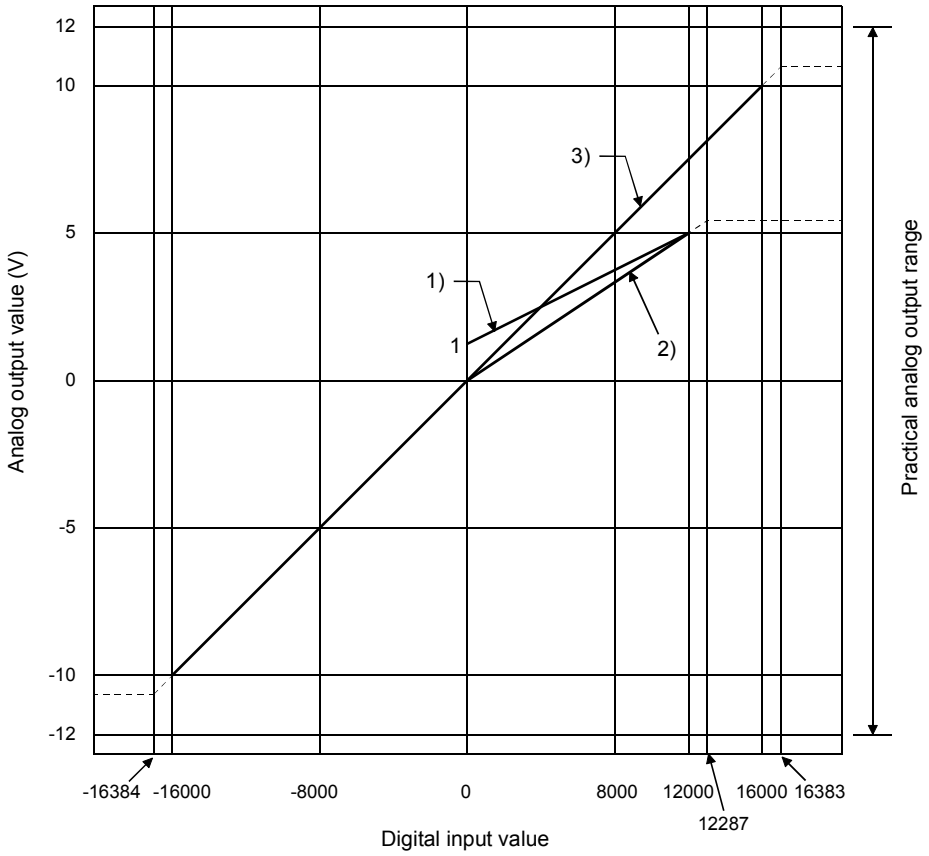
The offset value is the analog output value (voltage or current) when the digital input value set from the programmable controller CPU is 0.

### 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.




| Number | Output range setting | Offset value | Gain value | Digital input value | Maximum resolution |
|---|---|---|---|---|---|
| 1) | 1 to 5 V | 1 V | 5 V | 0 to 12000 | 0.333 mV |
| 2) | 0 to 5 V | 0 V | 5 V | | 0.416 mV |
| 3) | –10 to 10 V | 0 V | 10 V | –16000 to 16000 | 0.625 mV |
| — | User range setting2 | ∗1 | ∗1 | –12000 to 12000 | 0.366 mV |
| — | User range setting3 | ∗2 | ∗2 | | 0.183 mV |

Figure 3.1 Voltage output characteristic


3 - 3

POINT

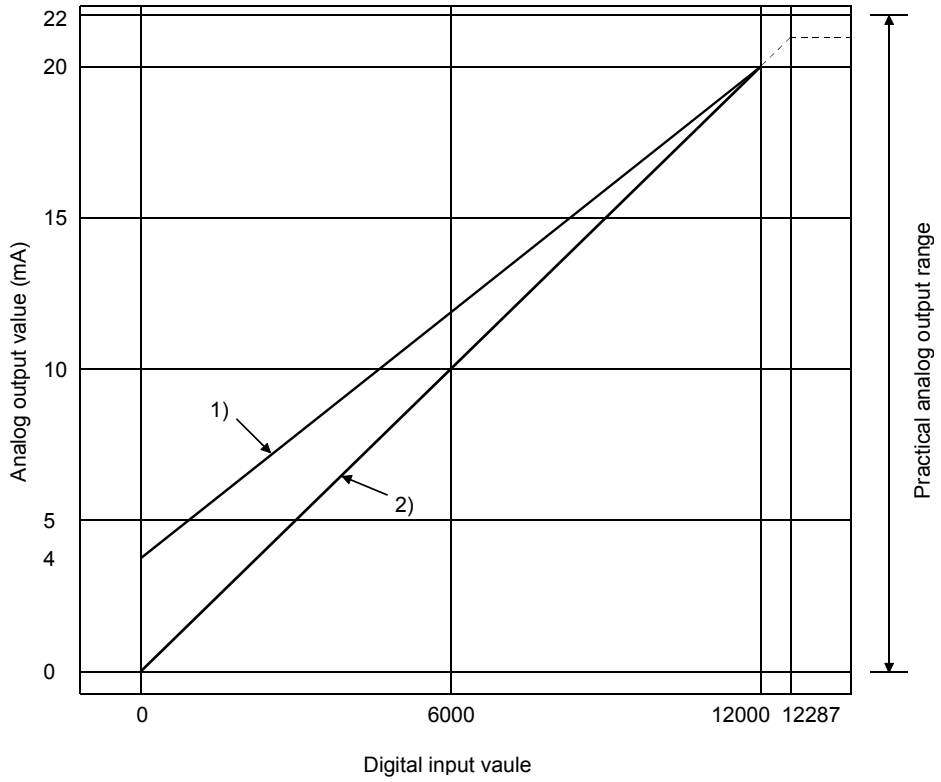
(1) Set within the digital input range and analog output range for each output range.
If these ranges are exceeded, the maximum resolution and accuracy may not fall within the performance specifications. (Avoid using the dotted line area shown in Figures 3.1.)

(2) Set the offset/gain values for the user range setting2 ＊1 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 ＊2 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.




| Number | Output range setting | Offset value | Gain value | Digital input value | Maximum resolution |
|---|---|---|---|---|---|
| 1) | 4 to 20 mA | 4 mA | 20 mA | 0 to 12000 | 1.33 μA |
| 2) | 0 to 20 mA | 0 mA | 20 mA | | 1.66 μA |
| — | User range setting1 | ∗1 | ∗1 | –12000 to 12000 | 0.671 μA |

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 ∗1 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.<br>• The conversion speed is 10ms regardless of the number of 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.<br>• 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 the CH□ output enable/disable flag 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 or user range setting 1, the output monitor value is watched to detect disconnection. | Section 3.2.6 |
| Online module change | • The module can be changed without the system being stopped. | 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) Make the setting in the HOLD/CLEAR setting (Refer to Section 4.5(1)). of the intelligent function modulemodule switchswitch.
(3) Depending on combinations of the HOLD/CLEAR setting, D/A conversion enable/disable setting (Un\G0), and CH output enable/disable flag (Y1, Y2), the analog out-put 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 flags (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 | | Outputs the analog value of the D/A converted digital value. ＊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 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 The 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) Switch the operating condition setting request (Y9) from OFF to ON to OFF. (Refer to Section 3.3.2.)

(c) Sets the output enable/disable flag (Y1, Y2) for the channel to be tested to enable (OFF → ON).

(d) Writes a digital value equivalent to the analog value to be output in CH□ digital value (see Table 3.6 in Section 3.4.1) 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 flags (Y1, Y2) | Enable | Disable | Enable | disable |
| Analog output test | | Allowed | Not allowed | Not allowed ＊1 | |

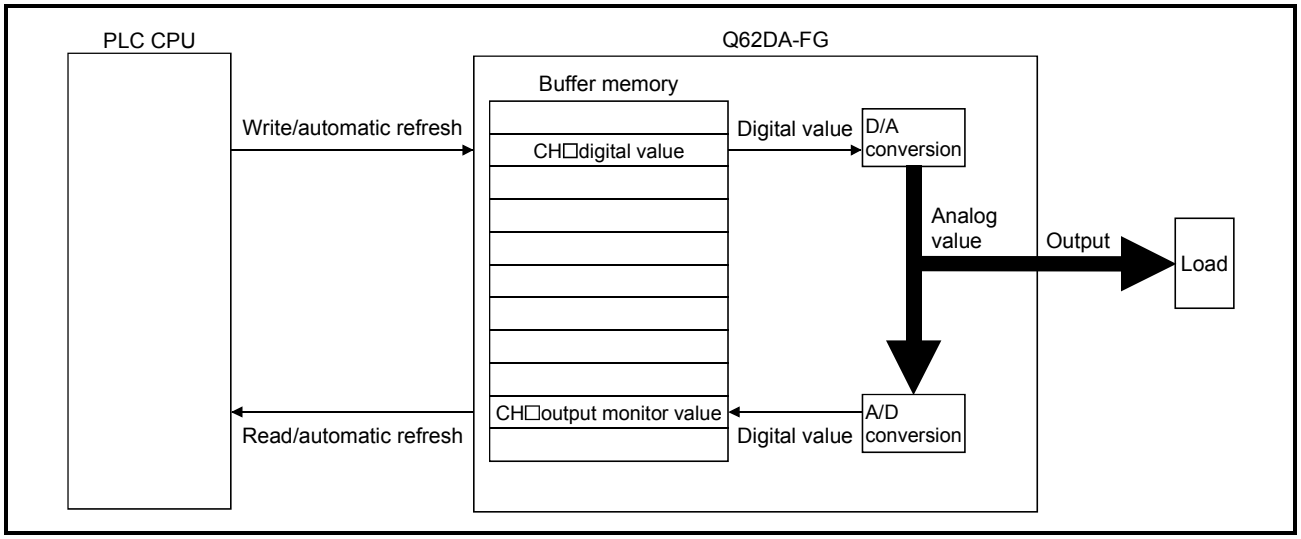
＊1 Perform the analog output test after changing the D/A conversion enable/disable setting (buffer memory address 0: Un\G0) to enable.

**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.

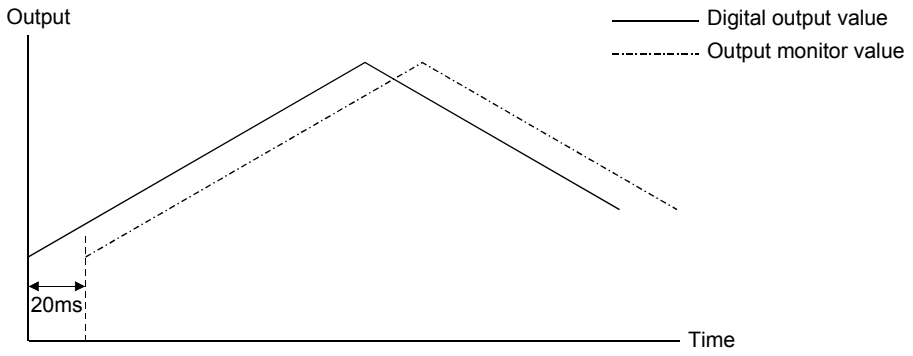
### 3.2.3 Output monitor function

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 addresses 38,39 (Un\G38, Un\G39) as an output monitor value.
The 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**

The output monitor value 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

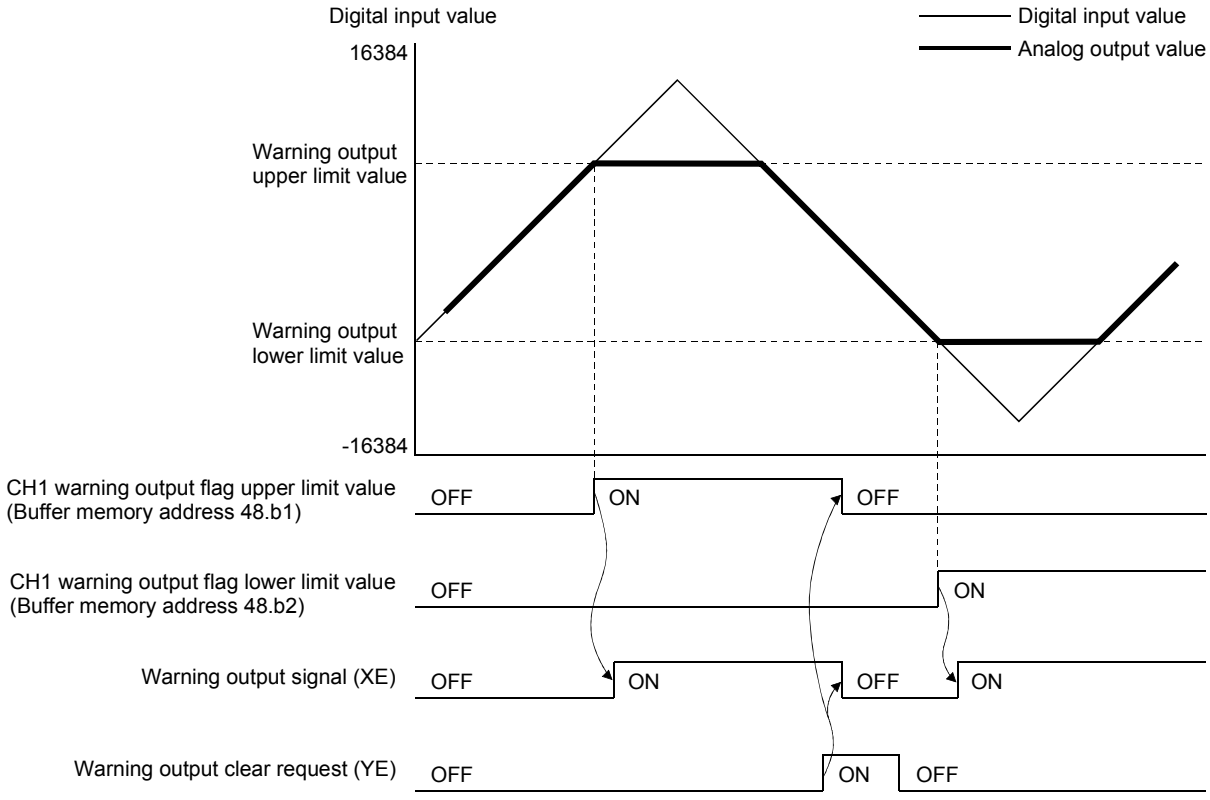
(1) If the digital value written to the buffer memory is equal to or greater than the warning output upper limit value is equal to or less than the warning output lower limit value, the warning output flag (buffer memory address 48: Un\G48) and warning output signal (XE) turn ON to give a warning.
The 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) The warning output flag (buffer memory address 48: Un\G48) and warning output signal (XE) turn OFF when the operating condition setting request (Y9) or warning output clear request (YE) turns ON.

(4) For the warning output function, the 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 the operating condition setting request (Y9). The default is all-channel disable.

(5) Set the warning output upper and lower limit values to the buffer memory addresses 86 to 89 (Un\G86 to Un\G89).




POINT

(1) If the warning is output immediately after D/A conversion is enabled, make a warning output clear request after writing the digital value that is less than the warning output upper limit value and is greater than the warning output lower limit value.

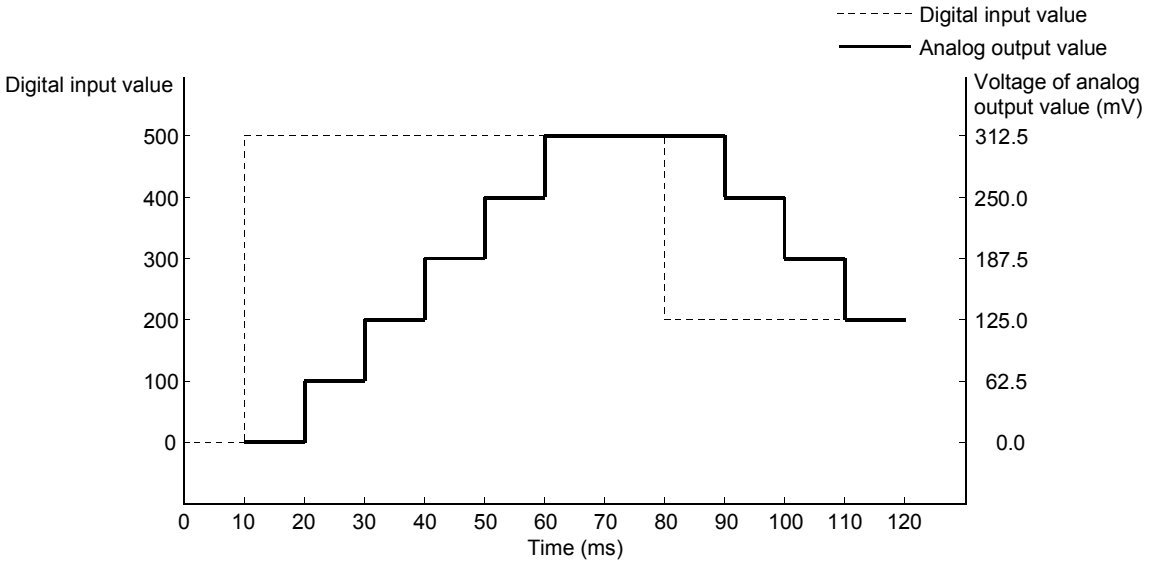
(2) During an analog output test, the warning output function is invalid.

## 3.2.5 Rate control function

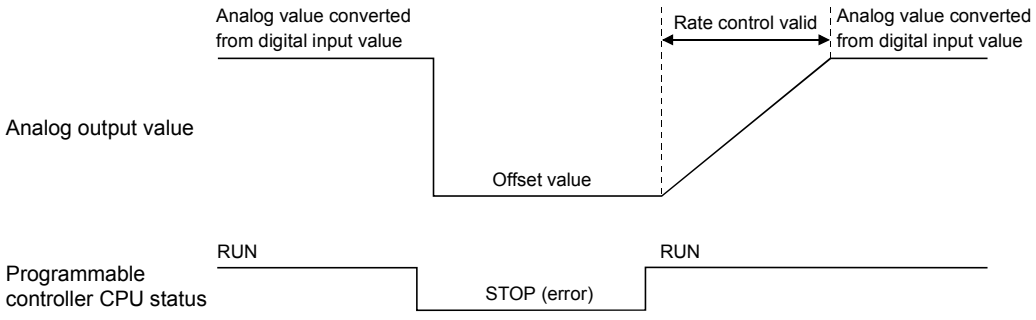
(1) The increment and decrement of the analog output value per conversion cycle are restricted to prevent a sudden change of the analog output value.

(2) For the rate control function, the 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 the operating condition setting request (Y9). The default is all-channel disable.

(3) Set the increase digital limit value and decrease digital limit value (buffer memory addresses 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 functions 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.

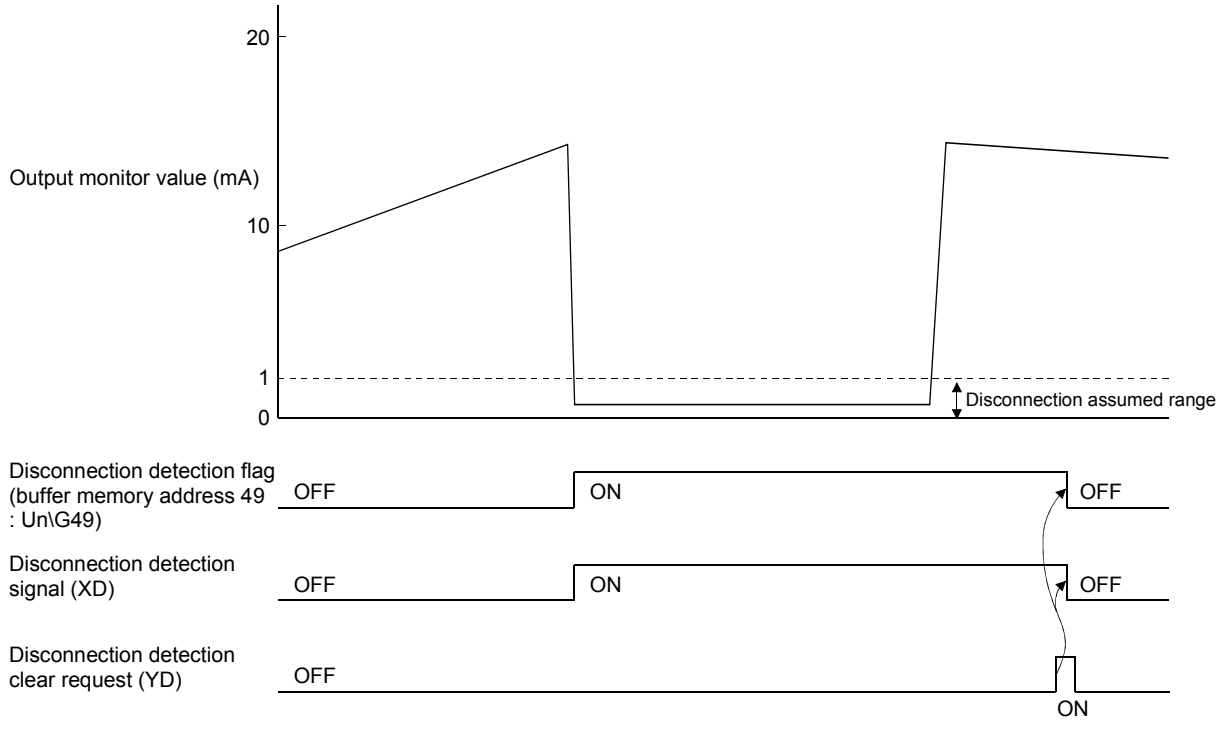


## 3.2.6 Disconnection detection function

(1) When the analog output value falls to or below 1ma ±accuracy (1.0%) in the output range of 4 to 20mA or user range setting 1, the disconnection detection flag (buffer memory address 49: Un\G49) and disconnection detection signal (XD) turn ON and disconnection is detected.
Disconnection is detected only on the channel set for D/A conversion enable and D/A output enable.

(2) The disconnection detection flag (buffer memory address 49: Un\G49) and disconnection detection signal (XD) turn OFF when the operating condition setting request (Y9) or disconnection detection clear request (YD) turns ON.

(3) For the disconnection detection function, the 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 the operating condition setting request (Y9). The default is all-channel disable.




| POINT |
|---|
| If the analog output value is 1mA or less at the user range setting 1, disconnection is detected if disconnection has not occurred actually.<br>When the analog output value is 1mA or less, disable the disconnection detection function. |

## 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 |

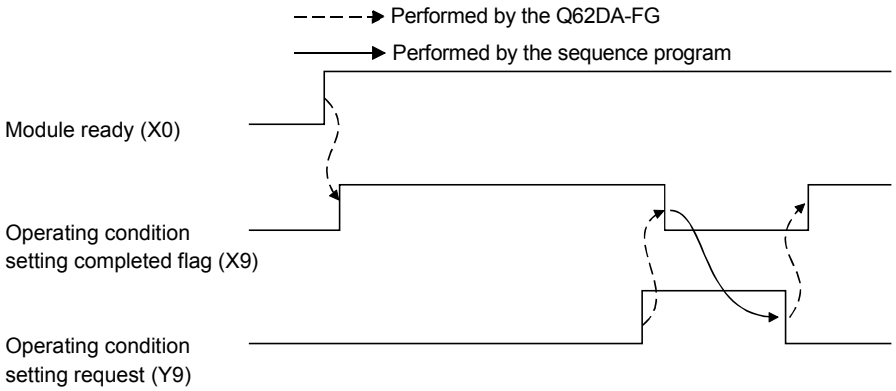
**POINT**

＊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 functioning of the Q62DA-FG cannot be guaranteed.

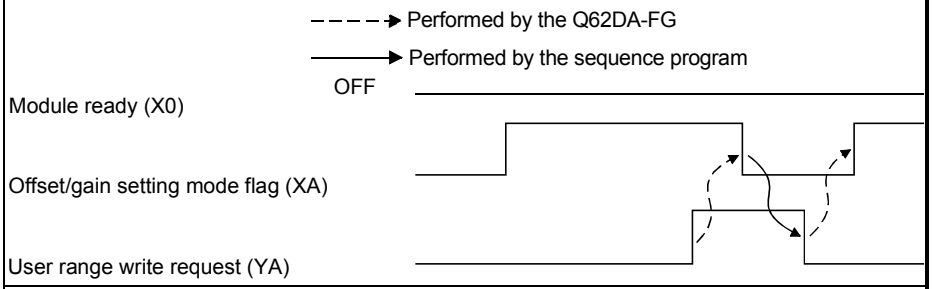
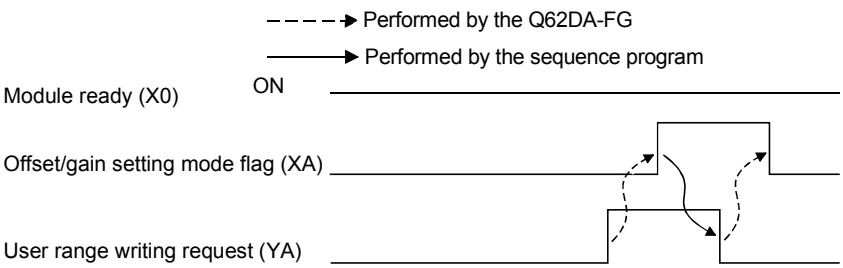
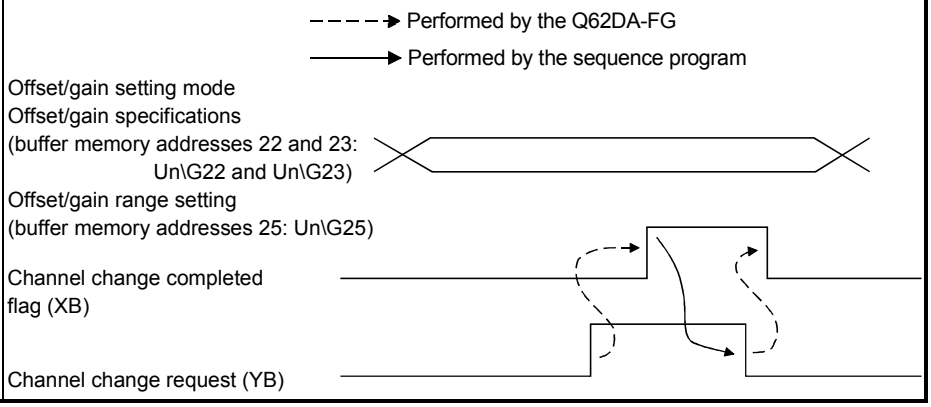
## 3.3.2 Details of I/O signals

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

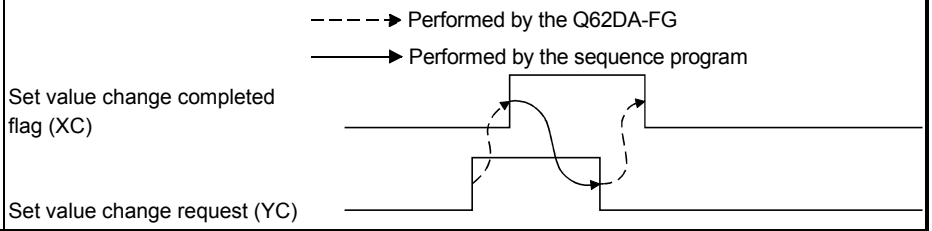
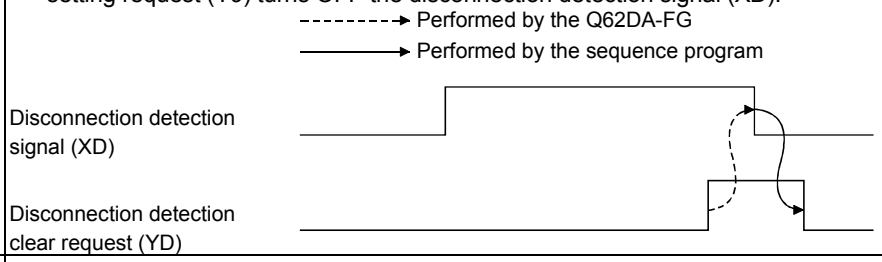
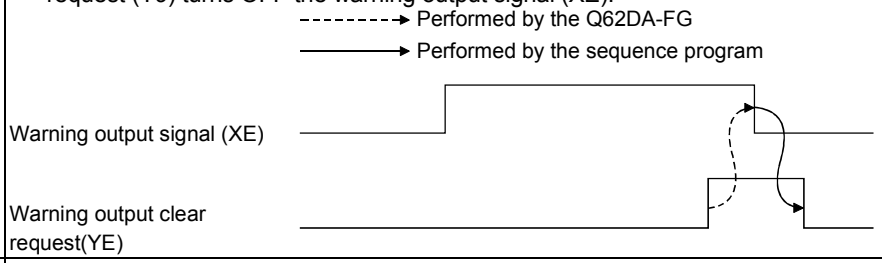
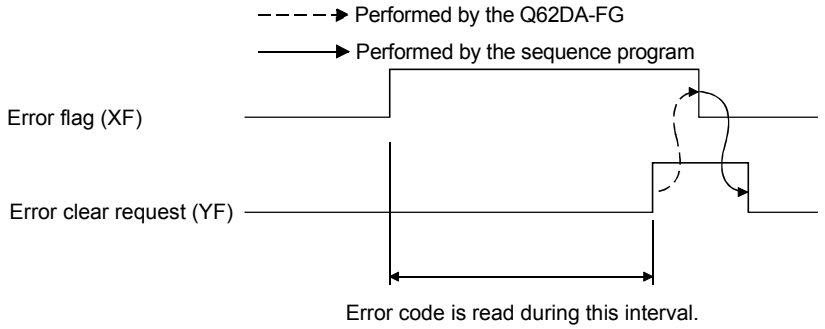
### (1) Input signals

| 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.<br>(2) When the Module ready (X0) signal is off, D/A conversion processing is not performed. Module ready (X0) turns off in the following situations:<br>• During offset/gain setting mode<br>• When the Q62DA-FG has a watchdog timer error |
| X8 | Monitor start flag | (1) This flag turns ON at completion of the A/D conversion of the output analog value, and the output monitor value is stored.<br>(2) The monitor start flag turns OFF when the 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 the operating condition setting request (Y9) when any of the following settings is changed.<br>• D/A conversion enable/disable setting (buffer memory address 0: Un\G0)<br>• Rate control enable/disable setting (buffer memory address 46: Un\G46)<br>• Disconnection detection/warning output setting (buffer memory address 47: Un\G47)<br>• Increase/decrease digital limit value (buffer memory addresses 70 to 73: Un\G70 to 73)<br>(2) Under the following conditions, the operating condition setting completed flag (X9) turns OFF.<br>• When operating condition setting request (Y9) is ON<br>  |


