

Programmable Controller

**MELSEC iQ-F**  
series

# MELSEC iQ-F FX5 User's Manual (Analog Control - Intelligent function module)

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Analog input module

-FX5-4AD

Analog output module

-FX5-4DA

Multiple input module

-FX5-8AD



# SAFETY PRECAUTIONS

(Read these precautions before use.)

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

This manual classifies the safety precautions into two categories: [⚠️ WARNING] and [⚠️ CAUTION].

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

Depending on the circumstances, procedures indicated by [⚠️ CAUTION] may also cause severe injury.

It is important to follow all precautions for personal safety.

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

## [DESIGN PRECAUTIONS]

### **WARNING**

- Make sure to set up the following safety circuits outside the PLC to ensure safe system operation even during external power supply problems or PLC failure. Otherwise, malfunctions may cause serious accidents.
  - Most importantly, set up the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit to prevent damage (to the equipment at the upper and lower positioning limits).
  - Note that when the CPU module detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the CPU module occurs in an input/output control block, output control may be disabled. External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
  - Note that when an error occurs in a relay, transistor or triac of an output circuit, the output might stay on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
- In an output circuit, when a load current exceeding the current rating 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.
- Construct an interlock circuit in the program so that the whole system always operates on the safe side before executing the control (for data change) of the PLC in operation.  
Read the manual thoroughly and ensure complete safety before executing other controls (for program change, parameter change, forcible output and operation status change) of the PLC in operation. Otherwise, the machine may be damaged and accidents may occur due to erroneous operations.
- Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Executing data writing to the "system area" or "write protect area" may cause malfunction of the programmable controller alarm. For the "system area" or "write-protect area", refer to "Buffer Memory".

## [DESIGN PRECAUTIONS]

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### **CAUTION**

- When an inductive load such as a lamp, heater, or solenoid valve is controlled, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Take proper measures so that the flowing current does not exceed the value corresponding to the maximum load specification of the resistance load.
  - Simultaneously turn on and off the power supplies of the CPU module and extension modules.
- 

## [INSTALLATION PRECAUTIONS]

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### **WARNING**

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
  - Use the product within the generic environment specifications described in the User's Manual (Hardware) of the CPU module used.  
Never use the product in areas with excessive dust, oily smoke, conductive dusts, corrosive gas (salt air, Cl<sub>2</sub>, H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>), flammable gas, vibration or impacts, or expose it to high temperature, condensation, or rain and wind.  
If the product is used in such conditions, electric shock, fire, malfunctions, deterioration or damage may occur.
- 

## [INSTALLATION PRECAUTIONS]

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### **CAUTION**

- Do not touch the conductive parts of the product directly. Doing so may cause device failures or malfunctions.
  - When drilling screw holes or wiring, make sure that cutting and wiring debris do not enter the ventilation slits of the PLC. Failure to do so may cause fire, equipment failures or malfunctions.
  - For the product supplied together with a dust proof sheet, the sheet should be affixed to the ventilation slits before the installation and wiring work to prevent foreign objects such as cutting and wiring debris.  
However, when the installation work is completed, make sure to remove the sheet to provide adequate ventilation. Failure to do so may cause fire, equipment failures or malfunctions.
  - Install the product on a flat surface. If the mounting surface is rough, undue force will be applied to the PC board, thereby causing nonconformities.
  - Install the product securely using a DIN rail or mounting screws.
  - Work carefully when using a screwdriver such as installation of the product. Failure to do so may cause damage to the product or accidents.
  - Connect the extension cables, peripheral device cables, input/output cables and battery connecting cable securely to their designated connectors. Loose connections may cause malfunctions.
  - Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause device failures or malfunctions.
    - Peripheral devices, expansion board, expansion adapter, and connector conversion adapter
    - Extension modules, bus conversion module, and connector conversion module
    - Battery
-

## [WIRING PRECAUTIONS]

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### **WARNING**

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
  - Make sure to attach the terminal cover, provided as an accessory, before turning on the power or initiating operation after installation or wiring work. Failure to do so may cause electric shock.
  - Don't use the input terminals for measurement on a main circuit, since those terminals have no measurement category.
  - The temperature rating of the cable should be 80°C or more.
  - Make sure to properly wire to the spring clamp terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
    - The disposal size of the cable end should follow the dimensions described in the manual.
    - Twist the ends of stranded wires and make sure that there are no loose wires.
    - Do not solder-plate the electric wire ends.
    - Do not connect more than the specified number of wires or electric wires of unspecified size.
    - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.
- 

## [WIRING PRECAUTIONS]

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### **CAUTION**

- Perform class D grounding (grounding resistance: 100  $\Omega$  or less) of the grounding terminal on the CPU module and extension modules with a wire 2 mm<sup>2</sup> or thicker.  
Do not use common grounding with heavy electrical systems.
  - Connect the power supply wiring to the dedicated terminals described in this manual. If an AC power supply is connected to a DC input/output terminal or DC power supply terminal, the PLC will burn out.
  - Do not wire vacant terminals externally. Doing so may damage the product.
  - Install module so that excessive force will not be applied to terminal blocks, power connectors, I/O connectors, communication connectors, or communication cables. Failure to do so may result in wire damage/breakage or PLC failure.
  - Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to malfunction of the PLC caused by abnormal data written to the PLC due to the effects of noise:
    - Do not bundle the power line, control line and communication cables together with or lay them close to the main circuit, high-voltage line, load line or power line. As a guideline, lay the power line, control line and connection cables at least 100 mm away from the main circuit, high-voltage line, load line or power line.
    - Ground the shield of the analog input/output cable at one point on the signal receiving side.  
However, do not use common grounding with heavy electrical systems.
  - 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.
  - To terminal blocks or power connectors, connect circuits isolated from hazardous voltage by double/reinforced insulation.
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## [STARTUP AND MAINTENANCE PRECAUTIONS]

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### **WARNING**

- Do not touch any terminal while the PLC's power is on. Doing so may cause electric shock or malfunctions.
  - Before cleaning or retightening terminals, cut off all phases of the power supply externally. Failure to do so in the power ON status may cause electric shock.
  - Before modifying the program in operation, forcible output, running or stopping the PLC, read through this manual carefully, and ensure complete safety. An operation error may damage the machinery or cause accidents.
  - Do not change the program in the PLC from two or more peripheral equipment devices at the same time. (i. e. from an engineering tool and a GOT) Doing so may cause destruction or malfunction of the PLC program.
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## [STARTUP AND MAINTENANCE PRECAUTIONS]

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### **CAUTION**

- Do not disassemble or modify the PLC. Doing so may cause fire, equipment failures, or malfunctions. For repair, contact your local Mitsubishi Electric representative.
  - Turn off the power to the PLC before connecting or disconnecting any extension cable. Failure to do so may cause device failures or malfunctions.
  - Turn off the power to the PLC before attaching or detaching the following devices. Failure to do so may cause device failures or malfunctions.
    - Peripheral devices, expansion board, expansion adapter, and connector conversion adapter
    - Extension modules, bus conversion module, and connector conversion module
    - Battery
  - 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.
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## [OPERATION PRECAUTIONS]

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### **CAUTION**

- Construct an interlock circuit in the program so that the whole system always operates on the safe side before executing the control (for data change) of the PLC in operation. Read the manual thoroughly and ensure complete safety before executing other controls (for program change, parameter change, forcible output and operation status change) of the PLC in operation. Otherwise, the machine may be damaged and accidents may occur by erroneous operations.
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## [DISPOSAL PRECAUTIONS]

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### **CAUTION**

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.
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## [TRANSPORTATION PRECAUTIONS]

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### **CAUTION**

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- The PLC is a precision instrument. During transportation, avoid impacts larger than those specified in the general specifications of the User's Manual (Hardware) of the CPU module used by using dedicated packaging boxes and shock-absorbing palettes. Failure to do so may cause failures in the PLC. After transportation, verify operation of the PLC and check for damage of the mounting part, etc.
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# INTRODUCTION

This manual contains text, diagrams and explanations which will guide the reader in the correct installation, safe use and operation of the analog input module, analog output module, multiple input module of MELSEC iQ-F series and should be read and understood before attempting to install or use the module.

Always forward it to the end user.

## Regarding use of this product

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

## Note

- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric representative.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification etc. may be changed, without a notice, for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you notice a doubtful point, an error, etc., please contact the nearest Mitsubishi Electric representative. When doing so, please provide the manual number given at the end of this manual.



# MEMO

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## PART 1 ANALOG INPUT MODULE

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# RELEVANT MANUALS

| Manual name <manual number>                                                                                                      | Description                                                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| MELSEC iQ-F FX5 User's Manual (Startup)<br><JY997D58201>                                                                         | Performance specifications, procedures before operation, and troubleshooting of the CPU module.                                                           |
| MELSEC iQ-F FX5U User's Manual (Hardware)<br><JY997D55301>                                                                       | Describes the details of hardware of the FX5U CPU module, including input/output specifications, wiring, installation, and maintenance.                   |
| MELSEC iQ-F FX5UC User's Manual (Hardware)<br><JY997D61401>                                                                      | Describes the details of hardware of the FX5UC CPU module, including input/output specifications, wiring, installation, and maintenance.                  |
| MELSEC iQ-F FX5 User's Manual (Application)<br><JY997D55401>                                                                     | Describes basic knowledge required for program design, functions of the CPU module, devices/labels, and parameters.                                       |
| MELSEC iQ-F FX5 Programming Manual (Program Design)<br><JY997D55701>                                                             | Describes specifications of ladders, ST, FBD/LD, and other programs and labels.                                                                           |
| MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks)<br><JY997D55801>                           | Describes specifications of instructions and functions that can be used in programs.                                                                      |
| MELSEC iQ-F FX5 User's Manual (Serial Communication)<br><JY997D55901>                                                            | Describes N:N network, Parallel link, MELSEC Communication protocol, inverter communication, non-protocol communication, and predefined protocol support. |
| MELSEC iQ-F FX5 User's Manual (MELSEC Communication Protocol)<br><JY997D60801>                                                   | Explains methods for the device that is communicating with the CPU module by MC protocol to read and write the data of the CPU module.                    |
| MELSEC iQ-F FX5 User's Manual (MODBUS Communication)<br><JY997D56101>                                                            | Describes MODBUS serial communication and MODBUS/TCP communication.                                                                                       |
| MELSEC iQ-F FX5 User's Manual (Ethernet Communication)<br><JY997D56201>                                                          | Describes the functions of the built-in Ethernet port communication function.                                                                             |
| MELSEC iQ-F FX5 User's Manual (SLMP)<br><JY997D56001>                                                                            | Explains methods for the device that is communicating with the CPU module by SLMP to read and write the data of the CPU module.                           |
| MELSEC iQ-F FX5 User's Manual (CC-Link IE)<br><JY997D64201>                                                                      | Describes CC-Link IE field network module.                                                                                                                |
| MELSEC iQ-F FX5 User's Manual (CC-Link)<br><SH-081793ENG>                                                                        | Describes CC-Link system master/intelligent device module.                                                                                                |
| MELSEC iQ-F FX5 User's Manual (ASLINK)<br><SH-081796ENG>                                                                         | Describes AnyWireASLINK system master module.                                                                                                             |
| MELSEC iQ-F FX5 User's Manual (Positioning Control - CPU module built-in, High-speed pulse input/output module)<br><JY997D56301> | Describes the positioning function of the CPU module built-in and the high-speed pulse input/output module.                                               |
| MELSEC iQ-F FX5 User's Manual (Positioning Control - Intelligent function module)<br><SH-081805ENG>                              | Describes the positioning module.                                                                                                                         |
| MELSEC iQ-F FX5 Simple Motion Module User's Manual (Startup)<br><IB0300251>                                                      | Specifications, procedures before operation, system configuration, wiring, and operation examples of the Simple Motion module.                            |
| MELSEC iQ-F FX5 Simple Motion Module User's Manual (Application)<br><IB0300253>                                                  | Functions, input/output signals, buffer memories, parameter settings, programming, and troubleshooting of the Simple Motion module.                       |
| MELSEC iQ-F FX5 Simple Motion Module User's Manual (Advanced Synchronous Control)<br><IB0300255>                                 | Functions and programming for the synchronous control of the Simple Motion module.                                                                        |
| MELSEC iQ-F FX5 User's Manual (Analog Control - CPU module built-in, Expansion adapter)<br><JY997D60501>                         | Describes the analog function of the CPU module built-in and the analog adapter.                                                                          |
| MELSEC iQ-F FX5 User's Manual (Analog Control - Intelligent function module)<br><SH-081802ENG> (This manual)                     | Describes the analog input module, analog output module, and multiple input module.                                                                       |
| MELSEC iQ-F FX5 User's Manual (Temperature Control)<br><SH-081799ENG>                                                            | Describes the temperature control module.                                                                                                                 |
| GX Works3 Operating Manual<br><SH-081215ENG>                                                                                     | System configuration, parameter settings, and online operations of GX Works3.                                                                             |
| Transition from MELSEC FX3U, FX3UC Series to MELSEC iQ-F Series Handbook<br><JY997D66201>                                        | Describes the transition from MELSEC FX3U/FX3UC series to MELSEC iQ-F series.                                                                             |

# TERMS

Unless otherwise specified, this manual uses the following terms.

For details on the FX3 devices that can be connected with the FX5, refer to the User's Manual (Hardware) of the CPU module to be used.

| Terms                                                          | Description                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ■Devices                                                       |                                                                                                                                                                                                                                                                                                                                                                                                        |
| FX5                                                            | Generic term for FX5U and FX5UC PLCs                                                                                                                                                                                                                                                                                                                                                                   |
| FX3                                                            | Generic term for FX3S, FX3G, FX3GC, FX3U, and FX3UC PLCs                                                                                                                                                                                                                                                                                                                                               |
| FX5 CPU module                                                 | Generic term for FX5U CPU module and FX5UC CPU module                                                                                                                                                                                                                                                                                                                                                  |
| FX5U CPU module                                                | Generic term for FX5U-32MR/ES, FX5U-32MT/ES, FX5U-32MT/ESS, FX5U-64MR/ES, FX5U-64MT/ES, FX5U-64MT/ESS, FX5U-80MR/ES, FX5U-80MT/ES, FX5U-80MT/ESS, FX5U-32MR/DS, FX5U-32MT/DS, FX5U-32MT/DSS, FX5U-64MR/DS, FX5U-64MT/DS, FX5U-64MT/DSS, FX5U-80MR/DS, FX5U-80MT/DS, and FX5U-80MT/DSS                                                                                                                  |
| FX5UC CPU module                                               | Generic term for FX5UC-32MT/D, FX5UC-32MT/DSS, FX5UC-64MT/D, FX5UC-64MT/DSS, FX5UC-96MT/D, FX5UC-96MT/DSS, FX5UC-32MT/DS-TS, and FX5UC-32MT/DSS-TS                                                                                                                                                                                                                                                     |
| Extension module                                               | Generic term for FX5 extension modules and FX3 function modules                                                                                                                                                                                                                                                                                                                                        |
| • FX5 extension module                                         | Generic term for I/O modules, FX5 extension power supply modules, and FX5 intelligent function modules                                                                                                                                                                                                                                                                                                 |
| • FX3 extension module                                         | Generic term for FX3 extension power supply module and FX3 intelligent function module                                                                                                                                                                                                                                                                                                                 |
| • Extension module (extension cable type)                      | Generic term for Input modules (extension cable type), Output modules (extension cable type), Input/output modules (extension cable type), Powered input/output module, High-speed pulse input/output module, Extension power supply module (extension cable type), Connector conversion module (extension cable type), Intelligent function modules, and Bus conversion module (extension cable type) |
| • Extension module (extension connector type)                  | Generic term for Input modules (extension connector type), Output modules (extension connector type), Input/output modules (extension connector type), Extension power supply module (extension connector type), Connector conversion module (extension connector type), and Bus conversion module (extension connector type)                                                                          |
| I/O module                                                     | Generic term for Input modules, Output modules, Input/output modules, Powered input/output modules, and High-speed pulse input/output modules                                                                                                                                                                                                                                                          |
| Input module                                                   | Generic term for Input modules (extension cable type) and Input modules (extension connector type)                                                                                                                                                                                                                                                                                                     |
| • Input module (extension cable type)                          | Generic term for FX5-8EX/ES and FX5-16EX/ES                                                                                                                                                                                                                                                                                                                                                            |
| • Input module (extension connector type)                      | Generic term for FX5-C16EX/D, FX5-C16EX/DS, FX5-C32EX/D, FX5-C32EX/DS, and FX5-C32EX/DS-TS                                                                                                                                                                                                                                                                                                             |
| Output module                                                  | Generic term for Output modules (extension cable type) and Output modules (extension connector type)                                                                                                                                                                                                                                                                                                   |
| • Output module (extension cable type)                         | Generic term for FX5-8EYR/ES, FX5-8EYT/ES, FX5-8EYT/ESS, FX5-16EYR/ES, FX5-16EYT/ES, and FX5-16EYT/ESS                                                                                                                                                                                                                                                                                                 |
| • Output module (extension connector type)                     | Generic term for FX5-C16EYT/D, FX5-C16EYT/DSS, FX5-C32EYT/D, FX5-C32EYT/DSS, FX5-C32EYT/D-TS, and FX5-C32EYT/DSS-TS                                                                                                                                                                                                                                                                                    |
| Input/output module                                            | Generic term for Input/output modules (extension cable type) and Input/output modules (extension connector type)                                                                                                                                                                                                                                                                                       |
| • Input/output module (extension cable type)                   | Generic term for FX5-16ER/ES, FX5-16ET/ES, and FX5-16ET/ESS                                                                                                                                                                                                                                                                                                                                            |
| • Input/output module (extension connector type)               | Generic term for FX5-C32ET/D, FX5-C32ET/DSS, FX5-C32ET/DS-TS, and FX5-C32ET/DSS-TS                                                                                                                                                                                                                                                                                                                     |
| Powered input/output module                                    | Generic term for FX5-32ER/ES, FX5-32ET/ES, FX5-32ET/ESS, FX5-32ER/DS, FX5-32ET/DS, and FX5-32ET/DSS                                                                                                                                                                                                                                                                                                    |
| High-speed pulse input/output module                           | Generic term for FX5-16ET/ES-H and FX5-16ET/ESS-H                                                                                                                                                                                                                                                                                                                                                      |
| Extension power supply module                                  | Generic term for FX5 extension power supply module and FX3 extension power supply module                                                                                                                                                                                                                                                                                                               |
| • FX5 extension power supply module                            | Generic term for FX5 extension power supply module (extension cable type) and FX5 extension power supply module (extension connector type)                                                                                                                                                                                                                                                             |
| • FX5 extension power supply module (extension cable type)     | Different name for FX5-1PSU-5V                                                                                                                                                                                                                                                                                                                                                                         |
| • FX5 extension power supply module (extension connector type) | Different name for FX5-C1PS-5V                                                                                                                                                                                                                                                                                                                                                                         |
| • FX3 extension power supply module                            | Different name for FX3U-1PSU-5V                                                                                                                                                                                                                                                                                                                                                                        |
| Intelligent module                                             | The abbreviation for intelligent function modules                                                                                                                                                                                                                                                                                                                                                      |
| Intelligent function module                                    | Generic term for FX5 intelligent function modules and FX3 intelligent function modules                                                                                                                                                                                                                                                                                                                 |
| • FX5 intelligent function module                              | Generic term for FX5-4AD, FX5-4DA, FX5-8AD, FX5-4LC, FX5-20PG-P, FX5-40SSC-S, FX5-80SSC-S, FX5-CCLIEF, FX5-CCL-MS, and FX5-ASL-M                                                                                                                                                                                                                                                                       |

| Terms                                                    | Description                                                                                                                    |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| • FX3 intelligent function module                        | Generic term for FX3U-4AD, FX3U-4DA, FX3U-4LC, FX3U-1PG, FX3U-2HC, FX3U-16CCL-M, FX3U-64CCL, and FX3U-128ASL-M                 |
| Expansion board                                          | Generic term for board for FX5U CPU module                                                                                     |
| • Communication board                                    | Generic term for FX5-232-BD, FX5-485-BD, and FX5-422-BD-GOT                                                                    |
| Expansion adapter                                        | Generic term for adapter for FX5 CPU module                                                                                    |
| • Communication adapter                                  | Generic term for FX5-232ADP and FX5-485ADP                                                                                     |
| • Analog adapter                                         | Generic term for FX5-4AD-ADP, FX5-4DA-ADP, FX5-4AD-PT-ADP, and FX5-4AD-TC-ADP                                                  |
| Bus conversion module                                    | Generic term for Bus conversion module (extension cable type) and Bus conversion module (extension connector type)             |
| • Bus conversion module (extension cable type)           | Different name for FX5-CNV-BUS                                                                                                 |
| • Bus conversion module (extension connector type)       | Different name for FX5-CNV-BUSC                                                                                                |
| Connector conversion module                              | Generic term for Connector conversion module (extension cable type) and Connector conversion module (extension connector type) |
| • Connector conversion module (extension cable type)     | Different name for FX5-CNV-IF                                                                                                  |
| • Connector conversion module (extension connector type) | Different name for FX5-CNV-IFC                                                                                                 |
| Extended extension cable                                 | Generic term for FX5-30EC and FX5-65EC                                                                                         |
| Connector conversion adapter                             | Different name for FX5-CNV-BC                                                                                                  |
| Battery                                                  | Different name for FX3U-32BL                                                                                                   |
| Peripheral device                                        | Generic term for engineering tools and GOTs                                                                                    |
| GOT                                                      | Generic term for Mitsubishi Electric Graphic Operation Terminal GOT1000 and GOT2000 series                                     |
| ■Software packages                                       |                                                                                                                                |
| Engineering tool                                         | The product name of the software package for the MELSEC programmable controllers                                               |
| GX Works3                                                | The product name of the software package, SWnDND-GXW3, for the MELSEC programmable controllers (The 'n' represents a version.) |



# PART 1

# ANALOG INPUT MODULE

Part 1 describes the analog input module.

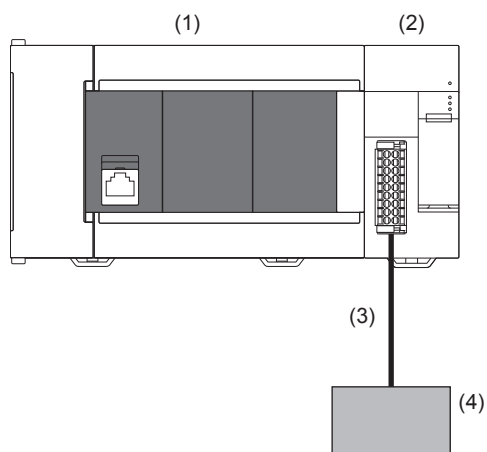
1 FX5-4AD

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# 1 FX5-4AD

## 1.1 Overview

The FX5-4AD analog input module can convert 4 points of analog input values (voltage, current) into digital values. It can be added to the FX5 CPU module and enables it to capture voltage/current data of 4 channels.



- (1) FX5 CPU module
- (2) Analog input module (FX5-4AD)
- (3) Analog device connection cable
- (4) Analog device (flow sensor etc.)

## 1.2 Specifications

This section describes the specifications of FX5-4AD.

### General specifications

The general specifications other than below are the same as those for the CPU module to be connected.

For general specifications, refer to the following manuals.

📖 MELSEC iQ-F FX5U User's Manual (Hardware)

📖 MELSEC iQ-F FX5UC User's Manual (Hardware)

| Items                        | Specifications                                           |                                           |
|------------------------------|----------------------------------------------------------|-------------------------------------------|
| Dielectric withstand voltage | 500 V AC for 1 minute                                    | Between all terminals and ground terminal |
| Insulation resistance        | 10 MΩ or higher by 500 V DC insulation resistance tester |                                           |

### Power supply specifications

The following table lists the power supply specifications.

| Items                 |                      | Specifications                   |
|-----------------------|----------------------|----------------------------------|
| Internal power supply | Power supply voltage | 24 V DC, 5 V DC                  |
|                       | Current consumption  | 24 V DC: 40 mA<br>5 V DC: 100 mA |

## Performance specifications

The following table lists the performance specifications.

| Items                         |                                     | Specifications                                                                              |
|-------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------|
| Number of input points        |                                     | 4 points (4 channels)                                                                       |
| Conversion speed              |                                     | 80 $\mu$ s/ch                                                                               |
| Isolation method              | Between input terminal and PLC      | Photocoupler                                                                                |
|                               | Between input terminal and channels | Non-isolation                                                                               |
| Number of occupied I/O points |                                     | 8 points                                                                                    |
| Applicable CPU module         |                                     | FX5U CPU module (Ver.1.050 or later)<br>FX5UC CPU module <sup>*1</sup> (Ver.1.050 or later) |
| Applicable engineering tool   |                                     | GX Works3 (Ver. 1.040S or later)                                                            |

\*1 FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-4AD to the FX5UC CPU module.

## Voltage/current input specifications

| Items                                                       | Specifications                                                                                                                                                                                                                                           |                    |                           |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|
| Analog input voltage                                        | -10 to 10 V DC (Input resistance 1 M $\Omega$ )                                                                                                                                                                                                          |                    |                           |
| Analog input current                                        | -20 to +20 mA DC (Input resistance 250 $\Omega$ )                                                                                                                                                                                                        |                    |                           |
| Digital output value                                        | 16-bit signed binary (-32768 to +32767)                                                                                                                                                                                                                  |                    |                           |
| Input characteristics, resolution <sup>*1</sup>             | Analog input range                                                                                                                                                                                                                                       |                    | Digital output value      |
|                                                             | Voltage                                                                                                                                                                                                                                                  | 0 to 10 V          | 0 to 32000                |
|                                                             |                                                                                                                                                                                                                                                          | 0 to 5 V           | 0 to 32000                |
|                                                             |                                                                                                                                                                                                                                                          | 1 to 5 V           | 0 to 32000                |
|                                                             |                                                                                                                                                                                                                                                          | -10 to +10 V       | -32000 to +32000          |
|                                                             |                                                                                                                                                                                                                                                          | User range setting | -32000 to +32000          |
|                                                             | Current                                                                                                                                                                                                                                                  | 0 to 20 mA         | 0 to 32000                |
|                                                             |                                                                                                                                                                                                                                                          | 4 to 20 mA         | 0 to 32000                |
|                                                             |                                                                                                                                                                                                                                                          | -20 to +20 mA      | -32000 to +32000          |
|                                                             |                                                                                                                                                                                                                                                          | User range setting | -32000 to +32000          |
|                                                             |                                                                                                                                                                                                                                                          |                    | Resolution                |
|                                                             |                                                                                                                                                                                                                                                          |                    | 312.5 $\mu$ V             |
|                                                             |                                                                                                                                                                                                                                                          |                    | 156.25 $\mu$ V            |
|                                                             |                                                                                                                                                                                                                                                          |                    | 125 $\mu$ V               |
|                                                             |                                                                                                                                                                                                                                                          |                    | 312.5 $\mu$ V             |
|                                                             |                                                                                                                                                                                                                                                          |                    | 125 $\mu$ V <sup>*2</sup> |
|                                                             |                                                                                                                                                                                                                                                          |                    | 625 nA                    |
|                                                             |                                                                                                                                                                                                                                                          |                    | 500 nA                    |
|                                                             |                                                                                                                                                                                                                                                          |                    | 625 nA                    |
|                                                             |                                                                                                                                                                                                                                                          |                    | 500 nA <sup>*2</sup>      |
| Accuracy (accuracy for the full scale digital output value) | Ambient temperature 25 $\pm$ 5 $^{\circ}$ C: within $\pm$ 0.1% ( $\pm$ 64 digits)<br>Ambient temperature 0 to 55 $^{\circ}$ C: within $\pm$ 0.2% ( $\pm$ 128 digits)<br>Ambient temperature -20 to 0 $^{\circ}$ C: within $\pm$ 0.3% ( $\pm$ 192 digits) |                    |                           |
| Absolute maximum input                                      | Voltage: $\pm$ 15 V, Current: $\pm$ 30 mA                                                                                                                                                                                                                |                    |                           |

\*1 For details on the input characteristics, refer to  Page 17 Input conversion characteristics.

\*2 Maximum resolution in the user range setting.

## Input conversion characteristics

The input conversion characteristics of A/D conversion are expressed by the slope of the straight line connecting the offset value and the gain value, both of which are used when an analog signal (voltage or current) from outside the programmable controller is converted to the corresponding digital output value.

### Offset value

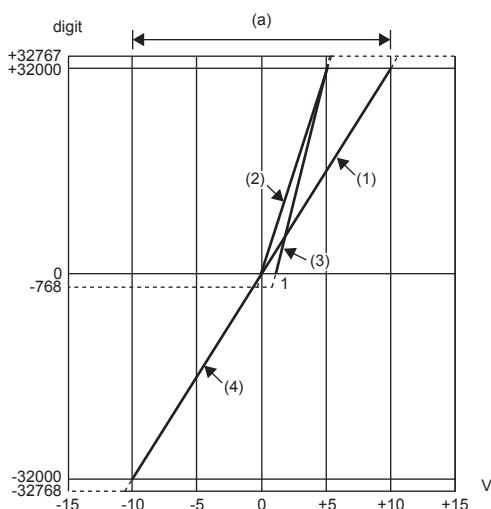
This value is the analog input value (voltage or current) where the corresponding digital output value is 0.

### Gain value

This value is the analog input value (voltage or current) where the corresponding digital output value is 32000.

## Voltage input characteristics

The following shows the list of the analog input ranges and the graphs of each voltage input characteristic, at the voltage input.



digit: Digital output value

V: Analog input voltage (V)

(a): Practical analog input range

| No. | Input range setting | Offset value | Gain value | Digital output value <sup>*1</sup> | Resolution                |
|-----|---------------------|--------------|------------|------------------------------------|---------------------------|
| (1) | 0 to 10 V           | 0 V          | 10 V       | 0 to 32000                         | 312.5 $\mu$ V             |
| (2) | 0 to 5 V            | 0 V          | 5 V        |                                    | 156.25 $\mu$ V            |
| (3) | 1 to 5 V            | 1 V          | 5 V        |                                    | 125 $\mu$ V               |
| (4) | -10 to +10 V        | 0 V          | 10 V       | -32000 to +32000                   | 312.5 $\mu$ V             |
| —   | User range setting  | *2           | *2         |                                    | 125 $\mu$ V <sup>*3</sup> |

\*1 If an analog input value exceeds the range of digital output value, the digital output value is fixed to the maximum or minimum value.

| Input range setting | Digital output value |         |
|---------------------|----------------------|---------|
|                     | Minimum              | Maximum |
| 0 to 10 V           | -768                 | +32767  |
| 0 to 5 V            |                      |         |
| 1 to 5 V            |                      |         |
| -10 to +10 V        | -32768               |         |
| User range setting  |                      |         |

\*2 Set the offset value and gain value in the user range setting within a range satisfying the following conditions. Failure to satisfy the conditions may not result in proper A/D conversion.

Setting range of the offset value and gain value: -10 to +10 V

$((\text{Gain value}) - (\text{Offset value})) \geq 2.0 \text{ V}$

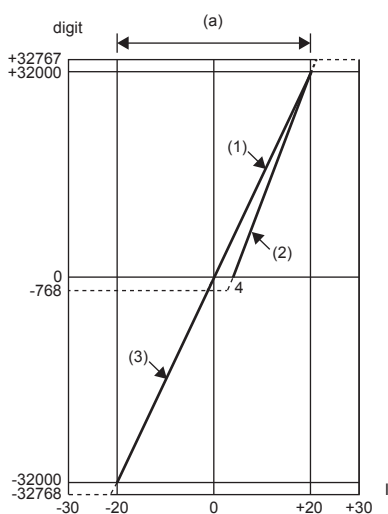
\*3 Maximum resolution in the user range setting. The resolution reaches the maximum when  $(\text{gain value} - \text{offset value}) = 4 \text{ V}$ . Even when  $(\text{gain value} - \text{offset value}) < 4 \text{ V}$ , the maximum resolution is unchanged.

### Point

- Set values within the practical range of the analog input and the digital output at each input range. If the range is exceeded, the resolution and accuracy may not fall within the range of the performance specifications. (Do not use the values in the dotted line region in the graph of voltage input characteristics.)
- Do not set the voltage over  $\pm 15 \text{ V}$ . Doing so can cause breakdown of components.

## Current input characteristics

The following shows the list of the analog input ranges and the graph of each current input characteristic, at the current input.



digit: Digital output value

I: Analog input current (mA)

(a): Practical analog input range

| No. | Input range setting | Offset value | Gain value | Digital output value <sup>*1</sup> | Resolution           |
|-----|---------------------|--------------|------------|------------------------------------|----------------------|
| (1) | 0 to 20 mA          | 0 mA         | 20 mA      | 0 to 32000                         | 625 nA               |
| (2) | 4 to 20 mA          | 4 mA         | 20 mA      |                                    | 500 nA               |
| (3) | -20 to +20 mA       | 0 mA         | 20 mA      | -32000 to +32000                   | 625 nA               |
| —   | User range setting  | *2           | *2         |                                    | 500 nA <sup>*3</sup> |

\*1 If an analog input value exceeds the range of digital output value, the digital output value is fixed to the maximum or minimum value.

| Input range setting | Digital output value |         |
|---------------------|----------------------|---------|
|                     | Minimum              | Maximum |
| 0 to 20 mA          | -768                 | +32767  |
| 4 to 20 mA          |                      |         |
| -20 to +20 mA       | -32768               |         |
| User range setting  |                      |         |

\*2 Set the offset value and gain value in the user range setting within a range satisfying the following conditions. Failure to satisfy the conditions may not result in proper A/D conversion.

Setting range of the offset value and gain value: 0 to 20 mA

$((\text{Gain value}) - (\text{Offset value})) \geq 6.0 \text{ mA}$

\*3 Maximum resolution in the user range setting. The resolution reaches the maximum when  $(\text{gain value} - \text{offset value}) = 16 \text{ mA}$ . Even when  $(\text{gain value} - \text{offset value}) < 16 \text{ mA}$ , the maximum resolution is unchanged.

### Point

- Set values within the practical range of the analog input and the digital output at each input range. If the range is exceeded, the resolution and accuracy may not fall within the range of the performance specifications. (Do not use the values in the dotted line region in the graph of current input characteristics.)
- Do not set the current over  $\pm 30 \text{ mA}$ . Doing so can cause breakdown of components.
- If a current is input from an external device into a channel set for voltage as the input type, an overvoltage may occur and destroy components. Limit the voltage so that the external device's voltage value does not exceed the range of  $-10 \text{ to } +10 \text{ V}$ .
- When applying the current on the negative side by using the input range of the current, start up the module, and after 'A/D conversion completed flag' turns on, start input from the external device.
- When using the input range of the current, do not perform the following operations.
  - Change the "A/D conversion enable/disable setting" while the current on the negative side from the external device is applied.
  - Change the "Range setting" while the current on the negative side from the external device is applied.

# Accuracy

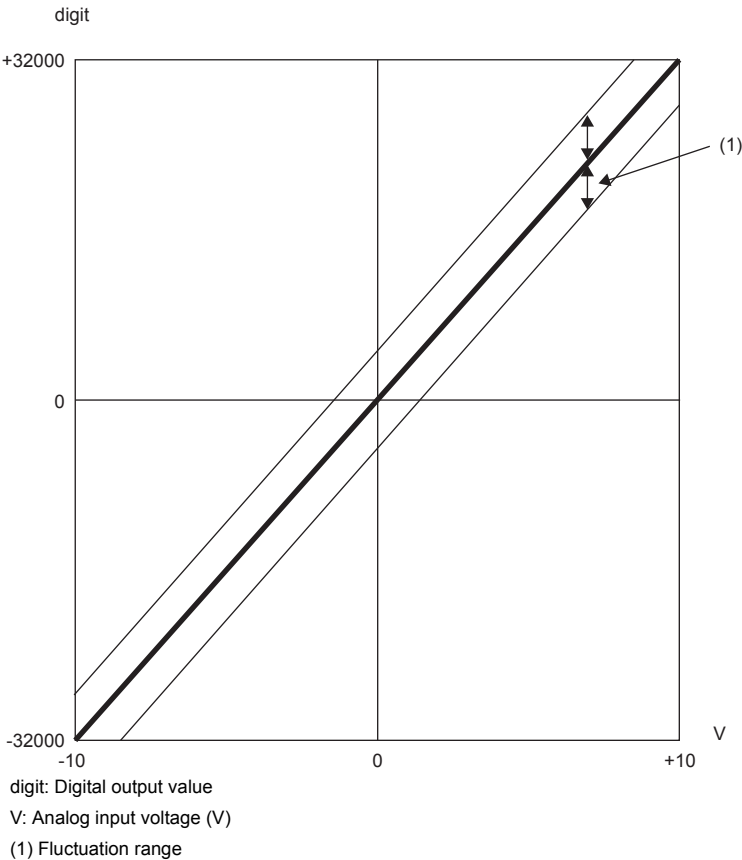
The accuracy of A/D conversion is the accuracy for the full scale of digital output value.  
 The fluctuation range varies as follows depending on ambient temperature and input range.

| Analog input range |               | Ambient temperature                  |                                       |                                       |
|--------------------|---------------|--------------------------------------|---------------------------------------|---------------------------------------|
|                    |               | 25±5℃                                | 0 to 55℃                              | -20 to 0℃                             |
| Voltage            | 0 to 10 V     | Within ±0.1% (±64 digits)/full scale | Within ±0.2% (±128 digits)/full scale | Within ±0.3% (±192 digits)/full scale |
|                    | 0 to 5 V      |                                      |                                       |                                       |
|                    | 1 to 5 V      |                                      |                                       |                                       |
|                    | -10 to +10 V  |                                      |                                       |                                       |
| Current            | 0 to 20 mA    |                                      |                                       |                                       |
|                    | 4 to 20 mA    |                                      |                                       |                                       |
|                    | -20 to +20 mA |                                      |                                       |                                       |

(Except for the conditions under noise influence.)

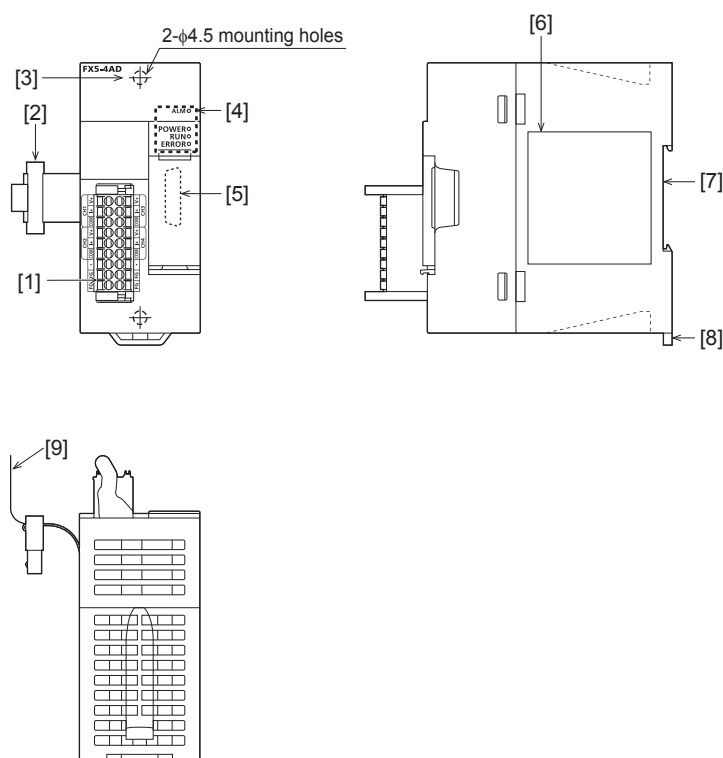
Ex.

Accuracy at -10 to +10 V range selection



## Part names

This section describes the part names of the analog input module.



| No. | Name                                         | Description                                                                    |
|-----|----------------------------------------------|--------------------------------------------------------------------------------|
| [1] | Terminal block (Spring clamp terminal block) | Used for current/voltage input.                                                |
| [2] | Expansion cable                              | Cable for connecting the module when adding the analog input module.           |
| [3] | Direct mounting hole                         | Screw holes (2- $\phi$ 4.5, mounting screw: M4 screw) for direct installation. |
| [4] | Operations status display LEDs               | Indicates the operating status of the module. (Page 21 LED display)            |
| [5] | Extension connector                          | Connector for connecting the extension cable of an extension module.           |
| [6] | Name plate                                   | The product model name and manufacturer's serial number are shown.             |
| [7] | DIN rail mounting groove                     | The module can be installed on DIN46277 rail (35 mm wide).                     |
| [8] | DIN rail mounting hook                       | Hook for mounting the module on a DIN rail of DIN46277 (35 mm wide).           |
| [9] | Pull out tab                                 | They are used when drawing out an extension cable.                             |

## LED display

The following table lists the LED display.

| LED display | LED color | Description                                                                                                                                 |
|-------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------|
| POWER       | Green     | Indicates the power supply status.<br>ON: Power ON<br>OFF: Power off or module failure                                                      |
| RUN         | Green     | Indicates the operating status.<br>Light on: Normal operation<br>Flashing: Offset/gain setting mode<br>Light off: Error occurring           |
| ERROR       | Red       | Indicates the error status.<br>ON: Minor error<br>Flashing: Moderate error or major error<br>OFF: Normal operation                          |
| ALM         | Red       | Indicates the output status.<br>Light on: Process alarm or rate alarm issued<br>Flashing: Input signal error<br>Light off: Normal operation |

## 1.3 Procedures Before Operation

---

This section describes the procedures before operation.

### 1. Check the analog input module specifications

Check the analog input module specifications. (📖 Page 16 Specifications)

### 2. Install the analog input module

Install the analog input module to the CPU module. For details, refer to the following.

📖 MELSEC iQ-F FX5U User's Manual (Hardware)

📖 MELSEC iQ-F FX5UC User's Manual (Hardware)

### 3. Wiring

Perform wiring of external devices to the analog input module.

### 4. Adding a module

Add an analog input module to the module configuration by using GX Works3.

#### Point

When adding a new analog input module, if selecting the module whose module model name has "(FX3)" at the end, it can be used as FX3 allocation mode.

- FX5-4AD: Normal mode
- FX5-4AD(FX3): FX3 allocation mode

For details on the FX3 allocation mode function, refer to 📖 Page 80 FX3 allocation mode function

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### 5. Parameter settings

Set parameters of the analog input module by using GX Works3. (📖 Page 86 Parameter Settings)

### 6. Offset/gain setting

When setting the user range, perform the offset/gain setting.

### 7. Programming

Create a program.

## 1.4 Functions

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This section describes the functions of an analog input module and the setting procedures for those functions.

For details on the buffer memory areas, refer to the following.

📖 Page 108 Buffer Memory Areas

#### Point

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

📖 Page 108 List of buffer memory areas

- 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 section. For details on the numerical values, refer to the following.

📖 Page 101 List of error codes

📖 Page 104 List of alarm codes

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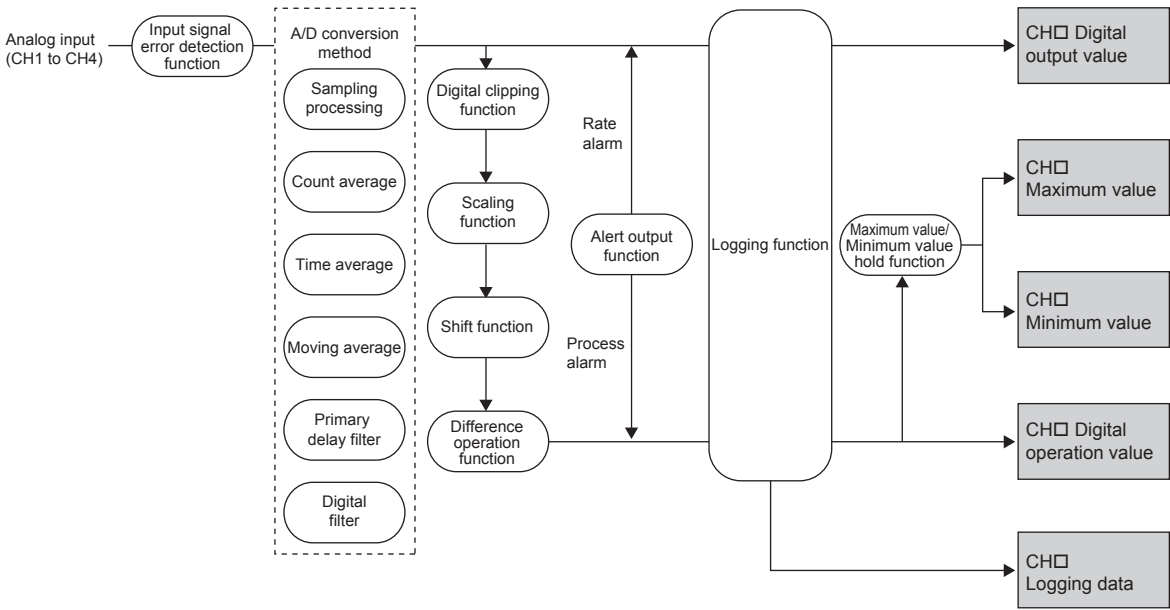
# Function list

This section lists the functions of analog input modules.

| Item                                           |                      |                | Description                                                                                                                                                                                                                                                                                                                                                                                      | Reference |
|------------------------------------------------|----------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Operation mode                                 |                      |                | Select the operation mode (normal mode, offset/gain setting mode) of the analog input module.                                                                                                                                                                                                                                                                                                    | Page 24   |
| Range switching function                       |                      |                | Allows switching the input range of an analog input for each channel. Switching the range makes it possible to change the input conversion characteristic.                                                                                                                                                                                                                                       | Page 25   |
| A/D conversion enable/disable setting function |                      |                | Controls whether to enable or disable the A/D conversion for each channel. Disabling A/D conversion for unused channels reduces the conversion cycles.                                                                                                                                                                                                                                           | Page 25   |
| A/D conversion method                          | Sampling processing  |                | Converts analog input values into digital at every sampling period, storing them in buffer memory areas.                                                                                                                                                                                                                                                                                         | Page 26   |
|                                                | Averaging processing | Time average   | Executes A/D conversion for the set time and performs the averaging processing on the total value excluding the maximum and minimum values. The processed values are stored in the buffer memory area. The number of processing times within the set time changes depending on the number of channels where A/D conversion is enabled.                                                           | Page 26   |
|                                                |                      | Count average  | Executes A/D conversion for a set number of times and performs the averaging processing on the total value excluding the maximum and minimum values. The processed values are stored in the buffer memory area. The time taken to store the count average value obtained by the processing in the buffer memory area varies depending on the number of channels where the conversion is enabled. | Page 27   |
|                                                |                      | Moving average | Averages digital output values taken at every sampling period for a specified number of times, and stores the averaged value in the buffer memory area. The target range for averaging processing moves at each sampling processing, thereby allowing the latest digital output value to be obtained.                                                                                            | Page 27   |
|                                                | Primary delay filter |                | Performs digital output where the transient noise of analog input is smoothed depending on the set time constant, and stores the value in the buffer memory area.                                                                                                                                                                                                                                | Page 28   |
|                                                | Digital filter       |                | Removes the fluctuation below the set value when the measurement signal includes noise such as a steep spike and stores the resulting stable data in the buffer memory.                                                                                                                                                                                                                          | Page 29   |
| Scaling function                               |                      |                | Performs scale conversion on digital output values within the range from a scaling upper limit value to a scaling lower limit value, both of which are set at desired values. This function helps reduce the man-hours taken for creating a scale conversion program.                                                                                                                            | Page 32   |
| Shift function                                 |                      |                | Adds (shifts) a set conversion value shift amount to a digital output value, and stores the result in the buffer memory area. A change in conversion value shift amount is reflected to the digital operation value in real time, which facilitates fine adjustment at system start-up.                                                                                                          | Page 34   |
| Digital clipping function                      |                      |                | Fixes a possible digital operation value to the maximum digital output value or the minimum digital output value when an input current or voltage exceeds the input range.                                                                                                                                                                                                                       | Page 37   |
| Difference operation function                  |                      |                | 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.                                                                                                                                                                                            | Page 39   |
| Maximum value/minimum value hold function      |                      |                | Stores the maximum and minimum values of digital operation values in the buffer memory area for each channel.                                                                                                                                                                                                                                                                                    | Page 43   |
| Alert output function                          | Process alarm        |                | Outputs an alert when a digital operation value falls within the preset alert output range.                                                                                                                                                                                                                                                                                                      | Page 44   |
|                                                | Rate alarm           |                | This function outputs an alert 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.                                                                                                                                                                            | Page 46   |
| Input signal error detection function          |                      |                | Outputs an alarm when an analog input value exceeds the preset range.                                                                                                                                                                                                                                                                                                                            | Page 51   |
| Logging function                               |                      |                | Logs (records) digital output values or digital operation values. 10000 points of data can be logged for each channel.                                                                                                                                                                                                                                                                           | Page 57   |
| 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.                                                                                                                                                                                                                             | Page 70   |
| Interrupt function                             |                      |                | Executes an interrupt program of the CPU module when an interrupt factor such as an input signal error or alarm output is detected.                                                                                                                                                                                                                                                              | Page 74   |
| Error history function                         |                      |                | Records up to 16 errors and alarms that occurred in an analog input module to store them in the buffer memory areas.                                                                                                                                                                                                                                                                             | Page 77   |
| Offset/gain setting function                   |                      |                | Allows the correction of errors in digital output values.                                                                                                                                                                                                                                                                                                                                        | Page 90   |
| Offset/gain initialization function            |                      |                | Initializes the offset and gain values to the factory defaults.                                                                                                                                                                                                                                                                                                                                  | Page 79   |
| FX3 allocation mode function                   |                      |                | Converts the layout of buffer memory addresses of an analog input module to the one equivalent to FX3U-4AD. This compatibility enables the reuse of programs that have proven performance on FX3U-4AD.                                                                                                                                                                                           | Page 80   |

# 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

The digital values subjected to the sampling processing, each averaging processing, or each filter processing are stored.

## Digital operation value

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

## Maximum value 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.

# Operation mode

The analog input module operation mode can be selected.

## Setting procedure

Set 'Operation mode setting'.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [Operation mode setting function]

| Operation mode           | Description                                                               |
|--------------------------|---------------------------------------------------------------------------|
| Normal mode              | A mode to perform usual A/D conversion.                                   |
| Offset/gain setting mode | A mode used for performing the offset/gain setting at user range setting. |

## Range switching function

Allows switching the input range of an analog input for each channel.

Switching the range makes it possible to change the input conversion characteristic.

### Setting procedure

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

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

| Input range setting | Digital output value |
|---------------------|----------------------|
| 4 to 20 mA          | 0 to 32000           |
| 0 to 20 mA          | 0 to 32000           |
| -20 to +20 mA       | -32000 to +32000     |
| 1 to 5 V            | 0 to 32000           |
| 0 to 5 V            | 0 to 32000           |
| 0 to 10 V           | 0 to 32000           |
| -10 to +10 V        | -32000 to +32000     |
| User range setting  | -32000 to +32000     |

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

#### Point

With the following buffer memory areas, the range switching and range setting can be monitored.

'CH1 Range setting' (Un\G598)

'CH1 Range setting monitor' (Un\G430)

For details on the buffer memory, refer to the following.

 Page 167 CH1 Range setting

 Page 141 CH1 Range setting monitor

When using the input range of current, do not change the "Input range setting" while the current on the negative from the external device is applied.

## A/D conversion enable/disable setting function

Controls whether to enable or disable the A/D conversion for each channel.

Disabling A/D conversion for unused channels reduces the conversion cycles.

### Setting procedure

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 ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [A/D conversion enable/disable setting function]

#### Point

When using the input range of current, do not change the "A/D conversion enable/disable setting" while the current on the negative from the external device is applied.

# A/D conversion method

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

## Sampling processing

This function A/D converts analog input values and stores them in the digital output value and digital operation value every sampling cycle.

### Point

The sampling cycle is "Conversion speed (80  $\mu$ s)  $\times$  Number of A/D 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 A/D conversion cycles.

Conversion cycle that applies when the three channels get A/D conversion enabled

- $80 \times 3 = 240$  ( $\mu$ s)

The conversion cycle is 240 ( $\mu$ s).

## Averaging processing

The digital output value is averaging processed for each channel, and averaged value is stored in the digital output value and the digital operation value.

The following three types of averaging processing are provided.

- Time average
- Count average
- Moving average

### ■Time average

Executes A/D conversion for the set time and performs the averaging processing on the total value excluding the maximum and minimum values. The averaged value is stored in the digital output value and the digital operation value.

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

$$\text{Processing times (times)}^{*1} = \frac{\text{Setting time}}{(\text{Number of A/D conversion enabled channels} \times \text{Conversion speed})}$$

\*1 Values after the decimal point are omitted.

### 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                                           | 2 ms                       |

$$\frac{2}{(4 \times 0.08)} = 6.25 \div 6$$

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

### Point

The valid lower limit setting value for the time average is calculated by the formula "Minimum processing times (4 times)  $\times$  Number of A/D conversion enabled channels  $\times$  Conversion speed".

## Count average

Executes A/D conversion for a set number of times and performs the averaging processing on the total value excluding the maximum and minimum values. The averaged value is stored in the digital output value and the digital operation value. The time taken to store the count average value obtained by the processing in the buffer memory area varies depending on the number of channels where the conversion is enabled.

Processing time = Set number of times × (Number of A/D conversion enabled channels × Conversion speed)

**Ex.**

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

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

$5 \text{ (times)} \times (4 \text{ (CH)} \times 80 \text{ (}\mu\text{s)}) = 1600 \text{ (}\mu\text{s)} = 1.6 \text{ (ms)}$

An average value is output every 1.6 ms.

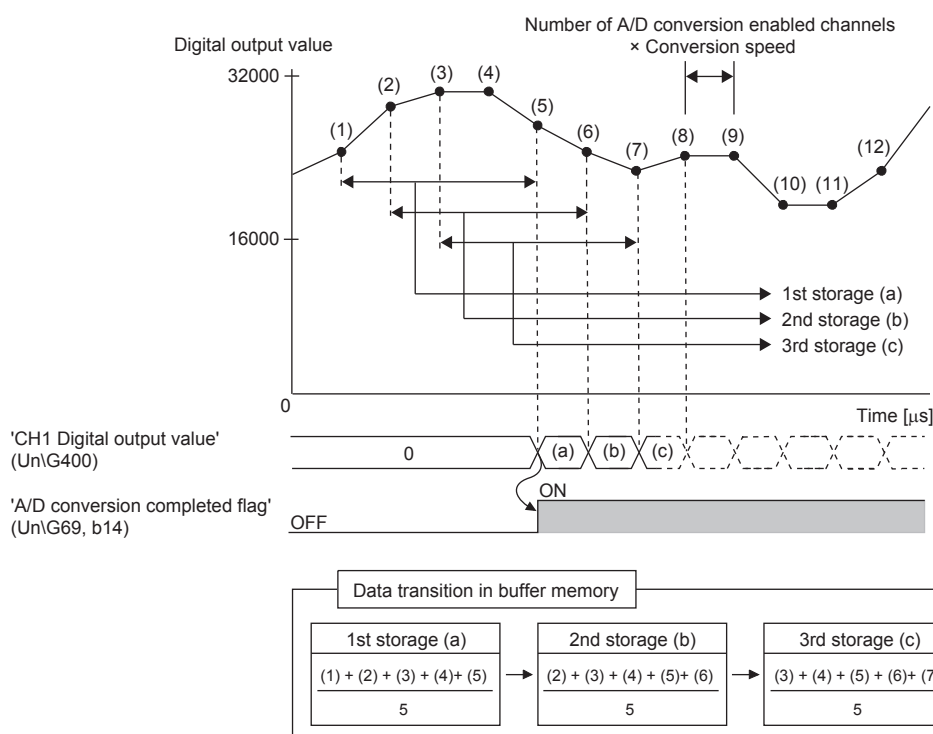
### Point

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

Converted values for the specified number of times captured every sampling period are averaged and stored in the digital output value and the digital operation value. The target range for averaging processing moves at each sampling processing, thereby allowing the latest digital output value to 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 and stored in the digital output value and digital operation value area.

The degree of smoothing varies depending on the setting of a time constant (s).

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  $n \geq 3$

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

$Y_n$  : Present digital output value

$Y_{n-1}$  : Last digital output value

$n$  : Number of sampling

$X_n$  : Digital output value before smoothing

$X_{n-1}$  : Last digital output value before smoothing

$\Delta T$  : Conversion time

$TA$  : Time constant

\*1 A/D conversion completed flag turns on when  $n \geq 2$ .

### Point

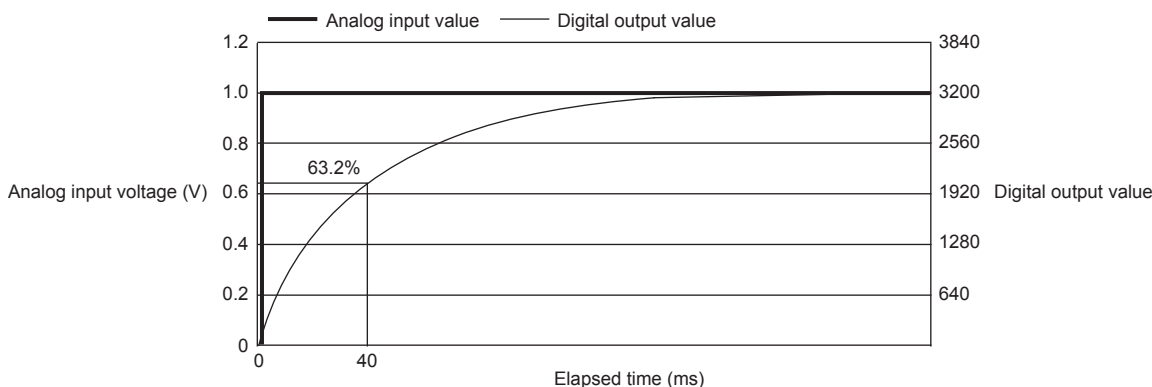
Time constant = [Primary delay filter constant set by "CH1 Time average/Count average/Primary delay filter constant setting" (Un\G502)] × [Conversion cycle].

### Ex.

Digital output value when an analog input value is changed  $0 \rightarrow 1$  V

The following figure shows the change of the digital output value with the input range of 0 to 10 V and time constant (Conversion cycle × Primary delay filter) of 40 ms.

After 40 ms from the analog input value becomes 1 V, the digital output value reaches 63.2% of the digital output value of when the sampling processing is selected.



## Digital filter

The digital filter can remove fluctuation of the analog input value below the digital filter setting value.  
The relationships among the digital output, digital filter setting, and analog input values are as follows.

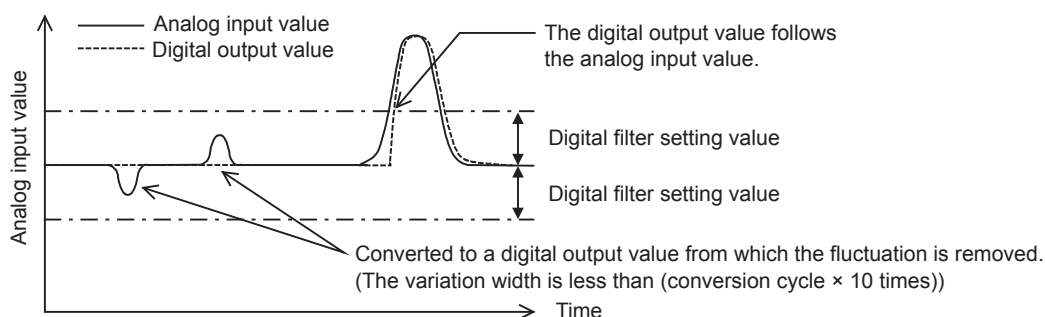
### ■Digital filter setting value > Analog input value fluctuation

If the analog input value fluctuation is smaller than the digital filter setting value, the conversion value resulting from removal of the fluctuation will be stored as the digital output value. Note that the fluctuation range below the digital filter setting value must satisfy the following expression.

Fluctuation range below the digital filter setting value < Conversion cycle × 10 times

### ■Digital filter setting value ≤ Analog input value fluctuation

When the analog input value fluctuation is larger than or equal to the digital filter setting value, the conversion value following the analog input value is stored as the digital output and digital operation values.



Digital filter requires the A/D conversion values for 23 times to remove the fluctuation which is smaller than the digital filter setting value. Therefore, when using the digital filter, the first digital output value is updated at the timing when the A/D conversion values for 23 times are completed.

From the second time on, the digital output value is updated every conversion cycle.

### ■Digital filter conversion cycle

The digital filter conversion cycle varies depending on the setting value of the digital filter fluctuation range setting. The conversion cycle of the digital filter in operation is stored in 'CH1 Digital filter conversion cycle monitor' (Un\G411).

#### Point

After CH1 digital filter conversion cycle monitor (Un\G411) turns on and off the operating condition setting request, "0" is stored for any of the following states.

- A/D conversion not allowed
- Operates in the A/D conversion method other than the digital filter.
- "Averaging process specification setting range error" (error code: 191□H) occurs
- "Time average setting range error" (error code: 192□H) occurs
- "Count average setting range error" (error code: 193□H) occurs
- "Moving average setting range error" (error code: 194□H) occurs
- "Primary delay filter constant setting range error" (error code: 195□H) occur
- "Digital filter setting range error" (error code: 19D□H) occur
- "Digital filter fluctuation width setting range error" (error code: 19E□H) occur

## Setting procedure

### ■Sampling processing

Set "Average processing setting" to "Sampling processing".

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

### ■Averaging processing and Primary delay filter

1. Set "Average processing setting" to "Time average", "Count average", "Moving average", or "Primary delay filter".

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [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         | 2 to 5000 (ms)      |
| Count average        | 4 to 62500 (counts) |
| Moving average       | 2 to 1000 (counts)  |
| Primary delay filter | 1 to 500 (times)    |

### ■Digital filter

1. Set "Average process specification" to "Digital filter".

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

2. Set a value for "Digital filter setting".

| Item                   | Setting range      |
|------------------------|--------------------|
| Digital filter setting | 1 to 1600 (digits) |

3. Set "Digital filter fluctuation range setting".

| Item                                     | Setting range                                |
|------------------------------------------|----------------------------------------------|
| Digital filter fluctuation range setting | 80 to 200000 ( $\mu\text{s}$ )* <sup>1</sup> |

- \*1 For the digital filter fluctuation range setting, set a value equal to or larger than [Number of A/D conversion enabled channels × Conversion speed].  
If a value less than [Number of A/D conversion enabled channels × Conversion speed] is set when the digital filter fluctuation range setting is within the setting range, it will operate with sampling processing without performing digital filtering.



- Digital filter conversion cycle

The digital filter conversion cycle varies as follows depending on the setting value of the digital filter fluctuation range setting.

| Number of A/D conversion enabled channels | Digital filter fluctuation range setting | Conversion cycle                            |
|-------------------------------------------|------------------------------------------|---------------------------------------------|
| 1                                         | 80 ≤ Fluctuation range < 800             | Sampling processing conversion processing   |
|                                           | 800 ≤ Fluctuation range ≤ 200000         | Time average conversion cycle <sup>*2</sup> |
| 2                                         | 160 ≤ Fluctuation range < 1600           | Sampling processing conversion processing   |
|                                           | 1600 ≤ Fluctuation range ≤ 200000        | Time average conversion cycle <sup>*2</sup> |
| 3                                         | 240 ≤ Fluctuation range < 2400           | Sampling processing conversion processing   |
|                                           | 2400 ≤ Fluctuation range ≤ 200000        | Time average conversion cycle <sup>*2</sup> |
| 4                                         | 320 ≤ Fluctuation range < 3200           | Sampling processing conversion processing   |
|                                           | 3200 ≤ Fluctuation range ≤ 200000        | Time average conversion cycle <sup>*2</sup> |

\*2 The time average conversion cycle is as follows.

$$\text{Time average conversion cycle} = \left( \text{Variation width} \div \left( \frac{\text{Number of A/D conversion enabled channels}}{\text{Values after the decimal point are omitted}} \times \text{Conversion speed} \times 10 \right) + 1 \right) \times \text{Number of A/D conversion enabled channels} \times \text{Conversion speed}$$

If the above calculation result is smaller than [Minimum acquisition count (4 times) × Number of A/D conversion enabled channels × Conversion speed], the time average conversion cycle is as follows.

Time average conversion cycle = Minimum acquisition count (4 times) × Number of A/D conversion enabled channels × Conversion speed

**Ex.**

If the channel used is only CH1 and the digital filter fluctuation range setting is 50000

Time average conversion cycle =  $((50000 \div (1 \times 80 \times 10)) + 1) \times 1 \times 80 = 5040 \text{ (}\mu\text{s)}$

Since the calculation result is larger than or equal to [Minimum acquisition count (4 times) × Number of A/D conversion enabled channels × Conversion speed], the time average conversion cycle is 5040 μs.

**Ex.**

If the channel used is only CH1 and the digital filter fluctuation range setting is 1000

Time average conversion cycle =  $((1000 \div (1 \times 80 \times 10)) + 1) \times 1 \times 80 = 160 \text{ (}\mu\text{s)}$

Since the calculation result is smaller than or equal to [Minimum acquisition count (4 times) × Number of A/D conversion enabled channels × Conversion speed], the time average conversion cycle is 320 μs.

# Scaling function

Performs scale conversion on digital output values within a specified range between a scaling upper limit value and a scaling lower limit value.

The converted values are stored in 'CH1 Digital operation value' (Un\G402).

## Concept of scaling setting

The concepts of each setting item are described below.

- For the scaling upper limit value, set a value corresponding to the upper limit value after the input range conversion.
- For the scaling lower limit value, set a value corresponding to the lower limit value after the input range conversion.

### Ex.

If the input range is 0 to 5 V in voltage and the scaling upper and lower limit values are set to 20000 and 4000, respectively, 4000 will be stored in 'CH1 Digital operation value' (Un\G402) when the voltage input is 0 V and 20000 will be stored there when the voltage input is 5 V.

## Calculating the scaling value

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

| Range setting                                              | Relational expression                                                        | Element                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current: 0 to 20 mA, 4 to 20 mA, user range setting        | $\frac{D_x \times (S_H - S_L)}{D_{Max}} + S_L$                               | D <sub>x</sub> : Digital output value<br>D <sub>Max</sub> : Maximum digital output value of the input range in use<br>D <sub>Min</sub> : Minimum digital output value of the input range in use<br>S <sub>H</sub> : Scaling upper limit value<br>S <sub>L</sub> : Scaling lower limit value |
| Voltage: 0 to 10 V, 0 to 5 V, 1 to 5 V, user range setting |                                                                              |                                                                                                                                                                                                                                                                                             |
| Current: -20 to +20 mA                                     | $\frac{D_x \times (S_H - S_L)}{(D_{Max} - D_{Min})} + \frac{(S_H + S_L)}{2}$ |                                                                                                                                                                                                                                                                                             |
| Voltage: -10 to +10 V                                      |                                                                              |                                                                                                                                                                                                                                                                                             |

### Point

If the calculated digital output value is 32767 or more, 32767 will be set. If it is -32768 or smaller, -32768 will be stored.

## Setting procedure

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

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

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

| Item                      | Setting range                                                  |
|---------------------------|----------------------------------------------------------------|
| Scaling upper limit value | -2147483648 to +2147483647 (practical range: -32000 to +32000) |
| Scaling lower limit value |                                                                |

### Point

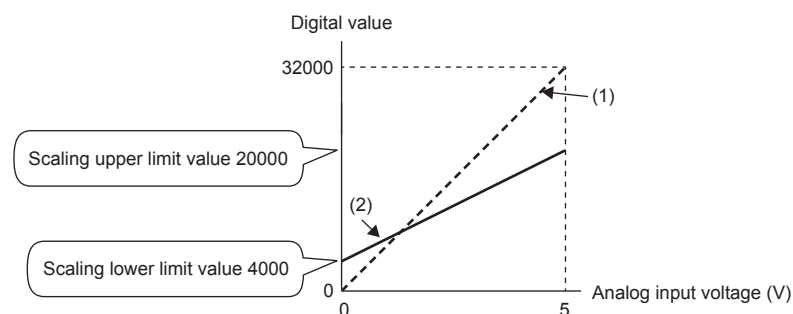
- Even when the scaling upper limit value and the scaling lower limit value are set so that the change is greater than the resolution, the resolution will not increase.
- If the relation between the values is the conversion scaling lower limit value > the conversion scaling upper limit value, the scale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

## Setting example

**Ex.**

An example of the following settings is shown below.

| Item                           | Setting            |
|--------------------------------|--------------------|
| Range setting                  | Voltage (0 to 5 V) |
| Scaling enable/disable setting | Enable             |
| Scaling upper limit value      | 20000              |
| Scaling lower limit value      | 4000               |



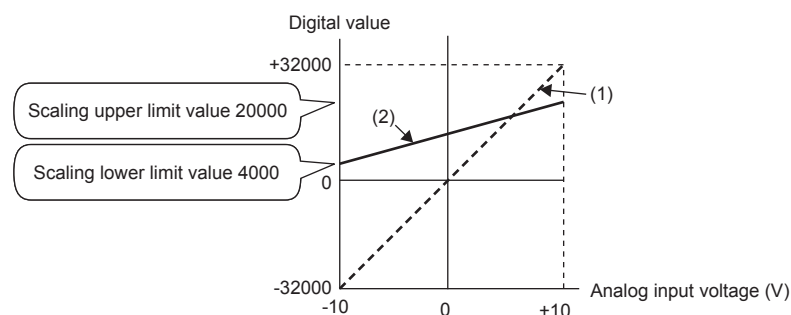
| Input voltage (V) | (1) Digital output value | (2) Digital operation value (scaling value) |
|-------------------|--------------------------|---------------------------------------------|
| 0                 | 0                        | 4000                                        |
| 1                 | 6400                     | 7200                                        |
| 2                 | 12800                    | 10400                                       |
| 3                 | 19200                    | 13600                                       |
| 4                 | 25600                    | 16800                                       |
| 5                 | 32000                    | 20000                                       |

**Ex.**

An example of the following settings is shown below.

| Item                           | Setting                |
|--------------------------------|------------------------|
| Range setting                  | Voltage (-10 to +10 V) |
| Scaling enable/disable setting | Enable                 |
| Scaling upper limit value      | 20000                  |
| Scaling lower limit value      | 4000                   |

Input voltage and scaling value become as follows.



| Analog input voltage (V) | (1) Digital output value | (2) Digital operation value (scaling value) |
|--------------------------|--------------------------|---------------------------------------------|
| -10                      | -32000                   | 4000                                        |
| -5                       | -16000                   | 8000                                        |
| 0                        | 0                        | 12000                                       |
| +5                       | +16000                   | 16000                                       |
| +10                      | +32000                   | 20000                                       |

# Shift function

Adds (shifts) a set conversion value shift amount to a digital output value and stores the result as the digital operation value. A change in conversion value shift amount is reflected to the digital operation value in real time, which facilitates fine adjustment at system start-up.

## 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 process 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 off→on→off 'Operating condition setting request' (Un\G70, b9).

## Setting procedure

Set a value for "Conversion value shift amount".

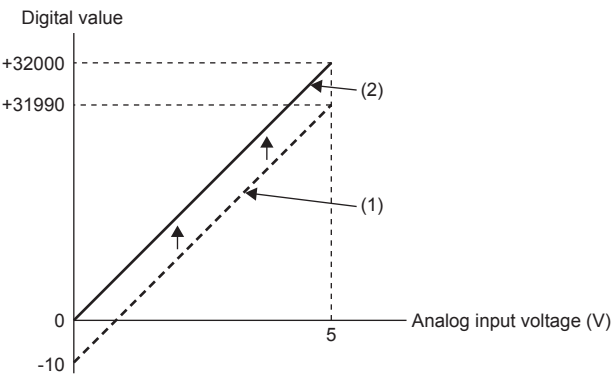
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Shift function]

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

## Setting example

Ex.

When the input characteristics is adjusted in a channel where the input range of 0 to 5 V is set by the shift function

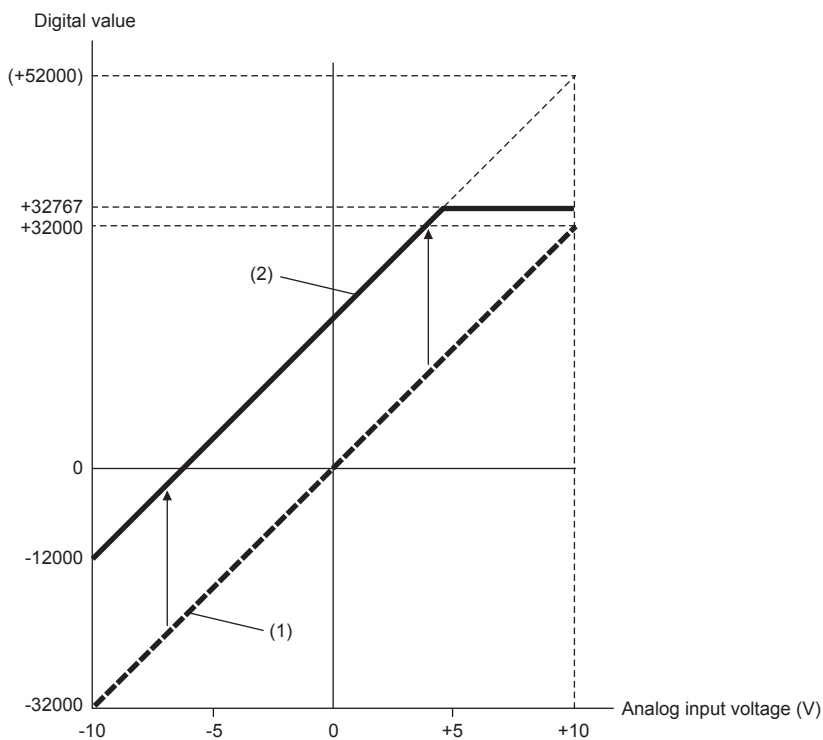


- (1) 'CH1 Digital output value' (Un\G400): -10 to +31990  
↓ 'CH1 Conversion value shift amount' (Un\G472) "+10"
- (2) 'CH1 Digital operation value' (Un\G402): 0 to +32000

| Voltage input | (1) Digital output value | (2) Digital operation value |
|---------------|--------------------------|-----------------------------|
| 0             | -10                      | 0                           |
| 5             | +31990                   | +32000                      |

**Ex.**

When the input characteristics is adjusted in a channel where the input range of -10 to +10 V is set by the shift function



- (1) 'CH1 Digital output value' (Un\G400): -32000 to +32000  
↓ 'CH1 Conversion value shift amount' (Un\G472) "+20000"
- (2) 'CH1 Digital operation value' (Un\G402): -12000 to +32767

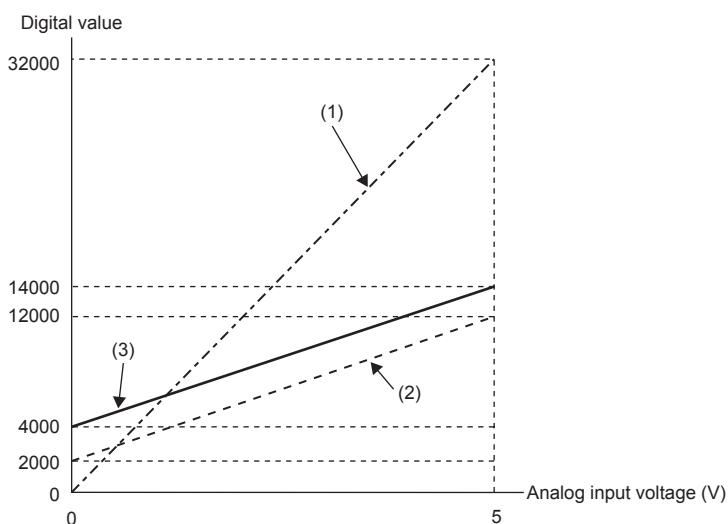
| Voltage input | (1) Digital output value | (2) Digital operation value |
|---------------|--------------------------|-----------------------------|
| -10           | -32000                   | -12000                      |
| -5            | -16000                   | +4000                       |
| 0             | 0                        | +20000                      |
| +5            | +16000                   | +32767 <sup>*1</sup>        |
| +10           | +32000                   | +32767 <sup>*1</sup>        |

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

**Ex.**

If the following are set for a channel for which the input range 0 to 5 V is set

| Item                                           | Setting    |
|------------------------------------------------|------------|
| '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): 0 to 32000  
↓ Scaling
- (2) Value after scaling: 2000 to 12000  
↓ 'CH1 Conversion value shift amount' (Un\G472) "+2000"
- (3) 'CH1 Digital operation value' (Un\G402): 4000 to 14000

| Voltage input | (1) Digital output value | (2) Value after scaling | (3) Digital operation value |
|---------------|--------------------------|-------------------------|-----------------------------|
| 0             | 0                        | 2000                    | 4000                        |
| 1             | 6400                     | 4000                    | 6000                        |
| 2             | 12800                    | 6000                    | 8000                        |
| 3             | 19200                    | 8000                    | 10000                       |
| 4             | 25600                    | 10000                   | 12000                       |
| 5             | 32000                    | 12000                   | 14000                       |

**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 38 Setting example

## Digital clipping function

This function fixes the range of the digital operation value with the maximum digital output value and the minimum digital output value when the corresponding current or voltage 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 20 mA         | 0 to 32000                               | -768 to +32767                        |
| 0 to 20 mA         |                                          |                                       |
| -20 to +20 mA      | -32000 to +32000                         | -32768 to +32767                      |
| 1 to 5 V           | 0 to 32000                               | -768 to +32767                        |
| 0 to 5 V           |                                          |                                       |
| 0 to 10 V          |                                          |                                       |
| -10 to +10 V       | -32000 to +32000                         | -32768 to +32767                      |
| User range setting |                                          |                                       |

### Setting procedure

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

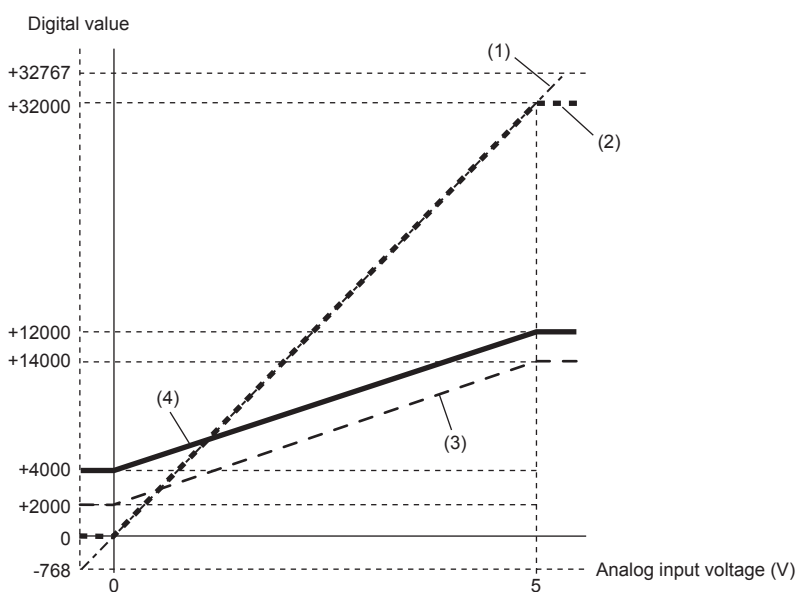
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter]  
⇒ [Application setting] ⇒ [Digital clipping function]

## Setting example

**Ex.**

If the following are set for a channel for which the input range 0 to 5 V is set

| Item                                                    | Setting    |
|---------------------------------------------------------|------------|
| 'CH1 Scaling enable/disable setting' (Un\G504)          | Enable (0) |
| 'CH1 Scaling upper limit value' (Un\G506, Un\G507)      | 12000      |
| 'CH1 Scaling lower limit value' (Un\G508, Un\G509)      | 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): -768 to +32767  
↓ Digital clipping
- (2) Value after digital clipping: 0 to 32000  
↓ Scaling
- (3) Value after scaling: 2000 to 12000  
↓ 'CH1 Conversion value shift amount' (Un\G472) "+2000"
- (4) 'CH1 Digital operation value' (Un\G402): 4000 to 14000

| Input voltage (V) | (1) Digital output value | (2) Value after digital clipping | (3) Value after scaling | (4) Digital operation value |
|-------------------|--------------------------|----------------------------------|-------------------------|-----------------------------|
| -0.12             | -768                     | 0                                | 2000                    | 4000                        |
| 0                 | 0                        | 0                                | 2000                    | 4000                        |
| +1                | +6400                    | +6400                            | 4000                    | 6000                        |
| +2                | +12800                   | +12800                           | 6000                    | 8000                        |
| +3                | +19200                   | +19200                           | 8000                    | 10000                       |
| +4                | +25600                   | +25600                           | 10000                   | 12000                       |
| +5                | +32000                   | +32000                           | 12000                   | 14000                       |
| +5.12             | +32767                   | +32000                           | 12000                   | 14000                       |

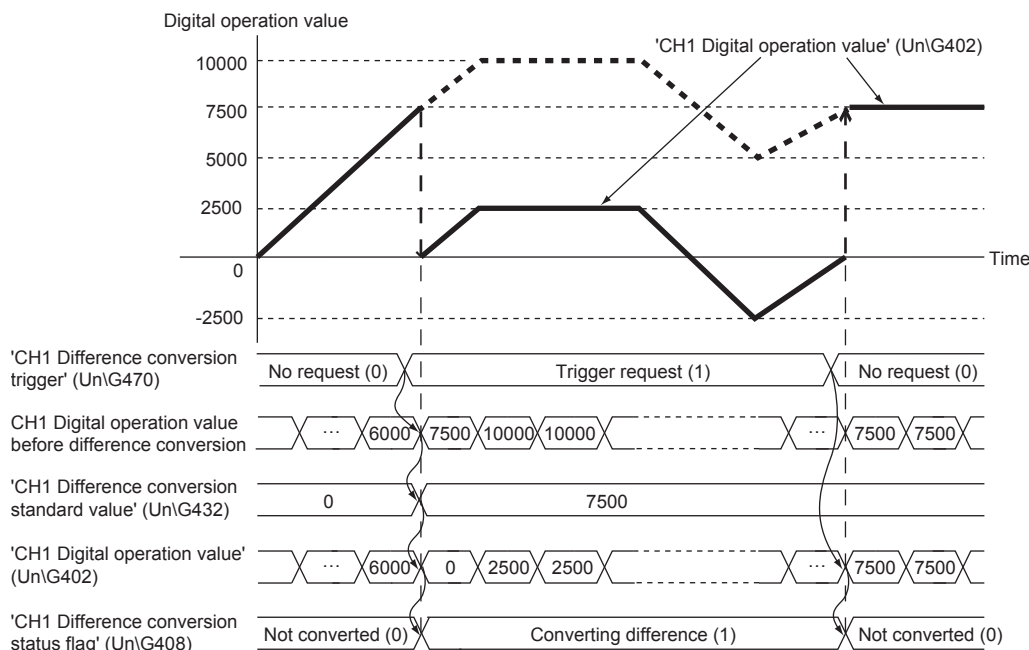
### Point

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



## Difference operation function

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 analog input 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' (UnG402). 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' (UnG470) 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' (UnG402). After the value is stored, 'CH1 Difference conversion status flag' (UnG408) turns to Converting difference (1).

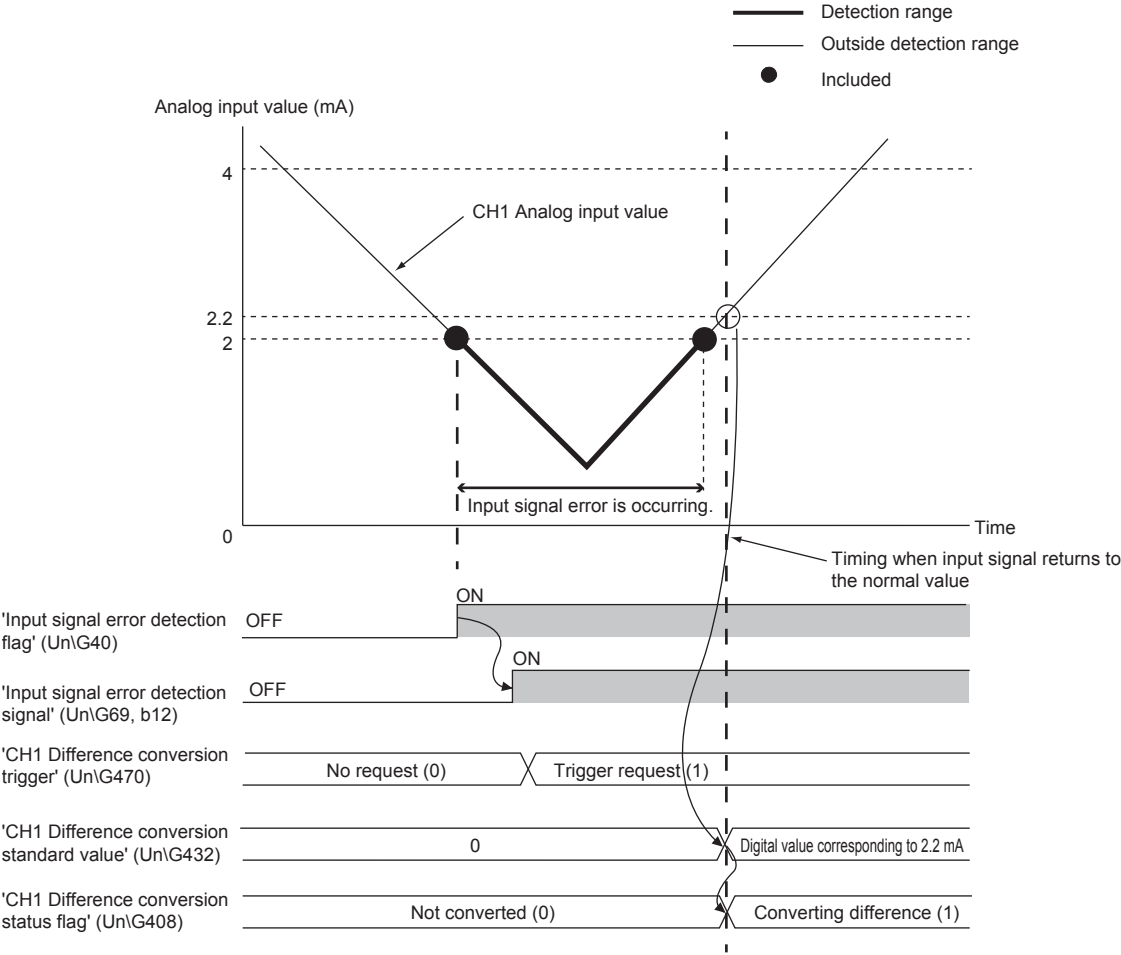
#### ■Stopping the difference conversion

1. Change 'CH1 Difference conversion trigger' (UnG470) from Trigger request (1) to No request (0).

The fall of Trigger request (1) to No request (0) is detected as a trigger. When the trigger is detected, the difference conversion stops, and 'CH1 Difference conversion status flag' (UnG408) turns to Not converted (0). Thereafter, the digital operation value is stored as it is in 'CH1 Digital operation value' (UnG402).

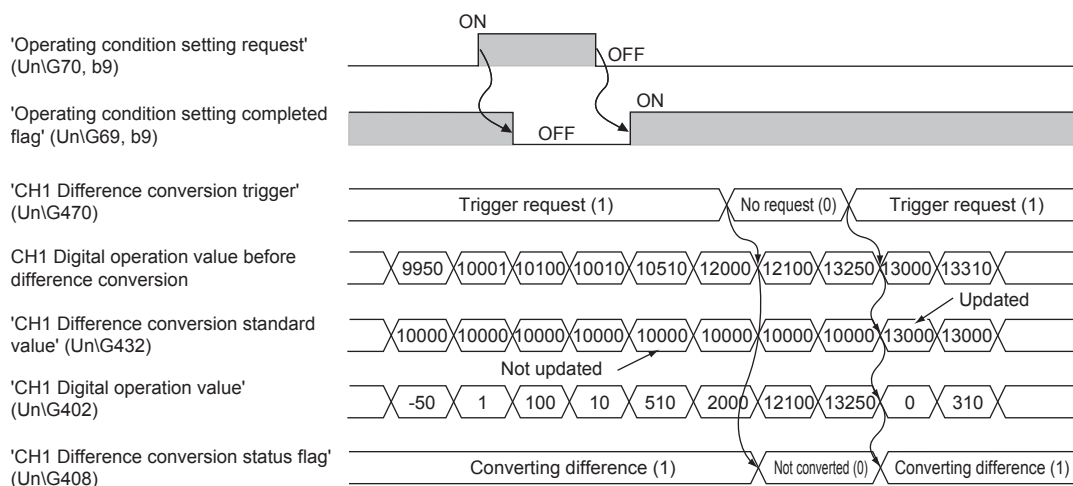
■Operations when an input signal error occurs

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.



## ■Operation performed when the operation condition setting request (Un\G70, b9) is turned off→on→off

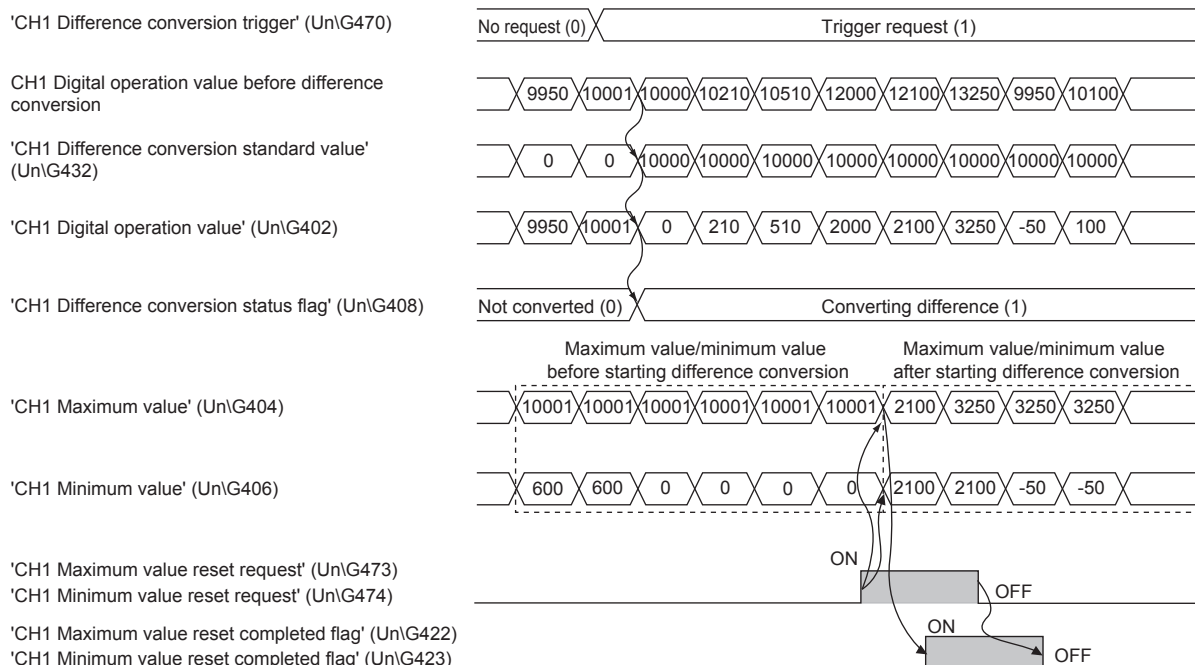
- During the difference conversion, even when 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, the difference conversion continues without updating the difference conversion reference value. To update the difference conversion reference value, restart the difference conversion 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' (Un\G70, b9) is turned off→on. After turning off→on→off Operating condition setting request (Un\G70, b9), change CH1 Difference conversion trigger (Un\G470) from No request (0) to Trigger request (1) again.



## ■Operations of maximum value and minimum value

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 reset request' (Un\G473) and 'Minimum value reset request' (Un\G474), the maximum and minimum values after the start of the difference conversion can be checked.

If 'Maximum value reset request' (Un\G473) or 'Minimum value reset request' (Un\G474) is not turned on, the maximum and minimum values before and after the start of the differential conversion will be mixed.



## ■Operation when the averaging processing is set

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

### Point

- The difference operation function can be started at any timing.
- When the difference operation 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 standard value' (Un\G432) is not updated. To update the value in 'CH1 Difference conversion standard value' (Un\G432), stop the difference conversion and restart it again.

## Maximum value/minimum value hold function

Stores the maximum and minimum values of digital operation values to the buffer memory area for each channel.

### Resetting the maximum value and the minimum value

The maximum and minimum values can be reset to the current value by performing the following processing.

#### ■Resetting the maximum value

When 'CH1 Maximum value reset request' (Un\G473) turns on (1), 'CH1 Maximum value' (Un\G404) is updated with current value, and 'CH1 Maximum value reset completion flag' (Un\G422) turns on (1).

#### ■Resetting the minimum value

When 'CH1 Minimum value reset request' (Un\G474) turns on (1), 'CH1 Minimum value' (Un\G406) is updated with current value, and 'CH1 Minimum value reset completion flag' (Un\G423) turns on (1).

#### ■Resetting the maximum value and the minimum value

The following two types of average processing of the maximum value and minimum value are provided.

- Perform "Reset Maximum value" and "Reset Minimum value" respectively.
- 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406) are updated with the current value when 'Operating condition setting request' (Un\G70, b9) turns on (1). 'CH1 Maximum value reset completion flag' (Un\G422) and 'CH1 Minimum value reset completion flag' (Un\G423) are not ON (1).

#### Point

If "A/D conversion disable" is set in 'CH1 A/D conversion enable/disable setting' (Un\G500), 0 is stored in both 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406).

### 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.

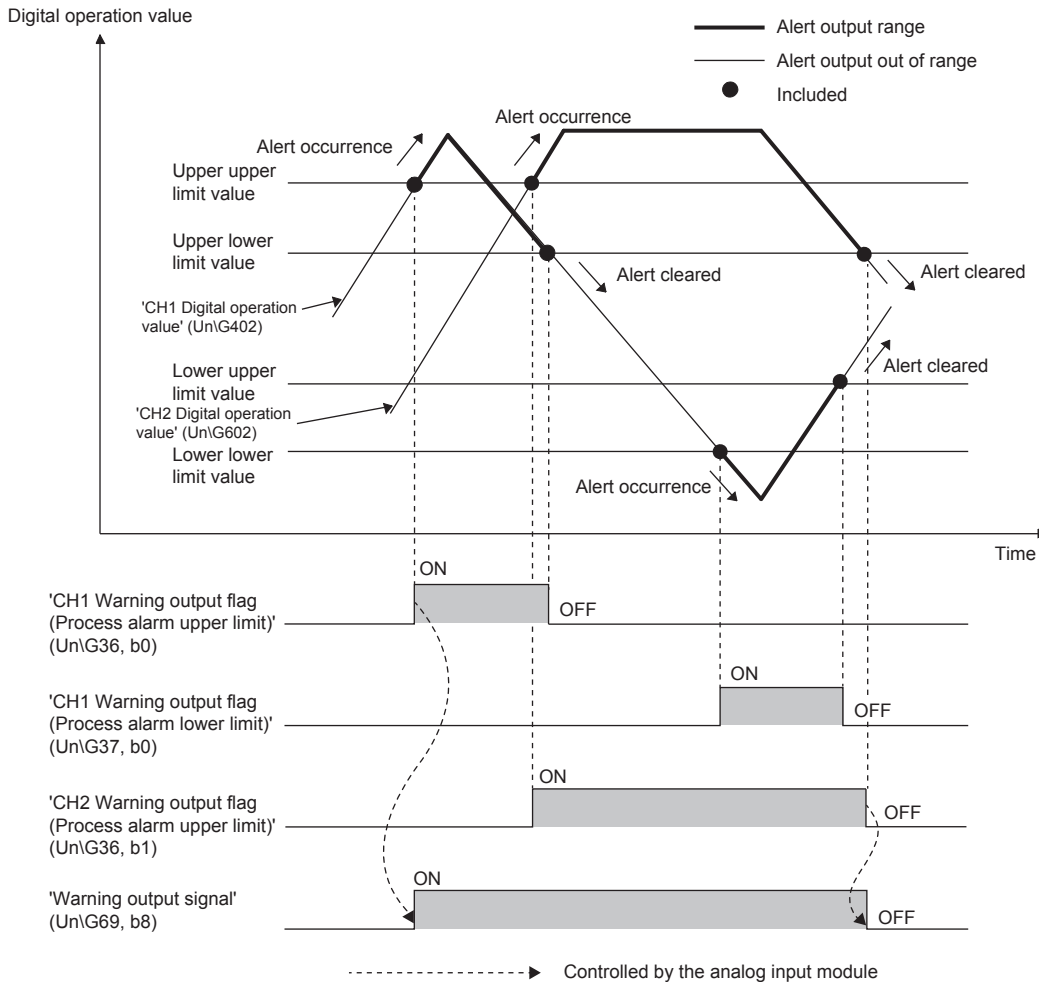
Using the averaging processing or the digital clipping, scaling, shift, or difference operation function results in storage of the maximum and minimum values of the digital operation values calculated by each function.

# Alert output function

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

## Process alarm

Outputs an alarm when a digital operation value enters the preset alarm output range.



## Operation

[Operation performed when an alarm is output]

When a digital operation value is equal to or greater than 'CH1 Process alarm upper upper limit value' (UnG514), or the value is equal to or smaller than 'CH1 Process alarm lower lower limit value' (UnG520) and the value enters the alarm output range, an alert is output as follows.

- Alarm ON (1) is stored in the bit position corresponding to the channel number of 'Warning output flag (Process alarm upper limit)' (UnG36) or 'Warning output flag (Process alarm lower limit)' (UnG37).
- 'Alarm output signal' (UnG69, b8) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (UnG2). ( Page 104 List of alarm codes)

### Point

- The A/D conversion on a channel where an alarm was output continues.
- A cycle to output the process alarm is within 2 ms. When the process alarm is detected multiple times within 2 ms, only the first process alarm detected may be notified as an alert.

[Operation after an alarm was output]

After an alarm was output, if the digital operation value does not satisfy the alarm output condition due to being smaller than the process alarm upper lower limit value or being greater than the process alarm lower upper limit value, 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), 'Alarm output signal' (Un\G69, b8) 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 off→on→off 'Error clear request (Un\G70, b15)' 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, or Primary delay filter is specified, this function works every conversion cycle.

### ■Detection target for outputting an alert

When the digital clipping function, scaling function, shift function, or difference operation function is used, the digital operation value to which digital clipping, scale conversion, shift-and-add, or difference conversion is performed is the detection target for outputting an alarm. 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 ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Warning output function (Process alarm)]

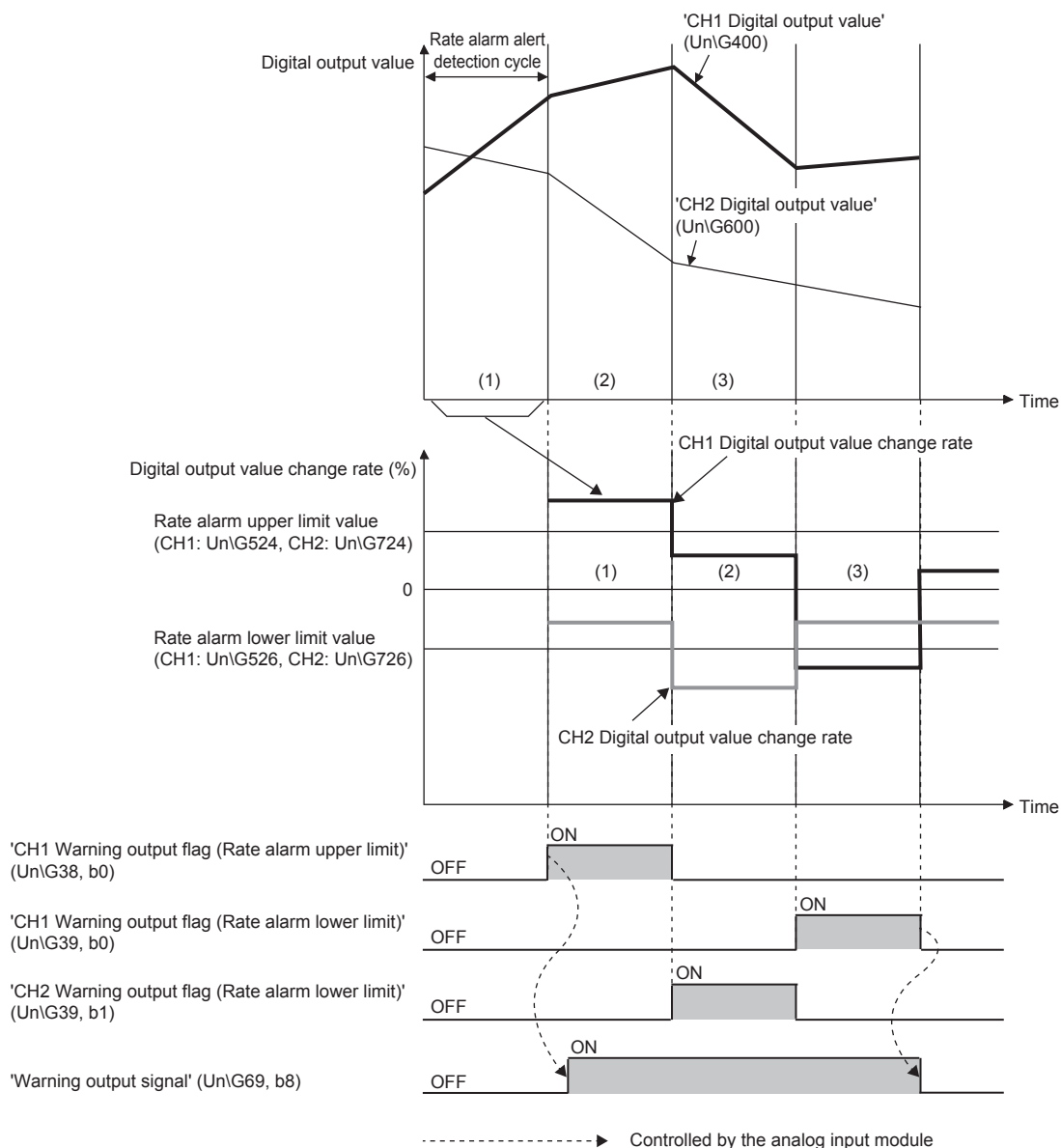
2. Set values for "Process alarm upper upper limit value", "Process alarm upper lower limit value", "Process alarm lower upper limit value", and "Process alarm lower lower limit value". The setting range is from -32768 to +32767.

#### Point

Set values within the range satisfying the condition Process alarm upper upper limit value  $\geq$  Process alarm upper lower limit value  $\geq$  Process alarm lower upper limit value  $\geq$  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

Outputs an alarm when the change rate of a digital output 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.





## ■Operation

[Operation performed when an alarm is output]

Digital output values are monitored on the rate alarm alert 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, an alert is output as follows.

- Alarm ON (1) is stored in the 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).
- 'Alarm output signal' (Un\G69, b8) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (Un\G2). (  Page 104 List of alarm codes)

### Point

- The A/D conversion on a channel where an alarm was output continues.
- A cycle to output the rate alarm is within 2 ms. When the rate alarm is detected multiple times within 2 ms, only the first rate alarm detected may be notified as an alert.

[Operation after an alarm was output]

After an alarm was output, if the change rate of a digital output value does not satisfy the alarm 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 the 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), 'Alarm output signal' (Un\G69, b8) 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 off→on→off 'Error clear request' (Un\G70, b15) 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

The rate alarm detection cycle is calculated by the following formula.

- Rate alarm detection cycle = Conversion cycle × Setting value of 'CH1 Rate alarm detection cycle setting' (Un\G522)

**Ex.**

The rate alarm detection cycle under the following conditions

- A/D conversion enable: CH1
- 'CH1 Rate alarm detection cycle setting' (Un\G522): 5 (times)

The rate alarm detection cycle is  $400\ \mu\text{s}$  ( $80\ \mu\text{s} \times 1\ (\text{CH}) \times 5\ (\text{times})$ ).

Digital output values are compared in  $400\ \mu\text{s}$  intervals to check the change rate.

**Ex.**

The rate alarm detection cycle under the following conditions

- A/D conversion enable: CH1, CH2
- 'CH1 Rate alarm detection cycle setting' (Un\G522): 5 (times)
- 'CH2 Rate alarm detection cycle setting' (Un\G722): 5 (times)
- 'CH1 Averaging process specification' (Un\G501): Count average (2)
- 'CH2 Averaging process specification' (Un\G701): Count average (2)
- 'CH1 Time average/Count average/Moving average/Primary delay filter constant setting' (Un\G502): 100 (counts)
- 'CH2 Time average/Count average/Moving average/Primary delay filter constant setting' (Un\G702): 100 (counts)

The rate alarm detection cycle is 80 ms. ( $80\ \mu\text{s} \times 100\ (\text{times}) \times 2(\text{CH}) \times 5\ (\text{times})$ ).

Digital output values are compared in 80 ms intervals to check the change rate.

## ■Judgment of rate alarm

The rate alarm is judged as follows according to the setting of 'Rate alarm change rate selection' (Un\G299).

- When 'Rate alarm change rate selection' is "Rate specification"

The 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 detection cycle.

The following shows the conversion formula<sup>\*1</sup> of judgment values used for the rate alarm detection.

Rate alarm upper limit (lower limit)  $\times 0.1 \times 0.01 \times$  Maximum digital output value

<sup>\*1</sup> Values after the decimal point are omitted.

**Ex.**

The judgment value under the following conditions

| Setting item                                 | Setting content     |
|----------------------------------------------|---------------------|
| Number of A/D conversion enabled channels    | CH1                 |
| Rate alarm change rate selection             | Rate specification  |
| CH1 Average processing specification         | Sampling processing |
| CH1 Rate alarm alert detection cycle setting | 5 times             |
| CH1 Rate alarm upper limit value             | 250 (25.0%)         |
| CH1 Rate alarm lower limit value             | 50 (5.0%)           |

In the above case, the current and previous digital output values are compared with each other with a rate alarm warning detection cycle of 400  $\mu$ s (conversion cycle 80  $\mu$ s  $\times$  5). As a result of the comparison, it is judged whether the increase of the digital output value is 8000 (= 250  $\times$  0.1  $\times$  0.01  $\times$  32000) digit or more or 1600 (= 50  $\times$  0.1  $\times$  0.01  $\times$  32000) digit or less. Use the following formula to calculate a change rate to be set based on the change amount of voltage and current to detect an alarm.

$$\text{Change rate to be set (0.1\%)} = \left( \frac{\text{Change amount of the voltage (current) to detect an alert (V(mA))}}{\text{Gain voltage (current) (V(mA)) - Offset voltage (current) (V(mA))}} \times 1000 \right)^{*2}$$

<sup>\*2</sup> Values after the decimal point are omitted.

- When 'Rate alarm change rate selection' is "Digital output value specification"

It is judged by comparing the difference between the current digital output value and the digital output value in the previous detection cycle with the 'CH1 Rate alarm upper limit value' (Un\G524) and the 'CH1 Rate alarm lower limit value' (Un\G526).

| Alarm occurrence condition                     | Conversion formula                                                                                                      |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| For alert outputting of rate alarm upper limit | Current digital output value - Digital output value at the previous detection cycle $\geq$ Rate alarm upper limit value |
| For alert outputting of rate alarm lower limit | Current digital output value - Digital output value at the previous detection cycle $\leq$ Rate alarm lower limit value |

**Ex.**

The judgment value under the following conditions

| Setting item                                 | Setting content                    |
|----------------------------------------------|------------------------------------|
| Number of A/D conversion enabled channels    | CH1                                |
| Rate alarm change rate selection             | Digital output value specification |
| CH1 Average processing specification         | Sampling processing                |
| CH1 Rate alarm alert detection cycle setting | 5 times                            |
| CH1 Rate alarm upper limit value             | 10000 (digit)                      |
| CH1 Rate alarm lower limit value             | 3200 (digit)                       |

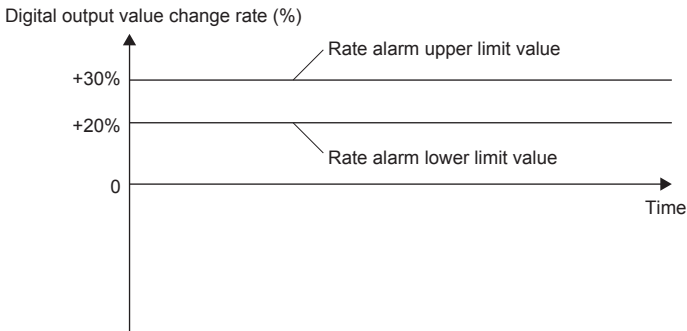
In the above case, the current and previous digital output values are compared with each other with a rate alarm warning detection cycle of 400  $\mu$ s (conversion cycle 80  $\mu$ s  $\times$  5 times). From the comparison, it is judged whether or not the increase in the digital output value is 10000 digits or more, or 3200 or less.

■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:

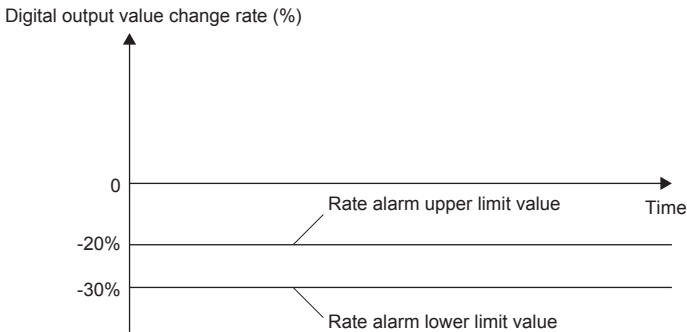
Ex.

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



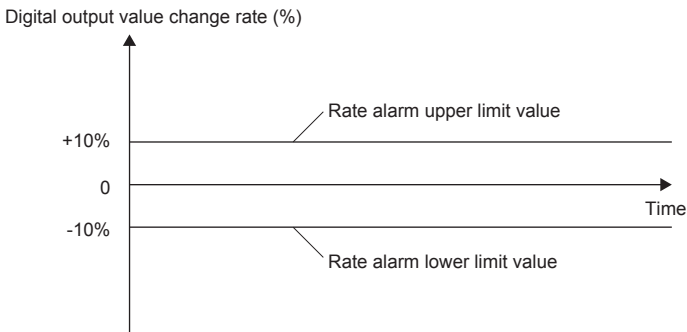
Ex.

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 ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Warning output function (Rate alarm)]

2. Set "Rate alarm change rate selection".

| Item                             | Setting range                         |
|----------------------------------|---------------------------------------|
| Rate alarm change rate selection | 0: Rate specification                 |
|                                  | 1: Digital output value specification |

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

The rate input and the digital output value input vary depending on the rate alarm change rate selection.

- When the rate alarm change rate selection is "Rate specification"

Set it in increments of 0.1% for the width of the analog input range (gain value - offset value).

| Item                         | Setting range                          |
|------------------------------|----------------------------------------|
| Rate alarm upper limit value | -32768 to +32767 (-3276.8 to +3276.7%) |
| Rate alarm lower limit value |                                        |

- When 'Rate alarm change rate' is "Digital output value specification"

Set a value for the range of the digital output value in increments of 1 digits.

| Item                         | Setting range    |
|------------------------------|------------------|
| Rate alarm upper limit value | -32768 to +32767 |
| 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.

4. Set an alarm detection cycle of rate alarms.

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

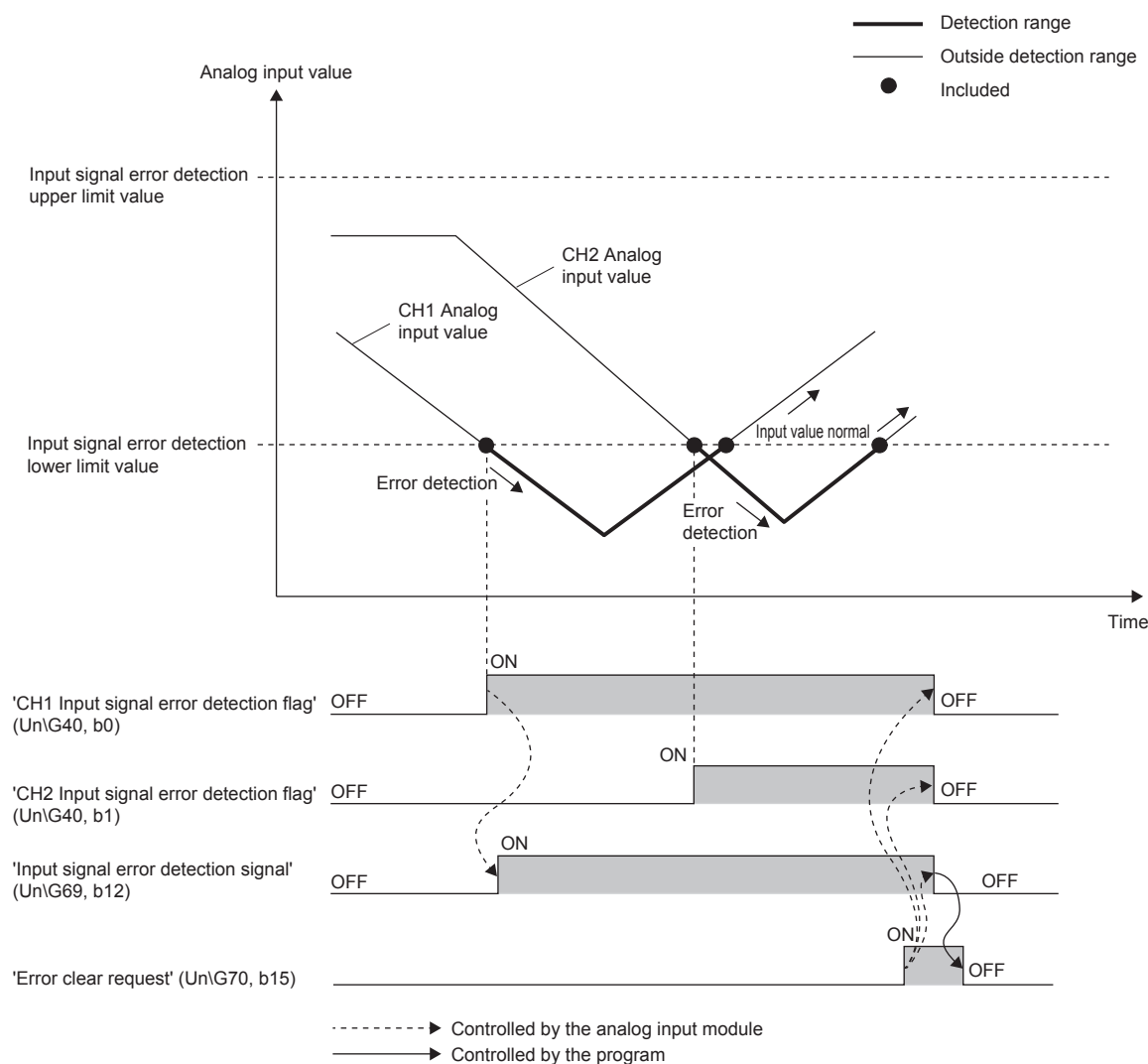
| Item                                     | Setting range      |
|------------------------------------------|--------------------|
| Rate alarm alert detection cycle setting | 1 to 32000 (times) |

### Point

A channel where the set value is out of the above range causes a rate alarm detection cycle setting range error (error code: 1B9□H).

# Input signal error detection function

Detects an analog input value that is above or below the set range.



## Point

Errors can also be cleared with the Input signal error auto-clear enable/disable setting. Refer to the following sections for details.

➔ Page 53 Clearing input signal errors

## Detection method

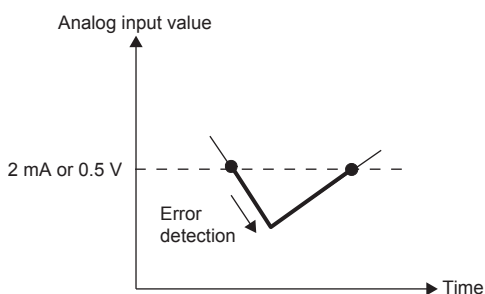
One of the following detection methods can be selected.

| 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. |   |
| 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.                                                                                                                |   |
| 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.                                                                                                                |   |
| 4: Simple disconnection detection  | Simple disconnection detection is performed. For details, refer to the following.<br> Page 52 Simple disconnection detection                                              |   |

### Simple disconnection detection

Simple disconnection detection is enabled by the range setting. The simple broken wire detection is supported only in the "4 to 20 mA" or "1 to 5 V" range. 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 signal  |
|-------------|---------------------------------|
| 4 to 20 mA  | Analog input value $\leq 2$ mA  |
| 1 to 5 V    | Analog input value $\leq 0.5$ V |



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

## Notification

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

- The input signal error (1) is stored in the bit position corresponding to the channel number of 'Input signal error detection flag' (Un\G40).
- 'Input signal error detection signal' (Un\G69, b12) turns on.
- The ALM LED flashes.
- An alarm code is stored in 'Latest alarm code' (Un\G2). Alarm codes are stored whenever the analog input value satisfies the condition for the input signal error detection. (  Page 104 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 restarts regardless of the reset on 'Input signal error detection flag' (Un\G40) or 'Input signal error detection signal' (Un\G69, b12). (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, A/D conversion completed flag turns on even when an input signal error is detected.
- A cycle to output the input signal error is within 2 ms. When the input signal error is detected multiple times within 2 ms, only the first input signal error detected may be notified.

## Clearing input signal errors

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

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

After the analog input value returns within the set range, turn off→on→off 'Error clear request' (Un\G70, b15).

The analog input 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' (Un\G69, b12) turns off.
- The ALM LED turns off.
- 'Latest alarm code' (Un\G2) is cleared.

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

After the analog input value returns to within the setting range, the analog input module arranges the following status automatically.

- 'Input signal error detection flag' (Un\G40) is cleared.
- 'Input signal error detection signal' (Un\G69, b12) turns off.
- The ALM LED turns off.

### Point

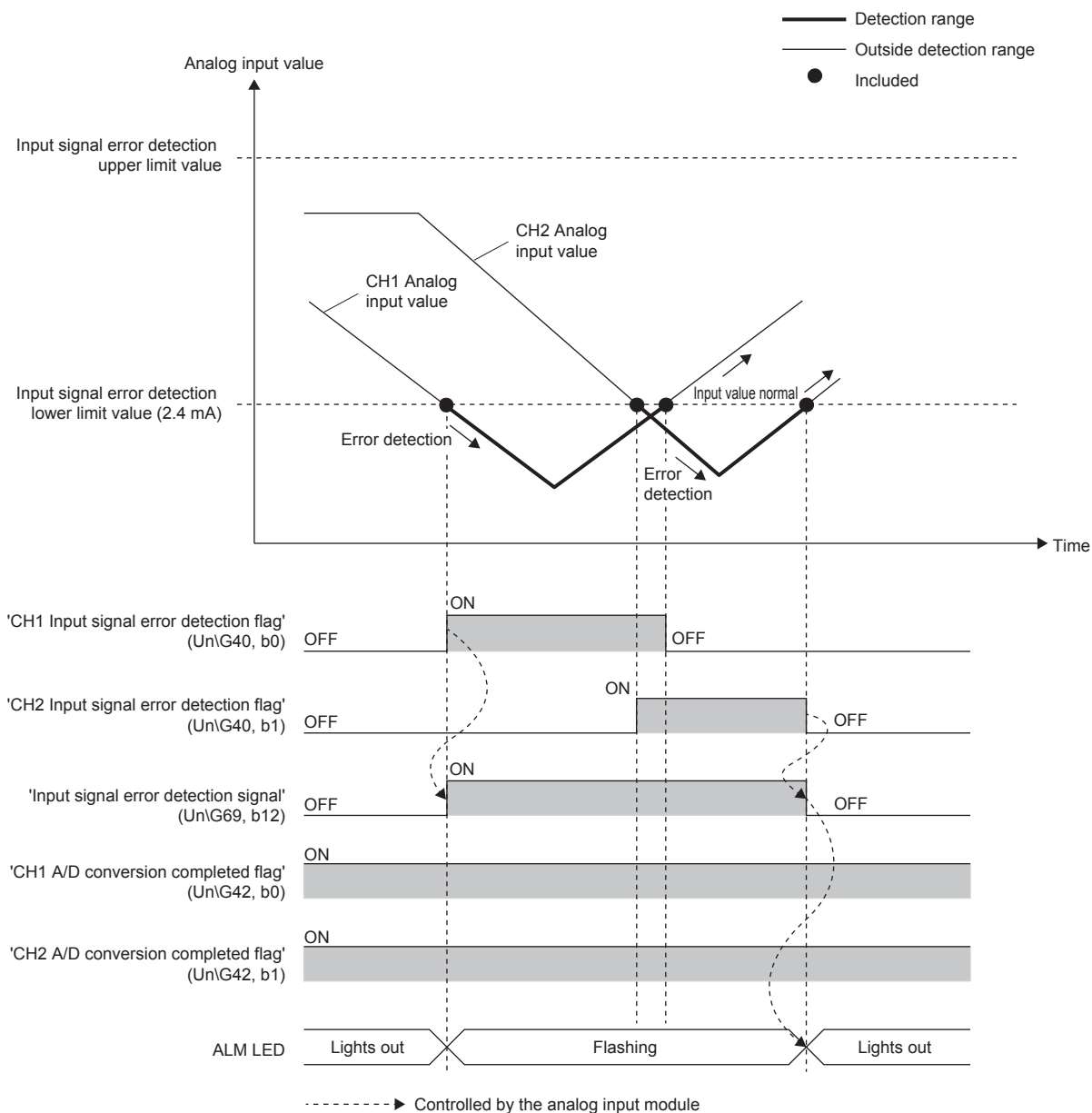
'Latest alarm code' (Un\G2) is not cleared.

After the analog input value returns within the setting range, turn off→on→off 'Error clear request' (Un\G70, b15) to clear 'Latest alarm code' (Un\G2).

**Ex.**

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

| Item                                                             | Setting                             |
|------------------------------------------------------------------|-------------------------------------|
| 'Input signal error auto-clear enable/disable setting' (Un\G302) | Enable (0)                          |
| Input range                                                      | 4 to 20 mA                          |
| 'CH1 Input signal error detection setting' (Un\G528)             | Upper and lower limit detection (1) |
| 'CH2 Input signal error detection setting' (Un\G728)             | Upper and lower limit detection (1) |
| Input signal error detection lower limit value                   | 2.4 mA                              |





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

For the input signal error upper and lower values, set the ratio to the analog input range width (gain value - offset value) in increments of 0.1%.

| Item                                                   | Setting range         |
|--------------------------------------------------------|-----------------------|
| Input signal error detection upper limit setting value | 0 to 250 (0 to 25.0%) |
| Input signal error detection lower limit setting value |                       |

### Input signal error detection upper limit setting 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. 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.

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

### Input signal error detection lower limit setting 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.

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

#### Point

- When Input signal error detection setting is set to Upper limit detection, the input signal error detection lower setting value is disabled.
- When Input signal error detection setting is set to Lower limit detection, the input signal error detection upper limit setting value is disabled.

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                             |
|-------------|--------------------|---------------------------------------------------------------------|----------------------------------------|
| Voltage     | 0 to 10 V          | 0 V                                                                 | 10 V                                   |
|             | 0 to 5 V           | 0 V                                                                 | 5 V                                    |
|             | 1 to 5 V           | 1 V                                                                 | 5 V                                    |
|             | -10 to +10 V       | 0 V                                                                 | 10 V                                   |
|             | User range setting | Analog input value equivalent to the digital output value of -32000 | Analog input value set as a gain value |
| Current     | 0 to 20 mA         | 0 mA                                                                | 20 mA                                  |
|             | 4 to 20 mA         | 4 mA                                                                | 20 mA                                  |
|             | -20 to +20 mA      | 0 mA                                                                | 20 mA                                  |
|             | User range setting | Analog input value equivalent to the digital output value of -32000 | Analog input value set as a gain value |

## Setting procedure

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

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

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

| Item                                                   | Setting range           |
|--------------------------------------------------------|-------------------------|
| Input signal error detection upper limit setting value | 0 to 250 (0.0 to 25.0%) |
| Input signal error detection lower limit setting value |                         |

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.

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

## 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 falls below -10.2 V or exceeds +10.2 V.

| Item                                                             | Setting value                       |
|------------------------------------------------------------------|-------------------------------------|
| Input range                                                      | -10 to +10 V                        |
| 'Input signal error auto-clear enable/disable setting' (Un\G304) | 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: -10.2 V
- Input signal error detection upper limit value: +10.2 V
- Range lower limit value: -10 V
- Offset value: 0.0 V
- Gain value: 10.0 V

[Calculation of lower limit value]

$$\begin{aligned} \text{Input signal error detection lower limit setting value} &= \frac{-10.0 - (-10.2)}{10.0 - 0.0} \times 1000 \\ &= 20 \text{ (2.0\%)} \end{aligned}$$

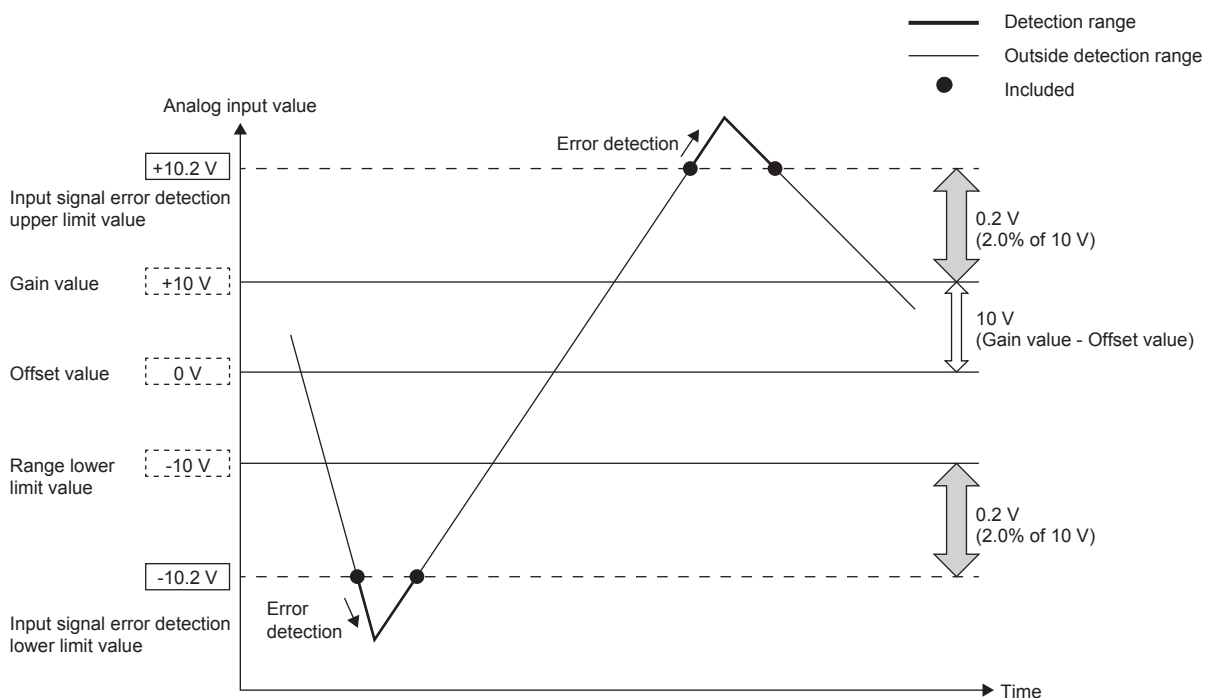
Set 'CH1 Input signal error detection lower limit set value' (Un\G529) to 20 (2.0%).

