MITSUBISHI ELECTRIC

Programmable Controller

MELSEC iQ-R series

# MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Application)

-R60AD6-DG

# SAFETY PRECAUTIONS

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the MELSEC iQ-R Module Configuration Manual.

In this manual, the safety precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

| | |
|---|---|
| ⚠ **WARNING** | Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| ⚠ **CAUTION** | Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage. |

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.

Observe the precautions of both levels because they are important for personal and system safety.

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

## [Design Precautions]

### ⚠WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
  (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
  (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
    - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
    - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
  (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to "General Safety Requirements" in the MELSEC iQ-R Module Configuration Manual.
  (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
- In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
- Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
- Configure a circuit so that the external power supply is turned off first and then the programmable controller. If the programmable controller is turned off first, an accident may occur due to an incorrect output or malfunction.
- For the operating status of each station after a communication failure, refer to manuals for the network used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.
- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents. When a Safety CPU is used, data cannot be modified while the Safety CPU is in SAFETY MODE.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.

## [Design Precautions]

### ⚠WARNING

- Do not write any data to the "system area" and "write prohibited area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write prohibited area", and the "use prohibited" signals, refer to the user's manual for the module used. For areas used for safety communications, they are protected from being written by users, and thus safety communications failure caused by data writing does not occur.
- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident. When safety communications are used, an interlock by the safety station interlock function protects the system from an incorrect output or malfunction.
- When using the module in the system where a 2-wire transmitter is not connected, use the module where the current input range is set. If the actual system configuration is not consistent with the range setting, it may cause an electric shock.

## [Design Precautions]

### ⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
- During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
- After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
- Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.
- When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not Open by Program" for "Opening Method" of "Module Parameter". If "Open by Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the communication line, and the external device cannot execute the remote RUN.

## [Security Precautions]

### ⚠WARNING

- To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from external devices via the network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions.

## [Installation Precautions]

### ⚠WARNING

- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may result in electric shock or cause the module to fail or malfunction.

## [Installation Precautions]

### ⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications in the Safety Guidelines included with the base unit. Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.
- To mount a module, place the concave part(s) located at the bottom onto the guide(s) of the base unit, and push in the module until the hook(s) located at the top snaps into place. Incorrect interconnection may cause malfunction, failure, or drop of the module.
- To mount a module with no module fixing hook, place the concave part(s) located at the bottom onto the guide(s) of the base unit, push in the module, and fix it with screw(s). Incorrect interconnection may cause malfunction, failure, or drop of the module.
- When using the programmable controller in an environment of frequent vibrations, fix the module with a screw.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. For the specified torque range, refer to the MELSEC iQ-R Module Configuration Manual.
- When using an extension cable, connect it to the extension cable connector of the base unit securely. Check the connection for looseness. Poor contact may cause malfunction.
- When using an SD memory card, fully insert it into the SD memory card slot. Check that it is inserted completely. Poor contact may cause malfunction.
- Securely insert an extended SRAM cassette or a battery-less option cassette into the cassette connector of the CPU module. After insertion, close the cassette cover and check that the cassette is inserted completely. Poor contact may cause malfunction.
- Do not directly touch any conductive parts and electronic components of the module, SD memory card, extended SRAM cassette, battery-less option cassette, or connector. Doing so can cause malfunction or failure of the module.

## [Wiring Precautions]

### ⚠WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- After installation and wiring, attach a blank cover module (RG60) to each empty slot and an included extension connector protective cover to the unused extension cable connector before powering on the system for operation. Failure to do so may result in electric shock.

## [Wiring Precautions]

### ⚠CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
- Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
- Securely connect the connector to the module. Poor contact may cause malfunction.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to noise. Keep a distance of 100mm or more between those cables.
- Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in malfunction or damage to modules or cables.
  In addition, the weight of the cables may put stress on modules in an environment of strong vibrations and shocks.
  Do not clamp the extension cables with the jacket stripped. Doing so may change the characteristics of the cables, resulting in malfunction.
- Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
- Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
- When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
- Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.
- A protective film is attached to the top of the module to prevent foreign matter, such as wire chips, from entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.
- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
- For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.
- Individually ground the shielded cables of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.

## [Startup and Maintenance Precautions]

### ⚠WARNING

- Do not touch any terminal while power is on. Doing so will cause electric shock or malfunction.
- Correctly connect the battery connector. Do not charge, disassemble, heat, short-circuit, solder, or throw the battery into the fire. Also, do not expose it to liquid or strong shock. Doing so will cause the battery to produce heat, explode, ignite, or leak, resulting in injury and fire.
- Shut off the external power supply (all phases) used in the system before cleaning the module or retightening the terminal screws, connector screws, or module fixing screws. Failure to do so may result in electric shock.

## [Startup and Maintenance Precautions]

### ⚠CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
- Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
- Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) more than 25cm away in all directions from the programmable controller. Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
- Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- After the first use of the product, do not perform each of the following operations more than 50 times (IEC 61131-2/JIS B 3502 compliant).
  Exceeding the limit may cause malfunction.
  - Mounting/removing the module to/from the base unit
  - Inserting/removing the extended SRAM cassette or battery-less option cassette to/from the CPU module
  - Mounting/removing the terminal block to/from the module
- After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
- Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
- Do not touch the integrated circuits on the circuit board of an extended SRAM cassette or a battery-less option cassette. Doing so may cause malfunction or failure of the module.
- Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
- Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
- Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Failure to do so may cause the module to fail or malfunction.

## [Operating Precautions]

### ⚠CAUTION

- When changing data and operating status, and modifying program of the running programmable controller from an external device such as a personal computer connected to an intelligent function module, read relevant manuals carefully and ensure the safety before operation. Incorrect change or modification may cause system malfunction, damage to the machines, or accidents.
- Do not power off the programmable controller or reset the CPU module while the setting values in the buffer memory are being written to the flash ROM in the module. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so can cause malfunction or failure of the module.

## [Disposal Precautions]

### ⚠CAUTION

- When disposing of this product, treat it as industrial waste.
- When disposing of batteries, separate them from other wastes according to the local regulations. For details on battery regulations in EU member states, refer to the MELSEC iQ-R Module Configuration Manual.

## [Transportation Precautions]

### ⚠CAUTION

- When transporting lithium batteries, follow the transportation regulations. For details on the regulated models, refer to the MELSEC iQ-R Module Configuration Manual.
- The halogens (such as fluorine, chlorine, bromine, and iodine), which are contained in a fumigant used for disinfection and pest control of wood packaging materials, may cause failure of the product. Prevent the entry of fumigant residues into the product or consider other methods (such as heat treatment) instead of fumigation. The disinfection and pest control measures must be applied to unprocessed raw wood.

# CONDITIONS OF USE FOR THE PRODUCT

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

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

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

(3) Mitsubishi shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

# INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.
This manual describes the functions, parameter settings, and troubleshooting of the relevant product listed below.
Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.
When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.
Please make sure that the end users read this manual.

**Point**

Unless otherwise specified, this manual provides program examples in which the I/O numbers of X/Y0 to X/YF are assigned to the A/D converter module. Assign I/O numbers when applying the program examples to an actual system. For I/O number assignment, refer to the following.
MELSEC iQ-R Module Configuration Manual

## Relevant product

R60AD6-DG

# CONTENTS

# RELEVANT MANUALS

| Manual name [manual number] | Description | Available form |
|---|---|---|
| MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Application) [SH-082300ENG] (this manual) | Functions, parameter settings, troubleshooting, I/O signals, and buffer memory of the A/D converter module | Print book<br>e-Manual<br>PDF |
| MELSEC iQ-R Module Configuration Manual [SH-081262ENG] | Common information on the hardware configuration of all modules, overview of each system configuration, and specifications of the power supply module, base unit, SD memory card, and battery | Print book<br>e-Manual<br>PDF |
| MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Startup) [SH-082298ENG] | Performance specifications, procedures before operation, wiring, operation examples, and offset/gain setting of the A/D converter module | Print book<br>e-Manual<br>PDF |
| MELSEC iQ-R Programming Manual (Module Dedicated Instructions) [SH-081976ENG] | Dedicated instructions for the intelligent function modules | e-Manual<br>PDF |
| MELSEC iQ-R Analog-Digital Converter Module/Digital-Analog Converter Module Function Block Reference [BCN-P5999-0375] | Function blocks of the A/D converter module and D/A converter module | e-Manual<br>PDF |
| GX Works3 Operating Manual [SH-081215ENG] | System configuration, parameter settings, and online operations of GX Works3 | e-Manual<br>PDF |
| MELSEC iQ-R Online Module Change Manual [SH-081501ENG] | The online module change, which allows a module to be changed without stopping the system for MELSEC iQ-R series programmable controllers | Print book<br>e-Manual<br>PDF |

**Point**

e-Manual refers to the Mitsubishi Electric FA electronic book manuals that can be browsed using a dedicated tool.

e-Manual has the following features:

- Required information can be cross-searched in multiple manuals.
- Other manuals can be accessed from the links in the manual.
- The hardware specifications of each part can be found from the product figures.
- Pages that users often browse can be bookmarked.
- Sample programs can be copied to an engineering tool.

# TERMS

Unless otherwise specified, this manual uses the following terms.

| Term | Description |
|---|---|
| Buffer memory | Memory in an intelligent function module for storing data such as setting values and monitored values.<br>When integrated into the CPU module, this memory refers to a memory for storing data such as setting values and monitored values of the Ethernet function, and data used for data communication of the multiple CPU system function. |
| Engineering tool | A tool used for setting up programmable controllers, programming, debugging, and maintenance |
| Global label | A label that is valid for all the program data when multiple program data are created in the project. There are two types of global label: a module specific label (module label), which is generated automatically by GX Works3, and an optional label, which can be created for any specified device. |
| Module label | A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. For the module used, GX Works3 automatically generates this label, which can be used as a global label. |
| Normal mode | A mode used for normal A/D conversion. In the engineering tool, the item name of the mode is displayed as "Normal mode (A/D conversion processing)". |
| Offset/gain setting mode | A mode used for performing the offset/gain setting |
| Q compatible mode | A mode in which the module operates with the buffer memory map converted to the equivalent one of the MELSEC-Q series |
| R mode | A mode in which the module operates with the buffer memory map that has been newly laid out in the MELSEC iQ-R series |
| Redundant system with redundant extension base unit | A redundant system that is configured using extension base unit(s) |
| User range | An analog input range where any value can be set. This range can be set in the offset/gain setting. |
| Watchdog timer error | The watchdog timer is a timer with which the module itself monitors whether the module's internal processing is performed correctly. The watchdog timer error is an error that occurs when internal processing is not processed correctly. |

# GENERIC TERMS AND ABBREVIATIONS

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

| Generic term/abbreviation | Description |
|---|---|
| A/D converter module | An abbreviation for the MELSEC iQ-R series channel isolated analog-digital converter module |
| Current input range | A generic term for the analog input range for current input that does not use a 2-wire transmitter |
| 2-wire transmitter range | A generic term for the analog input range for current input that uses a 2-wire transmitter |
| Remote head module | An abbreviation for the RJ72GF15-T2 CC-Link IE Field Network remote head module |

# 1 FUNCTIONS

This chapter describes the functions of the A/D converter module and the setting procedures for those functions.
For details on the I/O signals and the buffer memory, refer to the following.
☞ Page 120 I/O Signals
☞ Page 134 Buffer Memory

**Point**

- This chapter describes buffer memory addresses for CH1. For details on the buffer memory addresses after CH2, refer to the following.

☞ Page 134 List of buffer memory addresses

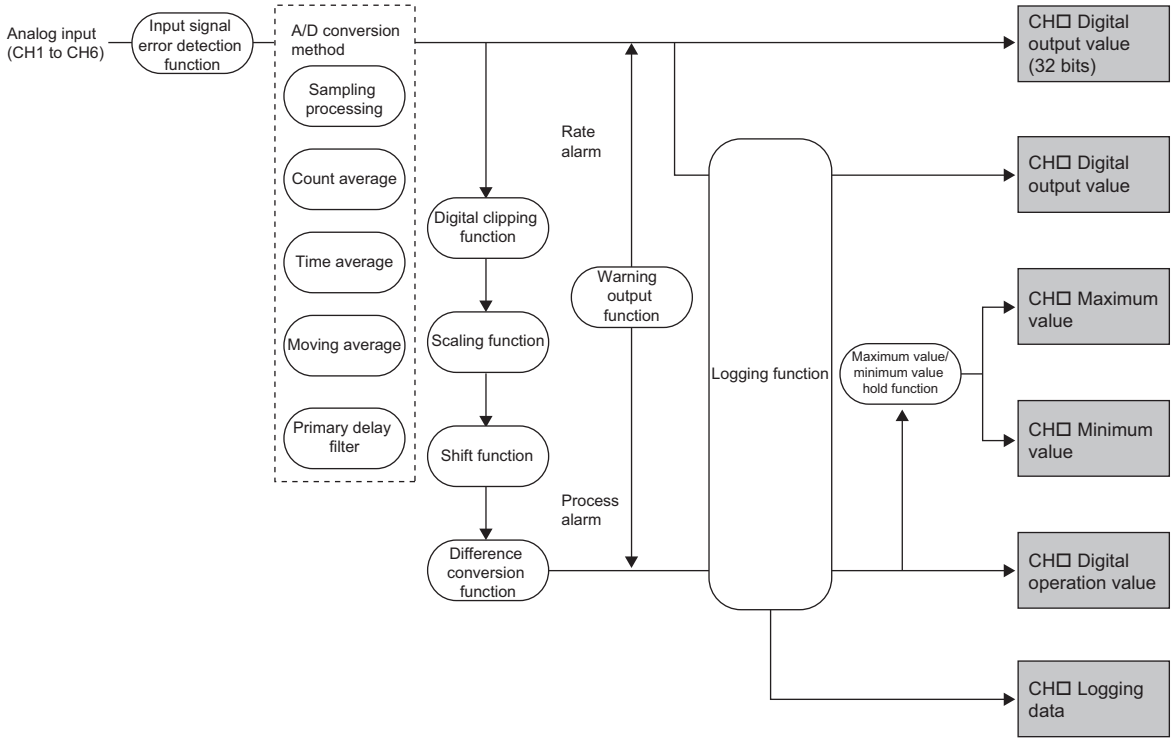
- Numerical values corresponding to the channel where an error has occurred and the error description fit in the □ and △ of an error code and alarm code described in this chapter. For details on the numerical values, refer to the following.

☞ Page 114 List of Error Codes
☞ Page 117 List of Alarm Codes

# 1.1 Processing of Each Function



The functions are processed in the order shown below. If multiple functions are enabled, the output of the first processed function is used as the input of the next function.




## Digital output value (32 bits)

These values are the digital values after the sampling processing, each averaging processing, or primary delay filter has been performed.

## Digital output value

These values are the 16-bit digital output values that were converted from 32-bit digital output values.

## Digital operation value

These values are obtained by operating a digital output value using the digital clipping function, scaling function, shift function, or difference conversion function. When each function is not used, the same value as the digital output value is stored.

## Maximum and minimum value

The maximum and minimum values of the digital operation values are stored.

## Logging data

When the logging function is used, digital output values or digital operation values are collected.

# 1.2 Range Switching Function

This function allows the input range of analog input to be switched for each channel.
Switching the range makes it possible to change the I/O conversion characteristics.

## Operation

Analog input values are converted to digital values within the set input range, and the converted values are stored in the following areas.

- 'CH1 Digital output value' (Un\G400)
- 'CH1 Digital operation value' (Un\G402)
- 'CH1 Digital output value (32 bits)' (Un\G410, Un\G411)

The data of 32768 or more cannot be output to 'CH1 Digital output value' (Un\G400) or 'CH1 Digital operation value' (Un\G402).
To check the data of 32768 or more, monitor 'CH1 Digital output value (32 bits)' (Un\G410, Un\G411).

**Point**

Digital output values (32768 to 36767) in the extended mode can be monitored within the range of 'CH1 Digital operation value' (Un\G402) with the shift function or scaling function.
For details, refer to the following.
☞ Page 50 Shift Function
☞ Page 27 Scaling Function

## Setting procedure

Set the input range to be used in the "Input range setting".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [Range switching function]

| Item | Setting value |
|---|---|
| Input range setting | 4 to 20mA (2-wire transmitter input) |
| | 4 to 20mA (current input) |
| | 0 to 20mA (current input) |
| | 4 to 20mA (extended mode) (2-wire transmitter input) |
| | 4 to 20mA (extended mode) (current input) |
| | User range setting (current input) |
| | User range setting (2-wire transmitter input) |

After the data is written, the range is switched when the programmable controller power supply is turned off and on or when the CPU module is reset.

**Point**

The range can be switched or set with the following buffer memory areas.

- 'CH1 Range setting' (Un\G598)
- 'CH1 Range setting monitor' (Un\G430)

For details on the buffer memory addresses, refer to the following.
☞ Page 202 CH1 Range setting
☞ Page 164 CH1 Range setting monitor

## Precautions

The input range cannot be changed for channels with A/D conversion disabled.
To change the input range, set "A/D conversion enable/disable setting" to "A/D conversion enable", and turn on and off 'Operating condition setting request' (Y9).

# 1.3 A/D Conversion Enable/Disable Setting Function



This function controls whether to enable or disable the A/D conversion for each channel.
Disabling the A/D conversion for unused channels reduces the conversion cycles.

## Operation

The power supply requirements for 2-wire transmitter are turned on/off with a combination of 'CH1 Range setting' (Un\G598) and 'CH1 A/D conversion enable/disable setting' (Un\G500).

| 'CH1 Range setting' (Un\G598) | 'CH1 A/D conversion enable/disable setting' (Un\G500) | CH1 Power supply requirements for 2-wire transmitter |
|---|---|---|
| • 4 to 20mA (2-wire transmitter input)<br>• 4 to 20mA (extended mode) (2-wire transmitter input)<br>• User range setting (2-wire transmitter input) | A/D conversion enable | On*1 |
| | A/D conversion disable | Off |
| • 4 to 20mA (current input)<br>• 0 to 20mA (current input)<br>• 4 to 20mA (extended mode) (current input)<br>• User range setting (current input) | A/D conversion enable | Off |
| | A/D conversion disable | Off |

*1 When the external power supply is off or the power supply is temporarily stopped, the power supply requirements for 2-wire transmitter are not performed.

## Setting procedure

***1.*** Set "A/D conversion enable/disable setting" to "A/D conversion enable" or "A/D conversion disable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [A/D conversion enable/disable setting function]

## Precautions

For a channel set to the 2-wire transmitter range, even when A/D conversion enabled (0) is set for 'CH1 A/D conversion enable/disable setting' (Un\G500), if any of the following factors occurs, A/D conversion is not performed and the state turns to A/D conversion stop. ('CH1 Digital output value' (Un\G400) and 'CH1 Digital operation value' (Un\G402) hold the current values.)

- The start of conversion by the conversion start time setting function is awaited. (☞ Page 20 Conversion Start Time Setting Function)
- The external power supply is turned off. (☞ Page 19 A/D Conversion Enable/Disable Setting Function)
- The power supply requirements for 2-wire transmitter are temporarily stopped by the supply power temporary stop function. (☞ Page 60 Supply Power Temporary Stop Function)
- Input signal error detection is in progress. (☞ Page 38 Input Signal Error Detection Function)

**Point**

To perform the power supply requirements for 2-wire transmitter, check the wiring and settings first, and turn on and off 'Operating condition setting request' (Y9). Note that when 'Operating condition setting request' (Y9) is turned on and off, the power supply requirements for 2-wire transmitter turn on before A/D conversion starts.

# 1.4 Conversion Start Time Setting Function

Setting the A/D conversion start time makes it possible to start A/D conversion from the time an output from the 2-wire transmitter becomes stable.
This setting is enabled only for a channel set to the 2-wire transmission range. The setting is ignored for a channel set to any other range.

## Operation

Even when A/D conversion enabled (0) is set for 'CH1 A/D conversion enable/disable setting' (Un\G500)', A/D conversion is not performed until the time set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532) passes. In this case, 'A/D conversion completed flag' (Un\G42) turns to A/D conversion in progress or not used (0), and 0 is stored in 'CH1 Digital output value' (Un\G400).
Note that A/D conversion starts after the set time passes.
When the first A/D conversion is completed, 'A/D conversion completed flag' (Un\G42) turns to A/D conversion completed (1).
The time until 'A/D conversion completed flag' (Un\G42) turns on when 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532) is set is a value obtained by adding the conversion start time and conversion cycle.

**Point**

- Consider the time required for an output to become stable after the 2-wire transmitter powers on and the warm-up time for the 2-wire transmitter when setting 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532).
- Even if there is a channel where A/D conversion is not performed because of the conversion start time setting function, the conversion cycle does not change.

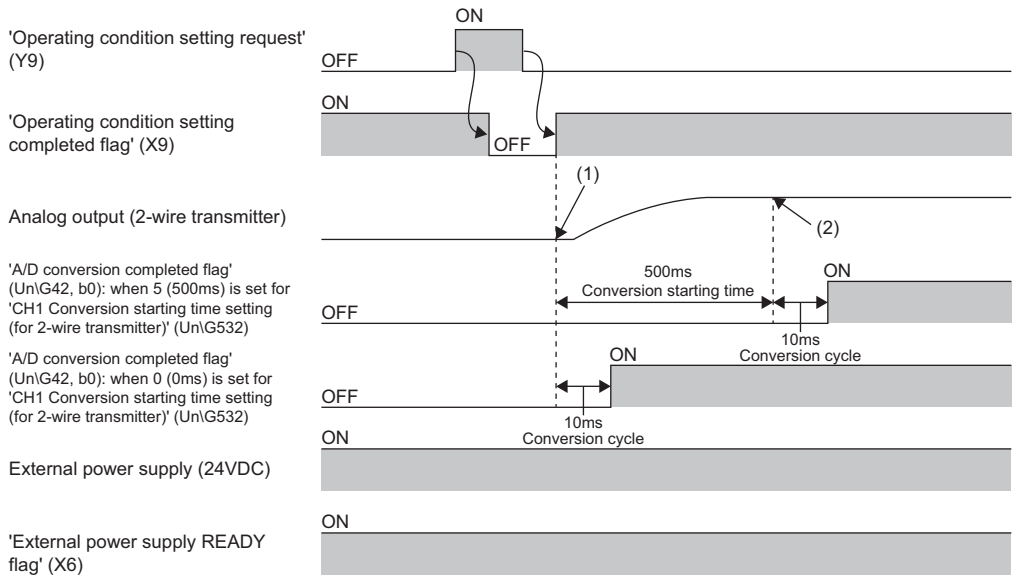
## Operation examples

This section shows examples of operations when the following are set.

- Input range: 4 to 20mA (2-wire transmitter input)
- A/D conversion-enabled channel: CH1
- 'CH1 Averaging processing specification' (Un\G501): Sampling processing (0)

### ■When the time required for an output to become stable after the 2-wire transmitter powers on is 500ms

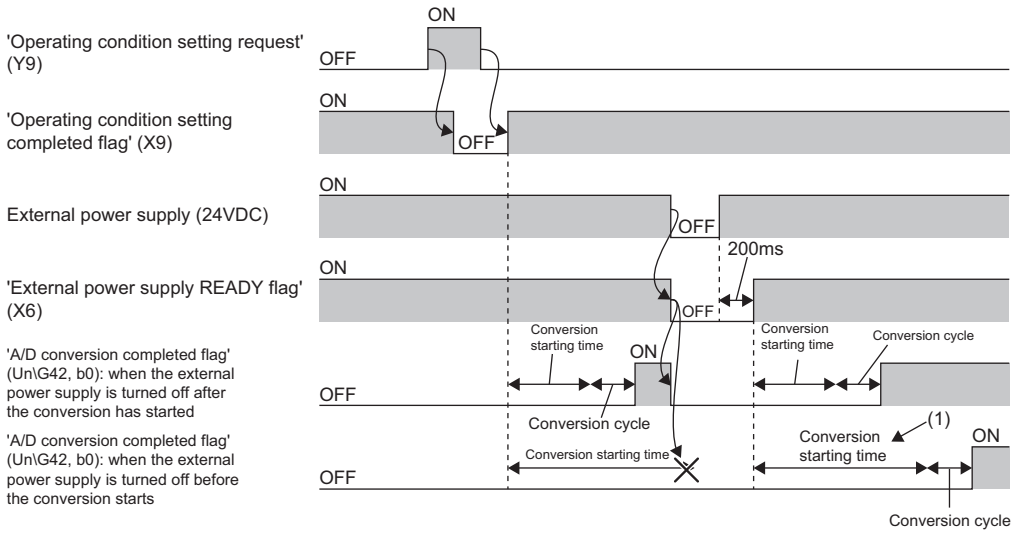
Ex.




(1) When the conversion start time is 0ms, A/D conversion starts at that point.
(2) When the conversion start time is 500ms, A/D conversion starts at that point.

### ■When the external power supply is turned off and on

Ex.




(1) The conversion start time is awaited again from the beginning.

After the time set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532) passes from the time the external power supply is turned off and on, A/D conversion starts.

### ■When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is set to Trigger request (1) and the supply power stops

After the time set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532) passes from the time the setting is changed from Trigger request (1) to No request (0), A/D conversion starts. The operation example is the same as the one when the external power supply is turned off and on.

## Setting procedure

***1.*** For "Conversion start time setting", set a value in the range 0 to 3276.7.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [Conversion starting time setting function]

# 1.5 A/D Conversion Method

An A/D conversion method can be set for each channel.

## Sampling processing

This function converts analog input values to digital values at every sampling period and stores the digital output values in buffer memory areas.

**Point**

The sampling period is "Conversion speed (10ms) × number of conversion enabled channels".
Whether to enable or disable the A/D conversion can be set for each channel. Disabling the A/D conversion for unused channels reduces the conversion cycles.
Conversion cycle that applies when CH1 to CH3 is set to A/D conversion enabled
• 10 × 3 = 30 (ms)
The conversion cycle is 30 (ms).
Digital output values and digital operation values of CH1 to CH3 are updated every 30ms.

## Averaging processing

The A/D converter module performs the averaging processing on digital output values for each channel. The processed values are stored in the buffer memory area.
The following three types of averaging processing are provided.

- Time average
- Count average
- Moving average

## ■Time average

The A/D converter module executes the A/D conversion for the setting time, and performs the averaging processing on the total value excluding the maximum and the minimum values. The processed values are stored in the buffer memory area.

• Setting time

Set a value that satisfies the following condition.

Lower limit value ≥ Conversion speed × Number of conversion enabled channels × Minimum processing times (4 times)

Ex.

The following shows the lower limit value to be set for when CH1 to CH6 are used.

10 (ms) × 6 (CH) × 4 (times) = 240 (ms)

• Processing times

The number of processing times within the set time changes depending on the number of channels where the A/D conversion is enabled.

Processing times (times) = Setting time ÷ (Number of conversion enabled channels × Conversion speed)

Ex.

The following table shows the processing times with the setting below.

| Item | Setting |
|---|---|
| Number of channels where the A/D conversion is enabled | Four channels (CH1 to CH4) |
| Setting time | 250ms |

250 (ms) ÷ (4 (CH) × 10 (ms)) = 6.25 (times)*1

*1 Values after the decimal point are omitted.

Conversion is processed 6 times and the mean value is output.

**Point**

When the number of processing times is less than 4 due to the set time, a time average setting range error (error code: 192□H) occurs. The value 0 is stored in the following buffer memory areas.

• 'CH1 Digital output value' (Un\G400)

• 'CH1 Digital operation value' (Un\G402)

• 'CH1 Digital output value (32 bits)' (Un\G410, Un\G411)

## ■Count average

The A/D converter module executes the A/D conversion for a set number of times, and performs the averaging processing on the total value excluding the maximum and the minimum values. The processed values are stored in the buffer memory area.
The time taken for the mean value calculated through the average processing to be stored in the buffer memory changes depending on the number of channels where the A/D conversion is enabled.
Processing time = Set number of times × (Number of conversion enabled channels × Conversion speed)

Ex.

The processing time calculated with the settings in the table is shown below.

| Item | Setting |
|---|---|
| Number of channels where the A/D conversion is enabled | Four channels (CH1 to CH4) |
| Set number of times | Five times |

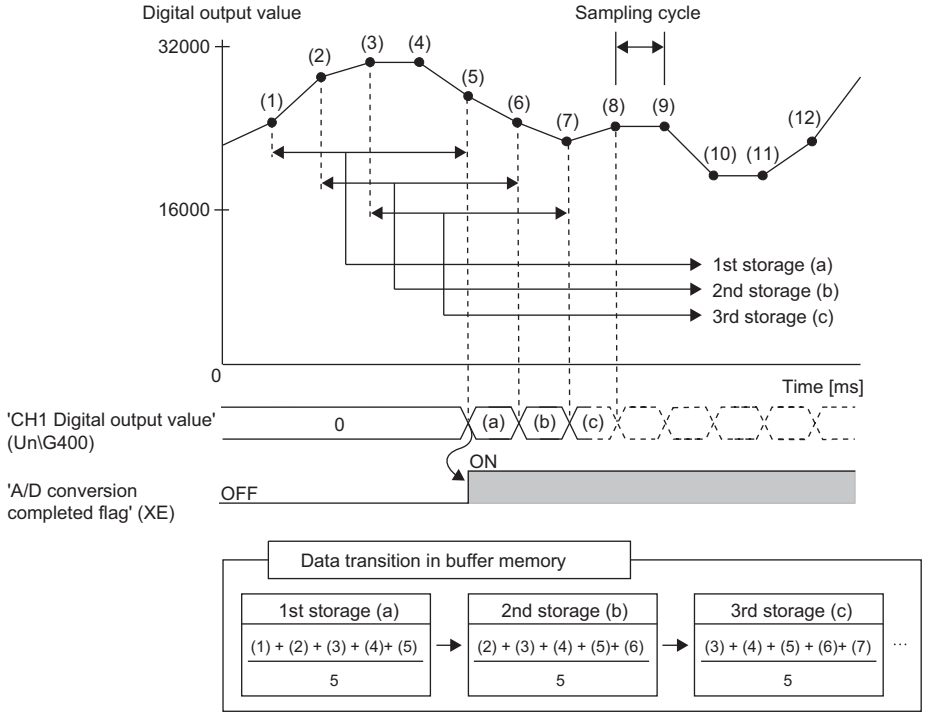
5 (times) × (4 (CH) × 10 (ms)) = 200 (ms)
A mean value is output every 200ms.

**Point**

Because the count average requires a sum of at least two counts excluding the maximum and minimum values, the set number of times should be four or more.

## ■Moving average

The A/D converter module averages digital output values taken at every sampling period for a specified number of times, and stores the mean value in the buffer memory area. Since the averaging processing is performed on a moving set of sampling, the latest digital output values can be obtained.
The following figure shows the moving average processing of when the set number of times is five.



## Primary delay filter

Depending on the set time constant, transient noise of analog input is smoothed. The smoothed digital output values are stored in the buffer memory area.

Time constant is the time taken for the digital output value to reach 63.2% of the steady-state value.

The following shows the relational expressions of time constants and digital output values.

### ■When n = 1*1

$Y_n = 0$

### ■When n = 2

$$Y_n = X_{n-1} + \frac{\Delta t}{\Delta t + TA} (X_n - X_{n-1})$$

### ■When n ≥ 3

$$Y_n = Y_{n-1} + \frac{\Delta t}{\Delta t + TA} (X_n - Y_{n-1})$$

$Y_n$: Current digital output value
$Y_{n-1}$: Last digital output value
n: Number of samplings
$X_n$: Digital output value before smoothing
$X_{n-1}$: Last digital output value before smoothing
$\Delta T$: Conversion time
TA: Time constant

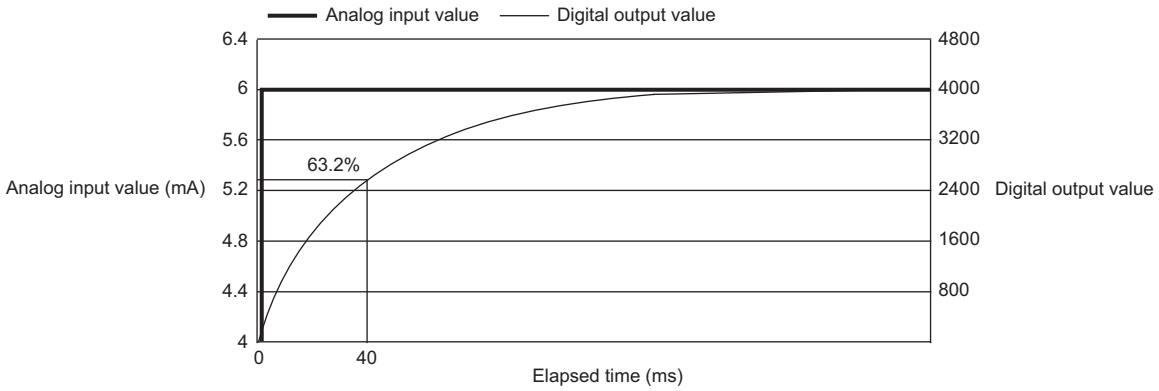
*1 The corresponding bit of 'A/D conversion completed flag' (Un\G42) turns on when n ≥ 2.

**Ex.**

Digital output value when an analog input value is changed from 4 to 6mA

For the input range of 4 to 20mA (2-wire transmission input), the following figure shows the change of the digital output value with the time constant set to 40ms.

After 40ms from the analog input value becoming 6mA, the digital output value reaches 63.2% of the digital output value of when the sampling processing is selected.



## Setting procedure

### ■Sampling processing

Set "Averaging processing specification" to "Sampling processing".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [A/D conversion method]

### ■Averaging processing and primary delay filter

**1.** Set "Averaging processing specification" to "Time average", "Count average", "Moving average", or "Primary delay filter".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [A/D conversion method]

**2.** Set a value for "Time average/Count average/Moving average/Primary delay filter constant setting".

| Item | Setting range |
|---|---|
| Time average | 40 to 5000 (ms)*1 |
| Count average | 4 to 500 (times) |
| Moving average | 2 to 200 (times) |
| Primary delay filter | 1 to 500 (times) |

In a channel where a value out of the setting range is set, a time average setting range error (error code: 192□H), count average setting range error (error code: 193□H), moving average setting range error (error code: 194□H), or primary delay filter constant setting range error (error code: 195□H) occurs.

*1 Set a value greater than the value calculated by the following formula as the time average.
10ms × 4 times × Number of channels used

**Point**

Set a primary delay filter constant for the primary delay filter. The value of the time constant (ms) is the product of the primary delay filter constant and the sampling cycle.

# 1.6 Scaling Function

This function performs the scale conversion on digital output values. The values are converted within a specified range between a scaling upper limit value and scaling lower limit value. This function helps reduce the time taken for creating a scale conversion program.
The converted values are stored in 'CH1 Digital operation value' (Un\G402).

## Concept of scaling setting

For the scaling lower limit value, set a value corresponding to the lower limit value of the input range (0).
For the scaling upper limit value, set a value corresponding to the upper limit value of the input range (32000).

## Calculating the scaling value

The scale conversion is based on the following formula. (In scale conversion, values are rounded to the nearest whole number.)

$$D_Y = \frac{D_X \times (S_H - S_L)}{D_{Max}} + S_L$$

$D_X$: Digital output value
$D_Y$: Scaling value (Digital operation value)
$D_{Max}$: Maximum digital output value of the input range in use
$S_H$: Scaling upper limit value
$S_L$: Scaling lower limit value

Although the range of the digital output value in the extended mode is -8000 to 36000, this function performs the scale conversion for digital output values within the range of 0 to 32000.

**Point**

When the calculated digital operation value exceeds 32767, the value 32767 is stored as the digital operation value. When the calculated digital operation value falls below -32768, the value -32768 is stored.

## Setting procedure

***1.*** Set "Scaling enable/disable setting" to "Enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Scaling setting]

***2.*** Set values for "Scaling upper limit value" and "Scaling lower limit value".

| Item | Setting range |
|---|---|
| Scaling upper limit value | -32000 to 32000 |
| Scaling lower limit value | |

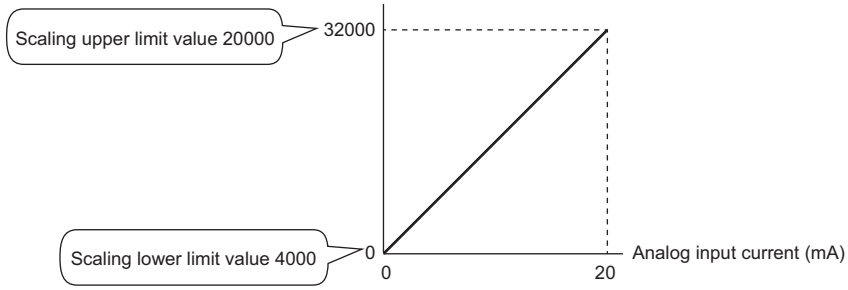
**Point**

- Even when the scaling upper limit value and the scaling lower limit value are set so that the change is greater than the resolution, the resolution will not increase.
- If the relation between the values is the scaling lower limit value > the scaling upper limit value, the scale conversion can be performed according to a negative slope.
- Set the scaling with the condition "Scaling upper limit value ≠ Scaling lower limit value".

## Setting example

**Ex.**

When 20000 is set to the scaling upper limit value and 4000 is set to the scaling lower limit value for an A/D converter module with the input range set to 0 to 20mA (current input)

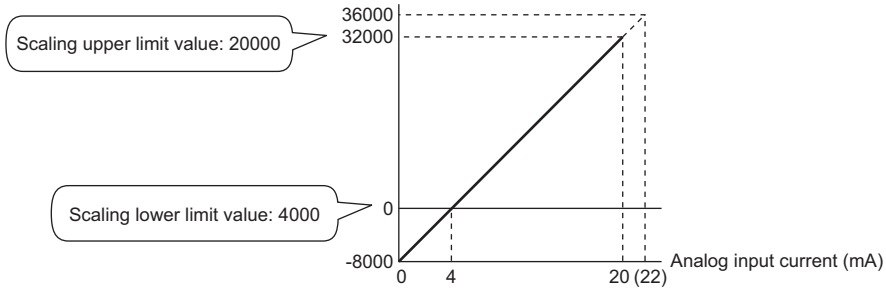



| Input current (mA) | Digital output value*1 | Digital operation value (scaling value) |
|---|---|---|
| 0 | 0 | 4000 |
| 4 | 6400 | 7200 |
| 8 | 12800 | 10400 |
| 12 | 19200 | 13600 |
| 16 | 25600 | 16800 |
| 20 | 32000 | 20000 |

*1 These values are also applied to the case of digital output values (32 bits).

**Ex.**

When 20000 is set to the scaling upper limit value and 4000 is set to the scaling lower limit value for an A/D converter module with the input range set to 4 to 20mA (extended mode) (2-wire transmitter input)

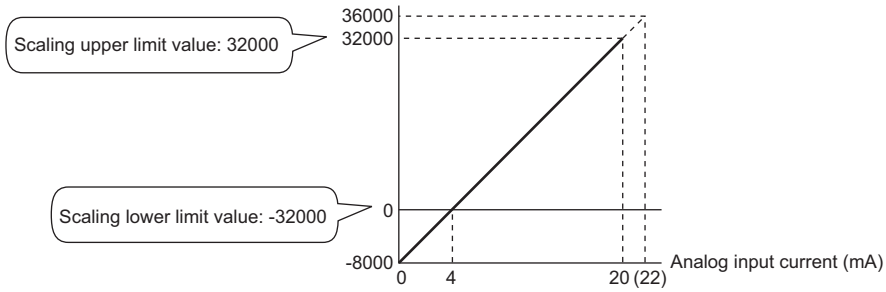



| Input current (mA) | Digital output value | | Digital operation value (scaling value) |
|---|---|---|---|
| | 16 bits | 32 bits | |
| 0 | -8000 | -8000 | 0 |
| 4 | 0 | 0 | 4000 |
| 8 | 8000 | 8000 | 8000 |
| 12 | 16000 | 16000 | 12000 |
| 16 | 24000 | 24000 | 16000 |
| 20 | 32000 | 32000 | 20000 |
| 22 | 32767*1 | 36000 | 22000 |

*1 Because the value exceeds the range of -32768 to 32767, the value is fixed to 32767 (the upper limit value).

Ex.

When 32000 is set to the scaling upper limit value and -32000 is set to the scaling lower limit value for an A/D converter module with the input range set to 4 to 20mA (extended mode) (2-wire transmitter input)




| Current input (mA) | Digital output value | | Digital operation value (scaling value) |
|---|---|---|---|
| | 16 bits | 32 bits | |
| 0 | -8000 | -8000 | -32768*1 |
| 4 | 0 | 0 | -32000 |
| 8 | 8000 | 8000 | -16000 |
| 12 | 16000 | 16000 | 0 |
| 16 | 24000 | 24000 | 16000 |
| 20 | 32000 | 32000 | 32000 |
| 20.24 | 32480 | 32480 | 32767*2 |
| 22 | 32767*2 | 36000 | 32767*2 |

*1 Because the value falls below the range of -32768 to 32767, the value is fixed to -32768 (the lower limit value).
*2 Because the value exceeds the range of -32768 to 32767, the value is fixed to 32767 (the upper limit value).

**Point**

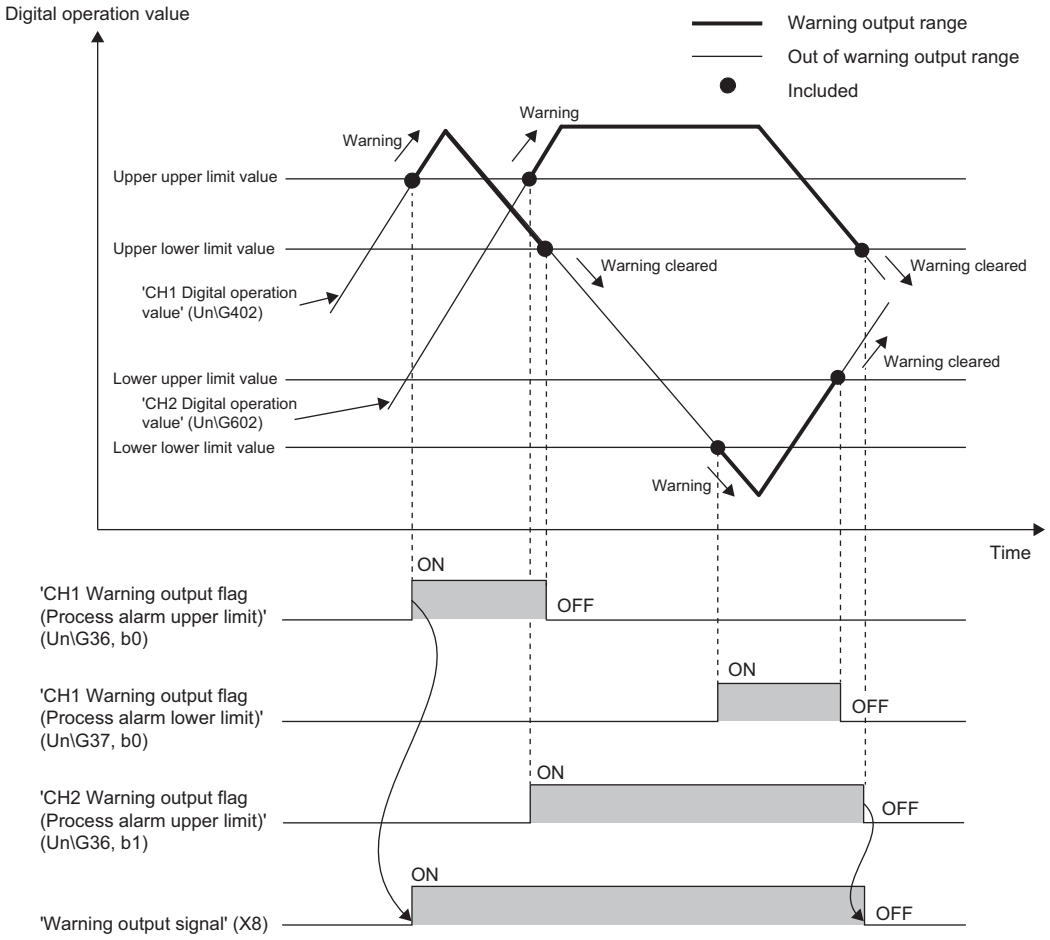
When the scaling function is used with the digital clipping function, the scale conversion is performed on the digital operation values after digital clipping.

# 1.7 Warning Output Function

This section describes process alarms and rate alarms used for the warning output function.

## Process alarm

This function outputs a warning when a digital operation value enters the preset warning output range.



## Operation

### ■Operation performed when a warning is output

When a digital operation value is equal to or greater than 'CH1 Process alarm upper upper limit value' (Un\G514), or the value is equal to or smaller than 'CH1 Process alarm lower lower limit value' (Un\G520) and the value enters the alarm output range, a warning is output as follows.

- Alarm ON (1) is stored in 'Warning output flag (Process alarm upper limit)' (Un\G36) or 'Warning output flag (Process alarm lower limit)' (Un\G37).
- 'Warning output signal' (X8) turns on.
- The ALM LED turns on.

In addition, an alarm code is stored in 'Latest alarm code' (Un\G2).

For details on the alarm codes, refer to the following.

☞ Page 117 List of Alarm Codes

**Point**

The A/D conversion on a channel where a warning was output continues.

### ■Operation after a warning was output

After a warning was output, if the digital operation value does not satisfy the warning output condition due to being smaller than 'CH1 Process alarm upper lower limit value' (Un\G516) or being greater than 'CH1 Process alarm lower upper limit value' (Un\G518), Normal (0) is stored in a bit position corresponding to the channel number of 'Warning output flag (Process alarm upper limit)' (Un\G36) or 'Warning output flag (Process alarm lower limit)' (Un\G37).

In addition, when all the bits of 'Warning output flag (Process alarm upper limit)' (Un\G36) and 'Warning output flag (Process alarm lower limit)' (Un\G37) return to Normal (0), 'Warning output signal' (X8) turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. To clear the alarm code, turn on and off 'Error clear request (YF)' after all the bits of 'Warning output flag (Process alarm upper limit)' (Un\G36) and 'Warning output flag (Process alarm lower limit)' (Un\G37) return to Normal (0).

## Detection cycle

When time average is specified, the function works at every interval of the time (for averaging). When count average is specified, the function works at every count (for averaging).

When the sampling processing, moving average, and primary delay filter is specified, this function works at every sampling cycle.

## Detection target for outputting a warning

When the digital clipping function, scaling function, shift function, or difference conversion function is used, the digital operation value obtained after digital clipping, scale conversion, shift-and-add, or difference conversion is performed is the detection target for outputting a warning. Set values for 'CH1 Process alarm upper upper limit value' (Un\G514), 'CH1 Process alarm upper lower limit value' (Un\G516), 'CH1 Process alarm lower upper limit value' (Un\G518), and 'CH1 Process alarm lower lower limit value' (Un\G520) while considering the digital clipping, scale conversion, shift-and-add, and difference conversion.

## Setting procedure

**1.** Set "Warning output setting (Process alarm)" to "Enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Warning output function (Process alarm)]

**2.** Set values for "Process alarm upper upper limit value", "Process alarm upper lower limit value", "Process alarm lower upper limit value", and "Process alarm lower lower limit value".

| Item | Setting range |
|---|---|
| Process alarm upper upper limit value | -32768 to 32767 |
| Process alarm upper lower limit value | |
| Process alarm lower upper limit value | |
| Process alarm lower lower limit value | |

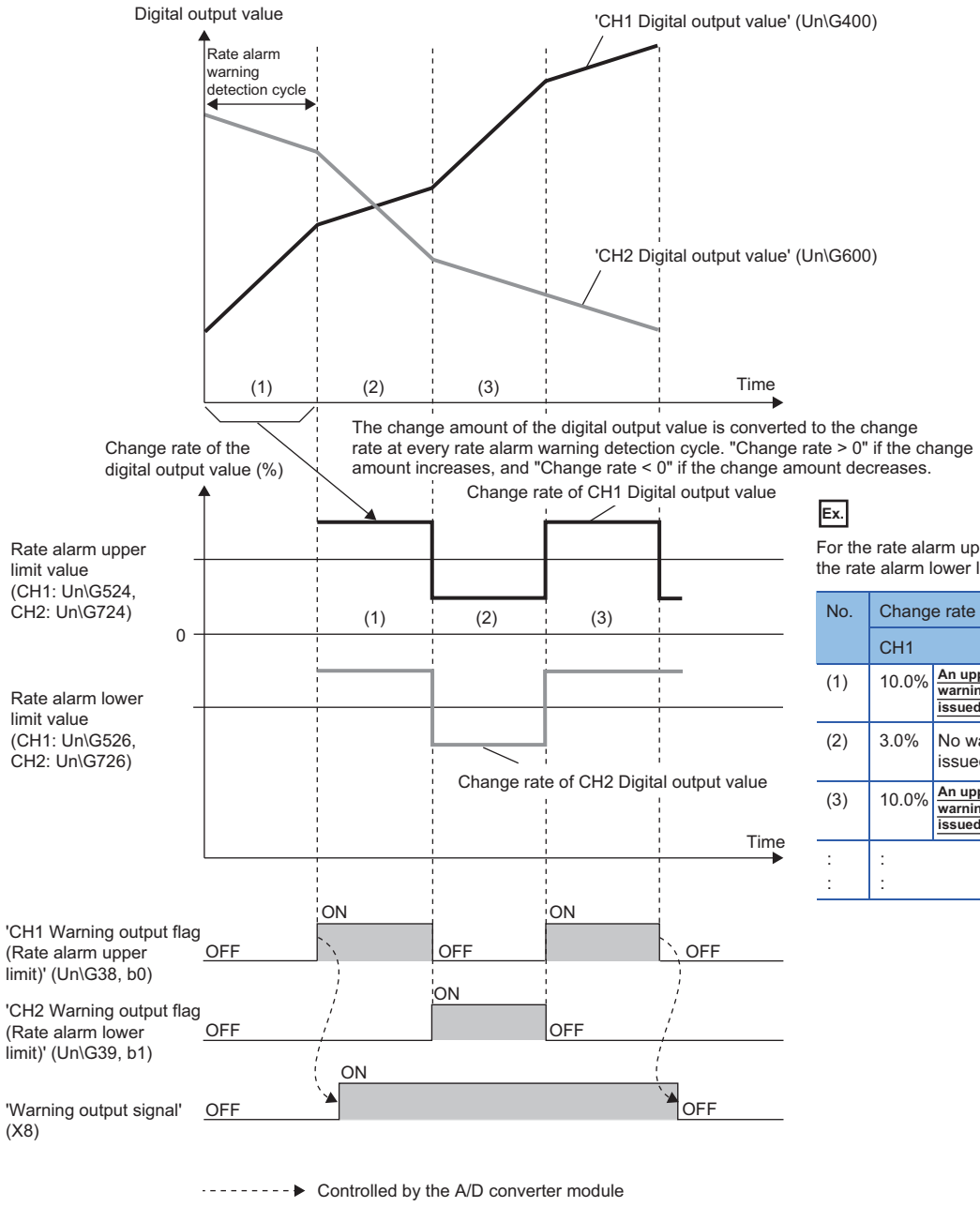
**Point**

Set values within the range satisfying the condition "Process alarm upper upper limit value ≥ Process alarm upper lower limit value ≥ Process alarm lower upper limit value ≥ Process alarm lower lower limit value". If a value out of the range is set, a process alarm upper lower limit value setting range error (error code: 1B△□H) occurs.

# Rate alarm



This function outputs a warning when the change rate of a digital output value is equal to or greater than the rate alarm upper limit value, or the rate is equal to or smaller than the rate alarm lower limit value.




Ex.

For the rate alarm upper limit value: 5.0%, and the rate alarm lower limit value: -5.0%

| No. | Change rate of the digital output value | | | |
|---|---|---|---|---|
| | CH1 | | CH2 | |
| (1) | 10.0% | **An upper limit warning issued for CH1** | -3.0% | No warning issued |
| (2) | 3.0% | No warning issued | -10.0% | **A lower limit warning issued for CH2** |
| (3) | 10.0% | **An upper limit warning issued for CH1** | -3.0% | No warning issued |
| : | : | | : | |
| : | : | | : | |

## Operation

### ■Operation performed when a warning is output

Digital output values are monitored on the rate alarm warning detection cycle. When a change rate of a digital output value (from a previous value) is equal to or more than the rate alarm upper limit value, or the rate is equal to or less than the rate alarm lower limit value, a warning is output as follows.

- Alarm ON (1) is stored in 'Warning output flag (Rate alarm upper limit)' (Un\G38) or 'Warning output flag (Rate alarm lower limit)' (Un\G39).
- 'Warning output signal' (X8) turns on.
- The ALM LED turns on.

In addition, an alarm code is stored in 'Latest alarm code' (Un\G2).

For details on the alarm codes, refer to the following.

☞ Page 117 List of Alarm Codes

**Point**

The A/D conversion on a channel where a warning was output continues.

### ■Operation after a warning was output

After a warning was output, if the change rate of a digital output value does not satisfy the warning output conditions due to being smaller than the rate alarm upper limit value or being greater than the rate alarm lower limit value, Normal (0) is stored in a bit position corresponding to the channel number of 'Warning output flag (Rate alarm upper limit)' (Un\G38) or 'Warning output flag (Rate alarm lower limit)' (Un\G39).

In addition, when all 'Warning output flag (Rate alarm upper limit)' (Un\G38) and 'Warning output flag (Rate alarm lower limit)' (Un\G39) return to Normal (0), 'Warning output signal' (X8) turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. To clear the alarm code, turn on and off 'Error clear request (YF)' after all the bits of 'Warning output flag (Rate alarm upper limit)' (Un\G38) and 'Warning output flag (Rate alarm lower limit)' (Un\G39) return to Normal (0).

## Detection cycle

Set the rate alarm warning detection cycle in 'CH1 Rate alarm warning detection cycle setting' (Un\G522).

The rate alarm warning detection cycle is the value calculated by multiplying the set value by the conversion cycle.

Ex.

The rate alarm warning detection cycle under the following conditions

- A/D conversion-enabled channels: CH1 to CH3
- 'CH1 Rate alarm warning detection cycle setting' (Un\G522): 5 (times)

The rate alarm warning detection cycle is 150ms. (10ms × 3 (CH) × 5 (times))

Digital output values are compared in 150ms intervals to check the change rate.

## Judgment of rate alarm

A change rate is judged with 'CH1 Rate alarm upper limit value' (Un\G524) and 'CH1 Rate alarm lower limit value' (Un\G526) converted to digital values per rate alarm warning detection cycle.
The following shows the conversion formula of judgment values used for the rate alarm detection.

$$\text{Value used for judgement at each Rate alarm warning detection cycle [digit]} = \left( \frac{R_H \text{ or } R_L}{1000} \right) \times D_{Max}$$

| Item | Description |
|---|---|
| $R_H$ | Rate alarm upper limit value (Unit: 0.1%) |
| $R_L$ | Rate alarm lower limit value (Unit: 0.1%) |
| $D_{Max}$ | Maximum digital output value of the input range<br>• Other than extended mode: 32000<br>• Extended mode: 36000 |

**Point**

Values after the decimal point are omitted.

**Ex.**

The judgment value under the following conditions

- Input range: 4 to 20mA (2-wire transmitter input)
- A/D conversion-enabled channel: CH1
- 'CH1 Averaging processing specification' (Un\G501): Sampling processing (0)
- 'CH1 Rate alarm warning detection cycle setting' (Un\G522): 5 (times)
- 'CH1 Rate alarm upper limit value' (Un\G524): 250 (25.0%)
- 'CH1 Rate alarm lower limit value' (Un\G526): 50 (5.0%)

$$\text{Upper limit value: } \frac{250}{1000} \times 32000 = 8000 \text{ (digit)}$$

$$\text{Lower limit value: } \frac{50}{1000} \times 32000 = 1600 \text{ (digit)}$$

The present value is compared to the previous value (50ms) in a rate alarm warning detection cycle of 50ms (sampling period 10ms × 5). A digital value is judged if it increases 8000 digits (25.0%) or more, or if the increase is 1600 digits (5.0%) or less from the previous value. (When the maximum digital output value is 32000)
Use the following formula to calculate a change rate to be set based on the change amount of current to detect a warning.

$$\text{Change rate to be set (0.1\%)} = \left( \frac{\text{Change amount (mA) of the current to detect a warning}}{\text{Gain current (mA) - Offset current (mA)}} \times 1000 \right)^{*1}$$

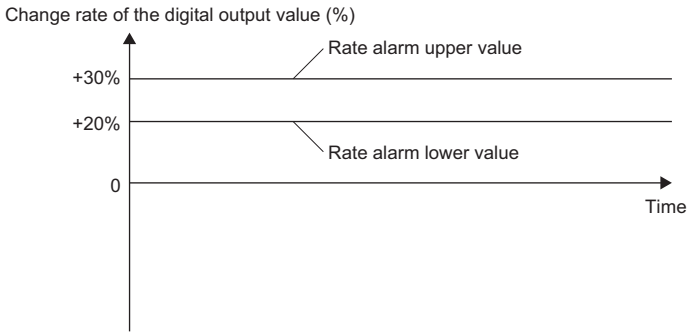
*1 Values after the decimal point are omitted.