3 - 16

<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]<br>(1) This is used as an interlock condition for setting the user range write request (YA) to ON/OFF when registering the value after adjustment of the offset/gain settings have been completed.<br>(2) See Section 4.6 regarding the offset/gain settings.<br> 
</td></tr>
<tr><td>[In normal mode]<br>(1) This is signal is used as an interlock condition to run ON/OFF the User range writing request (YA) when the user range is restored.<br>(2) See Chapter 7 regarding the user range restoration.<br> 
</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 the channel change request (YB) when changing the channel where offset/gain settings will be performed or changing the offset/gain range settings.<br>(2) See Section 4.6 regarding the offset/gain settings.<br> 
</td></tr>
</table>


3 - 17

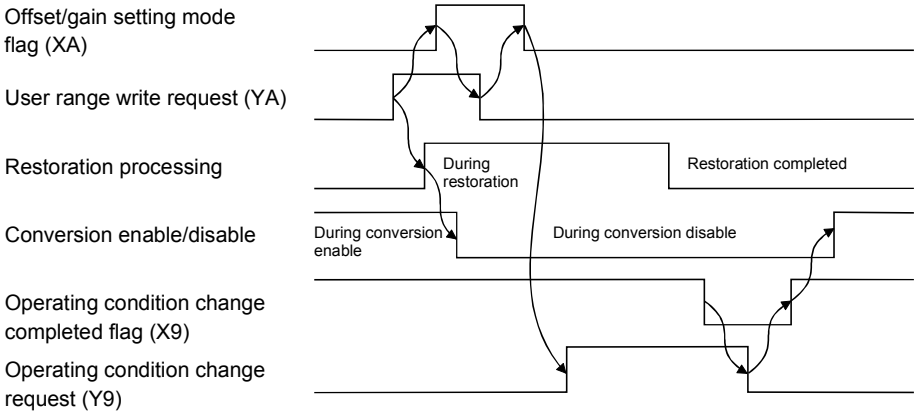
| Device No. | Signal name | Description |
|---|---|---|
| XC | Set value change completed flag | (1) This is used as an interlock condition for setting the set value change request (YC) to ON/OFF when adjusting the offset/gain settings.<br>(2) See Section 4.6 regarding the offset and gain settings.<br>  |
| XD | Disconnection detection signal | (1) This turns ON if disconnection is detected on any one channel at 4 to 20mA or user range setting 1.<br>(2) Turning ON the disconnection detection clear request (YD) or operating condition setting request (Y9) turns OFF the disconnection detection signal (XD).<br>  |
| 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.<br>(2) Turning ON the warning output clear request (YE) or operating condition setting request (Y9) turns OFF the warning output signal (XE).<br>  |
| XF | Error flag | (1) The error flag turns ON when a write error occurs.<br>(2) To turn the error flag (XF) OFF, remove the cause of the error and set the error clear request (YF) to ON.<br>The error code (buffer memory address 19: Un\G19) changes to 0 and the ERR. LED turns off.<br>  |

### (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.<br>ON: D/A converted value OFF: Offset value<br>(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.<br>• D/A conversion enable/disable setting (buffer memory address 0: Un\G0)<br>• Rate control enable/disable setting (buffer memory address 46: Un\G46)<br>• Disconnection detection/warning output setting (buffer memory address 47: Un\G47)<br>• Increase/decrease digital limit value (buffer memory addresses 70 to 73: Un\G70 to 73)<br>(2) See the X9 column for the ON/OFF timing. |
| YA | User range write request | [In offset/gain setting mode]<br>(1) This turns ON when the values for the adjusted offset/gain settings are registered in the Q62DA-FG.<br>(2) See the XA column for ON/OFF timing.<br>See Section 4.6 for offset/gain settings. |
| | | [In normal mode]<br>(1) Turn ON this signal when restoring the user range.<br>(2) See the XA column for the ON/OFF timing.<br>See 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.<br>(2) See 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.<br>(2) The analog output is incremented or decremented depending on the value set to the 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.<br>(2) See the XD column for the ON/OFF timing. |
| YE | Warning output clear request | (1) Turn ON this signal when clearing the warning output.<br>(2) See the XE column for the ON/OFF timing. |
| YF | Error clear request | (1) This turns ON when a write error is cleared.<br>(2) See the XF column for ON/OFF timing. |

POINT

When the user range write 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 - 20

## 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 (1/2)

| Address | | Description | Default *1 | Read/write *2 |
|---|---|---|---|---|
| Hexadecimal | Decimal | | | |
| 0H | 0 | D/A conversion enable/disable setting | 0003H | R/W |
| 1H | 1 | CH1 Digital value | 0 | R/W |
| 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 |
| CH | 12 | CH2 Set value check code | 0 | R |
| DH to 12H | 13 to 18 | System area | — | — |
| 13H | 19 | Error code | 0 | R |
| 14H | 20 | Setting range (CH1, CH2) | 0 | R |
| 15H | 21 | System area | — | — |
| 16H | 22 | Offset/gain setting mode Offset specification | 0 | R/W |
| 17H | 23 | Offset/gain setting mode Gain specification | 0 | R/W |
| 18H | 24 | Offset/gain adjustment value specification | 0 | R/W |
| 19H | 25 | Offset/gain range setting | 0 | R/W |
| 1AH to 25H | 26 to 37 | System area | — | — |
| 26H | 38 | CH1 Output monitor value | 0 | R |
| 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 |
| 2FH | 47 | Disconnection detection/Warning output setting | 3003H | R/W |
| 30H | 48 | Warning output flag | 0 | R |
| 31H | 49 | Disconnection detection flag | 0 | R |
| 32H to 45H | 50 to 69 | System area | — | — |

*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 - 21

Table 3.6 Buffer memory assignment (2/2)

| Address | | Description | Default ＊1 | Read/write ＊2 |
|---|---|---|---|---|
| Hexadecimal | Decimal | | | |
| 46H | 70 | CH1 Increase digital limit value | 32000 | R/W |
| 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 |
| 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 9DH | 90 to 157 | System area | — | — |
| 9EH | 158 | Mode switching setting | 0 | R/W |
| 9FH | 159 | | 0 | R/W |
| A0H to C7H | 160 to 199 | System area | — | — |
| C8H | 200 | Pass data classification setting ＊3 | 0 | R/W |
| C9H | 201 | System area | — | — |
| CAH | 202 | CH1 Industrial shipment settings offset value (used for D/A) ＊3 | 0 | R/W |
| 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 |
| CDH | 205 | CH2 Industrial shipment settings gain value (used for D/A) ＊3 | 0 | R/W |
| 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.

### 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 the operating condition setting request (Y9) to ON/OFF to validate the D/A conversion enable/disable setting. (See Section 3.3.2.)

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

Un\G0

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | CH 2 | CH 1 |

b2 to b15 information is fixed at 0.

1: D/A conversion disabled
0: D/A conversion enabled

**POINT**

Design the system so that the D/A conversion enable/disable setting (buffer memory address 0 : Un\G0) changes to "Enable" after the external power (see 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 CH□ digital values (buffer memory addresses 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.) Also, if this happens, a check code and an error code will be stored in the Set value check code (Un\G11 Un\G12) and Error code (Un \G19) respectively.

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<br>(Practical range: 0 to 12000) | 12288 or larger: 12287<br>–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<br>(Practical range: -16000 to 16000) | 16384 or larger: 16383<br>–16385 or smaller: 16384 |
| D: User range setting3 | -12288 to 12287<br>(Practical range: -12000 to 12000) | 12288 or larger: 12287<br>–12289 or smaller: –12288 |
| E: User range setting2 | | |
| F: User range setting1 | | |

### 3.4.4 CH□ set value check codes (buffer memory addresses 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 (see 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.<br>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 the CH□ set value check code, set the error clear request (YF) to ON after rewriting the digital value so that it is within the valid range.

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

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

(2) See Section 8.1 for more details of the error codes.

## 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.


| Output range | Setting value |
|---|---|
| 4 to 20 (mA) | 0H |
| 0 to 20 (mA) | 1H |
| 1 to 5 (V) | 2H |
| 0 to 5 (V) | 3H |
| –10 to 10 (V) | 4H |
| User range setting3 | DH |
| User range setting2 | EH |
| User range setting1 | FH |

## 3.4.7 Offset/gain setting mode and offset/gain specification (buffer memory addresses 22, 23: Un\G22, Un\G23)

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

(2) The channel change request (YB) must 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 setting is made for two or more channels simultaneously, an error occurs and the corresponding error code (buffer memory address 19: Un\G19) is stored.

(4) See 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 specification) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | CH2 | CH1 |
| Un\G23 (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

## 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 the 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 setting2) and about 0.18 V (user range setting3) for voltage output and about 0.67 mA for current output.

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

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

(1) This area is used to change the output range in the offset/gain setting mode. Turning ON the channel change request (YB) changes the output range into the set one.
If any value outside the setting range is set, an error occurs and the corresponding error code (buffer memory address 19: Un\G19) is stored.

| Output range | Set value |
|---|---|
| User range setting 1 | 000F$_H$ |
| User range setting 2 | 000E$_H$ |
| User range setting 3 | 000D$_H$ |

(2) The channel change request (YB) must 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 CH□ output monitor value (buffer memory addresses 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 |
| User range setting 2 | –12000 to 12000 |
| User range setting 3 | 0 to 12000 |

(2) Turning ON the 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) The operating condition setting request (Y9) must be turned ON/OFF to validate the 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

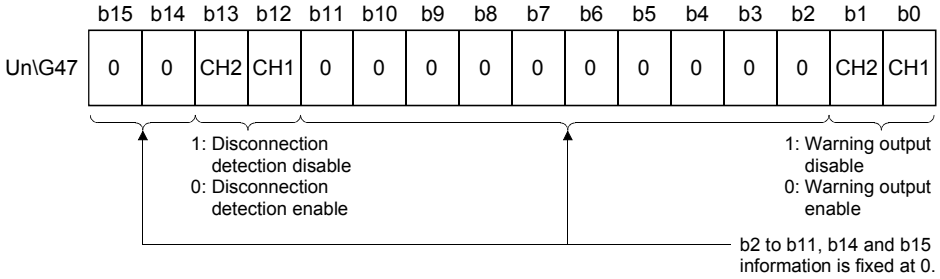

3 - 26

## 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) The operating condition setting request (Y9) must 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.



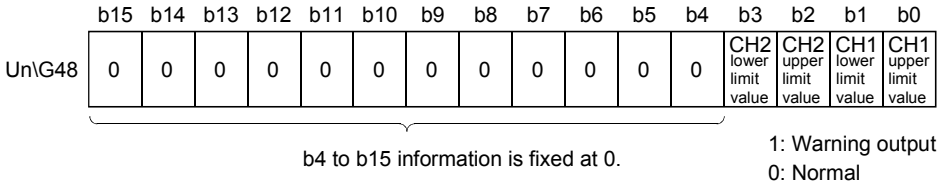

## 3.4.13 Warning output flag (buffer memory address 48: Un\G48)

(1) When the digital input value falls outside the CH□ warning output upper limit value/lower limit value (buffer memory addresses 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, the warning output signal (XE) also turns ON.

(4) Turning ON the operating condition setting request (Y9) or warning output clear request (YE) clears the warning output flag.



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

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

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

(3) Turning ON the 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 CH□ increase/decrease digital limit values (buffer memory addresses 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 occurs and the corresponding error code (buffer memory address 19: Un\G19) is stored.

(3) The operating condition setting request (Y9) must 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 CH□ warning output upper limit value/lower limit value (buffer memory addresses 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 occurs and the corresponding error code (buffer memory address 19: Un\G19) is stored.

(3) The 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 Mode switching setting (buffer memory addresses 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 the operation 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 the operating condition setting completed flag (X9) turns OFF.
After confirming that the operating condition setting completed flag (X9) has turned OFF, turn OFF the operation 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 | $4144_H$ | $0964_H$ |

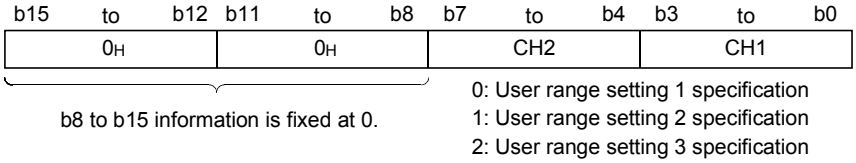
**POINT**

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

### 3.4.18 Pass data classification setting (buffer memory addresses 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**

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

### 3.4.19 Industrial shipment settings and user range settings offset/gain values (buffer memory addresses 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:
• Initial setting write is performed by the utility;
• The operating condition is set (Y9 turns from OFF to ON＊); or
• The offset/gain values are written in the offset/gain setting mode (YA turns from OFF to ON).
＊: The data are not saved when values have been written to the mode switching setting area (buffer memory addresses 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 the pass data classification setting (buffer memory addresses 200: Un\G200).
2) Turn the operation condition setting request (Y9) from OFF to ON.
3) Compare the offset/gain values of the industrial shipment settings and user range settings (buffer memory addresses 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 the pass data classification setting, industrial shipment settings and user range settings.

| POINT |
| --- |
| Refer to Section 4.6 for the offset/gain value setting method. |

# MEMO


3 - 31

# 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.

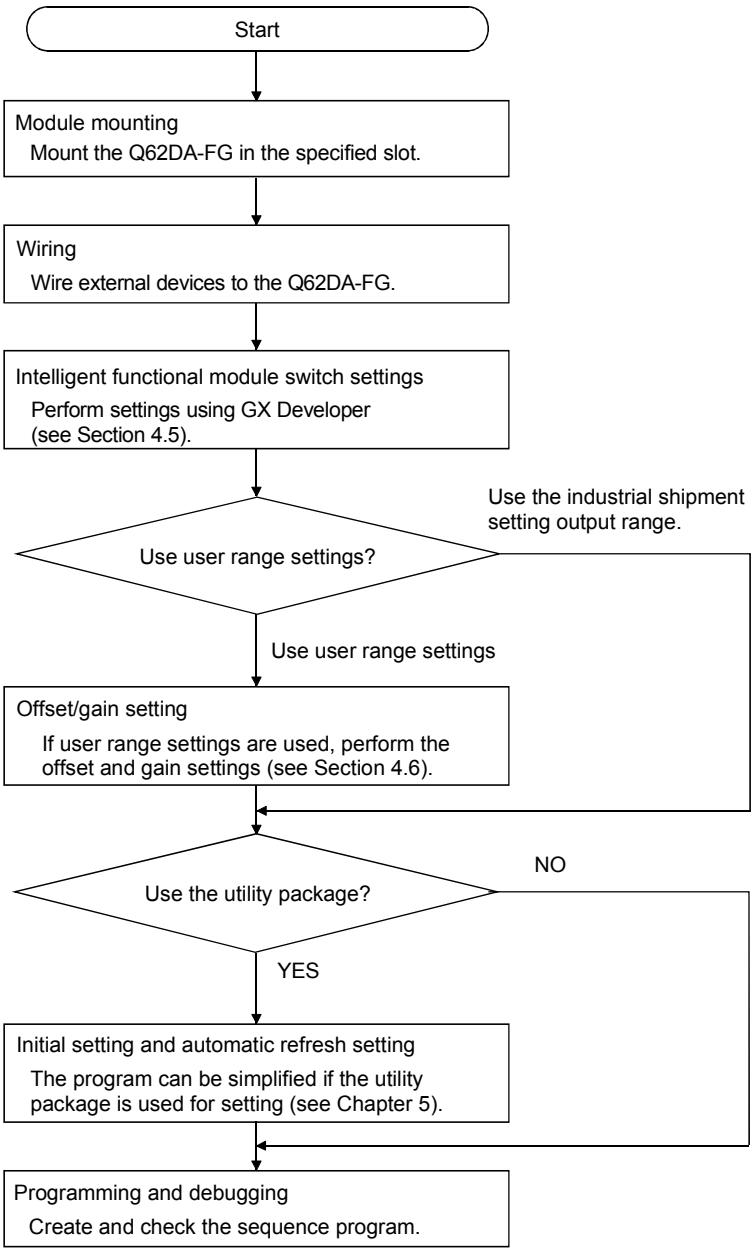
| Screw location | Tightening torque range |
|---|---|
| Module fixing screw (M3 screw) ∗1 | 0.36 to 0.48 N · m |
| Terminal block screw (M3 screw) | 0.42 to 0.58 N · m |
| Terminal block mounting screw (M3.5 screw) | 0.66 to 0.89 N · m |

∗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) To mount the module on the base unit, fully insert the module fixing latch into the fixing hole in the base unit and press the module using the hole as a fulcrum. Improper installation may result in a module malfunction, or may cause the module to fall off.

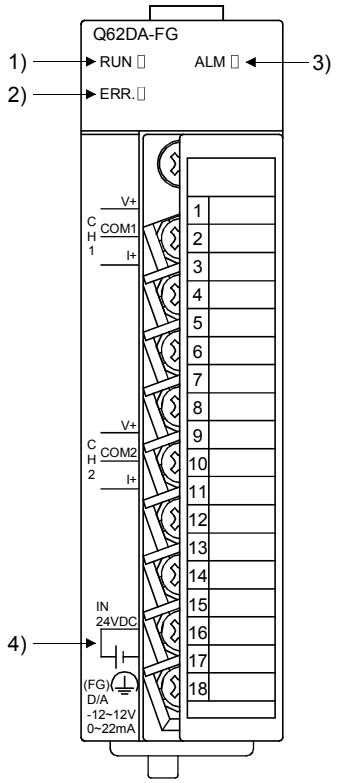

4 - 1

## 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.<br>On : Normal operation<br>Flashing : During offset/gain setting mode<br>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.<br>On : Error ✻<br>Flashing : Error in switch settings<br>Switch No. 5 of the intelligent function module has been set to a value other than zero "0".<br>Off : Normal operation |
| 3) | ALM LED | Indicates the warning status of the Q62DA-FG.<br>On : During warning output occurrence<br>Flashing : During disconnection detection<br>Off : Normal operation |
| 4) | External power supply terminal | This is the terminal for connecting the 24 V DC external power supply. |

✻ Check the 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.

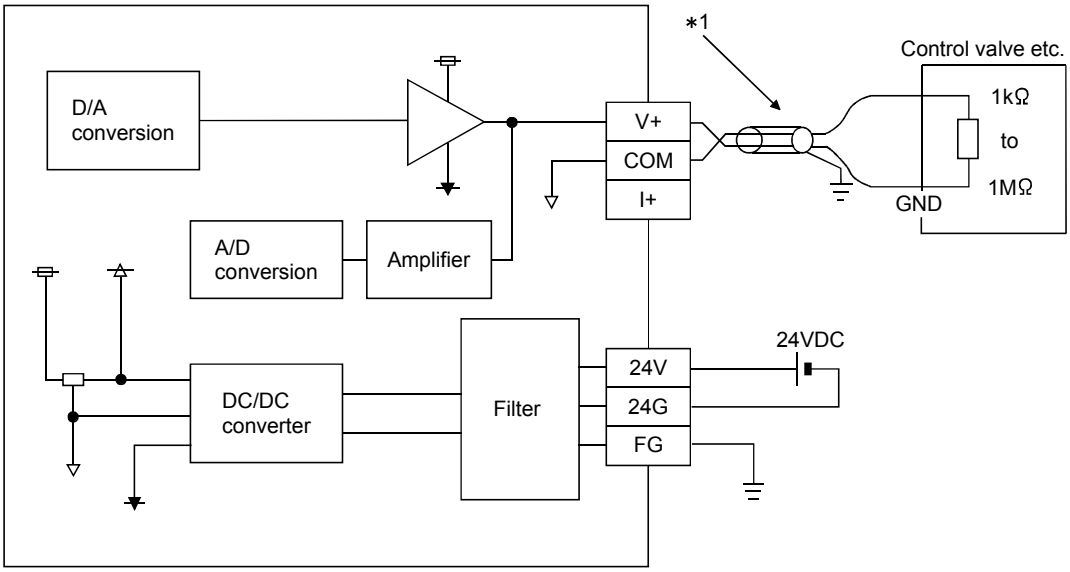
(2) Do not mount the cables close to or bundle them with the main circuit line, a high-voltage cable or a load cable from other than the programmable controller. This may increase the effects of noise, surges and induction.

(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.

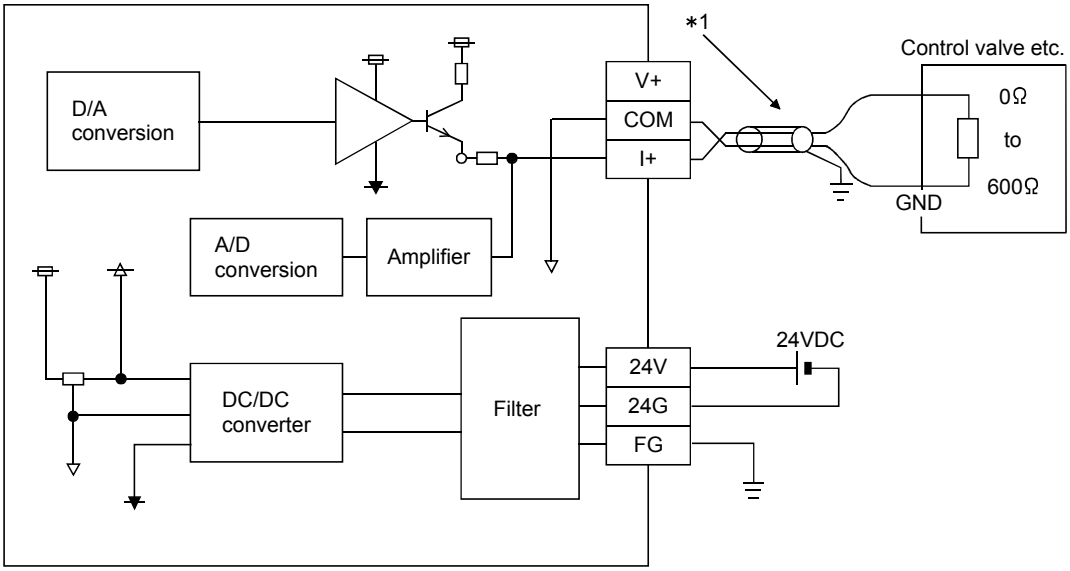
## 4.4.2 External wiring

(1) For voltage output




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

(2) For current output




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

**POINT**

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 replacement.


4 - 6

## 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.

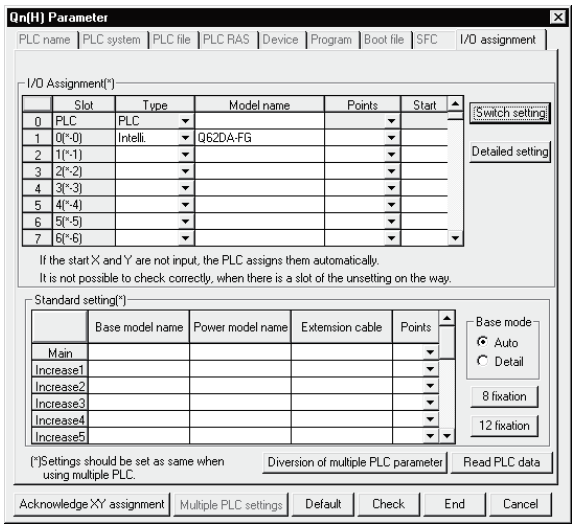
Table 4.1 Switch setting item for intelligent function module

<table>
<tr><th></th><th>Setting item</th></tr>
<tr><td>Switch 1</td><td>Output range setting<br>□□□□ H<br>CH2 CH1<br>00H: Fixed<br><br><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>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<br>CH2 CH1<br>00H: Fixed<br><br>HOLD/CLEAR function setting<br>0H : CLEAR<br>1 to FH(numeric value other than 0H) : HOLD</td></tr>
<tr><td>Switch 4</td><td>□□□□ H<br>000H: Fixed<br>0H : Normal mode (D/A conversion processing)<br>1 to FH (numeric value other than 0H)* : Offset/gain setting mode</td></tr>
<tr><td>Switch 5</td><td>0 : Fixed</td></tr>
</table>

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

(2) Operating procedure

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




(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."

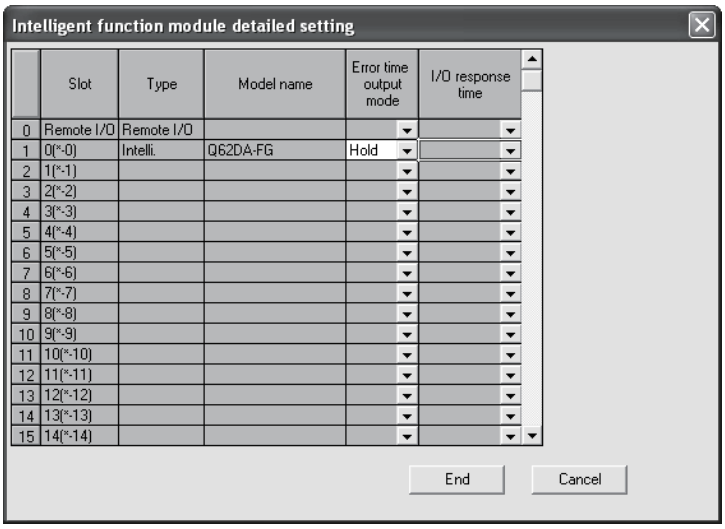
Model name : Enter the module model name.

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".

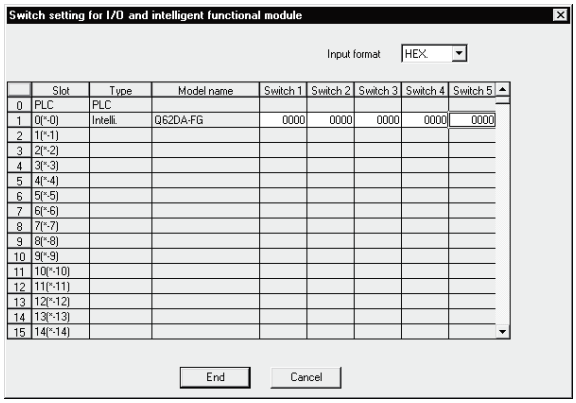


(b) Switch setting for intelligent function module screen

Click on [Switch setting] on the I/O assignment setting screen to display the screen 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.