[Calculation of upper limit value]

$$\begin{aligned} \text{Input signal error detection upper limit setting value} &= \frac{10.2 - 10.0}{10.0 - 0.0} \times 1000 \\ &= 20 \text{ (2.0\%)} \end{aligned}$$

Set 'CH1 Input signal error detection upper limit set value' (Un\G530) to 20 (2.0%).

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



# Logging function

This function stores 10000 points of digital output values or digital operation values per channel 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.

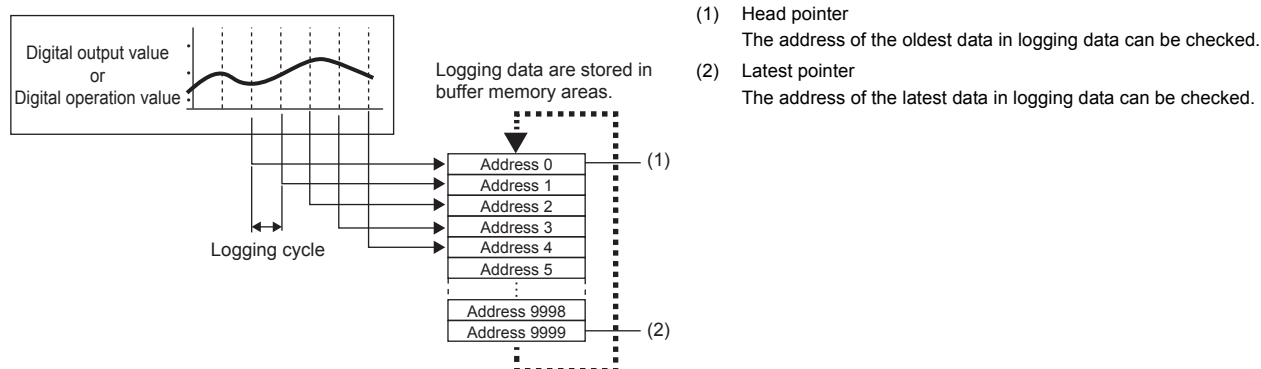
## Logging function

### ■Collecting logging data

Logging data is collected as follows.

- 10000 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 80  $\mu$ s at a minimum and of 3600 s at a maximum.

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



### Point

When the number of stored data points is 10001 or greater, data is sequentially overwritten from address 0 with new data.

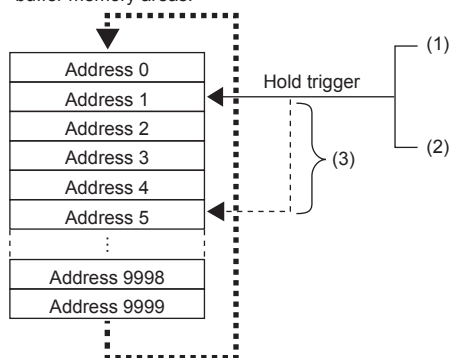
### ■Stopping the Logging Operation

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 logging cycle.

Logging can be stopped by the hold trigger.

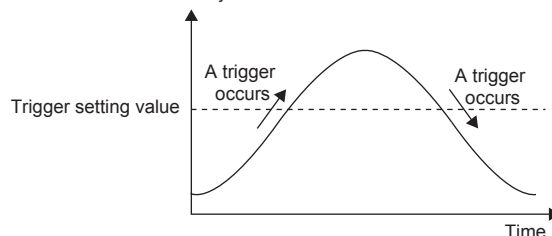
- A hold trigger allows two options: Logging hold request or Level trigger.
- The number of data points to be collected after a hold trigger occurs can be set.

Logging data are stored in buffer memory areas.



- (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.

Stored value in buffer memory area to be monitored



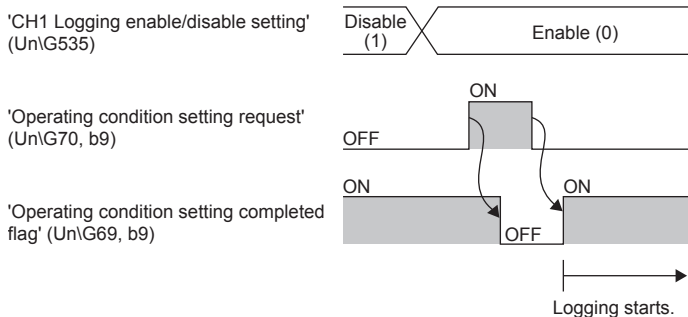
- (3) Post-trigger logging points  
When the set points of data is collected after a hold trigger is generated, the logging operation is stopped.

## 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' (Un\G70, b9) is turned off→on→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\G19999) on the set logging cycle.



### ■Logging data

Logging data are stored in the following buffer memory areas.

When the number of stored data points is 1001 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\G19999        |
| CH2     | Un\G20000 to Un\G29999        |
| CH3     | Un\G30000 to Un\G39999        |
| CH4     | Un\G40000 to Un\G49999        |

If logging has been performed even once, all the logging data above are cleared to 0 at the timing when 'Operating condition setting request' (Un\G70, b9) is turned off→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 |
|-------------------------------------------------|--------------------------------------------------|
| μs (0)                                          | 80 to 32767                                      |
| ms (1)                                          | 1 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         | $\left( \frac{\text{Time set in Time average/Count average/Moving average/Primary delay filter constant setting}}{\text{Number of conversion enabled channels} \times \text{Conversion speed}} \right)^{*1} \times \text{Number of A/D conversion enabled channels} \times \text{Conversion speed}$ |
| Count average        | The count set to CH1 Time average/Count average/Moving average/Primary delay filter constant setting (Un\G502)) × (Number of A/D conversion enabled channels × Conversion speed)                                                                                                                    |
| Moving average       | Number of A/D conversion enabled channels × Conversion speed                                                                                                                                                                                                                                        |
| Primary delay filter | Number of A/D conversion enabled channels × Conversion speed                                                                                                                                                                                                                                        |
| Digital filter       | For details, refer to the following.<br> Page 29 Digital filter                                                                                                                                                    |

\*1 Values after the decimal point are omitted.

#### Ex.

With the following settings, the conversion cycle is 320 μs and the actual logging cycle is 9.92 ms (integral multiple of 320 μs).

| Item                            | Setting             |
|---------------------------------|---------------------|
| Conversion enabled channels     | CH1 to CH4          |
| Averaging process specification | Sampling processing |
| Logging cycle setting value     | 10                  |
| Logging cycle unit setting      | ms                  |

The following values are stored in 'CH1 Logging cycle monitor value' (Un\G441 to Un\G443).

| Address | Item                                                 | Stored value |
|---------|------------------------------------------------------|--------------|
| 441     | CH1 Logging cycle monitor value (Un\G441 to Un\G443) | 0 (s)        |
| 442     |                                                      | 9 (ms)       |
| 443     |                                                      | 920 (μs)     |

### ■When the logging function becomes disabled

The logging is not performed when one of the following errors occurs after the logging function is enabled and 'Operating condition setting request' (Un\G70, b9) is off→on→off.

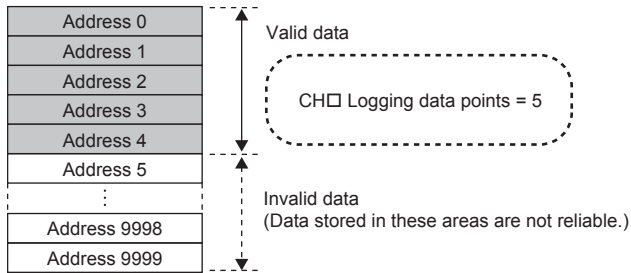
- Error code (191□H): Setting errors of 'CH1 Averaging process specification' (Un\G501)
- Error code (192□H to 195□H): Setting errors of 'CH1 Time average/Count average/Moving average/Primary delay filter constant setting' (Un\G502)
- Error code (19D□H): Setting error of 'CH1 Digital filter setting' (Un\G570)
- Error code (19E□H): Setting error of 'CH1 Digital filter fluctuation width setting' (Un\G572, Un\G573)
- Error code (1D0□H to 1D6□H): Setting errors of the logging function
- Error code (1D8□H, 1D9□H): Setting errors of the logging read function

When 'Operating condition setting request' (Un\G70, b9) is turned off→on→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), 'Error flag' (Un\G69, b15) and the ERROR LED turn on.

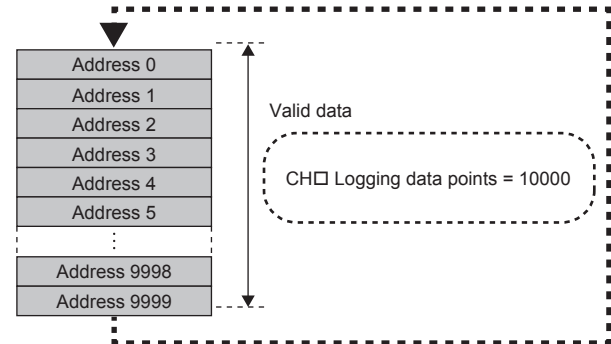
## ■Number of logging data

With 'CH1 Number of logging data' (Un\G436), the number of valid data in 'CH1 Logging data' (Un\G10000 to Un\G19999) can be checked.

**When the number of collected data points is less than 10000**



**When the number of collected data points is 10001 or greater**



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

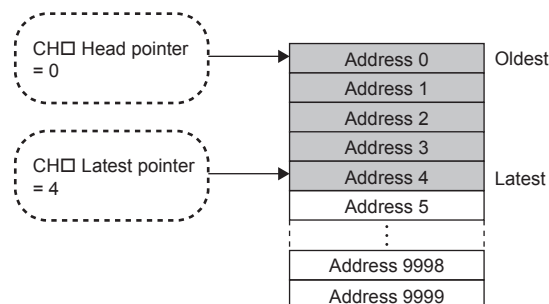
When CH1 Logging data (Un\G10000 to Un\G19999) becomes full (Number of logging data = 10000), the next data is stored in the head address of CH1 Logging data (Un\G10000 to Un\G19999), and the logging operation continues overwriting the existing data. In this case, the number of logging data is fixed to 10000.

## ■Head pointer and latest pointer

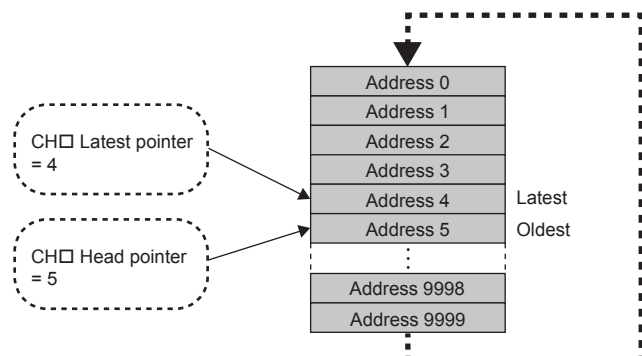
The storage location of the oldest data and the latest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with the following buffer memory areas.

| Buffer Memory Areas          | Description                                                                                                                                                                                                                                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CH1 Head pointer (Un\G434)   | The buffer memory address of the oldest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with this buffer memory area. The offset value (0 to 9999) counted from the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored. |
| CH1 Latest pointer (Un\G435) | The buffer memory address of the latest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with this buffer memory area. The offset value (0 to 9999) counted from the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored. |

**When the number of collected data points is less than 10000**



**When the number of collected data points is 10001 or greater**



The head pointer does not change (fixed to 0) until CH1 Logging data (Un\G10000 to Un\G19999) becomes full after the logging start. (fixed to 0).

The head pointer moves by one point when CH1 Logging data (Un\G10000 to Un\G19999) becomes full and overwriting the data starts from the head 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 the head pointer and the number of logging data, 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 62 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.

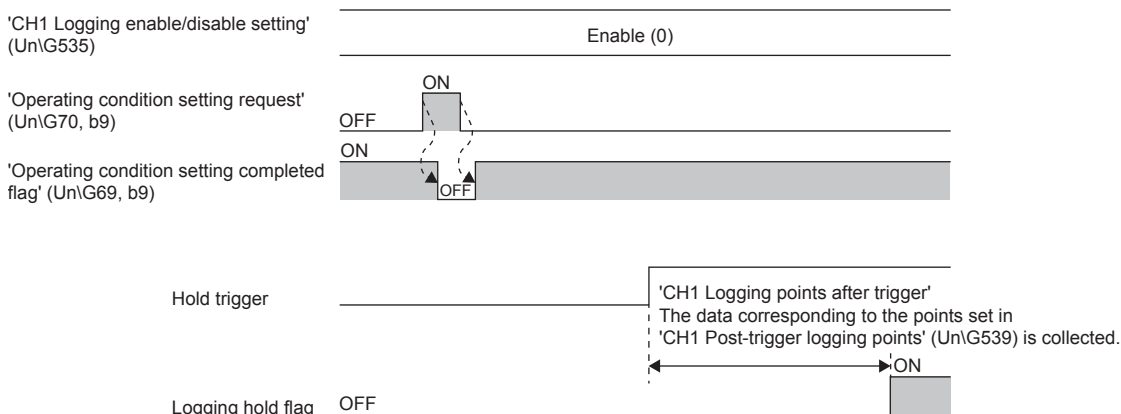
A trigger that is generated when the condition is satisfied is called a hold trigger.

To generate a hold trigger, the following two methods are available.

☞ Page 65 Logging hold request

☞ Page 66 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).

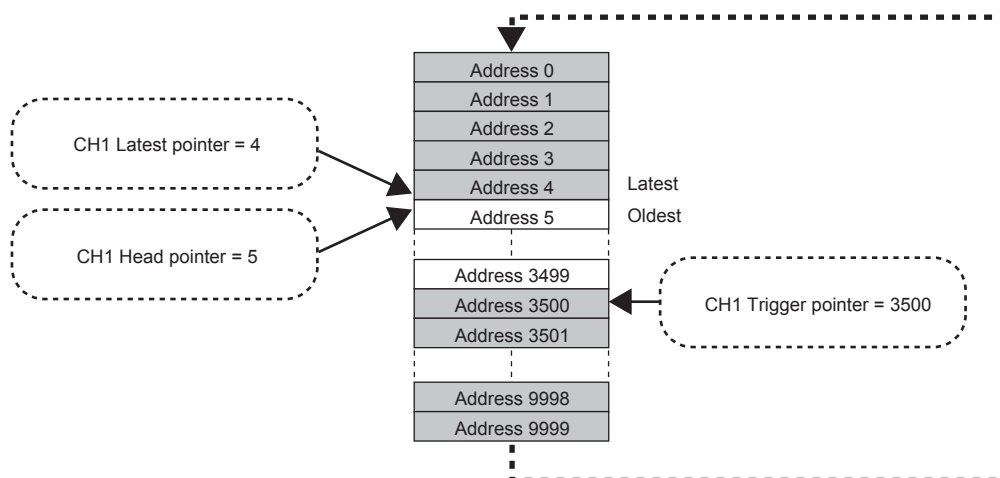
### ■Checking data when a hold trigger has occurred

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\G19999) is stored in 'CH1 Trigger pointer' (Un\G437).

**Ex.**

The value stored in Trigger pointer when the logging operation stops under the following conditions

- 'CH1 Post-trigger logging points' (Un\G539): 6505 points
- The data location where a hold trigger has occurred: At the 3500th point.





- Checking the trigger generation time

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

Even when the logging cycle is set to a period less than 1 millisecond (Example: 80  $\mu$ s), the minimum time unit recorded in 'CH1 Trigger generation time' (Un\G444 to Un\G448) is millisecond. Use the trigger generation time as an indication to refer to the logging data.

**Ex.**

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

|                                                                             | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |

| Item                                                               | Storage contents                                                                                                                                                                                                                                                     | Storage example*1 |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| First two digits of the year/Last two digits of the year           | Stored in BCD code.                                                                                                                                                                                                                                                  | 2017H             |
| Month/Day                                                          |                                                                                                                                                                                                                                                                      | 0130H             |
| Hour/Minute                                                        |                                                                                                                                                                                                                                                                      | 1035H             |
| Second                                                             |                                                                                                                                                                                                                                                                      | 40H               |
| Day of the week                                                    | One of the following values is stored in BCD code. <ul style="list-style-type: none"> <li>• Sunday: 00H</li> <li>• Monday: 01H</li> <li>• Tuesday: 02H</li> <li>• Wednesday: 03H</li> <li>• Thursday: 04H</li> <li>• Friday: 05H</li> <li>• Saturday: 06H</li> </ul> | 01H               |
| Millisecond (higher-order digits)/Millisecond (lower-order digits) | Stored in BCD code.                                                                                                                                                                                                                                                  | 0628H             |

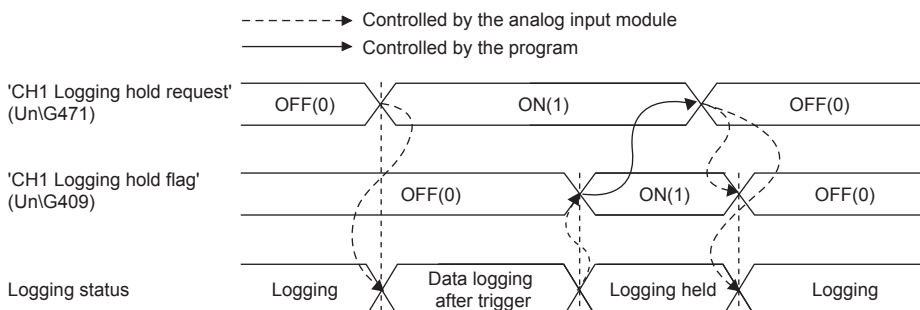
\*1 These values assume that a trigger is generated at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

## ■Resuming the logging

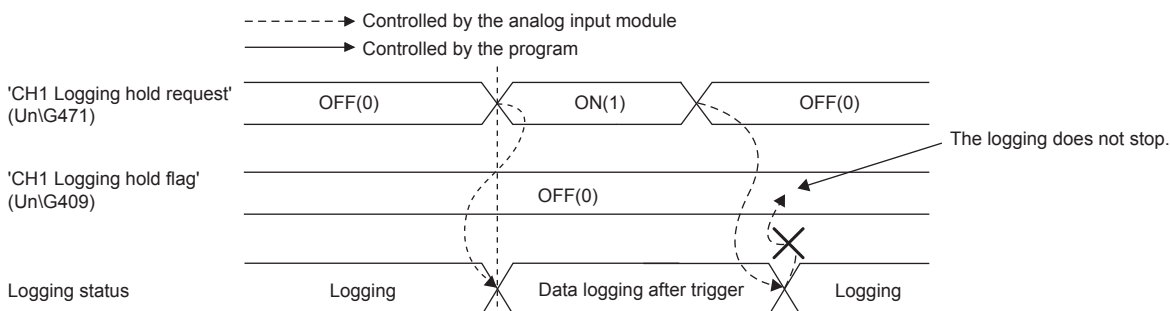
It may take time until ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) after 'CH1 Logging hold request' (Un\G471) is changed off→on.

To resume logging, check that ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) and 'CH1 Logging hold request' (Un\G471) is changed from on→off. After logging resumes, the value is stored from the head buffer memory area of CH1 Logging data (Un\G10000 to Un\G19999).

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 on→off before ON (1) is stored in 'CH1 Logging hold flag' (Un\G409).



### • Buffer memory area status when logging resumes

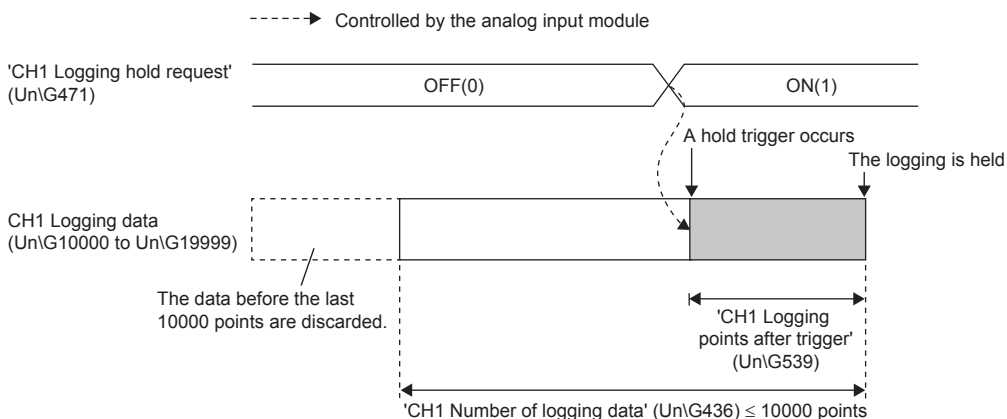
The following table shows the buffer memory area status when logging resumes.

| Buffer Memory Areas                              | 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\G19999)        | 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\G19999). 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 an analog input module receives a hold trigger after the value in 'CH1 Logging hold request' (Un\G471) is turned OFF (0) → 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 turned ON (1)→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.

## ■Checking that the logging has stopped

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

## Level trigger

When a value in the monitored buffer memory area of an analog input 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 an analog input 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)*1 | -32768 to +32767 |

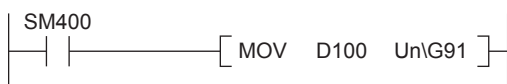
\*1 □ represents a number from 0 to 9.

**Ex.**

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

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

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



### Point

- Specify an 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.
- If other than 0 to 9999 is set for 'CH1 Trigger data' (Un\G541), an error occurs. A trigger data setting range error (error code: 1D6□H) is stored in 'Latest error code' (Un\G0), 'Error flag' (Un\G69, b15) and the ERROR LED turns on.

[Setting the monitoring condition]

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

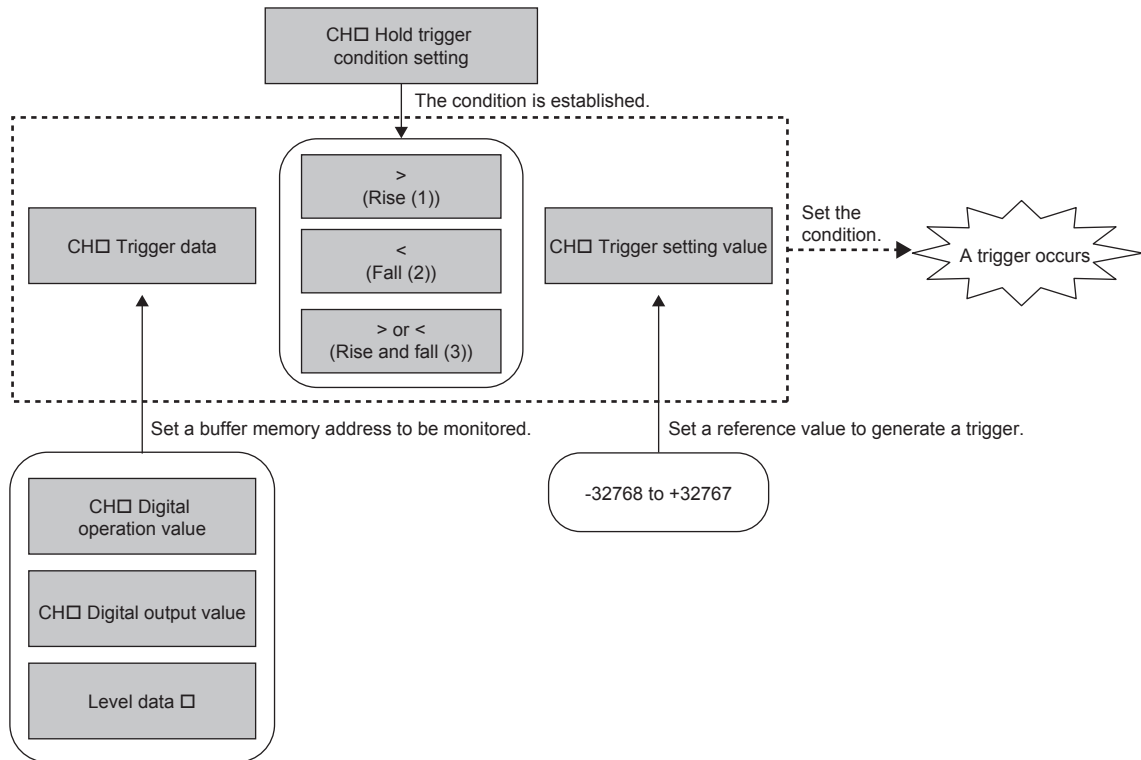
| Setting value     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rise (1)          | <div> <p>Stored value in buffer memory area to be monitored</p> <p>Trigger setting value</p> <p>Time</p> <p>(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 &gt; Trigger setting value".</p> <p>(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 &lt; Trigger setting value".</p> </div> |
| Fall (2)          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Rise and fall (3) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

- 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.



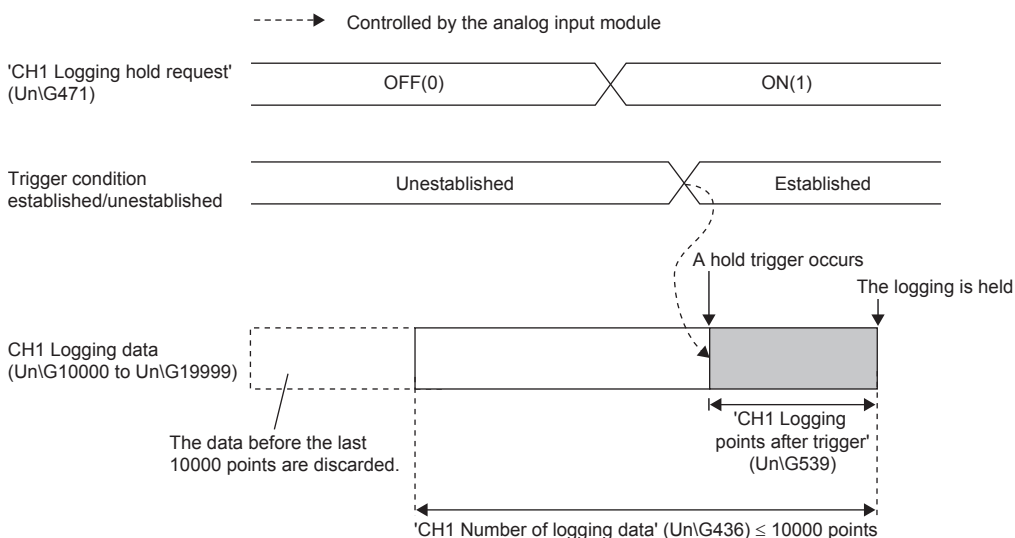
For example, to generate a hold trigger when a value in CH1 Digital output value exceeds 10000, set it as follows.

- '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

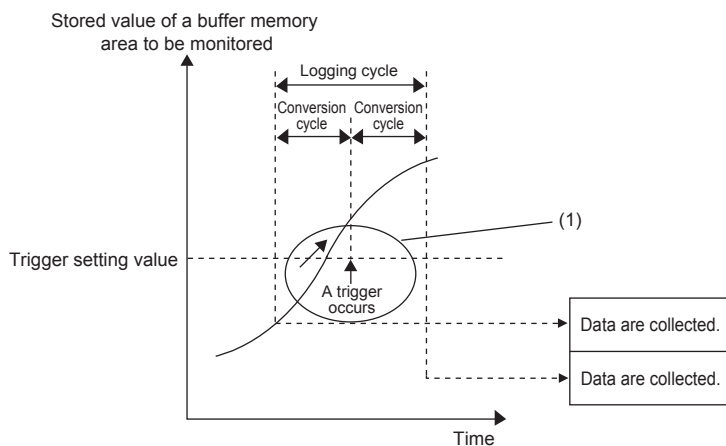
To use a level trigger, set ON (1) to 'CH1 Logging hold request' (Un\G471) in advance. At the point where ON (1) has been set to 'CH1 Logging hold request' (Un\G471), the module becomes the trigger condition wait status.

After the trigger condition has been satisfied, and the set points of the data have been collected from that point, the logging stops.



### 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\G19999) 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\G19999), arrange related settings so that the conversion cycle of the monitoring target value (a 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.

- 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.

1

### ■Setting procedure

1. Set "A/D conversion enable/disable setting" to "A/D conversion enable".  
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [A/D conversion enable/disable setting]
2. Set "Logging enable/disable setting" to "Enable".  
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Logging function]
3. Set the target data to be logged in "Logging data setting". Set either of "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 it to "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 for a level trigger to "Trigger data".
9. Set whether to enable or disable the logging read function in "Logging loading enable/disable setting".
10. Set a level where a level trigger operates for "Trigger setting value".

## 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.

An analog input module has 16 points of the interrupt factor to correspond to the logging reading of each channel.

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

 Page 70 Setting interrupt pointers



More than 10000 points of logging data can be stored by transferring the device data to the data register of the CPU module without stopping logging.

### ■Setting interrupt pointers

Assign the interrupt factors of an analog input module and interrupt pointers of the CPU module using the GX Works3 interrupt pointer setting.

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 Logging loading enable/disable setting' (Un\G544) to Enable (0) and set a number of logging points to generate an interrupt in 'CH1 Logging load points setting value' (Un\G545). This function starts when 'Operating condition setting request' (Un\G70, b9) is turned off→on→off.

- The number of logging read points

Set a value whose integral multiple is 10000 in 'CH1 Logging load points setting value' (Un\G545). The setting range is from 10 to 10000.

When a value whose integral multiple is not 10000 is set, the number of the actual logging read points is forced to become a maximum value whose integral multiple is 10000 within the set value. The value of the number of logging read points is stored in 'CH1 Logging read points monitor value' (Un\G440).

| The number of logging read points | Logging read points monitor value |
|-----------------------------------|-----------------------------------|
| 100                               | 100                               |
| 90                                | 80                                |
| 110                               | 100                               |
| 650                               | 625                               |
| 4000                              | 2500                              |

### ■Data checking method

[Current logging read pointer]

- The head pointer read from CH1 Logging data (Un\G10000 to Un\G19999) 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 monitor 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 monitor 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 load points setting value' (Un\G545) being set to 1000

| Occurrence of read pointer detection interrupts | Previous logging read pointer | Current logging read pointer | Latest pointer | Buffer memory areas |
|-------------------------------------------------|-------------------------------|------------------------------|----------------|---------------------|
| Default value                                   | -1                            | -1                           | 0              | 1st data            |
| 1st time                                        | -1                            | 0                            | 999            | :                   |
| 2nd time                                        | 0                             | 1000                         | 1999           | 1000th data         |
| 3rd time                                        | 1000                          | 2000                         | 2999           | 1001st data         |
| :                                               | :                             | :                            | :              | :                   |
|                                                 |                               |                              |                | 2000th data         |
| 10th time                                       | 8000                          | 9000                         | 9999           | 2001st data         |
| 11th time                                       | 9000                          | 0                            | 999            | :                   |
| 12th time                                       | 0                             | 1000                         | 1999           | 10000th data        |

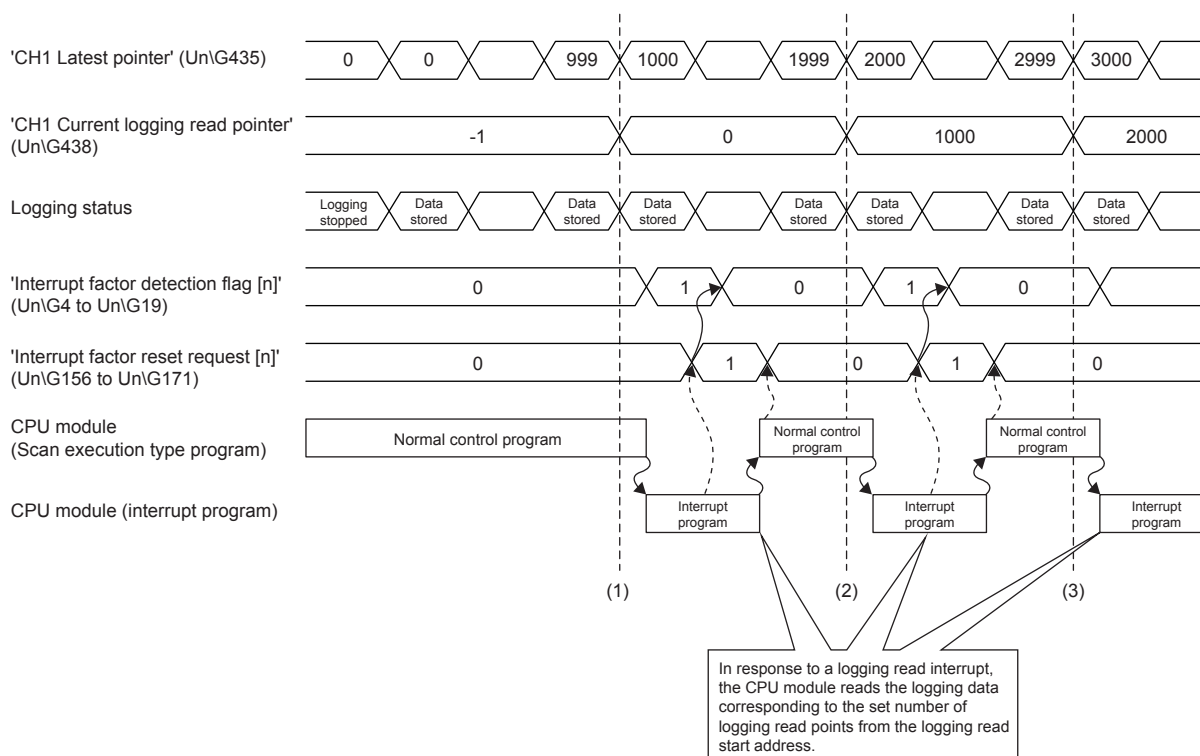
**Operation**

The logging read function starts by setting interrupt pointers and turning off→on→off 'Operating condition setting request' (Un\G70, b9). This function repeats its operation every time the same number of data as the logging read points monitor value is logged.

**Ex.**

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

- A/D conversion enable: CH1
- Logging load points setting value: 1000 points



- (1) The timing that the 1st interrupt processing occurs
- (2) The timing that the 2nd interrupt processing occurs
- (3) The timing that the 3rd 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 ⇒ [Module Parameter] ⇒ [Interrupt setting]

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

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

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

☞ [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [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 load points setting value".

## ■Setting example

**Ex.**

When an interrupt program that is executed when the logged data of CH1 Logging read points monitor value is assigned to the interrupt pointer I50

- Label settings

| Classification       | Device                                                     | Description                                | Device                |
|----------------------|------------------------------------------------------------|--------------------------------------------|-----------------------|
| Module label         | FX5_4AD_1.unInterruptFactorMask_D[0]                       | Interrupt factor mask                      | U1\G124               |
|                      | FX5_4AD_1.unInterruptFactorDetectionFlag_D[0]              | Interrupt factor detection flag            | U1\G4                 |
|                      | FX5_4AD_1.unInterruptFactorResetRequest_D[0]               | Interrupt factor reset request             | U1\G156               |
|                      | FX5_4AD_1.stnMonitor_D[0].wThisLoggingLoadPointer_D        | CH1 Current logging read pointer           | U1\G438               |
|                      | FX5_4AD_1.stnMonitor_D[0].uLoggingLoadPointsMonitorValue_D | CH1 Logging read points monitor value      | U1\G440               |
| Labels to be defined | Define global labels as shown below:                       |                                            |                       |
|                      | Label Name                                                 | Data Type                                  | Class                 |
|                      | G_uLoggingReadPoints                                       | Word [Unsigned]/Bit String [16-bit]        | VAR_GLOBAL            |
|                      | G_uLoggingReadPointsTemporary                              | Double Word [Unsigned]/Bit String [32-bit] | VAR_GLOBAL            |
|                      | G_uWritePosition                                           | Double Word [Unsigned]/Bit String [32-bit] | VAR_GLOBAL            |
|                      | G_uSaveFileRegisterMaxValue                                | Double Word [Unsigned]/Bit String [32-bit] | VAR_GLOBAL            |
|                      | G_wThisTimeLoggingReadPointIndex                           | Word [Signed]                              | VAR_GLOBAL            |
|                      | G_uWritePositionIndex                                      | Double Word [Unsigned]/Bit String [32-bit] | VAR_GLOBAL            |
|                      | G_wLoggingReadMonitorValuePlusIndex                        | Word [Signed]                              | VAR_GLOBAL            |
|                      | G_wSaveFileRegisterPlusIndex                               | Word [Signed]                              | VAR_GLOBAL            |
|                      |                                                            |                                            | Assign (Device/Label) |
|                      |                                                            |                                            | D1 0                  |
|                      |                                                            |                                            | D1 2                  |
|                      |                                                            |                                            | D20                   |
|                      |                                                            |                                            | D30                   |
|                      |                                                            |                                            | Z0                    |
|                      |                                                            |                                            | Z4                    |
|                      |                                                            |                                            | U1 #G1 000020         |
|                      |                                                            |                                            | R024                  |

- Program example

|       |                                                            |                                         |                          |            |                                                                           |                                                             |
|-------|------------------------------------------------------------|-----------------------------------------|--------------------------|------------|---------------------------------------------------------------------------|-------------------------------------------------------------|
| (0)   |                                                            | SM402                                   |                          | SIMASK     | I50                                                                       | K1                                                          |
|       |                                                            |                                         |                          |            |                                                                           | EI                                                          |
|       |                                                            |                                         |                          | MOV        | K0                                                                        | G_udLoggingReadPoints<br>D10                                |
|       |                                                            |                                         |                          | DMOV       | K0                                                                        | G_udWritePosition<br>D20                                    |
|       |                                                            |                                         |                          | DMOV       | K30000                                                                    | G_udSaveFileRegisterMaxValue<br>D30                         |
|       |                                                            |                                         |                          |            | SET                                                                       | FX5_4AD_1.unInterruptFactorMask_D[0].0<br>U1W6124.0         |
| (179) |                                                            |                                         |                          |            |                                                                           | FEND                                                        |
| (180) | D>_U                                                       | G_udSaveFileRegister<br>MaxValue<br>D30 | G_udWritePosition<br>D20 | MOV        | FX5_4AD_1.stnMonitor_D<br>[0].wThisLoggingLoadPointer_D<br>U1W6438        | G_wThisTimeLoggingReadPointIndex<br>Z0                      |
|       |                                                            |                                         |                          | MOV        | FX5_4AD_1.stnMonitor_D<br>[0].uLoggingLoadPointsMonitorValue_D<br>U1W6440 | G_uLoggingReadPoints<br>D10                                 |
|       |                                                            |                                         |                          | DMOV       | G_udWritePosition<br>D20                                                  | G_udWritePositionIndex<br>Z4                                |
|       |                                                            |                                         |                          | BMOV       | G_wLoggingReadMonitorValuePlusIndex<br>U1W610000Z0                        | G_uLoggingReadPoints<br>D10                                 |
|       |                                                            |                                         |                          | UINT2UDINT | G_uLoggingReadPoints<br>D10                                               | G_udLoggingReadPointsTemporary<br>D12                       |
|       |                                                            |                                         |                          | D+_U       | G_udLoggingReadPointsTemporary<br>D12                                     | G_udWritePosition<br>D20                                    |
| (464) | FX5_4AD_1.unInterruptFactorDetectionFlag_D[0].0<br>U1W64.0 |                                         |                          |            | SET                                                                       | FX5_4AD_1.unInterruptFactorResetRequest_D[0].0<br>U1W6156.0 |
| (492) |                                                            |                                         |                          |            |                                                                           | JRET                                                        |
| (493) |                                                            |                                         |                          |            |                                                                           | END                                                         |

# Interrupt function

Executes an interrupt program of the CPU module when an interrupt factor such as an input signal error or alarm output is detected.

The number of available interrupt pointers per analog input module is up to 16.

## 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) turns 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 GX Works3.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module name ⇒ [Module Parameter] ⇒ [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 134 Condition target setting [n]

### ■Condition target channel setting

Select a target channel when the condition target setting for the interrupt detection is channel specification.

| Item                             | Setting value   |        |        |        |        |
|----------------------------------|-----------------|--------|--------|--------|--------|
| Condition target channel setting | 0: All channels | 1: CH1 | 2: CH2 | 3: CH3 | 4: CH4 |

### ■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-F FX5 User's Manual (Application)

- 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 in 'Condition target setting [n]' (Un\G232 to Un\G247) occur, 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-F FX5 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 alarms 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, and a CPU module error may occur. When a CPU module error occurs, review the CPU module parameter setting and the program.

## Setting example

**Ex.**

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

- Parameter settings

Set "Interrupt setting" of [Module Parameter] as follows.

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

- Label settings

| Classification       | Device                                                                                                                                                                                                                                                                                                     | Description                    | Device                |            |           |       |                       |                   |     |            |    |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-----------------------|------------|-----------|-------|-----------------------|-------------------|-----|------------|----|
| Module label         | FX5CPU.stSM.bAlways_ON                                                                                                                                                                                                                                                                                     | Always ON                      | SM400                 |            |           |       |                       |                   |     |            |    |
|                      | FX5_4AD_1.unInterruptFactorMask_D[1]                                                                                                                                                                                                                                                                       | Interrupt factor mask          | U1\G125.0             |            |           |       |                       |                   |     |            |    |
|                      | FX5_4AD_1.unInterruptFactorResetRequest_D[1]                                                                                                                                                                                                                                                               | Interrupt factor reset request | U1\G157.0             |            |           |       |                       |                   |     |            |    |
| Labels to be defined | Define global labels as shown below: <table border="1"> <thead> <tr> <th>Label Name</th><th>Data Type</th><th>Class</th><th>Assign (Device/Label)</th></tr> </thead> <tbody> <tr> <td>G_bErrorDetection</td><td>Bit</td><td>VAR_GLOBAL</td><td>F0</td></tr> </tbody> </table> |                                |                       | Label Name | Data Type | Class | Assign (Device/Label) | G_bErrorDetection | Bit | VAR_GLOBAL | F0 |
| Label Name           | Data Type                                                                                                                                                                                                                                                                                                  | Class                          | Assign (Device/Label) |            |           |       |                       |                   |     |            |    |
| G_bErrorDetection    | Bit                                                                                                                                                                                                                                                                                                        | VAR_GLOBAL                     | F0                    |            |           |       |                       |                   |     |            |    |



# Error history function

Records up to 16 errors and alarms that occurred in an analog input module to store them in the buffer memory areas.

## Operation

When an error occurs, the error code and the error time are stored from Error history No. 1 (Un\G3600 to Un\G3609) in order. When an alarm occurs, the alarm code and the alarm time are stored from Alarm history No. 1 (Un\G3760 to Un\G3769) in order.

- Detail of the error code assignment

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3606 | System area                  |    |                             |    |    |
| ⋮        |                              |    |                             |    |    |
| Un\G3609 |                              |    |                             |    |    |

- Detail of the alarm code assignment

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3766 | System area                  |    |                             |    |    |
| :        |                              |    |                             |    |    |
| Un\G3769 |                              |    |                             |    |    |

### Ex.

Example of error history and alarm history storage

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

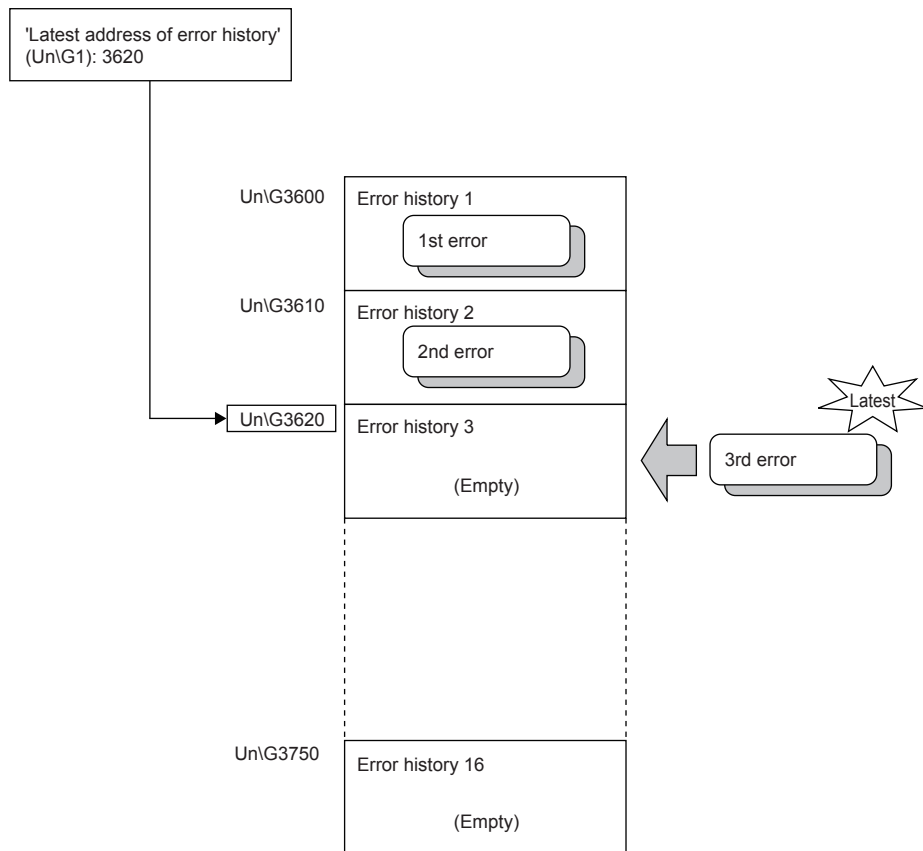
The start address of Error history where the latest error is stored, can be found in 'Latest address of error history' (Un\G1).

The start address of Alarm history where the latest alarm is stored, can be found in 'Latest address of alarm history' (Un\G3).

**Ex.**

When the 3rd error occurs:

The 3rd error is stored in Error history No. 3, and the value 3620 (start address of Error history No. 3) is stored to Latest address of error history.

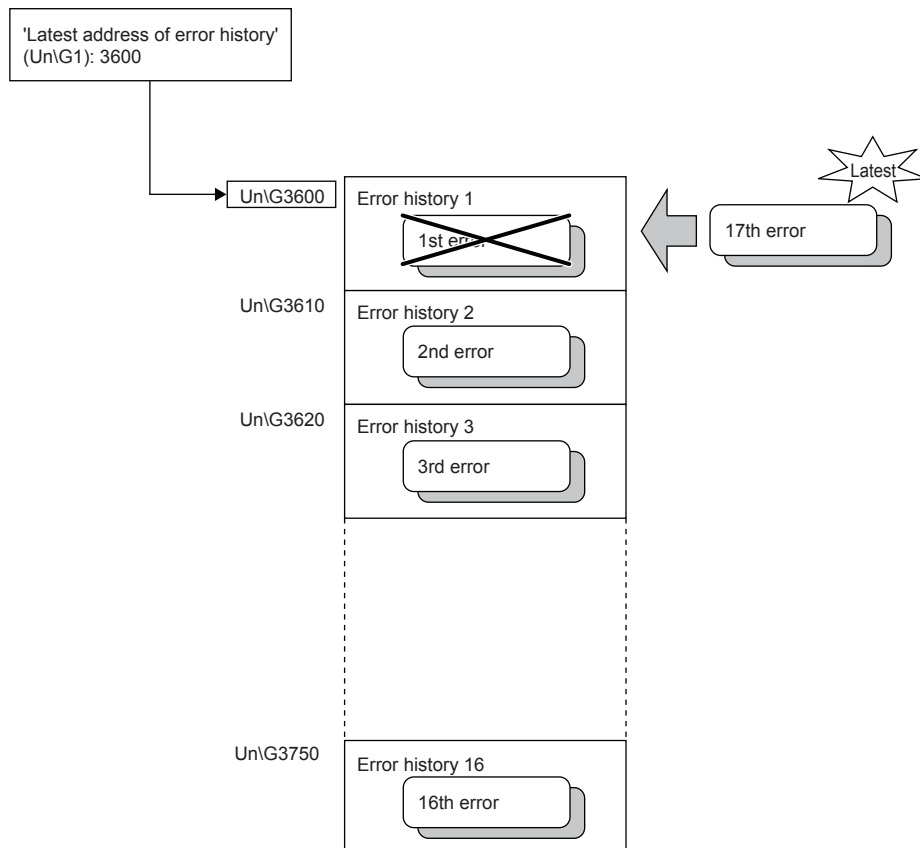




**Ex.**

When the 17th error occurs:

The 17th error is stored in Error history No. 1, and the value 3600 (start address of Error history No. 1) is stored to Latest address of error history.

**Point**

- Once the error history storage area becomes full, subsequent error information will overwrite the existing data, starting from Error history No. 1 (Un\G3600 to Un\G3609), and continues sequentially thereafter. The overwritten history is deleted.
- The same processing is performed for Alarm history when an alarm occurs.
- The stored error history is cleared when an analog input module is powered off or the CPU module is reset.

## Offset/gain initialization function

### Offset/gain initialization

This function initializes the offset and gain values adjusted by the offset/gain setting to the factory defaults.

1. Set the mode to the "Normal mode".
2. For all channels, set A/D conversion enable/disable setting to A/D conversion disable (1) and turn off→on→off 'Operating condition setting request' (Un\G70, b9).
3. Set "E20FH" in 'Offset/gain initialization enabled code' (Un\G305).
4. Turn ON (1) 'Offset/gain initialization request' (Un\G70, b5).

### Precautions

- The channels for which the offset and gain have been set are initialized to the factory defaults of the execution-time range type (voltage or current).
- The channels for which the offset and gain have not been set are initialized to the current range.

## FX3 allocation mode function

This function operates the buffer memory areas of the analog input module with the same layout as the buffer memory addresses equivalent to FX3U-4AD.

### Operation

In FX3 allocation mode, only allocation of buffer memory area is changed. The following buffer memory area is allocated the same as FX3U-4AD.

| Buffer memory areas | Buffer memory area name                                     |
|---------------------|-------------------------------------------------------------|
| Un\G10 to 13        | CH1 to 4 Digital operation value                            |
| Un\G26              | Warning output flag (Process alarm upper limit/lower limit) |
| Un\G27              | Warning output flag (Rate alarm upper limit/lower limit)    |
| Un\G30              | Type code                                                   |
| Un\G61 to 64        | CH1 to 4 Conversion value shift amount                      |
| Un\G101 to 104      | CH1 to 4 Minimum value                                      |
| Un\G109             | Minimum value reset request                                 |
| Un\G111 to 114      | CH1 to 4 Maximum value                                      |
| Un\G119             | Maximum value reset request                                 |

For buffer memories with different allocations from FX3U-4AD, it can be used by changing the program. For buffer memory in FX3 allocation mode, refer to the following.

 Page 114 In FX3 allocation function mode

### Restriction

When reusing the program used by FX3U-4AD, delete the initial setting process and set the module parameters with GX Works3.

When performing the same operation as FX3U-4AD, it can be executed by the following function.

| FX3U-4AD                                              | FX5-4AD                                   | Reference                                                                                                                          |
|-------------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Input mode specification                              | Range switching function                  | Page 25                                                                                                                            |
| Average count                                         | A/D conversion method                     | Page 26                                                                                                                            |
| Digital filter function                               |                                           |                                                                                                                                    |
| Setting change disabled                               | —                                         | It is unnecessary because the setting is reflected in the operating condition setting request, and erroneous setting is prevented. |
| Input characteristics adjustment                      | Offset/gain setting function              | Page 90                                                                                                                            |
| Data addition function                                | Shift function                            | Page 34                                                                                                                            |
| Upper lower limit value detection function            | Alarm output function (process alarm)     | Page 44                                                                                                                            |
| Sudden change detection function                      | Alarm output function (rate alarm)        | Page 46                                                                                                                            |
| Peak value hold function                              | Maximum value/Minimum value hold function | Page 43                                                                                                                            |
| Scale over detection function                         | Input signal error detection function     | Page 51                                                                                                                            |
| Data history function                                 | Logging function                          | Page 57                                                                                                                            |
| Initialization function                               | Offset/gain initialization function       | Page 79                                                                                                                            |
| Auto transfer function                                | Auto refresh                              | Page 89                                                                                                                            |
| Upper/lower limit error status auto transfer function | Auto refresh                              | Page 89                                                                                                                            |
| Sudden change detection status auto transfer function | Auto refresh                              | Page 89                                                                                                                            |
| Scale over status auto transfer function              | Auto refresh                              | Page 89                                                                                                                            |
| Error status auto transfer function                   | Auto refresh                              | Page 89                                                                                                                            |

## Setting procedure

1. When adding a new module, select the module whose module model name has "(FX3)" 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 Normal mode is used.
3. After writing the module parameter, turn off→on or reset the CPU module.

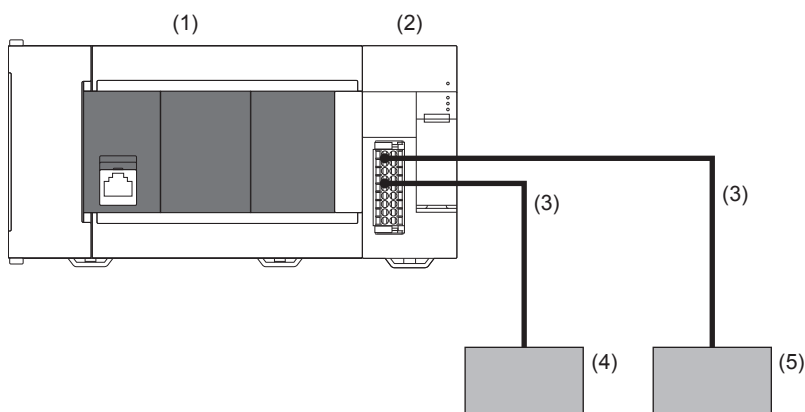
### Point

Switching between normal mode and FX3 allocation mode is not possible during operation.

## 1.5 System Configuration

The following shows a system configuration using the analog input module.

- System configuration example



- (1) FX5 CPU module
- (2) Analog input module (FX5-4AD)
- (3) Analog device connection cable
- (4) Current sensor
- (5) Voltage sensor

# 1.6 Wiring

This section describes the temperature input module wiring.

## Spring clamp terminal block

### Suitable wiring

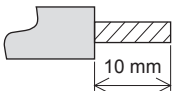
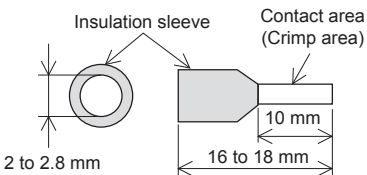
The wires to connect the spring clamp terminal block are described below.

| No. of wire per terminal | Wire size                                    |                                                |
|--------------------------|----------------------------------------------|------------------------------------------------|
|                          | Single wire, strand wire                     | Ferrule with insulation sleeve                 |
| Single wiring            | AWG24 to 16<br>(0.2 to 1.5 mm <sup>2</sup> ) | AWG23 to 19<br>(0.25 to 0.75 mm <sup>2</sup> ) |

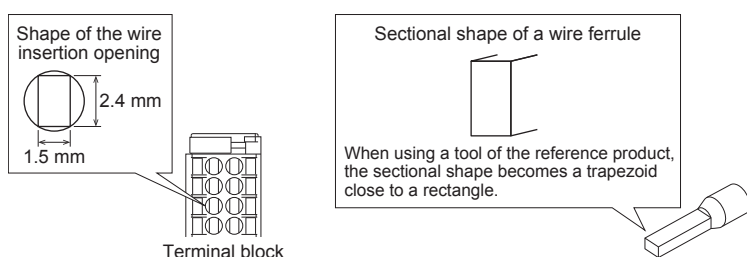
### Wire end treatment

Strip the cable about 10 mm from the tip to connect a wire ferrule at the stripped area. Failure to do so may result in electric shock or short circuit between adjacent terminals because the conductive part. If the wire strip length is too short, it may result in the poor contact to the spring clamp terminal part.

Depending on the thickness of the sheath, it may be difficult to insert into the insulation sleeve, so select the wires by referring to the appearance diagram.

| Strand wire/single wire                                                            | Ferrule with insulation sleeve                                                      |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

Check the shape of the wire insertion opening with the following chart, and use the smaller wire ferrule than the described size. Also, insert the wire with care so that the wire ferrule is in proper orientation. Failure to do so may cause the bite of the terminal and the damage of the terminal block.



The following table shows wire ferrules and its associated tools compatible with the terminal block. The shape of the wire ferrule differs depending on the crimp tool to be used, use the reference product. If the product other than referenced products is used, the wire ferrule cannot be removed. Sufficiently confirm that the wire ferrule can be removed before use.

<Reference product>

| Manufacturer                  | Model         | Wire size           | Crimp tool |
|-------------------------------|---------------|---------------------|------------|
| PHOENIX-CONTACT GmbH & Co. KG | AI 0.5-10 WH  | 0.5mm <sup>2</sup>  | CRIMPFOX 6 |
|                               | AI 0.75-10 GY | 0.75mm <sup>2</sup> |            |
|                               | A 1.0-10      | 1.0mm <sup>2</sup>  |            |
|                               | A 1.5-10      | 1.5mm <sup>2</sup>  |            |

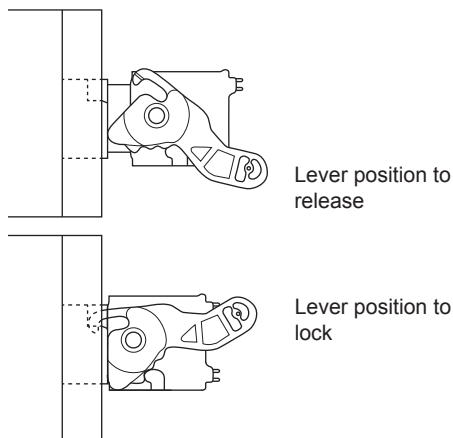
## Removing and installing the terminal block

The following shows how to remove and install the terminal block.

### ■Lever position to lock and release

A 3-step stopper is attached to prevent the lever from rotating, facilitating installation and removal of the terminal block.

When removing or installing the terminal block, move the lever to the corresponding position.



#### ■Lever position to release

The figure left shows the lever position when the terminal block has been completely removed from the module. Rotate the lever from the lock position to the release position, and lift the terminal block from the module.

#### ■Lever position to lock

The figure left shows the lever position when the terminal block is completely engaged with the module. Check that the lever is at the lock position, and pull the terminal block slightly to check that the module and terminal block are completely engaged.

### ■Removal procedure

Rotate the lever to the release position, and remove the terminal block from the module.

### ■Installation procedure

Move the lever to the release position, and insert the terminal block. When the terminal block is inserted sufficiently, the lever latch engages with the module and the terminal block is engaged with the module.



After inserting the terminal block, check that the lever is at the lock position.

### Precautions

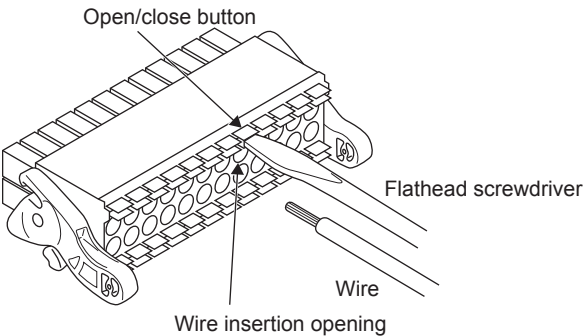
When installing the terminal block, check that the lever is in the release position. If installation is performed while the lever is in the lock position, it may cause damage to the lever.

Connection and disconnection of the cable

■Connection of the cable

Fully insert a cable whose end has been properly processed into the wire insertion opening.

If the cable cannot be inserted with this procedure, fully insert the cable while pushing the open/close button with a flathead screwdriver having a tip width of 2.0 to 2.5 mm. After fully inserting the cable, remove the screwdriver.



<Reference>

| Manufacturer                  | Model             |
|-------------------------------|-------------------|
| PHOENIX-CONTACT GmbH & Co. KG | SZS 0.4 × 2.5 VDE |

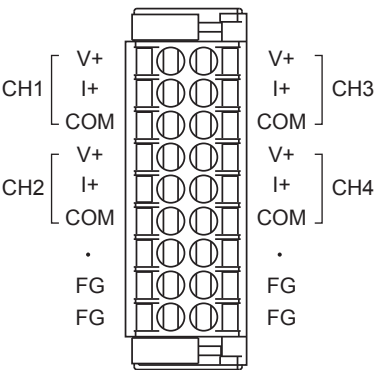
Precautions

Pull the cable or wire ferrule slightly to check that the cable is securely clamped.

■Disconnection of the cable

While pushing the open/close button with a flathead screwdriver having a tip width of 2.0 to 2.5 mm, disconnect the cable.

Terminal arrangement



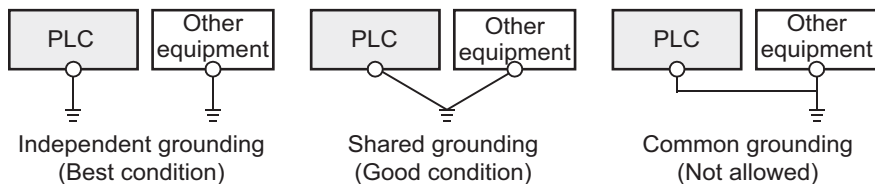
| Left side of terminal arrangement |                   | Right side of terminal arrangement |                   |
|-----------------------------------|-------------------|------------------------------------|-------------------|
| Display name                      | Description       | Display name                       | Description       |
| V+                                | CH1 Voltage input | V+                                 | CH3 Voltage input |
| I+                                | CH1 Current input | I+                                 | CH3 Current input |
| COM                               | CH1 COM           | COM                                | CH3 COM           |
| V+                                | CH2 Voltage input | V+                                 | CH4 Voltage input |
| I+                                | CH2 Current input | I+                                 | CH4 Current input |
| COM                               | CH2 COM           | COM                                | CH4 COM           |
| .                                 | Unused            | .                                  | Unused            |
| FG                                | Frame ground      | FG                                 | Frame ground      |
| FG                                | Frame ground      | FG                                 | Frame ground      |

# Ground wiring

## Grounding

Perform the following.

- Perform class D grounding (Grounding resistance: 100  $\Omega$  or less).
- Ground the programmable controller independently when possible.
- If the programmable controller cannot be grounded independently, perform the "Shared grounding" shown below.

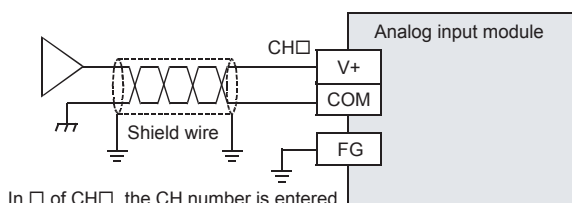


- Bring the grounding point close to the PLC as much as possible so that the ground cable can be shortened.

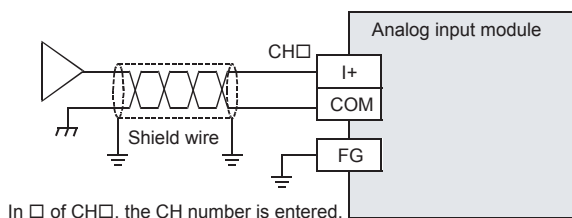
## External wiring example

The followings show the examples of external wiring.

### For the voltage input



### For the current input



## Precautions

Use a two-conductor shielded twisted pair cable for analog input lines and carry out the wiring while separating them from other power lines and lines susceptible to induction.

# 1.7 Parameter Settings

Set the parameters of each channel.

Setting parameters here eliminates the need to program them.

## Point

When adding a new analog input module, if selecting the module whose module model name has "(FX3)" at the end, it can be used as FX3 allocation mode.

- FX5-4AD: Normal mode
- FX5-4AD(FX3): FX3 allocation mode

For details on the FX3 allocation mode function, refer to  Page 80 FX3 allocation mode function.

This section describes the case in a normal mode..

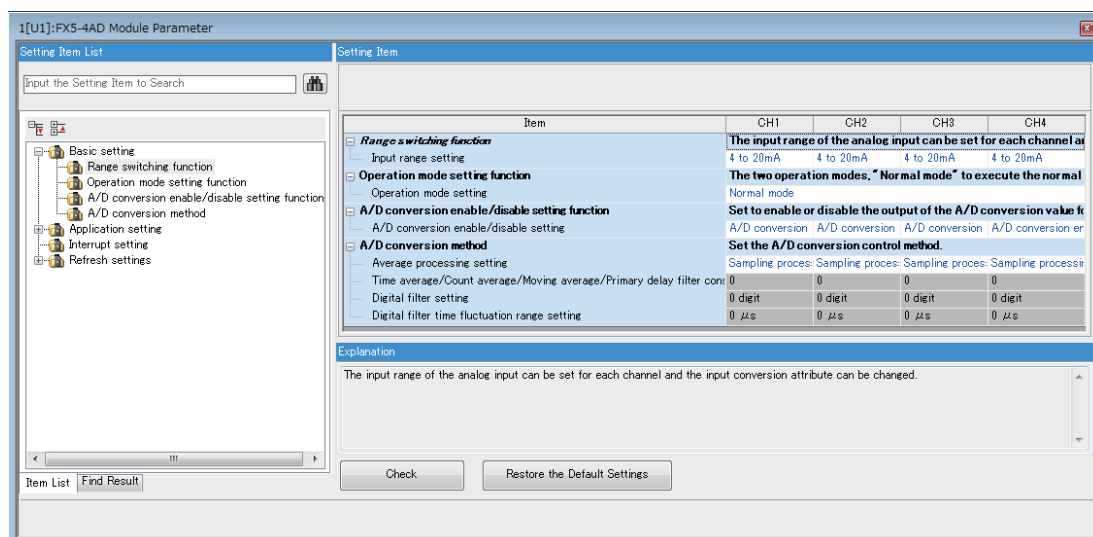
## Basic setting

### Setting procedure

Open "Basic setting" of GX Works3.

1. Start a module parameter.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [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.



# Application setting

1

## Setting procedure

Open "Application setting" of GX Works3.

1. Start a module parameter.

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

| Item                                                                                                                                       | CH1                                | CH2                                | CH3                                | CH4                                |
|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| <b>Scaling function</b><br>Configure the setting for the scaling at the conversion.                                                        |                                    |                                    |                                    |                                    |
| Scaling enable/disable setting                                                                                                             | Disable                            | Disable                            | Disable                            | Disable                            |
| Scaling upper limit value                                                                                                                  | 0                                  | 0                                  | 0                                  | 0                                  |
| Scaling lower limit value                                                                                                                  | 0                                  | 0                                  | 0                                  | 0                                  |
| <b>Shift function</b><br>Configure the setting for the shift function at the conversion.                                                   |                                    |                                    |                                    |                                    |
| Conversion value shift amount                                                                                                              | 0                                  | 0                                  | 0                                  | 0                                  |
| <b>Digitalclip function</b><br>Configure the setting for the digital clipping function at the conversion.                                  |                                    |                                    |                                    |                                    |
| Digitalclip enable/disable setting                                                                                                         | Disable                            | Disable                            | Disable                            | Disable                            |
| <b>Warning output function (Process alarm)</b><br>Set an alert at the conversion.                                                          |                                    |                                    |                                    |                                    |
| Warning output function (Process alarm)                                                                                                    | Disable                            | Disable                            | Disable                            | Disable                            |
| Process alarm upper upper limit value                                                                                                      | 0                                  | 0                                  | 0                                  | 0                                  |
| Process alarm upper lower limit value                                                                                                      | 0                                  | 0                                  | 0                                  | 0                                  |
| Process alarm lower upper limit value                                                                                                      | 0                                  | 0                                  | 0                                  | 0                                  |
| Process alarm lower lower limit value                                                                                                      | 0                                  | 0                                  | 0                                  | 0                                  |
| <b>Warning output function (Rate alarm)</b><br>Set an alert at the conversion.                                                             |                                    |                                    |                                    |                                    |
| Warning output function (Rate alarm)                                                                                                       | Disable                            | Disable                            | Disable                            | Disable                            |
| Rate alarm change rate selection                                                                                                           | Digital output value specification | Digital output value specification | Digital output value specification | Digital output value specification |
| Rate alarm detection cycle setting                                                                                                         | 0 times                            | 0 times                            | 0 times                            | 0 times                            |
| Rate alarm upper limit value                                                                                                               | 0                                  | 0                                  | 0                                  | 0                                  |
| Rate alarm lower limit value                                                                                                               | 0                                  | 0                                  | 0                                  | 0                                  |
| <b>Input signal error detection function</b><br>Configure the setting for the input signal at the conversion.                              |                                    |                                    |                                    |                                    |
| Input signal error detection setting                                                                                                       | Disable                            | Disable                            | Disable                            | Disable                            |
| Input signal error detection lower limit setting value                                                                                     | 5.0 %                              | 5.0 %                              | 5.0 %                              | 5.0 %                              |
| Input signal error detection upper limit setting value                                                                                     | 5.0 %                              | 5.0 %                              | 5.0 %                              | 5.0 %                              |
| <b>Input signal error automatic clear enable/disable setting</b><br>Set to enable or disable to auto clear of input signal error detection |                                    |                                    |                                    |                                    |
| Input signal error automatic clear enable/disable setting                                                                                  | Disable                            | Disable                            | Disable                            | Disable                            |
| <b>Logging function</b><br>Configure the setting for the logging function at the conversion.                                               |                                    |                                    |                                    |                                    |
| Logging enable/disable setting                                                                                                             | Disable                            | Disable                            | Disable                            | Disable                            |
| Logging data setting                                                                                                                       | Digital operation                  | Digital operation                  | Digital operation                  | Digital operation                  |
| Logging cycle setting value                                                                                                                | 4 ms                               | 4 ms                               | 4 ms                               | 4 ms                               |
| Logging cycle unit setting                                                                                                                 | ms                                 | ms                                 | ms                                 | ms                                 |
| Level trigger condition setting                                                                                                            | Disable                            | Disable                            | Disable                            | Disable                            |
| Logging points after trigger                                                                                                               | 5000                               | 5000                               | 5000                               | 5000                               |
| Trigger data                                                                                                                               | 402                                | 602                                | 802                                | 1002                               |
| Trigger setting value                                                                                                                      | 0                                  | 0                                  | 0                                  | 0                                  |
| Read interrupt enable/disable setting                                                                                                      | Disable                            | Disable                            | Disable                            | Disable                            |
| Logging load points setting value                                                                                                          | 1000                               | 1000                               | 1000                               | 1000                               |

**Explanation**  
Configure the setting for the scaling at the conversion.

Item List Find Result Check Restore the Default Settings

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.

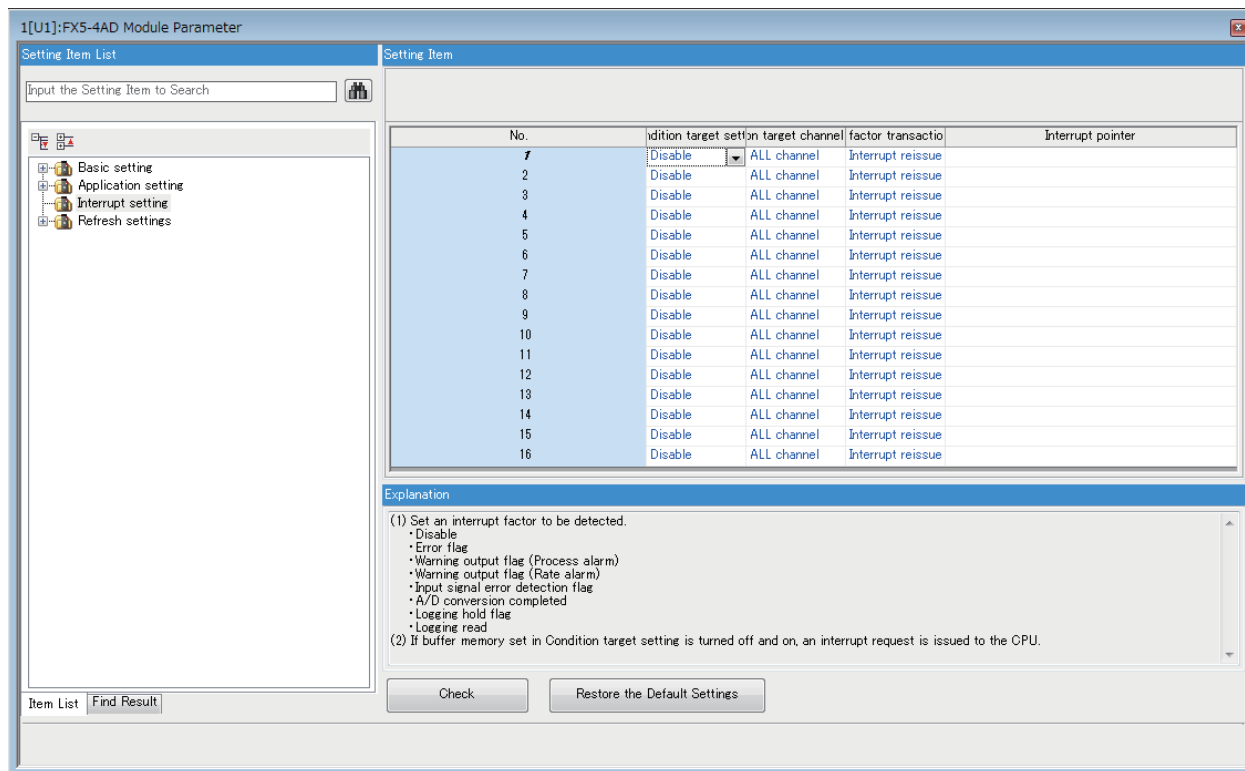
# Interrupt setting

## Setting procedure

Open "Interrupt setting" of GX Works3.

1. Start a module parameter.

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



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.

# Refresh setting

1

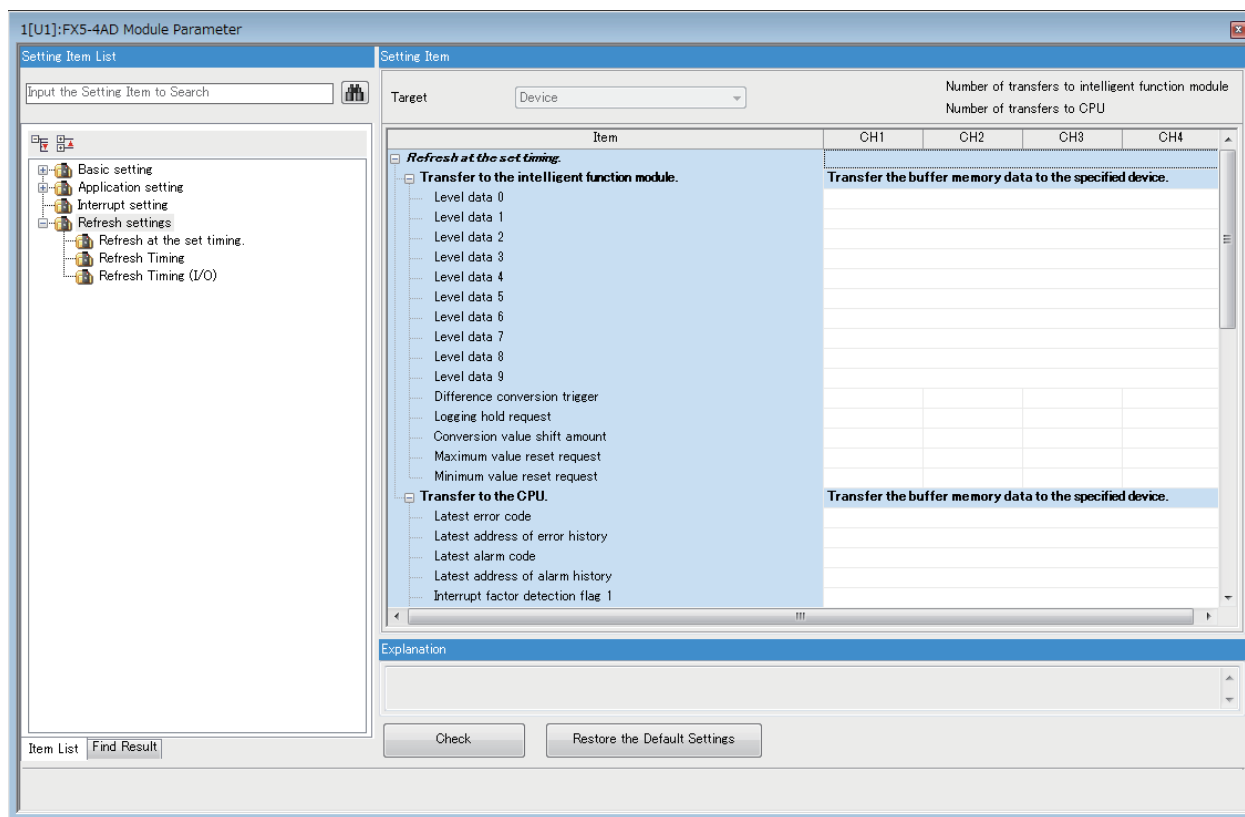
## Setting procedure

Set the buffer memory area of an analog input module to be refreshed.

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

1. Start a module parameter.

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



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

# 1.8 Offset/Gain Setting

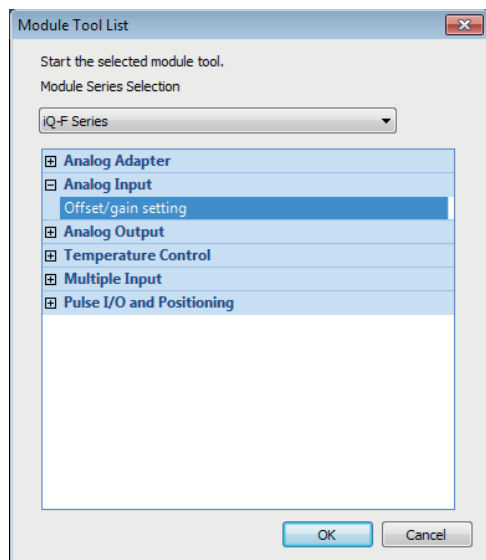
Using the user range setting requires setting the offset and gain values.

Access to the offset/gain setting window in GX Works3 to set the offset and gain values.

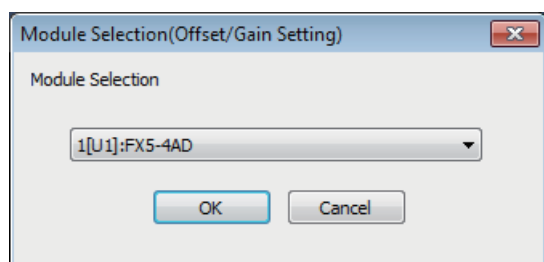
The set offset/gain values are saved in the flash memory of the analog input module.

## Setting procedure

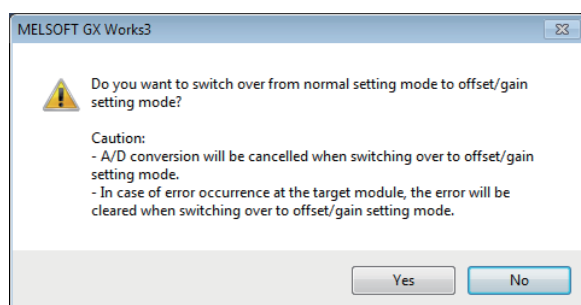
[Tool] ⇒ [Module Tool List]



1. In "Analog Input", select "Offset/gain setting" and click the [OK] button.



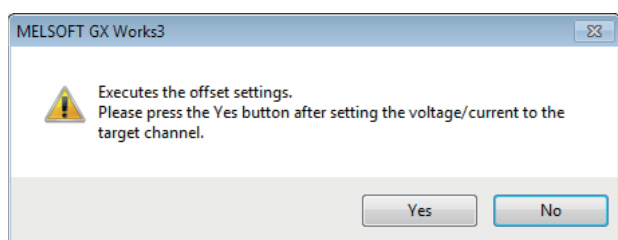
2. Select the target module for the offset/gain setting, and click the [OK] button.



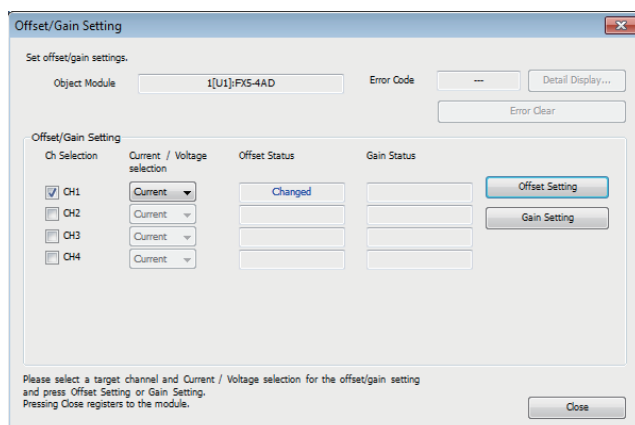
3. Click [Yes] button.



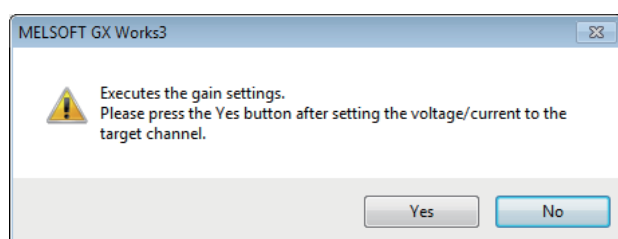
4. Mark the checkbox of the channel where offset and gain values are to be set.
5. Select the voltage or current and click the [Offset Setting] button.



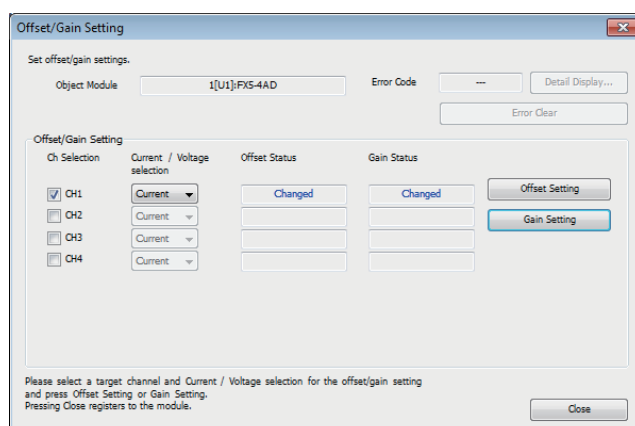
6. Apply the offset voltage or current to the terminal of the corresponding channel, and click [Yes] button.



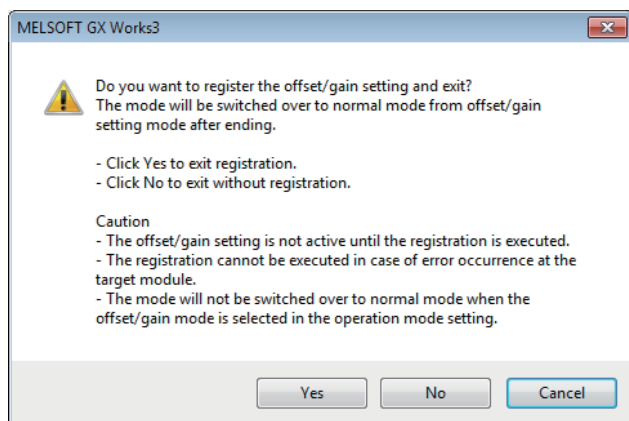
7. Check that "Offset Status" has changed to "Changed", and click [Gain Setting] button.



8. Apply the gain voltage or current to the terminal of the corresponding channel, and click [Yes] button.



9. Check that "Gain Status" has changed to "Changed", and click [Close] button.



**10.** Click [Yes] button.

## 1.9 Programming

This section describes the programming procedure and the basic program of an analog input module.

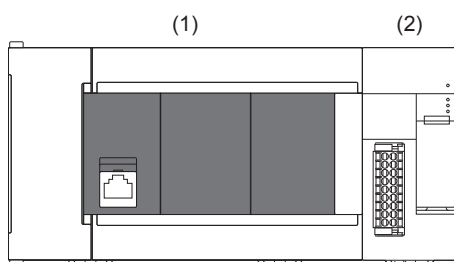
### Programming procedure

Take the following steps to create a program for running an analog input module:

- 1.** Set parameters.
- 2.** Create a program.

### System configuration example

#### ■System configuration



(1) CPU module (FX5U CPU module)

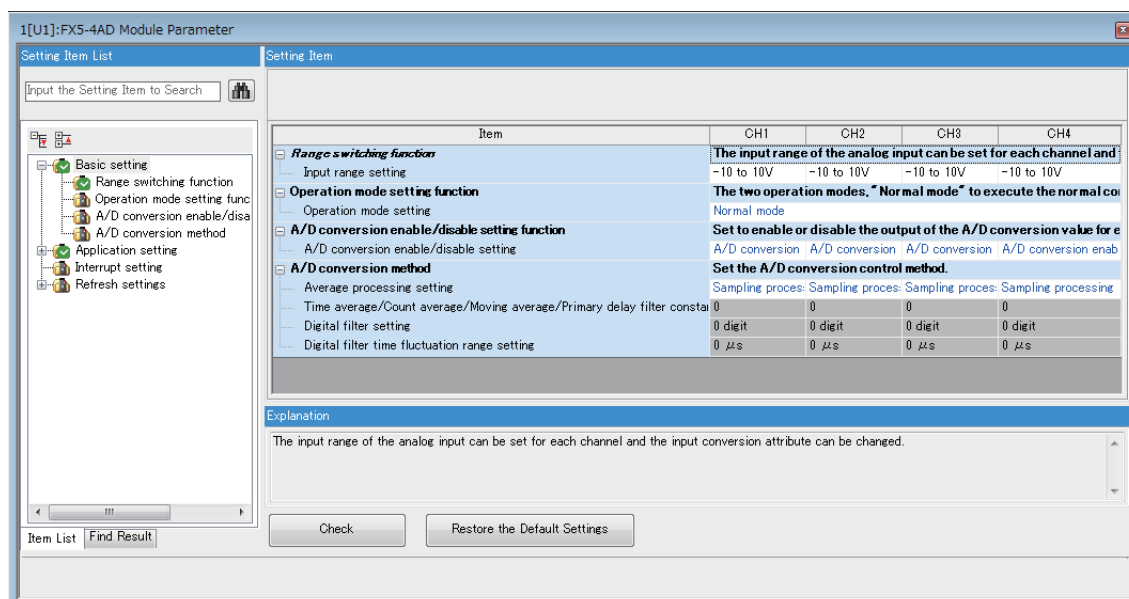
(2) Analog input module (FX5-4AD)

## ■Parameter settings

Perform an initial setting in the module parameter of GX Works3. The refresh settings do not need to be changed here.

For details on the parameter settings, refer to  Page 86 Parameter Settings.

[Basic setting]



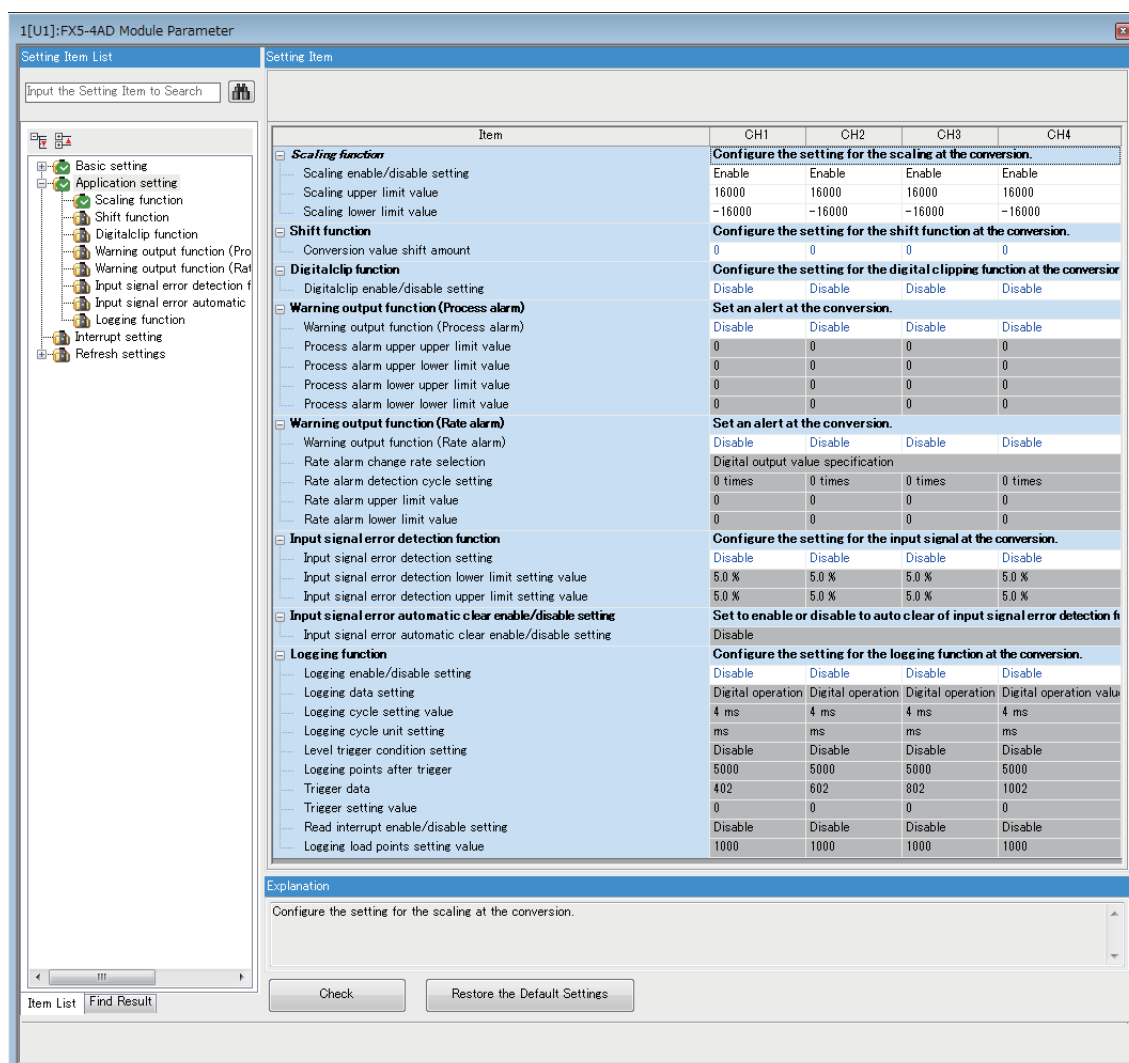
| Item                                                                    | CH1                                                                   | CH2              | CH3              | CH4              |
|-------------------------------------------------------------------------|-----------------------------------------------------------------------|------------------|------------------|------------------|
| <b>Range switching function</b>                                         | The input range of the analog input can be set for each channel and   |                  |                  |                  |
| Input range setting                                                     | -10 to 10V                                                            | -10 to 10V       | -10 to 10V       | -10 to 10V       |
| <b>Operation mode setting function</b>                                  | The two operation modes, "Normal mode" to execute the normal co       |                  |                  |                  |
| Operation mode setting                                                  | Normal mode                                                           |                  |                  |                  |
| <b>A/D conversion enable/disable setting function</b>                   | Set to enable or disable the output of the A/D conversion value for e |                  |                  |                  |
| A/D conversion enable/disable setting                                   | A/D conversion                                                        | A/D conversion   | A/D conversion   | A/D conversion   |
| <b>A/D conversion method</b>                                            | Set the A/D conversion control method.                                |                  |                  |                  |
| Average processing setting                                              | Sampling process                                                      | Sampling process | Sampling process | Sampling process |
| Time average/Count average/Moving average/Primary delay filter constant | 0                                                                     | 0                | 0                | 0                |
| Digital filter setting                                                  | 0 digit                                                               | 0 digit          | 0 digit          | 0 digit          |
| Digital filter time fluctuation range setting                           | 0 μs                                                                  | 0 μs             | 0 μs             | 0 μs             |

**Explanation**

The input range of the analog input can be set for each channel and the input conversion attribute can be changed.

Check Restore the Default Settings

[Application setting]



| Item                                                             | CH1                                                                        | CH2               | CH3               | CH4               |
|------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------|-------------------|-------------------|
| <b>Scaling function</b>                                          | Configure the setting for the scaling at the conversion.                   |                   |                   |                   |
| Scaling enable/disable setting                                   | Enable                                                                     | Enable            | Enable            | Enable            |
| Scaling upper limit value                                        | 16000                                                                      | 16000             | 16000             | 16000             |
| Scaling lower limit value                                        | -16000                                                                     | -16000            | -16000            | -16000            |
| <b>Shift function</b>                                            | Configure the setting for the shift function at the conversion.            |                   |                   |                   |
| Conversion value shift amount                                    | 0                                                                          | 0                 | 0                 | 0                 |
| <b>Digitalclip function</b>                                      | Configure the setting for the digital clipping function at the conversion. |                   |                   |                   |
| Digitalclip enable/disable setting                               | Disable                                                                    | Disable           | Disable           | Disable           |
| <b>Warning output function (Process alarm)</b>                   | Set an alert at the conversion.                                            |                   |                   |                   |
| Warning output function (Process alarm)                          | Disable                                                                    | Disable           | Disable           | Disable           |
| Process alarm upper upper limit value                            | 0                                                                          | 0                 | 0                 | 0                 |
| Process alarm upper lower limit value                            | 0                                                                          | 0                 | 0                 | 0                 |
| Process alarm lower upper limit value                            | 0                                                                          | 0                 | 0                 | 0                 |
| Process alarm lower lower limit value                            | 0                                                                          | 0                 | 0                 | 0                 |
| <b>Warning output function (Rate alarm)</b>                      | Set an alert at the conversion.                                            |                   |                   |                   |
| Warning output function (Rate alarm)                             | Disable                                                                    | Disable           | Disable           | Disable           |
| Rate alarm change rate selection                                 | Digital output value specification                                         |                   |                   |                   |
| Rate alarm detection cycle setting                               | 0 times                                                                    | 0 times           | 0 times           | 0 times           |
| Rate alarm upper limit value                                     | 0                                                                          | 0                 | 0                 | 0                 |
| Rate alarm lower limit value                                     | 0                                                                          | 0                 | 0                 | 0                 |
| <b>Input signal error detection function</b>                     | Configure the setting for the input signal at the conversion.              |                   |                   |                   |
| Input signal error detection setting                             | Disable                                                                    | Disable           | Disable           | Disable           |
| Input signal error detection lower limit setting value           | 5.0 %                                                                      | 5.0 %             | 5.0 %             | 5.0 %             |
| Input signal error detection upper limit setting value           | 5.0 %                                                                      | 5.0 %             | 5.0 %             | 5.0 %             |
| <b>Input signal error automatic clear enable/disable setting</b> | Set to enable or disable to auto clear of input signal error detection f   |                   |                   |                   |
| Input signal error automatic clear enable/disable setting        | Disable                                                                    |                   |                   |                   |
| <b>Logging function</b>                                          | Configure the setting for the logging function at the conversion.          |                   |                   |                   |
| Logging enable/disable setting                                   | Disable                                                                    | Disable           | Disable           | Disable           |
| Logging data setting                                             | Digital operation                                                          | Digital operation | Digital operation | Digital operation |
| Logging cycle setting value                                      | 4 ms                                                                       | 4 ms              | 4 ms              | 4 ms              |
| Logging cycle unit setting                                       | ms                                                                         | ms                | ms                | ms                |
| Level trigger condition setting                                  | Disable                                                                    | Disable           | Disable           | Disable           |
| Logging points after trigger                                     | 5000                                                                       | 5000              | 5000              | 5000              |
| Trigger data                                                     | 402                                                                        | 602               | 802               | 1002              |
| Trigger setting value                                            | 0                                                                          | 0                 | 0                 | 0                 |
| Read interrupt enable/disable setting                            | Disable                                                                    | Disable           | Disable           | Disable           |
| Logging load points setting value                                | 1000                                                                       | 1000              | 1000              | 1000              |

**Explanation**

Configure the setting for the scaling at the conversion.

Check Restore the Default Settings

## Program example

| Classification       | Device                                                 | Description                                     | Device                      |
|----------------------|--------------------------------------------------------|-------------------------------------------------|-----------------------------|
| Module label         | FX5_4AD_1.bA_D_conversionCompletedFlag_D               | A/D conversion completed flag                   | U1\G69.E                    |
|                      | FX5_4AD_1.bErrorFlag_DI                                | Error flag                                      | U1\G69.F                    |
|                      | FX5_4AD_1.bInputSignalErrorDetectionSignal_D           | Input signal error detection signal             | U1\G69.C                    |
|                      | FX5_4AD_1.bModuleREADY_D                               | Module READY                                    | U1\G69.0                    |
|                      | FX5_4AD_1.bOperatingConditionSettingCompletedFlag_D    | Operating condition setting completed flag      | U1\G69.9                    |
|                      | FX5_4AD_1.stnControl_D[1].uMaxResetReq_D.0             | Maximum value reset completed flag              | U1\G673.0                   |
|                      | FX5_4AD_1.stnControl_D[1].uMinResetReq_D.0             | Minimum value reset completed flag              | U1\G674.0                   |
|                      | FX5_4AD_1.stnMonitor_D[0].wDigitalOutputValue_D        | Digital output value                            | U1\G400                     |
|                      | FX5_4AD_1.stnMonitor_D[1].uMaxResetCmpFlg_D.0          | Maximum value reset completed flag              | U1\G622.0                   |
|                      | FX5_4AD_1.stnMonitor_D[1].uMinResetCmpFlg_D.0          | Minimum value reset completed flag              | U1\G623.0                   |
|                      | FX5_4AD_1.stnMonitor_D[1].wDigitalOutputValue_D        | Digital output value                            | U1\G600                     |
|                      | FX5_4AD_1.stnMonitor_D[1].wMaxValue_D                  | Maximum value                                   | U1\G604                     |
|                      | FX5_4AD_1.stnMonitor_D[1].wMinValue_D                  | Minimum value                                   | U1\G606                     |
|                      | FX5_4AD_1.stnMonitor_D[2].wDigitalOperationValue_D     | Digital operation value                         | U1\G802                     |
|                      | FX5_4AD_1.stnMonitor_D[3].wDigitalOutputValue_D        | Digital output value                            | U1\G1000                    |
|                      | FX5_4AD_1.uA_D_conversionCompletedFlag_D.0             | A/D conversion completed flag                   | U1\G42.0                    |
|                      | FX5_4AD_1.uA_D_conversionCompletedFlag_D.1             | A/D conversion completed flag                   | U1\G42.1                    |
|                      | FX5_4AD_1.uA_D_conversionCompletedFlag_D.2             | A/D conversion completed flag                   | U1\G42.2                    |
|                      | FX5_4AD_1.uA_D_conversionCompletedFlag_D.3             | A/D conversion completed flag                   | U1\G42.3                    |
|                      | FX5_4AD_1.uInputSignalErrorDetectionFlag_D.0           | Input signal error detection flag               | U1\G40.0                    |
|                      | FX5_4AD_1.uWarningOutputFlagProcessAlarmLowerLimit_D.1 | Warning output flag (Process alarm lower limit) | U1\G37.1                    |
|                      | FX5_4AD_1.uWarningOutputFlagProcessAlarmUpperLimit_D.1 | Warning output flag (Process alarm upper limit) | U1\G36.1                    |
|                      | FX5_4AD_1.uWarningOutputFlagRateAlarmLowerLimit_D.0    | Warning output flag (Rate alarm lower limit)    | U1\G39.0                    |
|                      | FX5_4AD_1.uWarningOutputFlagRateAlarmUpperLimit_D.0    | Warning output flag (Rate alarm upper limit)    | U1\G38.0                    |
| Labels to be defined | Define global labels as shown below:                   |                                                 |                             |
|                      | Label Name                                             | Data Type                                       | Class Assign (Device/Label) |
|                      | CH1_DigOutVal                                          | Word [Signed]                                   | VAR_GLOBAL D1 1             |
|                      | CH2_DigOutVal                                          | Word [Signed]                                   | VAR_GLOBAL D1 2             |
|                      | CH3_DigCalcVal                                         | Word [Signed]                                   | VAR_GLOBAL D1 3             |
|                      | CH4_DigOutVal                                          | Word [Signed]                                   | VAR_GLOBAL D1 4             |
|                      | CH2_DigMaxVal                                          | Word [Signed]                                   | VAR_GLOBAL D1 5             |
|                      | CH2_DigMinVal                                          | Word [Signed]                                   | VAR_GLOBAL D1 6             |
|                      | CH2_ProcAlmUpLimit                                     | Bit                                             | VAR_GLOBAL F0               |
|                      | CH2_ProcAlmLowLimit                                    | Bit                                             | VAR_GLOBAL F1               |
|                      | CH1_RateAlmUpLimit                                     | Bit                                             | VAR_GLOBAL F2               |
|                      | CH1_RateAlmLowLimit                                    | Bit                                             | VAR_GLOBAL F3               |
|                      | CH1_InptSigErr                                         | Bit                                             | VAR_GLOBAL F4               |
|                      | DigitOutValSig                                         | Bit                                             | VAR_GLOBAL X1 0             |
|                      | MaxMinReadSig                                          | Bit                                             | VAR_GLOBAL X1 1             |
|                      | MaxMinResetSig                                         | Bit                                             | VAR_GLOBAL X1 2             |
|                      | ErrResetSig                                            | Bit                                             | VAR_GLOBAL X1 3             |
|                      | ErrOperationEN                                         | Bit                                             | VAR_GLOBAL                  |
|                      | ErrOperationEND                                        | Bit                                             | VAR_GLOBAL                  |
|                      | ErrOperationOK                                         | Bit                                             | VAR_GLOBAL                  |
|                      | UnitErrFlg                                             | Bit                                             | VAR_GLOBAL                  |
|                      | UnitErrCode                                            | Word [Signed]                                   | VAR_GLOBAL                  |
|                      | UnitAlarmCode                                          | Word [Signed]                                   | VAR_GLOBAL                  |
|                      | ErrSet                                                 | Bit                                             | VAR_GLOBAL                  |
|                      | ErrOutSig                                              | Bit                                             | VAR_GLOBAL X1 4             |
|                      | UnitErrResetSig                                        | Bit                                             | VAR_GLOBAL X1 5             |



### • Digital output value readout processing

This program is an example to read and save the digital output values of CH1, CH2, and CH4, and the digital operation value of CH3.

|       |                       |                                      |                                                      |                                                                 |                                                        |  |  |     |                                                                   |                       |
|-------|-----------------------|--------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------|--|--|-----|-------------------------------------------------------------------|-----------------------|
| (0)   | DigitOutValSig<br>X10 | FX5_4AD_1.bModuleREADY_D<br>U1#G69.0 | FX5_4AD_1.bA_D_conversionCompletedFlag_D<br>U1#G69.E | FX5_4AD_1.bOperatingConditionSettingCompletedFlag_D<br>U1#G69.9 | FX5_4AD_1.uA_D_conversionCompletedFlag_D.0<br>U1#G42.0 |  |  | MOV | FX5_4AD_1.stnMonitor_D<br>[0].wDigitalOutputValue_D<br>U1#G400    | CH1_DigOutVal<br>D11  |
|       |                       |                                      |                                                      |                                                                 | FX5_4AD_1.uA_D_conversionCompletedFlag_D.1<br>U1#G42.1 |  |  | MOV | FX5_4AD_1.stnMonitor_D<br>[1].wDigitalOutputValue_D<br>U1#G600    | CH2_DigOutVal<br>D12  |
|       |                       |                                      |                                                      |                                                                 | FX5_4AD_1.uA_D_conversionCompletedFlag_D.2<br>U1#G42.2 |  |  | MOV | FX5_4AD_1.stnMonitor_D<br>[2].wDigitalOperationValue_D<br>U1#G802 | CH3_DigCalcVal<br>D13 |
|       |                       |                                      |                                                      |                                                                 | FX5_4AD_1.uA_D_conversionCompletedFlag_D.3<br>U1#G42.3 |  |  | MOV | FX5_4AD_1.stnMonitor_D<br>[3].wDigitalOutputValue_D<br>U1#G1000   | CH4_DigOutVal<br>D14  |
| (156) |                       |                                      |                                                      |                                                                 |                                                        |  |  |     |                                                                   | —END—                 |

### • Maximum/minimum value readout/clear processing

This program is an example to read and reset the maximum value and minimum values of CH3.

|       |                                                             |                                                                 |                                                      |                                                                 |                                                             |                                                                 |  |     |                                                             |                      |
|-------|-------------------------------------------------------------|-----------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------|--|-----|-------------------------------------------------------------|----------------------|
| (0)   | MaxMinReadSig<br>X11                                        | FX5_4AD_1.bModuleREADY_D<br>U1#G69.0                            | FX5_4AD_1.bA_D_conversionCompletedFlag_D<br>U1#G69.E | FX5_4AD_1.bOperatingConditionSettingCompletedFlag_D<br>U1#G69.9 | FX5_4AD_1.stnControl_D<br>[1].uMaxResetReq_D.0<br>U1#G673.0 | FX5_4AD_1.stnMonitor_D<br>[1].uMaxResetCompFlg_D.0<br>U1#G622.0 |  | MOV | FX5_4AD_1.stnMonitor_D<br>[1].wMaxValue_D<br>U1#G604        | CH2_DigMaxVal<br>D15 |
|       |                                                             |                                                                 |                                                      |                                                                 | FX5_4AD_1.stnControl_D<br>[1].uMinResetReq_D.0<br>U1#G674.0 | FX5_4AD_1.stnMonitor_D<br>[1].uMinResetCompFlg_D.0<br>U1#G623.0 |  | MOV | FX5_4AD_1.stnMonitor_D<br>[1].wMinValue_D<br>U1#G606        | CH2_DigMinVal<br>D16 |
| (87)  | MaxMinResetSig<br>X12                                       |                                                                 |                                                      |                                                                 |                                                             |                                                                 |  | SET | FX5_4AD_1.stnControl_D<br>[1].uMaxResetReq_D.0<br>U1#G673.0 |                      |
|       |                                                             |                                                                 |                                                      |                                                                 |                                                             |                                                                 |  | SET | FX5_4AD_1.stnControl_D<br>[1].uMinResetReq_D.0<br>U1#G674.0 |                      |
| (141) | FX5_4AD_1.stnControl_D<br>[1].uMaxResetReq_D.0<br>U1#G673.0 | FX5_4AD_1.stnMonitor_D<br>[1].uMaxResetCompFlg_D.0<br>U1#G622.0 |                                                      |                                                                 |                                                             |                                                                 |  | RST | FX5_4AD_1.stnControl_D<br>[1].uMaxResetReq_D.0<br>U1#G673.0 |                      |
| (173) | FX5_4AD_1.stnControl_D<br>[1].uMinResetReq_D.0<br>U1#G674.0 | FX5_4AD_1.stnMonitor_D<br>[1].uMinResetCompFlg_D.0<br>U1#G623.0 |                                                      |                                                                 |                                                             |                                                                 |  | RST | FX5_4AD_1.stnControl_D<br>[1].uMinResetReq_D.0<br>U1#G674.0 |                      |
| (205) |                                                             |                                                                 |                                                      |                                                                 |                                                             |                                                                 |  |     |                                                             | —END—                |

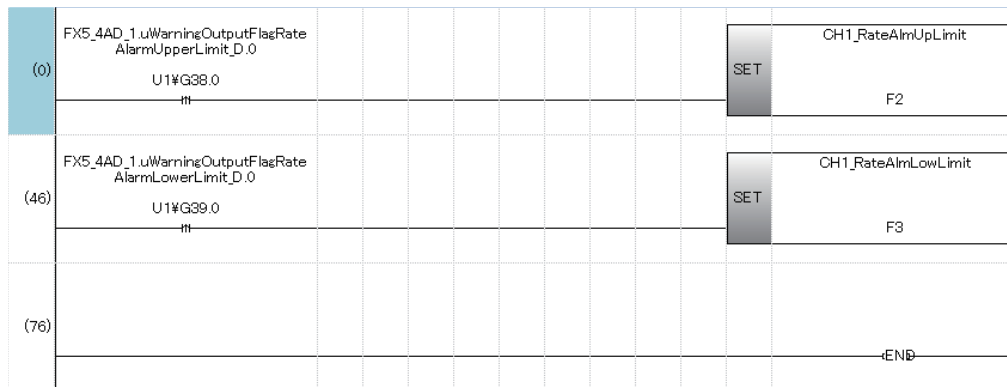
### • Process alarm occurrence processing

This program is an example to perform the processing at the time of the issuance of a process alarm upper/lower limit alarm in CH2.

|      |                                                             |  |  |  |  |  |  |     |                           |
|------|-------------------------------------------------------------|--|--|--|--|--|--|-----|---------------------------|
| (0)  | FX5_4AD_1.uWarningOutputFlasAlarmUpperLimit_D.1<br>U1#G36.1 |  |  |  |  |  |  | SET | CH2_ProcAlmUpLimit<br>F0  |
| (49) | FX5_4AD_1.uWarningOutputFlasAlarmLowerLimit_D.1<br>U1#G37.1 |  |  |  |  |  |  | SET | CH2_ProcAlmLowLimit<br>F1 |
| (81) |                                                             |  |  |  |  |  |  |     | —END—                     |

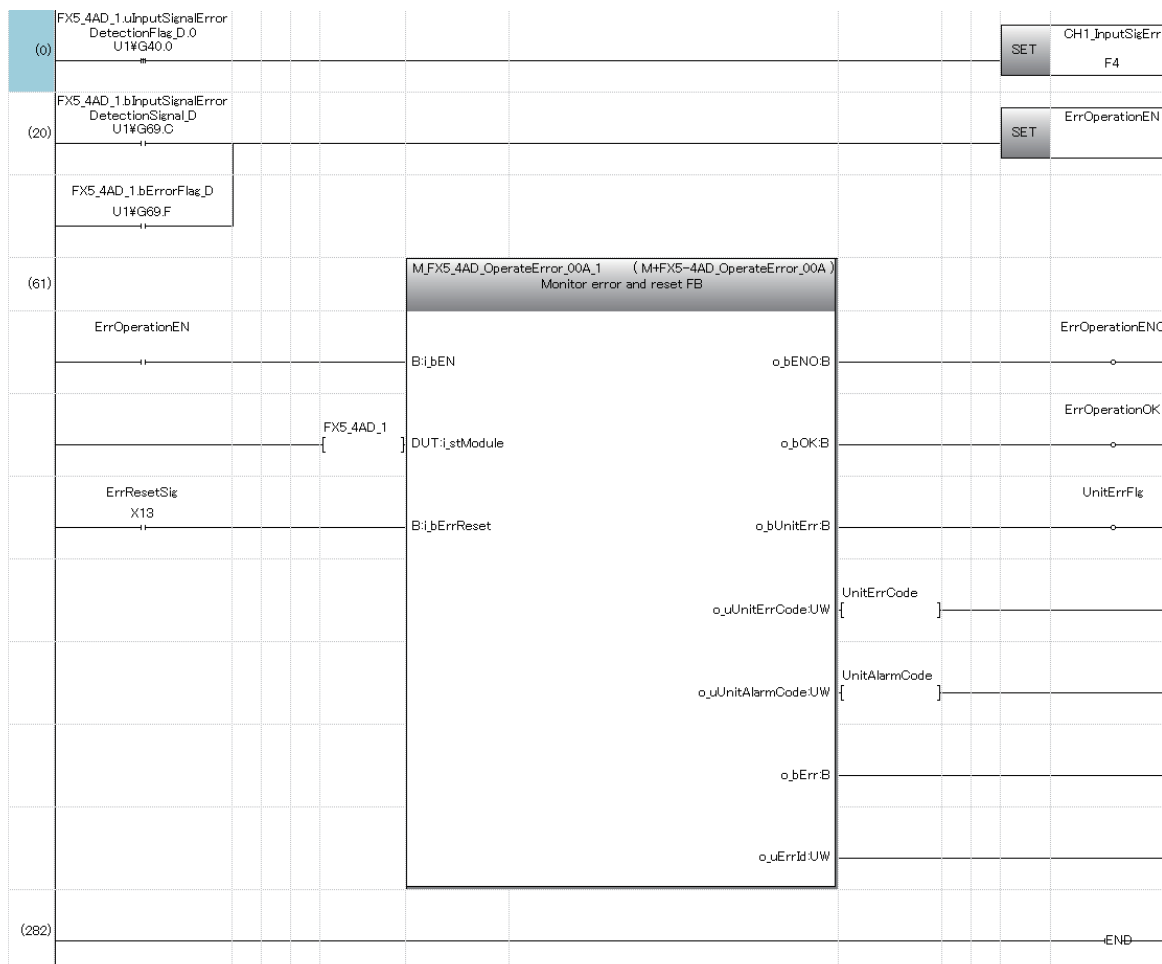
- Rate alarm occurrence processing

This program is an example to perform the processing at the time of the issuance of a rate alarm upper/lower limit alarm in CH1.



- Input signal error occurrence processing

This program is an example to make the latest error code appear when an input signal error is detected in CH1, or an error occurs. After this, the program clears the error flag and the stored error code.



# 1.10 Troubleshooting

This section describes errors that may occur in the use of an analog input module and those troubleshooting.

## 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 GX Works3.

The analog input module state can be checked with the POWER, RUN, ERROR, and ALM LEDs. The following table shows the correspondence between the LEDs and the analog input module state.

| Name      | Description                                                                                                                      |
|-----------|----------------------------------------------------------------------------------------------------------------------------------|
| POWER LED | Indicates the power supply status.<br>ON: Power ON<br>OFF: Power off or module failure                                           |
| RUN LED   | Indicates the operating status.<br>ON: Normal operation<br>Flashing: Offset/gain setting mode<br>OFF: Error                      |
| ERROR LED | Indicates the error status.*1<br>ON: Minor error<br>Flashing: Moderate error or major error<br>OFF: Normal operation             |
| ALM LED   | Indicates the alarm status.*2<br>ON: Process alarm or rate alarm issued<br>Flashing: Input signal error<br>OFF: Normal operation |

\*1 For details, refer to the following.

☞ Page 101 List of error codes

\*2 For details, refer to the following.

☞ Page 104 List of alarm codes

# Troubleshooting by symptom

## When the POWER LED turns off

| Check item                                                                                | Corrective action                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the power is supplied.                                                      | Check that power is supplied to the CPU and extension power supply modules.                                                                                                                    |
| Check whether the capacities of the CPU module extension power supply modules are enough. | Calculate the current consumption of the I/O modules, and intelligent function modules to check that the power supply capacity for the CPU module and extension power supply module is enough. |
| Check whether the module is mounted properly.                                             | Check that the extension cable is inserted correctly.                                                                                                                                          |

## When the RUN LED flashes or turns off

### ■When flashing

| Check item                                               | Cause                                                                                                                                                   | Corrective action                                                                                                             |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Check whether the module is in offset/gain setting mode. | In the GX Works3 module parameter setting, the CPU module was powered off→on or reset when the operation mode setting was the offset/gain setting mode. | In the GX Works3 module parameter setting, set the operation mode setting to normal and power off→on or reset the CPU module. |
|                                                          | The value in the mode switching setting has been changed and the mode has been switched to offset/gain setting mode.                                    | Review the program that uses the mode switching setting to check whether the mode has been switched erroneously.              |

### ■When turns off

| Check item                                                                                | Corrective action                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the power is supplied.                                                      | Check that power is supplied to the CPU and extension power supply modules.                                                                                                                    |
| Check whether the capacities of the CPU module extension power supply modules are enough. | Calculate the current consumption of the I/O modules, and intelligent function modules to check that the power supply capacity for the CPU module and extension power supply module is enough. |
| Check whether the module is mounted properly.                                             | Check that the extension cable is inserted correctly.                                                                                                                                          |
| Cases other than the above                                                                | Reset the CPU module, and check if the RUN LED turns on. If the RUN LED still remains off, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |

## When the ERROR LED flashes or turns on

### ■When flashing

| Check item                                   | Action                                                                                                                                                     |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether a moderate error has occurred. | Power off→on the module.<br>If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |

### ■When turns on

| Check item                            | Action                                                                                                                                                                                                |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any error has occurred. | Check Latest error code and take actions described in the list of error codes.<br>(  Page 101 List of error codes) |

## When the ALM LED turns on or flashes

### ■When turns on

| Check item                               | Corrective action                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any alert has been issued. | Check Alert output flag (Process alarm upper limit), Alert output flag (Process alarm lower limit), Alert output flag (Rate alarm upper limit), and Alert output flag (Rate alarm lower limit).<br>Take actions described in the list of alarm codes.<br> Page 104 List of alarm codes |

### ■When flashing

| Check item                                         | Corrective action                                                                                                                                                                                                                                       |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any input signal error has occurred. | Check Input signal error detection signal or Input signal error detection flag.<br>Take actions described in the list of alarm codes.<br> Page 104 List of alarm codes |

## When a normal digital output value cannot be read

| Check item                                                                                                                           | Corrective action                                                                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether there is any problem with the wiring, such as looseness or disconnection of analog signal lines.                       | Identify the faulty area of signal lines by a visual inspection and continuity check.                                                                                                                                                                                                                                                                                                                                                 |
| Check whether the CPU module is in the STOP state.                                                                                   | Change the state of the CPU module to RUN.                                                                                                                                                                                                                                                                                                                                                                                            |
| Check whether the offset/gain setting in the user range setting is correct.                                                          | Check that the offset/gain setting is correct.<br>If the user range setting is selected, change the input range to the factory default and check that the A/D conversion is performed.<br>If the A/D conversion is correct, perform the offset/gain setting.                                                                                                                                                                          |
| Check whether the input range setting is correct.                                                                                    | Check the CH□ Input range setting monitor with GX Works3. If the input range setting is incorrect, retry the input range setting.                                                                                                                                                                                                                                                                                                     |
| Check whether the following operations are performed while the current on the negative side is applied.                              | Check whether the module is turned off and then turned on.                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                      | Check whether the A/D conversion enable/disable setting is changed.                                                                                                                                                                                                                                                                                                                                                                   |
|                                                                                                                                      | Check whether the range setting is changed.                                                                                                                                                                                                                                                                                                                                                                                           |
| Check whether A/D conversion disable is set in A/D conversion enable/disable setting of the channel where a value is to be input.    | Check CH□ A/D conversion enable/disable setting and set it to A/D conversion enable using a sequence program or the GX Works3.                                                                                                                                                                                                                                                                                                        |
| Check whether 'Operating condition setting request' (Un\G70, b9) has been executed.                                                  | Turn off→on→off*1 'Operating condition setting request' (Un\G70, b9) and check that a digital output value is stored in 'CH1 Digital output value' (Un\G400) using GX Works3. If the stored value is correct, check the program.                                                                                                                                                                                                      |
| Check whether the setting value of the time average is correct when the time average is selected in Averaging process specification. | When the time average is selected for processing, set the time average value in CH□ Time average/Count average/Moving average/Primary delay filter constant setting so that the value satisfies the following condition:<br>Time averaging setting value $\geq 4$ (times) $\times$ Conversion speed $\times$ Number of conversion enabled channels<br>If the condition above is not satisfied, the digital output value results in 0. |
| Check whether there is any potential difference between the FG terminal and the external device ground.                              | A potential difference may occur between the FG terminal and the external device ground by a cause such as a long wiring distance, resulting in an incorrect A/D conversion. Connect the FG terminal and the external device ground to eliminate the potential difference.                                                                                                                                                            |
| Check whether external devices to be connected at each channel share the same ground.                                                | If the external device ground is shared across channels, noise can sneak in between channels, which may cause some error in A/D conversion. Connect the FG terminal and the external device ground to eliminate the errors.                                                                                                                                                                                                           |
| Check whether the program for reading digital output values has an error.                                                            | Check the CH□ Digital output values with GX Works3. If the digital output value is stored without being converted from the analog input value, review and correct the read program.                                                                                                                                                                                                                                                   |
| Check whether the refresh setting is correct.                                                                                        | If the refresh is set so that the value in CH□ Digital output value is transferred to the device of the CPU module, review and correct the auto refresh setting.                                                                                                                                                                                                                                                                      |

| Check item                                         | Corrective action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any input signal error has occurred. | <p>The digital output value and digital operation value are not updated during the occurrence of an input signal error.</p> <p>If Input signal error detection flag indicates an input signal error, check the values in CH□ Input signal error detection setting and CH□ Input signal error detection setting value to examine the validity of the input signal error detection upper limit value and the input signal error detection lower limit value.</p> <p>☞ Page 51 Input signal error detection function</p> <p>If the values are valid, change the analog input value so that an input signal error does not occur.</p> |

\*1 The A/D conversion does not start when 'Operating condition setting request' (Un\G70, b9) is on. After turning off→on, check that 'Operating condition setting completed flag' (Un\G69, b9) is off, and then make sure to turn on→off.

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

| Check item                                                                       | Corrective 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.     |
| Check whether no external input has occurred to the conversion disabled channel. | Do not input anything to the A/D conversion disabled channel from an external device. |

## Digital output value varies

| Check item                                                                    | Corrective action                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether an A/D conversion method other than sampling processing is set. | <p>Check the setting of average processing specification from the "Module parameter setting" screen of GX Works3.</p> <p>Review the setting of average processing specification and check the state of variation of CH□ Digital output value again.</p> |

## The A/D conversion completed flag does not turn on

| Check item                                                        | Corrective action                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether all channels are set to be A/D conversion disabled. | <p>Check the A/D conversion enable/disable setting with GX Works3.</p> <p>If there are only A/D conversion enabled channels, set the A/D conversion enable/disable setting to "A/D conversion enabled" for one or more channel the sequence program.</p> |

## List of error codes

If an error occurs during operation, an analog input module stores the error code into 'Latest error code' (Un\G0) of the buffer memory. In addition, 'Error flag' (Un\G69, b15) turns on. Turning on 'Error clear request' (Un\G70, b15) clears the error code in 'Latest error code' (Un\G0) and turns off 'Error flag' (Un\G69, b15).

Error codes of an analog input module are classified in minor and moderate errors.

- Minor error: This error is caused by the setting failure of programs and parameters, and after eliminating the error cause, each function normally executes. (1000H to 1FFFH)
- Moderate error: Hardware failures. The A/D conversion do not continue. (3000H to 3FFFH)

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

□: This symbol indicates the number of the channel where an error has occurred. It represents one of numerical values 0 to 3, which correspond to CH1 to CH4.