## Application examples of rate alarms

A rate alarm serves to monitor that the variation rate of a digital output value lies in a limited range as shown below:

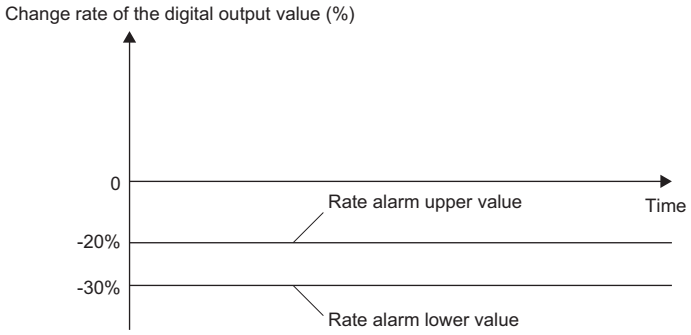
**Ex.**

To monitor that a rising rate of a digital output value is within the specified range



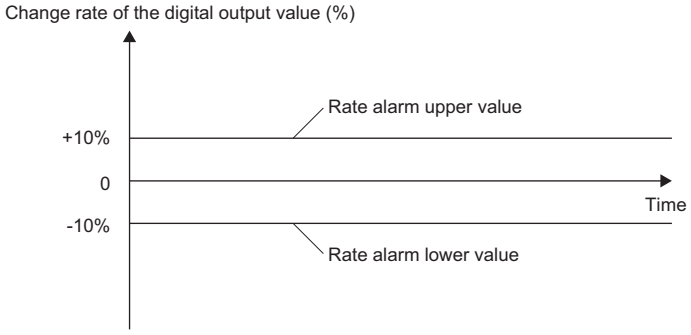

**Ex.**

To monitor that a drop rate of a digital output value is within the specified range




**Ex.**

To monitor that a change rate of a digital output value is within the specified range



## Setting procedure

**1.** Set "Warning output setting (Rate alarm)" to "Enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Warning output function (Rate alarm)]

**2.** Set a warning detection cycle of rate alarms.

Set the cycle in "Rate alarm warning detection cycle setting".

| Item | Setting range |
|---|---|
| Rate alarm warning detection cycle setting | 1 to 32000 (times) |

**Point**

In the channel where a value out of the range is set, a rate alarm warning detection cycle setting range error (error code: 1B9☐H) occurs.

**3.** Set values for "Rate alarm upper limit value" and "Rate alarm lower limit value".

Set a value for the maximum value of the digital output value in increments of 0.1%.

- Other than extended mode of the input range: 32000
- Extended mode of the input range: 36000

| Item | Setting range |
|---|---|
| Rate alarm upper limit value | -3276.8 to 3276.7 (%) |
| Rate alarm lower limit value | |

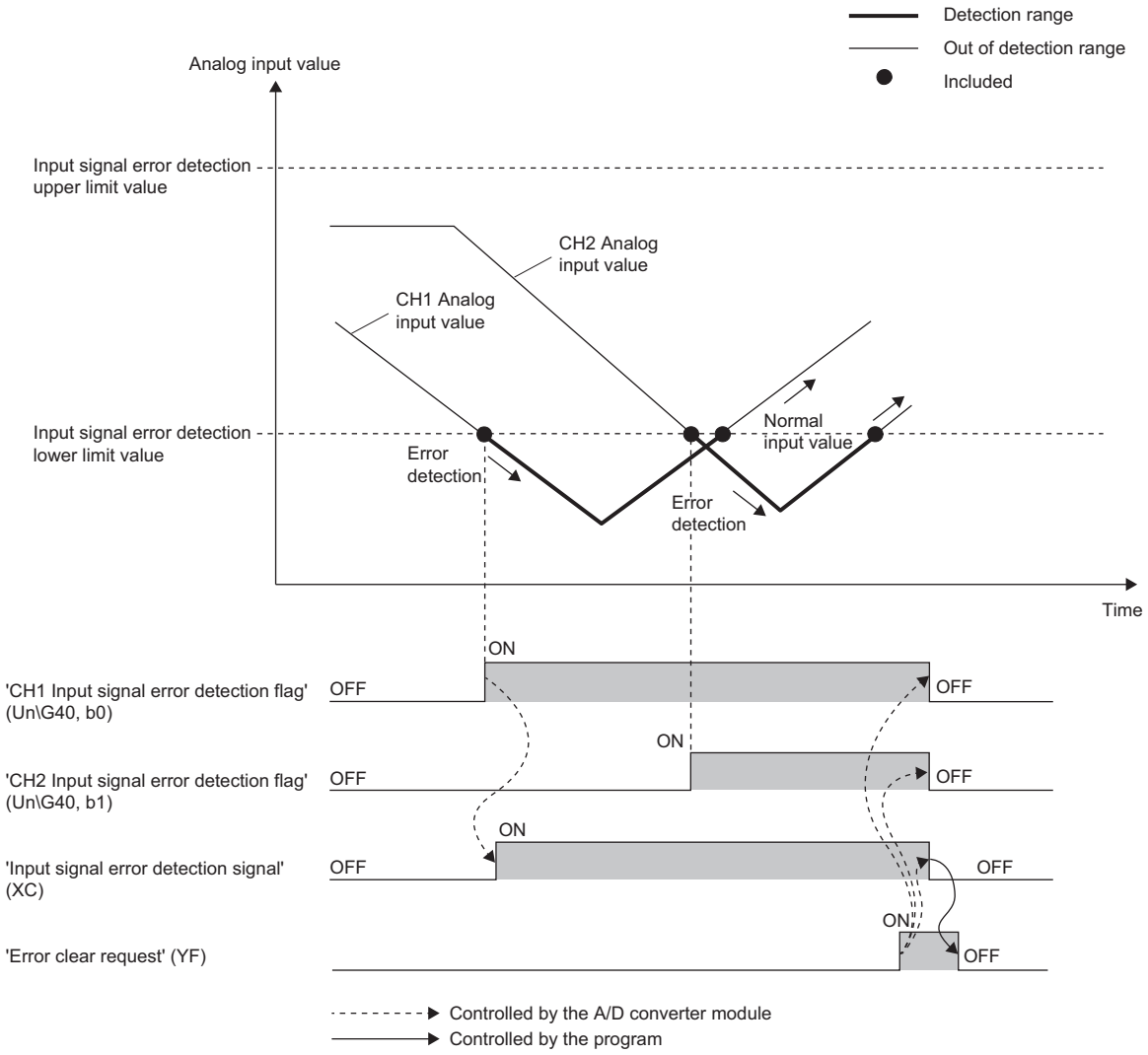
**Point**

Set values within the range satisfying the condition "Rate alarm upper limit value > Rate alarm lower limit value".

If a value out of the range is set, a rate alarm upper/lower limit setting value inversion error (error code: 1BA☐H) occurs.

# 1.8 Input Signal Error Detection Function

This function outputs an alarm when an analog input value exceeds the preset range.



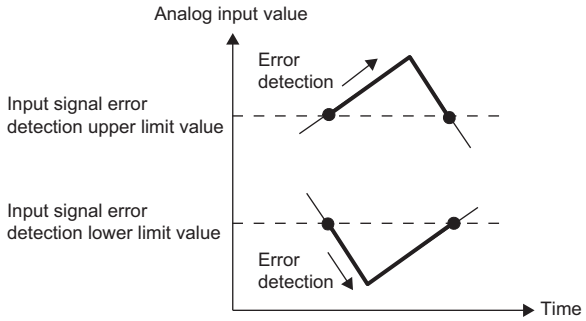
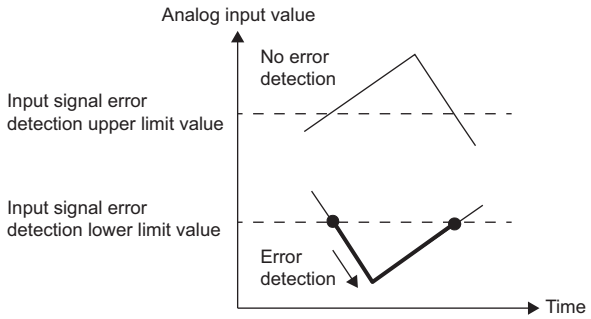
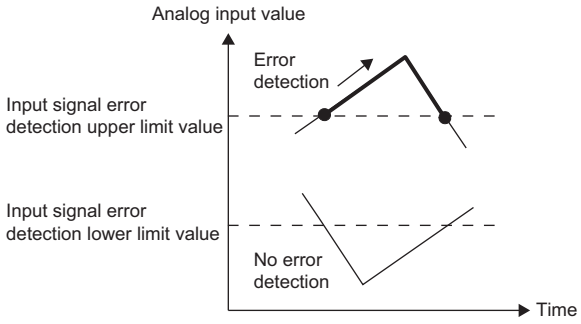

**Point**

Errors can be cleared also using 'Input signal error detection auto-clear enable/disable setting' (Un\G302). For details, refer to the following.

☞ Page 41 Clearing input signal errors

## Detection method

One of the following detection methods can be selected.

| Detection method | Detection condition |
|---|---|
| 0: Disable | Input signal errors are not detected. |
| 1: Upper and lower limit detection | An input signal error is detected when the analog input value is equal to or greater than the input signal error detection upper limit value, or when the analog input value is equal to or smaller than the input signal error detection lower limit value.<br>  |
| 2: Lower limit detection | An input signal error is detected when the analog input value is equal to or smaller than the input signal error detection lower limit value.<br>  |
| 3: Upper limit detection | An input signal error is detected when the analog input value is equal to or greater than the input signal error detection upper limit value.<br>  |
| 4: Simple disconnection detection | Simple disconnection detection is performed. For details, refer to the following.<br>☞ Page 40 Simple disconnection detection |

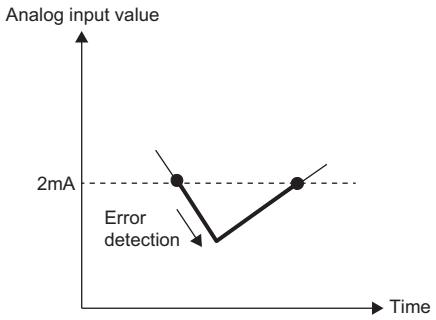
### ■Simple disconnection detection

Outputs an alarm when an analog input value is 2mA or smaller.

By combining this function with the extended mode in the input range setting, simple disconnection detection is enabled.

When an analog input value satisfies either of the following conditions, a disconnection occurs and 'Input signal error detection flag' (Un\G40) turns on.

| Input range | Disconnection detection value |
|---|---|
| 4 to 20mA (extended mode) (2-wire transmitter input) | Analog input value ≤ 2mA |
| 4 to 20mA (extended mode) (current input) | |




The settings for 'CH1 Input signal error detection lower limit set value' (Un\G529) and 'CH1 Input signal error detection upper limit set value' (Un\G530) are ignored.

## Notification

When an input signal error is detected, an error is notified as follows.

- Input signal error (1) is stored in the corresponding bit of 'Input signal error detection flag' (Un\G40).
- 'Input signal error detection signal' (XC) turns on.
- The ALM LED flashes.

In addition, an alarm code is stored in 'Latest alarm code' (Un\G2). Alarm codes are stored whenever the analog input satisfies the condition for the input signal error detection.

For details on the alarm codes, refer to the following.

☞ Page 117 List of Alarm Codes

## Operation

On the channel where an error is detected, the last digital output value and digital operation value just before the error was detected are stored.

When the analog input does not satisfy the condition of the input signal error detection, the A/D conversion resumes regardless of the reset on 'Input signal error detection flag' (Un\G40) and 'Input signal error detection signal' (XC). (The ALM LED remains flashing.)

**Point**

- When an input signal error occurs, the digital output value and digital operation value are not updated.
- The A/D conversion continues on the channel where no Input signal error is detected.
- Whether an input signal error occurred is judged with the value when the first A/D conversion is completed. Thus, the corresponding bit of 'A/D conversion completed flag' (Un\G42) turns on even when an input signal error is detected.

## Detection cycle

This function works at every sampling cycle.

## Clearing input signal errors

One of the following methods for clearing input signal errors can be selected by setting 'Input signal error detection auto-clear enable/disable setting' (Un\G302).

### ■When 'Input signal error detection auto-clear enable/disable setting' (Un\G302) is set to Enable (0)

After the analog input value returns within the setting range, the A/D converter module arranges the following status automatically. After the analog input value returns within the setting range, turning on and off 'Error clear request' (YF) is not required.

- 'Input signal error detection flag' (Un\G40) is cleared.
- 'Input signal error detection signal' (XC) turns off.
- The ALM LED turns off.

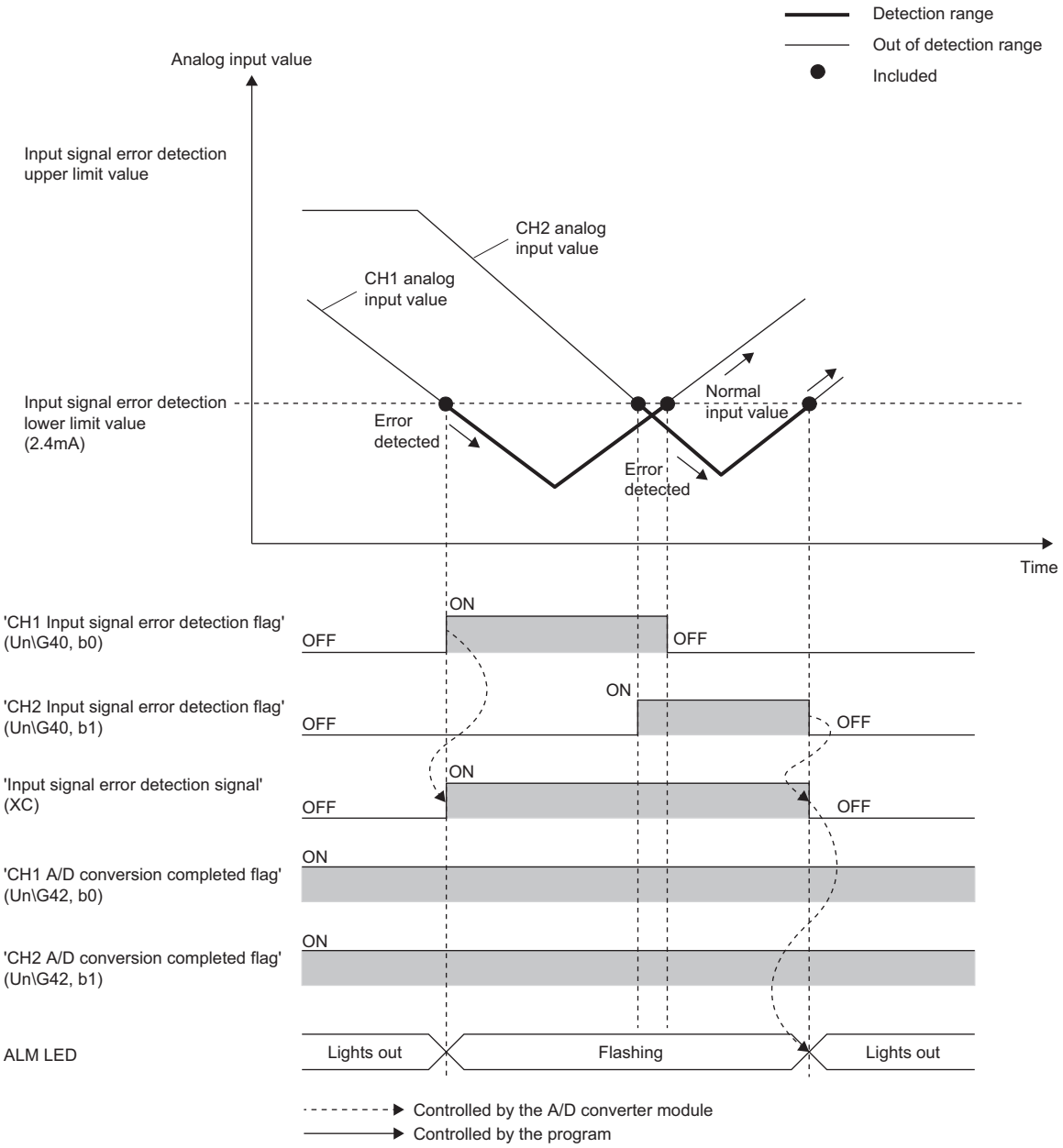
**Point**

'Latest alarm code' (Un\G2) is not cleared.
After the analog input value returns within the setting range, turn on and off 'Error clear request' (YF) to clear 'Latest alarm code' (Un\G2).

Ex.

The following figure shows the operation when an analog input value falls below 2.4mA and returns within the normal range under the following condition.

- 'Input signal error detection auto-clear enable/disable setting' (Un\G302): Enable (0)
- Input range: 4 to 20mA
- 'CH1 Input signal error detection setting' (Un\G528): Upper and lower limit detection (1)
- Input signal error detection lower limit value: 2.4mA




## ■When 'Input signal error detection auto-clear enable/disable setting' (Un\G302) is set to Disable (1)

After the analog input value returns within the set range, turn on and off 'Error clear request' (YF).

The A/D converter module arranges the following status when an input signal error is cleared.

- 'Input signal error detection flag' (Un\G40) is cleared.
- 'Input signal error detection signal' (XC) turns off.
- The ALM LED turns off.
- 'Latest alarm code' (Un\G2) is cleared.

## Setting the input signal error detection upper or lower limit value

### ■Input signal error detection upper limit value

Set the input signal error detection upper limit value by 1 (0.1%) based on the input signal error detection upper limit set value. This value is calculated by adding "Analog input range width (Gain value - Offset value) × input signal error detection upper limit set value (%)" to the gain value of each range. Only a value which is equal to or greater than the gain value can be set.
To calculate the input signal error detection upper limit set value based on the input signal error detection upper limit value, use the following formula.

$$\text{Input signal error detection upper limit setting value} = \frac{\text{Input signal error detection upper limit value - Gain value of each range}}{\text{Gain value of each range - Offset value of each range}} \times 1000$$

### ■Input signal error detection lower limit value

Set the input signal error detection lower limit value by 1 (0.1%) based on the input signal error detection lower limit set value. This value is calculated by subtracting "Analog input range width (Gain value - Offset value) × Input signal error detection lower limit set value (%)" from the lower limit value of each range. Only the value which is equal to or smaller than the lower limit value of the range can be set.
To calculate the input signal error detection lower limit set value based on the input signal error detection lower limit value, use the following formula.

$$\text{Input signal error detection lower limit setting value} = \frac{\text{Lower limit value of each range - Input signal error detection lower limit value}}{\text{Gain value of each range - Offset value of each range}} \times 1000$$

The following table lists the lower limit value, offset value, and gain value for each range.

| Input range | | Lower limit value | Offset value | Gain value |
|---|---|---|---|---|
| Current | 0 to 20mA | 0mA | | 20mA |
| | 4 to 20mA | 4mA | | 20mA |
| | 4 to 20mA (extended mode) | 4mA | | 20mA |
| | User range setting | Analog input value set as an offset value | | Analog input value set as a gain value |

**Point**

When 'CH1 Input signal error detection setting' (Un\G528) is set to Upper and lower limit detection (1) and the same value is set for 'CH1 Input signal error detection lower limit set value' (Un\G529) and 'CH1 Input signal error detection upper limit set value' (Un\G530), the same operation as the one performed with the following setting can be performed.

- Setting 'CH1 Input signal error detection extension/input signal error detection setting' (Un\G47) to Upper limit value/lower limit value same (0) in the Q compatible mode

For details on the Q compatible mode, refer to the following.

☞ Page 46 When the function is used in the Q compatible mode

## Setting procedure

**1.** Select a detection method in "Input signal error detection setting".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Input signal error detection function]

**2.** Set values for "Input signal error detection lower limit setting value" and "Input signal error detection upper limit setting value".

| Item | Setting range |
|---|---|
| Input signal error detection lower limit setting value | 0.0 to 25.0 (%) |
| Input signal error detection upper limit setting value | |

**3.** Set "Input signal error detection auto-clear enable/disable setting" to "Enable" or "Disable".

**Point**

In the channel where a value out of the range is set, an input signal error detection setting value range error (error code: 1C1□H) occurs.

## Setting example

### ■Setting example of the input signal error detection

In the channel where the following values are set, an input error is detected when an analog input value exceeds 21.2mA or falls below 0.4mA.

| Item | Setting value |
|---|---|
| Input range | 4 to 20mA |
| 'Input signal error detection auto-clear enable/disable setting' (Un\G302) | Disable (1) |
| 'CH1 Input signal error detection setting' (Un\G528) | Upper and lower limit detection (1) |

Assign the following values in a formula to determine the input signal error detection lower limit set value and input signal error detection upper limit set value.

- Input signal error detection lower limit value: 0.4mA
- Input signal error detection upper limit value: 21.2mA
- Offset value: 4.0mA
- Gain value: 20.0mA

**Point**

For details on the calculation formula, refer to the following.

☞ Page 43 Setting the input signal error detection upper or lower limit value

[Calculation of lower limit value]

$$\text{Input signal error detection lower limit setting value} = \frac{4.0 - 0.4}{20.0 - 4.0} \times 1000$$

$$= 225\ (22.5\%)$$

Thus, set 'CH1 Input signal error detection lower limit set value' (Un\G529) to 225 (22.5%).

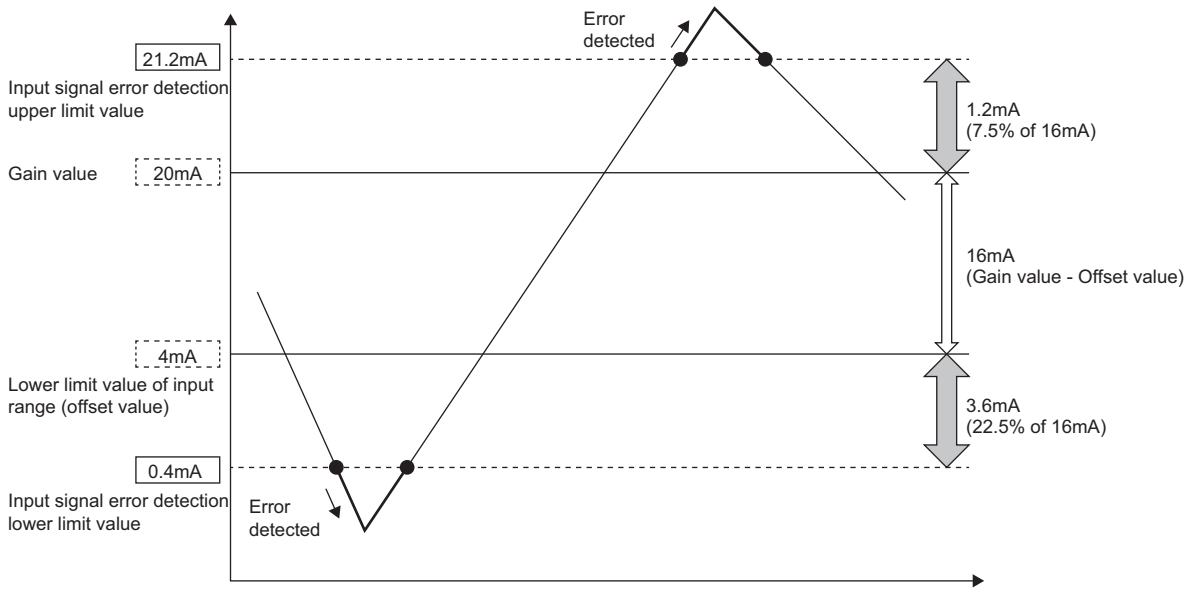
[Calculation of upper limit value]

$$\text{Input signal error detection upper limit setting value} = \frac{21.2 - 20.0}{20.0 - 4.0} \times 1000$$

$$= 75\ (7.5\%)$$

Thus, set 'CH1 Input signal error detection upper limit set value' (Un\G530) to 75 (7.5%).

The following figure shows the operation of the input signal error detection.



# When the function is used in the Q compatible mode

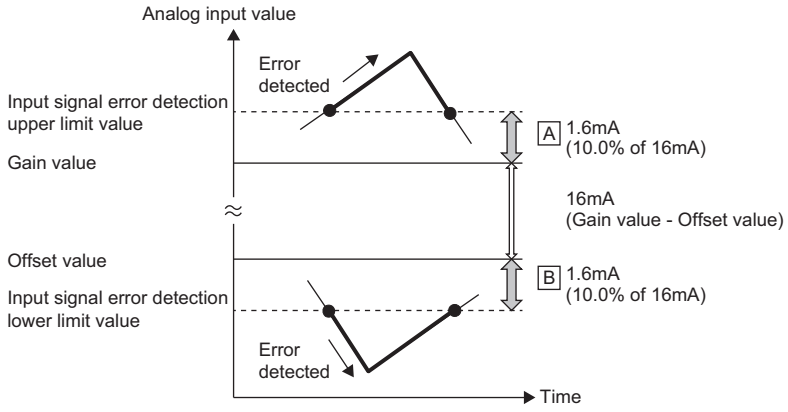
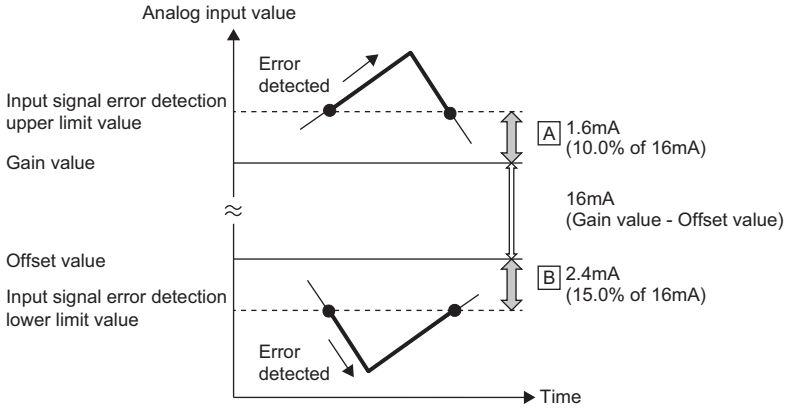
When the input signal error detection function is used in the Q compatible mode, the operation is different from that in the R mode. The following describes only the items that have differences in operation.

## Detection condition

An input signal error is detected when the analog input value is equal to or greater than the input signal error detection upper limit value, or when the analog input value is equal to or smaller than the input signal error detection lower limit value.

## Detection method

Select a detection method in 'Input signal error detection extension/input signal error detection setting' (Un\G47).

| Detection method | Description |
|---|---|
| 0: Upper limit value/ lower limit value same | The input signal error detection upper limit value and input signal error detection lower limit value are calculated from the same input signal error detection setting value.<br>Thus, the same range can be set for A and B in the figure below.<br>• Input signal error detection setting value: 100 (10%)<br>  |
| 1: Upper limit value/ lower limit value different | The input signal error detection upper limit value and input signal error detection lower limit value are calculated from different input signal error detection setting values.<br>Thus, different ranges can be set for A and B in the figure below.<br>• Input signal error detection setting value for the input signal error detection upper limit value: 100 (10%)<br>• Input signal error detection setting value for the input signal error detection lower limit value: 150 (15%)<br>  |

**Point**

For details on the input signal error detection upper limit value and input signal error detection lower limit value, refer to the following.

☞ Page 191 CH1 Input signal error detection setting value/lower limit set value [Q compatible mode]

## Notification

When an input signal error is detected, an error is notified as follows.

- Input signal error (1) is stored in the corresponding bit of 'Input signal error detection flag' (Un\G49).
- 'Input signal error detection signal' (XC) turns on.
- The corresponding bit of 'A/D conversion completed flag' (Un\G10) turns off.
- The ALM LED flashes.

In addition, an alarm code is stored in 'Latest alarm code' (Un\G3750).

For details on the alarm codes, refer to the following.

☞ Page 117 List of Alarm Codes

## Operation

On the channel where an error is detected, the last digital output value and digital operation value just before the error was detected are stored. Also, the corresponding bit of 'A/D conversion completed flag' (Un\G10) turns off.

When the analog input does not satisfy the condition of the input signal error detection, the A/D conversion resumes regardless of the reset on 'Input signal error detection flag' (Un\G49) and 'Input signal error detection signal' (XC). (The ALM LED remains flashing.)

## Clearing input signal errors

One of the following methods for clearing input signal errors can be selected by setting 'Input signal error detection auto-clear enable/disable setting' (Un\G162).

### ■When 'Input signal error detection auto-clear enable/disable setting' (Un\G162) is set to Enable (0)

After the analog input value returns within the setting range, the A/D converter module arranges the following status automatically. After the analog input value returns within the setting range, turning on and off 'Error clear request' (YF) is not required.

- 'Input signal error detection flag' (Un\G49) is cleared.
- 'Input signal error detection signal' (XC) turns off.
- The ALM LED turns off.

**Point**

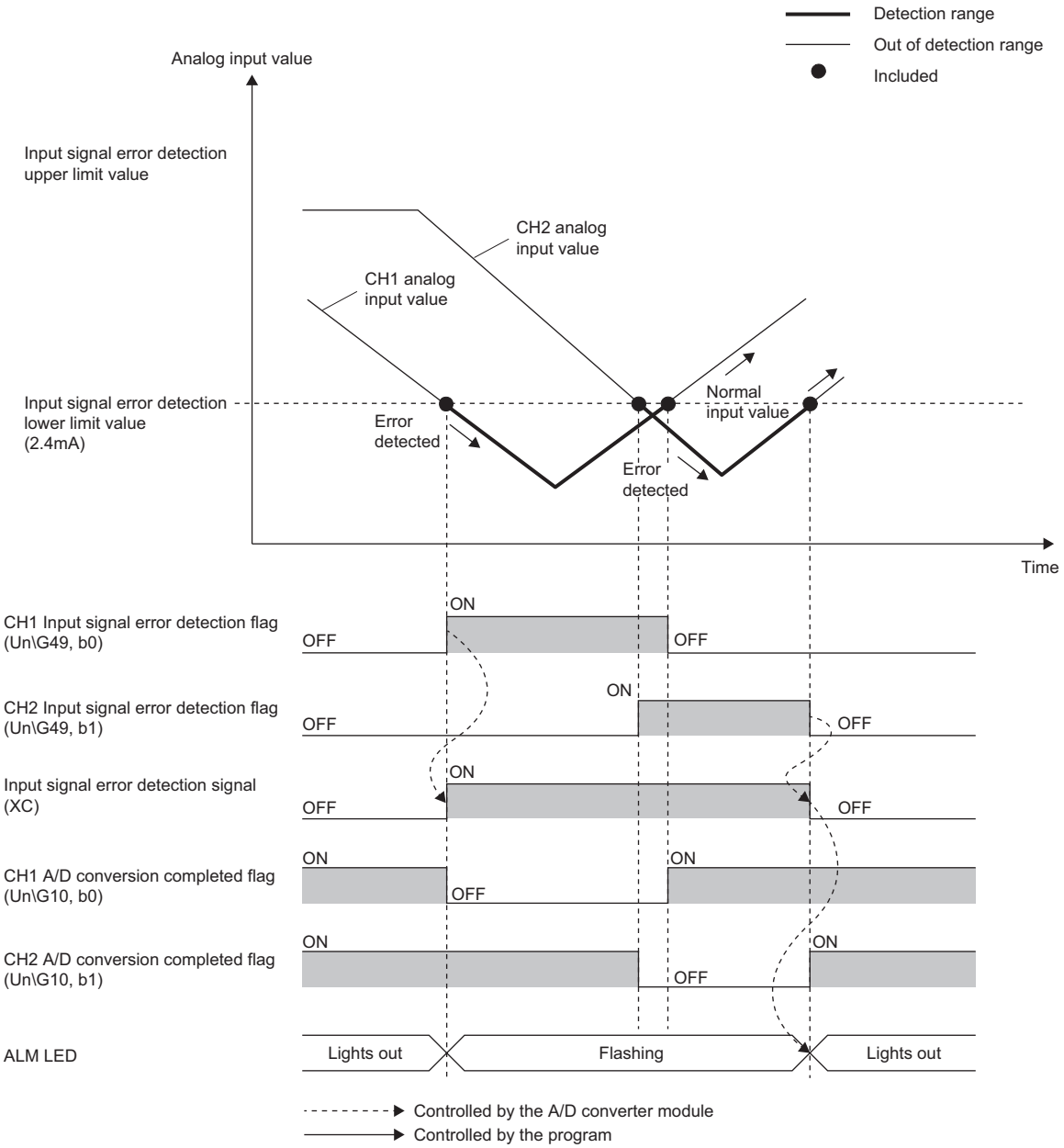
'Latest alarm code' (Un\G3750) is not cleared.

After the analog input value returns within the setting range, turn on and off 'Error clear request' (YF) to clear 'Latest alarm code' (Un\G3750).

Ex.

The following figure shows the operation when an analog input value falls below 2.4mA and returns within the normal range under the following condition.

- 'Input signal error detection auto-clear enable/disable setting' (Un\G162): Enable (0)
- Input range: 4 to 20mA
- 'Input signal error detection extension/input signal error detection setting' (Un\G47): Upper limit value/lower limit value same, Enable (0000H)
- Input signal error detection lower limit value: 2.4mA




## ■When 'Input signal error detection auto-clear enable/disable setting' (Un\G162) is set to Disable (1)

After the analog input value returns within the set range, turn on and off 'Error clear request' (YF).

The A/D converter module arranges the following status when an input signal error is cleared.

- 'Input signal error detection flag' (Un\G49) is cleared.
- 'Input signal error detection signal' (XC) turns off.
- The ALM LED turns off.
- 'Latest alarm code' (Un\G3750) is cleared.

## Setting example

### ■Setting example of the input signal error detection

In the channel where the following values are set, an input error is detected when an analog input value exceeds 21.6mA or falls below 0.8mA.

| Item | Setting value |
|---|---|
| Mode | Q compatible mode |
| Input range | 4 to 20mA |
| 'Input signal error detection auto-clear enable/disable setting' (Un\G162) | Disable (1) |
| 'Input signal error detection extension/input signal error detection setting' (Un\G47) | Upper limit value/lower limit value different (1) |

Assign the following values in a formula to determine the input signal error detection setting value from the input signal error detection upper limit value and input signal error detection lower limit value.

- Input signal error detection upper limit value: 21.6mA
- Input signal error detection lower limit value: 0.8mA
- Offset value: 4.0mA
- Gain value: 20.0mA

**Point**

For details on the calculation formula, refer to the following.

☞ Page 43 Setting the input signal error detection upper or lower limit value

[Calculation of lower limit value]

$$\text{Input signal error detection setting value} = \frac{4.0 - 0.8}{20.0 - 4.0} \times 1000$$

$$= 200\ (20.0\%)$$

Thus, set 'CH1 Input signal error detection setting value/CH1 Input signal error detection lower limit set value' (Un\G142) to the determined input signal error detection setting value (200 (20.0%)).

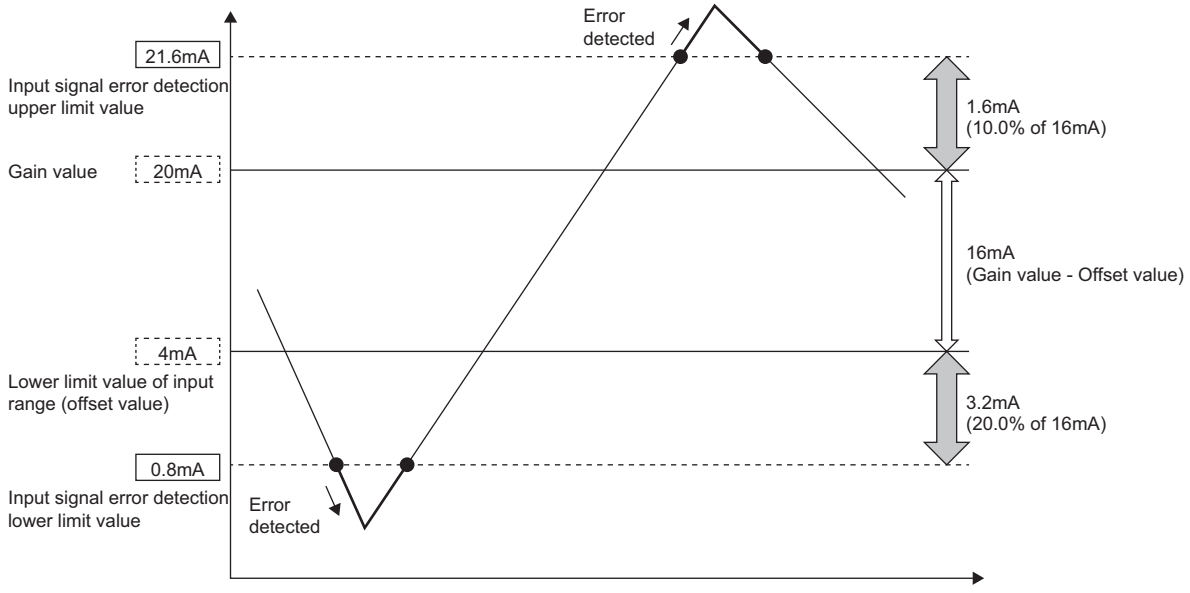
[Calculation of upper limit value]

$$\text{Input signal error detection setting value} = \frac{21.6 - 20.0}{20.0 - 4.0} \times 1000$$

$$= 100\ (10.0\%)$$

Thus, set 'CH1 Input signal error detection upper limit setting' (Un\G150) to the determined input signal error detection setting value (100 (10.0%)).

The following figure shows the operation with the determined input signal error detection setting values.



# 1.9 Shift Function

This function adds (shifts) a set conversion value shift amount to a digital output value and stores the result in the buffer memory area. The digital operation value reflects the change in the conversion value shift amount on a realtime basis. Therefore, fine adjustment can be easily performed when the system starts.

## Operation

A set conversion value shift amount is added to the digital operation value. The digital operation value with shift addition is stored in 'CH1 Digital operation value' (Un\G402). The conversion value shift amount is added in every sampling cycle for sampling processing and is added in every averaging processing cycle for averaging processing. After that, the added values are stored in 'CH1 Digital operation value' (Un\G402). If a value is set to the conversion value shift amount, the conversion value shift amount is added regardless of turning on and off 'Operating condition setting request' (Y9).

## Setting procedure

Set a value for "Conversion value shift amount".

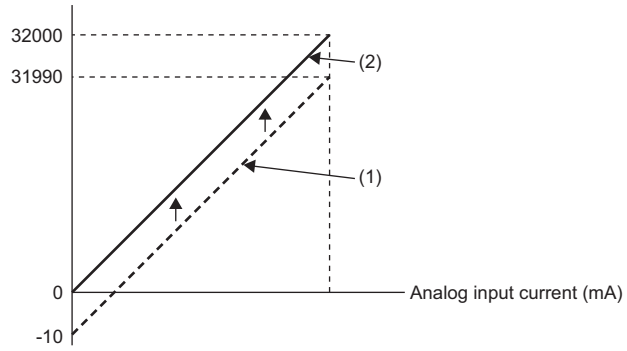
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Shift function]

| Item | Setting range |
|---|---|
| Conversion value shift amount | -32768 to 32767 |

## Setting example

Ex.

When the I/O characteristics are adjusted in a channel where the input range of 0 to 20mA (current input) is set by the shift function




(1) 'CH1 Digital output value' (Un\G400)
+
'CH1 Conversion value shift amount' (Un\G472) "+10"
↓
(2) 'CH1 Digital operation value' (Un\G402)

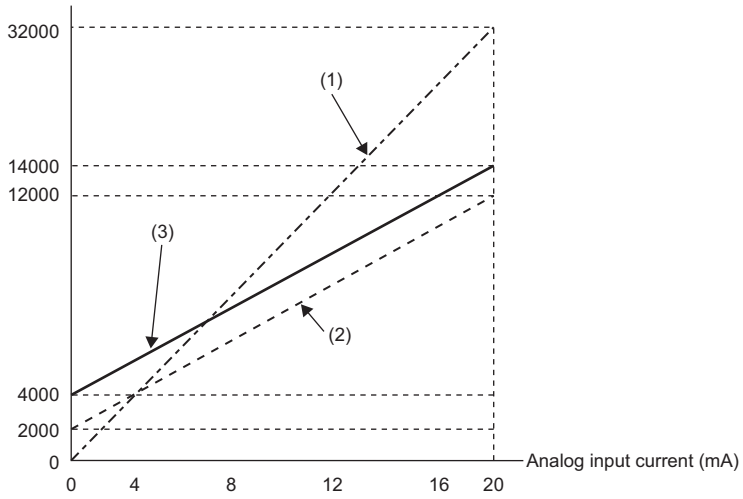
| Current input (mA) | Digital output value*1 | Digital operation value |
|---|---|---|
| 0 | -10 | 0 |
| 20 | 31990 | 32000 |

*1 These values are also applied to the case of digital output values (32 bits).

Ex.

When the following values are used for the A/D converter module with the input range of 4 to 20mA (2-wire transmission input)

- 'CH1 Scaling enable/disable setting' (Un\G504): Enable (0)
- 'CH1 Scaling upper limit value' (Un\G506): 12000
- 'CH1 Scaling lower limit value' (Un\G508): 2000
- 'CH1 Conversion value shift amount' (Un\G472): 2000




(1) 'CH1 Digital output value' (Un\G400)
Scaling
0 to 32000
↓
2000 to 12000
(2) Value after scaling
'CH1 Conversion value shift amount' (Un\G472) "+2000"
↓
(3) 'CH1 Digital operation value' (Un\G402)

| Current input (mA) | Digital output value*1 | Value after scaling | Digital operation value |
|---|---|---|---|
| 0 | 0 | 2000 | 4000 |
| 4 | 6400 | 4000 | 6000 |
| 8 | 12800 | 6000 | 8000 |
| 12 | 19200 | 8000 | 10000 |
| 16 | 25600 | 10000 | 12000 |
| 20 | 32000 | 12000 | 14000 |

*1 These values are also applied to the case of digital output values (32 bits).

**Point**

When the shift function is used with the digital clipping function and scaling function, shift-and-add is performed on the value obtained after digital clipping and scale conversion. Therefore, the range of the digital operation value is determined as -32768 to 32767.

For a setting example of when the digital clipping function, scaling function, and shift function are used together, refer to the following.

☞ Page 53 Setting example

# 1.10 Digital Clipping Function

This function fixes the digital operation value with the maximum digital output value and the minimum digital output value when the corresponding current exceeds the input range.

## List of output ranges

The following table lists the output ranges of the digital operation values when the digital clipping function is enabled with each range.

| Input range | Output range of digital operation values | |
|---|---|---|
| | Digital clipping function is enabled | Digital clipping function is disabled |
| 4 to 20mA (2-wire transmitter input) | 0 to 32000 | -768 to 32767 |
| 4 to 20mA (current input) | | |
| 0 to 20mA (current input) | | |
| User range setting (current input) | | |
| User range setting (2-wire transmitter input) | | |
| 4 to 20mA (extended mode) (2-wire transmitter input) | -8000 to 32767*1 | -8768 to 32767 |
| 4 to 20mA (extended mode) (current input) | | |

*1 Since the digital clipping function is effective with the value 36000 (22mA) in the extended mode, the output range is -8000 to 32767.

**Point**

When the determined digital operation value is out of the range of -32768 to 32767, the digital clipping function is performed to the following values.

- When the digital operation value is 32767 or greater: 32767
- When the digital operation value is -32768 or smaller: -32768

## Setting procedure

Set "Digital clipping enable/disable setting" to "Enable".

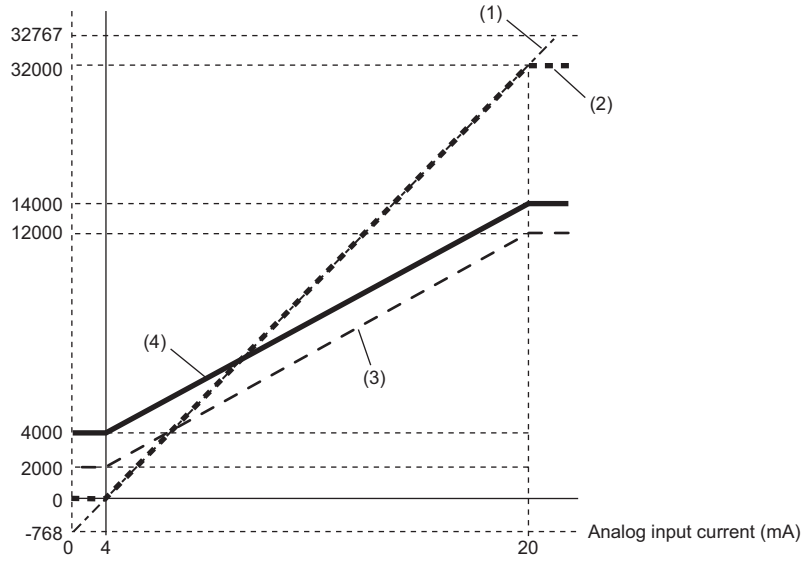
[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Digital clipping function]

## Setting example

Ex.

When the following values are used for the A/D converter module with the input range of 4 to 20mA (2-wire transmission input)

- 'CH1 Scaling enable/disable setting' (Un\G504): Enable (0)
- 'CH1 Scaling upper limit value' (Un\G506): 12000
- 'CH1 Scaling lower limit value' (Un\G508): 2000
- 'CH1 Conversion value shift amount' (Un\G472): 2000
- 'CH1 Digital clipping enable/disable setting' (Un\G510): Enable (0)




(1) 'CH1 Digital output value' (Un\G400)
Digital clipping
-768 to 32767
↓
0 to 32000
(2) Value after digital clipping
Scaling
0 to 32000
↓
2000 to 12000
(3) Value after scaling
'CH1 Conversion value shift amount' (Un\G472) "+2000"
↓
4000 to 14000
(4) 'CH1 Digital operation value' (Un\G402)

| Input current (mA) | Digital output value*1 | Digital operation value |
|---|---|---|
| 3.616 | -768 | 4000 |
| 4 | 0 | 4000 |
| 8 | 8000 | 6500 |
| 12 | 16000 | 9000 |
| 16 | 24000 | 11500 |
| 20 | 32000 | 14000 |
| 20.384 | 32767 | 14000 |

*1 These values are also applied to the case of digital output values (32 bits).

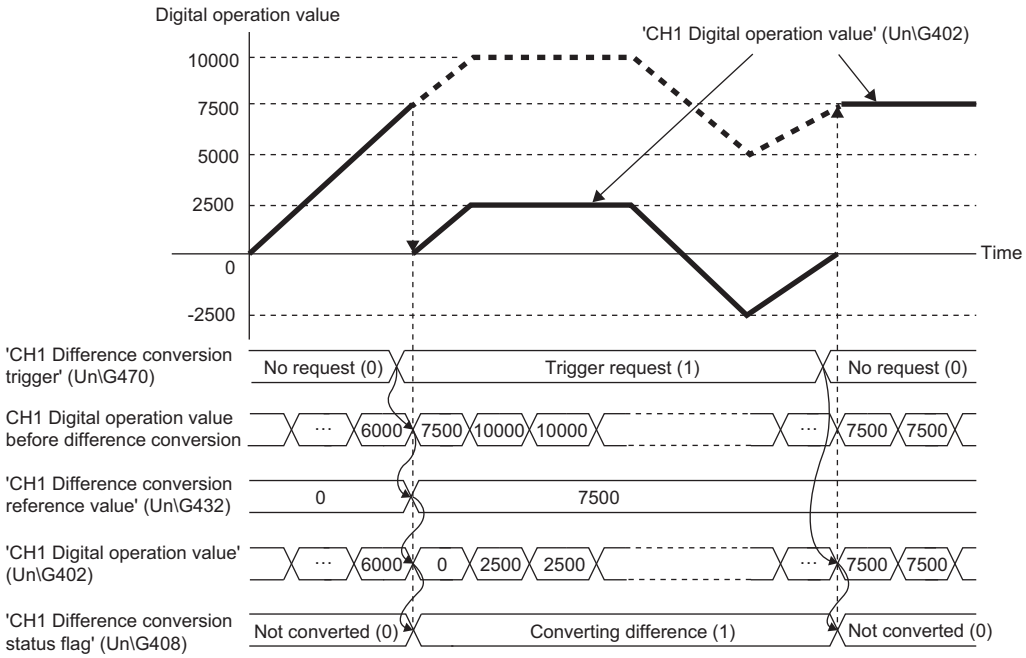
**Point**

When the digital clipping function is used with the scaling function, shift function, and difference conversion function, scale conversion, shift-and-add, and difference conversion are performed on the value obtained after digital clipping.

# 1.11 Difference Conversion Function

This function subtracts a difference conversion reference value from a digital operation value and stores the acquired value in the buffer memory area.

The digital operation value at the start of this function is treated as 0 (reference value). Thereafter, values that increased or decreased from the reference value are stored in the buffer memory.




## Operation

The digital operation value at the start of the difference conversion (the data stored inside the A/D converter module before the difference conversion starts) is determined as a difference conversion reference value. The value acquired by subtracting the difference conversion reference value from the digital operation value is stored in 'CH1 Digital operation value' (Un\G402). At the start of this function, the digital operation value is 0 (because the digital operation value and the difference conversion reference value have the same value at the start).

- Digital operation value after difference conversion = Digital operation value - Difference conversion reference value

### ■Starting the difference conversion

***1.*** Change 'CH1 Difference conversion trigger' (Un\G470) from No request (0) to Trigger request (1).

The rise of No request (0) → Trigger request (1) is detected as a trigger. When the trigger is detected, the digital operation value at the start is output to the difference conversion reference value. The value acquired by subtracting the difference conversion reference value from the digital operation value is stored in 'CH1 Digital operation value' (Un\G402). After the value is stored, 'CH1 Difference conversion status flag' (Un\G408) turns to Converting difference (1).

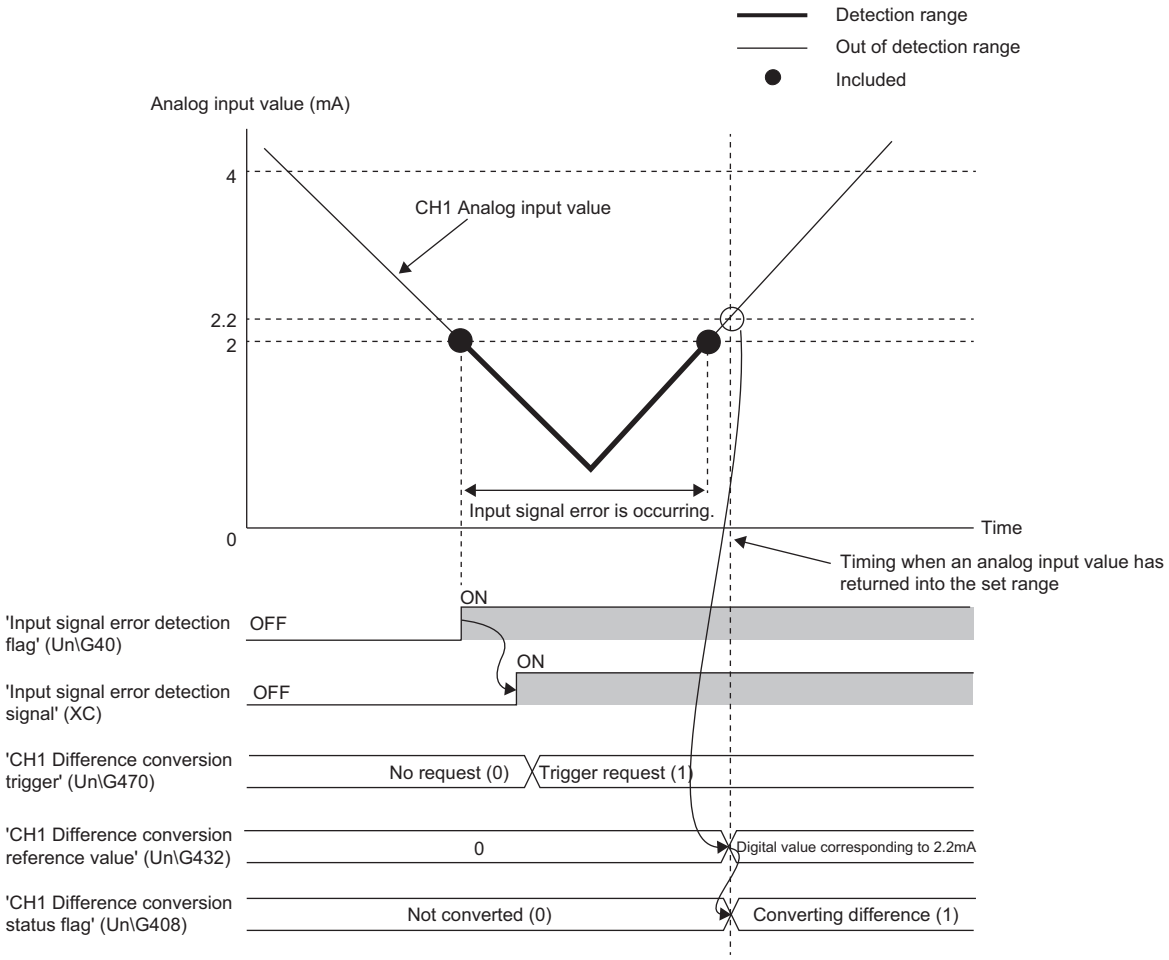
### ■Stopping the difference conversion

***1.*** Change 'CH1 Difference conversion trigger' (Un\G470) from Trigger request (1) to No request (0).

The fall of Trigger request (1) → No request (0) is detected as a trigger. When the trigger is detected, the difference conversion stops, and 'CH1 Difference conversion status flag' (Un\G408) turns to Not converted (0). Thereafter, the digital operation value is stored as it is in 'CH1 Digital operation value' (Un\G402).

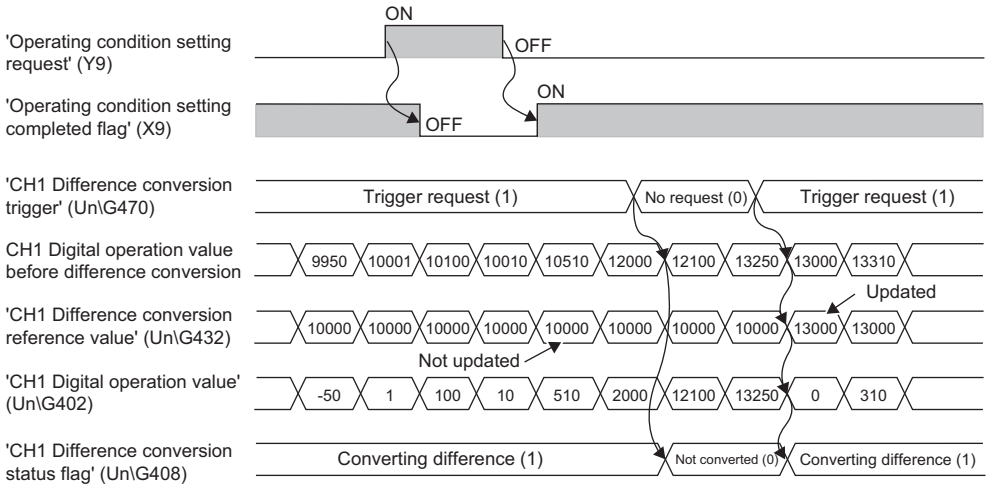
## ■Operations of when an input signal error occurs

When an input signal error occurs, even if 'CH1 Difference conversion trigger' (Un\G470) changes from No request (0) to Trigger request (1), the difference conversion does not start. After the input signal error returns to the normal value, change 'CH1 Difference conversion trigger' (Un\G470) from No request (0) to Trigger request (1) again. If an input signal error occurs in the status of Trigger request (1), the difference conversion starts at the timing when the input signal error returns to the normal value, treating the digital operation value as the difference conversion reference value.



## ■Operations of when 'Operating condition setting request' (Y9) is turned on and off

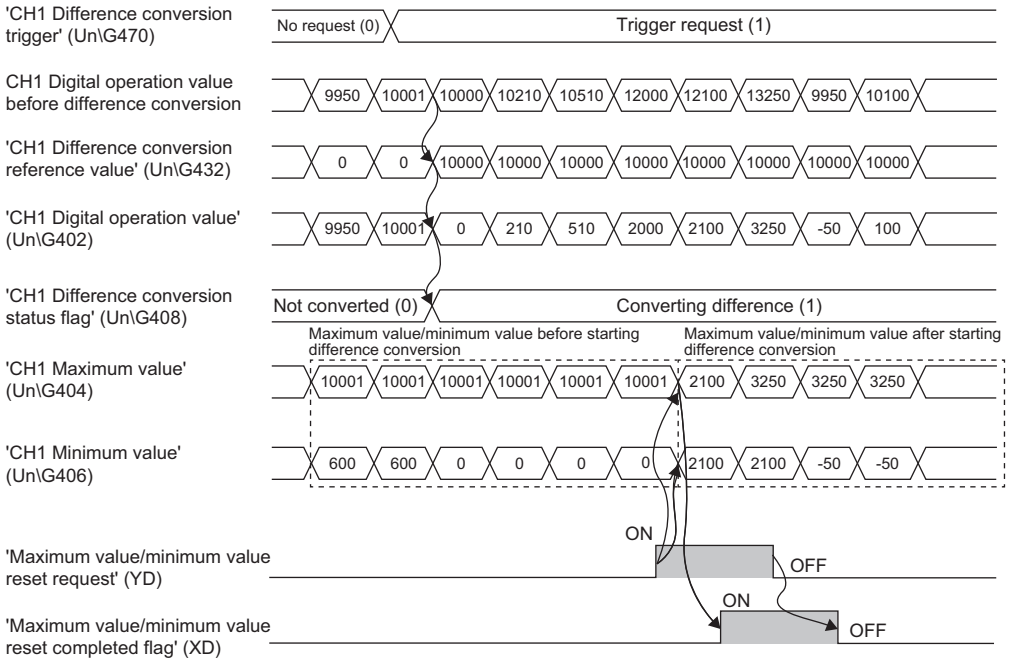
- During the difference conversion, even when 'Operating condition setting request' (Y9) is turned on and off, the difference conversion continues without updating the difference conversion reference value. To update the difference conversion reference value, restart the difference conversion by changing 'CH1 Difference conversion trigger' (Un\G470) from Trigger request (1) to No request (0), and Trigger request (1) again.
- 'CH1 Difference conversion trigger' (Un\G470) does not become valid even when the trigger changes from No request (0) to Trigger request (1) when 'Operating condition setting request' (Y9) is turned on. After turning on and off 'Operating condition setting request' (Y9), change 'CH1 Difference conversion trigger' (Un\G470) from No request (0) to Trigger request (1) again.