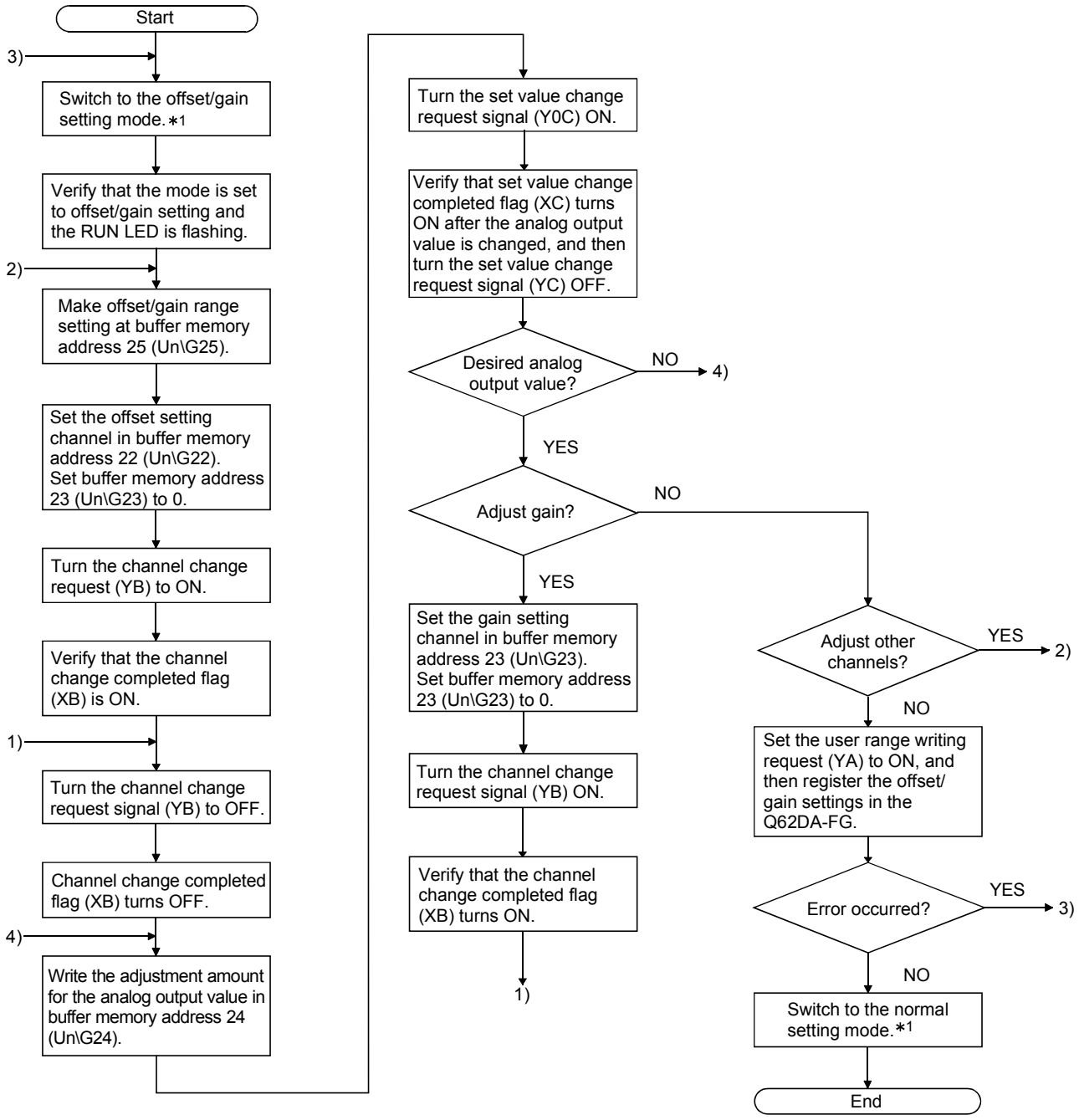


4 - 9

## 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 (buffer memory addresses 158, 159: 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.)

**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 addresses 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 $E^2$PROM and are not erased at power-off.

(5) At the time of offset/gain setting, turn ON the user range write request (YA) to write the values to the $E^2$PROM.
Data can be written to the $E^2$PROM up to 100 thousand times.
To prevent accidental write to the $E^2$PROM, an error will occur and the error code (buffer memory address 19: Un\G19) will be stored if write is performed 26 consecutive times.

(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 the mode switching setting (buffer memory addresses 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 the mode switching setting (buffer memory addresses 158, 159: Un\G158, Un\G159).

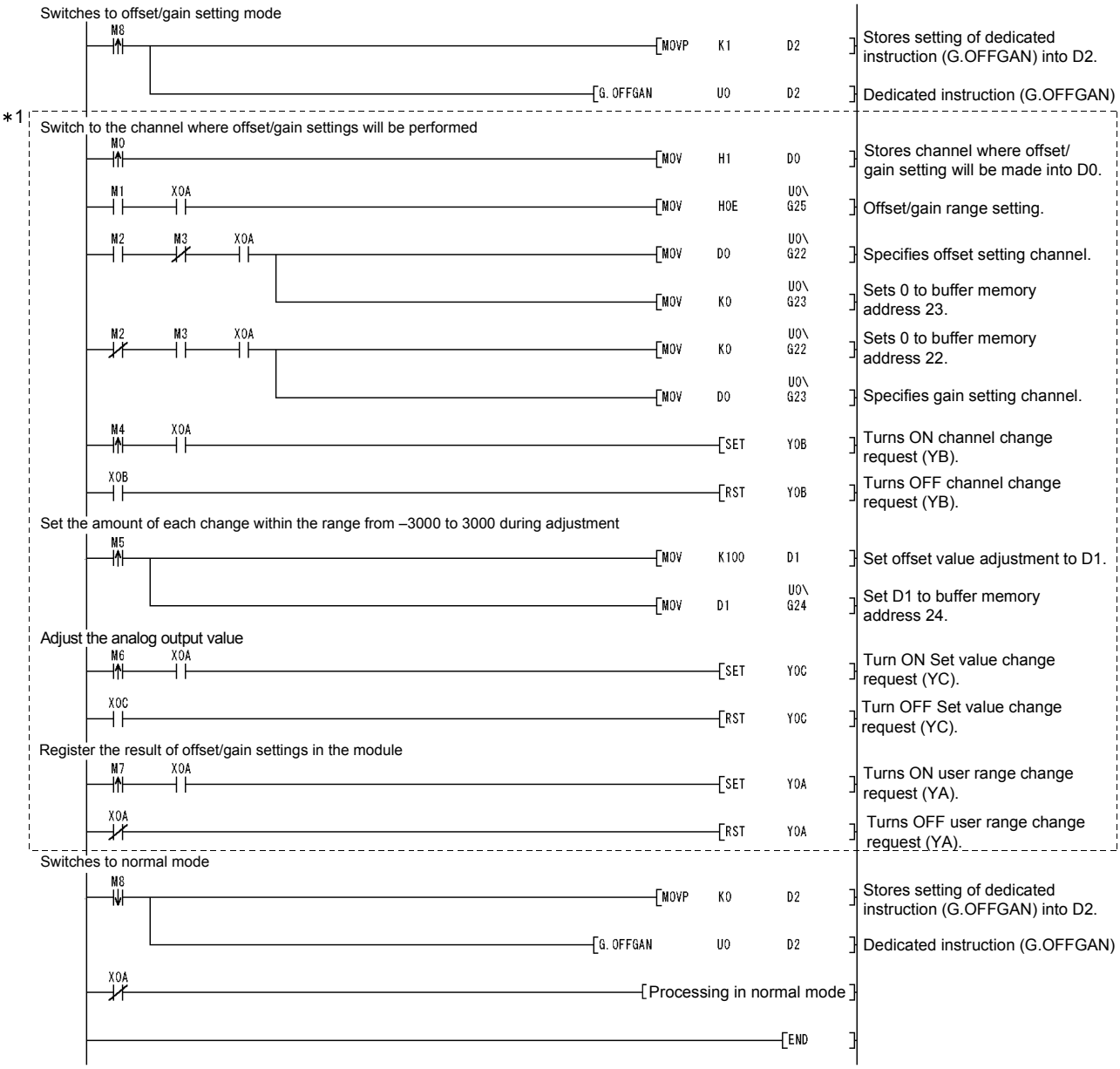
(9) Buffer memory addresses 200 (Un\G200), 202 to 217 (Un\G202 to Un\G217) are the areas used to restore the user range settings offset/gain values when online module change is made.
Refer to chapter 7 for details of online module change.

(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.

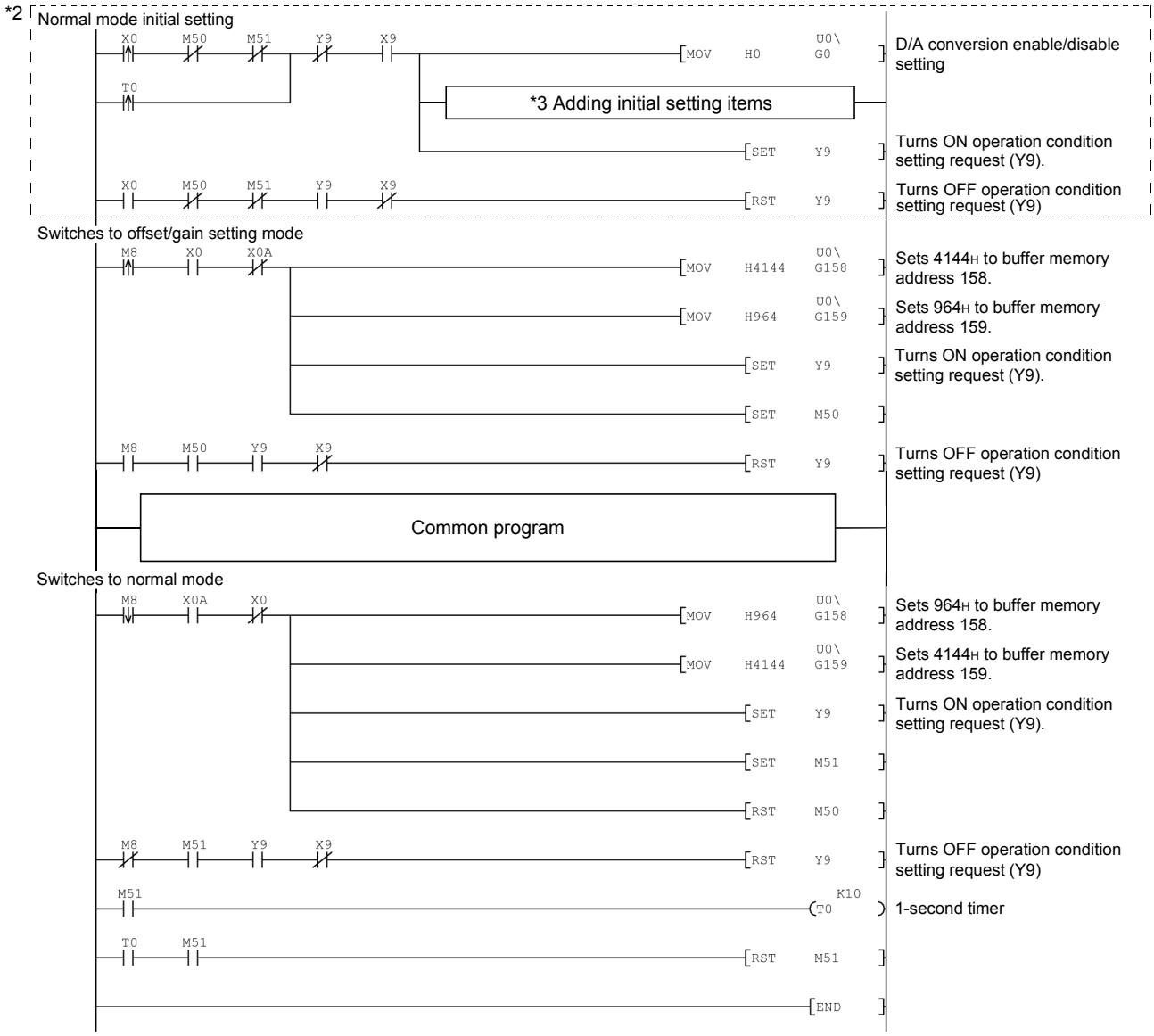
- Channel selection ····· M0
- Offset/gain range setting····· M1
- Offset setting ····· M2
- Gain setting ····· M3
- Channel change command ····· M4
- Writing the adjustment amount ····· M5
- Analog output value adjust command ····· M6
- Offset/gain setting value write command to the module ····· M7
- 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.



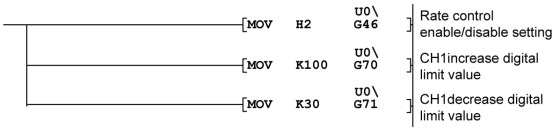

*1 The program in the dotted area is a common program.

(b) When switching the mode using the setting of the mode switching setting (buffer memory addresses 158, 159: Un\G158, Un\G159) and operation 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 *2 of this program as the initial setting program.
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 *2
*3 Example of adding initial setting items (Rate control function)




(c) When switching the mode by making intelligent function module switch setting
Only the common program is necessary.

# MEMO


4 - 15

# 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.<br>• D/A conversion enable/disable setting<br>• Rate control enable/disable setting<br>• Increase/decrease digital limit values<br>• Disconnection detection setting<br>• Warning output setting<br>• Warning output upper limit value/lower limit value<br>(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.<br>(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<br>The buffer memory and I/O signals for the Q62DA-FG are monitored and tested.<br>(2) Operating condition setting<br>Changes the D/A conversion enable/disable during operation.<br>(3) Offset/gain setting<br>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.<br>(4) Pass data<br>The pass data (pass data classification setting, industrial shipment settings offset/gain values, user range settings offset/gain values) 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.

## 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 PLC series and specify a project.
If any PLC 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.

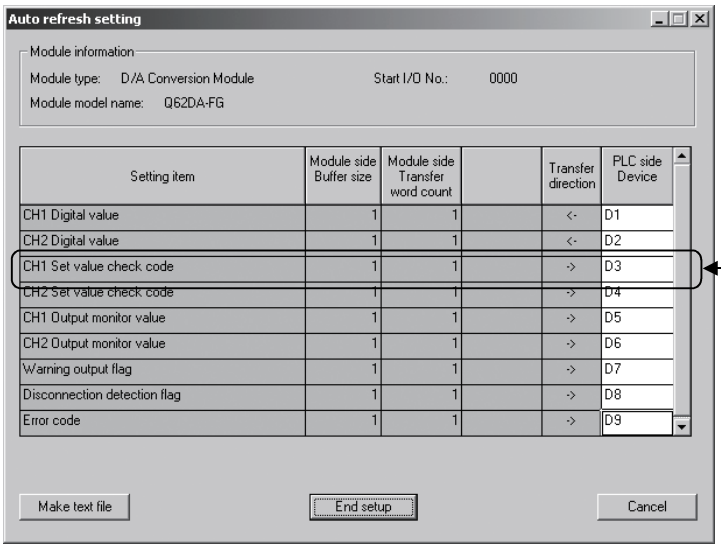
| When intelligent function modules are installed to: | Maximum number of parameter settings | |
|---|---|---|
| | Initial setting | Auto refresh setting |
| Q00J/Q00/Q01CPU | 512 | 256 |
| Q02/Q02H/Q06H/Q12H/Q25HCPU | 512 | 256 |
| Q02PH/Q06PH/Q12PH/Q25PHCPU | 512 | 256 |
| Q12PRH/Q25PRHCPU | 512 | 256 |
| Q02UCPU | 2048 | 1024 |
| Q03UD/Q04UDH/Q06UDH/Q13UDH/Q26UDH/ Q03UDE/Q04UDEH/Q06UDEH/Q13UDEH/ Q26UDEHCPU | 4096 | 2048 |
| 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 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 explains the operating environment of the personal computer that runs GX Configurator-DA.

| Item | | Description |
|---|---|---|
| Installation (Add-in) target ＊1 | | Add-in to GX Developer Version 4 (English version) or later ＊2 |
| Computer | | Personal computer on which Windows® operates. |
| | CPU | Refer to the following table "Used operating system and performance required for personal computer". |
| | Required memory | |
| Hard disk space ＊3 | For installation | 65 MB or more |
| | For operation | 20 MB or more |
| Display | | 800 × 600 dots or more resolution ＊4 |
| Operating system | | Microsoft® Windows® 95 Operating System (English version)<br>Microsoft® Windows® 98 Operating System (English version)<br>Microsoft® Windows® Millennium Edition Operating System (English version)<br>Microsoft® Windows NT® Workstation Operating System Version 4.0 (English version)<br>Microsoft® Windows® 2000 Professional Operating System (English version)<br>Microsoft® Windows® XP Professional Operating System (English version)<br>Microsoft® Windows® XP Home Edition Operating System (English version)<br>Microsoft® Windows Vista® Home Basic Operating System (English version)<br>Microsoft® Windows Vista® Home Premium Operating System (English version)<br>Microsoft® Windows Vista® Business Operating System (English version)<br>Microsoft® Windows Vista® Ultimate Operating System (English version)<br>Microsoft® Windows Vista® Enterprise Operating System (English version) |

＊1: Install GX Configurator-DA in GX Developer Version 4 or higher in the same language.
GX Developer (English version) and GX Configurator-DA (Japanese version) cannot be used in combination, and 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 necessary to use the FB conversion function.

＊3: At least 15GB is required for Windows Vista® .

＊4: Resolution of 1024 × 768 dots or more is recommended for Windows Vista® .

Operating system and performance required for personal computer

| Operating system | Performance required for 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 Professional (Service Pack 1 or more) | Pentium® 300MHz or more | 128MB or more |
| Windows® XP Home Edition (Service Pack 1 or more) | Pentium® 300MHz or more | 128MB or more |
| Windows Vista® Home Basic | Pentium® 1GHz or more | 1GB or more |
| Windows Vista® Home Premium | Pentium® 1GHz or more | 1GB or more |
| Windows Vista® Business | Pentium® 1GHz or more | 1GB or more |
| Windows Vista® Ultimate | Pentium® 1GHz or more | 1GB or more |
| Windows Vista® Enterprise | Pentium® 1GHz or more | 1GB or more |

POINT

(1) The functions shown below are not available for Windows® XP and Windows Vista® .
If any of the following functions is attempted, this product may not operate normally.
Start of application in Windows® compatible mode
Fast user switching
Remote desktop
Large fonts (Details setting of Display Properties)
Also, 64-bit version Windows® XP and Windows Vista® are not supported.
(2) Use a USER authorization or higher in Windows Vista® .

## 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.

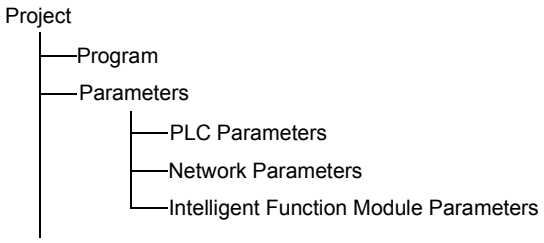
| Key | Application |
|---|---|
| Esc | Cancels the current entry in a cell.<br>Closes the window. |
| Tab | Moves between controls in the window. |
| Ctrl | Used in combination with the mouse operation to select multiple cells for test execution. |
| Delete | Deletes the character where the cursor is positioned.<br>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.

<Intelligent function module parameter>

(a) 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) 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]

<Text files>

(a) 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.

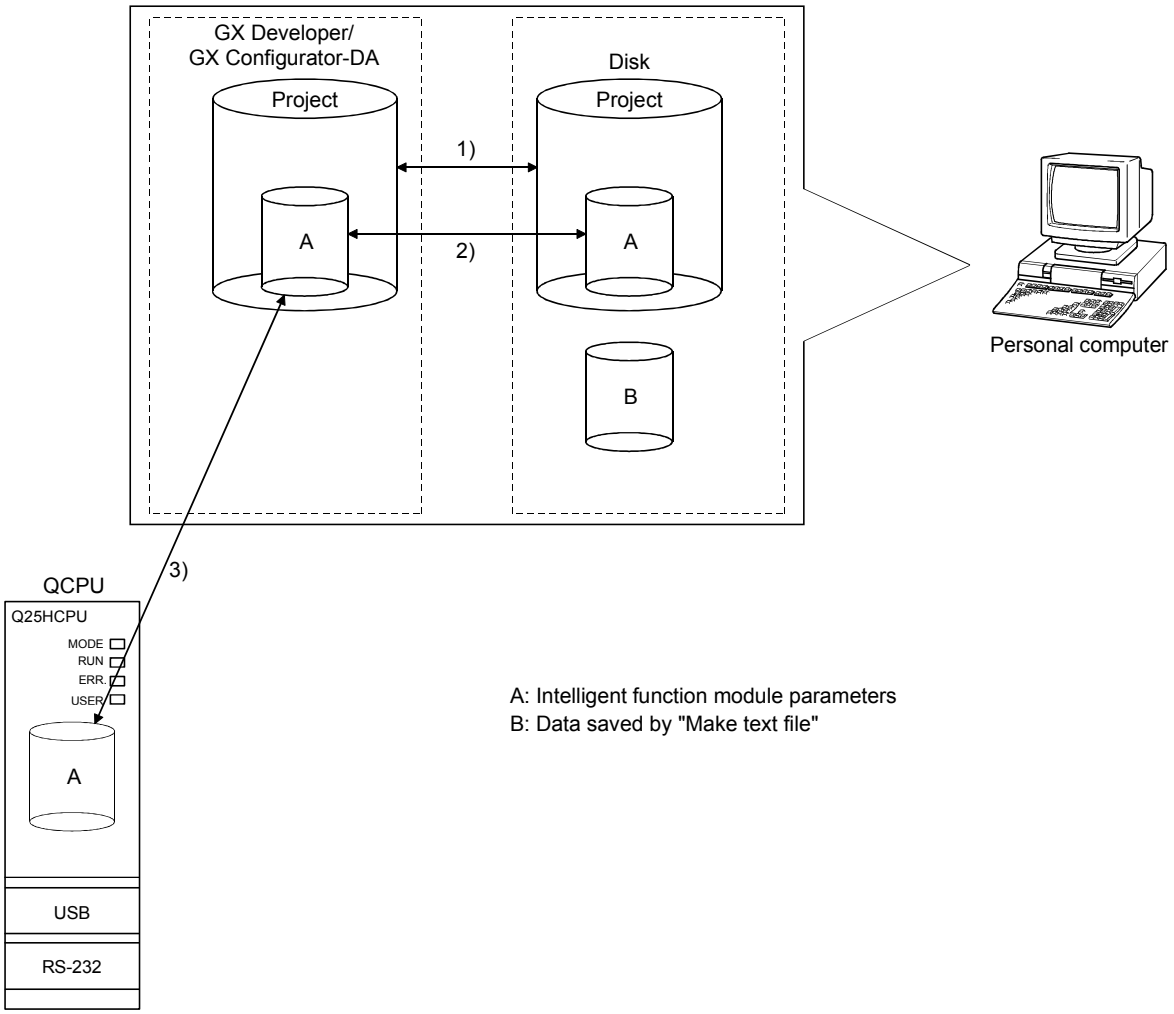
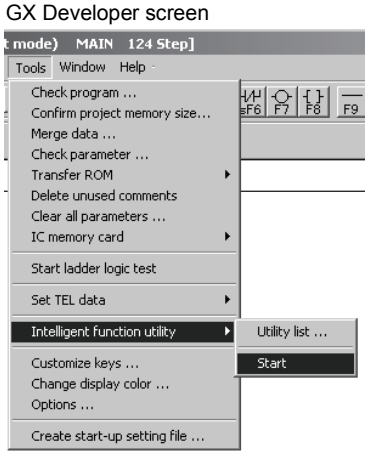



Figure 5.1 Correlation chart for data created with the utility package

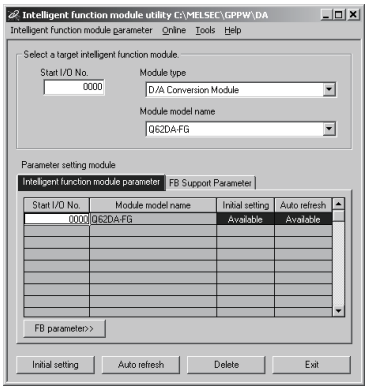
## 5.3.2 Operation overview

GX Developer screen




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

Screen for selecting a target intelligent function module




1)

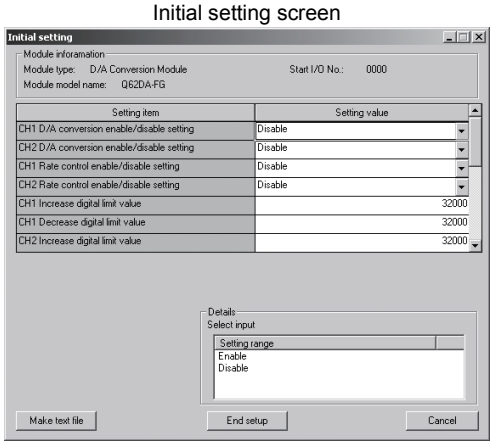
Refer to Section 5.3.3.

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

Initial setting

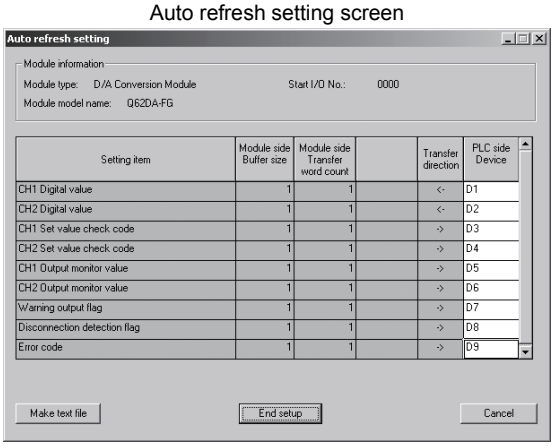
Auto refresh

Initial setting screen




Refer to Section 5.4.

Auto refresh setting screen



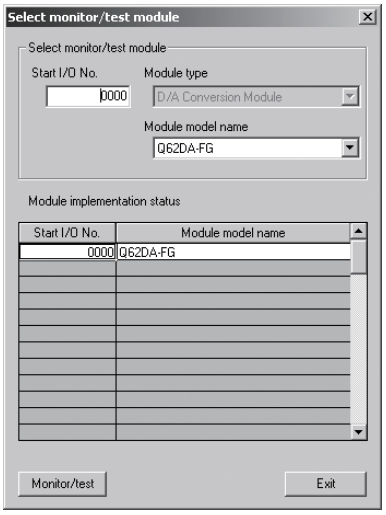

Refer to Section 5.5.

1)

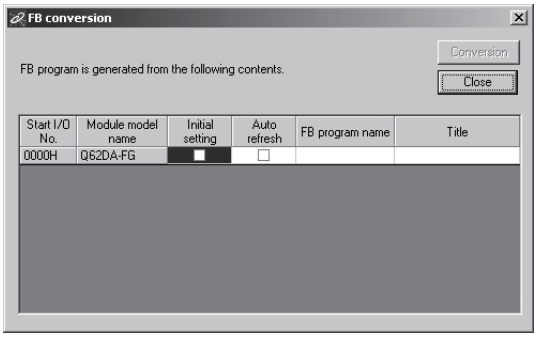
[Online] – [Monitor/Test]

<<FB support parameter>> tab – FB conversion

Selecting monitor/test module screen



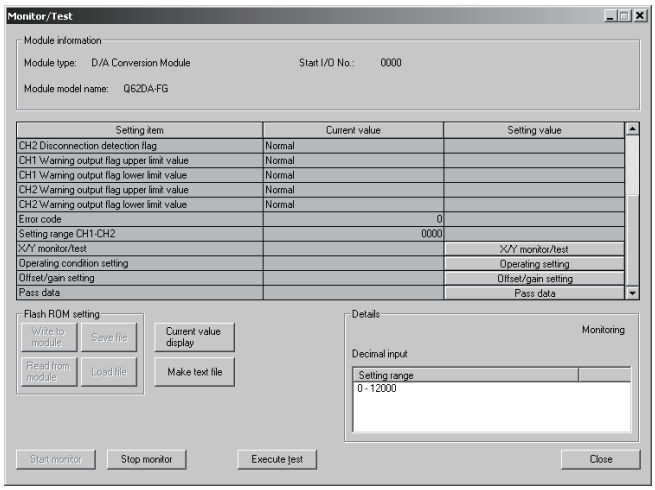

FB conversion screen




Refer to Section 5.7.

Select a module to be monitored/tested.

Monitor/Test




Refer to Section 5.6.


5 - 10

## 5.3.3 Starting the intelligent function module utility

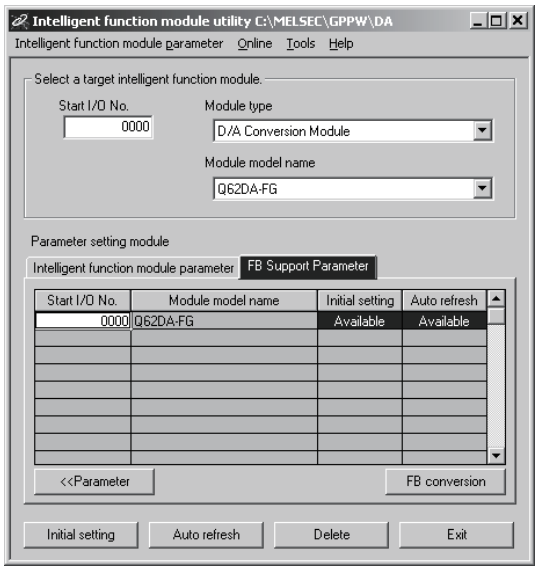
### [Operating procedure]

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 setting 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

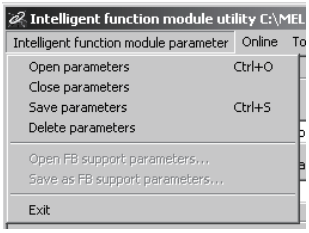
[<<Parameter] Moves the setting of the selected line to the <<Intelligent function module parameter>> tab.