(CH1: 0, CH2: 1, CH3: 2, CH4: 3)

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

| Error code | Error name                                                 | Description and cause                                                                                                                                                                                    | Corrective 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.                                         |
| 180△H      | Interrupt factor transaction setting range error           | A value other than 0 to 1 is set in Interrupt factor transaction setting [n].<br>△ indicates the interrupt setting related in the error as below:<br>0: Setting 1 to F: Setting 16                       | Set 0 or 1 in Interrupt factor transaction setting [n].                                                           |
| 181△H      | Condition target setting range error                       | A value other than 0 to 7 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 a value of 0 to 7 in Condition target setting [n].                                                            |
| 182△H      | Condition target channel setting range error               | A value other than 0 to 4 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 a value of 0 to 4 in Condition target channel setting [n].                                                    |
| 1861H      | Offset/gain setting continuous write occurrence error      | The setting value has been continuously written to the flash memory 26 times or more in the offset/gain setting.                                                                                         | For the offset/gain setting, write the setting value only once per setting.                                       |
| 190□H      | Range setting range error                                  | A value out of the range is set in CH□ Range setting.                                                                                                                                                    | Set CH□ Range setting to the value within the range again.                                                        |
| 191□H      | Averaging process specification setting range error        | A value other than 0 to 5 is set in CH□ Average processing specification.                                                                                                                                | Set a value of 0 to 5 in CH□ Average processing specification again.                                              |
| 192□H      | Time average setting range error                           | When Time average is selected in CH□ Averaging process specification, a value other than 2 to 5000 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.        | Set a value of 2 to 5000 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.  |
| 193□H      | Count average setting range error                          | When the count average is selected in CH□ Averaging process specification, a value other than 4 to 62500 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.  | Set a value of 4 to 62500 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting. |
| 194□H      | Moving average setting range error                         | When the moving average is selected in CH□ Averaging process specification, a value other than 2 to 1000 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.  | Set a value of 2 to 1000 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.  |
| 195□H      | Primary delay filter constant setting range error          | When Primary delay filter is selected in CH□ Averaging process specification, a value other than 1 to 500 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting. | Set a value of 1 to 500 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.   |

| Error code | Error name                                                 | Description and cause                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Corrective action                                                                                                                                                                                                                                       |
|------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19D□H      | Digital filter setting range error                         | When the digital filter is set in CH□ Averaging processing specification, a value other than 1 to 1600 is set in CH□ Digital filter setting.                                                                                                                                                                                                                                                                                                                                                                                                                                 | Set a value of 1 to 1600 in CH□ Digital filter setting.                                                                                                                                                                                                 |
| 19E□H      | Digital filter fluctuation width setting range error       | When the digital filter is set in CH□ Averaging processing specification, CH□ Digital filter fluctuation width setting is set to a value other than 80 to 200000 or a value below "Number of A/D conversion enabled channels × Conversion speed (μs)".                                                                                                                                                                                                                                                                                                                       | For the CH□ Digital filter fluctuation width setting, set a value of 80 to 200000 that equals to or larger than "Number of A/D conversion enabled channels × Conversion speed (μs)"                                                                     |
| 1A0□H      | Scaling enable/disable setting range error                 | A value other than 0 and 1 is set in CH□ Scaling enable/disable setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Set 0 or 1 in CH□ Scaling enable/disable setting.                                                                                                                                                                                                       |
| 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.                                                                                                                                                                                              |
| 1B0□H      | Alert output setting (Process alarm) range error           | A value other than 0 and 1 is set in CH□ Alert output setting (Process alarm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Set 0 or 1 in CH□ Alert output setting (Process alarm).                                                                                                                                                                                                 |
| 1B△□H      | Process alarm upper lower limit value setting range error  | The values not satisfying the following condition are set in CH□ Process alarm upper upper limit value to CH□ Process alarm lower lower limit value:<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      | Alert output setting (Rate alarm) range error              | A value other than 0 and 1 is set in CH□ Alert output setting (Rate alarm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Set 0 or 1 in CH□ Alert output setting (Rate alarm).                                                                                                                                                                                                    |
| 1B9□H      | Rate alarm alert detection cycle setting range error       | A value other than 1 to 32000 is set in CH□ Rate alarm alert detection cycle setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Set a value of 1 to 32000 in CH□ Rate alarm alert detection cycle setting.                                                                                                                                                                              |
| 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 again.                                                                                                                               |
| 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  | CH□ Input signal error detection setting is set in Simple disconnection detection, and the Input range is set in other than the following:<br>• 4 to 20 mA<br>• 1 to 5 V                                                                                                                                                                                                                                                                                                                                                                                                     | For channels for simple disconnection detection using the input signal error detection function, set Input range setting to either of the following again.<br>• 4 to 20 mA<br>• 1 to 5 V                                                                |
| 1D0□H      | Logging enable/disable setting range error                 | A value other than 0 and 1 is set in CH□ Logging enable/disable setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Set 0 or 1 in CH□ Logging enable/disable setting.                                                                                                                                                                                                       |
| 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 the value(s) within the range in one or both of CH□ Logging cycle setting value and CH□ Logging cycle unit setting.                                                                                                                                 |
| 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 the conversion cycle of the object to be logged or more.                                                                                            |
| 1D3□H      | Logging data setting range error                           | A value other than 0 and 1 is set in CH□ Logging data setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Set 0 or 1 in CH□ Logging data setting.                                                                                                                                                                                                                 |
| 1D4□H      | Post-trigger logging points setting range error            | A value other than 1 to 10000 is set in CH□ Post-trigger logging points.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Set a value of 1 to 10000 in CH□ Post-trigger logging points.                                                                                                                                                                                           |
| 1D5□H      | Level trigger condition setting range error                | A value other than 0 to 3 is set in CH□ Level trigger condition setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Set a value of 0 to 3 in CH□ Level trigger condition setting.                                                                                                                                                                                           |



| Error code | Error name                                                                                                              | Description and cause                                                                                                                                                                               | Corrective action                                                                                                                                                                                                                                                                                                                                                                                      |
|------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1D6□H      | Trigger data setting range error                                                                                        | A value other than 0 to 9999 is set in CH□ Trigger data.                                                                                                                                            | Set a value of 0 to 9999 in CH□ Trigger data.                                                                                                                                                                                                                                                                                                                                                          |
| 1D8□H      | Logging loading enable/disable setting range error                                                                      | A value other than 0 and 1 is set in CH□ Logging loading enable/disable setting.                                                                                                                    | Set CH□ Logging loading enable/disable setting to 0 or 1.                                                                                                                                                                                                                                                                                                                                              |
| 1D9□H      | Logging load points setting value range error                                                                           | A value other than 10 to 10000 is set in CH□ Logging load points setting value.                                                                                                                     | Set CH□ Logging load points setting value from the range between 10 to 10000.                                                                                                                                                                                                                                                                                                                          |
| 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 enabled, the range setting of the CH where the error occurred is User range) | 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 $\geq$ Gain value                                                                                   | Perform the offset/gain setting again so that the following condition is satisfied:<br>Offset value $<$ Gain value                                                                                                                                                                                                                                                                                     |
| 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 off→on→off Error clear request (Un\G70, b15) 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. |
| 1F08H      | Module power supply error                                                                                               | The 24 V DC power supply is not normally supplied to the analog input module.                                                                                                                       | Check whether the configuration is designed to exceed the 24 V DC power capacity of the CPU or extension power supply module. If the error occurs again even after the check, 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 analog input module.                                                                                                                              | Power off→on the module. 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. If the values are abnormal, please consult your local Mitsubishi representative.                                                                                                                                                                                                                                                                                      |

## List of alarm codes

If an alarm occurs during operation, the analog input module stores the alarm code into 'Latest alarm code' (Un\G2) of the buffer memory. Turning on Error clear request (Un\G70, b15) clears the alarm code in 'Latest alarm code' (Un\G2).

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

□: This symbol indicates the number of the channel where an alarm has occurred. It represents one of numerical values 0 to 3, which correspond to CH1 to CH4.

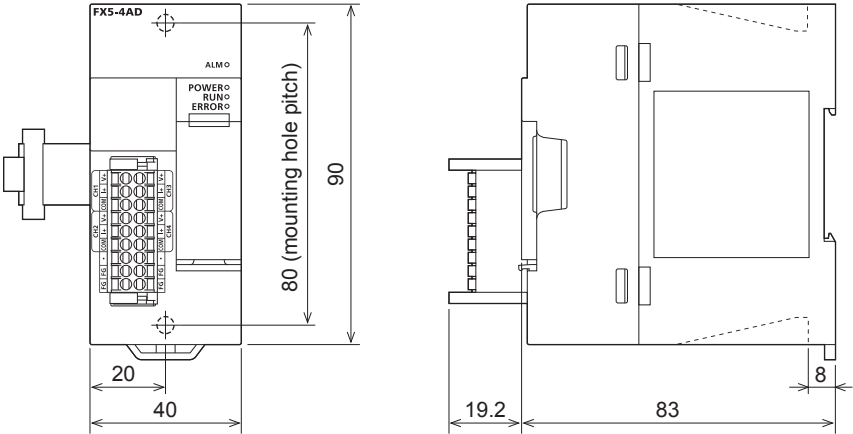
(CH1: 0, CH2: 1, CH3: 2, CH4: 3)

| Alarm code | Alarm name                                          | Description and cause                                                  | Corrective 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 range. As a result, the corresponding bit of Warning output flag (Process alarm upper limit) and/or Warning output flag (Process alarm lower limit), and Alarm output signal (Un\G69, b8) turn off automatically.       |
| 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 range. As a result, the corresponding bit of Warning output flag (Rate alarm upper limit) or Warning output flag (Rate alarm lower limit), and Alarm output signal (Un\G69, b8) turn off automatically. |
| 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□.          | Adjust the analog input value to fall within the range, and then turn off→on→off Error clear request (Un\G70, b15). As a result, the corresponding bit of Input signal error detection flag and Input signal error detection signal turn off.                                 |
| 091□H      | Input signal error detection (lower limit)          | An input signal error (lower limit) has been detected in CH□.          |                                                                                                                                                                                                                                                                               |
| 092□H      | Input signal error detection (simple disconnection) | An input signal error (simple disconnection) has been detected in CH□. |                                                                                                                                                                                                                                                                               |

# APPENDICES

## Appendix 1 External Dimensions

This chapter describes the external dimensions of the analog input module.



(Unit: mm)

# Appendix 2 Standards

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## Certification of UL, cUL standards

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The FX5-4AD supports UL (UL, cUL) standards.

For models that support UL standards, refer to the following.

UL, cUL file number: E95239

## Compliance with EC directive (CE marking)

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This note does not guarantee that an entire machine produced in accordance with the contents of this note will comply with the following standards.

Compliance to EMC directive and LVD directive of the entire mechanical module should be checked by the user/manufacturer. For more details please contact to the local Mitsubishi Electric sales site.

# Appendix 3 Module Label

The functions of the analog input module can be set by using module labels.

## Module label

The module label name is defined with the following structure:

"Module name"\_"Module number".b"Label name"\_D

Ex.

FX5\_4AD\_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.

## 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.

FX5\_4AD\_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 3 is used to correspond to CH1 to 4. (CH1: 0, CH2: 1, CH3: 2, CH4: 3)

### ■Data format

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

| Data format | Description                         |
|-------------|-------------------------------------|
| b           | Bit                                 |
| u           | Word [Unsigned]/Bit string [16-bit] |
| w           | Word [Signed]                       |

### ■Label name

The label identifier unique to a module is given.

### ■\_D

This string indicates that the module label is for the direct access. Values that are read from or written to the module label is reflected in the module instantly.

# Appendix 4 Buffer Memory Areas

## List of buffer memory areas

This section contains the list of buffer memory addresses of the analog input module. For details on the buffer memory, refer to the following.

☞ Page 120 Details of buffer memory addresses

The buffer memory areas of the analog input module are classified into the data types described below.

| Data type    | Description               |                                                                                                                                         |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Setting data | Description               | The data to be customized to suit the connected devices and the purpose of the system.                                                  |
|              | Read and write attributes | Read and write is possible.                                                                                                             |
|              | Setting procedure         | Use GX Works3 or a program to set the data.                                                                                             |
|              | Setting timing            | After a change of value, turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the setting value to take effect. |
| Control data | Description               | The data used for controlling the analog input module.                                                                                  |
|              | Read and write attributes | Read and write is possible.                                                                                                             |
|              | Setting procedure         | Use GX Works3 or a program to set the data.                                                                                             |
|              | Setting timing            | As soon as the values are changed, the set values become effective.                                                                     |
| Monitor data | Description               | The data used for checking the status of the analog input module.                                                                       |
|              | Read and write attributes | Only read is possible and write is not possible.                                                                                        |
|              | Setting procedure         | —                                                                                                                                       |
|              | Setting timing            | —                                                                                                                                       |

### 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 the normal mode

○: With refresh setting, ×: Without refresh setting

### ■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] <sup>*1</sup> | 0             | Monitor   | ○            |
| 20 to 29          | 14H to 1DH            | System area                                       | —             | —         | —            |
| 30                | 1EH                   | Module Information                                | 6140H         | Monitor   | ×            |
| 31                | 1FH                   | Firmware version                                  | *2            | Monitor   | ×            |
| 32 to 35          | 20H 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                                       | 0000H         | —         | —            |
| 42                | 2AH                   | A/D conversion completed flag                     | 0000H         | Monitor   | ○            |
| 43 to 59          | 2BH to 3BH            | System area                                       | —             | —         | —            |
| 60                | 3CH                   | Operation mode monitor                            | 0             | Monitor   | ×            |

| Address (decimal) | Address (hexadecimal) | Name                                                             | Default value | Data type | Auto refresh |
|-------------------|-----------------------|------------------------------------------------------------------|---------------|-----------|--------------|
| 61 to 68          | 3DH to 44H            | System area                                                      | —             | —         | —            |
| 69                | 45H                   | Input signals                                                    | 0             | Monitor   | ×            |
| 70                | 46H                   | Output signals                                                   | 0             | Control   | ×            |
| 71 to 89          | 47H 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] <sup>*1</sup>                          | 0             | Control   | ×            |
| 140 to 155        | 8CH to 9BH            | System area                                                      | —             | —         | —            |
| 156 to 171        | 9CH to ABH            | Interrupt factor reset request [n] <sup>*1</sup>                 | 0             | Control   | ×            |
| 172 to 199        | ACH to C7H            | System area                                                      | —             | —         | —            |
| 200 to 215        | C8H to D7H            | Interrupt factor transaction setting [n] <sup>*1</sup>           | 0             | Setting   | ×            |
| 216 to 231        | D8H to E7H            | System area                                                      | —             | —         | —            |
| 232 to 247        | E8H to F7H            | Condition target setting [n] <sup>*1</sup>                       | 0             | Setting   | ×            |
| 248 to 263        | F8H to 107H           | System area                                                      | —             | —         | —            |
| 264 to 279        | 108H to 117H          | Condition target channel setting [n] <sup>*1</sup>               | 0             | Setting   | ×            |
| 280 to 295        | 118H to 127H          | System area                                                      | —             | —         | —            |
| 296, 297          | 128H, 129H            | Mode switching setting                                           | 0             | Setting   | ×            |
| 298               | 12AH                  | System area                                                      | —             | —         | —            |
| 299               | 12BH                  | Rate alarm change rate selection                                 | 1             | Setting   | ×            |
| 300 to 303        | 12CH to 12FH          | System area                                                      | —             | —         | —            |
| 304               | 130H                  | Input signal error detect automatic clear enable/disable setting | 1             | Setting   | ×            |
| 305               | 131H                  | Offset/gain initialization enable code                           | 0             | Setting   | ×            |
| 306 to 399        | 132H to 18FH          | System area                                                      | —             | —         | —            |

\*1 [n] in the table indicates an interrupt setting number. (n = 1 to 16)

\*2 The firmware version of the analog input module is stored. For Ver. 1.000, 1000 is stored as the default value.

## ■Un\G400 to Un\G3599

| Address: decimal (hexadecimal) |            |            |             | Name                                        | Default value | Data type | Auto refresh |
|--------------------------------|------------|------------|-------------|---------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2        | CH3        | CH4         |                                             |               |           |              |
| 400 (190H)                     | 600 (258H) | 800 (320H) | 1000 (3E8H) | CH□ Digital output value                    | 0             | Monitor   | ○            |
| 401 (191H)                     | 601 (259H) | 801 (321H) | 1001 (3E9H) | System area                                 | —             | —         | —            |
| 402 (192H)                     | 602 (25AH) | 802 (322H) | 1002 (3EAH) | CH□ Digital operation value                 | 0             | Monitor   | ○            |
| 403 (193H)                     | 603 (25BH) | 803 (323H) | 1003 (3EBH) | System area                                 | —             | —         | —            |
| 404 (194H)                     | 604 (25CH) | 804 (324H) | 1004 (3ECH) | CH□ Maximum value                           | 0             | Monitor   | ○            |
| 405 (195H)                     | 605 (25DH) | 805 (325H) | 1005 (3EDH) | System area                                 | —             | —         | —            |
| 406 (196H)                     | 606 (25EH) | 806 (326H) | 1006 (3EEH) | CH□ Minimum value                           | 0             | Monitor   | ○            |
| 407 (197H)                     | 607 (25FH) | 807 (327H) | 1007 (3EFH) | System area                                 | —             | —         | —            |
| 408 (198H)                     | 608 (260H) | 808 (328H) | 1008 (3F0H) | CH□ Difference conversion state flag        | 0             | Monitor   | ○            |
| 409 (199H)                     | 609 (261H) | 809 (329H) | 1009 (3F1H) | CH□ Logging hold flag                       | 0             | Monitor   | ○            |
| 410 (19AH)                     | 610 (262H) | 810 (32AH) | 1010 (3F2H) | System area                                 | —             | —         | —            |
| 411 (19BH)                     | 611 (263H) | 811 (32BH) | 1011 (3F3H) | CH□ Digital filter conversion cycle monitor | 0             | Monitor   | ×            |

| Address: decimal (hexadecimal) |                              |                              |                                | Name                                                                                | Default value | Data type | Auto refresh |
|--------------------------------|------------------------------|------------------------------|--------------------------------|-------------------------------------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2                          | CH3                          | CH4                            |                                                                                     |               |           |              |
| 412 to 419<br>(19CH to 1A3H)   | 612 to 619<br>(264H to 26BH) | 812 to 819<br>(32CH to 333H) | 1012 to 1019<br>(3F4H to 3FBH) | System area                                                                         | —             | —         | —            |
| 420 (1A4H)                     | 620 (26CH)                   | 820 (334H)                   | 1020 (3FCH)                    | CH□ A/D conversion status                                                           | 0             | Monitor   | ×            |
| 421 (1A5H)                     | 621 (26DH)                   | 821 (335H)                   | 1021 (3FDH)                    | System area                                                                         | —             | —         | —            |
| 422 (1A6H)                     | 622 (26EH)                   | 822 (336H)                   | 1022 (3FEH)                    | CH□ Maximum value reset completed flag                                              | 0             | Monitor   | ○            |
| 423 (1A7H)                     | 623 (26FH)                   | 823 (337H)                   | 1023 (3FFH)                    | CH□ Minimum value reset completed flag                                              | 0             | Monitor   | ○            |
| 424 to 429<br>(1A8H to 1ADH)   | 624 to 629<br>(270H to 275H) | 824 to 829<br>(338H to 33DH) | 1024 to 1029<br>(400H to 405H) | System area                                                                         | —             | —         | —            |
| 430 (1AEH)                     | 630 (276H)                   | 830 (33EH)                   | 1030 (406H)                    | CH□ Range setting monitor                                                           | 0003H         | Monitor   | ×            |
| 431 (1AFH)                     | 631 (277H)                   | 831 (33FH)                   | 1031 (407H)                    | System area                                                                         | —             | —         | —            |
| 432 (1B0H)                     | 632 (278H)                   | 832 (340H)                   | 1032 (408H)                    | CH□ Difference conversion standard value                                            | 0             | Monitor   | ×            |
| 433 (1B1H)                     | 633 (279H)                   | 833 (341H)                   | 1033 (409H)                    | System area                                                                         | —             | —         | —            |
| 434 (1B2H)                     | 634 (27AH)                   | 834 (342H)                   | 1034 (40AH)                    | CH□ Head pointer                                                                    | 0             | Monitor   | ×            |
| 435 (1B3H)                     | 635 (27BH)                   | 835 (343H)                   | 1035 (40BH)                    | CH□ Latest pointer                                                                  | 0             | Monitor   | ×            |
| 436 (1B4H)                     | 636 (27CH)                   | 836 (344H)                   | 1036 (40CH)                    | CH□ Number of logging data                                                          | 0             | Monitor   | ×            |
| 437 (1B5H)                     | 637 (27DH)                   | 837 (345H)                   | 1037 (40DH)                    | CH□ Trigger pointer                                                                 | 0             | Monitor   | ×            |
| 438 (1B6H)                     | 638 (27EH)                   | 838 (346H)                   | 1038 (40EH)                    | CH□ Current logging read pointer                                                    | -1            | Monitor   | ×            |
| 439 (1B7H)                     | 639 (27FH)                   | 839 (347H)                   | 1039 (40FH)                    | CH□ Previous logging read pointer                                                   | -1            | Monitor   | ×            |
| 440 (1B8H)                     | 640 (280H)                   | 840 (348H)                   | 1040 (410H)                    | CH□ Logging read points monitor value                                               | 0             | Monitor   | ×            |
| 441 (1B9H)                     | 641 (281H)                   | 841 (349H)                   | 1041 (411H)                    | CH□ Logging cycle monitor value (s)                                                 | 0             | Monitor   | ×            |
| 442 (1BAH)                     | 642 (282H)                   | 842 (34AH)                   | 1042 (412H)                    | CH□ Logging cycle monitor value (ms)                                                | 0             | Monitor   | ×            |
| 443 (1BBH)                     | 643 (283H)                   | 843 (34BH)                   | 1043 (413H)                    | CH□ Logging cycle monitor value (μs)                                                | 0             | Monitor   | ×            |
| 444 (1BCH)                     | 644 (284H)                   | 844 (34CH)                   | 1044 (414H)                    | CH□ Trigger generation time (First/Last two digits of the year)                     | 0             | Monitor   | ×            |
| 445 (1BDH)                     | 645 (285H)                   | 845 (34DH)                   | 1045 (415H)                    | CH□ Trigger generation time (Month/Day)                                             | 0             | Monitor   | ×            |
| 446 (1BEH)                     | 646 (286H)                   | 846 (34EH)                   | 1046 (416H)                    | CH□ Trigger generation time (Hour/Minute)                                           | 0             | Monitor   | ×            |
| 447 (1BFH)                     | 647 (287H)                   | 847 (34FH)                   | 1047 (417H)                    | CH□ Trigger generation time (Second/Day of the week)                                | 0             | Monitor   | ×            |
| 448 (1C0H)                     | 648 (288H)                   | 848 (350H)                   | 1048 (418H)                    | CH□ Trigger generation time (Millisecond)                                           | 0             | Monitor   | ×            |
| 449 to 469<br>(1C1H to 1D5H)   | 649 to 669<br>(289H to 29DH) | 849 to 869<br>(351H to 365H) | 1049 to 1069<br>(419H to 42DH) | System area                                                                         | —             | —         | —            |
| 470 (1D6H)                     | 670 (29EH)                   | 870 (366H)                   | 1070 (42EH)                    | CH□ Difference conversion trigger                                                   | 0             | Control   | ○            |
| 471 (1D7H)                     | 671 (29FH)                   | 871 (367H)                   | 1071 (42FH)                    | CH□ Logging hold request                                                            | 0             | Control   | ○            |
| 472 (1D8H)                     | 672 (2A0H)                   | 872 (368H)                   | 1072 (430H)                    | CH□ Conversion value shift amount                                                   | 0             | Control   | ○            |
| 473 (1D9H)                     | 673 (2A1H)                   | 873 (369H)                   | 1073 (431H)                    | CH□ Maximum value reset request                                                     | 0             | Control   | ○            |
| 474 (1DAH)                     | 674 (2A2H)                   | 874 (36AH)                   | 1074 (432H)                    | CH□ Minimum value reset request                                                     | 0             | Control   | ○            |
| 475 to 499<br>(1DBH to 1F3H)   | 675 to 699<br>(2A3H to 2BBH) | 875 to 899<br>(36BH to 383H) | 1075 to 1099<br>(433H to 44BH) | System area                                                                         | —             | —         | —            |
| 500 (1F4H)                     | 700 (2BCH)                   | 900 (384H)                   | 1100 (44CH)                    | CH□ A/D conversion enable/disable setting                                           | 0             | Setting   | ×            |
| 501 (1F5H)                     | 701 (2BDH)                   | 901 (385H)                   | 1101 (44DH)                    | CH□ Averaging process specification                                                 | 0             | Setting   | ×            |
| 502 (1F6H)                     | 702 (2BEH)                   | 902 (386H)                   | 1102 (44EH)                    | CH□ Time average/Count average/Moving average/Primary delay filter constant setting | 0             | Setting   | ×            |
| 503 (1F7H)                     | 703 (2BFH)                   | 903 (387H)                   | 1103 (44FH)                    | System area                                                                         | —             | —         | —            |
| 504 (1F8H)                     | 704 (2C0H)                   | 904 (388H)                   | 1104 (450H)                    | CH□ Scaling enable/disable setting                                                  | 1             | Setting   | ×            |



| Address: decimal (hexadecimal) |                           |                           |                             | Name                                                       | Default value | Data type | Auto refresh |
|--------------------------------|---------------------------|---------------------------|-----------------------------|------------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2                       | CH3                       | CH4                         |                                                            |               |           |              |
| 505 (1F9H)                     | 705 (2C1H)                | 905 (389H)                | 1105 (451H)                 | System area                                                | —             | —         | —            |
| 506 (1FAH)                     | 706 (2C2H)                | 906 (38AH)                | 1106 (452H)                 | CH□ Scaling upper limit value (L)                          | 0             | Setting   | ×            |
| 507 (1FBH)                     | 707 (2C3H)                | 907 (38BH)                | 1107 (453H)                 | CH□ Scaling upper limit value (H)                          |               |           |              |
| 508 (1FCH)                     | 708 (2C4H)                | 908 (38CH)                | 1108 (454H)                 | CH□ Scaling lower limit value (L)                          | 0             | Setting   | ×            |
| 509 (1FDH)                     | 709 (2C5H)                | 909 (38DH)                | 1109 (455H)                 | CH□ Scaling lower limit value (H)                          |               |           |              |
| 510 (1FEH)                     | 710 (2C6H)                | 910 (38EH)                | 1110 (456H)                 | CH□ Digital clipping enable/disable setting                | 1             | Setting   | ×            |
| 511 (1FFH)                     | 711 (2C7H)                | 911 (38FH)                | 1111 (457H)                 | System area                                                | —             | —         | —            |
| 512 (200H)                     | 712 (2C8H)                | 912 (390H)                | 1112 (458H)                 | CH□ Alert output setting (Process alarm)                   | 1             | Setting   | ×            |
| 513 (201H)                     | 713 (2C9H)                | 913 (391H)                | 1113 (459H)                 | CH□ Alert output setting (Rate alarm)                      | 1             | Setting   | ×            |
| 514 (202H)                     | 714 (2CAH)                | 914 (392H)                | 1114 (45AH)                 | CH□ Process alarm upper upper limit value                  | 0             | Setting   | ×            |
| 515 (203H)                     | 715 (2CBH)                | 915 (393H)                | 1115 (45BH)                 | System area                                                | —             | —         | —            |
| 516 (204H)                     | 716 (2CCH)                | 916 (394H)                | 1116 (45CH)                 | CH□ Process alarm upper lower limit value                  | 0             | Setting   | ×            |
| 517 (205H)                     | 717 (2CDH)                | 917 (395H)                | 1117 (45DH)                 | System area                                                | —             | —         | —            |
| 518 (206H)                     | 718 (2CEH)                | 918 (396H)                | 1118 (45EH)                 | CH□ Process alarm lower upper limit value                  | 0             | Setting   | ×            |
| 519 (207H)                     | 719 (2CFH)                | 919 (397H)                | 1119 (45FH)                 | System area                                                | —             | —         | —            |
| 520 (208H)                     | 720 (2D0H)                | 920 (398H)                | 1120 (460H)                 | CH□ Process alarm lower lower limit value                  | 0             | Setting   | ×            |
| 521 (209H)                     | 721 (2D1H)                | 921 (399H)                | 1121 (461H)                 | System area                                                | —             | —         | —            |
| 522 (20AH)                     | 722 (2D2H)                | 922 (39AH)                | 1122 (462H)                 | CH□ Rate alarm alert detection cycle setting               | 0             | Setting   | ×            |
| 523 (20BH)                     | 723 (2D3H)                | 923 (39BH)                | 1123 (463H)                 | System area                                                | —             | —         | —            |
| 524 (20CH)                     | 724 (2D4H)                | 924 (39CH)                | 1124 (464H)                 | CH□ Rate alarm upper limit value                           | 0             | Setting   | ×            |
| 525 (20DH)                     | 725 (2D5H)                | 925 (39DH)                | 1125 (465H)                 | System area                                                | —             | —         | —            |
| 526 (20EH)                     | 726 (2D6H)                | 926 (39EH)                | 1126 (466H)                 | CH□ Rate alarm lower limit value                           | 0             | Setting   | ×            |
| 527 (20FH)                     | 727 (2D7H)                | 927 (39FH)                | 1127 (467H)                 | System area                                                | —             | —         | —            |
| 528 (210H)                     | 728 (2D8H)                | 928 (3A0H)                | 1128 (468H)                 | CH□ Input signal error detection setting                   | 0             | Setting   | ×            |
| 529 (211H)                     | 729 (2D9H)                | 929 (3A1H)                | 1129 (469H)                 | CH□ Input signal error detection lower limit setting value | 50            | Setting   | ×            |
| 530 (212H)                     | 730 (2DAH)                | 930 (3A2H)                | 1130 (46AH)                 | CH□ Input signal error detection upper limit setting value | 50            | Setting   | ×            |
| 531 to 534 (213H to 216H)      | 731 to 734 (2DBH to 2DEH) | 931 to 934 (3A3H to 3A6H) | 1131 to 1134 (46BH to 46EH) | System area                                                | —             | —         | —            |
| 535 (217H)                     | 735 (2DFH)                | 935 (3A7H)                | 1135 (46FH)                 | CH□ Logging enable/disable setting                         | 1             | Setting   | ×            |
| 536 (218H)                     | 736 (2E0H)                | 936 (3A8H)                | 1136 (470H)                 | CH□ Logging data setting                                   | 1             | Setting   | ×            |
| 537 (219H)                     | 737 (2E1H)                | 937 (3A9H)                | 1137 (471H)                 | CH□ Logging cycle setting value                            | 4             | Setting   | ×            |
| 538 (21AH)                     | 738 (2E2H)                | 938 (3AAH)                | 1138 (472H)                 | CH□ Logging cycle unit setting                             | 1             | Setting   | ×            |
| 539 (21BH)                     | 739 (2E3H)                | 939 (3ABH)                | 1139 (473H)                 | CH□ Post-trigger logging points                            | 5000          | Setting   | ×            |
| 540 (21CH)                     | 740 (2E4H)                | 940 (3ACH)                | 1140 (474H)                 | CH□ Level trigger condition setting                        | 0             | Setting   | ×            |
| 541 (21DH)                     | 741 (2E5H)                | 941 (3ADH)                | 1141 (475H)                 | CH□ Trigger data                                           | *1            | Setting   | ×            |
| 542 (21EH)                     | 742 (2E6H)                | 942 (3AEH)                | 1142 (476H)                 | CH□ Trigger setting value                                  | 0             | Setting   | ×            |
| 543 (21FH)                     | 743 (2E7H)                | 943 (3AFH)                | 1143 (477H)                 | System area                                                | —             | —         | —            |
| 544 (220H)                     | 744 (2E8H)                | 944 (3B0H)                | 1144 (478H)                 | CH□ Logging loading enable/disable setting                 | 1             | Setting   | ×            |
| 545 (221H)                     | 745 (2E9H)                | 945 (3B1H)                | 1145 (479H)                 | CH□ Logging load points setting value                      | 1000          | Setting   | ×            |
| 546 to 569 (222H to 239H)      | 746 to 769 (2EAH to 301H) | 946 to 969 (3B2H to 3C9H) | 1146 to 1169 (47AH to 491H) | System area                                                | —             | —         | —            |
| 570 (23AH)                     | 770 (302H)                | 970 (3CAH)                | 1170 (492H)                 | CH□ Digital filter setting                                 | 0             | Setting   | ×            |
| 571 (23BH)                     | 771 (303H)                | 971 (3CBH)                | 1171 (493H)                 | System area                                                | —             | —         | —            |

| Address: decimal (hexadecimal) |                           |                           |                             | Name                                             | Default value | Data type | Auto refresh |
|--------------------------------|---------------------------|---------------------------|-----------------------------|--------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2                       | CH3                       | CH4                         |                                                  |               |           |              |
| 572 (23CH)                     | 772 (304H)                | 972 (3CCH)                | 1172 (494H)                 | CH□ Digital filter fluctuation width setting (L) | 0             | Setting   | ×            |
| 573 (23DH)                     | 773 (305H)                | 973 (3CDH)                | 1173 (495H)                 | CH□ Digital filter fluctuation width setting (H) |               |           |              |
| 574 to 597 (23EH to 255H)      | 774 to 797 (306H to 31DH) | 974 to 997 (3CEH to 3E5H) | 1174 to 1197 (496H to 4ADH) | System area                                      | —             | —         | —            |
| 598 (256H)                     | 798 (31EH)                | 998 (3E6H)                | 1198 (4AEH)                 | CH□ Range setting                                | 0003H         | Setting   | ×            |
| 599 (257H)                     | 799 (31FH)                | 999 (3E7H)                | 1199 (4AFH)                 | System area                                      | —             | —         | —            |
| 1200 to 3599 (4B0H to E0FH)    |                           |                           |                             | System area                                      | —             | —         | —            |

\*1 The following shows the default values.  
CH1:402, CH2:602, CH3:802, CH4:1020

## ■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                  |                  |                         |                              |                             |               |           |              |
| 3603              | E13H                  |                  |                         |                              |                             |               |           |              |
| 3604              | E14H                  |                  |                         |                              |                             |               |           |              |
| 3605              | E15H                  |                  |                         |                              |                             |               |           |              |
| 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<br>(decimal) | Address<br>(hexadecimal) | Name             |                         |                                 |                                | Default<br>value | Data type | Auto<br>refresh |
|----------------------|--------------------------|------------------|-------------------------|---------------------------------|--------------------------------|------------------|-----------|-----------------|
| 3760                 | EB0H                     | Alarm history 1  | Alarm code              |                                 |                                | 0                | Monitor   | ×               |
| 3761                 | EB1H                     |                  | Alarm time              | First two digits<br>of the year | Last two digits of<br>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\G9999)

| Address: decimal (hexadecimal) |              |              |              | Name                                                | Default value | Data type | Auto refresh |
|--------------------------------|--------------|--------------|--------------|-----------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2          | CH3          | CH4          |                                                     |               |           |              |
| 4000 to 4131 (FA0H to 1023H)   |              |              |              | System area                                         | —             | —         | —            |
| 4132 (1024H)                   | 4134 (1026H) | 4136 (1028H) | 4138 (102AH) | CH□ Offset/gain setting mode (offset specification) | 0             | Setting   | ×            |
| 4133 (1025H)                   | 4135 (1027H) | 4137 (1029H) | 4139 (102BH) | CH□ Offset/gain setting mode (gain specification)   | 0             | Setting   | ×            |
| 4140 to 4163 (102CH to 1043H)  |              |              |              | System area                                         | —             | —         | —            |
| 4164 (1044H)                   | 4165 (1045H) | 4166 (1046H) | 4167 (1047H) | CH□ Offset/gain setting mode (range specification)  | 0             | Setting   | ×            |
| 4168 to 9999 (1048H to 270FH)  |              |              |              | System area                                         | —             | —         | —            |

## ■Logging data (Un\G10000 to Un\G89999)

| Address: decimal (hexadecimal)   |                                 |                                 |                                 | Name             | Default value | Data type | Auto refresh |
|----------------------------------|---------------------------------|---------------------------------|---------------------------------|------------------|---------------|-----------|--------------|
| CH1                              | CH2                             | CH3                             | CH4                             |                  |               |           |              |
| 10000 to 19999 (2710H to 4E1FH)  | 20000 to 29999 (4E20H to 752FH) | 30000 to 39999 (7530H to 9C3FH) | 40000 to 49999 (9C40H to C34FH) | CH□ Logging data | 0             | Monitor   | ×            |
| 50000 to 89999 (C350H to 15F8FH) |                                 |                                 |                                 | System area      | —             | —         | —            |

## In FX3 allocation function mode

○: With refresh setting, ×: Without refresh setting

| Address: decimal (hexadecimal) |          |          |          | Name                                                                                | Default value | Data type | Auto refresh |
|--------------------------------|----------|----------|----------|-------------------------------------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2      | CH3      | CH4      |                                                                                     |               |           |              |
| 0 (0H)                         |          |          |          | CH□ Range setting                                                                   | 0H            | Setting   | ×            |
| 1 (1H)                         |          |          |          | System area                                                                         | —             | —         | —            |
| 2 (2H)                         | 3 (3H)   | 4 (4H)   | 5 (5H)   | CH□ Time average/Count average/Moving average/Primary delay filter constant setting | 0000H         | Setting   | ×            |
| 6 (6H)                         | 7 (7H)   | 8 (8H)   | 9 (9H)   | CH□ Digital filter setting                                                          | 0             | Setting   | ×            |
| 10 (AH)                        | 11 (BH)  | 12 (CH)  | 13 (DH)  | CH□ Digital operation value                                                         | 0             | Monitor   | ○            |
| 14 to 25 (EH to 19H)           |          |          |          | System area                                                                         | —             | —         | —            |
| 26 (1AH)                       |          |          |          | Warning output flag (Process alarm upper limit/lower limit)                         | 0000H         | Monitor   | ○            |
| 27 (1BH)                       |          |          |          | Warning output flag (Rate alarm upper limit/lower limit)                            | 0000H         | Monitor   | ○            |
| 28 (1CH)                       |          |          |          | Input signal error detection flag                                                   | 0000H         | Monitor   | ○            |
| 29 (1DH)                       |          |          |          | Latest error code                                                                   | 0             | Monitor   | ○            |
| 30 (1EH)                       |          |          |          | Module information                                                                  | 6144H         | Monitor   | ×            |
| 31 to 60 (1FH to 3CH)          |          |          |          | System area                                                                         | —             | —         | —            |
| 61 (3DH)                       | 62 (3EH) | 63 (3FH) | 64 (40H) | CH□ Conversion value shift amount                                                   | 0             | Control   | ○            |
| 65 to 68 (41H to 44H)          |          |          |          | System area                                                                         | —             | —         | —            |
| 69 (45H)                       |          |          |          | Input signals                                                                       | 0             | Monitor   | ×            |
| 70 (46H)                       |          |          |          | Output signals                                                                      | 0             | Control   | ×            |
| 71 (47H)                       | 72 (48H) | 73 (49H) | 74 (4AH) | CH□ Process alarm lower lower limit value                                           | 0             | Setting   | ×            |
| 75 to 80 (4BH to 50H)          |          |          |          | System area                                                                         | —             | —         | —            |
| 81 (51H)                       | 82 (52H) | 83 (53H) | 84 (54H) | CH□ Process alarm upper upper limit value                                           | 0             | Setting   | ×            |
| 85 to 90 (55H to 5AH)          |          |          |          | System area                                                                         | —             | —         | —            |
| 91 (5BH)                       | 92 (5CH) | 93 (5DH) | 94 (5EH) | CH□ Rate alarm upper limit value                                                    | 3200          | Setting   | ×            |
| 95 to 100 (5FH to 64H)         |          |          |          | System area                                                                         | —             | —         | —            |

| Address: decimal (hexadecimal) |             |             |             | Name                                                             | Default value | Data type | Auto refresh |
|--------------------------------|-------------|-------------|-------------|------------------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2         | CH3         | CH4         |                                                                  |               |           |              |
| 101 (65H)                      | 102 (66H)   | 103 (67H)   | 104 (68H)   | CH□ Minimum value                                                | 0             | Monitor   | ○            |
| 105 to 108 (69H to 6CH)        |             |             |             | System area                                                      | —             | —         | —            |
| 109 (6DH)                      |             |             |             | Minimum value reset request                                      | 0000H         | Control   | ○            |
| 110 (6EH)                      |             |             |             | Minimum value reset completed flag                               | 0000H         | Monitor   | ○            |
| 111 (6FH)                      | 112 (70H)   | 113 (71H)   | 114 (72H)   | CH□ Maximum value                                                | 0             | Monitor   | ○            |
| 115 to 118 (73H to 76H)        |             |             |             | System area                                                      | —             | —         | —            |
| 119 (77H)                      |             |             |             | Maximum value reset request                                      | 0000H         | Control   | ○            |
| 120 (78H)                      |             |             |             | Maximum value reset completed flag                               | 0000H         | Monitor   | ○            |
| 121 to 123 (79H to 7BH)        |             |             |             | System area                                                      | —             | —         | —            |
| 124 (7CH)                      |             |             |             | A/D conversion completed flag                                    | 0000H         | Monitor   | ○            |
| 125 to 129 (7DH to 81H)        |             |             |             | System area                                                      | —             | —         | —            |
| 130 (82H)                      |             |             |             | Rate alarm change rate selection                                 | 0001H         | Setting   | ×            |
| 131, 132 (83H, 84H)            |             |             |             | System area                                                      | —             | —         | —            |
| 133 (85H)                      |             |             |             | Input signal error detect automatic clear enable/disable setting | 0001H         | Setting   | ×            |
| 134 to 999 (86H to 3E7H)       |             |             |             | System area                                                      | —             | —         | —            |
| 1000 (3E8H)                    | 1002 (3EAH) | 1004 (3ECH) | 1006 (3EEH) | CH□ Digital output value                                         | 0             | Monitor   | ○            |
| 1001 (3E9H)                    | 1003 (3EBH) | 1005 (3EDH) | 1007 (3EFH) | System area                                                      | —             | —         | —            |
| 1008 to 1020 (3F0H to 3FCH)    |             |             |             | System area                                                      | —             | —         | —            |
| 1021 (3FDH)                    | 1022 (3FEH) | 1023 (3FFH) | 1024 (400H) | CH□ A/D conversion status                                        | 0000H         | Monitor   | ×            |
| 1025 to 1030 (401H to 406H)    |             |             |             | System area                                                      | —             | —         | —            |
| 1031 (407H)                    | 1032 (408H) | 1033 (409H) | 1034 (40AH) | CH□ Range setting monitor                                        | 0             | Monitor   | ×            |
| 1035 to 1080 (40BH to 438H)    |             |             |             | System area                                                      | —             | —         | —            |
| 1081 (439H)                    | 1082 (43AH) | 1083 (43BH) | 1084 (43CH) | CH□ Averaging process specification                              | 0000H         | Setting   | ×            |
| 1085 to 1090 (43DH to 442H)    |             |             |             | System area                                                      | —             | —         | —            |
| 1091 (443H)                    | 1092 (444H) | 1093 (445H) | 1094 (446H) | CH□ Scaling enable/disable setting                               | 0001H         | Setting   | ×            |
| 1095 to 1099 (447H to 44BH)    |             |             |             | System area                                                      | —             | —         | —            |
| 1100 (44CH)                    | 1102 (44EH) | 1104 (450H) | 1106 (452H) | CH□ Scaling upper limit value (L)                                | 0             | Setting   | ×            |
| 1101 (44DH)                    | 1103 (44FH) | 1105 (451H) | 1107 (453H) | CH□ Scaling upper limit value (H)                                |               | Setting   | ×            |
| 1108 to 1119 (454H to 45FH)    |             |             |             | System area                                                      | —             | —         | —            |
| 1120 (460H)                    | 1122 (462H) | 1124 (464H) | 1126 (466H) | CH□ Scaling lower limit value (L)                                | 0             | Setting   | ×            |
| 1121 (461H)                    | 1123 (463H) | 1125 (465H) | 1127 (467H) | CH□ Scaling lower limit value (H)                                |               | Setting   | ×            |
| 1128 to 1140 (468H to 474H)    |             |             |             | System area                                                      | —             | —         | —            |
| 1141 (475H)                    | 1142 (476H) | 1143 (477H) | 1144 (478H) | CH□ Digital clipping enable/disable setting                      | 0001H         | Setting   | ×            |
| 1145 to 1150 (479H to 47EH)    |             |             |             | System area                                                      | —             | —         | —            |
| 1151 (47FH)                    | 1152 (480H) | 1153 (481H) | 1154 (482H) | CH□ Input signal error detection setting                         | 0001H         | Setting   | ×            |
| 1155 to 1160 (483H to 488H)    |             |             |             | System area                                                      | —             | —         | —            |
| 1161 (489H)                    | 1162 (48AH) | 1163 (48BH) | 1164 (48CH) | CH□ Input signal error detection lower limit setting value       | 20            | Setting   | ×            |
| 1165 to 1170 (48DH to 492H)    |             |             |             | System area                                                      | —             | —         | —            |

| Address: decimal (hexadecimal) |             |             |             | Name                                                       | Default value | Data type | Auto refresh |
|--------------------------------|-------------|-------------|-------------|------------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2         | CH3         | CH4         |                                                            |               |           |              |
| 1171 (493H)                    | 1172 (494H) | 1173 (495H) | 1174 (496H) | CH□ Input signal error detection upper limit setting value | 20            | Setting   | ×            |
| 1175 to 1180 (497H to 49CH)    |             |             |             | System area                                                | —             | —         | —            |
| 1181 (49DH)                    | 1182 (49EH) | 1183 (49FH) | 1184 (4A0H) | CH□ Alert output setting (Process alarm)                   | 0001H         | Setting   | ×            |
| 1185 to 1190 (4A1H to 4A6H)    |             |             |             | System area                                                | —             | —         | —            |
| 1191 (4A7H)                    | 1192 (4A8H) | 1193 (4A9H) | 1194 (4AAH) | CH□ Process alarm upper lower limit value                  | 0             | Setting   | ×            |
| 1195 to 1200 (4ABH to 4B0H)    |             |             |             | System area                                                | —             | —         | —            |
| 1201 (4B1H)                    | 1202 (4B2H) | 1203 (4B3H) | 1204 (4B4H) | CH□ Process alarm lower upper limit value                  | 0             | Setting   | ×            |
| 1205 to 1210 (4B5H to 4BAH)    |             |             |             | System area                                                | —             | —         | —            |
| 1211 (4BBH)                    | 1212 (4BCH) | 1213 (4BDH) | 1214 (4BEH) | CH□ Alert output setting (Rate alarm)                      | 0001H         | Setting   | ×            |
| 1215 to 1220 (4BFH to 4C4H)    |             |             |             | System area                                                | —             | —         | —            |
| 1221 (4C5H)                    | 1222 (4C6H) | 1223 (4C7H) | 1224 (4C8H) | CH□ Rate alarm alert detection cycle setting               | 0             | Setting   | ×            |
| 1225 to 1230 (4C9H to 4CEH)    |             |             |             | System area                                                | —             | —         | —            |
| 1231 (4CFH)                    | 1232 (4D0H) | 1233 (4D1H) | 1234 (4D2H) | CH□ Rate alarm lower limit value                           | -3200         | Setting   | ×            |
| 1235 to 1320 (4D3H to 528H)    |             |             |             | System area                                                | —             | —         | —            |
| 1321 (529H)                    | 1322 (52AH) | 1323 (52BH) | 1324 (52CH) | CH□ A/D conversion enable/disable setting                  | 0             | Setting   | ×            |
| 1325 to 1330 (52DH to 532H)    |             |             |             | System area                                                | —             | —         | —            |
| 1331 (533H)                    | 1332 (534H) | 1333 (535H) | 1334 (536H) | CH□ Digital filter conversion cycle monitor                | 0             | Monitor   | ×            |
| 1335 to 1339 (537H to 53BH)    |             |             |             | System area                                                | —             | —         | —            |
| 1340 (53DH)                    | 1342 (53FH) | 1344 (541H) | 1346 (543H) | CH□ Digital filter fluctuation width setting (L)           | 0             | Setting   | ×            |
| 1341 (53DH)                    | 1343 (53FH) | 1345 (541H) | 1347 (543H) | CH□ Digital filter fluctuation width setting (H)           |               |           |              |
| 1348 to 1360 (544H to 550H)    |             |             |             | System area                                                | —             | —         | —            |
| 1361 (551H)                    | 1362 (552H) | 1363 (553H) | 1364 (554H) | CH□ Difference conversion state flag                       | 0000H         | Monitor   | ○            |
| 1365 to 1370 (555H to 55AH)    |             |             |             | System area                                                | —             | —         | —            |
| 1371 (55BH)                    | 1372 (55CH) | 1373 (55DH) | 1374 (55EH) | CH□ Difference conversion standard value                   | 0             | Monitor   | ×            |
| 1375 to 1380 (55FH to 564H)    |             |             |             | System area                                                | —             | —         | —            |
| 1381 (565H)                    | 1382 (566H) | 1383 (567H) | 1384 (568H) | CH□ Difference conversion trigger                          | 0000H         | Control   | ○            |
| 1385 to 3100 (569H to C1CH)    |             |             |             | System area                                                | —             | —         | —            |
| 3101 (C1DH)                    |             |             |             | Latest address of error history                            | 0             | Monitor   | ○            |
| 3102 (C1EH)                    |             |             |             | Latest alarm code                                          | 0             | Monitor   | ○            |
| 3103 (C1FH)                    |             |             |             | Latest address of alarm history                            | 0             | Monitor   | ○            |
| 3104 to 3130 (C20H to C3AH)    |             |             |             | System area                                                | —             | —         | —            |
| 3131 (C3BH)                    |             |             |             | Firmware version                                           | 0             | Monitor   | ×            |
| 3132 to 3159 (C3CH to C57H)    |             |             |             | System area                                                | —             | —         | —            |
| 3160 (C58H)                    |             |             |             | Operation mode monitor                                     | 0             | Monitor   | ○            |
| 3161 to 4000 (C59H to FA0H)    |             |             |             | System area                                                | —             | —         | —            |
| 4001 to 4016 (FA1H to FB0H)    |             |             |             | Interrupt factor detection flag [n] <sup>+1</sup>          | 0             | Monitor   | ○            |
| 4017 to 4020 (FB1H to FB4H)    |             |             |             | System area                                                | —             | —         | —            |
| 4021 to 4036 (FB5H to FC4H)    |             |             |             | Interrupt factor mask [n] <sup>+1</sup>                    | 0             | Control   | ×            |

| Address: decimal (hexadecimal) |              |              |              | Name                                                   | Default value | Data type | Auto refresh |
|--------------------------------|--------------|--------------|--------------|--------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2          | CH3          | CH4          |                                                        |               |           |              |
| 4037 to 4040 (FC5H to FC8H)    |              |              |              | System area                                            | —             | —         | —            |
| 4041 to 4056 (FC9H to FD8H)    |              |              |              | Interrupt factor reset request [n] <sup>*1</sup>       | 0             | Control   | ×            |
| 4057 to 4060 (FD9H to FDCH)    |              |              |              | System area                                            | —             | —         | —            |
| 4061 to 4076 (FDDH to FECH)    |              |              |              | Interrupt factor transaction setting [n] <sup>*1</sup> | 0             | Setting   | ×            |
| 4077 to 4080 (FEDH to FF0H)    |              |              |              | System area                                            | —             | —         | —            |
| 4081 to 4096 (FF1H to 1000H)   |              |              |              | Condition target setting [n] <sup>*1</sup>             | 0             | Setting   | ×            |
| 4097 to 4100 (1001H to 1004H)  |              |              |              | System area                                            | —             | —         | —            |
| 4101 to 4116 (1005H to 1014H)  |              |              |              | Condition target channel setting [n] <sup>*1</sup>     | 0             | Setting   | ×            |
| 4117 to 4119 (1015H to 1017H)  |              |              |              | System area                                            | —             | —         | —            |
| 4120, 4121 (1018H, 1019H)      |              |              |              | Mode switching setting                                 | 0             | Setting   | ×            |
| 4122 to 4130 (101AH to 1022H)  |              |              |              | System area                                            | —             | —         | —            |
| 4131 (1023H)                   | 4132 (1024H) | 4133 (1025H) | 4134 (1026H) | CH□ Offset/gain setting mode (offset specification)    | 0             | Setting   | ×            |
| 4135 to 4140 (1027H to 102CH)  |              |              |              | System area                                            | —             | —         | —            |
| 4141 (102DH)                   | 4142 (102EH) | 4143 (102FH) | 4144 (1030H) | CH□ Offset/gain setting mode (gain specification)      | 0             | Setting   | ×            |
| 4145 to 4150 (1031H to 1036H)  |              |              |              | System area                                            | —             | —         | —            |
| 4151 (1037H)                   | 4152 (1038H) | 4153 (1039H) | 4154 (103AH) | CH□ Offset/gain setting mode (range specification)     | 0             | Setting   | ×            |
| 4155 to 4159 (103BH to 103FH)  |              |              |              | System area                                            | —             | —         | —            |
| 4160 (1040H)                   |              |              |              | Offset/gain initialization enable code                 | 0             | Setting   | ×            |
| 4161 to 8599 (1041H to 2197H)  |              |              |              | System area                                            | —             | —         | —            |
| 8600 to 8609 (2198H to 21A1H)  |              |              |              | Error history 1                                        | 0             | Monitor   | ×            |
| 8610 to 8619 (21A2H to 21ABH)  |              |              |              | Error history 2                                        | 0             | Monitor   | ×            |
| 8620 to 8629 (21ACH to 21B5H)  |              |              |              | Error history 3                                        | 0             | Monitor   | ×            |
| 8630 to 8639 (21B6H to 21BFH)  |              |              |              | Error history 4                                        | 0             | Monitor   | ×            |
| 8640 to 8649 (21C0H to 21C9H)  |              |              |              | Error history 5                                        | 0             | Monitor   | ×            |
| 8650 to 8659 (21CAH to 21D3H)  |              |              |              | Error history 6                                        | 0             | Monitor   | ×            |
| 8660 to 8669 (21D4H to 21DDH)  |              |              |              | Error history 7                                        | 0             | Monitor   | ×            |
| 8670 to 8679 (21DEH to 21E7H)  |              |              |              | Error history 8                                        | 0             | Monitor   | ×            |
| 8680 to 8689 (21E8H to 21F1H)  |              |              |              | Error history 9                                        | 0             | Monitor   | ×            |
| 8690 to 8699 (21F2H to 21FBH)  |              |              |              | Error history 10                                       | 0             | Monitor   | ×            |
| 8700 to 8709 (21FCH to 2205H)  |              |              |              | Error history 11                                       | 0             | Monitor   | ×            |
| 8710 to 8719 (2206H to 220FH)  |              |              |              | Error history 12                                       | 0             | Monitor   | ×            |
| 8720 to 8729 (2210H to 2219H)  |              |              |              | Error history 13                                       | 0             | Monitor   | ×            |
| 8730 to 8739 (221AH to 2223H)  |              |              |              | Error history 14                                       | 0             | Monitor   | ×            |
| 8740 to 8749 (2224H to 222DH)  |              |              |              | Error history 15                                       | 0             | Monitor   | ×            |
| 8750 to 8759 (222EH to 2237H)  |              |              |              | Error history 16                                       | 0             | Monitor   | ×            |
| 8760 to 8769 (2238H to 2241H)  |              |              |              | Alarm history 1                                        | 0             | Monitor   | ×            |
| 8770 to 8779 (2242H to 224BH)  |              |              |              | Alarm history 2                                        | 0             | Monitor   | ×            |
| 8780 to 8789 (224CH to 2255H)  |              |              |              | Alarm history 3                                        | 0             | Monitor   | ×            |
| 8790 to 8799 (2256H to 225FH)  |              |              |              | Alarm history 4                                        | 0             | Monitor   | ×            |
| 8800 to 8809 (2260H to 2269H)  |              |              |              | Alarm history 5                                        | 0             | Monitor   | ×            |
| 8810 to 8819 (226AH to 2273H)  |              |              |              | Alarm history 6                                        | 0             | Monitor   | ×            |
| 8820 to 8829 (2274H to 227DH)  |              |              |              | Alarm history 7                                        | 0             | Monitor   | ×            |
| 8830 to 8839 (227EH to 2287H)  |              |              |              | Alarm history 8                                        | 0             | Monitor   | ×            |
| 8840 to 8849 (2288H to 2291H)  |              |              |              | Alarm history 9                                        | 0             | Monitor   | ×            |
| 8850 to 8859 (2292H to 229BH)  |              |              |              | Alarm history 10                                       | 0             | Monitor   | ×            |
| 8860 to 8869 (229CH to 22A5H)  |              |              |              | Alarm history 11                                       | 0             | Monitor   | ×            |
| 8870 to 8879 (22A6H to 22AFH)  |              |              |              | Alarm history 12                                       | 0             | Monitor   | ×            |

| Address: decimal (hexadecimal) |              |              |              | Name                                                            | Default value | Data type | Auto refresh |
|--------------------------------|--------------|--------------|--------------|-----------------------------------------------------------------|---------------|-----------|--------------|
| CH1                            | CH2          | CH3          | CH4          |                                                                 |               |           |              |
| 8880 to 8889 (22B0H to 22B9H)  |              |              |              | Alarm history 13                                                | 0             | Monitor   | ×            |
| 8890 to 8899 (22BAH to 22C3H)  |              |              |              | Alarm history 14                                                | 0             | Monitor   | ×            |
| 8900 to 8909 (22C4H to 22CDH)  |              |              |              | Alarm history 15                                                | 0             | Monitor   | ×            |
| 8910 to 8919 (22CEH to 22D7H)  |              |              |              | Alarm history 16                                                | 0             | Monitor   | ×            |
| 8920 to 9009 (22D8H to 2331H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9010 to 9019 (2332H to 233BH)  |              |              |              | Level data 0 to 9                                               | 0             | Control   | ○            |
| 9020 (233CH)                   |              |              |              | System area                                                     | —             | —         | —            |
| 9021 (233DH)                   | 9022 (233EH) | 9023 (233FH) | 9024 (2340H) | CH□ Logging hold flag                                           | 0             | Monitor   | ○            |
| 9025 to 9030 (2341H to 2346H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9031 (2347H)                   | 9032 (2348H) | 9033 (2349H) | 9034 (234AH) | CH□ Head pointer                                                | 0             | Monitor   | ×            |
| 9035 to 9040 (234BH to 2350H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9041 (2351H)                   | 9042 (2352H) | 9043 (2353H) | 9044 (2354H) | CH□ Latest pointer                                              | 0             | Monitor   | ×            |
| 9045 to 9050 (2355H to 235AH)  |              |              |              | System area                                                     | —             | —         | —            |
| 9051 (235BH)                   | 9052 (235CH) | 9053 (235DH) | 9054 (235EH) | CH□ Number of logging data                                      | 0             | Monitor   | ×            |
| 9055 to 9060 (235FH to 2364H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9061 (2365H)                   | 9062 (2366H) | 9063 (2367H) | 9064 (2368H) | CH□ Trigger pointer                                             | 0             | Monitor   | ×            |
| 9065 to 9070 (2369H to 236EH)  |              |              |              | System area                                                     | —             | —         | —            |
| 9071 (236FH)                   | 9074 (2372H) | 9077 (2375H) | 9080 (2378H) | CH□ Logging cycle monitor value (s)                             | 0             | Monitor   | ×            |
| 9072 (2370H)                   | 9075 (2373H) | 9078 (2376H) | 9081 (2379H) | CH□ Logging cycle monitor value (ms)                            | 0             | Monitor   | ×            |
| 9073 (2371H)                   | 9076 (2374H) | 9079 (2377H) | 9082 (237AH) | CH□ Logging cycle monitor value (μs)                            | 0             | Monitor   | ×            |
| 9083 to 9100 (237BH to 238CH)  |              |              |              | System area                                                     | —             | —         | —            |
| 9101 (238DH)                   | 9106 (2392H) | 9111 (2397H) | 9116 (239CH) | CH□ Trigger generation time (First/Last two digits of the year) | 0             | Monitor   | ×            |
| 9102 (238EH)                   | 9107 (2393H) | 9112 (2398H) | 9117 (239DH) | CH□ Trigger generation time (Month/Day)                         | 0             | Monitor   | ×            |
| 9103 (238FH)                   | 9108 (2394H) | 9113 (2399H) | 9118 (239EH) | CH□ Trigger generation time (Hour/Minute)                       | 0             | Monitor   | ×            |
| 9104 (2390H)                   | 9109 (2395H) | 9114 (239AH) | 9119 (239FH) | CH□ Trigger generation time (Second/Day of the week)            | 0             | Monitor   | ×            |
| 9105 (2391H)                   | 9110 (2396H) | 9115 (239BH) | 9120 (23A0H) | CH□ Trigger generation time (Millisecond)                       | 0             | Monitor   | ×            |
| 9121 to 9150 (23A1H to 23BEH)  |              |              |              | System area                                                     | —             | —         | —            |
| 9151 (23BFH)                   | 9152 (23C0H) | 9153 (23C1H) | 9154 (23C2H) | CH□ Logging hold request                                        | 0             | Control   | ○            |
| 9155 to 9160 (23C3H to 23C8H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9161 (23C9H)                   | 9162 (23CAH) | 9163 (23CBH) | 9164 (23CCH) | CH□ Logging enable/disable setting                              | 1             | Setting   | ×            |
| 9165 to 9170 (23CDH to 23D2H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9171 (23D3H)                   | 9172 (23D4H) | 9173 (23D5H) | 9174 (23D6H) | CH□ Logging data setting                                        | 1             | Setting   | ×            |
| 9175 to 9180 (23D7H to 23DCH)  |              |              |              | System area                                                     | —             | —         | —            |
| 9181 (23DDH)                   | 9182 (23DEH) | 9183 (23DFH) | 9184 (23E0H) | CH□ Logging cycle setting value                                 | 4             | Setting   | ×            |
| 9185 to 9190 (23E1H to 23E6H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9191 (23E7H)                   | 9192 (23E8H) | 9193 (23E9H) | 9194 (23EAH) | CH□ Logging cycle unit setting                                  | 1             | Setting   | ×            |
| 9195 to 9200 (23EBH to 23F0H)  |              |              |              | System area                                                     | —             | —         | —            |
| 9201 (23F1H)                   | 9202 (23F2H) | 9203 (23F3H) | 9204 (23F4H) | CH□ Post-trigger logging points                                 | 5000          | Setting   | ×            |
| 9205 to 9210 (23F5H to 23FAH)  |              |              |              | System area                                                     | —             | —         | —            |
| 9211 (23FBH)                   | 9212 (23FCH) | 9213 (23FDH) | 9214 (23FEH) | CH□ Level trigger condition setting                             | 0             | Setting   | ×            |
| 9215 to 9220 (23FFH to 2404H)  |              |              |              | System area                                                     | —             | —         | —            |



| Address: decimal (hexadecimal)  |              |              |              | Name                                       | Default value | Data type | Auto refresh |
|---------------------------------|--------------|--------------|--------------|--------------------------------------------|---------------|-----------|--------------|
| CH1                             | CH2          | CH3          | CH4          |                                            |               |           |              |
| 9221 (2405H)                    | 9222 (2406H) | 9223 (2407H) | 9224 (2408H) | CH□ Trigger data                           | *2            | Setting   | ×            |
| 9225 to 9230 (2409H to 240EH)   |              |              |              | System area                                | —             | —         | —            |
| 9231 (240FH)                    | 9232 (2410H) | 9233 (2411H) | 9234 (2412H) | CH□ Trigger setting value                  | 0             | Setting   | ×            |
| 9235 to 9240 (2413H to 2418H)   |              |              |              | System area                                | —             | —         | —            |
| 9241 (2419H)                    | 9242 (241AH) | 9243 (241BH) | 9244 (241CH) | CH□ Current logging read pointer           | -1            | Monitor   | ×            |
| 9245 to 9250 (241DH to 2422H)   |              |              |              | System area                                | —             | —         | —            |
| 9251 (2423H)                    | 9252 (2424H) | 9253 (2425H) | 9254 (2426H) | CH□ Previous logging read pointer          | -1            | Monitor   | ×            |
| 9255 to 9260 (2427H to 242CH)   |              |              |              | System area                                | —             | —         | —            |
| 9261 (242DH)                    | 9262 (242EH) | 9263 (242FH) | 9264 (2430H) | CH□ Logging read points monitor value      | 0             | Monitor   | ×            |
| 9265 to 9270 (2431H to 2436H)   |              |              |              | System area                                | —             | —         | —            |
| 9271 (2437H)                    | 9272 (2438H) | 9273 (2439H) | 9274 (243AH) | CH□ Logging loading enable/disable setting | 1             | Setting   | ×            |
| 9275 to 9280 (243BH to 2440H)   |              |              |              | System area                                | —             | —         | —            |
| 9281 (2441H)                    | 9282 (2442H) | 9283 (2443H) | 9284 (2444H) | CH□ Logging load points setting value      | 1000          | Setting   | ×            |
| 9285 to 9999 (2445H to 270FH)   |              |              |              | System area                                | —             | —         | —            |
| 10000 to 19999 (2710H to 4E1FH) |              |              |              | CH1 Logging data                           | 0             | Monitor   | ×            |
| 20000 to 29999 (4E20H to 752FH) |              |              |              | CH2 Logging data                           | 0             | Monitor   | ×            |
| 30000 to 39999 (7530H to 9C3FH) |              |              |              | CH3 Logging data                           | 0             | Monitor   | ×            |
| 40000 to 49999 (9C40H to C34FH) |              |              |              | CH4 Logging data                           | 0             | Monitor   | ×            |
| 50000 - (C350H -)               |              |              |              | System area                                | —             | —         | —            |

\*1 [n] in the table indicates an interrupt setting number. (n = 1 to 16)

\*2 The following shows the default values.

CH1: 10, CH2: 11, CH3: 12, CH4: 13

## Details of buffer memory addresses

This section details the buffer memory areas of the analog input module.



This section describes buffer memory addresses for CH1.

### Latest error code

The latest error code detected in the analog input module is stored. For details, refer to the following.

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#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1 | CH2 | CH3 | CH4 |
|-----------------------------------------------------|-----|-----|-----|-----|
| Latest error code                                   | 0   |     |     |     |
| Latest error code (in FX3 allocation mode function) | 29  |     |     |     |

#### ■Clearing an error

Turn 'Error clear request' (Un\G70, b15) off→on→off.

### Latest address of error history

Among Error history □ (Un\G3600 to Un\G3759), the buffer memory address which stores the latest error code is stored.

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                | CH1  | CH2 | CH3 | CH4 |
|-------------------------------------------------------------------|------|-----|-----|-----|
| Latest address of error history                                   | 1    |     |     |     |
| Latest address of error history (in FX3 allocation mode function) | 3101 |     |     |     |

### Latest alarm code

The latest alarm code detected in the analog input module is stored. For details, refer to the following.

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#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1  | CH2 | CH3 | CH4 |
|-----------------------------------------------------|------|-----|-----|-----|
| Latest alarm code                                   | 2    |     |     |     |
| Latest alarm code (in FX3 allocation mode function) | 3102 |     |     |     |

#### ■Clearing an alarm

Turn 'Error clear request' (Un\G70, b15) off→on→off.

### 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.

| Buffer memory name                                                | CH1  | CH2 | CH3 | CH4 |
|-------------------------------------------------------------------|------|-----|-----|-----|
| Latest address of alarm history                                   | 3    |     |     |     |
| Latest address of alarm history (in FX3 allocation mode function) | 3103 |     |     |     |

## Interrupt factor detection flag [n]

The detection status of the interrupt factor is stored.

| Monitor 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) turns 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.

| Buffer memory name                                                    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|-----------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor detection flag [n]                                   | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   |
| Interrupt factor detection flag [n] (in FX3 allocation mode function) | 4001 | 4002 | 4003 | 4004 | 4005 | 4006 | 4007 | 4008 | 4009 | 4010 | 4011 | 4012 | 4013 | 4014 | 4015 | 4016 |

## Module information

Module information of FX5-4AD is stored. For module information, 6140H (fixed hexadecimal value) is stored.

- In the normal mode: 6140H
- In the FX3 allocation mode: 6144H

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                   | CH1 | CH2 | CH3 | CH4 |
|------------------------------------------------------|-----|-----|-----|-----|
| Module Information                                   | 30  |     |     |     |
| Module information (in FX3 allocation mode function) | 30  |     |     |     |

## Firmware version

Firmware version is stored. Firmware version is stored in 4 digit decimal number.

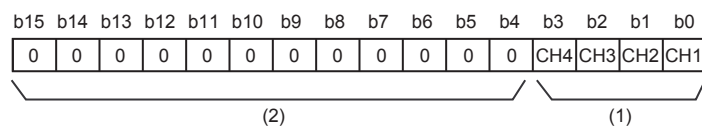
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                 | CH1  | CH2 | CH3 | CH4 |
|----------------------------------------------------|------|-----|-----|-----|
| Firmware version                                   | 31   |     |     |     |
| Firmware version (in FX3 allocation mode function) | 3131 |     |     |     |

## Warning output flag (Process alarm upper limit)

The upper limit alarm of the process alarm can be checked for each channel.



(1) 0: Normal, 1: Alarm ON

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------|-----|-----|-----|-----|
| Warning output flag (Process alarm upper limit) | 36  |     |     |     |

### ■Alert output flag status

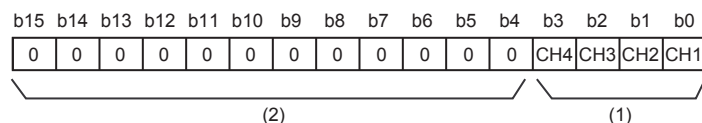
- If the limit specified by the process alarm upper upper limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Process alarm upper limit)' (Un\G36) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital operation value returns within the setting range, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Process alarm lower limit)

The lower limit alarm of the process alarm can be checked for each channel.



(1) 0: Normal, 1: Alarm ON

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------|-----|-----|-----|-----|
| Warning output flag (Process alarm lower limit) | 37  |     |     |     |

### ■Alert output flag status

- If the limit specified by the process alarm lower lower limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Process alarm lower limit)' (Un\G37) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital operation value returns within the setting range, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Process alarm upper limit/lower limit) [FX3 allocation mode]

When the FX3 allocation 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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH4<br>Upper<br>limit<br>value | CH4<br>Lower<br>limit<br>value | CH3<br>Upper<br>limit<br>value | CH3<br>Lower<br>limit<br>value | CH2<br>Upper<br>limit<br>value | CH2<br>Lower<br>limit<br>value | CH1<br>Upper<br>limit<br>value | CH1<br>Lower<br>limit<br>value |
| (2) |     |     |     |     |     |    |    | (1)                            |                                |                                |                                |                                |                                |                                |                                |

(1) 0: Normal, 1: Alarm ON

(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                    | CH1 | CH2 | CH3 | CH4 |
|-----------------------------------------------------------------------|-----|-----|-----|-----|
| Warning output flag (Process alarm) (in FX3 allocation mode function) | 26  |     |     |     |

### ■Alert output flag status

- When the value is equal to or exceeds the limit specified by the process alarm upper upper limit value or is equal to or falls below the process alarm lower lower limit value, Alarm ON (1) is stored in Warning output flag (Process alarm) corresponding to each channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital operation value returns within the setting range, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be 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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | CH4 | CH3 | CH2 | CH1 |
| (2) |     |     |     |     |     |    |    |    |    |    |    | (1) |     |     |     |

(1) 0: Normal, 1: Alarm ON

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                           | CH1 | CH2 | CH3 | CH4 |
|----------------------------------------------|-----|-----|-----|-----|
| Warning output flag (Rate alarm upper limit) | 38  |     |     |     |

### ■Alert output flag status

- If the limit specified in the rate alarm upper limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Rate alarm upper limit)' (Un\G38) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Rate alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the change rate of the digital output value returns within the setting range, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be 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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | CH4 | CH3 | CH2 | CH1 |

(2)
(1)

(1) 0: Normal, 1: Alarm ON

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                           | CH1 | CH2 | CH3 | CH4 |
|----------------------------------------------|-----|-----|-----|-----|
| Warning output flag (Rate alarm lower limit) | 39  |     |     |     |

### ■Alert output flag status

- When the value becomes equal to or smaller than 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.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Rate alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the change rate of the digital output value returns within the setting range, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Rate alarm upper limit/lower limit) [FX3 allocation mode]

When the FX3 allocation 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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH4<br>Upper<br>limit<br>value | CH4<br>Lower<br>limit<br>value | CH3<br>Upper<br>limit<br>value | CH3<br>Lower<br>limit<br>value | CH2<br>Upper<br>limit<br>value | CH2<br>Lower<br>limit<br>value | CH1<br>Upper<br>limit<br>value | CH1<br>Lower<br>limit<br>value |

(2)
(1)

(1) 0: Normal, 1: Alarm ON

(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                   | CH1 | CH2 | CH3 | CH4 |
|--------------------------------------------------------------------------------------|-----|-----|-----|-----|
| Warning output flag (Rate alarm upper/lower limit) (in FX3 allocation mode function) | 27  |     |     |     |

### ■Alert output flag status

- When the value is equal to or exceeds the limit specified by the rate alarm upper limit value or is equal to or falls below the rate alarm lower limit value, Alarm ON (1) is stored in Warning output flag (rate alarm) corresponding to each channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Rate alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the change rate of the digital output value returns within the setting range, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be 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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | CH4 | CH3 | CH2 | CH1 |
| (2) |     |     |     |     |     |    |    |    |    |    |    | (1) |     |     |     |

(1) 0: Normal, 1: Input signal error

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                | CH1 | CH2 | CH3 | CH4 |
|-----------------------------------|-----|-----|-----|-----|
| Input signal error detection flag | 40  |     |     |     |

### ■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' (Un\G69, b12) turns on.

### ■Clearing Input signal error detection flag

- When 'Input signal error detect automatic clear enable/disable setting' (Un\G304) is set to Disable, Input signal error detection flag turns off by turning off→on→off 'Error clear request' (Un\G70, b15) after the analog input value returns to within the setting range. When 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, the flag is cleared.
- When 'Input signal error detect automatic clear enable/disable setting' (Un\G304) is set to Disable, 'Input signal error detection signal' turns off after the analog input value returns to within the setting range.

## Input signal error detection flag [FX3 allocation mode]

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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | CH4 | 0   | CH3 | 0   | CH2 | 0   | CH1 |
|     |     |     |     |     |     |    |    |    | (1) | (1) |     | (1) |     | (1) |     |

(1) 0: Normal, 1: Input signal error

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1 | CH2 | CH3 | CH4 |
|---------------------------------------------------------------------|-----|-----|-----|-----|
| Input signal error detection flag [In FX3 allocation mode function] | 28  |     |     |     |

### ■Input signal error detection flag status

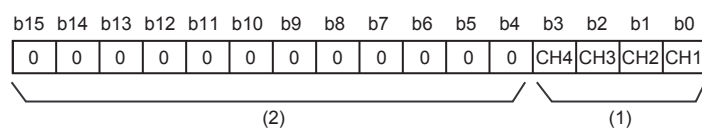
- When an analog input value out of the range specified in Input signal error detection setting value is detected, Input signal error (1) is stored in 'Input signal error detection flag' corresponding to each channel.
- When an error is detected in any channel where the A/D conversion and the input signal error detection are enabled, 'Input signal error detection signal' (Un\G69, b12) turns on.

### ■Clearing Input signal error detection flag

- When 'Input signal error detect automatic clear enable/disable setting' is set to Disable, Input signal error detection flag turns off by turning off→on→off 'Error clear request' (Un\G70, b15) after the analog input value returns to within the setting range. When 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, the flag is cleared.
- When 'Input signal error detect automatic clear enable/disable setting' is set to enable, 'Input signal error detection signal' turns off after the analog input value returns to within the setting range.

## A/D conversion completed flag

The A/D conversion status can be checked.



(1) 0: During A/D conversion or unused, 1: A/D conversion completed

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1 | CH2 | CH3 | CH4 |
|-----------------------------------------------------------------|-----|-----|-----|-----|
| A/D conversion completed flag                                   | 42  |     |     |     |
| A/D conversion completed flag (in FX3 allocation mode function) | 124 |     |     |     |

### ■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' (Un\G69, b14) 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 off→on→off 'Operating condition setting request' (Un\G70, b9) turns the flag back to the default (During A/D conversion or unused (0)), and when the first A/D conversion has completed, the flag turns to A/D conversion completed (1) again.

## Operation mode monitor

The operation mode status in operation can be checked.

| Monitor value | Description              |
|---------------|--------------------------|
| 0             | Normal mode              |
| 1             | Offset/gain setting mode |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                       | CH1  | CH2 | CH3 | CH4 |
|----------------------------------------------------------|------|-----|-----|-----|
| Operation mode monitor                                   | 60   |     |     |     |
| Operation mode monitor (In FX3 allocation mode function) | 3160 |     |     |     |



## Input signals

A state of an analog input module can be checked in the buffer memory area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                             | CH1 | CH2 | CH3 | CH4 |
|------------------------------------------------|-----|-----|-----|-----|
| Input signals                                  | 69  |     |     |     |
| Input signal (In FX3 allocation mode function) | 69  |     |     |     |

### ■List of input signals

| Buffer Memory Areas | Description                                |
|---------------------|--------------------------------------------|
| b0                  | Module READY                               |
| b1 to 4             | Use not allowed                            |
| b5                  | Offset/gain initialization completed flag  |
| b6                  | Use not allowed                            |
| b7                  | Use not allowed                            |
| b8                  | Warning output signal                      |
| b9                  | Operating condition setting completed flag |
| b10                 | Offset/gain setting mode status flag       |
| b11                 | Channel change completed flag              |
| b12                 | Input signal error detection signal        |
| b13                 | Range switching complete flag              |
| b14                 | A/D conversion completed flag              |
| b15                 | Error flag                                 |

### ■Module READY (b0)

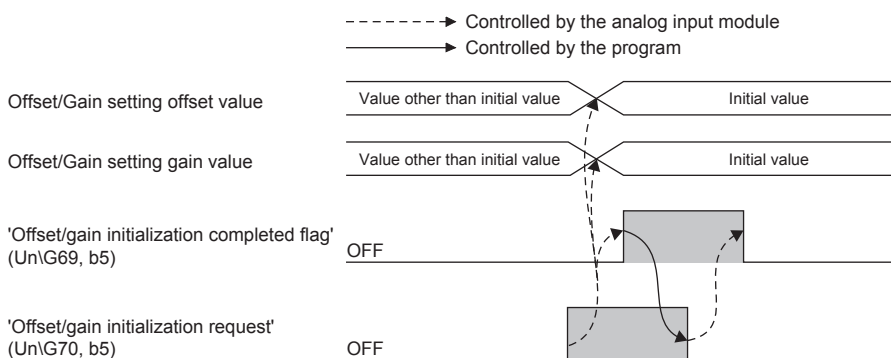
Module READY (X0) turns on to indicate the preparation for the A/D conversion is completed after the power-on or reset of the CPU module, and the A/D conversion is performed.

In the following cases, 'Module READY' turns off.

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

### ■Offset/gain initialization completed flag (b5)

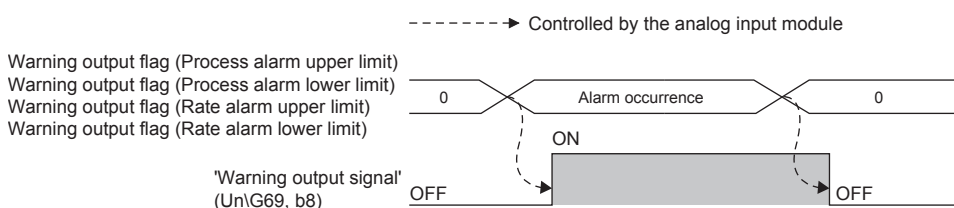
- Use as an interlock condition to turn off→on→off 'Offset/gain initialization request' (Un\G70, b5).
- Offset/gain initialization is not be performed unless 'Offset/gain initialization enabled code' (Un\G305) is set to E20FH.
- It is possible to perform offset/gain initialization in offset/gain setting mode only.
- When 'Offset/gain initialization request' (Un\G70, b5) is off, 'Offset/gain initialization complete flag' (Un\G69, b5) turns off.



## ■Warning output signal (b8)

Alert output signal (Un\G69, b8) turns on when the process alarm or rate alarm has been detected. When the alert output function (process alarm/rate alarm) is disabled for all channels, 'Alert output signal' (Un\G69, b8) is always off.

| Alarm         | Operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Process alarm | <ul style="list-style-type: none"> <li>The process alarm turns on when 'CH1 Digital operation value' is equal to or exceeds the setting range set in 'CH1 Process alarm upper upper limit value' (Un\G514) or is equal to or falls below the setting range set in 'CH1 Process alarm lower lower limit value' (Un\G520). The ALM LED also turns on along with the signal turning on. The target of alert output is the channels only where the alert output function (process alarm) and the A/D conversion are both enabled.</li> <li>Process alarm turns off when 'CH1 Digital output value' falls within the setting range for all the channels where the A/D conversion is enabled. The ALM LED also turns off along with the off of the signal.</li> </ul> |
| Rate alarm    | <ul style="list-style-type: none"> <li>The process alarm turns on when the change rate of 'CH1 Digital operation value' is equal to or exceeds the setting range set in 'CH1 Rate alarm upper limit value' (Un\G524) or is equal to or falls below the setting range set in 'CH1 Rate alarm lower value' (Un\G526). The ALM LED also turns on along with the signal turning on. The target of alert output is the channels only where the alert output function (rate alarm) and the A/D conversion are both enabled.</li> <li>Rate alarm turns off when the change rate of 'CH1 Digital output value' returns to within the setting range for all the channels where the A/D conversion is enabled. The ALM LED also turns off.</li> </ul>                     |



## ■Operating condition setting completed flag (b9)

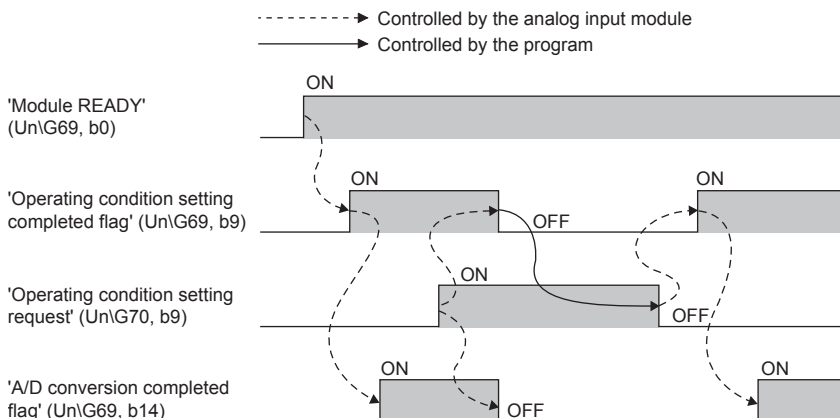
When changing values of the buffer memory, use as an interlock condition to turn off→on→off 'Operating condition setting request' (Un\G70, b9).

For the buffer memory areas which require turning off→on→off of 'Operating condition setting request' (Un\G70, b9) to enable the changed values, refer to the following.

☞ Page 108 Buffer Memory Areas

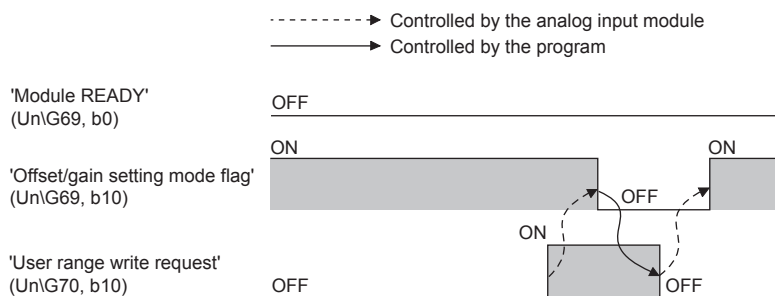
When 'Operating condition setting completed flag' (Un\G69, b9) is off, the A/D conversion is not performed.

When 'Operating condition setting request' (Un\G70, b9) is on, 'Operating condition setting completed flag' (Un\G69, b9) turns off.



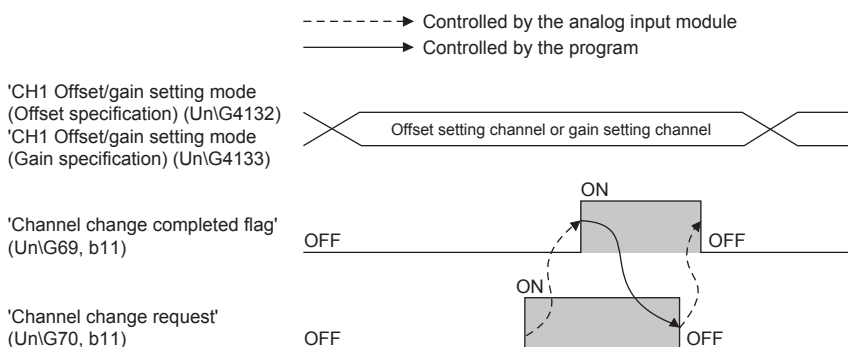
### ■Offset/gain setting mode status flag (b10)

When registering the value, which has been adjusted with the offset/gain setting, use as an interlock condition to turn off→on→off 'User range write request' (Un\G70, b10).



### ■Channel change completed flag (b11)

When changing a channel to perform the offset/gain setting, use as an interlock condition to turn off→on→off 'Channel change request' (Un\G70, b11).



### ■Input signal error detection signal (b12)

Set 'CH1 Input signal error detection setting' (Un\G528) to one of upper lower limit detection, upper limit detection, lower limit detection, and simple disconnection detection, and turns on if the analog input value exceeds the setting range that is set in 'CH1 Input signal error detection lower limit setting value' (Un\G529) or 'CH1 Input signal error detection upper limit setting value' (Un\G530) in the channel where the A/D conversion has been enabled. For the cases where the simple disconnection detection is set, 'CH1 Input signal error detection lower limit setting value' (Un\G529) or 'CH1 Input signal error detection upper limit setting value' (Un\G530) is ignored and turns on at the disconnection detection.

When 'Input signal error detection signal' (Un\G69, b12) turns on, the following operations are performed.

- Digital output value and digital operation value of the relevant channel is held with the value just before the error was detected.
- The ALM LED flashes.

Turning off 'Input signal error detection signal' (Un\G69, b12) varies depending on Input signal error detect automatic clear enable/disable setting.

| Input signal error detect automatic clear enable/disable setting | Operations related to the turning off of input signal error detection signal (Un\G69, b12)                                                                                                           |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enable (0)                                                       | If the input signal is within the setting range, 'Input signal error detection signal' (Un\G69, b12) and 'Input signal error detection flag' (Un\G40) automatically turn off, and ALM LED turns off. |

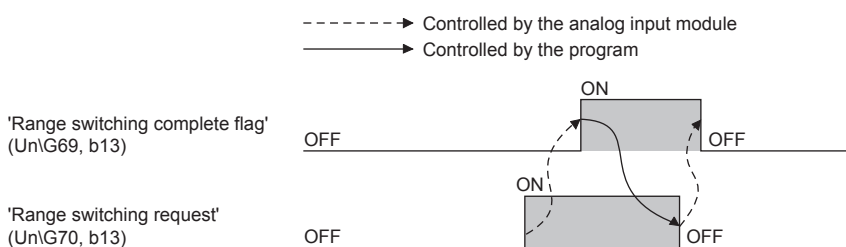
| Input signal error detect automatic clear enable/disable setting | Operations related to the turning off of input signal error detection signal (Un\G69, b12)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Disable (1)                                                      | <p>Remove the cause of the input signal error and set the input signal within the setting range. Then turn the 'error clear request' (Un\G70, b15) OFF→ON→OFF. The input signal error detection signal 'Un\G69, b12) and the 'input signal error detection flag' (Un\G40) will turn OFF, and the ALM LED will turn off. The latest alarm code will also be cleared. The latest alarm code will also be cleared.</p> <p>-----&gt; Controlled by the analog input module<br/> —————&gt; Controlled by the program</p> <p>Input signal error detection flag</p> <p>'Input signal error detection signal' (Un\G69, b12)</p> <p>'Error clear request' (Un\G70, b15)</p> |



Averaging processing starts over after the A/D conversion resumes.

### Range switching complete flag (b13)

When changing a range of channel to perform the offset/gain setting, use as an interlock condition to turn off→on→off 'Range switching request' (Un\G70, b13).

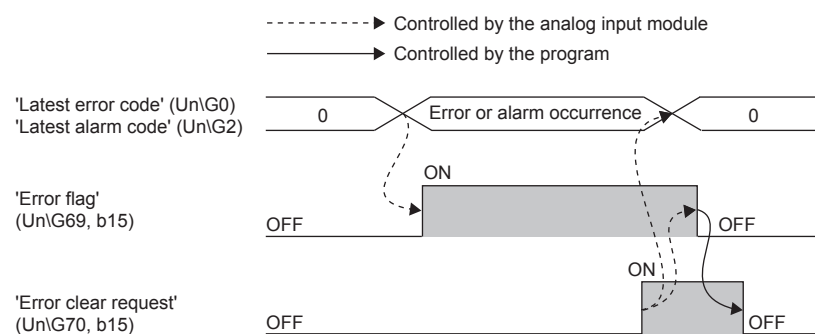


### A/D conversion completed flag (b14)

A/D conversion completed flag (Un\G70, b15) turns on when the first conversion has been completed for all A/D conversion enabled channels. When reading a digital output value, use this signal or 'A/D conversion completed flag' (Un\G42) as an interlock.

### Error occurrence flag (b15)

Error flag (Un\G69, b15) turns on when an error has occurred.



'Error flag' (Un\G69, b15), 'Latest error code' (Un\G0), and 'Latest alarm code' (Un\G2) are cleared at the timing when 'Error clear request' (Un\G70, b15) turns off→on.

## Output signals

The operation request to an analog input module can be set with the buffer memory.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------|-----|-----|-----|-----|
| Output signals                                  | 70  |     |     |     |
| Output signal (In FX3 allocation mode function) | 70  |     |     |     |

### ■List of output signals

| Buffer Memory Areas | Description                         |
|---------------------|-------------------------------------|
| b0 to 4             | Use not allowed                     |
| b5                  | Offset/gain initialization request  |
| b6 to 8             | Use not allowed                     |
| b9                  | Operating condition setting request |
| b10                 | User range write request            |
| b11                 | Channel change request              |
| b12                 | Use not allowed                     |
| b13                 | Range switching request             |
| b14                 | Use not allowed                     |
| b15                 | Error clear request                 |

#### ■Offset/gain initialization request (b5)

Turn off→on→off to enable the settings of buffer memory areas.

Offset/gain initialization is not to be performed unless Offset/gain initialization enabled code is set to E20FH.

When 'Offset/gain initialization request' (Un\G70, b5) is off, 'Offset/gain initialization complete flag' (Un\G69, b5) turns off.

#### ■Operating condition setting request (b9)

Turn off→on→off to enable the settings of buffer memory areas.

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

☞ Page 128 Operating condition setting completed flag (b9)

#### ■User range write request (b10)

In the offset/gain setting mode, turn off→on→off this signal to register the values adjusted with the offset/gain setting in an analog input module. The data is written to the flash memory at the timing when this signal is turned off→on.

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

☞ Page 129 Offset/gain setting mode status flag (b10)

#### ■Channel change request (b11)

Turn off→on→off Channel change request (b11) to change a channel to perform the offset/gain setting.

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

☞ Page 129 Channel change completed flag (b11)

#### ■Range switching request (b13)

Turn off→on→off Range switching request (b13) to change a range of channel to perform the offset/gain setting.

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

☞ Page 130 Range switching complete flag (b13)

#### ■Error clear request (b15)

Turn off→on→off Error clear request (b15) when Error flag (Un\G69, b15), Input signal error detection signal (Un\G69, b12), Latest error code (Un\G0), and Latest alarm code (Un\G2) are cleared.

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

☞ Page 130 Error occurrence flag (b15)

☞ Page 129 Input signal error detection signal (b12)

## 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). These are useful, for example, to generate triggers while monitoring the values of devices other than the analog input module.

For details on the logging function, refer to the following.

 Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                            | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|-----------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Level data□                                   | 90   | 91   | 92   | 93   | 94   | 95   | 96   | 97   | 98   | 99   |
| Level data□ (in FX3 allocation mode function) | 9010 | 9011 | 9012 | 9013 | 9014 | 9015 | 9016 | 9017 | 9018 | 9019 |

### ■Setting range

The possible 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.

| Buffer memory name                                          | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|-------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor mask [n]                                   | 124  | 125  | 126  | 127  | 128  | 129  | 130  | 131  | 132  | 133  | 134  | 135  | 136  | 137  | 138  | 139  |
| Interrupt factor mask [n] (in FX3 allocation mode function) | 4021 | 4022 | 4023 | 4024 | 4025 | 4026 | 4027 | 4028 | 4029 | 4030 | 4031 | 4032 | 4033 | 4034 | 4035 | 4036 |

### ■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 detection flag [n]' (Un\G4 to Un\G19) turns to 'No interrupt factor' (0). When the set value is two or larger, the setting is regarded as Reset request (1).

"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|----------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor reset request [n]                                   | 156  | 157  | 158  | 159  | 160  | 161  | 162  | 163  | 164  | 165  | 166  | 167  | 168  | 169  | 170  | 171  |
| Interrupt factor reset request [n] (in FX3 allocation mode function) | 4064 | 4065 | 4066 | 4067 | 4068 | 4069 | 4070 | 4071 | 4072 | 4073 | 4074 | 4075 | 4076 | 4077 | 4078 | 4079 |

### ■Default value

The default value is 0 for all channels.

## Interrupt factor transaction 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 |

- With 'Interrupt factor generation setting [n]' (Un\G200 to Un\G215) set to Interrupt resend request (0) and an interrupt factor being detected, an occurrence of the same interrupt factor results in an interrupt request being sent to the CPU module again.
- With 'Interrupt factor generation setting [n]' (Un\G200 to Un\G215) set to No interrupt resend request (1) and an interrupt factor being detected, an occurrence of the same interrupt factor does not result in an interrupt request being sent to the CPU module.

If a value other than the above is set, an interrupt factor generation setting 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.

| Buffer memory name                                                         | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|----------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor transaction setting [n]                                   | 200  | 201  | 202  | 203  | 204  | 205  | 206  | 207  | 208  | 209  | 210  | 211  | 212  | 213  | 214  | 215  |
| Interrupt factor transaction setting [n] (in FX3 allocation mode function) | 4061 | 4062 | 4063 | 4064 | 4065 | 4066 | 4067 | 4068 | 4069 | 4070 | 4071 | 4072 | 4073 | 4074 | 4075 | 4076 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

## Condition target setting [n]

Set an interrupt factor to be detected.

| Setting value | Setting content                     |
|---------------|-------------------------------------|
| 0             | Disable                             |
| 1             | Error flag (Un\G69, b15)            |
| 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                        |

If a value other than the above is set, a condition target setting range error (error code: 181△H) occurs.

When the buffer memory set to 'Condition target setting [n]' (Un\G232 to Un\G247) turns off→on, an interrupt request is sent to the CPU module.

"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|----------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Condition target setting [n]                                   | 232  | 233  | 234  | 235  | 236  | 237  | 238  | 239  | 240  | 241  | 242  | 243  | 244  | 245  | 246  | 247  |
| Condition target setting [n] (in FX3 allocation mode function) | 4081 | 4082 | 4083 | 4084 | 4085 | 4086 | 4087 | 4088 | 4089 | 4090 | 4091 | 4092 | 4093 | 4094 | 4095 | 4096 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 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             |

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.

If a value other than the above is set, a condition target 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.

| Buffer memory name                                                     | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Condition target channel setting [n]                                   | 264  | 265  | 266  | 267  | 268  | 269  | 270  | 271  | 272  | 273  | 274  | 275  | 276  | 277  | 278  | 279  |
| Condition target channel setting [n] (in FX3 allocation mode function) | 4101 | 4102 | 4103 | 4104 | 4105 | 4106 | 4107 | 4108 | 4109 | 4110 | 4111 | 4112 | 4113 | 4114 | 4115 | 4116 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.



## ■Default value

The default value is 0 for all channels.

## Mode switching setting

Set a setting value for the mode to be switched.

| Switching mode           | Setting value |       |
|--------------------------|---------------|-------|
| Buffer memory address    | 296           | 297   |
| Normal mode              | 4144H         | 4658H |
| Offset/gain setting mode | 4658H         | 4144H |

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                       | CH1        | CH2 | CH3 | CH4 |
|----------------------------------------------------------|------------|-----|-----|-----|
| Mode switching setting                                   | 296, 297   |     |     |     |
| Mode switching setting (in FX3 allocation mode function) | 4120, 4121 |     |     |     |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■After the mode is switched

When the mode is switched, this area is cleared to 0 and 'Operating condition setting completed flag' (Un\G69, b9) turns off. After checking that 'Operating condition setting completed flag' (Un\G69, b9) is off, turn off 'Operating condition setting request' (Un\G70, b9).

### Point

When a value out of the above is written and 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, the mode setting is not performed and only the operating condition is changed. In this case, this area is cleared to 0.

A

## Rate alarm change rate selection

Select rate alarm change rate. "Rate specification" that sets the rate alarm upper limit value and the rate alarm lower limit value in units of 0.1% with respect to (the maximum value of the digital output value) - (the minimum value of the digital output value), and "Digital output value specification" that sets in units of digits for the range of digital output values, can be selected.

| Setting value | Description                        |
|---------------|------------------------------------|
| 0             | Rate specification                 |
| 1             | Digital output value specification |

When setting to a value other than the above table, it operates with digital output value specification (1).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1 | CH2 | CH3 | CH4 |
|--------------------------------------------------------------------|-----|-----|-----|-----|
| Rate alarm change rate selection                                   | 299 |     |     |     |
| Rate alarm change rate selection (in FX3 allocation mode function) | 130 |     |     |     |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

Set to Digital output value specification (1).

## Input signal error detect automatic clear enable/disable setting

Set whether to enable or disable automatic clearing of input signal errors by using the input signal error detection function.

| Setting value | Description |
|---------------|-------------|
| 0             | Enable      |
| 1             | Disable     |

Setting a value other than in the table above results in operation with Disable (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                                 | CH1 | CH2 | CH3 | CH4 |
|----------------------------------------------------------------------------------------------------|-----|-----|-----|-----|
| Input signal error detect automatic clear enable/disable setting                                   | 304 |     |     |     |
| Input signal error detect automatic clear enable/disable setting (in FX3 allocation mode function) | 133 |     |     |     |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1).

## Offset/gain initialization enable code

When the offset/gain initialization request (Un\G70, b5) turns off→on by setting the enable code "E20FH" in this area at the time of initialization of offset/gain, the offset value and the gain value in the flash memory of the analog input module are initialized.

When setting anything other than "E20FH" in this area, initialization is not executed.

When Offset/gain initialization is completed, the values are initialized to "0000H".

### ■Buffer memory address

The following shows the buffer memory address of this area.

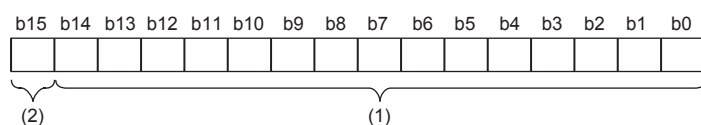
| Buffer memory name                                                       | CH1  | CH2 | CH3 | CH4 |
|--------------------------------------------------------------------------|------|-----|-----|-----|
| Offset/gain initialization enable code                                   | 305  |     |     |     |
| Offset/gain initialization enable code (In FX3 allocation mode function) | 4160 |     |     |     |

### ■Default value

The default value is set to 0.

## CH1 Digital output value

The A/D-converted digital output value is stored in 16-bit signed binary value.



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

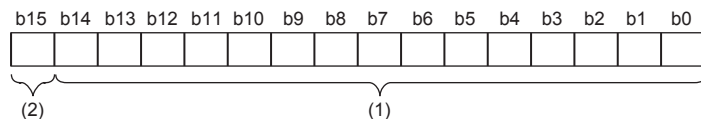
| Buffer memory name                                         | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------|------|------|------|------|
| CH□ Digital output value                                   | 400  | 600  | 800  | 1000 |
| CH□ Digital output value (in FX3 allocation mode function) | 1000 | 1002 | 1004 | 1006 |

## ■Refreshing cycle

If averaging processing is performed, values are updated at every averaging process 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.



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                            | CH1 | CH2 | CH3 | CH4  |
|---------------------------------------------------------------|-----|-----|-----|------|
| CH□ Digital operation value                                   | 402 | 602 | 802 | 1002 |
| CH□ Digital operation value (in FX3 allocation mode function) | 10  | 11  | 12  | 13   |



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' (Un\G70, b9) is turned off→on→off, and the setting is changed
- When 'CH1 Maximum value reset request' (Un\G473) is turned off→on→off

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------|-----|-----|-----|------|
| CH□ Maximum value                                   | 404 | 604 | 804 | 1004 |
| CH□ Maximum value (In FX3 allocation mode function) | 111 | 112 | 113 | 114  |

## 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' (Un\G70, b9) is turned off→on→off, and the setting is changed
- When 'Minimum value reset request' (Un\G474) is turned off→on→off

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------|-----|-----|-----|------|
| CH□ Minimum value                                   | 406 | 606 | 806 | 1006 |
| CH□ Minimum value (In FX3 allocation function mode) | 101 | 102 | 103 | 104  |

### 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.

## CH1 Difference conversion state flag

The difference conversion status can be checked.

| Monitor value | Description           |
|---------------|-----------------------|
| 0             | Not converted         |
| 1             | Converting difference |

When the difference conversion starting after 'CH1 Difference conversion trigger' (Un\G470) is changed from No request (0) to Trigger request (1), 'CH1 Difference conversion state 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 state flag' (Un\G408) is changed from Converting difference (1) to Not converted (0).

'CH1 Difference conversion state flag' (Un\G408) is Converting difference (1) during the difference conversion; Not converted (0) if not in the difference conversion state.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                     | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------------|------|------|------|------|
| CH□ Difference conversion state flag                                   | 408  | 608  | 808  | 1008 |
| CH□ Difference conversion state flag (In FX3 allocation mode function) | 1361 | 1362 | 1363 | 1364 |

## CH1 Logging hold flag

The logging holding status can be checked.

For details on the logging function, refer to the following.

📖 Page 57 Logging function

| Monitor value | Description |
|---------------|-------------|
| 0             | OFF         |
| 1             | ON          |

When a state that data is collected in 'CH1 Logging data' (Un\G10000 to Un\G19999) 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) → 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.

| Buffer memory name                                      | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------|------|------|------|------|
| CH□ Logging hold flag                                   | 409  | 609  | 809  | 1009 |
| CH□ Logging hold flag (in FX3 allocation mode function) | 9021 | 9022 | 9023 | 9024 |

## CH1 Digital filter conversion cycle monitor

The conversion cycle of the digital filter in operation is stored.

When something other than the digital filter (5) is set in 'CH1 Averaging processing specification' (Un\G501), 0 is stored.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                            | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------------|------|------|------|------|
| CH□ Digital filter conversion cycle monitor                                   | 411  | 611  | 811  | 1011 |
| CH□ Digital filter conversion cycle monitor (In FX3 allocation mode function) | 1331 | 1332 | 1333 | 1334 |

## CH1 A/D Conversion status

The conversion status is stored.

| Monitor value | Conversion status           | Setting content                                                                                   |
|---------------|-----------------------------|---------------------------------------------------------------------------------------------------|
| 0             | A/D conversion disable      | A status of A/D conversion disable. A/D conversion of the relevant channel has not been executed. |
| 1             | A/D conversion start        | Status from when the A/D conversion is enabled to when the initial A/D conversion completes.      |
| 2             | A/D conversion completed    | A status after the initial A/D conversion completes. Conversion is being executed.                |
| 3             | Input signal error detected | A status where an input signal error is being detected.                                           |

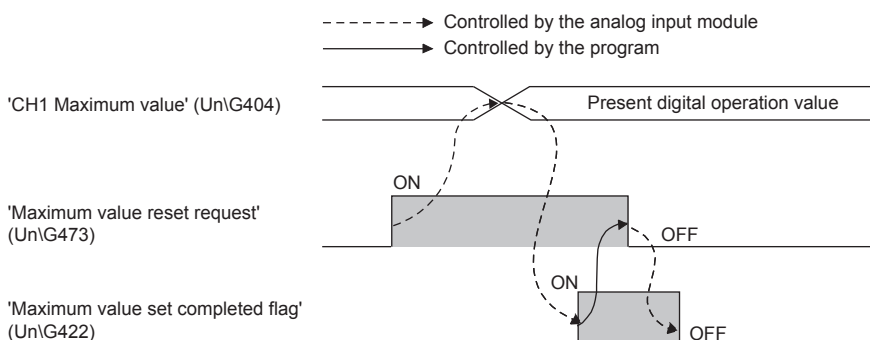
## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                          | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------|------|------|------|------|
| CH□ A/D conversion status                                   | 420  | 620  | 820  | 1020 |
| CH□ A/D conversion status (In FX3 allocation mode function) | 1021 | 1022 | 1023 | 1024 |

## CH1 Maximum value reset completed flag

The reset status of maximum value can be checked.



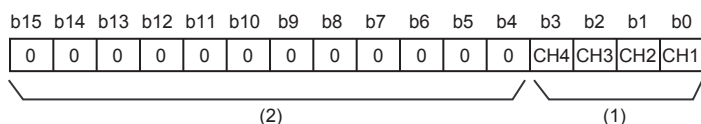
## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                     | CH1 | CH2 | CH3 | CH4  |
|----------------------------------------|-----|-----|-----|------|
| CH□ Maximum value reset completed flag | 422 | 622 | 822 | 1022 |

## Maximum value reset completed flag [FX3 allocation mode]

The reset status of maximum value in FX3 allocation mode can be checked.



(1) 0: Not completed, 1: Completed

(2) The values of b4 to b15 are fixed to 0.

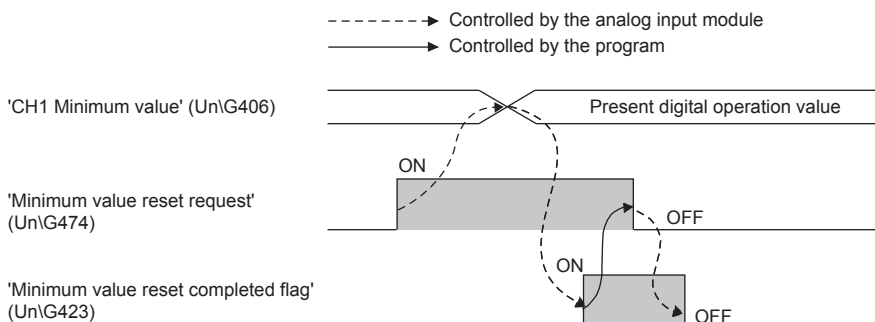
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                       | CH1 | CH2 | CH3 | CH4 |
|--------------------------------------------------------------------------|-----|-----|-----|-----|
| CH□ Maximum value reset completed flag (in FX3 allocation mode function) | 120 |     |     |     |

## CH1 Minimum value reset completed flag

The reset status of minimum value can be checked.



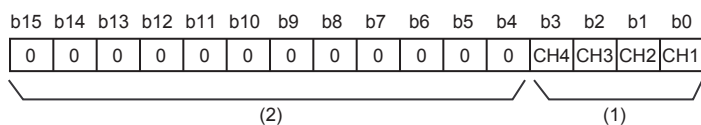
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                     | CH1 | CH2 | CH3 | CH4  |
|----------------------------------------|-----|-----|-----|------|
| CH□ Minimum value reset completed flag | 423 | 623 | 823 | 1023 |

## Minimum value reset completed flag [FX3 allocation mode]

The reset status of minimum value in FX3 allocation mode can be checked.



(1) 0: Not completed, 1: Completed

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                       | CH1 | CH2 | CH3 | CH4 |
|--------------------------------------------------------------------------|-----|-----|-----|-----|
| CH□ Minimum value reset completed flag (in FX3 allocation mode function) | 110 |     |     |     |

## CH1 Range setting monitor

The input range value set to the input range setting or 'CH1 Range setting' (Un\G598) can be checked.

| Monitor value | Description        |
|---------------|--------------------|
| 0003H         | 4 to 20 mA         |
| 0009H         | 0 to 20 mA         |
| 0006H         | -20 to +20m V      |
| 000AH         | 1 to 5 V           |
| 000BH         | 0 to 5 V           |
| 0000H         | -10 to +10 V       |
| 000CH         | 0 to 10 V          |
| 000EH         | User range setting |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name        | CH1 | CH2 | CH3 | CH4  |
|---------------------------|-----|-----|-----|------|
| CH□ Range setting monitor | 430 | 630 | 830 | 1030 |

## Range setting monitor [FX3 allocation mode]

When the FX3 allocation mode function is used, the input range set state in the input range setting can be checked.

| Monitor value | Description        |
|---------------|--------------------|
| 0000H         | -10 to +10 V       |
| 0001H         |                    |
| 0002H         |                    |
| 0003H         | 4 to 20 mA         |
| 0004H         |                    |
| 0005H         |                    |
| 0006H         | -20 to +20 mA      |
| 0007H         |                    |
| 0008H         |                    |
| 0009H         | 0 to 20 mA         |
| 000AH         | 1 to 5 V           |
| 000BH         | 0 to 5 V           |
| 000CH         | 0 to 10 V          |
| 000DH         | Use not allowed    |
| 000EH         | User range setting |
| 000FH         | Use not allowed    |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name    | CH1  | CH2  | CH3  | CH4  |
|-----------------------|------|------|------|------|
| Range setting monitor | 1031 | 1032 | 1033 | 1034 |

## 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.

| Buffer memory name                                                         | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------|------|------|------|------|
| CH□ Difference conversion standard value                                   | 432  | 632  | 832  | 1032 |
| CH□ Difference conversion standard value (in FX3 allocation mode function) | 1371 | 1372 | 1373 | 1374 |

### Point

Even if 'CH1 Difference conversion state flag' (Un\G408) is turned from Converting difference (1) to Not converted (0), 'CH1 Difference conversion reference value' (Un\G432) is not cleared.

## CH1 Head pointer

The buffer memory address of the oldest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with this buffer memory area.

The offset value counted from the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored.

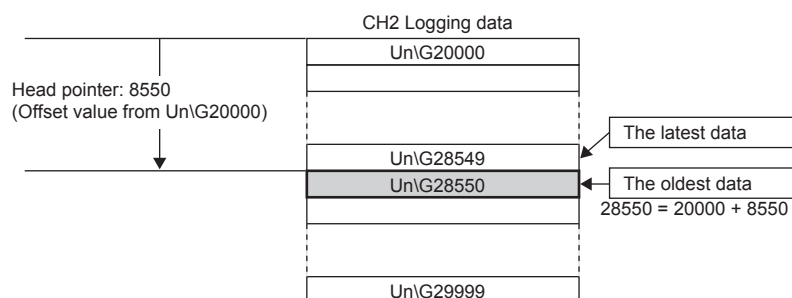
## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                 | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------|------|------|------|------|
| CH□ Head pointer                                   | 434  | 634  | 834  | 1034 |
| CH□ Head pointer (in FX3 allocation mode function) | 9031 | 9032 | 9033 | 9034 |

### Ex.

When the value of 'CH2 Head pointer' (Un\G634) is 8550



## ■Default value

The default value is 0 for all channels.

### 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\G19999) while the data of the first 10000 points is being logged from beginning of the logging. On and after the 10001st data, 'CH1 Head pointer' (Un\G434) increases one by one each time data is stored.
- When 'CH1 Logging hold request' (Un\G471) is turned on→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\G19999) can be checked with this buffer memory area.

The offset value counted from the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored.

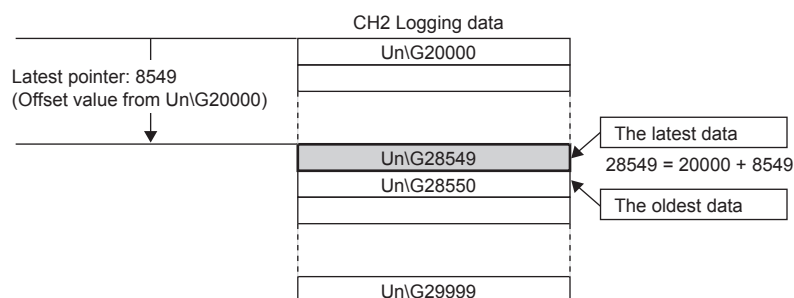
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                   | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------|------|------|------|------|
| CH□ Latest pointer                                   | 435  | 635  | 835  | 1035 |
| CH□ Latest pointer (in FX3 allocation mode function) | 9041 | 9042 | 9043 | 9044 |

**Ex.**

When the value of CH2 Latest pointer (Un\G635) is 8549



### ■Default value

The default value is 0 for all channels.

#### 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 on→off, 'CH1 Latest pointer' (Un\G435) is cleared to 0.

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## CH1 Logging data points

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 10000, 'CH1 Number of logging data points' (Un\G436) is fixed to 10000 since the value is overwritten from the head again.

For details on the logging function, refer to the following.

☞ Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                           | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------|------|------|------|------|
| CH□ Number of logging data                                   | 436  | 636  | 836  | 1036 |
| CH□ Number of logging data (in FX3 allocation mode function) | 9051 | 9052 | 9053 | 9054 |

#### Point

When 'CH1 Logging hold request' (Un\G471) is turned on→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\G19999) can be checked with this buffer memory area.

The difference between the address of 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\G19999) is stored.

For details on the logging function, refer to the following.

 Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                    | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------|------|------|------|------|
| CH□ Trigger pointer                                   | 437  | 637  | 837  | 1037 |
| CH□ Trigger pointer (In FX3 allocation mode function) | 9061 | 9062 | 9063 | 9064 |

### ■Default value

The default value is 0 for all channels.



When 'CH1 Logging hold request' (Un\G471) is turned on→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 monitor value is logged, a value calculated by the following formula is stored.

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

For details on the logging function, refer to the following.

 Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------|------|------|------|------|
| CH□ Current logging read pointer                                   | 438  | 638  | 838  | 1038 |
| CH□ Current logging read pointer (in FX3 allocation mode function) | 9241 | 9242 | 9243 | 9244 |

### ■Default value

The default value is -1 for all channels.

## CH1 Previous logging read pointer

At the time of generating an interrupt to the CPU module, the current logging read pointer just before the update by the interrupt is stored.

For details on the logging function, refer to the following.

 Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------|------|------|------|------|
| CH□ Previous logging read pointer                                   | 439  | 639  | 839  | 1039 |
| CH□ Previous logging read pointer (in FX3 allocation mode function) | 9251 | 9252 | 9253 | 9254 |

### ■Default value

The default value is -1 for all channels.

## CH1 Logging read points monitor value

The number of the actual logging read points is stored.

When 'Operating condition setting request' (Un\G70, b9) is turned off→on→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 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                      | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------|------|------|------|------|
| CH□ Logging read points monitor value                                   | 440  | 640  | 840  | 1040 |
| CH□ Logging read points monitor value (in FX3 allocation mode function) | 9261 | 9262 | 9263 | 9264 |

## CH1 Logging cycle monitor 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' (Un\G70, b9) is turned off→on→off, the actual logging cycle is stored in Logging cycle monitor value in the corresponding channel where the logging function is enabled.

For details on the logging function, refer to the following.

☞ Page 57 Logging function

The following values are stored in 'CH1 Logging cycle monitor value' (Un\G441 to Un\G443).

|                                                            |     |    |    |
|------------------------------------------------------------|-----|----|----|
|                                                            | b15 | to | b0 |
| 'CH1 Logging cycle Monitor value (Second)' (Un\G441)       |     | s  |    |
| 'CH1 Logging cycle Monitor value (Milli second)' (Un\G442) |     | ms |    |
| 'CH1 Logging cycle monitor value (μs)' (Un\G443)           |     | μs |    |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                     | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------------|------|------|------|------|
| CH□ Logging cycle monitor value (s)                                    | 441  | 641  | 841  | 1041 |
| CH□ Logging cycle monitor value (ms)                                   | 442  | 642  | 842  | 1042 |
| CH□ Logging cycle monitor value (μs)                                   | 443  | 643  | 843  | 1043 |
| CH□ Logging cycle monitor value (s) (In FX3 allocation mode function)  | 9071 | 9074 | 9077 | 9080 |
| CH□ Logging cycle monitor value (ms) (In FX3 allocation mode function) | 9072 | 9075 | 9078 | 9081 |
| CH□ Logging cycle monitor value (μs) (In FX3 allocation mode function) | 9073 | 9076 | 9079 | 9082 |

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## CH1 Trigger generation time

The time when a trigger is generated is recorded.

For details on the logging function, refer to the following.

 Page 57 Logging function

|                                                                             |                              |    |                             |    |    |
|-----------------------------------------------------------------------------|------------------------------|----|-----------------------------|----|----|
|                                                                             | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

## ■ Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                                | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Trigger generation time (First/Last two digits of the year)                                   | 444  | 644  | 844  | 1044 |
| CH□ Trigger generation time (Month/Day)                                                           | 445  | 645  | 845  | 1045 |
| CH□ Trigger generation time (Hour/Minute)                                                         | 446  | 646  | 846  | 1046 |
| CH□ Trigger generation time (Second/Day of the week)                                              | 447  | 647  | 847  | 1047 |
| CH□ Trigger generation time (Millisecond)                                                         | 448  | 648  | 848  | 1048 |
| CH□ Trigger generation time (First/Last two digits of the year) (In FX3 allocation mode function) | 9101 | 9106 | 9111 | 9116 |
| CH□ Trigger generation time (Month/Day) (In FX3 allocation mode function)                         | 9102 | 9107 | 9112 | 9117 |
| CH□ Trigger generation time (Hour/Minute) (In FX3 allocation mode function)                       | 9103 | 9108 | 9113 | 9118 |
| CH□ Trigger generation time (Second/Day of the week) (in FX3 allocation mode function)            | 9104 | 9109 | 9114 | 9119 |
| CH□ Trigger generation time (Millisecond) (in FX3 allocation mode function)                       | 9105 | 9110 | 9115 | 9120 |



- Time units shorter than one millisecond are not recorded.
- When 'CH1 Logging hold request' (Un\G471) is turned on→off, 'CH1 Trigger generation time' (Un\G444 to Un\G448) is cleared to 0.

## 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 39 Difference operation function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | No request      |
| 1             | Trigger request |

Setting a value other than the values in the table above results in operation with Trigger request (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------|------|------|------|------|
| CH□ Difference conversion trigger                                   | 470  | 670  | 870  | 1070 |
| CH□ Difference conversion trigger (in FX3 allocation mode function) | 1381 | 1382 | 1383 | 1384 |

### ■Starting and stopping the difference conversion

- When the setting value is turned from No request (0) to Trigger request (1), the difference conversion starts.
- When the setting value is turned from Trigger request (1) to No request (0), the difference conversion stops.

### ■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 57 Logging function

| Logging hold request | Setting value |
|----------------------|---------------|
| OFF                  | 0             |
| ON                   | 1             |

Setting a value other than in the table above results in operation with ON (1).

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.

| Buffer memory name                                         | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------|------|------|------|------|
| CH□ Logging hold request                                   | 471  | 671  | 871  | 1071 |
| CH□ Logging hold request (In FX3 allocation mode function) | 9151 | 9152 | 9153 | 9154 |

### ■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 off→on 'CH1 Logging hold request' (Un\G471).
- When a value other than Disable (0) is set to 'CH1 Level trigger condition setting' (Un\G540), the logging hold processing starts after 'CH1 Logging hold request' (Un\G471) is turned off→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 on→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.



The stop status of the logging can be checked with 'CH1 Logging hold flag' (Un\G409).

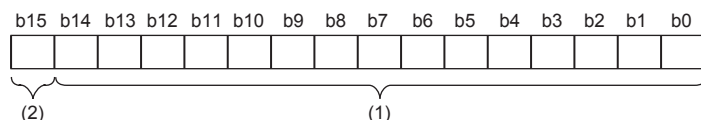
## CH1 Conversion value shift amount

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 34 Shift function



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1 | CH2 | CH3 | CH4  |
|---------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Conversion value shift amount                                   | 472 | 672 | 872 | 1072 |
| CH□ Conversion value shift amount (In FX3 allocation mode function) | 61  | 62  | 63  | 64   |

## ■Setting range

The possible setting range is from -32768 to +32767.

## ■Enabling the setting

Regardless of turning off→on→off 'Operating condition setting request' (Un\G70, b9), the set conversion value shift amount takes effect.

## ■Default value

The default value is 0 for all channels.

## CH1 Maximum value reset request

When resetting the maximum value, and updating with the current value, turn off→on.

| Maximum value reset request | Setting value |
|-----------------------------|---------------|
| OFF                         | 0             |
| ON                          | 1             |

Setting a value other than in the table above results in operation with ON (1).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name              | CH1 | CH2 | CH3 | CH4  |
|---------------------------------|-----|-----|-----|------|
| CH□ Maximum value reset request | 473 | 673 | 873 | 1073 |

## ■Enabling the setting

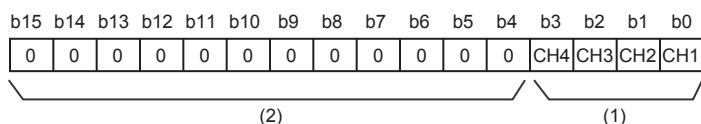
When 'CH1 Maximum value reset request' (Un\G473) turns off→on, 'CH1 Maximum value' (Un\G404) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

## ■Default value

The default value is OFF (0) for all channels.

## Maximum value reset request [FX3 allocation mode]

When resetting the maximum value, and updating with the current value in FX3 allocation mode, turn off→on.



(1) 0: No reset request, 1: Reset request

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                            | CH1 | CH2 | CH3 | CH4 |
|---------------------------------------------------------------|-----|-----|-----|-----|
| Maximum value reset request (In FX3 allocation mode function) | 119 |     |     |     |

### ■Enabling the setting

When 'Maximum value reset request' (Un\G119) turns off→on, 'CH1 Maximum value' (Un\G111) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

### ■Default value

The default value is off (0).

## CH1 Minimum value reset request

When resetting the minimum value, and updating with the current value, turn off→on.

| Minimum value reset request | Setting value |
|-----------------------------|---------------|
| OFF                         | 0             |
| ON                          | 1             |

Setting a value other than in the table above results in operation with ON (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name              | CH1 | CH2 | CH3 | CH4  |
|---------------------------------|-----|-----|-----|------|
| CH□ Minimum value reset request | 474 | 674 | 874 | 1074 |

### ■Enabling the setting

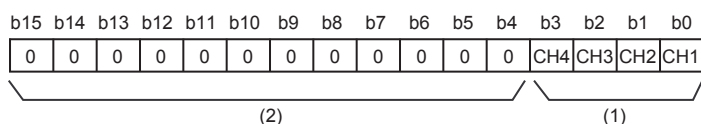
When 'CH1 Minimum value reset request' (Un\G474) turns off→on, 'CH1 Minimum value' (Un\G406) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

### ■Default value

The default value is OFF (0) for all channels.

## Minimum value reset request [In FX3 allocation mode]

When resetting the minimum value, and updating with the current value in FX3 allocation mode, turn off→on.



(1) 0: No reset request, 1: Reset request

(2) The values of b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                            | CH1 | CH2 | CH3 | CH4 |
|---------------------------------------------------------------|-----|-----|-----|-----|
| Minimum value reset request [In FX3 allocation mode function] | 109 |     |     |     |

## ■Enabling the setting

When 'Minimum value reset request' (Un\G109) turns off→on, 'CH1 Minimum value' (Un\G101) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

## ■Default value

The default value is off (0).

## CH1 A/D conversion enable/disable setting

Set whether to enable or disable the A/D conversion.

For details on the A/D conversion enable/disable setting function, refer to the following.

☞ Page 25 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, the setting is turned to A/D conversion disable (1).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1  | CH2  | CH3  | CH4  |
|-----------------------------------------------------------------------------|------|------|------|------|
| CH□ A/D conversion enable/disable setting                                   | 500  | 700  | 900  | 1100 |
| CH□ A/D conversion enable/disable setting (in FX3 allocation mode function) | 1321 | 1322 | 1323 | 1324 |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is A/D conversion enable (0) for all channels.

## CH1 Average processing specification

Select processing to be performed among the sampling processing, averaging processing, primary delay filter, and digital filter.

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 |
| 5             | Digital filter       |

Setting a value other than the above causes an averaging process specification setting range error (error code: 191□H).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                    | CH1  | CH2  | CH3  | CH4  |
|-----------------------------------------------------------------------|------|------|------|------|
| CH□ Averaging process specification                                   | 501  | 701  | 901  | 1101 |
| CH□ Averaging process specification (In FX3 allocation mode function) | 1081 | 1082 | 1083 | 1084 |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is Sampling processing (0) for all channels.



## 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 for each channel where the averaging processing is specified.

The following table lists the setting ranges.

| Setting value       | Setting content               |
|---------------------|-------------------------------|
| 2 to 5000 (ms)      | Time average                  |
| 4 to 62500 (counts) | Count average                 |
| 2 to 1000 (counts)  | Moving average                |
| 1 to 500 (times)    | Primary delay filter constant |

Setting a value other than the above causes any of time average setting range error (error code: 192□H), count average setting range error (error code: 193□H), moving count setting range error (error code: 194□H), Primary delay filter range error (error code: 195□H), and the A/D conversion processing is executed with the setting before error.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                                                    | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Time average/Count average/Moving average/Primary delay filter constant setting                                   | 502 | 702 | 902 | 1102 |
| CH□ Time average/Count average/Moving average/Primary delay filter constant setting (in FX3 allocation mode function) | 2   | 3   | 4   | 5    |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.



- 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 conversion 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 Digital filter (5) is set to 'CH1 Averaging process specification' (Un\G501).

A

## CH1 Scaling enable/disable setting

Set whether to enable or disable the scaling.

For details on the scaling function, refer to the following.

Page 32 Scaling function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes a scaling enable/disable setting range error (error code: 1A0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------|------|------|------|------|
| CH□ Scaling enable/disable setting                                   | 504  | 704  | 904  | 1104 |
| CH□ Scaling enable/disable setting (In FX3 allocation mode function) | 1091 | 1092 | 1093 | 1094 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all the channels.

## 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 32 Scaling function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1        | CH2        | CH3        | CH4        |
|-----------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Scaling upper limit value                                   | 506, 507   | 706, 707   | 906, 907   | 1106, 1107 |
| CH□ Scaling upper limit value (In FX3 allocation mode function) | 1100, 1101 | 1102, 1103 | 1104, 1105 | 1106, 1107 |

### ■Setting range

The possible setting range is from -2147483648 to +2147483647.

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, 507) is ignored.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■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 32 Scaling function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1        | CH2        | CH3        | CH4        |
|-----------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Scaling lower limit value                                   | 508, 509   | 708, 709   | 908, 909   | 1108, 1109 |
| CH□ Scaling lower limit value (In FX3 allocation mode function) | 1120, 1121 | 1122, 1123 | 1124, 1125 | 1126, 1127 |

### ■Setting range

The possible setting range is from -2147483648 to +2147483647.

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, 509) is ignored.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

## 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 37 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.

| Buffer memory name                                                            | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------------|------|------|------|------|
| CH□ Digital clipping enable/disable setting                                   | 510  | 710  | 910  | 1110 |
| CH□ Digital clipping enable/disable setting (In FX3 allocation mode function) | 1141 | 1142 | 1143 | 1144 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all the channels.

## CH1 Alert output setting (Process alarm)

Set whether to enable or disable the alert output of the process alarm.

For details on the alert output function, refer to the following.

 Page 44 Alert output function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes an alert output setting (Process alarm) range error (error code: 1B0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                         | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------|------|------|------|------|
| CH□ Alert output setting (Process alarm)                                   | 512  | 712  | 912  | 1112 |
| CH□ Alert output setting (Process alarm) (In FX3 allocation mode function) | 1181 | 1182 | 1183 | 1184 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all channels.

## CH1 Alert output setting (Rate alarm)

Set whether to enable or disable the alert output of the rate alarm.

For details on the alert output function, refer to the following.

 Page 44 Alert output function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes an alert output setting (Rate alarm) range error (error code: 1B8□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                      | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------|------|------|------|------|
| CH□ Alert output setting (Rate alarm)                                   | 513  | 713  | 913  | 1113 |
| CH□ Alert output setting (Rate alarm) (in FX3 allocation mode function) | 1211 | 1212 | 1213 | 1214 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all channels.

## CH1 Process alarm upper upper limit value

Set an upper upper limit value of the alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 44 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Process alarm upper upper limit value                                   | 514 | 714 | 914 | 1114 |
| CH□ Process alarm upper upper limit value (in FX3 allocation mode function) | 81  | 82  | 83  | 84   |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■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 alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 44 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1  | CH2  | CH3  | CH4  |
|-----------------------------------------------------------------------------|------|------|------|------|
| CH□ Process alarm upper lower limit value                                   | 516  | 716  | 916  | 1116 |
| CH□ Process alarm upper lower limit value (in FX3 allocation mode function) | 1191 | 1192 | 1193 | 1194 |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■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 alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 44 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1  | CH2  | CH3  | CH4  |
|-----------------------------------------------------------------------------|------|------|------|------|
| CH□ Process alarm lower upper limit value                                   | 518  | 718  | 918  | 1118 |
| CH□ Process alarm lower upper limit value (in FX3 allocation mode function) | 1201 | 1202 | 1203 | 1204 |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■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 alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 44 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Process alarm lower lower limit value                                   | 520 | 720 | 920 | 1120 |
| CH□ Process alarm lower lower limit value (In FX3 allocation mode function) | 71  | 72  | 73  | 74   |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■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 limit value.
- A channel where the set values do not satisfy the condition "Upper upper limit value  $\geq$  Upper lower limit value  $\geq$  Lower upper limit value  $\geq$  Lower lower limit value" causes a process alarm upper lower limit value setting range error (error code: 1B△□H).
- 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, alarm 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 alert 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 alert is the product of the value in 'CH1 Rate alarm alert detection cycle setting' (Un\G522) and the conversion cycle.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                             | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------------------|------|------|------|------|
| CH□ Rate alarm alert detection cycle setting                                   | 522  | 722  | 922  | 1122 |
| CH□ Rate alarm alert detection cycle setting (In FX3 allocation mode function) | 1221 | 1222 | 1223 | 1224 |

### ■Setting range

The possible setting range is from 1 to 32000 (times).