## ■Operations of CH1 Maximum value (Un\G404) and CH1 Minimum value (Un\G406)

When the difference conversion starts, the maximum value and the minimum value of the values acquired by the difference conversion are stored in 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406). By turning on 'Maximum value/minimum value reset request' (YD), the maximum value and the minimum value after the start of the difference conversion can be checked.

When 'Maximum value/minimum value reset request' (YD) is not turned on, the maximum values and minimum values before and after difference conversion are mixed.



### ■Operation of when the averaging processing is set

If the difference conversion starts after the averaging processing is set, the digital operation value at the completed of the averaging processing is determined as 'CH1 Difference conversion reference value' (Un\G432). 'CH1 Difference conversion status flag' (Un\G408) turns to Converting difference (1).

**Point**

- The difference conversion function can be started at any timing.
- When the difference conversion function is used with the digital clipping function, scaling function, and shift function, each digital operation value is determined as a difference conversion reference value and used for the difference conversion.
- Even though the digital clipping function, scaling function, and shift function are enabled during the difference conversion, the value in 'CH1 Difference conversion reference value' (Un\G432) is not updated. To update the value in 'CH1 Difference conversion reference value' (Un\G432), stop the difference conversion and restart it again.

# 1.12 Maximum Value/Minimum Value Hold Function

This function stores the maximum and minimum values of digital operation values in the buffer memory area for each channel. Time average and count average are processed on the averaging processing cycle. The values of the sampling processing, moving average, and primary delay filter are updated on the sampling cycle.

## Resetting the maximum value and the minimum value

Turn on and off 'Maximum value/minimum value reset request' (YD) or 'Operating condition setting request' (Y9) to update the maximum value and minimum value with the current value.
Turning on 'Maximum value/minimum value reset request' (YD) turns on 'Maximum value/minimum value reset completed flag' (XD).

## Values to be the maximum value and the minimum value

The maximum and minimum values of digital operation values are stored in the buffer memory.
When the digital clipping function, scaling function, shift function, or difference conversion function is used, the maximum value and minimum value of each function are stored.

**Point**

Even while A/D conversion is stopped, the maximum value and minimum value can be reset.
However, because the values when A/D conversion is stopped are held in the digital operation values, when 'Maximum value/minimum value reset request' (YD) is turned on and off, the maximum value and minimum value are updated with the held values.

# 1.13 External Power Supply Interruption Detection Function

This function detects the state in which 24VDC from the external power supply is not supplied or is stopped.
When an external power supply interruption is detected, 'External power supply READY flag' (X6) turns off, and for the 2-wire transmitter range, A/D conversion processing and power supply requirements for 2-wire transmitter are not performed. (A/D conversion processing for the current input range not using the 2-wire transmitter is performed.)

## Operation

When 200ms passes after an input from the external power supply, 'External power supply READY flag' (X6) turns on.
When there is no input from the external power supply, or when 200ms does not pass after an input from the external power supply, it is judged as a state of external power supply interruption and 'External power supply READY flag' (X6) turns off.
When an input from the external power supply stops, it is judged as a state of external power supply interruption and 'External power supply READY flag' (X6) turns off.

**Point**

- When 'External power supply READY flag' (X6) is off, A/D conversion for the 2-wire transmitter range stops and 'A/D conversion completed flag' (XE) turns off.
- Even if there is a channel where A/D conversion is not performed because the external power supply is off, the conversion cycle does not change.

## Precautions

If the external power supply does not satisfy the requirements of the performance specifications, it may be judged as a state of external power supply interruption.
For details on the performance specifications for the external power supply, refer to the following.
MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Startup)

# 1.14 Supply Power Temporary Stop Function

This function temporarily stops power supply requirements for 2-wire transmitter and A/D conversion for each channel. This function makes it possible to replace the 2-wire transmitter safely while keeping A/D conversion for other channels running.

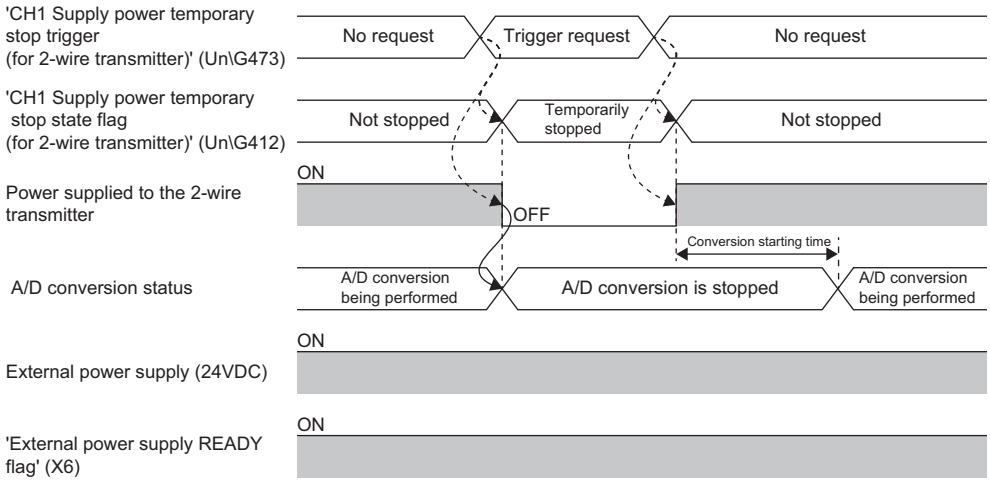
It is enabled only for a channel set to the 2-wire transmission range.

## Operation

### ■Channel set to the 2-wire transmission range

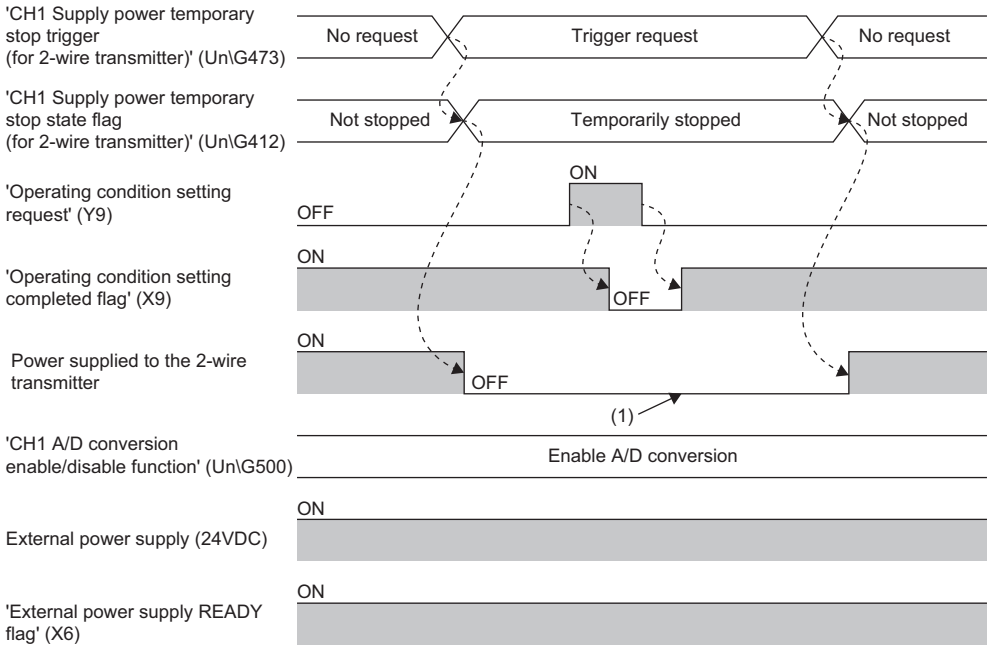
While 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is set to Trigger request (1), the power supply requirements for 2-wire transmitter is stopped and A/D conversion stops. In this case, 'CH1 Supply power temporary stop status flag (for 2-wire transmitter)' (Un\G412) is changed to Temporarily stopped (1).

When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is set to No request (0), a supply power output to the 2-wire transmitter starts, and after the warm-up time set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532) passes, A/D conversion starts. When a supply power output to the 2-wire transmitter starts, 'CH1 Supply power temporary stop status flag (for 2-wire transmitter)' (Un\G412) is changed to Not stopped (0).



**Ex.**

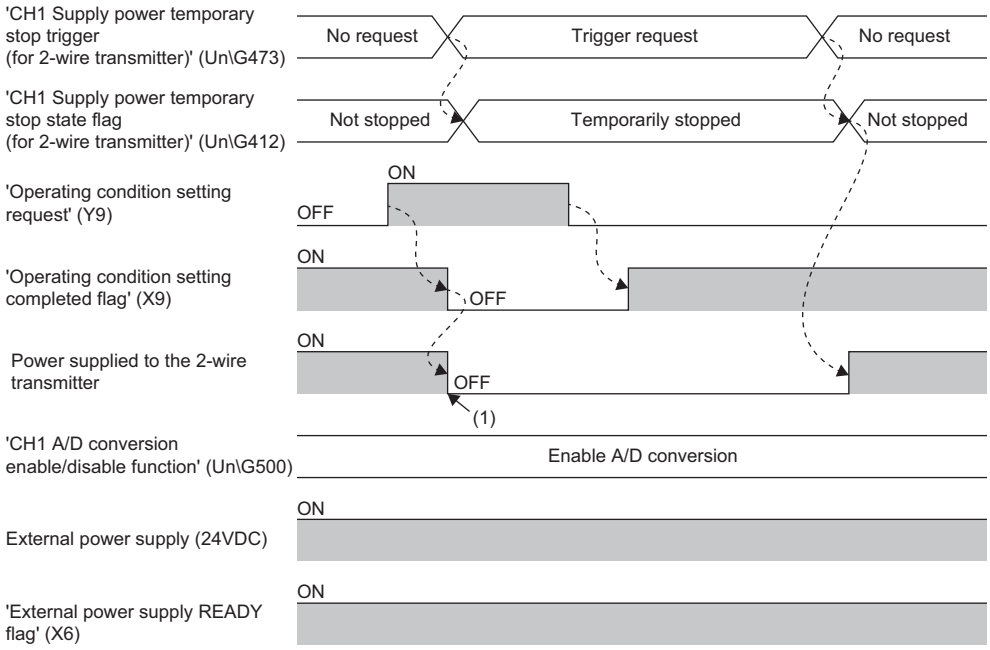
When 'Operating condition setting request' (Y9) is turned on and off while 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is set to Trigger request (1)




(1) Because 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is set to Trigger request (1), the supply power to the 2-wire transmitter is not turned on.

Ex.

When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is changed to Trigger request (1) while 'Operating condition setting request' (Y9) is being turned on and off




(1) Because 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is set to Trigger request (1) while 'Operating condition setting request' (Y9) is on, the supply power to the 2-wire transmitter is turned off.

**Point**

- When the supply power is temporarily stopped, A/D conversion stops and 'A/D conversion completed flag' (Un\G42) turns off. When A/D conversion is stopped, 'CH1 Digital output value' (Un\G400) and 'CH1 Digital operation value' (Un\G402) are held.
- Even if there is a channel where A/D conversion is not performed because the external power supply is temporarily turned off, the conversion cycle does not change.
- When the external power supply is off, regardless of the setting of 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473), the supply power to the 2-wire transmitter turns off, and A/D conversion stops as well.
- Note that when the system is powered off and on, 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) turns to the default value of No request (0), a state in which a supply power can be output to the 2-wire transmitter. To temporarily stop the supply power, after starting the module, set 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) to Trigger request (1).

### ■Channel set to the current input range

The setting of 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is ignored.

## Precautions

When the supply power temporary stop function stops and restarts A/D conversion for a channel where averaging processing is set, the updating of digital output values resumes when the values used for averaging processing are all acquired.

# 1.15 Logging Function



This function logs (records) digital output values or digital operation values. Data of 1000 points can be logged for each channel. Logging data are stored in the buffer memory area. In addition, the data collection can be stopped by using the status change of the data as a trigger. This function also helps the error analysis since the data before and after the occurrence of an error is held.
Using function blocks (FBs) enables saving the data stored in the buffer memory as a CSV file.

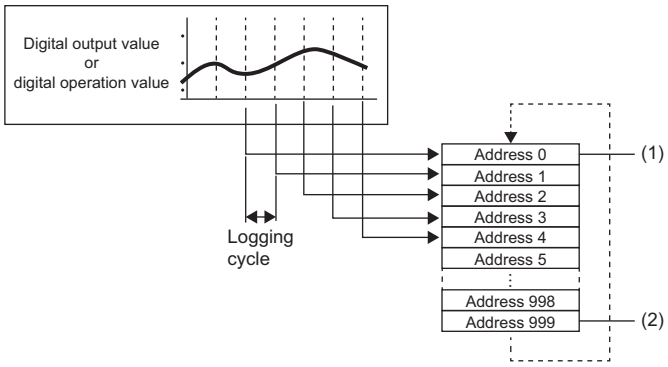
## Logging function

### ■Collecting logging data

Logging data is collected as follows.

- 1000 points of the latest digital output values or digital operation values can be always collected for each channel.
- The data can be collected at intervals of 10ms at a minimum and of 3600s at a maximum.

An address where the latest/oldest data is stored can be checked with the latest/head pointer.



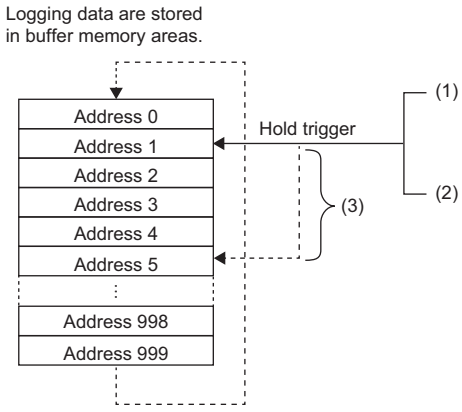

(1) Head pointer
The address of the oldest data in logging data can be checked.
(2) Latest pointer
The address of the latest data in logging data can be checked.

Logging data are stored in the buffer memory area. When the number of stored data points is 1001 or greater, data is sequentially overwritten from address 0 with new data.

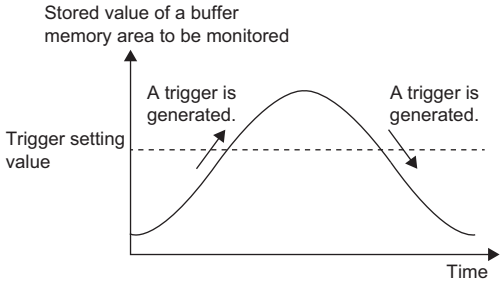
### ■Stopping the logging operation

The logging data is refreshed at high speed during logging. Stop logging when the logging data needs to be referred without paying attention to the refreshing cycle.
Logging can be stopped by the hold trigger.

- A hold trigger allows two options: Logging hold request or Level trigger.
- The number of data points to be collected after a hold trigger occurs can be set.




(1) Logging hold request
A hold trigger is generated from a program at any timing.
(2) Level trigger
A hold trigger is generated when a stored value in a buffer memory area is monitored and the set condition is satisfied as follows.
Example:When the stored value exceeds or falls below the set value, a hold trigger is generated.




(3) Post-trigger logging points
When the set points of data are collected after a hold trigger is generated, the logging operation is stopped.

### ■Saving logging data into a CSV file

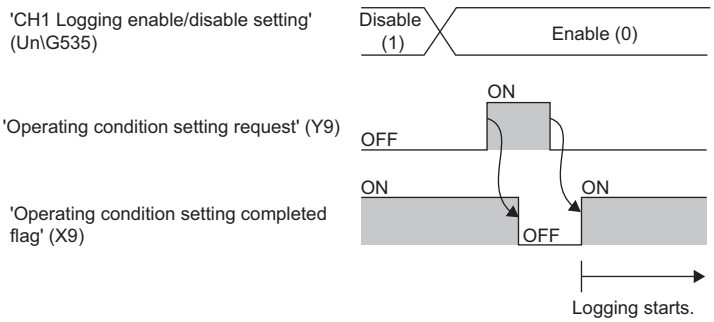
The data in 'CH1 Logging data' (Un\G10000 to Un\G10999) disappears when the module is powered off. However, the data can be saved in a CSV file by using function blocks (FBs).

## Operation of logging

### ■Starting logging data collection

Logging data collection starts when 'CH1 Logging enable/disable setting' (Un\G535) is set to Enable (0) and 'Operating condition setting request' (Y9) is turned on and off.

The data in 'CH1 Digital output value' (Un\G400) or 'CH1 Digital operation value' (Un\G402) is stored in 'CH1 Logging data' (Un\G10000 to Un\G10999) on the set logging cycle. The data in 'CH1 Digital output value (32 bits)' (Un\G410, Un\G411) cannot be logged.




### ■Logging data

Logging data are stored in the following buffer memory areas.

When the number of stored data points is 10001 or greater, the data is overwritten with new data from the head of the storage area of the corresponding channel.

| Channel | Storage area for logging data |
|---|---|
| CH1 | Un\G10000 to Un\G10999 |
| CH2 | Un\G11000 to Un\G11999 |
| CH3 | Un\G12000 to Un\G12999 |
| CH4 | Un\G13000 to Un\G13999 |
| CH5 | Un\G14000 to Un\G14999 |
| CH6 | Un\G15000 to Un\G15999 |

If logging has been performed even once, all the logging data above are cleared to 0 at the timing when 'Operating condition setting request' (Y9) is turned on.

## Logging data setting

Select a data type to be collected with 'CH1 Logging data setting' (Un\G536).

- Digital output value (0)
- Digital operation value (1)

## Logging cycle

### ■Logging cycle setting

Set the logging cycle with 'CH1 Logging cycle setting value' (Un\G537) and 'CH1 Logging cycle unit setting' (Un\G538).
The following table lists the setting range for each cycle.

| Setting value of CH1 Logging cycle unit setting | Setting range of CH1 Logging cycle setting value |
|---|---|
| ms (1) | 10 to 32767 |
| s (2) | 1 to 3600 |

The logging cycle must be an integral multiple of the conversion cycle. Even if the setting is not an integral multiple, the actual logging cycle is adjusted to the integral multiple of the conversion cycle within a limit of the set logging cycle.
The following table lists the conversion cycle for each A/D conversion method.

| Conversion method | Conversion cycle |
|---|---|
| Sampling processing | Number of conversion enabled channels × Conversion speed |
| Time average | $\left(\frac{\text{Time set in Time average} \,/\, \text{Count average} \,/\, \text{Moving average} \,/\, \text{Primary delay filter constant setting}}{\text{Number of conversion enabled channels} \times \text{Conversion speed}}\right)^{*1} \times \text{Number of conversion enabled channels} \times \text{Conversion speed}$ |
| Count average | (The count set to CH1 Time average/Count average/Moving average/Primary delay filter constant setting (Un\G502)) × (Number of conversion enabled channels × Conversion speed) |
| Moving average | Number of conversion enabled channels × Conversion speed |
| Primary delay filter | Number of conversion enabled channels × Conversion speed |

*1 Values after the decimal point are omitted.

Ex.
With the following settings, the conversion cycle is 60ms and the actual logging cycle is every 6960ms (integral multiple of 60ms).

- Conversion enabled channel: CH1 to CH6
- Conversion processing specification: Sampling processing
- 'CH1 Logging cycle setting value' (Un\G537): 7000
- Logging cycle unit setting: ms

The following values are stored in 'CH1 Logging cycle monitored value' (Un\G441, Un\G442).

| Address | Item | | Stored value |
|---|---|---|---|
| 441 | CH1 Logging cycle monitored value | s | 6 |
| 442 | | ms | 960 |

### ■When the logging function becomes disabled

The logging is not performed when even one of the following errors occurs after the logging function is enabled and 'Operating condition setting request' (Y9) is turned on and off.

- Error code (192□H to 195□H): Setting errors of 'CH1 Time average/Count average/Moving average/Primary delay filter constant setting' (Un\G502)
- Error code (1D0□H to 1D6□H): Setting errors of the logging function
- Error code (1D8□H to 1D9□H): Setting errors of the logging read function

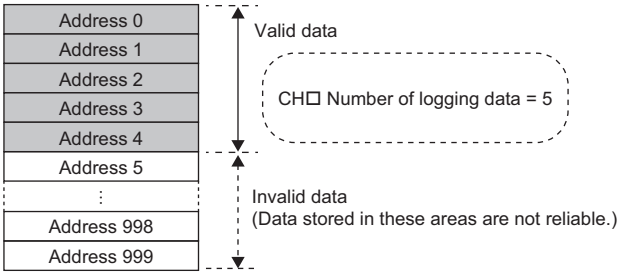
**Point**

When 'Operating condition setting request' (Y9) is turned on and off on the condition that the logging cycle determined by 'CH1 Logging cycle setting value' (Un\G537) and 'CH1 Logging cycle unit setting' (Un\G538) is shorter than the conversion cycle, an error occurs and logging does not start. A logging cycle setting disable error (error code: 1D2□H) is stored in 'Latest error code' (Un\G0), and 'Error flag' (XF) and the ERR LED turn on.

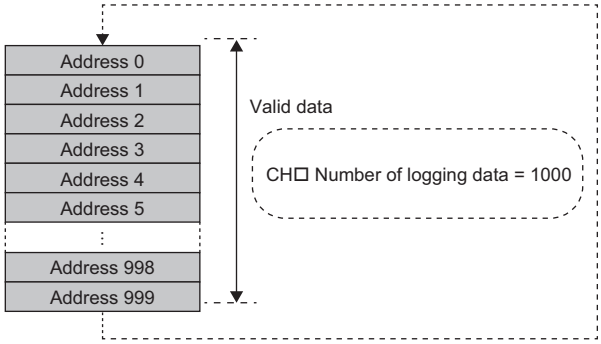
## ■Number of logging data

With 'CH1 Number of logging data' (Un\G436), the number of valid data points in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked.

**When the number of collected data points is less than 1000**




**When the number of collected data points is 1001 or greater**




The number of logging data increases by one each time new data is stored.

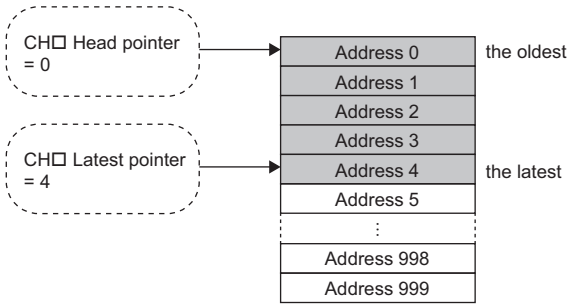
When 'CH1 Logging data' (Un\G10000 to Un\G10999) becomes full (Number of logging data = 1000), the next data is stored in the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999), and the logging operation continues overwriting the existing data. In this case, the number of logging data is fixed to 1000.

## ■Head pointer and latest pointer

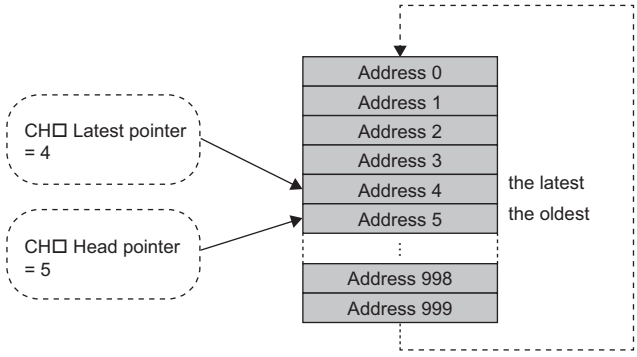
The storage locations of the oldest data and the latest data in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked with the following buffer memory areas.

| Buffer memory area | Description |
|---|---|
| 'CH1 Head pointer' (Un\G434) | The buffer memory address of the oldest data in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked with this buffer memory area. The offset value (0 to 999) counted from the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999) is stored. |
| 'CH1 Latest pointer' (Un\G435) | The buffer memory address of the latest data in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked with this buffer memory area. The offset value (0 to 999) counted from the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999) is stored. |

**When the number of collected data points is less than 1000**




**When the number of collected data points is 1001 or greater**




'CH1 Head pointer' (Un\G434) does not change until 'CH1 Logging data' (Un\G10000 to Un\G10999) becomes full after the logging start. (Fixed to 0)

'CH1 Head pointer' (Un\G434) moves by one point when 'CH1 Logging data' (Un\G10000 to Un\G10999) becomes full and overwriting the data starts from the start address.

### ■Checking logging data without stopping the logging operation

Logging data can be checked during the logging operation with 'CH1 Head pointer' (Un\G434), 'CH1 Latest pointer' (Un\G435), and 'CH1 Number of logging data' (Un\G436).

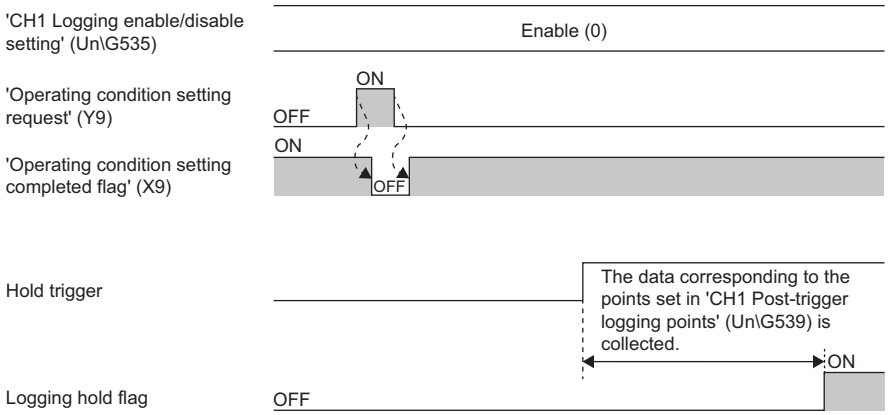
To check logging data during logging operation, follow the precautions below because logging data may be refreshed while data is being read out.

- Set the cycle to 'CH1 Logging cycle setting value' (Un\G537) so that data checking and reading surely complete before logging data is refreshed. If the logging cycle is short, logging data may be refreshed during data checking and reading.
- After obtaining the logging data which needs to be checked, monitor the variation of 'CH1 Head pointer' (Un\G434) or 'CH1 Number of logging data' (Un\G436), and obtain logging data just after the stored value has changed.
- If the data refreshed and the data being checked do not synchronize due to the relationship between the logging cycle and the scan time of the CPU module, adjust the logging cycle.

Stop the logging operation when the logging data needs to be checked without paying attention to the logging cycle. (☞ Page 68 Stopping the logging operation)

# Stopping the logging operation

Logging operation stops (holds) when the preset trigger condition is satisfied and the set points of the data are collected.
A trigger that is generated when the condition is satisfied is called a hold trigger.
To generate a hold trigger, the following two methods are available.
☞ Page 71 Logging hold request
☞ Page 72 Level trigger
When a hold trigger is detected during data collection, the logging operation stops after the points of the data set in 'CH1 Post-trigger logging points' (Un\G539) are collected.




## Post-trigger logging points

Set the number of data collected in the period from the detection of a hold trigger to logging operation stop to 'CH1 Post-trigger logging points' (Un\G539).

## Checking that the logging has stopped

Check that 'CH1 Logging hold flag' (Un\G409) is ON (1).

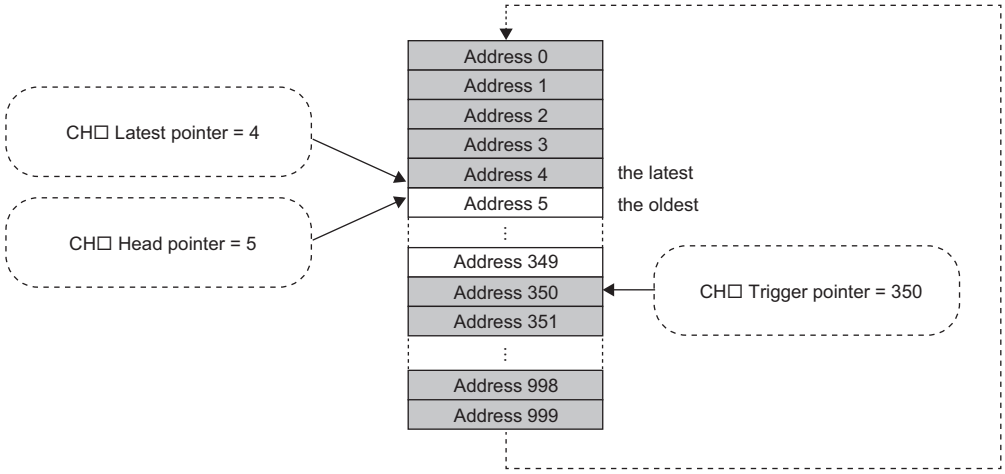
## Checking data when a hold trigger has occurred

The storage location of the data when a hold trigger has occurred can be checked with 'CH1 Trigger pointer' (Un\G437). The offset value counted from the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999) is stored in 'CH1 Trigger pointer' (Un\G437).

Ex.

The value stored in 'CH1 Trigger pointer' (Un\G437) when the logging operation stops under the following conditions

- 'CH1 Post-trigger logging points' (Un\G539): 655 points
- The data location where a hold trigger has occurred: 350th data




### ■Checking the trigger generation time

The trigger generation time can be checked with 'CH1 Trigger generation time' (Un\G444 to Un\G448).

Ex.

When 'CH1 Trigger generation time' (Un\G444 to Un\G448) is monitored

| | b15 ··· b8 | b7 ··· b0 |
|---|---|---|
| 'CH1 Trigger generation time (First/Last two digits of the year)' (Un\G444) | First two digits of the year | Last two digits of the year |
| 'CH1 Trigger generation time (Month/Day)' (Un\G445) | Month | Day |
| 'CH1 Trigger generation time (Hour/Minute)' (Un\G446) | Hour | Minute |
| 'CH1 Trigger generation time (Second/Day of the week)' (Un\G447) | Second | Day of the week |
| 'CH1 Trigger generation time (Millisecond)' (Un\G448) | Millisecond (higher-order digits) | Millisecond (lower-order digits) |

- First two digits of the year, last two digits of the year, month, day, hour, minute, second, and millisecond are all stored in the BCD code.
- In the day of the week segment, one of the following values in the BCD code indicating the corresponding day is stored.

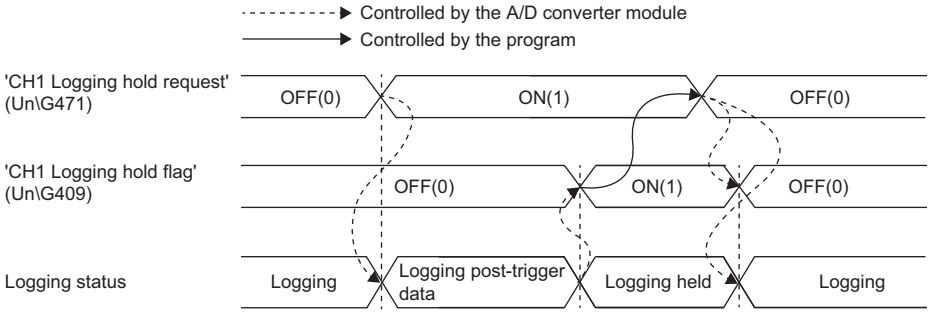
Sunday: 00H, Monday: 01H, Tuesday: 02H, Wednesday: 03H, Thursday: 04H, Friday: 05H, Saturday: 06H

## Resuming the logging

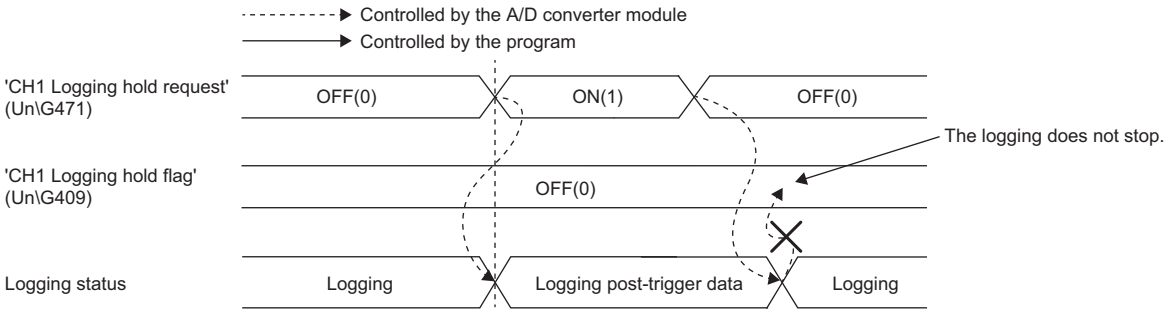
It may take time until ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) after 'CH1 Logging hold request' (Un\G471) is changed from off to on.

To resume logging, check that ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) and change 'CH1 Logging hold request' (Un\G471) from on to off. After logging resumes, the value is stored from the head buffer memory area of 'CH1 Logging data' (Un\G10000 to Un\G10999).

In addition, OFF (0) is stored in 'CH1 Logging hold flag' (Un\G409).




Logging does not stop when 'CH1 Logging hold request' (Un\G471) is changed from on to off before ON (1) is stored in 'CH1 Logging hold flag' (Un\G409).



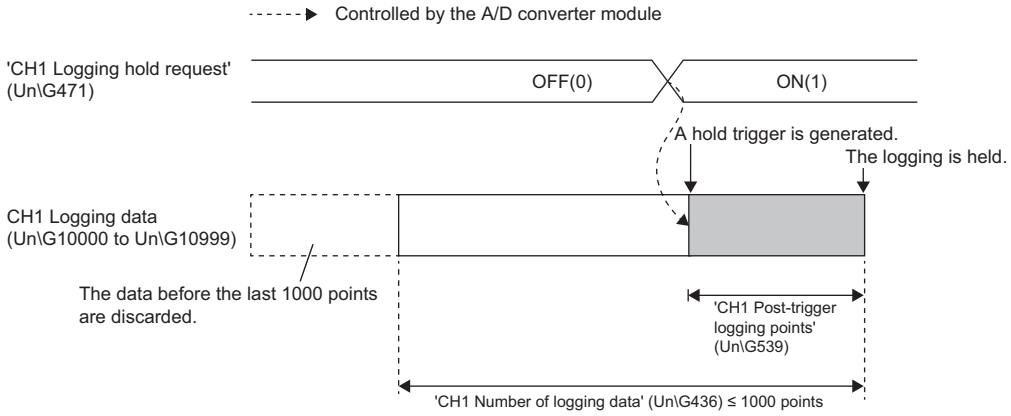

### ■Buffer memory area status when logging resumes

The following table shows the buffer memory area status when logging resumes.

| Buffer memory area | Value status |
|---|---|
| 'CH1 Head pointer' (Un\G434) | Values are initialized. |
| 'CH1 Latest pointer' (Un\G435) | |
| 'CH1 Number of logging data' (Un\G436) | |
| 'CH1 Trigger pointer' (Un\G437) | |
| 'CH1 Trigger generation time' (Un\G444 to Un\G448) | |
| 'CH1 Logging data' (Un\G10000 to Un\G10999) | The values before logging resumes are not initialized.<br>After logging resumes, values are stored from the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999). To refer to the logging data, check which area has valid data with 'CH1 Number of logging data' (Un\G436). |

# Logging hold request

A hold trigger is generated from a program at any timing.
Logging starts when ON (1) is set to 'CH1 Logging hold request' (Un\G471) and stops after a preset number of the data is collected.




**Point**

- The following delay time occurs until the A/D converter module receives a hold trigger after the value in 'CH1 Logging hold request' (Un\G471) is changed from OFF (0) to ON (1).

Trigger delay = Logging cycle (Cycle at which logging is actually performed) + Scan time of the CPU module

- When 'CH1 Logging hold request' (Un\G471) is changed from ON (1) to OFF (0) before 'CH1 Logging hold flag' (Un\G409) turns to ON (1), the data set in 'CH1 Post-trigger logging points' (Un\G539) is not held after logging, and logging resumes soon.
- If a value other than OFF (0) and ON (1) is set to 'CH1 Logging hold request' (Un\G471), an error occurs. A logging hold request range error (error code: 1D7□H) is stored in 'Latest error code' (Un\G0), and 'Error flag' (XF) and the ERR LED turn on.

## Checking that the logging has stopped

Check that 'CH1 Logging hold flag' (Un\G409) is ON (1).

**Point**

To refer to the logging data from the CPU module, hold (stop) the logging operation and check that ON (1) is stored in 'CH1 Logging hold flag' (Un\G409).

# Level trigger

When a value in the monitored buffer memory area of the A/D converter module satisfies a preset condition, a hold trigger is generated.

A level trigger is monitored on the refreshing cycle of the digital output value or the digital operation value.

## Initial setting of a level trigger

### ■Setting a target to be monitored

As a condition to generate a hold trigger, set the buffer memory address to be monitored to 'CH1 Trigger data' (Un\G541).

| Item | Setting range |
|---|---|
| 'CH1 Trigger data' (Un\G541) | 0 to 9999 |

To monitor a device value of a module other than the A/D converter module such as a device of the CPU module, set as follows.

- Set a value between 90 and 99 (Level data☐ (Un\G90 to Un\G99)) to 'CH1 Trigger data' (Un\G541).
- Write a value of the monitored device to Level data☐ (Un\G90 to Un\G99) by using the MOV instruction.

| Item | Setting range |
|---|---|
| Level data☐ (Un\G90 to Un\G99) | -32768 to 32767 |

Ex.

Application example of Level data☐ (Un\G90 to Un\G99)

To monitor the data register D100 in the CPU module and operate the level trigger in CH1, create a program as follows.

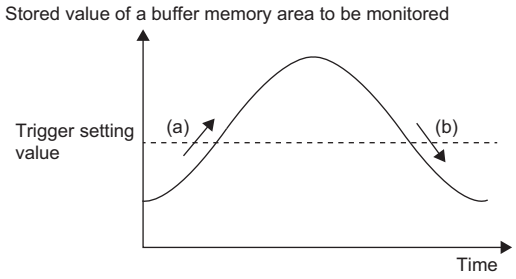
1. Set 91 (buffer memory address of Level data 1) to 'CH1 Trigger data' (Un\G541). (When Level data 1 is used)
2. Store the storage data of D100 in 'Level data 1' (Un\G91) by the program continuously.

**Point**

Specify appropriate data such as 'CH1 Digital output value' (Un\G400), 'CH1 Digital operation value' (Un\G402), or Level data☐ (Un\G90 to Un\G99) to 'CH1 Trigger data' (Un\G541). When a setting area or a system area is specified, the normal operation is not guaranteed.

## ■Setting the monitoring condition

Set a condition to generate a hold trigger in 'CH1 Level trigger condition setting' (Un\G540).




(a) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored ≤ Trigger setting value" to "Stored value of a buffer memory area to be monitored > Trigger setting value".
(b) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored ≥ Trigger setting value" to "Stored value of a buffer memory area to be monitored < Trigger setting value".

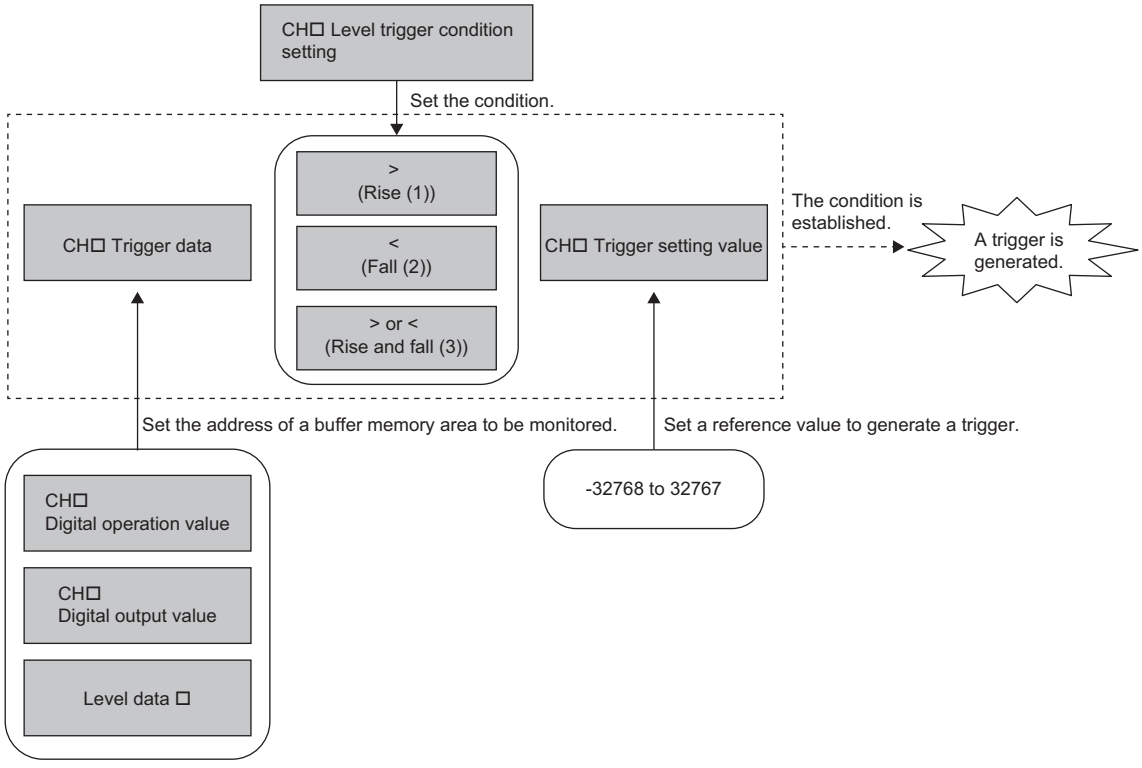
| Setting value | Description |
|---|---|
| Rise (1) | A hold trigger is generated under the condition (a). |
| Fall (2) | A hold trigger is generated under the condition (b). |
| Rise and fall (3) | A hold trigger is generated under the condition (a) or (b). |

Set a value where a hold trigger is generated to 'CH1 Trigger setting value' (Un\G542).

| Item | Setting range |
|---|---|
| 'CH1 Trigger setting value' (Un\G542) | -32768 to 32767 |

**Point**

The following figure shows the relation between setting items to be configured for the initial setting of a level trigger.

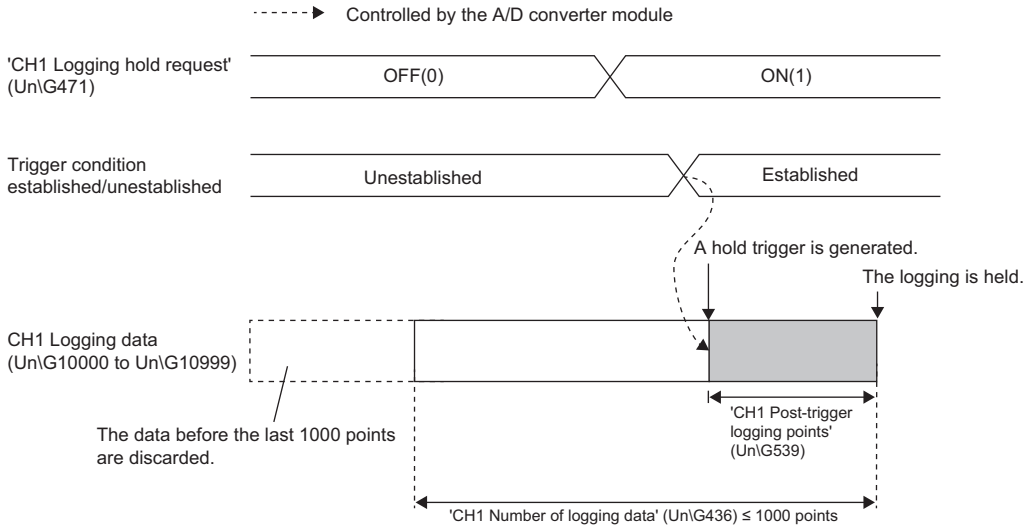



To generate a hold trigger when a value in 'CH1 Digital output value' (Un\G400) is greater than 10000, set as follows.

- 'CH1 Level trigger condition setting' (Un\G540): Rise (1)
- 'CH1 Trigger data' (Un\G541): 400
- 'CH1 Trigger setting value' (Un\G542): 10000

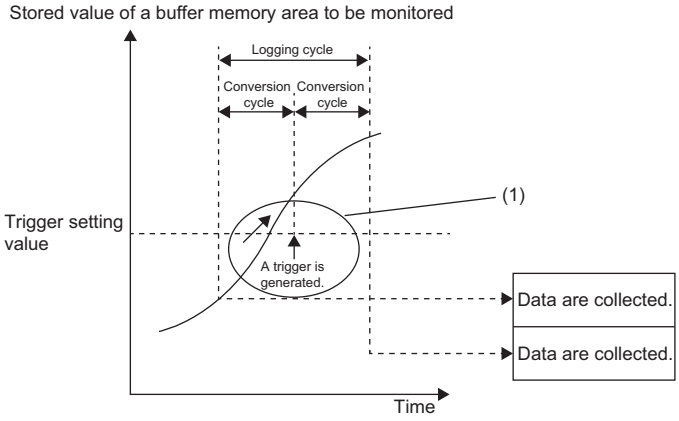
## Operation of a level trigger

To use a level trigger, set ON (1) to 'CH1 Logging hold request' (Un\G471) in advance. At the point where ON (1) has been set to 'CH1 Logging hold request' (Un\G471), the module becomes the trigger condition wait status.
Data collection starts when the trigger condition has been satisfied, and stops when the set points of the data have been collected.




**Point**

A level trigger is detected on the refreshing cycle of the digital output value or the digital operation value. Therefore, the data when a hold trigger is generated may not be stored in 'CH1 Logging data' (Un\G10000 to Un\G10999) depending on the setting of the logging cycle. To store the data at the timing when a hold trigger is generated in 'CH1 Logging data' (Un\G10000 to Un\G10999), arrange related settings so that the conversion cycle of the monitoring target value (trigger data) and the logging cycle (actual logging cycle) have the same time period.




(1) The data at the timing when a trigger is generated is not stored in the buffer memory area.

- To refer to the logging data from the CPU module, hold (stop) the logging operation and check that ON (1) is stored in 'CH1 Logging hold flag' (Un\G409).

### ■Checking that the logging has stopped

Check that 'CH1 Logging hold flag' (Un\G409) is ON (1).

# Initial settings of the logging function



The following describes the initial setting procedure to use the logging function.

## Setting procedure

1. Set "A/D conversion enable/disable setting" to "A/D conversion enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [A/D conversion enable/disable setting function]

2. Set "Logging enable/disable setting" to "Enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Logging function]

3. Set the target data to be logged in "Logging data setting". Set either "Digital output value" or "Digital operation value" for each channel.
4. Set the cycle to store the logging data to "Logging cycle setting value".
5. Select a unit of the logging cycle setting value in "Logging cycle unit setting".
6. Set a condition to generate a hold trigger in "Level trigger condition setting". To use 'CH1 Logging hold request' (Un\G471), set "Disable". To use the level trigger, set "Level trigger (condition: Rise)", "Level trigger (condition: Fall)", or "Level trigger (condition: Rise and fall)".
7. Set a number of the data points to be collected for the time period from the occurrence of a hold trigger to logging stop in "Post-trigger logging points".
8. Set a buffer memory address to be monitored with a level trigger to "Trigger data".
9. Set whether to enable or disable the logging read function in "Read interrupt enable/disable setting"
10. Set a level where a level trigger operates for "Trigger setting value".

# Logging read function

This function makes it possible to store more than 1000 points of logging data without stopping logging by transferring the device data to the file register of the CPU module during logging. This function reduces the takt time in a test demanding high-speed conversion.

## Overview of the logging read function

After logging starts, an interrupt request is sent to the CPU module and an interrupt program is executed every time the preset number of data to be read is logged.

The A/D converter module has 16 points of the interrupt factor (SI) corresponding to the logging reading of each channel.

For the setting of interrupt pointers, refer to the following.

☞ Page 76 Setting interrupt pointers

## Setting interrupt pointers

Assign the interrupt factors (SI) of the A/D converter module and interrupt pointers of the CPU module using the interrupt pointer setting of the engineering tool.

The interrupt function must be set when the logging read function is used.

## Starting the logging read function

To use the logging read function, set 'CH1 Loading interrupt enable/disable setting' (Un\G544) to Enable (0) and set a number of logging points to generate an interrupt in 'CH1 Logging read points setting value' (Un\G545). This function starts when 'Operating condition setting request' (Y9) is turned on and off.

### ■The number of logging read points

Set a value whose integral multiple is 1000 in 'CH1 Logging read points setting value' (Un\G545). The setting range is from 1 to 1000.

When a value whose integral multiple is not 1000 is set, the number of the actual logging read points is forced to become a maximum value whose integral multiple is 1000 within the set value. The value of the number of logging read points is stored in 'CH1 Logging read points monitored value' (Un\G440).

| Logging read points setting value | Logging read points monitored value |
|---|---|
| 100 | 100 |
| 90 | 50 |
| 110 | 100 |
| 650 | 500 |
| 400 | 250 |

## Data checking method

### ■Current logging read pointer

- The head pointer read from 'CH1 Logging data' (Un\G10000 to Un\G10999) with the interrupt processing is stored in 'CH1 Current logging read pointer' (Un\G438).
- The default value of 'CH1 Current logging read pointer' (Un\G438) is -1.
- Every time the same number of data as the value stored in 'CH1 Logging read points monitored value' (Un\G440) is logged, a value calculated by the following formula is stored in 'CH1 Current logging read pointer' (Un\G438).

CH1 Current logging read pointer = CH1 Latest pointer - CH1 Logging read points monitored value + 1

### ■Previous logging read pointer

- 'CH1 Current logging read pointer' (Un\G438) at the timing when the previous read pointer detection interrupt occurs is stored in 'CH1 Previous logging read pointer' (Un\G439).
- The default value of 'CH1 Previous logging read pointer' (Un\G439) is -1.
- 'CH1 Previous logging read pointer' (Un\G439) is used to detect the overlap of the logging read pointer detection interrupt processing.

Ex.

The values to be stored in each pointer at every detection interrupt when the logging read detection starts with 'CH1 Logging read points setting value' (Un\G545) being set to 100

| Occurrence of read pointer detection interrupts | Previous logging read pointer | Current logging read pointer | Latest pointer | Relative address | Buffer memory area |
|---|---|---|---|---|---|
| Default value | -1 | -1 | 0 | 0 | 1st data |
| First time | -1 | 0 | 99 | 99 | 100th data |
| Second time | 0 | 100 | 199 | 199 | 200th data |
| Third time | 100 | 200 | 299 | 299 | 300th data |
| ⋮ | ⋮ | ⋮ | ⋮ | ⋮ | ⋮ |
| 10th time | 800 | 900 | 999 | 999 | 1000th data |
| 11th time | 900 | 0 | 99 | 99 | 100th data |
| 12th time | 0 | 100 | 199 | 199 | 200th data |

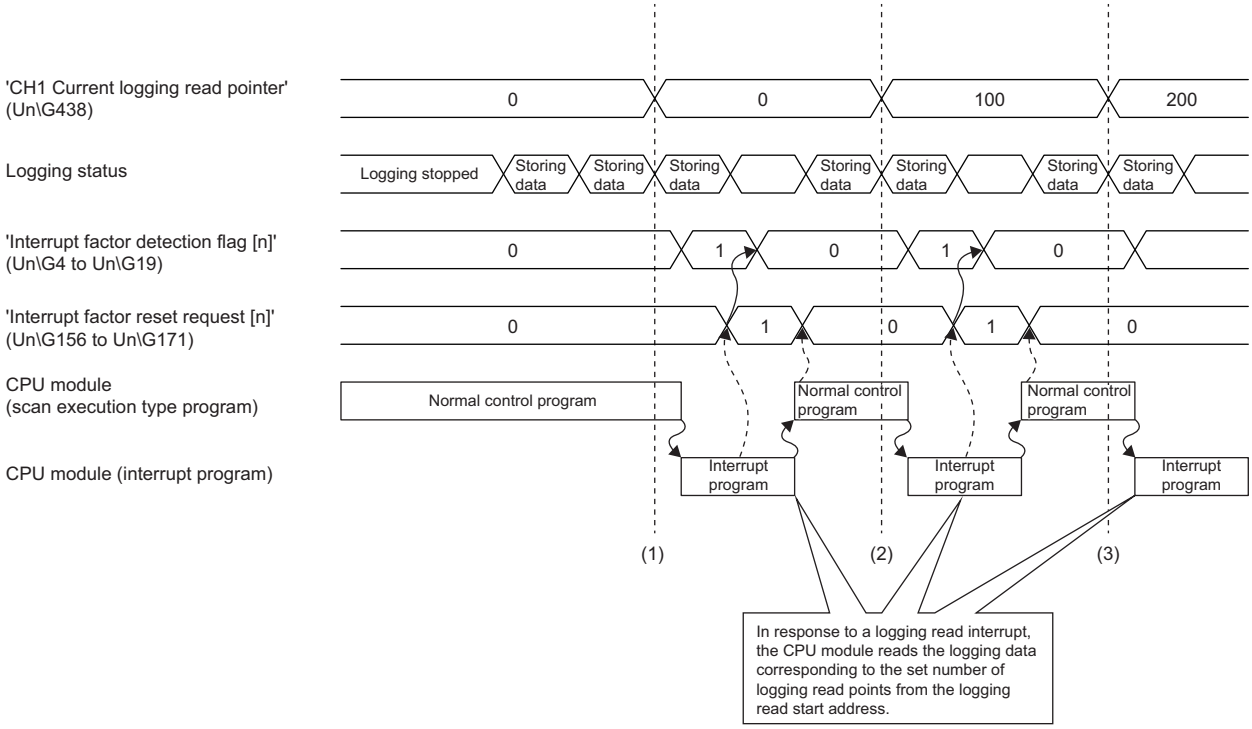
## Operation

The logging read function starts by setting interrupt pointers and turning on and off 'Operating condition setting request' (Y9). This function repeats its operation every time the same number of data as the logging read points monitored value is logged.

**Ex.**

The following figure shows the operation when the logging read function is used under the following conditions.

- A/D conversion-enabled channel: CH1
- 'CH1 Logging read points setting value' (Un\G545): 100 points




(1) The timing that the first interrupt processing occurs
(2) The timing that the second interrupt processing occurs
(3) The timing that the third interrupt processing occurs

## Setting procedure

To use the logging read function, both the logging read function and the interrupt setting must be set.

1. Set "Condition target setting" to "Logging read".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Interrupt setting]

2. Set "A/D conversion enable/disable setting" to "A/D conversion enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting] ⇨ [A/D conversion enable/disable setting]

3. Set "Logging enable/disable setting" to "Enable".

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Logging function]

4. Set the target data to be logged in "Logging data setting".
5. Set the cycle to store the logging data to "Logging cycle setting value".
6. Set "Read interrupt enable/disable setting" to "Enable".
7. Set the number of logging points that generate a read interrupt in "Logging read points setting value".

## Setting example

Ex.