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

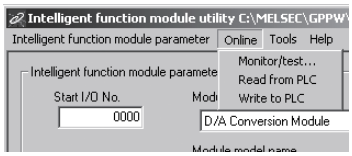
### (a) File menu




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
- Warning output setting
- Warning output upper limit value/lower limit value

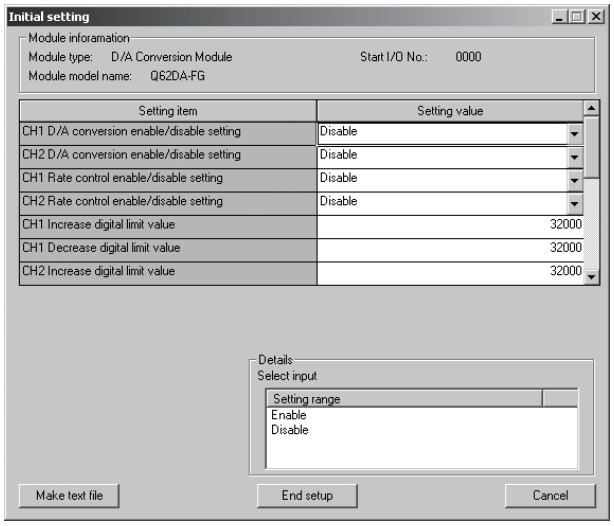
This initial setting makes sequence program setting unnecessary.

### [Operating procedure]

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

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

### [Setting screen]




### [Explanation of items]

#### (1) Setting contents

Set the 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 using a sequencer program to write the initial settings, when the CPU is switched from STOP to RUN the initial settings will be written, So ensures that programming is carried out to re-execute the initial settings.

## 5.5 Auto Refresh Setting

### [Purpose]

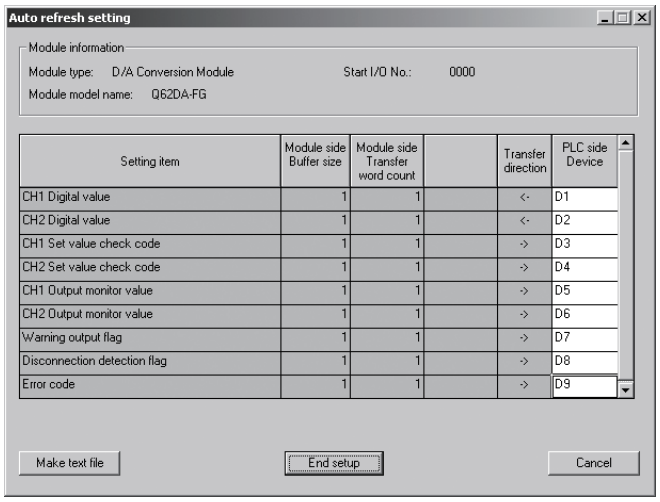
Configure the Q62DA-FG buffer memory for automatic refresh.

### [Operating procedure]

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

* 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.

The auto refresh settings become effective by performing STOP → RUN → STOP → RUN operations for the CPU module, turning the power OFF and then ON or resetting the CPU module after writing the intelligent function module parameters to 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]

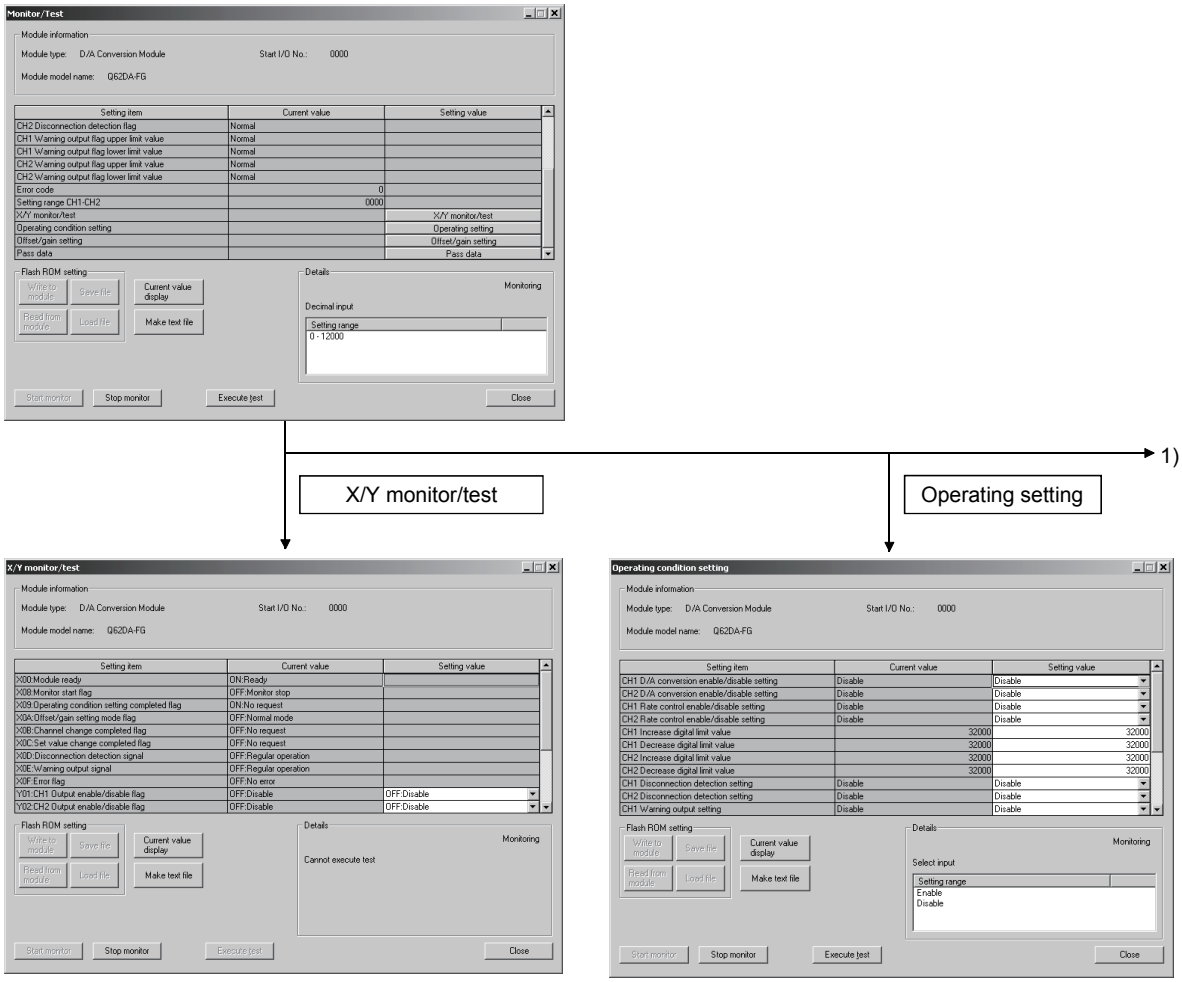
Start buffer memory monitoring/testing and I/O signal monitoring/testing, operating condition setting, offset/gain settings (refer to Section 5.6.2), pass data (refer to Section 5.6.4)from this screen.

[Operating procedure]

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

* 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]



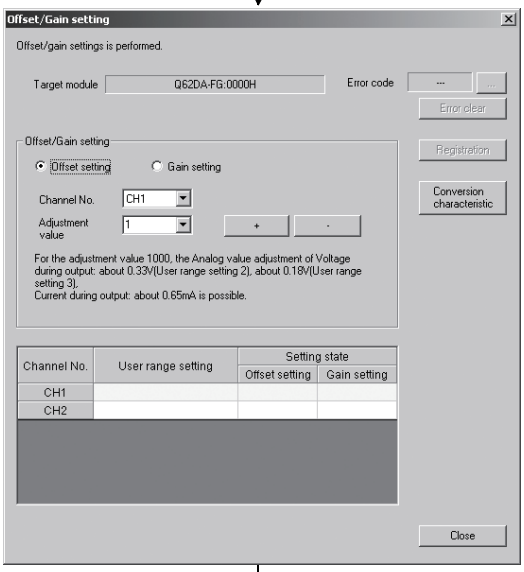


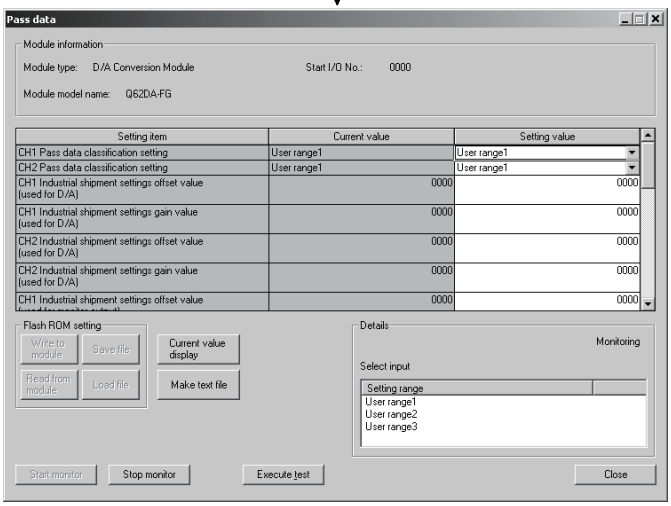
5 - 17

1)

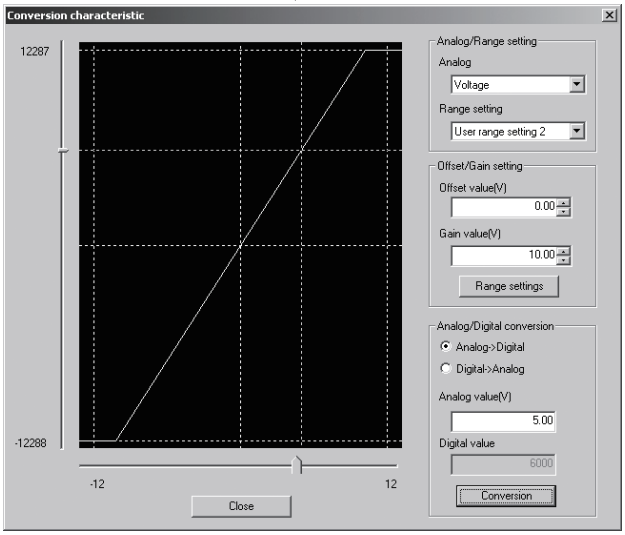
Offset/gain setting

Pass data




Conversion characteristic



[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 the CH□ digital value during test operation changes the analog output, so perform these after taking ample safety precautions.

**REMARK**

The selection test operation is explained below using the CH1 digital value writing as an example.

(1) Change the setting value field for "Y01: CH1 output enable/disable flag" to "ON: enable."
Nothing is written to the D/A converter module at this point.

(2) Click and select the setting value field to be written in the Q62DA-FG.
To write more than one setting item at the same time, select the items while holding down the Ctrl key.

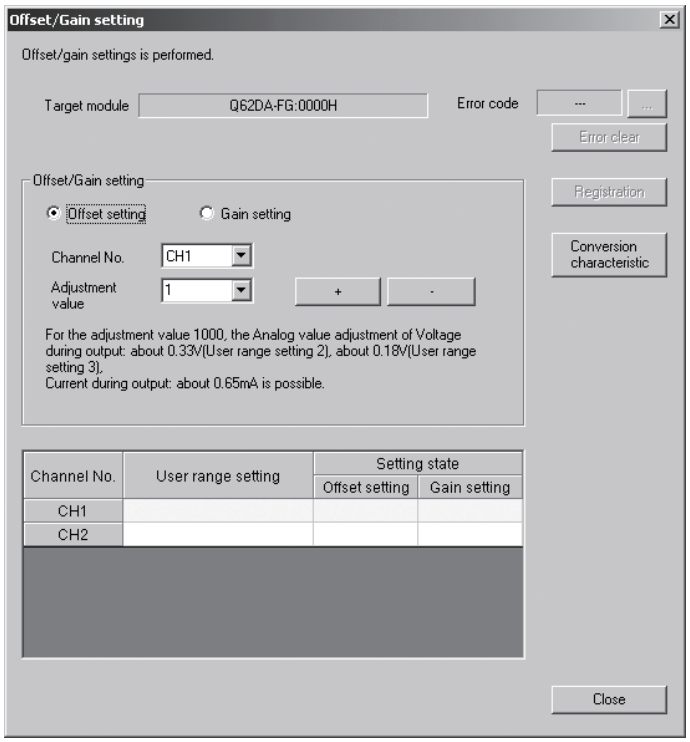
(3) Click the Execute test to execute the write operation.
Once writing has been completed, the value that was written will be displayed in the present value field.

## 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 dialog box to confirm the transition of 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 Q62DA-FG

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

(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, 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, the error code can be cleared by clicking the [Error clear] button.

## 5.6.3 Confirmation of Conversion Characteristic

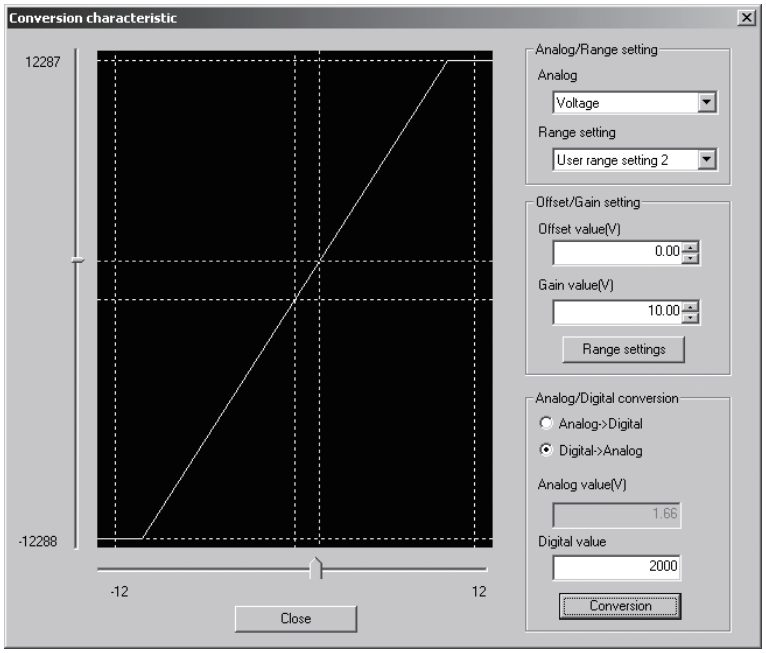
### [Purpose]

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

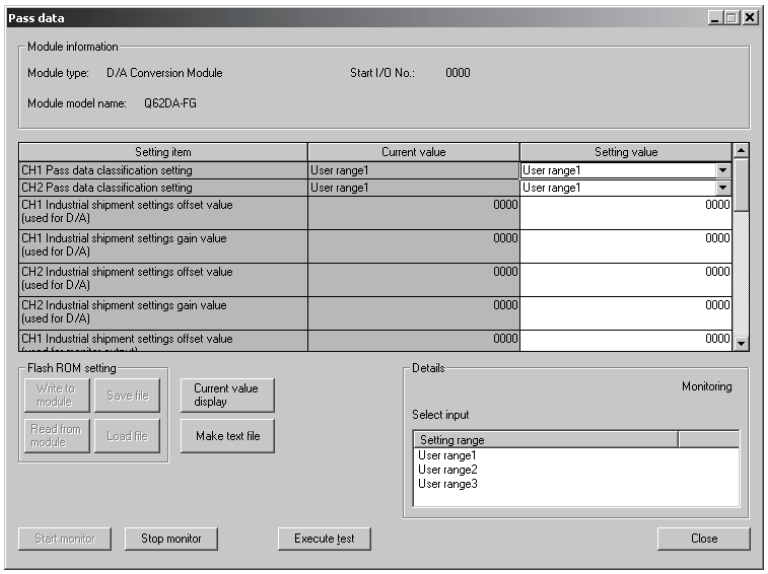
| | |
|---|---|
| Range setting | The entered offset/gain value is determined, and the I/O characteristic diagram is updated. |
| Conversion | Conversion for the entered value is performed. |

## 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

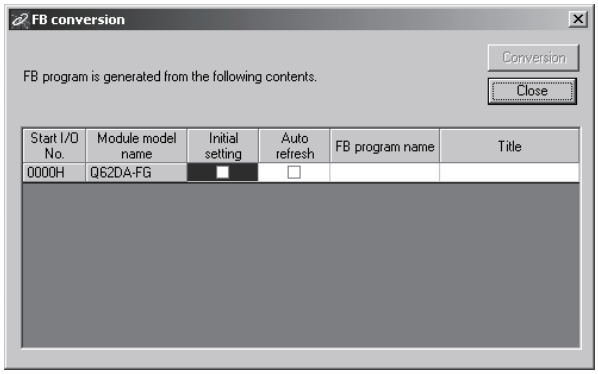
### [Purpose]

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>> → 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.

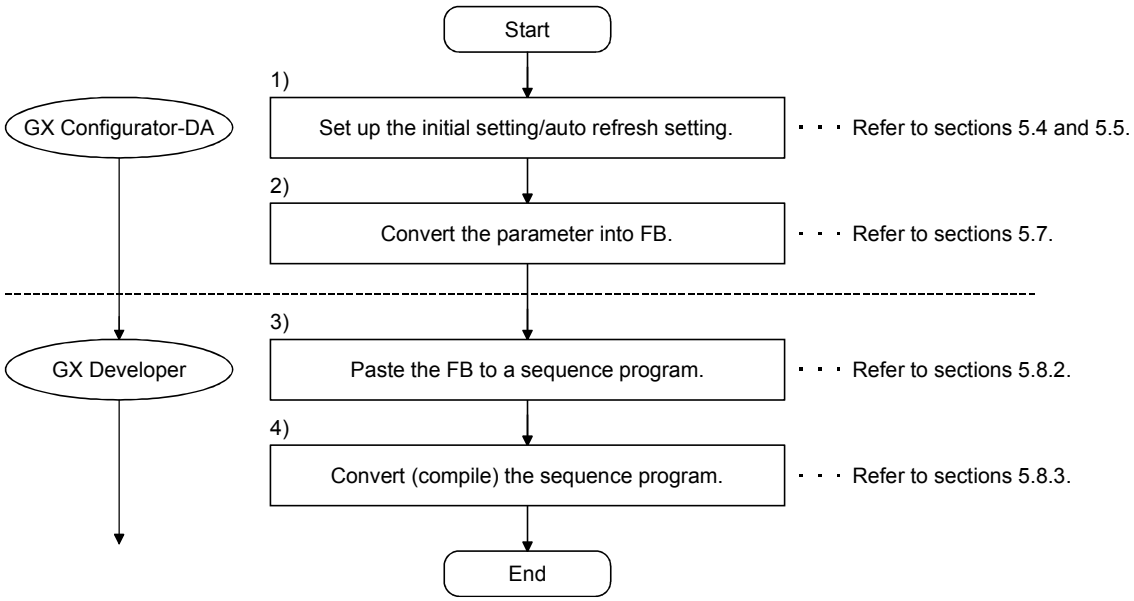
(1) Set up the intelligent function module parameter (initial setting/auto refresh setting).

(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.





5 - 27

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

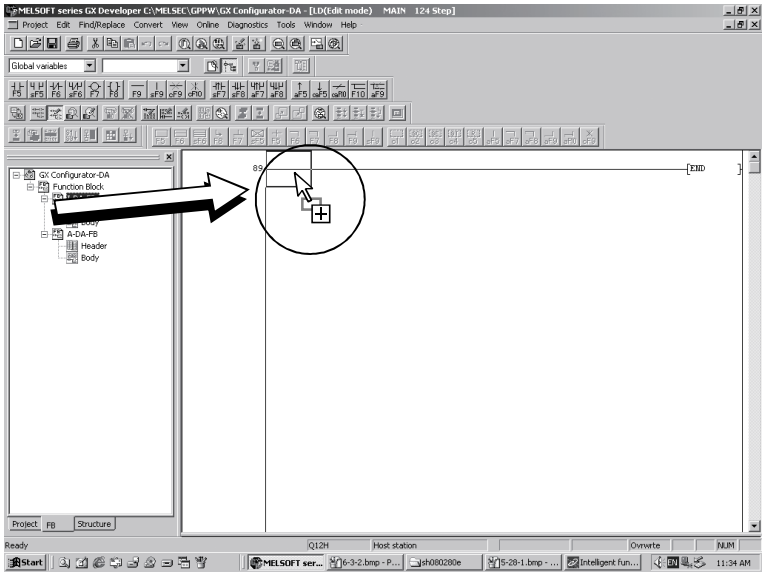
### [Purpose of operation]

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

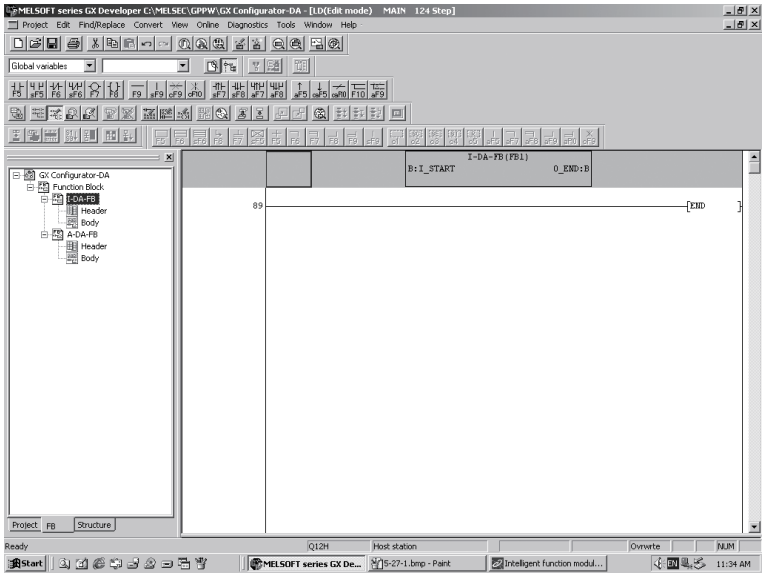
### [Operation procedure]

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



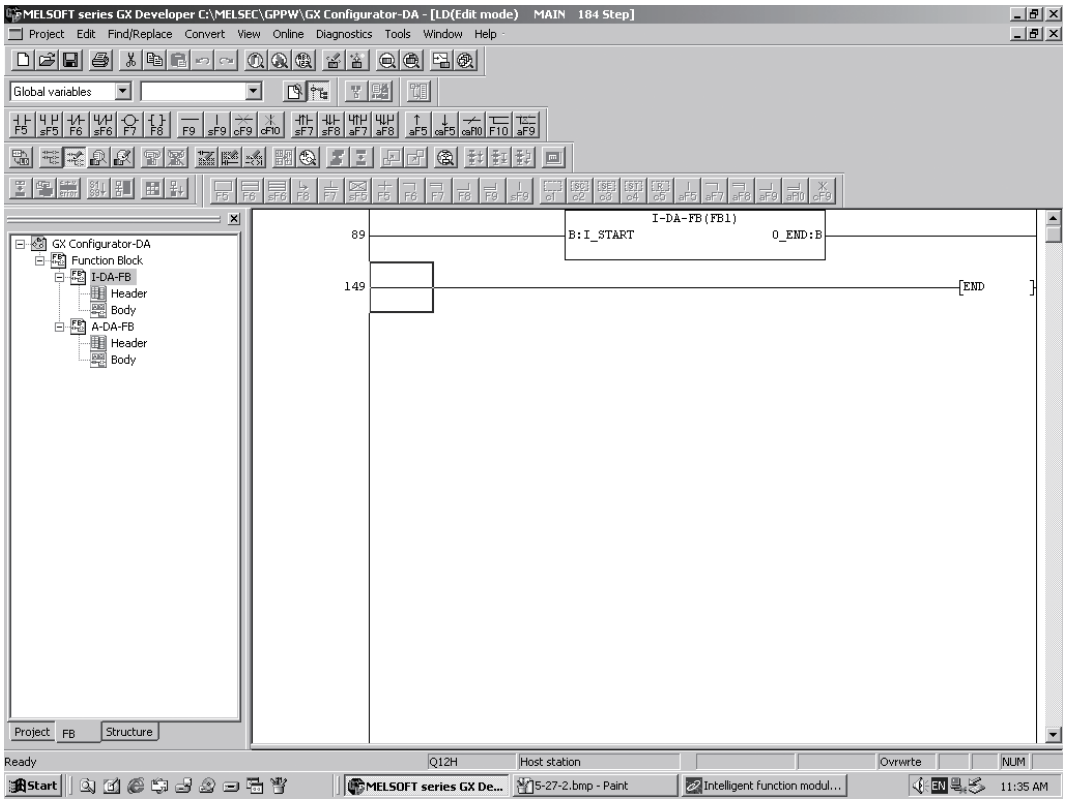
After pasting



## 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.

# MEMO

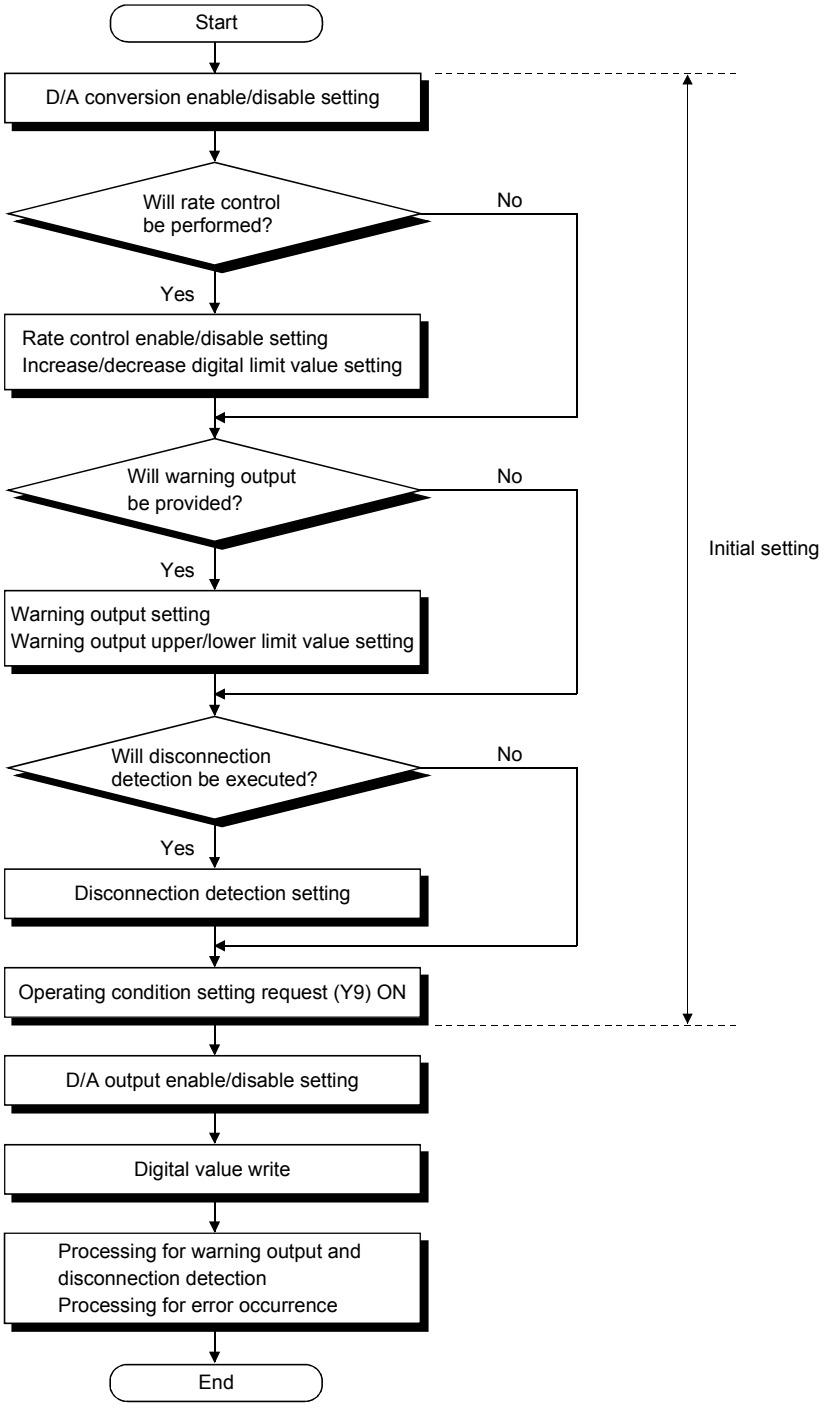

5 - 31

# 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

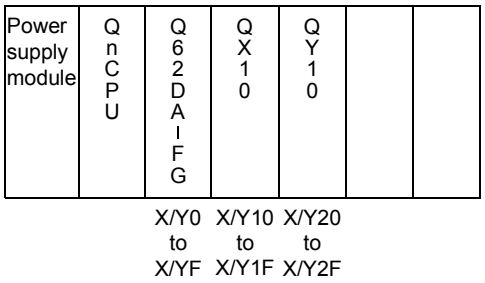
Create the program that will execute the digital-analog conversion of the Q62DA-FG in the following procedure.