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

- A channel where the set value is out of the range causes a rate alarm detection cycle setting range error (error code: 1B9□H).
- Since the default value is 0, change the setting value when setting the rate alarm function.

## 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 alert output function, refer to the following.

 Page 44 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1 | CH2 | CH3 | CH4  |
|--------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Rate alarm upper limit value                                   | 524 | 724 | 924 | 1124 |
| CH□ Rate alarm upper limit value (In FX3 allocation mode function) | 91  | 92  | 93  | 94   |

### ■Setting range

The possible setting range is from -32768 to +32767.

Unit of the setting value varies depending on the setting of 'Rate alarm change rate selection' (Un\G299).

| Rate alarm change rate selection (Un\G299) | Unit  |
|--------------------------------------------|-------|
| Rate specification (0)                     | 0.1%  |
| Digital output value specification (1)     | digit |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■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 alert output function, refer to the following.

 Page 44 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------|------|------|------|------|
| CH□ Rate alarm lower limit value                                   | 526  | 726  | 926  | 1126 |
| CH□ Rate alarm lower limit value (In FX3 allocation mode function) | 1231 | 1232 | 1233 | 1234 |

### ■Setting range

The possible setting range is from -32768 to +32767.

Unit of the setting value varies depending on the setting of 'Rate alarm change rate selection' (Un\G299).

| Rate alarm change rate selection (Un\G299) | Unit  |
|--------------------------------------------|-------|
| Rate specification (0)                     | 0.1%  |
| Digital output value specification (1)     | digit |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.



- When using the rate alarm, configure the 2-step settings for the rate alarm upper limit value and lower limit value.
- A channel where the set values satisfy the condition "Rate alarm lower limit value  $\geq$  Rate alarm upper limit value" causes a rate alarm upper/lower limit setting value inversion error (error code: 1BA□H).
- 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 51 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 4 to 20 mA and 1 to 5 V, 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.

| Buffer memory name                                                         | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------|------|------|------|------|
| CH□ Input signal error detection setting                                   | 528  | 728  | 928  | 1128 |
| CH□ Input signal error detection setting (In FX3 allocation mode function) | 1151 | 1152 | 1153 | 1154 |



## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is Disable (0) for all the channels.

## CH1 Input signal error detection lower limit setting value

Set a value to detect an error for the input analog value.

For details on the input signal error detection function, refer to the following.

☞ Page 51 Input signal error detection function

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                           | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Input signal error detection lower limit setting value                                   | 529  | 729  | 929  | 1129 |
| CH□ Input signal error detection lower limit setting value (In FX3 allocation mode function) | 1161 | 1162 | 1163 | 1164 |

## ■Setting range

The possible 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 above setting 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 the reference 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 - (Gain value of each range - Offset value of each range) × (Input signal error detection lower limit setting value/1000)

Detection conditions vary depending on 'CH1 Input signal error detection setting' (Un\G528) as follows:

- When Input signal error detection setting is set to Upper and lower limit detection (1), the detection is performed with both the input signal error detection upper limit value and input signal error detection lower limit value.
- When Input signal error detection setting is set to Lower limit detection (2), the detection is performed only with the input signal error detection lower limit value.
- When 'Input signal error detection setting' is set to Upper limit detection (3), the value set in this area is ignored.
- When Input signal error detection setting is set to Simple disconnection detection (4), the value set in this area is ignored.

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is 50 for all channels. When the FX3 allocation mode function is used, 20 is set for all channels.

## CH1 Input signal error detection upper limit setting value

Set a value to detect an error for the input analog value.

For details on the input signal error detection function, refer to the following.

 Page 51 Input signal error detection function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                           | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Input signal error detection upper limit setting value                                   | 530  | 730  | 930  | 1130 |
| CH□ Input signal error detection upper limit setting value (In FX3 allocation mode function) | 1171 | 1172 | 1173 | 1174 |

### ■Setting range

The possible 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 above setting 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 the reference 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 setting value/1000)

Detection conditions vary depending on 'CH1 Input signal error detection setting' (Un\G528) as follows:

- When Input signal error detection setting is set to Upper and lower limit detection (1), the detection is performed with both the input signal error detection upper limit value and input signal error detection lower limit value.
- When 'Input signal error detection setting' is set to Lower limit detection (2), the value set in this area is ignored.
- When Input signal error detection setting is set to Upper limit detection (3), the detection is performed only with the input signal error detection upper limit value.
- When Input signal error detection setting is set to Simple disconnection detection (4), the value set in this area is ignored.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 50 for all channels. When the FX3 allocation mode function is used, 20 is set 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 57 Logging function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes a logging enable/disable setting range error (error code: 1D0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------|------|------|------|------|
| CH□ Logging enable/disable setting                                   | 535  | 735  | 935  | 1135 |
| CH□ Logging enable/disable setting (In FX3 allocation mode function) | 9161 | 9162 | 9163 | 9164 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is Disable (1) for all the 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 57 Logging function

| Setting value | Setting content         |
|---------------|-------------------------|
| 0             | Digital output value    |
| 1             | Digital operation value |

Setting a value other than the above causes a logging data setting range error (error code: 1D3□H).

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.

| Buffer memory name                                         | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------|------|------|------|------|
| CH□ Logging data setting                                   | 536  | 736  | 936  | 1136 |
| CH□ Logging data setting (in FX3 allocation mode function) | 9171 | 9172 | 9173 | 9174 |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■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 57 Logging function

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------|------|------|------|------|
| CH□ Logging cycle setting value                                   | 537  | 737  | 937  | 1137 |
| CH□ Logging cycle setting value (In FX3 allocation mode function) | 9181 | 9182 | 9183 | 9184 |

## ■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 |
|------------------------------------------|---------------|
| μs (0)                                   | 80 to 32767   |
| ms (1)                                   | 1 to 32767    |
| s (2)                                    | 1 to 3600     |

- Setting a value out of the above range causes a logging cycle setting value range error (error code: 1D1□H). 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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is 4 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 57 Logging function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | μs              |
| 1             | ms              |
| 2             | s               |

- Setting a value out of the above range causes a logging cycle setting value range error (error code: 1D1□H). 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.

| Buffer memory name                                               | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------|------|------|------|------|
| CH□ Logging cycle unit setting                                   | 538  | 738  | 938  | 1138 |
| CH□ Logging cycle unit setting (In FX3 allocation mode function) | 9191 | 9192 | 9193 | 9194 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default is ms (1) for all channels.

## CH1 Logging points after trigger

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 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------|------|------|------|------|
| CH□ Post-trigger logging points                                   | 539  | 739  | 939  | 1139 |
| CH□ Post-trigger logging points (In FX3 allocation mode function) | 9201 | 9202 | 9203 | 9204 |

### ■Setting range

The possible setting range is from 1 to 10000.

Setting a value out of the range causes a post-trigger logging points setting range error (error code: 1D4□H). 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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 5000 for all channels.

## 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, perform level trigger condition setting to one 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 57 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) |

Setting a value other than the above causes a level trigger condition setting error (error code: 1D5□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                    | CH1  | CH2  | CH3  | CH4  |
|-----------------------------------------------------------------------|------|------|------|------|
| CH□ Level trigger condition setting                                   | 540  | 740  | 940  | 1140 |
| CH□ Level trigger condition setting (In FX3 allocation mode function) | 9211 | 9212 | 9213 | 9214 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (0) for all the 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 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                 | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------|------|------|------|------|
| CH□ Trigger data                                   | 541  | 741  | 941  | 1141 |
| CH□ Trigger data (In FX3 allocation mode function) | 9221 | 9222 | 9223 | 9224 |

### ■Setting range

The possible setting range is from 0 to 9999.

Setting a value out of the range causes a trigger data setting range error (error code: 1D6□H). Logging cannot be performed.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■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) |

When the FX3 allocation mode function is used, the following applies.

| Channel | Default value | Buffer memory area to be monitored   |
|---------|---------------|--------------------------------------|
| CH1     | 10            | CH1 Digital operation value (Un\G10) |
| CH2     | 11            | CH2 Digital operation value (Un\G11) |
| CH3     | 12            | CH3 Digital operation value (Un\G12) |
| CH4     | 13            | CH4 Digital operation value (Un\G13) |

## CH1 Trigger setting value

Set a level to generate a level trigger.

For details on the logging function, refer to the following.

 Page 57 Logging function

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                          | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------|------|------|------|------|
| CH□ Trigger setting value                                   | 542  | 742  | 942  | 1142 |
| CH□ Trigger setting value (In FX3 allocation mode function) | 9231 | 9232 | 9233 | 9234 |

## ■Setting range

The possible setting range is from -32768 to +32767.

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■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 57 Logging function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

- Setting a value other than the above causes a read interrupt enable/disable setting error (error code: 1D8□H). Logging cannot be performed.
- When 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.

| Buffer memory name                                                           | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------------------|------|------|------|------|
| CH□ Logging loading enable/disable setting                                   | 544  | 744  | 944  | 1144 |
| CH□ Logging loading enable/disable setting (in FX3 allocation mode function) | 9271 | 9272 | 9273 | 9274 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all the channels.

## CH1 Logging read points setting value

An interrupt is generated to the CPU module each time the data equal to the set data points is logged.

For details on the logging function, refer to the following.

 Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                      | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------|------|------|------|------|
| CH□ Logging load points setting value                                   | 545  | 745  | 945  | 1145 |
| CH□ Logging load points setting value (in FX3 allocation mode function) | 9281 | 9282 | 9283 | 9284 |

### ■Setting range

The possible setting range is from 10 to 10000.

Setting a value out of the range causes a logging load points setting value range error (error code: 1D9□H). Logging cannot be performed.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 1000 for all channels.

## CH1 Digital filter setting

When Digital filter (5) is set in Average processing specification, Digital filter setting is executed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                           | CH1 | CH2 | CH3 | CH4  |
|--------------------------------------------------------------|-----|-----|-----|------|
| CH□ Digital filter setting                                   | 570 | 770 | 970 | 1170 |
| CH□ Digital filter setting (In FX3 allocation mode function) | 6   | 7   | 8   | 9    |

### ■Setting range

The possible setting range is from 1 to 1600 (digits).

Setting a value out of the range causes a Digital filter setting range error (error code: 19D□H), and the A/D conversion processing is executed with the setting made before the error occurred.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

## CH1 Digital filter fluctuation width setting

The fluctuation width to be removed by digital filter processing is set.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                             | CH1        | CH2        | CH3        | CH4        |
|--------------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Digital filter fluctuation width setting                                   | 572, 573   | 772, 773   | 972, 973   | 1172, 1173 |
| CH□ Digital filter fluctuation width setting (In FX3 allocation mode function) | 1340, 1341 | 1342, 1343 | 1344, 1345 | 1346, 1347 |

### ■Setting range

The possible setting range is from 80 to 200000 (μs).

Set this value to Number of A/D conversion enabled channels × Conversion speed or more.

Setting a value out of the range causes a digital filter fluctuation width setting range error (error code: 19E□H), and the A/D conversion processing is executed with the setting made before the error occurred.

In the allowable setting range, when the value which is less than the value of "the Number of A/D conversion enable channels × Conversion speed" is set, "Digital filter fluctuation width setting range error" (error code: 19E□H) occurs and sampling processing is operated.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.



## CH1 Range setting

This area is for setting an input range.

| Setting value | Input range        |
|---------------|--------------------|
| 0003H         | 4 to 20 mA         |
| 0009H         | 0 to 20 mA         |
| 0006H         | -20 to +20 mA      |
| 000AH         | 1 to 5 V           |
| 000BH         | 0 to 5 V           |
| 0000H         | -10 to +10 V       |
| 000CH         | 0 to 10 V          |
| 000EH         | User range setting |

Setting a value other than the above causes an input range setting range error (error code: 190□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4  |
|--------------------|-----|-----|-----|------|
| CH□ Range setting  | 598 | 798 | 998 | 1198 |

### ■Enabling the setting

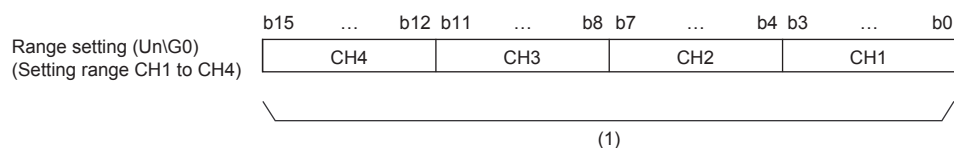
Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0003H for all channels.

## Range setting [FX3 allocation mode]

When the FX3 allocation mode function is used, this area is for setting an input range.



Set the following setting values for the bits corresponding to each CH.

| Setting value | Input range        |
|---------------|--------------------|
| 0H            | -10 to +10 V       |
| 1H            |                    |
| 2H            |                    |
| 3H            |                    |
| 4H            | 4 to 20 mA         |
| 5H            |                    |
| 6H            |                    |
| 7H            |                    |
| 8H            | -20 to +20 mA      |
| 9H            |                    |
| AH            |                    |
| BH            |                    |
| CH            | 0 to 20 mA         |
| EH            | 1 to 5 V           |
|               | 0 to 5 V           |
|               | 0 to 10 V          |
|               | User range setting |

### ■Buffer memory address

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------|-----|-----|-----|-----|
| Range setting (in FX3 allocation mode function) | 0   |     |     |     |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## Error history

Up to 16 errors that occurred in the analog input module are logged.

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3606 | System area                  |    |                             |    |    |
| ⋮        |                              |    |                             |    |    |
| Un\G3609 |                              |    |                             |    |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

## ■ 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 FX3 allocation mode function) | 8600 to 8759  |

## Alarm history

Up to 16 alarms that occurred in the analog input module are logged.

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3766 | System area                  |    |                             |    |    |
| :        |                              |    |                             |    |    |
| Un\G3769 |                              |    |                             |    |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that an alarm occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

### ■ 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 FX3 allocation mode function) | 8760 to 8919  |

A

## 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). Setting a value other than 0 and 1 causes an offset/gain setting channel range error (error code: 1E8□H).

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.

- When both the offset specification and gain specification of the same channel are set to Setting channel (1)
- When both the offset specification and gain specification of the same channel are set to Disable (0)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                    | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Offset/gain setting mode (offset specification)                                   | 4132 | 4134 | 4136 | 4138 |
| CH□ Offset/gain setting mode (gain specification)                                     | 4133 | 4135 | 4137 | 4139 |
| CH□ Offset/gain setting mode (offset specification) (in FX3 allocation mode function) | 4131 | 4132 | 4133 | 4134 |
| CH□ Offset/gain setting mode (gain specification) (in FX3 allocation mode function)   | 4141 | 4142 | 4143 | 4144 |

### ■Enabling the setting

Turn off→on 'Channel change request' (Un\G70, b11).

### ■Default value

The default value is Disable (0) for all the channels.

## CH1 Offset/gain setting mode (Range specification)

In the offset/gain setting, specify the current input or voltage input for each channel.

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Voltage         |
| 1             | Current         |

When a value other than 0 or 1 is set, the setting is regarded as Current (1).

- When an offset/gain value is written in the offset/gain setting mode (when 'User range write request' (Un\G70, b10) is turned off→on), this setting is written to the flash memory.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                   | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Offset/gain setting mode (range specification)                                   | 4164 | 4165 | 4166 | 4167 |
| CH□ Offset/gain setting mode (range specification) (In FX3 allocation mode function) | 4151 | 4152 | 4153 | 4154 |

### ■Default value

The default value is Voltage (0) for all channels.

When the mode changes to offset gain setting, the value saved in the flash memory is set.

## CH1 Logging data

This area stores the data logged by the logging function.

Up to 10000 points of data can be stored per channel. After the number of stored data points reaches 10000, data collection continues with the data overwritten from the head.

For details on the logging function, refer to the following.

📖 Page 57 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                 | CH1            | CH2            | CH3            | CH4            |
|----------------------------------------------------|----------------|----------------|----------------|----------------|
| CH□ Logging data                                   | 10000 to 19999 | 20000 to 29999 | 30000 to 39999 | 40000 to 49999 |
| CH□ Logging data (In FX3 allocation mode function) | 10000 to 19999 | 20000 to 29999 | 30000 to 39999 | 40000 to 49999 |

A



- Turning off→on 'Operating condition setting request' (Un\G70, b9) allows the logging data in all the channels to be cleared.
- Turning on→off Logging hold request while Logging hold flag is on allows logging to resume. In this case, the logged data is not cleared.

# MEMO

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## PART 2

# ANALOG OUTPUT MODULE

Part 2 describes the analog output module.

2 FX5-4DA

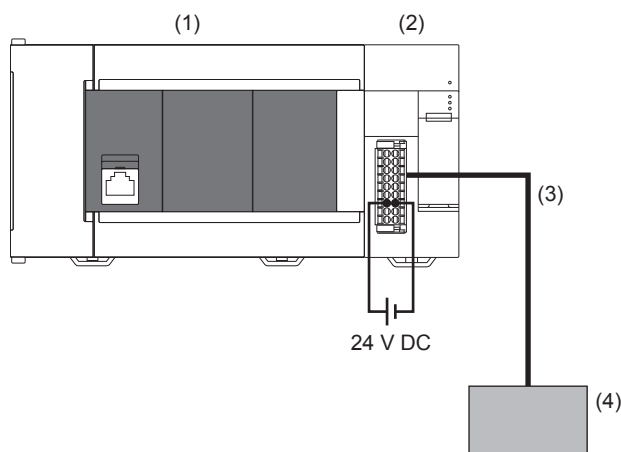
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# 2 FX5-4DA

## 2.1 Overview

The FX5-4DA analog output module is an intelligent function module that converts 4 points of digital values into analog output (voltage, current).

It can be added to an FX5 CPU module and can output 4 channels of voltage/current.



- (1) FX5 CPU module
- (2) Analog output module (FX5-4DA)
- (3) Analog device connection cable
- (4) Analog device (e.g. inverter)

## 2.2 Specifications

This section describes the specifications of FX5-4DA.

### General specifications

The general specifications other than below are the same as those for the CPU module to be connected.

For general specifications, refer to the following manuals.

📖 MELSEC iQ-F FX5U User's Manual (Hardware)

📖 MELSEC iQ-F FX5UC User's Manual (Hardware)

| Items                        | Specifications                                           |                                           |
|------------------------------|----------------------------------------------------------|-------------------------------------------|
| Dielectric withstand voltage | 500 V AC for 1 minute                                    | Between all terminals and ground terminal |
| Insulation resistance        | 10 MΩ or higher by 500 V DC insulation resistance tester |                                           |

### Power supply specifications

The following table lists the power supply specifications.

| Items                 |                                       | Specifications                                                                 |
|-----------------------|---------------------------------------|--------------------------------------------------------------------------------|
| External power supply | Power supply voltage                  | 24 V DC +20%, -15%                                                             |
|                       | Allowable momentary power outage time | Operation continues when the instantaneous power failure is shorter than 5 ms. |
|                       | Current consumption                   | 150 mA                                                                         |
| Internal power supply | Power supply voltage                  | 5 V DC                                                                         |
|                       | Current consumption                   | 100 mA                                                                         |



## Performance specifications

The following table lists the performance specifications.

| Items                         |                                  | Specifications                                                                              |
|-------------------------------|----------------------------------|---------------------------------------------------------------------------------------------|
| Number of output points       |                                  | 4 points (4 channels)                                                                       |
| Conversion speed              |                                  | 80 $\mu$ s/ch                                                                               |
| Isolation method              | Between output terminal and PLC  | Photocoupler                                                                                |
|                               | Between output terminal channels | Non-isolation                                                                               |
| Number of occupied I/O points |                                  | 8 points                                                                                    |
| Applicable CPU module         |                                  | FX5U CPU module (Ver.1.050 or later)<br>FX5UC CPU module <sup>*1</sup> (Ver.1.050 or later) |
| Applicable engineering tool   |                                  | GX Works3 (Ver. 1.040S or later)                                                            |

\*1 FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-4DA to the FX5UC CPU module.

## Output specifications

| Items                                                      | Specifications                                                                                      |                    |                  |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------|------------------|
| Analog output voltage                                      | -10 to +10 V DC (external load resistance value 1 k $\Omega$ to 1 M $\Omega$ )                      |                    |                  |
| Analog output current                                      | 0 to 20 mA DC (external load resistance value 0 to 500 $\Omega$ )                                   |                    |                  |
| Digital input                                              | 16-bit signed binary (-32768 to +32767)                                                             |                    |                  |
| Output characteristics, resolution <sup>*1</sup>           | Analog output range                                                                                 |                    | Digital value    |
|                                                            | Voltage                                                                                             | 0 to 10 V          | 0 to 32000       |
|                                                            |                                                                                                     | 0 to 5 V           | 0 to 32000       |
|                                                            |                                                                                                     | 1 to 5 V           | 0 to 32000       |
|                                                            |                                                                                                     | -10 to +10 V       | -32000 to +32000 |
|                                                            |                                                                                                     | User range setting | -32000 to +32000 |
|                                                            | Current                                                                                             | 0 to 20 mA         | 0 to 32000       |
|                                                            |                                                                                                     | 4 to 20 mA         | 0 to 32000       |
|                                                            |                                                                                                     | User range setting | -32000 to +32000 |
| Accuracy (accuracy for the full scale analog output value) | Ambient temperature 25 $\pm$ 5°C: Within $\pm$ 0.1% (voltage $\pm$ 20 mV, current $\pm$ 20 $\mu$ A) |                    |                  |
|                                                            | Ambient temperature 0 to 55°C: Within $\pm$ 0.2% (voltage $\pm$ 40 mV, current $\pm$ 40 $\mu$ A)    |                    |                  |
|                                                            | Ambient temperature -20 to 0°C: Within $\pm$ 0.3% (voltage $\pm$ 60 mV, current $\pm$ 60 $\mu$ A)   |                    |                  |

\*1 For details on the output characteristics, refer to  Page 176 Output conversion characteristics.

\*2 Maximum resolution in the user range setting.

# Output conversion characteristics

The output conversion characteristics of D/A conversion are expressed by the slope of the straight line connected between the offset and gain values both of which are used when a digital value written from CPU module is converted to the voltage or current output value.

## Offset value

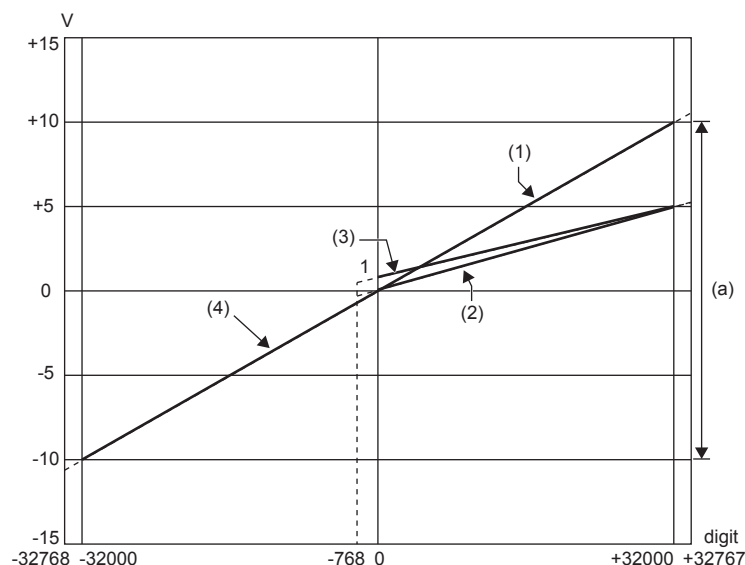
The analog voltage or current value generated when the digital value 0 is set from the CPU module.

## Gain value

The analog voltage or current value generated when the digital value 32000 is set from the CPU module.

## Voltage output characteristic

The following shows the list of analog output ranges at the voltage output and the graphs of the voltage input characteristics.



digit: Digital value

V: Analog output voltage (V)

(a): Practical analog output range

| No. | Analog output range setting  | Offset value | Gain value | Digital value    | Resolution                  |
|-----|------------------------------|--------------|------------|------------------|-----------------------------|
| (1) | 0 to 10 V                    | 0 V          | 10 V       | 0 to 32000       | 312.5 $\mu$ V               |
| (2) | 0 to 5 V                     | 0 V          | 5 V        |                  | 156.3 $\mu$ V               |
| (3) | 1 to 5 V                     | 1 V          | 5 V        |                  | 125.0 $\mu$ V               |
| (4) | -10 to +10 V                 | 0 V          | 10V        | -32000 to +32000 | 312.5 $\mu$ V               |
| —   | User range setting (voltage) | *1           | *1         |                  | 312.5 $\mu$ V <sup>*2</sup> |

\*1 Set the offset value and gain value in the user range setting within a range satisfying the following conditions. Failure to satisfy the conditions may not result in proper D/A conversion.

- Setting range of the offset value and gain value: -10 to +10 V
- $((\text{Gain value}) - (\text{Offset value})) \geq 2.0 \text{ V}$

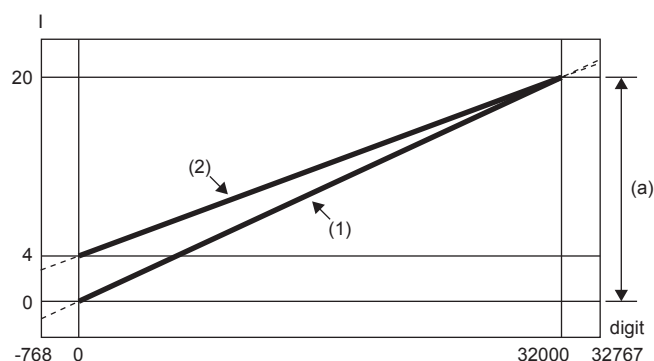
\*2 Maximum resolution in the user range setting. The resolution reaches the maximum when (gain value - offset value) = 10 V. Even when (gain value - offset value) < 10 V, the maximum resolution is unchanged.

### Point

- Set values within the practical digital input and analog output ranges of each output range. If the range is exceeded, the resolution and accuracy may not fall within the range of the performance specifications. (Do not use values in the dotted line region in the graph of voltage output characteristics.)

## Current output characteristic

The following shows the list of analog output ranges at the current output and the graphs of the voltage output characteristics.



digit: Digital value

I: Analog output current (mA)

(a): Practical analog output range

| No. | Analog output range setting  | Offset value | Gain value | Digital value    | Resolution             |
|-----|------------------------------|--------------|------------|------------------|------------------------|
| (1) | 0 to 20 mA                   | 0 mA         | 20 mA      | 0 to 32000       | 625.0 nA               |
| (2) | 4 to 20 mA                   | 4 mA         | 20 mA      |                  | 500.0 nA               |
| —   | User range setting (current) | *1           | *1         | -32000 to +32000 | 500.0 nA <sup>*2</sup> |

\*1 Set the offset value and gain value in the user range setting within a range satisfying the following conditions. Failure to satisfy the conditions may not result in proper D/A conversion.

- Offset value  $\geq 0$  mA, gain value  $\leq 20$  mA
- ((Gain value) - (Offset value))  $\geq 6.0$  mA

\*2 Maximum resolution in the user range setting. The resolution reaches the maximum when (gain value - offset value) = 16 mA. Even when (gain value - offset value) < 16 mA, the maximum resolution is unchanged.

### Point

- Set values within the practical digital input and analog output ranges of each output range. If the range is exceeded, the resolution and accuracy may not fall within the range of the performance specifications. (Do not use values in the dotted line region in the graph of current output characteristics.)

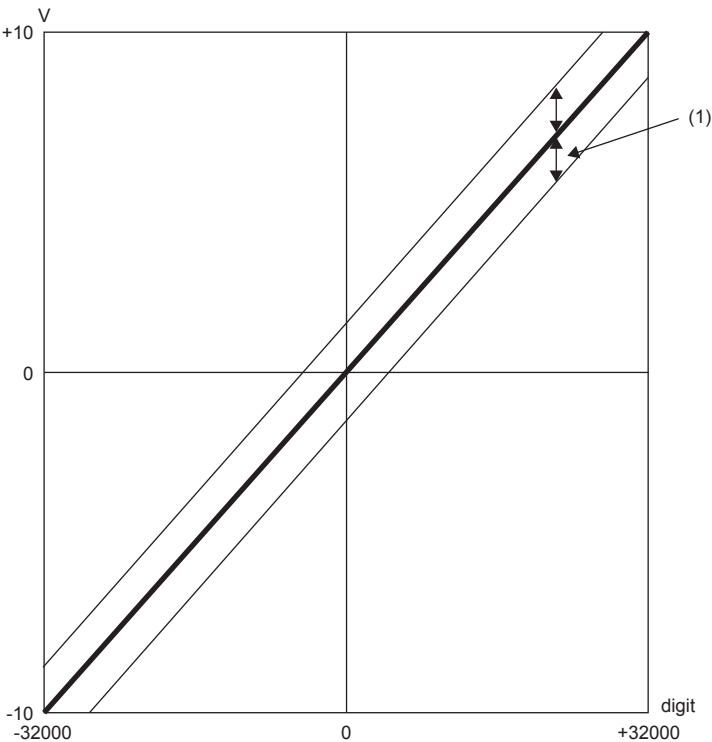
# Accuracy

The accuracy of D/A conversion is the accuracy for the full scale of analog output value.  
Any output characteristic change through changes of the offset/gain setting or the output range does not sacrifice the accuracy, which is maintained within the range in the performance specifications.  
The following graph shows the fluctuation range of accuracy when the range of -10 to +10 V is selected.  
The fluctuation range varies as follows depending on the ambient temperature and output range.

| Analog output | Ambient temperature                                        |                                                            |                                                            |
|---------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|
|               | 25±5℃                                                      | 0 to 55℃                                                   | -20 to 0℃                                                  |
| Voltage       | Within ±0.1% (voltage ±20 mV, current ±20 μA)/full scale*1 | Within ±0.2% (voltage ±40 mV, current ±40 μA)/full scale*1 | Within ±0.3% (voltage ±60 mV, current ±60 μA)/full scale*1 |
| Current       |                                                            |                                                            |                                                            |

\*1 Full-scale refers to voltage: -10 to +10 V, and current: 0 to 20 mA.  
(Except for the conditions under noise influence.)

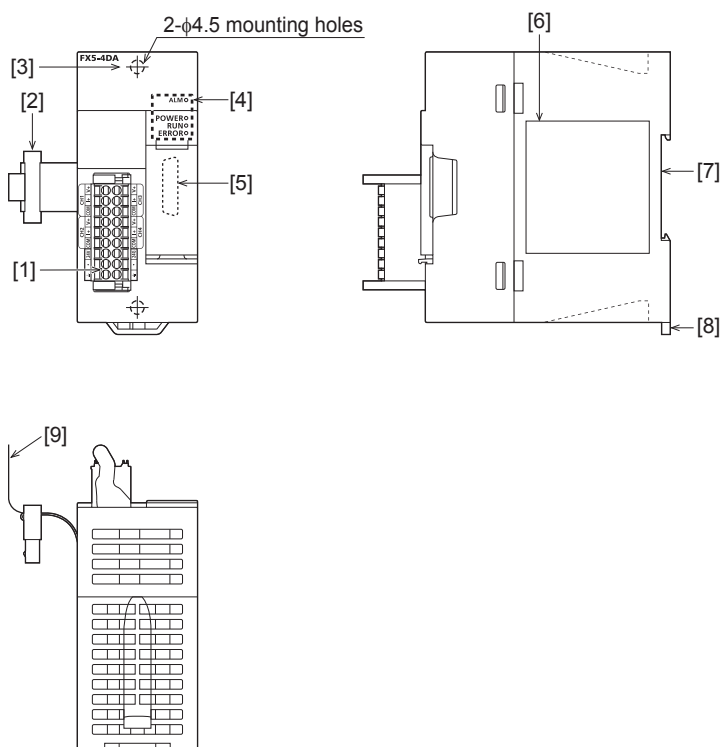
Ex.



digit: Digital value  
V: Analog output value (V)  
(1): Fluctuation range

## Part names

This section describes the part names of the analog output module.



| No. | Name                                         | Description                                                                    |
|-----|----------------------------------------------|--------------------------------------------------------------------------------|
| [1] | Terminal block (Spring clamp terminal block) | For the current/voltage output and the input of 24 V external power supply.    |
| [2] | Expansion cable                              | Cable for connecting the module when adding the analog output module.          |
| [3] | Direct mounting hole                         | Screw holes (2- $\phi$ 4.5, mounting screw: M4 screw) for direct installation. |
| [4] | Operations status display LEDs               | Indicates the operating status of the module. (Page 179 LED display)           |
| [5] | Extension connector                          | Connector for connecting the extension cable of an extension module.           |
| [6] | Name plate                                   | The product model name and manufacturer's serial number are shown.             |
| [7] | DIN rail mounting groove                     | The module can be installed on DIN46277 rail (35 mm wide).                     |
| [8] | DIN rail mounting hook                       | Hook for mounting the module on a DIN rail of DIN46277 (35 mm wide).           |
| [9] | Pull out tab                                 | They are used when drawing out an extension cable.                             |

## LED display

The following table lists the LED display.

| LED display | LED color | Description                                                                                                                       |
|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------|
| POWER       | Green     | Indicates the power supply status.<br>ON: Power ON<br>OFF: Power off or module failure                                            |
| RUN         | Green     | Indicates the operating status.<br>Light on: Normal operation<br>Flashing: Offset/gain setting mode<br>Light off: Error occurring |
| ERROR       | Red       | Indicates the error status.<br>ON: Minor error<br>Flashing: Moderate error or major error<br>OFF: Normal operation                |
| ALM         | Red       | Indicates the alarm status.<br>ON: Alarm occurred<br>OFF: Normal operation                                                        |

## 2.3 Procedures Before Operation

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This section describes the procedures before operation.

### 1. Check the analog output module specifications

Check the specifications for the analog output module. (📖 Page 174 Specifications)

### 2. Install the analog output module

Install the analog output module to the CPU module. For details, refer to the following.

📖 MELSEC iQ-F FX5U User's Manual (Hardware)

📖 MELSEC iQ-F FX5UC User's Manual (Hardware)

### 3. Wiring

Perform wiring of external devices to the analog output module.

### 4. Adding a module

Add an analog output module to the module configuration by using GX Works3.

#### Point

When adding a new analog output module, if selecting the module whose module model name has "(FX3)" at the end, it can be used as FX3 allocation mode.

- FX5-4DA: Normal mode
- FX5-4DA(FX3): FX3 allocation mode

For details on the FX3 allocation mode function, refer to 📖 Page 235 FX3 allocation mode function

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### 5. Parameter settings

Set parameters of the analog output module by using GX Works3. (📖 Page 242 Parameter Settings)

### 6. Offset/gain setting

When setting the user range, perform the offset/gain setting.

### 7. Programming

Create a program.

## 2.4 Functions

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This section describes the functions of an analog output module and the setting procedures for those functions.

For details on the buffer memory areas, refer to the following.

📖 Page 279 Buffer Memory Areas

#### Point

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

📖 Page 279 List of buffer memory areas

- 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 section. For details on the numerical values, refer to the following.

📖 Page 271 List of error codes

📖 Page 274 List of alarm codes

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## Function list

This section lists the functions of analog output module.

| Item                                                   | Description                                                                                                                                                                                                                                                    | Reference |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Operation mode                                         | Select the operation mode (Normal mode, Offset/gain setting mode) of the analog output module.                                                                                                                                                                 | Page 181  |
| Range switching function                               | Switches the analog output range for each channel. This function can change the output conversion characteristic by switching the range.                                                                                                                       | Page 183  |
| D/A conversion enable/disable function                 | Controls whether to enable or disable the D/A conversion for each channel. Disabling D/A conversion for unused channels reduces the conversion cycle.                                                                                                          | Page 183  |
| D/A output enable/disable function                     | Specifies whether to output the D/A conversion value or offset value for each channel. The conversion speed is constant regardless of the output enable/disable setting.                                                                                       | Page 183  |
| Analog output HOLD/CLEAR function                      | Sets whether to clear the current analog output value, or hold the previous value or the setting value when the CPU module operating status is Run, Stop, or Stop Error.                                                                                       | Page 184  |
| Analog output test function when CPU module stops      | Conducts an analog output test when CPU module stops.                                                                                                                                                                                                          | Page 186  |
| Scaling function                                       | Performs scale conversion on digital values within the range from a scaling upper limit value to a scaling lower limit value, both of which are set at desired values. This function helps reduce the man-hours taken for creating a scale conversion program. | Page 187  |
| Shift function                                         | Adds the set input value shift amount to the digital value.                                                                                                                                                                                                    | Page 189  |
| Alert output function                                  | Outputs an alarm when the digital value exceeds the warning output upper limit value or is below the warning output lower limit value.                                                                                                                         | Page 191  |
| Rate control function                                  | Limits the increase or decrease amount of the analog output value per 80 $\mu$ s to prevent sudden change of the analog output value.                                                                                                                          | Page 193  |
| External power supply disconnection detection function | Detects that the 24 V DC external power supply is not being supplied or the supply stopped.                                                                                                                                                                    | Page 196  |
| Disconnection detection function                       | Detects a disconnection by monitoring the analog output value.                                                                                                                                                                                                 | Page 197  |
| Interrupt function                                     | Executes a CPU module interrupt program when an interrupt factor such as a disconnection or warning output is detected.                                                                                                                                        | Page 198  |
| Wave output function                                   | Registers the previously prepared wave data (digital input values) in the analog output module and performs consecutive analog output with the set conversion cycle.                                                                                           | Page 201  |
| Error history function                                 | Records up to 16 errors and alarms that occurred in an analog output module to store them in the buffer memory areas.                                                                                                                                          | Page 232  |
| Offset/gain setting                                    | Corrects the D/A conversion value error for each channel.                                                                                                                                                                                                      | Page 254  |
| FX3 allocation mode function                           | This function controls the operation with a layout of the buffer memory addresses equivalent to those in FX3U-4DA. Sequence programs with proven results in FX3U-4DA can be diverted.                                                                          | Page 235  |

## Operation mode

The analog output module operates in the normal and offset gain setting modes. Change the mode according to the function to be used.

The individual modes are described below.

### Point

Each operation mode further allows you to select the FX3 allocation mode function that controls the operation with a layout of the buffer memory addresses equivalent to those in FX3U-4DA.

## Normal mode

The normal mode is divided into the normal output and wave output modes. "Normal mode" in this manual refers to both the normal output and wave output modes.

### ■Normal output mode

Used to perform normal D/A conversion. This mode D/A-converts the value set in 'CH1 Digital value' (Un\G460) and outputs it as an analog output value.

### ■Wave output mode

Used for wave output. This mode D/A-converts the value set in 'Wave data registration area' (Un\G10000 to Un\G89999) and outputs it as an analog output value.

For details on the wave output function, refer to the following.

☞ Page 201 Wave output function

## Offset/gain setting mode

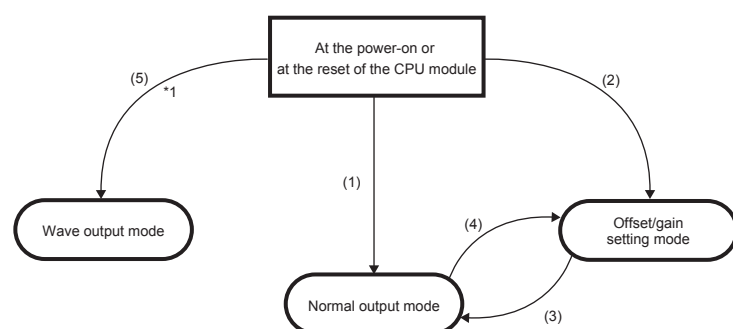
A mode used for the offset/gain setting

For details on the offset/gain settings, refer to the following.

☞ Page 254 Offset/Gain Setting

## Mode change

The conditions for changing each mode are described below.



| No. | Conditions for change                                                                                                                                                                             |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) | In "Basic setting" of GX Works 3, "Operation mode setting" is set to "Normal mode", and "Output mode setting" is set to "Normal output mode".                                                     |
| (2) | In "Basic setting" of GX Works 3, "Operation mode setting" is set to the "Offset/gain setting mode".                                                                                              |
| (3) | The following values are set in 'Mode switching setting' (Un\G296, Un\G297), and 'Operation condition setting request' (Un\G70, b9) is turned off→on→off.<br>• Un\G296: 4658H<br>• Un\G297: 4441H |
| (4) | The following values are set in 'Mode switching setting' (Un\G296, Un\G297), and 'Operation condition setting request' (Un\G70, b9) is turned off→on→off.<br>• Un\G296: 4441H<br>• Un\G297: 4658H |
| (5) | In "Basic setting" of GX Works 3, "Operation mode setting" is set to "Normal mode", and "Output mode setting" is set to "Wave output mode".                                                       |

\*1 The wave output mode is independent of the others. After the system starts up in the wave output mode, it cannot change to another. After the system starts up in a mode other than wave output, it cannot change to the wave output mode.

## Checking

The current mode can be examined by the following.

| Mode                     |                    | RUN LED status | Stored value of "Operation mode monitor" (Un\G60) | Offset/gain setting mode status flag (Un\G69, b10) |
|--------------------------|--------------------|----------------|---------------------------------------------------|----------------------------------------------------|
| Normal mode              | Normal output mode | ON             | 0                                                 | OFF                                                |
|                          | Wave output mode   | ON             | 2                                                 | OFF                                                |
| Offset/gain setting mode |                    | FLASH          | 1                                                 | ON                                                 |



## Range switching function

Switches the analog output range for each channel.

This function can change the output conversion characteristic by switching the range.

### Setting procedure

In the "Output range setting", set the output range to be used.

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

| Output range setting | Digital input range |
|----------------------|---------------------|
| 4 to 20 mA           | 0 to 32000          |
| 0 to 20 mA           | 0 to 32000          |
| 1 to 5 V             | 0 to 32000          |
| 0 to 5 V             | 0 to 32000          |
| -10 to +10 V         | -32000 to +32000    |
| 0 to 10 V            | 0 to 32000          |
| User range (voltage) | -32000 to +32000    |
| User range (current) | -32000 to +32000    |

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

#### Point

The range can be switched or the range setting can be monitored using the following buffer memory addresses.

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

For details on the buffer memory, refer to the following.

 Page 320 CH1 Range setting

 Page 306 CH1 Range setting monitor

## D/A conversion enable/disable function

Controls whether to enable or disable the D/A conversion for each channel.

Disabling D/A conversion for unused channels reduces the conversion cycle.

### Setting procedure

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

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

## D/A output enable/disable function

This function specifies whether to output the D/A conversion value or offset value for each channel.

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

### Setting procedure

Set D/A output enable/disable for each channel by using 'CH1 Output enable/disable flag' (Un\G70, b1).

| CH1 Output enable/disable flag (Un\G70, b1) | Analog output                     |
|---------------------------------------------|-----------------------------------|
| Output enable (ON)*1                        | Outputs the D/A conversion value. |
| Output disable (OFF)                        | Outputs the offset value.         |

\*1 When the CPU module changes from RUN to STOP, or a stop error occurs in the CPU module, the 'Output enable/disable flag' (Un\G70, b1) turns off.

# Analog output HOLD/CLEAR function

Sets whether to clear the current analog output value, or hold the previous value or the setting value when the CPU module operating status is Run, Stop, or Stop Error.

When the setting value is set, it becomes the value that was set in 'CH1 HOLD setting value' (Un\G596). The following table lists the setting ranges.

| Output range setting         | When the scaling function is disabled                   | When the scaling function is enabled <sup>*1</sup> |
|------------------------------|---------------------------------------------------------|----------------------------------------------------|
|                              | Setting range (practical range)                         | Setting range                                      |
| 4 to 20 mA                   | 0 to 32767<br>(practical range: 0 to 32000)             | -32000 to +32000                                   |
| 0 to 20 mA                   |                                                         |                                                    |
| 1 to 5 V                     |                                                         |                                                    |
| 0 to 5 V                     |                                                         |                                                    |
| 0 to 10 V                    |                                                         |                                                    |
| -10 to +10 V                 | -32768 to +32767<br>(practical range: -32000 to +32000) |                                                    |
| User range setting (voltage) |                                                         |                                                    |
| User range setting (current) |                                                         |                                                    |

<sup>\*1</sup> The setting and practical ranges applied when the scaling function is enabled depend on the setting of the upper and lower scaling limit values.

The HOLD/CLEAR setting can be checked with 'CH1 HOLD/CLEAR function setting monitor' (Un\G431).

## Operation

When the CPU module operation status changes to RUN, STOP, or Stop Error, the following analog output state is entered, depending on the combination of the analog output HOLD/CLEAR setting, 'CH1 D/A conversion enable/disable setting' (Un\G500), and 'CH1 Output enable/disable flag' (Un\G70, b1). If the analog output HOLD/CLEAR function setting is the previous value, the last output value will be held.

### ■In the normal output mode

| Execution status                                                      | CH1 D/A conversion enable/disable setting (Un\G500) | Enable                                                |                                    |                                         | Disable                                 |  |
|-----------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------|------------------------------------|-----------------------------------------|-----------------------------------------|--|
|                                                                       | CH1 Output enable/disable flag (Un\G70, b1)         | Enable                                                |                                    | Disable                                 | Enable/disable                          |  |
|                                                                       | Analog output HOLD/CLEAR setting                    | HOLD                                                  | CLEAR                              | Previous Value, setting value, or CLEAR | Previous Value, setting value, or CLEAR |  |
|                                                                       |                                                     | Previous Value                                        | Setting value                      |                                         |                                         |  |
| Analog output status while the CPU module is RUN                      |                                                     | Output the value D/A-converted from the digital value |                                    | Offset value                            | 0 V/0 mA                                |  |
| Analog output status while the CPU module is STOP                     |                                                     | Previous value <sup>*2*3</sup>                        | HOLD setting value <sup>*2*3</sup> | Offset value                            | Offset value                            |  |
| Analog output status while the CPU module is in Stop Error            |                                                     | Previous value <sup>*3</sup>                          | HOLD setting value <sup>*3</sup>   | Offset value                            | Offset value                            |  |
| The external power supply READY flag is off.                          |                                                     | 0 V/0 mA                                              | 0 V/0 mA                           | 0 V/0 mA                                | 0 V/0 mA                                |  |
| The disconnection detection flag is on.                               |                                                     |                                                       |                                    |                                         |                                         |  |
| Analog output status when a watchdog timer error <sup>*1</sup> occurs |                                                     |                                                       |                                    |                                         |                                         |  |

<sup>\*1</sup> When a watchdog timer error occurs, 'Module READY' (Un\G69, b0) turns off and the RUN LED of the analog output module turns off.

<sup>\*2</sup> Also when the CPU module changes from STOP to RUN, the value is output according to the analog output HOLD/CLEAR setting.

<sup>\*3</sup> When the external supply power shuts off or a disconnection is detected and then it is restored, the output will be the offset value.

## Precautions

With 'CH1 Output enable/disable flag' (Un\G70, b1) enabled, any CPU module change from RUN to STOP changes this flag to Disable.

At this time, if the analog output HOLD/CLEAR function setting is the previous value, the analog output will hold the last output value. If the analog output HOLD/CLEAR function setting is the setting value, the analog output will be the HOLD setting value.

When the CPU module is set to RUN again, 'CH1 Output enable/disable flag' (Un\G70, b1) remains disabled. However, the analog output will not be the offset value, and output of the previous value or HOLD setting value will continue.

When 'CH1 Output enable/disable flag' (Un\G70, b1) is enabled, output of the value D/A-converted from the digital value is restarted.

### ■In the wave output mode

| Execution status                                           | CH1 D/A Conversion enable/disable setting (Un\G500) | Enable                |      |                |                           |      |                    |                |      |              |                                         | Disable                                 |
|------------------------------------------------------------|-----------------------------------------------------|-----------------------|------|----------------|---------------------------|------|--------------------|----------------|------|--------------|-----------------------------------------|-----------------------------------------|
|                                                            | CH1 Output enable/disable flag (Un\G70, b1)         | Enable                |      |                |                           |      |                    |                |      |              | Disable                                 | Enable/disable                          |
|                                                            | Analog output HOLD/CLEAR setting                    | HOLD                  |      |                |                           |      |                    | CLEAR          |      |              | Previous Value, setting value, or CLEAR | Previous Value, setting value, or CLEAR |
|                                                            |                                                     | Previous Value        |      |                | Setting value             |      |                    |                |      |              |                                         |                                         |
|                                                            | Wave output status                                  | Output                | Stop | Pause          | Output                    | Stop | Pause              | Output         | Stop | Pause        |                                         |                                         |
| Analog output status while the CPU module is RUN           |                                                     | Wave data             | *3   | Previous value | Wave data                 | *3   | HOLD setting value | Wave data      | *3   | Offset value | Offset value                            | 0 V/0 mA                                |
| Analog output status while the CPU module is STOP          |                                                     | Previous value**1*4*5 |      |                | HOLD setting value**1*4*5 |      |                    | Offset value*1 |      |              | Offset value                            | 0 V/0 mA                                |
| Analog output status while the CPU module is in Stop Error |                                                     | Previous value*1*5    |      |                | HOLD setting value*1*5    |      |                    | Offset value*1 |      |              | Offset value                            | 0 V/0 mA                                |
| The external power supply READY flag is off.*1             |                                                     | 0 V/0 mA              |      |                | 0 V/0 mA                  |      |                    | 0 V/0 mA       |      |              | 0 V/0 mA                                | 0 V/0 mA                                |
| The disconnection detection flag is on.*1                  |                                                     |                       |      |                |                           |      |                    |                |      |              |                                         |                                         |
| Analog output status when a watchdog timer error*2 occurs  |                                                     |                       |      |                |                           |      |                    |                |      |              |                                         |                                         |

\*1 When the CPU module changes from RUN to STOP or a disconnection has occurred, the wave output status changes to the wave output stop.

\*2 When a watchdog timer error occurs, 'Module READY' (Un\G69, b0) turns off and the RUN LED of the analog output module turns off.

\*3 Output as per the setting of 'CH1 Output setting during wave output stop' (Un\G524).

\*4 Also when the CPU module changes from STOP to RUN, the value is output according to the analog output HOLD/CLEAR function setting.

\*5 When the external supply power shuts off or a disconnection is detected and then it is restored, the output will be as follows.

If the CPU module is RUN: Output that was selected in Wave output stopped selection.

If the analog output HOLD/CLEAR function is being used for output because the CPU module has changed from RUN to STOP: Offset value.

## Precautions

With 'CH1 Output enable/disable flag' (Un\G70, b1) enabled, any CPU module change from RUN to STOP changes this flag to Disable. The wave output signal also changes to wave output stop.

At this time, if the analog output HOLD/CLEAR function setting is the previous value, the analog output will hold the last output value. If the analog output HOLD/CLEAR function setting is the setting value, the analog output will be the HOLD setting value.

When the CPU module is set to RUN again, 'CH1 Output enable/disable flag' (Un\G70, b1) remains disabled. However, the analog output will not be the offset value, and output of the previous value or HOLD setting value will continue.

When 'CH1 Output enable/disable flag' (Un\G70, b1) is enabled, the value selected in Wave output stopped selection is output. Wave output does not restart.

## Setting procedure

Set "Analog output HOLD/CLEAR setting" to "Previous Value", "Setting value", or "CLEAR".

🔍 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [Analog output HOLD/CLEAR function]

## Analog output test function when CPU module stops

Conducts an analog output test when CPU module stops.

The following functions are enabled also during the analog output test.

- Scaling function (📖 Page 187 Scaling function)
- Shift function (📖 Page 189 Shift function)
- Alert output function (📖 Page 191 Alert output function)

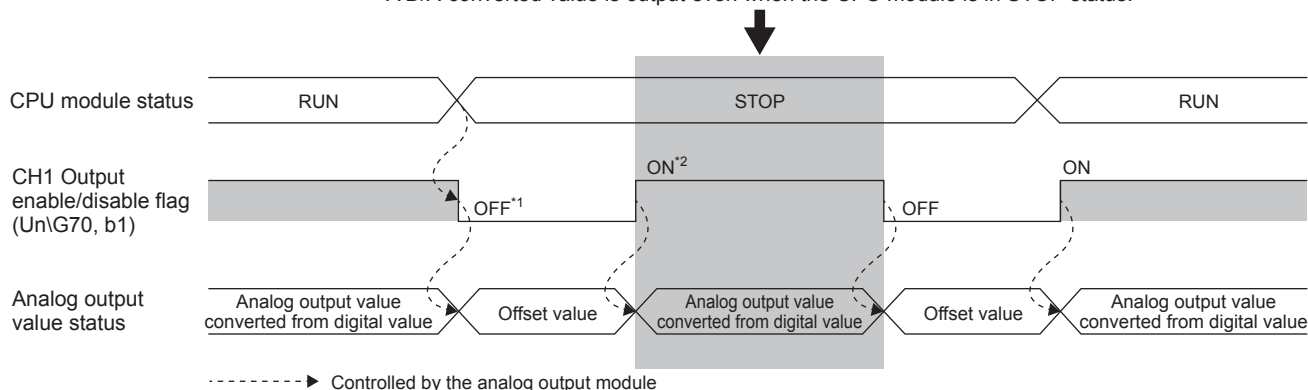
If a digital value out of the setting range is written, a digital value setting range error (error code: 191□H) will occur and the check code will be stored in 'CH1 Set value check code' (Un\G400).

## Operation

When the CPU module forcibly turns 'CH1 Output enable/disable flag' (Un\G70, b1) off→on while it is STOP, the analog output value changes from the offset value to the D/A-converted analog output value. After that, when 'CH1 Digital value' (Un\G460) is updated, the analog output is also updated.

When the CPU module is STOP with the analog output HOLD/CLEAR setting set to CLEAR (0), there is the following relationship between 'CH1 Output enable/disable flag' (Un\G70, b1) and the analog output value.

A D/A-converted value is output even when the CPU module is in STOP status.



\*1 When the CPU module status changes to STOP, 'CH1 Output enable/disable flag' (Un\G70, b1) turns off.

\*2 When the CPU module forcibly turns 'CH1 Output enable/disable flag' (Un\G70, b1) off→on, the analog output value changes from the offset value to the D/A-converted analog output value.

## Setting procedure

To execute the analog output test, in the GX Works3 device test, use the following procedure for setting.

1. Set D/A conversion enable (0) in the buffer memory address 'CH1 D/A conversion enable/disable setting' (Un\G500).
2. Turn off→on 'Operating condition setting request' (Un\G70, b9).
3. After checking that 'Operating condition setting completed flag' (Un\G69, b9) turns off, turn on→off 'Operating condition setting request' (Un\G70, b9).
4. In the buffer memory address 'CH1 Digital value' (Un\G460), set the digital value corresponding to the analog value to be output.
5. Turn off→on 'CH1 Output enable/disable flag' (Un\G70, b1).

## Scaling function

Performs scale conversion on digital values within the range from a scaling upper limit value to a scaling lower limit value, both of which are set at desired values. This function helps reduce the man-hours taken for creating a scale conversion program.

### Operation

The set 'CH1 Digital value' (Un\G460) is scale converted using 'CH1 Scaling upper limit value' (Un\G504) and 'CH1 Scaling lower limit value' (Un\G506). Then, the D/A conversion is executed using the scale converted value. (In conversion, values are rounded off to the nearest whole number.)

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.

### Concept of scaling setting

The scaling lower and upper limit value settings depend on whether the factory setting or user range setting is used for the analog output range.

#### ■If the factory default is used for the analog output range

- For the scaling upper limit value, set the value corresponding to the upper limit value of the analog output value in the currently set output range.
- For the scaling lower limit value, set the value corresponding to the lower limit value of the analog output value in the currently set output range.

#### ■If the user range is set for the analog output range

- For the scaling upper limit, set the value corresponding to the gain value.
- For the scaling lower limit, set the value corresponding to the offset value.

### Calculating the scaling value

For D/A conversion, use the value converted based on the following formula.

#### ■If the factory default is used for the output range

- If voltage: 1 to 5, 0 to 5, or 0 to 10 V  
Current: 4 to 20 or 0 to 20 mA

$$\text{Digital value used for D/A conversion} = \frac{32000}{SH - SL} \times (DX - SL)$$

- If voltage: -10 to 10 V

$$\text{Digital value used for D/A conversion} = \frac{64000}{SH - SL} \times (DX - SL) - 32000$$

## ■If the user range setting is used for the output range

$$\text{Digital value used for D/A conversion} = \frac{32000}{S_H - S_L} \times (D_X - S_L)$$

| Item           | Description               |
|----------------|---------------------------|
| D <sub>X</sub> | Digital value             |
| S <sub>H</sub> | Scaling upper limit value |
| S <sub>L</sub> | Scaling lower limit value |

## Setting procedure

1. Set "D/A conversion enable/disable setting" to "D/A conversion enable".  
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [D/A conversion enable/disable setting function]
2. Set "Scaling enable/disable setting" to "Enable".  
 Navigation window ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Scaling function]
3. Set values for "Scaling upper limit value" and "Scaling lower limit value". Set the scaling setting in the following conditions. Scaling upper limit value ≠ Scaling lower limit value

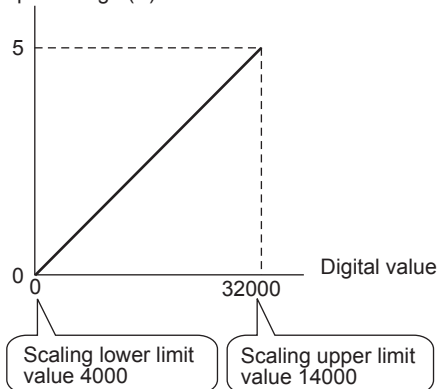
| Item                      | Setting range                       |
|---------------------------|-------------------------------------|
| Scaling upper limit value | -2147483648 to +2147483647          |
| Scaling lower limit value | (practical range: -32000 to +32000) |

## Scaling setting example

**Ex.**

When the scaling upper and lower limit values are set as 14000 and 4000, respectively, for a channel the output range of which is set as 0 to 5 V

Analog output voltage (V)



| Digital value | Scaled digital value | Output voltage (V) |
|---------------|----------------------|--------------------|
| 4000          | 0                    | 0                  |
| 6000          | 6400                 | 1                  |
| 8000          | 12800                | 2                  |
| 10000         | 19200                | 3                  |
| 12000         | 25600                | 4                  |
| 14000         | 32000                | 5                  |

## Precautions

- When the scaling function is used, the unscaled digital value can be set to a value out of the range between the scaling upper and lower limit values (dashed line portion of output characteristics)". However, use it within the analog output practical range (solid line portion of output characteristics). If the analog output practical range is exceeded, the maximum resolution or the accuracy may go out of the specification.
- Depending on the scaling function setting, the default digital value "0" may be inappropriate. Particularly for an example of the output range 0 to 5 V, if 'CH1 Output enable/disable flag' (Un\G70, b1) turns on with the digital value set to "0", a digital value out-of-range error will occur. A digital value setting range error occurs (error code: 191□H) occurs, "Error flag" (Un\G69, b15) turns on, and the ERROR LED turns on. To avoid this, set a proper digital value within the scaling range before turning on 'CH1 Output enable/disable flag' (Un\G70, b1).
- Note that use of the user range results in "scaling lower limit value = offset value".
- If a scaling converted digital value falls outside the digital setting range when the scaling function is enabled, a digital value setting range error (error code: 191□H) occurs and the check code is stored in 'CH1 Set value check code' (Un\G400).
- The scaling function is enabled only for normal output. If the scaling function is enabled while the wave output function is in use, a wave output mode scaling setting error (alarm code: 0B1□H) will occur and 'Warning output signal' (Un\G69, b14) turns on.
- Use the setting range of the scaling upper and lower limit values in the range of -2147483648 to +2147483647 only when only when performing the same operation as the FX3U-4DA offset/gain function. For other than the FX3U-4DA Offset/gain setting function, use it in the range of -32000 to +32000 because the digital value exceeds this range.

## Shift function

Adds the set input value shift amount to the digital input value.

A change in input value shift amount is reflected to the analog output value in real time, which facilitates fine adjustment at system start-up.

## Operation

During digital value D/A conversion, the value obtained by adding 'CH1 Input value shift' (Un\G480) to 'CH1 Digital value' (Un\G460) is D/A-converted.

If the shift processing produces a calculated digital value exceeding the range of -32768 to +32767, the lower (-32768) and upper (+32767) limit values are fixed.

If the value is written into the 'CH1 Input value shift' (Un\G480), the setting value will be added to the digital input value regardless of whether 'Operating condition setting request' (Un\G70, b9) is on or off.

## Setting procedure

In 'Input value shift amount', set the amount by which to shift.

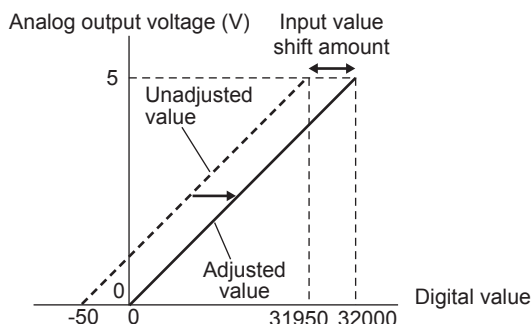
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Shift function]

| Item                     | Setting range    |
|--------------------------|------------------|
| Input value shift amount | -32768 to +32767 |

## Setting example

**Ex.**

When the output range is set to 0 to 5 V and the input value shift amount is set to +50



| Digital value    |                | Analog output voltage (V) |
|------------------|----------------|---------------------------|
| Unadjusted value | Adjusted value |                           |
| -50              | 0              | 0                         |
| 31950            | 32000          | 5                         |

## Precautions

- The warning output, scaling, and rate control functions are executed based on the digital value for which shift-and-add was performed.
- When the value obtained by adding 'CH1 Input value shift' (Un\G480) to 'CH1 Digital value' (Un\G460) is out of the digital setting range, a digital value setting range error (error code: 191□H) occurs and the check code is stored in 'CH1 Set value check code' (Un\G400).
- The shift function is enabled only for normal output. If 'CH1 Input value shift' (Un\G480) is set to a value other than 0 while the wave output function is in use, a Wave output mode Input value shift amount setting error (alarm code: 0B2□H) occurs and 'Warning output signal' (Un\G69, b14) turns on. The wave output continues, but 'CH1 Input value shift' (Un\G480) is not added to the output wave data.
- After a Wave output mode Input value shift amount setting error occurs, 'Warning output signal' (Un\G69, b14) will not be turned off even if 0 is set in 'CH1 Input value shift' (Un\G480). To turn off 'Warning output signal' (Un\G69, b14), turn off→on→off 'Warning output clear request' (Un\G70, b14). This turns off 'Warning output signal' (Un\G69, b14), turns off the ALM LED, and clears the 'Latest alarm code' (Un\G2).



## Alert output function

Outputs an alarm when the digital value exceeds the warning output upper limit value or is below the warning output lower limit value.

### Operation

#### ■Warning output notification

When 'CH1 Digital value' (Un\G460) exceeds 'CH1 Alert output upper limit' (Un\G510) or falls below 'CH1 Alert output lower limit' (Un\G512), an alarm is output when 'Alarm output upper limit flag' (Un\G36), 'Alarm output lower limit flag' (Un\G37), or 'Warning output signal' (Un\G69, b14) turns on and the ALM LED turns on. When an alarm occurs, alarm code 080□H or 081□H is stored in 'Latest alarm code' (Un\G2).

When an alarm occurs, one of the following is executed depending on 'CH1 Alert output setting' (Un\G508).

- If the setting is Enable (output not limited), the D/A conversion will be executed with the set digital values.
- If the setting is Disable (output limited), the D/A conversion will be executed with the setting values of the warning output upper and lower limit values handled as digital values.

After a warning occurs and 'CH1 Digital value' (Un\G460) becomes less than 'CH1 Alert output upper limit value' (Un\G510) or larger than 'CH1 Alert output lower limit value' (Un\G512), the analog output value returns to the normal value, but 'Alarm output upper limit flag' (Un\G36), 'Alarm output lower limit flag' (Un\G37), and 'Alarm output signal flag' (Un\G69, b14) are not cleared.

### Clear the warning

There are the following two methods to clear the warning output.

Set 'CH1 Digital value' (Un\G460) to a value equal to or smaller than 'CH1 Alert output upper limit value' (Un\G510) and equal to or larger than 'CH1 Alert output lower limit value' (Un\G512). Then,

- Turn off→on→off 'Alarm output clear request' (Un\G70, b14).
- Turn off→on→off 'Operating condition setting request' (Un\G70, b9).

The analog output module changes to the following status when the warning output is cleared.

- 'Alarm output upper flag' (Un\G36) and 'Alarm output lower flag' (Un\G37) are cleared.
- 'Alarm output signal' (Un\G69, b14) turns off.
- The ALM LED turns off.
- The alarm code stored in 'Latest alarm code' (Un\G2) is cleared.

### Setting procedure

1. Set 'Warning output setting' to 'Enable (output not limited)' or 'Disable (output limited)'.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Warning output function]

2. Set values for "Warning output upper limit value" and "Warning output lower limit value".

Set the warning output upper and lower limit values in the following conditions.

- Warning output upper limit value > Warning output lower limit value

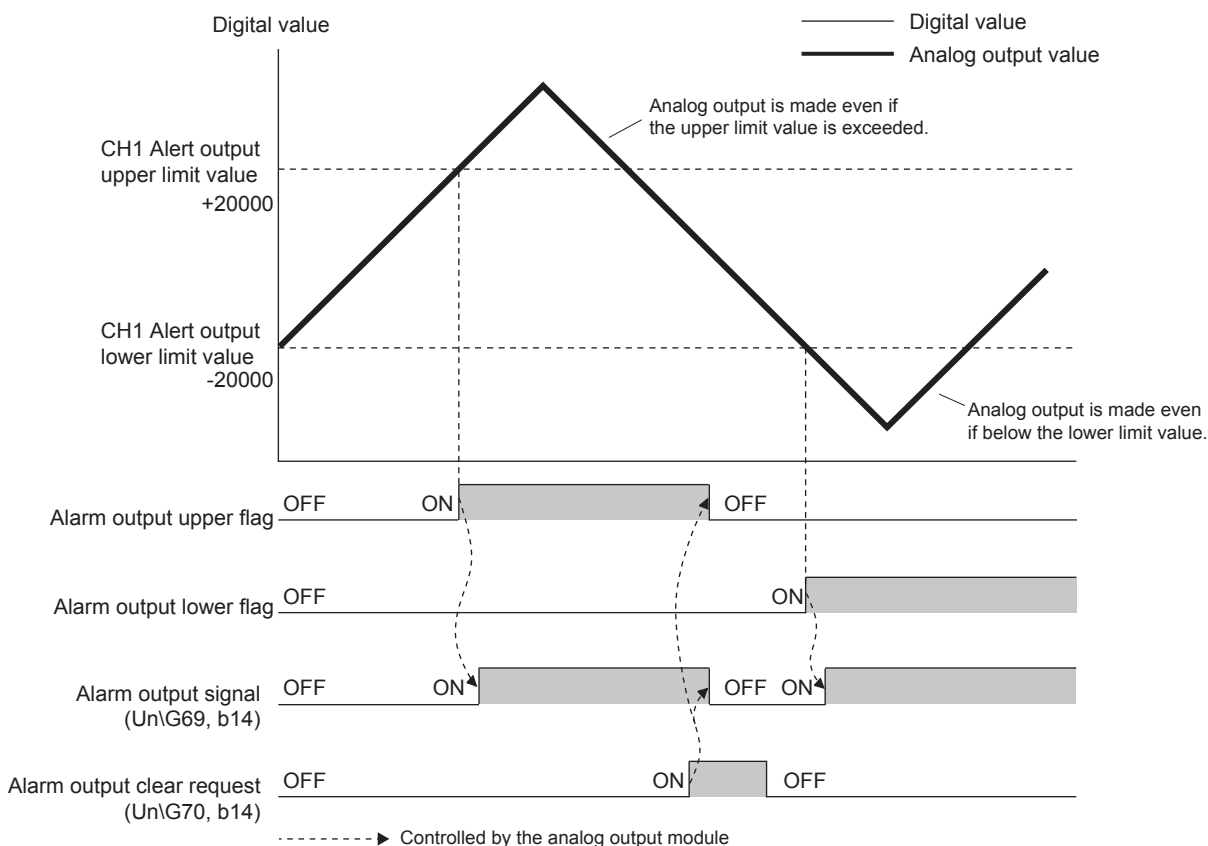
| Item                             | Setting range    |
|----------------------------------|------------------|
| Warning output upper limit value | -32768 to +32767 |
| Warning output lower limit value |                  |

### Precautions

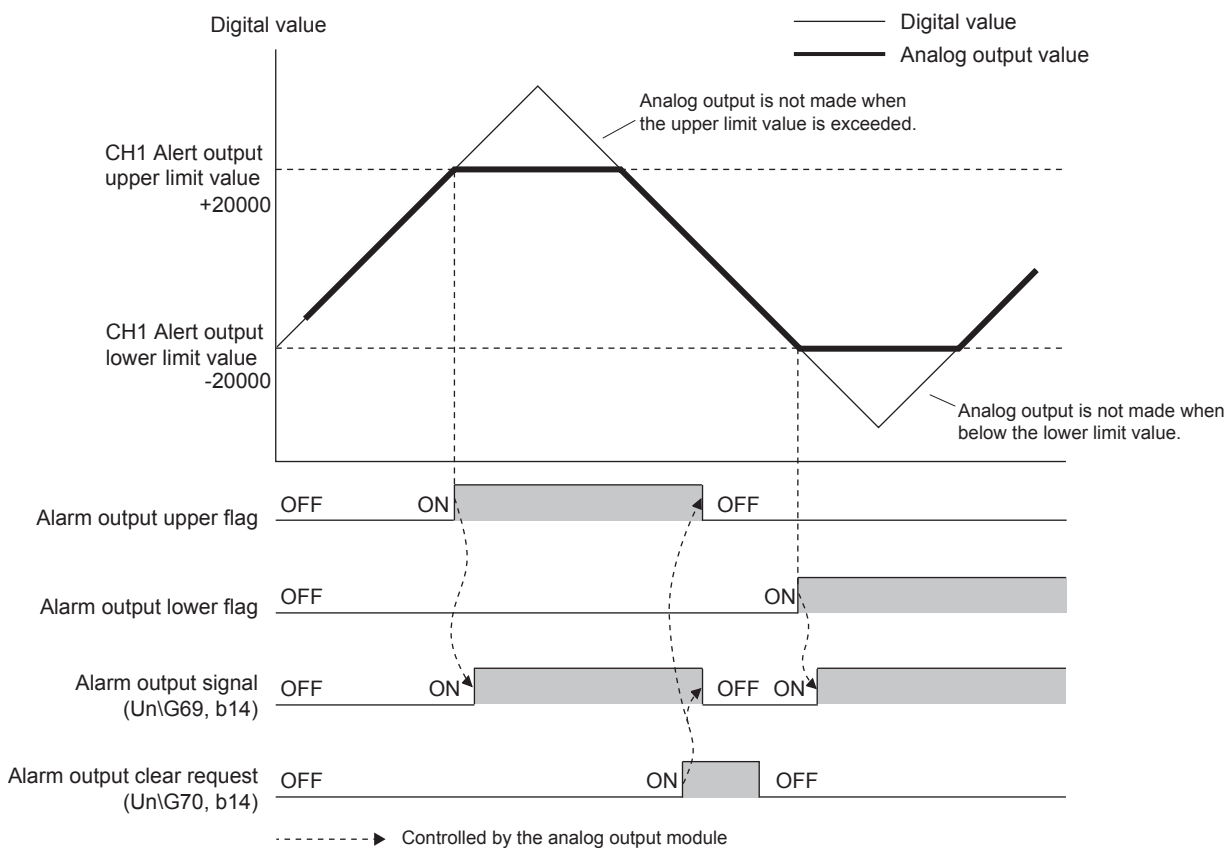
When the shift function is used in the normal mode, the 'CH1 Digital value' (Un\G460) for which shift-and-add was performed will be processed as the target of alarm detection. For the warning output upper and lower limit values, be sure to set the values, taking shift-and-add into consideration.

## Warning output function operation example

### ■When 'CH1 Alert output setting' (Un\G508) is enabled (output not limited)



### ■When 'CH1 Alert output setting' (Un\G508) is enabled (output limited)



## Rate control function

Limits the increase or decrease amount of the analog output value per 80  $\mu$ s to prevent sudden change of the analog output value.

### Operation

If the variation amount of 'CH1 Digital value' (Un\G460) is larger than the value set by 'CH1 Increase digital limit value' (Un\G514) and 'CH1 Decrease digital limit value' (Un\G516), 'CH1 Digital value' (Un\G460) is changed by the limit value set for each digital limit value.

For 'CH1 Increase digital limit value' (Un\G514) and 'CH1 Decrease digital limit value' (Un\G516), the increase or decrease value per 80  $\mu$ s is set; however, in actuality, the output value of the corresponding channel is updated with a cycle of "80  $\mu$ s  $\times$  Number of conversion enabled channels".

Therefore, the analog output value is increased or decreased as follows with the update cycle.

- 1st time: D/A conversion value of the Increase/Decrease digital limit value
- 2nd time or later: D/A conversion value of "Increase/Decrease digital limit value  $\times$  Number of conversion enabled channels"

If the digital value is changed during rate control, rate control will continue until a new digital value will be output. At this time, if a digital value is set so that the increase/decrease direction is reversed, the initial output after change will be the D/A conversion value of " 'CH1 Increase digital limit value' (Un\G514)  $\times$  Number of conversion enabled channels" or " 'CH1 Decrease digital limit value' (Un\G516)  $\times$  Number of conversion enabled channels".

### Setting procedure

1. Set "Rate control enable/disable setting" to "Enable".

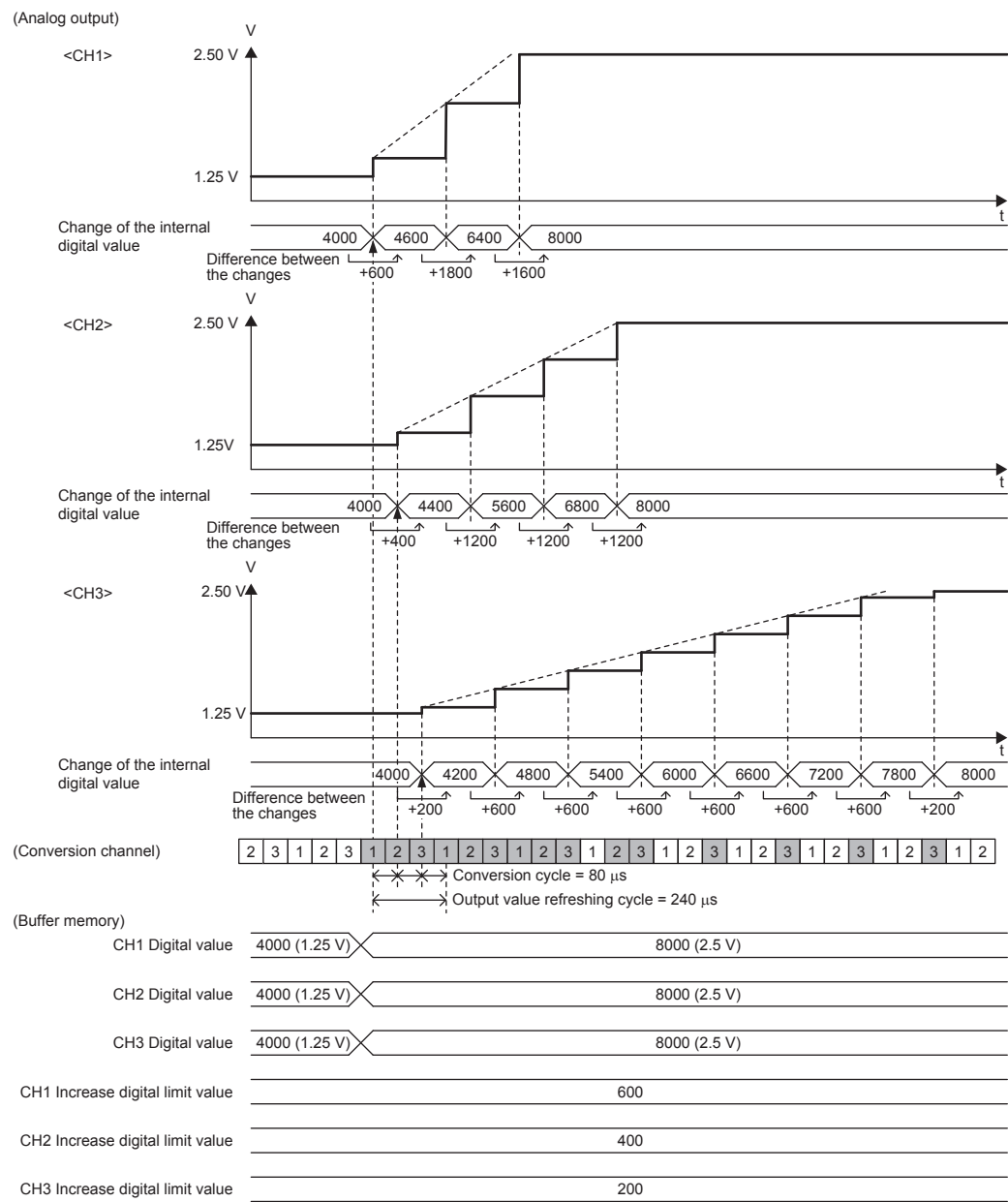
 [Navigation window]  $\Rightarrow$  [Parameter]  $\Rightarrow$  [Module Information]  $\Rightarrow$  Module model name  $\Rightarrow$  [Module Parameter]  $\Rightarrow$  [Application setting]  $\Rightarrow$  [Rate control function]

2. Set values for "Increase digital limit value" and "Decrease digital limit value".

| Item                         | Setting range |
|------------------------------|---------------|
| Increase digital limit value | 0 to 64000    |
| Decrease digital limit value |               |

Rate control function operation example

This example shows operations when the rate control enable/disable settings of channels 1 to 3 are set to Enable (0) and their Increase digital limit values are set to 600, 400, and 200.

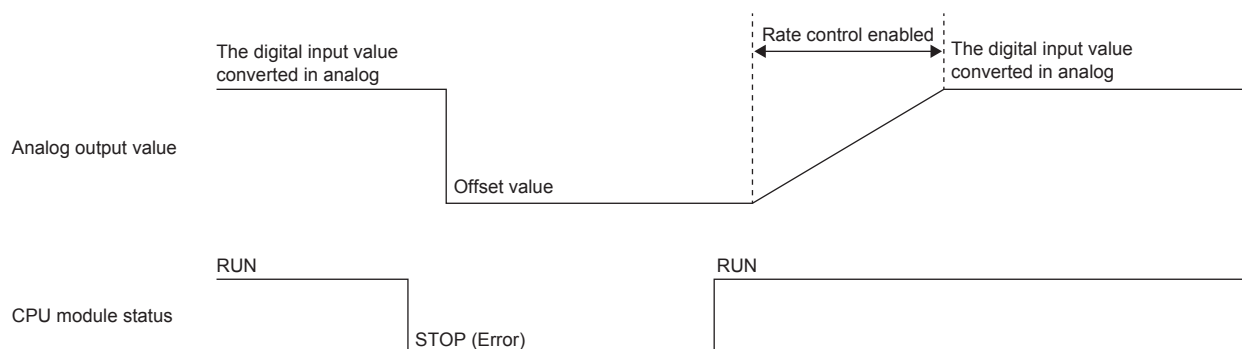


## Precautions

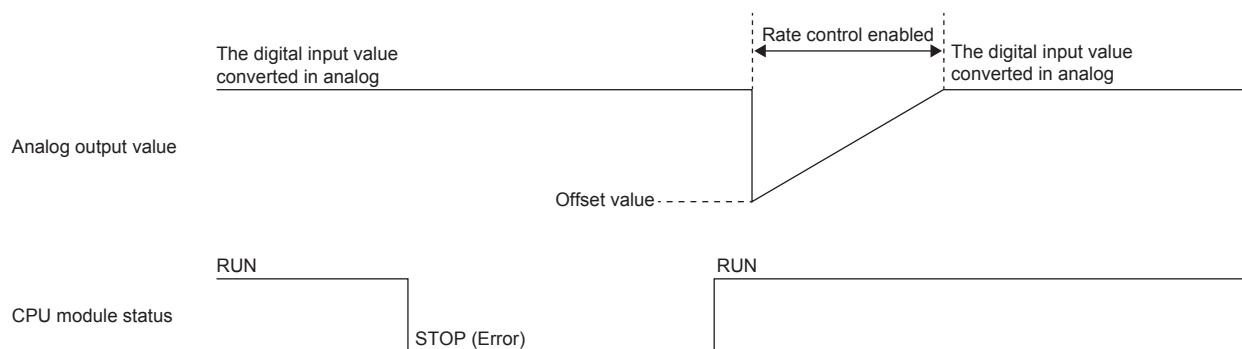
- The shift function setting is enabled also during rate control.
- If the warning output function is enabled, alarm judgment is made for the preset 'CH1 Digital value' (Un\G460). Note that it is not the timing when the upper/lower limit is exceeded by rate control.
- Rate control does not function when the analog output test is in progress in the CPU module STOP state.
- If the analog output HOLD/CLEAR setting is other than the previous value, rate control does not function although the analog output changes in the CPU module STOP state.
- The rate control function will be as follows if the CPU module changes its operation when D/A conversion is enabled, D/A output is enabled, or analog output CLEAR is set.

When the CPU module changes from RUN to STOP (error): Rate control does not function.

When the CPU module changes from STOP (error) to RUN: Rate control functions.



- When D/A conversion is enabled, D/A output is enabled, or the analog output HOLD setting is the previous value or set value if rate control is enabled, the analog output restarts from the offset value when the CPU module changes from STOP (error) to RUN.



- When D/A conversion is enabled or D/A output is disabled, rate control does not function.
- During rate control, if a value out of the settable range is written to 'CH1 Digital value' (Un\G460), rate control is performed with the upper and lower limit values of the setting range. In addition, the check result is stored in 'CH1 Set value check code' (Un\G400).
- If the scaling function is enabled in the following cases, rate control is performed with the upper (-32768) or lower (+32767) limit value.

For the range of -10 to +10 V: (Scaling upper limit value + Scaling lower limit value) / 2 exceeded the range of -32768 to +32767.

For the range of other than -10 to +10 V: The scaling lower limit value exceeded the range of -32768 to +32767.

- If the external power supply turns off during rate control, the analog output changes to 0 V/0 mA with the rate control function stopped. When the external power supply is then restored, rate control restarts from the offset value.
- If a disconnection is detected during rate control, the analog output changes 0 V/0 mA with the rate control function stopped. When the disconnection is then restored and 'Disconnection detection flag' (Un\G38) is cleared, rate control restarts from the offset value.
- The rate control function is enabled only for normal output. If the rate control function is enabled while the wave output function is in use, a wave output mode rate control setting error (alarm code: 0B3□H) will occur and 'Warning output signal' (Un\G69, b14) turns on.

## External power supply disconnection detection function

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Detects that the 24 V DC external power supply is not being supplied or the supply stopped.

When external power supply off is detected, 'External power supply READY flag' (Un\G69, b7) turns off and the analog output value changes to 0 V/0 mA independently of the other settings.

### Operation

If no external power supply is input, the state is judged to be external power supply off, with 'External power supply READY flag' (Un\G69, b7) turned off.

If the input of the external power supply stops, the state is judged to be external power supply off, with 'External power supply READY flag' (Un\G69, b7) turned off.

### Precautions

If the external power supply does not satisfy the requirements of the power supply specifications, the state may be determined to be external power supply off.

For the power specifications for the external power supply, refer to  Page 174 Power supply specifications.

## Disconnection detection function

Detects a disconnection by monitoring the analog output value. This function is enabled only when the analog output range is 4 to 20 mA, 0 to 20 mA or the user range (current). Disconnections can be detected for each channel.

### Operation

#### ■ Disconnection detection

Disconnections can be when the analog output range is 4 to 20 mA<sup>\*1</sup>, 0 to 20 mA, or the user range (current)<sup>\*1</sup> and 'CH1 D/A conversion enable/disable setting' (Un\G500) is set to D/A conversion enable (0).

<sup>\*1</sup> If the analog output value is 1 mA or less, disconnections may be unable to be detected.

#### ■ Operation performed when disconnection is detected

When a disconnection is detected, 'Disconnection detection flag' (Un\G38) and 'Disconnection detection signal' (Un\G69, b13) turn on and the disconnection is notified by turning on the ERROR LED.

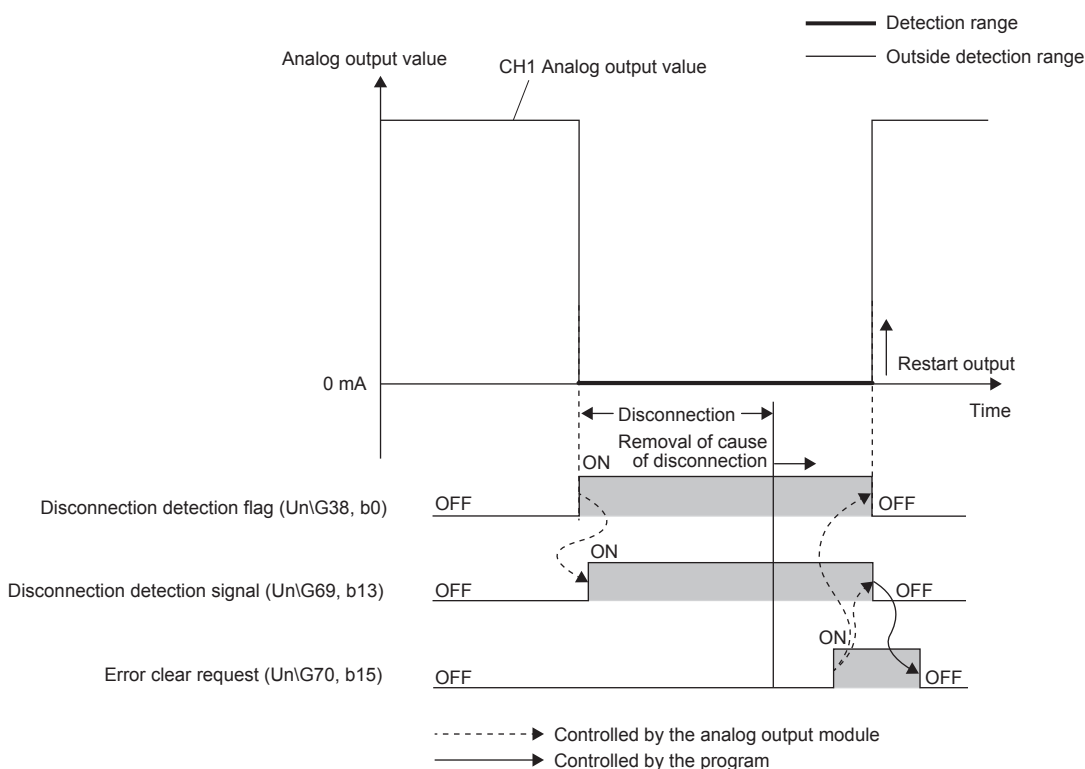
In addition, when a disconnection is detected, error code 1C4□H is stored in 'Latest error code' (Un\G0).

Eliminate the cause of the disconnection from the disconnection state, and perform the following operations depending on the setting of 'Disconnection Detection Automatic Clear Enable/Disable Setting' (Un\G304)<sup>\*1</sup>. The analog output restarts according to 'CH1 Output enable/disable flag' (Un\G70, b1).

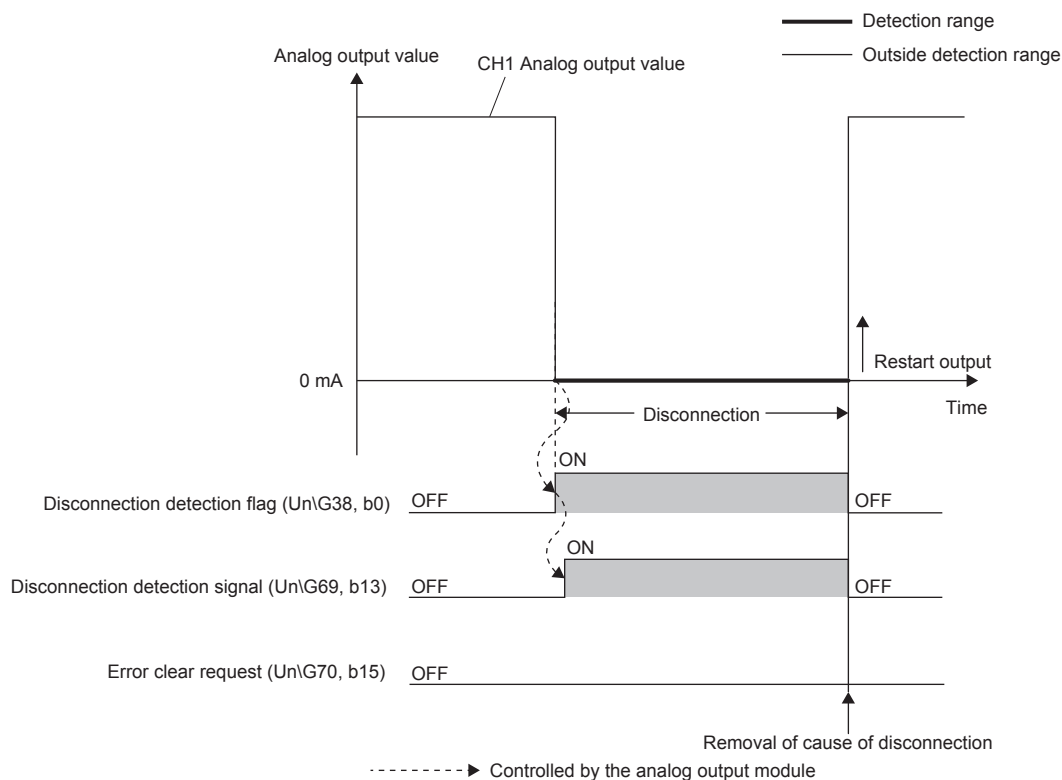
<sup>\*1</sup> Disconnection detection auto-clear enable/disable setting (Un\G304) is enable only in the normal output mode.

| Output mode        | Disconnection detection automatic clear enable/disable setting (Un\G304)                                                                                                                              |                                                                                            |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|
|                    | Disable                                                                                                                                                                                               | Enable                                                                                     |
| Normal output mode | Check the CH1 Digital value (Un\G460), and then turn off→on→off 'Error clear request' (Un\G70, b15).                                                                                                  | Once the cause of the disconnection is eliminated, the analog output starts automatically. |
| Wave output mode   | When disconnection is detected, wave output stops. After turning off→on→off 'Error clear request' (Un\G70, b15), set 'CH1 Wave output start/stop request' (Un\G462) as Wave output start request (1). | —                                                                                          |

- Operation when 'Disconnection detection automatic clear enable/disable setting' (Un\G304) is Disable



- Operation when 'Disconnection detection automatic clear enable/disable setting' (Un\G304) is Enable



At the same time analog output restarts, the disconnection detection flag (Un\G38) of the corresponding channel is cleared. In addition, when the analog output of all channels restarts, 'Disconnection detection signal' (Un\G69, b13) is cleared.

## Interrupt function

Executes a CPU module interrupt program when an interrupt factor such as a disconnection or warning output is detected. The number of available interrupt pointers per analog output module is up to 16.

### 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) turns to Interrupt factor (1).

#### ■ How to reset an interrupt factor

When Reset request (1) is set in '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 GX Works3. After completing the settings, write the project to enable the settings.

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

The following shows the setting items on the interrupt settings 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 301 Condition target setting [n]

### ■Condition target channel setting

Select a target channel when the condition target setting for the interrupt detection is channel specification.

| Item                             | Setting value   |        |        |        |        |
|----------------------------------|-----------------|--------|--------|--------|--------|
| Condition target channel setting | 0: All channels | 1: CH1 | 2: CH2 | 3: CH3 | 4: CH4 |

### ■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-F FX5 Module User's Manual (Application)

#### Point

- If 'Condition target setting [n]' (Un\G232 to Un\G247) is Disable (0), no interrupt request is 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-F FX5 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 Warning output flag (2) etc., the interrupt requests that have the same interrupt factor are sent to the CPU module if alarms are issued in multiple channels. In this case, the CPU module executes multiple interrupt programs at a time and thus judges that the program cannot be normally finished due to the scan monitoring function, and a CPU module error may occur. When a CPU module error occurs, review the CPU module parameter setting and the program.

Setting example

Ex.

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

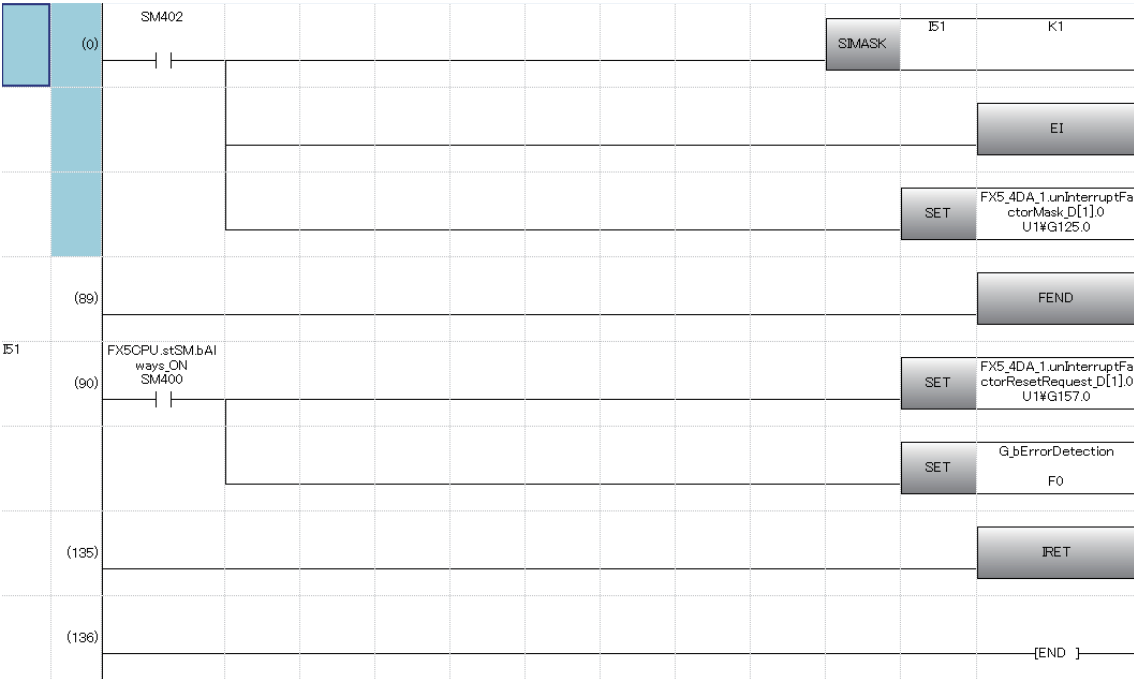
- Parameter settings

Set "Interrupt setting" of [Module Parameter] as follows.

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

- Label settings

| Classification       | Device                                                                                                                                                                                 | Description                      | Device                |            |           |       |                       |                   |     |            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------|------------|-----------|-------|-----------------------|-------------------|-----|------------|
| Module Label         | FX5CPU.stSM.bAlways_ON                                                                                                                                                                 | Always ON                        | SM400                 |            |           |       |                       |                   |     |            |
|                      | FX5_4DA_1.unInterruptFactorMask_D[1]                                                                                                                                                   | Interrupt factor mask 2          | U1\G125               |            |           |       |                       |                   |     |            |
|                      | FX5_4DA_1.unInterruptFactorResetRequest_D[1]                                                                                                                                           | Interrupt factor reset request 2 | U1\G157               |            |           |       |                       |                   |     |            |
| Labels to be defined | Define global labels as shown below:                                                                                                                                                   |                                  |                       |            |           |       |                       |                   |     |            |
|                      | <table><tr><th>Label Name</th><th>Data Type</th><th>Class</th><th>Assign (Device/Label)</th></tr><tr><td>G_bErrorDetection</td><td>Bit</td><td>VAR_GLOBAL</td><td>F0</td></tr></table> |                                  |                       | Label Name | Data Type | Class | Assign (Device/Label) | G_bErrorDetection | Bit | VAR_GLOBAL |
| Label Name           | Data Type                                                                                                                                                                              | Class                            | Assign (Device/Label) |            |           |       |                       |                   |     |            |
| G_bErrorDetection    | Bit                                                                                                                                                                                    | VAR_GLOBAL                       | F0                    |            |           |       |                       |                   |     |            |

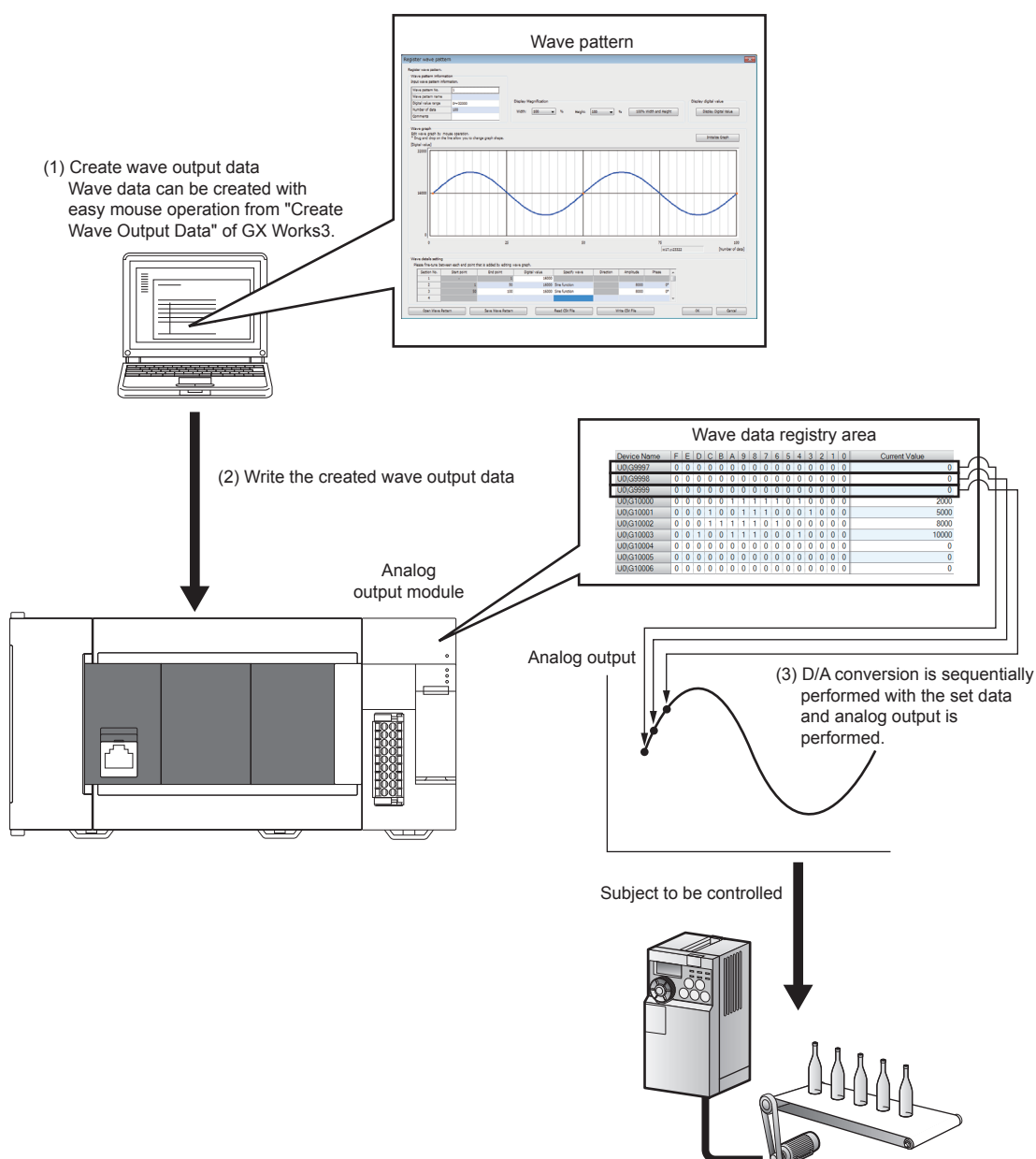


## Wave output function

This function registers the previously prepared wave data (digital input values) in the analog output module and performs consecutive analog output with the set conversion cycle. When analog (torque) control is to be performed, for example, for a press machine or injection molding machine, it can achieve faster and smoother control than that by programming, by automatically outputting the control wave registered in the analog output module in advance. In addition, since this control can be achieved only by registering the wave data in the analog output module, it enables control without programming when repetitive control such as line control is to be performed, thus reducing the man-hours for programming.

The wave output function is available only when "Wave output mode" is set in "Output mode setting" of the basic setting. In this section, the following items set in the wave output function are called wave output data. Wave output data can be created by "Wave output data creating tool" of the module expansion parameter.

- Wave pattern (  Page 248 Register the wave pattern)
- Wave output function parameters (  Page 252 Setting the wave output function parameters)



## Procedure for using the wave output function

Use the following procedure to use the wave output function.

- 1.** Register the wave pattern  
☞ Page 248 Register the wave pattern
- 2.** Set the wave output function parameters  
☞ Page 252 Setting the wave output function parameters
- 3.** Save the wave pattern  
☞ Page 252 Save the wave pattern
- 4.** Parameter setting of the analog output module  
☞ Page 207 Parameter setting of the analog output module
- 5.** Transfer the wave output data  
☞ Page 210 Transfer the wave output data
- 6.** Start, stop, or pause the wave output  
☞ Page 212 Start, stop, or pause the wave output

## Restrictions and precautions on the wave output function

The wave output function has the following restrictions and precautions.

### ■Output mode setting

To use the wave output function, set the output mode setting to the wave output mode. This makes all channels operate in the wave output mode.

### ■Output range setting

No user range is available. When executing the wave output function, be sure to use anything other than the user range. For output range setting, refer to the following.

☞ Page 183 Range switching function

### ■Unavailable functions

When the wave output function is selected, the scaling, shift, and rate functions are unavailable. Also, the setting description of "Disconnection detection auto-clear enable/disable setting" (Un\G304) will be ignored, and the setting will be disable. When executing the wave output function, be sure to disable them.

### ■Analog output HOLD/CLEAR function

The analog output HOLD/CLEAR function differs from operation from that for normal output.

For details, refer to the following.

☞ Page 185 In the wave output mode

## Setting the wave output function parameters

To use the wave output function, the parameters of the wave output function needs to be set on the "Create Wave Output Data" window.

| Setting item                              | Reference |
|-------------------------------------------|-----------|
| Output setting during wave output stop    | Page 252  |
| Output value during wave output stop      |           |
| Wave pattern start address setting        |           |
| Wave pattern data points setting          |           |
| Wave pattern output repetition setting    |           |
| Constant for wave output conversion cycle |           |

For details on the buffer memory areas, refer to the following.

☞ Page 290 Details of buffer memory addresses

## Wave data

Wave data is a series of chronologically arranged digital input values to be output as analog data. Up to 80000 points of wave data are available. Wave data is designed to be registered in 'Wave data registry area' (Un\G10000 to Un\G89999).

## Wave pattern

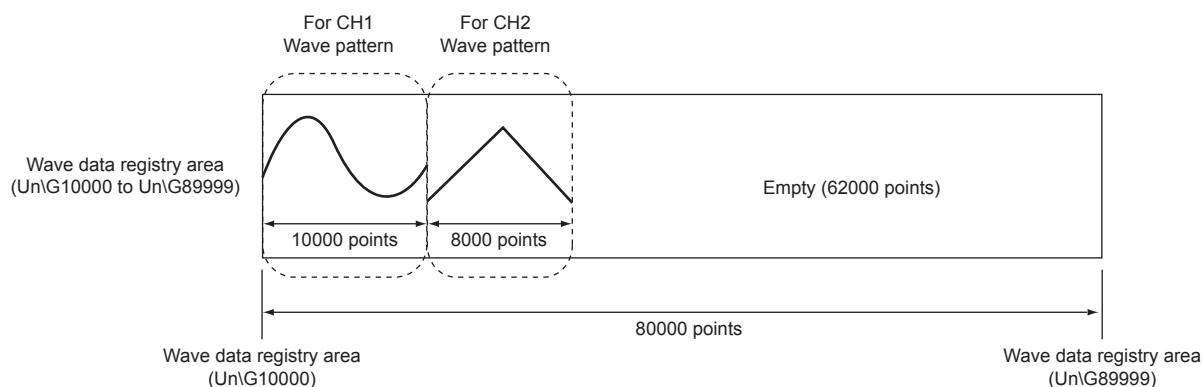
The wave output function allows you to select a desired data points from the registered wave data and set a wave pattern for each channel. Set the wave pattern with the following items.

| Setting item                       | Description                                                                                                                                                                                                              |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wave pattern start address setting | Sets the start address of the wave pattern that is output for each channel. D/A conversion is performed sequentially from the digital input values of the set buffer memory address, and they are output as analog data. |
| Wave pattern data points setting   | Sets the data points of the wave pattern that is output for each channel. From the wave pattern start address, the wave data for the set data points is D/A-converted and output as analog data.                         |

An error occurs if the value obtained by subtracting 1 from the sum of the setting values of the wave pattern start address setting and the wave pattern point setting exceeds the last buffer memory address (Un\G89999) of the wave data registration area. Error code 1D9□H is stored in 'Latest error code' (Un\G0), 'Error flag' (Un\G69, b15) turns on, and the ERROR LED turns on.

### Ex.

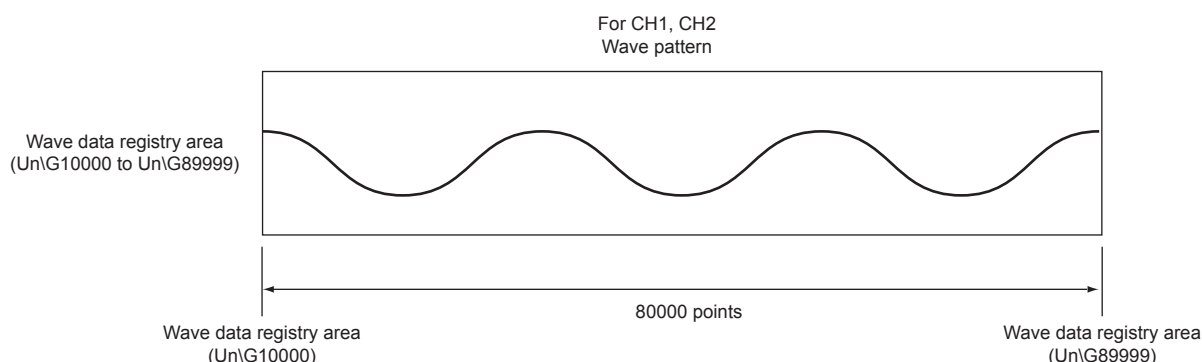
Setting example where different waves are output separately with CH1 and CH2



| Setting item                           | Setting value |
|----------------------------------------|---------------|
| CH1 Wave pattern start address setting | 10000         |
| CH1 Wave pattern data points setting   | 10000         |
| CH2 Wave pattern start address setting | 20000         |
| CH2 Wave pattern data points setting   | 8000          |

**Ex.**

Setting example where the same wave is output with CH1 and CH2



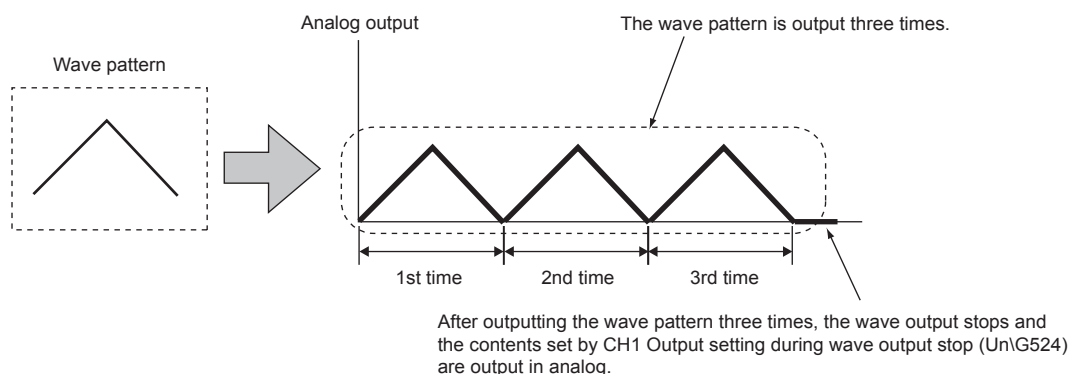
| Setting item                           | Setting value |
|----------------------------------------|---------------|
| CH1 Wave pattern start address setting | 10000         |
| CH1 Wave pattern data points setting   | 80000         |
| CH2 Wave pattern start address setting | 10000         |
| CH2 Wave pattern data points setting   | 80000         |

## Wave pattern output count

The wave pattern can be output repeatedly by setting 'CH1 Wave pattern output repetition setting' (Un\G530). A count from 1 to 32767 times can be set. By setting the output count to -1, analog output of the wave pattern can be repeated indefinitely.

**Ex.**

If the wave pattern output count is set to 3 times



For the analog output module, "repetitive control" that outputs the same wave pattern repeatedly is defined as follows.

### ■If the start and end point digital input values are identical

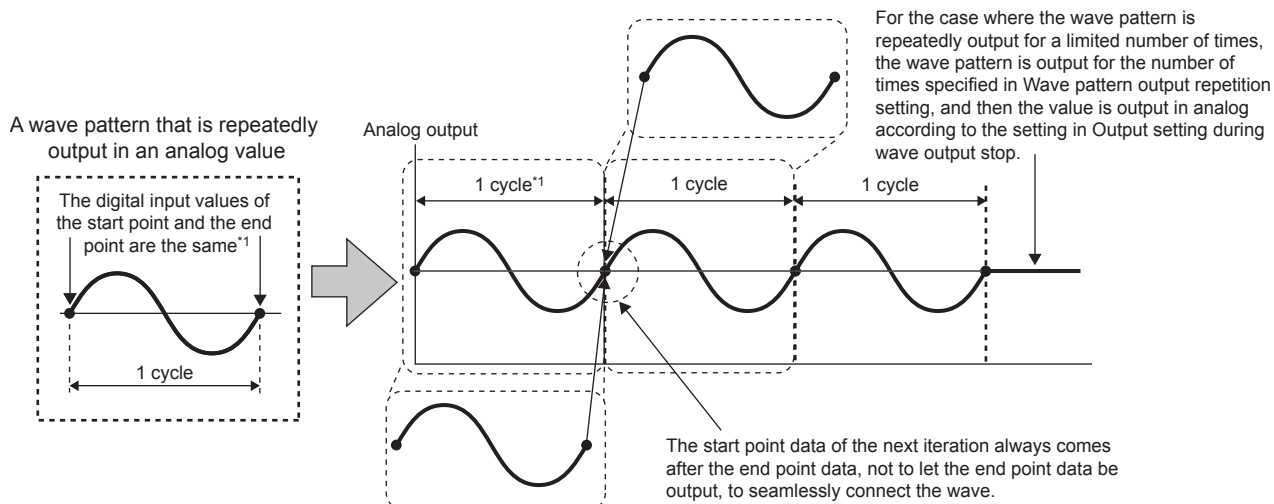
The end point of a wave pattern overlaps with the start point of the succeeding wave pattern by processing of the analog output module; thus, it will not be output as analog data. By setting 'CH1 Wave pattern output repetition setting' (Un\G530), the analog output at the wave pattern end point is as follows.

- For finite repetition

If 'CH1 Wave pattern output repetition setting' (Un\G530) is set to 2 to 32767, the digital input value at the wave pattern end point will not be output as analog data until the last repetition. However, after the end point digital input value is output as analog data at the last repetitive output, analog output is performed as per the setting of 'CH1 Output setting during wave output stop' (Un\G524).

- For indefinite repetition

Any digital input value at the wave pattern end point is not output as analog data.



\*1 The wave pattern output cycle is calculated using the following formula.

$$\text{Wave pattern output cycle} = (\text{Wave output conversion cycle}) \times (\text{Wave pattern data points} - 1)$$

For details on the wave output conversion cycle, refer to the following.

☞ Page 206 Wave output conversion cycle

**Ex.**

Calculating the wave pattern output cycle

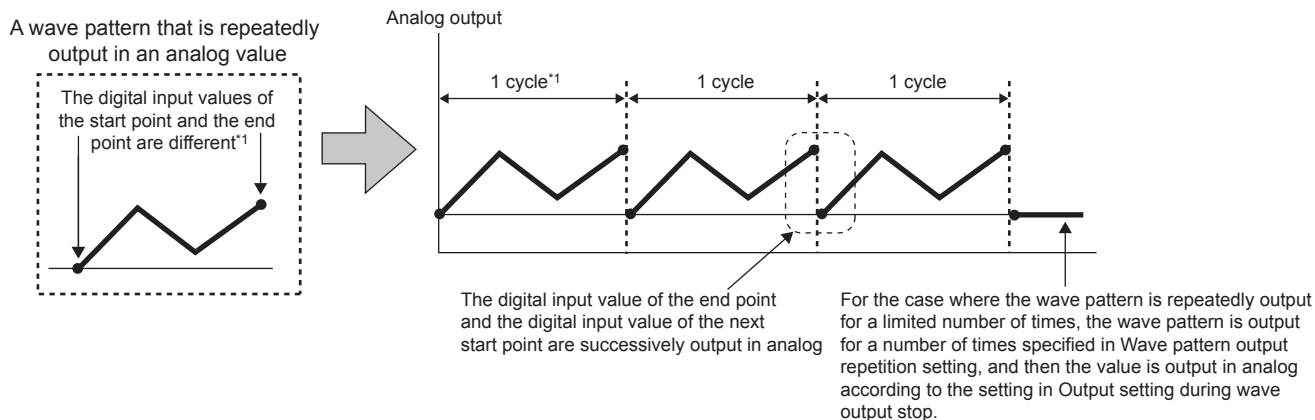
| Setting item                                  | Setting value             |
|-----------------------------------------------|---------------------------|
| CH1 D/A conversion enable/disable setting     | D/A conversion enable (0) |
| CH1 Wave pattern data points setting          | 101                       |
| CH1 Wave pattern output repetition setting    | 3                         |
| CH1 Constant for wave output conversion cycle | 1                         |

For the above setting, the wave pattern output cycle is as follows (when D/A conversion is enabled only for CH1).

$$\begin{aligned}
 \text{Output cycle of a wave pattern (}\mu\text{s)} &= \text{Conversion speed} \times \frac{\text{D/A conversion enabled}}{\text{Number of channels}} \times \text{Wave output Conversion cycle constant} \times (\text{Wave pattern data points} - 1) \\
 &= 80 \times 1 \times 1 \times (101 - 1) \\
 &= 8000
 \end{aligned}$$

### ■ If the start and end point digital input values are different

The wave pattern end point is directly output as analog data. Regardless of the setting in 'CH1 Wave pattern output repetition setting' (Un\G530), the set wave patterns are consecutively output as analog data.



\*1 The wave pattern output cycle is calculated using the following formula.

$$\text{Wave pattern output cycle} = (\text{Wave output conversion cycle}) \times (\text{Wave pattern data points})$$

For details on the wave output conversion cycle, refer to the following.

☞ Page 206 Wave output conversion cycle

**Ex.**

Calculating the wave pattern output cycle

| Setting item                                  | Setting value             |
|-----------------------------------------------|---------------------------|
| CH1 D/A conversion enable/disable setting     | D/A conversion enable (0) |
| CH1 Wave pattern data points setting          | 101                       |
| CH1 Wave pattern output repetition setting    | 3                         |
| CH1 Constant for wave output conversion cycle | 1                         |

For the above setting, the wave pattern output cycle is as follows (when D/A conversion is enabled only for CH1).

$$\begin{aligned}
 \text{Output cycle of a wave pattern (}\mu\text{s)} &= \text{Conversion speed} \times \text{D/A conversion enabled} \times \text{Wave output Conversion cycle constant} \times \text{Wave pattern data points} \\
 &= 80 \times 1 \times 1 \times 101 \\
 &= \underline{8080}
 \end{aligned}$$

## Wave output conversion cycle

The wave pattern conversion cycle is calculated using the following formula.

$$\text{Conversion cycle (}\mu\text{s)} = \text{Conversion speed (80 }\mu\text{s)} \times \text{Number of D/A conversion enabled channels} \times \boxed{\text{Wave output conversion cycle constant}}$$

The wave output function allows you to set the conversion cycle by setting 'CH1 Constant for wave output conversion cycle' (Un\G531). The conversion cycle of the current wave output can be examined using 'CH1 Wave output conversion cycle monitor' (Un\G432, 433).

**Ex.**

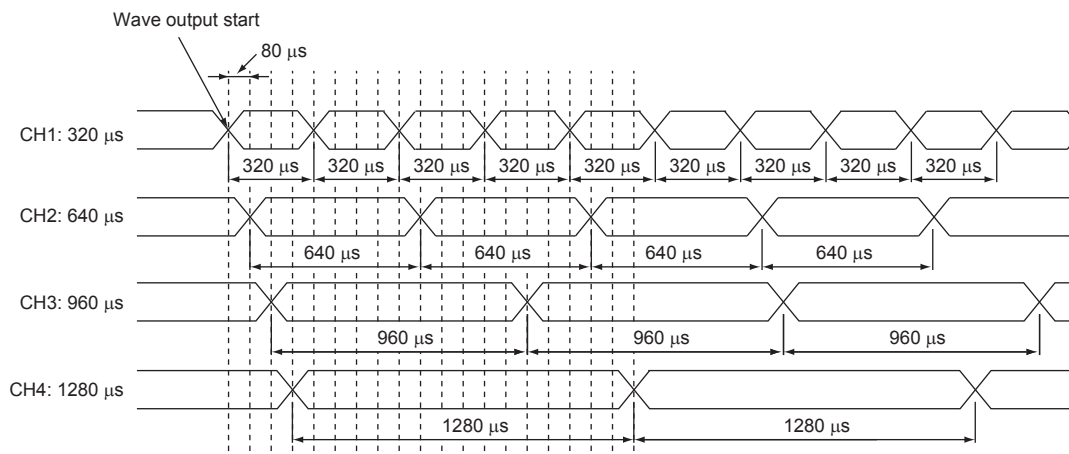
Conversion cycle and operation timing

| Setting item                                  | Setting value                         |
|-----------------------------------------------|---------------------------------------|
| D/A conversion enable/disable setting         | Enable D/A conversion for CH1 to CH4. |
| CH1 Constant for wave output conversion cycle | 1                                     |
| CH2 Constant for wave output conversion cycle | 2                                     |
| CH3 Constant for wave output conversion cycle | 3                                     |
| CH4 Constant for wave output conversion cycle | 4                                     |

For the above setting, the conversion cycles for the channels are as follows.

- CH1:  $80 \times 4 \times 1 = 320 \text{ (}\mu\text{s)}$
- CH2:  $80 \times 4 \times 2 = 640 \text{ (}\mu\text{s)}$
- CH3:  $80 \times 4 \times 3 = 960 \text{ (}\mu\text{s)}$
- CH4:  $80 \times 4 \times 4 = 1280 \text{ (}\mu\text{s)}$

With this conversion cycle, D/A conversion is executed and the analog values are output.





## Initializing the wave output function

For the wave output function, the following are required to be initialized. Before executing the wave output function, perform the settings described in this section.

- Register the wave pattern (  Page 248 Register the wave pattern)
- Create the wave output function parameters (  Page 252 Setting the wave output function parameters)
- Save the wave pattern (  Page 252 Save the wave pattern)
- Parameter setting of the analog output module (  Page 207 Parameter setting of the analog output module)

### ■Parameter setting of the analog output module

When the wave output function is to be used, the module parameters need to be set up separately from setting up the wave output function parameters.

The items to be with the module parameters are as follows.

- Output range setting

Same as normal output. Select the output range to be used.

Note that when the wave output function is in use, no user range is available.

- Operation mode setting

Select "Normal mode" for the operation mode setting.

- Output mode setting

Select "Wave output mode" for the output mode setting.

- Analog output HOLD/CLEAR setting

The analog output HOLD/CLEAR function differs from operation from that for normal output. For the differences in operation arising from the HOLD/CLEAR setting, refer to the following.

 Page 184 Analog output HOLD/CLEAR function

- Disconnection detection auto-clear enable/disable setting

"Disconnection detection auto-clear enable/disable setting" cannot be used.

## [Warning output setting]

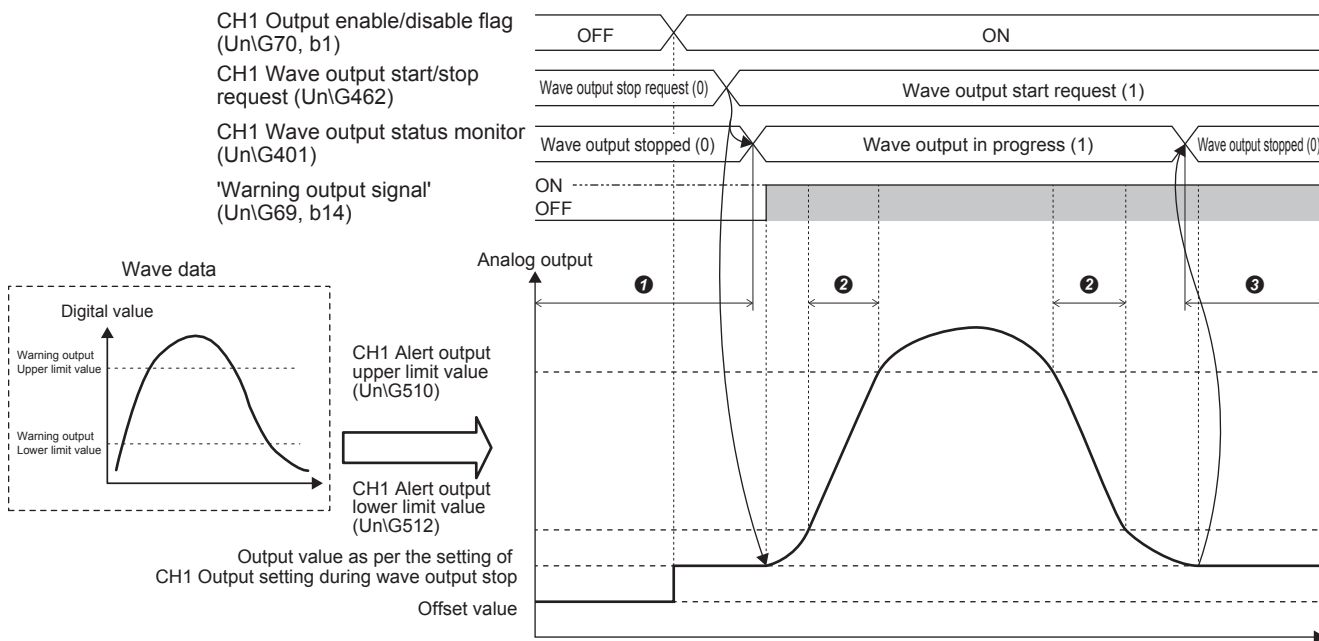
Like normal output, set 'Enable (output not limited)' or 'Disable (output limited)' in 'Warning output setting' for the channel for which to execute D/A conversion.

Whereas for normal output, 'CH1 Digital value' (Un\G460) is the target, for wave output, the set 'wave data registry area' (Un\G10000 to Un\G89999) is the target. The following describes the operation when the warning output function is enabled (output not limited) and the operation when it is enabled (output limited).

- For Enable (output not limited)

If Output setting during wave output stop is Output value during wave output stop (2), this function outputs the value that was set with the Output value during wave output stop while the wave output is at a stop.

By starting the wave output, analog output is performed, but because of "output not limited", the value of wave data is output.

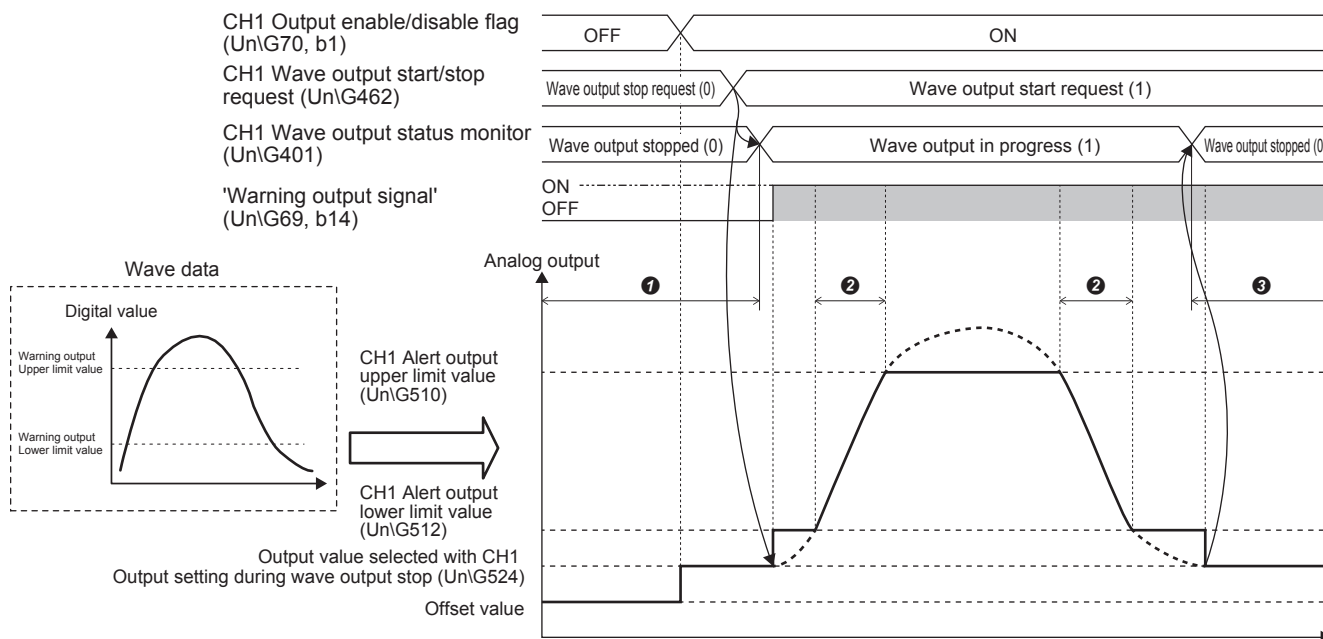


- 1 Since the wave output is at a stop, the alarm turns off. (The warning doesn't turn on.)
- 2 When the output is in the range equal to or larger than "Warning output lower limit value" or equal to or smaller than "Warning output upper limit value", the alarm can be turned off using 'Warning output clear request' (Un\G70, b14).
- 3 Since the wave output is at a stop, the alarm can be turned off using 'Warning output clear request' (Un\G70, b14).