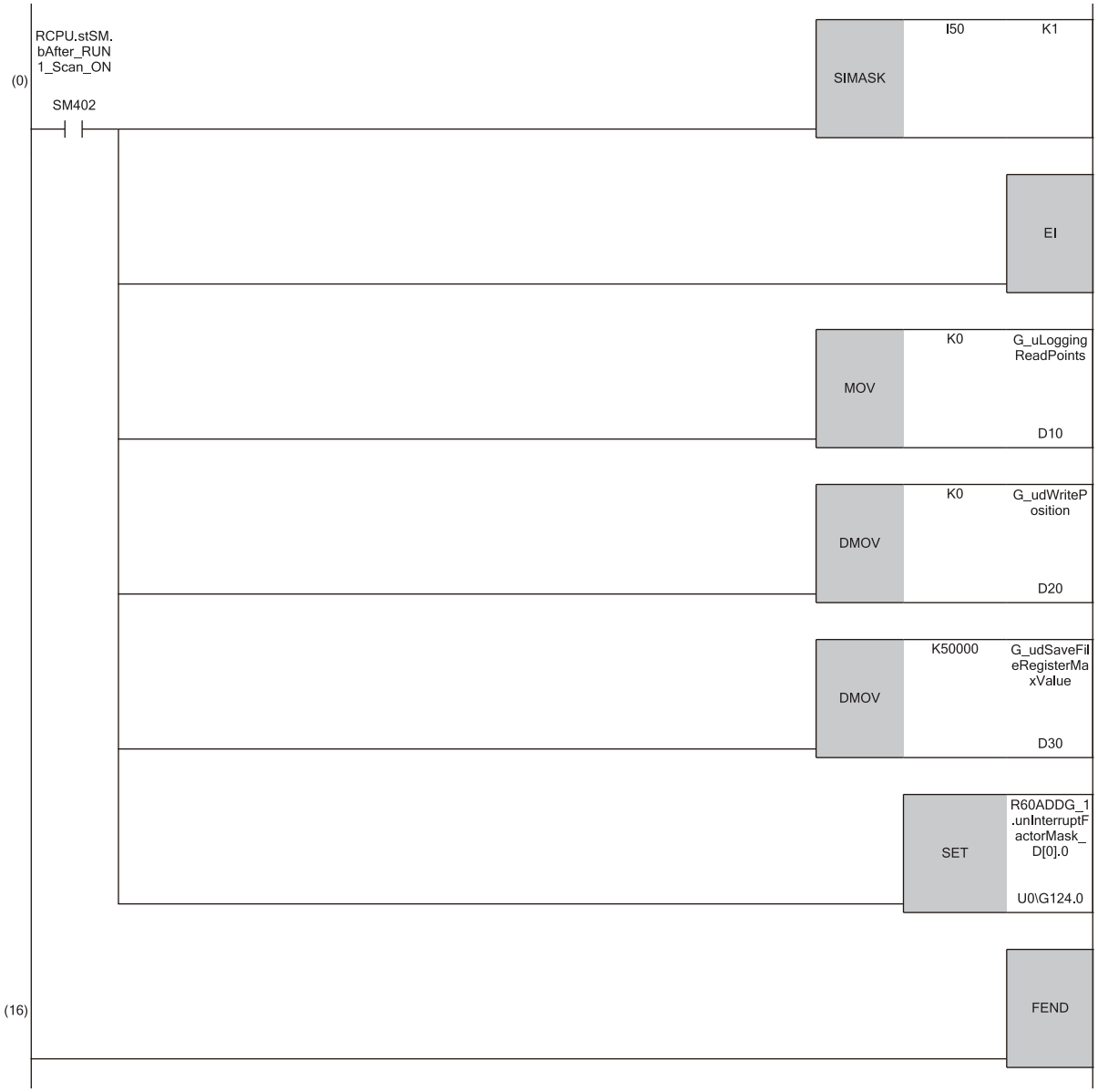
When an interrupt program that is executed when the data of 'CH1 Logging read points monitored value' (U0\G440) is logged is assigned to the interrupt pointer I50

• Label settings

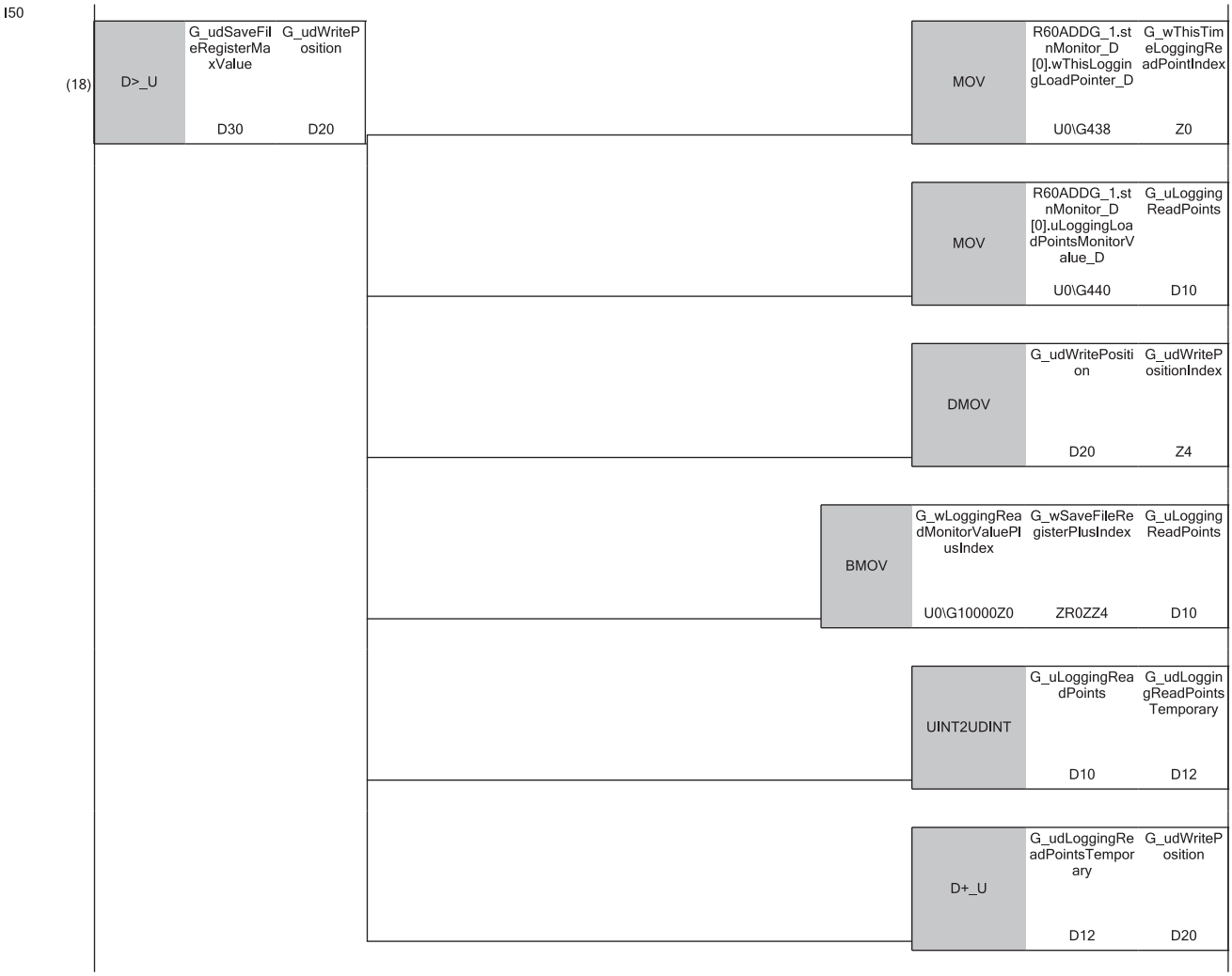
| Classification | Label name | Description | Device |
|---|---|---|---|
| Module Label | RCPU.stSM.bAlways_ON | Always ON | SM400 |
| | RCPU.stSM.bAfter_RUN1_Scan_ON | ON for one scan after RUN | SM402 |
| | R60ADDG_1.unInterruptFactorMask_D[0].0 | Interrupt factor mask [1] | U0\G124 |
| | R60ADDG_1.unInterruptFactorDetectionFlag_D[0].0 | Interrupt factor detection flag [1] | U0\G4 |
| | R60ADDG_1.unInterruptFactorResetRequest_D[0].0 | Interrupt factor reset request [1] | U0\G156 |
| | R60ADDG_1.stnMonitor_D[0].wThisLoggingLoadPointer_D | CH1 Current logging read pointer | U0\G438 |
| | R60ADDG_1.stnMonitor_D[0].uLoggingLoadPointsMonitorValue_D | CH1 Logging read points monitored value | U0\G440 |
| Label to be defined | Define global labels as shown below: | | |

| | Label Name | Data Type | | Class | Assign (Device/Label) |
|---|---|---|---|---|---|
| 1 | G_uLoggingReadPoints | Word [Unsigned]/Bit String [16-bit] | ... | VAR_GLOBAL | D10 |
| 2 | G_udLoggingReadPointsTemporary | Double Word [Unsigned]/Bit String [32-bit] | ... | VAR_GLOBAL | D12 |
| 3 | G_udWritePosition | Double Word [Unsigned]/Bit String [32-bit] | ... | VAR_GLOBAL | D20 |
| 4 | G_udSaveFileRegisterMaxValue | Double Word [Unsigned]/Bit String [32-bit] | ... | VAR_GLOBAL | D30 |
| 5 | G_wLoggingReadMonitorValuePlusIndex | Word [Signed] | ... | VAR_GLOBAL | U0\G10000Z0 |
| 6 | G_wThisTimeLoggingReadPointIndex | Word [Signed] | ... | VAR_GLOBAL | Z0 |
| 7 | G_udWritePositionIndex | Double Word [Unsigned]/Bit String [32-bit] | ... | VAR_GLOBAL | Z4 |
| 8 | G_wSaveFileRegisterPlusIndex | Word [Signed] | ... | VAR_GLOBAL | ZR0ZZ4 |

• Program example




(0) Enable only the interrupt pointer I50.
Initialize 'CH1 Logging read points monitored value' (U0\G440) and the write position of the save destination file register.
Set the maximum number of stored save destination file registers.
Clear Interrupt factor mask [0].




(18)Store 'CH1 Current logging read pointer' (U0\G438) in the index register.
Store 'CH1 Logging read points monitored value' (U0\G440) in the register.
Store the write position of the save destination file register in the index register.
Store 'CH1 Logging data' (Un\G10000 to Un\G10999) for the logging read points monitored value in the save destination file register.
Add the points of the logging read points monitored value to the write position of the save destination file register and store the obtained value as the write position for the next logging.


(45)Turn off Interrupt factor mask [0] when Interrupt factor detection flag turns on.
Turn on Interrupt factor reset request [0].

# Saving to a CSV file

The logging data stored in the buffer memory areas can be saved to a CSV file by using function blocks (FBs). The save data is sorted in a time series, where the logging data can be easily checked.
However, function blocks (FBs) can be executed only when the logging operation is stopped. During the logging operation, the execution of function blocks (FBs) is disabled.

## Saving a CSV file

To save a CSV file, an SD memory card is required.
CSV files are saved in an SD memory card installed in the CPU module. CSV files cannot be saved in the built-in memory of the CPU module.

## Saving procedure

1. Check that ON (1) is stored in 'CH1 Logging hold flag' (Un\G409).
2. Execute the function block (FB).

**Point**

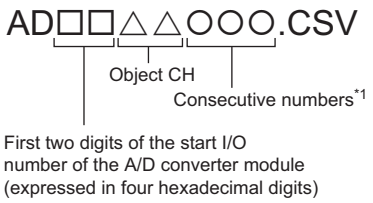
If the execution state of the function block (FB) is maintained, logging data can be saved in the CSV file every time logging stops.

## Data to be saved in a CSV file

The logging data stored in the buffer memory areas is saved.
For how to check the logging data, refer to the following.
☞ Page 69 Checking data when a hold trigger has occurred

## CSV file name

CSV files saved with the function block (FB) are named as follows.




*1 The maximum number of the consecutive numbers can be set with the input label i_Max_Number (maximum number of saving files) of the function block (FB).

Ex.

The file name under the following condition is AD4506006.CSV.

- Start I/O number of the A/D converter module: 0450H
- Target channel: 6
- Saving to a CSV file: 6th time

# Displaying logging data

The CSV file output with the logging function can be displayed graphically by reading the file through GX LogViewer.
For how to display the logging data with GX LogViewer, refer to the following.

GX LogViewer Version 1 Operating Manual

# 1.16 Interrupt Function

This function executes an interrupt program of the CPU module when an interrupt factor such as an input signal error or warning output is detected.
For the A/D converter module, the maximum number of interrupt pointers available is 16 per module.

## Operation

### ■Detecting an interrupt factor

When an interrupt factor occurs, an interrupt request is sent to the CPU module at the same time as 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) is turned to Interrupt factor (1).

### ■How to reset an interrupt factor

When Reset request (1) is set to 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) corresponding to the interrupt factor, the specified interrupt factor is reset and 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) changes to No interrupt factor (0).

## Setting procedure

To use the interrupt function, set "Condition target setting", "Condition target channel setting", "Interrupt factor transaction setting", and "Interrupt pointer" in the engineering tool. After completing the settings, write the project to enable the settings.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Interrupt setting]

The following table shows the setting items on the interrupt setting window.

| Item | Description |
|---|---|
| Condition target setting | Select a factor of the target for the interrupt detection. |
| Condition target channel setting | Select a target channel when the condition target setting for the interrupt detection is channel specification. |
| Interrupt factor transaction setting | Set an interrupt request for when the same interrupt factor occurs during the interrupt factor detection. |
| Interrupt pointer | Specify the number of an interrupt pointer that is initiated at the detection of an interrupt factor. |

### ■Condition target setting

Select a factor of the condition target setting for the interrupt detection.
For details on the factors to be detected, refer to the following.
☞ Page 157 Condition target setting [n]

### ■Condition target channel setting

Select a target channel when the condition target setting for the interrupt detection is channel specification.
For details on the settings, refer to the following.
☞ Page 158 Condition target channel setting [n]

### ■Interrupt factor transaction setting

Set an interrupt request for when the same interrupt factor occurs during the interrupt factor detection.

- With "Interrupt reissue requests (0)", if the same interrupt factor occurs during the interrupt factor detection, an interrupt request is sent to the CPU module again.
- With "No interrupt reissue request (1)", if the same interrupt factor occurs during the interrupt factor detection, an interrupt request is not sent to the CPU module.

### ■Interrupt pointer

Specify the number of an interrupt pointer that is initiated at the detection of an interrupt factor. For details on the interrupt pointers, refer to the following.
MELSEC iQ-R CPU Module User's Manual (Application)

**Point**

- If 'Condition target setting [n]' (Un\G232 to Un\G247) is Disable (0), an interrupt request is not sent to the CPU module.
- To reset the interrupt factor, set Reset request (1) until 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) changes to No interrupt factor (0).
- Resetting interrupt factors is executed only when 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) changes from No reset request (0) to Reset request (1).
- Multiple interrupt pointers can also share the same setting of 'Condition target setting [n]' (Un\G232 to Un\G247). When interrupts with the same settings occur in 'Condition target setting [n]' (Un\G232 to Un\G247), the interrupt program is executed in order of the priority of the interrupt pointers. For the priority of the interrupt pointers, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

- When All channels (0) is set for 'Condition target channel setting [n]' (Un\G264 to Un\G279) and an interrupt detection target is set for each channel of 'Condition target setting [n]' (Un\G232 to Un\G247), the interrupt requests that have the same interrupt factor are sent to the CPU module if warnings are issued in multiple channels. In this case, the CPU module executes multiple interrupt programs and judges that the program cannot be normally finished due to the scan monitoring function of the CPU module, and a CPU module error may occur. When a CPU error occurs, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

## Setting example

**Ex.**

If the interrupt program (I51) is executed when an error occurs in any channel

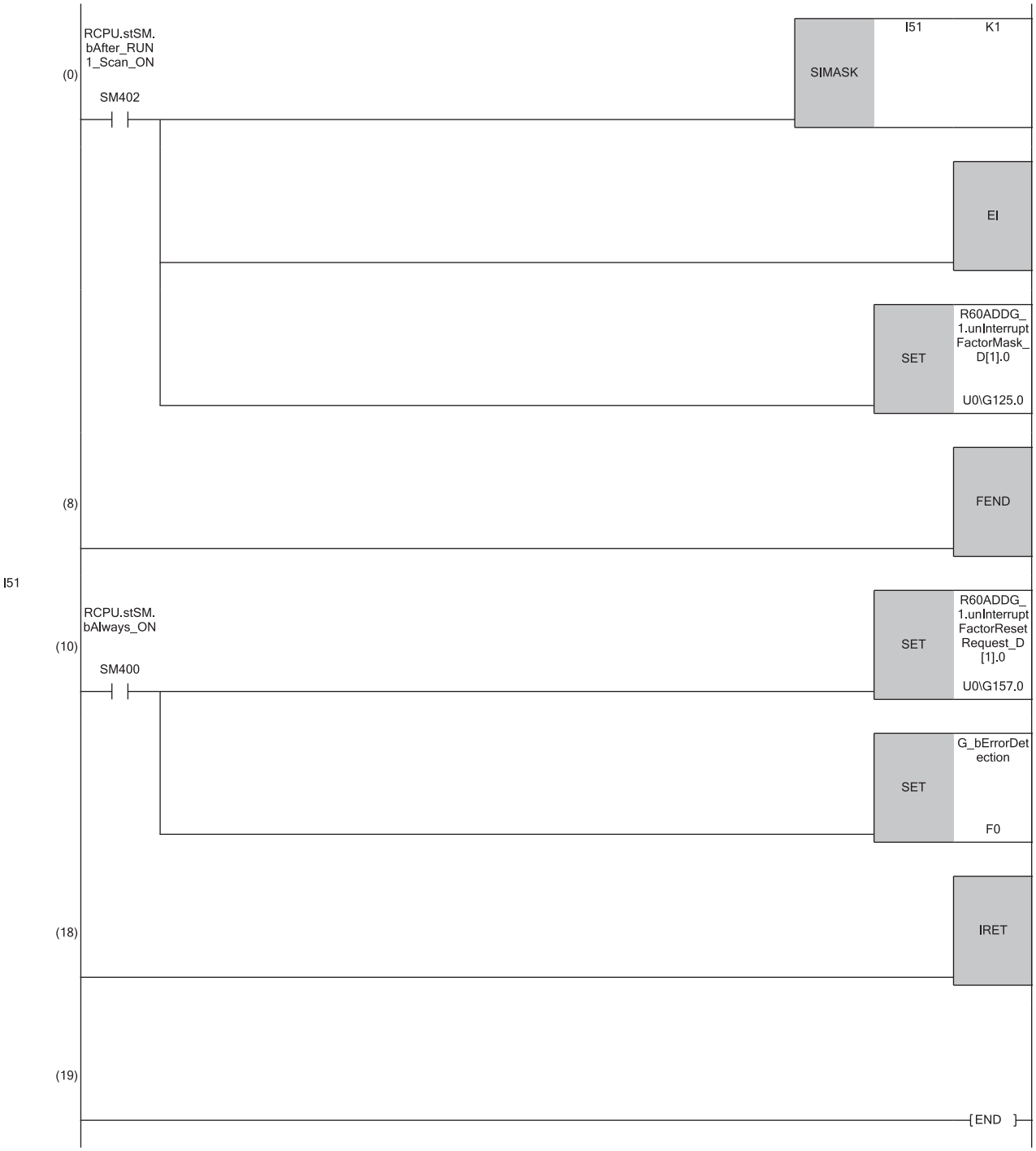
- Parameter setting

Set "Interrupt setting" as follows.

| No. | Condition target setting | Condition target channel setting | Interrupt pointer |
|---|---|---|---|
| 2 | Error flag | All channels | I51 |

- Label settings

| Classification | Label name | Description | Device |
|---|---|---|---|
| Module Label | RCPU.stSM.bAlways_ON | Always ON | SM400 |
| | RCPU.stSM.bAfter_RUN1_Scan_ON | ON for one scan after RUN | SM402 |
| | R60ADDG_1.unInterruptFactorMask_D[1].0 | Interrupt factor mask | U0\G125.0 |
| | R60ADDG_1.unInterruptFactorResetRequest_D[1].0 | Interrupt factor reset request | U0\G157.0 |
| Label to be defined | Define global labels as shown below:<br>Label Name: G_bErrorDetection, Data Type: Bit, Class: VAR_GLOBAL, Assign (Device/Label): F0 | | |




(0) Enable only the interrupt pointer I51.
(10)Turn on 'Interrupt factor reset request [0]' (U0\G157). Performs the processing of when an error is detected.

# 1.17 Error History Function

This function records errors and alarms that occurred in the A/D converter module to store them into the buffer memory area. Up to 16 errors and alarms are stored.

## Operation

When an error occurs, the error code and the error time are stored from 'Error history 1' (Un\G3600 to Un\G3609) in order.
When an alarm occurs, the alarm code and the alarm time are stored from 'Alarm history 1' (Un\G3760 to Un\G3769) in order.

- Detail of the error code assignment

| | b15 ··· b8 | b7 ··· b0 |
|---|---|---|
| Un\G3600 | Error code | |
| Un\G3601 | First two digits of the year | Last two digits of the year |
| Un\G3602 | Month | Day |
| Un\G3603 | Hour | Minute |
| Un\G3604 | Second | Day of the week |
| Un\G3605 | Millisecond (higher-order digits) | Millisecond (lower-order digits) |
| Un\G3606 to Un\G3609 | System area | |

- Detail of the alarm code assignment

| | b15 ··· b8 | b7 ··· b0 |
|---|---|---|
| Un\G3760 | Alarm code | |
| Un\G3761 | First two digits of the year | Last two digits of the year |
| Un\G3762 | Month | Day |
| Un\G3763 | Hour | Minute |
| Un\G3764 | Second | Day of the week |
| Un\G3765 | Millisecond (higher-order digits) | Millisecond (lower-order digits) |
| Un\G3766 to Un\G3769 | System area | |

Ex.

Storing example of error history and alarm history

| Item | Description | Storage example*1 |
|---|---|---|
| First two digits of the year/Last two digits of the year | Stored in BCD code. | 2015H |
| Month/Day | | 131H |
| Hour/Minute | | 1234H |
| Second | | 56H |
| Day of the week | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3<br>Thursday: 4, Friday: 5, Saturday: 6 | 6H |
| Millisecond (upper) | Stored in BCD code. | 7H |
| Millisecond (lower) | | 89H |

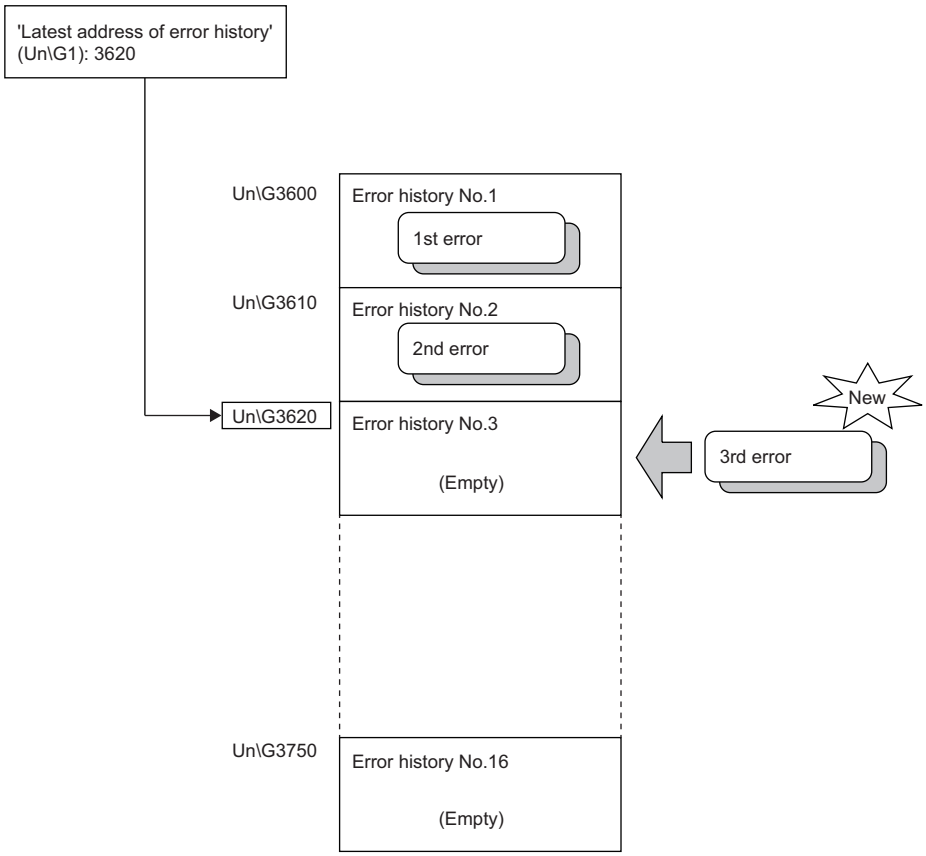
*1 Values stored when an error occurs at 12:34:56.789 on Saturday, January 31st, 2015.

The start address of Error history where the latest error is stored can be checked in 'Latest address of error history' (Un\G1).
The start address of Alarm history where the latest alarm is stored can be checked in 'Latest address of alarm history' (Un\G3).

Ex.

When the third error occurs:

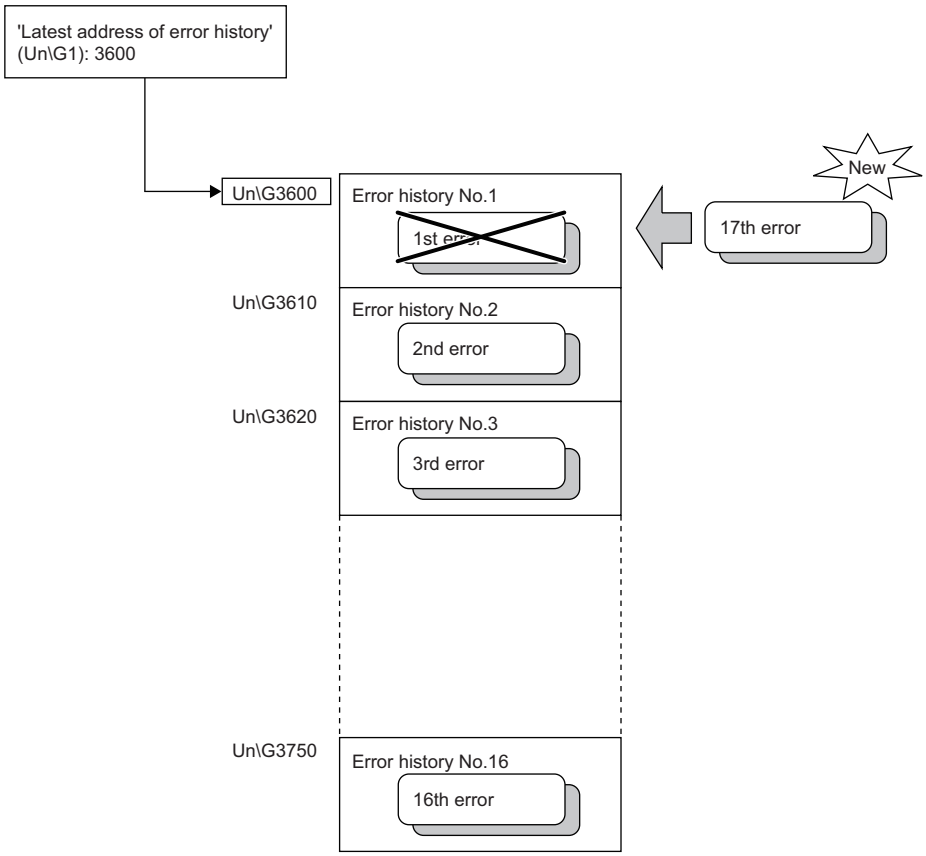
The third error is stored in Error history 3, and the value 3620 (start address of Error history 3) is stored to 'Latest address of error history' (Un\G1).



Ex.

When the 17th error occurs:

The 17th error is stored in Error history 1, and the value 3600 (start address of Error history 1) is stored to 'Latest address of error history' (Un\G1).




**Point**

- Once the error history storage area becomes full, subsequent error information will overwrite the existing data, starting from 'Error history 1' (Un\G3600 to Un\G3609), and continues sequentially thereafter. The histories to be overwritten are deleted.
- The same processing is performed for Alarm history when an alarm occurs.
- The stored error history is cleared when the A/D converter module is powered off, or when the CPU module is reset.

# 1.18 Module Event History Collection Function



This function collects generated errors, alarms or executed operations in the A/D converter module as event information in the CPU module.
The CPU module collects the event information caused in the A/D converter module and keeps them in the data memory inside of the CPU module or an SD memory card.
The event information collected by the CPU module can be displayed on an engineering tool to check the occurrence history in a time series.

| Event type | Classification | Description |
|---|---|---|
| System | Error | Self-diagnostics error detected in each module |
| | Warning | Warning (alarm) detected in each module |
| | Information | Operation normally detected by the system not classified as an error or a warning, or operation performed automatically by the system |
| Security | Warning | Operation that is judged as an unauthorized access to each module. |
| | Information | Operation that could not be judged as a successful unlock of a password or unauthorized access |
| Operation | Warning | Among operations performed on modules, delete operation (data clear) that is not judged as an error by self-diagnostics but likely to change the behavior |
| | Information | Operations performed by users to change the system operation or configuration in the offset/gain setting. |

## Setting procedure

The event history function can be set from the event history setting window of the engineering tool. For the setting method, refer to the following.
MELSEC iQ-R CPU Module User's Manual (Application)

## Displaying event history

Access to the menu window of the engineering tool. For details on the operating procedure and how to view the contents, refer to the following.
GX Works3 Operating Manual

## List of event history data

The following table lists the events that would occur in the A/D converter module when the event type is set to "Operation"

| Event code | Event classification | Event name | Description | Additional information |
|---|---|---|---|---|
| 20010 | Information | Offset/gain setting execution | In the user range setting, offset/gain values have been set. | Total number of writes |
| 20100 | Information | Error clear | Error clear request has been issued. | — |

# 1.19 Backing up, Saving, and Restoring Offset/Gain Values

The A/D converter module is capable of backing up, saving, and restoring offset/gain values of the user range setting.

- Back up: Creates a module-specific backup parameter and saves offset/gain values.
- Save: Saves the offset/gain information, registered in this module by making the offset/gain setting, in the CPU module.
- Restoration: Writes the information backed up and saved in the CPU module to this module.

In the event that the A/D converter module fails and needs to be replaced, the offset/gain values of the failed A/D converter module can be restored onto the new A/D converter module.

However, if the offset/gain values are saved and restored, the accuracy after the restoration decreases by approximately three times compared to that before the restoration. Reconfigure the offset/gain setting when required.

Only when the model where the offset/gain values are to be saved and the model where the offset/gain values are to be restored are the same, the offset/gain values can be saved and restored.

Each procedure differs depending on whether a module-specific backup parameter is used or not.

## When the module-specific backup parameter is used

Offset/gain values are automatically restored when the failed module is replaced with a new one using the online module change.

For details on the online module change, refer to the following.

MELSEC iQ-R Online Module Change Manual

### Details of the module-specific backup parameter

A module-specific backup parameter is a file created in an SD memory card or the data memory of the control CPU. The contents of the parameter are the offset/gain value of the user range stored in the flash memory of the A/D converter module.

The file name of a module-specific backup parameter is determined as follows based on the start I/O number of the A/D converter module.

UBPmmmnn.BPR

- mmm indicates a value calculated by dividing the module I/O No. by 10H (3 digits in hexadecimal).
- nn indicates a consecutive number of the module-specific backup parameters for each module and is fixed to 00.

## Creating and updating a module-specific backup parameter

A module-specific backup parameter is created or updated when the offset/gain values stored in the flash memory of the A/D converter module are updated.

| Timing when backup data is created or updated | Description |
|---|---|
| When the offset/gain setting is completed with "Offset/gain setting" of the engineering tool | A module-specific backup parameter is created or updated when the offset/gain setting is completed with "Offset/gain setting" of the engineering tool. |
| When 'User range write request' (YA) is turned on in the offset/gain setting mode | A module-specific backup parameter is created or updated when the offset/gain values of the user range are changed in the offset/gain setting mode. |
| When 'User range write request' (YA) is turned on in the normal mode | When 'User range write request' (YA) is turned on in the normal mode, the offset/gain values of the user range are restored based on the settings of the buffer memory areas (CH1 Factory default setting offset value (L) to CH6 User range setting gain value (H)). At this timing, module-specific backup parameters are updated. |
| When the G(P).OGSTOR instruction is executed in the normal mode | When the G(P).OGSTOR instruction is executed in the normal mode, the offset/gain values of the user range are restored.<br>At this timing, module-specific backup parameters are updated. |
| When a new module is recognized after the online module change | When a new module is mounted and recognized after the online module change, the offset/gain values of the user range are restored. At this timing, module-specific backup parameters are updated. |

When no module-specific backup parameter exists in the data memory of the control CPU and a module-specific backup parameter needs to be created with the current setting, change the mode of the A/D converter module to the offset/gain setting mode and turn on 'User range write request' (YA). A module-specific backup parameter is created with the current setting of the flash memory.

### ■Precautions

- If the creation of a module-specific backup parameter fails because the data memory of the control CPU does not have sufficient free space or the module-specific backup parameter is being used, a module-specific backup parameter creation error (error code: 17E1H) occurs.
- When the mode switches from the offset/gain setting mode to the normal mode, A/D conversion does not start (the state becomes A/D conversion disabled internally). Because the values set in the buffer memory do not change before and after mode switching, operation is performed with the previous settings by turning on and off 'Operating condition setting request' (Y9).

## Reading of module-specific backup parameters

To read a module-specific backup parameter and restore offset/gain values, set "Auto restore of Offset/gain setting with the module change" to "Enable" in advance.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting] ⇨ [Online module change]

### ■Read timing

Module-specific backup parameters are read when a new module is mounted and recognized after the online module change. When the programmable controller is powered off and the module is replaced with a new one, module-specific backup parameters are not read.

### ■Precautions

When the module-specific backup parameter for the target slot does not exist in an SD memory card or the data memory of the control CPU, the subsequent restoration of the offset/gain values is not performed. If the offset/gain values cannot be restored even though the module-specific backup parameter exists, a module-specific backup parameter restore error (error code: 17E0H) occurs.

## Restoration of the offset/gain values of the user range

When the reading of module-specific backup parameters is completed with no errors, the values are converted (restored) into the offset/gain values of the user range for the new module, and stored in the flash memory. At the same timing, the module-specific backup parameter in the data memory of the control CPU is updated with the setting of the new module.

## Restrictions on the module-specific backup parameter

Offset/gain values cannot be backed up or restored with a module-specific backup parameter in the following cases.

- When the control CPU is not the process CPU
- When the programmable controller is powered off and the A/D converter module is replaced with a new one
- When "Auto restore of Offset/gain setting with the module change" is set to "Disable"

In any of the cases above, back up or restore offset/gain values by the following method.

☞ Page 95 When the module-specific backup parameter is not used

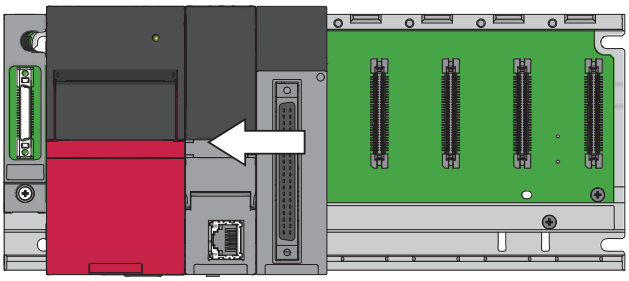
# When the module-specific backup parameter is not used

Back up or restore offset/gain values by one of the following methods.

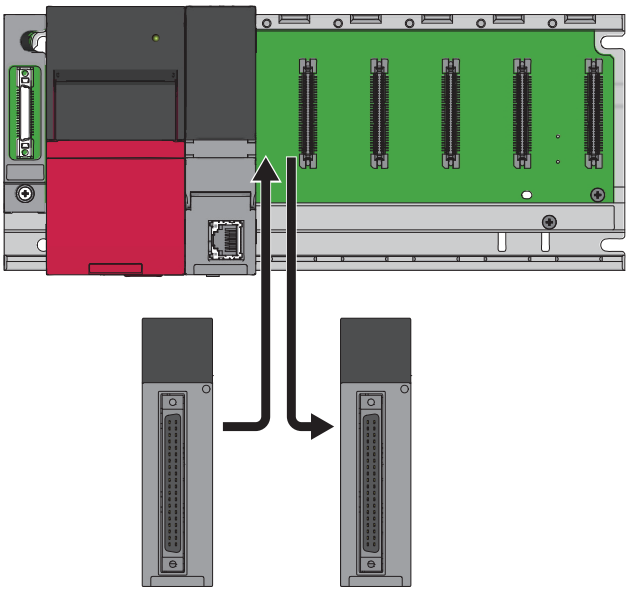
- Saving and restoring by dedicated instructions
- Saving and restoring by reading from and writing to the buffer memory

With the method above, offset/gain values can be restored to a new module, or the offset/gain values set in one module can be applied to the other modules in the same system.

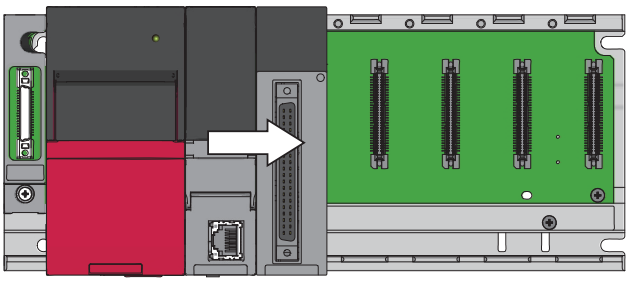
- To restore offset/gain values onto a new replaced module:



***1.*** Save offset/gain values.



***2.*** Power off the programmable controller, and replace the A/D converter module with a new one.

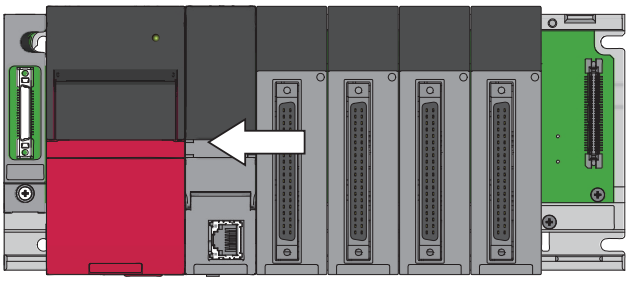


***3.*** Restore the offset/gain values.

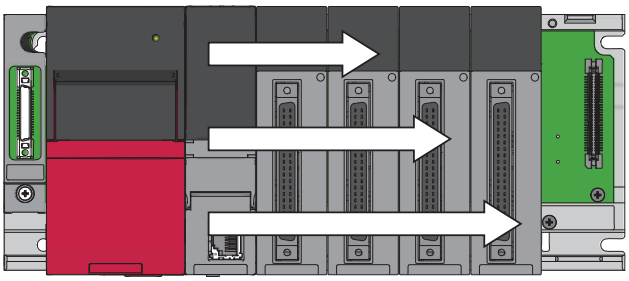
• To apply the offset/gain values set in one module to the other modules in the same system:

Ex.

When the offset/gain values in module No.1 are applied to modules No.2 to No.4



***1.*** Save the offset/gain values in module No.1.



***2.*** Apply the offset/gain values to modules No.2 to No.4

## Saving and restoring by dedicated instructions

Use the dedicated instruction G(P).OGLOAD to temporarily save the offset/gain values of the source A/D converter module to the internal device of the CPU, then use G(P).OGSTOR to write the values to the destination A/D converter module.

Prevent the saved offset/gain setting data from being deleted, by one of the following methods before replacing the modules:

- Use latch settings for the internal device of the destination module.
- Save the data onto an SD memory card. (To write data: use the SP.FWRITE instruction. To read data: use the SP.FREAD instruction.)
- Store the saved data.

For use of dedicated instructions, refer to the following.

MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

## Saving and restoring by reading from and writing to the buffer memory

Use CH1 Factory default setting offset value (L) to CH6 User range setting gain value (H) and 'User range write request' (YA) to read the offset/gain values from the source A/D converter module. Use the buffer memory again to write the values to the destination A/D converter module.

The following describes the procedure for using the buffer memory.

### ■To restore offset/gain values onto a new replaced module:

• When restoring offset/gain values onto the source A/D converter module

1. Turn on and off 'Operating condition setting request' (Y9).
2. Save the stored values of CH1 Factory default setting offset value (L) to CH6 User range setting gain value (H).

• When the power of the module is off

3. Replace the A/D converter module.

• When restoring offset/gain values onto the source A/D converter module

4. Write the data saved in CH1 Factory default setting offset value (L) to CH6 User range setting gain value (H).
5. Turn on 'User range write request' (YA).
6. Check that 'Offset/gain setting mode status flag' (XA) is on.
7. Turn off 'User range write request (YA)'.
8. Check whether the destination A/D converter module operates with the offset/gain values that are restored.

**Point**

When replacing modules, prevent the saved offset/gain setting data from being deleted, by one of the following methods before powering off the module.

- Use latch settings for the internal device of the destination module.
- Save the data onto an SD memory card. (To write data: use the SP.FWRITE instruction. To read data: use the SP.FREAD instruction.)
- Store the saved data.

### ■To apply the offset/gain values set in one module to the other modules in the same system:

• When restoring offset/gain values onto the source A/D converter module

1. Turn on and off 'Operating condition setting request' (Y9).
2. Save the stored values of CH1 Factory default setting offset value (L) to CH6 User range setting gain value (H).

• When restoring offset/gain values onto the destination A/D converter module

3. Write the data saved in CH1 Factory default setting offset value (L) to CH6 User range setting gain value (H).
4. Turn on 'User range write request' (YA).
5. Check that 'Offset/gain setting mode status flag' (XA) is on.
6. Turn off 'User range write request (YA)'.
7. Check whether the destination A/D converter module operates with the offset/gain values that are restored.

## Range reference table

The following describes the range reference tables used for saving and restoring offset/gain values.

### ■Factory default setting

The following describes the buffer memory addresses of the factory default setting.

'CH1 Factory default setting offset value (L)' (Un\G4004) to 'CH6 Factory default setting gain value (H)' (Un\G4027)

| Address (decimal) | | | | | | Description | Range type | Analog value | Reference value (hexadecimal) |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 4004<br>4005 | 4008<br>4009 | 4012<br>4013 | 4016<br>4017 | 4020<br>4021 | 4024<br>4025 | Factory default setting offset value | Current | 0mA | 801AF7H |
| 4006<br>4007 | 4010<br>4011 | 4014<br>4015 | 4018<br>4019 | 4022<br>4023 | 4026<br>4027 | Factory default setting gain value | Current | 20mA | D45FE9H |

### ■User range setting

The following describes the buffer memory addresses of the user range setting.

'CH1 User range setting offset value (L)' (Un\G4028) to 'CH6 User range setting gain value (H)' (Un\G4051)

| Address (decimal) | | | | | | Description | Range type | Analog value | Reference value (hexadecimal) |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 4028<br>4029 | 4032<br>4033 | 4036<br>4037 | 4040<br>4041 | 4044<br>4045 | 4048<br>4049 | User range setting offset value | Current | 4mA | 90F58DH |
| 4030<br>4031 | 4034<br>4035 | 4038<br>4039 | 4042<br>4043 | 4046<br>4047 | 4050<br>4051 | User range setting gain value | Current | 20mA | D45FE9H |

# 1.20 Q Compatible Mode Function

This function allows setting the buffer memory addresses of the A/D converter module same as the buffer memory addresses of the MELSEC-Q series.
This compatibility makes it possible to reuse sequence programs that have exhibited high performance on the MELSEC-Q series modules.
The following table lists the compatible modules of the MELSEC-Q series.

| A/D converter module of the MELSEC iQ-R series | Compatible A/D converter module |
|---|---|
| R60AD6-DG | Q66AD-DG |

## Operation

Only the buffer memory assignment is changed in the Q compatible mode.

- The I/O signal assignment is the same as that of the R mode. Some signals have been changed. However, the signals that change the module operation maintain the compatibility. Therefore, when a MELSEC-Q series sequence program is diverted, a significant modification of the sequence program is not required. The following table shows a difference between the R60AD6-DG and Q66AD-DG.

| Device number | R60AD6-DG | Q66AD-DG |
|---|---|---|
| X7 | Use prohibited | High resolution mode status flag<br>(ON: High resolution mode, OFF: Normal resolution mode) |

**Point**

- When a MELSEC-Q series sequence program is diverted, check digital output values and the operation timing and modify the sequence program if necessary because the specifications such as the resolution and update timing are changed.
- When a MELSEC-Q series sequence program is diverted and an error code is set as the operating condition or interlock condition, the program does not operate normally.
- When the Q compatible mode function is enabled, a program that uses FB or labels cannot be created. When FB or labels is used, create a program in the R mode.

## Setting procedure

***1.*** When adding a new module, select the module whose module name has "(Q)" at the end.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]

***2.*** Configure the same parameter setting as the one of when the R mode is used.

***3.*** Restart the CPU module after the module parameter is written.

**Point**

- During the module operation, the mode cannot be switched between the R mode and Q compatible mode.
- The project of the compatible A/D converter module created by GX Works2 can be read with the other format read function of GX Works3. The read project keeps various settings of the compatible A/D converter module as the settings of the A/D converter module of the MELSEC iQ-R series. The settings to be kept are the switch setting, parameter setting, auto refresh setting, and I/O assignment setting.

# 2 PARAMETER SETTINGS

Set the parameters of each channel.
Setting parameters here eliminates the need to program them.

## 2.1 Parameter Setting Procedure

***1.*** Add an A/D converter module to the engineering tool.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]

***2.*** There are four types of parameter setting: basic setting, application setting, interrupt setting, and refresh setting. Choose the desired type from the tree in the following window to set parameters.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Select the A/D converter module.

***3.*** Use the engineering tool to write the settings to the CPU module.

[Online] ⇨ [Write to PLC]

***4.*** Reset the CPU module or turn off and on the power to apply the settings.

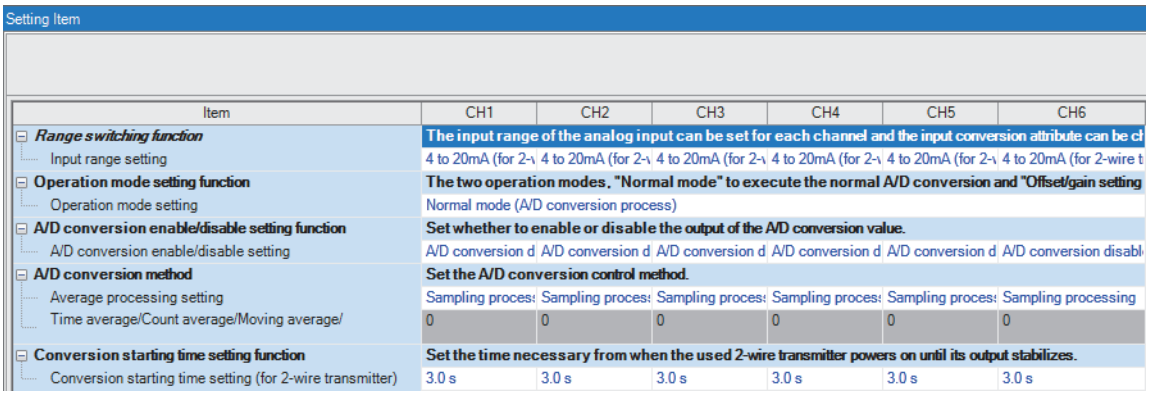
## 2.2 Basic Setting

### Setting procedure

Open "Basic setting" of the engineering tool.

***1.*** Start Module Parameter.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Basic setting]




***2.*** Click the item to be changed to enter the setting value.

• Item where a value is selected from the pull-down list

Click [▼] button of the item to be set, and from the pull-down list that appears, select the value.

• Item where a value is entered into the text box

Double-click the item to be set to enter the numeric value.

# 2.3 Application Setting



## Setting procedure

Open "Application setting" of the engineering tool.

***1.*** Start Module Parameter.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Application setting]

Setting Item

| Item | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| ***Scaling function*** | Configure the setting for the scaling at the A/D conversion. | | | | | |
| Scaling enable/disable setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Scaling upper limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| Scaling lower limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| **Shift function** | Configure the setting for the shift function at the A/D conversion. | | | | | |
| Conversion value shift | 0 | 0 | 0 | 0 | 0 | 0 |
| **Digital clipping function** | Configure the setting for the digital clipping function at the A/D conversion. | | | | | |
| Digitalclip enable/disable setting | Disable | Disable | Disable | Disable | Disable | Disable |
| **Warning output function (Process alarm)** | Set an alert at the A/D conversion. | | | | | |
| Warning output setting (Process alarm) | Disable | Disable | Disable | Disable | Disable | Disable |
| Process alarm upper upper limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| Process alarm upper lower limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| Process alarm lower upper limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| Process alarm lower lower limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| **Warning output function (Rate alarm)** | Set an alert at the A/D conversion. | | | | | |
| Warning output setting (Rate alarm) | Disable | Disable | Disable | Disable | Disable | Disable |
| Rate alarm detection cycle setting | 0 times | 0 times | 0 times | 0 times | 0 times | 0 times |
| Rate alarm upper limit value | 0.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % |
| Rate alarm lower limit value | 0.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % |
| **Input signal error detection function** | Configure the setting for the input signal at the A/D conversion. | | | | | |
| Input signal error detection setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Input signal error detection lower limit setting value | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % |
| Input signal error detection upper limit setting value | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % |
| Input signal error detection auto clear enable/disable settir | Disable | | | | | |
| **Logging function** | Configure the setting for the logging function at the A/D conversion. | | | | | |
| Logging enable/disable setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Logging data setting | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation value |
| Logging cycle setting value | 60 ms | 60 ms | 60 ms | 60 ms | 60 ms | 60 ms |
| Logging cycle unit setting | ms | ms | ms | ms | ms | ms |
| Level trigger condition setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Logging points after trigger | 500 | 500 | 500 | 500 | 500 | 500 |
| Trigger data | 402 | 602 | 802 | 1002 | 1202 | 1402 |
| Trigger setting value | 0 | 0 | 0 | 0 | 0 | 0 |
| Logging read enable/disable setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Logging read points setting value | 100 | 100 | 100 | 100 | 100 | 100 |
| **Online module change** | The module can be changed without the system being stopped. | | | | | |
| Auto restore of Offset/ gain setting with the module change | Enable | | | | | |

***2.*** Click the item to be changed to enter the setting value.

• Item where a value is selected from the pull-down list

Click [▼] button of the item to be set, and from the pull-down list that appears, select the value.

• Item where a value is entered into the text box

Double-click the item to be set to enter the numeric value.

# 2.4 Interrupt Setting

## Setting procedure

Open "Interrupt setting" of the engineering tool.

***1.*** Start Module Parameter.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Interrupt setting]

Setting Item

| No. | Condition target setting | Condition target channel setting | Interrupt factor transaction setting | Interrupt pointer |
|---|---|---|---|---|
| 1 | Disable | All CH specification | Interrupt reissue requests | |
| 2 | Disable | All CH specification | Interrupt reissue requests | |
| 3 | Disable | All CH specification | Interrupt reissue requests | |
| 4 | Disable | All CH specification | Interrupt reissue requests | |
| 5 | Disable | All CH specification | Interrupt reissue requests | |
| 6 | Disable | All CH specification | Interrupt reissue requests | |
| 7 | Disable | All CH specification | Interrupt reissue requests | |
| 8 | Disable | All CH specification | Interrupt reissue requests | |
| 9 | Disable | All CH specification | Interrupt reissue requests | |
| 10 | Disable | All CH specification | Interrupt reissue requests | |
| 11 | Disable | All CH specification | Interrupt reissue requests | |
| 12 | Disable | All CH specification | Interrupt reissue requests | |
| 13 | Disable | All CH specification | Interrupt reissue requests | |
| 14 | Disable | All CH specification | Interrupt reissue requests | |
| 15 | Disable | All CH specification | Interrupt reissue requests | |
| 16 | Disable | All CH specification | Interrupt reissue requests | |

***2.*** Click the interrupt setting number (No.1 to 16) to be changed to enter the setting value.

• Item where a value is selected from the pull-down list

Click [▼] button of the item to be set, and from the pull-down list that appears, select the value.

• Item where a value is entered into the text box

Double-click the item to be set to enter the numeric value.

# 2.5 Refresh Setting



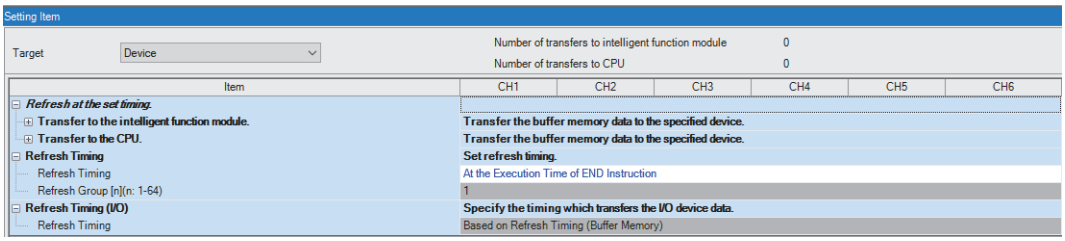
## Setting procedure

Set the buffer memory area of the A/D converter module to be refreshed.

This refresh setting eliminates the need for reading/writing data by programming.

***1.*** Start Module Parameter.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Module model name ⇨ [Refresh settings]




***2.*** Click "Target", and set the auto refresh destination.

• When "Refresh Destination" is "Module Label"

Set whether to enable or disable the refresh by setting "Level data 0" to Enable or Disable.

• When "Refresh Destination" is "Refresh Data Register (RD)"

The transfer destinations of all items are automatically set by setting the start device to "Top Device Name".

• When "Refresh Destination" is "Specified Device"

Double-click the item to be set to enter the refresh destination device.

***3.*** Click "Refresh Timing" to set the timing to refresh.

Set "Refresh Timing" to "At the Execution Time of END Instruction" or "At the Execution Time of Specified Program".

When "At the Execution Time of Specified Program" is set, double-click "Refresh Group [n](n: 1-64)" and set a value of 1 to 64.

**Point**

When the refresh is enabled, the values of the refresh destination are enabled at the refresh timing set with the engineering tool. At this time, the buffer memory areas are overwritten with the values of the refresh destination. To change the value in the refresh target buffer memory area, create a program to change the module label of the refresh destination and the device value.

# Refresh processing time

The refresh processing time [μs] is a constituent of the scan time of the CPU module. For details on the scan time, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

The refresh processing time [μs], which is taken for refresh, is given by:

- Refresh processing time [μs] = Refresh read time (time for transferring refresh data to the CPU module) + Refresh write time (time for transferring refresh data to the intelligent function module)

The refresh read time and refresh write time vary depending on the settings of "Target".

## When "Target" is "Module Label" or "Refresh Data Register (RD)"

The following table shows the refresh read time and refresh write time with an R□CPU used.

| Model | Classification | When using the refresh settings |
|---|---|---|
| R60AD6-DG | Refresh read time | 23.14μs |
| | Refresh write time | 13.44μs |
| R60AD6-DG (Q compatible mode) | Refresh read time | 24.96μs |
| | Refresh write time | 11.70μs |

## When "Target" is "Device"

Calculate the refresh read time and refresh write time according to the number of items and the number of their transfer data (in units of word) that are set to be refreshed. For the calculation method, refer to the following.

MELSEC iQ-R CPU Module User's Manual (Application)

# 3 TROUBLESHOOTING

This chapter describes errors that may occur in the use of the A/D converter module and those troubleshooting.

## 3.1 Troubleshooting with the LEDs

Check the state of the LEDs to narrow down the possible causes of the trouble. This step is the first diagnostics before using the engineering tool.

A state of the A/D converter module can be checked with the RUN LED, ERR LED, and ALM LED. The following table shows the correspondence of these LEDs and a state of the A/D converter module.

| Name | Description |
|---|---|
| RUN LED | Indicates the operating status of the module.<br>On: Normal operation<br>Flashing (1s cycles): In offset/gain setting mode<br>Flashing (400ms cycles): Selected as a module for the online module change<br>Off: 5V power supply interrupted, watchdog timer error occurred, or exchanging the module is allowed in the process of the online module change. |
| ERR LED | Indicates the error status of the module.*1<br>On: Error occurred<br>Off: Normal operation |
| ALM LED | Indicates the alarm status of the module.*2<br>On: Warning (process alarm or rate alarm) issued<br>Flashing: Input signal error detection<br>Off: Normal operation |

*1 For details, refer to the following.
☞ Page 114 List of Error Codes

*2 For details, refer to the following.
☞ Page 117 List of Alarm Codes

# 3.2 Checking the State of the Module

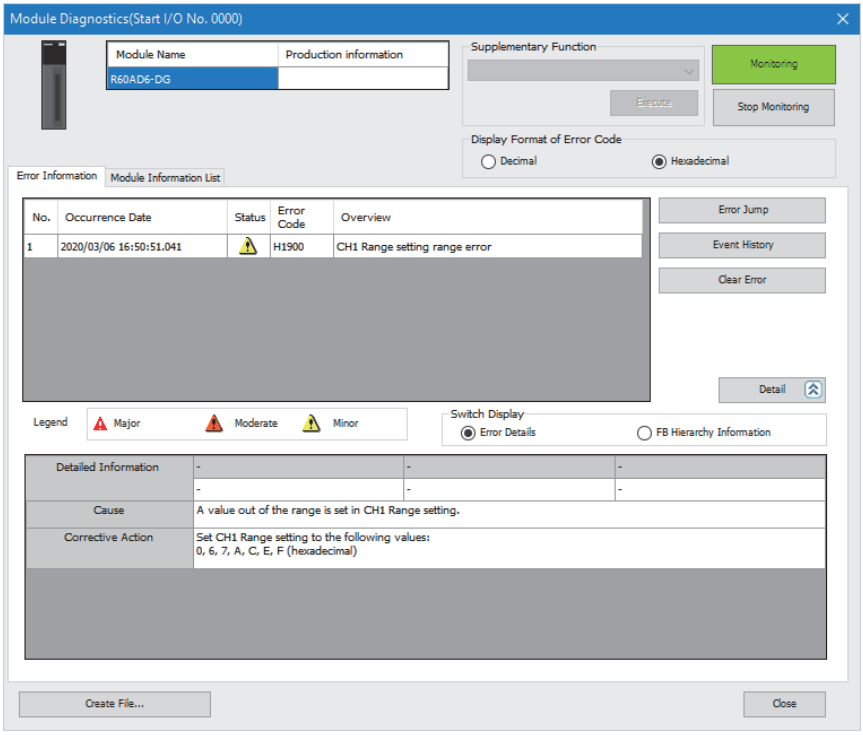
The following functions are available in the "Module Diagnostics" window of the A/D converter module.

| Function | Application |
|---|---|
| Error Information | Displays the details of the currently occurring error.<br>Clicking the [Event History] button displays the errors that have occurred on the network and the history of the errors detected and the operations executed on each module. |
| Module Information List | Displays each status information of the A/D converter module. |

## Error Information

Check the description and the actions for the errors that have occurred.