## 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

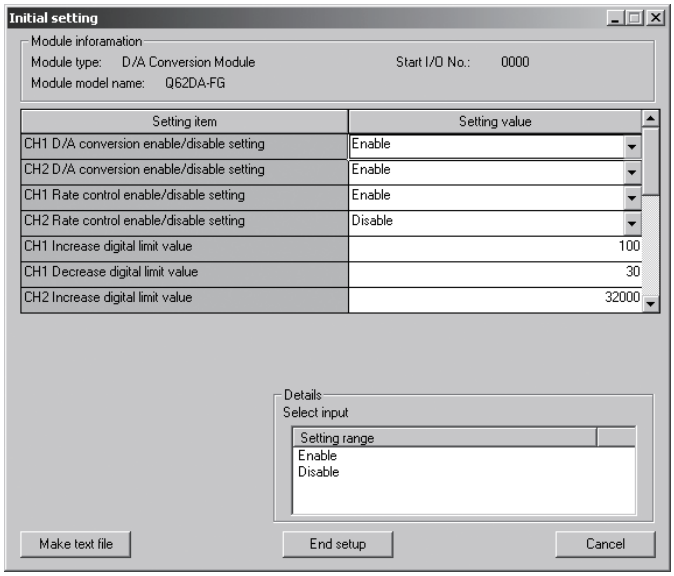
- Output enable ..... X11
- Digital value write signal ..... X12
- Disconnection detection reset signal ..... X13
- Warning output reset signal ..... X14
- Error code reset signal ..... X15
- Error code display (BCD 3 digits) ..... Y20 to Y2B
- CH1 digital value ..... D11
- CH2 digital value ..... D12
- 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

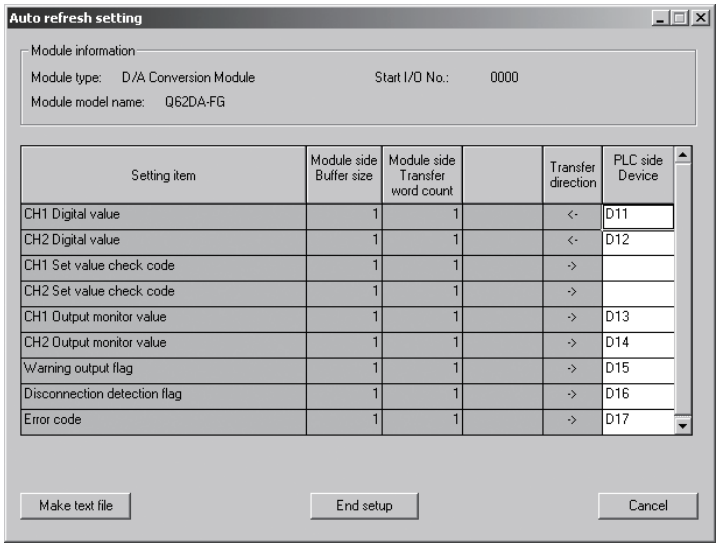
(a) Initial settings (Refer to Section 5.4)

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"



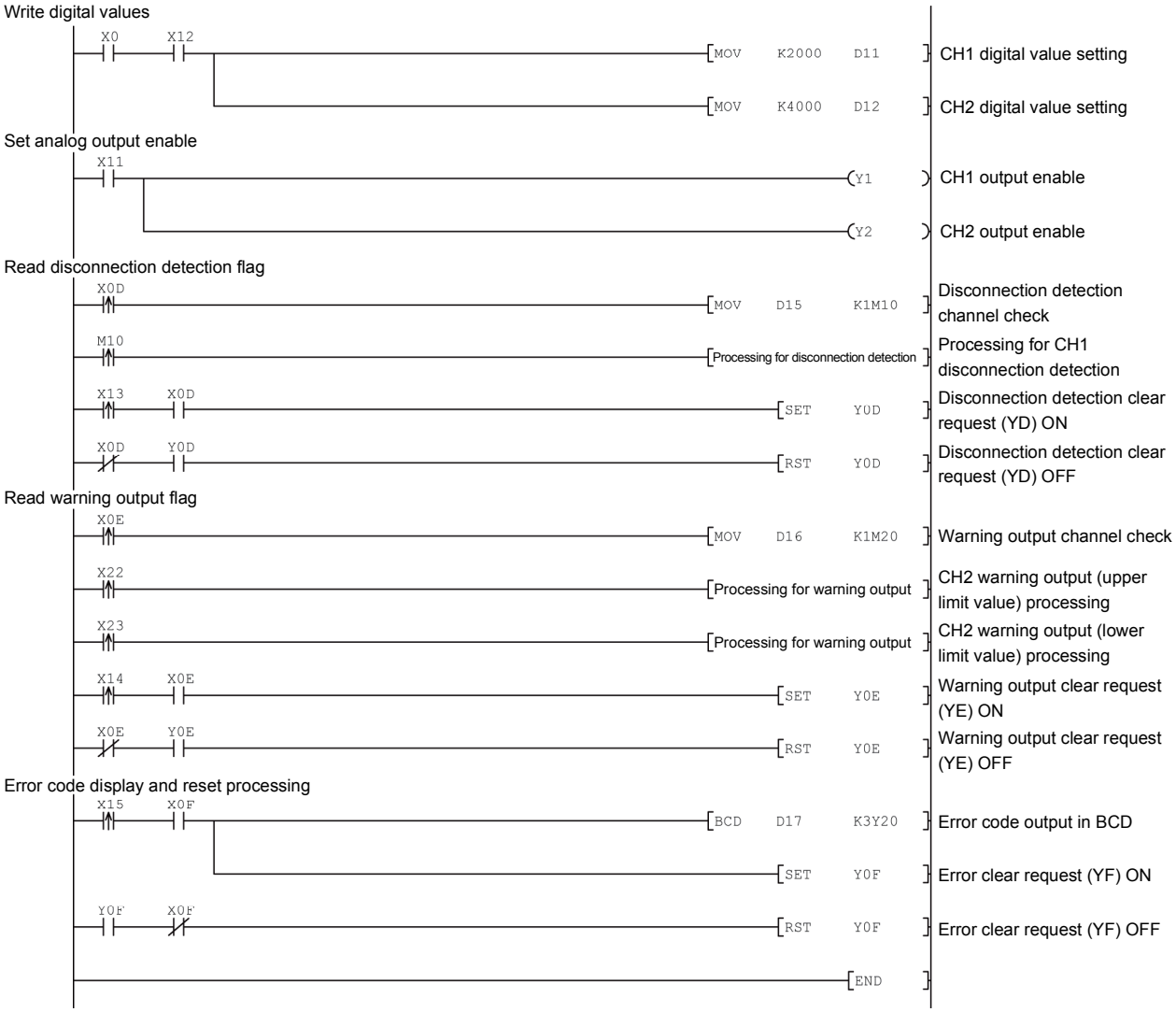

(b) Automatic refresh setting (Refer to Section 5.5)

CH1, CH2 digital values .....D11, D12
CH1, CH2 output monitor values .....D13, D14
Disconnection detection .....D15
Warning output .....D16
Error code .....D17

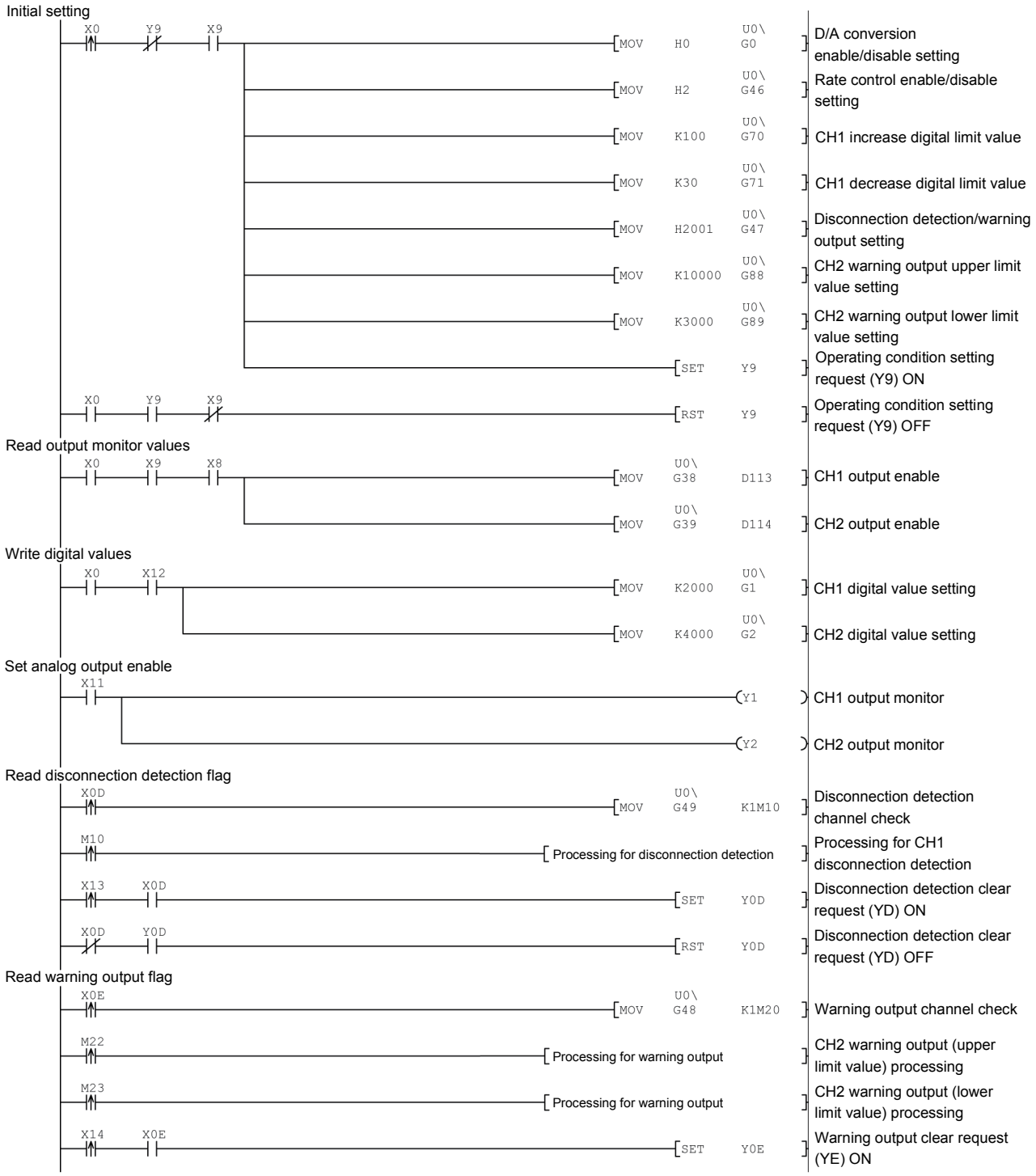


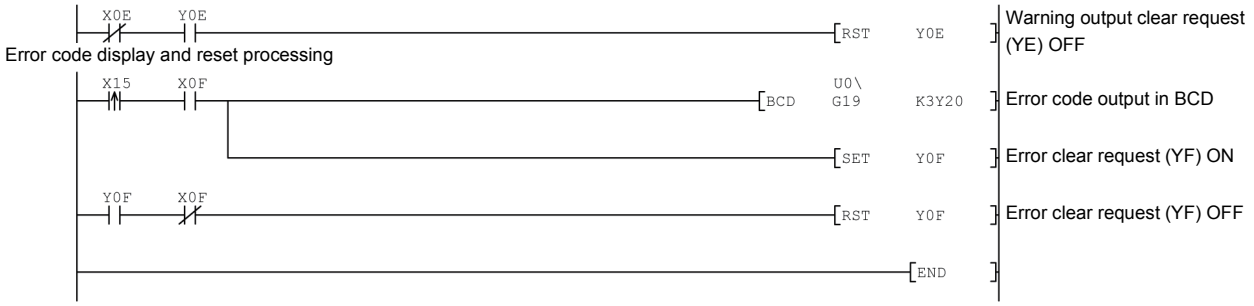
(c) Write of intelligent function module parameters (Refer to Section 5.3.3)
Write the intelligent function module parameters to the CPU module.
Perform this operation on the parameter setting module selection screen.

## (2) Program example



## 6.2.2 Programming example without using the utility package



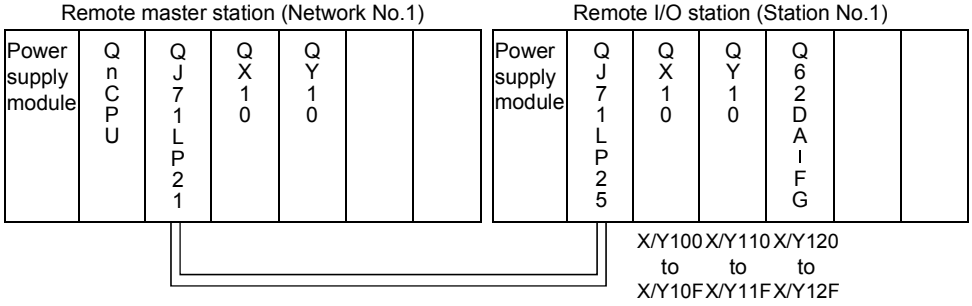

Error code display and reset processing
X0E
Y0E
RST
Y0E
Warning output clear request (YE) OFF
X15
X0F
BCD
U0\G19
K3Y20
Error code output in BCD
SET
Y0F
Error clear request (YF) ON
Y0F
X0F
RST
Y0F
Error clear request (YF) OFF
END


6 - 6

## 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 $0030_H$ (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 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 | | | | | ↔ | | | | |

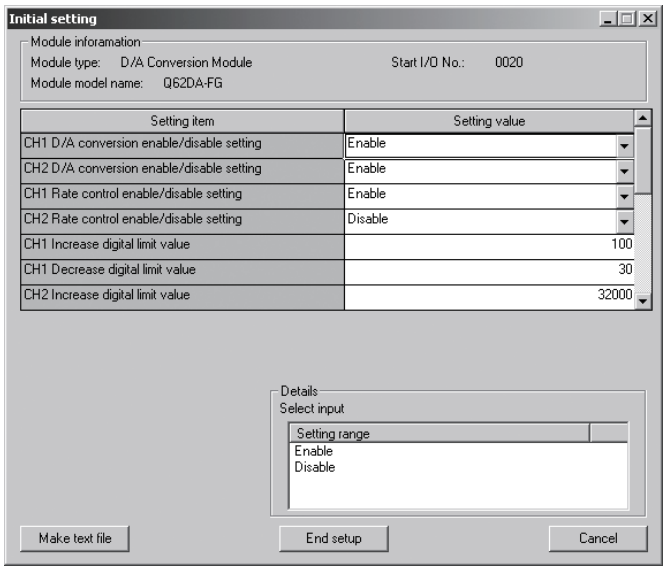
**POINT**

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

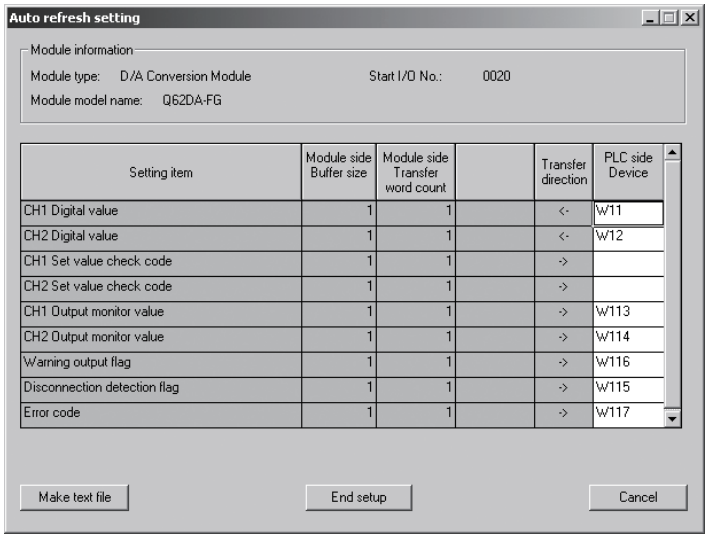
(a) Initial setting (see Section 5.4)

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 (see Section 5.5)

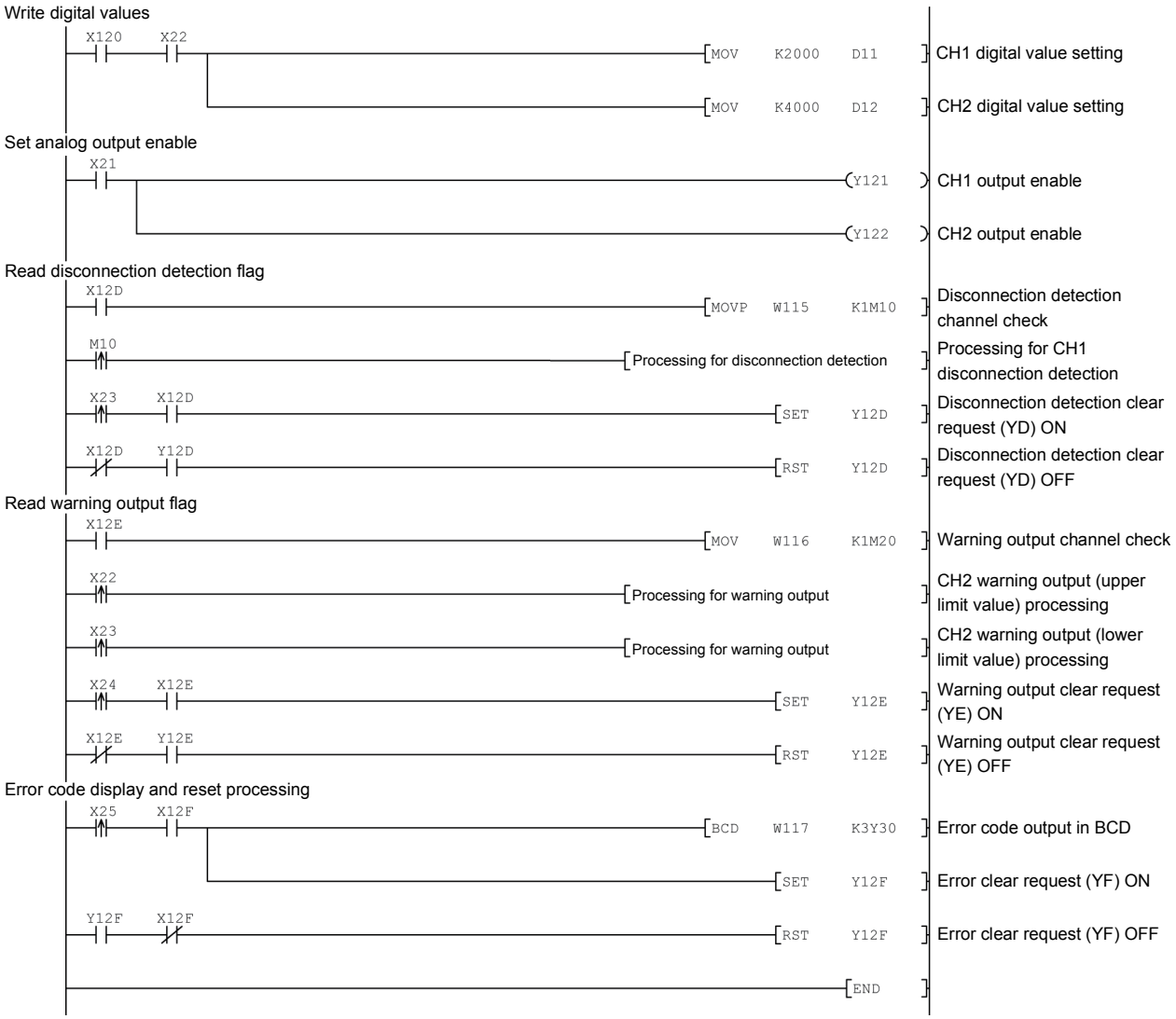
CH1, CH2 digital values.....W11, W12
CH1, CH2 output monitor values.....W113, W114
Disconnection detection.....W115
Warning output.....W116
Error code.....W117




(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)

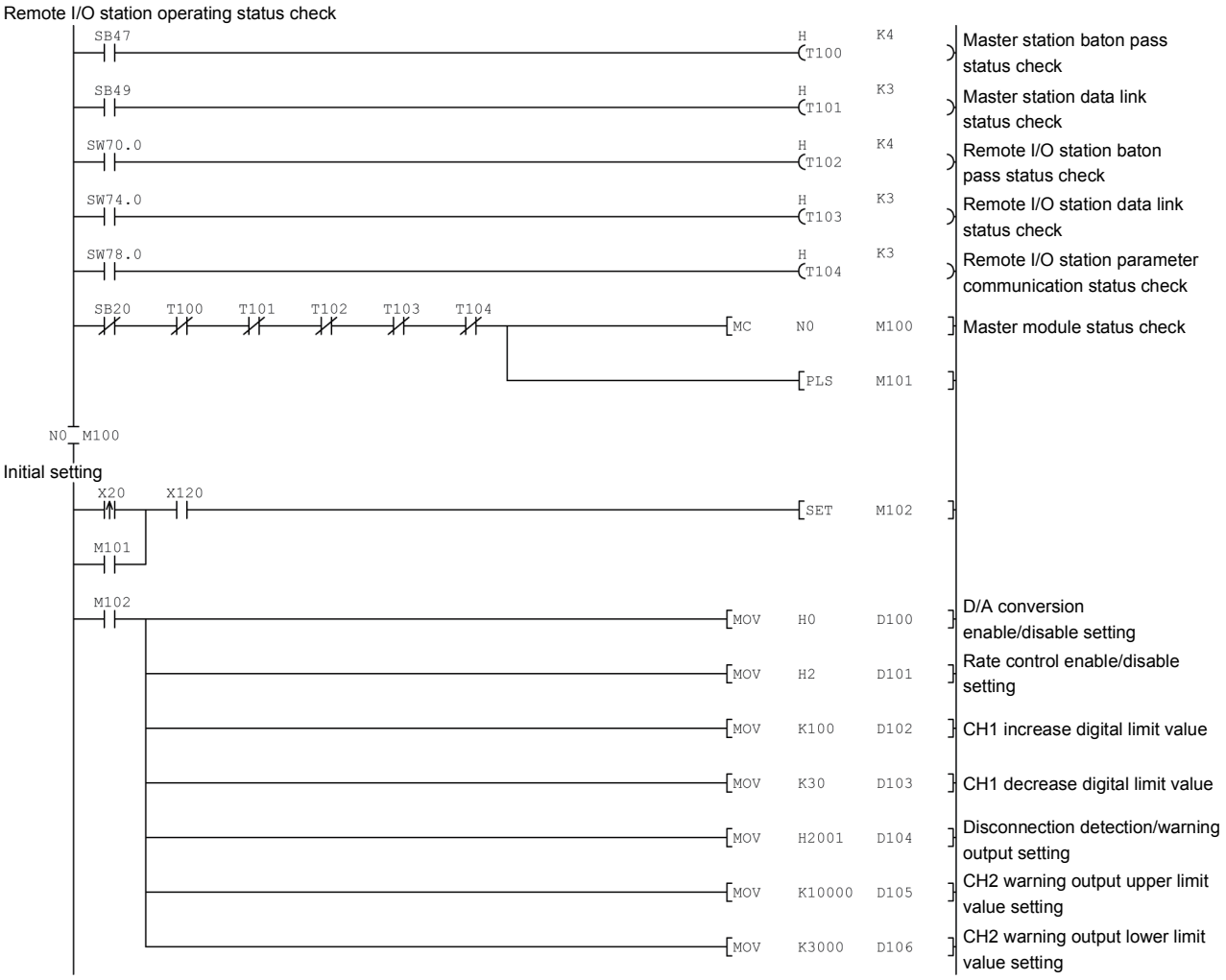
- Network type : MNET/H (remote master)
- Head I/O No. : 0000H
- Network No. : 1
- Total number of (slave) stations : 1
- Mode : Online
- Network range assignment :

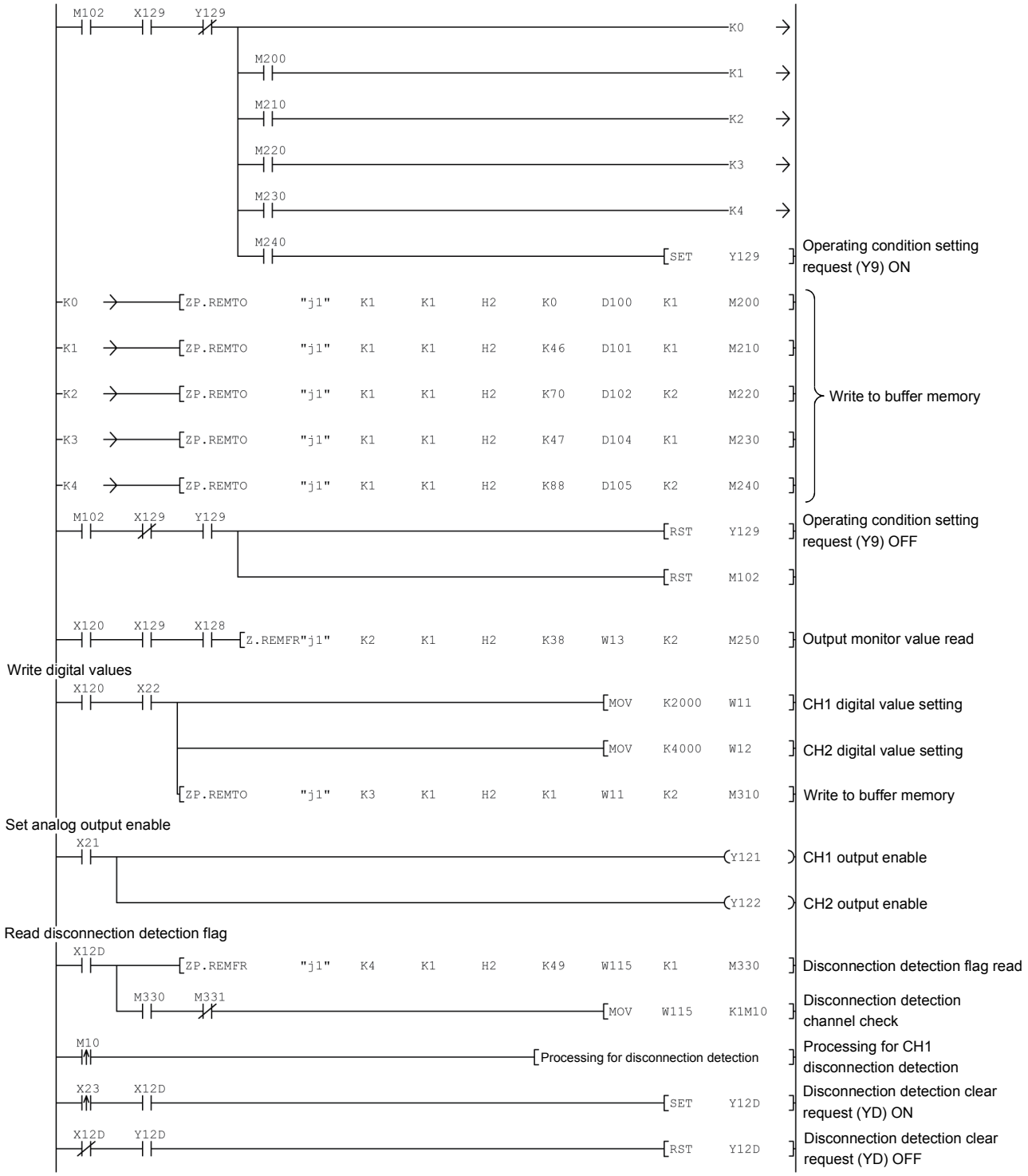
| StationNo. | M station -> R station | | | | | | M station <- R station | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Y | | | Y | | | X | | | X | | |
| | Points | Start | End | Points | Start | End | Points | Start | End | Points | Start | End |
| 1 | 256 | 0100 | 01FF | 256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

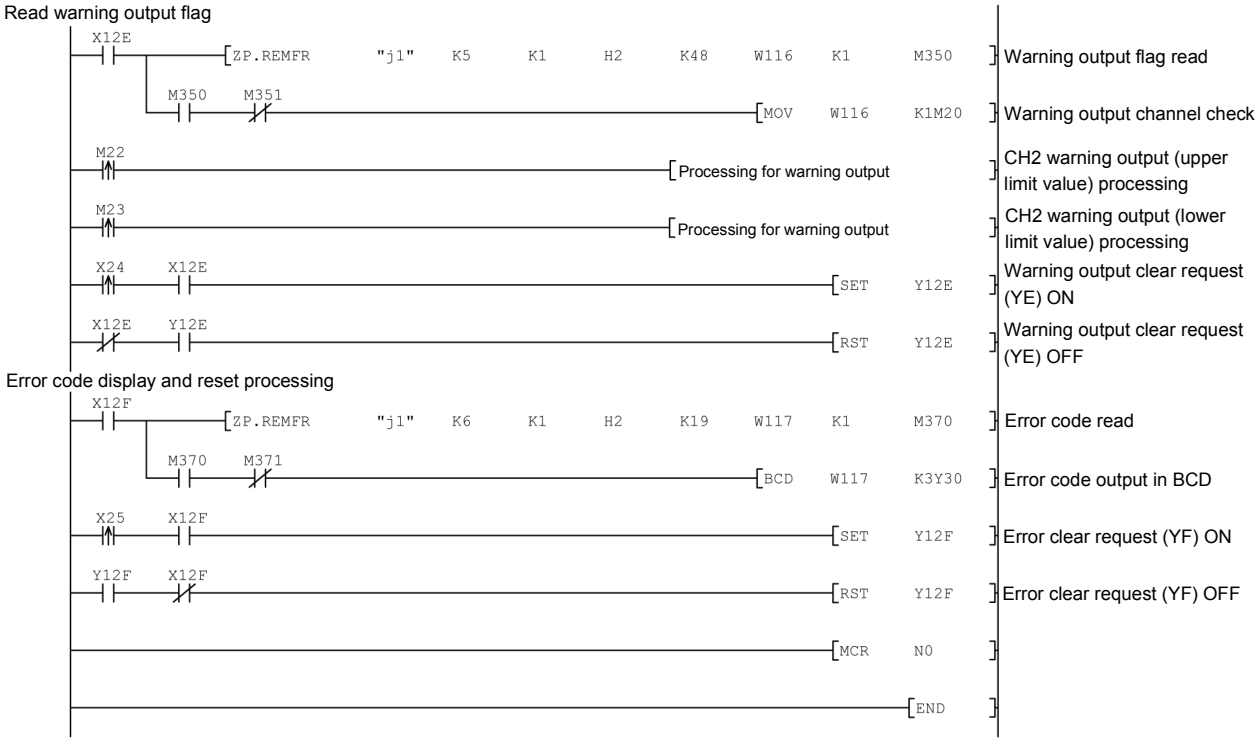
- Refresh parameters :

| | 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
RST M102
Operating condition setting request (Y9) OFF
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

This chapter describes the specifications of an online module change.