- For Enable (output limited)

If Output setting during wave output stop is Output value during wave output stop (2), this function outputs the value that was set with the Output value during wave output stop while the wave output is at a stop.

By starting the wave output, warning output is performed, and the value set by the warning output upper and limit values is output.



- ① Since the wave output is at a stop, the alarm turns off. (The warning doesn't turn on.)
- ② When the output is in the range equal to or larger than "Warning output lower limit value" or equal to or smaller than "Warning output upper limit value", the alarm can be turned off using 'Warning output clear request' (Un\G70, b14).
- ③ Since the wave output is at a stop, the alarm can be turned off using 'Warning output clear request' (Un\G70, b14).

## Executing the wave output function

This section describes the procedure for executing the wave output function. After the initial setting of the wave output function, execute the contents of this section.

### ■Transfer the wave output data

The CPU module power is turned off→on or reset, and the wave output data created with module extension parameter "Wave output data creation tool" is transferred to the analog output module.

If the module extension parameter file has an error, a module extension parameter acquisition error (error code: 1DA0H) occurs without executing D/A conversion on all channels.

### ■D/A conversion enable/disable setting

D/A conversion enable/disable setting can be set by the module parameter, however, when the wave output data is not set by the module expansion parameter, perform the setting using the program.

At this time, register the wave output function parameter settings and the wave data settings before changing 'D/A conversion enable/disable setting'.

## Precautions

'D/A conversion enable/disable setting' can be set also with a module parameter.

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

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

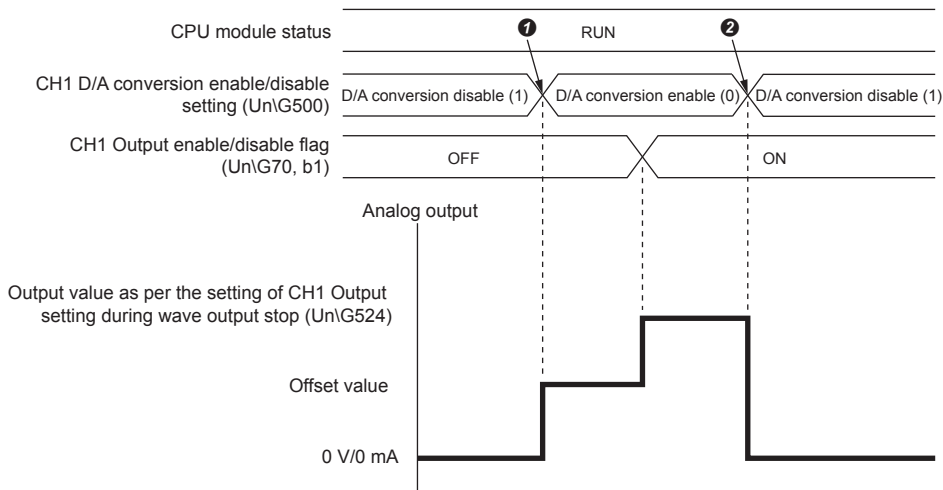
Note the following when wave output data is not yet set by the module extension parameter: If the setting is enabled by resetting the CPU module or turning off→on the power supply, this causes a wave pattern data points setting range error (error code: 1D5□H). This is because the wave pattern data points setting is set to 0 (default value) in the D/A conversion enabled channel.

To clear this error, register the wave output function parameter setting and the wave output data, and then turn off→on→off 'Operation condition setting request' (Un\G70, b9). ( Page 252 Setting the wave output function parameters)

## ■ Changing the module settings

For the wave output function parameter settings written with the program, 'Operating condition setting request' (Un\G70, b9) needs to be turned off→on→off to enable the settings. When the settings are enabled, the CH1 Analog output value set as D/A conversion enable changes to the following depending on the status of the 'CH1 Output enable/disable flag' (Un\G70, b1).

- 'CH1 Output enable/disable flag' (Un\G70, b1) Changes to the offset value.
- 'CH1 Output enable/disable flag' (Un\G70, b1) The setting in 'CH1 Output setting during wave output stop' (Un\G524) is output.



- 1 Set the CH1 D/A conversion enable/disable setting (Un\G500) to D/A conversion enable (0) and turn off→on→off 'Operation condition setting request' (Un\G70, b9).
- 2 Set the CH1 D/A conversion enable/disable setting (Un\G500) to D/A conversion disable (1) and off→on→off 'Operation condition setting request' (Un\G70, b9).

### Point

When the wave output function is in use, the parameter setting can be enabled by turning off→on→off 'Operating condition setting request' (Un\G70, b9) only when all channels are at a wave output stop (the CH□ Wave output status monitors for all channels are at a wave output stop (0)).

An alarm will occur if 'Operating condition setting request' (Un\G70, b9) is turned off→on→off when the wave output status is other than the wave output stopped state for even one channel. Alarm code 0B0□H is stored in 'Latest alarm code' (Un\G2). The parameter setting will not be enabled.

## ■Start, stop, or pause the wave output

[Starting the wave output]

After the wave data is registered, the wave output can be started using the following procedure.

1. Turn on 'CH1 Output enable/disable flag' (Un\G70, b1).

Turning on this flag outputs the 'CH1 Output setting during wave output stop' (Un\G524) setting as analog data.

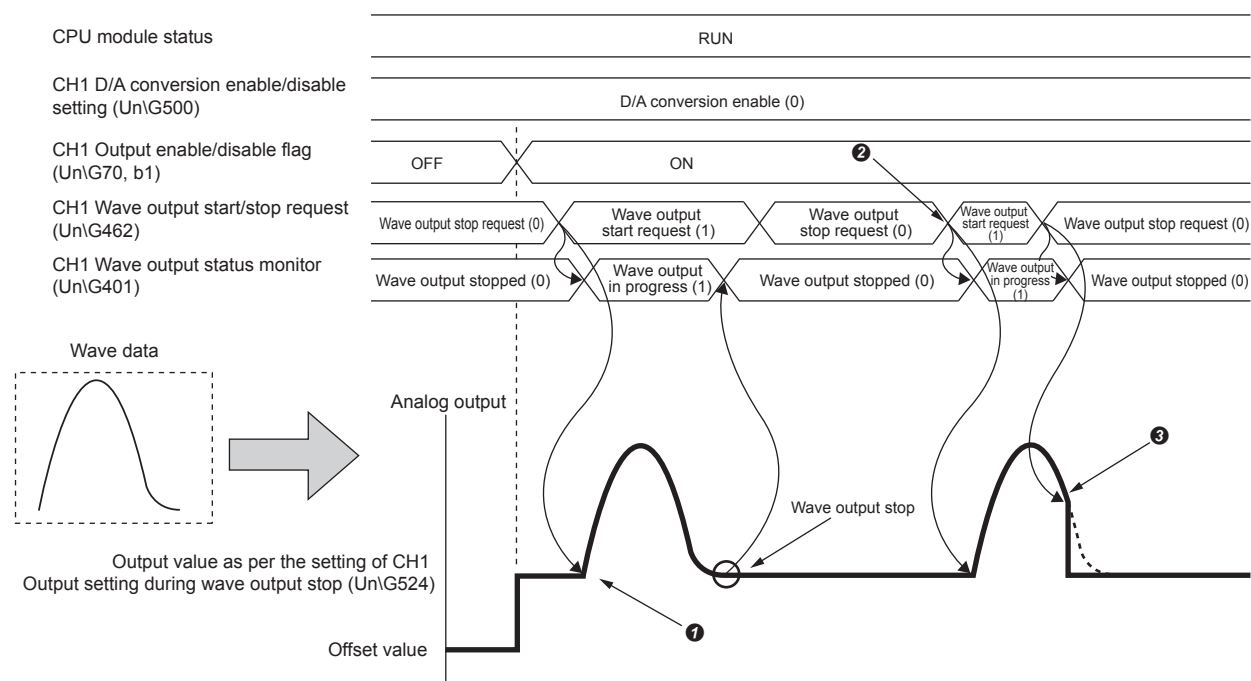
2. Set 'CH1 Wave output start/stop request' (Un\G462) to Wave output start request (1).

The wave output starts by changing Wave output stop request (0) or Wave output pause request (2) to Wave output start request (1).

[Stopping the wave output]

To stop the wave output at a desired timing during wave output, set 'CH1 Wave output start/stop request' (Un\G462) to Wave output stop request (0). The wave output fully stops by changing Wave output start request (1) or Wave output pause request (2) to Wave output stop request (0). When wave output stops, Wave output stopped (0) is stored in 'CH1 Wave output status monitor' (Un\G401). The wave output cannot restart from the stopping time point.

The wave output stops also after the wave patterns for the count set with 'CH1 Wave pattern output repetition setting' (Un\G530) have been output.



- 1 The wave output starts by setting 'CH1 Wave output start/stop request' (Un\G462) to Wave output start request (1).
- 2 To execute the wave output again, change the 'CH1 Wave output start/stop request' (Un\G462) to Wave output stop request (0) before changing it to Wave output start request (1).
- 3 The wave output stops by setting 'CH1 Wave output start/stop request' (Un\G462) to Wave output stop request (0) during wave output.

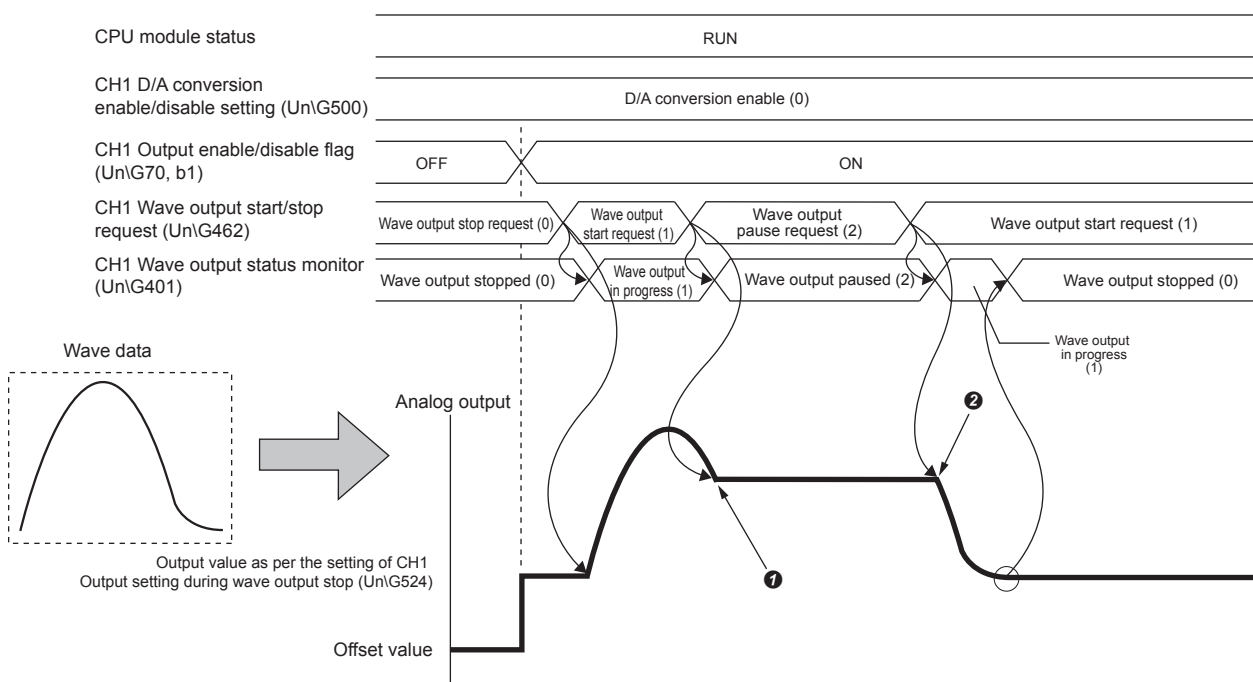
### [Pausing the wave output]

- To pause the wave output, set 'CH1 Wave output start/stop request' (Un\G462) to Wave output pause request (2). The wave output pauses by changing from Wave output start request (1) to Wave output pause request (2). In addition, Wave output paused (2) is stored in 'CH1 Wave output status monitor' (Un\G401).
- To restart the wave output, change 'CH1 Wave output start/stop request' (Un\G462) from Wave output pause request (2) to Wave output start request (1). This restarts the wave output from the wave data generated when the pause occurred.
- If 'CH1 Wave output start/stop request' (Un\G462) is set to Wave output temporary stop request (2) while the wave output is at a stop, the following will be output depending on HOLD/CLEAR setting.

Previous Value: Outputs the digital value of the wave pattern start address.

Setting value: Outputs the HOLD setting value.

CLEAR: Outputs the offset value.



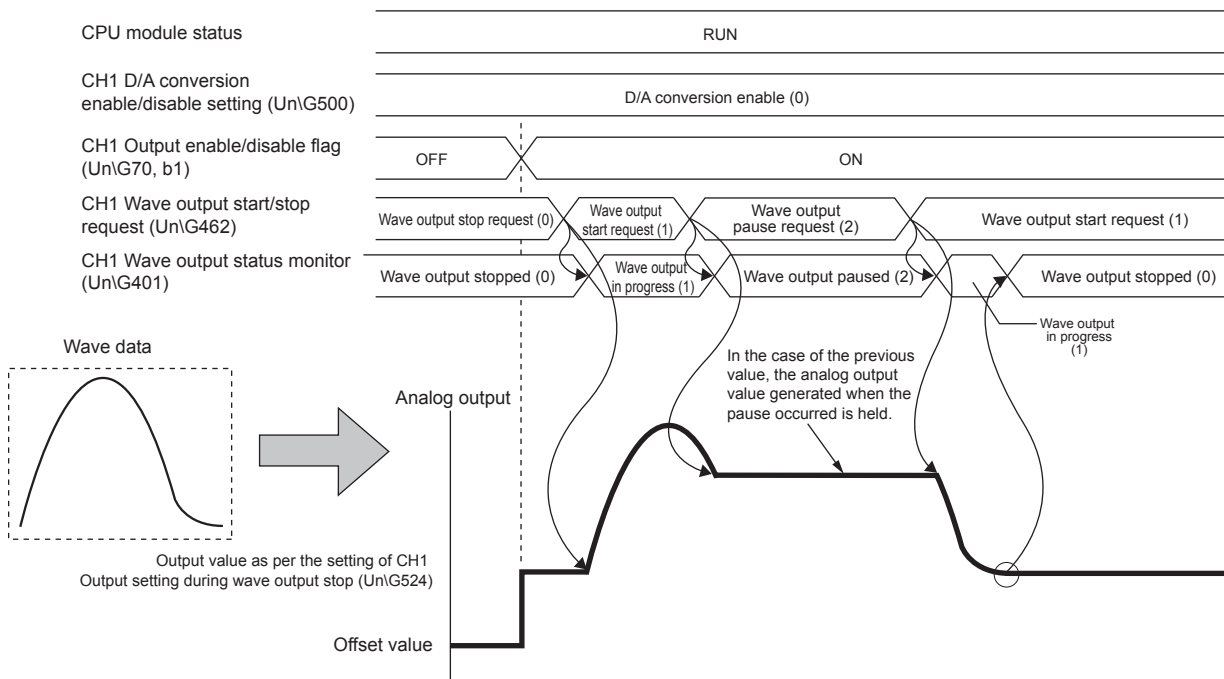
- 1 The wave output stops by setting 'CH1 Wave output start/stop request' (Un\G462) to Wave output pause request (2) during wave output.
- 2 The wave output restarts by setting 'CH1 Wave output start/stop request' (Un\G462) to Wave output start request (1).

The analog output value obtained during the wave output paused state depends on the setting of the analog output HOLD/CLEAR function. For details, refer to the following.

📖 Page 185 In the wave output mode

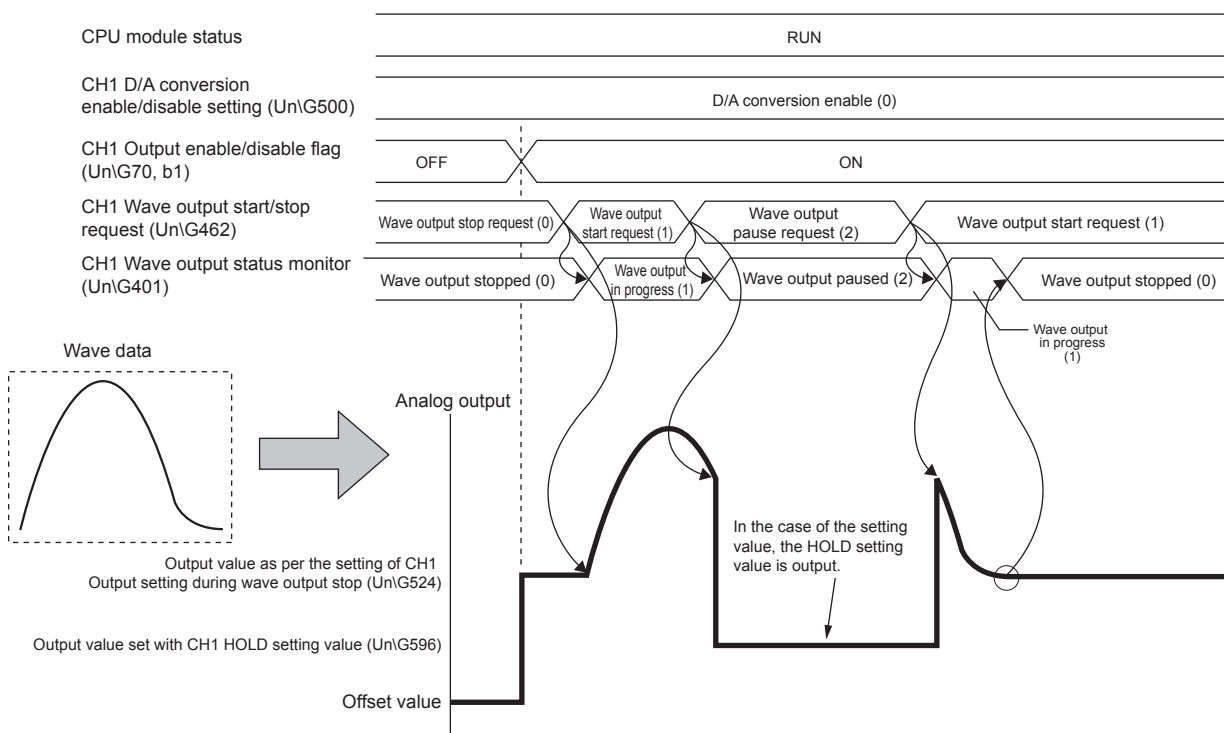
- For the previous value

While the wave output is at a pause, the analog output value generated when the pause occurred is held.



- For the setting value

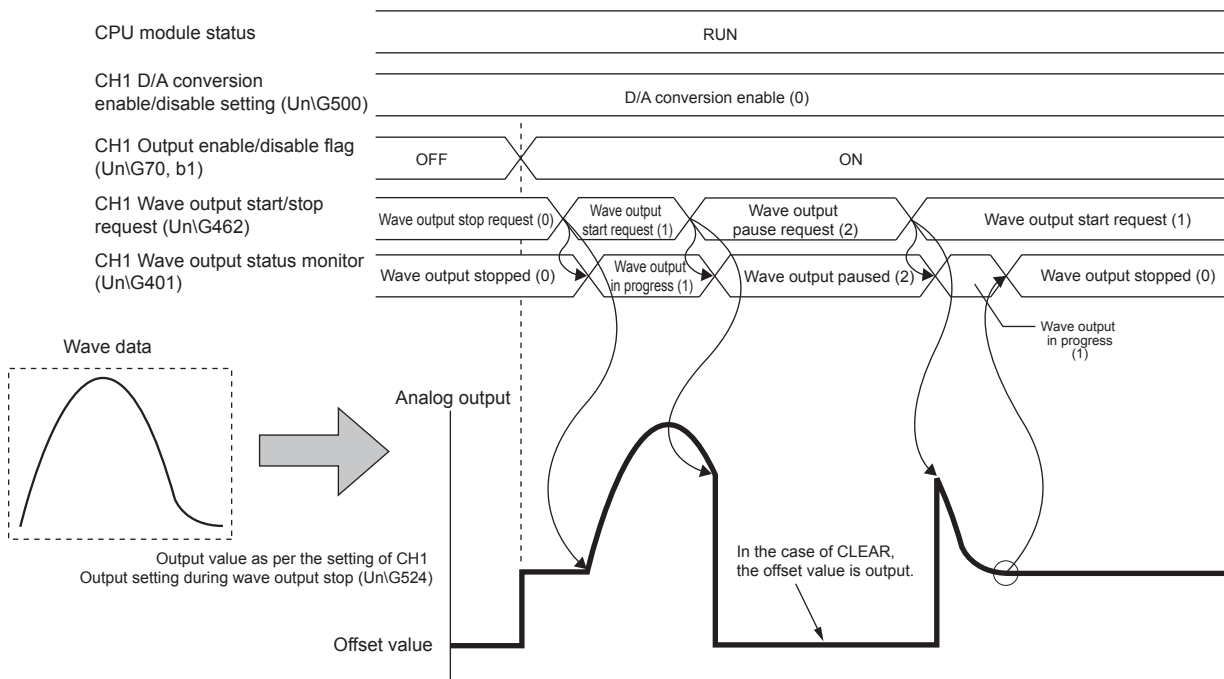
While the wave output is at a pause, the HOLD setting value is output.





• For CLEAR

While the wave output is at a stop, the offset value is output.



**Point**

- Wave output start request is accepted only when the CPU module status is RUN. If 'CH1 Wave output start/stop request' (Un\G462) is changed to Wave output start request (1) in CPU module status other than RUN, the wave output will not start.
- Wave output pause request is accepted only when the CPU module status is RUN or STOP.
- Wave output pause request is accepted only when the CPU module status is RUN.
- If 'CH1 Wave output start/stop request' (Un\G462) is set to a value other than 0 to 2, an error will occur. A logging cycle setting disable error (error code: 1D0□H) is stored in 'Latest error code' (Un\G0), 'Error flag' (Un\G69, b15) and the ERROR LED turn on. In this case, the wave output will continue.
- An attempt to output a value out of the digital value range set with the output range causes an error, resulting in occurrence of a digital value setting range error (error code: 191□H).

## ■Checking the wave output function status

The wave output function status can be checked with the following buffer memory addresses.

| Item                                                   | Description                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Wave output status monitor                             | An area to store the wave output status.                                                                                                                                                                                                                                                                                                                                              |
| Wave output conversion cycle monitor                   | Area in which the conversion cycle of wave output is stored. The unit of the stored value is $\mu$ s.                                                                                                                                                                                                                                                                                 |
| Wave output count monitor                              | An area to store the number of times the wave pattern was output.                                                                                                                                                                                                                                                                                                                     |
| Wave output current address monitor                    | An area to store the buffer memory address of the currently output wave data.                                                                                                                                                                                                                                                                                                         |
| Wave output current digital value monitor              | An area to store the currently output digital input value.                                                                                                                                                                                                                                                                                                                            |
| Wave output digital value out-of-range address monitor | When wave data that contains a registered digital input value out of the setting range is output, this area is used to store the registration destination buffer memory address of that wave data. When a digital value outside the setting range is detected with multiple pieces of wave data, this area stores the buffer memory address of only the first detected piece of data. |
| Wave output alarm occurrence address monitor           | An area to store the buffer memory address of the wave data when an alarm occurred. When an alarm occurs due to multiple pieces of wave data, only the buffer memory address of the wave data causing the first alarm is stored.                                                                                                                                                      |

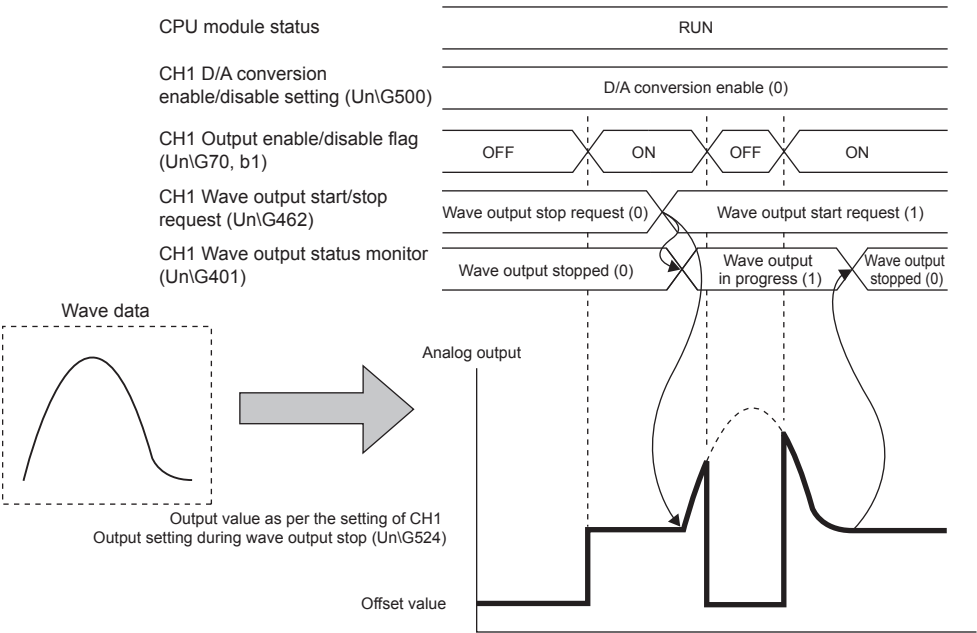
For details on the buffer memory areas, refer to the following.

☞ Page 290 Details of buffer memory addresses

Points on using the wave output function

■If ‘CH1 Output enable/disable flag’ (Un\G70, b1) was changed during wave output

When ‘CH1 Output enable/disable flag’ (Un\G70, b1) is turned on→off during wave output, the wave output does not stop although the analog output value changes to the offset value. The wave output update continues also while ‘CH1 Output enable/disable flag’ (Un\G70, b1) is off. Turning off→on ‘CH1 Output enable/disable flag’ (Un\G70, b1) restarts the analog output.



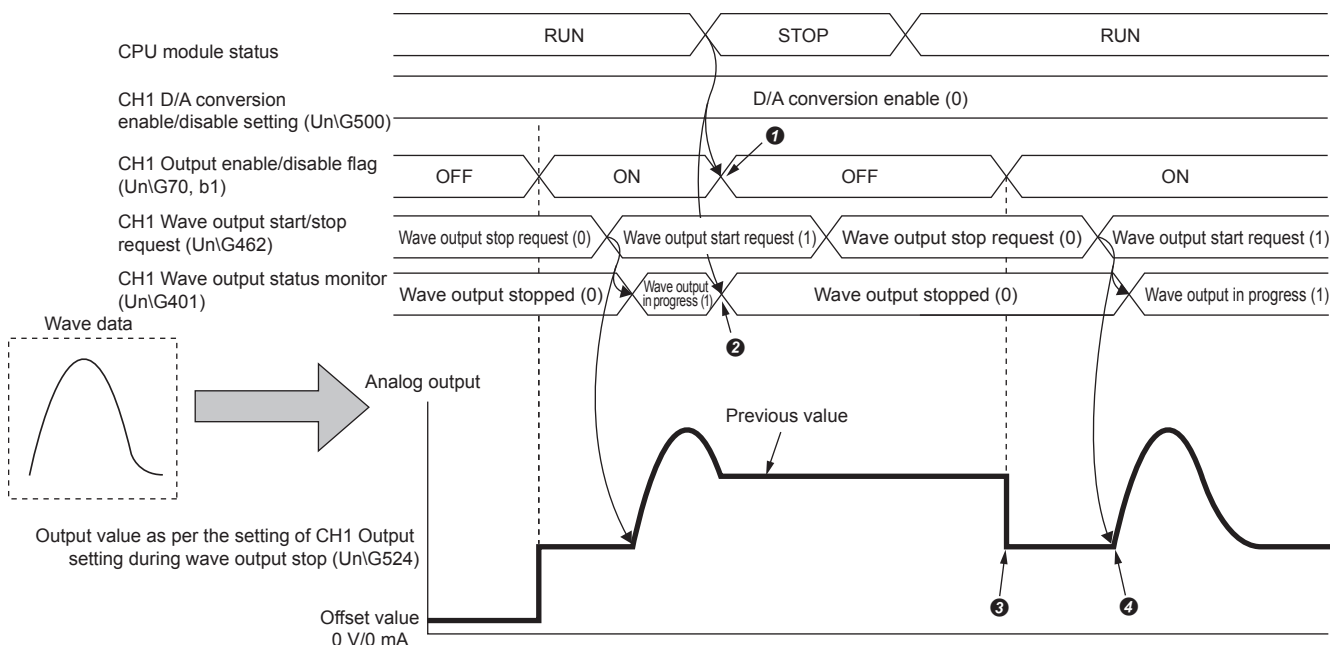
## ■If the CPU module status was changed during output

When the CPU module status was changed during wave output, after terminating the wave output, it operates as follows depending on the analog output HOLD/CLEAR function setting.

- For the previous value

If the CPU changes from RUN to STOP, the wave output terminates and the value immediately before STOP is held. When 'CH1 Output enable/disable flag' (Un\G70, b1) is turned on with the CPU module changed from STOP to RUN, the output changes as per the setting of 'CH1 Output setting during wave output stop' (Un\G524). Wave output does not restart.

To restart the wave output, change 'CH1 Wave output start/stop request' (Un\G462) from Wave output stop request (0) to Wave output start request (1) again.

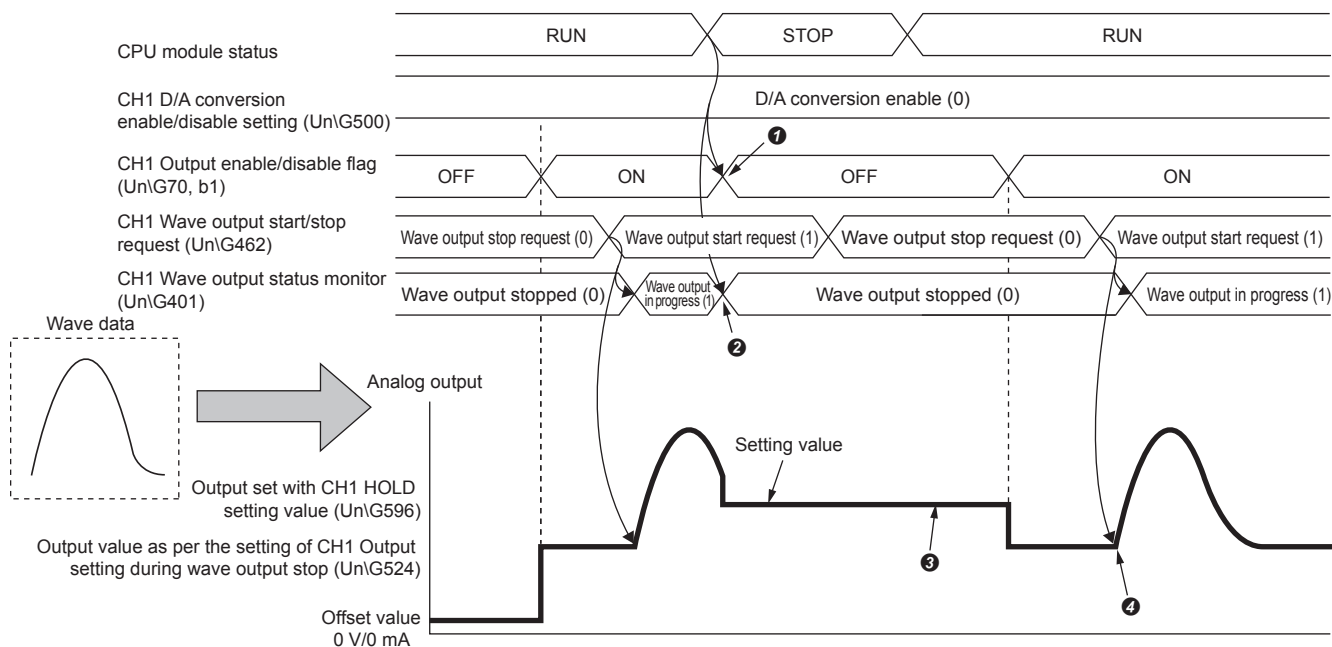


- 1 The output is disabled because the CPU module changes from RUN to STOP.
- 2 Once the HOLD/CLEAR operates, the wave output stops.
- 3 Wave output does not restart.
- 4 To restart the wave output, change the setting to Wave output start request (1).

- For the setting value

If the CPU changes from RUN to STOP, the wave output terminates and its value is held as the 'CH1 HOLD setting value' (Un\G596). When 'CH1 Output enable/disable flag' (Un\G70, b1) is turned on with the CPU module changed from STOP to RUN, the output changes as per the setting of 'CH1 Output setting during wave output stop' (Un\G524). Wave output does not restart.

To perform the wave output, change 'CH1 Wave output start/stop request' (Un\G462) from Wave output request (0) to Wave output start request (1) again.

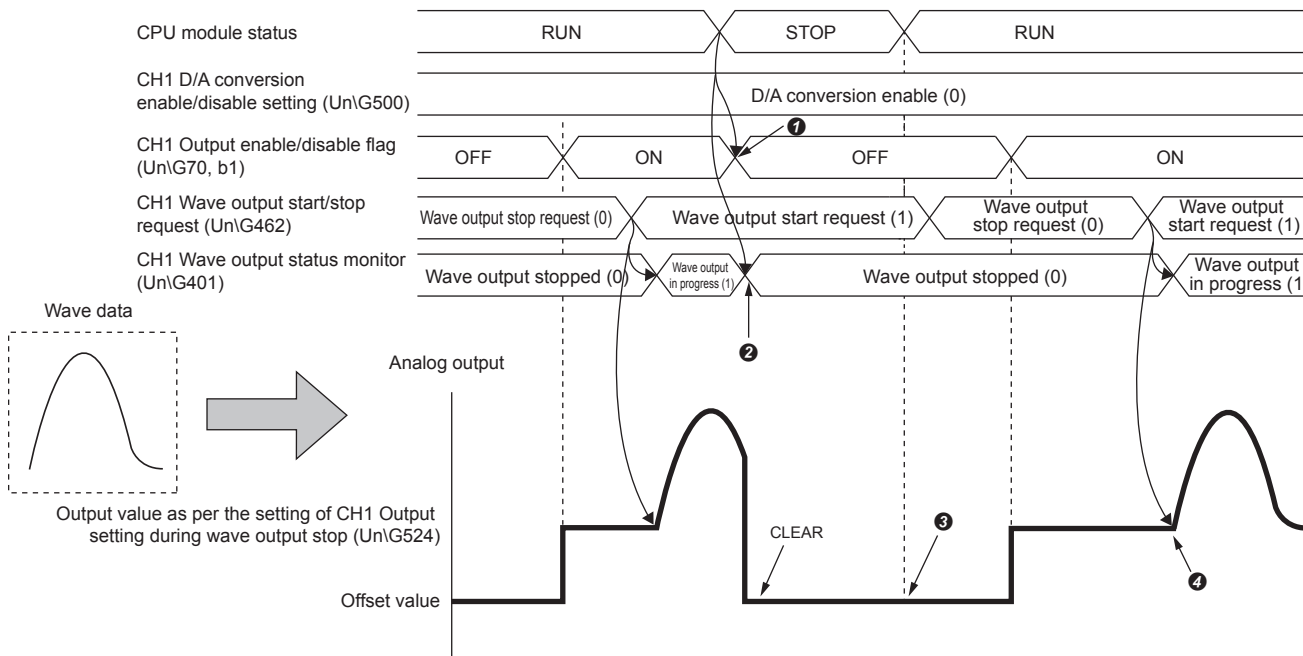


- ① The output is disabled because the CPU module changes from RUN to STOP.
- ② Once the HOLD/CLEAR operates, the wave output stops.
- ③ The value set by the HOLD setting value is output.
- ④ To restart the wave output, change the setting to Wave output start request (1).

- For CLEAR

If the CPU changes from RUN to STOP, the wave output terminates and the offset value is output. When 'CH1 Output enable/disable flag' (Un\G70, b1) is turned on with the CPU module changed from STOP to RUN, the output changes as per the setting of 'CH1 Output setting during wave output stop' (Un\G524). Wave output does not restart.

To perform the wave output, change the CPU module from STOP to RUN and then set 'CH1 Wave output start/stop request' (Un\G462) to Wave output stop request (0). Then, change 'CH1 Wave output start/stop request' (Un\G462) from Wave output stop request (0) to Wave output start request (1).



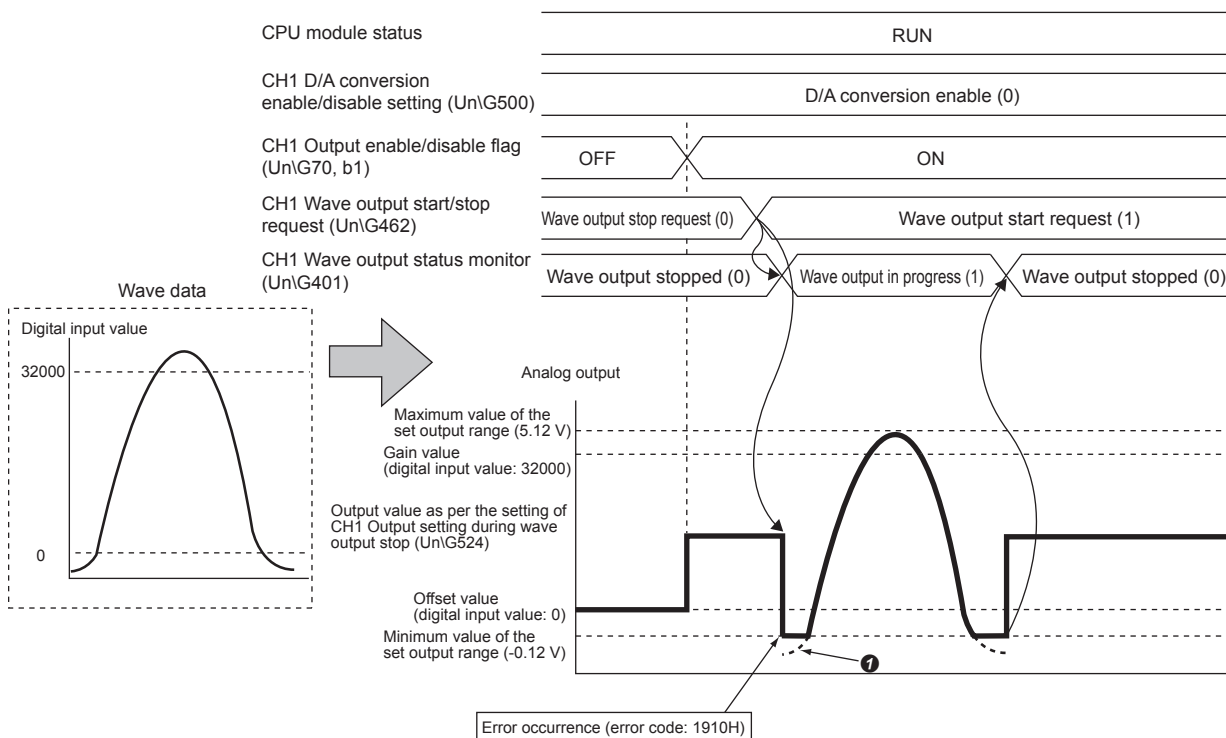
- ❶ The output is disabled because the CPU module changes from RUN to STOP.
- ❷ Once the HOLD/CLEAR operates, the wave output stops.
- ❸ Outputs the offset value.
- ❹ To restart the wave output, change the setting to Wave output start request (1).

## ■When an error occurs

If a value out of the setting range of the output range is attempted to be output, an error will occur and error code 191□H is stored in 'Latest error code' (Un\G0); 'Error flag' (Un\G69, b15) turns on at this time. If this error (error code: 191□H) occurs during wave output, the analog output value will be as follows.

- If an attempt is made to output a value below the minimum value of the output range, the analog output value will be the minimum value of the output range.

When the output range is set to 0 to 5 V



- ❶ If an attempt is made to output a value below the minimum value of the output range, the analog output value will be the minimum value of the output range.

If an error with error code 191□H occurs due to setting a digital input value outside the range, restore the digital input value to the value within the range before turning off→on→off 'Error clear request' (Un\G70, b15).

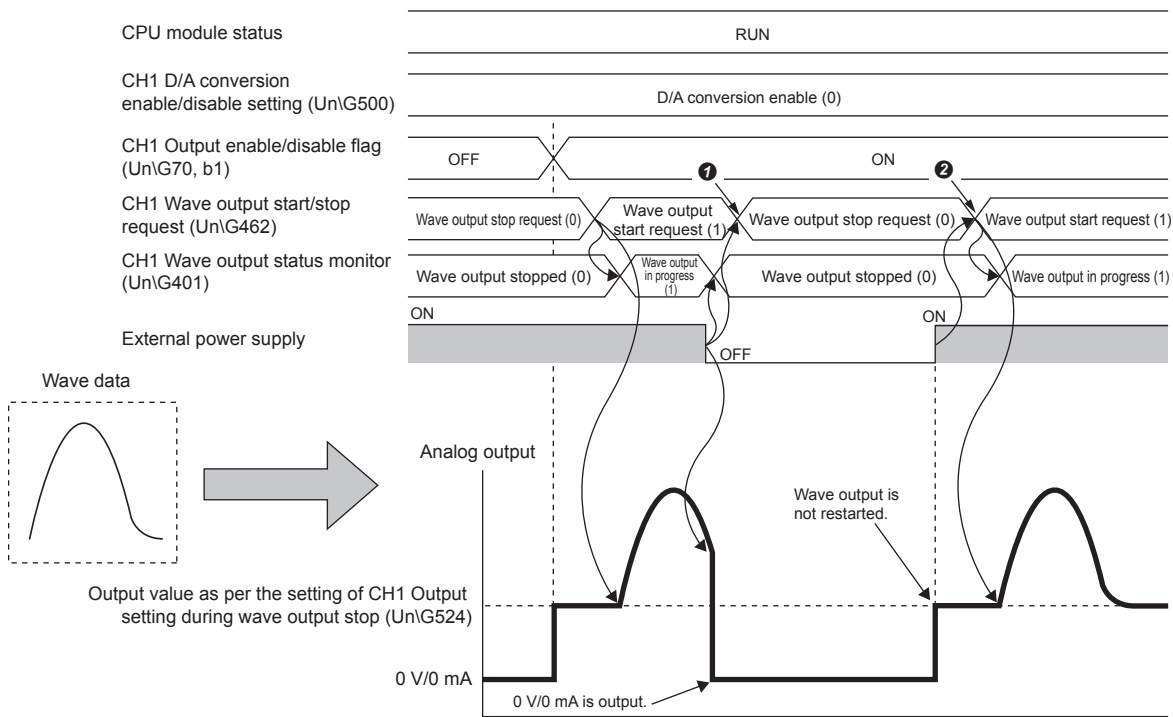
The buffer memory address to register the wave data being out of range can be examined using the wave output digital value out-of-range address monitor.

## ■When the external power supply turns off during wave output

When the external power supply turns on→off during without, the wave output status of every channel stops and the wave output fully stops. If the external power supply turns off→on at this time, the wave output will not restart.

To restart the wave output, after the external power supply turns off→on, check that the status of the analog output module and the externally connected devices. Then, set 'CH1 Wave output start/stop request' (Un\G462) to Wave output start request (1).

While the external power supply is off, no Wave output start/stop request is accepted.



- ❶ Since the external power supply turned on→off and the wave output stopped, change the CH1 Wave output start/stop request (Un\G462) to Wave output stop request (0).
- ❷ To restart the wave output again, change the 'CH1 Wave output start/stop request' (Un\G462) to Wave output stop request (0) before changing it to Wave output start request (1).

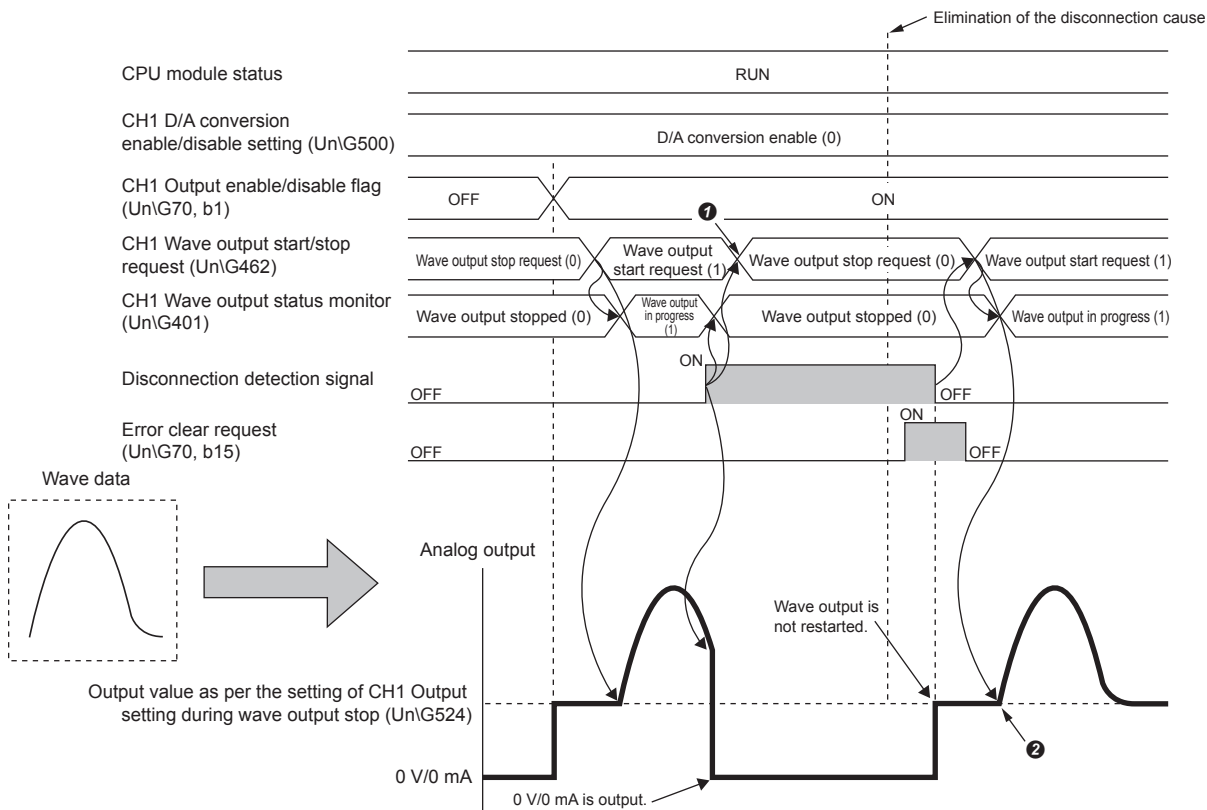
## ■When the disconnection occurs during wave output

When the disconnection is detected during wave output, the wave output status of the channel in which the disconnection was detected becomes the wave output stopping, and the wave output completely stops. Even if the disconnection cause is eliminated from the disconnection status, the wave output is not restarted.

By turning 'Error clear request' (Un\G70, b15) off→on→off, the output of the value set in 'Output setting during wave output stop' (Un\G524) is restarted.

To restart the wave output, check that the status of the analog output module and the externally connected devices. Then, set 'CH1 Wave output start/stop request' (Un\G462) to Wave output start request (1).

While the disconnection detection signal is on, no Wave output start/stop request is accepted.



- ① Since the disconnection detection signal turned off→on and the wave output stopped, change the CH1 Wave output start/stop request (Un\G462) to Wave output stop request (0).
- ② To restart the wave output again, change the 'CH1 Wave output start/stop request' (Un\G462) to Wave output stop request (0) before changing it to Wave output start request (1).



## ■Using the wave output function as PWM

The wave output function is available also as PWM with the shortest pulse width of 80  $\mu$ s.

In addition, since any number of pulses can be analog output by only creating a one pulse wave pattern, it contributes to reduction of man-hours for program creation.

- Example of creating a wave pattern

Creating a wave pattern with pulse width 80  $\mu$ s, amplitude 5 V, and duty ratio 50%

1. Set "Output range setting" to 0 to 5 V.

 [Navigation window]  $\Rightarrow$  [Parameter]  $\Rightarrow$  [Module Information]  $\Rightarrow$  Module model name  $\Rightarrow$  [Module Parameter]  $\Rightarrow$  [Basic setting]  $\Rightarrow$  [Range switching function]

2. In "Create Wave Output Data", create a wave pattern for one pulse.

| Setting item             | Setting content                 |            |
|--------------------------|---------------------------------|------------|
| Wave pattern information | Digital value range             | 0 to 32000 |
|                          | Number of pieces of data        | 2          |
| Wave detail setting      | Digital value in section No. 1  | 32000      |
|                          | Digital value in section No. 2  | 0          |
|                          | Specified wave of section No. 2 | Line       |

The wave monitored on GX Works3 differ from the analog output wave.

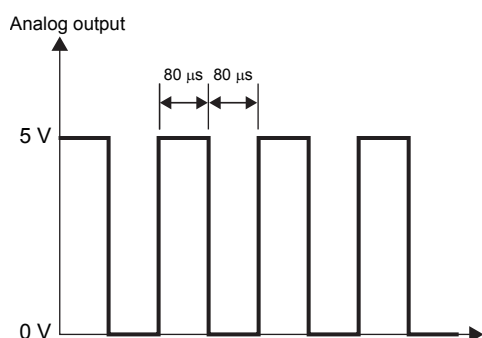
3. Set "Wave output data setting" as follows.

| Setting item                                  | Setting content                                            |
|-----------------------------------------------|------------------------------------------------------------|
| CH1 Wave pattern No.                          | Wave pattern created in step 2.                            |
| CH1 Wave pattern start address setting        | 10000 (default value)                                      |
| CH1 Wave pattern output repetition setting    | Set the number of times the wave output is to be repeated. |
| CH1 Constant for wave output conversion cycle | 1 (default value)                                          |

4. Register the wave data and wave output function parameter settings in the analog output module. For how to register these, refer to the following.

 Page 210 Transfer the wave output data

5. Set D/A conversion enable (0) in 'CH1 D/A conversion enable/disable setting' (Un\G500).
6. Turn off  $\rightarrow$  on  $\rightarrow$  off 'Operating condition setting request' (Un\G70, b9).
7. Turn on 'CH1 Output enable/disable flag' (Un\G70, b1).
8. Set 'CH1 Wave output start/stop request' (Un\G462), and start the wave output. After the wave output starts, the following analog output is generated.



Wave output step execution function

When the wave output function is in use, this execution function changes the address and data value to be output and freely changes the analog output at a desired timing.

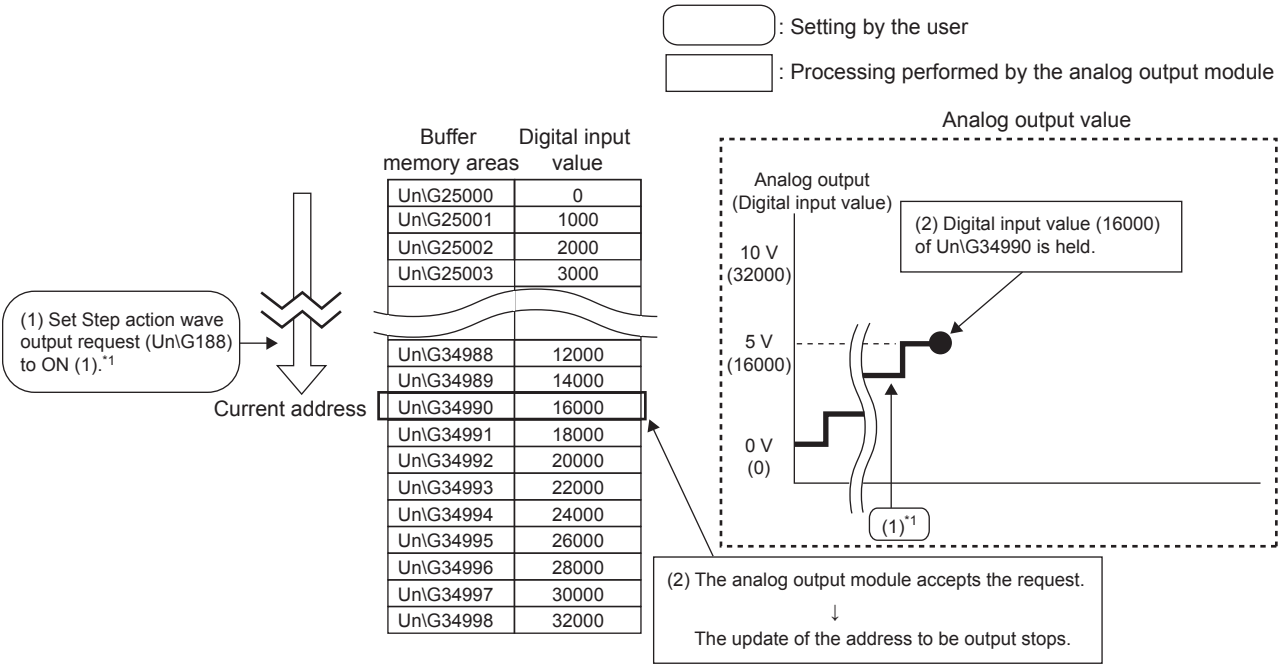
This function is useful for debugging the analog output test or wave output function when the wave output function is used.

Ex.

Wave output step execution in the following conditions

- The output range is set to -10 to +10 V.
- The wave output status is wave output in progress.
- The address when the Step action wave output request is accepted is 34990.

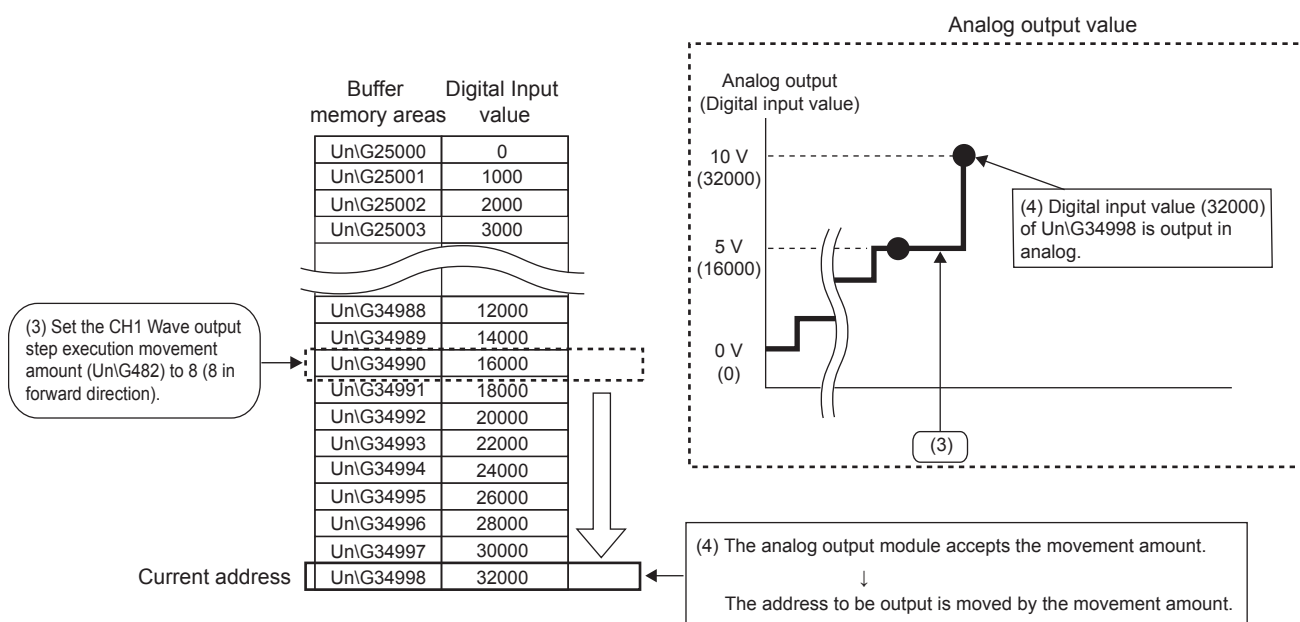
1. During wave output, set Step action wave output request (Un\G188) to ON (1).



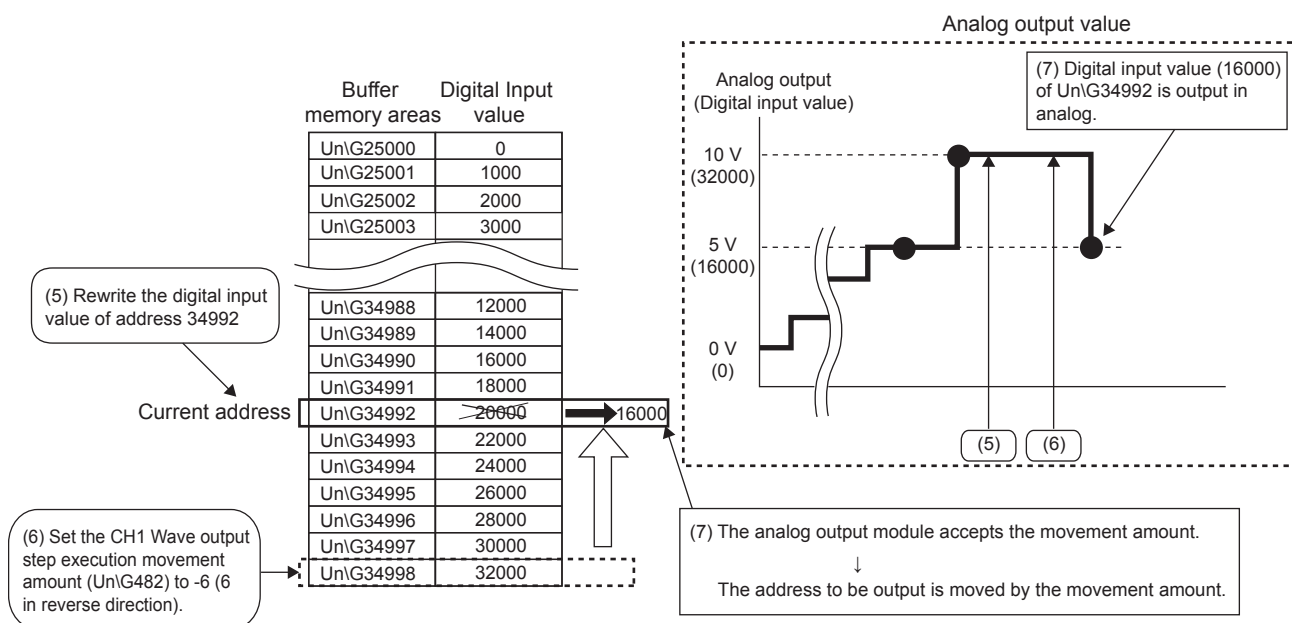
\*1 The contents described here is the case when the wave output status is the wave output in progress at the timing of (1). If the status is other than the wave output in progress, the following value is output at the timing of (2).

- When wave output is stopped  
The digital value that is set as the wave pattern start address is output in an analog value and held.
- When wave output is paused  
The data of the address during the wave output pause (wave output current address) is held.

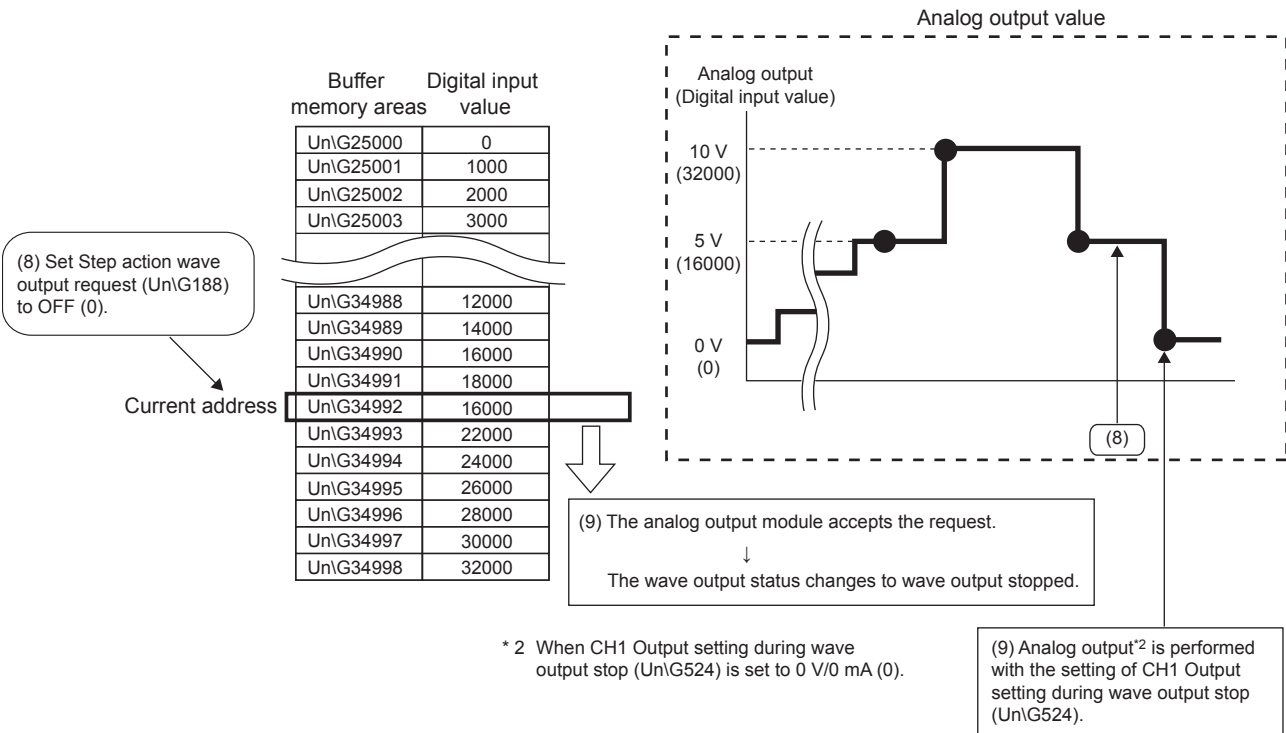
## 2. Set 'CH1 Wave output step action movement amount' (Un\G482) to 8 (8 in forward direction).



## 3. Rewrite the digital input value of address 34992 to 16000, and set 'CH1 Wave output step action movement amount' (Un\G482) to -6 (6 in reverse direction).

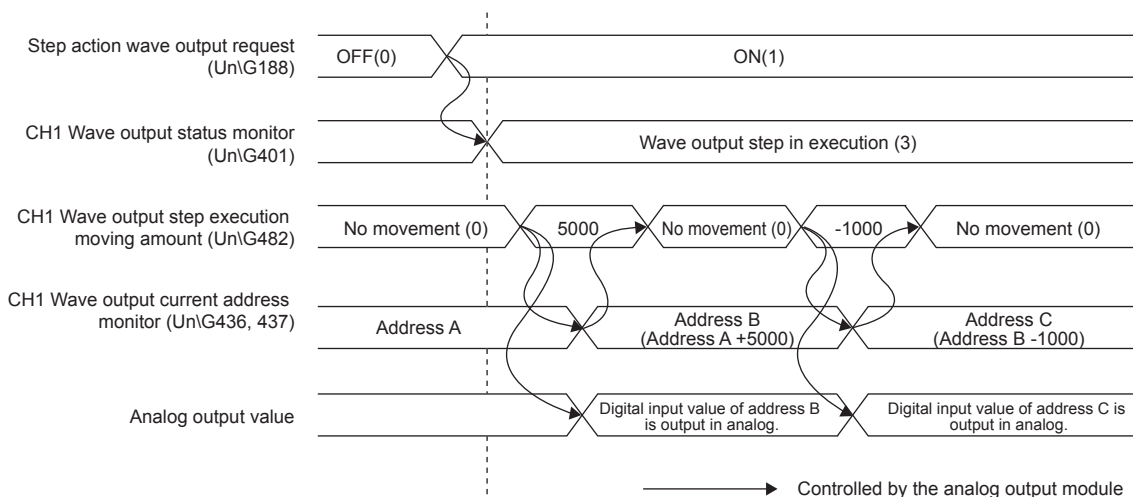


4. Set Step action wave output request (Un\G188) to OFF (0).



## ■Operation of the wave output step execution function

The wave output step execution function operates as follows.



By turning 'Step action wave output request' (UnG188) OFF (0) → ON (1), change the status to Wave output step execution in progress. By setting the value in 'CH1 Wave output step action movement amount' (UnG482) during wave output step execution, control moves to the address of the wave data to be subjected to the output test. For the value in 'CH1 Wave output step action movement amount' (UnG482), set the amount by which to move it from the address of the current wave data.

After the movement is completed, 'CH1 Wave output step action movement amount' (UnG482) changes to No movement (0) and the destination wave data is output as analog data.

The range where the movement is enabled by 'CH1 Wave output step action movement amount' (UnG482) is determined by both setting values of the wave pattern start address and the wave pattern data points. The movable range is as follows.

$$\left( \begin{array}{c} \text{Wave pattern} \\ \text{Start address} \end{array} \right) \text{ to } \left( \begin{array}{c} \text{Wave pattern} \\ \text{Start address} \end{array} + \text{Wave pattern data points} - 1 \right)$$

If a value equal to or larger than "Wave pattern data points" is set in 'CH1 Wave output step action movement amount' (UnG482), the value of wave pattern data points will be used for processing.

## ■Execution of the wave output step execution function

To use the wave output step execution function, the wave output function needs to be initialized beforehand. For initializing the wave output function, refer to the following.

☞ Page 207 Initializing the wave output function

[Changing the status to wave output step execution]

Change the wave output status to Wave output step execution in progress by using the following procedure.

1. Turn Step action wave output request (UnG188) OFF (0) → ON (1).
2. Check that the CH□ Wave output status monitor for all channels have changed to Wave output step execution in progress (3).

To perform the wave output step execution, check the 'Latest error code' (UnG0) and the ERROR LED to confirm that no error has occurred. Then, change 'Step action wave output request' (UnG188) (0) from OFF (0) to ON (1). Unless the wave output parameter setting is set within the set range on all D/A conversion enabled channels, the wave output step execution cannot be performed on any channels.

[Wave output step execution]

After making change to the wave output step execution state, perform the wave output step execution using the following procedure. By repeating this procedure, the analog output test and debugging can be performed when the wave output function is performed.

1. Change the wave data of the target subjected to wave output step execution to an arbitrary value.
2. Set the value in 'CH1 Wave output step action movement amount' (Un\G482).

Set the following value depending on the direction in which to move control.

| Shift direction  | Description                                                                                                                                                                                                                                                                                                                                                                                                                       | Setting value |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| No shift         | Control does not move to another buffer memory address of the output wave data.                                                                                                                                                                                                                                                                                                                                                   | 0             |
| Forward movement | Control moves to another output buffer memory address in the increasing direction from the address at which the wave data is currently being output. <ul style="list-style-type: none"><li>• If 10000 is set in 'CH1 Wave output step action movement amount' (Un\G482) when the currently output wave data is at buffer memory address Un\G20000, control will move to Un\G30000 as the output buffer memory address.</li></ul>  | 1 to 30000    |
| Reverse movement | Control moves to another output buffer memory address in the decreasing direction from the address at which the wave data is currently being output. <ul style="list-style-type: none"><li>• If -10000 is set in 'CH1 Wave output step action movement amount' (Un\G482) when the currently output wave data is at buffer memory address Un\G40000, control will move to Un\G30000 as the output buffer memory address.</li></ul> | -1 to -30000  |

3. Check that the value of 'CH1 Wave output step action movement amount' (Un\G482) has changed to No movement (0).
4. Check that 'CH1 Wave output current address monitor' (Un\G436, 437) has changed to the buffer memory addresses at which to output the wave data.
5. Check that the analog output value is proper.

[Terminating the wave output step execution]

Terminate the wave output step execution using the following procedure.

1. Turn 'Step action wave output request' (Un\G188) ON (1) → OFF (0).
2. Check that the CH□ Wave output status monitor for all channels have changed to Wave output stopped (0). In addition, if the CH□ Wave output start/stop request was other than the wave output stop request (0), check that the status has been forcibly changed to Wave output stop request (0) at this timing.

To perform the wave output after the wave output step execution terminates, set CH□ Wave output start/stop request in Wave output start request (1).

#### Point

- When the value is set for the CH□ Wave output step execution movement amount, the analog output may suddenly change. It is recommended to use this function in combination with the CH□ Output enable/disable flag to suppress the sudden change. For the combination, refer to the following.

☞ Page 185 In the wave output mode

- By using this function in combination with the CH□ Output enable/disable flag during wave output step execution, the analog output can be changed at a desired timing. For details, refer to the following.

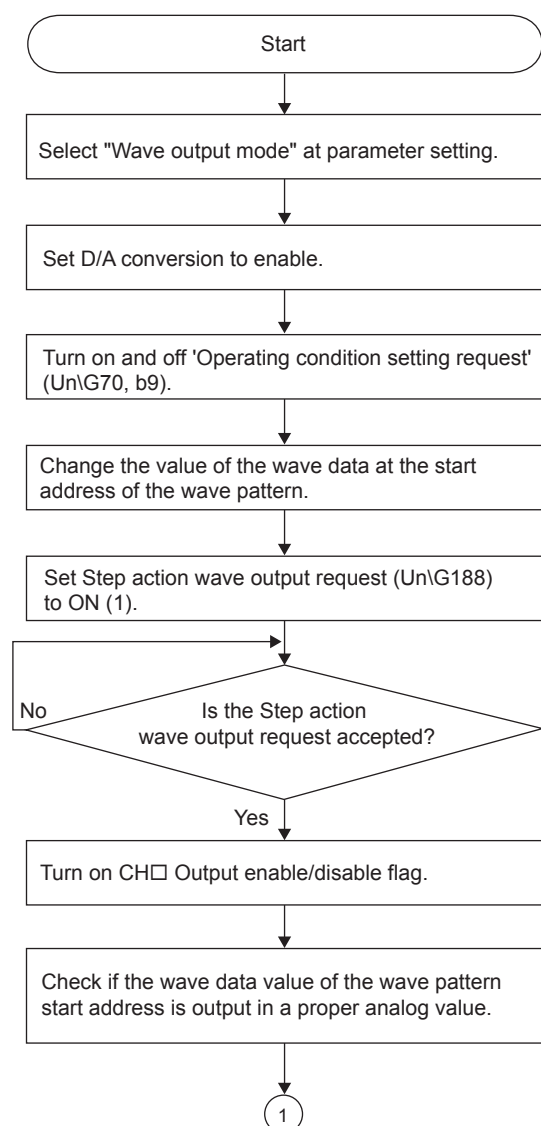
☞ Page 229 Analog output test when wave output function is used

- During wave output step execution, setting a value in CH□ Wave output start/stop request does not change the wave output status. The wave output status can be changed by setting 'Step action wave output request' (Un\G188) to OFF (0) so that the status changes to Wave output stopped.

## ■Analog output test when wave output function is used

The following shows the procedure of an analog output test that uses the wave output step execution function.

An example of executing a CH1 Analog output test is also shown.



### Example of executing a CH1 Analog output test

Select "Wave output mode" at "Output mode setting" of parameter setting.

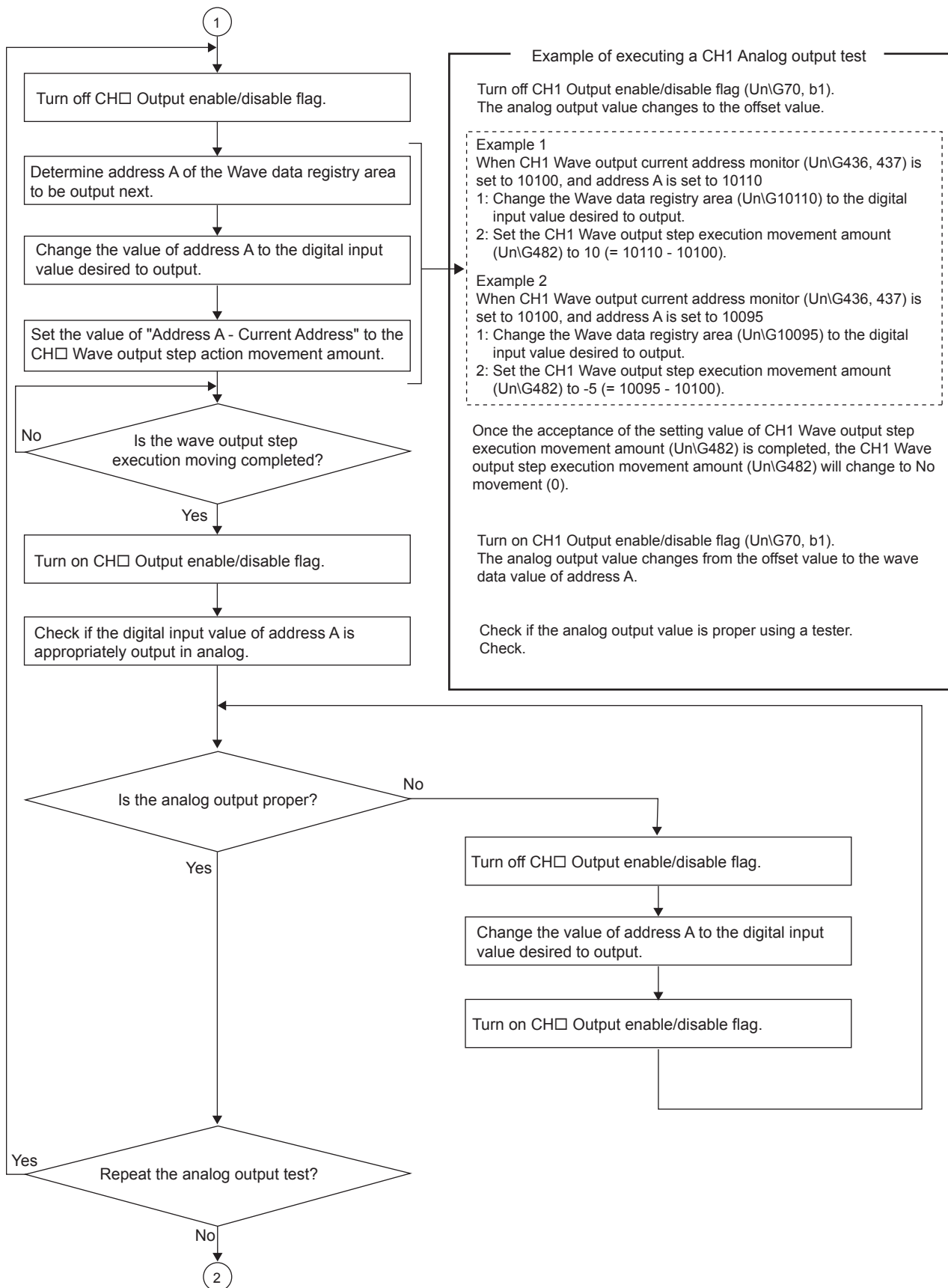
Set D/A conversion enable (0) in CH1 D/A conversion enable/disable setting (Un\G500).

Turn on and off 'Operating condition setting request' (Un\G70, b9). Even if D/A conversion is enabled, since the CH1 Output enable/disable flag (Un\G70, b1) is OFF, the analog output value will be the offset value.

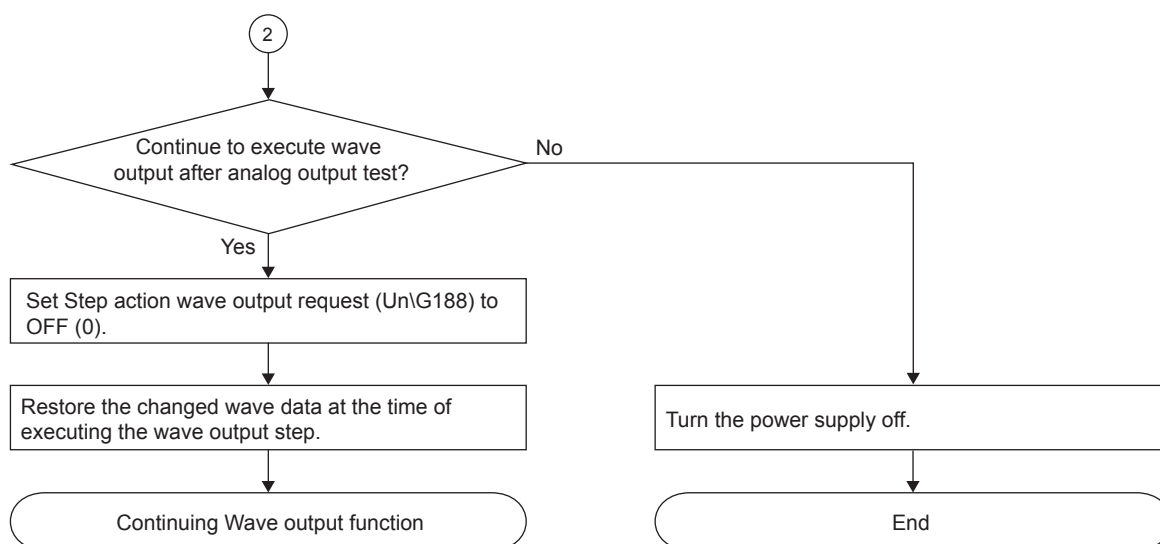
When reception of the set value of the Step action wave output request (Un\G188) is completed, the CH1 Wave output status monitor (Un\G401) becomes wave output step in execution (3).

The analog output value changes from the offset value to the wave data value of the wave pattern start address.

Check if the analog output value is proper using a tester.







# Error history function

Records up to 16 errors and alarms that occurred in an analog output module to store them in the buffer memory areas.

## Operation

When an error occurs, the error code and error time are stored in order, beginning with Error history No. 1 (Un\G3600 to Un\G3609).

When an alarm occurs, the alarm code and alarm time are stored in order, beginning with Alarm history No. 1 (Un\G3760 to Un\G3769).

- Detail of the error code assignment

|          |                              |    |    |                             |    |    |
|----------|------------------------------|----|----|-----------------------------|----|----|
|          | b15                          | to | b8 | b7                          | to | 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 (upper)          |    |    | Millisecond (lower)         |    |    |
| Un\G3606 | System area                  |    |    |                             |    |    |
| to       |                              |    |    |                             |    |    |
| Un\G3609 |                              |    |    |                             |    |    |

- Detail of the alarm code assignment

|          |                              |    |    |                             |    |    |
|----------|------------------------------|----|----|-----------------------------|----|----|
|          | b15                          | to | b8 | b7                          | to | 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 (upper)          |    |    | Millisecond (lower)         |    |    |
| Un\G3766 | System area                  |    |    |                             |    |    |
| to       |                              |    |    |                             |    |    |
| Un\G3769 |                              |    |    |                             |    |    |

### Ex.

Example of error history and alarm history storage

| Item                                                     | Storage contents                                                                                                                          | Storage example*1 |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H             |
| Month/Day                                                |                                                                                                                                           | 0130H             |
| Hour/Minute                                              |                                                                                                                                           | 1035H             |
| Second                                                   |                                                                                                                                           | 40H               |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H               |
| Millisecond (lower)                                      |                                                                                                                                           | 28H               |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

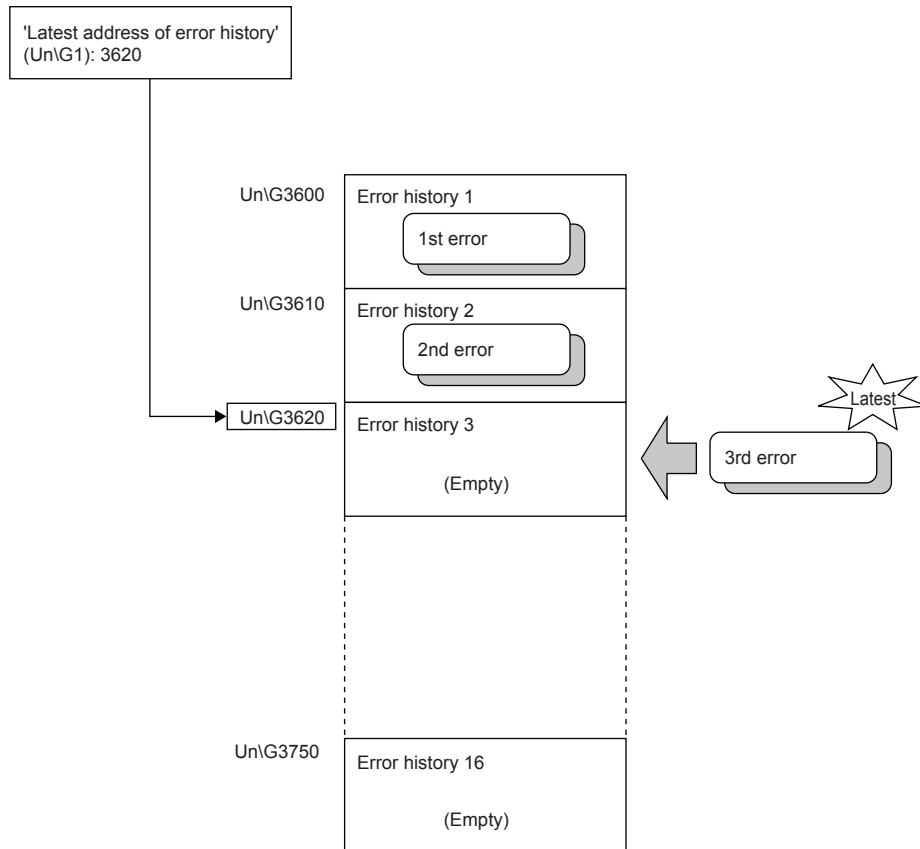
The start address of Error history where the latest error is stored, can be found in 'Latest address of error history' (Un\G1).

The start address of Alarm history where the latest alarm is stored, can be found in 'Latest address of alarm history' (Un\G3).

**Ex.**

When the third error occurs:

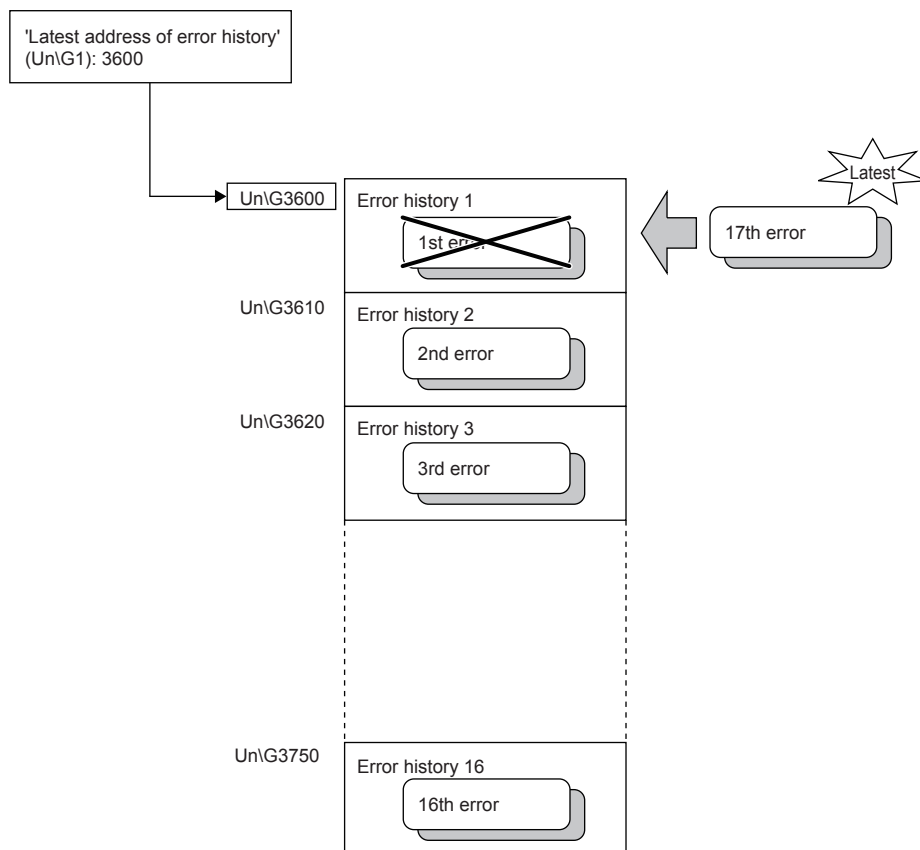
The third error is stored in Error history No. 3, and the value 3620 (start address of Error history No. 3) is stored to Latest address of error history.



**Ex.**

When the 17th error occurs:

The 17th error is stored in Error history No. 1, and the value 3600 (start address of Error history No. 1) is stored to Latest address of error history.

**Point**

- Once the error history storage area becomes full, the existing data is overwritten in order, starting with 'Error history No. 1' (Un\G3600 to Un\G3609), and error history logging continues. The overwritten history is deleted.
- The same processing is performed for Alarm history when an alarm occurs.
- The stored error history is cleared when an analog output module is powered off or the CPU module is reset.

## Offset/gain initialization function

### Offset/gain initialization

This function initializes the offset and gain values adjusted by the offset/gain setting to the factory defaults.

| User range setting           | Offset value | Gain value |
|------------------------------|--------------|------------|
| User range setting (voltage) | 0 V          | 10 V       |
| User range setting (current) | 4 mA         | 20 mA      |

1. Set the mode to normal output.
2. Set "D/A conversion not allowed (1)" in 'CH1 D/A conversion enable/disable setting' (Un\G500) to 'CH4 D/A conversion enable/disable setting' (Un\G1100). Then, turn off→on→off 'Operating condition setting request' (Un\G70, b9).
3. Set "E20FH" to 'Offset/gain initialization enabled code' (Un\G305).
4. Turn ON (1) 'Offset/gain initialization request' (Un\G70, b5).

After completion of the offset/gain initialization function, 'Offset/gain initialization enable code' (Un\G305) is initialized to '0000H' and 'Offset/gain initialization completed flag' (Un\G69, b5) turns on (1).

## FX3 allocation mode function

This function operates the buffer memory areas of the analog output module with a layout of the buffer memory addresses equivalent to those in FX3U-4DA.

### Operation

In FX3 allocation mode, only allocation of buffer memory area is changed. The following buffer memory area is allocated the same as FX3U-4DA.

| Buffer Memory Areas | Buffer Memory Area Name               |
|---------------------|---------------------------------------|
| Un\G1 to 4          | CH1 to 4 Digital value                |
| Un\G6               | Output status                         |
| Un\G28              | Disconnection detection flag          |
| Un\G30              | Module Information                    |
| Un\G39              | Alarm output flag (upper/lower limit) |

For buffer memories with different allocations from FX3U-4DA, it can be used by changing the program. For buffer memory in FX3 allocation mode, refer to the following.

 Page 285 In FX3 allocation function mode

### Restriction

When reusing the program used by FX3U-4DA, delete the initial setting process and set the module parameters with GX Works3.

When performing the same operation as FX3U-4DA, it can be executed by the following function.

| FX3U-4DA                                                      | FX5-4DA                                                | Reference |
|---------------------------------------------------------------|--------------------------------------------------------|-----------|
| Output mode specification                                     | Range switching function                               | Page 183  |
| Output setting upon PLC stop                                  | Analog output HOLD/CLEAR setting                       | Page 184  |
| Upper lower limit value function                              | Alert Output Function                                  | Page 191  |
| Table output function                                         | Wave output function                                   | Page 201  |
| Output characteristics adjustment                             | Offset/gain setting function                           | Page 254  |
| Initialization function                                       | Offset/gain initialization function                    | Page 234  |
| Disconnection detection                                       | Disconnection detection function                       | Page 197  |
| Power supply error                                            | External power supply disconnection detection function | Page 196  |
| Error status data automatic transfer function                 | Auto refresh                                           | Page 246  |
| Upper/lower limit function status automatic transfer function | Auto refresh                                           | Page 246  |
| Disconnection detection status automatic transfer function    | Auto refresh                                           | Page 246  |

### Setting procedure

1. When adding a new module, select the module whose module model name has "(FX3)" 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 Normal mode is used.

3. After writing the module parameter, turn off→on or reset the CPU module.

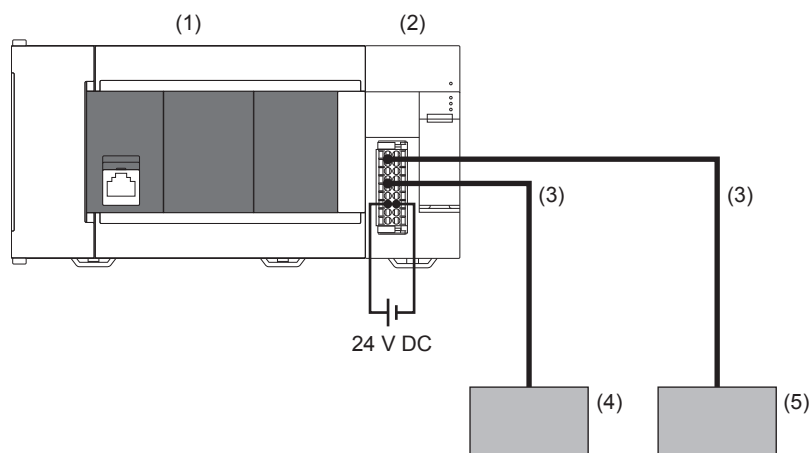
### Point

Switching between normal mode and FX3 allocation mode is not possible during operation.

## 2.5 System Configuration

The following shows a system configuration using the analog output module.

- System configuration example



- (1) FX5 CPU module
- (2) Analog output module (FX5-4DA)
- (3) Analog device connection cable
- (4) Inverter
- (5) DC motor

## 2.6 Wiring

This section describes the analog output module wiring.

### Spring clamp terminal block

#### Suitable wiring

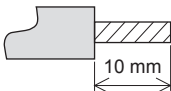
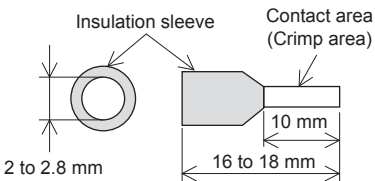
The wires to connect the spring clamp terminal block are described below.

| No. of wire per terminal | Wire size                                    |                                                |
|--------------------------|----------------------------------------------|------------------------------------------------|
|                          | Single wire, strand wire                     | Ferrule with insulation sleeve                 |
| Single wiring            | AWG24 to 16<br>(0.2 to 1.5 mm <sup>2</sup> ) | AWG23 to 19<br>(0.25 to 0.75 mm <sup>2</sup> ) |

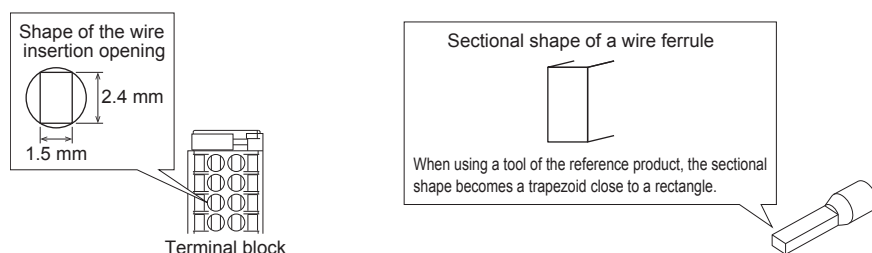
#### Wire end treatment

Strip the cable about 10 mm from the tip to connect a wire ferrule at the stripped area. Failure to do so may result in electric shock or short circuit between adjacent terminals because the conductive part. If the wire strip length is too short, it may result in the poor contact to the spring clamp terminal part.

Depending on the thickness of the sheath, it may be difficult to insert into the insulation sleeve, so select the wires by referring to the appearance diagram.

| Strand wire/single wire                                                            | Ferrule with insulation sleeve                                                      |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

Check the shape of the wire insertion opening with the following chart, and use the smaller wire ferrule than the described size. Also, insert the wire with care so that the wire ferrule is in proper orientation. Failure to do so may cause the bite of the terminal and the damage of the terminal block.



The following table shows wire ferrules and its associated tools compatible with the terminal block. The shape of the wire ferrule differs depending on the crimp tool to be used, use the reference product. If the product other than referenced products is used, the wire ferrule cannot be removed. Sufficiently confirm that the wire ferrule can be removed before use.

<Reference product>

| Manufacturer                  | Model         | Wire size           | Crimp tool |
|-------------------------------|---------------|---------------------|------------|
| PHOENIX-CONTACT GmbH & Co. KG | AI 0.5-10 WH  | 0.5mm <sup>2</sup>  | CRIMPFOX 6 |
|                               | AI 0.75-10 GY | 0.75mm <sup>2</sup> |            |
|                               | A 1.0-10      | 1.0mm <sup>2</sup>  |            |
|                               | A 1.5-10      | 1.5mm <sup>2</sup>  |            |

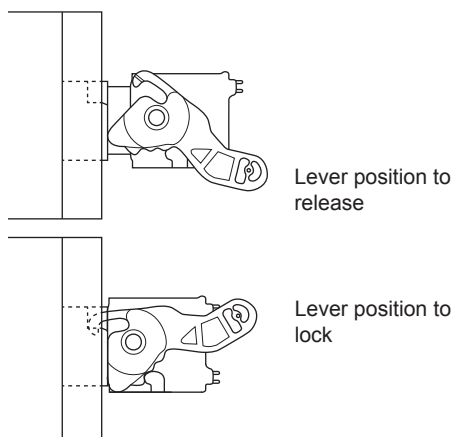
## Removing and installing the terminal block

The following shows how to remove and install the terminal block.

### ■Lever position to lock and release

A 3-step stopper is attached to prevent the lever from rotating, facilitating installation and removal of the terminal block.

When removing or installing the terminal block, move the lever to the corresponding position.



#### ■Lever position to release

The figure left shows the lever position when the terminal block has been completely removed from the module. Rotate the lever from the lock position to the release position, and lift the terminal block from the module.

#### ■Lever position to lock

The figure left shows the lever position when the terminal block is completely engaged with the module. Check that the lever is at the lock position, and pull the terminal block slightly to check that the module and terminal block are completely engaged.

### ■Removal procedure

Rotate the lever to the release position, and remove the terminal block from the module.

### ■Installation procedure

Move the lever to the release position, and insert the terminal block. When the terminal block is inserted sufficiently, the lever latch engages with the module and the terminal block is engaged with the module.



After inserting the terminal block, check that the lever is at the lock position.

## Precautions

When installing the terminal block, check that the lever is in the release position. If installation is performed while the lever is in the lock position, it may cause damage to the lever.

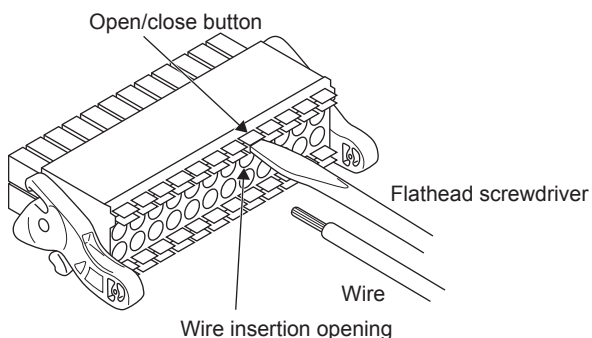


## Connection and disconnection of the cable

### ■ Connection of the cable

Fully insert a cable whose end has been properly processed into the wire insertion opening.

If the cable cannot be inserted with this procedure, fully insert the cable while pushing the open/close button with a flathead screwdriver having a tip width of 2.0 to 2.5 mm. After fully inserting the cable, remove the screwdriver.



<Reference>

| Manufacturer                  | Model             |
|-------------------------------|-------------------|
| PHOENIX-CONTACT GmbH & Co. KG | SZS 0.4 × 2.5 VDE |

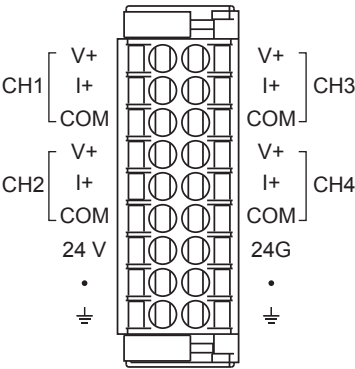
### Precautions

Pull the cable or wire ferrule slightly to check that the cable is securely clamped.

### ■ Disconnection of the cable

While pushing the open/close button with a flathead screwdriver having a tip width of 2.0 to 2.5 mm, disconnect the cable.

# Terminal arrangement



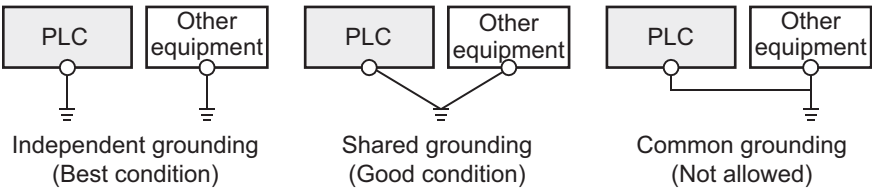
| Left side of terminal arrangement |                                   | Right side of terminal arrangement |                                   |
|-----------------------------------|-----------------------------------|------------------------------------|-----------------------------------|
| Display name                      | Description                       | Display name                       | Description                       |
| V+                                | CH1 Voltage output                | V+                                 | CH3 Voltage output                |
| I+                                | CH1 Current output                | I+                                 | CH3 Current output                |
| COM                               | CH1 Voltage/current output common | COM                                | CH3 Voltage/current output common |
| V+                                | CH2 Voltage output                | V+                                 | CH4 Voltage output                |
| I+                                | CH2 Current output                | I+                                 | CH4 Current output                |
| COM                               | CH2 Voltage/current output common | COM                                | CH4 Voltage/current output common |
| 24V                               | External 24 V +24 V terminal      | 24G                                | External 24 V Ground terminal     |
| .                                 | Unused terminal                   | .                                  | Unused terminal                   |
| ⏏                                 | 24 V external ground terminal     | ⏏                                  | 24 V external ground terminal     |

## Ground wiring

### Grounding

Perform the following.

- Perform class D grounding (Grounding resistance: 100 Ω or less).
- Ground the programmable controller independently when possible.
- If the programmable controller cannot be grounded independently, perform the "Shared grounding" shown below.



- Bring the grounding point close to the PLC as much as possible so that the ground cable can be shortened.

## Wiring precautions

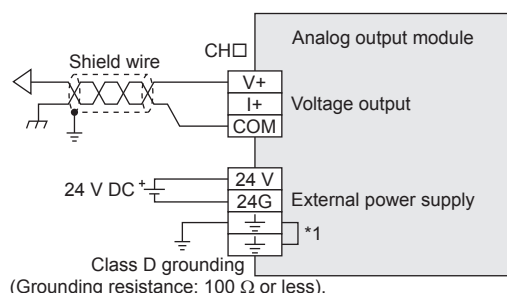
Wiring precautions are indicated below.

- Use separate cables for the external I/O signals of the AC control circuit and the analog output module so that they are not affected by surge or induction on the AC side.
- Do not approach or bundle with the main circuit line, high voltage line, and load line from other than the PLC. Keep it far from circuits including high frequency such as high voltage line and inverter load main circuit. t becomes susceptible to noise, surge, and induction.
- Provide a single-point ground for the shield wire and the shielded cable at the PLC side. However, depending on the external noise situation, it may be better to ground on the external side.

## External wiring example

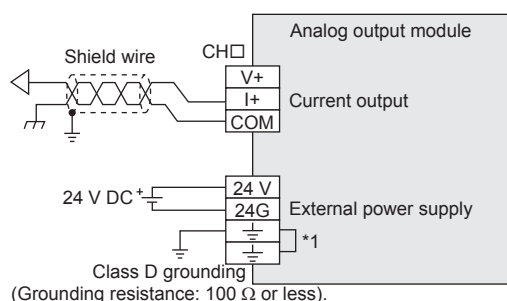
The followings show the examples of external wiring.

### For voltage output



In □ of CH□, the CH number is entered.

### For current output



In □ of CH□, the CH number is entered.

\*1 " " terminals are internally connected. Perform class D grounding by either terminal.

### Precautions

Use 2-core shielded twisted pair cable for the analog output lines, and separate the analog output lines from other power lines or inductive lines.

Ground the shielded wire at one point on the signal receiving side.

The external power supply of 24 V DC must be turned on before the system power supply.

## 2.7 Parameter Settings

---

Set the parameters of each channel.

Setting parameters here eliminates the need to program them.

### Parameter setting procedure

---

1. Add the analog output module to GX Works3.  
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Right-click ⇒ [Add New Module]
2. There are two parameter setting types: module parameter and module extension parameter settings, both of which can be set after selecting them from the tree on the following window.  
 [Navigation window] ⇒ [Parameter] ⇒ [Module information] ⇒ [Target Module]
3. Using GX Works3, write the settings to the CPU module.  
 [Online] ⇒ [Write to PLC]
4. The settings are reflected by resetting the CPU module or turning the power supply off→on.

#### Point

When adding a new analog output module, if selecting the module whose module model name has "(FX3)" at the end, it can be used as FX3 allocation mode.

- FX5-4DA: Normal mode
- FX5-4DA(FX3): FX3 allocation mode

For details on the FX3 allocation mode function, refer to  Page 235 FX3 allocation mode function  
This section describes the case in a normal mode.

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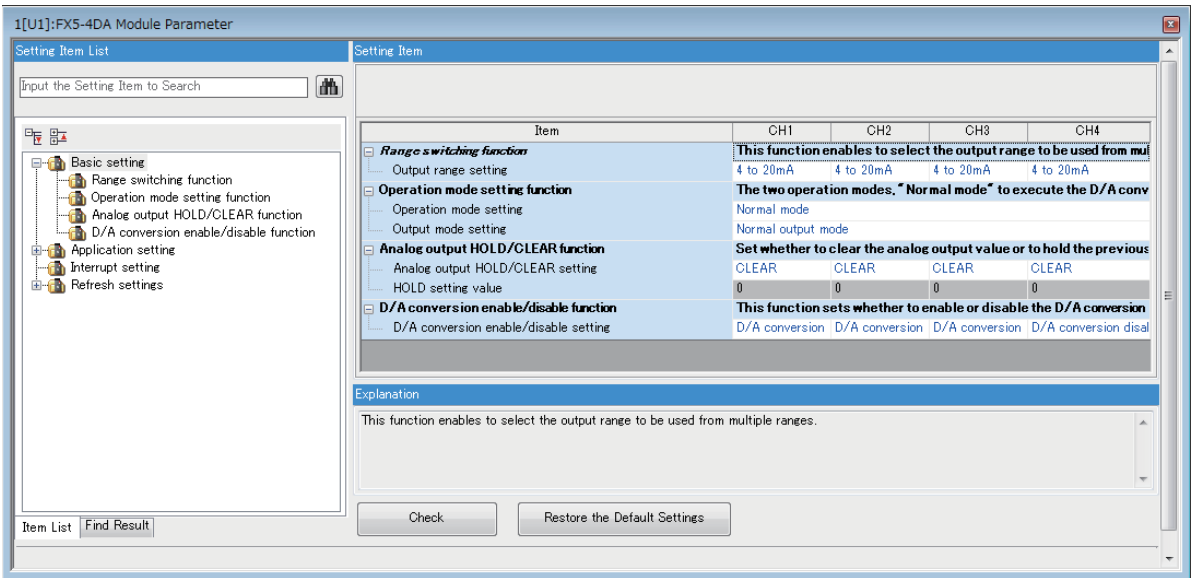
# Module parameters

## Basic setting

### ■Setting procedure

1. Open "Basic setting" of GX Works3.

[Navigation window] ⇒ [Parameter] ⇒ [Module information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Basic setting]



2. Double-click the item to be changed to enter the setting value.

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

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

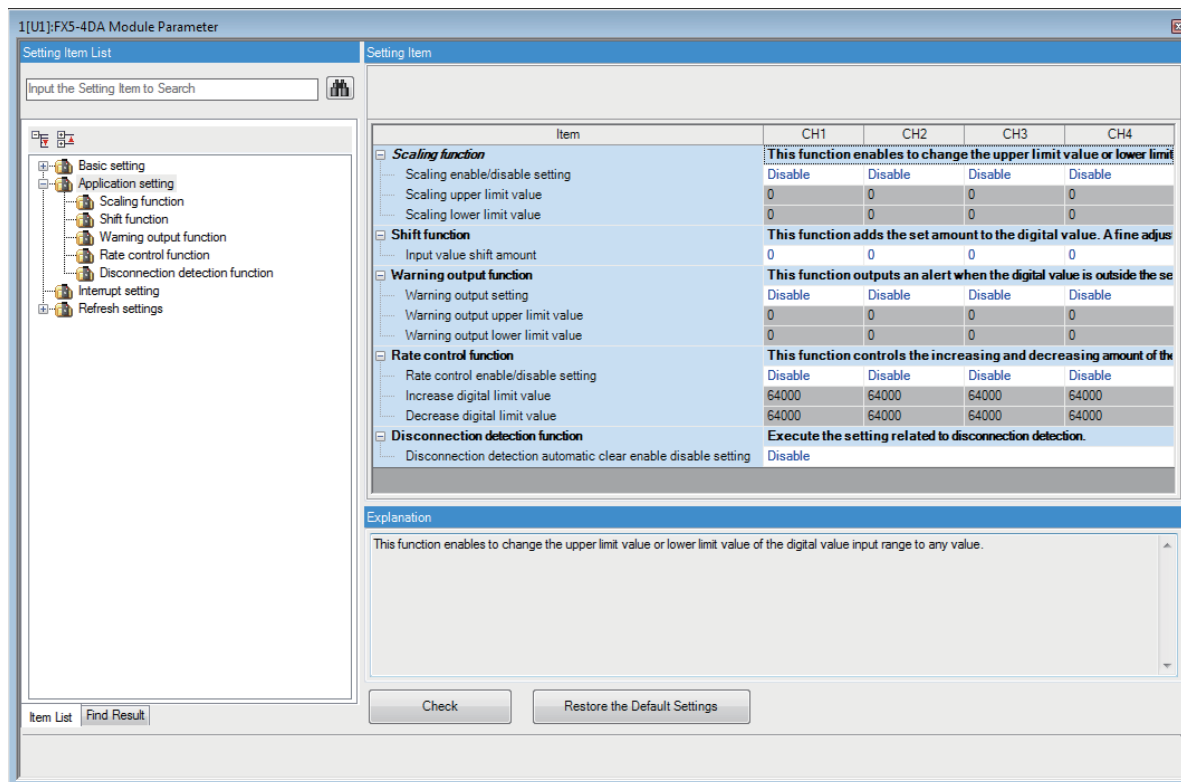
Double-click the item to be set to enter the numeric value.

## Application setting

### ■ Setting procedure

1. Open "Application setting" of GX Works3.

 [Navigation window] ⇒ [Parameter] ⇒ [Module information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Application setting]



2. Double-click the item to be changed to enter the setting value.

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

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

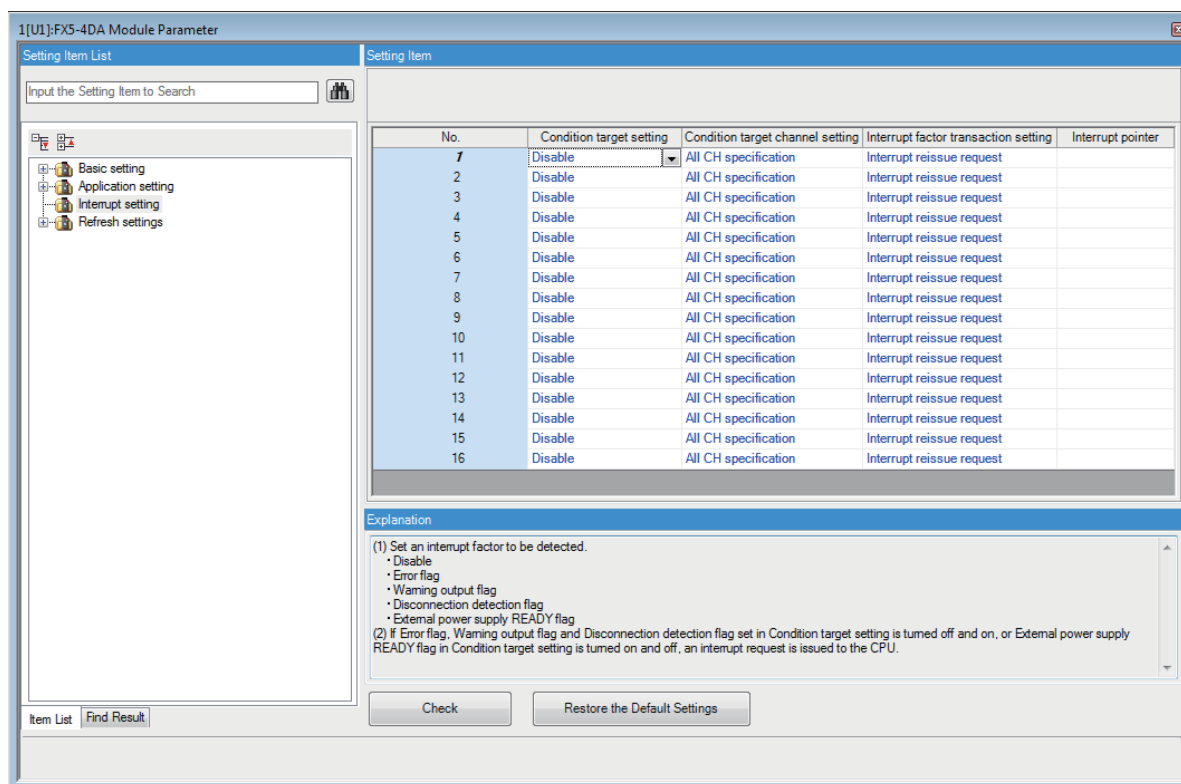
Double-click the item to be set to enter the numeric value.

## Interrupt setting

### ■Setting procedure

1. Open "Interrupt setting" of GX Works3.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Interrupt setting]



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

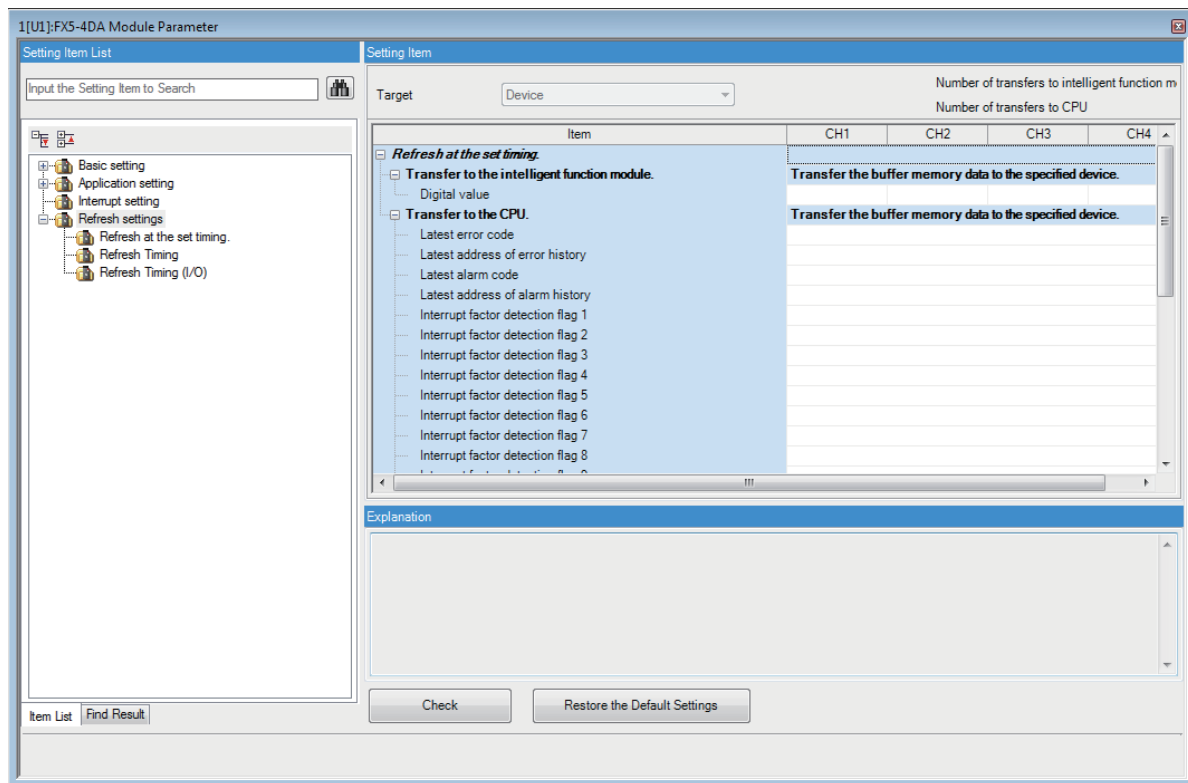
Double-click the item to be set to enter the numeric value.

## Refresh setting

### ■Setting procedure

1. Open "Refresh setting" of GX Works3.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Refresh setting]



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



## Module extension parameters

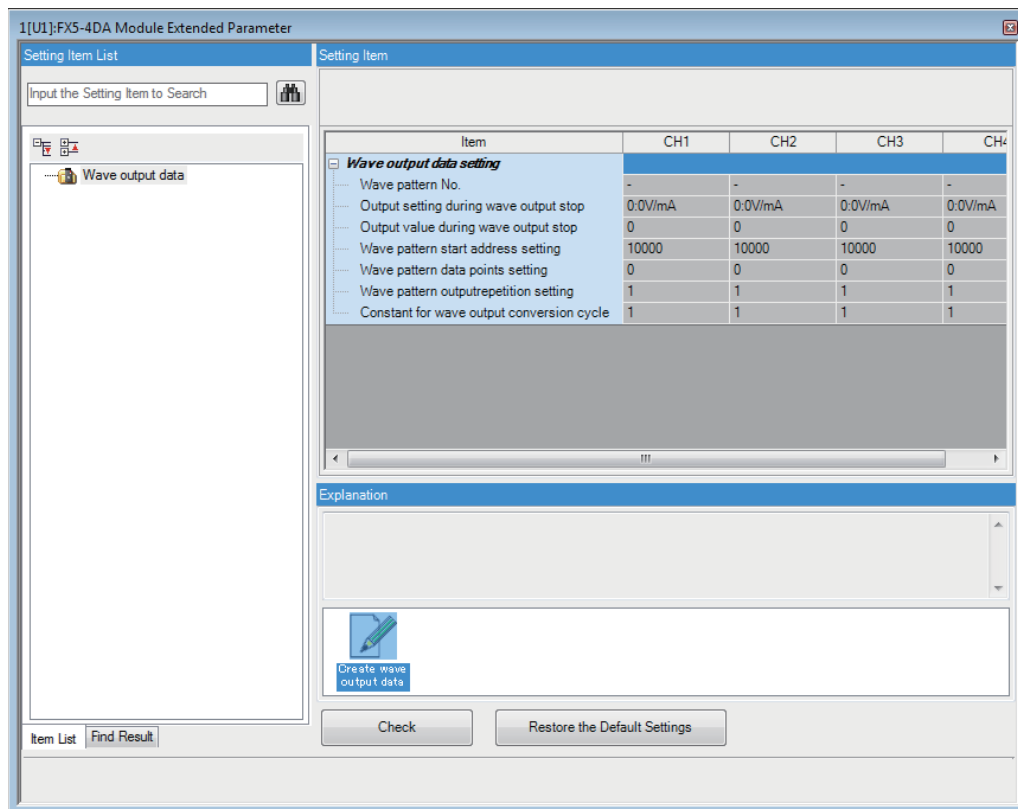
Module extension parameters are set to use the wave output function.

To set module extension parameters, use the wave output data creation tool.

### Starting up the wave output data creation tool

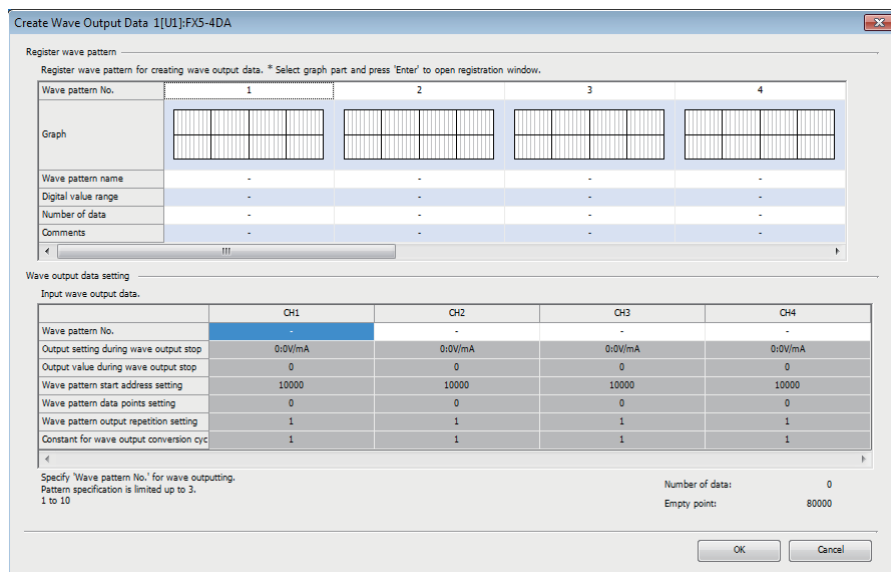
The wave output data creation tool starts up from the Set module extension parameters window.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Target module ⇒ [Module Extension Parameter] ⇒ [Create wave output data]



### Creating the wave output data

Using the wave output data creation tool, create the wave pattern and wave output function parameters.



■Register the wave pattern

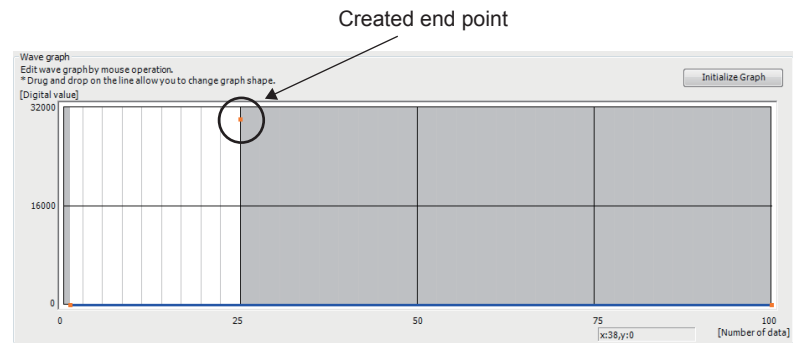
Using the wave output data creation tool, create and register a wave pattern.

1. Select a graph from "Register wave pattern", and press the Enter key on the keyboard. The "Register wave pattern" window is displayed.

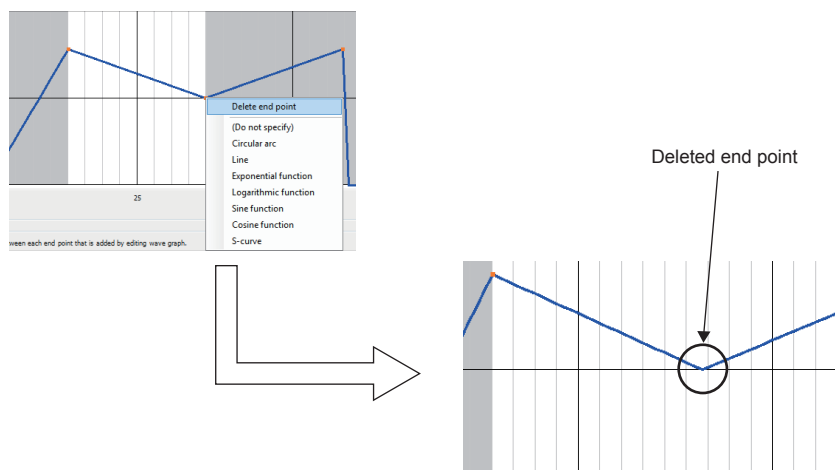
2. Set "Wave pattern information".

| Item                     | Description                                                                                     | Setting range                                      |
|--------------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Wave pattern No.         | The wave pattern No. selected on the "Create Wave Data". Up to 10 wave patterns can be created. | —                                                  |
| Wave pattern name        | Set "Wave pattern name".                                                                        | 8 two-byte characters (16 one-byte characters)     |
| Digital value range      | Select the digital value setting range. Select it according to the output range to be used.     | • 0 to 32000 (default value)<br>• -32000 to +32000 |
| Number of pieces of data | Set the wave data points of the wave pattern.                                                   | 1 to 80000 (default value: 100)                    |
| Comment                  | Set a comment on the wave pattern.                                                              | 32 two-byte characters (64 one-byte characters)    |

3. Click any position on the wave graph to create the terminal point. Each created terminal points is indicated by ■ .

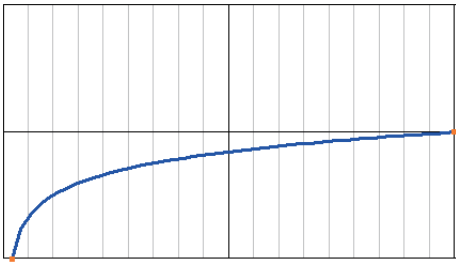
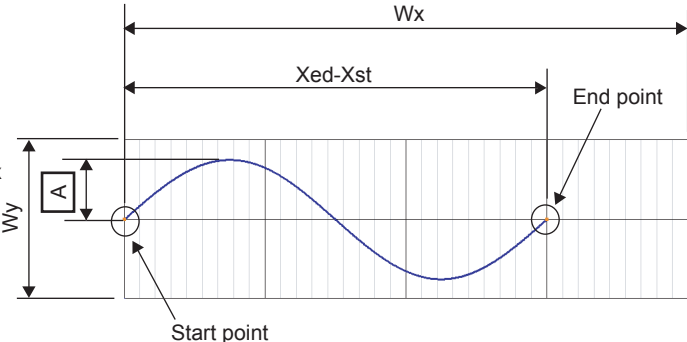
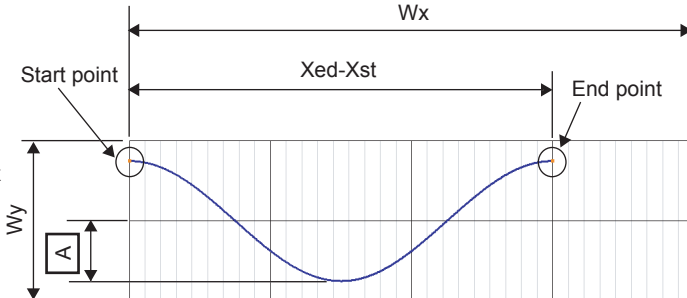
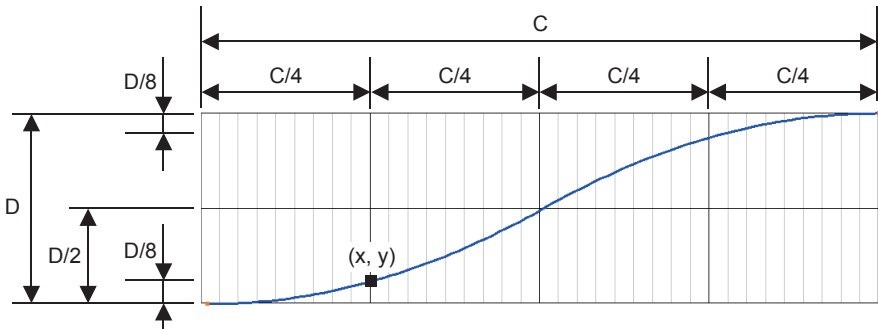


To delete it, move the mouse pointer to the terminal point and select "Delete End Point" from the right-click menu. Once the mouse pointer moves to the terminal point, its displayed shape changes to  $\oplus$ .