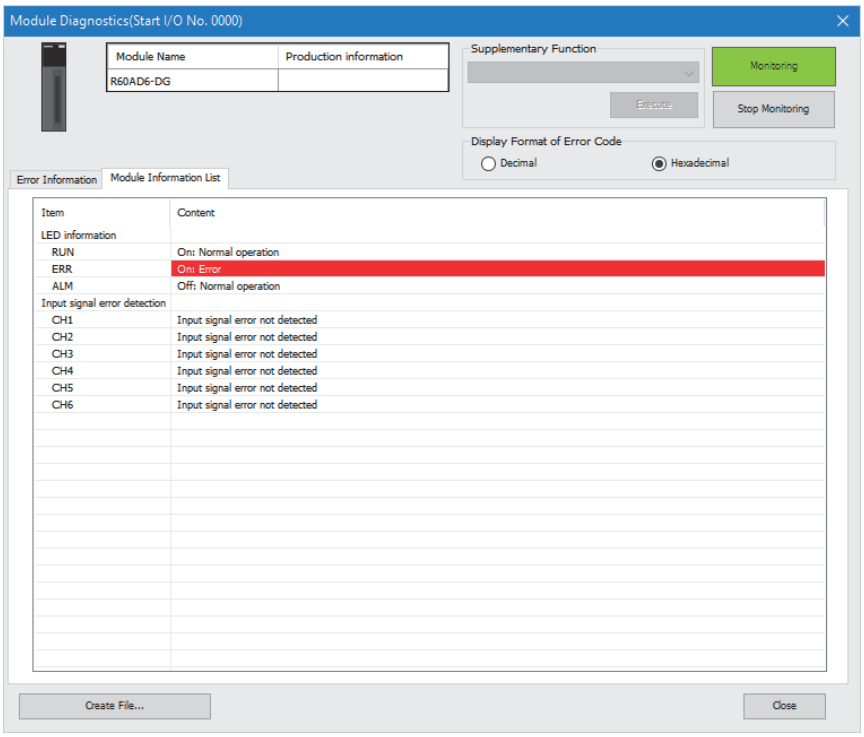
[Diagnostics] ⇨ [System Monitor] ⇨ Right-click the module to be checked. ⇨ "Module Diagnostics"




| Item | Description |
|---|---|
| Status | Major: An error such as a hardware failure or memory failure. The module stops operating. |
| | Moderate: An error, such as a parameter error, which affects module operation. The module stops operating. |
| | Minor: An error such as a communication failure. The module continues operating. |
| Detailed Information | Displays detailed information about each error (maximum of 3 pieces). |
| Cause | Displays the details of the cause of each error. |
| Action | Displays actions against the error. |

## Module Information List

Switch to the "Module Information List" tab to display each status information of the A/D converter module.




| Item | Description |
|---|---|
| LED information | Displays the LED status of the A/D converter module. |
| Input signal error detection | Displays the detection status for the input signal errors of the A/D converter module for each channel. |

# 3.3 Troubleshooting by Symptom

## When the A/D converter module does not start up

| Check item | Action |
|---|---|
| Check that five seconds have passed since the power supply module is powered off. | After the power supply module is powered off, wait at least five seconds before turning on the input power supply to the power supply module. |

## When the RUN LED flashes or turns off

### When flashing

| Check item | Cause | Action |
|---|---|---|
| Check whether the module is in offset/gain setting mode. | In the module parameter setting of the engineering tool, the programmable controller power supply has been turned off and on, or the CPU module has been reset when "Operation mode setting" is "Offset/gain setting mode". | In the module parameter setting of the engineering tool, set "Operation mode setting" to "Normal mode (A/D conversion processing)" and turn off and on the programmable controller power supply, or reset the CPU module. |
| | The G(P).OFFGAN instruction has been executed with the mode switched to offset/gain setting mode. | Review the program that uses the G(P).OFFGAN instruction to check whether the mode has been switched erroneously. |
| | The value in 'Mode switching setting' (Un\G296, Un\G297) has been changed and the mode has been switched to the offset/gain setting mode. | Review the program that uses 'Mode switching setting' (Un\G296, Un\G297) to check whether the mode has been switched erroneously. |
| Check whether the module is selected as a target module for the online module change. | The base number and slot number of the A/D converter module have been set in Module selection (base unit No.) (SD1600) or Module selection (slot No.) (SD1601). | Turn on Module selection cancel request flag (SM1615). |

### When turning off

| Check item | Action |
|---|---|
| Check whether the power is supplied. | Check that the supply voltage of the power supply module is within the rated range. |
| Check whether the capacity of the power supply module is enough. | Calculate the current consumption of mounted modules, such as the CPU module, I/O modules, and intelligent function modules to check that the power capacity is enough. |
| Check whether the module is mounted properly. | Check the mounting state of the module. |
| Check whether the module is during online module change and is ready for the online module change. | Perform the online module change. For details, refer to the following manual.<br>MELSEC iQ-R Online Module Change Manual |
| Check whether the weight of the cables is putting stress on modules. | Place cables connected to modules in a duct or clamp them so that their weight does not put stress on modules. |
| Cases other than the above | Reset the CPU module, and check if the RUN LED turns on.<br>If the RUN LED still remains off, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |

# When the ERR LED turns on

## When turning on

| Check item | Action |
|---|---|
| Check whether any error has occurred. | Check 'Latest error code' (Un\G0) and take actions described in the list of error codes.<br>☞ Page 114 List of Error Codes |

# When the ALM LED turns on or flashes

## When turning on

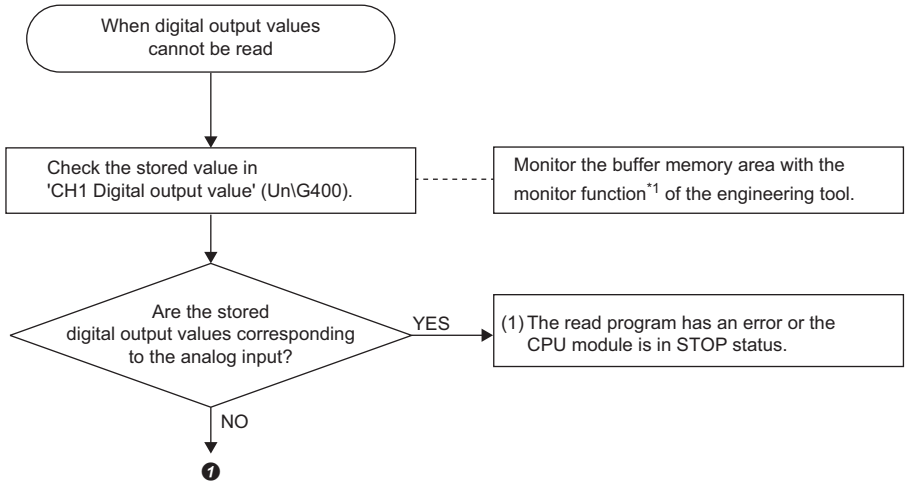
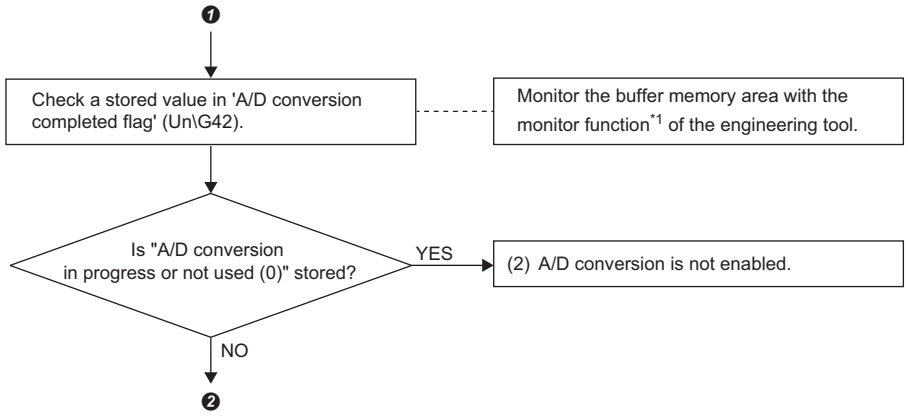
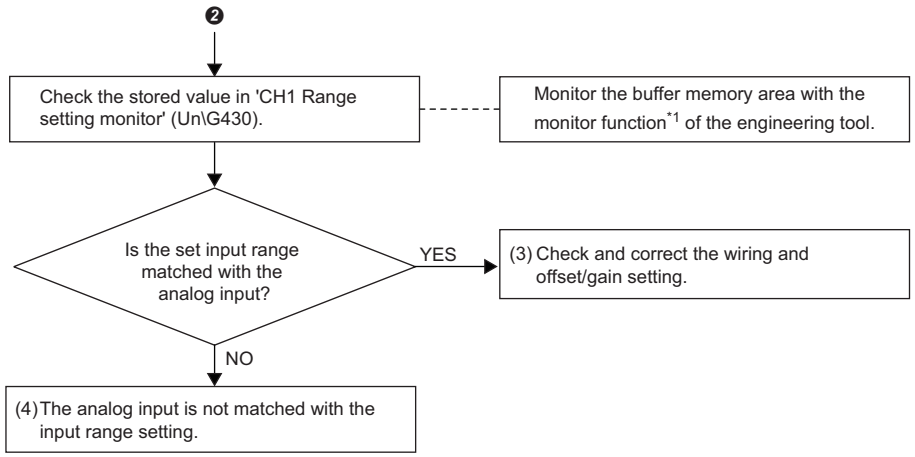
| Check item | Action |
|---|---|
| Check whether any warning has been issued. | Check 'Warning output flag (process alarm upper limit)' (Un\G36), 'Warning output flag (process alarm lower limit)' (Un\G37), 'Warning output flag (rate alarm upper limit)' (Un\G38), and 'Warning output flag (rate alarm lower limit)' (Un\G39).<br>Take actions described in the list of alarm codes.<br>☞ Page 117 List of Alarm Codes |

## When flashing

| Check item | Action |
|---|---|
| Check whether any input signal error has occurred. | Check 'Input signal error detection signal' (XC) or 'Input signal error detection flag' (Un\G40).<br>Take actions described in the list of alarm codes.<br>☞ Page 117 List of Alarm Codes |

# When a digital output value cannot be read

Check according to the following flow.

| Check procedure | Check details |
|---|---|
|  | ■Step 1: Checking the digital output values<br>Check the following.<br>• Whether the digital output values are stored in the buffer memory area<br>• Whether the program for reading digital output values has an error |
|  | ■Step 2: Checking the status of conversion<br>Check the execution status of A/D conversion inside the module such as whether A/D conversion is performed in the A/D converter module. |
|  | ■Step 3: Checking the input range setting<br>Check whether the input range suitable for the analog input is set. |

*1 Monitor the buffer memory area by using "Device/buffer memory batch monitor" or "Intelligent function module monitor".

## Check item 1

The read program has an error, or the CPU module is in the STOP state. Check the following items.

| Check item | Action |
|---|---|
| Check whether the CPU module is in the STOP state. | Change the state of the CPU module to RUN. |
| Check whether the program for reading digital output values has an error. | Check 'CH1 Digital output value' (Un\G400) using the monitor function of the engineering tool ("Device/buffer memory batch monitor" or "Intelligent function module monitor"). If the digital output value is stored without being converted from the analog input value, review and correct the read program. |
| Check whether the auto refresh setting is correct. | If the auto refresh is set to transfer 'CH1 Digital output value' (Un\G400) to the device of the CPU module, review and correct the auto refresh setting. |



## Check item 2

A/D conversion is not enabled. Check the following items.

| Check item | Action |
|---|---|
| Check whether A/D conversion disable (1) is set in 'CH1 A/D conversion enable/disable setting' (Un\G500) of the channel where a value is to be input. | Check 'CH1 A/D conversion enable/disable setting' (Un\G500) using the monitor function of the engineering tool ("Device/buffer memory batch monitor" or "Intelligent function module monitor"). If A/D conversion disable (1) is set, change the setting to A/D conversion enabled (0) using the engineering tool or a program. |
| Check whether 'Operating condition setting request' (Y9) has been executed after parameter change. | Turn on and off*1 'Operating condition setting request' (Y9) and check that a digital output value is stored in 'CH1 Digital output value' (Un\G400) using the engineering tool.<br>If the stored value is correct, further check the program to see if the description related to 'Operating condition setting request' (Y9) is proper. |
| Check whether the 24VDC external power supply is applied. | If the input range setting is the 2-wire transmitter input, check 'External power supply READY flag' (X6). If the flag is off, supply a voltage of 24VDC to the external power supply terminal (between terminal numbers A19 and 20 or B19 and 20). |
| Check whether a great value is set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532). | When the input range setting is the 2-wire transmitter input, check the value set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532). The digital output value and digital operation value are not updated until the set time passes. |
| Check whether the supply power is temporarily stopped. | When the input range setting is the 2-wire transmitter input, check the value set in 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473). If "1: Trigger request" is set, the digital output value and digital operation value are not updated. |

*1 If 'Operating condition setting request' (Y9) is in an on state, A/D conversion does not start. Turn (Y9) on, check the off state of 'Operating condition setting completed flag' (X9), and be sure to turn (Y9) off.

## Check item 3

Review and correct the wiring and offset/gain setting. Check the following items.

| Check item | Action |
|---|---|
| Check whether the terminal screws are loose. | Retighten the terminal screws within the range of the specified torques. |
| Check that the cables are connected to the correct terminals. | Review and correct the wiring by referring to the examples of external wiring.<br>📖 MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Startup) |
| Check whether there is any problem with the wiring, such as looseness or disconnection of signal lines and analog signal lines connected to the 2-wire transmitter. | Identify the faulty area of signal lines by a visual check and continuity check. |
| Check whether the offset/gain setting of the user range is correct. | If the input range setting is the user range, turn on and off 'Operating condition setting request' (Y9), and check 'CH1 User range setting offset value (L)' (Un\G4028) to 'CH1 User range setting gain value (H)' (Un\G4031) comparing with the range reference table.<br>If the stored values are not desired offset/gain values, perform the offset/gain setting again.<br>For the range reference table, refer to the following.<br>☞ Page 98 Range reference table |

## Check item 4

The analog input and input range setting do not match. Check the following items.

| Check item | Action |
|---|---|
| Check whether the setting for the module parameter "Input range setting" is correct. | Check the module parameter "Input range setting", and set it again if it is not correct. |
| Check whether the program has an error when the input range in 'CH1 Range setting' (Un\G598) is set from the program. | Check 'CH1 Range setting' (Un\G598) using the monitor function of the engineering tool ("Device/buffer memory batch monitor" or "Intelligent function module monitor"). If the set value is not correct, set a correct value using the engineering tool or a program. |
| Check whether 'Operating condition setting request' (Y9) has been executed after parameter change. | Turn on and off*1 'Operating condition setting request' (Y9) and check that a digital output value is stored in 'CH1 Digital output value' (Un\G400) using the engineering tool.<br>If the stored value is correct, further check the program to see if the description related to 'Operating condition setting request' (Y9) is proper. |

*1 If 'Operating condition setting request' (Y9) is in an on state, A/D conversion does not start. Turn (Y9) on, check the off state of 'Operating condition setting completed flag' (X9), and be sure to turn (Y9) off.

**Point**

If digital output values cannot be read even after the above actions are taken, the possible cause is a failure of the module. Please consult your local Mitsubishi representative.

# When the digital output value does not fall within the range of accuracy

| Check item | Action |
|---|---|
| Check whether any measures have been taken to reduce noise. | To reduce noise, take measures such as the use of shielded cables for connection. |

# 3.4 List of Error Codes

If an error occurs during operation, the A/D converter module stores the error code into 'Latest error code' (Un\G0) of the buffer memory. In addition, 'Error flag' (XF) turns on. Turning on 'Error clear request' (YF) clears the error code of 'Latest error code' (Un\G0), and 'Error flag' (XF) turns off.

Error codes of the A/D converter module are classified in minor errors or moderate errors.

- Minor error: This error is caused by the setting failure of programs and parameters. The A/D conversion continues with the parameter setting before the change. (1000H to 1FFFH)
- Moderate error: An error such as hardware failure. The A/D conversion does not continue. (3000H to 3FFFH)

The following table lists the error codes that may be stored.

☐ in error codes: This symbol indicates the number of the channel where an error has occurred. A numerical value of 0 to 5 is used to correspond to CH1 to CH6.

(CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5)

△ in error codes: For what this symbol indicates, refer to Description and cause.

| Error code | Error name | Description and cause | Action |
|---|---|---|---|
| 0000H | — | There is no error. | — |
| 1080H | Number of writes to offset/gain settings reach limit error | The number of the offset/gain settings has exceeded the guaranteed maximum number. | Any further setting of offset/gain values may not be reflected correctly. |
| 17E0H | Module-specific backup parameter restore error | Offset/gain values cannot be restored with the module-specific backup parameter. | The module-specific backup parameter file may be damaged.<br>Readjust the user range. |
| 17E1H | Module-specific backup parameter creation error | The module-specific backup parameter has not been created. | Check the free space on the data memory of the control CPU and the SD memory card, and recreate a module-specific backup parameter.<br>For how to create module-specific backup parameters, refer to the following.<br>☞ Page 92 Backing up, Saving, and Restoring Offset/Gain Values |
| 180△H | Interrupt factor generation setting range error | A value other than 0 to 1 is set in Interrupt factor generation setting [n].<br>△ indicates the interrupt setting related in the error as below:<br>0: Setting 1 to F: Setting 16 | Set Interrupt factor generation setting [n] to 0 or 1. |
| 181△H | Condition target setting range error | A value other than 0 to 8 is set in Condition target setting [n].<br>△ indicates the interrupt setting related in the error as below:<br>0: Setting 1 to F: Setting 16 | Set Condition target setting [n] to 0 to 8. |
| 182△H | Condition target channel setting range error | A value other than 0 to 6 is set in Condition target channel setting [n].<br>△ indicates the interrupt setting related in the error as below:<br>0: Setting 1 to F: Setting 16 | Set Condition target channel setting [n] to 0 to 6. |
| 1860H | G(P).OGSTOR instruction execution error in offset/gain setting mode | The G(P).OGSTOR instruction has been executed in offset/gain setting mode. | Do not execute the G(P).OGSTOR instruction in the offset/gain setting mode. |
| 1861H | Offset/gain setting continuous write occurrence error | The G(P).OGSTOR instruction has been executed continuously or a setting value has been continuously written to the flash memory 26 times or more in the offset/gain setting. | For the G(P).OGSTOR instruction, execute it only once per module. For the offset/gain setting, write the setting value only once per setting. |
| 1862H | Model mismatch error at the execution of OGSTOR | The G(P).OGSTOR instruction has been executed on a module different from the one on which the G(P).OGLOAD instruction was executed.<br>The G(P).OGSTOR instruction has been executed ahead of the G(P).OGLOAD instruction. | Execute the G(P).OGLOAD and G(P).OGSTOR instructions on the same module. As the other way, execute the G(P).OGLOAD instruction on the module whose data is to be restored, and then execute the G(P).OGSTOR instruction on the module to which the data is to be restored. |
| 190☐H | Range setting range error | A value out of the range is set in CH☐ Range setting. | Set CH☐ Range setting to the following values:<br>0, 6, 7, A, C, E, or F (hexadecimal) |
| 191☐H | Averaging processing specification setting range error | A value other than 0 to 4 is set in CH☐ Averaging processing specification. | Set CH☐ Averaging processing specification to 0 to 4. |

| Error code | Error name | Description and cause | Action |
|---|---|---|---|
| 192☐H | Time average setting range error | When the time average is selected in CH☐ Averaging processing specification, CH☐ Time average/Count average/Moving average/Primary delay filter constant setting is set to the following value:<br>A value other than 40 to 5000<br>A value smaller than "4 × Number of channels used × Conversion speed" (ms) | Set CH☐ Time average/Count average/Moving average/Primary delay filter constant setting to the following value:<br>40 to 5000<br>A value equal to or larger than "4 × Number of channels used × Conversion speed" (ms) |
| 193☐H | Count average setting range error | When the count average is selected in CH☐ Averaging processing specification, a value other than 4 to 500 is set in CH☐ Time average/Count average/Moving average/Primary delay filter constant setting. | Set CH☐ Time average/Count average/Moving average/Primary delay filter constant setting to 4 to 500. |
| 194☐H | Moving average setting range error | When the moving average is selected in CH☐ Averaging processing specification, a value other than 2 to 200 is set in CH☐ Time average/Count average/Moving average/Primary delay filter constant setting. | Set CH☐ Time average/Count average/Moving average/Primary delay filter constant setting to 2 to 200. |
| 195☐H | Primary delay filter constant setting range error | When the primary delay filter is selected in CH☐ Averaging processing specification, a value other than 1 to 500 is set in CH☐ Time average/Count average/Moving average/Primary delay filter constant setting. | Set CH☐ Time average/Count average/Moving average/Primary delay filter constant setting to 1 to 500. |
| 1A0☐H | Scaling enable/disable setting range error | A value other than 0 and 1 is set in CH☐ Scaling enable/disable setting. | Set CH☐ Scaling enable/disable setting to 0 or 1. |
| 1A1☐H | Scaling setting range error | A value other than -32000 to 32000 is set in CH☐ Scaling lower limit value and/or CH☐ Scaling upper limit value. | Set CH☐ Scaling lower limit value and CH☐ Scaling upper limit value to -32000 to 32000. |
| 1A2☐H | Scaling upper/lower limit value setting error | CH☐ Scaling upper limit value and CH☐ Scaling lower limit value are set as the scaling upper limit value = the scaling lower limit value. | Set CH☐ Scaling upper limit value and CH☐ Scaling lower limit value as the scaling upper limit value ≠ the scaling lower limit value. |
| 1A5☐H | Digital clipping enable/disable setting range error | A value other than 0 and 1 is set in CH☐ Digital clipping enable/disable setting. | Set CH☐ Digital clipping enable/disable setting to 0 or 1. |
| 1A7☐H | Difference conversion trigger setting range error | A value other than 0 and 1 is set in CH☐ Difference conversion trigger. | Set CH☐ Difference conversion trigger to 0 or 1. |
| 1B0☐H | Warning output setting (Process alarm) range error | A value other than 0 and 1 is set in CH☐ Warning output setting (Process alarm). | Set CH☐ Warning output setting (Process alarm) to 0 or 1. |
| 1B△☐H | Process alarm upper lower limit value setting range error | The values set in CH☐ Process alarm upper upper limit value to CH☐ Process alarm lower lower limit value do not satisfy the following condition:<br>Upper upper limit value ≥ Upper lower limit value ≥ Lower upper limit value ≥ Lower lower limit value<br>△ indicates that the set values are as follows:<br>1: Process alarm lower lower limit value > Process alarm lower upper limit value<br>2: Process alarm lower upper limit value > Process alarm upper lower limit value<br>3: Process alarm upper lower limit value > Process alarm upper upper limit value | Set CH☐ Process alarm upper upper limit value to CH☐ Process alarm lower lower limit value so that the values satisfy the following condition:<br>Upper upper limit value ≥ Upper lower limit value ≥ Lower upper limit value ≥ Lower lower limit value |
| 1B8☐H | Warning output setting (rate alarm) range error | A value other than 0 and 1 is set in CH☐ Warning output setting (Rate alarm). | Set CH☐ Warning output setting (Rate alarm) to 0 or 1. |
| 1B9☐H | Rate alarm warning detection cycle setting range error | A value other than 1 to 32000 is set in CH☐ Rate alarm warning detection cycle setting. | Set CH☐ Rate alarm warning detection cycle setting to 1 to 32000. |
| 1BA☐H | Rate alarm upper/lower limit setting value inversion error | CH☐ Rate alarm upper limit value and CH☐ Rate alarm lower limit value are set as Lower limit value ≥ Upper limit value. | Set CH☐ Rate alarm upper limit value and CH☐ Rate alarm lower limit value as Lower limit value < Upper limit value. |
| 1C0☐H | Input signal error detection setting range error | A value other than 0 to 4 is set in CH☐ Input signal error detection setting. | Set CH☐ Input signal error detection setting value to 0 to 4. |
| 1C1☐H | Input signal error detection setting value range error | A value other than 0 to 250 is set in CH☐ Input signal error detection setting. | Set CH☐ Input signal error detection setting value to 0 to 250. |
| 1C6☐H | Disconnection detection enabled range setting range error | Simple disconnection detection is set in CH☐ Input signal error detection setting, and the value set in CH☐ Input range setting is other than the following:<br>• 4 to 20mA (extended mode) (2-wire transmitter input)<br>• 4 to 20mA (extended mode) (current input) | For channels for simple disconnection detection using the input signal error detection function, set CH☐ Input range setting to either of the following:<br>• 4 to 20mA (extended mode) (2-wire transmitter input)<br>• 4 to 20mA (extended mode) (current input) |
| 1C8☐H | Conversion start time setting range error | A value other than 0 to 32767 is set in CH☐ Conversion start time setting (for 2-wire transmitter). | Set CH☐ Conversion start time setting (for 2-wire transmitter) to 0 to 32767. |

| Error code | Error name | Description and cause | Action |
|---|---|---|---|
| 1C9☐H | Supply power temporary stop trigger setting range error | A value other than 0 to 1 is set in CH☐ Supply power temporary stop trigger (for 2-wire transmitter). | Set CH☐ Supply power temporary stop trigger (for 2-wire transmitter) to 0 to 1. |
| 1D0☐H | Logging enable/disable setting range error | A value other than 0 and 1 is set in CH☐ Logging enable/disable setting. | Set CH☐ Logging enable/disable setting to 0 or 1. |
| 1D1☐H | Logging cycle setting value range error | A value out of the range is set in CH☐ Logging cycle setting value and/or CH☐ Logging cycle unit setting. | Set one or both of CH☐ Logging cycle setting value and CH☐ Logging cycle unit setting to the values within the range. |
| 1D2☐H | Logging cycle setting disable error | CH☐ Logging cycle setting value and CH☐ Logging cycle unit setting are set so that the set logging cycle falls below the conversion cycle. | Set CH☐ Logging cycle setting value and CH☐ Logging cycle unit setting so that the logging cycle is not less than the conversion cycle of the object to be logged. |
| 1D3☐H | Logging data setting range error | A value other than 0 and 1 is set in CH☐ Logging data setting. | Set CH☐ Logging data setting to 0 or 1. |
| 1D4☐H | Post-trigger logging points setting range error | A value other than 1 to 1000 is set in CH☐ Post-trigger logging points. | Set CH☐ Post-trigger logging points to 1 to 1000. |
| 1D5☐H | Level trigger condition setting range error | A value other than 0 to 3 is set in CH☐ Level trigger condition setting. | Set CH☐ Level trigger condition setting to 0 to 3. |
| 1D6☐H | Trigger data setting range error | A value other than 0 to 9999 is set in CH☐ Trigger data. | Set CH☐ Trigger data to 0 to 9999. |
| 1D7☐H | Logging hold request range error | A value other than 0 and 1 is set in CH☐ Logging hold request. | Set CH☐ Logging hold request to 0 or 1. |
| 1D8☐H | Loading interrupt enable/ disable setting range error | A value other than 0 and 1 is set in CH☐ Loading interrupt enable/disable setting. | Set CH☐ Loading interrupt enable/disable setting to 0 or 1. |
| 1D9☐H | Logging read points setting value range error | A value other than 1 to 1000 is set in CH☐ Logging read points setting value. | Set CH☐ Logging read points setting value to 1 to 1000. |
| 1E50H | Offset/gain setting channel specification error | In the offset/gain setting, "1: Setting channel" is set for both CH☐ Offset/gain setting mode (offset specification) and CH☐ Offset/gain setting mode (gain specification), or "0: Disable" is set. | Correctly set CH☐ Offset/gain setting mode (offset specification) and CH☐ Offset/gain setting mode (gain specification). |
| 1E51H | User range data invalid (CH identification disabled) | An invalid value is set in the offset/gain setting. The number of the channel in which this error occurs cannot be identified. | Perform the offset/gain setting again for all channels where the user range is set.<br>If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |
| 1E6☐H | User range data invalid (CH identification allowed) | An invalid value is set in CH☐ Offset/gain setting. | Perform the offset/gain setting again for the channels where the error has occurred.<br>If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |
| 1E7☐H | Offset/gain value inversion error | The offset value and gain value to be saved in the flash memory are as follows:<br>Offset value ≥ Gain value | Perform the offset/gain setting again so that the following condition is satisfied:<br>Offset value < Gain value<br>When the 2-wire transmitter is connected, check whether 24VDC is supplied from the external power supply. |
| 1E8☐H | Offset/gain setting channel range error | A value other than 0 and 1 is set in CH☐ Offset/gain setting mode (offset specification) and CH☐ Offset/ gain setting mode (gain specification). | Set CH☐ Offset/gain setting mode (offset specification) and CH☐ Offset/gain setting mode (gain specification) to 0 or 1. |
| 1F00H | Hardware failure (minor) | A hardware failure (minor) has occurred in the module. | The module may be affected by noise. Review and adjust the cable wiring and the installation environment of the programmable controllers. After the adjustment, turn on and off 'Error clear request' (YF) to eliminate this error and resume the conversion.<br>If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |
| 3001H | Hardware failure (moderate) | A hardware failure (moderate) has occurred in the module. | Power off and on the module.<br>If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |
| 3030H | Flash memory error | The data in the flash memory is abnormal. | Check the digital output values.<br>If the values are abnormal, please consult your local Mitsubishi representative. |

# 3.5 List of Alarm Codes

If an alarm occurs during operation, the A/D converter module stores the alarm code into 'Latest alarm code' (Un\G2) of the buffer memory. Turning on 'Error clear request' (YF) clears the alarm code of 'Latest alarm code' (Un\G2).

☐ in alarm codes: This symbol indicates the number of the channel where an alarm has occurred. A numerical value of 0 to 5 is used to correspond to CH1 to CH6.

(CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5)

| Alarm code | Alarm name | Description and cause | Action |
|---|---|---|---|
| 080☐H | Process alarm (upper limit) | The process alarm (upper limit) has occurred in CH☐. | Adjust CH☐ Digital operation value to fall within the set range. As a result, the corresponding bit of CH☐ Warning output flag (process alarm upper limit) or CH☐ Warning output flag (process alarm lower limit) and 'Warning output signal' (X8) turn off. |
| 081☐H | Process alarm (lower limit) | The process alarm (lower limit) has occurred in CH☐. | |
| 082☐H | Rate alarm (upper limit) | The rate alarm (upper limit) has occurred in CH☐. | Adjust the change rate in CH☐ Digital output value to fall within the set range. As a result, the corresponding bit of CH☐ Warning output flag (rate alarm upper limit) or CH☐ Warning output flag (rate alarm lower limit) and 'Warning output signal' (X8) turn off. |
| 083☐H | Rate alarm (lower limit) | The rate alarm (lower limit) has occurred in CH☐. | |
| 090☐H | Input signal error detection (upper limit) | An input signal error (upper limit) has been detected in CH☐. | The following operations are performed by turning on and off 'Error clear request' (YF) after the analog input value returns within the setting range.<br>• All the bits of CH☐ Input signal error detection flag are set to Normal (0).<br>• 'Input signal error detection signal' (XC) turns off.<br>• 'Latest alarm code' (Un\G2) is cleared. |
| 091☐H | Input signal error detection (lower limit) | An input signal error (lower limit) has been detected in CH☐. | |
| 0A0☐H | Input signal error detection (disconnection) | An input signal error (disconnection) has been detected in CH☐. | |

# APPENDICES

# Appendix 1 Module Label

The functions of the A/D converter module can be set by using module labels.

## Module labels of I/O signals

The module label name of an I/O signal is defined with the following structure:
"Module name"_"Module number".b"Label name" or "Module name"_"Module number".b"Label name"_D

Ex.
R60ADDG_1.bModuleREADY_D

### ■Module name

The character string of a module model name is given.

### ■Module number

A number starting from 1 is added to identify modules that have the same module name.

### ■Label name

The label identifier unique to a module is given.

### ■_D

This string indicates that the module label is for the direct access input (DX) or direct access output (DY). A module label without the string is for the input (X) or output (Y) of the refresh processing.

## Module labels of buffer memory areas

The module label name of a buffer memory area is defined with the following structure:
"Module name"_"Module number"."Data type"_D["(Channel)"]."Data format""Label name"_D

Ex.
R60ADDG_1.stnMonitor_D[0].wDigitalOutputValue_D

### ■Module name

The character string of a module model name is given.

### ■Module number

A number starting from 1 is added to identify modules that have the same module name.

### ■Data type

The data type to sort a buffer memory area is given. Each data type is as follows:

| Data type | Description |
|---|---|
| stnMonitor | Monitor |
| stnControl | Control |
| stnSetting | Setting |

### ■Channel

The channel number corresponding to a module label is given. A numerical value of 0 to 5 is used to correspond to CH1 to CH6.
(CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5)

## ■Data format

The string that represents the data size of a buffer memory area is given. Each data format is as follows:

| Data format | Description |
|---|---|
| u | Word [Unsigned]/Bit string [16-bit] |
| w | Word [Signed] |
| d | Double word [Signed] |
| z | System area |

## ■Label name

The label identifier unique to a module is given.

## ■_D

This string indicates that the module label is for the direct access. A module label without the string is for the auto refresh. The following table shows the differences between the auto refresh and direct access.

| Type | Description | Access timing | Example |
|---|---|---|---|
| Auto refresh | Values that are read from or written to the module label are reflected in the module collectively at the auto refresh. The run time of the program can be reduced. To use the auto refresh, set "Target" to "Module Label" in "Refresh settings" of "Module Parameter". | At auto refresh | R60ADDG_1.stnMonitor[0].wDigitalOutputValue |
| Direct access | Values that are read from or written to the module label is reflected in the module instantly. Compared with the auto refresh, the run time of the program becomes longer. However, the responsiveness is high. | At reading/writing from/to the module label | R60ADDG_1.stnMonitor_D[0].wDigitalOutputValue_D |

# Appendix 2 I/O Signals

## List of I/O signals

The following table lists the I/O signals of the A/D converter module.
For details on the I/O signals, refer to the following.
☞ Page 122 Details of input signals
☞ Page 132 Details of output signals

**Point**

- The I/O number (X/Y) described below shows the case that the start I/O number of the A/D converter module is set to "0".
- Do not use the "Use prohibited" signals shown below because the system uses them. If users use (turn on) the signals, the functions of the A/D converter module cannot be guaranteed.

### Input signal

| Device number | Signal name | |
|---|---|---|
| X0 | Module READY | |
| X1 | Use prohibited | |
| X2 | Use prohibited | |
| X3 | Use prohibited | |
| X4 | Use prohibited | |
| X5 | Use prohibited | |
| X6 | External power supply READY flag | |
| X7 | Use prohibited | |
| X8 | Warning output signal | |
| X9 | Operating condition setting completed flag | |
| XA | Offset/gain setting mode status flag | |
| XB | Channel change completed flag | |
| XC | In the normal mode | Input signal error detection signal |
| | In the offset/gain setting mode | Offset/gain change completed flag |
| XD | Maximum value/minimum value reset completed flag | |
| XE | A/D conversion completed flag | |
| XF | Error flag | |

## Output signal

| Device number | Signal name |
|---|---|
| Y0 | Use prohibited |
| Y1 | Use prohibited |
| Y2 | Use prohibited |
| Y3 | Use prohibited |
| Y4 | Use prohibited |
| Y5 | Use prohibited |
| Y6 | Use prohibited |
| Y7 | Use prohibited |
| Y8 | Use prohibited |
| Y9 | Operating condition setting request |
| YA | User range write request |
| YB | Channel change request |
| YC | Offset/gain change request |
| YD | Maximum value/minimum value reset request |
| YE | Use prohibited |
| YF | Error clear request |

# Details of input signals

The following describes the details of the input signals for the A/D converter module which are assigned to the CPU module. The I/O numbers (X/Y) described in Appendix 2 are for the case when the start I/O number of the A/D converter module is set to 0.

**Point**

This section describes buffer memory addresses for CH1.
For details on the buffer memory addresses after CH2, refer to the following.
☞ Page 134 List of buffer memory addresses

## Module READY

'Module READY' (X0) turns on to indicate the preparation for the A/D conversion is completed after the power-on or after the reset operation of the CPU module.
In the following cases, 'Module READY' (X0) turns off.

- In the offset/gain setting mode (In this case, the A/D conversion is performed.)
- When a watchdog timer error occurs in the A/D converter module (In this case, the A/D conversion is not performed.)

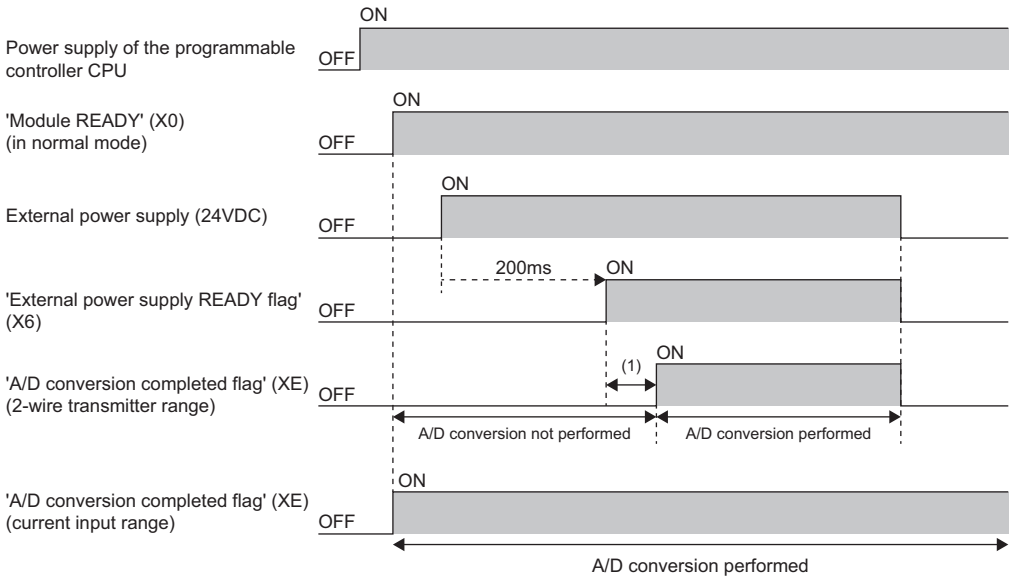
### ■Device number

The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| Module READY | X0 |

## External power supply READY flag

- When the external power supply is off, or when 200ms have not passed after it is turned on, 'External power supply READY flag' (X6) remains turned off, and for the 2-wire transmitter range channel, neither A/D conversion processing nor power supply to the 2-wire transmitter is performed. In this case, 'A/D conversion completed flag' (XE) turns off.
- When the external power supply is turned on and 200ms have passed, 'External power supply READY flag' (X6) turns on, and for the 2-wire transmitter range channel where conversion is enabled, A/D conversion processing and power supply to the 2-wire transmitter start.




(1) A/D conversion processing is not performed until the time set in 'CH1 Conversion start time setting (for 2-wire transmitter)' (Un\G532) is passed.

- When the external power supply is turned off, 'External power supply READY flag' (X6) turns off, and for the 2-wire transmitter range, A/D conversion processing and power supply to the 2-wire transmitter stop. In this case, 'A/D conversion completed flag' (XE) turns off.
- For the current input range channel, even if the external power supply is off, A/D conversion processing is performed. Even if the external power supply is turned off, A/D conversion processing continues, and 'A/D conversion completed flag' (XE) remains turned on.

**Point**

- The A/D conversion processing status change by turning on/off the external power supply can be checked with 'A/D conversion completed flag' (XE).
- If the external power supply does not satisfy the requirements of the performance specifications, 'External power supply READY flag' (X6) does not turn on. For details on the performance specifications, refer to the following.

MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Startup)

### ■Device number

The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| External power supply READY flag | X6 |

## Warning output signal

'Warning output signal' (X8) turns on when the process alarm or rate alarm has been detected. When the warning output function is disabled for all channels, 'Warning output signal' (X8) always turns off.

### ■Device number

The following shows the device number of this input signal.

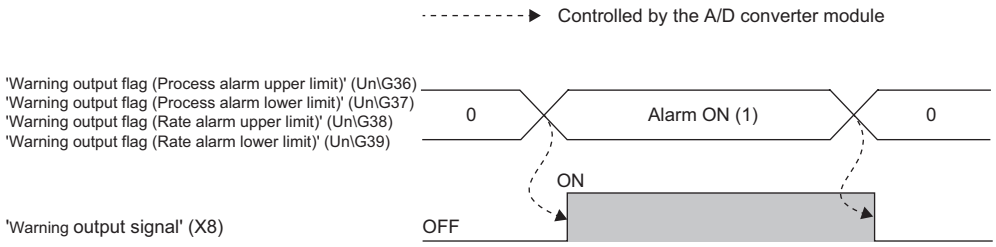
| Signal name | CH1 to CH6 |
|---|---|
| Warning output signal | X8 |

### ■Process alarm

- 'Warning output signal' (X8) turns on when digital operation values of the A/D conversion enabled channels exceed the ranges set for 'CH1 Process alarm upper upper limit value' (Un\G514) to 'CH1 Process alarm lower lower limit value' (Un\G520) after 'CH1 Warning output setting (process alarm)' (Un\G512) is enabled. The ALM LED also turns on along with the on of the signal.
- Warning output signal (X8) turns off when the digital operation values fall within the setting range for all the A/D conversion enabled channels. The ALM LED also turns off along with the off of the signal.

### ■Rate alarm

- 'Warning output signal' (X8) turns on when the change rate of the digital output values of the A/D conversion enabled channels exceed the ranges set for 'CH1 Rate alarm upper limit value' (Un\G524) to 'CH1 Rate alarm lower limit value' (Un\G526) after 'CH1 Warning output setting (rate alarm)' (Un\G513) is enabled. The ALM LED also turns on along with the on of the signal.
- Warning output signal (X8) turns off when the change rate of the digital output values falls within the setting range for all the A/D conversion enabled channels. The ALM LED also turns off along with the off of the signal.



## Operating condition setting completed flag

### ■Device number

The following shows the device number of this input signal.

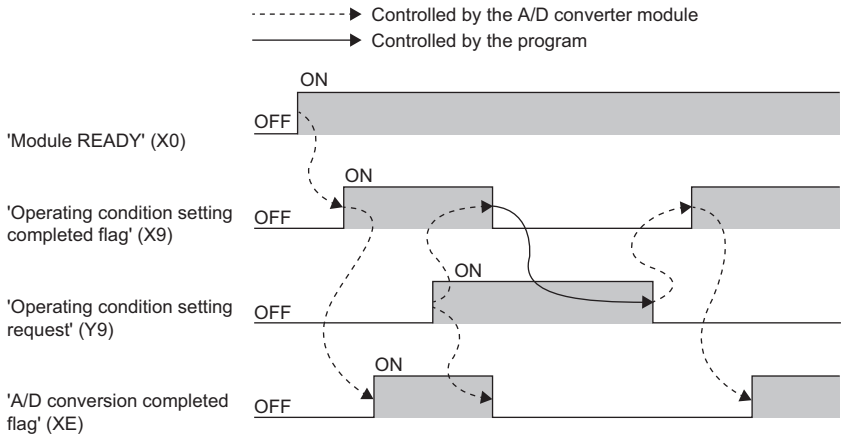
| Signal name | CH1 to CH6 |
|---|---|
| Operating condition setting completed flag | X9 |

When changing values of the buffer memory, use Operating condition setting completed flag (X9) as an interlock condition to turn on and off 'Operating condition setting request' (Y9). For the buffer memory addresses which require turning on and off of 'Operating condition setting request' (Y9) to enable the changed values, refer to the following.

☞ Page 134 List of buffer memory addresses

When 'Operating condition setting completed flag' (X9) is off, the A/D conversion is not performed.

When 'Operating condition setting request' (Y9) is on, 'Operating condition setting completed flag' (X9) turns off.



## Offset/gain setting mode status flag

### ■Device number

The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| Offset/gain setting mode status flag | XA |

### ■In the offset/gain setting mode

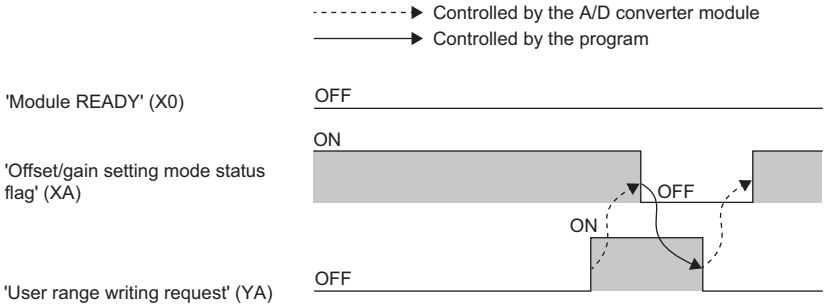
When registering the value, which has been adjusted with the offset/gain setting, use Offset/gain setting mode status flag (XA) as an interlock condition to turn on and off 'User range write request' (YA).

When the offset/gain setting is configured from the offset/gain setting window of an engineering tool, the setting is performed properly on the window. Therefore, a program is not required to perform the setting.

When a sequence program used for the MELSEC-Q series A/D converter module is utilized to configure the offset/gain setting, check that this flag is used as an interlock.

For the sequence programs for the MELSEC-Q series A/D converter module, refer to the following.

📖 MELSEC-Q Channel Isolated Analog-Digital Converter Module/Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual

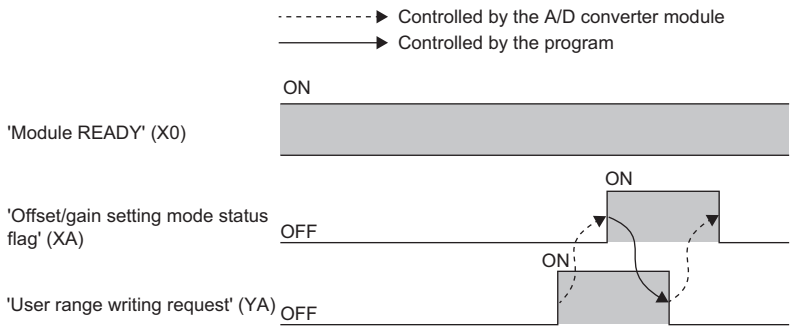



### ■In the normal mode

In the user range setting restoration, use Offset/gain setting mode status flag (XA) as an interlock condition to turn on and off 'User range write request' (YA).

For user range setting restoration, refer to the following.

☞ Page 92 Backing up, Saving, and Restoring Offset/Gain Values



## Channel change completed flag

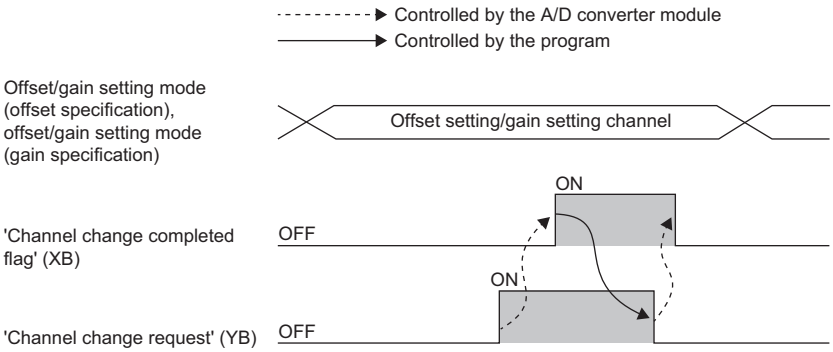
When changing a channel to perform the offset/gain setting, use Channel change completed flag (XB) as an interlock condition to turn on and off 'Channel change request' (YB).

When the offset/gain setting is configured from the offset/gain setting window of an engineering tool, the setting is performed properly on the window. Therefore, a program is not required to perform the setting.

When a sequence program used for the MELSEC-Q series A/D converter module is utilized to configure the offset/gain setting, check that this flag is used as an interlock.

For the sequence programs for the MELSEC-Q series A/D converter module, refer to the following.

MELSEC-Q Channel Isolated Analog-Digital Converter Module/Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual




### ■Device number

The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| Channel change completed flag | XB |

A

## Input signal error detection signal

### ■Device number

The following shows the device number of this input signal in the normal mode.

| Signal name | CH1 to CH6 |
|---|---|
| Input signal error detection signal | XC |

### ■Turning on 'Input signal error detection signal' (XC)

Input signal error detection signal (XC) turns on when an analog input value exceeds the range set with 'CH1 Input signal error detection lower limit set value' (Un\G529) or 'CH1 Input signal error detection upper limit set value' (Un\G530) in any channel which has been A/D conversion-enabled, after the detection condition is set in 'CH1 Input signal error detection setting' (Un\G528). When the simple disconnection detection is set, the signal ignores the settings for 'CH1 Input signal error detection lower limit set value' (Un\G529) and 'CH1 Input signal error detection upper limit set value' (Un\G530) and turns on at the disconnection detection.

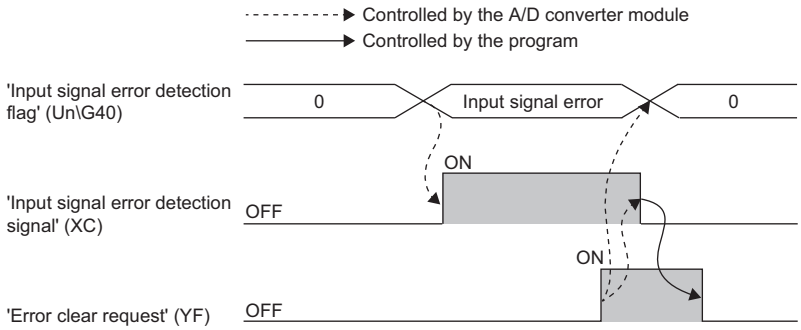
When 'Input signal error detection signal' (XC) turns on, the following operations are performed.

- 'CH1 Digital output value' (Un\G400) and 'CH1 Digital operation value' (Un\G402) hold the digital value just before the error was detected.
- The ALM LED flashes.
- In Q compatible mode, the corresponding bit of 'A/D conversion completed flag' (Un\G10) turns off. In R mode, the corresponding bit of 'A/D conversion completed flag' (Un\G42) remains on.

### ■Turning off 'Input signal error detection signal' (XC)

When 'Input signal error detection signal' (XC) turns off, the following operations are performed.

- The ALM LED turns off.
- 'Latest alarm code' (Un\G2) is cleared.




### ■'Input signal error detection auto-clear enable/disable setting' (Un\G302) is set to Disable (1)

The following operations are performed by turning on and off 'Error clear request' (YF) after the cause of the input signal error is eliminated and the analog input value returns within the setting range.

- 'Input signal error detection signal' (XC) turns off.
- 'Input signal error detection flag' (Un\G40) turns off.
- The ALM LED turns off.
- 'Latest alarm code' (Un\G2) is cleared.

### ■'Input signal error detection auto-clear enable/disable setting' (Un\G302) is set to Enable (0)

The following operations are performed after the cause of the input signal error is eliminated and the analog input value returns within the setting range.

- 'Input signal error detection signal' (XC) turns off.
- 'Input signal error detection flag' (Un\G40) turns off.
- The ALM LED turns off.

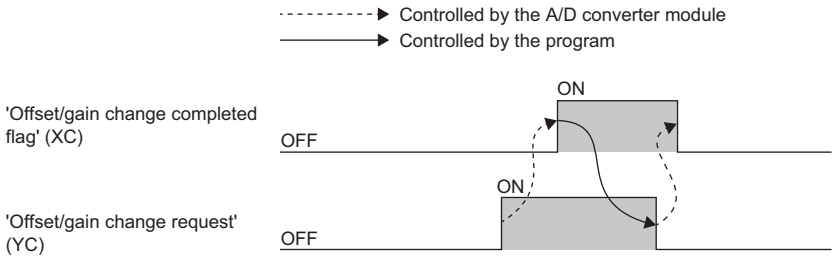
**Point**

- Averaging processing starts over after the A/D conversion resumes.
- 'Input signal error detection signal' (XC) operates only when the input signal error detection function is enabled. When the input signal error detection function is disabled, 'Input signal error detection signal' (XC) always turns off.

## Offset/gain change completed flag

When changing the offset/gain value, use Offset/gain change completed flag (XC) as an interlock condition to turn on and off 'Offset/gain change request' (YC).

When the offset/gain setting is configured from the offset/gain setting window of an engineering tool, the setting is performed properly on the window. Therefore, a program is not required to perform the setting.




### ■Device number

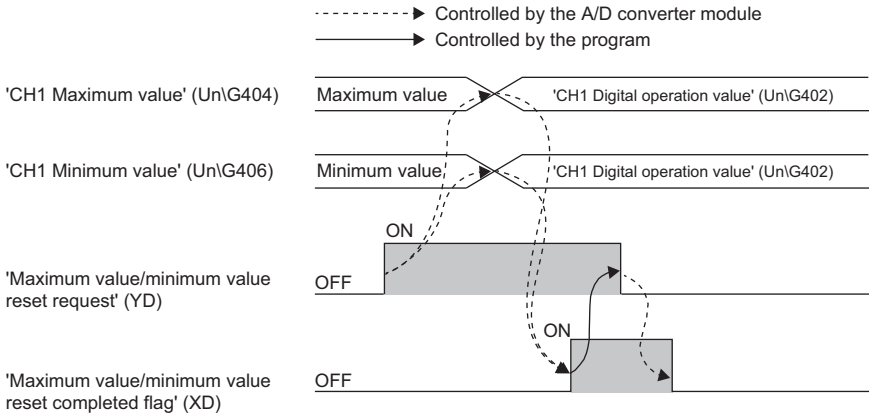
The following shows the device number of this input signal in the offset/gain setting mode.

| Signal name | CH1 to CH6 |
|---|---|
| Offset/gain change completed flag | XC |

## Maximum value/minimum value reset completed flag

Maximum value/minimum value reset completed flag (XD) turns on after the maximum and minimum values stored in 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406) are reset by turning on 'Maximum value/minimum value reset request' (YD).

The flag turns off when 'Maximum value/minimum value reset request' (YD) is turned off.




### ■Device number

The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| Maximum value/minimum value reset completed flag | XD |

## A/D conversion completed flag

A/D conversion completed flag (XE) turns on when all conversion enabled channels are converted.

### ■Device number

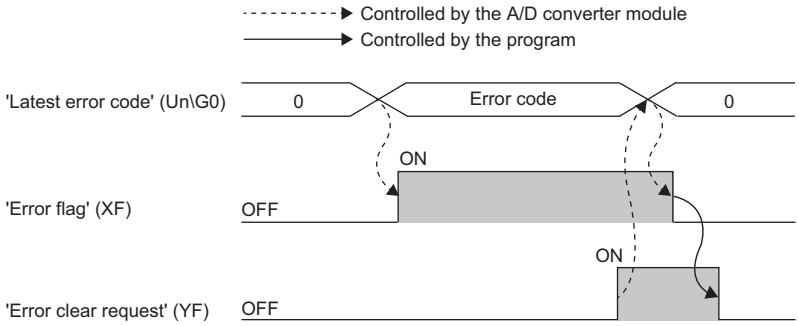
The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| A/D conversion completed flag | XE |

## Error flag

'Error flag' (XF) turns on when an error occurs.

Turn on and off 'Error clear request' (YF) to clear 'Latest error code' (Un\G0) and 'Latest alarm code' (Un\G2).




### ■Device number

The following shows the device number of this input signal.

| Signal name | CH1 to CH6 |
|---|---|
| Error flag | XF |

A

# Details of output signals

The following describes the details of the output signals for the A/D converter module which are assigned to the CPU module. The I/O numbers (X/Y) described in Appendix 2 are for the case when the start I/O number of the A/D converter module is set to 0.

**Point**

This section describes buffer memory addresses for CH1.
For details on the buffer memory addresses after CH2, refer to the following.
☞ Page 134 List of buffer memory addresses

## Operating condition setting request

Turn on and off Operating condition setting request (Y9) to enable the setting of the A/D converter module.
For the timing of turning the signal on and off, refer to the following.
☞ Page 125 Operating condition setting completed flag
For details on the buffer memory areas to be enabled, refer to the following.
☞ Page 134 List of buffer memory addresses

### ■Device number

The following shows the device number of this output signal.

| Signal name | CH1 to CH6 |
|---|---|
| Operating condition setting request | Y9 |

## User range write request

### ■Device number

The following shows the device number of this output signal.

| Signal name | CH1 to CH6 |
|---|---|
| User range write request | YA |

### ■In the offset/gain setting mode

Turn on and off User range write request (YA) to register values adjusted with the offset/gain setting in the A/D converter module. The data is written to the flash memory when this signal is turned on.
For the timing of turning the signal on and off, refer to the following.
☞ Page 126 In the offset/gain setting mode

### ■In the normal mode

Turn on and off User range write request (YA) to restore the user range.
For the timing of turning the signal on and off, refer to the following.
☞ Page 126 In the normal mode

## Channel change request

Turn on and off Channel change request (YB) to change a channel to perform the offset/gain setting.