(1) Perform an online module change by operating 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 an 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 3.4.18, 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 an 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 an online module change. When using the dedicated instruction to execute save/restoration, therefore, execute save/restoration in the other system ＊.
If the other system is unavailable, execute restoration by performing write to the buffer memory.

＊ : 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 an online module change.

### (1) CPU

The Process CPU is required.
For precautions for multiple CPU system configuration, refer to the QCPU User's Manual (Multiple CPU 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 an online module change on the remote I/O station.

### (5) Base unit

1) When the slim type main base unit (Q3□SB) is used, an 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 an 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) Conversion disable<br>Turn OFF all Y signals that were turned ON by a sequence program. ＊2<br>(2) Dismounting of module<br>Operate GX Developer to start an online module change.<br>Click the [Execution] button of GX Developer to make the module dismountable.<br>Dismount the corresponding module.<br>(3) Mounting of new module<br>Mount a new module. | Module is operating as usual.<br>Module stops operating.<br>• RUN LED turns off.<br>• Conversion disabled.<br>• Analog output is 0V/0mA. |
| × | × | × | × | × | × | | |
| ○ | × | × | × | ○ | × | After mounting the module, click the [Execution] button of GX Developer. | ＊3<br>X/Y refresh resumes and the module starts.<br>• RUN LED turns on.<br>• Default operation (X0 remains OFF)<br>When there are initial setting parameters, operation is performed according to the initial setting parameters at this point. |
| ○ | × | × | ○ | × | ○ | Operation check before control start<br>(4) Operation check<br>Click the [Cancel] button of GX Developer to leave the online mode.<br>Conduct an operation test on the new module using "Device test" of GX Developer or "Monitor/test" of GX Configurator.<br>Perform user range restoration processing by write to buffer memory at this point.<br>Operation check completed | Module operates according to test operation ＊4 |
| ○ | ○ | ○ | ○ | × | ○ | (5) Resumption of control<br>Operate GX Developer to resume the online module change mode, and click the [Execution] button to resume control. | X0 (Module Ready) turns ON.<br>Start is made when X0 turns from OFF to ON.<br>Operation is performed according to the initial setting sequence.＊4 |

＊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.

## 7.3 Online Module Change Procedure

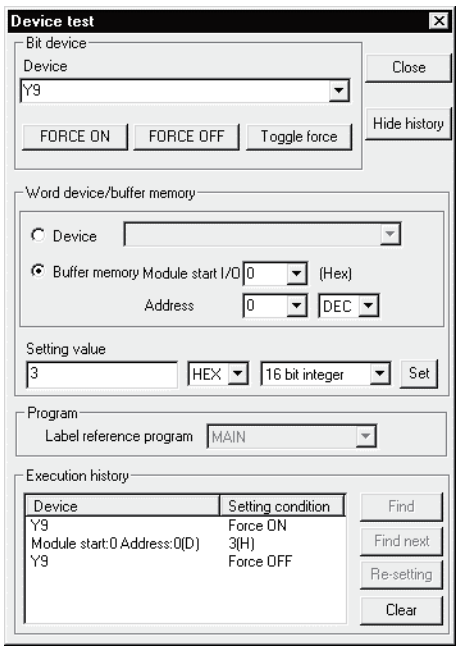
There are the following online module change procedures depending on whether the user range setting has been made or not, whether the initial setting of GX Configurator-DA has been made or not, and whether the other system exists or not.

| 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

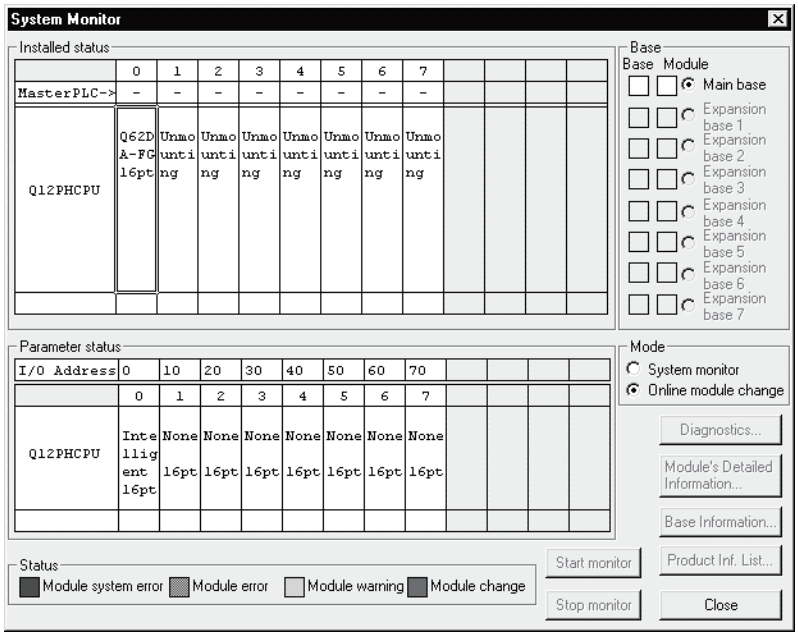
#### (1) Conversion disable

(a) Set D/A Conversion enable/disable setting (buffer memory address 0: Un\G0) for all channel conversion disable and turn Operating condition setting request (Y9) from OFF to ON to stop conversion.
After confirming that conversion has stopped with the actual analog output value, turn OFF Operating condition setting request (Y9).

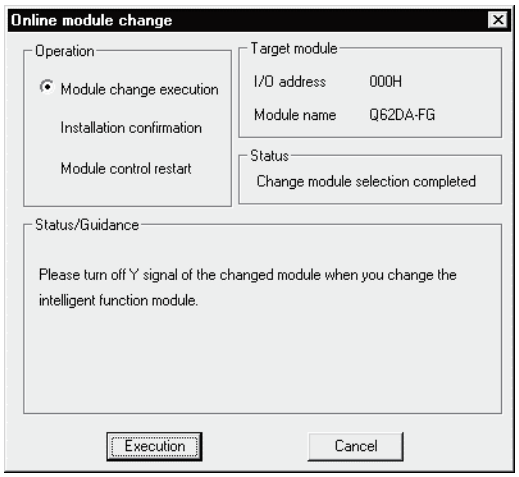


(2) Dismounting of module

(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.

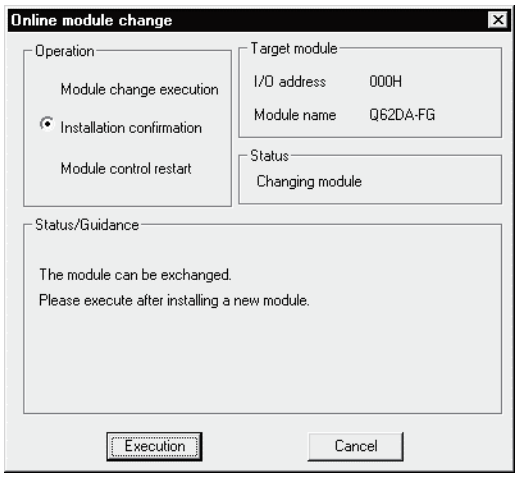
**POINT**

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

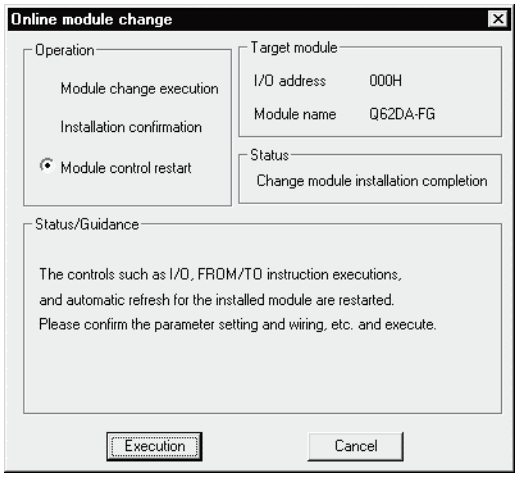
(a) Mount a new module to the same slot and install the terminal block.

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

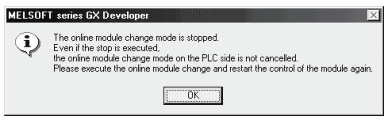



(4) Operation check

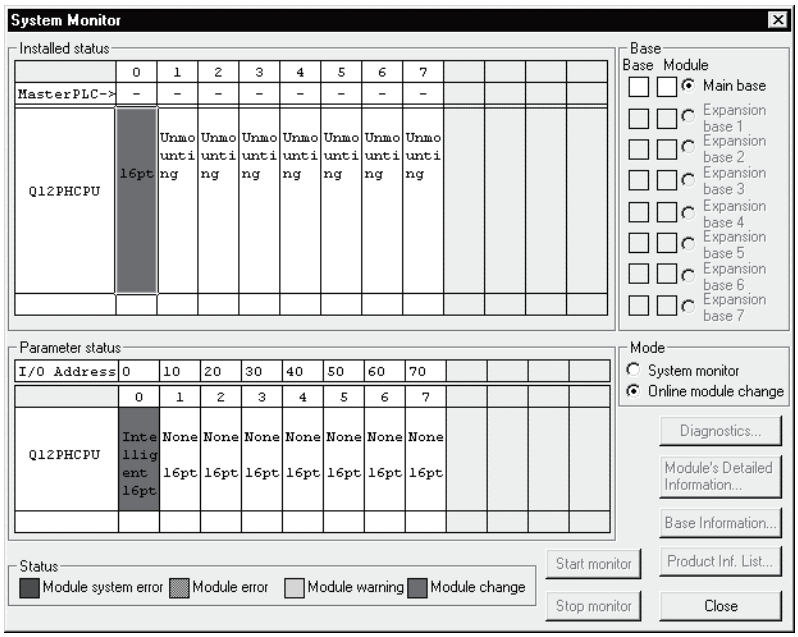
(a) To make an operation check, click the [Cancel] button to cancel control resumption.




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



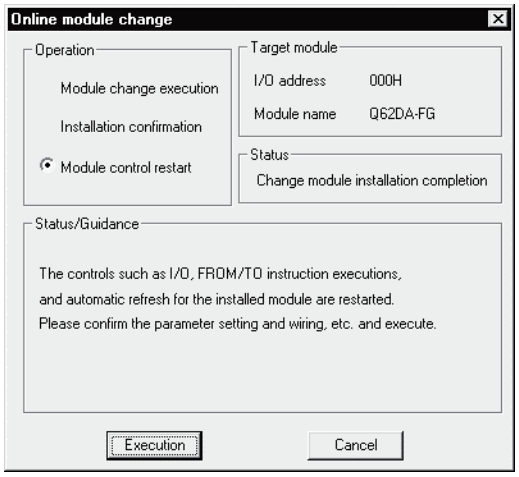
(c) Click the [Close] button to close the System monitor screen.




(d) Set digital values to the digital values (buffer memory addresses 1, 2: Un\G1, 2) 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 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 redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

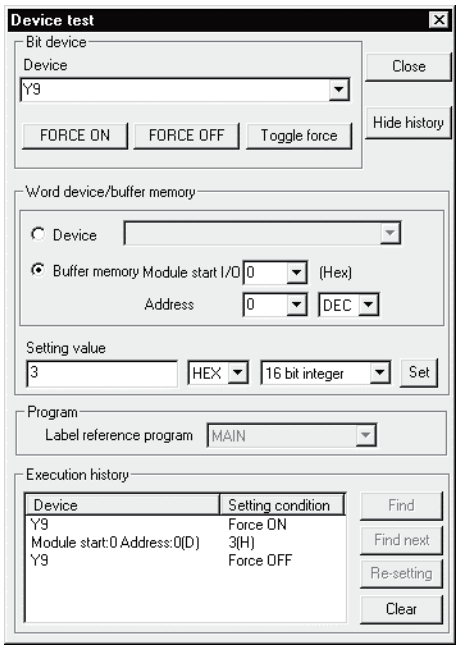



(b) The "Online module change completed" screen appears.

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

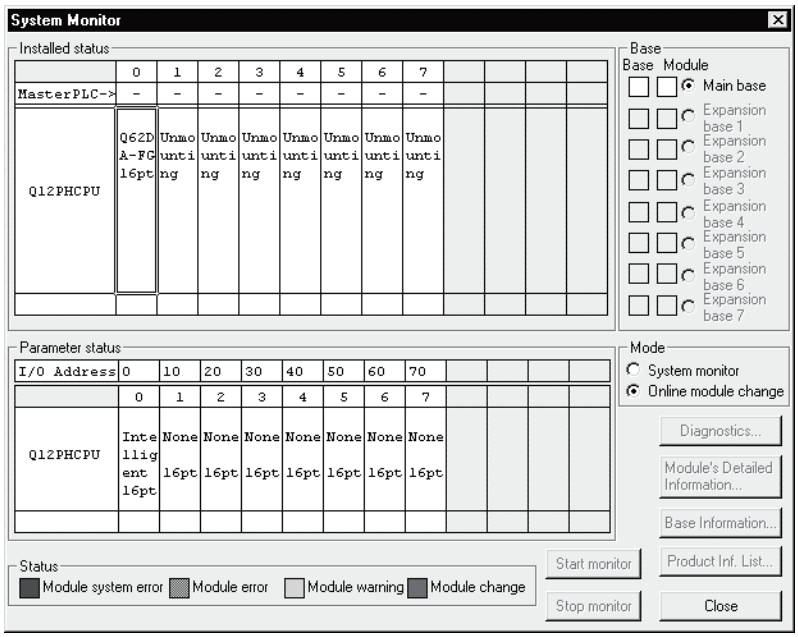
#### (1) Conversion disable

(a) Set D/A Conversion enable/disable setting (buffer memory address 0: Un\G0) for all channel conversion disable and turn Operating condition setting request (Y9) from OFF to ON to stop conversion.
After confirming that conversion has stopped with the actual analog output value, turn OFF Operating condition setting request (Y9).

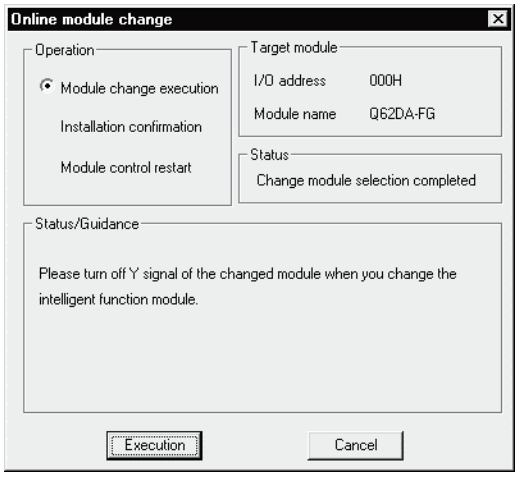



#### (2) Dismounting of module

(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.

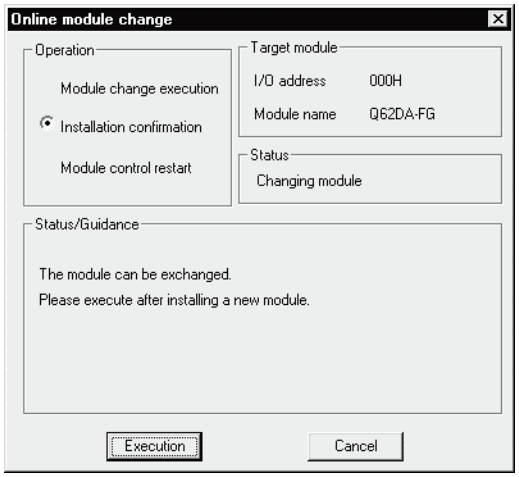
**POINT**

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

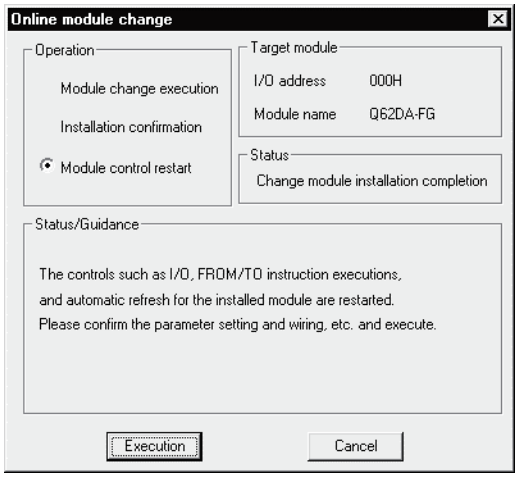
(a) Mount a new module to the same slot and install the terminal block.

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



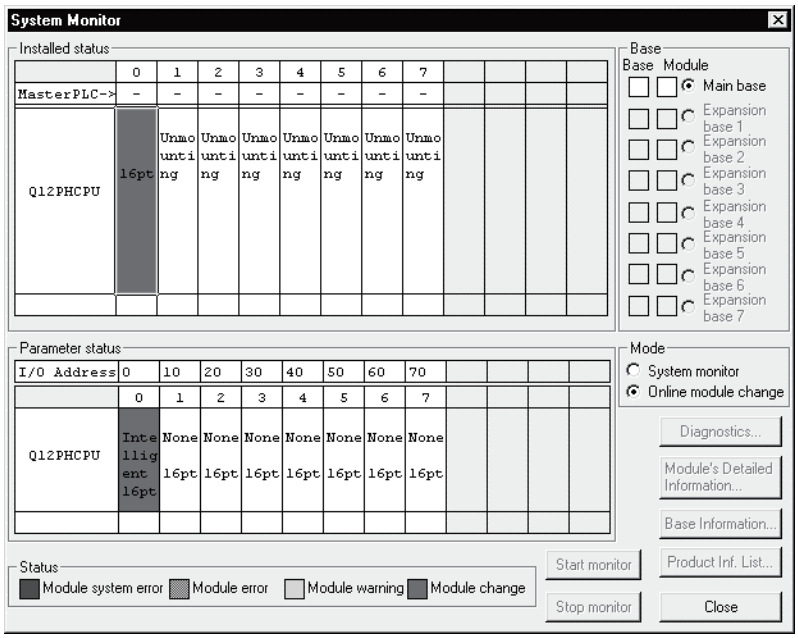
(4) Operation check

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




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


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



(d) Referring to (1), enable the conversion of the channels to be used, set digital values to the digital values (buffer memory addresses 1, 2: Un\G1, 2), 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 or not.
(Be careful since analog outputs are provided actually.)

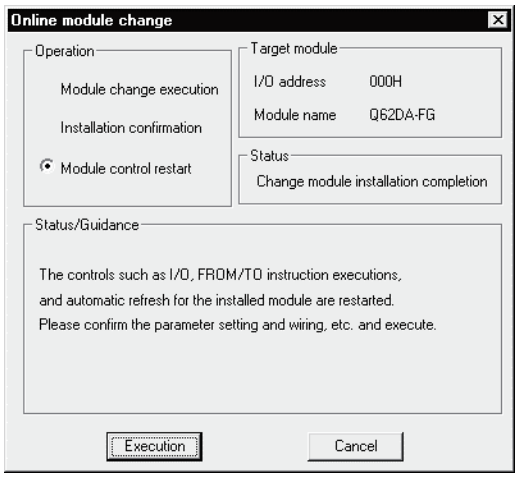
(e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
Before performing initialization, check whether the contents of the initialization program are correct or not.

1) Normal system configuration
The sequence program should perform initialization on the leading edge of Module READY (X9) 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 redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

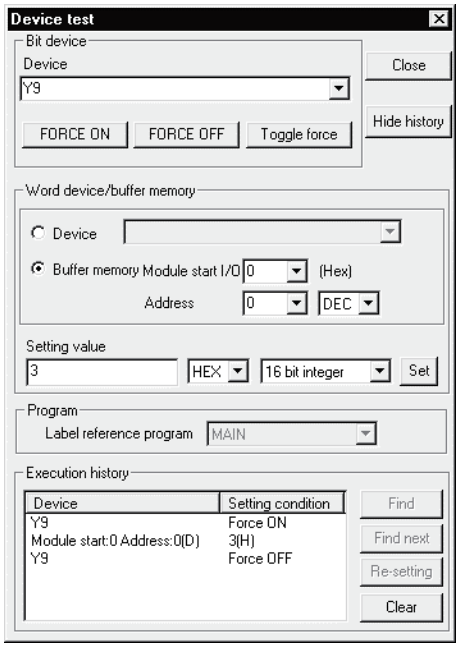



(b) The "Online module change completed" screen appears.

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

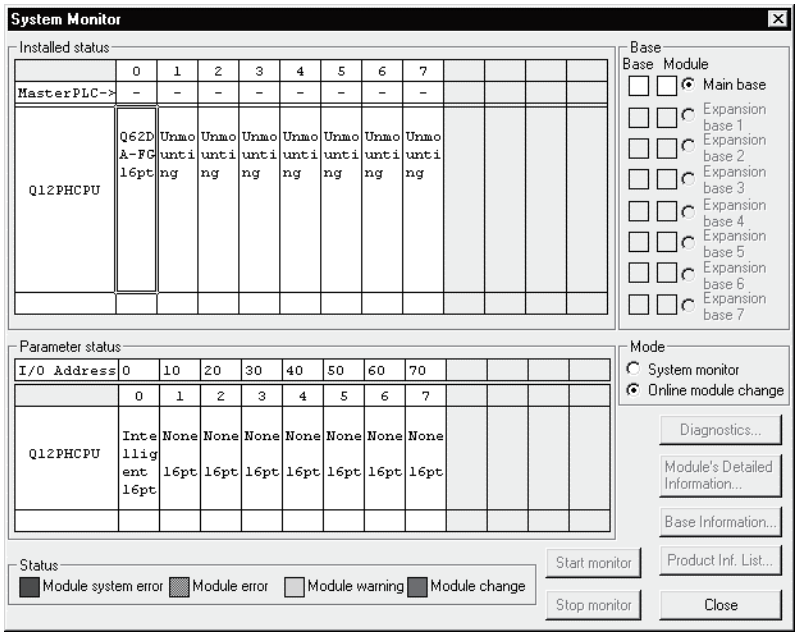
#### (1) Conversion disable

(a) Set D/A Conversion enable/disable setting (buffer memory address 0: Un\G0) for all channel conversion disable and turn Operating condition setting request (Y9) from OFF to ON to stop conversion.
After confirming that conversion has stopped with the actual analog output value, turn OFF Operating condition setting request (Y9).

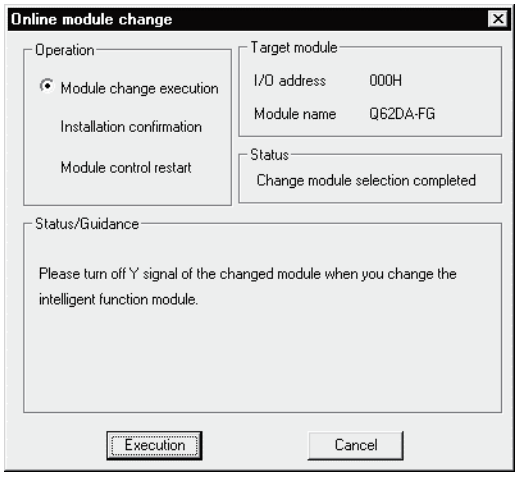



#### (2) Dismounting of module

(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 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

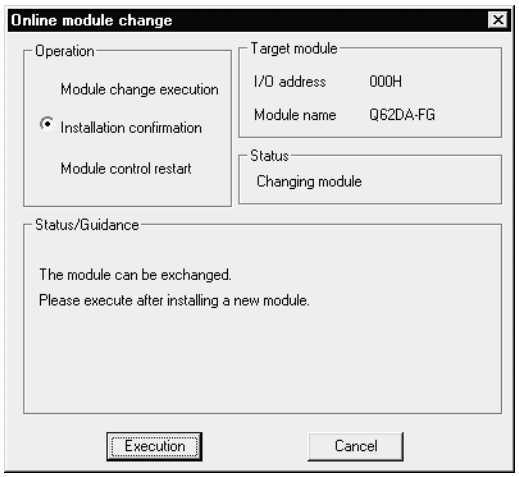
(a) Mount the dismounted module and new module to the other system.

(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.

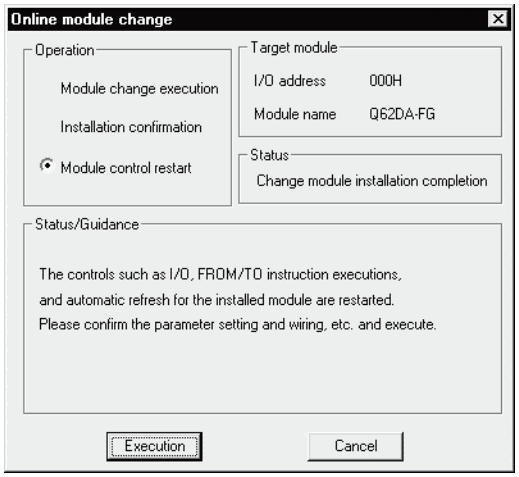
(d) Dismount the new module from the other system, mount it to the slot from where the old module was dismounted in the original system, and install the terminal block.

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



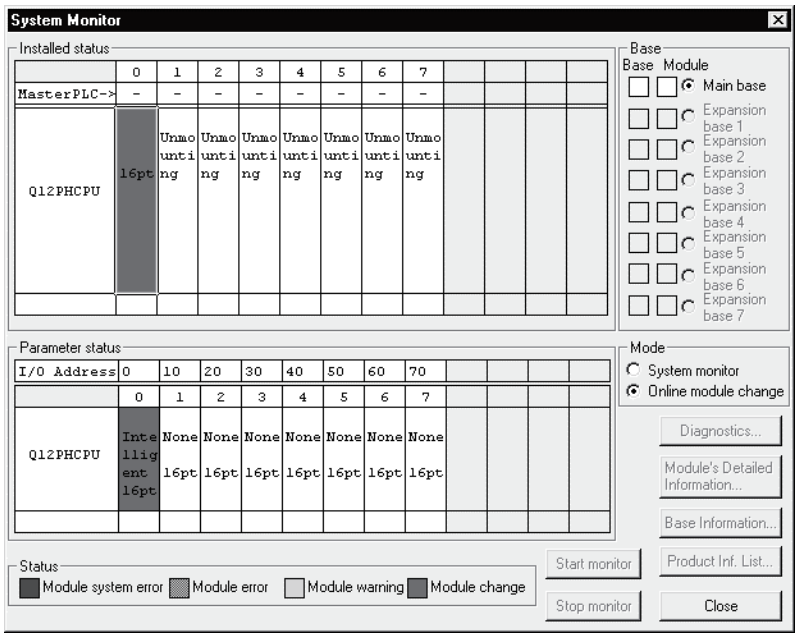

## (4) Operation check

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




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

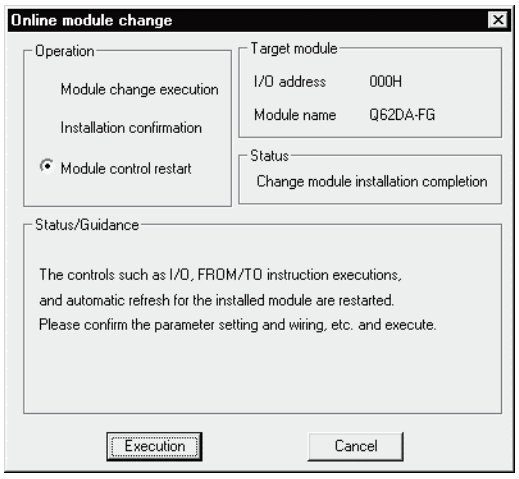
(c) Click the [Close] button to close the System monitor screen.