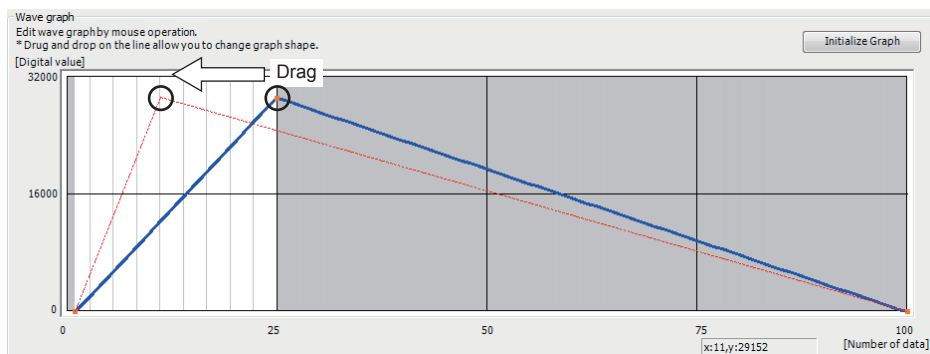
**4.** Set the wave between terminal points in the right-click menu or "Wave Specification" in "Wave Detail Setting".

| Item                 | Setting result                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |              |           |           |              |        |  |                  |        |  |  |          |  |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|-----------|--------------|--------|--|------------------|--------|--|--|----------|--|
| Circular arc         | <div><div><p>The start and end points are drawn by an arc. When an arc is to be selected, its orientation can be inverted by setting it in "Orientation". The drawn arc is processed according to the following procedure.</p><div><div><p>The arc to be drawn</p><p>End point</p><p>Start point</p></div><div><p>Set "Direction".</p><table><tr><th>Specify wave</th><th>Direction</th><th>Amplitude</th></tr><tr><td>Circular arc</td><td>Upward</td><td></td></tr><tr><td>(Do not specify)</td><td>Upward</td><td></td></tr><tr><td></td><td>Downward</td><td></td></tr></table></div></div><div><div><p>1) Construct an equilateral triangle having the start and end points as its vertices.</p><p>2) Construct a circle having the other vertex of the triangle as its center and a side of the triangle as its radius.</p><p>3) Draw the minor arc connecting the start and end points on the wave graph.</p><p>* The steps 1) and 2) are processed inside GX Works3, and not displayed on the wave graph.</p></div><div><div><p>In an upward direction</p></div><div><p>In a downward direction</p></div></div></div></div></div> | Specify wave | Direction | Amplitude | Circular arc | Upward |  | (Do not specify) | Upward |  |  | Downward |  |
| Specify wave         | Direction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Amplitude    |           |           |              |        |  |                  |        |  |  |          |  |
| Circular arc         | Upward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |           |           |              |        |  |                  |        |  |  |          |  |
| (Do not specify)     | Upward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |           |           |              |        |  |                  |        |  |  |          |  |
|                      | Downward                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |           |           |              |        |  |                  |        |  |  |          |  |
| Line                 | <div><p>The start and end points are drawn by a line.</p></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |           |           |              |        |  |                  |        |  |  |          |  |
| Exponential function | <div><p>The start and end points are drawn by expanding or contracting the graph so that they will be the terminal points of the graph of exponential function <math>y = e^x</math> (<math>X = 0</math> to <math>10</math>).</p></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |              |           |           |              |        |  |                  |        |  |  |          |  |

| Item                   | Setting result                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Logarithmic function   | <p>The start and end points are drawn by expanding or contracting the graph so that they will be the terminal points of the graph of logarithmic function <math>y=\log_e X</math> (<math>X = 1</math> to <math>101</math>).</p>                                                                                                                                                                                                                                                                                           |
| Sine function*1        | <p>The start and end points are drawn by a sine function. The vertical width, A, of the sine function drawn is the value set by "Amplitude". The star position can be changed by 180° by using "Phase setting".</p>  <p>Number of data in a wave pattern: Wx<br/> Digital value range: Wy<br/> Data position of the start point: Xst<br/> Data position of the end point: Xed</p>                                                                                                                                        |
| Cosine function*1      | <p>The start and end points are drawn by a cosine function. The vertical width, A, of the cosine function drawn is the value set by "Amplitude". The star position can be changed by 180° by using "Phase setting".</p>  <p>Number of data in a wave pattern: Wx<br/> Digital value range: Wy<br/> Data position of the start point: Xst<br/> Data position of the end point: Xed</p>                                                                                                                                  |
| S-shaped interpolation | <p>The start and end points are drawn by S-shaped interpolation by using the following acceleration.</p> <p>Acceleration <math>a = (2 \times \text{Output value width } D) \div (\text{Data width } C \times \text{Data width } C)</math></p> <p>The digital value y of certain point x is calculated by the following formula.</p> <p>If <math>x &lt; (c/2)</math>: <math>y = ax^2</math><br/> If <math>x \geq (c/2)</math>: <math>y = -a(x - c)^2 + D</math></p>  <p>Width of output value: D<br/> Data width: C</p> |

\*1 When the sine and cosine functions are to be set, set the digital values of the start and end points to the same value.

5. Drag the created end point to adjust its position.



The end point position can be adjusted also by changing the "End point" and "Digital value" values in "Wave detail setting".

| Item          | Description                                                                                                                                             |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Start point   | The end point of the previous section is displayed. To change it, change the end point of the previous section.                                         |
| End point     | Set the number of pieces of data of the target terminal point. Since section No.1 represents the first point of the wave pattern, it cannot be changed. |
| Digital value | Set the digital value of the target terminal point.                                                                                                     |

6. Repeat steps 3 to 5 to create the wave to be output.

Each digital value of the created wave pattern can be shown using the [Display Digital Value] button. To clear the contents of the created wave pattern, click the [Initialize Graph] button. The graph and the contents of "Wave detail setting" are cleared.

7. To save the wave pattern, click [Save Wave Pattern] or [Write CSV File].

☞ Page 252 Save the wave pattern

8. Click the [OK] button on the "Register wave pattern" window.

9. Repeat steps 1 to 8 to create another wave pattern.

## ■Setting the wave output function parameters

Set the wave output function parameters for each channel.

Before setting the parameters, create the wave data.

| Item                                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Setting range                                                                                                                                                                                           | Remarks                                                                                                                                         |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| Wave pattern No.                          | Up to three registered wave patterns can be specified at once. To specify two or more wave patterns, set them as follows.<br>• When using Nos. 1 and 2: 1, 2<br>• When using Nos. 1, 5, and 10: 1, 5, 10<br>• When using Nos. 1 to 3: 1-3                                                                                                                                                                                                                                        | 1 to 10                                                                                                                                                                                                 | Use the "Create Wave Output Data" window for setting.                                                                                           |
| Output setting during wave output stop    | Set the analog output that is in the wave output stopped state.                                                                                                                                                                                                                                                                                                                                                                                                                  | • 0: 0 V/0 mA<br>• 1: Offset value (default value)<br>• 2: Output value during wave output stop                                                                                                         |  Page 316 CH1<br>Output setting during wave output stop      |
| Output value during wave output stop      | Set the value to be output in wave output stopped state. This value is enabled only when "Output setting during wave output stop" is set in "2: Output value during wave output stop". Set a value within the setting range of the output range to be used.                                                                                                                                                                                                                      | • For 4 to 20 or 0 to 20 mA; or 1 to 5, 0 to 5, or 0 to 10 V 0 to 32767 (practical range: 0 to 32000)<br>• For -10 to +10 V: -32768 to +32767 (practical range: -32000 to +32000)<br>(Default value: 0) |  Page 317 CH1<br>Output value during wave output stop        |
| Wave pattern start address setting        | Set the start address of the wave pattern to be output as analog data.                                                                                                                                                                                                                                                                                                                                                                                                           | 10000 to 89999<br>(Default value: 10000)                                                                                                                                                                |  Page 317 CH1<br>Wave pattern start address setting          |
| Wave pattern data points setting          | Does not need to be set because the number of data points possessed by the wave pattern to be used is automatically stored.                                                                                                                                                                                                                                                                                                                                                      | —                                                                                                                                                                                                       |  Page 318 CH1<br>Wave pattern data points setting            |
| Wave pattern output repetition setting    | When the wave pattern is to be output repeatedly, set the number of repetitions.                                                                                                                                                                                                                                                                                                                                                                                                 | • -1 (indefinite repetitive output)<br>• 1 to 32767 (default value: 1)                                                                                                                                  |  Page 318 CH1<br>Wave pattern output repetition setting      |
| Constant for wave output conversion cycle | Set the constant used to determine the conversion cycle (multiple specification of conversion speed). The wave output conversion cycle is determined by the combination of the conversion speed, the number of D/A conversion enabled channels, and this setting.<br>For how to calculate the wave output conversion cycle, refer to the following.<br> Page 206 Wave output conversion cycle | 1 to 5000 (default value: 1)                                                                                                                                                                            |  Page 319 CH1<br>Constant for wave output conversion cycle |

In the wave output data creation tool, click the [OK] button. The wave pattern and wave output function parameters are determined as module extension parameters.

The module extension parameters need to be written to the CPU built-in memory or SD memory card.

For the procedure for writing to the SD memory card, refer to the following.

 MELSEC iQ-F FX5 Module User's Manual (Application)

## ■Save the wave pattern

The created wave pattern can be saved in the following format.

- Save the wave pattern

By clicking [Save Wave Pattern], the created wave pattern can be saved. The file is saved in the format of extension ".wdn".

The saved file can be read using the [Open Wave Pattern].

- Saving the wave pattern to a CSV file

By clicking [Write CSV File], the created wave pattern can be saved in a CSV file. The file is saved in the format of extension ".csv".

The saved file can be read using the [Read CSV File].

## ■About CSV file format

The CSV file format is as below.

[CSV format specifications]

| Item name      | Description        |
|----------------|--------------------|
| Separator      | Comma (,)          |
| Return code    | CRLF (0DH, 0AH)    |
| Character code | ASCII or Shift JIS |

[CSV file name]

The number of characters of each CSV file name must be 64 characters or less including extension ".CSV".

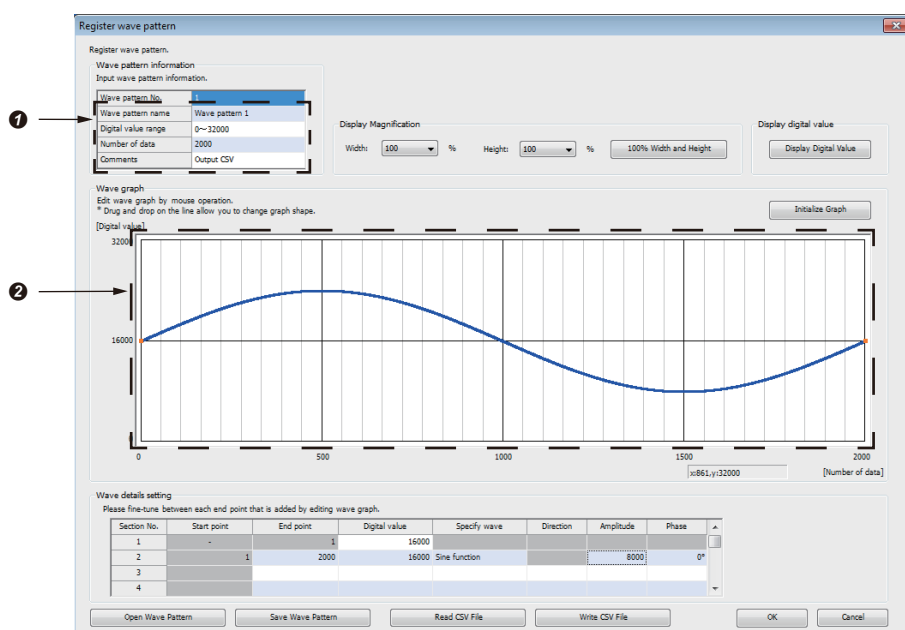
**Ex.**

FX5-4DA\_1.csv, wd000001.csv, wave data.csv

[Contents of CSV file]

The following shows examples of the "Register wave pattern" window and the contents of a CSV file.

- "Register wave pattern" window



- Contents of CSV file

|   |                        |                                                           |                            |              |
|---|------------------------|-----------------------------------------------------------|----------------------------|--------------|
| ① | ["Wave pattern name"], | [Digital value range (1: 0 to 32000/2: -32000 to 32000)], | [Number of pieces of data] | ["Comment"]  |
|   | "Wave pattern 1",      | 1,                                                        | 2000,                      | "Output CSV" |
| ② | [Data No.],            | [Digital value]                                           |                            |              |
|   | 1,                     | 16000                                                     |                            |              |
|   | 2,                     | 16025                                                     |                            |              |
|   | 3,                     | 16050                                                     |                            |              |
|   | ⋮                      | ⋮                                                         |                            |              |
|   | 1999,                  | 15974                                                     |                            |              |
|   | 2000,                  | 16000                                                     |                            |              |

### Point

- Some instruments such as oscilloscopes and pulse generators can output input or output waves to a CSV file. If the waves are to be output with the wave output function by using the saved data in this CSV file, modify the file into the above CSV file format. In addition, modify all decimal values into integers because they are not available with the wave output function.
- If a wave pattern is read from a CSV file, it cannot be edited on the "Register Wave Pattern" window. After editing the CSV file, read the CSV file again.

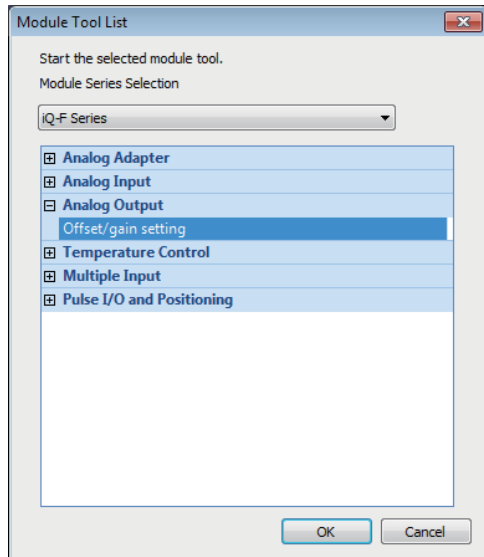
## 2.8 Offset/Gain Setting

Using the user range setting requires setting the offset and gain values.

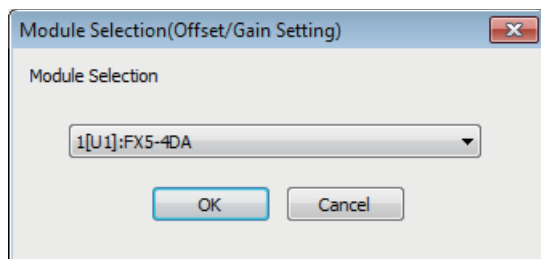
Access to the offset/gain setting window in GX Works3 to set the offset and gain values.

### Setting procedure

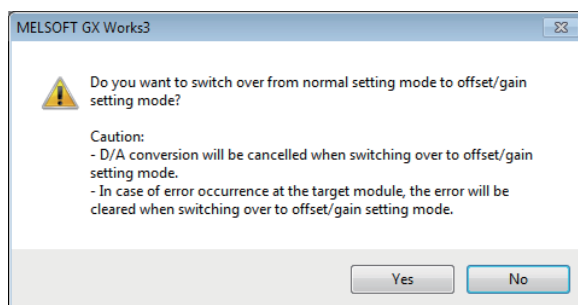
 [Tool] ⇒ [Module Tool List]



1. In "Analog Output", select "Offset/gain setting" and click the [OK] button.



2. Select the target module for the offset/gain setting, and click the [OK] button.



3. Click [Yes] button.



Offset/Gain Setting

Set offset/gain settings.

Object Module: 1[U1]:FX5-4DA Error Code: --- Detail Display... Error Clear

Offset/Gain Setting

Channel No.: CH1

User Range Setting: User Range Setting (Voltage)

☒ Offset Setting ☐ Gain Setting

Adjustment Value: 1 + -

Range: 1 to 3000  
For the adjustment value of 1000 the analog output value with  
-voltage at output of about 0.31V and  
-current at output of about 0.35mA  
can be adjusted.

| Channel No. | Offset Status | Gain Status |
|-------------|---------------|-------------|
| CH1         |               |             |
| CH2         |               |             |
| CH3         |               |             |
| CH4         |               |             |

Please select a target channel for the offset/gain setting.  
Check Offset setting or Gain setting and input an adjustment value.

Close

4. Specify the channel and offset/gain setting used to perform the offset/gain setting.

Offset/Gain Setting

Set offset/gain settings.

Object Module: 1[U1]:FX5-4DA Error Code: --- Detail Display... Error Clear

Offset/Gain Setting

Channel No.: CH1

User Range Setting: User Range Setting (Voltage)

☒ Offset Setting ☐ Gain Setting

Adjustment Value: 1 + -

Range: 1 to 3000  
For the adjustment value of 1000 the analog output value with  
-voltage at output of about 0.31V and  
-current at output of about 0.35mA  
can be adjusted.

| Channel No. | Offset Status | Gain Status |
|-------------|---------------|-------------|
| CH1         |               |             |
| CH2         |               |             |
| CH3         |               |             |
| CH4         |               |             |

Please select a target channel for the offset/gain setting.  
Check Offset setting or Gain setting and input an adjustment value.

Close

5. Specify the offset or gain setting using the radio button.  
(Perform step 6 and later only when the offset setting is specified in this step.)

Offset/Gain Setting

Set offset/gain settings.

Object Module: 1[U1]:FX5-4DA Error Code: --- Detail Display... Error Clear

Offset/Gain Setting

Channel No.: CH1

User Range Setting: User Range Setting (Voltage)

☒ Offset Setting ☐ Gain Setting

Adjustment Value: 1 100 500 1000 2000 3000 + -

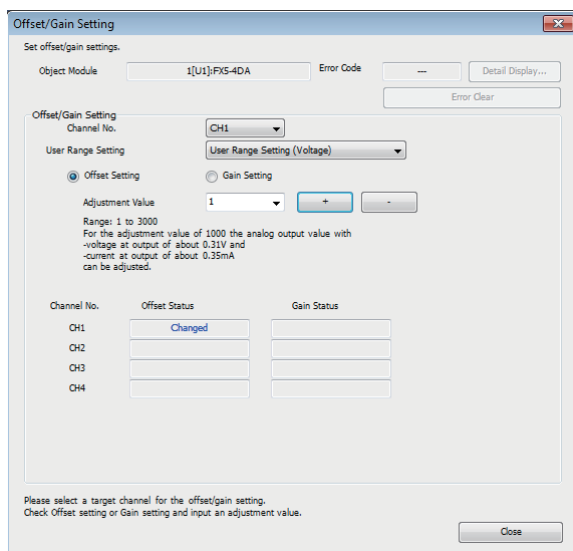
Range: 1 to 3000  
For the adjustment value of 1000 the analog output value with  
-voltage at output of about 0.31V and  
-current at output of about 0.35mA  
can be adjusted.

| Channel No. | Offset Status | Gain Status |
|-------------|---------------|-------------|
| CH1         |               |             |
| CH2         |               |             |
| CH3         |               |             |
| CH4         |               |             |

Please select a target channel for the offset/gain setting.  
Check Offset setting or Gain setting and input an adjustment value.

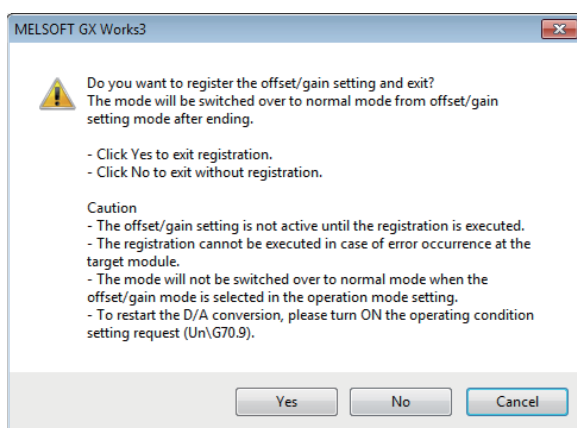
Close

6. Select the adjustment amount of the offset or gain value from "1", "100", "500", "1000", "2000", and "3000".  
Alternatively, the adjustment amount can be set also by entering any numerical value from 1 to 3000.



7. By clicking the [+] or [-] button, fine adjust the analog output voltage or current value corresponding to the set adjustment value.
8. The offset setting state of the specified channel changes to "Changed".
9. If the gain setting is to be performed, repeat the above from step 5.
10. After completion of the setting, click [Close] button.

11. Click the [Yes] button.



# 2.9 Programming

This section describes the programming procedure and the basic program of an analog output module.

## Programming procedure

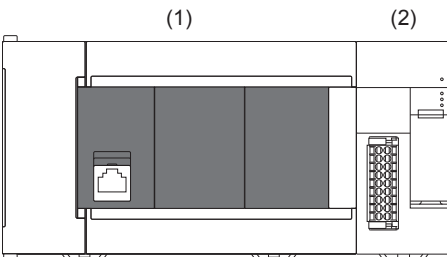
Take the following steps to create a program for running an analog output module:

1. Set parameters.
2. Create a program.

### In the normal output mode

#### ■System configuration

The following shows a system configuration example.



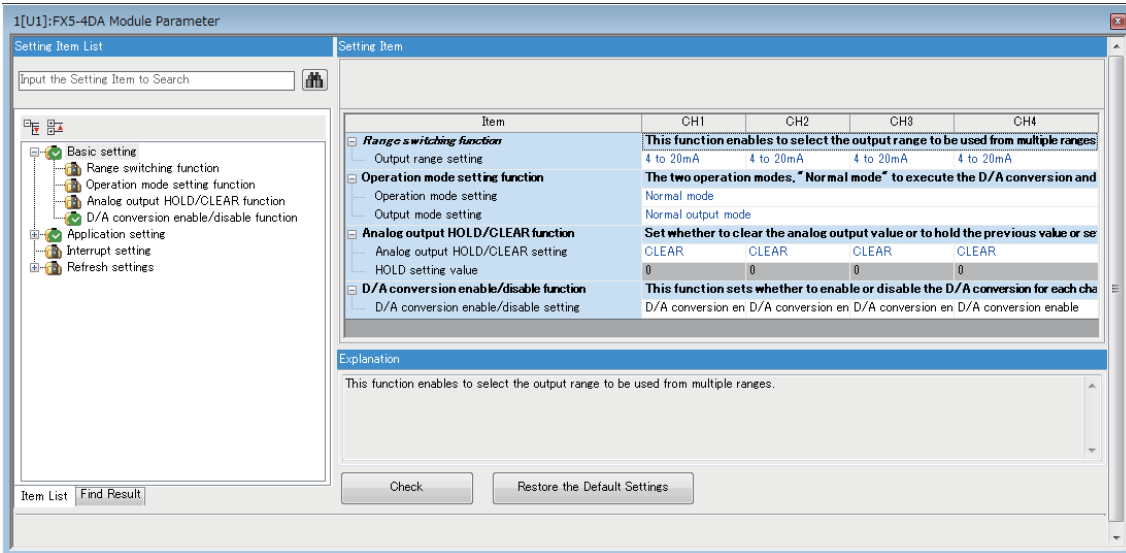
- (1) CPU module (FX5U CPU module)  
(2) Analog output module (FX5-4DA)

#### ■Parameter settings

Perform an initial setting in the module parameter of GX Works3. The refresh settings do not need to be changed here.

- Module parameters

[Basic setting]



## [Application setting]

1[U1]:FX5-4DA Module Parameter

Setting Item List

Input the Setting Item to Search

Basic setting  
Application setting  
Scaling function  
Shift function  
Warning output function  
Rate control function  
Disconnection detection function  
Interrupt setting  
Refresh settings

Setting Item

| Item                                                           | CH1                                                                                                                       | CH2                | CH3                | CH4                |
|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------|--------------------|
| <b>Scaling function</b>                                        | This function enables to change the upper limit value or lower limit value of the digital value input range to any value. |                    |                    |                    |
| Scaling enable/disable setting                                 | Disable                                                                                                                   | Disable            | Disable            | Disable            |
| Scaling upper limit value                                      | 0                                                                                                                         | 0                  | 0                  | 0                  |
| Scaling lower limit value                                      | 0                                                                                                                         | 0                  | 0                  | 0                  |
| <b>Shift function</b>                                          | This function adds the set amount to the digital value. A fine adjustment is possible.                                    |                    |                    |                    |
| Input value shift amount                                       | 0                                                                                                                         | 0                  | 0                  | 0                  |
| <b>Warning output function</b>                                 | This function outputs an alert when the digital value is outside the set range.                                           |                    |                    |                    |
| Warning output setting                                         | Enable (no output)                                                                                                        | Enable (no output) | Enable (no output) | Enable (no output) |
| Warning output upper limit value                               | 32000                                                                                                                     | 32000              | 32000              | 32000              |
| Warning output lower limit value                               | 0                                                                                                                         | 0                  | 0                  | 0                  |
| <b>Rate control function</b>                                   | This function controls the increasing and decreasing amount of the digital value.                                         |                    |                    |                    |
| Rate control enable/disable setting                            | Disable                                                                                                                   | Disable            | Disable            | Disable            |
| Increase digital limit value                                   | 64000                                                                                                                     | 64000              | 64000              | 64000              |
| Decrease digital limit value                                   | 64000                                                                                                                     | 64000              | 64000              | 64000              |
| <b>Disconnection detection function</b>                        | Execute the setting related to disconnection detection.                                                                   |                    |                    |                    |
| Disconnection detection automatic clear enable/disable setting | Disable                                                                                                                   |                    |                    |                    |

Explanation

This function enables to change the upper limit value or lower limit value of the digital value input range to any value.

Item List Find Result

Check Restore the Default Settings

## ■Program example

| Classification       | Device                                     | Description                         | Device     |
|----------------------|--------------------------------------------|-------------------------------------|------------|
| Module label         | FX5_4DA_1.bCH1OutputEnableDisableFlag_D    | CH1 Output enable/disable flag      | U1\G70.1   |
|                      | FX5_4DA_1.bCH2OutputEnableDisableFlag_D    | CH2 Output enable/disable flag      | U1\G70.2   |
|                      | FX5_4DA_1.bCH3OutputEnableDisableFlag_D    | CH3 Output enable/disable flag      | U1\G70.3   |
|                      | FX5_4DA_1.bCH4OutputEnableDisableFlag_D    | CH4 Output enable/disable flag      | U1\G70.4   |
|                      | FX5_4DA_1.bDisconnectionDetectionSignal_D  | Disconnection detection signal      | U1\G69.D   |
|                      | FX5_4DA_1.bErrorFlag_D                     | Error flag                          | U1\G69.F   |
|                      | FX5_4DA_1.bExternalPowerSupplyREADY_Flag_D | External power supply READY flag    | U1\G69.7   |
|                      | FX5_4DA_1.bModuleREADY_D                   | Module READY                        | U1\G69.0   |
|                      | FX5_4DA_1.bWarningOutputClearRequest_D     | Warning output clear request        | U1\G70.E   |
|                      | FX5_4DA_1.bWarningOutputSignal_D           | Alert output signal                 | U1\G69.E   |
|                      | FX5_4DA_1.stnControl_D[0].wDigitalValue_D  | CH1 Digital value                   | U1\G460    |
|                      | FX5_4DA_1.stnControl_D[1].wDigitalValue_D  | CH2 Digital value                   | U1\G660    |
|                      | FX5_4DA_1.stnControl_D[2].wDigitalValue_D  | CH3 Digital value                   | U1\G860    |
|                      | FX5_4DA_1.stnControl_D[3].wDigitalValue_D  | CH4 Digital value                   | U1\G1060   |
|                      | FX5_4DA_1.uDisconnectionDetectionFlag_D.3  | Disconnection detection flag        | U1\G38.3   |
|                      | FX5_4DA_1.uWarningOutputLowerFlag_D.1      | Warning output lower flag           | U1\G37.1   |
|                      | FX5_4DA_1.uWarningOutputUpperFlag_D.1      | Warning output upper flag           | U1\G36.1   |
| Labels to be defined | Define global labels as shown below:       |                                     |            |
|                      | Label Name                                 | Data Type                           | Class      |
|                      | CH1_DigInVal                               | Word [Signed]                       | VAR_GLOBAL |
|                      | CH2_DigInVal                               | Word [Signed]                       | VAR_GLOBAL |
|                      | CH3_DigInVal                               | Word [Signed]                       | VAR_GLOBAL |
|                      | CH4_DigInVal                               | Word [Signed]                       | VAR_GLOBAL |
|                      | CH2_AlmUpLimit                             | Bit                                 | VAR_GLOBAL |
|                      | CH2_AlmLowLimit                            | Bit                                 | VAR_GLOBAL |
|                      | CH4_DisconnectDetect                       | Bit                                 | VAR_GLOBAL |
|                      | DigitWriteSig                              | Bit                                 | VAR_GLOBAL |
|                      | DAOutputSig                                | Bit                                 | VAR_GLOBAL |
|                      | WarningOutClrSig                           | Bit                                 | VAR_GLOBAL |
|                      | ErrResetSig                                | Bit                                 | VAR_GLOBAL |
|                      | ErrOperationEN                             | Bit                                 | VAR_GLOBAL |
|                      | ErrOperationENO                            | Bit                                 | VAR_GLOBAL |
|                      | ErrOperationOK                             | Bit                                 | VAR_GLOBAL |
|                      | UnitErFlg                                  | Bit                                 | VAR_GLOBAL |
|                      | UnitErCode                                 | Word [Unsigned]/Bit String [16-bit] | VAR_GLOBAL |
|                      |                                            |                                     |            |
|                      |                                            |                                     |            |
|                      |                                            |                                     |            |

- D/A conversion value setting and D/A output start processing

This program example sets digital values for D/A conversion of CH1 to CH4 in the analog output module and then starts the D/A conversion by enabling the analog output.

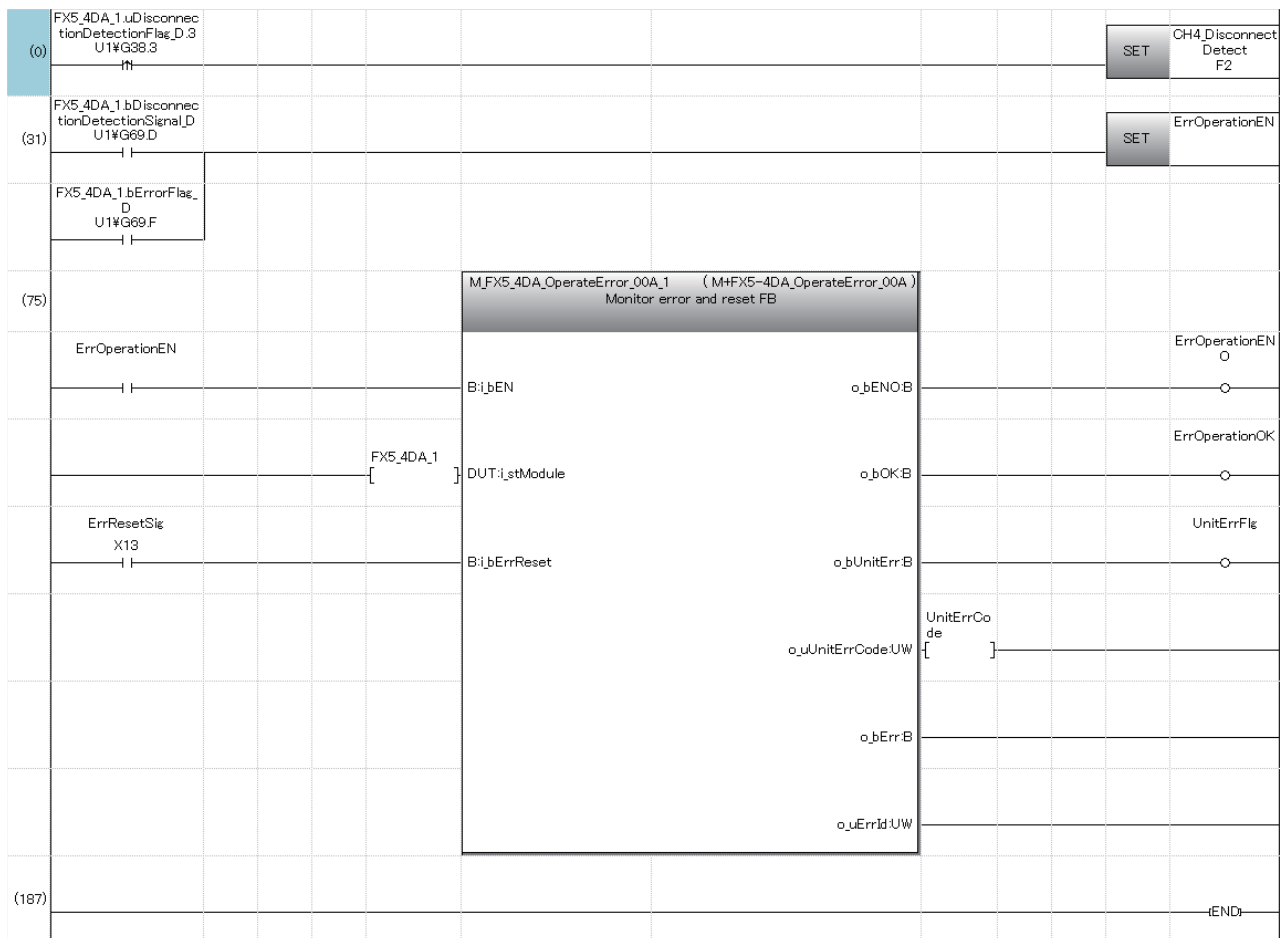
|       |                      |                                      |                                                        |  |  |  |  |     |                     |                                                          |
|-------|----------------------|--------------------------------------|--------------------------------------------------------|--|--|--|--|-----|---------------------|----------------------------------------------------------|
| (0)   | DigitWriteSig<br>X10 | FX5_4DA_1.bModuleREADY_D<br>U1#G69.0 | FX5_4DA_1.bExternalPowerSupplyREADY_Flag_D<br>U1#G69.7 |  |  |  |  | MOV | CH1_DigInVal<br>D11 | FX5_4DA_1.stnControl_D[0].wDigitalValue_D<br>U1#G460     |
|       |                      |                                      |                                                        |  |  |  |  |     |                     |                                                          |
|       |                      |                                      |                                                        |  |  |  |  | MOV | CH2_DigInVal<br>D12 | FX5_4DA_1.stnControl_D[1].wDigitalValue_D<br>U1#G660     |
|       |                      |                                      |                                                        |  |  |  |  |     |                     |                                                          |
|       |                      |                                      |                                                        |  |  |  |  | MOV | CH3_DigInVal<br>D13 | FX5_4DA_1.stnControl_D[2].wDigitalValue_D<br>U1#G860     |
|       |                      |                                      |                                                        |  |  |  |  |     |                     |                                                          |
|       |                      |                                      |                                                        |  |  |  |  | MOV | CH4_DigInVal<br>D14 | FX5_4DA_1.stnControl_D[3].wDigitalValue_D<br>U1#G1060    |
| (114) | DAOutputSig<br>X11   | FX5_4DA_1.bModuleREADY_D<br>U1#G69.0 | FX5_4DA_1.bExternalPowerSupplyREADY_Flag_D<br>U1#G69.7 |  |  |  |  |     |                     | FX5_4DA_1.bCH1OutputEnableDisableFlag_D<br>U1#G70.1<br>○ |
|       |                      |                                      |                                                        |  |  |  |  |     |                     | FX5_4DA_1.bCH2OutputEnableDisableFlag_D<br>U1#G70.2<br>○ |
|       |                      |                                      |                                                        |  |  |  |  |     |                     | FX5_4DA_1.bCH3OutputEnableDisableFlag_D<br>U1#G70.3<br>○ |
|       |                      |                                      |                                                        |  |  |  |  |     |                     | FX5_4DA_1.bCH4OutputEnableDisableFlag_D<br>U1#G70.4<br>○ |
| (202) |                      |                                      |                                                        |  |  |  |  |     |                     | —END—                                                    |

- Warning output-time processing

This program example clears the CH2 Warning output-time processing and warning output in the analog output module.

|       |                                                   |                                                    |  |  |  |  |  |     |                                                    |
|-------|---------------------------------------------------|----------------------------------------------------|--|--|--|--|--|-----|----------------------------------------------------|
| (0)   | FX5_4DA_1.uWarningOutputUpperFlag_D.1<br>U1#G36.1 |                                                    |  |  |  |  |  | SET | CH2_AlmUpLimit<br>F0                               |
|       |                                                   |                                                    |  |  |  |  |  |     |                                                    |
| (37)  | FX5_4DA_1.uWarningOutputLowerFlag_D.1<br>U1#G37.1 |                                                    |  |  |  |  |  | SET | CH2_AlmLowLimit<br>F1                              |
|       |                                                   |                                                    |  |  |  |  |  |     |                                                    |
| (61)  | WarningOutClrSig<br>X12                           | FX5_4DA_1.bWarningOutputSignal_D<br>U1#G69.E       |  |  |  |  |  | SET | FX5_4DA_1.bWarningOutputClearRequest_D<br>U1#G70.E |
|       |                                                   |                                                    |  |  |  |  |  |     |                                                    |
| (89)  | FX5_4DA_1.bWarningOutputSignal_D<br>U1#G69.E      | FX5_4DA_1.bWarningOutputClearRequest_D<br>U1#G70.E |  |  |  |  |  | RST | FX5_4DA_1.bWarningOutputClearRequest_D<br>U1#G70.E |
|       |                                                   |                                                    |  |  |  |  |  |     |                                                    |
| (118) |                                                   |                                                    |  |  |  |  |  |     |                                                    |
|       |                                                   |                                                    |  |  |  |  |  |     | ⌋END⌋                                              |

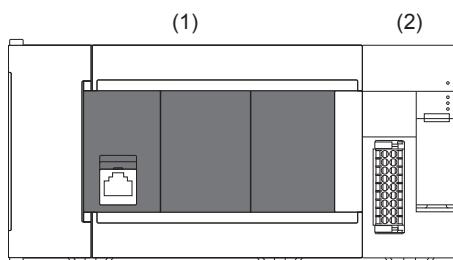
- When a CH4 disconnection is detected or an error occurs in the analog output module, the latest error code appears. After this, the program clears the disconnection detection flag, error flag, and stored error code.



## In the wave output mode

### ■System configuration

The following shows a system configuration example.



(1) CPU module (FX5U CPU module)

(2) Analog output module (FX5-4DA)

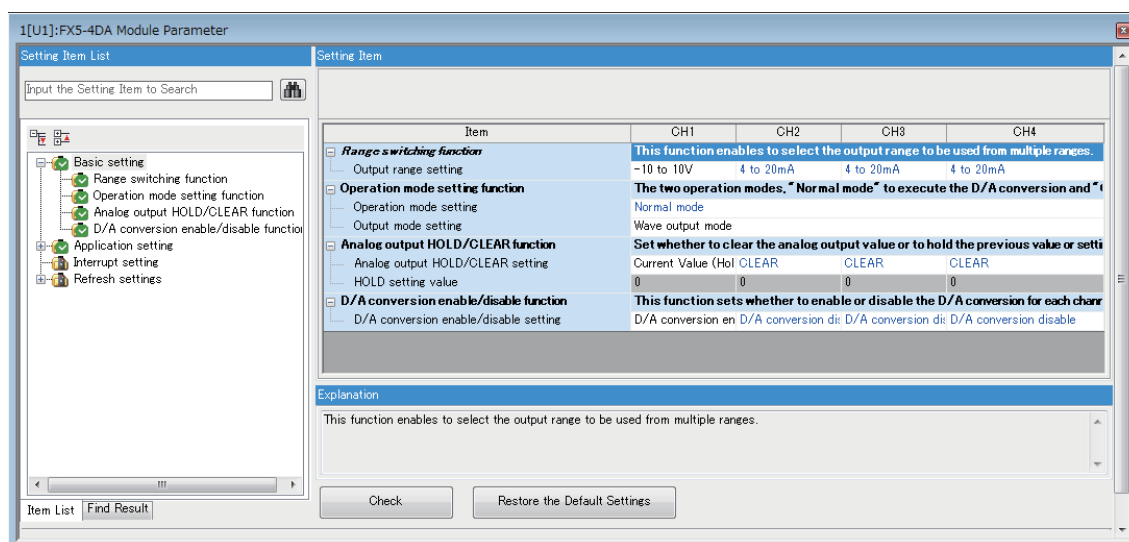
### ■Parameter settings

Perform the initial setting using the module and module extension parameters of GX Works3. The refresh settings do not need to be changed here.

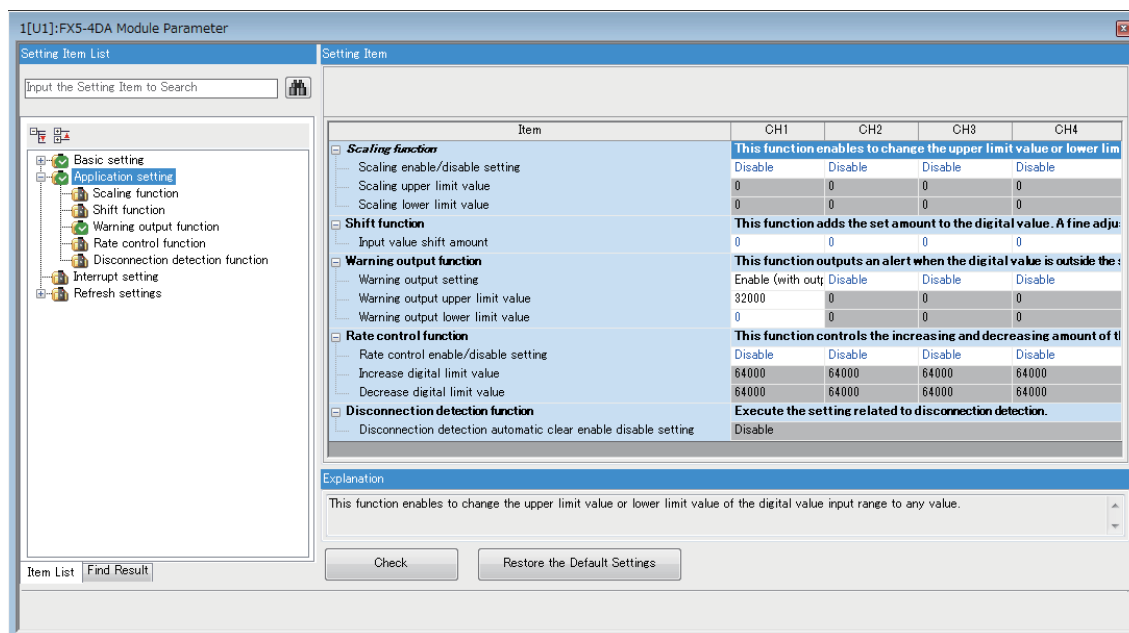
- Module parameters

Set the module parameters as follows.

[Basic setting]



[Application setting]



- Module Extension Parameters

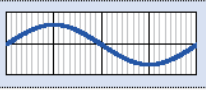
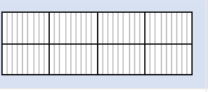
To create the wave output data and register the wave pattern of the module extension parameter, set the setting as follows.

[Create Wave Output Data]

Create Wave Output Data 1[U1]:FX5-4DA

Register wave pattern

Register wave pattern for creating wave output data. \* Select graph part and press 'Enter' to open registration window.

| Wave pattern No.    | 1                                                                                 | 2                                                                                 | 3                                                                                 | 4                                                                                   |
|---------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Graph               |  |  |  |  |
| Wave pattern name   | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                   |
| Digital value range | 0~32000                                                                           | -                                                                                 | -                                                                                 | -                                                                                   |
| Number of data      | 360                                                                               | -                                                                                 | -                                                                                 | -                                                                                   |
| Comments            | -                                                                                 | -                                                                                 | -                                                                                 | -                                                                                   |

Wave output data setting

Input wave output data.

|                                         | CH1     | CH2     | CH3     | CH4     |
|-----------------------------------------|---------|---------|---------|---------|
| Wave pattern No.                        | 1       | -       | -       | -       |
| Output setting during wave output stop  | 0:0V/mA | 0:0V/mA | 0:0V/mA | 0:0V/mA |
| Output value during wave output stop    | 0       | 0       | 0       | 0       |
| Wave pattern start address setting      | 10000   | 10000   | 10000   | 10000   |
| Wave pattern data points setting        | 360     | 0       | 0       | 0       |
| Wave pattern output repetition setting  | 100     | 1       | 1       | 1       |
| Constant for wave output conversion cyc | 100     | 1       | 1       | 1       |

Specify 'Wave pattern No.' for wave outputting.  
Pattern specification is limited up to 3.  
1 to 10

Number of data: 360  
Empty point: 79640

OK Cancel

[Register wave pattern]

Register wave pattern

Register wave pattern.

Wave pattern information

Input wave pattern information.

|                     |         |
|---------------------|---------|
| Wave pattern No.    | 1       |
| Wave pattern name   | -       |
| Digital value range | 0~32000 |
| Number of data      | 360     |
| Comments            | -       |

Display Magnification

Width: 100 % Height: 100 % 100% Width and Height

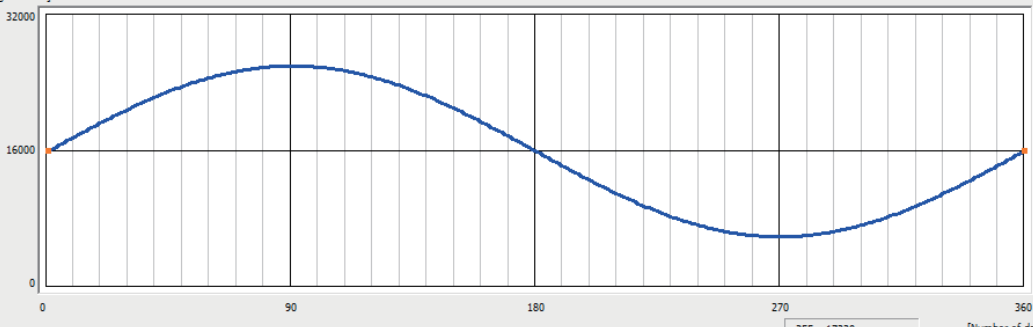
Display digital value

Display Digital Value

Wave graph

Edit wave graph by mouse operation.  
\* Drag and drop on the line allow you to change graph shape.

[Digital value]



Wave details setting

Please fine-tune between each end point that is added by editing wave graph.

| Section No. | Start point | End point | Digital value | Specify wave  | Direction | Amplitude | Phase |
|-------------|-------------|-----------|---------------|---------------|-----------|-----------|-------|
| 1           | -           | 1         | 16000         |               |           |           |       |
| 2           | 1           | 360       | 16000         | Sine function |           | 10000     | 0°    |
| 3           |             |           |               |               |           |           |       |
| 4           |             |           |               |               |           |           |       |

Open Wave Pattern Save Wave Pattern Read CSV File Write CSV File OK Cancel

The created wave output data need to be written, as module extension parameters, to the CPU module or SD memory card.



## Program example

| Classification       | Device                                                  | Description                                | Device                                     |
|----------------------|---------------------------------------------------------|--------------------------------------------|--------------------------------------------|
| Module label         | FX5_4DA_1.bCH1OutputEnableDisableFlag_D                 | CH1 Output enable/disable flag             | U1\G70.1                                   |
|                      | FX5_4DA_1.bExternalPowerSupplyREADY_Flag_D              | External power supply READY flag           | U1\G69.7                                   |
|                      | FX5_4DA_1.bModuleREADY_D                                | Module READY                               | U1\G69.0                                   |
|                      | FX5_4DA_1.bOperatingConditionSettingCompletedFlag_D     | Operating condition setting completed flag | U1\G69.9                                   |
|                      | FX5_4DA_1.bOperatingConditionSettingRequest_D           | Operating condition setting request        | U1\G70.9                                   |
|                      | FX5_4DA_1.stnControl_D[0].uWaveOutputStartStopRequest_D | CH1 Wave output start/stop request         | U1\G462                                    |
| Labels to be defined | Define global labels as shown below:                    |                                            |                                            |
|                      |                                                         | Label Name                                 | Data Type                                  |
|                      | 1                                                       | WaveOutputSettingEN                        | Bit                                        |
|                      | 2                                                       | WaveOutputSettingENO                       | Bit                                        |
|                      | 3                                                       | WaveOutputSettingOK                        | Bit                                        |
|                      | 4                                                       | WaveOutputSettingERR                       | Bit                                        |
|                      | 5                                                       | WaveOutputSettingOutputSelect              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 6                                                       | WaveOutputSettingOutputValue               | Word [Signed]                              |
|                      | 7                                                       | WaveOutputSettingStartingAddr              | Double Word [Unsigned]/Bit String [32-bit] |
|                      | 8                                                       | WaveOutputSettingPointsSetting             | Double Word [Unsigned]/Bit String [32-bit] |
|                      | 9                                                       | WaveOutputSettingFrequency                 | Word [Signed]                              |
|                      | 10                                                      | WaveOutputSettingConvSpeed                 | Word [Unsigned]/Bit String [16-bit]        |
|                      | 11                                                      | WaveOutputSettingErrorCode                 | Word [Unsigned]/Bit String [16-bit]        |
|                      | 12                                                      | RequestSettingEN                           | Bit                                        |
|                      | 13                                                      | RequestSettingENO                          | Bit                                        |
|                      | 14                                                      | RequestSettingOK                           | Bit                                        |
|                      | 15                                                      | RequestSettingERR                          | Bit                                        |
|                      | 16                                                      | RequestSettingErrorCode                    | Word [Unsigned]/Bit String [16-bit]        |
|                      | 17                                                      | WaveOutputReqSettingEN                     | Bit                                        |
|                      | 18                                                      | WaveOutputReqSettingENO                    | Bit                                        |
|                      | 19                                                      | WaveOutputReqSettingOK                     | Bit                                        |
|                      | 20                                                      | WaveOutputReqSettingERR                    | Bit                                        |
|                      | 21                                                      | WaveStartStop                              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 22                                                      | WaveStatusCH1                              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 23                                                      | WaveStatusCH2                              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 24                                                      | WaveStatusCH3                              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 25                                                      | WaveStatusCH4                              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 26                                                      | WaveOutputReqSettingErrorCode              | Word [Unsigned]/Bit String [16-bit]        |
|                      | 27                                                      | WaveDataStoreReq                           | Bit                                        |
|                      | 28                                                      | WaveOutputSetting                          | Bit                                        |
|                      | 29                                                      | WaveRequestSetting                         | Bit                                        |
|                      | 30                                                      | OutputReq                                  | Bit                                        |
|                      | 31                                                      | WaveStartStopReq                           | Bit                                        |

This program example is used to change part of the wave output parameter settings that were set from the "Create Wave Output Data" window. If this change is not to be made, this program is unnecessary.

[illegible]

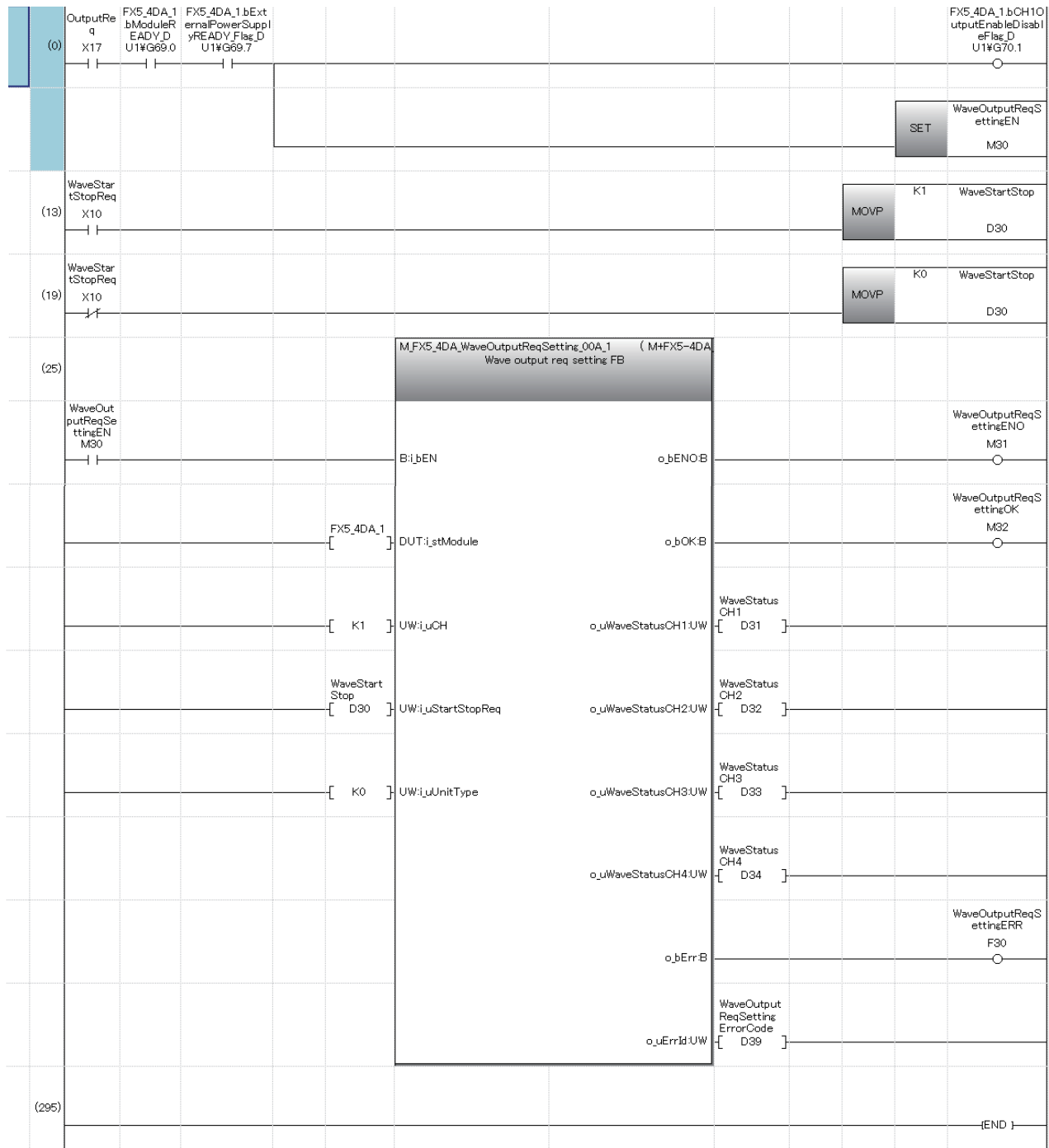
- 2

2



- Example of wave output start processing program

This program example starts the CH1 wave output.



# 2.10 Troubleshooting

This section describes errors that may occur during use of an analog output module and troubleshooting for these.

## 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 GX Works3.

The analog output module state can be checked with the POWER, RUN, ERROR, and ALM LEDs. The following table shows the correspondence between the LEDs and the analog output module state.

| Name      | Description                                                                                                                       |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------|
| POWER LED | Indicates the power supply status.<br>ON: Power ON<br>OFF: Power off or module failure                                            |
| RUN LED   | Indicates the operating status.<br>Light on: Normal operation<br>Flashing: Offset/gain setting mode<br>Light off: Error occurring |
| ERROR LED | Indicates the error status.*1<br>ON: Minor error<br>Flashing: Moderate error or major error<br>OFF: Normal operation              |
| ALM LED   | Indicates the alarm status.*2<br>ON: Alarm occurred<br>OFF: Normal operation                                                      |

\*1 For details, refer to the following.

📖 Page 271 List of error codes

\*2 For details, refer to the following.

📖 Page 274 List of alarm codes

# Troubleshooting by symptom

## When the POWER LED turns off

| Check item                                                                                | Corrective action                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the power is supplied.                                                      | Check that power is supplied to the CPU and extension power supply modules.                                                                                                                    |
| Check whether the capacities of the CPU module extension power supply modules are enough. | Calculate the current consumption of the I/O modules, and intelligent function modules to check that the power supply capacity for the CPU module and extension power supply module is enough. |
| Check whether the module is mounted properly.                                             | Check that the extension cable is inserted correctly.                                                                                                                                          |

## When the RUN LED flashes or turns off

### ■When flashing

| Check item                                               | Cause                                                                                                                                                   | Corrective action                                                                                                             |
|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| Check whether the module is in offset/gain setting mode. | In the GX Works3 module parameter setting, the CPU module was powered off→on or reset when the operation mode setting was the offset/gain setting mode. | In the GX Works3 module parameter setting, set the operation mode setting to normal and power off→on or reset the CPU module. |
|                                                          | The value in the mode switching setting has been changed and the mode has been switched to offset/gain setting mode.                                    | Review the program that uses the mode switching setting to check whether the mode has been switched erroneously.              |

### ■When turning off

| Check item                                                                                | Corrective action                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the power is supplied.                                                      | Check that power is supplied to the CPU and extension power supply modules.                                                                                                                       |
| Check whether the capacities of the CPU module extension power supply modules are enough. | Calculate the current consumption of the I/O modules, and intelligent function modules to check that the power supply capacity for the CPU module and extension power supply module is enough.    |
| Check whether the module is mounted properly.                                             | Check that the extension cable is inserted correctly.                                                                                                                                             |
| 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 ERROR LED flashes or turns on

### ■When flashing

| Check item                                                   | Action                                                                                                                                                                                                                                |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the 24 V DC external power supply is supplied. | Confirm if FX5-4DA is connected properly to the external power supply of 24 V DC. Also, confirm if the supply of the voltage from the external power supply of 24 V DC to FX5-4DA is started before the system power supply turns on. |
| Check whether a moderate error has occurred.                 | Check Latest error code and take actions described in the list of error codes. (Page 271 List of error codes)                                                                                                                         |

### ■When turning on

| Check item                            | Action                                                                                                        |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Check whether any error has occurred. | Check Latest error code and take actions described in the list of error codes. (Page 271 List of error codes) |

## The ALM LED turns on

### ■When turning on

| Check item                               | Action                                                                                                              |
|------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Check whether any alert has been issued. | Check the latest alarm code and take action as described in the list of alarm codes. (Page 274 List of alarm codes) |

## No analog output

### ■No analog output when the normal output mode is selected

| Check item                                                                                                                | Action                                                                                                                                                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the 24 V DC external power supply is supplied.                                                              | Check 'External power supply READY flag' (Un\G69, b7). If it is off, supply 24 V DC to the external power supply terminal.                                                                                                                                  |
| Check whether there is any problem with the wiring, such as looseness or disconnection of analog signal lines.            | Identify the faulty area of signal lines by a visual check and continuity check.                                                                                                                                                                            |
| Check whether the CPU module is in the STOP state.                                                                        | Change the state of the CPU module to RUN.                                                                                                                                                                                                                  |
| Check whether the offset/gain setting in the user range setting is correct.                                               | Check that the offset/gain setting is correct.<br>If a user range setting is in use, change it to another default output range and check that the D/A conversion is performed normally.<br>If the D/A conversion is correct, retry the offset/gain setting. |
| Check whether the output range setting is correct.                                                                        | Check the CH□ Input range setting monitor with the GX Works3 monitor.<br>If the output range setting is incorrect, retry to set the GX Works3 output range setting or CH□ Range setting.                                                                    |
| For the desired channel for output, check whether the CH□ D/A conversion enable/disable is set to D/A conversion disable. | Check CH□ D/A conversion enable/disable setting and set it to D/A conversion enable using a sequence program or the GX Works3.                                                                                                                              |
| For the desired channel for output, check whether 'CH□ Output enable/disable flag' (Un\G70, b1 to b4) is set to OFF.      | Check the ON/OFF setting of 'CH□ Output enable/disable flag' (Un\G70, b1 to b4).<br>If 'CH□ Output enable/disable flag' (Un\G70, b1 to b4) is off, review the sequence program. In addition, check whether the CPU module is in the STOP state.             |
| Check whether the digital value writing program has an error.                                                             | Check the CH□ Digital value using the GX Works 3 monitor (buffer memory batch monitor). If the value as specified for the digital value has not been stored, review the writing program.                                                                    |
| Check whether 'Operating condition setting request' (Un\G70, b9) has been executed.                                       | By turning off→on→off 'Operating condition setting request' (Un\G70, b9), check whether the normal analog output is generated.<br>If it is normal, review the sequence program.                                                                             |

### ■No analog output when the wave output mode is selected

| Check item                                          | Action                                                                                                                                                                                                                                              |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check the connection method                         | Check whether the 24 V DC external power supply is supplied.                                                                                                                                                                                        |
| Checking the module parameter settings of GX Works3 | Check that Offset/gain setting mode flag (Un\G69, b10) is off, and the operation mode setting is normal mode.<br>If the normal mode is not set, retry to set the operation mode to the normal mode with the module parameter setting of GX Works 3. |
|                                                     | Check whether the output module setting is correct.                                                                                                                                                                                                 |
|                                                     | Check whether the user range setting was selected.                                                                                                                                                                                                  |

| Check item           |                                                                                                                                     | Action                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Checking the program | For the desired channel for wave output, check whether the CH□ D/A conversion enable/disable is set to D/A conversion disable.      | Check CH□ D/A conversion enable/disable setting to set to D/A conversion enable.                                                                                                                                                                                                                                                                                                                  |
|                      | Check whether 'Operating condition setting request' (Un\G70, b9) has been executed.                                                 | By turning off→on→off 'Operating condition setting request' (Un\G70, b9), enable the wave output function parameter setting.                                                                                                                                                                                                                                                                      |
|                      | Check whether the value is written in the wave data registry area of the desired channel for wave output.                           | Check the value of the wave data registry area used for the desired channel for wave output.<br>By pausing the wave output, each monitor of the wave output function can be checked.<br>Set the analog output HOLD/CLEAR setting to the previous value, set the CH□ Wave output start/stop request to the wave output pause request (2) to pause the analog output state, and check each monitor. |
|                      | Check whether the CH□ Wave output start/stop request of the desired channel for wave output is set to Wave output stop request (0). | Check the CH□ Wave output status monitor of the desired channel for wave output.<br>When the CH□ Wave output status monitor is Wave output stopped (0), retry to set CH□ Wave output start/stop request in Wave output start request (1).                                                                                                                                                         |
|                      | For the desired channel for wave output, check whether 'CH□ Output enable/disable flag' (Un\G70, b1 to b4) is set to OFF.           | Check the status of the ON/OFF setting of 'CH□ Output enable/disable flag' (Un\G70, b1 to b4).<br>If 'CH□ Output enable/disable flag' (Un\G70, b1 to b4) is off, review the program.                                                                                                                                                                                                              |

## The analog output value is not identical with the previous value/setting value

| Check item                                                                  | Corrective action                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the operation status of the CPU module is STOP or Stop Error. | Check the CPU module operating status.<br>The analog output HOLD/CLEAR function is enabled when the CPU module operating status is STOP or Stop Error.                                                           |
| Check whether the analog output HOLD/CLEAR function is correct.             | Check the CH□ HOLD/CLEAR function setting monitor.<br>If the setting is incorrect, retry to set the analog output HOLD/CLEAR setting to the previous value/setting value by setting GX Works3 module parameters. |
| Check whether the CH□ HOLD setting value is correct.                        | If the setting value is selected with the analog output HOLD/CLEAR function setting function, check the value the CH□ HOLD setting value.                                                                        |

## 'External power supply READY flag' (Un\G69, b7) does not turn on

Use the following procedure for checking.

| Check item                                                                                                                                                         | Corrective action                                                                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the 24 V DC external power supply is supplied.<br>(1) Wiring is proper.<br>(2) External power supply 24 V DC is supplied within the specified range. | (1) Make wiring by reference to the external wiring. (  Page 237)<br>(2) Supply 24 V DC within the performance specifications. (  Page 175) |
| Other than the above                                                                                                                                               | The analog output module may be in failure. Please consult your local Mitsubishi representative.                                                                                                                                                                                                                      |

### Point

If the external power supply does not operate normally after the above actions are taken, the analog output module may be in failure. Please consult your local Mitsubishi representative.



## List of error codes

If an error occurs during operation, an analog output module stores the error code into 'Latest error code' (Un\G0) of the buffer memory. In addition, 'Error flag' (Un\G69, b15) turns on. Turning on 'Error clear request' (Un\G70, b15) clears the error code in 'Latest error code' (Un\G0) and turns off 'Error flag' (Un\G69, b15).

Error codes of an analog output module are classified into minor and moderate errors.

- Minor error: This error is caused by the setting failure of programs and parameters, and after eliminating the error cause, each function normally executes. (1000H to 1FFFH)
- Moderate error: An error such as hardware failure. The D/A conversion does not continue. (3000H to 3FFFH)

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

□: Indicates the number of the channel where an error has occurred. It represents one of numerical values 0 to 3, which correspond to CH1 to CH4.

(CH1: 0, CH2: 1, CH3: 2, CH4: 3)

△ in error code: Indicates the interrupt setting corresponding to the error (0: setting 1 to F: setting 16).

| Error code | Error name                                                 | Description and cause                                                                                                                                                              | Corrective 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.                                                                                                 | Though any further setting of offset/gain values is performed, the setting value will not be guaranteed.                                                                       |
| 180△H      | Interrupt factor transaction setting range error           | A value other than 0 or 1 was set in 'Interrupt factor transaction setting' (Un\G200 to 215).                                                                                      | Retry to set 0 or 1 in 'Interrupt factor transaction setting' (Un\G200 to 215).                                                                                                |
| 181△H      | Condition target setting range error                       | A value other than 0 to 4 was set in 'Condition target setting' (Un\G232 to 247).                                                                                                  | Retry to set a value of 0 to 4 in 'Condition target setting' (Un\G232 to 247).                                                                                                 |
| 182△H      | Condition target channel setting range error               | A value other than 0 to 4 was set in 'Condition target channel setting' (Un\G264 to 279).                                                                                          | Retry to set a value of 0 to 4 in 'Condition target channel setting' (Un\G264 to 279).                                                                                         |
| 1861H      | Offset/gain setting continuous write occurrence error      | The setting value has been continuously written to the flash memory 26 times or more in the offset/gain setting.                                                                   | For the offset/gain setting, write the setting value only once per setting.                                                                                                    |
| 190□H      | Range setting range error                                  | A value out of the range is set in CH□ Range setting.                                                                                                                              | Set CH□ Range setting to the value within the range again.                                                                                                                     |
| 191□H      | Digital value setting range error                          | • For normal output<br>A value out of the range is set for the CH□ Digital value.                                                                                                  | Retry to set a proper value for the CH□ Digital value.                                                                                                                         |
|            |                                                            | • For wave output<br>A value out of the setting range was set for part of 'wave data registry area' (Un\G10000 to Un\G89999) used for the channel of wave-output-in-progress.      | Correct the corresponding data in 'wave data registry area' (Un\G10000 to Un\G89999) being used for the channel where the error occurred, to a value within the setting range. |
| 192□H      | HOLD setting value range error                             | A value out of the range is set in CH□ HOLD setting.                                                                                                                               | Retry to set a proper value for the CH□ HOLD digital value.                                                                                                                    |
| 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.                                                                                                                              |
| 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.                                          |
| 1B0□H      | Warning output setting range error                         | A value other than 0 to 2 was set in CH□ Warning output setting.                                                                                                                   | Retry to set CH□ Warning output setting to 0 to 2.                                                                                                                             |
| 1B1□H      | Warning output upper/limit reversal error                  | A value not meeting the following condition was set for the CH□ Warning output upper limit value or CH□ Warning output lower limit value.<br>Upper limit value > Lower limit value | Retry to set the CH□ Warning output upper limit value and CH□ Warning output lower limit value so that the condition "upper limit value > lower limit value".                  |
| 1B8□H      | Rate control enable/disable setting range error            | A value other than 0 or 1 was set in CH□ Rate control enable/disable setting.                                                                                                      | Retry to set CH□ Rate control enable/disable setting to 0 or 1.                                                                                                                |
| 1B9□H      | Digital limit value range error                            | A value other than 0 to 64000 was set for the CH□ Increase digital limit value or CH□ Decrease digital limit value.                                                                | Retry to set a value of 0 to 64000 for the CH□ Increase digital limit value or CH□ Decrease digital limit value.                                                               |

| Error code | Error name                                                 | Description and cause                                                                                                                                                                                                                                                                                                                         | Corrective action                                                                                                                                                                                                                                                                                                                                              |
|------------|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1C4□H      | Disconnection detection error                              | A disconnection was detected on CH□.                                                                                                                                                                                                                                                                                                          | Eliminate the cause of the disconnection from the channel. If the disconnection detection automatic clear enable/disable setting is disabled, remove the cause of the disconnection and then turn off→on→off 'Error Clear Request' (Un\G70, b15)'.                                                                                                             |
| 1D0□H      | Wave output start/stop setting range error                 | A value out of the range was set in 'CH□ Wave output start/stop request'.                                                                                                                                                                                                                                                                     | Retry to set 'CH□ Wave output start/stop request' to one of the following. <ul style="list-style-type: none"> <li>• Wave output stop request (0)</li> <li>• Wave output start request (1)</li> <li>• Wave output pause request (2)</li> </ul>                                                                                                                  |
| 1D1□H      | Wave output mode user range specification error            | In the output mode setting, the wave output mode was selected, and the user range setting was selected with the output range setting.                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>• If the wave output function is to be used, retry to set the output range to a range other than the user range by using the output range setting.</li> <li>• If the user range setting is to be used, retry to set the output mode setting to the normal output mode by using the module parameter setting.</li> </ul> |
| 1D2□H      | Output setting during wave output stop setting range error | 'CH□ Output setting during wave output stop' is set to a value other than 0 to 2.                                                                                                                                                                                                                                                             | Retry to set 'CH□ Output setting during wave output stop' to one of the following. <ul style="list-style-type: none"> <li>• 0 V/0 mA (0)</li> <li>• Offset value (1)</li> <li>• Output value during wave output stop (2)</li> </ul>                                                                                                                            |
| 1D3□H      | Output value during wave output stop range error           | 'CH□ Output value during wave output stop' is set to a value out of the range.                                                                                                                                                                                                                                                                | Correct 'CH□ Output value during wave output stop' to a value within the setting range. The setting range depends on the output range setting.<br>-10 to +10 V: -32768 to +32767<br>4 to 20 mA, 0 to 20 mA, 1 to 5 V, 0 to 5 V, or 0 to 10 V: 0 to 32767                                                                                                       |
| 1D4□H      | Wave pattern start address setting range error             | 'CH□ Wave pattern start address setting' is set to a value out of the setting range.                                                                                                                                                                                                                                                          | Retry to set 'CH□ Wave pattern start address setting' to a value of 10000 to 89999.                                                                                                                                                                                                                                                                            |
| 1D5□H      | Wave pattern number-of-points setting range error          | 'CH□ Wave pattern data points setting' is set to a value other than 1 to 80000.                                                                                                                                                                                                                                                               | Retry to set 'CH□ Wave pattern data points setting' to a value of 1 to 80000.                                                                                                                                                                                                                                                                                  |
| 1D6□H      | Wave pattern output repetition setting range error         | 'CH□ Wave pattern output repetition setting' is set to a value out of the range.                                                                                                                                                                                                                                                              | Retry to set 'CH□ Wave pattern output repetition setting' to one of the following. <ul style="list-style-type: none"> <li>• Indefinite repetitive output (-1)</li> <li>• Specified-count output (1 to 32767)</li> </ul>                                                                                                                                        |
| 1D7□H      | Wave output conversion cycle setting range error           | 'CH□ Constant for wave output conversion cycle' is set to a value other than 1 to 5000.                                                                                                                                                                                                                                                       | Retry to set 'CH□ Constant for wave output conversion cycle' to a value of 1 to 7.                                                                                                                                                                                                                                                                             |
| 1D80H      | Step action wave output request range error                | 'Step action wave output request' is set to a value other than 0 or 1.                                                                                                                                                                                                                                                                        | Retry to set 0 or 1 'Step action wave output request'.                                                                                                                                                                                                                                                                                                         |
| 1D9□H      | Wave data registry area range error                        | The value obtained by subtracting 1 from the sum of 'CH□ Wave pattern start address setting' and 'CH□ Wave pattern data points setting' is set to a value exceeding 89999 (final buffer memory address of wave data registry area).                                                                                                           | Retry to set 'CH□ Wave pattern start address setting' and 'CH□ Wave pattern number-of-points setting' to values meeting the following conditions.<br>"Wave pattern start address setting" + "Wave pattern data points setting" - 1 ≤ 89999                                                                                                                     |
| 1DA0H      | Module extension parameter acquisition error               | No module extension parameter can be acquired.                                                                                                                                                                                                                                                                                                | Write to the CPU module, the module extension parameter by which the wave output data was registered. Then, power off→on or reset the CPU module.                                                                                                                                                                                                              |
| 1E50H      | Offset/gain setting channel specification error            | <ul style="list-style-type: none"> <li>• Multiple channels are set simultaneously while during offset/gain setting.</li> <li>• 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.</li> </ul> | Correctly set CH□ Offset/gain setting mode (offset specification) and CH□ Offset/gain setting mode (gain specification).                                                                                                                                                                                                                                       |
| 1E51H      | User range data invalid (CH specification disable)         | 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.                                                                                                                                          |
| 1E52H      | Analog adjustment output out-of-range error                | A value other than -3000 to +3000 is set for the offset/gain adjustment value specification.                                                                                                                                                                                                                                                  | Retry to set the offset/gain adjustment value specification to a value of -3000 to +3000.                                                                                                                                                                                                                                                                      |

| Error code | Error name                                        | Description and cause                                                                                                                           | Corrective action                                                                                                                                                                                                                                                                                                 |
|------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1E6□H      | User range data invalid (CH specification enable) | 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 $\geq$ Gain value                               | Perform the offset/gain setting again so that the following condition is satisfied:<br>Offset value < Gain value                                                                                                                                                                                                  |
| 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.                                                                                                                                                                                          |
| 1E9□H      | Offset/gain setting range error                   | When the offset and gain are set, values other than D or E were set in 'CH□ Offset/gain setting mode' (range specification).                    | Retry to set the 'CH□ Offset/gain setting mode' (range specification) to D or E.                                                                                                                                                                                                                                  |
| 1F08H      | Module power supply error                         | The 24 V DC power supply is not normally supplied to the module.                                                                                | Check the wiring of the cable or the supplied voltage.<br>After the check, turn off→on→off Error clear request (Un\G70, b15) 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                                  | A hardware failure in the module.                                                                                                               | Power off→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 analog output values.<br>If the values are abnormal, please consult your local Mitsubishi representative.                                                                                                                                                                                               |

## List of alarm codes

If an alarm occurs during operation, the analog output module stores the alarm code into 'Latest alarm code' (Un\G2) of the buffer memory. Turning on 'Alert output clear request'(Un\G70, b14) or 'Operating condition setting request'(Un\G70, b9) clears the alarm code in 'Latest alarm code' (Un\G2).

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

□: Indicates the number of the channel where the alarm has occurred. It represents one of numerical values 0 to 3, which correspond to CH1 to CH4.

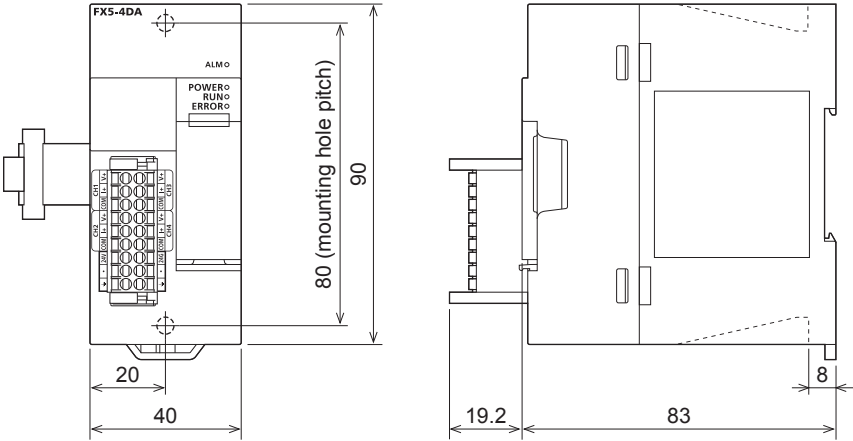
(CH1: 0, CH2: 1, CH3: 2, CH4: 3)

| Alarm code | Alarm name                                                               | Description and cause                                                                                                           | Corrective action                                                                                                                                                                                                                                       |
|------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 080□H      | Warning output alarm flag (upper limit)                                  | A warning output alarm (upper limit) has occurred in CH□.                                                                       | After the CH□ Digital value returns to within the setting range, turn off→on→off 'Warning output clear request' (Un\G70, b14). Both the bit corresponding to the warning output upper or lower flag and 'Warning output signal' (Un\G69, b14) turn off. |
| 081□H      | Warning output alarm flag (lower limit)                                  | A warning output alarm (lower limit) has occurred in CH□.                                                                       |                                                                                                                                                                                                                                                         |
| 0B0□H      | Setting error of conditions for operation other than Wave output stopped | In wave output status other than Wave output stopped, 'Operating condition setting request' (Un\G70, b9) was turned off→on→off. | Wait until the wave output of all channels stop. Then, turn off→on→off 'Operating condition setting request' (Un\G70, b9).                                                                                                                              |
| 0B1□H      | Wave output mode scaling setting error                                   | The scaling function is enabled when the wave output function is in use.                                                        | If the wave output function is in use, retry to set 'CH□ Scaling enable/disable setting' to Disable (1).                                                                                                                                                |
| 0B2□H      | Wave output mode input value shift amount setting error                  | When the wave output function is in use, the input value shift amount is set to a value other than 0.                           | If the wave output function is in use, retry to set 'CH□ Input value shift' to 0.                                                                                                                                                                       |
| 0B3□H      | Wave output mode rate control setting error                              | The rate function is enabled when the wave output function is in use.                                                           | If the wave output function is in use, retry to set 'CH□ Rate control enable/disable setting to Disable (1).                                                                                                                                            |
| 0C0□H      | CH□ Output-in-progress range change enable alarm                         | In CH□, range switching was executed during analog output.                                                                      | When range switching is to be performed, turn off 'Output enable/disable flag' (Un\G70, b1 to b4) for the channel the range of which is to be switched and turn off→on→off 'Operating condition setting request' (Un\G70, b9).                          |

# APPENDICES

## Appendix 5 External Dimensions

The following figure shows the external dimensions of an analog output module.



(Unit: mm)

# Appendix 6 Standards

## Certification of UL, cUL standards

The FX5-4DA supports UL (UL, cUL) standards.

For models that support UL standards, refer to the following.

UL, cUL file number: E95239

## Compliance with EC directive (CE marking)

This note does not guarantee that an entire machine produced in accordance with the contents of this note will comply with the following standards.

Compliance to EMC directive and LVD directive of the entire mechanical module should be checked by the user/manufacturer. For more details please contact to the local Mitsubishi Electric sales site.

## Requirement for compliance with EMC directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2014/30/EU) when used as directed by the appropriate documentation.

### Attention

This product is designed for use in industrial applications.

### Product compatibility

Type: Programmable controller (open type equipment)

Models: FX5 manufactured

| from November 1st, 2017                                                       | FX5-4DA                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electromagnetic compatibility (EMC) directive                                 | Remarks                                                                                                                                                                                                                                                                                                                         |
| EN61131-2:2007 Programmable controllers<br>- Equipment requirements and tests | Compliance with all relevant aspects of the standard.<br>EMI<br>• Radiated emission<br>• Conducted emission<br>EMS<br>• Radiated electromagnetic field<br>• Fast transient burst<br>• Electrostatic discharge<br>• High-energy surge<br>• Voltage drops and interruptions<br>• Conducted RF<br>• Power frequency magnetic field |

## Caution for compliance with EC directive

### Caution for when the FX5-4DA is used

When the FX5-4DA is used, attach a ferrite core to the power supply of the CPU module.

Make 2 turns around the ferrite core and attach within approximately 200 mm from the terminal block and connectors of the power cable. Also, attach a ferrite core to the input/output cable pulled out to the outside of the control panel. Attach the ferrite core before the cable is pulled out to the outside of the control panel. (Ferrite core used in Mitsubishi Electric's test: E04SR401938 manufactured by SEIWA ELECTRIC MFG. CO., LTD.)

# Appendix 7 Module Label

The functions of the analog output 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"\_D

Ex.

FX5\_4DA\_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.

## 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.

FX5\_4DA\_1.stnMonitor\_D[0].uSetValueCheckCode\_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 3 is used to correspond to CH1 to 4. (CH1: 0, CH2: 1, CH3: 2, CH4: 3)

### ■Data format

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

| Data format | Description                                |
|-------------|--------------------------------------------|
| u           | Word [Unsigned]/Bit string [16-bit]        |
| w           | Word [Signed]                              |
| ud          | Double word [Unsigned]/Bit string [32-bit] |
| d           | Double word [Signed]                       |

### ■Label name

The label identifier unique to a module is given.

## ■\_D

This string indicates that the module label is for the direct access. Values that are read from or written to the module label is reflected in the analog output module instantly.



# Appendix 8 Buffer Memory Areas

## List of buffer memory areas

This section lists the buffer memory areas of the analog output module. For details on the buffer memory, refer to the following.

Page 290 Details of buffer memory addresses

The buffer memory areas of the analog output module are classified into the data types described below.

| Data type    | Description               |                                                                                                                                         |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Setting data | Description               | The data to be customized to suit the connected devices and the purpose of the system.                                                  |
|              | Read and write attributes | Read and write is possible.                                                                                                             |
|              | Setting procedure         | Use GX Works3 or a program to set the data.                                                                                             |
|              | Setting timing            | After a change of value, turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the setting value to take effect. |
| Control data | Description               | The data used for controlling the analog output module.                                                                                 |
|              | Read and write attributes | Read and write is possible.                                                                                                             |
|              | Setting procedure         | Use GX Works3 or a program to set the data.                                                                                             |
|              | Setting timing            | As soon as the values are changed, the set values become enabled.                                                                       |
| Monitor data | Description               | The data used for checking the status of the analog output module.                                                                      |
|              | Read and write attributes | Only read is possible and write is not possible.                                                                                        |
|              | Setting procedure         | —                                                                                                                                       |
|              | Setting timing            | —                                                                                                                                       |



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.

A

### In the normal mode

○: With refresh setting, ×: Without refresh setting

#### ■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] <sup>*1</sup> | 0             | Monitor   | ○            |
| 20 to 29          | 14H to 1DH            | System area                                       | —             | —         | —            |
| 30                | 1EH                   | Module Information                                | 6160H         | Monitor   | ×            |
| 31                | 1FH                   | Firmware version                                  | *2            | Monitor   | ×            |
| 32 to 35          | 20H to 23H            | System area                                       | —             | —         | —            |
| 36                | 24H                   | Alarm output upper limit flag                     | 0000H         | Monitor   | ○            |
| 37                | 25H                   | Alarm output lower limit flag                     | 0000H         | Monitor   | ○            |
| 38                | 26H                   | Disconnection detection flag                      | 0000H         | Monitor   | ○            |
| 39 to 59          | 27H to 3BH            | System area                                       | —             | —         | —            |
| 60                | 3CH                   | Operation mode monitor                            | 0000H         | Monitor   | ×            |
| 61 to 68          | 3DH to 44H            | System area                                       | —             | —         | —            |
| 69                | 45H                   | Input signals                                     | 0             | Monitor   | ×            |
| 70                | 46H                   | Output signals                                    | 0             | Control   | ×            |
| 71 to 123         | 47H to 7BH            | System area                                       | —             | —         | —            |

| Address<br>(decimal) | Address<br>(hexadecimal) | Name                                                           | Default value | Data type | Auto refresh |
|----------------------|--------------------------|----------------------------------------------------------------|---------------|-----------|--------------|
| 124 to 139           | 7CH to 8BH               | Interrupt factor mask [n] <sup>*1</sup>                        | 0             | Control   | ×            |
| 140 to 155           | 8CH to 9BH               | System area                                                    | —             | —         | —            |
| 156 to 171           | 9CH to ABH               | Interrupt factor reset request [n] <sup>*1</sup>               | 0             | Control   | ×            |
| 172 to 187           | ACH to BBH               | System area                                                    | —             | —         | —            |
| 188                  | BCH                      | Step action wave output request                                | 0             | Control   | ×            |
| 189 to 199           | BDH to C7H               | System area                                                    | —             | —         | —            |
| 200 to 215           | C8H to D7H               | Interrupt factor generation setting [n] <sup>*1</sup>          | 0             | Setting   | ×            |
| 216 to 231           | D8H to E7H               | System area                                                    | —             | —         | —            |
| 232 to 247           | E8H to F7H               | Condition target setting [n] <sup>*1</sup>                     | 0             | Setting   | ×            |
| 248 to 263           | F8H to 107H              | System area                                                    | —             | —         | —            |
| 264 to 279           | 108H to 117H             | Condition target channel setting [n] <sup>*1</sup>             | 0             | Setting   | ×            |
| 280 to 295           | 118H to 127H             | System area                                                    | —             | —         | —            |
| 296, 297             | 128H, 129H               | Mode switching setting                                         | 0             | Setting   | ×            |
| 298 to 303           | 12AH to 12FH             | System area                                                    | —             | —         | —            |
| 304                  | 130H                     | Disconnection detection automatic clear enable/disable setting | 1             | Setting   | ×            |
| 305                  | 131H                     | Offset/gain initialization enable code                         | 0             | Setting   | ×            |
| 306 to 399           | 132H to 18FH             | System area                                                    | —             | —         | —            |

\*1 [n] in the table indicates an interrupt setting number. (n = 1 to 16)

\*2 The firmware version of the analog output module is stored. For Ver. 1.000, 1000 is stored as the default value.

## ■Un\G400 to Un\G3599

| Address<br>Decimal (hexadecimal) |                              |                              |                                | Name                                                           | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|------------------------------|------------------------------|--------------------------------|----------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2                          | CH3                          | CH4                            |                                                                |                  |              |                 |
| 400<br>(190H)                    | 600<br>(258H)                | 800<br>(320H)                | 1000<br>(3E8H)                 | CH□ Setting value check code                                   | 0                | Monitor      | ○               |
| 401<br>(191H)                    | 601<br>(259H)                | 801<br>(321H)                | 1001<br>(3E9H)                 | CH□ Wave output status monitor                                 | 0                | Monitor      | ○               |
| 402 to 428<br>(192H to 1ACH)     | 602 to 628<br>(25AH to 274H) | 802 to 828<br>(322H to 33CH) | 1002 to 1028<br>(3EAH to 404H) | System area                                                    | —                | —            | —               |
| 429<br>(1ADH)                    | 629<br>(275H)                | 829<br>(33DH)                | 1029<br>(405H)                 | CH□ Output status                                              | 0                | Monitor      | ×               |
| 430<br>(1AEH)                    | 630<br>(276H)                | 830<br>(33EH)                | 1030<br>(406H)                 | CH□ Range setting monitor                                      | 3                | Monitor      | ×               |
| 431<br>(1AFH)                    | 631<br>(277H)                | 831<br>(33FH)                | 1031<br>(407H)                 | CH□ HOLD/CLEAR function setting monitor                        | 0                | Monitor      | ×               |
| 432<br>(1B0H)                    | 632<br>(278H)                | 832<br>(340H)                | 1032<br>(408H)                 | CH□ Wave output conversion cycle monitor (L)                   | 0                | Monitor      | ×               |
| 433<br>(1B1H)                    | 633<br>(279H)                | 833<br>(341H)                | 1033<br>(409H)                 | CH□ Wave output conversion cycle monitor (H)                   |                  | Monitor      | ×               |
| 434<br>(1B2H)                    | 634<br>(27AH)                | 834<br>(342H)                | 1034<br>(40AH)                 | CH□ Wave pattern output count monitor                          | 0                | Monitor      | ×               |
| 435<br>(1B3H)                    | 635<br>(27BH)                | 835<br>(343H)                | 1035<br>(40BH)                 | System area                                                    | —                | —            | —               |
| 436<br>(1B4H)                    | 636<br>(27CH)                | 836<br>(344H)                | 1036<br>(40CH)                 | CH□ Wave output current address monitor (L)                    | 0                | Monitor      | ×               |
| 437<br>(1B5H)                    | 637<br>(27DH)                | 837<br>(345H)                | 1037<br>(40DH)                 | CH□ Wave output current address monitor (H)                    |                  | Monitor      | ×               |
| 438<br>(1B6H)                    | 638<br>(27EH)                | 838<br>(346H)                | 1038<br>(40EH)                 | CH□ Wave output current digital value monitor                  | 0                | Monitor      | ×               |
| 439<br>(1B7H)                    | 639<br>(27FH)                | 839<br>(347H)                | 1039<br>(40FH)                 | System area                                                    | —                | —            | —               |
| 440<br>(1B8H)                    | 640<br>(280H)                | 840<br>(348H)                | 1040<br>(410H)                 | CH□ Wave output digital value out-of-range address monitor (L) | 0                | Monitor      | ×               |
| 441<br>(1B9H)                    | 641<br>(281H)                | 841<br>(349H)                | 1041<br>(411H)                 | CH□ Wave output digital value out-of-range address monitor (H) |                  | Monitor      | ×               |

| Address<br>Decimal (hexadecimal) |                              |                              |                                | Name                                           | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|------------------------------|------------------------------|--------------------------------|------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2                          | CH3                          | CH4                            |                                                |                  |              |                 |
| 442<br>(1BAH)                    | 642<br>(282H)                | 842<br>(34AH)                | 1042<br>(412H)                 | CH□ Wave output warning address<br>monitor (L) | 0                | Monitor      | ×               |
| 443<br>(1BBH)                    | 643<br>(283H)                | 843<br>(34BH)                | 1043<br>(413H)                 | CH□ Wave output warning address<br>monitor (H) |                  | Monitor      | ×               |
| 444 to 459<br>(1BCH to 1CBH)     | 644 to 659<br>(284H to 293H) | 844 to 859<br>(34CH to 35BH) | 1044 to 1059<br>(414H to 423H) | System area                                    | —                | —            | —               |
| 460<br>(1CCH)                    | 660<br>(294H)                | 860<br>(35CH)                | 1060<br>(424H)                 | CH□ Digital value                              | 0                | Control      | ○               |
| 461<br>(1CDH)                    | 661<br>(295H)                | 861<br>(35DH)                | 1061<br>(425H)                 | System area                                    | —                | —            | —               |
| 462<br>(1CEH)                    | 662<br>(296H)                | 862<br>(35EH)                | 1062<br>(426H)                 | CH□ Wave output start/stop request             | 0                | Control      | ×               |
| 463 to 479<br>(1CFH to 1DFH)     | 663 to 679<br>(297H to 2A7H) | 863 to 879<br>(35FH to 36FH) | 1063 to 1079<br>(427H to 437H) | System area                                    | —                | —            | —               |
| 480<br>(1E0H)                    | 680<br>(2A8H)                | 880<br>(370H)                | 1080<br>(438H)                 | CH□ Input value shift amount                   | 0                | Control      | ×               |
| 481<br>(1E1H)                    | 681<br>(2A9H)                | 881<br>(371H)                | 1081<br>(439H)                 | System area                                    | —                | —            | —               |
| 482<br>(1E2H)                    | 682<br>(2AAH)                | 882<br>(372H)                | 1082<br>(43AH)                 | CH□ Wave output step action<br>movement amount | 0                | Control      | ×               |
| 483 to 499<br>(1E3H to 1F3H)     | 683 to 699<br>(2ABH to 2BBH) | 883 to 899<br>(373H to 383H) | 1083 to 1099<br>(43BH to 44BH) | System area                                    | —                | —            | —               |
| 500<br>(1F4H)                    | 700<br>(2BCH)                | 900<br>(384H)                | 1100<br>(44CH)                 | CH□ D/A conversion enable/disable<br>setting   | 1                | Setting      | ×               |
| 501<br>(1F5H)                    | 701<br>(2BDH)                | 901<br>(385H)                | 1101<br>(44DH)                 | System area                                    | —                | —            | —               |
| 502<br>(1F6H)                    | 702<br>(2BEH)                | 902<br>(386H)                | 1102<br>(44EH)                 | CH□ Scaling enable/disable setting             | 1                | Setting      | ×               |
| 503<br>(1F7H)                    | 703<br>(2BFH)                | 903<br>(387H)                | 1103<br>(44FH)                 | System area                                    | —                | —            | —               |
| 504<br>(1F8H)                    | 704<br>(2C0H)                | 904<br>(388H)                | 1104<br>(450H)                 | CH□ Scaling upper limit value (L)              | 0                | Setting      | ×               |
| 505<br>(1F9H)                    | 705<br>(2C1H)                | 905<br>(389H)                | 1105<br>(451H)                 | CH□ Scaling upper limit value (H)              |                  | Setting      | ×               |
| 506<br>(1FAH)                    | 706<br>(2C2H)                | 906<br>(38AH)                | 1106<br>(452H)                 | CH□ Scaling lower limit value (L)              | 0                | Setting      | ×               |
| 507<br>(1FBH)                    | 707<br>(2C3H)                | 907<br>(38BH)                | 1107<br>(453H)                 | CH□ Scaling lower limit value (H)              |                  | Setting      | ×               |
| 508<br>(1FCH)                    | 708<br>(2C4H)                | 908<br>(38CH)                | 1108<br>(454H)                 | CH□ Alert output setting                       | 0                | Setting      | ×               |
| 509<br>(1FDH)                    | 709<br>(2C5H)                | 909<br>(38DH)                | 1109<br>(455H)                 | CH□ Rate control enable/disable<br>setting     | 1                | Setting      | ×               |
| 510<br>(1FEH)                    | 710<br>(2C6H)                | 910<br>(38EH)                | 1110<br>(456H)                 | CH□ Alert output upper limit value             | 0                | Setting      | ×               |
| 511<br>(1FFH)                    | 711<br>(2C7H)                | 911<br>(38FH)                | 1111<br>(457H)                 | System area                                    | —                | —            | —               |
| 512<br>(200H)                    | 712<br>(2C8H)                | 912<br>(390H)                | 1112<br>(458H)                 | CH□ Alert output lower limit value             | 0                | Setting      | ×               |
| 513<br>(201H)                    | 713<br>(2C9H)                | 913<br>(391H)                | 1113<br>(459H)                 | System area                                    | —                | —            | —               |
| 514<br>(202H)                    | 714<br>(2CAH)                | 914<br>(392H)                | 1114<br>(45AH)                 | CH□ Increase digital limit value               | 64000            | Setting      | ×               |
| 515<br>(203H)                    | 715<br>(2CBH)                | 915<br>(393H)                | 1115<br>(45BH)                 | System area                                    | —                | —            | —               |
| 516<br>(204H)                    | 716<br>(2CCH)                | 916<br>(394H)                | 1116<br>(45CH)                 | CH□ Decrease digital limit value               | 64000            | Setting      | ×               |
| 517 to 523<br>(205H to 20BH)     | 717 to 723<br>(2CDH to 2D3H) | 917 to 923<br>(395H to 39BH) | 1117 to 1123<br>(45DH to 463H) | System area                                    | —                | —            | —               |

| Address<br>Decimal (hexadecimal) |                              |                              |                                | Name                                          | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|------------------------------|------------------------------|--------------------------------|-----------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2                          | CH3                          | CH4                            |                                               |                  |              |                 |
| 524<br>(20CH)                    | 724<br>(2D4H)                | 924<br>(39CH)                | 1124<br>(464H)                 | CH□ Output setting during wave output stop    | 1                | Setting      | ×               |
| 525<br>(20DH)                    | 725<br>(2D5H)                | 925<br>(39DH)                | 1125<br>(465H)                 | CH□ Output value during wave output stop      | 0                | Setting      | ×               |
| 526<br>(20EH)                    | 726<br>(2D6H)                | 926<br>(39EH)                | 1126<br>(466H)                 | CH□ Wave pattern start address setting (L)    | 10000            | Setting      | ×               |
| 527<br>(20FH)                    | 727<br>(2D7H)                | 927<br>(39FH)                | 1127<br>(467H)                 | CH□ Wave pattern start address setting (H)    |                  | Setting      | ×               |
| 528<br>(210H)                    | 728<br>(2D8H)                | 928<br>(3A0H)                | 1128<br>(468H)                 | CH□ Wave pattern data points setting (L)      | 0                | Setting      | ×               |
| 529<br>(211H)                    | 729<br>(2D9H)                | 929<br>(3A1H)                | 1129<br>(469H)                 | CH□ Wave pattern data points setting (H)      |                  | Setting      | ×               |
| 530<br>(212H)                    | 730<br>(2DAH)                | 930<br>(3A2H)                | 1130<br>(46AH)                 | CH□ Wave pattern output repetition setting    | 1                | Setting      | ×               |
| 531<br>(213H)                    | 731<br>(2DBH)                | 931<br>(3A3H)                | 1131<br>(46BH)                 | CH□ Constant for wave output conversion cycle | 1                | Setting      | ×               |
| 532 to 595<br>(214H to 253H)     | 732 to 795<br>(2DCH to 31BH) | 932 to 995<br>(3A4H to 3E3H) | 1132 to 1195<br>(46CH to 4ABH) | System area                                   | —                | —            | —               |
| 596<br>(254H)                    | 796<br>(31CH)                | 996<br>(3E4H)                | 1196<br>(4ACH)                 | CH□ HOLD setting value                        | 0                | Setting      | ×               |
| 597<br>(255H)                    | 797<br>(31DH)                | 997<br>(3E5H)                | 1197<br>(4ADH)                 | System area                                   | —                | —            | —               |
| 598<br>(256H)                    | 798<br>(31EH)                | 998<br>(3E6H)                | 1198<br>(4AEH)                 | CH□ Range setting                             | 3                | Setting      | ×               |
| 599<br>(257H)                    | 799<br>(31FH)                | 999<br>(3E7H)                | 1199<br>(4AFH)                 | System area                                   | —                | —            | —               |
| 1200 to 3599<br>(4B0H to E0FH)   |                              |                              |                                | System area                                   | —                | —            | —               |

## ■Error history (Un\G3600 to Un\G3759)

| Address<br>(decimal) | Address<br>(hexadecimal) | Name                |                            |                                 |                                | Default<br>value | Data type | Auto<br>refresh |
|----------------------|--------------------------|---------------------|----------------------------|---------------------------------|--------------------------------|------------------|-----------|-----------------|
| 3600                 | E10H                     | Error history No.1  | Error code                 |                                 |                                | 0                | Monitor   | ×               |
| 3601                 | E11H                     |                     | Error time                 | First two digits<br>of the year | Last two digits of<br>the year |                  |           |                 |
| 3602                 | E12H                     |                     |                            |                                 |                                |                  |           |                 |
| 3603                 | E13H                     |                     |                            |                                 |                                |                  |           |                 |
| 3604                 | E14H                     |                     |                            |                                 |                                |                  |           |                 |
| 3605                 | E15H                     |                     |                            |                                 |                                |                  |           |                 |
| 3606 to 3609         | E16H to E19H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3610 to 3615         | E1AH to E1FH             | Error history No.2  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3616 to 3619         | E20H to E23H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3620 to 3625         | E24H to E29H             | Error history No.3  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3626 to 3629         | E2AH to E2DH             | System area         |                            |                                 |                                | —                | —         | —               |
| 3630 to 3635         | E2EH to E33H             | Error history No.4  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3636 to 3639         | E34H to E37H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3640 to 3645         | E38H to E3DH             | Error history No.5  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3646 to 3649         | E3EH to E41H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3650 to 3655         | E42H to E47H             | Error history No.6  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3656 to 3659         | E48H to E4BH             | System area         |                            |                                 |                                | —                | —         | —               |
| 3660 to 3665         | E4CH to E51H             | Error history No.7  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3666 to 3669         | E52H to E55H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3670 to 3675         | E56H to E5BH             | Error history No.8  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3676 to 3679         | E5CH to E5FH             | System area         |                            |                                 |                                | —                | —         | —               |
| 3680 to 3685         | E60H to E65H             | Error history No.9  | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3686 to 3689         | E66H to E69H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3690 to 3695         | E6AH to E6FH             | Error history No.10 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3696 to 3699         | E70H to E73H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3700 to 3705         | E74H to E79H             | Error history No.11 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3706 to 3709         | E7AH to E7DH             | System area         |                            |                                 |                                | —                | —         | —               |
| 3710 to 3715         | E7EH to E83H             | Error history No.12 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3716 to 3719         | E84H to E87H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3720 to 3725         | E88H to E8DH             | Error history No.13 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3726 to 3729         | E8EH to E91H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3730 to 3735         | E92H to E97H             | Error history No.14 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3736 to 3739         | E98H to E9BH             | System area         |                            |                                 |                                | —                | —         | —               |
| 3740 to 3745         | E9CH to EA1H             | Error history No.15 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3746 to 3749         | EA2H to EA5H             | System area         |                            |                                 |                                | —                | —         | —               |
| 3750 to 3755         | EA6H to EABH             | Error history No.16 | Same as error history No.1 |                                 |                                | 0                | Monitor   | ×               |
| 3756 to 3759         | EACH to EAFH             | System area         |                            |                                 |                                | —                | —         | —               |

## ■Alarm history (Un\G3760 to Un\G3999)

| Address<br>(decimal) | Address<br>(hexadecimal) | Name                   |                            |                                 |                 | Default<br>value | Data type | Auto<br>refresh |                                |
|----------------------|--------------------------|------------------------|----------------------------|---------------------------------|-----------------|------------------|-----------|-----------------|--------------------------------|
| 3760                 | EB0H                     | Alarm history No.1     | Alarm code                 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3761                 | EB1H                     |                        | Alarm time                 | First two digits<br>of the year |                 |                  |           |                 | Last two digits of<br>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 No.2     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3776 to 3779         | EC0H to EC3H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3780 to 3785         | EC4H to EC9H             | Alarm history No.3     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3786 to 3789         | ECAH to ECDH             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3790 to 3795         | ECEH to ED3H             | Alarm history No.4     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3796 to 3799         | ED4H to ED7H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3800 to 3805         | ED8H to EDDH             | Alarm history No.5     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3806 to 3809         | EDEH to EE1H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3810 to 3815         | EE2H to EE7H             | Alarm history No.6     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3816 to 3819         | EE8H to EEBH             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3820 to 3825         | EECH to EF1H             | Alarm history No.7     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3826 to 3829         | EF2H to EF5H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3830 to 3835         | EF6H to EFBH             | Alarm history No.8     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3836 to 3839         | EFCH to EFFH             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3840 to 3845         | F00H to F05H             | Alarm history No.9     | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3846 to 3849         | F06H to F09H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3850 to 3855         | F0AH to F0FH             | Alarm history<br>No.10 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3856 to 3859         | F10H to F13H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3860 to 3865         | F14H to F19H             | Alarm history<br>No.11 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3866 to 3869         | F1AH to F1DH             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3870 to 3875         | F1EH to F23H             | Alarm history<br>No.12 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3876 to 3879         | F24H to F27H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3880 to 3885         | F28H to F2DH             | Alarm history<br>No.13 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3886 to 3889         | F2EH to F31H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3890 to 3895         | F32H to F37H             | Alarm history<br>No.14 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3896 to 3899         | F38H to F3BH             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3900 to 3905         | F3CH to F41H             | Alarm history<br>No.15 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3906 to 3909         | F42H to F45H             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3910 to 3915         | F46H to F4BH             | Alarm history<br>No.16 | Same as alarm history No.1 |                                 |                 | 0                | Monitor   | ×               |                                |
| 3916 to 3919         | F4CH to F4FH             | System area            |                            |                                 |                 | —                | —         | —               |                                |
| 3920 to 3999         | F50H to F9FH             | System area            |                            |                                 |                 | —                | —         | —               |                                |

## ■Offset/gain setting (Un\G4000 to Un\G9999)

| Address<br>Decimal (hexadecimal) |                 |                 |                 | Name                                                   | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|-----------------|-----------------|-----------------|--------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2             | CH3             | CH4             |                                                        |                  |              |                 |
| 4000 to 4131<br>(FA0H to 1023H)  |                 |                 |                 | System area                                            | —                | —            | —               |
| 4130<br>(1022H)                  |                 |                 |                 | Offset/gain adjustment value<br>specification          | 0                | Control      | ×               |
| 4131<br>(1023H)                  |                 |                 |                 | System area                                            | —                | —            | —               |
| 4132<br>(1024H)                  | 4134<br>(1026H) | 4136<br>(1028H) | 4138<br>(102AH) | CH□ Offset/gain setting mode<br>(offset specification) | 0                | Setting      | ×               |
| 4133<br>(1025H)                  | 4135<br>(1027H) | 4137<br>(1029H) | 4139<br>(102BH) | CH□ Offset/gain setting mode (gain<br>specification)   | 0                | Setting      | ×               |
| 4140 to 4163<br>(102CH to 1043H) |                 |                 |                 | System area                                            | —                | —            | —               |
| 4164<br>(1044H)                  | 4165<br>(1045H) | 4166<br>(1046H) | 4167<br>(1047H) | CH□ Offset/gain setting mode<br>(range specification)  | 0                | Setting      | ×               |
| 4168 to 9999<br>(1048H to 270FH) |                 |                 |                 | System area                                            | —                | —            | —               |

## ■Wave data registration (Un\G10000 to Un\G89999)

| Address<br>Decimal (hexadecimal)    |     |     |     | Name                        | Default<br>value | Data<br>type | Auto<br>refresh |
|-------------------------------------|-----|-----|-----|-----------------------------|------------------|--------------|-----------------|
| CH1                                 | CH2 | CH3 | CH4 |                             |                  |              |                 |
| 10000 to 89999<br>(2710H to 15F8FH) |     |     |     | Wave data registration area | 0                | Setting      | ×               |

## In FX3 allocation function mode

○: With refresh setting, ×: Without refresh setting

| Address<br>Decimal (hexadecimal) |          |          |          | Name                                  | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|----------|----------|----------|---------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2      | CH3      | CH4      |                                       |                  |              |                 |
| 0 (0H)                           |          |          |          | Range setting                         | 0000H            | Setting      | ×               |
| 1 (1H)                           | 2 (2H)   | 3 (3H)   | 4 (4H)   | CH□ Digital value                     | 0000H            | Control      | ○               |
| 5 (5H)                           |          |          |          | System area                           | —                | —            | —               |
| 6 (6H)                           |          |          |          | Output status                         | 0000H            | Monitor      | ×               |
| 7 to 27 (7H to 1BH)              |          |          |          | System area                           | —                | —            | —               |
| 28 (1CH)                         |          |          |          | Disconnection detection flag          | 0000H            | Monitor      | ○               |
| 29 (1DH)                         |          |          |          | Latest error code                     | 0                | Monitor      | ○               |
| 30 (1EH)                         |          |          |          | Module Information                    | 6164H            | Monitor      | ×               |
| 31 (1FH)                         |          |          |          | System area                           | —                | —            | —               |
| 32 to 35 (20H to 35H)            |          |          |          | CH□ HOLD setting value                | 0                | Setting      | ×               |
| 36, 37 (24H, 25H)                |          |          |          | System area                           | —                | —            | —               |
| 38 (26H)                         |          |          |          | Alert output setting                  | 0000H            | Setting      | ×               |
| 39 (27H)                         |          |          |          | Alert output flag (upper/lower limit) | 0                | Monitor      | ○               |
| 40 (28H)                         |          |          |          | System area                           | —                | —            | —               |
| 41 (29H)                         | 42 (2AH) | 43 (2BH) | 44 (2CH) | CH□ Alert output lower limit value    | 0                | Setting      | ×               |
| 45 (2DH)                         | 46 (2EH) | 47 (2FH) | 48 (30H) | CH□ Alert output upper limit value    | 0                | Setting      | ×               |
| 49 to 68 (31H to 44H)            |          |          |          | System area                           | —                | —            | —               |
| 69 (45H)                         |          |          |          | Input signals                         | 0                | Monitor      | ×               |
| 70 (46H)                         |          |          |          | Output signals                        | 0                | Control      | ×               |
| 71 to 3100 (47H to C1CH)         |          |          |          | System area                           | —                | —            | —               |
| 3101 (C1DH)                      |          |          |          | Latest address of error history       | 0                | Monitor      | ○               |
| 3102 (C1EH)                      |          |          |          | Latest alarm code                     | 0                | Monitor      | ○               |

| Address<br>Decimal (hexadecimal) |             |             |              | Name                                                              | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|-------------|-------------|--------------|-------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2         | CH3         | CH4          |                                                                   |                  |              |                 |
| 3103 (C1FH)                      |             |             |              | Latest address of alarm history                                   | 0                | Monitor      | ○               |
| 3104 to 3130 (C20H to C3AH)      |             |             |              | System area                                                       | —                | —            | —               |
| 3131 (C3BH)                      |             |             |              | Firmware version                                                  | —*1              | Monitor      | ×               |
| 3132 to 3159 (C3CH to C57H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3160 (C58H)                      |             |             |              | Operation mode monitor                                            | 0                | Monitor      | ×               |
| 3161 to 3169 (C59H to C61H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3170 (C62H)                      |             |             |              | Disconnection detection automatic<br>clear enable/disable setting | 0                | Setting      | ×               |
| 3171 to 3200 (C63H to C80H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3201 (C81H)                      | 3202 (C82H) | 3203 (C83H) | 3204 (C84H)  | CH□ Setting value check code                                      | 0                | Monitor      | ○               |
| 3205 to 3210 (C85H to C8AH)      |             |             |              | System area                                                       | —                | —            | —               |
| 3211 (C8BH)                      | 3212 (C8CH) | 3213 (C8DH) | 3214 (C8EH)  | CH□ Range setting monitor                                         | 0                | Monitor      | ×               |
| 3215 to 3220 (C8FH to C94H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3221 (C95H)                      | 3222 (C96H) | 3223 (C97H) | 3224 (C98H)  | CH□ HOLD/CLEAR function setting<br>monitor                        | 1                | Monitor      | ×               |
| 3225 to 3249 (C99H to CB1H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3250 (CB2H)                      | 3252 (CB4H) | 3254 (CB6H) | 3256 (CB8H)  | CH□ Input value shift amount                                      | 0                | Setting      | ×               |
| 3251 (CB3H)                      | 3253 (CB5H) | 3255 (CB7H) | 3257 (CB9H)  | System area                                                       | —                | —            | —               |
| 3258 to 3270 (CBAH to CC6H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3271 (CC7H)                      | 3272 (CC8H) | 3273 (CC9H) | 3274 (CCA H) | CH□ D/A conversion enable/disable<br>setting                      | 0                | Setting      | ×               |
| 3275 to 3280 (CCBH to CD0H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3281 (CD1H)                      | 3282 (CD2H) | 3283 (CD3H) | 3284 (CD4H)  | CH□ Scaling enable/disable setting                                | 1                | Setting      | ×               |
| 3285 to 3289 (CD5H to CD9H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3290 (CDAH)                      | 3292 (CDCH) | 3294 (CDEH) | 3296 (CE0H)  | CH□ Scaling upper limit value (L)                                 | 0                | Setting      | ×               |
| 3291 (CDBH)                      | 3293 (CDDH) | 3295 (CDFH) | 3297 (CE1H)  | CH□ Scaling upper limit value (H)                                 |                  | Setting      | ×               |
| 3298 to 3309 (CE2H to CEDH)      |             |             |              | System area                                                       | —                | —            | —               |
| 3310 (CEEH)                      | 3312 (CF0H) | 3314 (CF2H) | 3316 (CF4H)  | CH□ Scaling lower limit value (L)                                 | 0                | Setting      | ×               |
| 3311 (CEFH)                      | 3313 (CF1H) | 3315 (CF3H) | 3317 (CF5H)  | CH□ Scaling lower limit value (H)                                 |                  | Setting      | ×               |
| 3318 to 3330 (CF6H to D02H)      |             |             |              | System area                                                       | —                | —            | —               |
| 3331 (D03H)                      | 3332 (D04H) | 3333 (D05H) | 3334 (D06H)  | CH□ Rate control enable/disable<br>setting                        | 1                | Setting      | ×               |
| 3335 to 3339 (D07H to D0BH)      |             |             |              | System area                                                       | —                | —            | —               |
| 3340 (D0CH)                      | 3342 (D0EH) | 3344 (D10H) | 3346 (D12H)  | CH□ Increase digital limit value                                  | 64000            | Setting      | ×               |
| 3341 (D0DH)                      | 3343 (D0FH) | 3345 (D11H) | 3347 (D13H)  | System area                                                       | —                | —            | —               |
| 3348 to 3359 (D14H to D1FH)      |             |             |              | System area                                                       | —                | —            | —               |
| 3360 (D20H)                      | 3362 (D22H) | 3364 (D24H) | 3366 (D26H)  | CH□ Decrease digital limit value                                  | 64000            | Setting      | ×               |
| 3361 (D21H)                      | 3363 (D23H) | 3365 (D25H) | 3367 (D27H)  | System area                                                       | —                | —            | —               |
| 3368 to 4000 (D28H to FA0H)      |             |             |              | System area                                                       | —                | —            | —               |
| 4001 to 4016 (FA1H to FB0H)      |             |             |              | Interrupt factor detection flag [n] <sup>*2</sup>                 | 0                | Monitor      | ○               |
| 4017 to 4020 (FB1H to FB4H)      |             |             |              | System area                                                       | —                | —            | —               |
| 4021 to 4036 (FB5H to FC4H)      |             |             |              | Interrupt factor mask [n] <sup>*2</sup>                           | 0                | Control      | ×               |
| 4037 to 4040 (FC5H to FC8H)      |             |             |              | System area                                                       | —                | —            | —               |
| 4041 to 4056 (FC9H to FD8H)      |             |             |              | Interrupt factor reset request [n] <sup>*2</sup>                  | 0                | Control      | ×               |
| 4057 to 4060 (FD9H to FDCH)      |             |             |              | System area                                                       | —                | —            | —               |
| 4061 to 4076 (FDDH to FECH)      |             |             |              | Interrupt factor generation setting<br>[n] <sup>*2</sup>          | 0                | Setting      | ×               |
| 4077 to 4080 (FEDH to FF0H)      |             |             |              | System area                                                       | —                | —            | —               |
| 4081 to 4096 (FF1H to 1000H)     |             |             |              | Condition target setting [n] <sup>*2</sup>                        | 0                | Setting      | ×               |
| 4097 to 4100 (1001H to 1004H)    |             |             |              | System area                                                       | —                | —            | —               |
| 4101 to 4116 (1005H to 1014H)    |             |             |              | Condition target channel setting [n] <sup>*2</sup>                | 0                | Setting      | ×               |
| 4117 to 4119 (1015H to 1017H)    |             |             |              | System area                                                       | —                | —            | —               |



| Address<br>Decimal (hexadecimal) |              |              |              | Name                                                   | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|--------------|--------------|--------------|--------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2          | CH3          | CH4          |                                                        |                  |              |                 |
| 4120, 4121 (1018H, 1019H)        |              |              |              | Mode switching setting                                 | 0                | Setting      | ×               |
| 4122 to 4129 (101AH to 1021H)    |              |              |              | System area                                            | —                | —            | —               |
| 4130 (1022H)                     |              |              |              | Offset/gain adjustment value<br>specification          | 0                | Control      | ×               |
| 4131 (1023H)                     | 4132 (1024H) | 4133 (1025H) | 4134 (1026H) | CH□ Offset/gain setting mode<br>(offset specification) | 0                | Setting      | ×               |
| 4135 to 4140 (1027H to 102CH)    |              |              |              | System area                                            | —                | —            | —               |
| 4141 (102DH)                     | 4142 (102EH) | 4143 (102FH) | 4144 (1030H) | CH□ Offset/gain setting mode (gain<br>specification)   | 0                | Setting      | ×               |
| 4145 to 4150 (1031H to 1036H)    |              |              |              | System area                                            | —                | —            | —               |
| 4151 (1037H)                     | 4152 (1038H) | 4153 (1039H) | 4154 (103AH) | CH□ Offset/gain setting mode<br>(range specification)  | 0                | Setting      | ×               |
| 4155 to 4159 (103BH to 103FH)    |              |              |              | System area                                            | —                | —            | —               |
| 4160 (1040H)                     |              |              |              | Offset/gain initialization enable code                 | 0                | Setting      | ×               |
| 4161 to 8599 (1041H to 2197H)    |              |              |              | System area                                            | —                | —            | —               |
| 8600 to 8609 (2198H to 21A1H)    |              |              |              | Error history No.1                                     | 0                | Monitor      | ×               |
| 8610 to 8619 (21A2H to 21ABH)    |              |              |              | Error history No.2                                     | 0                | Monitor      | ×               |
| 8620 to 8629 (21ACH to 21B5H)    |              |              |              | Error history No.3                                     | 0                | Monitor      | ×               |
| 8630 to 8639 (21B6H to 21BFH)    |              |              |              | Error history No.4                                     | 0                | Monitor      | ×               |
| 8640 to 8649 (21C0H to 21C9H)    |              |              |              | Error history No.5                                     | 0                | Monitor      | ×               |
| 8650 to 8659 (21CAH to 21D3H)    |              |              |              | Error history No.6                                     | 0                | Monitor      | ×               |
| 8660 to 8669 (21D4H to 21DDH)    |              |              |              | Error history No.7                                     | 0                | Monitor      | ×               |
| 8670 to 8679 (21DEH to 21E7H)    |              |              |              | Error history No.8                                     | 0                | Monitor      | ×               |
| 8680 to 8689 (21E8H to 21F1H)    |              |              |              | Error history No.9                                     | 0                | Monitor      | ×               |
| 8690 to 8699 (21F2H to 21FBH)    |              |              |              | Error history No.10                                    | 0                | Monitor      | ×               |
| 8700 to 8709 (21FCH to 2205H)    |              |              |              | Error history No.11                                    | 0                | Monitor      | ×               |
| 8710 to 8719 (2206H to 220FH)    |              |              |              | Error history No.12                                    | 0                | Monitor      | ×               |
| 8720 to 8729 (2210H to 2219H)    |              |              |              | Error history No.13                                    | 0                | Monitor      | ×               |
| 8730 to 8739 (221AH to 2223H)    |              |              |              | Error history No.14                                    | 0                | Monitor      | ×               |
| 8740 to 8749 (2224H to 222DH)    |              |              |              | Error history No.15                                    | 0                | Monitor      | ×               |
| 8750 to 8759 (222EH to 2237H)    |              |              |              | Error history No.16                                    | 0                | Monitor      | ×               |
| 8760 to 8769 (2238H to 2241H)    |              |              |              | Alarm history No.1                                     | 0                | Monitor      | ×               |
| 8770 to 8779 (2242H to 224BH)    |              |              |              | Alarm history No.2                                     | 0                | Monitor      | ×               |
| 8780 to 8789 (224CH to 2255H)    |              |              |              | Alarm history No.3                                     | 0                | Monitor      | ×               |
| 8790 to 8799 (2256H to 225FH)    |              |              |              | Alarm history No.4                                     | 0                | Monitor      | ×               |
| 8800 to 8809 (2260H to 2269H)    |              |              |              | Alarm history No.5                                     | 0                | Monitor      | ×               |
| 8810 to 8819 (226AH to 2273H)    |              |              |              | Alarm history No.6                                     | 0                | Monitor      | ×               |
| 8820 to 8829 (2274H to 227DH)    |              |              |              | Alarm history No.7                                     | 0                | Monitor      | ×               |
| 8830 to 8839 (227EH to 2287H)    |              |              |              | Alarm history No.8                                     | 0                | Monitor      | ×               |
| 8840 to 8849 (2288H to 2291H)    |              |              |              | Alarm history No.9                                     | 0                | Monitor      | ×               |
| 8850 to 8859 (2292H to 229BH)    |              |              |              | Alarm history No.10                                    | 0                | Monitor      | ×               |
| 8860 to 8869 (229CH to 22A5H)    |              |              |              | Alarm history No.11                                    | 0                | Monitor      | ×               |
| 8870 to 8879 (22A6H to 22AFH)    |              |              |              | Alarm history No.12                                    | 0                | Monitor      | ×               |
| 8880 to 8889 (22B0H to 22B9H)    |              |              |              | Alarm history No.13                                    | 0                | Monitor      | ×               |
| 8890 to 8899 (22BAH to 22C3H)    |              |              |              | Alarm history No.14                                    | 0                | Monitor      | ×               |
| 8900 to 8909 (22C4H to 22CDH)    |              |              |              | Alarm history No.15                                    | 0                | Monitor      | ×               |
| 8910 to 8919 (22CEH to 22D7H)    |              |              |              | Alarm history No.16                                    | 0                | Monitor      | ×               |
| 8920 to 8999 (22D8H to 2327H)    |              |              |              | System area                                            | —                | —            | —               |
| 9000 (2328H)                     |              |              |              | Step action wave output request                        | 0                | Control      | ×               |
| 9001 (2329H)                     | 9002 (232AH) | 9002 (232BH) | 9004 (232CH) | CH□ Wave output status monitor                         | 0                | Monitor      | ○               |
| 9005 to 9009 (232DH to 2331H)    |              |              |              | System area                                            | —                | —            | —               |

| Address<br>Decimal (hexadecimal) |              |              |              | Name                                                                | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|--------------|--------------|--------------|---------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2          | CH3          | CH4          |                                                                     |                  |              |                 |
| 9010 (2332H)                     | 9012 (2334H) | 9014 (2336H) | 9016 (2338H) | CH□ Wave output conversion cycle monitor (L)                        | 0                | Monitor      | ×               |
| 9011 (2333H)                     | 9013 (2335H) | 9015 (2337H) | 9017 (2339H) | CH□ Wave output conversion cycle monitor (H)                        |                  | Monitor      | ×               |
| 9018 to 9029 (233AH to 2345H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9030 (2346H)                     | 9032 (2348H) | 9034 (234AH) | 9036 (234CH) | CH□ Wave pattern output count monitor                               | 0                | Monitor      | ×               |
| 9031 (2347H)                     | 9033 (2349H) | 9035 (234BH) | 9037 (234DH) | System area                                                         | —                | —            | —               |
| 9038 to 9049 (234EH to 2359H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9050 (235AH)                     | 9052 (235CH) | 9054 (235EH) | 9056 (2360H) | CH□ Wave output current address monitor (L)                         | 0                | Monitor      | ×               |
| 9051 (235BH)                     | 9053 (235DH) | 9055 (235FH) | 9057 (2361H) | CH□ Wave output current address monitor (H)                         |                  | Monitor      | ×               |
| 9058 to 9069 (2362H to 236DH)    |              |              |              | System area                                                         | —                | —            | —               |
| 9070 (236EH)                     | 9072 (2370H) | 9074 (2372H) | 9076 (2374H) | CH□ Wave output current digital value monitor                       | 0                | Monitor      | ×               |
| 9071 (236FH)                     | 9073 (2371H) | 9075 (2373H) | 9077 (2375H) | System area                                                         | —                | —            | —               |
| 9078 to 9089 (2376H to 2381H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9090 (2382H)                     | 9092 (2384H) | 9094 (2386H) | 9096 (2388H) | CH□ Wave output digital value outside the range Address monitor (L) | 0                | Monitor      | ×               |
| 9091 (2383H)                     | 9093 (2385H) | 9095 (2387H) | 9097 (2389H) | CH□ Wave output digital value outside the range Address monitor (H) |                  | Monitor      | ×               |
| 9098 to 9109 (238AH to 2395H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9110 (2396H)                     | 9112 (2398H) | 9114 (239AH) | 9116 (239CH) | CH□ Wave output warning Address monitor (L)                         | 0                | Monitor      | ×               |
| 9111 (2397H)                     | 9113 (2399H) | 9115 (239BH) | 9117 (239DH) | CH□ Wave output warning Address monitor (H)                         |                  | Monitor      | ×               |
| 9118 to 9130 (239EH to 23AAH)    |              |              |              | System area                                                         | —                | —            | —               |
| 9131 (23ABH)                     | 9132 (23ACH) | 9133 (23ADH) | 9134 (23AEH) | CH□ Wave output start/stop request                                  | 0                | Control      | ×               |
| 9135 to 9139 (23AFH to 23B3H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9140 (23B4H)                     | 9142 (23B6H) | 9144 (23B8H) | 9146 (23BAH) | CH□ Wave output step action movement amount                         | 0                | Control      | ×               |
| 9141 (23B5H)                     | 9143 (23B7H) | 9145 (23B9H) | 9147 (23BBH) | System area                                                         | —                | —            | —               |
| 9148 to 9160 (23BCH to 23C8H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9161 (23C9H)                     | 9162 (23CAH) | 9163 (23CBH) | 9164 (23CCH) | CH□ Output setting during wave output stop                          | 1                | Setting      | ×               |
| 9165 to 9170 (23CDH to 23D2H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9171 (23D3H)                     | 9172 (23D4H) | 9173 (23D5H) | 9174 (23D6H) | CH□ Output value during wave output stop                            | 0                | Setting      | ×               |
| 9175 to 9179 (23D7H to 23DBH)    |              |              |              | System area                                                         | —                | —            | —               |
| 9180 (23DCH)                     | 9182 (23DEH) | 9184 (23E0H) | 9186 (23E2H) | CH□ Wave pattern start address setting (L)                          | 10000            | Setting      | ×               |
| 9181 (23DDH)                     | 9183 (23DFH) | 9185 (23E1H) | 9187 (23E3H) | CH□ Wave pattern start address setting (H)                          |                  | Setting      | ×               |
| 9188 to 9199 (23E4H to 23EFH)    |              |              |              | System area                                                         | —                | —            | —               |
| 9200 (23F0H)                     | 9202 (23F2H) | 9204 (23F4H) | 9206 (23F6H) | CH□ Wave pattern data points setting (L)                            | 0                | Setting      | ×               |
| 9201 (23F1H)                     | 9203 (23F3H) | 9205 (23F5H) | 9207 (23F7H) | CH□ Wave pattern data points setting (H)                            |                  | Setting      | ×               |
| 9208 to 9220 (23F8H to 2404H)    |              |              |              | System area                                                         | —                | —            | —               |
| 9221 (2405H)                     | 9222 (2406H) | 9223 (2407H) | 9224 (2408H) | CH□ Wave pattern output repetition setting                          | 1                | Setting      | ×               |
| 9225 to 9230 (2409H to 240EH)    |              |              |              | System area                                                         | —                | —            | —               |

| Address<br>Decimal (hexadecimal) |              |              |              | Name                                          | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|--------------|--------------|--------------|-----------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2          | CH3          | CH4          |                                               |                  |              |                 |
| 9231 (240FH)                     | 9232 (2410H) | 9233 (2411H) | 9234 (2412H) | CH□ Constant for wave output conversion cycle | 1                | Setting      | ×               |
| 9235 to 9999 (2413H to 270FH)    |              |              |              | System area                                   | —                | —            | —               |
| 10000 to 89999 (2710H to 15F8FH) |              |              |              | Wave data registry area                       | 0                | Setting      | ×               |

\*1 The firmware version of the analog output module is stored. For Ver. 1.000, 1000 is stored as the default value.

\*2 [n] in the table indicates an interrupt setting number. (n = 1 to 16)

## Details of buffer memory addresses

This section details the buffer memory areas of the analog output module.



This section describes buffer memory addresses for CH1.

### Latest error code

The latest error code detected in the analog output module is stored. For details, refer to the following.

Page 271 List of error codes

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1 | CH2 | CH3 | CH4 |
|-----------------------------------------------------|-----|-----|-----|-----|
| Latest error code                                   | 0   |     |     |     |
| Latest error code (in FX3 allocation mode function) | 29  |     |     |     |

#### ■Clearing an error

Turn on and off 'Error clear request' (Un\G70, b15).

### Latest address of error history

Among 'Error history No.□' (Un\G3600 to Un\G3759), a buffer memory address which stores the latest error code is stored.

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                | CH1  | CH2 | CH3 | CH4 |
|-------------------------------------------------------------------|------|-----|-----|-----|
| Latest address of error history                                   | 1    |     |     |     |
| Latest address of error history (in FX3 allocation mode function) | 3101 |     |     |     |

### Latest alarm code

The latest alarm code detected in the analog output module is stored. For details, refer to the following.

Page 274 List of alarm codes

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1  | CH2 | CH3 | CH4 |
|-----------------------------------------------------|------|-----|-----|-----|
| Latest alarm code                                   | 2    |     |     |     |
| Latest alarm code (in FX3 allocation mode function) | 3102 |     |     |     |

#### ■Clearing an alarm

Turn on and off 'Error clear request' (Un\G70, b15).