For the timing of turning the signal on and off, refer to the following.

☞ Page 127 Channel change completed flag

### ■Device number

The following shows the device number of this output signal.

| Signal name | CH1 to CH6 |
|---|---|
| Channel change request | YB |

## Offset/gain change request

Turn on and off Offset/gain change request (YC) to change the offset/gain value.

For the timing of turning the signal on and off, refer to the following.

☞ Page 130 Offset/gain change completed flag

### ■Device number

The following shows the device number of this output signal.

| Signal name | CH1 to CH6 |
|---|---|
| Offset/gain change request | YC |

## Maximum value/minimum value reset request

Turn on and off 'Maximum value/minimum value reset request' (YD) to clear the maximum and minimum values stored in 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406).

For the timing of turning the signal on and off, refer to the following.

☞ Page 130 Maximum value/minimum value reset completed flag

### ■Device number

The following shows the device number of this output signal.

| Signal name | CH1 to CH6 |
|---|---|
| Maximum value/minimum value reset request | YD |

## Error clear request

Turn on and off Error clear request (YF) to clear 'Error flag' (XF), 'Input signal error detection signal' (XC), 'Latest error code' (Un\G0), and 'Latest alarm code' (Un\G2). For the timing of turning the signal on and off, refer to the following.

☞ Page 128 Input signal error detection signal

☞ Page 131 Error flag

### ■Device number

The following shows the device number of this output signal.

| Signal name | CH1 to CH6 |
|---|---|
| Error clear request | YF |

# Appendix 3 Buffer Memory

## List of buffer memory addresses

The following table lists the buffer memory addresses of the A/D converter module. For details on the buffer memory addresses, refer to the following.

☞ Page 149 Details of buffer memory addresses

The buffer memory areas of the A/D converter module are classified by the following data types.

| Data type | Description | |
|---|---|---|
| Setting data | Description | Set this data according to the connected device and the use of the system. |
| | Read/write attribute | Data can be read and written from/to this area. |
| | Setting procedure | Set this data using an engineering tool or in a program. |
| | Setting timing | After changing the values, turn on and off 'Operating condition setting request' (Y9) to enable the set values. |
| Control data | Description | Use this data to control the A/D converter module. |
| | Read/write attribute | Data can be read and written from/to this area. |
| | Setting procedure | Set this data using an engineering tool or in a program. |
| | Setting timing | As soon as the values are changed, the set values become enabled. |
| Monitor data | Description | Use this data to monitor the status of the A/D converter module. |
| | Read/write attribute | Writing data is only allowed. Reading data is not allowed. |
| | Setting procedure | — |
| | Setting timing | — |
| User range setting data | Description | Use this data to update the user range setting of the A/D converter module. |
| | Read/write attribute | Data can be read and written from/to this area. |
| | Setting procedure | Set this data using an engineering tool or in a program. |
| | Setting timing | After changing the values, turn on and off 'User range write request' (YA) to enable the set values. |

**Point**

Do not write data to the system areas and areas whose data types are monitor in the buffer memory. Writing data into these areas can cause the malfunction of the module.

## In R mode

### ■Un\G0 to Un\G399

| Address (decimal) | Address (hexadecimal) | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|
| 0 | 0H | Latest error code | 0 | Monitor | ○ |
| 1 | 1H | Latest address of error history | 0 | Monitor | ○ |
| 2 | 2H | Latest alarm code | 0 | Monitor | ○ |
| 3 | 3H | Latest address of alarm history | 0 | Monitor | ○ |
| 4 to 19 | 4H to 13H | Interrupt factor detection flag [n]*1 | 0 | Monitor | ○ |
| 20 to 35 | 14H to 23H | System area | — | — | — |
| 36 | 24H | Warning output flag (Process alarm upper limit) | 0000H | Monitor | ○ |
| 37 | 25H | Warning output flag (Process alarm lower limit) | 0000H | Monitor | ○ |
| 38 | 26H | Warning output flag (Rate alarm upper limit) | 0000H | Monitor | ○ |
| 39 | 27H | Warning output flag (Rate alarm lower limit) | 0000H | Monitor | ○ |
| 40 | 28H | Input signal error detection flag | 0000H | Monitor | ○ |
| 41 | 29H | System area | — | — | — |
| 42 | 2AH | A/D conversion completed flag | 0000H | Monitor | ○ |
| 43 to 69 | 2BH to 45H | System area | — | — | — |
| 70 | 46H | RUN LED status monitor | 0000H | Monitor | × |
| 71 | 47H | ERR LED status monitor | 0000H | Monitor | × |
| 72 | 48H | ALM LED status monitor | 0000H | Monitor | × |
| 73 to 89 | 49H to 59H | System area | — | — | — |
| 90 | 5AH | Level data 0 | 0 | Control | ○ |
| 91 | 5BH | Level data 1 | 0 | Control | ○ |
| 92 | 5CH | Level data 2 | 0 | Control | ○ |
| 93 | 5DH | Level data 3 | 0 | Control | ○ |
| 94 | 5EH | Level data 4 | 0 | Control | ○ |
| 95 | 5FH | Level data 5 | 0 | Control | ○ |
| 96 | 60H | Level data 6 | 0 | Control | ○ |
| 97 | 61H | Level data 7 | 0 | Control | ○ |
| 98 | 62H | Level data 8 | 0 | Control | ○ |
| 99 | 63H | Level data 9 | 0 | Control | ○ |
| 100 to 123 | 64H to 7BH | System area | — | — | — |
| 124 to 139 | 7CH to 8BH | Interrupt factor mask [n]*1 | 0 | Control | × |
| 140 to 155 | 8CH to 9BH | System area | — | — | — |
| 156 to 171 | 9CH to ABH | Interrupt factor reset request [n]*1 | 0 | Control | × |
| 172 to 199 | ACH to C7H | System area | — | — | — |
| 200 to 215 | C8H to D7H | Interrupt factor generation setting [n]*1 | 0 | Setting | × |
| 216 to 231 | D8H to E7H | System area | — | — | — |
| 232 to 247 | E8H to F7H | Condition target setting [n]*1 | 0 | Setting | × |
| 248 to 263 | F8H to 107H | System area | — | — | — |
| 264 to 279 | 108H to 117H | Condition target channel setting [n]*1 | 0 | Setting | × |
| 280 to 295 | 118H to 127H | System area | — | — | — |
| 296 | 128H | Mode switching setting (L) | 0 | Setting | × |
| 297 | 129H | Mode switching setting (H) | 0 | Setting | × |
| 298 to 301 | 12AH to 12DH | System area | — | — | — |
| 302 | 12EH | Input signal error detection auto-clear enable/disable setting | 1 | Setting | × |
| 303 to 399 | 12FH to 18FH | System area | — | — | — |

*1 [n] in the table indicates an interrupt setting number. (n = 1 to 16)

## ■Un\G400 to Un\G3599

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 400 (190H) | 600 (258H) | 800 (320H) | 1000 (3E8H) | 1200 (4B0H) | 1400 (578H) | CH□ Digital output value | 0 | Monitor | ○ |
| 401 (191H) | 601 (259H) | 801 (321H) | 1001 (3E9H) | 1201 (4B1H) | 1401 (579H) | System area | — | — | — |
| 402 (192H) | 602 (25AH) | 802 (322H) | 1002 (3EAH) | 1202 (4B2H) | 1402 (57AH) | CH□ Digital operation value | 0 | Monitor | ○ |
| 403 (193H) | 603 (25BH) | 803 (323H) | 1003 (3EBH) | 1203 (4B3H) | 1403 (57BH) | System area | — | — | — |
| 404 (194H) | 604 (25CH) | 804 (324H) | 1004 (3ECH) | 1204 (4B4H) | 1404 (57CH) | CH□ Maximum value | 0 | Monitor | ○ |
| 405 (195H) | 605 (25DH) | 805 (325H) | 1005 (3EDH) | 1205 (4B5H) | 1405 (57DH) | System area | — | — | — |
| 406 (196H) | 606 (25EH) | 806 (326H) | 1006 (3EEH) | 1206 (4B6H) | 1406 (57EH) | CH□ Minimum value | 0 | Monitor | ○ |
| 407 (197H) | 607 (25FH) | 807 (327H) | 1007 (3EFH) | 1207 (4B7H) | 1407 (57FH) | System area | — | — | — |
| 408 (198H) | 608 (260H) | 808 (328H) | 1008 (3F0H) | 1208 (4B8H) | 1408 (580H) | CH□ Difference conversion status flag | 0 | Monitor | ○ |
| 409 (199H) | 609 (261H) | 809 (329H) | 1009 (3F1H) | 1209 (4B9H) | 1409 (581H) | CH□ Logging hold flag | 0 | Monitor | ○ |
| 410 (19AH) | 610 (262H) | 810 (32AH) | 1010 (3F2H) | 1210 (4BAH) | 1410 (582H) | CH□ Digital output value (32 bits) (L) | 0 | Monitor | ○ |
| 411 (19BH) | 611 (263H) | 811 (32BH) | 1011 (3F3H) | 1211 (4BBH) | 1411 (583H) | CH□ Digital output value (32 bits) (H) | 0 | Monitor | ○ |
| 412 (19CH) | 612 (264H) | 812 (32CH) | 1012 (3F4H) | 1212 (4BCH) | 1412 (584H) | CH□ Supply power temporary stop status flag (for 2-wire transmitter) | 0 | Monitor | ○ |
| 413 to 429 (19DH to 1ADH) | 613 to 629 (265H to 275H) | 813 to 829 (32DH to 33DH) | 1013 to 1029 (3F5H to 405H) | 1213 to 1229 (4BDH to 4CDH) | 1413 to 1429 (585H to 595H) | System area | — | — | — |
| 430 (1AEH) | 630 (276H) | 830 (33EH) | 1030 (406H) | 1230 (4CEH) | 1430 (596H) | CH□ Range setting monitor | 0000H | Monitor | × |
| 431 (1AFH) | 631 (277H) | 831 (33FH) | 1031 (407H) | 1231 (4CFH) | 1431 (597H) | System area | — | — | — |
| 432 (1B0H) | 632 (278H) | 832 (340H) | 1032 (408H) | 1232 (4D0H) | 1432 (598H) | CH□ Difference conversion reference value | 0000H | Monitor | × |
| 433 (1B1H) | 633 (279H) | 833 (341H) | 1033 (409H) | 1233 (4D1H) | 1433 (599H) | System area | — | — | — |
| 434 (1B2H) | 634 (27AH) | 834 (342H) | 1034 (40AH) | 1234 (4D2H) | 1434 (59AH) | CH□ Head pointer | 0 | Monitor | × |
| 435 (1B3H) | 635 (27BH) | 835 (343H) | 1035 (40BH) | 1235 (4D3H) | 1435 (59BH) | CH□ Latest pointer | 0 | Monitor | × |
| 436 (1B4H) | 636 (27CH) | 836 (344H) | 1036 (40CH) | 1236 (4D4H) | 1436 (59CH) | CH□ Number of logging data | 0 | Monitor | × |
| 437 (1B5H) | 637 (27DH) | 837 (345H) | 1037 (40DH) | 1237 (4D5H) | 1437 (59DH) | CH□ Trigger pointer | 0 | Monitor | × |
| 438 (1B6H) | 638 (27EH) | 838 (346H) | 1038 (40EH) | 1238 (4D6H) | 1438 (59EH) | CH□ Current logging read pointer | -1 | Monitor | × |
| 439 (1B7H) | 639 (27FH) | 839 (347H) | 1039 (40FH) | 1239 (4D7H) | 1439 (59FH) | CH□ Previous logging read pointer | -1 | Monitor | × |
| 440 (1B8H) | 640 (280H) | 840 (348H) | 1040 (410H) | 1240 (4D8H) | 1440 (5A0H) | CH□ Logging read points monitored value | 0 | Monitor | × |
| 441 (1B9H) | 641 (281H) | 841 (349H) | 1041 (411H) | 1241 (4D9H) | 1441 (5A1H) | CH□ Logging cycle monitored value (s) | 0 | Monitor | × |
| 442 (1BAH) | 642 (282H) | 842 (34AH) | 1042 (412H) | 1242 (4DAH) | 1442 (5A2H) | CH□ Logging cycle monitored value (ms) | 0 | Monitor | × |

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 443 (1BBH) | 643 (283H) | 843 (34BH) | 1043 (413H) | 1243 (4DBH) | 1443 (5A3H) | System area | — | — | — |
| 444 (1BCH) | 644 (284H) | 844 (34CH) | 1044 (414H) | 1244 (4DCH) | 1444 (5A4H) | CH□ Trigger generation time (First/Last two digits of the year) | 0 | Monitor | × |
| 445 (1BDH) | 645 (285H) | 845 (34DH) | 1045 (415H) | 1245 (4DDH) | 1445 (5A5H) | CH□ Trigger generation time (Month/Day) | 0 | Monitor | × |
| 446 (1BEH) | 646 (286H) | 846 (34EH) | 1046 (416H) | 1246 (4DEH) | 1446 (5A6H) | CH□ Trigger generation time (Hour/Minute) | 0 | Monitor | × |
| 447 (1BFH) | 647 (287H) | 847 (34FH) | 1047 (417H) | 1247 (4DFH) | 1447 (5A7H) | CH□ Trigger generation time (Second/Day of the week) | 0 | Monitor | × |
| 448 (1C0H) | 648 (288H) | 848 (350H) | 1048 (418H) | 1248 (4E0H) | 1448 (5A8H) | CH□ Trigger generation time (Millisecond) | 0 | Monitor | × |
| 449 to 469 (1C1H to 1D5H) | 649 to 669 (289H to 29DH) | 849 to 869 (351H to 365H) | 1049 to 1069 (419H to 42DH) | 1249 to 1269 (4E1H to 4F5H) | 1449 to 1469 (5A9H to 5BDH) | System area | — | — | — |
| 470 (1D6H) | 670 (29EH) | 870 (366H) | 1070 (42EH) | 1270 (4F6H) | 1470 (5BEH) | CH□ Difference conversion trigger | 0 | Control | ○ |
| 471 (1D7H) | 671 (29FH) | 871 (367H) | 1071 (42FH) | 1271 (4F7H) | 1471 (5BFH) | CH□ Logging hold request | 0 | Control | ○ |
| 472 (1D8H) | 672 (2A0H) | 872 (368H) | 1072 (430H) | 1272 (4F8H) | 1472 (5C0H) | CH□ Conversion value shift amount | 0 | Control | ○ |
| 473 (1D9H) | 673 (2A1H) | 873 (369H) | 1073 (431H) | 1273 (4F9H) | 1473 (5C1H) | CH□ Supply power temporary stop trigger (for 2-wire transmitter) | 0 | Control | ○ |
| 474 to 499 (1DAH to 1F3H) | 674 to 699 (2A2H to 2BBH) | 874 to 899 (36AH to 383H) | 1074 to 1099 (432H to 44BH) | 1274 to 1299 (4FAH to 513H) | 1474 to 1499 (5C2H to 5DBH) | System area | — | — | — |
| 500 (1F4H) | 700 (2BCH) | 900 (384H) | 1100 (44CH) | 1300 (514H) | 1500 (5DCH) | CH□ A/D conversion enable/disable setting | 1 | Setting | × |
| 501 (1F5H) | 701 (2BDH) | 901 (385H) | 1101 (44DH) | 1301 (515H) | 1501 (5DDH) | CH□ Averaging processing specification | 0 | Setting | × |
| 502 (1F6H) | 702 (2BEH) | 902 (386H) | 1102 (44EH) | 1302 (516H) | 1502 (5DEH) | CH□ Time average/Count average/Moving average/Primary delay filter constant setting | 0 | Setting | × |
| 503 (1F7H) | 703 (2BFH) | 903 (387H) | 1103 (44FH) | 1303 (517H) | 1503 (5DFH) | System area | — | — | — |
| 504 (1F8H) | 704 (2C0H) | 904 (388H) | 1104 (450H) | 1304 (518H) | 1504 (5E0H) | CH□ Scaling enable/disable setting | 1 | Setting | × |
| 505 (1F9H) | 705 (2C1H) | 905 (389H) | 1105 (451H) | 1305 (519H) | 1505 (5E1H) | System area | — | — | — |
| 506 (1FAH) | 706 (2C2H) | 906 (38AH) | 1106 (452H) | 1306 (51AH) | 1506 (5E2H) | CH□ Scaling upper limit value | 0 | Setting | × |
| 507 (1FBH) | 707 (2C3H) | 907 (38BH) | 1107 (453H) | 1307 (51BH) | 1507 (5E3H) | System area | — | — | — |
| 508 (1FCH) | 708 (2C4H) | 908 (38CH) | 1108 (454H) | 1308 (51CH) | 1508 (5E4H) | CH□ Scaling lower limit value | 0 | Setting | × |
| 509 (1FDH) | 709 (2C5H) | 909 (38DH) | 1109 (455H) | 1309 (51DH) | 1509 (5E5H) | System area | — | — | — |
| 510 (1FEH) | 710 (2C6H) | 910 (38EH) | 1110 (456H) | 1310 (51EH) | 1510 (5E6H) | CH□ Digital clipping enable/disable setting | 1 | Setting | × |
| 511 (1FFH) | 711 (2C7H) | 911 (38FH) | 1111 (457H) | 1311 (51FH) | 1511 (5E7H) | System area | — | — | — |
| 512 (200H) | 712 (2C8H) | 912 (390H) | 1112 (458H) | 1312 (520H) | 1512 (5E8H) | CH□ Warning output setting (Process alarm) | 1 | Setting | × |
| 513 (201H) | 713 (2C9H) | 913 (391H) | 1113 (459H) | 1313 (521H) | 1513 (5E9H) | CH□ Warning output setting (Rate alarm) | 1 | Setting | × |
| 514 (202H) | 714 (2CAH) | 914 (392H) | 1114 (45AH) | 1314 (522H) | 1514 (5EAH) | CH□ Process alarm upper upper limit value | 0 | Setting | × |

A

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 515 (203H) | 715 (2CBH) | 915 (393H) | 1115 (45BH) | 1315 (523H) | 1515 (5EBH) | System area | — | — | — |
| 516 (204H) | 716 (2CCH) | 916 (394H) | 1116 (45CH) | 1316 (524H) | 1516 (5ECH) | CH□ Process alarm upper lower limit value | 0 | Setting | × |
| 517 (205H) | 717 (2CDH) | 917 (395H) | 1117 (45DH) | 1317 (525H) | 1517 (5EDH) | System area | — | — | — |
| 518 (206H) | 718 (2CEH) | 918 (396H) | 1118 (45EH) | 1318 (526H) | 1518 (5EEH) | CH□ Process alarm lower upper limit value | 0 | Setting | × |
| 519 (207H) | 719 (2CFH) | 919 (397H) | 1119 (45FH) | 1319 (527H) | 1519 (5EFH) | System area | — | — | — |
| 520 (208H) | 720 (2D0H) | 920 (398H) | 1120 (460H) | 1320 (528H) | 1520 (5F0H) | CH□ Process alarm lower lower limit value | 0 | Setting | × |
| 521 (209H) | 721 (2D1H) | 921 (399H) | 1121 (461H) | 1321 (529H) | 1521 (5F1H) | System area | — | — | — |
| 522 (20AH) | 722 (2D2H) | 922 (39AH) | 1122 (462H) | 1322 (52AH) | 1522 (5F2H) | CH□ Rate alarm warning detection cycle setting | 0 | Setting | × |
| 523 (20BH) | 723 (2D3H) | 923 (39BH) | 1123 (463H) | 1323 (52BH) | 1523 (5F3H) | System area | — | — | — |
| 524 (20CH) | 724 (2D4H) | 924 (39CH) | 1124 (464H) | 1324 (52CH) | 1524 (5F4H) | CH□ Rate alarm upper limit value | 0 | Setting | × |
| 525 (20DH) | 725 (2D5H) | 925 (39DH) | 1125 (465H) | 1325 (52DH) | 1525 (5F5H) | System area | — | — | — |
| 526 (20EH) | 726 (2D6H) | 926 (39EH) | 1126 (466H) | 1326 (52EH) | 1526 (5F6H) | CH□ Rate alarm lower limit value | 0 | Setting | × |
| 527 (20FH) | 727 (2D7H) | 927 (39FH) | 1127 (467H) | 1327 (52FH) | 1527 (5F7H) | System area | — | — | — |
| 528 (210H) | 728 (2D8H) | 928 (3A0H) | 1128 (468H) | 1328 (530H) | 1528 (5F8H) | CH□ Input signal error detection setting | 0 | Setting | × |
| 529 (211H) | 729 (2D9H) | 929 (3A1H) | 1129 (469H) | 1329 (531H) | 1529 (5F9H) | CH□ Input signal error detection lower limit set value | 50 | Setting | × |
| 530 (212H) | 730 (2DAH) | 930 (3A2H) | 1130 (46AH) | 1330 (532H) | 1530 (5FAH) | CH□ Input signal error detection upper limit set value | 50 | Setting | × |
| 531 (213H) | 731 (2DBH) | 931 (3A3H) | 1131 (46BH) | 1331 (533H) | 1531 (5FBH) | System area | — | — | — |
| 532 (214H) | 732 (2DCH) | 932 (3A4H) | 1132 (46CH) | 1332 (534H) | 1532 (5FCH) | CH□ Conversion start time setting (for 2-wire transmitter) | 30 | Setting | × |
| 533 to 534 (215H to 216H) | 733 to 734 (2DDH to 2DEH) | 933 to 934 (3A5H to 3A6H) | 1133 to 1134 (46DH to 46EH) | 1333 to 1334 (535H to 536H) | 1533 to 1534 (5FDH to 5FEH) | System area | — | — | — |
| 535 (217H) | 735 (2DFH) | 935 (3A7H) | 1135 (46FH) | 1335 (537H) | 1535 (5FFH) | CH□ Logging enable/disable setting | 1 | Setting | × |
| 536 (218H) | 736 (2E0H) | 936 (3A8H) | 1136 (470H) | 1336 (538H) | 1536 (600H) | CH□ Logging data setting | 1 | Setting | × |
| 537 (219H) | 737 (2E1H) | 937 (3A9H) | 1137 (471H) | 1337 (539H) | 1537 (601H) | CH□ Logging cycle setting value | 160 | Setting | × |
| 538 (21AH) | 738 (2E2H) | 938 (3AAH) | 1138 (472H) | 1338 (53AH) | 1538 (602H) | CH□ Logging cycle unit setting | 1 | Setting | × |
| 539 (21BH) | 739 (2E3H) | 939 (3ABH) | 1139 (473H) | 1339 (53BH) | 1539 (603H) | CH□ Post-trigger logging points | 500 | Setting | × |
| 540 (21CH) | 740 (2E4H) | 940 (3ACH) | 1140 (474H) | 1340 (53CH) | 1540 (604H) | CH□ Level trigger condition setting | 0 | Setting | × |
| 541 (21DH) | 741 (2E5H) | 941 (3ADH) | 1141 (475H) | 1341 (53DH) | 1541 (605H) | CH□ Trigger data | *1 | Setting | × |
| 542 (21EH) | 742 (2E6H) | 942 (3AEH) | 1142 (476H) | 1342 (53EH) | 1542 (606H) | CH□ Trigger setting value | 0 | Setting | × |
| 543 (21FH) | 743 (2E7H) | 943 (3AFH) | 1143 (477H) | 1343 (53FH) | 1543 (607H) | System area | — | — | — |

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 544 (220H) | 744 (2E8H) | 944 (3B0H) | 1144 (478H) | 1344 (540H) | 1544 (608H) | CH☐ Loading interrupt enable/ disable setting | 1 | Setting | × |
| 545 (221H) | 745 (2E9H) | 945 (3B1H) | 1145 (479H) | 1345 (541H) | 1545 (609H) | CH☐ Logging read points setting value | 100 | Setting | × |
| 546 to 597 (222H to 255H) | 746 to 797 (2EAH to 31DH) | 946 to 997 (3B2H to 3E5H) | 1146 to 1197 (47AH to 4ADH) | 1346 to 1397 (542H to 575H) | 1546 to 1597 (60AH to 63DH) | System area | — | — | — |
| 598 (256H) | 798 (31EH) | 998 (3E6H) | 1198 (4AEH) | 1398 (576H) | 1598 (63EH) | CH☐ Range setting | 0 | Setting | × |
| 599 (257H) | 799 (31FH) | 999 (3E7H) | 1199 (4AFH) | 1399 (577H) | 1599 (63FH) | System area | — | — | — |

*1 The following shows the default values.
CH1: 402, CH2: 602, CH3: 802, CH4: 1002, CH5: 1202, CH6: 1402

A

## ■Error history (Un\G3600 to Un\G3759)

| Address (decimal) | Address (hexadecimal) | Name | | | | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|
| 3600 | E10H | Error history 1 | Error code | | | 0 | Monitor | × |
| 3601 | E11H | | Error time | First two digits of the year | Last two digits of the year | | | |
| 3602 | E12H | | | Month | Day | | | |
| 3603 | E13H | | | Hour | Minute | | | |
| 3604 | E14H | | | Second | Day of the week | | | |
| 3605 | E15H | | | Millisecond | | | | |
| 3606 to 3609 | E16H to E19H | System area | | | | — | — | — |
| 3610 to 3615 | E1AH to E1FH | Error history 2 | Same as error history 1 | | | 0 | Monitor | × |
| 3616 to 3619 | E20H to E23H | System area | | | | — | — | — |
| 3620 to 3625 | E24H to E29H | Error history 3 | Same as error history 1 | | | 0 | Monitor | × |
| 3626 to 3629 | E2AH to E2DH | System area | | | | — | — | — |
| 3630 to 3635 | E2EH to E33H | Error history 4 | Same as error history 1 | | | 0 | Monitor | × |
| 3636 to 3639 | E34H to E37H | System area | | | | — | — | — |
| 3640 to 3645 | E38H to E3DH | Error history 5 | Same as error history 1 | | | 0 | Monitor | × |
| 3646 to 3649 | E3EH to E41H | System area | | | | — | — | — |
| 3650 to 3655 | E42H to E47H | Error history 6 | Same as error history 1 | | | 0 | Monitor | × |
| 3656 to 3659 | E48H to E4BH | System area | | | | — | — | — |
| 3660 to 3665 | E4CH to E51H | Error history 7 | Same as error history 1 | | | 0 | Monitor | × |
| 3666 to 3669 | E52H to E55H | System area | | | | — | — | — |
| 3670 to 3675 | E56H to E5BH | Error history 8 | Same as error history 1 | | | 0 | Monitor | × |
| 3676 to 3679 | E5CH to E5FH | System area | | | | — | — | — |
| 3680 to 3685 | E60H to E65H | Error history 9 | Same as error history 1 | | | 0 | Monitor | × |
| 3686 to 3689 | E66H to E69H | System area | | | | — | — | — |
| 3690 to 3695 | E6AH to E6FH | Error history 10 | Same as error history 1 | | | 0 | Monitor | × |
| 3696 to 3699 | E70H to E73H | System area | | | | — | — | — |
| 3700 to 3705 | E74H to E79H | Error history 11 | Same as error history 1 | | | 0 | Monitor | × |
| 3706 to 3709 | E7AH to E7DH | System area | | | | — | — | — |
| 3710 to 3715 | E7EH to E83H | Error history 12 | Same as error history 1 | | | 0 | Monitor | × |
| 3716 to 3719 | E84H to E87H | System area | | | | — | — | — |
| 3720 to 3725 | E88H to E8DH | Error history 13 | Same as error history 1 | | | 0 | Monitor | × |
| 3726 to 3729 | E8EH to E91H | System area | | | | — | — | — |
| 3730 to 3735 | E92H to E97H | Error history 14 | Same as error history 1 | | | 0 | Monitor | × |
| 3736 to 3739 | E98H to E9BH | System area | | | | — | — | — |
| 3740 to 3745 | E9CH to EA1H | Error history 15 | Same as error history 1 | | | 0 | Monitor | × |
| 3746 to 3749 | EA2H to EA5H | System area | | | | — | — | — |
| 3750 to 3755 | EA6H to EABH | Error history 16 | Same as error history 1 | | | 0 | Monitor | × |
| 3756 to 3759 | EACH to EAFH | System area | | | | — | — | — |

## ■Alarm history (Un\G3760 to Un\G3999)

| Address (decimal) | Address (hexadecimal) | Name | | | | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|
| 3760 | EB0H | Alarm history 1 | Alarm code | | | 0 | Monitor | × |
| 3761 | EB1H | | Alarm time | First two digits of the year | Last two digits of the year | | | |
| 3762 | EB2H | | | Month | Day | | | |
| 3763 | EB3H | | | Hour | Minute | | | |
| 3764 | EB4H | | | Second | Day of the week | | | |
| 3765 | EB5H | | | Millisecond | | | | |
| 3766 to 3769 | EB6H to EB9H | System area | | | | — | — | — |
| 3770 to 3775 | EBAH to EBFH | Alarm history 2 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3776 to 3779 | EC0H to EC3H | System area | | | | — | — | — |
| 3780 to 3785 | EC4H to EC9H | Alarm history 3 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3786 to 3789 | ECAH to ECDH | System area | | | | — | — | — |
| 3790 to 3795 | ECEH to ED3H | Alarm history 4 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3796 to 3799 | ED4H to ED7H | System area | | | | — | — | — |
| 3800 to 3805 | ED8H to EDDH | Alarm history 5 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3806 to 3809 | EDEH to EE1H | System area | | | | — | — | — |
| 3810 to 3815 | EE2H to EE7H | Alarm history 6 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3816 to 3819 | EE8H to EEBH | System area | | | | — | — | — |
| 3820 to 3825 | EECH to EF1H | Alarm history 7 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3826 to 3829 | EF2H to EF5H | System area | | | | — | — | — |
| 3830 to 3835 | EF6H to EFBH | Alarm history 8 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3836 to 3839 | EFCH to EFFH | System area | | | | — | — | — |
| 3840 to 3845 | F00H to F05H | Alarm history 9 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3846 to 3849 | F06H to F09H | System area | | | | — | — | — |
| 3850 to 3855 | F0AH to F0FH | Alarm history 10 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3856 to 3859 | F10H to F13H | System area | | | | — | — | — |
| 3860 to 3865 | F14H to F19H | Alarm history 11 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3866 to 3869 | F1AH to F1DH | System area | | | | — | — | — |
| 3870 to 3875 | F1EH to F23H | Alarm history 12 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3876 to 3879 | F24H to F27H | System area | | | | — | — | — |
| 3880 to 3885 | F28H to F2DH | Alarm history 13 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3886 to 3889 | F2EH to F31H | System area | | | | — | — | — |
| 3890 to 3895 | F32H to F37H | Alarm history 14 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3896 to 3899 | F38H to F3BH | System area | | | | — | — | — |
| 3900 to 3905 | F3CH to F41H | Alarm history 15 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3906 to 3909 | F42H to F45H | System area | | | | — | — | — |
| 3910 to 3915 | F46H to F4BH | Alarm history 16 | Same as alarm history 1 | | | 0 | Monitor | × |
| 3916 to 3999 | F4CH to F9FH | System area | | | | — | — | — |

## ■Offset/gain setting (Un\G4000 to Un\G4131)

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 4000 to 4003 (FA0H to FA3H) | | | | | | System area | — | — | — |
| 4004 (FA4H) | 4008 (FA8H) | 4012 (FACH) | 4016 (FB0H) | 4020 (FB4H) | 4024 (FB8H) | CH□ Factory default setting offset value (L) | 0 | User range setting | × |
| 4005 (FA5H) | 4009 (FA9H) | 4013 (FADH) | 4017 (FB1H) | 4021 (FB5H) | 4025 (FB9H) | CH□ Factory default setting offset value (H) | 0 | User range setting | × |
| 4006 (FA6H) | 4010 (FAAH) | 4014 (FAEH) | 4018 (FB2H) | 4022 (FB6H) | 4026 (FBAH) | CH□ Factory default setting gain value (L) | 0 | User range setting | × |
| 4007 (FA7H) | 4011 (FABH) | 4015 (FAFH) | 4019 (FB3H) | 4023 (FB7H) | 4027 (FBBH) | CH□ Factory default setting gain value (H) | 0 | User range setting | × |
| 4028 (FBCH) | 4032 (FC0H) | 4036 (FC4H) | 4040 (FC8H) | 4044 (FCCH) | 4048 (FD0H) | CH□ User range setting offset value (L) | 0 | User range setting | × |
| 4029 (FBDH) | 4033 (FC1H) | 4037 (FC5H) | 4041 (FC9H) | 4045 (FCDH) | 4049 (FD1H) | CH□ User range setting offset value (H) | 0 | User range setting | × |
| 4030 (FBEH) | 4034 (FC2H) | 4038 (FC6H) | 4042 (FCAH) | 4046 (FCEH) | 4050 (FD2H) | CH□ User range setting gain value (L) | 0 | User range setting | × |
| 4031 (FBFH) | 4035 (FC3H) | 4039 (FC7H) | 4043 (FCBH) | 4047 (FCFH) | 4051 (FD3H) | CH□ User range setting gain value (H) | 0 | User range setting | × |
| 4052 to 4131 (FD4H to 1023H) | | | | | | System area | — | — | — |

## ■Un\G4132 to Un\G9999

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 4132 (1024H) | 4134 (1026H) | 4136 (1028H) | 4138 (102AH) | 4140 (102CH) | 4142 (102EH) | CH□ Offset/gain setting mode (offset specification) | 0 | Setting | × |
| 4133 (1025H) | 4135 (1027H) | 4137 (1029H) | 4139 (102BH) | 4141 (102DH) | 4143 (102FH) | CH□ Offset/gain setting mode (gain specification) | 0 | Setting | × |
| 4144 to 9999 (1030H to 270FH) | | | | | | System area | — | — | — |

## ■Logging data (Un\G10000 to Un\G15999)

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 10000 to 10999 (2710H to 2AF7H) | 11000 to 11999 (2AF8H to 2EDFH) | 12000 to 12999 (2EE0H to 32C7H) | 13000 to 13999 (32C8H to 36AFH) | 14000 to 14999 (36B0H to 3A97H) | 15000 to 15999 (3A98H to 3E7FH) | CH□ Logging data | 0 | Monitor | × |

## ■Un\G16000 to Un\G29999

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 16000 to 29999 (3E80H to 752FH) | | | | | | System area | — | — | — |

## In Q compatible mode

### ■Un\G0 to Un\G199

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 0 (0H) | | | | | | A/D conversion enable/disable setting | 003FH | Setting | × |
| 1 (1H) | 2 (2H) | 3 (3H) | 4 (4H) | 5 (5H) | 6 (6H) | CH□ Time average/Count average/Moving average/Primary delay filter constant setting | 0 | Setting | × |
| 7 to 9 (7H to 9H) | | | | | | System area | — | — | — |
| 10 (AH) | | | | | | A/D conversion completed flag | 0000H | Monitor | ○ |
| 11 (BH) | 12 (CH) | 13 (DH) | 14 (EH) | 15 (FH) | 16 (10H) | CH□ Digital output value | 0 | Monitor | ○ |
| 17 to 18 (11H to 12H) | | | | | | System area | — | — | — |
| 19 (13H) | | | | | | Latest error code | 0 | Monitor | ○ |
| 20 (14H) | | | | 21 (15H) | | Range setting monitor | 0000H | Monitor | × |
| 22 (16H) | | | | | | Offset/gain setting mode (offset specification) | 0000H | Setting | × |
| 23 (17H) | | | | | | Offset/gain setting mode (gain specification) | 0000H | Setting | × |
| 24 (18H) | | | | 25 (19H) | | Averaging processing specification | 0 | Setting | × |
| 26 to 28 (1AH to 1CH) | | | | | | System area | — | — | — |
| 29 (1DH) | | | | | | Digital clipping enable/disable setting | 003FH | Setting | × |
| 30 (1EH) | 32 (20H) | 34 (22H) | 36 (24H) | 38 (26H) | 40 (28H) | CH□ Maximum value | 0 | Monitor | ○ |
| 31 (1FH) | 33 (21H) | 35 (23H) | 37 (25H) | 39 (27H) | 41 (29H) | CH□ Minimum value | 0 | Monitor | ○ |
| 42 to 46 (2AH to 2EH) | | | | | | System area | — | — | — |
| 47 (2FH) | | | | | | Input signal error detection extension/input signal error detection setting | 003FH | Setting | × |
| 48 (30H)<br>(b13 to b8: Rate alarm/b5 to b0: Process alarm) | | | | | | Warning output setting (Process alarm)<br>Warning output setting (Rate alarm) | 3F3FH | Setting | × |
| 49 (31H) | | | | | | Input signal error detection flag | 0000H | Monitor | ○ |
| 50 (32H) | | | | | | Warning output flag (Process alarm) | 0000H | Monitor | ○ |
| 51 (33H) | | | | | | Warning output flag (Rate alarm) | 0000H | Monitor | ○ |
| 52 (34H) | | | | | | System area | — | — | — |
| 53 (35H) | | | | | | Scaling enable/disable setting | 003FH | Setting | × |
| 54 (36H) | 55 (37H) | 56 (38H) | 57 (39H) | 58 (3AH) | 59 (3BH) | CH□ Digital operation value | 0 | Monitor | ○ |
| 60 to 61 (3CH to 3DH) | | | | | | System area | — | — | — |
| 62 (3EH) | 64 (40H) | 66 (42H) | 68 (44H) | 70 (46H) | 72 (48H) | CH□ Scaling lower limit value | 0 | Setting | × |
| 63 (3FH) | 65 (41H) | 67 (43H) | 69 (45H) | 71 (47H) | 73 (49H) | CH□ Scaling upper limit value | 0 | Setting | × |
| 74 to 77 (4AH to 4DH) | | | | | | System area | — | — | — |
| 78 (4EH) | 79 (4FH) | 80 (50H) | 81 (51H) | 82 (52H) | 83 (53H) | CH□ Conversion start time setting (for 2-wire transmitter) | 30 | Setting | × |
| 84 to 85 (54H to 55H) | | | | | | System area | — | — | — |
| 86 (56H) | 90 (5AH) | 94 (5EH) | 98 (62H) | 102 (66H) | 106 (6AH) | CH□ Process alarm lower lower limit value | 0 | Setting | × |
| 87 (57H) | 91 (5BH) | 95 (5FH) | 99 (63H) | 103 (67H) | 107 (6BH) | CH□ Process alarm lower upper limit value | 0 | Setting | × |

A

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 88 (58H) | 92 (5CH) | 96 (60H) | 100 (64H) | 104 (68H) | 108 (6CH) | CH□ Process alarm upper lower limit value | 0 | Setting | × |
| 89 (59H) | 93 (5DH) | 97 (61H) | 101 (65H) | 105 (69H) | 109 (6DH) | CH□ Process alarm upper upper limit value | 0 | Setting | × |
| 110 to 117 (6EH to 75H) | | | | | | System area | — | — | — |
| 118 (76H) | 119 (77H) | 120 (78H) | 121 (79H) | 122 (7AH) | 123 (7BH) | CH□ Rate alarm warning detection cycle setting | 0 | Setting | × |
| 124 to 125 (7CH to 7DH) | | | | | | System area | — | — | — |
| 126 (7EH) | 128 (80H) | 130 (82H) | 132 (84H) | 134 (86H) | 136 (88H) | CH□ Rate alarm upper limit value | 0 | Setting | × |
| 127 (7FH) | 129 (81H) | 131 (83H) | 133 (85H) | 135 (87H) | 137 (89H) | CH□ Rate alarm lower limit value | 0 | Setting | × |
| 138 to 141 (8AH to 8DH) | | | | | | System area | — | — | — |
| 142 (8EH) | 143 (8FH) | 144 (90H) | 145 (91H) | 146 (92H) | 147 (93H) | CH□ Input signal error detection setting value/CH□ Input signal error detection lower limit set value | 50 | Setting | × |
| 148 to 149 (94H to 95H) | | | | | | System area | — | — | — |
| 150 (96H) | 151 (97H) | 152 (98H) | 153 (99H) | 154 (9AH) | 155 (9BH) | CH□ Input signal error detection upper limit set value | 50 | Setting | × |
| 156 to 157 (9CH to 9DH) | | | | | | System area | — | — | — |
| 158 (9EH) | | | | | | Mode switching setting (L) | 0 | Setting | × |
| 159 (9FH) | | | | | | Mode switching setting (H) | 0 | Setting | × |
| 160 to 161 (A0H to A1H) | | | | | | System area | — | — | — |
| 162 (A2H) | | | | | | Input signal error detection auto-clear enable/disable setting | 1 | Setting | × |
| 163 (A3H) | | | | | | System area | — | — | — |
| 164 (A4H) | 165 (A5H) | 166 (A6H) | 167 (A7H) | 168 (A8H) | 169 (A9H) | CH□ Conversion value shift amount | 0 | Control | ○ |
| 170 to 171 (AAH to ABH) | | | | | | System area | — | — | — |
| 172 (ACH) | 173 (ADH) | 174 (AEH) | 175 (AFH) | 176 (B0H) | 177 (B1H) | CH□ Difference conversion trigger | 0 | Control | ○ |
| 178 to 179 (B2H to B3H) | | | | | | System area | — | — | — |
| 180 (B4H) | 181 (B5H) | 182 (B6H) | 183 (B7H) | 184 (B8H) | 185 (B9H) | CH□ Difference conversion reference value | 0 | Monitor | × |
| 186 to 189 (BAH to BDH) | | | | | | System area | — | — | — |
| 190 (BEH) | 191 (BFH) | 192 (C0H) | 193 (C1H) | 194 (C2H) | 195 (C3H) | CH□ Difference conversion status flag | 0 | Monitor | ○ |
| 196 to 199 (C4H to C7H) | | | | | | System area | — | — | — |

## ■Un\G200 to Un\G999

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 200 to 201 (C8H to C9H) | | | | | | System area | — | — | — |
| 202 (CAH) | 206 (CEH) | 210 (D2H) | 214 (D6H) | 218 (DAH) | 222 (DEH) | CH□ Factory default setting offset value (L) | 0 | User range setting | × |
| 203 (CBH) | 207 (CFH) | 211 (D3H) | 215 (D7H) | 219 (DBH) | 223 (DFH) | CH□ Factory default setting offset value (H) | 0 | User range setting | × |
| 204 (CCH) | 208 (D0H) | 212 (D4H) | 216 (D8H) | 220 (DCH) | 224 (E0H) | CH□ Factory default setting gain value (L) | 0 | User range setting | × |
| 205 (CDH) | 209 (D1H) | 213 (D5H) | 217 (D9H) | 221 (DDH) | 225 (E1H) | CH□ Factory default setting gain value (H) | 0 | User range setting | × |
| 226 (E2H) | 230 (E6H) | 234 (EAH) | 238 (EEH) | 242 (F2H) | 246 (F6H) | CH□ User range setting offset value (L) | 0 | User range setting | × |
| 227 (E3H) | 231 (E7H) | 235 (EBH) | 239 (EFH) | 243 (F3H) | 247 (F7H) | CH□ User range setting offset value (H) | 0 | User range setting | × |
| 228 (E4H) | 232 (E8H) | 236 (ECH) | 240 (F0H) | 244 (F4H) | 248 (F8H) | CH□ User range setting gain value (L) | 0 | User range setting | × |
| 229 (E5H) | 233 (E9H) | 237 (EDH) | 241 (F1H) | 245 (F5H) | 249 (F9H) | CH□ User range setting gain value (H) | 0 | User range setting | × |
| 250 to 299 (FAH to 12BH) | | | | | | System area | — | — | — |
| 300 (12CH) | 302 (12EH) | 304 (130H) | 306 (132H) | 308 (134H) | 310 (136H) | CH□ Digital output value (32 bits) (L) | 0 | Monitor | ○ |
| 301 (12DH) | 303 (12FH) | 305 (131H) | 307 (133H) | 309 (135H) | 311 (137H) | CH□ Digital output value (32 bits) (H) | 0 | Monitor | ○ |
| 312 to 319 (138H to 13FH) | | | | | | System area | — | — | — |
| 320 (140H) | | | | | | RUN LED status monitor | 0 | Monitor | × |
| 321 (141H) | | | | | | ERR LED status monitor | 0 | Monitor | × |
| 322 (142H) | | | | | | ALM LED status monitor | 0 | Monitor | × |
| 323 to 329 (143H to 149H) | | | | | | System area | — | — | — |
| 330 (14AH) | 331 (14BH) | 332 (14CH) | 333 (14DH) | 334 (14EH) | 335 (14FH) | CH□ Supply power temporary stop trigger (for 2-wire transmitter) | 0 | Control | ○ |
| 336 to 339 (150H to 153H) | | | | | | System area | — | — | — |
| 340 (154H) | 341 (155H) | 342 (156H) | 343 (157H) | 344 (158H) | 345 (159H) | CH□ Supply power temporary stop status flag (for 2-wire transmitter) | 0 | Monitor | ○ |
| 346 to 401 (15AH to 191H) | | | | | | System area | — | — | — |
| 402 (192H) | | | | 403 (193H) | | Range setting | 0 | Setting | × |
| 404 to 999 (194H to 3E7H) | | | | | | System area | — | — | — |

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## ■Un\G1000 to Un\G4999

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 1000 (3E8H) | 1001 (3E9H) | 1002 (3EAH) | 1003 (3EBH) | 1004 (3ECH) | 1005 (3EDH) | CH□ Logging enable/disable setting | 1 | Setting | × |
| 1006 to 1007 (3EEH to 3EFH) | | | | | | System area | — | — | — |
| 1008 (3F0H) | 1009 (3F1H) | 1010 (3F2H) | 1011 (3F3H) | 1012 (3F4H) | 1013 (3F5H) | CH□ Logging hold request | 0 | Control | ○ |
| 1014 to 1015 (3F6H to 3F7H) | | | | | | System area | — | — | — |
| 1016 (3F8H) | 1017 (3F9H) | 1018 (3FAH) | 1019 (3FBH) | 1020 (3FCH) | 1021 (3FDH) | CH□ Logging hold flag | 0 | Monitor | ○ |
| 1022 to 1023 (3FEH to 3FFH) | | | | | | System area | — | — | — |
| 1024 (400H) | 1025 (401H) | 1026 (402H) | 1027 (403H) | 1028 (404H) | 1029 (405H) | CH□ Logging data setting | 1 | Setting | × |
| 1030 to 1031 (406H to 407H) | | | | | | System area | — | — | — |
| 1032 (408H) | 1033 (409H) | 1034 (40AH) | 1035 (40BH) | 1036 (40CH) | 1037 (40DH) | CH□ Logging cycle setting value | 60 | Setting | × |
| 1038 to 1039 (40EH to 40FH) | | | | | | System area | — | — | — |
| 1040 (410H) | 1041 (411H) | 1042 (412H) | 1043 (413H) | 1044 (414H) | 1045 (415H) | CH□ Logging cycle unit setting | 1 | Setting | × |
| 1046 to 1047 (416H to 417H) | | | | | | System area | — | — | — |
| 1048 (418H) | 1049 (419H) | 1050 (41AH) | 1051 (41BH) | 1052 (41CH) | 1053 (41DH) | CH□ Post-trigger logging points | 500 | Setting | × |
| 1054 to 1055 (41EH to 41FH) | | | | | | System area | — | — | — |
| 1056 (420H) | 1057 (421H) | 1058 (422H) | 1059 (423H) | 1060 (424H) | 1061 (425H) | CH□ Level trigger condition setting | 0 | Setting | × |
| 1062 to 1063 (426H to 427H) | | | | | | System area | — | — | — |
| 1064 (428H) | 1065 (429H) | 1066 (42AH) | 1067 (42BH) | 1068 (42CH) | 1069 (42DH) | CH□ Trigger data | *1 | Setting | × |
| 1070 to 1071 (42EH to 42FH) | | | | | | System area | — | — | — |
| 1072 to 1081 (430H to 439H) | | | | | | Level data 0 to 9 | 0 | Control | ○ |
| 1082 (43AH) | 1083 (43BH) | 1084 (43CH) | 1085 (43DH) | 1086 (43EH) | 1087 (43FH) | CH□ Trigger setting value | 0 | Setting | × |
| 1088 to 1089 (440H to 441H) | | | | | | System area | — | — | — |
| 1090 (442H) | 1091 (443H) | 1092 (444H) | 1093 (445H) | 1094 (446H) | 1095 (447H) | CH□ Head pointer | 0 | Monitor | × |
| 1096 to 1097 (448H to 449H) | | | | | | System area | — | — | — |
| 1098 (44AH) | 1099 (44BH) | 1100 (44CH) | 1101 (44DH) | 1102 (44EH) | 1103 (44FH) | CH□ Latest pointer | 0 | Monitor | × |
| 1104 to 1105 (45H0 to 451H) | | | | | | System area | — | — | — |
| 1106 (452H) | 1107 (453H) | 1108 (454H) | 1109 (455H) | 1110 (456H) | 1111 (457H) | CH□ Number of logging data | 0 | Monitor | × |
| 1112 to 1113 (458H to 459H) | | | | | | System area | — | — | — |
| 1114 (45AH) | 1115 (45BH) | 1116 (45CH) | 1117 (45DH) | 1118 (45EH) | 1119 (45FH) | CH□ Trigger pointer | 0 | Monitor | × |
| 1120 to 1121 (460H to 461H) | | | | | | System area | — | — | — |
| 1122 (462H) | 1125 (465H) | 1128 (468H) | 1131 (46BH) | 1134 (46EH) | 1137 (471H) | CH□ Logging cycle monitored value (s) | 0 | Monitor | × |
| 1123 (463H) | 1126 (466H) | 1129 (469H) | 1132 (46CH) | 1135 (46FH) | 1138 (472H) | CH□ Logging cycle monitored value (ms) | 0 | Monitor | × |
| 1124 (464H) | 1127 (467H) | 1130 (46AH) | 1133 (46DH) | 1136 (470H) | 1139 (473H) | System area | — | — | — |
| 1140 to 1153 (474H to 481H) | | | | | | System area | — | — | — |
| 1154 (482H) | 1158 (486H) | 1162 (48AH) | 1166 (48EH) | 1170 (492H) | 1174 (496H) | CH□ Trigger generation time (First/Last two digits of the year) | 0 | Monitor | × |
| 1155 (483H) | 1159 (487H) | 1163 (48BH) | 1167 (48FH) | 1171 (493H) | 1175 (497H) | CH□ Trigger generation time (Month/Day) | 0 | Monitor | × |

| Address Decimal (hexadecimal) | | | | | | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|---|---|---|---|---|
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | | | | |
| 1156 (484H) | 1160 (488H) | 1164 (48CH) | 1168 (490H) | 1172 (494H) | 1176 (498H) | CH□ Trigger generation time (Hour/Minute) | 0 | Monitor | × |
| 1157 (485H) | 1161 (489H) | 1165 (48DH) | 1169 (491H) | 1173 (495H) | 1177 (499H) | CH□ Trigger generation time (Second/Day of the week) | 0 | Monitor | × |
| 1178 to 1185 (49AH to 4A1H) | | | | | | System area | — | — | — |
| 1186 (4A2H) | 1187 (4A3H) | 1188 (4A4H) | 1189 (4A5H) | 1190 (4A6H) | 1191 (4A7H) | CH□ Trigger generation time (Millisecond) | 0 | Monitor | × |
| 1192 to 1199 (4A8H to 4AFH) | | | | | | System area | — | — | — |
| 1200 (4B0H) | 1201 (4B1H) | 1202 (4B2H) | 1203 (4B3H) | 1204 (4B4H) | 1205 (4B5H) | CH□ Loading interrupt enable/ disable setting | 1 | Setting | × |
| 1206 to 1207 (4B6H to 4B7H) | | | | | | System area | — | — | — |
| 1208 (4B8H) | 1209 (4B9H) | 1210 (4BAH) | 1211 (4BBH) | 1212 (4BCH) | 1213 (4BDH) | CH□ Logging read points setting value | 100 | Setting | × |
| 1214 to 1215 (4BEH to 4BFH) | | | | | | System area | — | — | — |
| 1216 (4C0H) | 1217 (4C1H) | 1218 (4C2H) | 1219 (4C3H) | 1220 (4C4H) | 1221 (4C5H) | CH□ Current logging read pointer | -1 | Setting | × |
| 1222 to 1223 (4C6H to 4C7H) | | | | | | System area | — | — | — |
| 1224 (4C8H) | 1225 (4C9H) | 1226 (4CAH) | 1227 (4CBH) | 1228 (4CCH) | 1229 (4CDH) | CH□ Previous logging read pointer | -1 | Setting | × |
| 1230 to 1231 (4CEH to 4CFH) | | | | | | System area | — | — | — |
| 1232 (4D0H) | 1233 (4D1H) | 1234 (4D2H) | 1235 (4D3H) | 1236 (4D4H) | 1237 (4D5H) | CH□ Logging read points monitored value | 0 | Monitor | × |
| 1238 to 1799 (4D6H to 707H) | | | | | | System area | — | — | — |
| 1800 (708H) | | | | | | Latest address of error history | 0 | Monitor | ○ |
| 1801 to 1809 (709H to 711H) | | | | | | System area | — | — | — |
| 1810 to 1969 (712H to 7B1H) | | | | | | Error history 1 to 16 | 0 | Monitor | × |
| 1970 to 3749 (7B2H to EA5H) | | | | | | System area | — | — | — |
| 3750 (EA6H) | | | | | | Latest alarm code | 0 | Monitor | ○ |
| 3751 (EA7H) | | | | | | Latest address of alarm history | 0 | Monitor | ○ |
| 3752 to 3759 (EA8H to EAFH) | | | | | | System area | — | — | — |
| 3760 to 3919 (EB0H to F4FH) | | | | | | Alarm history 1 to 16 | 0 | Monitor | × |
| 3920 to 3999 (F50H to F9FH) | | | | | | System area | — | — | — |
| 4000 to 4015 (FA0H to FAFH) | | | | | | Interrupt factor detection flag [n]*2 | 0 | Monitor | ○ |
| 4016 to 4031 (FB0H to FBFH) | | | | | | System area | — | — | — |
| 4032 to 4047 (FC0H to FCFH) | | | | | | Interrupt factor mask [n]*2 | 0 | Control | × |
| 4048 to 4063 (FD0H to FDFH) | | | | | | System area | — | — | — |
| 4064 to 4079 (FE0H to FEFH) | | | | | | Interrupt factor reset request [n]*2 | 0 | Control | × |
| 4080 to 4095 (FF0H to FFFH) | | | | | | System area | — | — | — |
| 4096 to 4111 (1000H to 100FH) | | | | | | Interrupt factor generation setting [n]*2 | 0 | Setting | × |
| 4112 to 4127 (1010H to 101FH) | | | | | | System area | — | — | — |
| 4128 to 4143 (1020H to 102FH) | | | | | | Condition target setting [n]*2 | 0 | Setting | × |
| 4144 to 4159 (1030H to 103FH) | | | | | | System area | — | — | — |
| 4160 to 4175 (1040H to 104FH) | | | | | | Condition target channel setting [n]*2 | 0 | Setting | × |
| 4176 to 4999 (1050H to 1387H) | | | | | | System area | — | — | — |

*1 The following shows the default values.
CH1: 54, CH2: 55, CH3: 56, CH4: 57, CH5: 58, CH6: 59

*2 [n] in the table indicates an interrupt setting number. (n = 1 to 16)

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## ■Logging data (Un\G5000 to Un\G10999)

| Address<br>Decimal (hexadecimal) | Name | Default value | Data type | Auto refresh |
|---|---|---|---|---|
| 5000 to 5999 (1388H to 176FH) | CH1 Logging data | 0 | Monitor | × |
| 6000 to 6999 (1770H to 1B57H) | CH2 Logging data | 0 | Monitor | × |
| 7000 to 7999 (1B58H to 1F3FH) | CH3 Logging data | 0 | Monitor | × |
| 8000 to 8999 (1F40H to 2327H) | CH4 Logging data | 0 | Monitor | × |
| 9000 to 9999 (2328H to 270FH) | CH5 Logging data | 0 | Monitor | × |
| 10000 to 10999 (2710H to 2AF7H) | CH6 Logging data | 0 | Monitor | × |

# Details of buffer memory addresses

The following describes the details of the buffer memory addresses of the A/D converter module.

**Point**

This section describes buffer memory addresses for CH1.

## Latest error code

The latest error code detected in the A/D converter module is stored. For details, refer to the following.

☞ Page 114 List of Error Codes

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 0
- Q compatible mode: 19

### ■Clearing an error

Turn on and off 'Error clear request' (YF).

## Latest address of error history

Among Error history ☐ (Un\G3600 to Un\G3759), a buffer memory address which stores the latest error code is stored. In the Q compatible mode, the error history is stored in Un\G1810 to Un\G1969.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 1
- Q compatible mode: 1800

## Latest alarm code

The latest alarm code detected in the A/D converter module is stored. For details, refer to the following.

☞ Page 117 List of Alarm Codes

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 2
- Q compatible mode: 3750

### ■Clearing an alarm

Turn on and off 'Error clear request' (YF).