(d) Set digital values to the digital values (buffer memory addresses 1, 2: Un\G1, 2) 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 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 redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

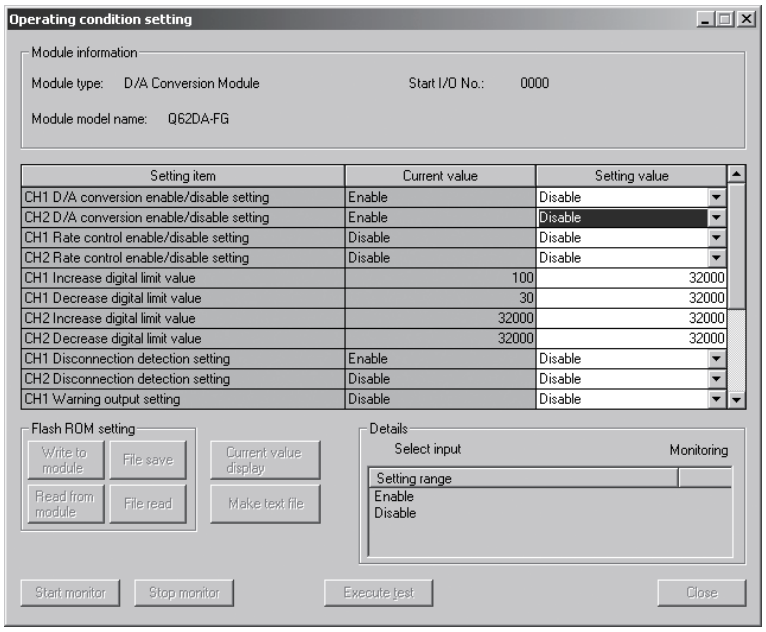



(b) The "Online module change completed" screen appears.

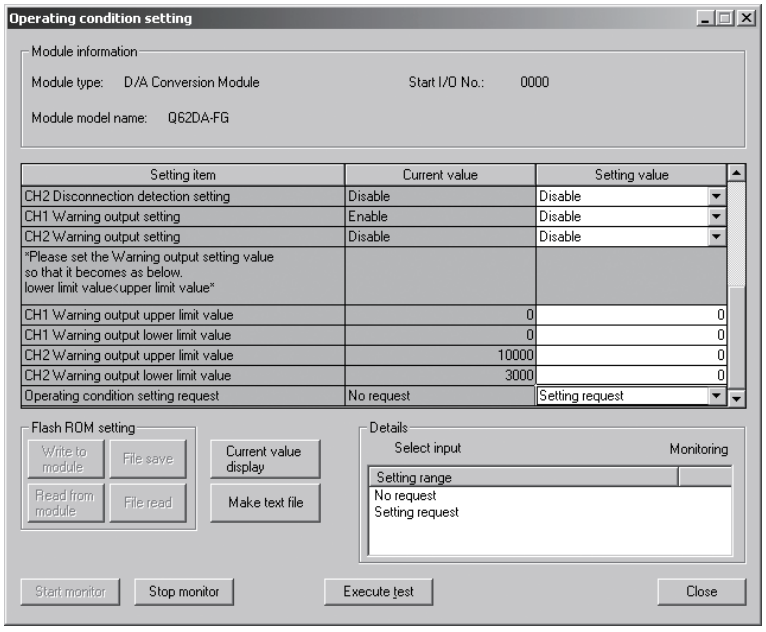
### 7.3.4 When user range setting is used and initial setting was made with GX Configurator-DA (other system is unavailable)

#### (1) Conversion disable

(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.



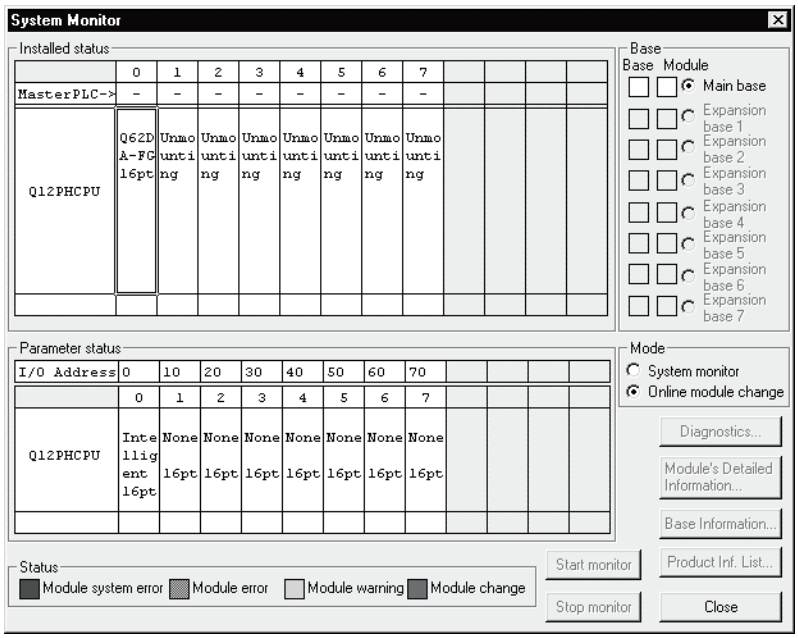
(c) If the saved buffer memory contents are not yet prerecorded, record them in the following procedure.
1) Display the pass data screen of GX Configurator-DA.
2) Select the user range used for pass data classification setting, and make a pass data read request. (Refer to Section 5.6.3.)
3) Compare the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

**POINT**

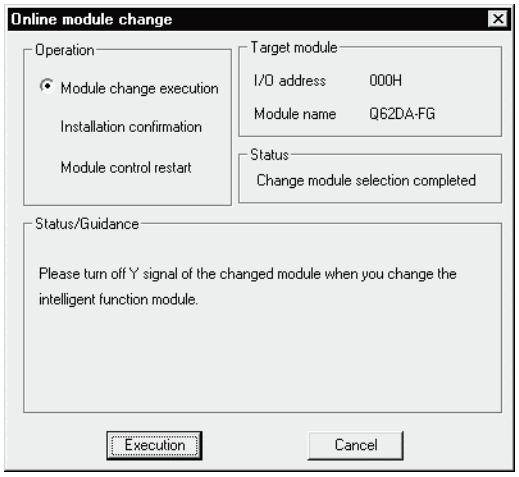
If the buffer memory values compared with the reference table are not proper, save and restoration of the user range cannot be executed.
Before executing module control resumption, make offset/gain setting in the GX Configurator-DA. (see Section 5.6.2)
Note that if module control is resumed without offset/gain 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 operation in Section (2)(c) and later.

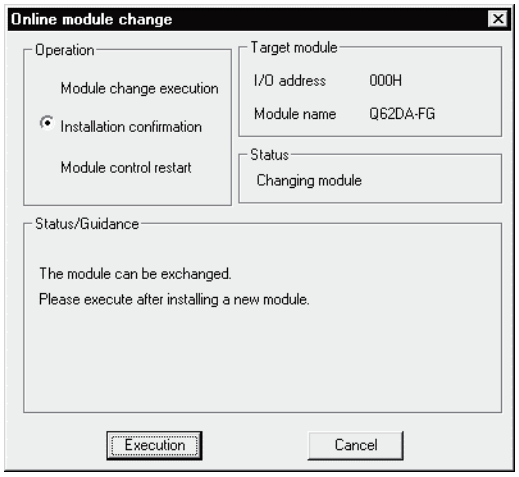

(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

| 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

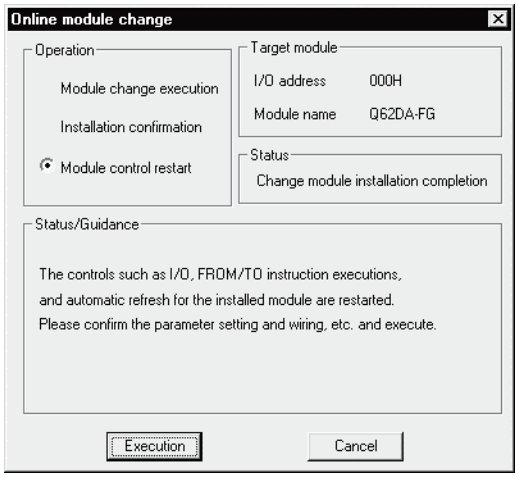
(a) Mount a new module to the same slot and install the terminal block.

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



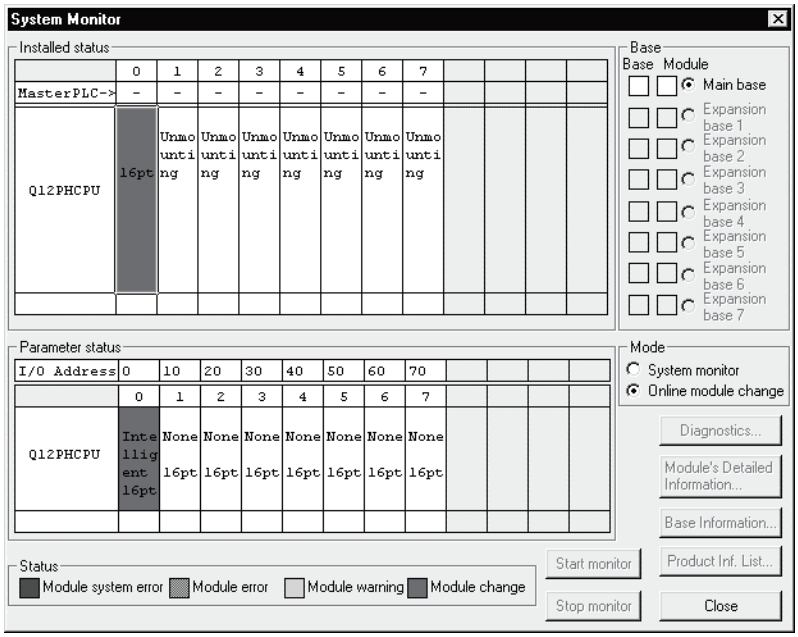
(4) Operation check

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




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

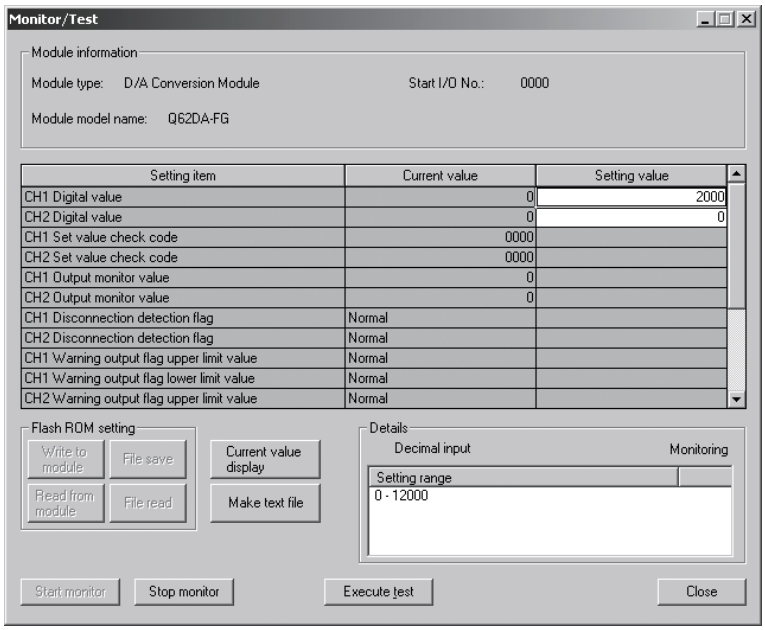

(c) Click the [Close] button to close the System monitor screen.




(d) On the pass data screen of GX Configurator-DA, set the prerecorded values and make a pass data write request. (Refer to Section 5.6.3.)

(e) Referring to (1), change the D/A conversion enable/disable setting of the used channel to conversion enable.

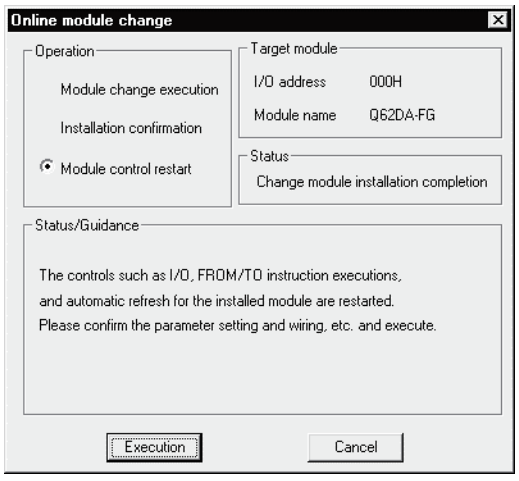
(f) On the monitor/test screen of GX Configurator-DA, set a value in the Setting value field of CH□ digital value of the used channel, and click the [Execute test] button.




(g) Turn ON the 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 redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

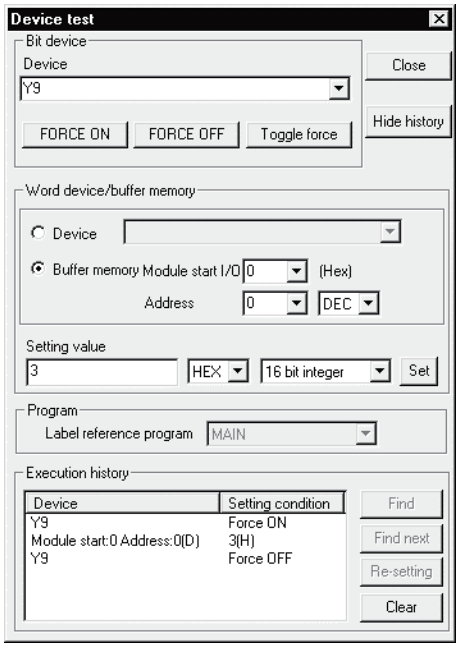



(b) The "Online module change completed" screen appears.

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

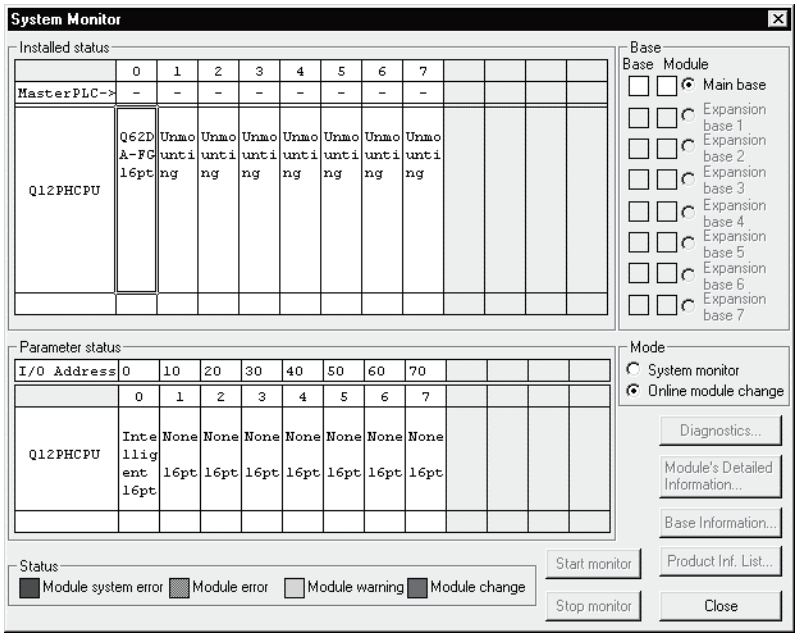
#### (1) Conversion disable

(a) Set D/A Conversion enable/disable setting (buffer memory address 0: Un\G0) for all channel conversion disable and turn Operating condition setting request (Y9) from OFF to ON to stop conversion.
After confirming that conversion has stopped with the actual analog output value, turn OFF Operating condition setting request (Y9).

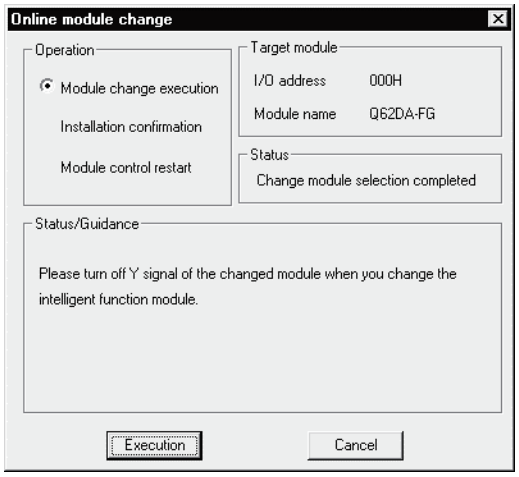



#### (2) Dismounting of module

(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 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

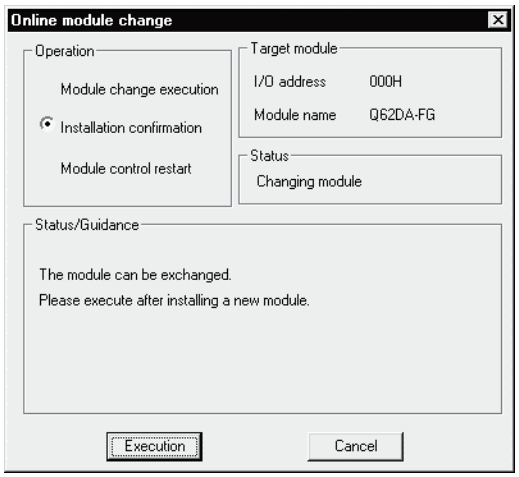
(a) Mount the dismounted module and new module to the other system.

(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.

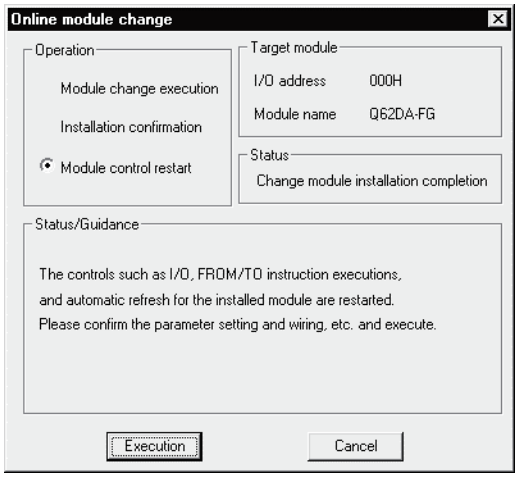
(d) Dismount the new module from the other system, mount it to the slot from where the old module was dismounted in the original system, and install the terminal block.

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



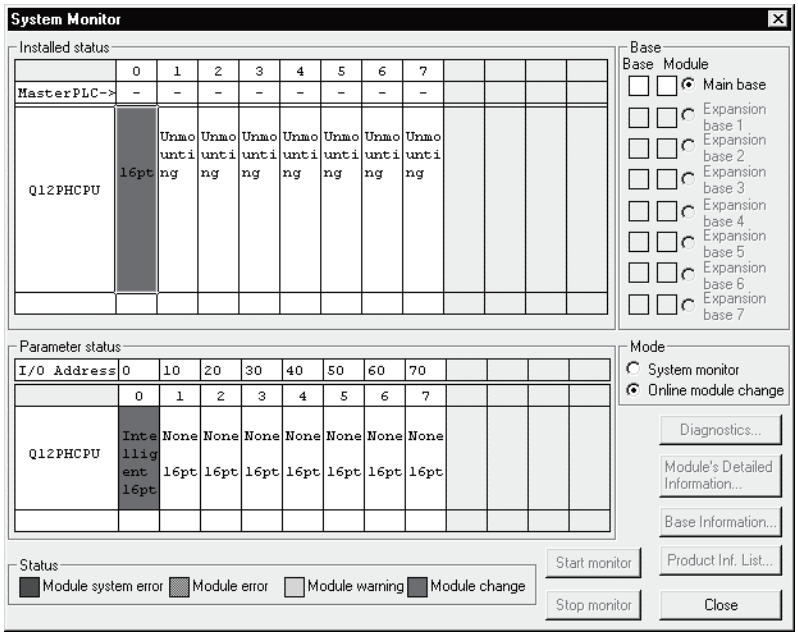

## (4) Operation check

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




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

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




(d) Referring to (1), enable the conversion of the channels to be used, set digital values to the digital values (buffer memory addresses 1, 2: Un\G1, 2), 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 or not.
(Be careful since analog outputs are provided actually.)

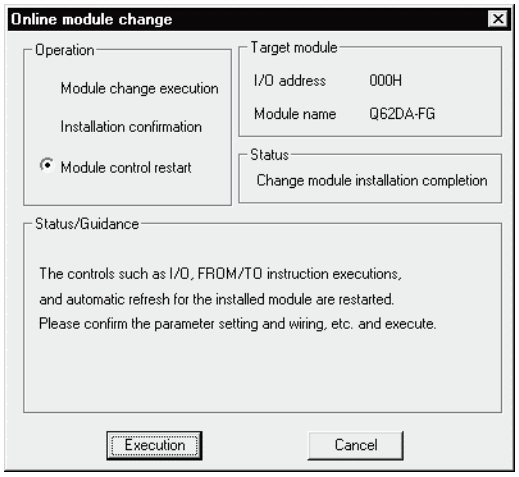
(e) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
Before performing initialization, check whether the contents of the initialization program are correct or not.

1) Normal system configuration
The sequence program should perform initialization on the leading edge of Module READY (X9) 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 redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.

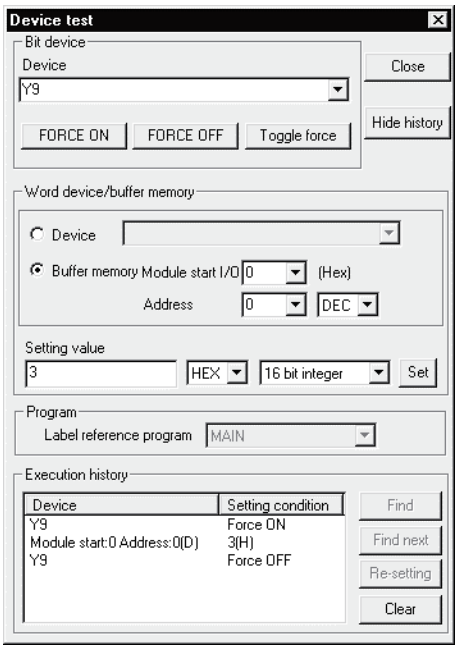



(b) The "Online module change completed" screen appears.

### 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) Set D/A Conversion enable/disable setting (buffer memory address 0: Un\G0) for all channel conversion disable and turn Operating condition setting request (Y9) from OFF to ON to stop conversion.
After confirming that conversion has stopped with the actual analog output value, turn OFF Operating condition setting request (Y9).




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

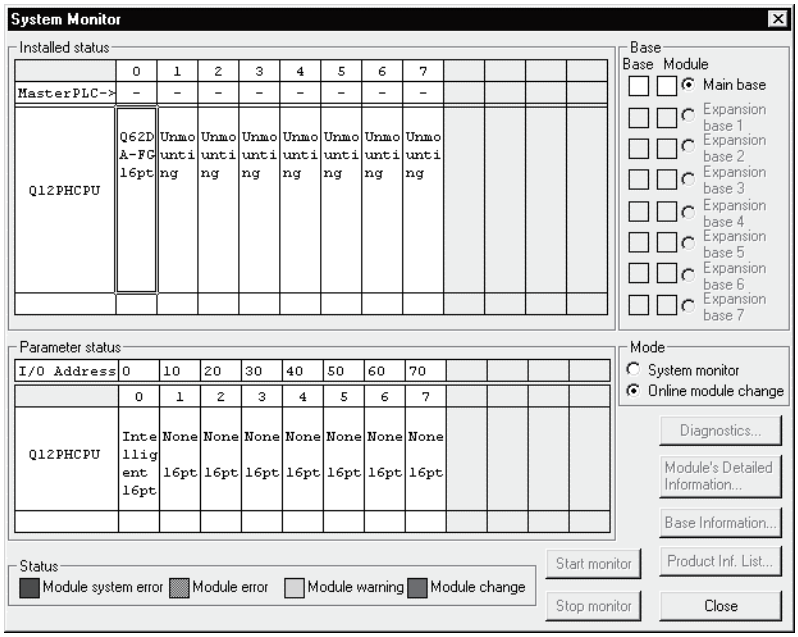
1) Make the pass data classification setting (buffer memory address 200: Un\G200).
2) Turn Operation Condition Setting Request (Y9) from OFF to ON.
3) Compare the offset/gain values of the industrial shipment settings and user range settings (buffer memory addresses 202 to 217: Un\G202 to Un\G217) with 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 the 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 the mode switching setting (buffer memory addresses 158, 159: Un\G158, Un\G159) and turning Operation 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

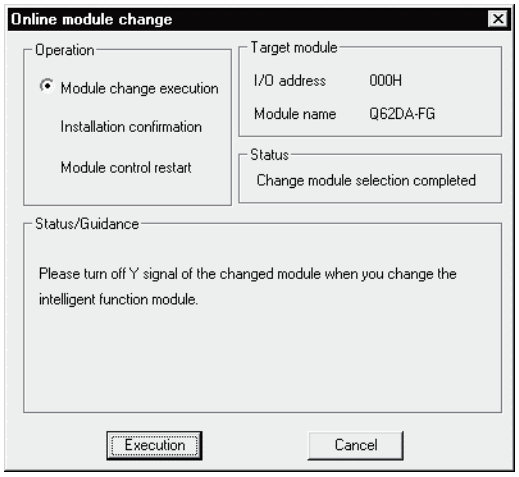
(a) After choosing [Diagnosis] - [Online module change] on GX Developer to enter the "Online module change" mode, double-click the module to be changed online to display the "Online module change" screen.





7 - 27

(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 (2)(c) and later.

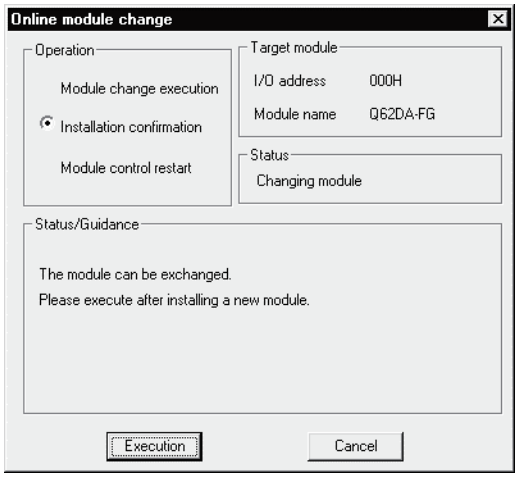

(c) After confirming that the "RUN" LED of the module has turned off, remove the terminal block and dismount the module.

| 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

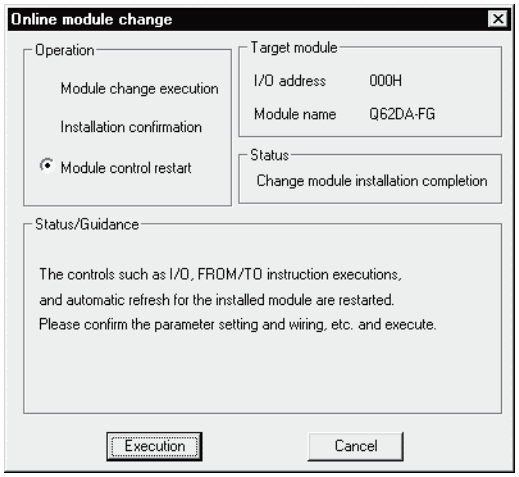
(a) Mount a new module to the same slot and install the terminal block.