### Latest address of alarm history

Among 'Alarm history No.□' (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.

| Buffer memory name                                                | CH1  | CH2 | CH3 | CH4 |
|-------------------------------------------------------------------|------|-----|-----|-----|
| Latest address of alarm history                                   | 3    |     |     |     |
| Latest address of alarm history (in FX3 allocation mode function) | 3103 |     |     |     |

## Interrupt factor detection flag [n]

The detection status of the interrupt factor is stored.

| Monitor 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.

| Buffer memory name                                              | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|-----------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor detection flag [n]                             | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   |
| Interrupt factor detection flag [n]<br>(in FX3 allocation mode) | 4001 | 4002 | 4003 | 4004 | 4005 | 4006 | 4007 | 4008 | 4009 | 4010 | 4011 | 4012 | 4013 | 4014 | 4015 | 4016 |

## Module information

Module information of FX5-4DA is stored. For module information, 6160H (fixed hexadecimal value) is stored.

- In the normal mode: 6160H
- In the FX3 allocation mode: 6164H

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                      | CH1 | CH2 | CH3 | CH4 |
|---------------------------------------------------------|-----|-----|-----|-----|
| Module Information                                      | 30  |     |     |     |
| Module information (in FX3 allocation mode<br>function) | 30  |     |     |     |

## Firmware version

Firmware version is stored. Firmware version is stored in 4 digit decimal number.

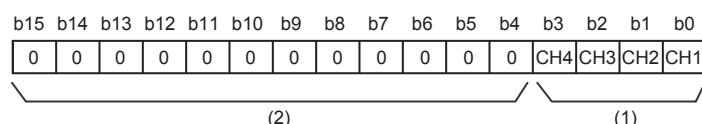
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                    | CH1  | CH2 | CH3 | CH4 |
|-------------------------------------------------------|------|-----|-----|-----|
| Firmware version                                      | 31   |     |     |     |
| Firmware version (in FX3 allocation mode<br>function) | 3131 |     |     |     |

## Alarm output upper limit flag

The upper limit alarm can be checked for each channel.



(1) 0: Normal, 1: Alarm ON

(2) b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name            | CH1 | CH2 | CH3 | CH4 |
|-------------------------------|-----|-----|-----|-----|
| Alarm output upper limit flag | 36  |     |     |     |

### ■Alarm output upper limit flag status

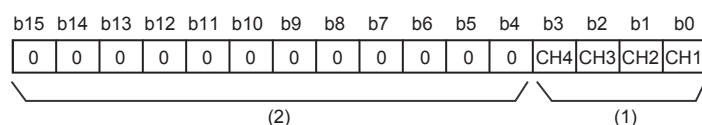
- When the value is out of the range specified in the alert output upper limit value, Alert alarm ON (1) is stored in 'Alarm output upper limit flag' (Un\G36) corresponding to each channel.
- When an alert is detected in any channel where the D/A conversion and the alert output setting are enabled, 'Alarm output signal' (Un\G69, b14) also turns on.

### ■Clearing Alarm output upper limit flag

Turn on and off 'Operating condition setting request' (Un\G70, b9) or 'Alarm output clear request' (Un\G70, b14).

## Alarm output lower limit flag

The lower limit alarm can be checked for each channel.



(1) 0: Normal, 1: Alarm ON

(2) b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name            | CH1 | CH2 | CH3 | CH4 |
|-------------------------------|-----|-----|-----|-----|
| Alarm output lower limit flag | 37  |     |     |     |

### ■Alarm output lower limit flag status

- When the value is out of the range specified in the alert output lower limit value, Alert alarm ON (1) is stored in 'Alarm output lower limit flag' (Un\G37) corresponding to each channel.
- When an alert is detected in any channel where the D/A conversion and the alert output setting are enabled, 'Alarm output signal' (Un\G69, b14) also turns on.

### ■Clearing Alarm output lower limit flag

Turn on and off 'Operating condition setting request' (Un\G70, b9) or 'Alarm output clear request' (Un\G70, b14).

## Alarm output flag (upper/lower limit)

When the FX3 allocation mode function is used, the upper/lower limit alarm can be checked.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7                             | b6                             | b5                             | b4                             | b3                             | b2                             | b1                             | b0                             |
|-----|-----|-----|-----|-----|-----|----|----|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH4<br>Upper<br>limit<br>value | CH4<br>Lower<br>limit<br>value | CH3<br>Upper<br>limit<br>value | CH3<br>Lower<br>limit<br>value | CH2<br>Upper<br>limit<br>value | CH2<br>Lower<br>limit<br>value | CH1<br>Upper<br>limit<br>value | CH1<br>Lower<br>limit<br>value |
| (2) |     |     |     |     |     |    |    | (1)                            |                                |                                |                                |                                |                                |                                |                                |

(1) 0: Normal, 1: Alarm ON

(2) b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                      | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------------------------------|-----|-----|-----|-----|
| Alarm output flag (upper/lower limit) (in FX3 allocation mode function) | 39  |     |     |     |

### ■Alarm output flag status

- When the value is out of the range specified in the alert output upper limit value or alert output lower limit value, Alert alarm ON (1) is stored in 'Alarm output flag' (Un\G48) corresponding to each channel.
- When an alert is detected in any channel where the D/A conversion and the alert output setting are enabled, 'Alarm output signal' (Un\G69, b14) also turns on.

### ■Clearing Alarm output flag

Turn on and off 'Operating condition setting request' (Un\G70, b9) or 'Alarm output clear request' (Un\G70, b14).

## Disconnection detection flag

By setting 4 to 20 mA, 0 to 20 mA, or user range (current) for the analog output range and enabling the D/A conversion, a disconnection can be detected for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7 | b6 | b5 | b4 | b3  | b2  | b1  | b0  |
|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|-----|-----|-----|-----|
| 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | CH4 | CH3 | CH2 | CH1 |
| (2) |     |     |     |     |     |    |    |    |    |    |    | (1) |     |     |     |

(1) 0: Normal, 1: Disconnection detection

(2) b4 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | CH1 | CH2 | CH3 | CH4 |
|----------------------------------------------------------------|-----|-----|-----|-----|
| Disconnection detection flag                                   | 38  |     |     |     |
| Disconnection detection flag (in FX3 allocation mode function) | 28  |     |     |     |

### ■Status of Disconnection detection flag

- When a disconnection is detected, Disconnection detection (1) is stored in 'Disconnection detection flag' (Un\G38) corresponding to each channel.
- When a disconnection is detected in any channel, 'Disconnection detection signal' (Un\G69, b13) turns on.

### ■Clearing disconnection detection flag

Even if the disconnection cause is eliminated from the disconnected state when the disconnection detection auto-clear enable/disable setting is disabled, analog output does not restart automatically to prevent an incorrect output.

To restart analog output, perform the following. Analog output restarts according to the state of CH□ Output enable/disable flag (Un\G70, b1 to 4).

- In the normal output mode

Check the CH□ Digital value, and then turn on and off 'Error clear request' (Un\G70, b15).

- In the wave output mode

Turn on and off 'Error clear request' (Un\G70, b15) , and set CH□ Wave output start/stop request to Wave output start request (1).

If disconnection detection auto-clear enable/disable setting is enable, perform the following. Analog output restarts according to the state of CH□ Output enable/disable flag (Un\G70, b1-4).

- In the normal output mode

When the cause of the disconnection is eliminated from the disconnected state, analog output restarts.



At the same time analog output restarts, the disconnection detection flag of the corresponding channel is cleared.

## Operation mode monitor

The current normal mode can be checked.

| Monitor value | Description              |
|---------------|--------------------------|
| 0H            | Normal output mode       |
| 1H            | Offset/gain setting mode |
| 2H            | Wave output mode         |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                       | CH1  | CH2 | CH3 | CH4 |
|----------------------------------------------------------|------|-----|-----|-----|
| Operation mode monitor                                   | 60   |     |     |     |
| Operation mode monitor (In FX3 allocation mode function) | 3160 |     |     |     |

## Input signals

A state of an analog output module can be checked in the buffer memory area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------|-----|-----|-----|-----|
| Input signals                                   | 69  |     |     |     |
| Input signals (In FX3 allocation mode function) | 69  |     |     |     |

### ■List of input signals

| Buffer memory | Description                                |
|---------------|--------------------------------------------|
| b0            | Module READY                               |
| b1 to 4       | Use not allowed                            |
| b5            | Offset/gain initialization completed flag  |
| b6            | Use not allowed                            |
| b7            | External power supply READY flag           |
| b8            | Use not allowed                            |
| b9            | Operating condition setting completed flag |
| b10           | Offset/gain setting mode status flag       |
| b11           | Channel change completed flag              |
| b12           | Set value change completed flag            |
| b13           | Disconnection detection signal             |
| b14           | Alert output signal                        |
| b15           | Error flag                                 |



## ■Module READY (b0)

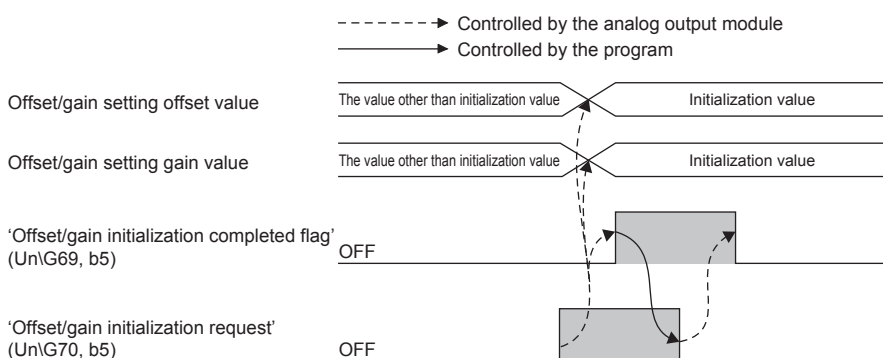
'Module READY' (Un\G69, b0) turns on to indicate the preparation for the D/A conversion is completed after the power-on or the reset operation of the CPU module.

In the following cases, 'Module READY' turns off.

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

## ■Offset/gain initialization completed flag (b5)

- Use as an interlock condition to turn on and off 'Offset/gain initialization request' (Un\G70, b5).
- After the offset/gain initialization is executed, the offset/gain initialization completed flag turns on from off.
- Offset/gain initialization is not be performed unless 'Offset/gain initialization enabled code' (Un\G305) is set to E20FH.
- It is possible to perform offset/gain initialization in normal output mode only.
- When 'Offset/gain initialization request' (Un\G70, b5) is off, 'Offset/gain initialization complete flag' (Un\G69, b5) turns off.



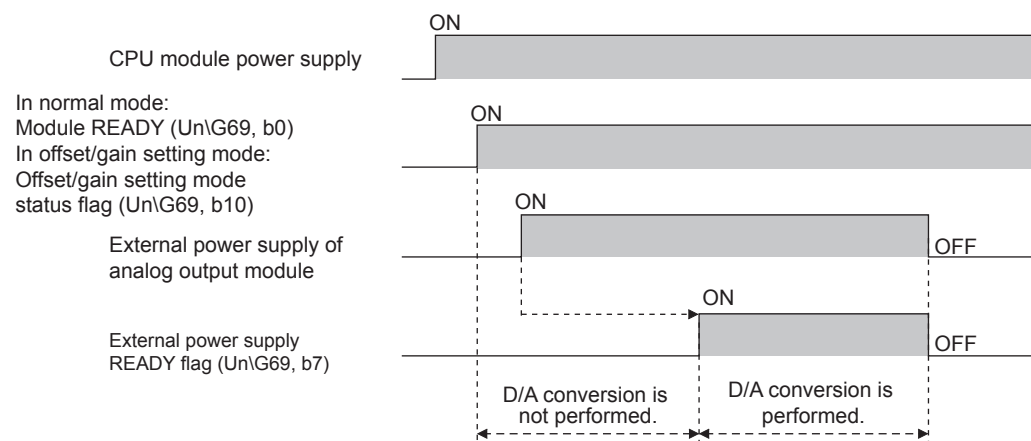
## ■External power supply READY flag (b7)

- When the external power supply is off

'External power supply READY flag' (Un\G69, b7) remains off and D/A conversion processing is not performed. In this case, the analog output value is 0 V/0 mA.

- When the external power supply is turned off and on

When the external power supply turns on, 'External power supply READY flag' (Un\G69, b7) turns on. The D/A conversion is started on the channels where the D/A conversion is enabled.



- When the external power supply is turned on and off

'External power supply READY flag' (Un\G69, b7) turns off and the D/A conversion stops. In this case, the analog output value is 0 V/0 mA. When the external power supply is turned off and on again, 'External power supply READY flag' (Un\G69, b7) turns on after 200ms as described above and the D/A conversion is restarted.

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## Precautions

Use the external power supply that satisfies the specifications defined in the "Power Supply Specifications" section.

Otherwise, 'External power supply READY flag' (Un\G69, b7) does not turn on. For the power supply specifications, refer to

Page 174 Power supply specifications.

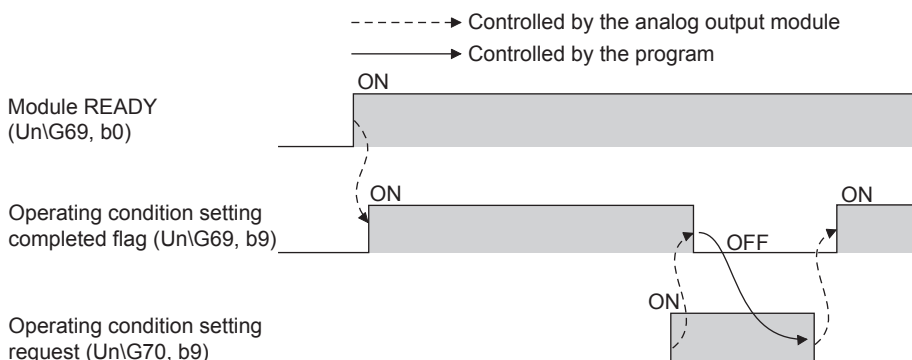
## ■Operating condition setting completed flag (b9)

When changing values of the buffer memory, use 'Operating condition setting completed flag' (Un\G69, b9) as an interlock condition to turn on and off 'Operating condition setting request' (Un\G70, b9).

For the buffer memory addresses which require turning on and off of 'Operating condition setting request' (Un\G70, b9) to enable the changed values, refer to the following.

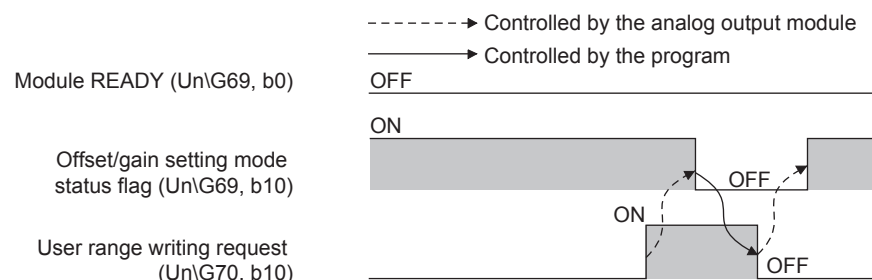
☞ Page 279 Buffer Memory Areas

When 'Operating condition setting request' (Un\G70, b9) is on, 'Operating condition setting completed flag' (Un\G69, b9) turns off.



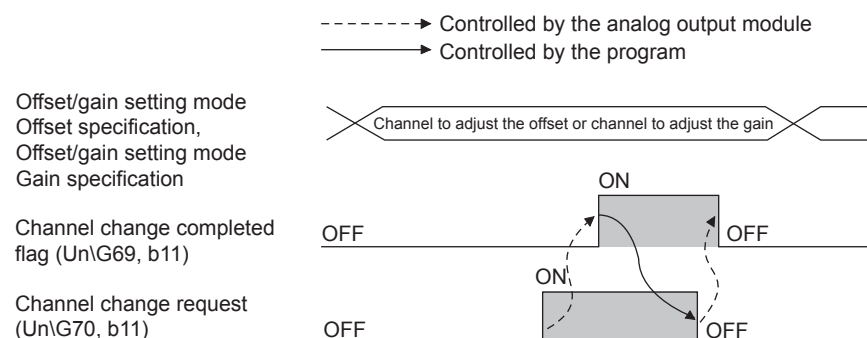
## ■Offset/gain setting mode status flag (b10)

When registering the value, which has been adjusted with the offset/gain setting, use 'Offset/gain setting mode status flag' (Un\G69, b10) as an interlock condition to turn on and off 'User range write request' (Un\G70, b10).



## ■Channel change completed flag (b11)

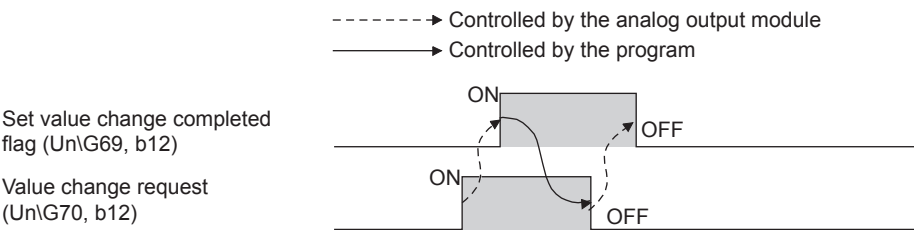
When changing a channel to perform the offset/gain setting, use 'Channel change completed flag' (Un\G69, b11) as an interlock condition to turn on and off 'Channel change request' (Un\G70, b11).



■Set value change completed flag (b12)

When adjusting the offset gain setting, use 'Set value change completed flag' (Un\G69, b12) as an interlock condition to turn on and off 'Value change request Un\G70, b12).

When the external power supply is off, the 'Set value change completed flag' (Un\G69, b12) does not turn on. After turning on the external power supply, turn on and off again 'Value change request' (Un\G70, b12).

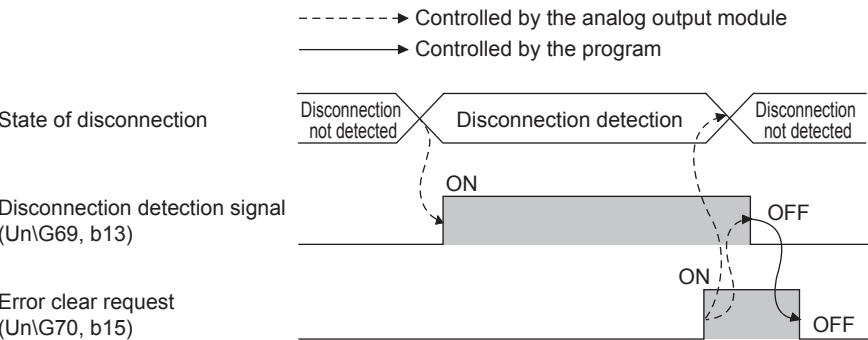


■Disconnection detection signal (b13)

'Disconnection detection signal' (Un\G69, b13) turns on when a disconnection is detected in a channel while the current of 4 to 20 mA, 0 to 20 mA, or user range is in use.

If disconnection detection auto-clear enable/disable setting is disable, 'Disconnection detection signal' (Un\G69, b13) turns off by turning on and off 'Error clear request' (Un\G70, b15) or 'Operating condition setting request' (Un\G70, b9) after the cause of the disconnection is eliminated.

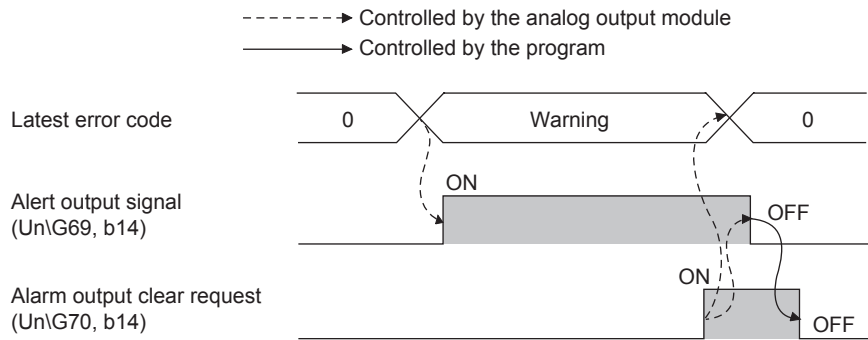
When the cause of disconnection is eliminated if disconnection detection auto-clear enable/disable setting is enable, the disconnection detection signal automatically turns off.



■Alarm output signal (b14)

If the D/A conversion is enabled, this signal turns on when the 'CH1 Digital value' (Un\G460) exceeds 'CH1 Alarm output upper limit value' (Un\G510) or falls below 'CH1 Alarm output lower limit value' (Un\G512).

By turning on and off 'Alert output clear request' (Un\G70, b14) or turning off and on 'Operating condition setting request' (Un\G70, b9) after the cause of the warning is eliminated, 'Alert output signal' (Un\G69, b14) turns off and 'Latest alarm code' (Un\G2) is cleared.

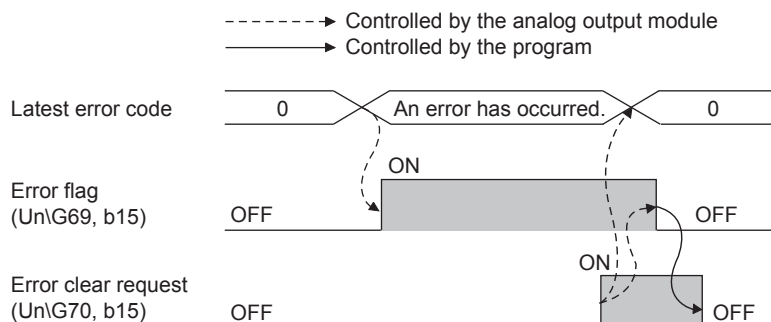


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## ■Error flag (b15)

'Error flag' (Un\G69, b15) turns on when an error occurs.

By turning on and off 'Error clear request' (Un\G70, b15) after the cause of the error is eliminated, 'Error flag' (Un\G69, b15) turns off and 'Latest error code' (Un\G0) is cleared.



## Output signals

A state of FX5-4DA can be checked in the buffer memory area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                               | CH1 | CH2 | CH3 | CH4 |
|--------------------------------------------------|-----|-----|-----|-----|
| Output signals                                   | 70  |     |     |     |
| Output signals (In FX3 allocation mode function) | 70  |     |     |     |

### ■List of output signals

| Buffer memory | Description                         |
|---------------|-------------------------------------|
| b0            | Use not allowed                     |
| b1            | CH1 Output enable/disable flag      |
| b2            | CH2 Output enable/disable flag      |
| b3            | CH3 Output enable/disable flag      |
| b4            | CH4 Output enable/disable flag      |
| b5            | Offset/gain initialization request  |
| b6 to 8       | Use not allowed                     |
| b9            | Operating condition setting request |
| b10           | User range write request            |
| b11           | Channel change request              |
| b12           | Value change request                |
| b13           | Use not allowed                     |
| b14           | Alert output clear request          |
| b15           | Error clear request                 |

### ■CH1-4 Output enable/disable flag (b1-4)

Set whether to output the D/A conversion value or offset value.

ON: D/A conversion value

OFF: Offset value

### ■Offset/gain initialization request (b5)

Turn on and off to enable the settings of buffer memory areas.

Offset/gain initialization is not to be performed unless offset/gain initialization enabled code is set to E20FH.

It is possible to perform offset/gain initialization in normal mode only.

When 'Offset/gain initialization request' (Un\G70, b5) is off, 'Offset/gain initialization complete flag' (Un\G69, b5) turns off.

### ■Operating condition setting request (b9)

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting of the buffer memory address.

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

☞ Page 296 Operating condition setting completed flag (b9)

### ■User range write request (b10)

In the offset/gain setting mode, turn on and off 'User range write request' (Un\G70, b10) to register the values adjusted with offset/gain setting in an analog output module. The data is written to the flash memory when this signal is turned off and on.

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

☞ Page 296 Offset/gain setting mode status flag (b10)

### ■Channel change request (b11)

Turn on and off 'Channel change request' (Un\G70, b11) 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 296 Channel change completed flag (b11)

### ■Value change request (b12)

Turn on and off 'Value change request' (Un\G70, b12) to change the analog output value to adjust the offset/gain setting.

The analog output value increases or decreases depending on the value set for the offset/gain adjustment value specification.

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

☞ Page 297 Set value change completed flag (b12)

### ■Alarm output clear request (b14)

When clearing the alarm output, turn on and off this signal.

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

☞ Page 297 Alarm output signal (b14)

### ■Error clear request (b15)

Turn on and off 'Error clear request' (Un\G70, b15) to clear 'Error flag' (Un\G69, b15), '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 298 Error flag (b15)

## 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 G139) is set 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.

| Buffer memory name                                          | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|-------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor mask [n]                                   | 124  | 125  | 126  | 127  | 128  | 129  | 130  | 131  | 132  | 133  | 134  | 135  | 136  | 137  | 138  | 139  |
| Interrupt factor mask [n] (in FX3 allocation mode function) | 4021 | 4022 | 4023 | 4024 | 4025 | 4026 | 4027 | 4028 | 4029 | 4030 | 4031 | 4032 | 4033 | 4034 | 4035 | 4036 |

### ■Default value

The default value is Mask (Interrupt unused) (0) for buffer memory areas.

## 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 detection flag [n]' (Un\G4 to Un\G19) turns to 'No interrupt factor' (0). When the set value is two or larger, the setting is regarded as Reset request (1).

Interrupt factors can also be reset by turning on and off 'Operating condition setting request' (Un\G70, b9).

"n" indicates an interrupt setting number. (n = 1 to 16)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                      | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|-------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor reset request [n]                                      | 156  | 157  | 158  | 159  | 160  | 161  | 162  | 163  | 164  | 165  | 166  | 167  | 168  | 169  | 170  | 171  |
| Interrupt factor reset request [n]<br>(in FX3 allocation mode function) | 4041 | 4042 | 4043 | 4044 | 4045 | 4046 | 4047 | 4048 | 4049 | 4050 | 4051 | 4052 | 4053 | 4054 | 4055 | 4056 |

### ■Default value

The default value is No reset request (0) for buffer memory areas.

## Step action wave output request

Set whether to execute the step action wave output for all the analog output channels in a batch.

| Step action wave output request | Setting value |
|---------------------------------|---------------|
| OFF                             | 0             |
| ON                              | 1             |

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

When the setting value is changed from OFF (0) to ON (1), the wave output status in all the channels, where the D/A conversion is enabled, is changed to During wave output step action and the wave output step action function is enabled.

When the setting value is changed from ON (1) to OFF (0), the wave output status is changed to During wave output stop and the wave output step action ends.

When a value out of the setting range is set, a step action wave output request range error (error code: 1D80H) occurs and the wave output status is not changed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                | CH1  | CH2 | CH3 | CH4 |
|-------------------------------------------------------------------|------|-----|-----|-----|
| Step action wave output request                                   | 188  |     |     |     |
| Step action wave output request (in FX3 allocation mode function) | 9000 |     |     |     |

### ■Default value

The default value is OFF (0).

## 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.
- When 'Interrupt factor generation setting [n]' (Un\G200 to Un\G215) is No interrupt resend request (1) and the same interrupt factor occurs during the interrupt factor detection, an interrupt request is not sent to the CPU module.

If a value other than the above is set, an interrupt factor generation setting range error (error code: 180△H) occurs.

"n" and △ indicate an interrupt setting number. (n = 1 to 16, △ = 0 to F)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                               | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Interrupt factor generation setting [n]                          | 200  | 201  | 202  | 203  | 204  | 205  | 206  | 207  | 208  | 209  | 210  | 211  | 212  | 213  | 214  | 215  |
| Interrupt factor generation setting [n] (in FX3 allocation mode) | 4061 | 4062 | 4063 | 4064 | 4065 | 4066 | 4067 | 4068 | 4069 | 4070 | 4071 | 4072 | 4073 | 4074 | 4075 | 4076 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Interrupt resend request (0) for all buffer memory areas.

## Condition target setting [n]

Set an interrupt factor to be detected.

| Setting value | Setting content                               |
|---------------|-----------------------------------------------|
| 0             | Disable                                       |
| 1             | Error flag (Un\G69, b15)                      |
| 2             | Alert output flag                             |
| 3             | Disconnection detection flag                  |
| 4             | External power supply READY flag (Un\G69, b7) |

If a value other than the above is set, a condition target setting range error (error code: 181△H) occurs.

Turning off and on 'Error flag', 'Alarm output flag' and 'Disconnection detection flag' set in 'Condition target setting [n]' (Un\G232 to Un\G247) or turning on and off 'External power supply READY flag' set in 'Condition target setting [n]' (Un\G232 to Un\G247) send an interrupt request for the CPU module.

"n" and △ indicate an interrupt setting number. (n = 1 to 16, △ = 0 to F)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|----------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Condition target setting [n]                                   | 232  | 233  | 234  | 235  | 236  | 237  | 238  | 239  | 240  | 241  | 242  | 243  | 244  | 245  | 246  | 247  |
| Condition target setting [n] (in FX3 allocation mode function) | 4081 | 4082 | 4083 | 4084 | 4085 | 4086 | 4087 | 4088 | 4089 | 4090 | 4091 | 4092 | 4093 | 4094 | 4095 | 4096 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (0) for all buffer memory areas.

## Condition target channel setting [n]

Set a channel where an interrupt is detected.

| Setting value | Setting content   |
|---------------|-------------------|
| 0             | All specification |
| 1             | CH1               |
| 2             | CH2               |
| 3             | CH3               |
| 4             | CH4               |

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. If a value other than the above is set, a condition target setting range error (error code: 182△H) occurs.

"n" and △ indicates an interrupt setting number. (n = 1 to 16, △ = 0 to F)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                     | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   |
|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Condition target channel setting [n]                                   | 264  | 265  | 266  | 267  | 268  | 269  | 270  | 271  | 272  | 273  | 274  | 275  | 276  | 277  | 278  | 279  |
| Condition target channel setting [n] (in FX3 allocation mode function) | 4160 | 4161 | 4162 | 4163 | 4164 | 4165 | 4166 | 4167 | 4168 | 4169 | 4170 | 4171 | 4172 | 4173 | 4174 | 4175 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is All CH specification (0) for all buffer memory areas.

## Mode switching setting

Set a setting value for the mode to be switched.

| Switching mode           | Setting value |       |
|--------------------------|---------------|-------|
|                          | 296           | 297   |
| Normal output mode       | 4658H         | 4441H |
| Offset/gain setting mode | 4441H         | 4658H |

When a value other than the above is set, the mode switching is not executed and only the operating condition is changed. In this case, this area is cleared to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                       | CH1        | CH2 | CH3 | CH4 |
|----------------------------------------------------------|------------|-----|-----|-----|
| Mode switching setting                                   | 296, 297   |     |     |     |
| Mode switching setting (in FX3 allocation mode function) | 4121, 4122 |     |     |     |

### ■Enabling the setting

Turn on 'Operating condition setting request' (Un\G70, b9).

### ■After the mode is switched

When the mode is switched, this area is cleared to 0 and 'Operating condition setting completed flag' (Un\G69, b9) turns off. After checking that 'Operating condition setting completed flag' (Un\G69, b9) is off, turn off 'Operating condition setting request' (Un\G70, b9).

### ■Default value

The default value is 0.



## Disconnection detection automatic clear enable/disable setting

Set whether to enable or disable an automatic clear of disconnection detection of the disconnection detection function. The setting is enable only in the normal output mode.

| Setting value | Description |
|---------------|-------------|
| 0             | Enable      |
| 1             | Disable     |

Setting a value other than in the table above results in operation with Disable (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory area name                                                                     | CH1  | CH2 | CH3 | CH4 |
|---------------------------------------------------------------------------------------------|------|-----|-----|-----|
| Disconnection detection automatic clear enable/disable setting                              | 304  |     |     |     |
| Disconnection detection auto-clear enable/disable setting (in FX3 allocation mode function) | 3170 |     |     |     |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

- In the normal mode: The default value is Disable (1) for all the channels.
- In the FX3 allocation mode: The default value is Enable (0) for all the channels.

## Offset/gain initialization enable code

When the 'offset/gain initialization request' (Un\G70, b5) turns on from off by setting the enable code "E20FH" in this area at the time of initialization of offset/gain, the offset value and the gain value in the flash memory of the analog output module are initialized.

When setting anything other than "E20FH" in this area, initialization is not executed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory area name                                                  | CH1  | CH2 | CH3 | CH4 |
|--------------------------------------------------------------------------|------|-----|-----|-----|
| Offset/gain initialization enable code                                   | 305  |     |     |     |
| Offset/gain initialization enable code (In FX3 allocation mode function) | 4160 |     |     |     |

### ■Default value

The default value is 0.

## CH1 Setting value check code

The check result of whether the set digital value is within the setting range can be checked.

The target values are 'CH1 Digital value' (Un\G460) in the normal output mode and the wave data to be output in the wave output mode.

When a digital value out of the setting range is written, one of the following check codes is stored.

| Check code | Description                                                                                                                                                                                        |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 000FH      | A digital value exceeding the upper limit of the setting range has been written.                                                                                                                   |
| 00F0H      | A digital value below the lower limit of the setting range has been written.                                                                                                                       |
| 00FFH      | A digital value falling short of the setting range and a digital value exceeding the upper limit setting range have been written.<br>This check code may be stored when a check code is not reset. |

Once the check code is stored, the code is not reset even when the digital value falls within the setting range.

To reset the check code, rewrite the digital value to a value within the setting range and turn on and off 'Error clear request' (Un\G70, b15).

### Point

When the scaling function is used, the value of 'CH1 Digital value' (Un\G460) which has undergone a scale conversion is checked. Note that some errors may be observed in the target digital value for a check code to be stored due to the calculation error of scale conversion when a scale-converted value exceeds the setting range.

When a check code is stored in the wave output, the address of the wave data which is out of the setting range can be checked with 'CH1 Wave output digital value outside the range Address monitor' (Un\G440 to Un\G441).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------|------|------|------|------|
| CH□ Setting value check code                                   | 400  | 600  | 800  | 1000 |
| CH□ Setting value check code (in FX3 allocation mode function) | 3201 | 3202 | 3203 | 3204 |

## CH1 Wave output status monitor

The wave output status can be checked.

| Monitor value | Description                    |
|---------------|--------------------------------|
| 0H            | During wave output stop        |
| 1H            | During wave output             |
| 2H            | Wave output pause              |
| 3H            | During wave output step action |

Only when the wave output function is used and the operation mode is normal mode, a value is stored in the area. Otherwise, 0 is stored.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                               | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------|------|------|------|------|
| CH□ Wave output status monitor                                   | 401  | 601  | 801  | 1001 |
| CH□ Wave output status monitor (in FX3 allocation mode function) | 9001 | 9002 | 9003 | 9004 |

## CH1 Output status

The output status information can be checked.

| Monitor value | Setting content           |
|---------------|---------------------------|
| 0             | Output update inactive    |
| 1             | Output update in progress |

This area stores a value only in the normal output mode.

When outputting the D/A conversion value, output update in progress (1) is stored in the output status.

When the CPU module is put in STOP state, "Output update inactive" (0) is written automatically. If the CH□ Output enable/disable flag is turned on while the CPU module is in STOP state, the output status information is updated.

When 'Operating condition setting request' (Un\G70, b9) is turned on and off, the status returns to "Output update inactive" (0); when the D/A conversion value is output, the status changes to "Output update in progress" (1).

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name | CH1 | CH2 | CH3 | CH4  |
|-------------------------|-----|-----|-----|------|
| CH□ Output status       | 429 | 629 | 829 | 1029 |

## Output status [FX3 allocation mode]

While the FX3 allocation mode function is in use, the output status can be checked.

The setting contents in FX3 allocation mode are as follows.

|                       |     |     |     |     |     |    |    |     |     |    |     |    |     |
|-----------------------|-----|-----|-----|-----|-----|----|----|-----|-----|----|-----|----|-----|
|                       | b15 | ... | b12 | b11 | ... | b8 | b7 | ... | b4  | b3 | ... | b0 |     |
| Output status (Un\G6) | CH4 |     |     |     | CH3 |    |    |     | CH2 |    |     |    | CH1 |

The following values are stored in the bits corresponding to each CH.

| Monitor value | Setting content           |
|---------------|---------------------------|
| 0000          | Output update inactive    |
| 0001          | Output update in progress |

This area stores a value only in the normal output mode.

When outputting the D/A conversion value, output update in progress (1) is stored in the output status.

When the CPU module is put in STOP state, "Output update inactive" (0) is written automatically. If the CH□ Output enable/disable flag is turned on while the CPU module is in STOP state, the output status information is updated.

When 'Operating condition setting request' (Un\G70, b9) is turned on and off, the status returns to "Output update inactive" (0); when the D/A conversion value is output, the status changes to "Output update in progress" (1).

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                         | CH1 | CH2 | CH3 | CH4 |
|-------------------------------------------------|-----|-----|-----|-----|
| Output status (in FX3 allocation mode function) | 6   |     |     |     |

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## CH1 Range setting monitor

The value of the output range set by 'CH1 range setting' (Un\G598) can be checked.

| Monitor value | Description                  |
|---------------|------------------------------|
| 0003H         | 4 to 20 mA                   |
| 0002H         | 0 to 20 mA                   |
| 0005H         | 1 to 5 V                     |
| 0006H         | 0 to 5 V                     |
| 0000H         | -10 to +10 V                 |
| 0007H         | 0 to 10 V                    |
| 000DH         | User range setting (voltage) |
| 000EH         | User range setting (current) |

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                                     | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------|------|------|------|------|
| CH□ Range setting monitor                                   | 430  | 630  | 830  | 1030 |
| CH□ Range setting monitor (in FX3 allocation mode function) | 3211 | 3212 | 3213 | 3214 |

## CH1 HOLD/CLEAR function setting monitor

The setting status of the HOLD/CLEAR function can be checked.

| Monitor value | Description    |
|---------------|----------------|
| 0             | CLEAR          |
| 1             | Previous Value |
| 2             | Setting value  |

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                                                   | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------------|------|------|------|------|
| CH□ HOLD/CLEAR function setting monitor                                   | 431  | 631  | 831  | 1031 |
| CH□ HOLD/CLEAR function setting monitor (in FX3 allocation mode function) | 3221 | 3222 | 3223 | 3224 |

## CH1 Wave output conversion cycle monitor

The wave output conversion cycle can be checked.

Only when the wave output function is used and the operation mode is normal mode, a value is stored in the area. Otherwise, 0 is stored.

The unit of the stored value is  $\mu\text{s}$ .

When 'Operating condition setting request' (Un\G70, b9) is turned on and off, the monitored value is updated.

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                                                    | CH1        | CH2        | CH3        | CH4        |
|----------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Wave output conversion cycle monitor                                   | 432, 433   | 632, 633   | 832, 833   | 1032, 1033 |
| CH□ Wave output conversion cycle monitor (in FX3 allocation mode function) | 9010, 9011 | 9012, 9013 | 9014, 9015 | 9016, 9017 |

## CH1 Wave pattern output count monitor

The output count of the wave pattern can be checked.

Only when the wave output function is used and the operation mode is normal mode, a value is stored in the area. Otherwise, 0 is stored.

The stored value increases by one every time one cycle of a wave pattern is output. The measuring range is from 0 to 32767. When the wave pattern output repetition setting is set to Unlimitedly repeat output, the count returns to 0 and starts again from 1 after the 32767th count. (...32766→32767→0→1→2...)

In the following cases, the stored value is reset.

- When 'Operating condition setting request' (Un\G70, b9) is turned on and off
- When the wave output status transitions from During wave output stop to another wave output status

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                      | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------|------|------|------|------|
| CH□ Wave pattern output count monitor                                   | 434  | 634  | 834  | 1034 |
| CH□ Wave pattern output count monitor (in FX3 allocation mode function) | 9030 | 9032 | 9034 | 9036 |

## CH1 Wave output current address monitor

In the wave output mode, which data in the wave data registry area is D/A-converted and output can be checked.

Only in the wave output mode, the buffer memory address of the wave output data is stored in this area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1        | CH2        | CH3        | CH4        |
|---------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Wave output current address monitor                                   | 436, 437   | 636, 637   | 836, 837   | 1036, 1037 |
| CH□ Wave output current address monitor (in FX3 allocation mode function) | 9050, 9051 | 9052, 9053 | 9054, 9055 | 9056, 9057 |

## CH1 Wave output current digital value monitor

The digital value of the current output wave can be checked.

Only in the wave output mode, a value is stored in this area. The stored value differs depending on the wave output status. Otherwise, 0 is stored.

When 'Operating condition setting request' (Un\G70, b9) is turned on and off, the stored value is reset.

The stored value of when the D/A conversion and D/A output are enabled is shown. For the analog output in other statuses, refer to the following.

☞ Page 185 In the wave output mode

The following shows the correspondence relation between the wave output status and the stored value.

- During wave output stop

Output digital value selected in 'CH1 Output setting during wave output stop' (Un\G524)

| Setting value of Output setting during wave output stop | Stored value                                                          |
|---------------------------------------------------------|-----------------------------------------------------------------------|
| 0 V/0 mA (0)                                            | 0                                                                     |
| Offset value (1)                                        |                                                                       |
| Setting value during stop (2)                           | Setting value of 'CH1 Output value during wave output stop' (Un\G525) |

- During wave output

Digital value stored in the buffer memory address indicated by 'CH1 Wave output current address monitor' (Un\G436 to Un\G437)

- Wave output pause

The value differs depending on the analog output HOLD/CLEAR setting.

| Setting of analog output HOLD/CLEAR function | Stored value                                                                                                                      |
|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Previous Value                               | Digital value stored in the buffer memory address indicated by 'CH1 waveform output current address monitor' (Un\G436 to Un\G437) |
| Setting value                                | Setting value for 'CH1 HOLD setting value' (Un\G596)                                                                              |
| CLEAR                                        | 0                                                                                                                                 |

- During wave output step action

Digital value stored in the buffer memory address indicated with 'CH1 Wave output current address monitor' (Un\G436 to Un\G437)

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                              | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------------------|------|------|------|------|
| CH□ Wave output current digital value monitor                                   | 438  | 638  | 838  | 1038 |
| CH□ Wave output current digital value monitor (in FX3 allocation mode function) | 9070 | 9072 | 9074 | 9076 |

## CH1 Wave output digital value out-of-range address monitor

When the digital value of the output wave data is out of the range, the buffer memory address of the wave data with a value out of the range can be checked.

Only in the wave output mode, a value is stored in this area. Otherwise, 0 is stored.

When the multiple wave data with a digital input value out of the setting range are detected, only the buffer memory address of the wave data detected first is stored.

When the first detection of a digital value out of the range occurs in a wave output status other than During wave output stop, the stored value is updated.

To reset this area, correct the wave data to a value within the available setting range. After that, turn on and off 'Error clear request' (Un\G70, b15) or 'Operating condition setting request' (Un\G70, b9) to reset this area.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                           | CH1        | CH2        | CH3        | CH4        |
|----------------------------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Wave output digital value out-of-range address monitor                                   | 440, 441   | 640, 641   | 840, 841   | 1040, 1041 |
| CH□ Wave output digital value out-of-range address monitor (in FX3 allocation mode function) | 9090, 9091 | 9092, 9093 | 9094, 9095 | 9096, 9097 |

## CH1 Wave output warning address monitor

The buffer memory address of the wave data where a warning has occurred can be checked.

Only in the wave output mode, a value is stored in this area. Otherwise, 0 is stored.

When a warning has occurred in the multiple wave data, only the buffer memory address of the wave data where the warning occurred first is stored.

When the first warning occurs in a wave output status other than During wave output stop, the stored value is updated.

To reset this area, correct the wave data to a value within the setting range. After that, turn on and off 'Alert output clear request' (Un\G70, b14) or 'Operating condition setting request' (Un\G70, b9) to reset this area.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1        | CH2        | CH3        | CH4        |
|---------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Wave output warning address monitor                                   | 442, 443   | 642, 643   | 842, 843   | 1042, 1043 |
| CH□ Wave output warning address monitor (in FX3 allocation mode function) | 9110, 9111 | 9112, 9113 | 9114, 9115 | 9116, 9117 |

## CH1 Digital value

Set the digital input value in 16-bit signed binary for the D/A conversion from the CPU module.

| Output range setting            | When the scaling function is disabled                   | When the scaling function is enabled*1 |
|---------------------------------|---------------------------------------------------------|----------------------------------------|
|                                 | Setting range (practical range)                         | Setting range                          |
| 3: 4 to 20 mA                   | -768 to +32767<br>(practical range: 0 to 32000)         | -32000 to +32000                       |
| 2: 0 to 20 mA                   |                                                         |                                        |
| 5: 1 to 5 V                     |                                                         |                                        |
| 6: 0 to 5 V                     |                                                         |                                        |
| 7: 0 to 10 V                    |                                                         |                                        |
| 0: -10 to +10 V                 | -32768 to +32767<br>(practical range: -32000 to +32000) |                                        |
| D: User range setting (voltage) |                                                         |                                        |
| E: User range setting (current) |                                                         |                                        |

\*1 The available setting range and practical range of when the scaling function is enabled differ depending on the setting of the scaling upper limit value and scaling lower limit value.

When a value out of the available setting range is written, the D/A conversion is performed with the upper or lower limit value of the available setting range.

A check code is stored in 'CH1 Setting value check code' (Un\G400) and a digital value setting range error (error code: 191□H) is stored in 'Latest error code' (Un\G0).

When the wave output function is selected, this area is disabled because registered wave data is output.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------|-----|-----|-----|------|
| CH□ Digital value                                   | 460 | 660 | 860 | 1060 |
| CH□ Digital value (in FX3 allocation mode function) | 1   | 2   | 3   | 4    |

## CH1 Wave output start/stop request

This area is for requesting start or stop of wave output to the analog output module when the wave output function is used. The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

| Request                   | Setting value |
|---------------------------|---------------|
| Wave output stop request  | 0             |
| Wave output start request | 1             |
| Wave output pause request | 2             |

While 'Step action wave output request' (Un\G188) is set to ON (1), changing the setting value is ignored.

When 'Step action wave output request' (Un\G188) is changed from ON (1) to OFF (0), the wave output status changes to

During wave output stop and Wave output stop request (0) is set for this area.

In the channel where a value out of the setting range is set, a wave output start/stop setting range error (error code: 1D1□H) occurs and 'Error flag' (Un\G69, b15) turns on. The operation of the wave output before the change continues.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------|------|------|------|------|
| CH□ Wave output start/stop request                                   | 462  | 662  | 862  | 1062 |
| CH□ Wave output start/stop request (in FX3 allocation mode function) | 9131 | 9132 | 9133 | 9134 |

### ■Default value

The default value is Wave output stop request (0) for all channels.

## CH1 Input value shift amount

The set value is added to the digital input value regardless of the on/off status of 'Operating condition setting request' (Un\G70, b9).

For the shift function, refer to the following.

☞ Page 189 Shift function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------|------|------|------|------|
| CH□ Input value shift amount                                   | 480  | 680  | 880  | 1080 |
| CH□ Input value shift amount (in FX3 allocation mode function) | 3250 | 3252 | 3254 | 3256 |

### ■Setting range

The setting range is from -32768 to +32767.

### ■Default value

The default value is 0 for all channels.

## CH1 Wave output step action movement amount

This area is for setting the wave output step action movement amount and for checking if the target has been obtained.

The value set in this area is subtracted from or added to the buffer memory address that has been storing the value and so the buffer memory address of Wave data registry area that has been storing the target digital value is specified. When a value is set in this area, the target address starts to be specified and when specifying the address is complete, No movement (0) is stored.

The setting for this area is enabled only when the following conditions are satisfied.

- In the wave output mode
- When During wave output step action (3) is stored in 'CH1 Wave output status monitor' (Un\G401).

| Movement direction                                                   | Setting value |
|----------------------------------------------------------------------|---------------|
| No movement                                                          | 0             |
| Forward movement (movement in the direction to increase the address) | 1 to 30000    |
| Reverse movement (movement in the direction to decrease the address) | -30000 to -1  |

The setting range is from -30000 to +30000. Even if a set value is out of the setting range, no error occurs. When a value smaller than -30000 is set, the value is processed as -30000. When a value greater than 30000 is set, the value is processed as 30000.

The following shows the available range for movement.

- "Wave pattern start address" to "Wave pattern start address" + "Wave pattern data points setting" - 1

If a value equal to or more than the wave pattern data points is set, only the data for the wave pattern data points is processed.

Set a value for the wave output step action movement amount. When specifying the address is complete, No movement (0) is stored in this area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                            | CH1  | CH2  | CH3  | CH4  |
|-------------------------------------------------------------------------------|------|------|------|------|
| CH□ Wave output step action movement amount                                   | 482  | 682  | 882  | 1082 |
| CH□ Wave output step action movement amount (in FX3 allocation mode function) | 9140 | 9142 | 9144 | 9146 |

### ■Default value

The default value is No movement (0) for all channels.



## CH1 D/A conversion enable/disable setting

Set whether to enable or disable the D/A conversion.

For details on the D/A conversion enable/disable setting function, refer to the following.

 Page 183 D/A conversion enable/disable function

| Setting value | Description             |
|---------------|-------------------------|
| 0             | D/A conversion enabled  |
| 1             | D/A conversion disabled |

When a value other than the above is set, the value is processed as D/A conversion disable (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                         | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------|------|------|------|------|
| CH□ D/A conversion enable/disable setting                                  | 500  | 700  | 900  | 1100 |
| CH□ D/A conversion enable/disable setting (in F3 allocation mode function) | 3271 | 3272 | 3273 | 3274 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

- In the normal mode: The default value is D/A conversion disable (1) for all the channels.
- In the FX3 allocation mode: The default value is D/A conversion enable (0) for all the channels.

## CH1 Scaling enable/disable setting

Set whether to enable or disable the scaling.

For the scaling function, refer to the following.

 Page 187 Scaling function

| Setting value | Description |
|---------------|-------------|
| 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.

The scaling function cannot be used when the wave output function is used. In the channel for which Enable (0) is set while the wave output function is being used, a scaling setting error in wave output mode (alarm code: 0B0□H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------|------|------|------|------|
| CH□ Scaling enable/disable setting                                   | 502  | 702  | 902  | 1102 |
| CH□ Scaling enable/disable setting (In FX3 allocation mode function) | 3281 | 3282 | 3283 | 3284 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all the channels.

## CH1 Scaling upper limit value

Set the range of scale conversion.

For the scaling function, refer to the following.

 Page 187 Scaling function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1        | CH2        | CH3        | CH4        |
|-----------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Scaling upper limit value                                   | 504, 505   | 704, 705   | 904, 905   | 1104, 1105 |
| CH□ Scaling upper limit value (In FX3 allocation mode function) | 3290, 3291 | 3292, 3293 | 3294, 3295 | 3296, 3297 |

### ■Setting range

The setting range is from -2147483648 to +2147483647. In the channel where a set value does not satisfy the condition "scaling upper limit value  $\neq$  scaling lower limit value", a scaling upper/lower limit value setting error (error code: 1A2□H) occurs.

When 'CH1 Scaling enable/disable setting' (Un\G502) is set to Disable (1), the setting for 'CH1 Scaling upper limit value' (Un\G504, 505) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

## CH1 Scaling lower limit value

Set the range of scale conversion.

For the scaling function, refer to the following.

 Page 187 Scaling function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1        | CH2        | CH3        | CH4        |
|-----------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Scaling lower limit value                                   | 506, 507   | 706, 707   | 906, 907   | 1106, 1107 |
| CH□ Scaling lower limit value (In FX3 allocation mode function) | 3310, 3311 | 3312, 3313 | 3314, 3315 | 3316, 3317 |

### ■Setting range

The setting range is from -2147483648 to +2147483647. In the channel where a set value does not satisfy the condition "scaling upper limit value  $\neq$  scaling lower limit value", a scaling upper/lower limit value setting error (error code: 1A2□H) occurs.

When 'CH1 Scaling enable/disable setting' (Un\G502) is set to Disable (1), the setting for 'CH1 Scaling lower limit value' (Un\G506, 507) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

## CH1 Alarm output setting

Set whether to enable or disable the alarm output.

For the alarm output function, refer to the following.

 Page 191 Alert output function

| Setting value | Description                |
|---------------|----------------------------|
| 0             | Disable                    |
| 1             | Enabled (no output limit)  |
| 2             | Enable (with output limit) |

Setting a value other than the above causes an alarm output setting range error (error code: 1B0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name       | CH1 | CH2 | CH3 | CH4  |
|--------------------------|-----|-----|-----|------|
| CH□ Alarm output setting | 508 | 708 | 908 | 1108 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (0) for all the channels.

## Alarm output setting [FX3 allocation mode]

Set whether to enable or disable disconnection detection or alarm output while the FX3 allocation mode function is in use.

The setting contents in FX3 allocation mode are as follows.

|     |     |     |     |     |     |    |    |     |    |    |    |     |    |    |    |
|-----|-----|-----|-----|-----|-----|----|----|-----|----|----|----|-----|----|----|----|
| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7  | b6 | b5 | b4 | b3  | b2 | b1 | b0 |
| CH4 |     |     |     | CH3 |     |    |    | CH2 |    |    |    | CH1 |    |    |    |

Set the following setting values for the bits corresponding to each CH.

| Setting value | Description                |
|---------------|----------------------------|
| 0000          | Disable                    |
| 0001          | Enabled (no output limit)  |
| 0010          | Enable (with output limit) |

Setting a value other than the above causes an alarm output setting range error (error code: 1B0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                     | CH1 | CH2 | CH3 | CH4 |
|--------------------------------------------------------|-----|-----|-----|-----|
| Alarm output setting [in FX3 allocation mode function] | 38  |     |     |     |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (0) for all the channels.

## CH1 Rate control enable/disable setting

Set whether to enable or disable rate control.

For the rate control function, refer to the following.

 Page 193 Rate control function

| Setting value | Description |
|---------------|-------------|
| 0             | Enable      |
| 1             | Disable     |

If a value other than the above is set, a rate control enable/disable setting range error (error code: 1B8□H) occurs.

The rate control function cannot be used when the wave output function is used. In the channel for which Enable (0) is set while the wave output function is being used, a rate control setting error in wave output mode (alarm code: 0B3□H) occurs.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------------|------|------|------|------|
| CH□ Rate control enable/disable setting                                   | 509  | 709  | 909  | 1109 |
| CH□ Rate control enable/disable setting (in FX3 allocation mode function) | 3331 | 3332 | 3333 | 3334 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all channels.

## CH1 Alarm output upper limit value

Set the range of a digital value used for alarm output.

For the alarm output function, refer to the following.

 Page 191 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1 | CH2 | CH3 | CH4  |
|----------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Alarm output upper limit value                                   | 510 | 710 | 910 | 1110 |
| CH□ Alarm output upper limit value (in FX3 allocation mode function) | 45  | 46  | 47  | 48   |

### ■Setting range

The setting range is from -32768 to +32767. In the channel where a set value does not satisfy the condition "alert output upper limit value > alert output lower limit value", an alert output upper/lower limit value inversion error (error code: 1B1□H) occurs. When 'CH1 Alert output setting' (Un\G508) is set to Disable (1), the setting of 'CH1 Alert output upper limit value' (Un\G510) is ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

### ■Precautions

When the shift function is used, always set a value in consideration of 'CH1 Input value shift amount' (Un\G480).

## CH1 Alarm output lower limit value

Set the range of a digital value used for alarm output.

For the alarm output function, refer to the following.

☞ Page 191 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1 | CH2 | CH3 | CH4  |
|----------------------------------------------------------------------|-----|-----|-----|------|
| CH□ Alarm output lower limit value                                   | 512 | 712 | 912 | 1112 |
| CH□ Alarm output lower limit value (in FX3 allocation mode function) | 41  | 42  | 43  | 44   |

### ■Setting range

The possible setting range is from -32768 to +32767. A channel for which any value not meeting the condition of "alarm output upper limit value > alarm output lower limit value" causes an alarm output upper/lower limit value reverse error (error code: 1B1□H).

If 'CH1 alarm output setting' (Un\G508) is set to Disable (1), the setting for 'CH1 alarm output lower limit value' (Un\G512) will be ignored.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

### ■Precautions

When the shift function is used, always set a value in consideration of 'CH1 Input value shift amount' (Un\G480).

## CH1 Increase digital limit value

Set the increment value per conversion cycle (80  $\mu$ s) when using the rate control function.

For the rate control function, refer to the following.

☞ Page 193 Rate control function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------|------|------|------|------|
| CH□ Increase digital limit value                                   | 514  | 714  | 914  | 1114 |
| CH□ Increase digital limit value (in FX3 allocation mode function) | 3340 | 3342 | 3344 | 3346 |

### ■Setting range

The setting range is from 0 to 64000 (FA00H). If a value out of the setting range is set for a channel where the conversion and rate control are enabled, a digital limit value range error (error code: 1B9□H) occurs.

When the scaling setting is enabled, the increase digital limit value of the input digital value converted within the scaling range is applied.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 64000 for all channels.

### ■Precautions

When a value exceeding 32767 is set in 'CH1 Increase digital limit value' (Un\G514) with the program, the value must be input in hexadecimal.

## CH1 Decrease digital limit value

Set the decrement value per conversion cycle (80  $\mu$ s) when using the rate control function.

For the rate control function, refer to the following.

 Page 193 Rate control function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------|------|------|------|------|
| CH□ Decrease digital limit value                                   | 516  | 716  | 916  | 1116 |
| CH□ Decrease digital limit value (in FX3 allocation mode function) | 3360 | 3362 | 3364 | 3366 |

### ■Setting range

The setting range is from 0 to 64000 (FA00H). If a value out of the setting range is set for a channel where the conversion and rate control are enabled, a digital limit value range error (error code: 1B9□H) occurs.

When the scaling setting is enabled, the decrease digital limit value of the input digital value converted within the scaling range is applied.

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 64000 for all channels.

### ■Precautions

When a value exceeding 32767 is set in 'CH1 Decrease digital limit value' (Un\G516) with the program, the value must be input in hexadecimal.

## CH1 Output setting during wave output stop

Select the output during wave output stop when the wave output function is used.

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

| Analog output                                      | Setting value |
|----------------------------------------------------|---------------|
| 0 V/0 mA                                           | 0             |
| Offset value                                       | 1             |
| Output value during wave output stop <sup>*1</sup> | 2             |

<sup>\*1</sup> Set value of 'CH1 Output value during wave output stop' (Un\G525)

In the channel where a value out of the setting range is set, an output setting during wave output stop setting range error (error code: 1D2□H) occurs and 'Error flag' (Un\G69, b15) turns on. The operation of the wave output before the change continues.

When Output value during wave output stop (2) is set for this area, set a value in 'CH1 Output value during wave output stop' (Un\G525).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                           | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------------------|------|------|------|------|
| CH□ Output setting during wave output stop                                   | 524  | 724  | 924  | 1124 |
| CH□ Output setting during wave output stop (in FX3 allocation mode function) | 9161 | 9162 | 9163 | 9164 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is the offset value (1) for all the channels.

## CH1 Output value during wave output stop

This area is for setting the value to be output when Output value during wave output stop (2) is set in 'CH1 Output setting during wave output stop' (Un\G524).

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored. The setting range depends on the set output range. Configure the setting in the following range.

| Output range   | Setting range                                        |
|----------------|------------------------------------------------------|
| 6: 0 to 5V     | 0 to 32767 (practical range: 0 to 32000)             |
| 5: 1 to 5V     |                                                      |
| 2: 0 to 20mA   |                                                      |
| 3: 4 to 20mA   |                                                      |
| 7: 0 to 10 V   |                                                      |
| 0: -10 to +10V | -32768 to +32767 (practical range: -32000 to +32000) |

In the channel where a value out of the setting range is set, an output value during wave output stop setting range error (error code: 1D3□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

However, when a value other than Output value during wave output stop (2) is set in 'CH1 Output setting during wave output stop' (Un\G524), the above error does not occur.

Since the default value is 0, change the setting value if 'CH1 Output setting during wave output stop' (Un\G524) is set to Output value during wave output stop (2).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                         | CH1  | CH2  | CH3  | CH4  |
|----------------------------------------------------------------------------|------|------|------|------|
| CH□ Output value during wave output stop                                   | 525  | 725  | 925  | 1125 |
| CH□ Output value during wave output stop (in FX3 allocation mode function) | 9171 | 9172 | 9173 | 9174 |

### ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is 0 for all channels.

## CH1 Wave pattern start address setting

This area is for setting the start address of the wave pattern to be output when the wave output function is used.

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

In the channel where the set values in this area and in 'CH1 Wave pattern data points setting' (Un\G528, Un\G529) satisfy the following conditions, a wave data registry area range error (error code: 1D9□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

(Wave pattern start address setting + Wave pattern data points setting - 1) > 89999 (the last buffer memory address of the wave data registry area)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                       | CH1        | CH2        | CH3        | CH4        |
|--------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Wave pattern start address setting                                   | 526, 527   | 726, 727   | 926, 927   | 1126, 1127 |
| CH□ Wave pattern start address setting (in FX3 allocation mode function) | 9180, 9181 | 9182, 9183 | 9184, 9185 | 9186, 9187 |

### ■Setting range

The possible setting range is from 10000 to 89999. (10000 89999 of buffer memory)

In the channel where a value out of the setting range is set, a wave pattern start address setting range error (error code: 1D4□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

## ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is 10000 for all channels.

## CH1 Wave pattern data points setting

This area is for setting the data points of the wave pattern to be output when the wave output function is used.

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

In the channel where the set values in this area and in 'CH1 Wave pattern data points setting' (Un\G528, Un\G529) satisfy the following conditions, a wave data registry area range error (error code: 1D9□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

(Wave pattern start address setting + Wave pattern data points setting - 1) > 89999 (the last buffer memory address of the wave data registry area)

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                     | CH1        | CH2        | CH3        | CH4        |
|------------------------------------------------------------------------|------------|------------|------------|------------|
| CH□ Wave pattern data points setting                                   | 528, 529   | 728, 729   | 928, 929   | 1128, 1129 |
| CH□ Wave pattern data points setting (in FX3 allocation mode function) | 9200, 9201 | 9202, 9203 | 9204, 9205 | 9206, 9207 |

## ■Setting range

The setting range is from 1 to 80000 (the number of data points of the wave data registry area).

In the channel where a value out of the setting range is set, a wave pattern data points setting range error (error code: 1D5□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

However, when the value of 'CH1 Wave pattern start address setting' (Un\G526, Un\G527) is out of the setting range, the above error does not occur.

## ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is 0 for all channels.

## CH1 Wave pattern output repetition setting

This area is for setting the number of wave pattern outputs when the wave output function is used.

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

| Setting value | Description                                              |
|---------------|----------------------------------------------------------|
| -1            | The wave pattern is output in analog unlimitedly.        |
| 1 to 32767    | The wave pattern is output in analog for the set number. |

In the channel where a value out of the setting range is set, a wave pattern output repetition setting range error (error code: 1D6□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                           | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------------------|------|------|------|------|
| CH□ Wave pattern output repetition setting                                   | 530  | 730  | 930  | 1130 |
| CH□ Wave pattern output repetition setting (in FX3 allocation mode function) | 9221 | 9222 | 9223 | 9224 |

## ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.



## ■Default value

The default value is 1 (once) for all channels.

## CH1 Constant for wave output conversion cycle

This area is for setting the constant to determine the conversion cycle (specifying a multiple of the conversion speed) for each channel when the wave output function is used.

The setting for this area is enabled only in the wave output mode. In other modes, changing the setting value is ignored.

The conversion cycle of each channel is determined from the combination of the reference conversion speed (80  $\mu$ s), number of channels where D/A conversion is enabled, and the constant for wave output conversion cycle.

- "Conversion cycle" = "Reference conversion speed (80  $\mu$ s)  $\times$  "Number of channels where D/A conversion is enabled"  $\times$  "Constant for wave output conversion cycle"

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                 | CH1  | CH2  | CH3  | CH4  |
|------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Constant for wave output conversion cycle                                      | 531  | 731  | 931  | 1131 |
| CH□ Constant for wave output conversion cycle<br>(in FX3 allocation mode function) | 9231 | 9232 | 9233 | 9234 |

## ■Setting range

The possible setting range is from 1 to 5000.

In the channel where a value out of the setting range is set, a wave output conversion cycle setting range error (error code: 1D7□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output does not start.

## ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is 1 for all channels.

## CH1 HOLD setting value

When the setting value (2) is set for the analog output HOLD/CLEAR function setting, this area is used to set the output value.

| Output range setting         | When the scaling function is disabled                   | When the scaling function is enabled <sup>*1</sup> |
|------------------------------|---------------------------------------------------------|----------------------------------------------------|
|                              | Setting range (practical range)                         | Setting range                                      |
| 4 to 20 mA                   | 0 to 32767<br>(practical range: 0 to 32000)             | -32000 to +32000                                   |
| 0 to 20 mA                   |                                                         |                                                    |
| 1 to 5 V                     |                                                         |                                                    |
| 0 to 5 V                     |                                                         |                                                    |
| 0 to 10 V                    |                                                         |                                                    |
| -10 to +10 V                 | -32768 to +32767<br>(practical range: -32000 to +32000) |                                                    |
| User range setting (voltage) |                                                         |                                                    |
| User range setting (current) |                                                         |                                                    |

\*1 The setting and practical ranges applied when the scaling function is enabled depend on the setting of the upper and lower scaling limit values.

Any channel for which a value out of the range is set causes a HOLD setting value range error (error code: 192□H). However, the error will not occur unless the HOLD/CLEAR function setting is the setting value (2).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1 | CH2 | CH3 | CH4  |
|-----------------------------------------------------------------|-----|-----|-----|------|
| CH□ HOLD setting value                                          | 596 | 796 | 996 | 1196 |
| CH□HOLD Trigger setting value (In FX3 allocation mode function) | 32  | 33  | 34  | 35   |

## ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is 0 for all channels.

## CH1 Range setting

This area is for setting the output range.

| Setting value | Output range                 |
|---------------|------------------------------|
| 0003H         | 4 to 20 mA                   |
| 0002H         | 0 to 20 mA                   |
| 0005H         | 1 to 5 V                     |
| 0006H         | 0 to 5 V                     |
| 0000H         | -10 to +10 V                 |
| 0007H         | 0 to 10 V                    |
| 000DH         | User range setting (voltage) |
| 000EH         | User range setting (current) |

If a value other than the above is set, a range setting range error (error code: 190□H) occurs.

If the range switching is attempted with the D/A conversion and D/A output enabled for the purpose of preventing a sudden change in the analog output, CH□ Under-output range change denial alarm (alarm code: 0C0□H) occurs and the range switching is not executed. To execute the range switching, turn off 'CH1 Output enable/disable flag' (Un\G70, b1).

The user range cannot be used when the wave output function is used. Even within the setting range in the above table, when the user range is set while the wave output function is used, a user range specification error in wave output mode (error code: 1D1□H) occurs and the wave output does not start.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4  |
|--------------------|-----|-----|-----|------|
| CH□ Range setting  | 598 | 798 | 998 | 1198 |

## ■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## Range setting [FX3 allocation mode]

When the FX3 allocation mode function is used, this area is for setting the output range.

The setting contents in FX3 allocation mode are as follows.

|     |     |         |     |       |     |       |     |    |
|-----|-----|---------|-----|-------|-----|-------|-----|----|
| b15 | ... | b12 b11 | ... | b8 b7 | ... | b4 b3 | ... | b0 |
| CH4 |     | CH3     |     | CH2   |     | CH1   |     |    |

Set the following setting values for the bits corresponding to each CH.

| Setting value | Output range                 |
|---------------|------------------------------|
| 0000          | -10 to +10 V                 |
| 0001          | -10 to +10 V                 |
| 0010          | 0 to 20 mA                   |
| 0011          | 4 to 20 mA                   |
| 0100          | 0 to 20 mA                   |
| 0101          | 1 to 5 V                     |
| 0110          | 0 to 5 V                     |
| 0111          | 0 to 10 V                    |
| 1101          | User range setting (voltage) |
| 1110          | User range setting (current) |

If a value other than the above is set, a range setting range error (error code: 190□H) occurs.

If the range switching is attempted with the D/A conversion and D/A output enabled for the purpose of preventing a sudden change in the analog output, CH. Under-output range change denial alarm (alarm code: 0C0□H) occurs and the range switching is not executed. To execute the range switching, turn off 'CH1 Output enable/disable flag' (Un\G70, b1).

The user range cannot be used when the wave output function is used. Even within the setting range in the above table, when the user range is set while the wave output function is used, a user range specification error in wave output mode (error code: 1D1□H) occurs and the wave output does not start.

■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4 |
|--------------------|-----|-----|-----|-----|
| Range setting      | 0   |     |     |     |

■Enabling the setting

Turn on and off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

Error history

Up to 16 errors that occurred in the analog output module are logged.

|          |                              |    |    |                             |    |    |
|----------|------------------------------|----|----|-----------------------------|----|----|
|          | b15                          | to | b8 | b7                          | to | 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 (upper)          |    |    | Millisecond (lower)         |    |    |
| Un\G3606 | System area                  |    |    |                             |    |    |
| to       |                              |    |    |                             |    |    |
| Un\G3609 |                              |    |    |                             |    |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example *1 |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H              |
| Month/Day                                                |                                                                                                                                           | 0130H              |
| Hour/Minute                                              |                                                                                                                                           | 1035H              |
| Second                                                   |                                                                                                                                           | 40H                |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                 |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 6H                 |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory area name                         | No.1 to No.16 |
|-------------------------------------------------|---------------|
| Error history                                   | 3600 to 3759  |
| Error history (In FX3 allocation mode function) | 8600 to 8759  |



## Alarm history

Up to 16 alarms that occurred in the analog output module are logged.

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3766 | System area                  |    |                             |    |    |
| to       |                              |    |                             |    |    |
| Un\G3769 |                              |    |                             |    |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example*1 |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H             |
| Month/Day                                                |                                                                                                                                           | 0130H             |
| Hour/Minute                                              |                                                                                                                                           | 1035H             |
| Second                                                   |                                                                                                                                           | 40H               |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H               |
| Millisecond (lower)                                      |                                                                                                                                           | 28H               |

\*1 These values assume that an alarm occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory area name                         | No.1 to No.16 |
|-------------------------------------------------|---------------|
| Alarm history                                   | 3760 to 3919  |
| Alarm history (in FX3 allocation mode function) | 8760 to 8919  |

## Offset/gain adjustment value specification

This area is used to set the adjustment amount of analog output value during the offset/gain setting mode.

Adjust it to make it equal to the target output value.

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                                                      | CH1  | CH2 | CH3 | CH4 |
|------------------------------------------------------------------------------|------|-----|-----|-----|
| Offset/gain adjustment value specification                                   | 4130 |     |     |     |
| Offset/gain adjustment value specification (In FX3 allocation mode function) | 4130 |     |     |     |

### ■Setting range

The possible setting range is from -3000 to +3000.

**Ex.**

If the setting value is 1000

During voltage output: Approx. 0.31 V, During current output: The analog output value rises by approx. 0.35 mA.

If the setting value is -1000

During voltage output: Approx. 0.31 V, During current output: The analog output value drops by approx. 0.35 mA.

## 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 value | Description     |
|---------------|-----------------|
| 0             | Disable         |
| 1             | Setting channel |

Multiple channels cannot be set at the same time. Set to Offset/gain setting mode (offset specification) or Offset/gain setting mode (gain specification) to Disable (0).

Setting a value other than the above causes an offset/gain setting value range error (error code: 1E8□H).

In the following cases, an offset/gain setting channel specification error (error code: 1E50H) occurs.

- Both the offset/gain setting mode (offset specification) and the offset/gain setting mode (gain specification) of the same channel are set for the setting channel (1) at the same time.
- All channels are set to Disable (0).
- Multiple channels are set at the same time.

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                                                               | CH1  | CH2  | CH3  | CH4  |
|---------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Offset/gain setting mode (offset specification)                                   | 4132 | 4134 | 4136 | 4138 |
| CH□ Offset/gain setting mode (gain specification)                                     | 4133 | 4135 | 4137 | 4139 |
| CH□ Offset/gain setting mode (offset specification) (in FX3 allocation mode function) | 4131 | 4132 | 4133 | 4134 |
| CH□ Offset/gain setting mode (gain specification) (in FX3 allocation mode function)   | 4141 | 4142 | 4143 | 4144 |

### ■Enabling the setting

From off, Turn on 'Channel change request' (Un\G70, b11).

### ■Default value

The default value is Disable (0) for all the channels.

## CH1 Offset/gain setting mode (range specification)

The output range can be changed during offset/gain setting.

The output range is changed to the set one by using 'Channel change request' (Un\G70, b11).

| Setting value | Description                  |
|---------------|------------------------------|
| 000DH         | User range setting (voltage) |
| 000EH         | User range setting (current) |

Setting a value other than the above causes an offset/gain setting range range error (error code: 1E9□H).

### ■Buffer memory address

The following shows the buffer memory addresses of this area.

| Buffer memory area name                                                              | CH1  | CH2  | CH3  | CH4  |
|--------------------------------------------------------------------------------------|------|------|------|------|
| CH□ Offset/gain setting mode (range specification)                                   | 4164 | 4165 | 4166 | 4167 |
| CH□ Offset/gain setting mode (range specification) (in FX3 allocation mode function) | 4151 | 4152 | 4153 | 4154 |

## Wave data registry area

This area is for registering wave data for analog output in the wave output mode.

The setting range depends on the set output range. The setting range is shown below.

| Output range | Setting range                                        |
|--------------|------------------------------------------------------|
| 4 to 20 mA   | 0 to 32767 (practical range: 0 to 32000)             |
| 0 to 20 mA   |                                                      |
| 1 to 5 V     |                                                      |
| 0 to 5 V     |                                                      |
| 0 to 10 V    | -32768 to +32767 (practical range: -32000 to +32000) |
| -10 to +10 V |                                                      |

In the channel where the wave data with a value out of the above setting range set is output, a digital value setting range error (error code: 191□H) occurs and 'Error flag' (Un\G69, b15) turns on. The wave output operations continue to be performed. However, the analog output value corresponding to a digital input value out of the setting range is fixed to the maximum or minimum value of the output range.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                        | CH1            | CH2 | CH3 | CH4 |
|-----------------------------------------------------------|----------------|-----|-----|-----|
| Wave data registry area                                   | 10000 to 89999 |     |     |     |
| Wave data registry area (in FX3 allocation mode function) | 10000 to 89999 |     |     |     |

# PART 3

# MULTIPLE INPUT MODULE

Part 3 describes the multiple input module.

3 FX5-8AD

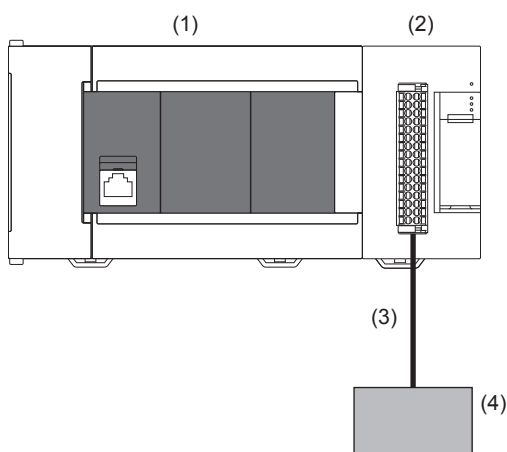
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# 3 FX5-8AD

## 3.1 Overview

FX5-8AD multiple input module can convert 8 points of analog input values (voltage input, current input, thermocouple and resistance temperature detector) into digital values.

It is added to FX5 CPU module, and is possible to capture voltage/current/thermocouple/resistance temperature detector data of 8 channels.



- (1) FX5 CPU module
- (2) Multiple input module (FX5-8AD)
- (3) Analog device connection cable
- (4) Analog device (flow sensor, thermocouple, and resistance temperature detector, etc.)

## 3.2 Specifications

This section describes the specifications of FX5-8AD.

### General specifications

The general specifications other than below are the same as those for the CPU module to be connected.

For general specifications, refer to the following.

📖 MELSEC iQ-F FX5U User's Manual (Hardware)

📖 MELSEC iQ-F FX5UC User's Manual (Hardware)

| Items                        |                                                          | Specifications                            |
|------------------------------|----------------------------------------------------------|-------------------------------------------|
| Dielectric withstand voltage | 500 V AC for 1 minute                                    | Between all terminals and ground terminal |
| Insulation resistance        | 10 MΩ or higher by 500 V DC insulation resistance tester |                                           |

### Power supply specifications

The following table lists the power supply specifications.

| Items                 |                                       | Specifications                                                                 |
|-----------------------|---------------------------------------|--------------------------------------------------------------------------------|
| External power supply | Power supply voltage                  | 24 V DC +20%, -15%                                                             |
|                       | Allowable momentary power outage time | Operation continues when the instantaneous power failure is shorter than 5 ms. |
|                       | Current consumption                   | 100 mA                                                                         |
| Internal power supply | Power supply voltage                  | 24 V DC                                                                        |
|                       | Current consumption                   | 40 mA                                                                          |



## Performance specifications

The following table lists the performance specifications.

| Items                         |                                                     | Specifications                                                                              |
|-------------------------------|-----------------------------------------------------|---------------------------------------------------------------------------------------------|
| Number of input points        |                                                     | 8 points (8 channels)                                                                       |
| Conversion speed              | Voltage/Current                                     | 1 ms/ch <sup>*1</sup>                                                                       |
|                               | Thermocouple/<br>Resistance temperature<br>detector | 40 ms/ch                                                                                    |
| Isolation method              | Between input terminal<br>and PLC                   | Photocoupler                                                                                |
|                               | Between input terminal<br>and channels              | Non-isolation                                                                               |
| Number of occupied I/O points |                                                     | 8 points                                                                                    |
| Applicable CPU module         |                                                     | FX5U CPU module (Ver.1.050 or later)<br>FX5UC CPU module <sup>*2</sup> (Ver.1.050 or later) |
| Applicable engineering tool   |                                                     | GX Works3 (Ver. 1.035M or later)                                                            |

\*1 In the case of 2CH conversion mode, conversion speed is 1 ms/2ch.

\*2 FX5-CNV-IFC or FX5-C1PS-5V is necessary to connect FX5-8AD to the FX5UC CPU module.

### Voltage/current input specifications

| Items                                                       | Specifications                                                                                                        |               |                      |            |
|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------|----------------------|------------|
| Analog input voltage                                        | -10 to 10 V DC (Input resistance 1 MΩ)                                                                                |               |                      |            |
| Analog input current                                        | -20 to +20 mA DC (Input resistance 250 Ω)                                                                             |               |                      |            |
| Digital output value                                        | 16-bit signed binary (-32000 to +32000)                                                                               |               |                      |            |
| Input characteristics, resolution *1                        | Analog input range                                                                                                    |               | Digital output value | Resolution |
|                                                             | Voltage                                                                                                               | 0 to 10 V     | 0 to 32000           | 312.5 μV   |
|                                                             |                                                                                                                       | 0 to 5 V      | 0 to 32000           | 156.25 μV  |
|                                                             |                                                                                                                       | 1 to 5 V      | 0 to 32000           | 125 μV     |
|                                                             |                                                                                                                       | -10 to +10 V  | -32000 to +32000     | 312.5 μV   |
|                                                             | Current                                                                                                               | 0 to 20 mA    | 0 to 32000           | 625 nA     |
|                                                             |                                                                                                                       | 4 to 20 mA    | 0 to 32000           | 500 nA     |
|                                                             |                                                                                                                       | -20 to +20 mA | -32000 to +32000     | 625 nA     |
| Accuracy (accuracy for the full scale digital output value) | Ambient temperature 25±5°C: within ±0.3% (±192 digits)<br>Ambient temperature -20 to 55°C: within ±0.5% (±320 digits) |               |                      |            |
| Absolute maximum input                                      | Voltage: ±15 V, Current: ±30 mA                                                                                       |               |                      |            |

\*1 For details on the input characteristics, refer to  Page 329 Input conversion characteristics.

## Thermocouple input specifications

| Items                                       |                                  | Specifications                                                                                                                                                                                                                                    |
|---------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Usable thermocouple                         |                                  | K, J, T, B, R, S                                                                                                                                                                                                                                  |
| Resolution                                  |                                  | K, J, T: 0.1°C (0.1 to 0.2°F)<br>B, R, S: 0.1 to 0.3°C (0.1 to 0.6°F)                                                                                                                                                                             |
| Temperature measuring range                 |                                  | K: -200 to +1200°C (-328.0 to +2192.0°F)<br>J: -40 to +750°C (-40.0 to +1382.0°F)<br>T: -200 to +350°C (-328.0 to +662.0°F)<br>B: 600 to 1700°C (1112.0 to 3092.0°F)<br>R: 0 to 1600°C (32.0 to 2912.0°F)<br>S: 0 to 1600°C (32.0 to 2912.0°F)    |
| Digital output value (16-bit signed binary) |                                  | K: -2000 to +12000 (-3280 to +21920)<br>J: -400 to +7500 (-400 to +13820)<br>T: -2000 to +3500 (-3280 to +6620)<br>B: 6000 to 17000 (11120 to 30920)<br>R: 0 to 16000 (320 to 29120)<br>S: 0 to 16000 (320 to 29120)                              |
| Accuracy                                    | Ambient temperature 25±5°C       | K: ±3.5°C (-200°C to -150°C)<br>K: ±2.5°C (-150°C to -100°C)<br>K: ±1.5°C (-100°C to +1200°C)<br>J: ±1.2°C<br>T: ±3.5°C (-200°C to -150°C)<br>T: ±2.5°C (-150°C to -100°C)<br>T: ±1.5°C (-100°C to +350°C)<br>B: ±2.3°C<br>R: ±2.5°C<br>S: ±2.5°C |
|                                             | Ambient temperature -20 to +55°C | K: ±8.5°C (-200°C to -150°C)<br>K: ±7.5°C (-150°C to -100°C)<br>K: ±6.5°C (-100°C to +1200°C)<br>J: ±3.5°C<br>T: ±5.2°C (-200°C to -150°C)<br>T: ±4.2°C (-150°C to -100°C)<br>T: ±3.1°C (-100°C to +350°C)<br>B: ±6.5°C<br>R: ±6.5°C<br>S: ±6.5°C |



To stabilize the accuracy, warm-up (supply power) the system for 30 minutes or more after power-on.

## Resistance temperature detector (RTD) input specifications

| Items                                       |                                | Specifications                                                                  |
|---------------------------------------------|--------------------------------|---------------------------------------------------------------------------------|
| Usable resistance temperature detector*1    |                                | Pt100, Ni100                                                                    |
| Resolution                                  |                                | 0.1°C (0.2°F)                                                                   |
| Temperature measuring range                 |                                | Pt100: -200 to +850°C (-328 to +1562°F)<br>Ni100: -60 to +250°C (-76 to +482°F) |
| Digital output value (16-bit signed binary) |                                | Pt100: -2000 to +8500 (-3280 to +15620)<br>Ni100: -600 to +2500 (-760 to +4820) |
| Accuracy                                    | Ambient temperature 25±5°C     | Pt100: ±0.8°C<br>Ni100: ±0.4°C                                                  |
|                                             | Ambient temperature -20 to +55 | Pt100: ±2.4°C<br>Ni100: ±1.2°C                                                  |

\*1 Only 3-wire type resistance temperature detectors can be used.

## Input conversion characteristics

The input conversion characteristics of A/D conversion are expressed by the slope of the straight line connecting the offset value and the gain value, both of which are used when an analog signal (voltage or current) from outside the programmable controller is converted to the corresponding digital output value.

### Offset value

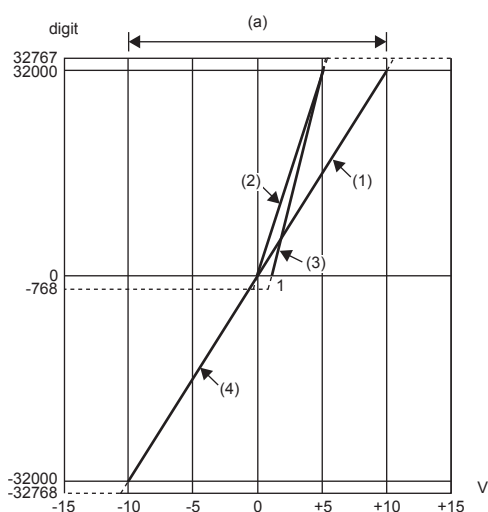
This value is the analog input value (voltage or current) where the corresponding digital output value is 0.

### Gain value

This value is the analog input value (voltage or current) where the corresponding digital output value is 32000.

### Voltage input characteristics

The following shows the list of the analog input ranges and the graphs of each voltage input characteristic, at the voltage input.



digit: Digital output value

V: Analog input voltage (V)

(a): Practical analog input range

| No. | Input range setting | Offset value | Gain value | Digital output value <sup>*2</sup> | Resolution     |
|-----|---------------------|--------------|------------|------------------------------------|----------------|
| (1) | 0 to 10 V           | 0 V          | 10 V       | 0 to 32000                         | 312.5 $\mu$ V  |
| (2) | 0 to 5 V            | 0 V          | 5 V        |                                    | 156.25 $\mu$ V |
| (3) | 1 to 5 V            | 1 V          | 5 V        |                                    | 125 $\mu$ V    |
| (4) | -10 to +10 V        | 0 V          | 10 V       | -32000 to +32000                   | 312.5 $\mu$ V  |

\*1 Set the offset value and gain value in the user range setting within a range satisfying the following conditions. Failure to satisfy the conditions may not result in proper A/D conversion.

Setting range of the offset value and gain value: -10 to +10 V

$((\text{Gain value}) - (\text{Offset value})) \geq 4 \text{ V}$

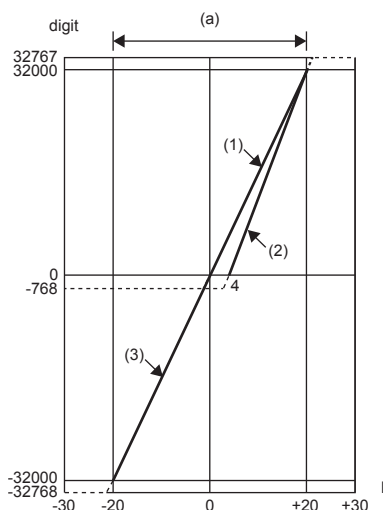
\*2 If an analog input value exceeds the range of digital output value, the digital output value is fixed to the maximum or minimum value.

| Input range setting | Digital output value |         |
|---------------------|----------------------|---------|
|                     | Minimum              | Maximum |
| 0 to 10 V           | -768                 | +32767  |
| 0 to 5 V            |                      |         |
| 1 to 5 V            |                      |         |
| -10 to +10 V        | -32768               |         |

- Set values within the practical range of the analog input and the digital output at each input range. If the range is exceeded, the resolution and accuracy may not fall within the range of the performance specifications. (Do not use the values in the dotted line region in the graph of voltage input characteristics.)
- Do not set the voltage over  $\pm 15$  V. Doing so can cause breakdown of the elements.

## Current input characteristics

The following shows the list of the analog input ranges and the graph of each current input characteristic, at the current input.



digit: Digital output value

I: Analog input current (mA)

(a): Practical analog input range

| No. | Input range setting | Offset value | Gain value | Digital output value*2 | Resolution |
|-----|---------------------|--------------|------------|------------------------|------------|
| (1) | 0 to 20 mA          | 0 mA         | 20 mA      | 0 to 32000             | 625 nA     |
| (2) | 4 to 20 mA          | 4 mA         | 20 mA      |                        | 500 nA     |
| (3) | -20 to +20 mA       | 0 mA         | 20 mA      | -32000 to +32000       | 625 nA     |

\*1 Set the offset value and gain value in the user range setting within a range satisfying the following conditions. Failure to satisfy the conditions may not result in proper A/D conversion.

Gain value  $\leq 20$  mA, offset value  $\geq 0$  mA

$((\text{Gain value}) - (\text{Offset value})) \geq 16$  mA

\*2 If an analog input value exceeds the range of digital output value, the digital output value is fixed to the maximum or minimum value.

| Input range setting | Digital output value |         |
|---------------------|----------------------|---------|
|                     | Minimum              | Maximum |
| 4 to 20 mA          | -768                 | +32767  |
| 0 to 20 mA          |                      |         |
| -20 to +20 mA       | -36768               |         |

- Set values within the practical range of the analog input and the digital output at each input range. If the range is exceeded, the resolution and accuracy may not fall within the range of the performance specifications. (Do not use the values in the dotted line region in the graph of current input characteristics.)
- Do not set the current over  $\pm 30$  mA. Doing so can cause breakdown of components.
- If a current is input from an external device into a channel set for voltage as the input type, an overvoltage may occur and destroy components. Limit the voltage so that the external device's voltage value does not exceed the range of -10 to +10 V.

# Accuracy

The following shows the accuracy of a multiple input module.

## Accuracy at voltage/current input

The accuracy of A/D conversion is the accuracy for the full scale of digital output value.

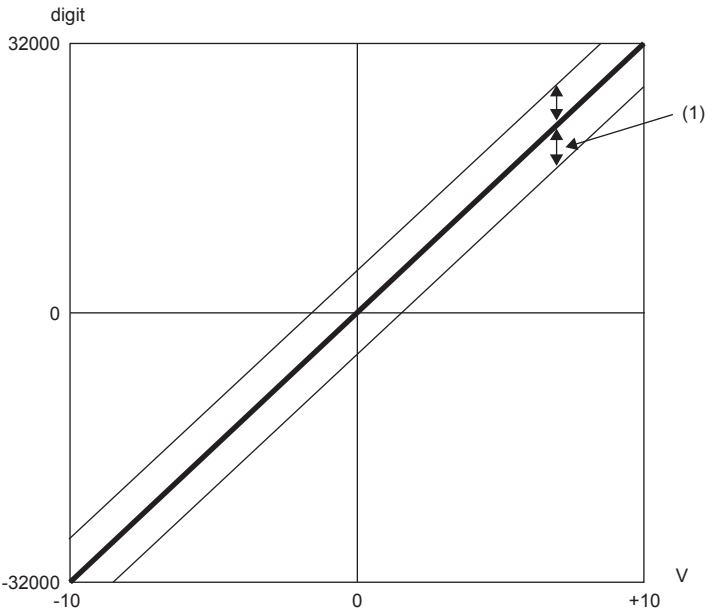
The fluctuation range varies as follows depending on ambient temperature and input range.

| Analog input range |               | Ambient temperature                   |                                       |
|--------------------|---------------|---------------------------------------|---------------------------------------|
|                    |               | 25±5℃                                 | -20 to +55℃                           |
| Voltage            | 0 to 10 V     | Within ±0.3% (±192 digits)/full scale | Within ±0.5% (±320 digits)/full scale |
|                    | 0 to 5 V      |                                       |                                       |
|                    | 1 to 5 V      |                                       |                                       |
|                    | -10 to +10 V  |                                       |                                       |
| Current            | 0 to 20 mA    |                                       |                                       |
|                    | 4 to 20 mA    |                                       |                                       |
|                    | -20 to +20 mA |                                       |                                       |

(Except for the conditions under noise influence.)

Ex.

Accuracy at -10 to +10 V range selection



digit: Digital output value  
V: Analog input voltage (V)  
(1) Fluctuation range

## Accuracy at thermocouple connection

The accuracy (°C) is given by the following formula:

Full scale × Thermocouple accuracy + Cold junction compensation accuracy

**Ex.**

Accuracy when B thermocouple is used, the operating ambient temperature is 25°C, and measured temperature is 1000°C  
 $(1700^{\circ}\text{C} - 600^{\circ}\text{C}) \times (\pm 0.0013) + (\pm 1^{\circ}\text{C}) = \pm 2.5^{\circ}\text{C}$

### ■Usable thermocouples and conversion accuracy

Usable thermocouples and conversion accuracy are shown as follows.

| Usable thermocouple | Conversion accuracy<br>(at operating ambient temperature 25±5°C) | Conversion accuracy<br>(at operating ambient temperature -20 to +55°C) |
|---------------------|------------------------------------------------------------------|------------------------------------------------------------------------|
| K                   | ±1.5°C                                                           | ±7.3°C                                                                 |
| J                   | ±1.2°C                                                           | ±4.95°C                                                                |
| T                   | ±1.5°C                                                           | ±6.5°C                                                                 |
| B                   | ±2.3°C                                                           | ±9.8°C                                                                 |
| R                   | ±2.5°C                                                           | ±12.5°C                                                                |
| S                   | ±2.5°C                                                           | ±12.5°C                                                                |



To stabilize the accuracy, warm-up (supply power) the system for 30 minutes or more after power-on.

## Accuracy at resistance temperature detector connection

The accuracy (°C) is given by the following formula:

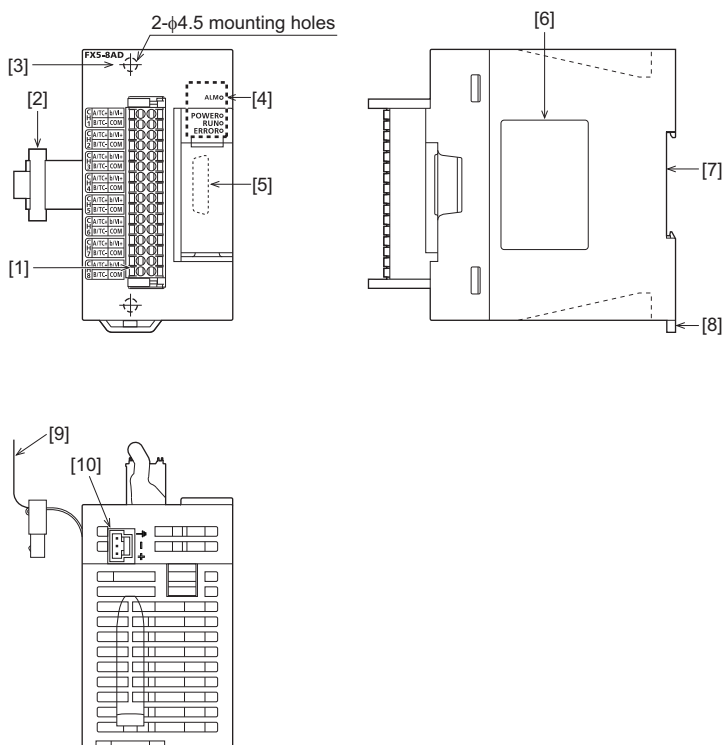
Conversion accuracy + Temperature characteristic × Operating ambient temperature change + Allowable tolerance of used resistance temperature detector

### ■Usable resistance temperature detector, accuracy

| Usable resistance temperature detector | Temperature measuring range | Accuracy (accuracy for the maximum value of the selected range) |                                               |
|----------------------------------------|-----------------------------|-----------------------------------------------------------------|-----------------------------------------------|
|                                        |                             | at operating ambient temperature 25±5°C                         | at operating ambient temperature -20 to +55°C |
| Pt100                                  | -200 to +850°C              | ±0.8°C                                                          | ±2.4°C                                        |
| Ni100                                  | -60 to +250°C               | ±0.4°C                                                          | ±1.2°C                                        |

## Part names

This section describes the names of each part of the multiple input module.



| No.  | Name                                         | Description                                                                |
|------|----------------------------------------------|----------------------------------------------------------------------------|
| [1]  | Terminal block (Spring clamp terminal block) | Use for the current/voltage and temperature sensor input.                  |
| [2]  | Expansion cable                              | Cable for connecting the module when adding the multiple input module.     |
| [3]  | Direct mounting hole                         | Screw holes (2-φ4.5, mounting screw: M4 screw) for direct installation.    |
| [4]  | Operations status display LEDs               | Indicates the operating status of the module. (☞ Page 333 LED display)     |
| [5]  | Extension connector                          | Connector for connecting the extension cable of an extension module.       |
| [6]  | Name plate                                   | The product model name and manufacturer's serial number are shown.         |
| [7]  | DIN rail mounting groove                     | The module can be installed on DIN46277 rail (35 mm wide).                 |
| [8]  | DIN rail mounting hook                       | Hook for mounting the module on a DIN rail of DIN46277 (35 mm wide).       |
| [9]  | Pull out tab                                 | They are used when drawing out an extension cable.                         |
| [10] | Power connector                              | Connector for connecting the power cable. (☞ Page 392 Power supply wiring) |

## LED display

The following table lists the LED display.

| LED display | LED color | Description                                                                                                                                                           |
|-------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POWER       | Green     | Indicates the power supply status.<br>ON: Power ON<br>OFF: Power off or module failure                                                                                |
| RUN         | Green     | Indicates the operating status.<br>Light on: Normal operation<br>Flashing: In offset/gain setting mode<br>Light off: Error occurring                                  |
| ERROR       | Red       | Indicates the error status.<br>ON: Minor error or major error<br>Flashing: Moderate error or major error<br>OFF: Normal operation                                     |
| ALM         | Red       | Indicates the output status.<br>Light on: Process alarm or rate alarm issued<br>Flashing: Input signal error or disconnection occurred<br>Light off: Normal operation |

## 3.3 Procedures Before Operation

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This section describes the procedures before operation.

### 1. Check of multiple input module specifications

Check the multiple input module specifications. (  Page 326 Specifications)

### 2. Installation of multiple input module

Install a multiple input module to a CPU module. For details, refer to the following.

 MELSEC iQ-F FX5U User's Manual (Hardware)

 MELSEC iQ-F FX5UC User's Manual (Hardware)

### 3. Wiring

Perform wiring of external devices to a multiple input module.

### 4. Adding a module

Add a multiple input module to a module configuration by using GX Works3.

#### Point

When adding a new multiple input module, if selecting the module whose module model name has "(FX2N)" at the end, it can be used as FX2N allocation mode.

- FX5-8AD: Normal mode
- FX5-8AD(FX2N): FX2N allocation mode

### 5. Parameter settings

Set parameters of the multiple input module by using GX Works3. (  Page 394 Parameter Setting)

### 6. Offset/gain setting

When setting the user range, perform the offset/gain setting.

### 7. Programming

Create a program.

## 3.4 Functions

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This section describes the functions of a multiple input module and the setting procedures for those functions.

For details on the buffer memory areas, refer to the following.

 Page 420 Buffer Memory Areas

#### Point

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

 Page 420 List of buffer memory areas

- 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 section. For details on the numerical values, refer to the following.

 Page 412 List of error codes

 Page 415 List of alarm codes



# Function list

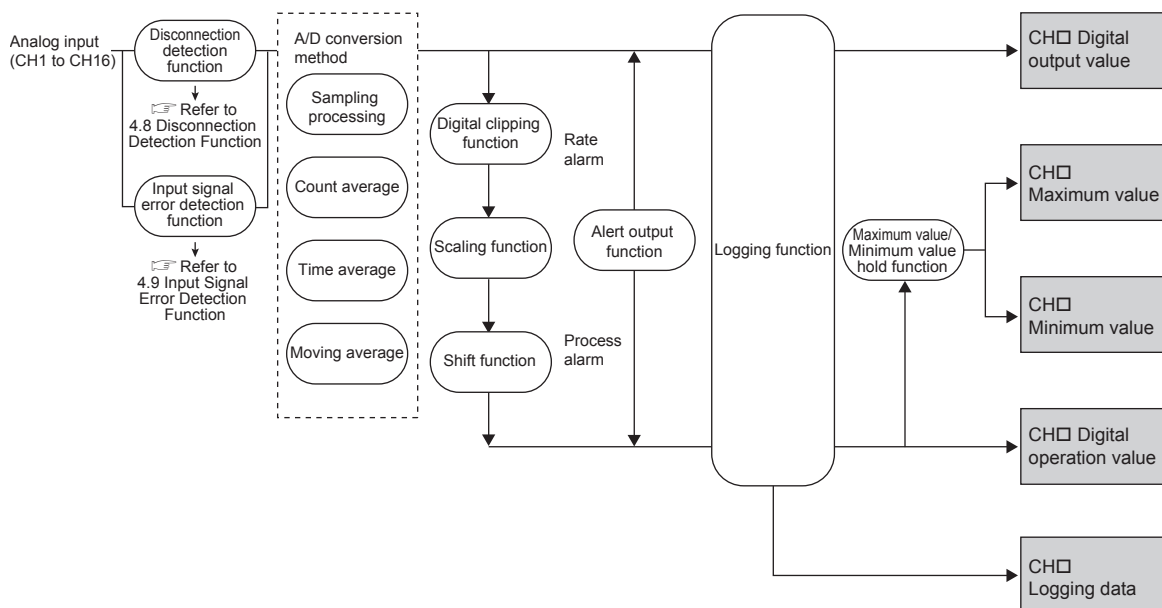
This section lists the functions of multiple input module.

| Item                                      |                                                                               |                | Description                                                                                                                                                                                                                                                                                                                                                                                                                                | Reference |
|-------------------------------------------|-------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Operation mode                            |                                                                               |                | Select the operation mode (normal mode, 2CH conversion mode, offset/gain setting mode) of the multiple input module.                                                                                                                                                                                                                                                                                                                       | Page 337  |
| Input type/Range setting function         |                                                                               |                | Input type, and input range can be checked for each channel. Disabling the conversion on unused channels reduces the conversion cycles.                                                                                                                                                                                                                                                                                                    | Page 338  |
| Conversion method                         | Sampling processing                                                           |                | Converts analog input values and temperature conversion values at every sampling period, storing them in buffer memory areas.                                                                                                                                                                                                                                                                                                              | Page 339  |
|                                           | Averaging processing                                                          | Time average   | Executes A/D conversion and temperature conversion for the set time and performs the average processing on the total value excluding the maximum and minimum values. The values that had the average processing are stored in the buffer memory areas. The number of processing times within the set time varies depending on the number of channels where the conversion is enabled.                                                      | Page 340  |
|                                           |                                                                               | Count average  | Executes A/D conversion and temperature conversion for a set number of times and performs the average processing on the total value excluding the maximum and minimum values. The values that had the average processing are stored in the buffer memory areas. The time taken to store the average value obtained by the processing in the buffer memory area varies depending on the number of channels where the conversion is enabled. | Page 341  |
|                                           |                                                                               | Moving average | Averages digital output values taken at every sampling period for a specified number of times, and stores the averaged value in the buffer memory area. The target range for averaging processing moves at each sampling period, thereby allowing the latest digital output value to be obtained.                                                                                                                                          | Page 341  |
| Scaling function                          |                                                                               |                | Performs scale conversion on digital operation values within the range from a scaling upper limit value to a scaling lower limit value, both of which are set at desired values. This function helps reduce the man-hours taken for creating a scale conversion program.                                                                                                                                                                   | Page 343  |
| Shift function                            |                                                                               |                | Adds (shifts) a set conversion value shift amount to a digital output value, and stores the result in the buffer memory area. A change in conversion value shift amount is reflected to the digital operation value in real time, which facilitates fine adjustment at system start-up.                                                                                                                                                    | Page 346  |
| Digital clipping function                 |                                                                               |                | Fixes a possible digital operation value to the maximum digital output value or the minimum digital output value when an input current or voltage exceeds the input range.                                                                                                                                                                                                                                                                 | Page 349  |
| Maximum value/Minimum value hold function |                                                                               |                | Stores the maximum and minimum values of digital operation values in the buffer memory area for each channel.                                                                                                                                                                                                                                                                                                                              | Page 351  |
| Alert output function                     | Process alarm                                                                 |                | Outputs an alert when a digital operation value falls within the preset alert output range.                                                                                                                                                                                                                                                                                                                                                | Page 352  |
|                                           | Rate alarm                                                                    |                | This function outputs an alert 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.                                                                                                                                                                                                                      | Page 354  |
| Input signal error detection function     | Upper limit detection, lower limit detection, upper and lower limit detection |                | Outputs an alarm when an analog input value exceeds the preset range.                                                                                                                                                                                                                                                                                                                                                                      | Page 359  |
|                                           | Simple disconnection detection                                                |                | Outputs an alarm when an analog input value is 0.5 V or smaller or 2 mA or smaller.                                                                                                                                                                                                                                                                                                                                                        | Page 361  |
| Disconnection detection function          |                                                                               |                | Outputs an alarm when disconnection of a thermocouple, compensation lead wire, or resistance temperature detector is detected. A measured temperature value to be stored at the disconnection detection is selected from the following. <ul style="list-style-type: none"><li>• Value just before disconnection</li><li>• Upscale</li><li>• Downscale</li><li>• Any value</li></ul>                                                        | Page 366  |
| Logging function                          |                                                                               |                | Logs (records) digital output values or digital operation values. 10000 points of data can be logged for each channel.                                                                                                                                                                                                                                                                                                                     | Page 369  |
| Error history function                    |                                                                               |                | Records up to 16 errors and alarms that occurred in an multiple input module to store them in the buffer memory areas.                                                                                                                                                                                                                                                                                                                     | Page 382  |
| Offset/gain setting function              |                                                                               |                | Allows the correction of errors in digital output values.                                                                                                                                                                                                                                                                                                                                                                                  | Page 384  |
| FX2N allocation mode function             |                                                                               |                | Allows to convert the layout of buffer memory addresses of a multiple input module to the one equivalent to FX2N-8AD. This compatibility enables the reuse of programs that have proven performance on FX2N-8AD.                                                                                                                                                                                                                           | Page 385  |
| 2CH conversion mode function              |                                                                               |                | Performs A/D conversion of 2CH to 1 ms and can update the digital output value at the same time.                                                                                                                                                                                                                                                                                                                                           | Page 386  |

## Processing of each function

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

### • Normal mode



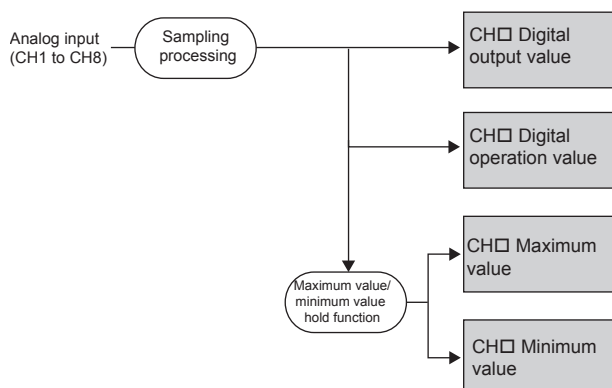
### Point

For the resistance temperature detector input range, or thermocouple input range, the conversion is stopped when a disconnection is detected. The digital output value, digital operation value, logging data, maximum value, and minimum value in this case are as follows:

- Digital output value: The values are stored according to the setting in conversion setting at disconnection detection.
- Digital operation value: The calculated values are stored according to the scaling function and shift function in digital output value.
- Logging data: The digital output values or digital operation value are stored according to the logging data setting
- Maximum value and minimum value: The values are updated with the maximum and minimum values of the digital operation value

In the use of the input signal error detection function, conversion is stopped if an input signal error is detected. In this case, the digital output values, digital operation values, and maximum and minimum values are not updated. The values obtained before the input signal error is detected are held. Conversion is resumed after restoration from the errors in the input signal. The digital output value or digital operation value before the input signal error was detected is stored in logging data depending on the logging data setting.

### • 2CH conversion mode



## Digital output value

The digital values after the sampling processing or each average processing are stored.

## Logging data

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

## Maximum value/Minimum value

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

## Digital operation value

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

## Operation mode

Operation mode of multiple input module can be selected.

## Setting procedure

Set 'Operation mode setting'.

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [Operation mode setting function]

| Operation mode                    | Description                                                                              |
|-----------------------------------|------------------------------------------------------------------------------------------|
| Normal mode                       | A mode to perform a normal conversion.                                                   |
| 2CH conversion mode <sup>*1</sup> | Performs A/D conversion of 2CH and can update the digital output value at the same time. |
| Offset/gain setting mode          | A mode used for performing the offset/gain setting at user range setting.                |

<sup>\*1</sup> It cannot be used in FX2N allocation mode.

# Input type/range setting function

The Input type/Range setting can be selected for each channel according to the type of sensor to be connected.

## Operation

The analog input value is A/D converted or temperature converted by the set input type, input range, or Input type/Range setting (offset/gain setting), and the value is stored in the following area.

- 'CH1 Digital output value' (Un\G400)
- 'CH1 Digital operation value' (Un\G402)

## Setting procedure

Set "Input Type", "Input Range", or "Input Type/Range Setting (Offset/Gain Setting)".

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

| Input type*1                      | Input range    | Input type/Range setting (Offset/gain setting)                                                            |
|-----------------------------------|----------------|-----------------------------------------------------------------------------------------------------------|
| Conversion disable                | —              | —                                                                                                         |
| Current                           | 4 to 20 mA     | <ul style="list-style-type: none"> <li>• Factory default setting</li> <li>• User range setting</li> </ul> |
|                                   | 0 to 20 mA     |                                                                                                           |
|                                   | -20 to +20 mA  |                                                                                                           |
| Voltage                           | 1 to 5 V       |                                                                                                           |
|                                   | 0 to 5 V       |                                                                                                           |
|                                   | -10 to +10 V   |                                                                                                           |
|                                   | 0 to 10 V      |                                                                                                           |
| Resistance temperature detector*2 | Pt100          |                                                                                                           |
|                                   | Ni100          |                                                                                                           |
| Thermocouple*2                    | Thermocouple B |                                                                                                           |
|                                   | Thermocouple R |                                                                                                           |
|                                   | Thermocouple S |                                                                                                           |
|                                   | Thermocouple K |                                                                                                           |
|                                   | Thermocouple J |                                                                                                           |
|                                   | Thermocouple T |                                                                                                           |

\*1 Controls whether to enable or disable A/D conversion or temperature conversion for each channel. Disabling the conversion on unused channels reduces the conversion cycles.

\*2 With the Centigrade/Fahrenheit display setting function, the display method of digital output value can be set to "Centigrade" or "Fahrenheit".

## ■Operation of factory default setting and user range setting

The input range used depends on the setting specified by Input type/Range setting (offset/gain setting).

- Case of factory default setting

Conversion is performed with the specified input type and input range.

- Case of user range setting

Conversion is performed with input type and input range specified in the offset/gain setting function.

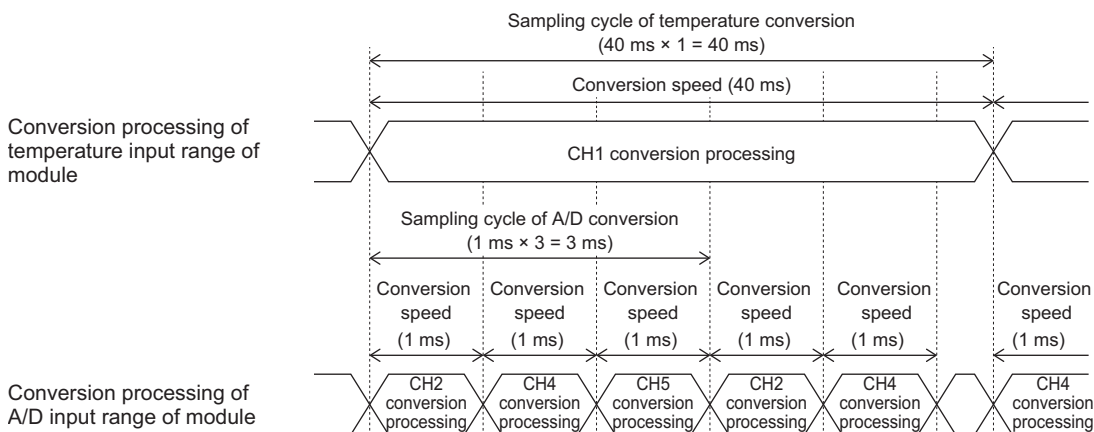
## Conversion method

This function sets the A/D conversion or temperature conversion method for each channel.

The conversion speed is 1 ms when the input range is current and voltage, 40 ms in the case of resistance temperature detector and thermocouple.

A/D conversion or temperature conversion is performed asynchronously. The A/D conversion or temperature conversion sampling cycle varies according to the number of channels respectively set.

The conversion process order and sampling cycle for when CH1 is set to the temperature input range, and CH2, CH4, and CH5 are set to the A/D input range are shown below.



## Sampling processing

The analog input value and temperature input value are converted for each sampling period and stored as digital output value and digital operation value.

- When input range is set only with current, voltage, or resistance temperature detector, and thermocouple only, perform conversion for each channel.
- When setting the current, voltage, resistance temperature detector, and thermocouple in the input range, convert asynchronously in each sampling period.

### Point

A/D conversion and temperature conversion are performed asynchronously, so the respective sampling cycles are as shown below.

- The A/D conversion sampling cycle is "conversion speed (1 ms) × number of A/D conversion enabled channels".
- The temperature conversion sampling cycle is "conversion speed (40 ms) × number of temperature conversion enabled channels".

Whether to enable or disable the conversion can be set for each channel. Disabling the conversion on unused channels reduces the sampling cycle.

For example, when setting the temperature conversion to 2 channels (CH1, CH4) conversion enabled, the conversion period is 80 ms (40 ms × 2).

## Averaging processing

Averaging processing is performed for analog input value or temperature input value for each channel. Averaged values are stored as digital output values and digital operation values.

The following three types of averaging processing are provided.

- Time average
- Count average
- Moving average

### ■Time average

A multiple input module executes the conversion for set time and averages the total value excluding the maximum value and the minimum value. The averaged value is stored in the digital output value and the digital operation value.

- Setting time

Set a value that satisfies the following condition.

Setting time of A/D conversion = Number of A/D conversion enabled channels × Conversion speed (1 ms) × Set number of times

Setting time of temperature conversion = Number of temperature conversion enabled channels × Conversion speed (40 ms) × Set number of times

- Processing times

The number of processing times within the set time varies depending on the number of channels where the conversion is enabled.

$$\text{Number of processing times}^{*1} = \frac{\text{Setting time}}{(\text{Number of conversion enabled channels} \times \text{Conversion speed})}$$

\*1 Values after the decimal point are omitted.

**Ex.**

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

| Item                                                       | Setting                    |
|------------------------------------------------------------|----------------------------|
| Input type                                                 | Voltage                    |
| Number of channels where temperature conversion is enabled | Four channels (CH1 to CH4) |
| Setting time                                               | 20 ms                      |

$$\frac{20 \text{ ms}}{(4 \text{ ch} \times 1 \text{ ms})} = 5 \text{ times}$$

Conversion is processed 5 times and the mean value is output.

### Point

- The valid lower limit setting value for the time average is calculated by the formula "Minimum processing times (4 times) × Number of conversion enabled channels × Conversion speed". 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. 0 is stored in the 'CH1 digital output value' (Un\G400) and 'CH1 digital operation value' (Un\G402).
- Because the time 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.

## Count average

A multiple input module executes the conversion for a set number of times and averages the total value excluding the maximum value and the minimum value. The averaged value is stored in the digital output value and the digital operation value.

The time taken to store the average value obtained by the processing in the buffer memory area is the following value.

Processing time of A/D conversion = Set number of times × (Number of A/D conversion enabled channels × Conversion speed (1 ms))

Processing time of temperature conversion = Set number of times × (Number of temperature conversion enabled channels × Conversion speed (40 ms))

**Ex.**

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

| Item                                                       | Setting                    |
|------------------------------------------------------------|----------------------------|
| Input type                                                 | Thermocouple               |
| Number of channels where temperature conversion is enabled | Four channels (CH1 to CH4) |
| Set number of times                                        | Five times                 |

$5 (\text{times}) \times 4 (\text{CH}) \times 40 (\text{ms}) = 800 (\text{ms})$

An average value is output every 800 ms.

### Point

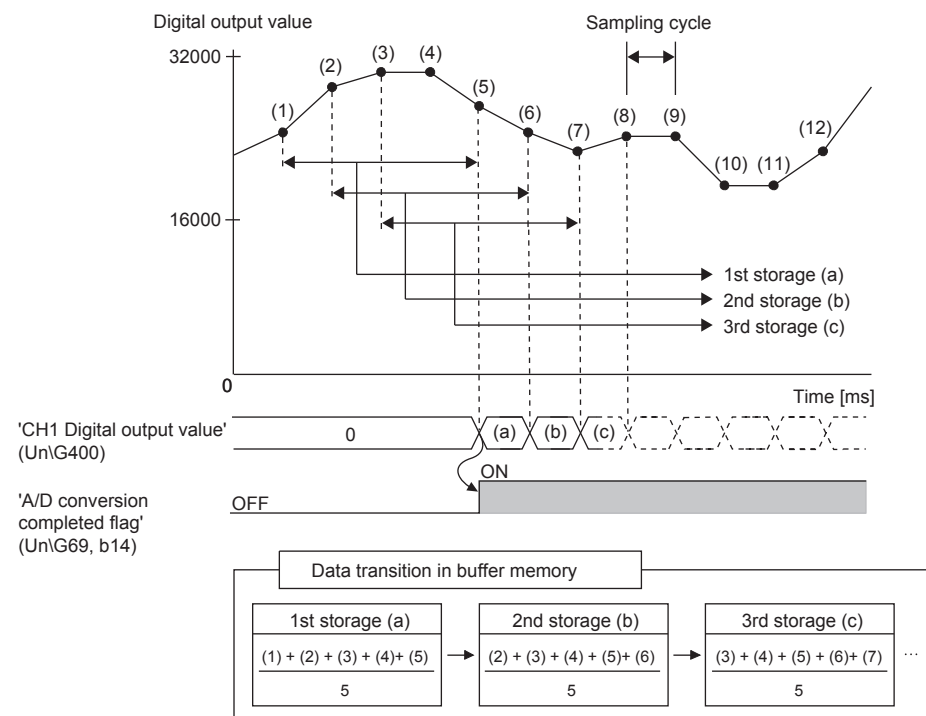
Because the count average requires a sum of at least two counts excluding the maximum and minimum values, the set number of times should be four or more.

## Moving average

Converted values for the specified number of times captured every sampling period are averaged and stored in the digital output value and the digital operation value. As each sampling process moves and averaging is performed, the latest digital output value and digital operation value are obtained.

**Ex.**

The following figure shows the moving average processing of when the set number of times is five.



## Setting procedure

### ■Sampling processing

Set "Average processing setting" to "Sampling processing".

🔍 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [Conversion system]

### ■Average processing

**1.** Set "Average processing setting" to "Time average", "Count average", or "Moving average".

🔍 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [Conversion system]

**2.** Set a value for "Time average/Count average/Moving average setting".

| Item                       | Setting range                                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time average <sup>*1</sup> | When the input type is current, and voltage: 4 to 10000 (ms)<br>When the input type is resistance temperature detector, and thermocouple: 160 to 10000 (ms) |
| Count average              | 4 to 10000 (times)                                                                                                                                          |
| Moving average             | 2 to 1000 (times)                                                                                                                                           |

<sup>\*1</sup> Set a value greater than the value calculated by the following formula as the time average.  
Conversion speed × Number of conversion enabled channels × Minimum processing times (4 times)



## Scaling function

Performs scale conversion on digital output values within the range from a scaling upper limit value to a scaling lower limit value, both of which are set at desired values.

The converted values are stored in 'CH1 Digital operation value' (Un\G402).

### Concept of scaling setting

The concepts of each setting item are described below.

- For the scaling upper limit value, set a value corresponding to the upper limit value after the input range conversion.
- For the scaling lower limit value, set a value corresponding to the lower limit value after the input range conversion.

The upper and lower limits of each range are shown below.

| Input type/range                |               |            | Lower limit value |                      | Upper limit value |                      |
|---------------------------------|---------------|------------|-------------------|----------------------|-------------------|----------------------|
|                                 |               |            | Input value       | Digital output value | Input value       | Digital output value |
| Current                         | 4 to 20 mA    |            | 4 mA              | 0                    | 20 mA             | 32000                |
|                                 | 0 to 20 mA    |            | 0 mA              | 0                    | 20 mA             | 32000                |
|                                 | -20 to +20 mA |            | -20 mA            | -32000               | 20 mA             | 32000                |
| Voltage                         | 0 to 10 V     |            | 0 V               | 0                    | 10 V              | 32000                |
|                                 | 0 to 5 V      |            | 0 V               | 0                    | 5 V               | 32000                |
|                                 | 1 to 5 V      |            | 1 V               | 0                    | 5 V               | 32000                |
|                                 | -10 to +10 V  |            | -10 V             | -32000               | 10 V              | 32000                |
| Resistance temperature detector | Pt100         | Centigrade | -200°C            | -2000                | 850°C             | 8500                 |
|                                 |               | Fahrenheit | -328°F            | -3280                | 1562°F            | 15620                |
|                                 | Ni100         | Centigrade | -60°C             | -600                 | 250°C             | 2500                 |
|                                 |               | Fahrenheit | -76°F             | -760                 | 482°F             | 4820                 |
| Thermocouple                    | K             | Centigrade | -270°C            | -2700                | 1370°C            | 13700                |
|                                 |               | Fahrenheit | -454°F            | -4540                | 2498°F            | 24980                |
|                                 | J             | Centigrade | -210°C            | -2100                | 1130°C            | 11300                |
|                                 |               | Fahrenheit | -346°F            | -3460                | 2066°F            | 20660                |
|                                 | T             | Centigrade | -270°C            | -2700                | 400°C             | 4000                 |
|                                 |               | Fahrenheit | -454°F            | -4540                | 752°F             | 7520                 |
|                                 | B             | Centigrade | 0°C               | 0                    | 1710°C            | 17100                |
|                                 |               | Fahrenheit | +32°F             | +320                 | 3110°F            | 31100                |
|                                 | R             | Centigrade | -50°C             | -500                 | 1710°C            | 17100                |
|                                 |               | Fahrenheit | -58°F             | -580                 | 3110°F            | 31100                |
|                                 | S             | Centigrade | -50°C             | -500                 | 1710°C            | 17100                |
|                                 |               | Fahrenheit | -58°F             | -580                 | 3110°F            | 31100                |

#### Ex.

The scaling value with the following conditions

- Set the input type/range to voltage (0 to 5 V)
- A value of 20000 is set in Scaling upper limit value, and 4000 is set in Scaling lower limit value.

4000 is stored when the voltage input is 0 V and 20000 is stored when the voltage input is 5 V in 'CH1 digital operation value' (Un\G402).

## Calculating the scaling value

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

The calculation formula for a scaling value varies depending on the input type/range.

| Input type/Range                                                                                                                    | Relational expression                                                        | Element                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Current (0 to 20 mA, 4 to 20 mA)</li> <li>Voltage (0 to 10 V, 0 to 5 V, 1 to 5 V)</li> </ul> | $\frac{D_x \times (S_H - S_L)}{D_{Max}} + S_L$                               | D <sub>x</sub> : Digital output value<br>D <sub>Max</sub> : Maximum digital output value of the input range in use<br>D <sub>Min</sub> : Minimum digital output value of the input range in use<br>S <sub>H</sub> : Scaling upper limit value<br>S <sub>L</sub> : Scaling lower limit value |
| <ul style="list-style-type: none"> <li>Current (-20 to +20 mA)</li> <li>Voltage (-10 to +10 V)</li> </ul>                           | $\frac{D_x \times (S_H - S_L)}{(D_{Max} - D_{Min})} + \frac{(S_H + S_L)}{2}$ |                                                                                                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>Resistance temperature detector</li> <li>Thermocouple</li> </ul>                             | $\frac{(D_x - D_{Min}) \times (S_H - S_L)}{(D_{Max} - D_{Min})} + S_L$       |                                                                                                                                                                                                                                                                                             |

## Setting procedure

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

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

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".

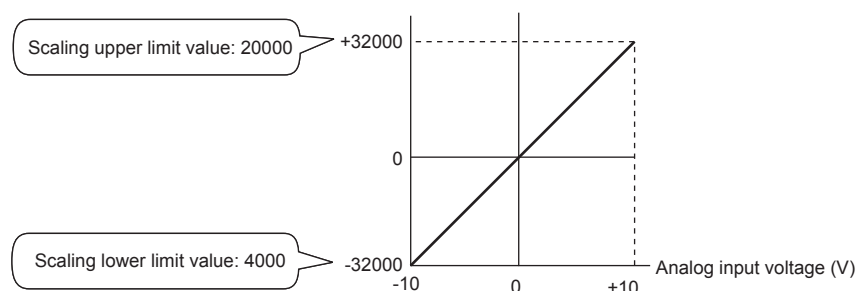
## Setting example

### ■Example 1

An example of the following settings is shown below.

| Item                           | Setting                |
|--------------------------------|------------------------|
| Input type/range               | Voltage (-10 to +10 V) |
| Scaling enable/disable setting | Enable                 |
| Scaling upper limit value      | 20000                  |
| Scaling lower limit value      | 4000                   |

Input voltage and scaling value become as follows.



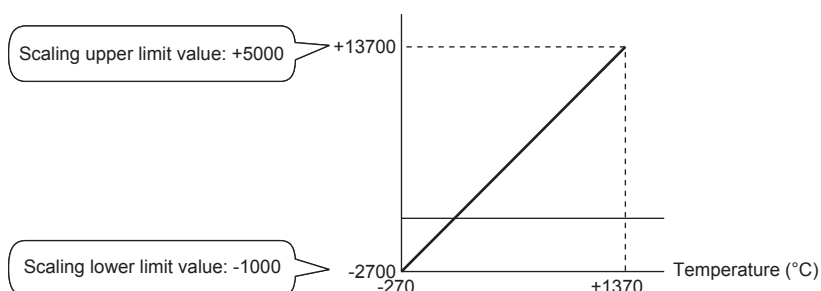
| Analog input voltage (V) | Digital output value | Digital operation value (scaling value) |
|--------------------------|----------------------|-----------------------------------------|
| -10                      | -32000               | 4000                                    |
| -5                       | -16000               | 8000                                    |
| 0                        | 0                    | 12000                                   |
| +5                       | +16000               | 16000                                   |
| +10                      | +32000               | 20000                                   |

### ■Example 2

An example of the following settings is shown below.

| Item                           | Setting                          |
|--------------------------------|----------------------------------|
| Input type/range               | K thermocouple (-270 to +1370°C) |
| Scaling enable/disable setting | Enable                           |
| Scaling upper limit value      | +5000                            |
| Scaling lower limit value      | -1000                            |

A measured temperature value and scaling value become as follows.



| Temperature input value (°C) | Measured temperature value | Digital operation value (scaling value) |
|------------------------------|----------------------------|-----------------------------------------|
| -270                         | -2700                      | -1000                                   |
| +50                          | +500                       | +170                                    |
| +500                         | +5000                      | +1817                                   |
| +850                         | +8500                      | +3097                                   |
| +1370                        | +13700                     | +5000                                   |

## Precautions

When the scaling function is used with the digital clipping function simultaneously, the scale conversion is performed on the digital operation values after digital clipping. For the digital clipping function, refer to the following.

☞ Page 349 Digital clipping function

# Shift function

Adds (shifts) a set conversion value shift amount to a digital output value, and stores the result in the buffer memory area. A change in conversion value shift amount is reflected to the digital operation value in real time, which facilitates fine adjustment at system start-up.

## 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 process 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 off→on→off 'Operating condition setting request' (Un\G70, b9).

## Setting procedure

Set a value for "Conversion value shift amount".