## Latest address of alarm history

Among Alarm history ☐ (Un\G3760 to Un\G3999), a buffer memory address which stores the latest alarm code is stored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 3
- Q compatible mode: 3751

## Interrupt factor detection flag [n]

The detection status of the interrupt factor is stored.

| Monitored value | Description |
|---|---|
| 0 | No interrupt factor |
| 1 | Interrupt factor |

When an interrupt factor occurs, an interrupt request is sent to the CPU module at the same time as 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) is turned to Interrupt factor (1).
"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 4 to 19
- Q compatible mode: 4000 to 4015

## Warning output flag (Process alarm upper limit)

The upper limit alarm of the process alarm can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 upper limit value | CH5 upper limit value | CH4 upper limit value | CH3 upper limit value | CH2 upper limit value | CH1 upper limit value |

0: Normal
1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

R mode: 36

### ■Warning output flag status

- When the value is out of the range specified in the process alarm upper upper limit value, Alarm ON (1) is stored in 'Warning output flag (Process alarm upper limit)' (Un\G36) corresponding to each channel.
- When a warning is detected in any channel where the A/D conversion and the warning output setting (Process alarm) are enabled, 'Warning output signal' (X8) also turns on.

### ■Clearing Warning output flag

- When the digital operation value returns within the setting range, the flag is automatically cleared.
- When 'Operating condition setting request' (Y9) is turned on and off, the flag is cleared.

## Warning output flag (Process alarm lower limit)

The lower limit alarm of the process alarm can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 lower limit value | CH5 lower limit value | CH4 lower limit value | CH3 lower limit value | CH2 lower limit value | CH1 lower limit value |

0: Normal
1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

R mode: 37

### ■Warning output flag status

- When the value is out of the range specified in the process alarm lower lower limit value, Alarm ON (1) is stored in 'Warning output flag (Process alarm lower limit)' (Un\G37) corresponding to each channel.
- When a warning is detected in any channel where the A/D conversion and the warning output setting (Process alarm) are enabled, 'Warning output signal' (X8) also turns on.

### ■Clearing Warning output flag

- When the digital operation value returns within the setting range, the flag is automatically cleared.
- When 'Operating condition setting request' (Y9) is turned on and off, the flag is cleared.

## Warning output flag (Process alarm) [Q compatible mode]

When the Q compatible mode function is used, the upper/lower limit alarm of the process alarm can be checked.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | CH6 lower limit value | CH6 upper limit value | CH5 lower limit value | CH5 upper limit value | CH4 lower limit value | CH4 upper limit value | CH3 lower limit value | CH3 upper limit value | CH2 lower limit value | CH2 upper limit value | CH1 lower limit value | CH1 upper limit value |

0: Normal
1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 50

### ■Warning output flag status

- When the value is out of the range specified in the process alarm upper upper limit value or process alarm lower lower limit value, Alarm ON (1) is stored in 'Warning output flag (Process alarm)' (Un\G50) corresponding to each channel.
- When a warning is detected in any channel where the A/D conversion and the warning output setting (Process alarm) are enabled, 'Warning output signal' (X8) also turns on.

### ■Clearing Warning output flag

- When the digital operation value returns within the setting range, the flag is automatically cleared.
- When 'Operating condition setting request' (Y9) is turned on and off, the flag is cleared.

## Warning output flag (Rate alarm upper limit)

The upper limit alarm of the rate alarm can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 upper limit value | CH5 upper limit value | CH4 upper limit value | CH3 upper limit value | CH2 upper limit value | CH1 upper limit value |

0: Normal
1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

R mode: 38

### ■Warning output flag status

- When the value is out of the range specified in the rate alarm upper limit value, Alarm ON (1) is stored in 'Warning output flag (Rate alarm upper limit)' (Un\G38) corresponding to each channel.
- When a warning is detected in any channel where the A/D conversion and the warning output setting (Rate alarm) are enabled, 'Warning output signal' (X8) also turns on.

### ■Clearing Warning output flag

- When the change rate of the digital output value returns within the setting range, the flag is automatically cleared.
- When 'Operating condition setting request' (Y9) is turned on and off, the flag is cleared.

## Warning output flag (Rate alarm lower limit)

The lower limit alarm of the rate alarm can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 lower limit value | CH5 lower limit value | CH4 lower limit value | CH3 lower limit value | CH2 lower limit value | CH1 lower limit value |

0: Normal
1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

R mode: 39

### ■Warning output flag status

- When the value is out of the range specified in the rate alarm lower limit value, Alarm ON (1) is stored in 'Warning output flag (Rate alarm lower limit)' (Un\G39) corresponding to each channel.
- When a warning is detected in any channel where the A/D conversion and the warning output setting (Rate alarm) are enabled, 'Warning output signal' (X8) also turns on.

### ■Clearing Warning output flag

- When the change rate of the digital output value returns within the setting range, the flag is automatically cleared.
- When 'Operating condition setting request' (Y9) is turned on and off, the flag is cleared.

## Warning output flag (Rate alarm) [Q compatible mode]

When the Q compatible mode function is used, the upper/lower limit alarm of the rate alarm can be checked.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | CH6 lower limit value | CH6 upper limit value | CH5 lower limit value | CH5 upper limit value | CH4 lower limit value | CH4 upper limit value | CH3 lower limit value | CH3 upper limit value | CH2 lower limit value | CH2 upper limit value | CH1 lower limit value | CH1 upper limit value |

0: Normal
1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 51

### ■Warning output flag status

- When the value is out of the range specified in the rate alarm upper limit value or rate alarm lower limit value, Alarm ON (1) is stored in Warning output flag (Rate alarm) corresponding to each channel.
- When a warning is detected in any channel where the A/D conversion and the warning output setting (Rate alarm) are enabled, 'Warning output signal' (X8) also turns on.

### ■Clearing Warning output flag

- When the change rate of the digital output value returns within the setting range, the flag is automatically cleared.
- When 'Operating condition setting request' (Y9) is turned on and off, the flag is cleared.

## Input signal error detection flag

The status of an input signal can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

0: Normal
1: Input signal error

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 40
- Q compatible mode: 49

### ■Input signal error detection flag status

- When an analog input value out of the range specified in Input signal error detection setting value is detected, Input signal error (1) is stored in 'Input signal error detection flag' (Un\G40) corresponding to each channel.
- When an error is detected in any channel where the A/D conversion and the input signal error detection are enabled, 'Input signal error detection signal' (XC) turns on.

### ■Clearing Input signal error detection flag

'Input signal error detection flag' (Un\G40) is turned off by turning on and off 'Error clear request' (YF) after the analog input value returns within the setting range.

When 'Operating condition setting request' (Y9) is turned on and off, 'Input signal error detection flag' (Un\G40) is also cleared.

## A/D conversion completed flag

The A/D conversion status can be checked.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

0: A/D conversion in progress or not used
1: A/D conversion completed

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 42
- Q compatible mode: 10

### ■A/D conversion completed flag status

When the first A/D conversion is completed in the channel where the A/D conversion is enabled, the flag turns to A/D conversion completed (1). 'A/D conversion completed flag' (XE) turns on when the conversion of all the channels where the A/D conversion is enabled is completed.

### ■Clearing A/D conversion completed flag

Turning on and off 'Operating condition setting request' (Y9) turns the flag back to the default (A/D conversion in progress or not used (0)), and when the first A/D conversion has completed, the flag turns to A/D conversion completed (1) again.

### ■Precautions on the 2-wire transmitter range

For the 2-wire transmitter range channel where the external power supply is off or Trigger request (1) is set for 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473)*1, because A/D conversion does not start even when conversion is enabled, 'A/D conversion completed flag' (Un\G42) turns into A/D conversion in progress or not used (0).

*1 In Q compatible mode, it becomes 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G330).

## RUN LED status monitor

The current RUN LED status is stored.

| Monitored value | Description |
|---|---|
| 0 | Off |
| 1 | On |
| 2 | Flashing (1s cycles) |
| 3 | Flashing (400ms cycles) |

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 70
- Q compatible mode: 320

## ERR LED status monitor

The current ERR LED status is stored.

| Monitored value | Description |
|---|---|
| 0 | Off |
| 1 | On |
| 2 | Flashing (1s cycles) |
| 3 | Flashing (400ms cycles) |

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 71
- Q compatible mode: 321

## ALM LED status monitor

The current ALM LED status is stored.

| Monitored value | Description |
|---|---|
| 0 | Off |
| 1 | On |
| 2 | Flashing (1s cycles) |
| 3 | Flashing (400ms cycles) |

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 72
- Q compatible mode: 322

## Level data 0 to 9

This area stores data to be monitored when a level trigger of the logging function is used. Ten types of data are available: 'Level data 0' (Un\G90) to 'Level data 9' (Un\G99). Use the area to generate triggers while monitoring the values of devices other than the A/D converter module.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 90 to 99
- Q compatible mode: 1072 to 1081

### ■Setting range

The setting range is from -32768 to 32767.

### ■Default value

The default value is 0 for all channels.

## Interrupt factor mask [n]

Set Interrupt factor mask to be used.

| Setting value | Setting content |
|---|---|
| 0 | Mask (Interrupt unused) |
| 1 | Mask clear (Interrupt used) |

When 'Interrupt factor mask [n]' (Un\G124 to Un\G139) is changed to Mask clear (Interrupt used) (1) and an interrupt factor occurs, an interrupt request is sent to the CPU module. When the set value is two or larger, the setting is regarded as Mask clear (Interrupt used) (1).
"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 124 to 139
- Q compatible mode: 4032 to 4047

### ■Default value

The default value is set to Mask (Interrupt unused) (0) for all channels.

## Interrupt factor reset request [n]

An interrupt factor reset request is sent.

| Setting value | Setting content |
|---|---|
| 0 | No reset request |
| 1 | Reset request |

When Reset request (1) is set to 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) corresponding to the interrupt factor, the interrupt factor corresponding to the specified interrupt is reset. After that, 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) turns to No reset request (0). When the set value is two or larger, the setting is regarded as Reset request (1).
Interrupt factors can be reset by turning on and off 'Operating condition setting request' (Y9).
"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 156 to 171
- Q compatible mode: 4064 to 4079

### ■Default value

The default value is No reset request (0) for all channels.

## Interrupt factor generation setting [n]

Set an interrupt request for when the same interrupt factor occurs during the interrupt factor detection.

| Setting value | Setting content |
|---|---|
| 0 | Interrupt resend request |
| 1 | No interrupt resend request |

When 'Interrupt factor generation setting [n]' (Un\G200 to Un\G215) is Interrupt resend request (0) and the same interrupt factor occurs during the interrupt factor detection, an interrupt request is sent to the CPU module again.
If a value other than the above is set, an interrupt factor generation setting range error (error code: 180△H) occurs.
"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 200 to 215
- Q compatible mode: 4096 to 4111

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Interrupt resend request (0) for all channels.

## Condition target setting [n]

Set an interrupt factor to be detected.

| Setting value | Setting content |
|---|---|
| 0 | Disable |
| 1 | Error flag (XF) |
| 2 | Warning output flag (Process alarm) |
| 3 | Warning output flag (Rate alarm) |
| 4 | Input signal error detection flag |
| 5 | A/D conversion completed |
| 6 | Logging hold flag |
| 7 | Logging read |
| 8 | External power supply READY flag (X6) |

If a value other than the above is set, a condition target setting range error (error code: 181△H) occurs.
An interrupt request is sent to the CPU module when 'Error flag' (XF) or the buffer memory area set to 'Condition target setting [n]' (Un\G232 to Un\G247) is turned on, and when 'External power supply READY flag' (X6) is turned off. When A/D conversion completed (5) is set, an interrupt request is sent with 'A/D conversion completed flag' (Un\G42) on.
"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 232 to 247
- Q compatible mode: 4128 to 4143

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (0) for all channels.

## Condition target channel setting [n]

Set a channel where an interrupt is detected.

| Setting value | Setting content |
|---|---|
| 0 | All channels |
| 1 | CH1 |
| 2 | CH2 |
| 3 | CH3 |
| 4 | CH4 |
| 5 | CH5 |
| 6 | CH6 |

When a factor for the channel specification is set to 'Condition target setting [n]' (Un\G232 to Un\G247), an interrupt factor in the channel set by this area is monitored. When a factor of the input signal (X) is set, the setting in this area is ignored.
If a value other than the above is set, a condition target channel setting range error (error code: 182△H) occurs.
"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 264 to 279
- Q compatible mode: 4160 to 4175

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is All channels (0) for all channels.

## Mode switching setting (L)

Set a setting value for the mode to be switched.

| Switching mode | Setting value |
|---|---|
| Normal mode | 5260H |
| Offset/gain setting mode | 4144H |

**Point**

If a value other than the above is set, the mode is not switched and only the operating condition is changed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 296
- Q compatible mode: 158

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■After the mode is switched

When the mode is switched, this area is cleared to 0 and 'Operating condition setting completed flag' (X9) turns off.
After checking that 'Operating condition setting completed flag' (X9) is off, turn off 'Operating condition setting request' (Y9).

## Mode switching setting (H)

Set a setting value for the mode to be switched.

| Switching mode | Setting value |
|---|---|
| Normal mode | 4144H |
| Offset/gain setting mode | 5260H |

**Point**

If a value other than the above is set, the mode is not switched and only the operating condition is changed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 297
- Q compatible mode: 159

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■After the mode is switched

When the mode is switched, this area is cleared to 0 and 'Operating condition setting completed flag' (X9) turns off.

After checking that 'Operating condition setting completed flag' (X9) is off, turn off 'Operating condition setting request' (Y9).

## Input signal error detection auto-clear enable/disable setting

Set whether to enable or disable auto-clearing of input signal errors by using the input signal error detection function.

For details on the input signal error detection function, refer to the following.

☞ Page 38 Input Signal Error Detection Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

If a value other than the above is set, the value is regarded as Disable (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

- R mode: 302
- Q compatible mode: 162

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1).

## CH1 Digital output value

The A/D-converted digital output value is stored in 16-bit signed binary value.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Data section | | | | | | | | | | | | | | |

(1) Sign bit
- 0: Positive
- 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Digital output value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 400 | 600 | 800 | 1000 | 1200 | 1400 |

- CH☐ Digital output value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 11 | 12 | 13 | 14 | 15 | 16 |

### ■Refreshing cycle

If averaging processing is performed, values are updated at every averaging processing cycle, but if not performed, values are updated at every sampling cycle.

## CH1 Digital operation value

A digital operation value obtained by the scaling function, shift function, digital clipping function, or difference conversion function is stored in 16-bit signed binary value.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Data section | | | | | | | | | | | | | | |

(1) Sign bit
- 0: Positive
- 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Digital operation value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 402 | 602 | 802 | 1002 | 1202 | 1402 |

- CH☐ Digital operation value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 54 | 55 | 56 | 57 | 58 | 59 |

**Point**

When the scaling function, shift function, digital clipping function, or difference conversion function is not used, a value which is the same as the one in 'CH1 Digital output value' (Un\G400) is stored.

## CH1 Maximum value

The maximum value of the digital operation value is stored in 16-bit signed binary value.

In the following cases, 'CH1 Maximum value' (Un\G404) is updated with the current value.

- When 'Operating condition setting request' (Y9) is turned on and off and the setting is changed
- When 'Maximum value/minimum value reset request' (YD) is turned on and off

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Data section | | | | | | | | | | | | | | |

(1) Sign bit
- 0: Positive
- 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Maximum value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 404 | 604 | 804 | 1004 | 1204 | 1404 |

- CH☐ Maximum value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 30 | 32 | 34 | 36 | 38 | 40 |

## CH1 Minimum value

The minimum value of the digital operation value is stored in 16-bit signed binary value.

In the following cases, 'CH1 Minimum value' (Un\G406) is updated with the current value.

- When 'Operating condition setting request' (Y9) is turned on and off and the setting is changed
- When 'Maximum value/minimum value reset request' (YD) is turned on and off

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Data section | | | | | | | | | | | | | | |

(1) Sign bit
- 0: Positive
- 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Minimum value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 406 | 606 | 806 | 1006 | 1206 | 1406 |

- CH☐ Minimum value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 31 | 33 | 35 | 37 | 39 | 41 |

**Point**

- For the channel to which the averaging processing is specified, the maximum and minimum values are stored at every averaging processing time.
- When the scaling function, shift function, digital clipping function, or difference conversion function is used, values calculated by each function are stored in Maximum value and Minimum value.

A

## CH1 Difference conversion status flag

The difference conversion status can be checked.

| Monitored value | Description |
|---|---|
| 0 | Not converted |
| 1 | Converting difference |

When the difference conversion starts after 'CH1 Difference conversion trigger' (Un\G470) is changed from No request (0) to Trigger request (1), 'CH1 Difference conversion status flag' (Un\G408) corresponding to the channel turns to Converting difference (1).
When 'CH1 Difference conversion trigger' (Un\G470) is changed from Trigger request (1) to No request (0), 'CH1 Difference conversion status flag' (Un\G408) is changed from Converting difference (1) to Not converted (0).
'CH1 Difference conversion status flag' (Un\G408) is Converting difference (1) during the difference conversion; Not converted (0) if not during the difference conversion.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Difference conversion status flag

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 408 | 608 | 808 | 1008 | 1208 | 1408 |

• CH☐ Difference conversion status flag (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 190 | 191 | 192 | 193 | 194 | 195 |

## CH1 Logging hold flag

The logging holding status can be checked.
For details on the logging function, refer to the following.
☞ Page 63 Logging Function

| Monitored value | Description |
|---|---|
| 0 | Off |
| 1 | On |

When a state in which data is collected in 'CH1 Logging data' (Un\G10000 to Un\G10999) changes to the stop state, 'CH1 Logging hold flag' (Un\G409) is turned to ON (1).
When logging restarts by changing 'CH1 Logging hold request' (Un\G471) from ON (1) to OFF (0), 'CH1 Logging hold flag' (Un\G409) is turned to OFF (0).

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging hold flag

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 409 | 609 | 809 | 1009 | 1209 | 1409 |

• CH☐ Logging hold flag (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1016 | 1017 | 1018 | 1019 | 1020 | 1021 |

## CH1 Digital output value (32 bits)

The A/D-converted digital output value is stored in 32-bit signed binary value.

| b31 | b30 | b29 | b28 | b27 | b26 | b25 | b24 | b23 | b22 | b21 | b20 | b19 | b18 | b17 | b16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Data section | | | | | | | | | | | | | | |

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Data section | | | | | | | | | | | | | | | |

(1) Sign bit
- 0: Positive
- 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Digital output value (32 bits)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 410 to 411 | 610 to 611 | 810 to 811 | 1010 to 1011 | 1210 to 1211 | 1410 to 1411 |

- CH☐ Digital output value (32 bits) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 300 to 301 | 302 to 303 | 304 to 305 | 306 to 307 | 308 to 309 | 310 to 311 |

### ■Refreshing cycle

If averaging processing is performed, values are updated at every averaging processing cycle, but if not performed, values are updated at every sampling cycle.

## CH1 Supply power temporary stop status flag (for 2-wire transmitter)

The temporary stop status of the supply power can be checked.

| Monitored value | Description |
|---|---|
| 0 | Not stopped |
| 1 | Temporarily stopped |

- When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is changed from No request (0) to Trigger request (1) and the power supply requirements for 2-wire transmitter temporarily stops, 'CH1 Supply power temporary stop status flag (for 2-wire transmitter)' (Un\G412) becomes Temporarily stopped (1).
- When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is changed from Trigger request (1) to No request (0), 'CH1 Supply power temporary stop status flag (for 2-wire transmitter)' (Un\G412) is changed from Temporarily stopped (1) to Not stopped (0).
- While the power supply requirements for 2-wire transmitter is temporarily stopped, 'CH1 Supply power temporary stop status flag (for 2-wire transmitter)' (Un\G412) is Temporarily stopped (1), and if otherwise, the flag is Not stopped (0).

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Supply power temporary stop status flag (for 2-wire transmitter)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 412 | 612 | 812 | 1012 | 1212 | 1412 |

- CH☐ Supply power temporary stop status flag (for 2-wire transmitter) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 340 | 341 | 342 | 343 | 344 | 345 |

## CH1 Range setting monitor

The input range value set to the input range setting or 'CH1 Range setting' (Un\G598) can be checked.

| Monitored value | Description |
|---|---|
| 0H | 4 to 20mA (2-wire transmitter input) |
| 6H | 4 to 20mA (current input) |
| 7H | 0 to 20mA (current input) |
| AH | 4 to 20mA (extended mode) (2-wire transmitter input) |
| CH | 4 to 20mA (extended mode) (current input) |
| EH | User range setting (current input) |
| FH | User range setting (2-wire transmitter input) |

### ■Buffer memory address

The following shows the buffer memory address of this area.

CH☐ Range setting monitor

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 430 | 630 | 830 | 1030 | 1230 | 1430 |

## Range setting monitor [Q compatible mode]

When the Q compatible mode function is used, the input range value set in the input range setting can be checked.

The monitored value of the input range is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- Buffer memory address: 20

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CH4 | | | | CH3 | | | | CH2 | | | | CH1 | | | |

- Buffer memory address: 21

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | CH6 | | | | CH5 | | | |

**Restriction**

Bits corresponding to the channels with A/D conversion disabled in this area will not be updated because the input range cannot be changed for channels with A/D conversion disabled. For details, refer to the following.

☞ Page 18 Range Switching Function

## CH1 Difference conversion reference value

This area stores 'CH1 Digital operation value' (Un\G402) at the start of the difference conversion as the difference conversion reference value.

The difference conversion reference value is updated when 'CH1 Difference conversion trigger' (Un\G470) is turned from No request (0) to Trigger request (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Difference conversion reference value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 432 | 632 | 832 | 1032 | 1232 | 1432 |

• CH☐ Difference conversion reference value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 180 | 181 | 182 | 183 | 184 | 185 |

### ■Setting range

The setting range is from -32768 to 32767.

**Point**

Even if 'CH1 Difference conversion status flag' (Un\G408) is turned from Converting difference (1) to Not converted (0), 'CH1 Difference conversion reference value' (Un\G432) is not cleared.

A

## CH1 Head pointer

The buffer memory address of the oldest data in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked with this buffer memory area.

The offset value counted from the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999) is stored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Head pointer

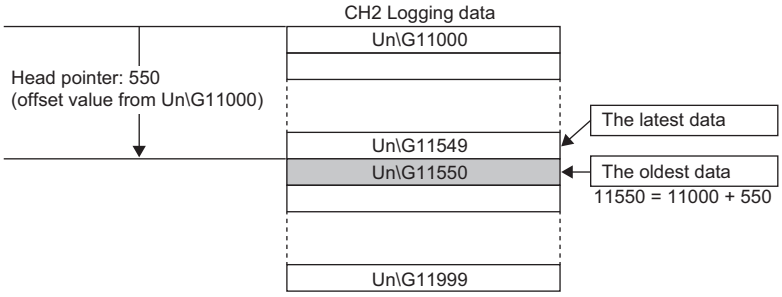
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 434 | 634 | 834 | 1034 | 1234 | 1434 |

• CH☐ Head pointer (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1090 | 1091 | 1092 | 1093 | 1094 | 1095 |

Ex.

When the value of 'CH2 Head pointer' (Un\G634) is 550




**Point**

- The value in 'CH1 Head pointer' (Un\G434) is fixed to 0 since the oldest data is stored in the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999) while the data of the first 1000 points is being logged from the beginning of the logging. On and after the 1001st data, 'CH1 Head pointer' (Un\G434) increases one by one each time data is stored.
- When 'CH1 Logging hold request' (Un\G471) is turned off, 'CH1 Head pointer' (Un\G434) is cleared to 0.

## CH1 Latest pointer

The buffer memory address of the latest data in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked with this buffer memory area.

The offset value counted from the start address of 'CH1 Logging data' (Un\G10000 to Un\G10999) is stored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Latest pointer

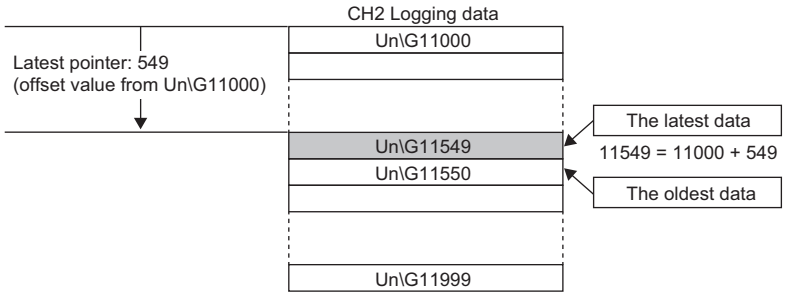
| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 435 | 635 | 835 | 1035 | 1235 | 1435 |

• CH☐ Latest pointer (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1098 | 1099 | 1100 | 1101 | 1102 | 1103 |

Ex.

When the value of 'CH2 Latest pointer' (Un\G635) is 549




**Point**

• 'CH1 Latest pointer' (Un\G435) increases one by one each time data is stored from beginning of the logging.

• When 'CH1 Logging hold request' (Un\G471) is turned off, 'CH1 Latest pointer' (Un\G435) is cleared to 0.

A

## CH1 Number of logging data

The number of data stored in the logging data storage area can be checked during the logging.

'CH1 Number of logging data' (Un\G436) increases one by one each time data is stored from beginning of the logging.

When the value in the logging data storage area reaches 1000, 'CH1 Number of logging data' (Un\G436) is fixed to 1000 since the value is overwritten from the head again.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Number of logging data

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 436 | 636 | 836 | 1036 | 1236 | 1436 |

• CH☐ Number of logging data (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1106 | 1107 | 1108 | 1109 | 1110 | 1111 |

**Point**

When 'CH1 Logging hold request' (Un\G471) is turned off, 'CH1 Number of logging data' (Un\G436) is cleared to 0.

## CH1 Trigger pointer

The buffer memory address of the data of when a hold trigger is executed in 'CH1 Logging data' (Un\G10000 to Un\G10999) can be checked with this buffer memory area.

The difference between the address of the buffer memory which stores the data of when a hold trigger is executed and the start address in 'CH1 Logging data' (Un\G10000 to Un\G10999) is stored.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Trigger pointer

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 437 | 637 | 837 | 1037 | 1237 | 1437 |

• CH☐ Trigger pointer (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1114 | 1115 | 1116 | 1117 | 1118 | 1119 |

**Point**

When 'CH1 Logging hold request' (Un\G471) is turned off, 'CH1 Trigger pointer' (Un\G437) is cleared to 0.

## CH1 Current logging read pointer

Each time an amount equivalent to the logging read points monitored value is logged, a value calculated by the following formula is stored.

CH1 Current logging read pointer = CH1 Latest pointer - CH1 Logging read points monitored value + 1

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Current logging read pointer

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 438 | 638 | 838 | 1038 | 1238 | 1438 |

• CH☐ Current logging read pointer (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1216 | 1217 | 1218 | 1219 | 1220 | 1221 |

## CH1 Previous logging read pointer

A before-update current logging read pointer is stored just before an interrupt to the CPU module causes the update.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Previous logging read pointer

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 439 | 639 | 839 | 1039 | 1239 | 1439 |

• CH☐ Previous logging read pointer (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1224 | 1225 | 1226 | 1227 | 1228 | 1229 |

## CH1 Logging read points monitored value

The number of the actual logging read points is stored.

When 'Operating condition setting request' (Y9) is turned on and off, a value is not stored in the channel where the logging read function is disabled.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging read points monitored value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 440 | 640 | 840 | 1040 | 1240 | 1440 |

• CH☐ Logging read points monitored value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1232 | 1233 | 1234 | 1235 | 1236 | 1237 |

## CH1 Logging cycle monitored value

This area stores the actual logging cycle which is calculated from the refreshing cycle of data to be logged.

When 'Operating condition setting request' (Y9) is turned on and off, the actual logging cycle is stored in Logging cycle monitored value in the corresponding channel where the logging function is enabled.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

The following values are stored in 'CH1 Logging cycle monitored value' (Un\G441, Un\G442).

| | b15 ··· b0 |
|---|---|
| 'CH1 Logging cycle monitor value (s)' (Un\G441) | s |
| 'CH1 Logging cycle monitor value (ms)' (Un\G442) | ms |

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging cycle monitored value (s)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 441 | 641 | 841 | 1041 | 1241 | 1441 |

• CH☐ Logging cycle monitored value (ms)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 442 | 642 | 842 | 1042 | 1242 | 1442 |

• CH☐ Logging cycle monitored value (s) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1122 | 1125 | 1128 | 1131 | 1134 | 1137 |

• CH☐ Logging cycle monitored value (ms) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1123 | 1126 | 1129 | 1132 | 1135 | 1138 |

## CH1 Trigger generation time

The time when a trigger is generated is recorded.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

| | b15 ··· b8 | b7 ··· b0 |
|---|---|---|
| 'CH1 Trigger generation time (First/Last two digits of the year)' (Un\G444) | First two digits of the year | Last two digits of the year |
| 'CH1 Trigger generation time (Month/Day)' (Un\G445) | Month | Day |
| 'CH1 Trigger generation time (Hour/Minute)' (Un\G446) | Hour | Minute |
| 'CH1 Trigger generation time (Second/Day of the week)' (Un\G447) | Second | Day of the week |
| 'CH1 Trigger generation time (Millisecond)' (Un\G448) | Millisecond (higher-order digits) | Millisecond (lower-order digits) |

| Item | Description | Storage example*1 |
|---|---|---|
| First two digits of the year/Last two digits of the year | Stored in BCD code. | 2015H |
| Month/Day | | 131H |
| Hour/Minute | | 1234H |
| Second | | 56H |
| Day of the week | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3<br>Thursday: 4, Friday: 5, Saturday: 6 | 6H |
| Millisecond (upper) | Stored in BCD code. | 7H |
| Millisecond (lower) | | 89H |

*1 Values stored when an error occurs at 12:34:56.789 on Saturday, January 31st, 2015.

## ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Trigger generation time (First/Last two digits of the year)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 444 | 644 | 844 | 1044 | 1244 | 1444 |

• CH☐ Trigger generation time (Month/Day)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 445 | 645 | 845 | 1045 | 1245 | 1445 |

• CH☐ Trigger generation time (Hour/Minute)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 446 | 646 | 846 | 1046 | 1246 | 1446 |

• CH☐ Trigger generation time (Second/Day of the week)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 447 | 647 | 847 | 1047 | 1247 | 1447 |

• CH☐ Trigger generation time (Millisecond)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 448 | 648 | 848 | 1048 | 1248 | 1448 |

• CH☐ Trigger generation time (First/Last two digits of the year) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1154 | 1158 | 1162 | 1166 | 1170 | 1174 |

• CH☐ Trigger generation time (Month/Day) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1155 | 1159 | 1163 | 1167 | 1171 | 1175 |

• CH☐ Trigger generation time (Hour/Minute) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1156 | 1160 | 1164 | 1168 | 1172 | 1176 |

• CH☐ Trigger generation time (Second/Day of the week) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1157 | 1161 | 1165 | 1169 | 1173 | 1177 |

• CH☐ Trigger generation time (Millisecond) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1186 | 1187 | 1188 | 1189 | 1190 | 1191 |

**Point**

- Time units shorter than one millisecond are not recorded.
- When 'CH1 Logging hold request' (Un\G471) is turned off, 'CH1 Trigger generation time' (Un\G444 to Un\G448) is cleared to 0.

A

## CH1 Difference conversion trigger

Use this buffer memory area as a trigger to start or stop the difference conversion.

For details on the difference conversion function, refer to the following.

☞ Page 54 Difference Conversion Function

| Setting value | Setting content |
|---|---|
| 0 | No request |
| 1 | Trigger request |

If a value other than the above is set, a difference conversion trigger setting range error (error code: 1A7☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Difference conversion trigger

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 470 | 670 | 870 | 1070 | 1270 | 1470 |

- CH☐ Difference conversion trigger (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 172 | 173 | 174 | 175 | 176 | 177 |

### ■Starting and stopping the difference conversion

- The difference conversion starts when 'CH1 Difference conversion trigger' (Un\G470) is changed from No request (0) to Trigger request (1).
- The difference conversion stops when 'CH1 Difference conversion trigger' (Un\G470) is changed from Trigger request (1) to No request (0).

### ■Default value

The default value is No request (0) for all channels.

## CH1 Logging hold request

Use this buffer memory area as a trigger to hold (stop) logging at any timing during the logging.
For details on the logging function, refer to the following.
☞ Page 63 Logging Function

| Setting value | Setting content |
|---|---|
| 0 | Off |
| 1 | On |

If a value other than the above is set, a logging hold request range error (error code: 1D7☐H) occurs.
When 'CH1 Logging enable/disable setting' (Un\G535) is set to Disable (1), the setting for 'CH1 Logging hold request' (Un\G471) is ignored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Logging hold request

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 471 | 671 | 871 | 1071 | 1271 | 1471 |

- CH☐ Logging hold request (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1008 | 1009 | 1010 | 1011 | 1012 | 1013 |

### ■Operation of the logging hold processing

- When Disable (0) is set to 'CH1 Level trigger condition setting' (Un\G540), the logging hold processing starts by turning on 'CH1 Logging hold request' (Un\G471).
- When a value other than Disable (0) is set to 'CH1 Hold trigger condition setting' (Un\G540), the logging hold processing starts after 'CH1 Logging hold request' (Un\G471) is turned on and the set trigger condition is satisfied. When the level trigger is enabled, use this buffer memory area as an interlock condition to operate the level trigger.
- If 'CH1 Logging hold request' (Un\G471) is turned off during the logging hold processing, the hold (stop) status is cleared and the logging restarts.

### ■Default value

The default value is OFF (0) for all channels.

**Point**

The stop status of the logging can be checked with 'CH1 Logging hold flag' (Un\G409).

## CH1 Conversion value shift amount

Set 'CH1 Conversion value shift amount' (Un\G472) used for the shift function.

The digital operation value to which the conversion value shift amount is applied is stored in 'CH1 Digital operation value' (Un\G402).

For details on the shift function, refer to the following.

☞ Page 50 Shift Function

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) | Data section | | | | | | | | | | | | | | |

(1) Sign bit
- 0: Positive
- 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Conversion value shift amount

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 472 | 672 | 872 | 1072 | 1272 | 1472 |

- CH☐ Conversion value shift amount (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 164 | 165 | 166 | 167 | 168 | 169 |

### ■Setting range

The setting range is from -32768 to 32767.

### ■Enabling the setting

Regardless of turning on and off 'Operating condition setting request' (Y9), the set conversion value shift amount takes effect.

### ■Default value

The default value is 0 for all channels.

## CH1 Supply power temporary stop trigger (for 2-wire transmitter)

Use this buffer memory area as a trigger to output or stop the supply power.

This area is enabled when the channel whose input range setting is set to the 2-wire transmitter range is set to A/D conversion enabled (0).

| Setting value | Setting content |
|---|---|
| 0 | No request |
| 1 | Trigger request |

If a value other than the above is set, a supply power temporary stop trigger setting range error (error code: 1C9☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Supply power temporary stop trigger (for 2-wire transmitter)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 473 | 673 | 873 | 1073 | 1273 | 1473 |

- CH☐ Supply power temporary stop trigger (for 2-wire transmitter) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 330 | 331 | 332 | 333 | 334 | 335 |

### ■Outputting/stopping the supply power

- When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is changed from No request (0) to Trigger request (1), the supply power stops.
- When 'CH1 Supply power temporary stop trigger (for 2-wire transmitter)' (Un\G473) is changed from Trigger request (1) to No request (0), the supply power is output.

### ■Default value

The default value is No request (0) for all channels.

## CH1 A/D conversion enable/disable setting

Set whether to enable or disable the A/D conversion.

For a channel where the 2-wire transmitter input range is set for the input range setting, when A/D conversion enabled (0) is set, the power is supplied to the 2-wire transmitter.

For details on the A/D conversion enable/disable setting function, refer to the following.

☞ Page 19 A/D Conversion Enable/Disable Setting Function

| Setting value | Setting content |
|---|---|
| 0 | A/D conversion enable |
| 1 | A/D conversion disable |

When a value other than the ones above is set, CH1 A/D conversion enable/disable setting (Un\G500) is turned to A/D conversion disable (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ A/D conversion enable/disable setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 500 | 700 | 900 | 1100 | 1300 | 1500 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is A/D conversion disable (1) for all channels.

## A/D conversion enable/disable setting [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the A/D conversion.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

The setting value of the A/D conversion enable/disable setting is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 0

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is A/D conversion disabled (1).

## CH1 Averaging processing specification

Select processing to be performed among the sampling processing, averaging processing, and filter processing.
Averaging processing consists of time average, count average, and moving average.

| Setting value | Setting content |
|---|---|
| 0 | Sampling processing |
| 1 | Time average |
| 2 | Count average |
| 3 | Moving average |
| 4 | Primary delay filter |

If a value other than the above is set, an averaging processing specification setting range error (error code: 191□H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH□ Averaging processing specification

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 501 | 701 | 901 | 1101 | 1301 | 1501 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Sampling processing (0) for all channels.

## Averaging processing specification [Q compatible mode]

In the Q compatible mode, set which processing is to be used, sampling processing, averaging processing, or filter processing.
The setting value of the averaging processing specification is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• Buffer memory address: 24

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CH4 | | | | CH3 | | | | CH2 | | | | CH1 | | | |

• Buffer memory address: 25

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | CH6 | | | | CH5 | | | |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Sampling processing (0).

## CH1 Time average/Count average/Moving average/Primary delay filter constant setting

Configure the time (for averaging), count (for averaging), moving average count, and primary delay filter constant when a value other than Sampling processing (0) is set for 'CH1 Averaging processing specification' (Un\G501).
The following table lists the setting ranges.

| Setting value | Setting content |
|---|---|
| 40 to 5000 (ms) | Time average |
| 4 to 500 (times) | Count average |
| 2 to 200 (times) | Moving average |
| 1 to 500 (times) | Primary delay filter constant |

If a value other than the above is set, any of a time average setting range error (error code: 192☐H), count average setting range error (error code: 193☐H), moving average setting range error (error code: 194☐H), or primary delay filter constant setting range error (error code: 195☐H) occurs, and the A/D conversion processing is performed with the setting before the occurrence of the error.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Time average/Count average/Moving average/Primary delay filter constant setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 502 | 702 | 902 | 1102 | 1302 | 1502 |

• CH☐ Time average/Count average/Moving average/Primary delay filter constant setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

**Point**

- Set a primary delay filter constant for the primary delay filter. The value of the time constant (ms) is the product of the primary delay filter constant and the sampling cycle.
- Since the default value is 0, change the setting value according to the processing method.
- The setting for this area is ignored in the channel where Sampling processing (0) is set to 'CH1 Averaging processing specification' (Un\G501).

## CH1 Scaling enable/disable setting

Set whether to enable or disable the scaling.

For details on the scaling function, refer to the following.

☞ Page 27 Scaling Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

If a value other than the above is set, a scaling enable/disable setting range error (error code: 1A0☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Scaling enable/disable setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 504 | 704 | 904 | 1104 | 1304 | 1504 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1) for all channels.

## Scaling enable/disable setting [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the scaling.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

The setting value of the scaling enable/disable setting is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 53

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1).

A

## CH1 Scaling upper limit value

Set an upper limit value for the range of the scale conversion.

For details on the scaling function, refer to the following.

☞ Page 27 Scaling Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Scaling upper limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 506 | 706 | 906 | 1106 | 1306 | 1506 |

• CH☐ Scaling upper limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 63 | 65 | 67 | 69 | 71 | 73 |

### ■Setting range

The setting range is from -32000 to 32000.

In the channel where a value out of the range is set, a scaling setting range error (error code: 1A1☐H) occurs.

In the channel where a set value does not satisfy the condition "the scaling upper limit value ≠ the scaling lower limit value", a scaling upper/lower limit value setting error (error code: 1A2☐H) occurs.

When 'CH1 Scaling enable/disable setting' (Un\G504) is set to Disable (1), the setting for 'CH1 Scaling upper limit value' (Un\G506) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

## CH1 Scaling lower limit value

Set a lower limit value for the range of the scale conversion.

For details on the scaling function, refer to the following.

☞ Page 27 Scaling Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Scaling lower limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 508 | 708 | 908 | 1108 | 1308 | 1508 |

• CH☐ Scaling lower limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 62 | 64 | 66 | 68 | 70 | 72 |

### ■Setting range

The setting range is from -32000 to 32000.

In the channel where a value out of the range is set, a scaling setting range error (error code: 1A1☐H) occurs.

In the channel where a set value does not satisfy the condition "the scaling upper limit value ≠ the scaling lower limit value", a scaling upper/lower limit value setting error (error code: 1A2☐H) occurs.

When 'CH1 Scaling enable/disable setting' (Un\G504) is set to Disable (1), the setting for 'CH1 Scaling lower limit value' (Un\G508) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

A

## CH1 Digital clipping enable/disable setting

Set whether to enable or disable the digital clipping function.

For details on the digital clipping function, refer to the following.

☞ Page 52 Digital Clipping Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

If a value other than the above is set, a digital clipping enable/disable setting range error (error code: 1A5☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Digital clipping enable/disable setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 510 | 710 | 910 | 1110 | 1310 | 1510 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1) for all channels.

## Digital clipping enable/disable setting [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the digital clipping function.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

The setting value of the digital clipping enable/disable setting is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 29

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1).

## CH1 Warning output setting (Process alarm)

Set whether to enable or disable the warning output of the process alarm.

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

If a value other than the above is set, a warning output setting (Process alarm) range error (error code: 1B0☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Warning output setting (Process alarm)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 512 | 712 | 912 | 1112 | 1312 | 1512 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1) for all channels.

## CH1 Warning output setting (Rate alarm)

Set whether to enable or disable the warning output of the rate alarm.

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

If a value other than the above is set, a warning output setting (Rate alarm) range error (error code: 1B8☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Warning output setting (Rate alarm)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 |
|---|---|---|---|---|---|---|
| 513 | 713 | 913 | 1113 | 1313 | 1513 | 1713 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1) for all channels.

## Warning output setting [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the warning output of process alarms and rate alarms.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 | 0 (fixed) | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

(b0 to b5) 0: Process alarm enabled, 1: Process alarm disabled
(b8 to b13) 0: Rate alarm enabled, 1: Rate alarm disabled

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 48

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

- b0 to b5: The default value is Process alarm disabled (1).
- b8 to b13: The default value is Rate alarm disabled (1).

## CH1 Process alarm upper upper limit value

Set an upper upper limit value of the warning output function (Process alarm).

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Process alarm upper upper limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 514 | 714 | 914 | 1114 | 1314 | 1514 |

- CH☐ Process alarm upper upper limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 89 | 93 | 97 | 101 | 105 | 109 |

### ■Setting range

The setting range is from -32768 to 32767.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

## CH1 Process alarm upper lower limit value

Set an upper lower limit value of the warning output function (Process alarm).

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Process alarm upper lower limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 516 | 716 | 916 | 1116 | 1316 | 1516 |

• CH☐ Process alarm upper lower limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 88 | 92 | 96 | 100 | 104 | 108 |

### ■Setting range

The setting range is from -32768 to 32767.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

## CH1 Process alarm lower upper limit value

Set a lower upper limit value of the warning output function (Process alarm).

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Process alarm lower upper limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 518 | 718 | 918 | 1118 | 1318 | 1518 |

• CH☐ Process alarm lower upper limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 87 | 91 | 95 | 99 | 103 | 107 |

### ■Setting range

The setting range is from -32768 to 32767.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

## CH1 Process alarm lower lower limit value

Set a lower lower limit value of the warning output function (Process alarm).

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Process alarm lower lower limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 520 | 720 | 920 | 1120 | 1320 | 1520 |

• CH☐ Process alarm lower lower limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 86 | 90 | 94 | 98 | 102 | 106 |

### ■Setting range

The setting range is from -32768 to 32767.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

**Point**

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value, upper lower limit value, lower upper limit value, and lower lower value.
- In the channel where a set value does not satisfy the condition "the upper upper limit value ≥ the upper lower limit value ≥ the lower upper limit value ≥ the lower lower limit value", a process alarm upper lower limit value setting range error (error code: 1B△☐H) occurs.
- Since the default value is 0, change the setting value.
- When the scaling function, shift function, digital clipping function, or difference conversion function is used, warning targets are digital operation values to which the operation of each function is reflected. Be sure to consider operation results of each function to set values.

## CH1 Rate alarm warning detection cycle setting

Set the cycle to check the change rate of digital output values.

The value of the cycle to detect a rate alarm warning is the product of the value in 'CH1 Rate alarm warning detection cycle setting' (Un\G522) and the conversion cycle.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Rate alarm warning detection cycle setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 522 | 722 | 922 | 1122 | 1322 | 1522 |

• CH☐ Rate alarm warning detection cycle setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 118 | 119 | 120 | 121 | 122 | 123 |

### ■Setting range

The setting range is from 1 to 32000 (times).

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

**Point**

- In the channel where a value out of the range is set, a rate alarm warning detection cycle setting range error (error code: 1B9☐H) occurs.
- Since the default value is 0, change the setting value when setting the rate alarm function.

A

## CH1 Rate alarm upper limit value

Set an upper limit value of the change rate of digital output values to detect a rate alarm.

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Rate alarm upper limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 524 | 724 | 924 | 1124 | 1324 | 1524 |

• CH☐ Rate alarm upper limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 126 | 128 | 130 | 132 | 134 | 136 |

### ■Setting range

The setting range is from -32768 to 32767 (-3276.8 to 3276.7%). (Set it in a unit of 0.1%.)

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

## CH1 Rate alarm lower limit value

Set a lower limit value of the change rate of digital output values to detect a rate alarm.

For details on the warning output function, refer to the following.

☞ Page 30 Warning Output Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Rate alarm lower limit value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 526 | 726 | 926 | 1126 | 1326 | 1526 |

• CH☐ Rate alarm lower limit value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 127 | 129 | 131 | 133 | 135 | 137 |

### ■Setting range

The setting range is from -32768 to 32767 (-3276.8 to 3276.7%). (Set it in a unit of 0.1%.)

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

**Point**

- When using the rate alarm, configure the 2-step settings for the rate alarm upper limit value and lower limit value.
- In the channel where a set value does not satisfy the condition "the rate alarm lower limit value ≥ the rate alarm upper limit value", a rate alarm upper/lower limit setting value inversion error (error code: 1BA☐H) occurs.
- Since the default value is 0, change the setting value.

## CH1 Input signal error detection setting

Set a condition for detecting an input signal error.

For details on the input signal error detection function, refer to the following.

☞ Page 38 Input Signal Error Detection Function

| Setting value | Setting content |
|---|---|
| 0 | Disable |
| 1 | Upper and lower limit detection |
| 2 | Lower limit detection |
| 3 | Upper limit detection |
| 4 | Simple disconnection detection |

If a value other than the above is set, an input signal error detection setting range error (error code: 1C0□H) occurs.

If Simple disconnection detection (4) is selected for the channel where the input range setting is other than the extended mode, a disconnection detection enabled range setting range error (error code: 1C6□H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH□ Input signal error detection setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 528 | 728 | 928 | 1128 | 1328 | 1528 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (0) for all channels.

## CH1 Input signal error detection setting value/lower limit set value [Q compatible mode]

When the Q compatible mode function is used, set a condition for detecting an input signal error.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 | 0 (fixed) | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

(b0 to b5) 0: Enabled, 1: Disabled

(b8 to b13) 0: Upper limit value/lower limit value same, 1: Upper limit value/lower limit value different

• When Upper limit value/lower limit value same (0) is set

The input signal error detection upper limit value and the input signal error detection lower limit value are calculated by using 'CH1 Input signal error detection setting value/CH1 Input signal error detection lower limit set value' (Un\G142). In that case, 'CH1 Input signal error detection upper limit set value' (Un\G150) is ignored.

• When Upper limit value/lower limit value different (1) is set

The input signal error detection upper limit value is calculated by using 'CH1 Input signal error detection upper limit set value' (Un\G150).

The input signal error detection lower limit value is calculated by using 'CH1 Input signal error detection setting value/CH1 Input signal error detection lower limit set value' (Un\G142).

### ■Buffer memory address

The following shows the buffer memory address of this area.

Q compatible mode: 47

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

• b0 to b5: The default value is Disabled (1).

• b8 to b13: The default value is Upper limit value/lower limit value same (0).

## CH1 Input signal error detection lower limit set value

Set a lower limit value to detect an error for the input analog value.

For details on the input signal error detection function, refer to the following.

☞ Page 38 Input Signal Error Detection Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Input signal error detection lower limit set value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 529 | 729 | 929 | 1129 | 1329 | 1529 |

### ■Setting range

The setting range is from 0 to 250 (0 to 25.0%). Set it in a unit of 1 (0.1%).

For example, set 150 in the buffer memory area to set 15%.

In the channel where a value out of the range is set, an input signal error detection setting value range error (error code: 1C1☐H) occurs.

The input signal error detection lower limit value is calculated by using the input signal error detection lower limit set value as follows. The input signal error detection lower limit value to be calculated varies depending on the input range used.

Input signal error detection lower limit value = Lower limit value of each range[*1] - (Gain value of each range - Offset value of each range) × (Input signal error detection lower limit set value/1000)

*1 The lower limit value in the 4 to 20mA (extended mode) range is the same as the lower limit value between 4 and 20mA.

Ex.

When 'CH1 Input signal error detection lower limit set value' (Un\G529) is set to 100 (10%)

Range used: 4 to 20mA

The input signal error detection lower limit value is calculated as follows:

$$\text{Input signal error detection lower limit value} = 4 - (20 - 4) \times \frac{100}{1000} = 2.4\text{mA}$$

Detection conditions vary depending on the setting of 'CH1 Input signal error detection setting' (Un\G528) as follows:

- When 'CH1 Input signal error detection setting' (Un\G528) is set to Upper and lower limit detection (1), the detection is performed with both the input signal error detection upper limit value and the input signal error detection lower limit value.
- When 'CH1 Input signal error detection setting' (Un\G528) is set to Lower limit detection (2), the detection is performed only with the input signal error detection lower limit value.
- When 'CH1 Input signal error detection setting' (Un\G528) is set to Upper limit detection (3), the value set in this area is ignored.
- When 'CH1 Input signal error detection setting' (Un\G528) is set to Simple disconnection detection (4), the value set in this area is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 50 for all channels.

## CH1 Input signal error detection setting value/lower limit set value [Q compatible mode]

In the Q compatible mode, set a value to detect an error for the input analog value.

The operation varies depending on the value set in 'CH1 Input signal error detection extension/input signal error detection setting' (Un\G47).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| CH☐ Input signal error detection setting value/CH☐ Input signal error detection lower limit set value (in Q compatible mode) | 142 | 143 | 144 | 145 | 146 | 147 |

### ■Setting range

The setting range is from 0 to 250 (0 to 25.0%). Set it in a unit of 1 (0.1%).

For example, set 150 in the buffer memory area to set 15%.

In the channel where a value out of the range is set, an input signal error detection setting value range error (error code: 1C1☐H) occurs.

- When 'CH1 Input signal error detection extension/input signal error detection setting' (Un\G47) is set to Upper limit value/lower limit value same (0)

The area is used to set the input signal error detection setting value.

The input signal error detection upper limit value and the input signal error detection lower limit value are calculated as follows: The calculated values vary depending on the input range used.

Input signal error detection upper limit value =
Gain value of each range + (Gain value of each range - Offset value of each range) × (Input signal error detection set value[*1]/1000)

Input signal error detection lower limit value =
Lower limit value of each range - (Gain value of each range - Offset value of each range) × (Input signal error detection set value[*1]/1000)

*1 The input signal error detection setting value is set in this area.

- When 'CH1 Input signal error detection extension/input signal error detection setting' (Un\G47) is set to Upper limit value/lower limit value different (1)

The area is used to set the input signal error detection lower limit set value.

Setting 251 disables the input signal error detection.

The input signal error detection upper limit value and the input signal error detection lower limit value are calculated as follows: The calculated values vary depending on the input range used.

Input signal error detection upper limit value =
Gain value of each range + (Gain value of each range - Offset value of each range) × (Upper limit set value[*1]/1000)

Input signal error detection lower limit value =
Lower limit value of each range - (Gain value of each range - Offset value of each range) × (Lower limit set value[*2]/1000)

*1 The upper limit set value is the value set in 'CH1 Input signal error detection upper limit set value' (Un\G150).
*2 The lower limit set value is the value set in this area.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 50 for all channels.

## CH1 Input signal error detection upper limit set value

Set an upper limit value to detect an error for the input analog value.

For details on the input signal error detection function, refer to the following.

☞ Page 38 Input Signal Error Detection Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Input signal error detection upper limit set value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 530 | 730 | 930 | 1130 | 1330 | 1530 |

### ■Setting range

The setting range is from 0 to 250 (0 to 25.0%). Set it in a unit of 1 (0.1%).

For example, set 150 in the buffer memory area to set 15%.

In the channel where a value out of the range is set, an input signal error detection setting value range error (error code: 1C1☐H) occurs.

The input signal error detection upper limit value is calculated by using the input signal error detection upper limit set value as follows. The input signal error detection upper limit value to be calculated varies depending on the input range used.

Input signal error detection upper limit value = Gain value of each range + (Gain value of each range - Offset value of each range) × (Input signal error detection upper limit set value/1000)

Ex.

When 'CH1 Input signal error detection upper limit set value' (Un\G530) is set to 100 (10%)

Range used: 4 to 20mA

The input signal error detection upper limit value is calculated as follows:

$$\text{Input signal error detectionupper limit value} = 20 + (20 - 4) \times \frac{100}{1000} = 21.6\text{mA}$$

Detection conditions vary depending on the setting of 'CH1 Input signal error detection setting' (Un\G528) as follows:

- When 'CH1 Input signal error detection setting' (Un\G528) is set to Upper and lower limit detection (1), the detection is performed with both the input signal error detection upper limit value and the input signal error detection lower limit value.
- When 'CH1 Input signal error detection setting' (Un\G528) is set to Lower limit detection (2), the value set in this area is ignored.
- When 'CH1 Input signal error detection setting' (Un\G528) is set to Upper limit detection (3), the detection is performed only with the input signal error detection upper limit value.
- When 'CH1 Input signal error detection setting' (Un\G528) is set to Simple disconnection detection (4), the value set in this area is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 50 for all channels.

## CH1 Input signal error detection upper limit set value [Q compatible mode]

In the Q compatible mode, set an upper limit value to detect an input signal error.

The operation varies depending on the value set in 'CH1 Input signal error detection extension/input signal error detection setting' (Un\G47).

- When Upper limit value/lower limit value same (0) is set

The value set in this area is ignored.

- When Upper limit value/lower limit value different (1) is set

Set an upper limit value to detect an input signal error.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| CH☐ Input signal error detection upper limit set value (in Q compatible mode) | 150 | 151 | 152 | 153 | 154 | 155 |

### ■Setting range

The setting range is from 0 to 250 (0 to 25.0%). Set it in a unit of 1 (0.1%).

In the channel where a value out of the range is set, an input signal error detection setting value range error (error code: 1C1☐H) occurs.

However, setting 251 disables the input signal error detection.

For the setting method, refer to the following.

☞ Page 191 CH1 Input signal error detection setting value/lower limit set value [Q compatible mode]

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 50 for all channels.

## CH1 Conversion start time setting (for 2-wire transmitter)

Set the time (warm-up time) required for an output to become stable after the 2-wire transmitter is powered on.

This area is enabled when the channel whose input range setting is set to the 2-wire transmitter input range is set to A/D conversion enabled (0).

| Setting value | Setting content |
|---|---|
| 0 to 32767 | 0 to 3276.7 seconds (0 to 54 minute 36.7 seconds) |

- If a value other than the above is set, a conversion start time setting range error (error code: 1C8☐H) occurs, and the A/D conversion processing is performed in the state before the error occurrence.
- Set the values in increments of 100ms.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Conversion start time setting (for 2-wire transmitter)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 532 | 732 | 932 | 1132 | 1332 | 1532 |

- CH☐ Conversion start time setting (for 2-wire transmitter) (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 78 | 79 | 80 | 81 | 82 | 83 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default is 30 (3 seconds) for all channels.

## CH1 Logging enable/disable setting

Set whether to enable or disable the logging function.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

If a value other than the above is set, a logging enable/disable setting range error (error code: 1D0☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging enable/disable setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 535 | 735 | 935 | 1135 | 1335 | 1535 |

• CH☐ Logging enable/disable setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1000 | 1001 | 1002 | 1003 | 1004 | 1005 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1) for all channels.

## CH1 Logging data setting

Determine the target to be collected: digital output value or digital operation value.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

| Setting value | Setting content |
|---|---|
| 0 | Digital output value |
| 1 | Digital operation value |

If a value other than the above is set, a logging data setting range error (error code: 1D3☐H) occurs.

When 'CH1 Logging enable/disable setting' (Un\G535) is set to Disable (1), the setting for 'CH1 Logging data setting' (Un\G536) is ignored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging data setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 536 | 736 | 936 | 1136 | 1336 | 1536 |

• CH☐ Logging data setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1024 | 1025 | 1026 | 1027 | 1028 | 1029 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Digital operation value (1) for all channels.

## CH1 Logging cycle setting value

Set a cycle for storing the logging data.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging cycle setting value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 537 | 737 | 937 | 1137 | 1337 | 1537 |

• CH☐ Logging cycle setting value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1032 | 1033 | 1034 | 1035 | 1036 | 1037 |

### ■Setting range

The setting range varies depending on the setting in 'CH1 Logging cycle unit setting' (Un\G538).

| CH1 Logging cycle unit setting (Un\G538) | Setting range |
|---|---|
| ms (1) | 10 to 32767 |
| s (2) | 1 to 3600 |

- If a value out of the range is set, a logging cycle setting value range error (error code: 1D1☐H) occurs. Logging cannot be performed.
- If the set logging cycle is below the update cycle of data to be logged, a logging cycle setting disable error (error code: 1D2☐H) occurs. Logging cannot be performed.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 60 for all channels.