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



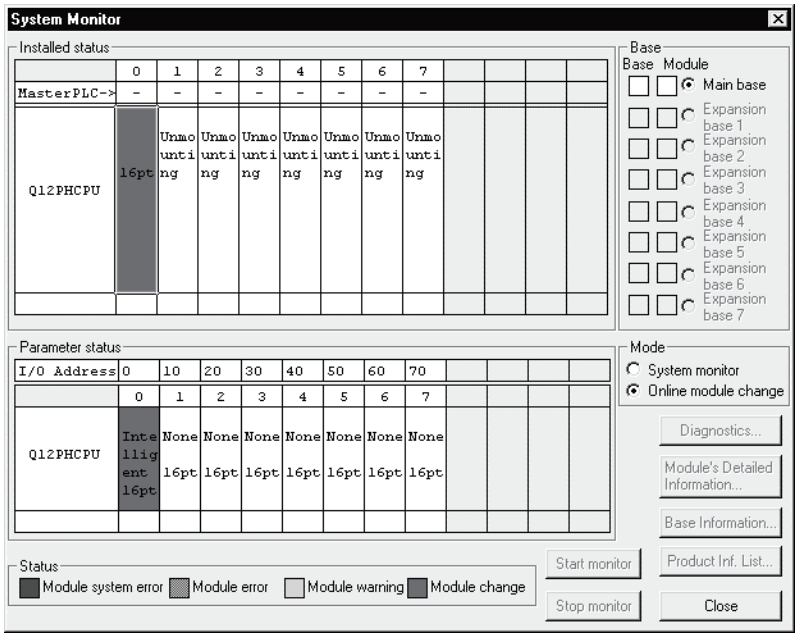
(4) Operation check

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




(b) Click the [OK] button to leave 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 the user range write request (YA) from OFF to ON to restore the user set values to the module.
After confirming that the offset/gain setting mode status flag (XA) is ON, turn OFF the user range write request (YA).

(f) Referring to (1), enable the conversion of the channels to be used, set digital values to the digital values (buffer memory addresses 1, 2: Un\G1, 2), 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 or not.
(Be careful since analog outputs are provided actually.)

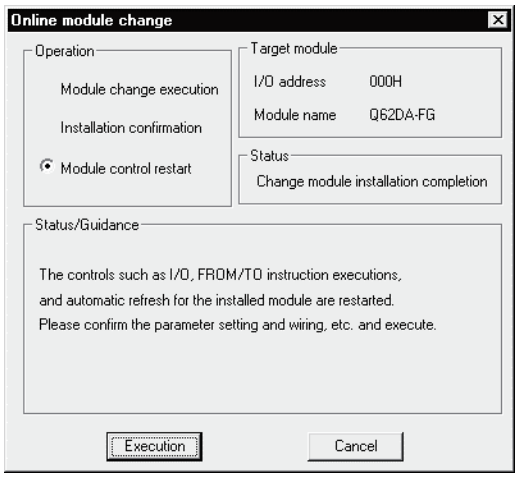
(g) Since the new module is in a default status, it must be initialized by a sequence program after control resumption.
Before performing initialization, check whether the contents of the initialization program are correct or not.

1) Normal system configuration
The sequence program should perform initialization on the leading edge of Module READY (X9) 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 redisplay the "Online module change" screen, click the [Execution] button to resume control. The FROM/TO instruction for the module resumes.




(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 of industrial shipment settings (buffer memory addresses 202 to 209: Un\G202 to 209)

The reference values change depending on the setting of the 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 user range settings offset/gain values (buffer memory addresses 210 to 217: Un\G210 to 217)

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 (for D/A conversion) : Approx. 96D0H (Buffer memory address 210: Un\G210)
- CH1 user range settings gain value (for D/A conversion) : Approx. E788H (Buffer memory address 211: Un\G211)
- CH1 user range settings offset value (for monitor output) : Approx. 147EH (Buffer memory address 214: Un\G214)
- CH1 user range settings gain value (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 following are the precautions for online module change.

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

(2) If an online module change is made with 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.

# 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 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. (See 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 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 *3 | 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 *1 | • The G(P).OGSTOR instruction was executed consecutively.<br>• At the time of offset/gain setting, a set value was written to the $E^2$PROM 26 or more times. | • Execute the G(P).OGSTOR instruction only once for one module.<br>• At the time of offset/gain setting, write a set value only once at one time. |
| 163 *1 | 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□ *1 | 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 *1 | More than one channel was set at the same time during offset/gain settings. | Set the correct value in buffer memory addresses 22 and 23 (Un\G22 and Un\G23). |
| 60□ *2 | 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□ *1 | The warning output upper/lower limit value setting is outside the range -16384 to 16383. □ indicates the channel number incorrectly set. | Correct the contents of the buffer memory addresses 86 to 89 (Un\G86 to 89) to within the range -16384 to 16383. |

Table 8.1 Error code list (2/2)

| Error code (decimal) | Error description | Processing |
|---|---|---|
| 62□ *1 | 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. |
| 700 *1 | 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□ *1 | The offset/gain range setting is outside the range $D_H$ to $F_H$. | Correct the contents of the buffer memory address 25 (Un\G25) to within the range $D_H$ to $F_H$. |
| 80□ *1 | The increase/decrease digital limit value setting is outside the range 0 to 32000. □ indicates the channel number incorrectly set. | Correct the contents of the buffer memory addresses 70 to 73 (Un\G70 to 73) to within the range 0 to 32000. |

POINT

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

(2) The error described with *1 can be cleared by setting the error clear request (YF) to ON.

(3) If the error marked *2 occurs continuously, it is added to the error history of GX Developer in each conversion cycle.

(4) Error code161 maked *3 is not stored in the Error code(Un\G19). It is writen to the Completion status area, (S) + 1, of the G(P).OGSTOR instruction.




8 - 2

## 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 (see 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 an 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 the 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" (see 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 the warning output flag (buffer memory address 48, Un\G48). |

#### (2) When flashing

| Check item | Corrective action |
|---|---|
| Has disconnection occurred? | Check the 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 (see sections 4.6 and 5.6.2).<br>If the user range setting is being used, switch to a different default input range and check if D/A conversion is correctly performed. If it is correctly performed, redo 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 (see Section 4.5). |
| Is the D/A conversion enable/disable setting for the channel to be output set to Disable? | Check the 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 (see Section 3.4). |
| Is the D/A output enable/disable setting for the channel to be output set to Disable? | Verify ON/OFF for the output enable/disable flags (Y1, 2) in GX Developer monitor.<br>If the output enable/disable flags are OFF, review the initial setting for the sequence program or utility package (see Section 3.3). |
| Is the digital value being written to the channel to be output? | Verify buffer memory addresses 1, 2 (Un\G1, Un\G2) in GX Developer monitor (see Section 3.4). |
| Has the operating condition setting request (Y9) been executed? | Set the operating condition setting request (Y9) from ON to OFF from GX Developer and check to see if the analog output is normal.<br>If normal analog output is obtained, review the initial setting for the sequence program or utility package (see 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 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 action, referring to POINT (2) 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

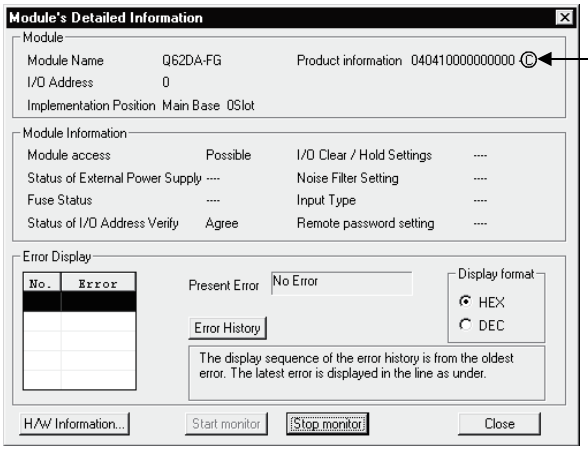
(a) Checking the function version

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

(b) Checking the error code

The 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

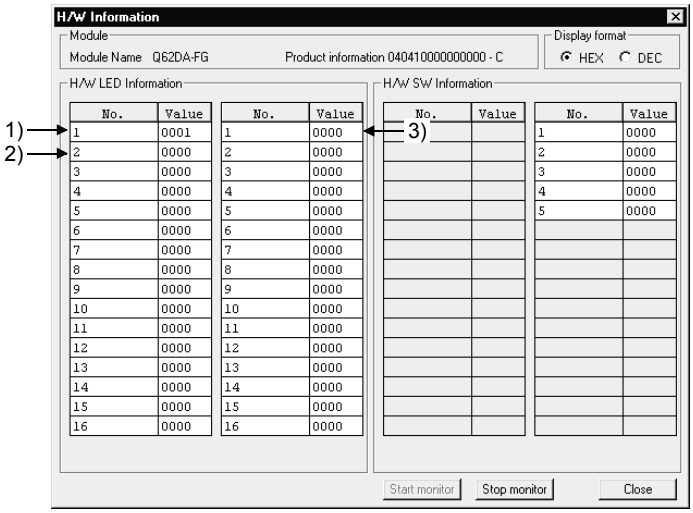
The LED status is displayed.

| No. | LED name | Status |
|---|---|---|
| 1) | RUN LED | $0000_H$ : Indicates that LED is unlit.<br>$0001_H$ : 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 7.13P)

# 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.<br>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.

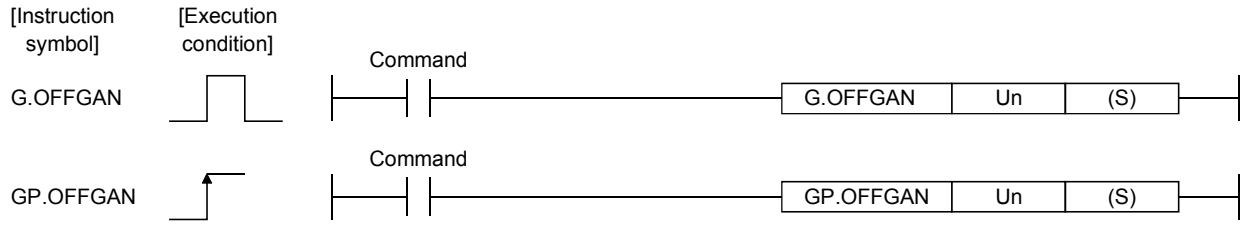
App


App - 1

## 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)

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




### Set data

| Device | Description | Setting range | Data type |
|---|---|---|---|
| Un | Start I/O number of the module | 0 to FEH | Binary 16 bits |
| (S) | Mode switching<br>0: Switching to normal mode<br>1: Switching to offset/gain setting mode<br>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 (the offset/gain setting mode status flag (XA) turns ON)
- Offset/gain setting mode to normal mode (the offset/gain setting mode status 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).

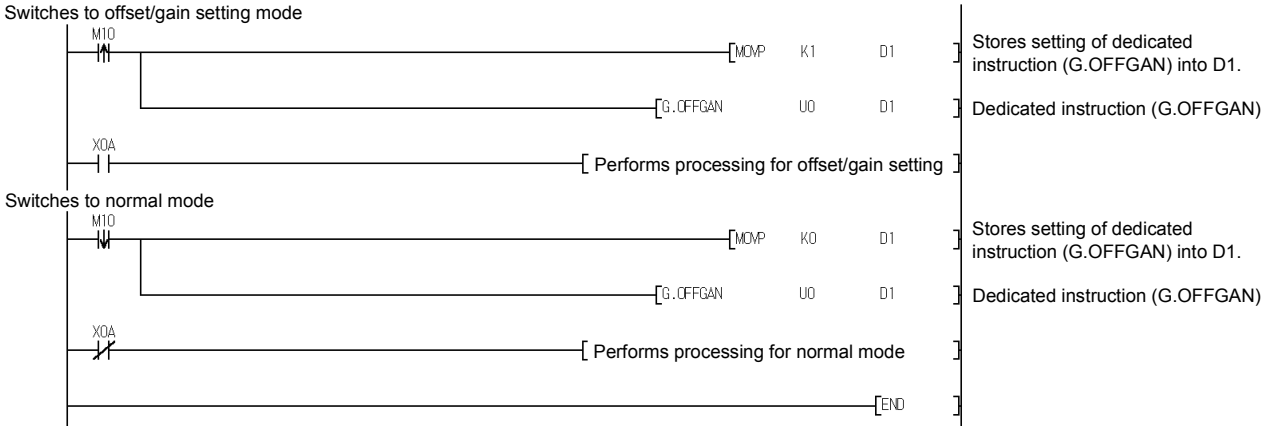
### (2) Operation error

No errors.

App

### (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.

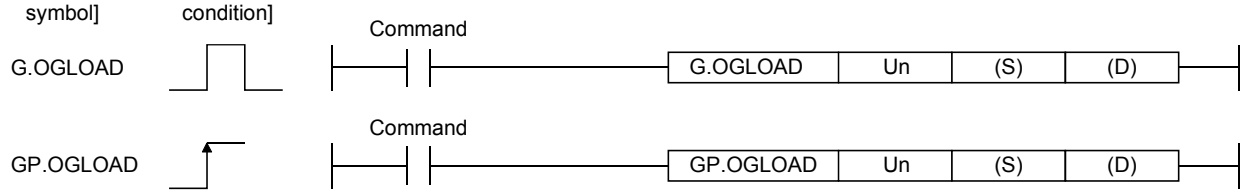


## Appendix 1.2 G(P).OGLOAD

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

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

[Instruction symbol] [Execution condition]




### Set data

| Device | 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.<br>(D) + 1 also turns ON at an abnormal completion. | Within the range of the specified device | Bit |

### Control data *1 (1/2)

| Device | Item | Set data | Setting range | Set by |
|---|---|---|---|---|
| (S) | System area | — | — | — |
| (S) + 1 | Completion status | Stores the status when the instruction is complete.<br>0 : Normal completion<br>Other than 0: Abnormal completion | — | System |
| (S) + 2 | Pass data classification setting | Specify the user range setting where offset/gain values will be read.<br>0H: Use range setting 1 specified<br>1H: Use range setting 2 specified<br>2H: Use range setting 3 specified<br>b15 to b12 b11 to b8 b7 to b4 b3 to b0<br>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 | Set 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 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.

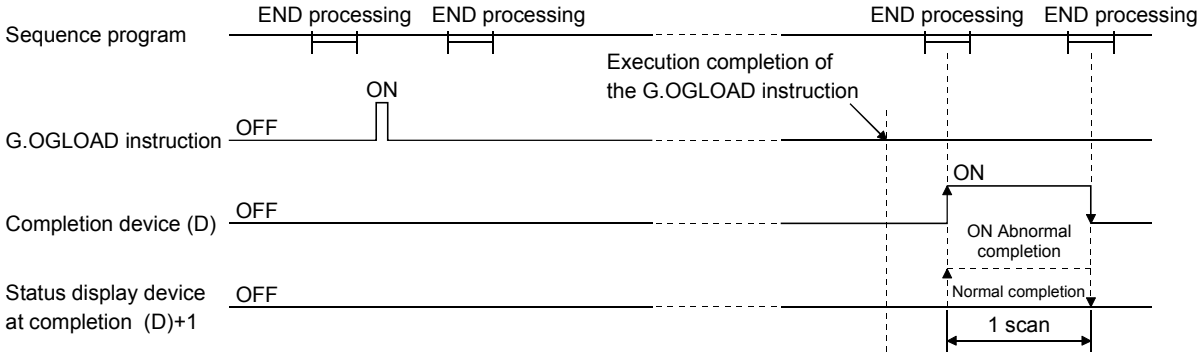
(1) Functions

(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.



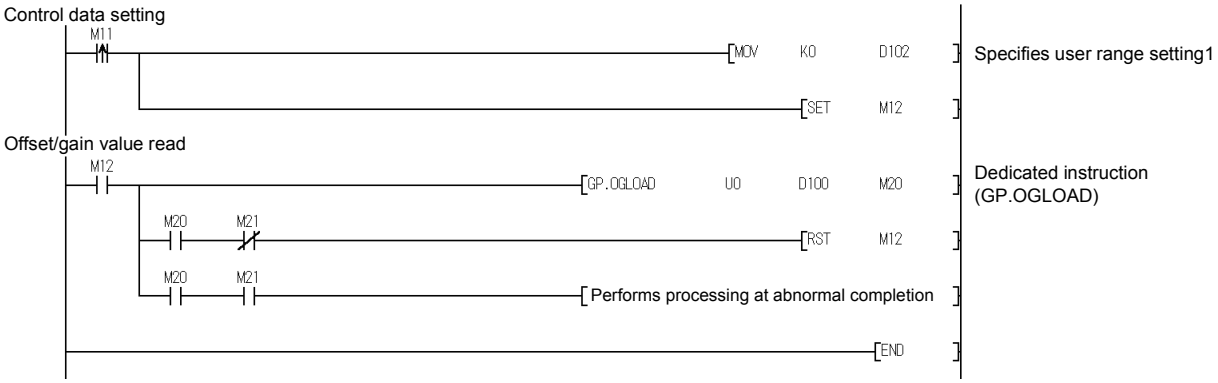
### (2) Operation error

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 the pass data classification setting (S)+2 is outside the range. |

### (3) Program example

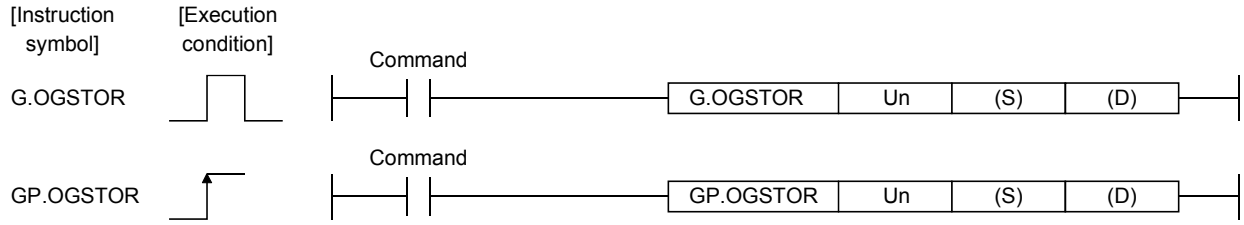
The following program is designed to read the offset/gain values of the Q62DA-FG mounted in the position of I/O number X/Y0 to X/YF when M11 is turned ON.



## Appendix 1.3 G(P).OGSTOR

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

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




### Set data

| Device | 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.<br>(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 | Set data | Setting range | Set by |
|---|---|---|---|---|
| (S) | System area | — | — | — |
| (S) + 1 | Completion status | Stores the status when the instruction is complete.<br>0 : Normal completion<br>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.<br>0H: Use range setting 1 specified<br>1H: Use range setting 2 specified<br>2H: Use range setting 3 specified<br>b15 to b12 \| b11 to b8 \| b7 to b4 \| b3 to b0<br>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 | Set 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 |

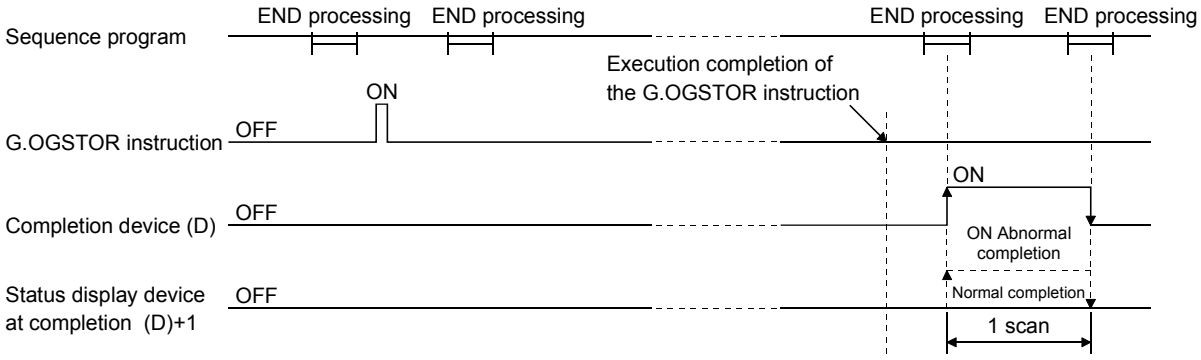
(1) Functions

(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.



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

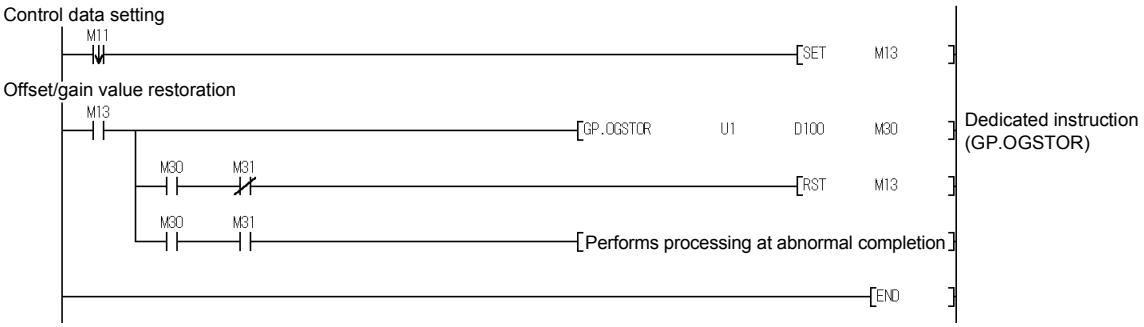
## (2) Operation error

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 the 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 Q62DA-FG and Q62DA

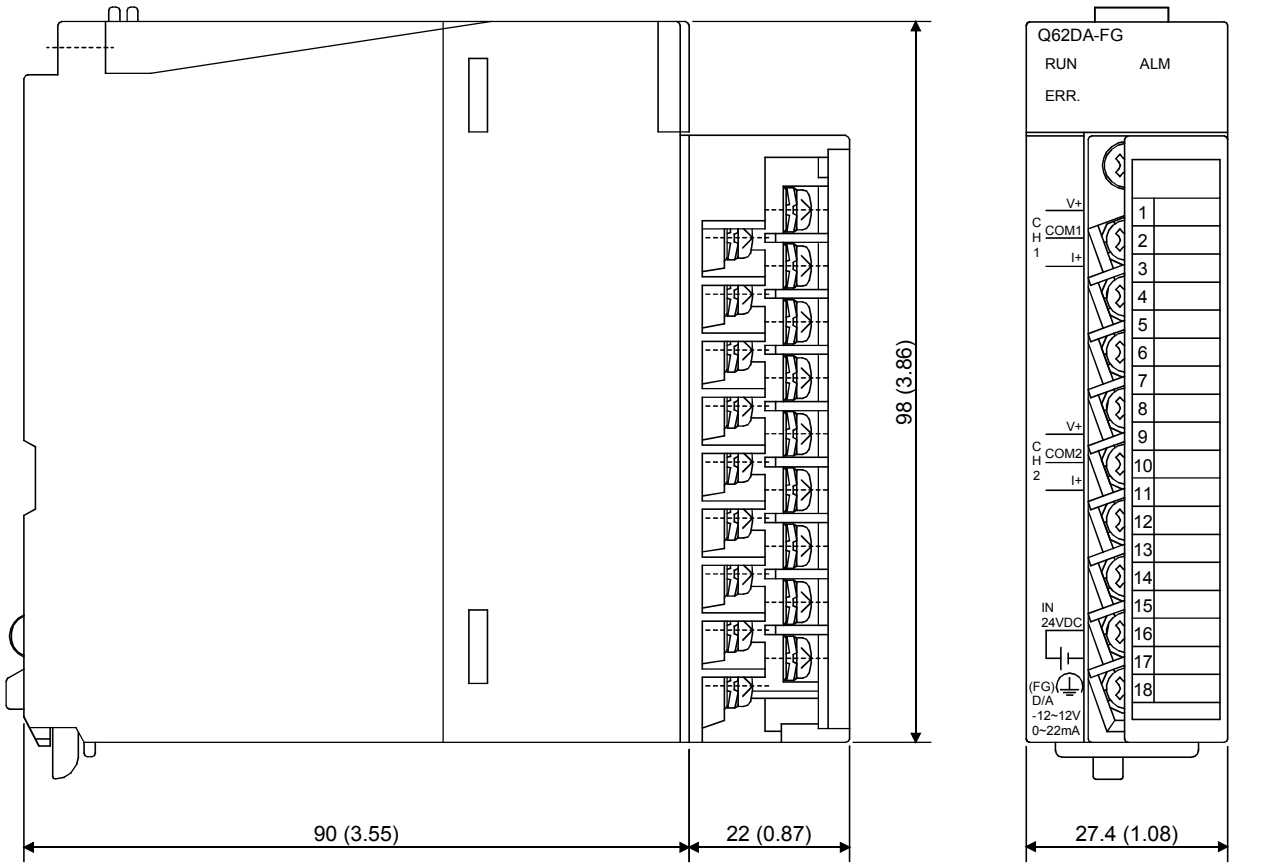
The following table indicates performance comparison between the Q62DA-FG and Q62DA.

### Table Appendix. 1 Performance Comparison Table

<table>
<tr><th colspan="2">Item \ Type</th><th>Q62DA-FG</th><th>Q62DA</th></tr>
<tr><td colspan="2">Number of analog outputs</td><td colspan="2">2 points (2 channels)</td></tr>
<tr><td colspan="2">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 rowspan="2">Analog output</td><td>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>Current</td><td>0 to 20mADC (External load resistance: 0 to 600Ω)<br>0 to 22mADC</td><td>0 to 20 mA DC<br>(External load resistance value: 0Ω to 600Ω)</td></tr>
<tr><td colspan="2">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="5">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>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="3">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>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</th><th>Maximum ∗ resolution</th></tr>
<tr><td rowspan="3">Voltage</td><td>0 to 5V</td><td rowspan="2">0 to 4000<br>(0 to 12000)</td><td>1.25mV<br>(0.416mV)</td></tr>
<tr><td>1 to 5V</td><td>1.0mV<br>(0.333mV)</td></tr>
<tr><td>-10 to 10V</td><td>-4000 to 4000<br>(-16000 to 16000)</td><td>2.5mV<br>(0.625mV)</td></tr>
<tr><td rowspan="3">Current</td><td>User range setting</td><td>-4000 to 4000<br>(-12000 to 12000)</td><td>0.75mV<br>(0.333mV)</td></tr>
<tr><td>0 to 20mA</td><td rowspan="2">0 to 4000<br>(0 to 12000)</td><td>5 μA<br>(1.66 μA)</td></tr>
<tr><td>4 to 20mA</td><td>4 μA<br>(1.33 μA)</td></tr>
<tr><td>User range setting</td><td>-4000 to 4000<br>(-12000 to 12000)</td><td>1.5 μA<br>(0.83 μA)</td></tr>
</table>
</td></tr>
<tr><td colspan="2">Accuracy (Accuracy relative to maximum analog output value)</td><td>Reference accuracy:<br>Within ±0.1% (Voltage: ±10mV, Current: ±20 μA)<br>Temperature coefficient: ±80ppm/ °C (0.008%/ °C)</td><td>Ambient temperature 25 ±5 °C:<br>Within ±0.1 % (Voltage: ±10 mV, Current: ±20 μA)<br>Ambient temperature 0 to 55 °C:<br>Within ±0.3 % (Voltage: ±30 mV, Current: ±60 μA)</td></tr>
<tr><td colspan="2">Conversion speed</td><td>10ms/2 channels</td><td>80 μs/channel</td></tr>
<tr><td rowspan="2">Absolute maximum output</td><td>Voltage</td><td>±13V</td><td>± 12 V</td></tr>
<tr><td>Current</td><td>23mA</td><td>21 mA</td></tr>
<tr><td rowspan="3">Output monitor</td><td>Resolution</td><td>12bit</td><td rowspan="3">—</td></tr>
<tr><td>Reference accuracy</td><td>±0.2%</td></tr>
<tr><td>Temperature coefficient</td><td>±160ppm/ °C (0.016%/ °C)</td></tr>
<tr><td colspan="2">Maximum number of writes for E²PROM</td><td colspan="2">Max. 100 thousand times</td></tr>
<tr><td colspan="2">Output short-circuit protection</td><td colspan="2">Available</td></tr>
<tr><td colspan="2">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 colspan="2">Number of I/O occupied points</td><td colspan="2">16 points</td></tr>
<tr><td colspan="2">Connected terminal</td><td colspan="2">18 points terminal block</td></tr>
<tr><td colspan="2">Applicable wire size</td><td colspan="2">0.3 to 0.75mm²</td></tr>
<tr><td colspan="2">Applicable solderless terminals</td><td colspan="2">R 1.25-3 (Solderless terminals with sleeves are not applicable)</td></tr>
<tr><td colspan="2" 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 colspan="2">Internal current consumption (5 VDC)</td><td>0.37A</td><td>0.33A</td></tr>
<tr><td colspan="2">Weight</td><td>0.20kg</td><td>0.19kg</td></tr>
</table>

∗: The values in parentheses are those in the high resolution mode.

## Appendix 3 External Dimension Diagram




Unit : mm (inch)


App - 11

# INDEX





Index - 1

Index - 2

# WARRANTY

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

## 1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

### [Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

### [Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

## 2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
(2) Product supply (including repair parts) is not available after production is discontinued.

## 3. Overseas service

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

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

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

## 5. Changes in product specifications

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

## 6. Product application

(1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
(2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.
However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

SH (NA)-080281E-K

# Channel Isolated Digital-Analog Converter Module

## User's Manual

| | |
|---|---|
| MODEL | Q-D/A-FG-U-SY-E |
| MODEL CODE | 13JR52 |
| SH(NA)-080281E-K(0805)MEE | |

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