## CH1 Logging cycle unit setting

Set a cycle unit for storing the logging data.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

| Setting value | Setting content |
|---|---|
| 1 | ms |
| 2 | s |

- If a value out of the range is set, a logging cycle setting value range error (error code: 1D1□H) occurs. Logging cannot be performed.
- If the set logging cycle is below the update cycle of data to be logged, a logging cycle setting disable error (error code: 1D2□H) occurs. Logging cannot be performed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH□ Logging cycle unit setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 538 | 738 | 938 | 1138 | 1338 | 1538 |

- CH□ Logging cycle unit setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1040 | 1041 | 1042 | 1043 | 1044 | 1045 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default is ms (1) for all channels.

## CH1 Post-trigger logging points

Set a number of data points collected for the time period from the occurrence of a hold trigger to the logging stop.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Post-trigger logging points

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 539 | 739 | 939 | 1139 | 1339 | 1539 |

• CH☐ Post-trigger logging points (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1048 | 1049 | 1050 | 1051 | 1052 | 1053 |

### ■Setting range

The setting range is from 1 to 1000.

If a value out of the range is set, a post-trigger logging points setting range error (error code: 1D4☐H) occurs. Logging cannot be performed.

When 'CH1 Logging enable/disable setting' (Un\G535) is set to Disable (1), the setting for 'CH1 Post-trigger logging points' (Un\G539) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 500 for all channels.

A

## CH1 Level trigger condition setting

Set the condition for the occurrence of a hold trigger when using the level trigger in the logging function.

To use the level trigger, set Level trigger condition setting to either level of Level trigger (condition: Rise) (1), Level trigger (condition: Fall) (2), or Level trigger (condition: Rise and fall) (3).

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

| Setting value | Setting content |
|---|---|
| 0 | Disable |
| 1 | Level trigger (condition: Rise) |
| 2 | Level trigger (condition: Fall) |
| 3 | Level trigger (condition: Rise and fall) |

If a value other than the above is set, a level trigger condition setting range error (error code: 1D5☐H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Level trigger condition setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 540 | 740 | 940 | 1140 | 1340 | 1540 |

• CH☐ Level trigger condition setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1056 | 1057 | 1058 | 1059 | 1060 | 1061 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (0) for all channels.

## CH1 Trigger data

Set a buffer memory address to be monitored using a level trigger.

Set the buffer memory address where the target data for monitoring is stored.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Trigger data

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 541 | 741 | 941 | 1141 | 1341 | 1541 |

### ■Setting range

The setting range is from 0 to 9999.

If a value out of the range is set, a trigger data setting range error (error code: 1D6☐H) occurs. Logging cannot be performed.

When 'CH1 Logging enable/disable setting' (Un\G535) is set to Disable (1), the setting for 'CH1 Trigger data' (Un\G541) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default values are set as shown below.

| Channel | Default value | Buffer memory area to be monitored |
|---|---|---|
| CH1 | 402 | 'CH1 Digital operation value' (Un\G402) |
| CH2 | 602 | 'CH2 Digital operation value' (Un\G602) |
| CH3 | 802 | 'CH3 Digital operation value' (Un\G802) |
| CH4 | 1002 | 'CH4 Digital operation value' (Un\G1002) |
| CH5 | 1202 | 'CH5 Digital operation value' (Un\G1202) |
| CH6 | 1402 | 'CH6 Digital operation value' (Un\G1402) |

## CH1 Trigger data [Q compatible mode]

In the Q compatible mode, set a buffer memory address to be monitored using a level trigger.

Set the buffer memory address where the target data for monitoring is stored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| CH1 Trigger data (in Q compatible mode) | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 |

### ■Setting range

The setting range is from 0 to 9999.

If a value out of the range is set, a trigger data setting range error (error code: 1D6☐H) occurs. Logging cannot be performed.

When 'CH1 Logging enable/disable setting' (Un\G1000) is set to Disable (1), the setting for 'CH1 Trigger data' (Un\G1064) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default values are set as shown below.

| Channel | Default value | Buffer memory area to be monitored |
|---|---|---|
| CH1 | 54 | CH1 Digital operation value (Un\G54) |
| CH2 | 55 | CH2 Digital operation value (Un\G55) |
| CH3 | 56 | CH3 Digital operation value (Un\G56) |
| CH4 | 57 | CH4 Digital operation value (Un\G57) |
| CH5 | 58 | CH5 Digital operation value (Un\G58) |
| CH6 | 59 | CH6 Digital operation value (Un\G59) |

## CH1 Trigger setting value

Set a level to generate a level trigger.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Trigger setting value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 542 | 742 | 942 | 1142 | 1342 | 1542 |

• CH☐ Trigger setting value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1082 | 1083 | 1084 | 1085 | 1086 | 1087 |

### ■Setting range

The setting range is from -32768 to 32767.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 0 for all channels.

## CH1 Loading interrupt enable/disable setting

Set whether to enable or disable the logging read function.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

| Setting value | Setting content |
|---|---|
| 0 | Enable |
| 1 | Disable |

- If a value other than the above is set, a read interrupt enable/disable setting range error (error code: 1D8☐H) occurs. Logging cannot be performed.
- When CH1 Logging read enable/disable setting (Un\G544) is set to Enable (0), an interrupt is generated and sent to the CPU module by setting a read pointer each time an amount equivalent to the logging read points setting value is logged.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Loading interrupt enable/disable setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 544 | 744 | 944 | 1144 | 1344 | 1544 |

- CH☐ Loading interrupt enable/disable setting (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1200 | 1201 | 1202 | 1203 | 1204 | 1205 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is Disable (1) for all channels.

**Point**

The interrupt pointer to be used is preset but can be changed. To change the interrupt pointer, set the corresponding interrupt pointer with the engineering tool.

A

## CH1 Logging read points setting value

An interrupt is generated to the CPU module each time data is logged for the set number of data points.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging read points setting value

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 545 | 745 | 945 | 1145 | 1345 | 1545 |

• CH☐ Logging read points setting value (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 1208 | 1209 | 1210 | 1211 | 1212 | 1213 |

### ■Setting range

The setting range is from 1 to 1000.

If a value out of the range is set, a logging read points setting value range error (error code: 1D9☐H) occurs. Logging cannot be performed.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 100 for all channels.

## CH1 Range setting

This area is for setting an input range.

| Input range | Setting value |
|---|---|
| 4 to 20mA (2-wire transmitter input) | 0H |
| 4 to 20mA (current input) | 6H |
| 0 to 20mA (current input) | 7H |
| 4 to 20mA (extended mode) (2-wire transmitter input) | AH |
| 4 to 20mA (extended mode) (current input) | CH |
| User range setting (current input) | EH |
| User range setting (2-wire transmitter input) | FH |

• If a value other than the above is set, a range setting range error (error code: 190☐H) occurs.

• The input range cannot be changed for channels with A/D conversion disabled. To change the input range, set 'CH1 A/D conversion enable/disable setting' (Un\G500) to A/D conversion enable (0), and turn on and off 'Operating condition setting request' (Y9).

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Range setting

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 598 | 798 | 998 | 1198 | 1398 | 1598 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 4 to 20mA (2-wire transmitter input) (0H) for all channels.

## Range setting [Q compatible mode]

When the Q compatible mode function is used, this area is for setting an input range.
The range setting value is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• Buffer memory address: 402

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CH4 | | | | CH3 | | | | CH2 | | | | CH1 | | | |

• Buffer memory address: 403

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | CH6 | | | | CH5 | | | |

The input range cannot be changed for channels with A/D conversion disabled. To change the input range, set the bit corresponding to the channel of 'A/D conversion enable/disable setting [Q compatible mode]' (Un\G0) to A/D conversion enable (0), and turn on and off 'Operating condition setting request' (Y9).

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9).

### ■Default value

The default value is 4 to 20mA (2-wire transmitter input) (0H) for all channels.

## Error history

Up to 16 errors that occurred in the module are recorded.

| | b15 ··· b8 | b7 ··· b0 |
|---|---|---|
| Un\G3600 | Error code | |
| Un\G3601 | First two digits of the year | Last two digits of the year |
| Un\G3602 | Month | Day |
| Un\G3603 | Hour | Minute |
| Un\G3604 | Second | Day of the week |
| Un\G3605 | Millisecond (higher-order digits) | Millisecond (lower-order digits) |
| Un\G3606 to Un\G3609 | System area | |

| Item | Description | Storage example*1 |
|---|---|---|
| First two digits of the year/Last two digits of the year | Stored in BCD code. | 2015H |
| Month/Day | | 131H |
| Hour/Minute | | 1234H |
| Second | | 56H |
| Day of the week | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3<br>Thursday: 4, Friday: 5, Saturday: 6 | 6H |
| Millisecond (upper) | Stored in BCD code. | 7H |
| Millisecond (lower) | | 89H |

*1 Values stored when an error occurs at 12:34:56.789 on Saturday, January 31st, 2015.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | No.1 to No.16 |
|---|---|
| Error history | 3600 to 3759 |
| Error history (in Q compatible mode) | 1810 to 1969 |

## Alarm history

Up to 16 alarms that occurred in the module are recorded.

| | b15 … b8 | b7 … b0 |
|---|---|---|
| Un\G3760 | Alarm code | |
| Un\G3761 | First two digits of the year | Last two digits of the year |
| Un\G3762 | Month | Day |
| Un\G3763 | Hour | Minute |
| Un\G3764 | Second | Day of the week |
| Un\G3765 | Millisecond (higher-order digits) | Millisecond (lower-order digits) |
| Un\G3766 ⋮ Un\G3769 | System area | |

| Item | Description | Storage example*1 |
|---|---|---|
| First two digits of the year/Last two digits of the year | Stored in BCD code. | 2015H |
| Month/Day | | 131H |
| Hour/Minute | | 1234H |
| Second | | 56H |
| Day of the week | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3<br>Thursday: 4, Friday: 5, Saturday: 6 | 6H |
| Millisecond (upper) | Stored in BCD code. | 7H |
| Millisecond (lower) | | 89H |

*1 Values stored when an alarm occurs at 12:34:56.789 on Saturday, January 31st, 2015.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | No.1 to No.16 |
|---|---|
| Alarm history | 3760 to 3919 |
| Alarm history (in Q compatible mode) | 3760 to 3919 |

A

## CH1 User range setting

This area restores the offset/gain setting value in user range setting.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| CH☐ Factory default setting offset value (L) (H) | 4004 | 4008 | 4012 | 4016 | 4020 | 4024 |
| | 4005 | 4009 | 4013 | 4017 | 4021 | 4025 |
| CH☐ Factory default setting gain value (L) (H) | 4006 | 4010 | 4014 | 4018 | 4022 | 4026 |
| | 4007 | 4011 | 4015 | 4019 | 4023 | 4027 |
| CH☐ User range setting offset value (L) (H) | 4028 | 4032 | 4036 | 4040 | 4044 | 4048 |
| | 4029 | 4033 | 4037 | 4041 | 4045 | 4049 |
| CH☐ User range setting gain value (L) (H) | 4030 | 4034 | 4038 | 4042 | 4046 | 4050 |
| | 4031 | 4035 | 4039 | 4043 | 4047 | 4051 |
| CH☐ Factory default setting offset value (L) (H) (in Q compatible mode) | 202 | 206 | 210 | 214 | 218 | 222 |
| | 203 | 207 | 211 | 215 | 219 | 223 |
| CH☐ Factory default setting gain value (L) (H) (in Q compatible mode) | 204 | 208 | 212 | 216 | 220 | 224 |
| | 205 | 209 | 213 | 217 | 221 | 225 |
| CH☐ User range setting offset value (L) (H) (in Q compatible mode) | 226 | 230 | 234 | 238 | 242 | 246 |
| | 227 | 231 | 235 | 239 | 243 | 247 |
| CH☐ User range setting gain value (L) (H) (in Q compatible mode) | 228 | 232 | 236 | 240 | 244 | 248 |
| | 229 | 233 | 237 | 241 | 245 | 249 |

When the following operations are performed, the data to be used is stored (saved).

- Writing the initial setting by engineering tool
- Turning on 'Operating condition setting request' (Y9) (Data is not saved when the mode is switched from the normal mode to the offset/gain setting mode by 'Mode switching setting' (Un\G296, Un\G297).)
- Writing an offset/gain value in the offset/gain setting mode (When 'User range write request' (YA) is turned on)

When restoring the offset/gain setting value in user range setting, set the same data as the saved data in this area to the corresponding area of the A/D converter module that is the restoration destination.

For the offset/gain setting, refer to the following.

MELSEC iQ-R Channel Isolated Analog-Digital Converter Module User's Manual (Startup)

### ■Default value

The default value is 0 for all channels.

## CH1 Offset/gain setting mode

Specify the channel where the offset/gain setting is adjusted.

- Offset/gain setting mode (offset specification): Channel to adjust the offset
- Offset/gain setting mode (gain specification): Channel to adjust the gain

| Setting | Setting content |
|---|---|
| 0 | Disable |
| 1 | Setting channel |

Set one of the offset specification or gain specification to the Setting channel (1), and the other to Disable (0). When a value other than 0 and 1 is set, an offset/gain setting channel range error (error code: 1E8☐H) occurs.

Multiple channels can be set at the same time. In that case, set the offset specification and gain specification separately. The offset specification and gain specification cannot be set at the same time.

In the following cases, an offset/gain setting channel specification error (error code: 1E50H) occurs. Also, the ON/OFF status of the power supply requirements for 2-wire transmitter does not change.

- When both the offset specification and gain specification of the same channel are set to Setting channel (1)
- When Disable (0) is set for all channels
- When both the offset specification and gain specification of multiple channels are set to Setting channel (1) at the same time

Also when 'Offset/gain change request' (YC) is turned on before 'Channel change request' (YB) is turned on, an offset/gain setting channel specification error (error code: 1E50H) occurs. In this case, the last value is the set value.

### ■Buffer memory address

The following shows the buffer memory address of this area.

- CH☐ Offset/gain setting mode (offset specification)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 4132 | 4134 | 4136 | 4138 | 4140 | 4142 |

- CH☐ Offset/gain setting mode (gain specification)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 4133 | 4135 | 4137 | 4139 | 4141 | 4143 |

### ■Enabling the setting

Turn on 'Channel change request' (YB).

### ■Default value

The default value is Disable (0) for all channels.

A

## Offset/gain setting mode [Q compatible mode]

When the Q compatible mode function is used, specify the channel where the offset/gain setting is adjusted.
The setting value of the offset/gain setting mode is the same as the one for the R mode.

### ■Buffer memory address

The following shows the buffer memory address of this area.

• Buffer memory address: 22 (offset specification)

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

• Buffer memory address: 23 (gain specification)

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 (fixed) | | | | | | | | | | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

### ■Enabling the setting

Turn on 'Channel change request' (YB).

### ■Default value

The default value is Disable (0).

**Point**

When the offset/gain setting is configured from the offset/gain setting window of an engineering tool, the setting is performed properly on the window. Therefore, a program is not required to perform the setting.
When a sequence program used for the MELSEC-Q series A/D converter module is utilized to configure the offset/gain setting, check that an appropriate value has been set in this area.
For the sequence programs for the MELSEC-Q series A/D converter module, refer to the following.
MELSEC-Q Channel Isolated Analog-Digital Converter Module/Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual

## CH1 Logging data

This area stores the data logged by the logging function.

Up to 1000 points of data can be stored per channel. When the number of stored data points is 1001 or greater, data is continuously collected overwriting the data from the head.

For details on the logging function, refer to the following.

☞ Page 63 Logging Function

### ■Buffer memory address

The following shows the buffer memory address of this area.

• CH☐ Logging data

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 10000 to 10999 | 11000 to 11999 | 12000 to 12999 | 13000 to 13999 | 14000 to 14999 | 15000 to 15999 |

• CH☐ Logging data (in Q compatible mode)

| CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|
| 5000 to 5999 | 6000 to 6999 | 7000 to 7999 | 8000 to 8999 | 9000 to 9999 | 10000 to 10999 |

**Point**

- When 'Operating condition setting request' (Y9) is turned on, the logging data in all the channels are cleared.
- When Logging hold request is turned off while 'CH1 Logging hold flag' (Un\G409) is on, data logging resumes. In this case, the logged data is not cleared.

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# Appendix 4 Dedicated Instructions

## Instruction list

The following table lists the dedicated instructions that can be used in the A/D converter module.

| Instruction | Description |
|---|---|
| G(P).OFFGAN | Switches normal mode to offset/gain setting mode.<br>Switches offset/gain setting mode to normal mode. |
| G(P).OGLOAD | Reads out the offset/gain setting value in the user range setting to write it into the CPU module. |
| G(P).OGSTOR | Restores the offset/gain setting value in the user range setting stored in the CPU module into the A/D converter module. |

For details on the dedicated instructions, refer to the following.

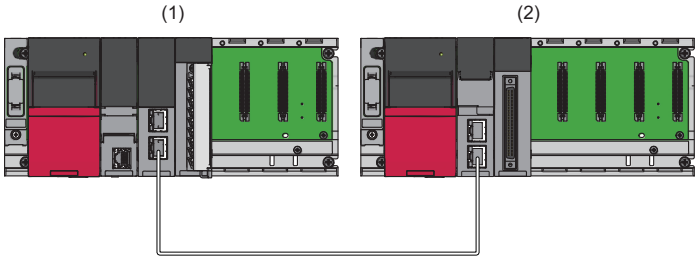
MELSEC iQ-R Programming Manual (Module Dedicated Instructions)

# Appendix 5 Operation Examples of When the Remote Head Module Is Mounted

This section describes operation examples of when the remote head module is mounted.

## System configuration example

The following system configuration is used to explain an example of operation.




(1) Master station (Network number 1, station number 0)
- Power supply module: R61P
- CPU module: R04CPU
- Master/local module: RJ71GF11-T2 (Start I/O number: 0000H to 001FH)
- Input module: RX10 (Start I/O number: 0020H to 002FH)

(2) Intelligent device station (Network number 1, station number 1)
- Power supply module: R61P
- Remote head module: RJ72GF15-T2
- A/D converter module: R60AD6-DG (Start I/O number: 0000H to 000FH*1)

*1 In the RX/RY setting of the master station, set 1000H to 100FH as the start I/O number of the A/D converter module.

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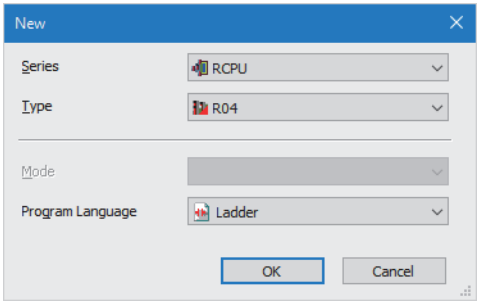
# Setting in the master station

Connect the engineering tool to the CPU module of the master station and set parameters.

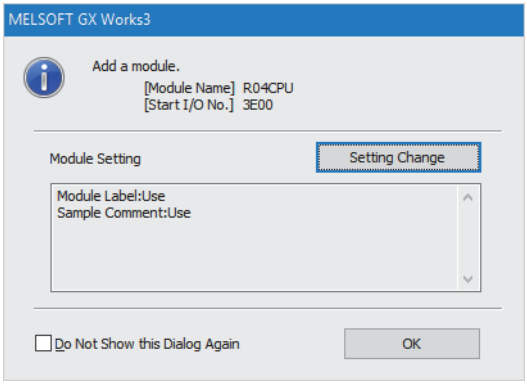
***1.*** Create the project with the following settings.

[Project] ⇨ [New]



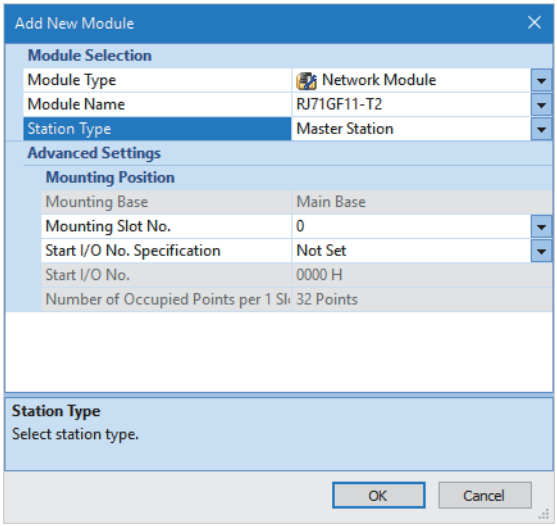

***2.*** Click the [Setting Change] button and set the module to use the module labels.

***3.*** Click the [OK] button in the following window to add the module labels of the CPU module.

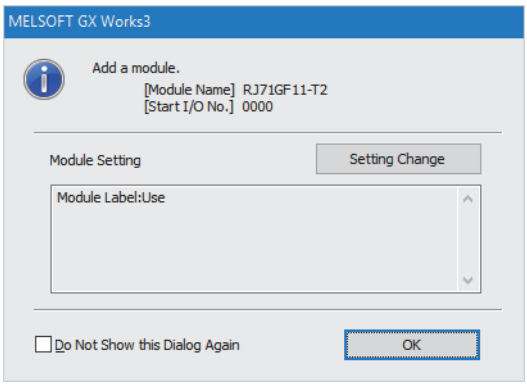



***4.*** Add the master/local module with the following settings.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]



**5.** Click the [OK] button in the following window to add the module labels of the master/local module.



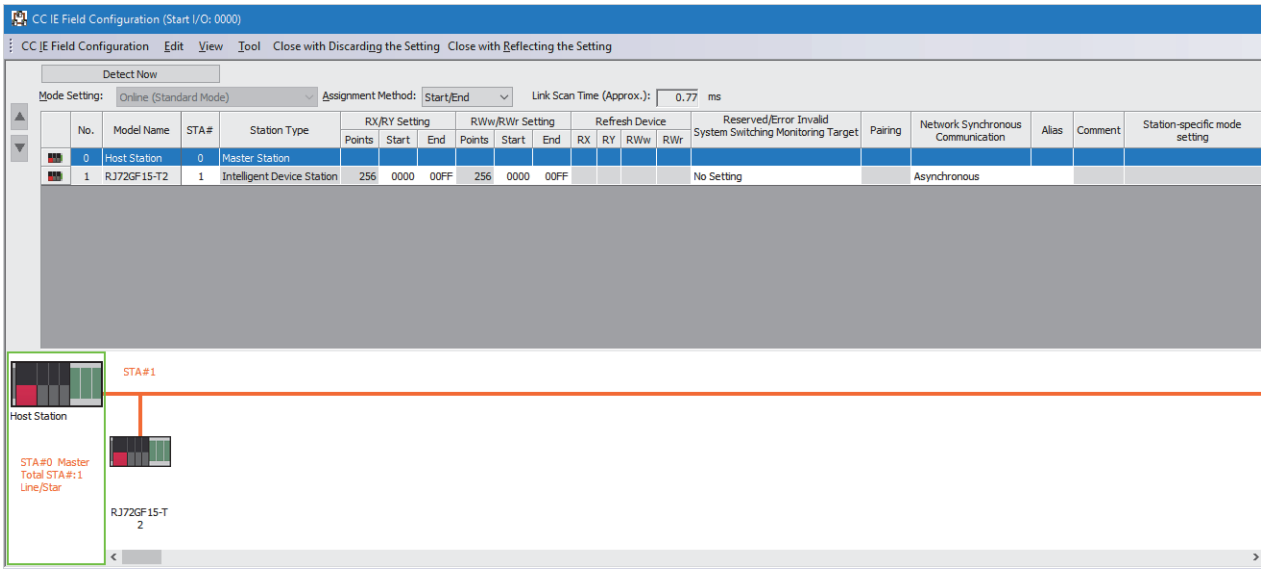

**6.** Set "Required Settings" of the module parameter of the master/local module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Required Settings]

| Item | Setting |
|---|---|
| ***Station Type*** | |
| Station Type | Master Station |
| **Network No.** | |
| Network No. | 1 |
| **Station No.** | |
| Setting Method | Parameter Editor |
| Station No. | 0 |
| **Parameter Setting Method** | |
| Setting Method of Basic/Application Settings | Parameter Editor |

**7.** Set "Network Configuration Settings" of the module parameter of the master/local module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic setting] ⇨ [Network Configuration Settings]

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**8.** Set "Refresh settings" of the module parameter of the master/local module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [RJ71GF11-T2] ⇨ [Basic setting] ⇨ [Refresh settings]

| No. | Link Side | | | | | CPU Side | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Device Name | Points | Start | End | | Target | Device Name | Points | Start | End |
| - | SB | 512 | 00000 | 001FF | | Module Lab | | | | |
| - | SW | 512 | 00000 | 001FF | | Module Lab | | | | |
| 1 | RX | 256 | 00000 | 000FF | | Specify Dev | X | 256 | 01000 | 010FF |
| 2 | RY | 256 | 00000 | 000FF | | Specify Dev | Y | 256 | 01000 | 010FF |
| 3 | RWr | 256 | 00000 | 000FF | | Specify Dev | W | 256 | 00000 | 000FF |
| 4 | RWw | 256 | 00000 | 000FF | | Specify Dev | W | 256 | 01000 | 010FF |
| 5 | | | | | | | | | | |

**9.** Write the set parameters to the CPU module on the master station. Then reset the CPU module or power off and on the system.

[Online] ⇨ [Write to PLC]

**Point**

For parameters of the master/local module which are not described in this procedure, set default values. For details on parameters of the master/local module, refer to the following.

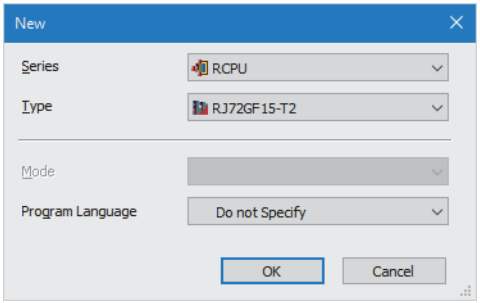
MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

# Setting in the intelligent device station

Connect the engineering tool to the remote head module of the intelligent device station and set parameters.

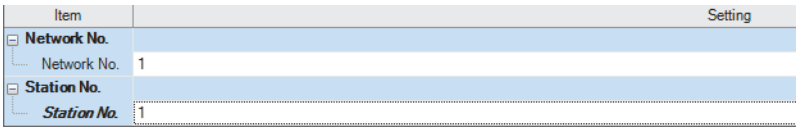
**1.** Create the project with the following settings.

[Project] ⇨ [New]



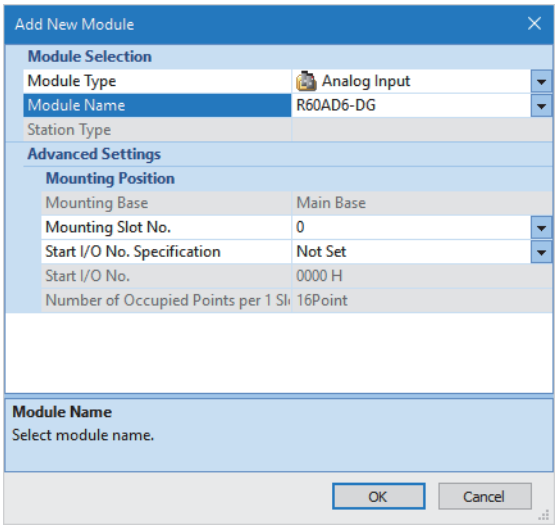

**2.** Set "Network Required Setting" of "CPU Parameter" of the remote head module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [RJ72GF15-T2] ⇨ [CPU Parameter] ⇨ [Network Required Setting]

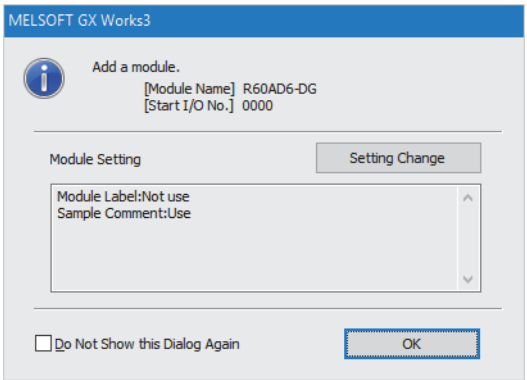



**3.** Add the A/D converter module with the following settings.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ Right-click ⇨ [Add New Module]




**4.** Configure the setting not to use the module labels.

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**5.** Set "Basic setting" of the module parameter of the A/D converter module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [R60AD6-DG] ⇨ [Basic setting]

Setting Item

| Item | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| ***Range switching function*** | The input range of the analog input can be set for each channel and the input conversion attribute can b | | | | | |
| Input range setting | 4 to 20mA (for 2-v | 4 to 20mA (for 2-v | 4 to 20mA (for 2-v | 4 to 20mA (for 2-v | 4 to 20mA (for cu | 4 to 20mA (for 2-w |
| **Operation mode setting function** | The two operation modes, "Normal mode" to execute the normal A/D conversion and "Offset/gain set | | | | | |
| Operation mode setting | Normal mode (A/D conversion process) | | | | | |
| **A/D conversion enable/disable setting function** | Set whether to enable or disable the output of the A/D conversion value. | | | | | |
| A/D conversion enable/disable setting | A/D conversion e | A/D conversion d | A/D conversion e | A/D conversion d | A/D conversion e | A/D conversion en |
| **A/D conversion method** | Set the A/D conversion control method. | | | | | |
| Average processing setting | Sampling proces | Sampling proces | Count average | Sampling proces | Moving average | Sampling process |
| Time average/Count average/Moving average/ | 0 | 0 | 50 times | 0 | 10 times | 0 |
| **Conversion starting time setting function** | Set the time necessary from when the used 2-wire transmitter powers on until its output stabilizes. | | | | | |
| Conversion starting time setting (for 2-wire transmitter) | 10.0 s | 3.0 s | 3.0 s | 3.0 s | 3.0 s | 3.0 s |

**6.** Set "Application setting" of the module parameter of the A/D converter module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [R60AD6-DG] ⇨ [Application setting]

Setting Item

| Item | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| ***Scaling function*** | Configure the setting for the scaling at the A/D conversion. | | | | | |
| Scaling enable/disable setting | Disable | Disable | Disable | Disable | Enable | Disable |
| Scaling upper limit value | 0 | 0 | 0 | 0 | 16000 | 0 |
| Scaling lower limit value | 0 | 0 | 0 | 0 | 2000 | 0 |
| **Shift function** | Configure the setting for the shift function at the A/D conversion. | | | | | |
| Conversion value shift | 0 | 0 | 0 | 0 | 2000 | 0 |
| **Digital clipping function** | Configure the setting for the digital clipping function at the A/D conversion. | | | | | |
| Digitalclip enable/disable setting | Disable | Disable | Disable | Disable | Enable | Disable |
| **Warning output function (Process alarm)** | Set an alert at the A/D conversion. | | | | | |
| Warning output setting (Process alarm) | Disable | Disable | Enable | Disable | Disable | Disable |
| Process alarm upper upper limit value | 0 | 0 | 32000 | 0 | 0 | 0 |
| Process alarm upper lower limit value | 0 | 0 | 20000 | 0 | 0 | 0 |
| Process alarm lower upper limit value | 0 | 0 | 4000 | 0 | 0 | 0 |
| Process alarm lower lower limit value | 0 | 0 | 0 | 0 | 0 | 0 |
| **Warning output function (Rate alarm)** | Set an alert at the A/D conversion. | | | | | |
| Warning output setting (Rate alarm) | Enable | Disable | Disable | Disable | Disable | Disable |
| Rate alarm detection cycle setting | 400 times | 0 times | 0 times | 0 times | 0 times | 0 times |
| Rate alarm upper limit value | 250.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % |
| Rate alarm lower limit value | -5.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % | 0.0 % |
| **Input signal error detection function** | Configure the setting for the input signal at the A/D conversion. | | | | | |
| Input signal error detection setting | Upper limit detec | Disable | Disable | Disable | Disable | Disable |
| Input signal error detection lower limit setting value | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % |
| Input signal error detection upper limit setting value | 8.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % | 5.0 % |
| Input signal error detection auto clear enable/disable setting | Disable | | | | | |
| **Logging function** | Configure the setting for the logging function at the A/D conversion. | | | | | |
| Logging enable/disable setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Logging data setting | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation val |
| Logging cycle setting value | 60 ms | 60 ms | 60 ms | 60 ms | 60 ms | 60 ms |
| Logging cycle unit setting | ms | ms | ms | ms | ms | ms |
| Level trigger condition setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Logging points after trigger | 500 | 500 | 500 | 500 | 500 | 500 |
| Trigger data | 402 | 602 | 802 | 1002 | 1202 | 1402 |
| Trigger setting value | 0 | 0 | 0 | 0 | 0 | 0 |
| Logging read enable/disable setting | Disable | Disable | Disable | Disable | Disable | Disable |
| Logging read points setting value | 100 | 100 | 100 | 100 | 100 | 100 |
| **Online module change** | The module can be changed without the system being stopped. | | | | | |
| Auto restore of Offset/ gain setting with the module change | Disable | | | | | |

**7.** Set "Refresh settings" of the module parameter of the A/D converter module as shown below.

[Navigation window] ⇨ [Parameter] ⇨ [Module Information] ⇨ [R60AD6-DG] ⇨ [Refresh settings]

Setting Item

Target: Device

Number of transfers to intelligent function module: 0
Number of transfers to CPU: 13

| Item | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 |
|---|---|---|---|---|---|---|
| **Refresh at the set timing.** | | | | | | |
| **Transfer to the intelligent function module.** | **Transfer the buffer memory data to the specified device.** | | | | | |
| **Transfer to the CPU.** | **Transfer the buffer memory data to the specified device.** | | | | | |
| Latest error code | W1020 | | | | | |
| Latest address of error history | | | | | | |
| *Latest alarm code* | | | | | | |
| Latest address of alarm history | | | | | | |
| Interrupt factor detection flag 1 | | | | | | |
| Interrupt factor detection flag 2 | | | | | | |
| Interrupt factor detection flag 3 | | | | | | |
| Interrupt factor detection flag 4 | | | | | | |
| Interrupt factor detection flag 5 | | | | | | |
| Interrupt factor detection flag 6 | | | | | | |
| Interrupt factor detection flag 7 | | | | | | |
| Interrupt factor detection flag 8 | | | | | | |
| Interrupt factor detection flag 9 | | | | | | |
| Interrupt factor detection flag 10 | | | | | | |
| Interrupt factor detection flag 11 | | | | | | |
| Interrupt factor detection flag 12 | | | | | | |
| Interrupt factor detection flag 13 | | | | | | |
| Interrupt factor detection flag 14 | | | | | | |
| Interrupt factor detection flag 15 | | | | | | |
| Interrupt factor detection flag 16 | | | | | | |
| Warning output flag (Process alarm upper limit) | W1010 | | | | | |
| Warning output flag (Process alarm lower limit) | W1011 | | | | | |
| Warning output flag (Rate alarm upper limit) | W1012 | | | | | |
| Warning output flag (Rate alarm lower limit) | W1013 | | | | | |
| Input signal error detection flag | W1014 | | | | | |
| A/D conversion completed flag | W1000 | | | | | |
| Digital output value | W1001 | | W1002 | | | W1004 |
| Digital operation value | | | | | W1003 | |
| Maximum value | | | | | W1005 | |
| Minimum value | | | | | W1006 | |
| Difference conversion state flag | | | | | | |
| Logging hold flag | | | | | | |
| Digital output value (32bit) | | | | | | |
| Supply power temporary stop state flag (for 2-wire transmitter) | | | | | | |
| **Refresh Timing** | **Set refresh timing.** | | | | | |
| Refresh Timing | - | | | | | |
| Refresh Group [n](n: 1-64) | 1 | | | | | |
| **Refresh Timing (I/O)** | **Specify the timing which transfers the I/O device data.** | | | | | |
| Refresh Timing | Based on Refresh Timing (Buffer Memory) | | | | | |

**8.** Write the set parameters to the remote head module on the intelligent device station. Then reset the remote head module or turn off and on the power.

[Online] ⇨ [Write to PLC]

**Point**

For parameters of the remote head module which are not described in this procedure, set default values. For details on parameters of the remote head module, refer to the following.

MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

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# Checking the network status

After setting parameters to the master station and the intelligent device station, check whether data link is normally performed between the master station and the intelligent device station. Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool.

For how to perform the CC-Link IE Field Network diagnostics from the master station, refer to the following.

MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

# Program examples

For the program examples, the module labels of the master/local module are used.

Write the programs to the CPU module on the master station.

| Classification | Label name | Description | Device |
|---|---|---|---|
| Module Label | GF11_1.bSts_DataLinkError | Data link error status of own station | SB0049 |
| | GF11_1.bnSts_DataLinkError_Station[1] | Data link status of each station (station number 1) | SW00B0.0 |
| Labels to be defined | Define global labels as shown below: | | |

| | Label Name | Data Type | | Class | Assign (Device/Label) |
|---|---|---|---|---|---|
| 1 | CH1_DigOutValTempArea | Word [Signed] | ... | VAR_GLOBAL | D11 |
| 2 | CH3_DigOutValTempArea | Word [Signed] | ... | VAR_GLOBAL | D12 |
| 3 | CH5_DigCalcValTempArea | Word [Signed] | ... | VAR_GLOBAL | D13 |
| 4 | CH6_DigOutValTempArea | Word [Signed] | ... | VAR_GLOBAL | D14 |
| 5 | CH5_DigMaxValTempArea | Word [Signed] | ... | VAR_GLOBAL | D15 |
| 6 | CH5_DigMinValTempArea | Word [Signed] | ... | VAR_GLOBAL | D16 |
| 7 | CH3_ProcAlmUpLimit | Bit | ... | VAR_GLOBAL | F0 |
| 8 | CH3_ProcAlmLowLimit | Bit | ... | VAR_GLOBAL | F1 |
| 9 | CH1_RateAlmUpLimit | Bit | ... | VAR_GLOBAL | F2 |
| 10 | CH1_RateAlmLowLimit | Bit | ... | VAR_GLOBAL | F3 |
| 11 | CH1_InputSigErr | Bit | ... | VAR_GLOBAL | F4 |
| 12 | Connect_FormationFlg_St1 | Bit | ... | VAR_GLOBAL | M0 |
| 13 | CH1_AD_conversionCompletedFlag | Bit | ... | VAR_GLOBAL | W1000.0 |
| 14 | CH3_AD_conversionCompletedFlag | Bit | ... | VAR_GLOBAL | W1000.2 |
| 15 | CH5_AD_conversionCompletedFlag | Bit | ... | VAR_GLOBAL | W1000.4 |
| 16 | CH6_AD_conversionCompletedFlag | Bit | ... | VAR_GLOBAL | W1000.5 |
| 17 | CH1_DigOutVal | Word [Signed] | ... | VAR_GLOBAL | W1001 |
| 18 | CH3_DigOutVal | Word [Signed] | ... | VAR_GLOBAL | W1002 |
| 19 | CH5_DigCalcVal | Word [Signed] | ... | VAR_GLOBAL | W1003 |
| 20 | CH6_DigOutVal | Word [Signed] | ... | VAR_GLOBAL | W1004 |
| 21 | CH5_DigMaxVal | Word [Signed] | ... | VAR_GLOBAL | W1005 |
| 22 | CH5_DigMinVal | Word [Signed] | ... | VAR_GLOBAL | W1006 |
| 23 | CH3_WarningOutputFlagProcessAlarmUpperLimit | Bit | ... | VAR_GLOBAL | W1010.2 |
| 24 | CH3_WarningOutputFlagProcessAlarmLowerLimit | Bit | ... | VAR_GLOBAL | W1011.2 |
| 25 | CH1_WarningOutputFlagRateAlarmUpperLimit | Bit | ... | VAR_GLOBAL | W1012.0 |
| 26 | CH1_WarningOutputFlagRateAlarmLowerLimit | Bit | ... | VAR_GLOBAL | W1013.0 |
| 27 | CH1_InputSignalErrorDetectionFlag | Bit | ... | VAR_GLOBAL | W1014.0 |
| 28 | DigitOutValSig | Bit | ... | VAR_GLOBAL | X20 |
| 29 | MaxMinReadSig | Bit | ... | VAR_GLOBAL | X21 |
| 30 | MaxMinResetSig | Bit | ... | VAR_GLOBAL | X22 |
| 31 | ErrResetSig | Bit | ... | VAR_GLOBAL | X23 |
| 32 | ModuleREADY | Bit | ... | VAR_GLOBAL | X1000 |
| 33 | InputSignalErrorDetectionSignal | Bit | ... | VAR_GLOBAL | X100C |
| 34 | MaxValueMinValueResetCompletedFlag | Bit | ... | VAR_GLOBAL | X100D |
| 35 | A_D_conversionCompletedFlag | Bit | ... | VAR_GLOBAL | X100E |
| 36 | ErrorFlag | Bit | ... | VAR_GLOBAL | X100F |
| 37 | OperatingConditionSettingRequest | Bit | ... | VAR_GLOBAL | Y1009 |
| 38 | MaxValueMinValueResetRequest | Bit | ... | VAR_GLOBAL | Y100D |
| 39 | ErrorClearRequest | Bit | ... | VAR_GLOBAL | Y100F |

## Common program

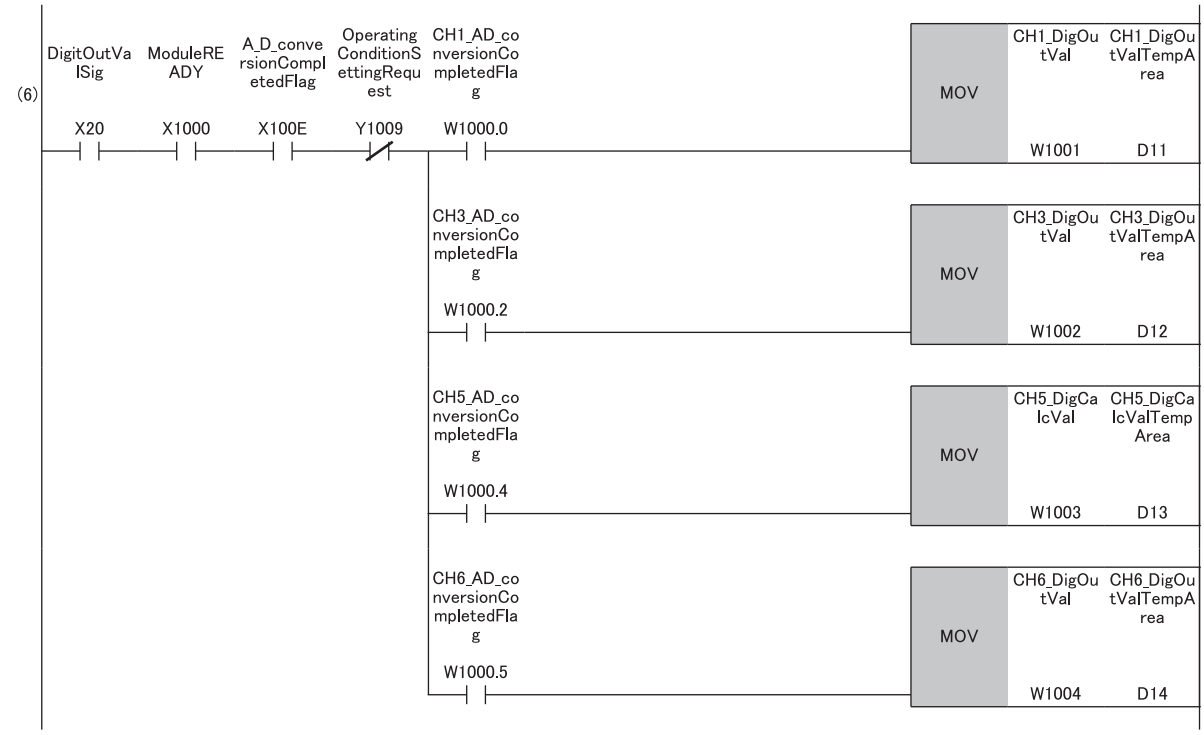
The following figure shows an example of the program to check the data link status of the remote head module (station number 1).


(0) Checks the data link status of the remote head module (station number 1).

Add the MCR instruction shown below to the last of the program.


## Program example 1

This program is an example to read and save the digital output values of CH1, CH3, and CH6, and the digital operation value of CH5.




(6) Reads values of CH1 Digital output value, CH3 Digital output value, CH5 Digital operation value, and CH6 Digital output value.

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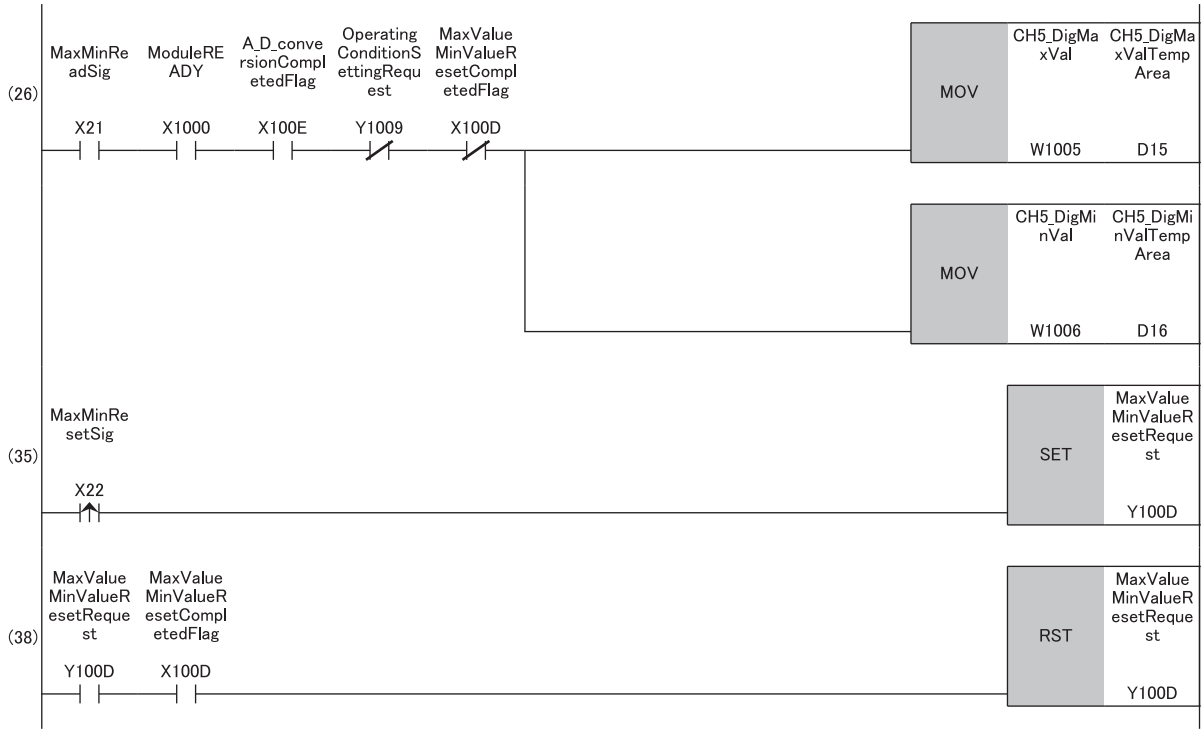
## Program example 2

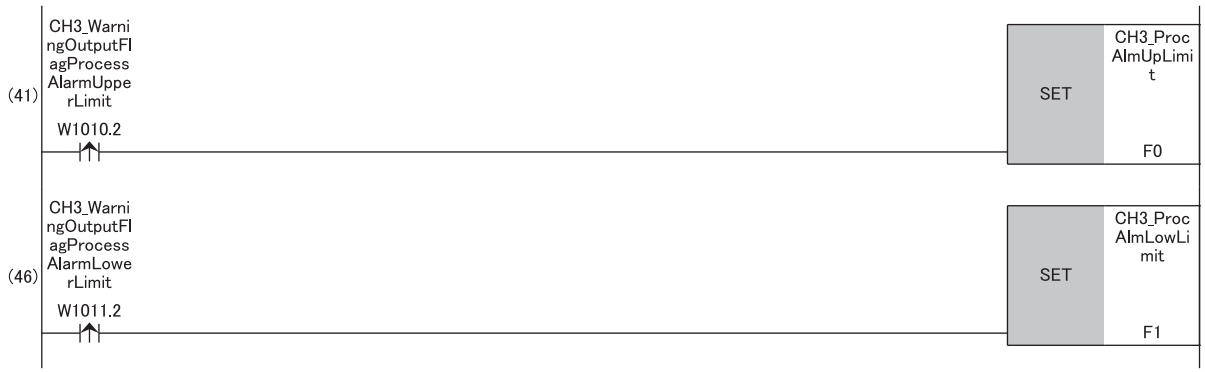
The following figure shows an example of the program to read a maximum value and a minimum value of CH5 and clear the values after reading out them.




(26)Reads values of CH5 Maximum value and CH5 Minimum value.
(35)Turns on 'Maximum value/minimum value reset request' (Y100D).
(38)Turns off 'Maximum value/minimum value reset request' (Y100D).

## Program example 3

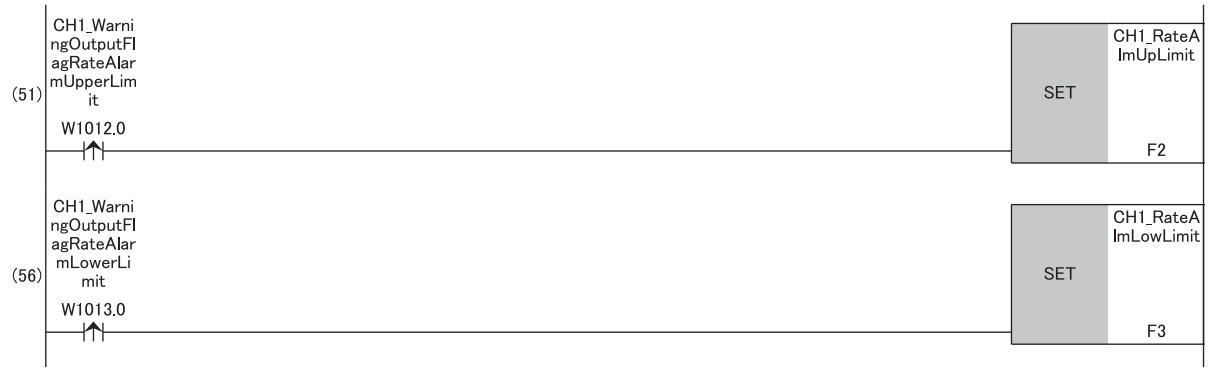
The following figure shows an example of the program to perform operations reacting to a warning if a warning (process alarm upper/lower limit) occurs in CH3.




(41)Performs a processing of when a warning (process alarm upper limit) has occurred in CH3.
(46)Performs a processing of when a warning (process alarm lower limit) has occurred in CH3.

## Program example 4

The following figure shows an example of the program to perform operations reacting to a warning if a warning (rate alarm upper/lower limit) occurs in CH1.




(51)Performs a processing of when a warning (rate alarm upper limit) has occurred in CH1.
(56)Performs a processing of when a warning (rate alarm lower limit) has occurred in CH1.

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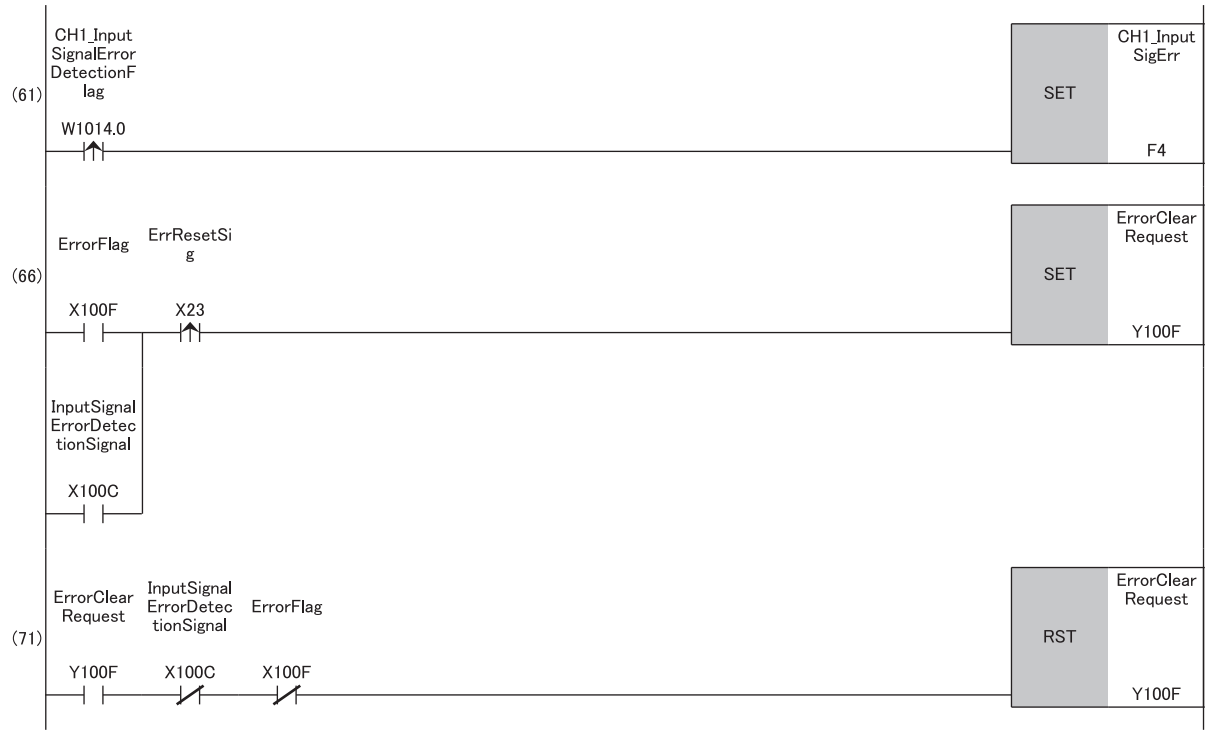
## Program example 5

The following figure shows an example of the program to clear Input signal error detection flag, Error flag, and Latest error code if an input signal error is detected in CH1 or an error occurs in any of the channels.




(61)Performs a processing of when an input signal error was detected in CH1.
(66)Turns on 'Error clear request' (Y100F).
(71)Turns off 'Error clear request' (Y100F).

# Appendix 6 Using the Module in the Redundant System with Redundant Extension Base Unit

This chapter describes restrictions and precautions for using the A/D converter module that is mounted on the extension base unit in the redundant system.

## Restrictions on functions and specifications

### Functions

| Function | Restriction |
|---|---|
| Logging function | Cannot be used.<br>When the function is used, proper operation cannot be guaranteed. |
| Interrupt function | The interrupt program cannot be executed. |
| Backing up, saving, and restoring offset/gain values | The function cannot be used for either of the following cases.<br>• When using the module-specific backup parameter<br>• When saving and restoring the values using the dedicated instruction instead of the module-specific backup parameter |

### Dedicated instructions

Any dedicated instructions of the A/D converter module cannot be used.

### Module FBs

| Name | Restriction |
|---|---|
| M+R60ADDG_SetLoggingParam | Cannot be used.<br>When the FB is used, proper operation cannot be guaranteed. |
| M+R60ADDG_SaveLogging | |

### Module parameter

**■Application setting**

Set "Auto restore of Offset/gain setting with the module change" to "Disable".

## Precautions

### When configuring the offset/gain setting

Connect the engineering tool to the CPU module of the control system.

The engineering tool cannot recognize the A/D converter module if it is connected to the CPU module of the standby system.

### Program examples

Unless otherwise specified, program examples provided in this manual and the following manual are for when the module is used in the single CPU system or in the multiple CPU system.

📖 MELSEC iQ-R Channel Isolated Analog-Digital Converter Module (With Signal Conditioning Function) User's Manual (Startup)

When using the module in the redundant system, refer to the following manual and observe the precautions on programming for when using the Process CPU (redundant mode).

📖 MELSEC iQ-R CPU Module User's Manual (Application)

### Signal flow tracking setting

When using the module FBs and applying the program examples to an actual system, set "Signal Flow Memory Tracking Setting" to "Transfer". If not, the module FBs and programs may not work properly when system switching occurs.

[CPU Parameter] ⇨ [Redundant System Settings] ⇨ [Tracking Setting]

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## P



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## R



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## U



## W

# REVISIONS

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

| Revision date | *Manual number | Description |
|---|---|---|
| May 2020 | SH(NA)-082300ENG-A | First edition |
| October 2020 | SH(NA)-082300ENG-B | ■Added or modified parts<br>SAFETY PRECAUTIONS, CONDITIONS OF USE FOR THE PRODUCT, RELEVANT MANUALS, Appendix 6 |

Japanese manual number: SH-082299-B

# 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 to:

(1) Damages caused by any cause found not to be the responsibility of Mitsubishi.

(2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.

(3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.

(4) 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.

# TRADEMARKS

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SH(NA)-082300ENG-B(2010)MEE
MODEL: R60AD6-DG-U-OU-E
MODEL CODE: 13JX3F

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