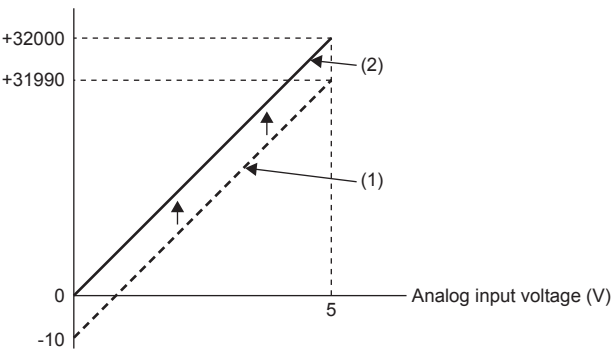
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Shift function]

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

## Setting example

**Ex.**

When the input characteristics is adjusted in a channel where the input range of 0 to 5 V is set by the shift function

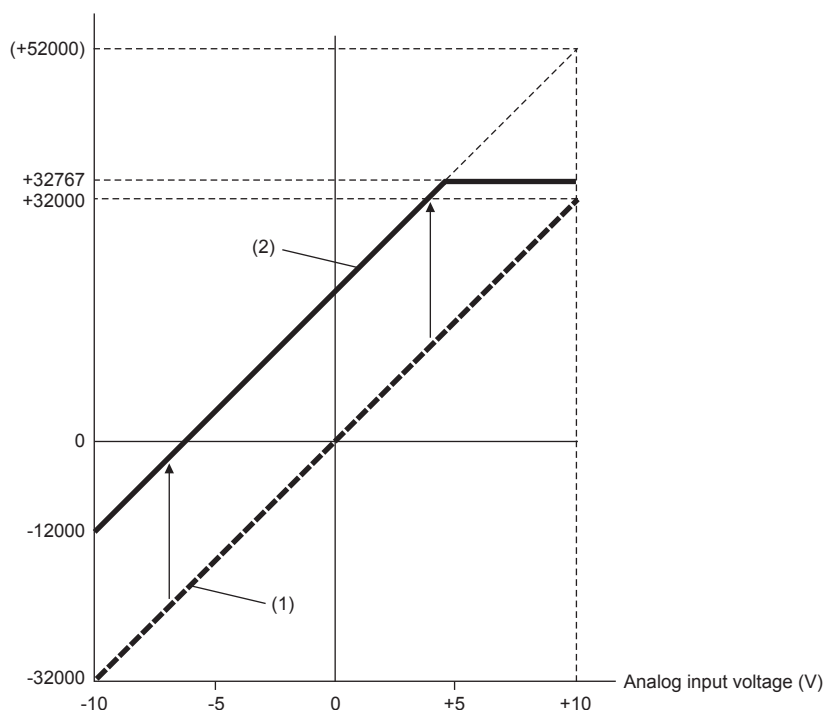


- (1) 'CH1 Digital output value' (Un\G400)  
+  
'CH1 Conversion value shift amount' (Un\G472) "+10"  
↓  
(2) 'CH1 Digital operation value' (Un\G402)

| Voltage input (V) | Digital output value | Digital operation value |
|-------------------|----------------------|-------------------------|
| 0                 | -10                  | 0                       |
| 5                 | 31990                | 32000                   |

**Ex.**

When the input characteristics is adjusted in a channel where the input range of -10 to +10 V is set by the shift function



- (1) 'CH1 Digital output value' (Un\G400)  
+  
'CH1 Conversion value shift amount' (Un\G472)  
"+20000"  
↓  
(2) 'CH1 Digital operation value' (Un\G402)

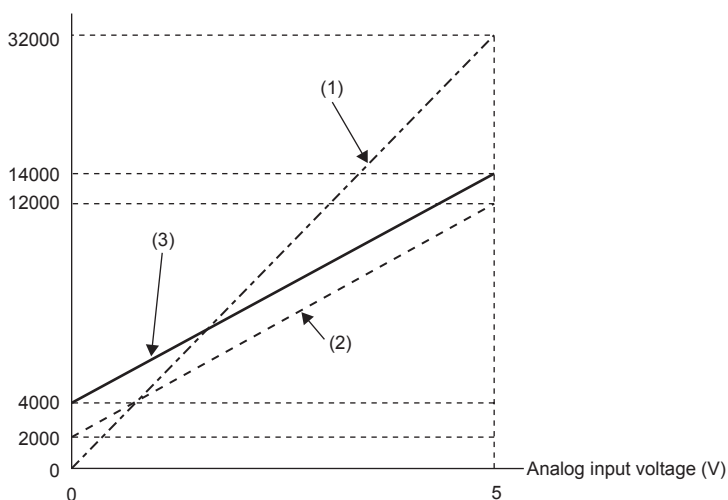
| Voltage input (V) | Digital output value | Digital operation value |
|-------------------|----------------------|-------------------------|
| -10               | -32000               | -12000                  |
| -5                | -16000               | +4000                   |
| 0                 | 0                    | +20000                  |
| +5                | +16000               | +32767 <sup>*1</sup>    |
| +10               | +32000               | +32767 <sup>*1</sup>    |

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

**Ex.**

When the following values are used for multiple input module with the input range of 0 to 5 V

| Item                                           | Setting    |
|------------------------------------------------|------------|
| '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)

| Voltage input (V) | Digital output value | Value after scaling | Digital operation value |
|-------------------|----------------------|---------------------|-------------------------|
| 0                 | 0                    | 2000                | 4000                    |
| 1                 | 6400                 | 4000                | 6000                    |
| 2                 | 12800                | 6000                | 8000                    |
| 3                 | 19200                | 8000                | 10000                   |
| 4                 | 25600                | 10000               | 12000                   |
| 5                 | 32000                | 12000               | 14000                   |

**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 350 Setting example

## Digital clipping function

Fixes a possible digital operation value to the maximum digital output value or the minimum digital output value when an input current or voltage 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 20 mA    | 0 to 32000                               | -768 to +32767                        |
| 0 to 20 mA    |                                          |                                       |
| 1 to 5 V      |                                          |                                       |
| 0 to 5 V      |                                          |                                       |
| 0 to 10 V     |                                          |                                       |
| -20 to +20 mA | -32000 to +32000                         | -32768 to +32767                      |
| -10 to +10 V  |                                          |                                       |

#### 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 32767 or greater: 32767
- When -32768 or smaller: -32768

### Setting procedure

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

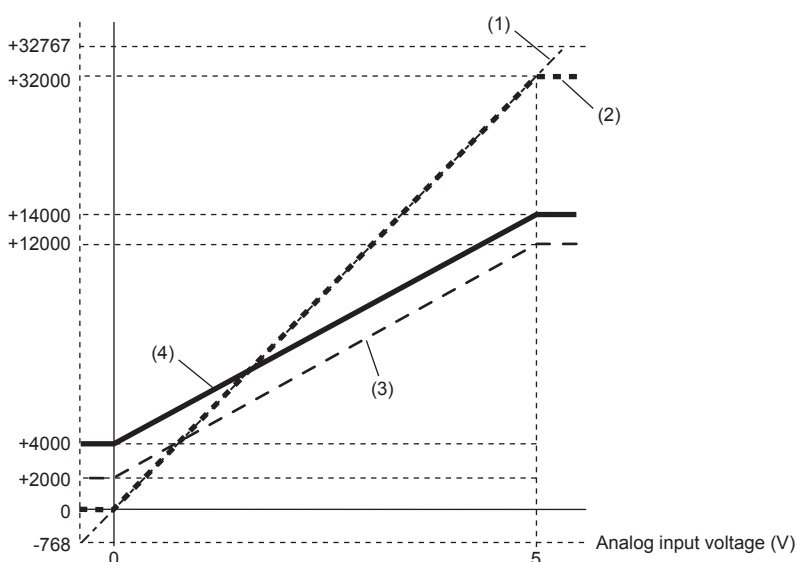
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter]  
⇒ [Application setting] ⇒ [Digital clipping function]

## Setting example

**Ex.**

When the following values are used for multiple input module with the input range of 0 to 5 V

| Item                                                    | Setting    |
|---------------------------------------------------------|------------|
| '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 voltage (V) | Digital output value | Digital operation value |
|-------------------|----------------------|-------------------------|
| -0.12             | -768                 | 4000                    |
| 0                 | 0                    | 4000                    |
| +1                | +6400                | 6000                    |
| +2                | +12800               | 8000                    |
| +3                | +19200               | 10000                   |
| +4                | +25600               | 12000                   |
| +5                | +32000               | 14000                   |
| +5.12             | +32767               | 14000                   |

### Point

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



## Maximum value/minimum value hold 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 average processing cycle. The values of the sampling processing, and moving average are updated on the sampling cycle.

### Resetting the maximum value and the minimum value

#### ■Resetting the maximum value

When 'CH1 Maximum value reset request' (Un\G473) turns on (1), 'CH1 Maximum value' (Un\G404) is updated with current value, and 'CH1 Maximum value reset completion flag' (Un\G422) turns on (1).

#### ■Resetting the minimum value

When 'CH1 Minimum value reset request' (Un\G474) turns on (1), 'CH1 Minimum value' (Un\G406) is updated with current value, and 'CH1 Minimum value reset completion flag' (Un\G423) turns on (1).

#### ■Resetting the maximum value and the minimum value

The following two types of average processing of the maximum value and minimum value are provided.

- Perform "Reset Maximum value" and "Reset Minimum value" respectively.
- 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406) are updated<sup>\*1</sup> with the current value when 'Operating condition setting request' (Un\G70, b9) turns on (1). 'CH1 Maximum value reset completion flag' (Un\G422) and 'CH1 Minimum value reset completion flag' (Un\G423) are not ON (1).

<sup>\*1</sup> When "Conversion disabled" is set to 'CH1 Input type/Range setting' (Un\G598), 0 is stored in 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406).

### 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.

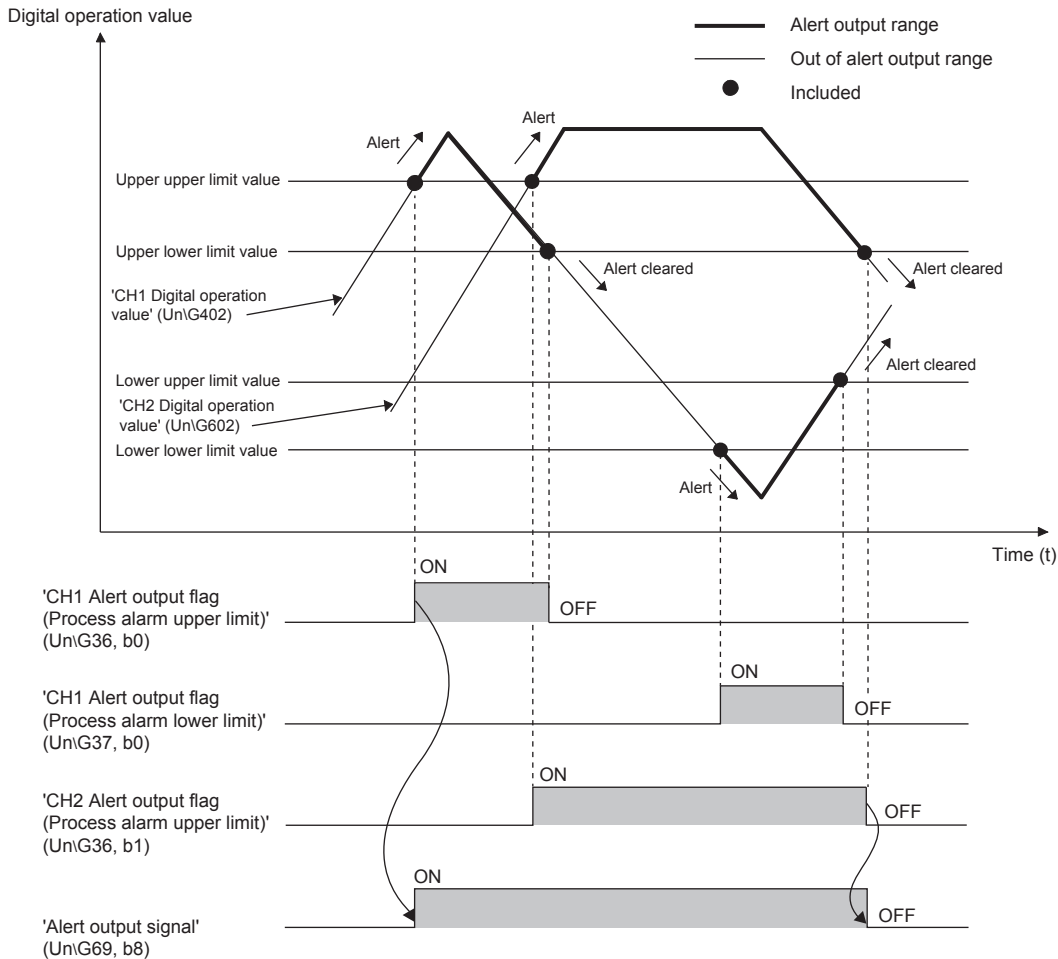
When the average processing, digital clipping function, scaling function, and shift function are used, the maximum value and minimum value of each function are stored.

# Alert output function

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

## Process alarm

Outputs an alert when a digital operation value falls within the preset alert output range.



## Operation

[Operation performed when an alert 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, an alert is output as follows.

- Alarm ON (1) is stored in 'Alert output flag (Process alarm upper limit)' (Un\G36) or 'Alert output flag (Process alarm lower limit)' (Un\G37).
- 'Alert output signal' (Un\G69, b8) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (Un\G2). (  Page 415 List of alarm codes)

### Point

The conversion on a channel where an alert was output continues.

[Operation after an alert was output]

After an alert was output, if the digital operation value does not satisfy the alert 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 corresponding to the channel of 'Alert output flag (Process alarm upper limit)' (Un\G36) or 'Alert output flag (Process alarm lower limit)' (Un\G37).

In addition, when all the bits of 'Alert output flag (Process alarm upper limit)' (Un\G36) and 'Alert output flag (Process alarm lower limit)' (Un\G37) return to Normal (0), 'Alert output signal' (Un\G69, b8) turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. Turn off→on→off 'Error clear request' (Un\G70, b15) to clear the alarm code.

### ■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, and moving average are specified, this function works at every conversion period.

### ■Detection target for outputting an alert

When using the digital clipping function, scaling function, and shift function, 'CH1 digital operation value' (Un\G402) digitally clipped, scale converted, and shifted are subject to alarm (process alarm).

### ■Operation performed when disconnection is detected

When input type is set to "resistance temperature detector" or "thermocouple", 'CH1 Digital output value' (Un\G400) changes according to 'CH1 Conversion setting at disconnection detection' (Un\G534), so process alarms may occur at the same time.

### ■Setting procedure

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

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [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". The setting range is from -32768 to +32767<sup>\*1</sup>.

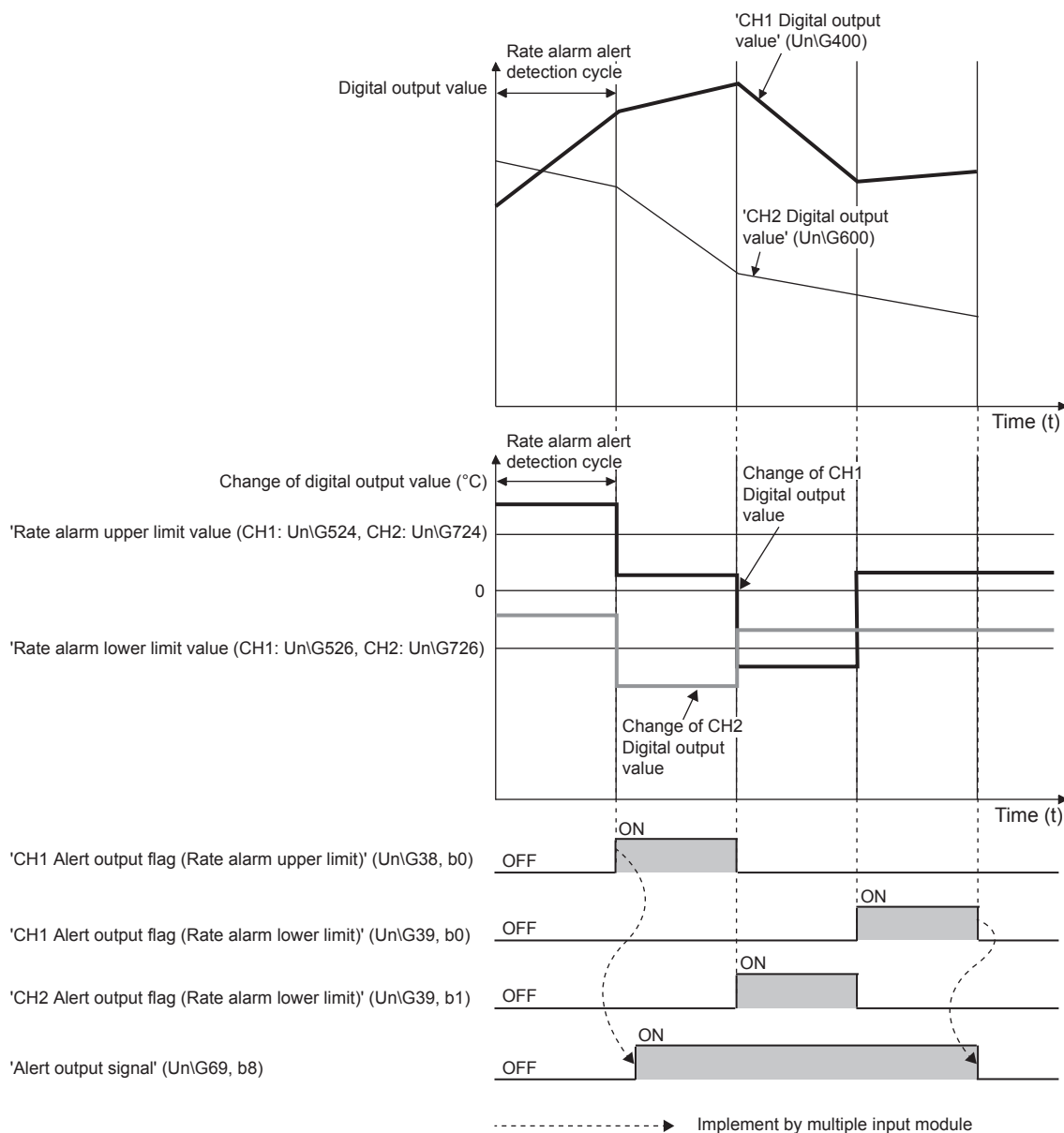
<sup>\*1</sup> When "RTD" or "Thermocouple" is set as the input type, set it in units of 0.1°C (°F) unit.

#### 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 an alert 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.



## ■Operation

[Operation performed when an alert is output]

Digital output values are monitored on the rate alarm alert 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, an alert is output as follows.

- Alarm ON (1) is stored in 'Alert output flag (Rate alarm upper limit)' (Un\G38) or 'Alert output flag (Rate alarm lower limit)' (Un\G39).
- 'Alert output signal' (Un\G69, b8) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (Un\G2). (  Page 415 List of alarm codes)

### Point

The conversion on a channel where an alert was output continues.

[Operation after an alert was output]

After an alert was output, if the change rate of a digital output value does not satisfy the alert 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 corresponding to the channel of 'Alert output flag (Rate alarm upper limit)' (Un\G38) or 'Alert output flag (Rate alarm lower limit)' (Un\G39).

In addition, when all 'Alert output flag (Rate alarm upper limit)' (Un\G38) and 'Alert output flag (Rate alarm lower limit)' (Un\G39) return to Normal (0), 'Alert output signal' (Un\G69, b8) turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. Turn off→on→off 'Error clear request' (Un\G70, b15) to clear the alarm code.

## ■Detection cycle

The rate alarm alert detection cycle is calculated by the following formula.

- Rate alarm alert detection cycle = Conversion cycle × Setting value of 'CH1 Rate alarm alert detection cycle setting' (Un\G522)

### Ex.

CH1: Current (4 to 20 mA), CH2 to 6: Conversion disabled, CH7: Pt100, CH8: When setting the input range to K and making the following settings

- 'CH1 Rate alarm alert detection cycle setting' (Un\G522): 5 (times)
- 'CH7 Rate alarm alert detection cycle setting' (Un\G1722): 8 (times)

The CH1 rate alarm alert detection cycle is 5 ms. (1 ms × 1 (CH) × 5 (times))

The CH7 rate alarm alert detection cycle is 640 ms. (40 ms × 2 (CH) × 8 (times))

## ■Judgment of rate alarm

The judgment of the rate alarm is judged by the following formula according to the rate alarm change rate selection and input type setting.

- When the rate alarm change rate selection is "rate specification"

Convert 'CH1 rate alarm upper limit value' (Un\G524) and 'CH1 rate alarm lower limit value' (Un\G526) to digit value for each rate alarm warning detection cycle value. The following shows the conversion formula of judgment values used for the rate alarm detection.

| Input type                                                | Conversion formula                                                                                                                                                    |
|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Case of current or voltage                                | Rate alarm upper limit (lower limit) <sup>*1</sup> × 0.1 × 0.01 × Maximum value of digital output value                                                               |
| Case of resistance temperature detector, and thermocouple | Rate alarm upper limit value (lower limit value) <sup>*1</sup> × 0.1 × 0.01 × (upper limit value of digital output value - lower limit value of digital output value) |

\*1 When the input type is "current" or "voltage", set it in units of 0.1% with respect to the width (gain value - offset value) of the analog input range.

When the input type is "RTD" or "Thermocouple", set it in units of 0.1% with respect to (maximum value - minimum value) of measured temperature value.

**Ex.**

The judgment under the following conditions

| Setting item                                 | Setting content      |
|----------------------------------------------|----------------------|
| Conversion enabled channels                  | CH1                  |
| CH1 Input type/range setting                 | Current (4 to 20 mA) |
| Rate alarm change rate selection             | Rate specification   |
| CH1 Average processing specification         | Sampling processing  |
| CH1 Rate alarm alert detection cycle setting | 5 times              |
| CH1 Rate alarm upper limit value             | 250 (25.0%)          |
| CH1 Rate alarm lower limit value             | 50 (5.0%)            |

In the above case, the current digital output value and the previous digital output value (digital output value of 5 ms before) are compared at each rate alarm warning detection cycle of 5 ms (1 ms × 5 times). As a result of the comparison, it is judged whether the increase of the digital output value is 8000 (= 250 × 0.1 × 0.01 × 32000) digit or more or 1600 (= 50 × 0.1 × 0.01 × 32000) digit or less.

- When the rate alarm change rate selection is "Digital output value specification"

It is judged by comparing the difference between the current digital output value and the digital output value in the previous detection cycle with the rate alarm upper limit value and the rate alarm lower limit value.

| Alarm occurrence condition                     | Conversion formula                                                                                                               |
|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| For alert outputting of rate alarm upper limit | Current digital output value - Digital output value at the previous detection cycle ≥ Rate alarm upper limit value <sup>*1</sup> |
| For alert outputting of rate alarm lower limit | Current digital output value - Digital output value at the previous detection cycle ≤ Rate alarm lower limit value <sup>*1</sup> |

\*1 When the input type is "RTD" or "Thermocouple", set the rate alarm upper limit (lower limit) in unit of 0.1°C.

**Ex.**

The judgment under the following conditions

| Setting item                                 | Setting content      |
|----------------------------------------------|----------------------|
| Conversion enabled channels                  | CH1                  |
| CH1 Input type/range setting                 | Pt100                |
| Rate alarm change rate selection             | Digital output value |
| CH1 Average processing specification         | Sampling processing  |
| CH1 Rate alarm alert detection cycle setting | 5 times              |
| CH1 Rate alarm upper limit value             | 10000 (1000.0°C)     |
| CH1 Rate alarm lower limit value             | 3200 (320.0°C)       |

In the above case, the current digital output value and the previous digital output value (digital output value of 200 ms before) are compared at each rate alarm warning detection cycle of 200 ms (40 ms × 5 times). From the comparison, whether the increase in the digital output value is 10000 (1000.0°C) or more, or 3200 (320.0°C) or less is judged.

## ■Detection target for outputting an alert

'CH1 Digital output value' (Un\G400) is a target for outputting an alert. The target is the same for when the scaling function is enabled.

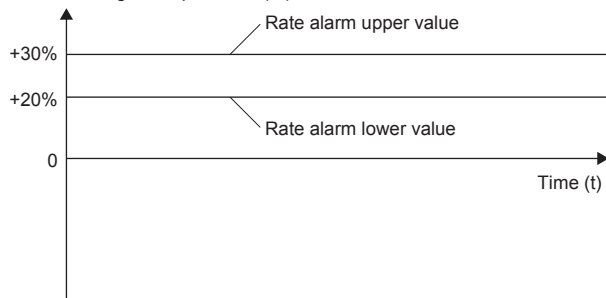
## ■Application examples of rate alarms

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

### • Example 1

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

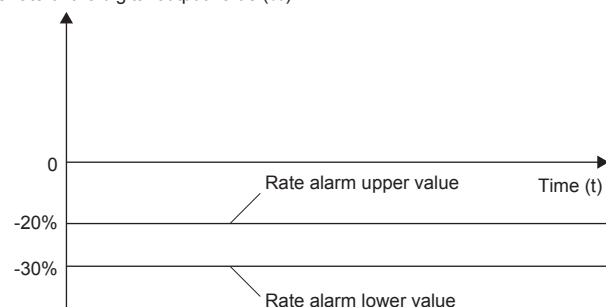
Change rate of the digital output value (%)



### • Example 2

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

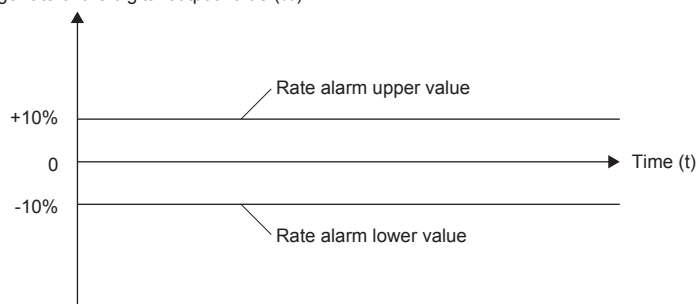
Change rate of the digital output value (%)



### • Example 3

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

Change rate of the digital output value (%)



## ■Operation performed when disconnection is detected

- At disconnection detection, a rate alarm may occur as well because 'CH1 Digital output value' (Un\G400) changes according to 'CH1 Conversion setting at disconnection detection' (Un\G531).
- At recovery time from disconnection, previous information (value) of rate alarm is cleared. Therefore, at the restart of conversion, even if the change rate of the digital output value (from before restart to after restart) is out of the limit range, an alert is not output.

## ■Setting procedure

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

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

2. Set the value to "Rate alarm change rate selection".

| Item                             | Setting range                         |
|----------------------------------|---------------------------------------|
| Rate alarm change rate selection | 0: Rate specification                 |
|                                  | 1: Digital output value specification |

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

| Item                         | Setting range    |
|------------------------------|------------------|
| Rate alarm upper limit value | -32768 to +32767 |
| 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.

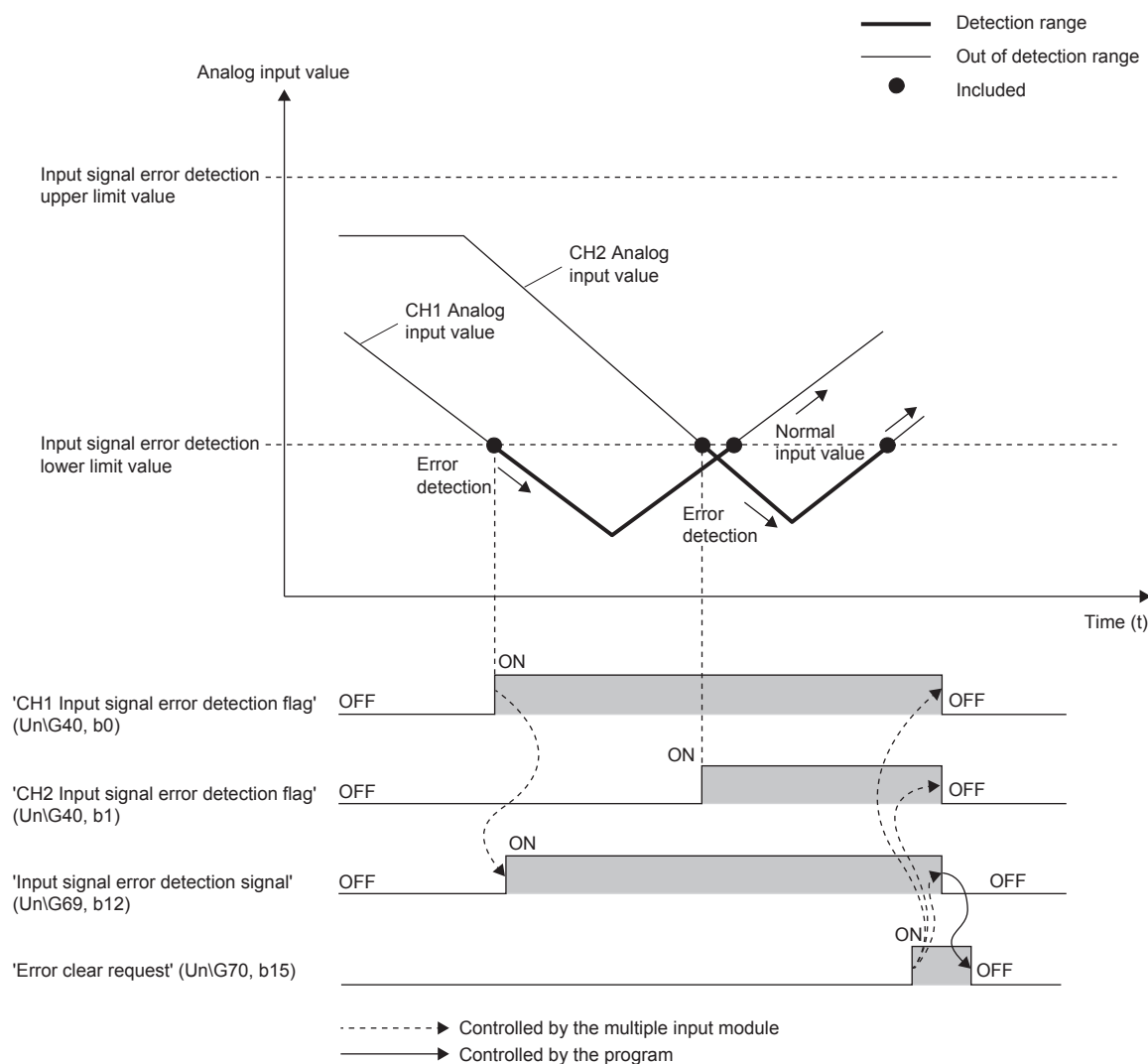
4. Set a value in "Rate alarm detection cycle setting".

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



# Input signal error detection function

Outputs an alarm when an analog input value exceeds the preset range.



## Point

Errors can also be cleared with the Input signal error auto-clear enable/disable setting. Refer to the following sections for details.

📖 Page 362 Clearing input signal errors

## Detection method

One of the following detection methods can be selected.

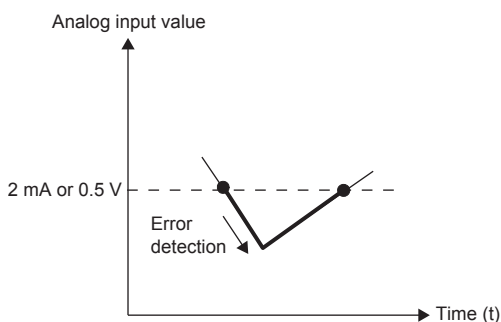
| Detection method                   | Detection condition                                                                                                                                                                                                                                          |   |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 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. |   |
| 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.                                                                                                                |   |
| 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.                                                                                                                |   |
| 4: Simple disconnection detection  | Simple disconnection detection is performed. For details, refer to the following.<br><a href="#">Page 361 Simple disconnection detection</a>                                                                                                                 |   |

## Simple disconnection detection

Outputs an alarm when an analog input value is 0.5 V or smaller or 2 mA or smaller.

By the input range setting, simple disconnection detection is enabled. The simple broken wire detection is supported only in the "4 to 20 mA" or "1 to 5 V" range. 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 20 mA  | Analog input value $\leq 2$ mA  |
| 1 to 5 V    | Analog input value $\leq 0.5$ V |



### Point

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' (Un\G69, b12) turns on.
- The ALM LED flashes.
- An alarm code is stored in 'Latest alarm code' (Un\G2). Alarm codes are stored whenever the analog input value satisfies the condition for the input signal error detection. (Page 415 List of alarm codes)
- The digital output value or digital operation value before the input signal error was detected is stored in 'CH1 logging data' (Un\G10000 to 19999) depending on the 'CH1 logging data setting' (Un\G536).

## 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 value does not satisfy the condition of the input signal error detection, the A/D conversion resumes regardless of off of 'Input signal error detection flag' (Un\G40) and 'Input signal error detection signal' (Un\G69, b12). (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 auto-clear enable/disable setting' (Un\G304).

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

After the analog input value returns within the setting range, the multiple input module arranges the following status automatically. After the analog input value returns within the setting range, turning off→on→off 'Error clear request' (Un\G70, b15) is not required.

- 'Input signal error detection flag' (Un\G40) is cleared.
- Input signal error detection signal (Un\G69, b12) turns off.
- The ALM LED turns off.

#### Point

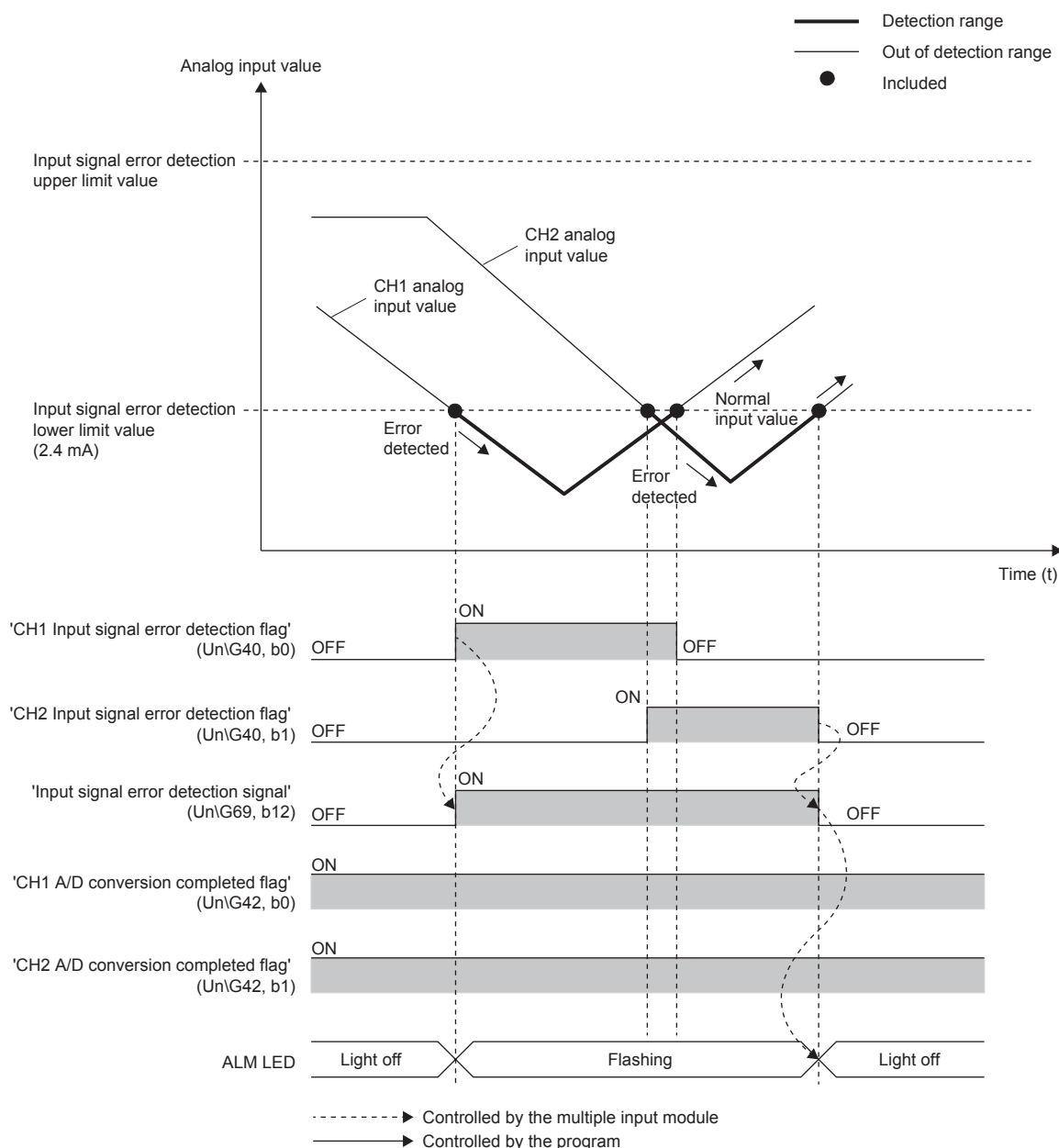
'Latest alarm code' (Un\G2) is not cleared.

After the analog input value returns within the setting range, turn off→on→off 'Error clear request' (Un\G70, b15) to clear 'Latest alarm code' (Un\G2).

**Ex.**

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

| Item                                                             | Setting                             |
|------------------------------------------------------------------|-------------------------------------|
| 'Input signal error auto-clear enable/disable setting' (Un\G304) | Enable (0)                          |
| Input range                                                      | 4 to 20 mA                          |
| 'CH1 Input signal error detection setting' (Un\G528)             | Upper and lower limit detection (1) |
| 'CH2 Input signal error detection setting' (Un\G728)             | Upper and lower limit detection (1) |
| Input signal error detection lower limit value                   | 2.4 mA                              |



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

After the analog input value returns within the set range, turn off→on→off Error clear request (Un\G70, b15).

The multiple input 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' (Un\G69, b12) 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. 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.

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

### ■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.

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

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 |
|-------------|-------------------|--------------|------------|
| Voltage     | 0 to 10 V         | 0 V          | 10 V       |
|             | 0 to 5 V          | 0 V          | 5 V        |
|             | 1 to 5 V          | 1 V          | 5 V        |
|             | -10 to +10 V      | 0 V          | 10 V       |
| Current     | 0 to 20 mA        | 0 mA         | 20 mA      |
|             | 4 to 20 mA        | 4 mA         | 20 mA      |
|             | -20 to +20 mA     | 0 mA         | 20 mA      |

## Setting procedure

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

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [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   |
|------------------------------------------------------------------------|-----------------|
| 'CH1 Input signal error detection lower limit setting value' (Un\G529) | 0.0 to 25.0 (%) |
| 'CH1 Input signal error detection upper limit setting value' (Un\G530) |                 |

### 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.

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

## 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 +10.235 V or falls below -10.24 V.

| Item                                                             | Setting value                       |
|------------------------------------------------------------------|-------------------------------------|
| Input range                                                      | -10 to +10 V                        |
| 'Input signal error auto-clear enable/disable setting' (Un\G304) | 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: -10.24 V
- Input signal error detection upper limit value: 10.235 V
- Offset value: 0.0 V
- Gain value: 10.0 V

[Calculation of lower limit value]

$$\begin{aligned} \text{Input signal error detection lower limit setting value} &= \frac{-10.0 - (-10.24)}{10.0 - 0.0} \times 1000 \\ &= 24 \text{ (2.4\%)} \end{aligned}$$

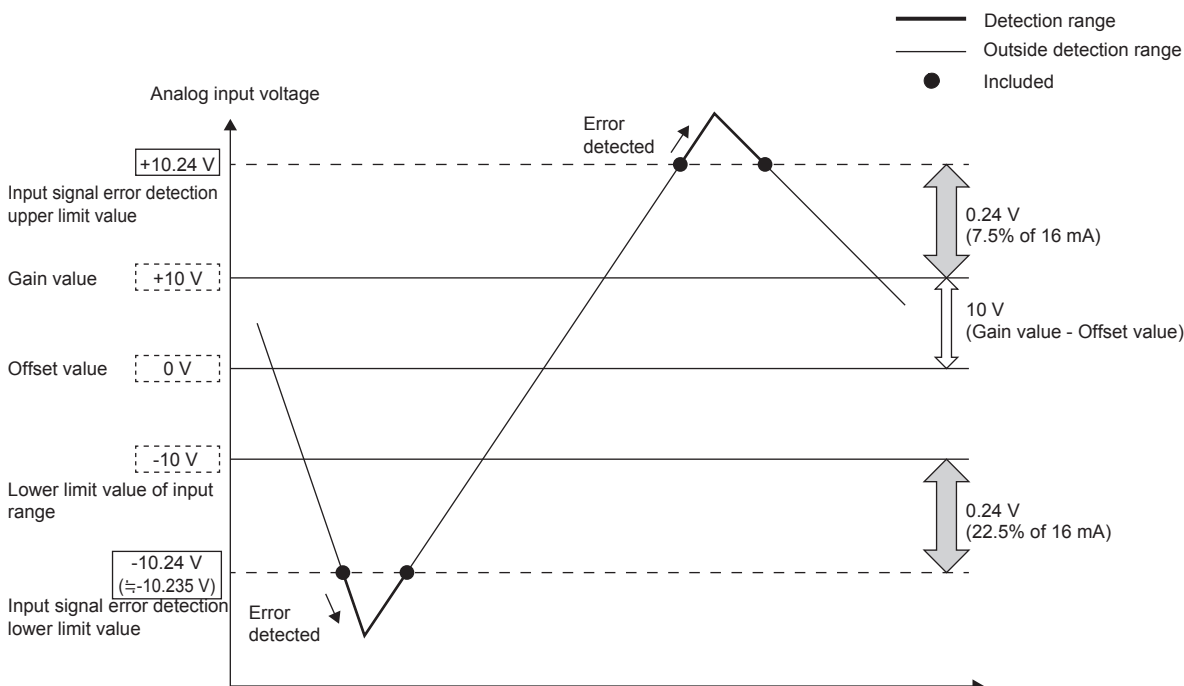
Set 'CH1 Input signal error detection lower limit set value' (Un\G529) to 24 (2.4%).

[Calculation of upper limit value]

$$\begin{aligned} \text{Input signal error detection upper limit setting value} &= \frac{10.235 - 10.0}{10.0 - 0.0} \times 1000 \\ &= 24 \text{ (2.35\%)} \end{aligned}$$

Set 'CH1 Input signal error detection upper limit set value' (Un\G530) to 24 (2.35%).

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



# Disconnection detection function

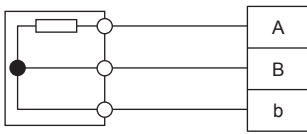
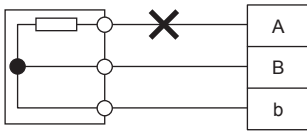
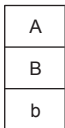
This function detects disconnection of a thermocouple or resistance temperature detector.

## Notification of disconnection

- Disconnection detection (1) is stored in a bit corresponding to the channel of 'Disconnection detection flag' (Un\G41).
- 'Disconnection detection signal' (Un\G69, b6) turns on.
- The ALM LED flashes.
- An alarm code is stored in 'Latest alarm code' (Un\G2). (  Page 415 List of alarm codes)
- A value specified in 'CH1 Conversion setting at disconnection detection' (Un\G534) (Value just before disconnection, Upscale, Downscale, or Any value) is stored in 'CH1 Digital output value' (Un\G400).
- The value calculated with the scaling function and shift function is stored in 'CH1 digital operation value' (Un\G402) and 'CH1 digital output value' (Un\G400).
- The digital output value or digital operation value is stored in 'CH1 logging data' (Un\G10000 to 19999) depending on the 'CH1 logging data setting' (Un\G536).
- The 'CH1 maximum value' (Un\G404) and 'CH1 minimum value' (Un\G406) are updated with the maximum and minimum values of the digital operation value.

## Relationship of disconnection detection and conversion enable/disable setting

The disconnection detection is executed only for a channel where conversion is set to be enabled. The following table shows the relationship of disconnection detection and state of conversion enable/disable setting.

| Connection status                                                                                          | State of conversion enable/disable setting | Disconnection detection flag |
|------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------|
|  <p>No disconnection</p> | Conversion enable                          | 0 (OFF)                      |
|                                                                                                            | Conversion disable                         |                              |
|  <p>Disconnection</p>   | Conversion enable                          | 1 (ON)                       |
|                                                                                                            | Conversion disable                         | 0 (OFF)                      |
|  <p>No connection</p>   | Conversion enable                          | 1 (ON)                       |
|                                                                                                            | Conversion disable                         | 0 (OFF)                      |

## Recovery from disconnection

When the cause of the disconnection is eliminated and the connection of external devices is established, the operation after this recovery varies depending on the setting of 'Input signal error/Disconnection detection automatic clear enable/disable setting' (Un\G304).

### ■Case of Enable (0)

Normal (0) is stored in the bit corresponding to 'Disconnection detection flag' (Un\G41) of the recovered channel. After Normal (0) is stored in all the bits of 'Disconnection detection flag' (Un\G41), 'Disconnection detection signal' (Un\G69, b6) automatically turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. Turn off→on→off 'Error clear request' (Un\G70, b15) to clear the alarm code.

### ■Case of Disable (1)

'Disconnection detection flag' (Un\G41), 'Disconnection detection signal' (Un\G69, b6), and the ALM LED hold the status at the time of the disconnection detection. To return to the normal status, make a recovery from disconnection of all the channels, and turn off→on→off 'Error clear request' (Un\G70, b15).



## Detection cycle

Disconnection detection is executed every sampling cycle.

## Conversion setting at disconnection detection

A value stored in 'CH1 Digital output value' (Un\G400) at the time of the disconnection detection can be specified by setting 'CH1 Conversion setting at disconnection detection' (Un\G534). This enables disconnection detection only by checking 'CH1 Digital output value' (Un\G400), without checking 'Disconnection detection signal' (Un\G69, b6). The default value of 'CH1 Conversion setting at disconnection detection' (Un\G534) is Downscale (1). Change the setting value if necessary.

| Conversion setting at disconnection detection | Operation performed when disconnection is detected                                                                                           |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 0: Upscale                                    | An upscale value of the presently set input range (upper limit value +5% of input range) is stored in 'CH1 Digital output value' (Un\G400).  |
| 1: Downscale                                  | A downscale value of the presently set input range (lower limit value -5% of input range) is stored in 'CH1 Digital output value' (Un\G400). |
| 2: Any value                                  | A value set in 'CH1 Conversion setting value at disconnection detection' (Un\G532) is stored in 'CH1 Digital output value' (Un\G400).        |
| 3: Value just before disconnection            | 'CH1 Digital output value' (Un\G400) holds a value just before the disconnection is detected.                                                |

## ■Upscale, downscale

An upscale value (upper limit value +5% of input range) or a downscale value (lower limit value -5% of input range) of the set input range is stored in 'CH1 Digital output value' (Un\G400) at the time of the disconnection detection. The following tables list a value stored in 'CH1 Digital output value' (Un\G400) at the disconnection detection, when the upscale or downscale is selected.

- Case of thermocouple

| Input range |                 | Temperature measuring range | Down Scale | Up Scale |
|-------------|-----------------|-----------------------------|------------|----------|
| K           | Centigrade (°C) | -270 to +1370°C             | -352.0°C   | 1452.0°C |
|             | Fahrenheit (°F) | -454 to +2498°F             | -601.6°F   | 2645.6°F |
| J           | Centigrade (°C) | -210 to +1130°C             | -277.0°C   | 1197.0°C |
|             | Fahrenheit (°F) | -346 to +2066°F             | -466.6°F   | 2186.6°F |
| T           | Centigrade (°C) | -270 to +400°C              | -303.5°C   | 433.5°C  |
|             | Fahrenheit (°F) | -454 to +752°F              | -514.3°F   | 812.3°F  |
| B           | Centigrade (°C) | 0 to 1710°C                 | -85.5°C    | 1795.5°C |
|             | Fahrenheit (°F) | 32 to 3110°F                | -121.9°F   | 3263.9°F |
| R           | Centigrade (°C) | -50 to +1710°C              | -138.0°C   | 1798.0°C |
|             | Fahrenheit (°F) | -58 to +3110°F              | -216.4°F   | 3268.4°F |
| S           | Centigrade (°C) | -50 to +1710°C              | -138.0°C   | 1798.0°C |
|             | Fahrenheit (°F) | -58 to +3110°F              | -216.4°F   | 3268.4°F |

- Case of resistance temperature detector

| Input range |                 | Temperature measuring range | Down Scale | Up Scale |
|-------------|-----------------|-----------------------------|------------|----------|
| Pt100       | Centigrade (°C) | -200 to +850°C              | -252.5°C   | 902.5°C  |
|             | Fahrenheit (°F) | -328 to +1562°F             | -422.5°F   | 1656.5°F |
| Ni100       | Centigrade (°C) | -60 to +250°C               | -75.5°C    | 265.5°C  |
|             | Fahrenheit (°F) | -76 to +482°F               | -103.9°F   | 509.9°F  |

## ■Any value

At the time of the disconnection detection, a value set in 'CH1 Conversion setting value at disconnection detection' (Un\G532) is stored in 'CH1 Digital output value' (Un\G400).

The default value of 'CH1 Conversion setting value at disconnection detection' (Un\G532) is 0. The value can be changed to any value although using 0 is no problem.

### Point

- When the scaling function is used, a value according to the setting of 'CH1 Conversion setting at disconnection detection' (Un\G534) is scale converted and then stored as a scaling value.
- When using the shift function, the value obtained by the conversion value shift rate to the scale converted value is stored.

## Setting procedure

1. Set "Disconnection detection function enable/disable setting" to "Enable".

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Disconnection detection function]

2. Set "Input signal error detection/disconnection detection auto-clear enable/disable setting" to "Enable" or "Disable".
3. Using "Conversion setting for disconnection detection", set what value is to be stored in 'CH1 Digital output value' (Un\G400) at the time of the disconnection detection.

| Item                                          | Setting range                                                                                                                                          |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Conversion setting at disconnection detection | <ul style="list-style-type: none"><li>• Up Scale</li><li>• Down Scale</li><li>• Given Value</li><li>• Value immediately before disconnection</li></ul> |

4. When "Given Value" is set, set "Conversion setting value for disconnection detection".

| Item                                                 | Setting range                 |
|------------------------------------------------------|-------------------------------|
| Conversion setting value for disconnection detection | -32768 to +32767 (0.1°C unit) |

### Point

It takes up to 355 ms to detect a broken wire.

# Logging function

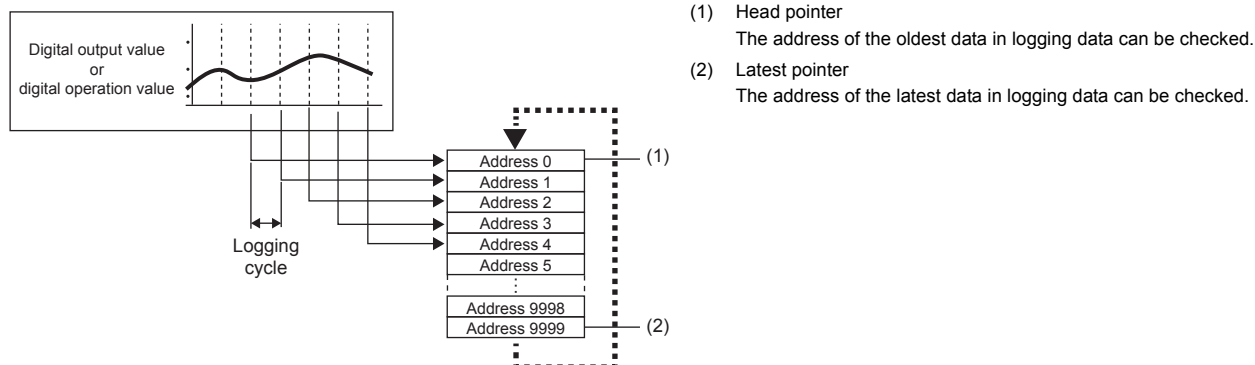
Logs (records) digital output values or digital operation values. 10000 points of data can be logged for each channel. Logging data are stored in the buffer memory area. In addition, the data collection can be stopped by using the status change of the data as a trigger. This function also helps the error analysis since the data before and after the occurrence of an error is held.

## Logging function

### ■Collecting logging data

Logging data is collected as follows.

- 10000 points of the latest digital output values or digital operation values can be always collected for each channel.
- It can be collected at the specified interval (logging cycle).



### Point

When the number of stored data points is 10001 or greater, data is sequentially overwritten from address 0 with new data.

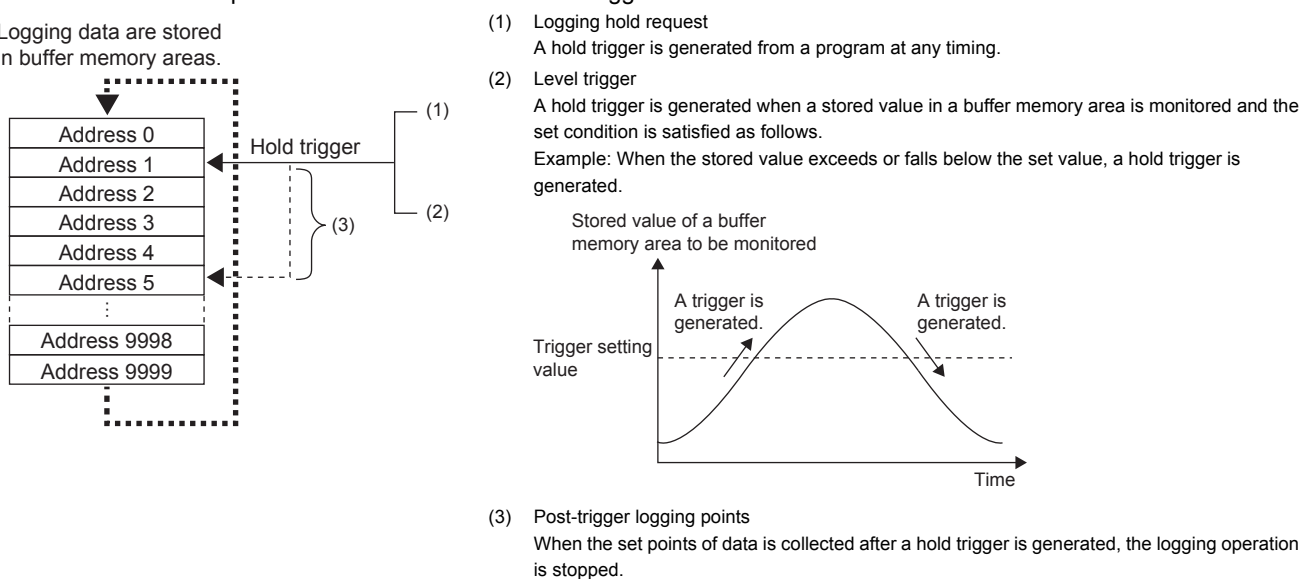
### ■Stopping the logging operation

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.

Logging data are stored in buffer memory areas.

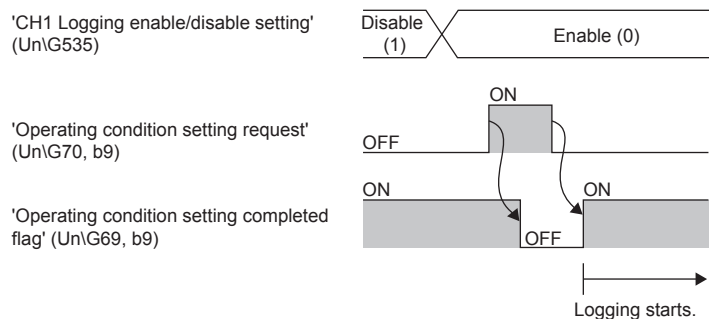


## Operation of logging

### ■Starting logging data collection

Logging data collection starts when Enable (0) is set in 'CH1 Logging enable/disable setting' (Un\G535) and 'Operating condition setting request' (Un\G70, b9) turns off→on→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\G19999) on the set logging cycle.



### ■Logging data

Logging data are stored in the following buffer memory areas.

When the number of stored data points is 1001 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\G19999        |
| CH2     | Un\G20000 to Un\G29999        |
| CH3     | Un\G30000 to Un\G39999        |
| CH4     | Un\G40000 to Un\G49999        |
| CH5     | Un\G50000 to Un\G59999        |
| CH6     | Un\G60000 to Un\G69999        |
| CH7     | Un\G70000 to Un\G79999        |
| CH8     | Un\G80000 to Un\G89999        |

If logging has been performed even once, 0 is stored for all the logging data above at the timing when 'Operating condition setting request' (Un\G70, b9) turns off→on→off.

### ■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' (Un\G538) | Setting range of 'CH1 Logging cycle setting value' (Un\G537)                                                                                                                                                         |
|-------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ms (1)                                                      | <ul style="list-style-type: none"> <li>• 1 to 32767 (When the input range is "current", and "voltage")</li> <li>• 40 to 32767 (When the input range is thermocouple, and resistance temperature detector)</li> </ul> |
| 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 temperature conversion method.

| Temperature conversion method | Input type       | Conversion cycle                                                                                                                                                                                                                                                                                  |
|-------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sampling processing           | Current/Voltage  | Conversion speed (1 ms) × Number of channels where the A/D conversion is enabled                                                                                                                                                                                                                  |
|                               | RTD/Thermocouple | Conversion speed (40 ms) × Number of channels where the temperature conversion is enabled                                                                                                                                                                                                         |
| Time average                  | Current/Voltage  | $\left( \frac{\text{Time set in Time average/Count average/Moving average}}{\text{Number of A/D conversion enabled channels} \times \text{Conversion speed (1 ms)}} \right)^{*1} \times \text{Number of A/D conversion enabled channels} \times \text{Conversion speed (1 ms)}$                   |
|                               | RTD/Thermocouple | $\left( \frac{\text{Time set in Time average/Count average/Moving average}}{\text{Number of temperature conversion enabled channels} \times \text{Conversion speed (40 ms)}} \right)^{*1} \times \text{Number of temperature conversion enabled channels} \times \text{Conversion speed (40 ms)}$ |
| Count average                 | Current/Voltage  | (The count set to CH1 Time average/Count average/Moving average) × (Conversion speed (1ms) × Number of channels where the A/D conversion is enabled)                                                                                                                                              |
|                               | RTD/Thermocouple | (The count set to CH1 Time average/Count average/Moving average) × (Conversion speed (40ms) × Number of channels where the temperature conversion is enabled)                                                                                                                                     |
| Moving average                | Current/Voltage  | Conversion speed (1 ms) × Number of channels where the A/D conversion is enabled                                                                                                                                                                                                                  |
|                               | RTD/Thermocouple | Conversion speed (40 ms) × Number of channels where the temperature conversion is enabled                                                                                                                                                                                                         |

\*1 Values after the decimal point are omitted.

**Ex.**

With the following settings, the conversion cycle is 240 ms and the actual logging cycle is every 6720 ms (integral multiple of 240 ms).

| Item                                      | Setting                            |
|-------------------------------------------|------------------------------------|
| Conversion enabled channels               | CH1 to CH8                         |
| CH3 Logging data setting                  | Digital output value               |
| CH1, 2 average processing specification   | Sampling processing (Current)      |
| CH3 to 8 average processing specification | Sampling processing (Thermocouple) |
| CH3 Logging cycle setting value           | 6950                               |
| CH3 Logging cycle unit specification      | ms                                 |

The following values are stored in 'CH3 Logging cycle monitor value' (Un\G841, Un\G842).

| Buffer memory address | Item                                                 | Stored value |
|-----------------------|------------------------------------------------------|--------------|
| 841                   | 'CH3 Logging cycle monitor value' (Un\G841, Un\G842) | 6 (s)        |
| 842                   |                                                      | 720 (ms)     |

## ■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' (Un\G70, b9) is turned off→on→off.

- 'CH1 Time Average/Count Average/Moving Average' (Un\G502) setting error: Error code (192□H to 194□H)
- Logging function setting error: Error code (1D0□H to 1D6□H)

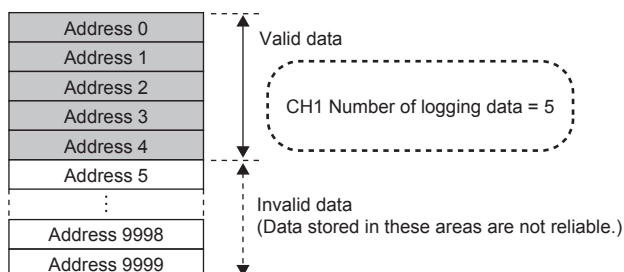
### Point

When 'Operating condition setting request' (Un\G70, b9) is turned off→on→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), 'Error flag' (Un\G69, b15) and the ERROR LED turn on.

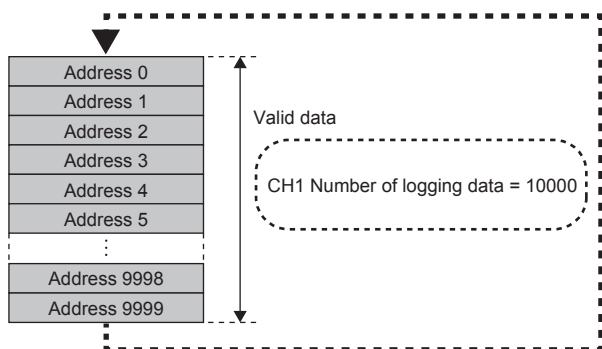
## ■Number of logging data

With 'CH1 Number of logging data' (Un\G436), the number of valid data in 'CH1 Logging data' (Un\G10000 to Un\G19999) can be checked.

- When the number of collected data points is less than 10000



- When the number of collected data points is 10001 or greater



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

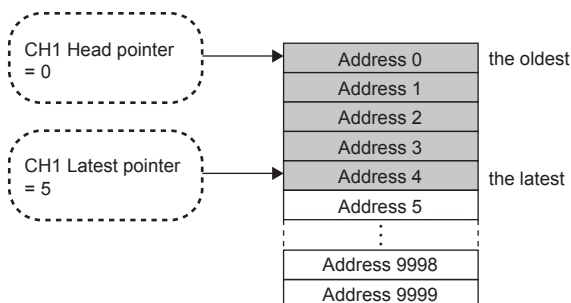
When CH1 Logging data (Un\G10000 to Un\G19999) becomes full (Number of logging data = 10000), the next data is stored in the head address of CH1 Logging data (Un\G10000 to Un\G19999), and the logging operation continues overwriting the existing data. In this case, the number of logging data is fixed to 10000.

## ■Head pointer and latest pointer

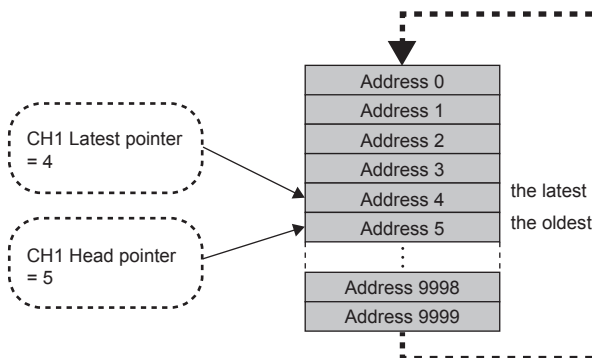
The storage location of the oldest data and the latest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with the following buffer memory areas.

| Buffer Memory Areas          | Description                                                                                                                                                                                                                                                |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CH1 Head pointer (Un\G434)   | The buffer memory address of the oldest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with this buffer memory area. The offset value (0 to 9999) counted from the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored. |
| CH1 Latest pointer (Un\G435) | The buffer memory address of the latest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with this buffer memory area. The offset value (0 to 9999) counted from the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored. |

- When the number of collected data points is less than 10000



- When the number of collected data points is 10001 or greater



The head pointer does not change until CH1 Logging data (Un\G10000 to Un\G19999) becomes full after the logging start (fixed to 0).

When CH1 Logging data (Un\G10000 to Un\G19999) becomes full and overwriting the data starts from the start address, the head pointer increases by one each time new data is stored.

## ■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 the head pointer and the number of logging data, 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 374 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.

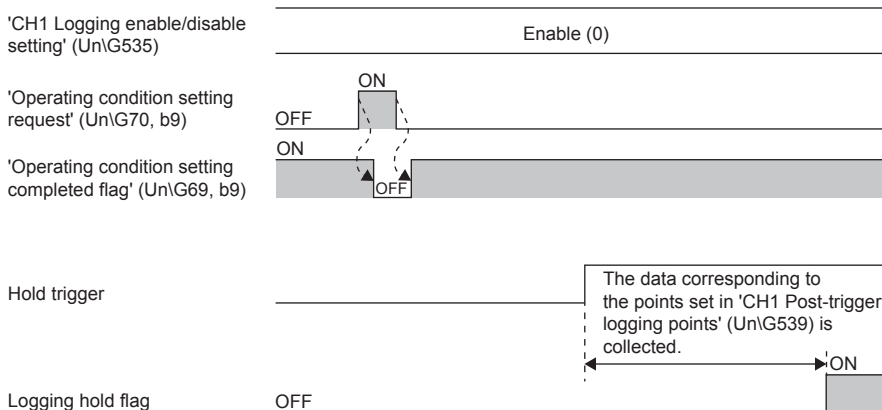
A trigger that is generated when the condition is satisfied is called a hold trigger.

To generate a hold trigger, the following two methods are available.

☞ Page 377 Logging hold request

☞ Page 378 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).

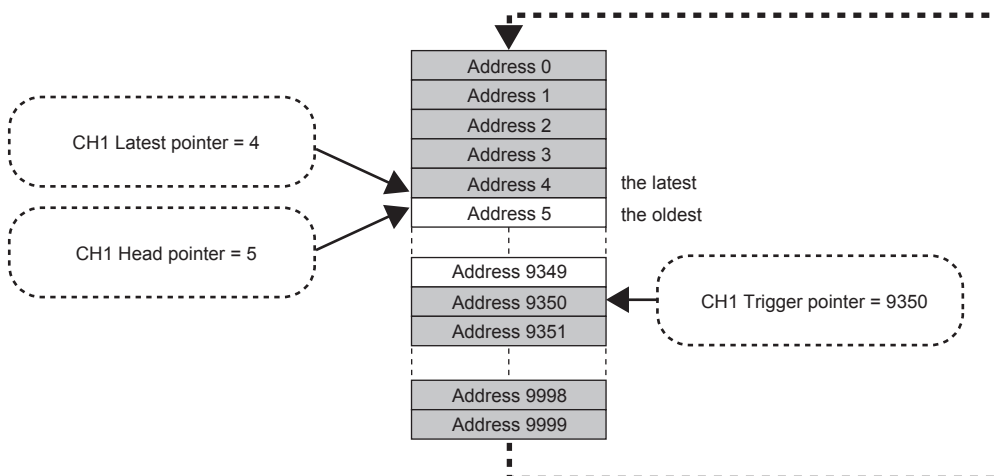
### ■Checking data when a hold trigger has occurred

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\G19999) is stored in 'CH1 Trigger pointer' (Un\G437).

#### Ex.

The value stored in Trigger pointer 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: 9350th 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                               | to | b8 b7                            | to | 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                                                               | Storage contents                                                                                                                                                                                                                                                     | Storage example*1 |
|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| First two digits of the year/Last two digits of the year           | Stored in BCD code.                                                                                                                                                                                                                                                  | 2017H             |
| Month/Day                                                          |                                                                                                                                                                                                                                                                      | 0130H             |
| Hour/Minute                                                        |                                                                                                                                                                                                                                                                      | 1035H             |
| Second                                                             |                                                                                                                                                                                                                                                                      | 40H               |
| Day of the week                                                    | One of the following values is stored in BCD code. <ul style="list-style-type: none"> <li>• Sunday: 00H</li> <li>• Monday: 01H</li> <li>• Tuesday: 02H</li> <li>• Wednesday: 03H</li> <li>• Thursday: 04H</li> <li>• Friday: 05H</li> <li>• Saturday: 06H</li> </ul> | 01H               |
| Millisecond (higher-order digits)/Millisecond (lower-order digits) | Stored in BCD code.                                                                                                                                                                                                                                                  | 0628H             |

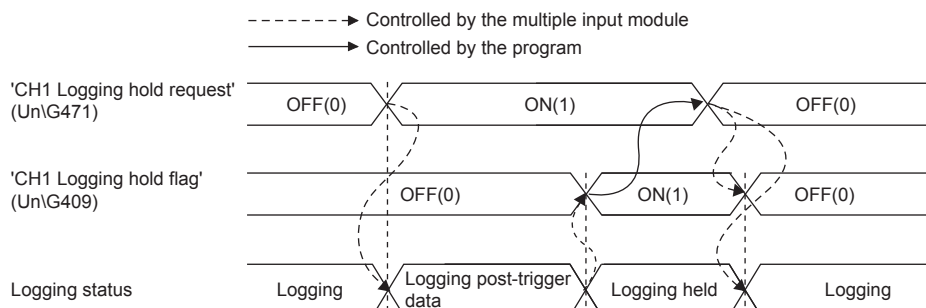
\*1 These values assume that a trigger is generated at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

## ■Resuming the logging

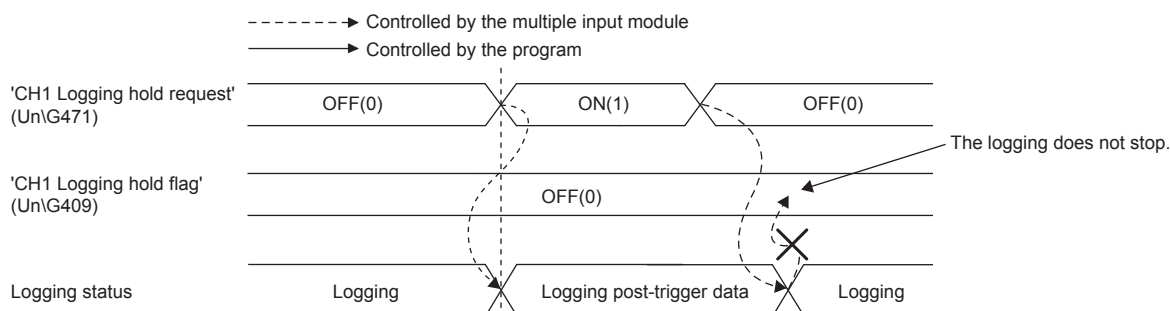
It may take time until ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) after 'CH1 Logging hold request' (Un\G471) is changed off→on.

To resume logging, check that ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) and change 'CH1 Logging hold request' (Un\G471) on→off. After logging resumes, the value is stored from the start buffer memory area of CH1 Logging data (Un\G10000 to Un\G19999).

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 → off before ON (1) is stored in 'CH1 Logging hold flag' (Un\G409).



### • Buffer memory area status when logging resumes

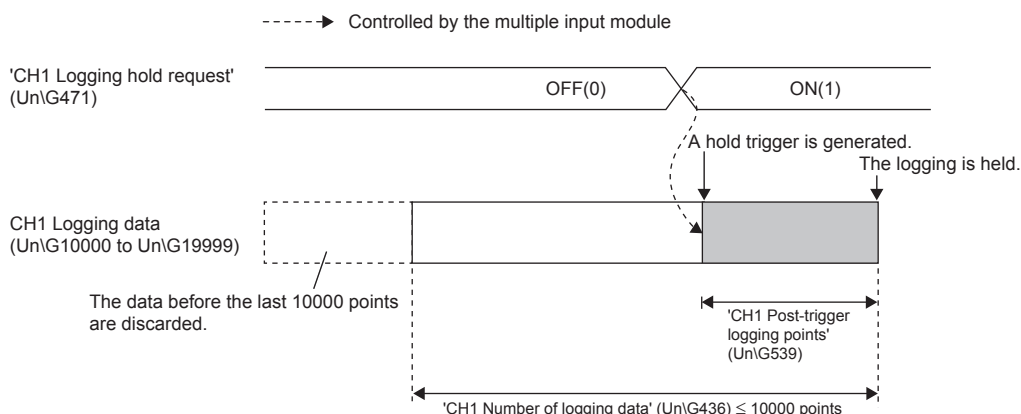
The following table shows the buffer memory area status when logging resumes.

| Item                                               | Status of Buffer Memory Areas                                                                                                                                                                                                                                                      |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| '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\G19999)        | 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\G19999). 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.

After ON (1) is set to 'CH1 Logging hold request' (Un\G471), a preset number of data is collected and then the logging stops.



### Point

- The following delay time occurs until multiple input module receives a hold trigger after the value in 'CH1 Logging hold request' (Un\G471) is changed from OFF (0)→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)→OFF (0) before 'CH1 Logging hold flag' (Un\G409) turns to ON (1), the number of data set in 'CH1 Post-trigger logging points' (Un\G539) is collected, and then logging resumes soon, without stopping.
- 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' (Un\G69, b15) and the ERROR LED turn on.

## ■Checking that the logging has stopped

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

## Level trigger

When a value in the monitored buffer memory area of multiple input module satisfies a preset condition, a hold trigger is generated.

The level trigger is monitored at the conversion cycle.

### ■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 multiple input 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.

#### Ex.

Application example of 'Level data 1' (Un\G91)

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

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

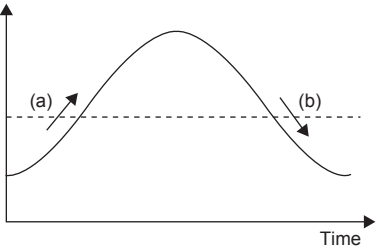


#### Point

- Specify an 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.
- If other than 0 to 9999 is set for 'CH1 Trigger data' (Un\G541), an error occurs. A trigger data setting range error (error code: 1D6□H) is stored in 'Latest error code' (Un\G0), 'Error flag' (Un\G69, b15) and the ERROR LED turns on.

[Setting the monitoring condition]

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

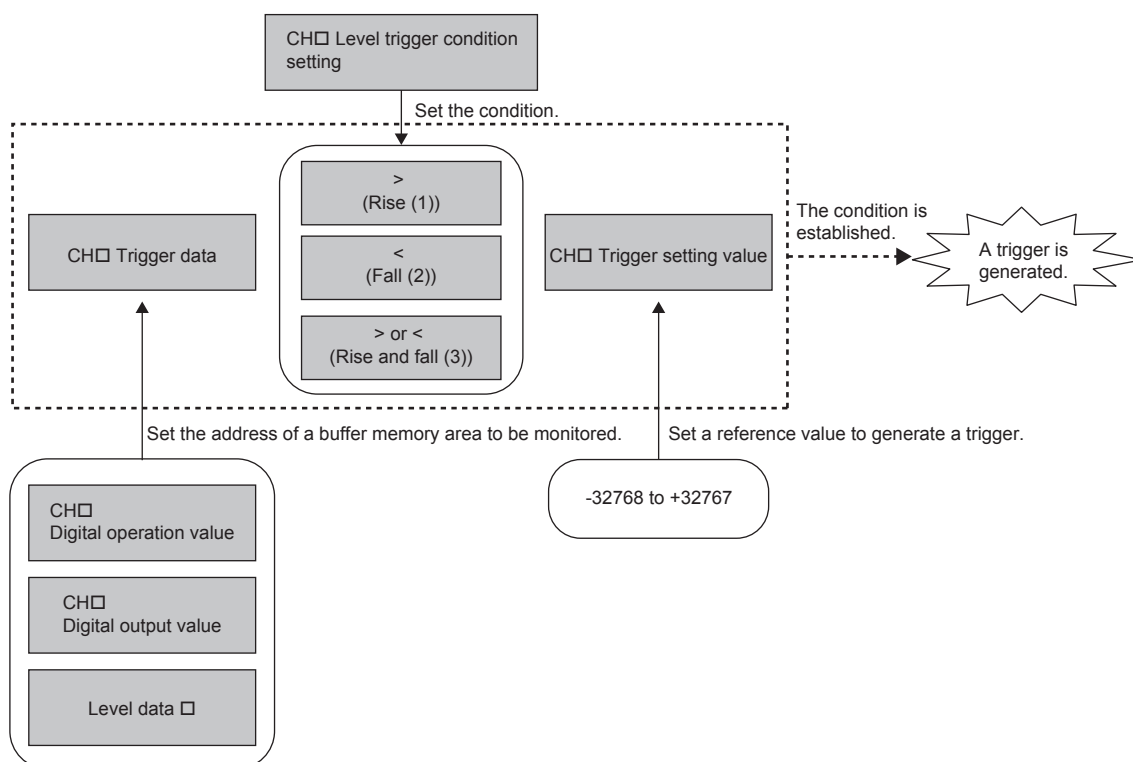
| Setting value                               | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                             |
|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| 1: Level trigger (Condition: Rise)          | <p>Stored value of a buffer memory area to be monitored</p>  <p>Trigger setting value</p> <p>Time</p> <p>(a) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored <math>\leq</math> Trigger setting value" to "Stored value of a buffer memory area to be monitored <math>&gt;</math> Trigger setting value".</p> <p>(b) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored <math>\geq</math> Trigger setting value" to "Stored value of a buffer memory area to be monitored <math>&lt;</math> Trigger setting value".</p> | A hold trigger is generated under the condition (a).        |
| 2: Level trigger (Condition: Fall)          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | A hold trigger is generated under the condition (b).        |
| 3: Level trigger (Condition: Rise and fall) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 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.



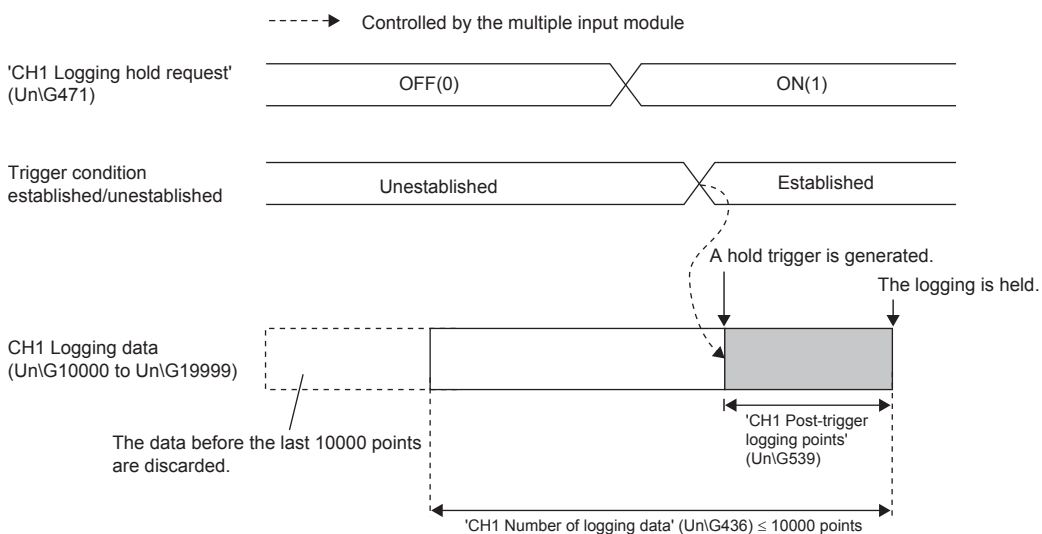
For example if trying to generate a hold trigger when a value in 'CH1 Digital output value' (Un\G400) is greater than 1000, set as follows.

- 'CH1 Level trigger condition setting' (Un\G540): Rise (1)
- 'CH1 Trigger data' (Un\G541): 400
- 'CH1 Trigger setting value' (Un\G542): 1000

## ■Operation of a level trigger

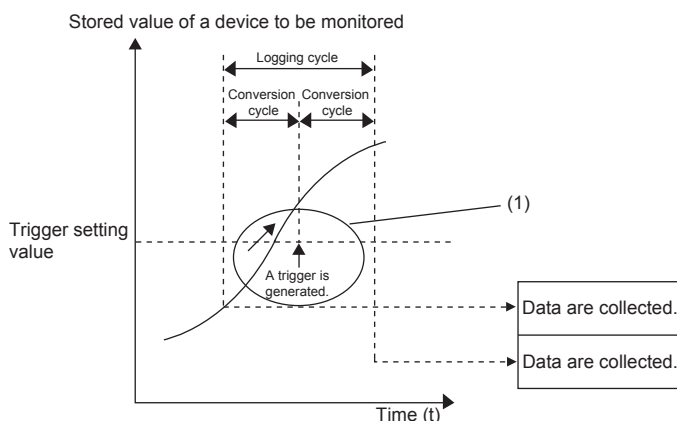
To use a level trigger, set ON (1) to 'CH1 Logging hold request' (Un\G471) in advance. At the point where ON (1) has been set to 'CH1 Logging hold request' (Un\G471), the module becomes the trigger condition wait status.

After the trigger condition has been satisfied, and the set points of the data have been collected from that point, the logging stops.



### 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\G19999) 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\G19999), arrange related settings so that the conversion cycle of the monitoring target value (a 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.

- 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 the "Input type", and "Input range".

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

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

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

3. Set the target data to be logged in "Logging data setting". Set either of "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 either of 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 for a level trigger to "Trigger data".
9. Set a level where a level trigger operates for "Trigger setting value".

# Error history function

This function records up to 16 errors and alarms that occurred in a multiple input module to store them in the buffer memory areas.

## Operation

When an error occurs, the error code and error time are stored in order, beginning with Error history No. 1 (Un\G3600 to Un\G3609).

When an alarm occurs, the alarm code and the alarm time are stored from Alarm history No. 1 (Un\G3760 to Un\G3769) in order.

- Detail of the error code assignment

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3606 | System area                  |    |                             |    |    |
| ⋮        |                              |    |                             |    |    |
| Un\G3609 |                              |    |                             |    |    |

- Detail of the alarm code assignment

|          |                              |    |                             |    |    |
|----------|------------------------------|----|-----------------------------|----|----|
|          | b15                          | to | b8 b7                       | to | 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 (upper)          |    | Millisecond (lower)         |    |    |
| Un\G3766 | System area                  |    |                             |    |    |
| :        |                              |    |                             |    |    |
| Un\G3769 |                              |    |                             |    |    |

### Ex.

Example of error history and alarm history storage

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

<sup>\*1</sup> These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

The start address of error history where the latest error is stored, can be found in 'Latest address of error history' (Un\G1).

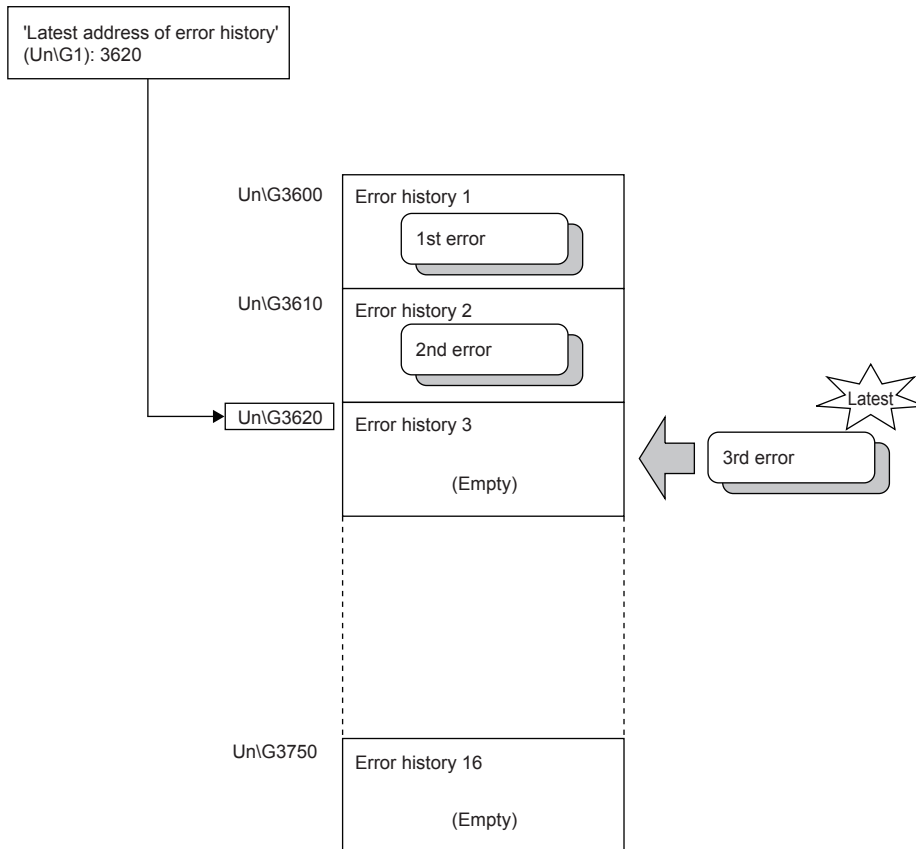
The start address of alarm history where the latest alarm is stored, can be found in 'Latest address of alarm history' (Un\G3).



**Ex.**

When the third error occurs:

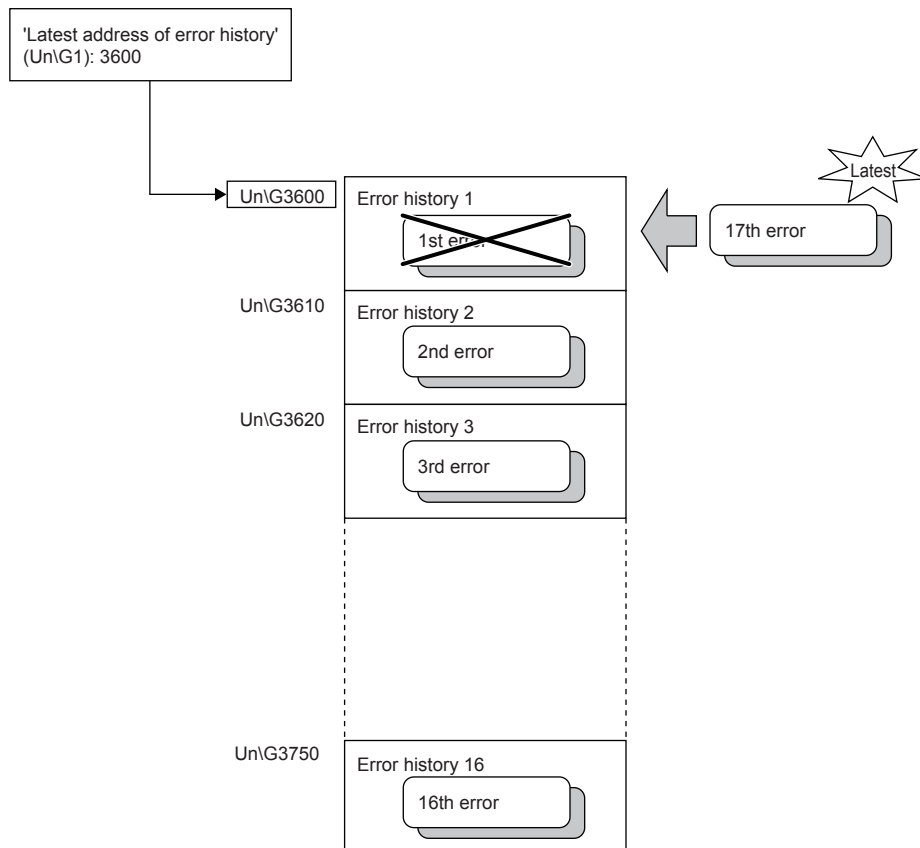
The third error is stored in Error history No. 3, and the value 3620 (start address of Error history No. 3) is stored to Latest address of error history.



**Ex.**

When the 17th error occurs:

The 17th error is stored in Error history No. 1, and the value 3600 (start address of Error history No. 1) is stored to Latest address of error history.

**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 overwritten history is deleted.
- The same processing is performed for Alarm history when an alarm occurs.
- The stored error history is cleared when a multiple input module is powered off or the CPU module is reset.

## Offset/gain initialization function

### Offset/gain initialization

The offset and gain values are initialized to the factory default offset and gain values according to the set input type.

1. Set the mode to the "Normal mode".
2. Set 'CH1 Input type/Range setting'(Un\G598) to 'CH8 Input type/Range setting' (Un\G1998) as 'Conversion disabled' and turn off→on→off 'Operation condition setting request' (Un\G70, b9).
3. Set "E20FH" to 'Offset/gain initialization enabled code' (Un\G305).
4. Turn ON (1) 'Offset/gain initialization request' (Un\G70, b5).

### Precautions

Channels for which the offset and gain have not been set are initialized with the current range.

## FX2N allocation mode function

It is a function to operate the buffer memory areas of the multiple input module with the same layout as the buffer memory address equivalent to FX2N-8AD.

This compatibility enables the reuse of programs that have proven performance on FX2N-8AD.

### Operation

In FX2N allocation mode, only allocation of buffer memory area is changed. The following buffer memory area is allocated the same as FX2N-8AD.

| Buffer Memory Areas | Buffer Memory Area Name                                     |
|---------------------|-------------------------------------------------------------|
| Un\G10 to 17        | CH1 to 8 Digital operation value                            |
| Un\G26              | Warning output flag (Process alarm upper limit/lower limit) |
| Un\G27              | Warning output flag (Rate alarm upper limit/lower limit)    |
| Un\G30              | Type code                                                   |
| Un\G61 to 68        | CH1 to 8 Conversion value shift amount                      |
| Un\G101 to 108      | CH1 to 8 Minimum value                                      |
| Un\G109             | Minimum value reset request                                 |
| Un\G111 to 118      | CH1 to 8 Maximum value                                      |
| Un\G119             | Maximum value reset request                                 |

For buffer memories with different allocations from FX2N-8AD, it can be used by changing the program. For buffer memory in FX2N allocation mode, refer to the following.

☞ Page 428 In FX2N allocation function mode

### Restriction

When reusing the program used by FX2N-8AD, delete the initial setting process and set the module parameters with GX Works3.

When performing the same operation as FX2N-8AD, it can be executed by the following function.

| FX2N-8AD                                    | Multiple input module                     | Reference                                                                                                                          |
|---------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Input mode setting                          | Input type/Range setting function         | Page 338                                                                                                                           |
| Average count                               | Conversion method                         | Page 339                                                                                                                           |
| Setting change disabled                     | —                                         | It is unnecessary because the setting is reflected in the operating condition setting request, and erroneous setting is prevented. |
| Input characteristics adjustment            | Offset/gain setting function              | Page 397                                                                                                                           |
| High speed conversion CH specification mode | —                                         | No correspondence                                                                                                                  |
| Data addition function                      | Shift function                            | Page 346                                                                                                                           |
| Upper lower limit value detection function  | Process alarm function                    | Page 352                                                                                                                           |
| Sudden change detection function            | Rate alarm function                       | Page 354                                                                                                                           |
| Peak value hold function                    | Maximum value/Minimum value hold function | Page 351                                                                                                                           |
| Scale over detection function               | Input signal error detection function     | Page 359                                                                                                                           |
| Disconnection detection                     | Disconnection detection function          | Page 366                                                                                                                           |
| Data history                                | Logging function                          | Page 369                                                                                                                           |
| Function initialization                     | Offset/gain initialization function       | Page 384                                                                                                                           |

## Setting procedure

1. When adding a new module, select the module whose module model name has "(FX2N)" 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 Normal mode is used.

3. After writing the module parameter, turn off→on or reset the CPU module.

### Point

- Switching between normal mode and FX2N allocation mode is not possible during operation.
- Do not switch to the FX2N allocation mode when the user range setting was adjusted by the resistance temperature detector range in normal mode. If 'CH1 input type/range setting (offset/gain setting)' (Un\G598) is set to "user range setting" in the FX2N allocation mode when the setting is adjusted by the resistance temperature detector range, an input type/range setting range error (190□H) occurs. To use the user range setting in the FX2N allocation mode, set the input type other than "resistance temperature detector" to the user range setting in the normal mode.

## 2CH conversion mode function

A function that performs A/D conversion of 2CH in 1 ms and can update the digital output value at the same time. Only input type "current", "voltage" are supported.

The combination of channels to update at the same time is as follows.

### The combination of channels to update

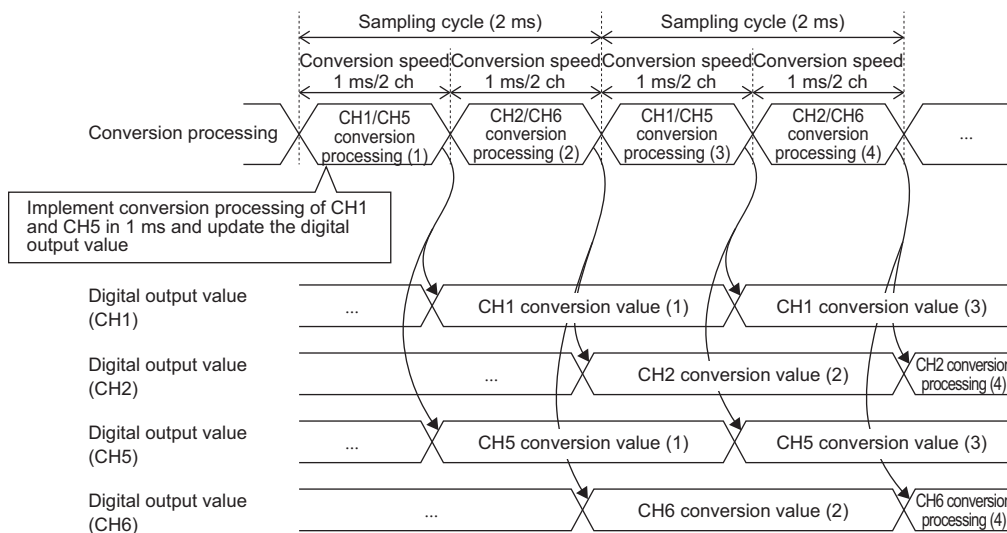
CH1 and CH5

CH2 and CH6

CH3 and CH7

CH4 and CH8

The sampling cycle per 2CH is 1 ms.



### Point

For each sampling cycle, the maximum and minimum values of the digital operation value are stored in 'CH1 Maximum value' (Un\G404) and 'CH1 Minimum value' (Un\G406).

## Compatible functions

The following functions can be used with the 2CH conversion mode. Settings used with other functions are invalid.

| Function                                  |
|-------------------------------------------|
| Input type/Range setting function         |
| Voltage, current conversion function      |
| Conversion method (Sampling processing)   |
| Maximum value/Minimum value hold function |

## Setting procedure

1. Set "Operation mode setting" to "2CH conversion mode".

☞ [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Basic setting] ⇒ [Operation mode setting function]

2. Set the channel to be used with "Number of conversion enabled channels".

| Number of conversion enabled channels | Use enabled channel                            | Sampling cycle |
|---------------------------------------|------------------------------------------------|----------------|
| 0                                     | None                                           | —              |
| 1                                     | CH1                                            | 1 ms           |
| 2                                     | [CH1, CH5]                                     | 1 ms           |
| 3                                     | [CH1, CH5], CH2                                | 2 ms           |
| 4                                     | [CH1, CH5], [CH2, CH6]                         | 2 ms           |
| 5                                     | [CH1, CH5], [CH2, CH6], CH3                    | 3 ms           |
| 6                                     | [CH1, CH5], [CH2, CH6], [CH3, CH7]             | 3 ms           |
| 7                                     | [CH1, CH5], [CH2, CH6], [CH3, CH7], CH4        | 4 ms           |
| 8                                     | [CH1, CH5], [CH2, CH6], [CH3, CH7], [CH4, CH8] | 4 ms           |

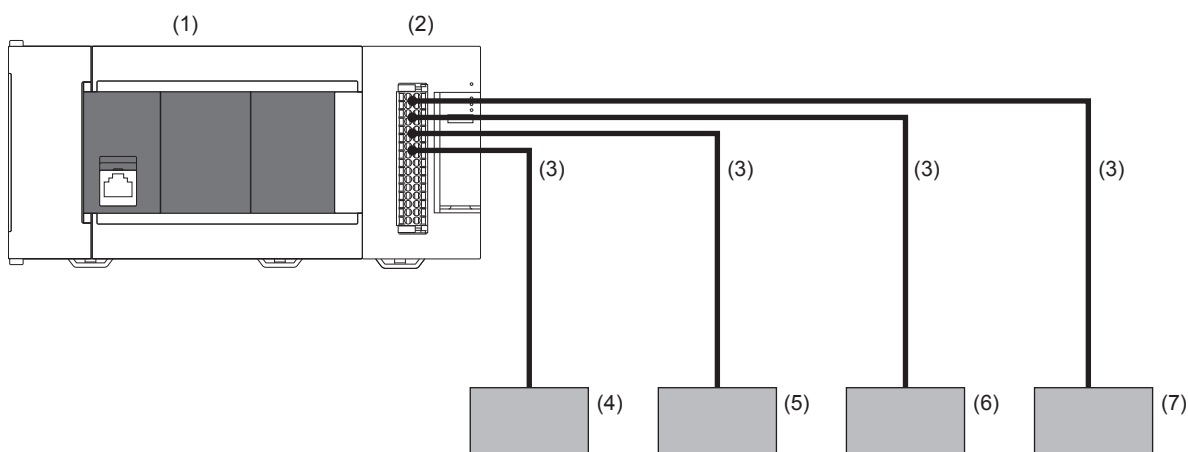
3. Set the "Input type" and "Input range" of the channel to be used.

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

## 3.5 System Configuration

The system configuration using the multiple input module is as follows.

- System configuration example



- (1) FX5 CPU module
- (2) Multiple input module (FX5-8AD)
- (3) Analog device connection cable
- (4) Current input
- (5) Voltage input
- (6) Resistance temperature detector input
- (7) Thermocouple input

# 3.6 Wiring

This section explains the multiple input module wiring.

## Spring clamp terminal block

### Suitable wiring

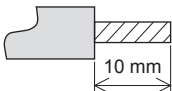
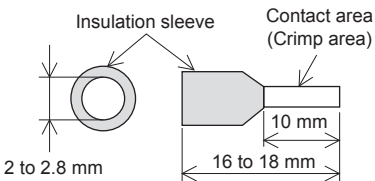
The wires to connect the spring clamp terminal block are described below.

| No. of wire per terminal | Wire size                                    |                                                |
|--------------------------|----------------------------------------------|------------------------------------------------|
|                          | Single wire, strand wire                     | Ferrule with insulation sleeve                 |
| Single wiring            | AWG24 to 16<br>(0.2 to 1.5 mm <sup>2</sup> ) | AWG23 to 19<br>(0.25 to 0.75 mm <sup>2</sup> ) |

### Wire end treatment

Strip the cable about 10 mm from the tip to connect a wire ferrule at the striped area. Failure to do so may result in electric shock or short circuit between adjacent terminals because the conductive part. If the wire strip length is too short, it may result in the poor contact to the spring clamp terminal part.

Depending on the thickness of the sheath, it may be difficult to insert into the insulation sleeve, so select the wires by referring to the appearance diagram.

| Strand wire/single wire                                                            | Ferrule with insulation sleeve                                                      |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |

The following table shows wire ferrules and tools for wire ferrules compatible with the terminal block. Use of items other than these may result in not being able to remove the wire ferrule, so carefully check that the wire ferrule can be unplugged.

<Reference product>

| Manufacturer                  | Model         | Wire size            | Crimp tool |
|-------------------------------|---------------|----------------------|------------|
| PHOENIX-CONTACT GmbH & Co. KG | Al 0.5-10 WH  | 0.5 mm <sup>2</sup>  | CRIMPFOX 6 |
|                               | Al 0.75-10 GY | 0.75 mm <sup>2</sup> |            |
|                               | A 1.0-10      | 1.0 mm <sup>2</sup>  |            |
|                               | A 1.5-10      | 1.5 mm <sup>2</sup>  |            |

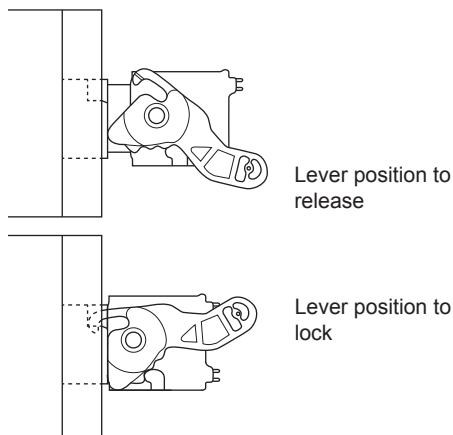
## Removing and installing the terminal block

The following shows how to remove and install the terminal block.

### ■Lever position to lock and release

A 3-step stopper is attached to prevent the lever from rotating, facilitating installation and removal of the terminal block.

When removing or installing the terminal block, move the lever to the corresponding position.



#### ■Lever position to release

The figure left shows the lever position when the terminal block has been completely removed from the module.

Rotate the lever from the lock position to the release position, and lift the terminal block from the module.

#### ■Lever position to lock

The figure left shows the lever position when the terminal block is completely engaged with the module.

Check that the lever is at the lock position, and pull the terminal block slightly to check that the module and terminal block are completely engaged.

### ■Removal procedure

Rotate the lever to the release position, and remove the terminal block from the module.

### ■Installation procedure

Move the lever to the release position, and insert the terminal block. When the terminal block is inserted sufficiently, the lever latch engages with the module and the terminal block is engaged with the module.



After inserting the terminal block, check that the lever is at the lock position.

### Precautions

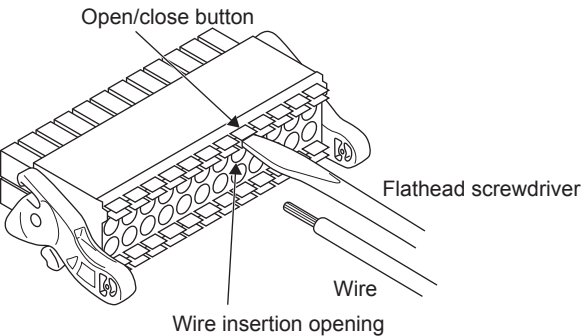
When installing the terminal block, check that the lever is in the release position. If installation is performed while the lever is in the lock position, it may cause damage to the lever.

## Connection and disconnection of the cable

### ■Connection of the cable

Fully insert a cable whose end has been properly processed into the wire insertion opening.

If the cable cannot be inserted with this procedure, fully insert the cable while pushing the open/close button with a flathead screwdriver having a tip width of 2.0 to 2.5 mm. After fully inserting the cable, remove the screwdriver.



<Reference>

| Manufacturer                  | Model             |
|-------------------------------|-------------------|
| PHOENIX-CONTACT GmbH & Co. KG | SZS 0.4 × 2.5 VDE |

### Precautions

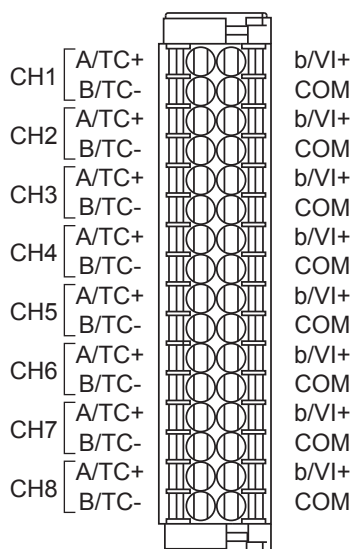
Pull the cable or bar solderless terminal slightly to check that the cable is securely clamped.

### ■Disconnection of the cable

While pushing the open/close button with a flathead screwdriver having a tip width of 2.0 to 2.5 mm, disconnect the cable.



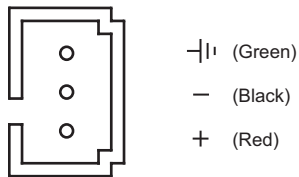
## Terminal arrangement



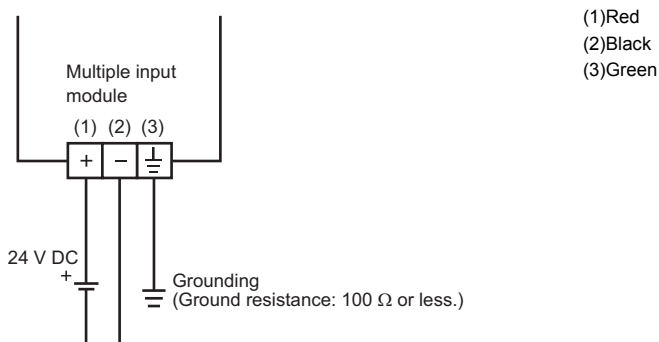
| Terminal name |       | Description                                                     |
|---------------|-------|-----------------------------------------------------------------|
| CH1           | A/TC+ | CH1 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH1 Voltage/current input/resistance temperature detector input |
|               | COM   | CH1 Voltage/current input                                       |
| CH2           | A/TC+ | CH2 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH2 Voltage/current input/resistance temperature detector input |
|               | COM   | CH2 Voltage/current input                                       |
| CH3           | A/TC+ | CH3 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH3 Voltage/current input/resistance temperature detector input |
|               | COM   | CH3 Voltage/current input                                       |
| CH4           | A/TC+ | CH4 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH4 Voltage/current input/resistance temperature detector input |
|               | COM   | CH4 Voltage/current input                                       |
| CH5           | A/TC+ | CH5 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH5 Voltage/current input/resistance temperature detector input |
|               | COM   | CH5 Voltage/current input                                       |
| CH6           | A/TC+ | CH6 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH6 Voltage/current input/resistance temperature detector input |
|               | COM   | CH6 Voltage/current input                                       |
| CH7           | A/TC+ | CH7 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH7 Voltage/current input/resistance temperature detector input |
|               | COM   | CH7 Voltage/current input                                       |
| CH8           | A/TC+ | CH8 Resistance temperature detector input/thermocouple input    |
|               | B/TC- |                                                                 |
|               | b/VI+ | CH8 Voltage/current input/resistance temperature detector input |
|               | COM   | CH8 Voltage/current input                                       |

# Power supply wiring

## Power connector layout



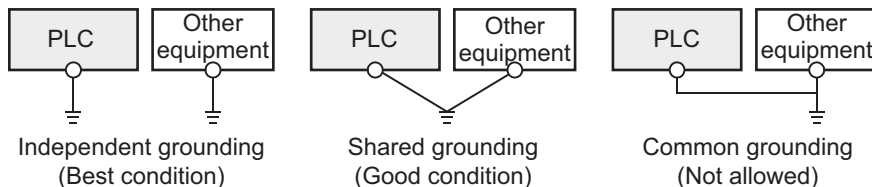
## Power supply wiring



## Grounding

Perform the following.

- Perform class D grounding (Grounding resistance: 100  $\Omega$  or less).
- Ground the programmable controller independently when possible.
- If the programmable controller cannot be grounded independently, perform the "Shared grounding" shown below.



- Bring the grounding point close to the PLC as much as possible so that the ground cable can be shortened.

## Wiring precautions

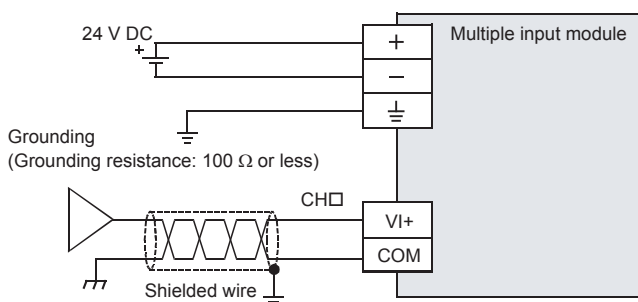
Wiring precautions are indicated below.

- Use separate cables for the external I/O signals of the AC control circuit and the multiple input module so that they are not affected by surge or induction on the AC side.
- Do not approach or bundle with the main circuit line, high voltage line, and load line from other than the PLC. Keep it far from circuits including high frequency such as high voltage line and inverter load main circuit. It becomes susceptible to noise, surge, and induction.
- Provide a single-point ground for the shield wire and the shielded cable at the PLC side. However, depending on the external noise situation, it may be better to ground on the external side.

## External wiring example

The followings show the examples of external wiring.

### Voltage input, and current input



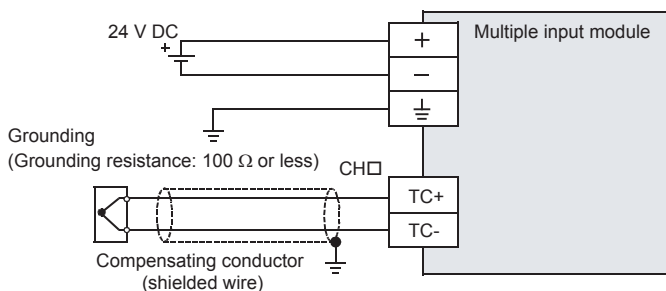
For □ in CH□, the CH number is entered.

### Precautions

Use a two-conductor shielded twisted pair cable for analog input lines and carry out the wiring while separating them from other power lines and lines susceptible to induction.

### Thermocouple

Refer to Page 328 Thermocouple input specifications for the thermocouples that can be used with multiple input module.



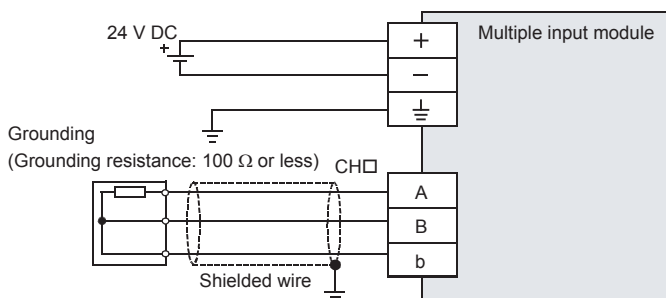
For □ in CH□, the CH number is entered.

### Precautions

When using thermocouple input, use the prescribed compensation lead wire.  
Use insulated thermocouple types.

### Case of RTD

Refer to Page 328 Resistance temperature detector (RTD) input specifications for the resistance temperature detector that can be used with multiple input module.



For □ in CH□, the CH number is entered.

### Precautions

When using the resistance temperature detector, carry out the wiring with a wire with low lead wire resistance and no resistance difference between the lead wires.

## 3.7 Parameter Setting

Set the parameters of each channel.

Setting parameters here eliminates the need to program them.

### Point

When adding a new multiple input module, if selecting the module whose module model name has "(FX2N)" at the end, it can be used as FX2N allocation mode.

- FX5-8AD: Normal mode
- FX5-8AD(FX2N): FX2N allocation mode

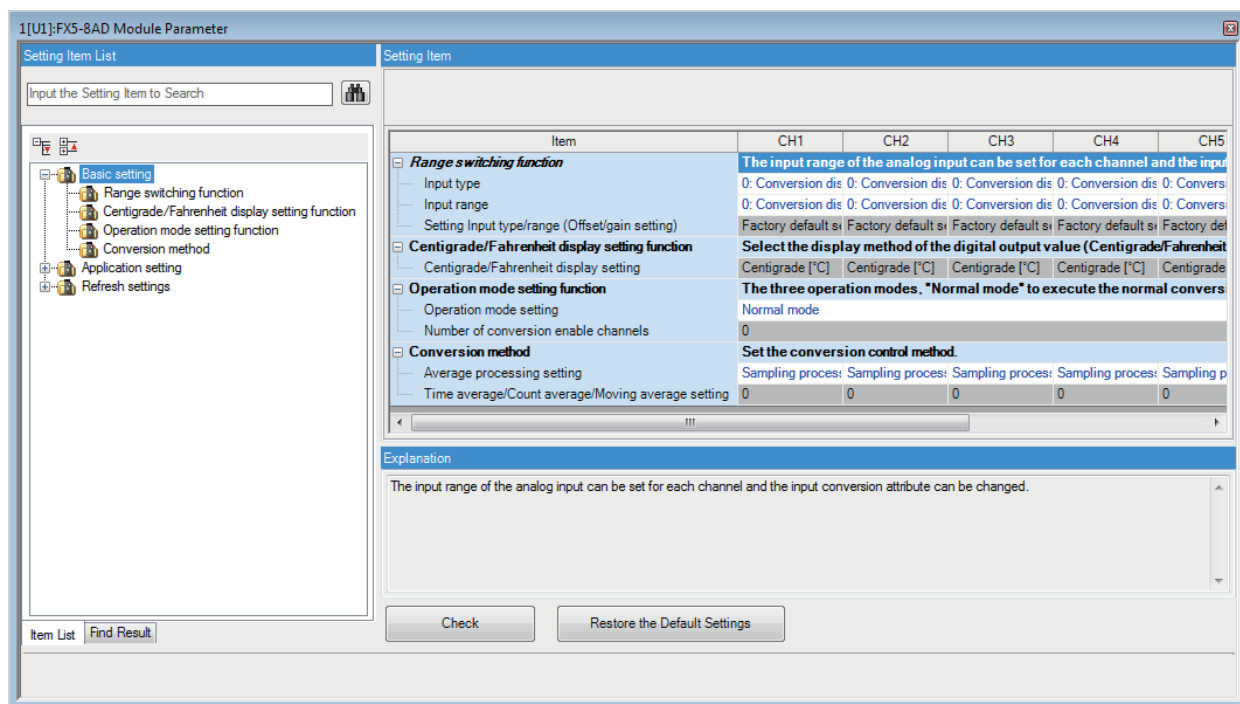
This section describes the case in a normal mode.

## Basic setting

### Setting procedure

1. Open "Basic setting" of GX Works3.

[Navigation window] ⇒ [Parameter] ⇒ [Module information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Basic setting]



2. Double-click the item to be changed to enter the setting value.

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

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

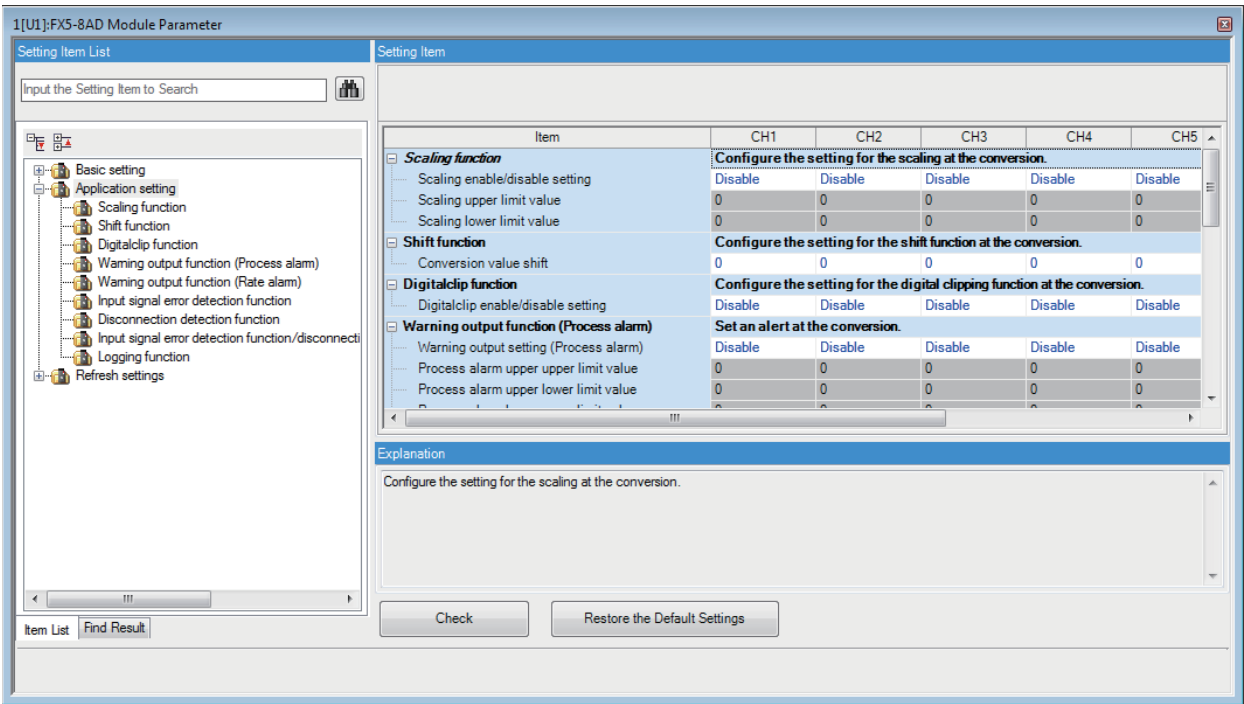
Double-click the item to be set to enter the numeric value.

# Application setting

## Setting procedure

1. Open "Application setting" of GX Works3.

[Navigation window] ⇒ [Parameter] ⇒ [Module information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Application setting]



2. Double-click the item to be changed to enter the setting value.

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

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.

# Refresh setting

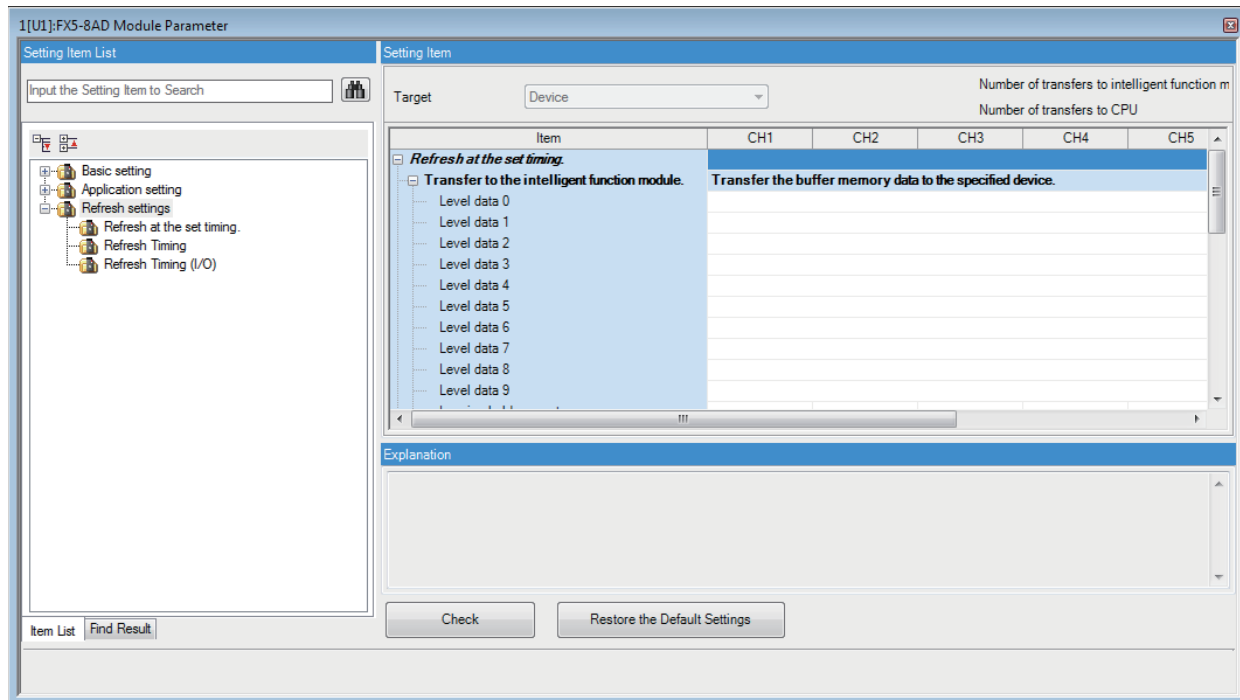
## Setting procedure

Set the buffer memory area of a multiple input module to be refreshed automatically.

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

**1.** Start a module parameter.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Refresh setting]



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

## 3.8 Offset/Gain Setting

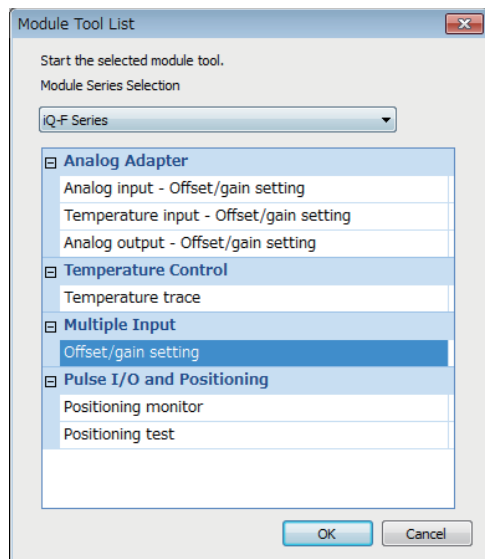
Using the user range setting requires setting the offset and gain values.

Access to the offset/gain setting window in GX Works3 to set the offset and gain values.

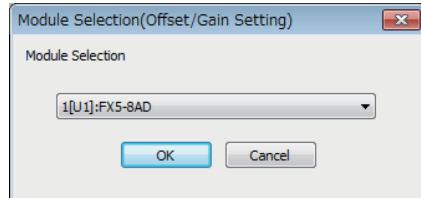
### Setting procedure

#### When input type is current/voltage

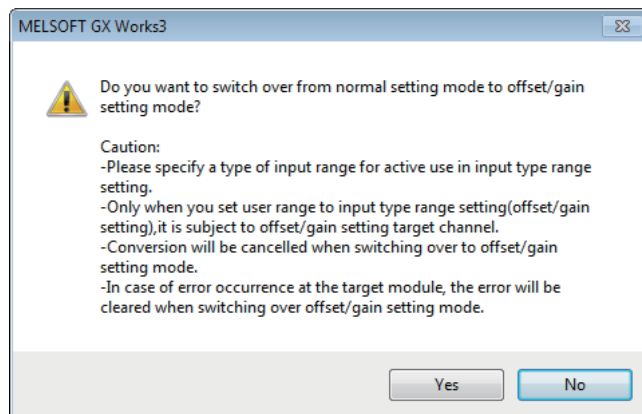
[Tool] ⇨ [Module Tool List]



1. In "Multiple Input", select "Offset/gain setting" and click the [OK] button.



2. Select the target module for the offset/gain setting, and click the [OK] button.



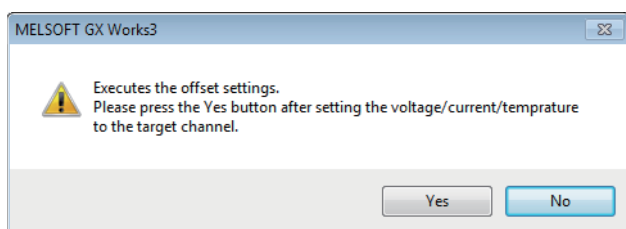
3. Click the [Yes] button.

4. Mark the checkbox of the channel where offset and gain values are to be set.



Set the input type (other than conversion disable) to be used in "Input type/Range setting" and "Setting Input type/range (Offset/gain setting)" to the user range setting in advance.

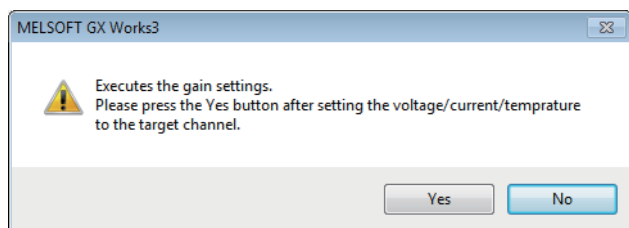
5. Select voltage or current and click the [Offset Setting] button.



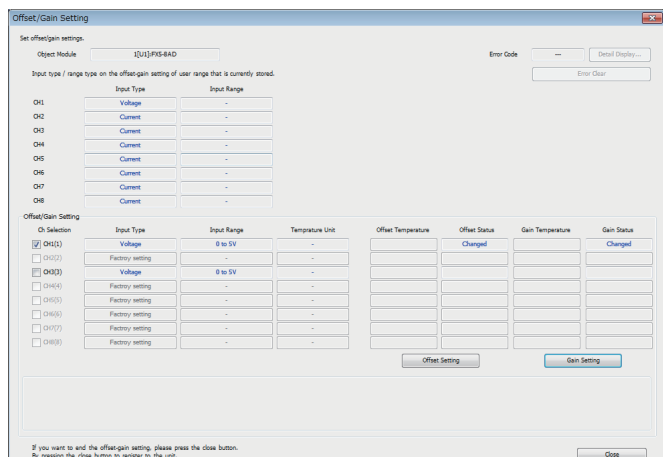
6. Apply the offset voltage or current to the corresponding channel, and click the [Yes] button.

7. Check that "Offset Status" has changed to "Changed", and click the [Gain Setting] button.

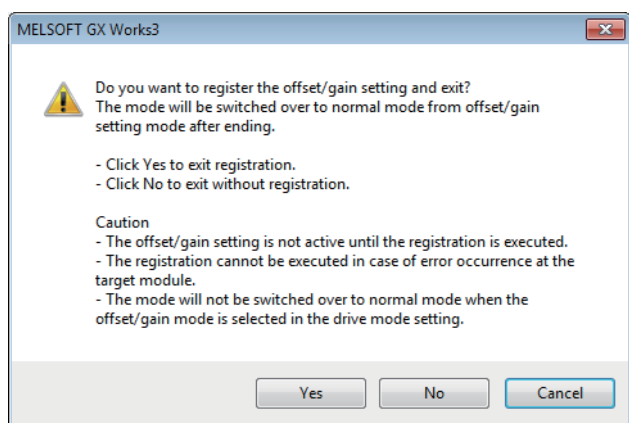




8. Apply the gain voltage or current to the corresponding channel, and click the [Yes] button.



9. Check that "Gain Status" has changed to "Changed", and click the [Close] button.



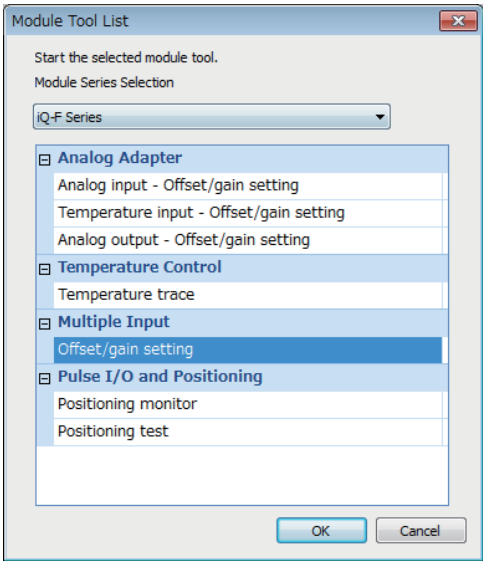
10. Click the [Yes] button.



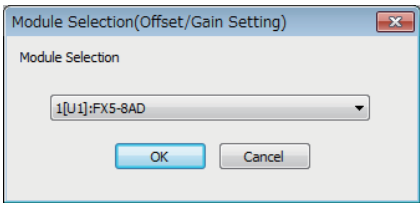
When the input type is "current", "voltage", offset value < gain value.

When input type is resistance temperature detector/thermocouple

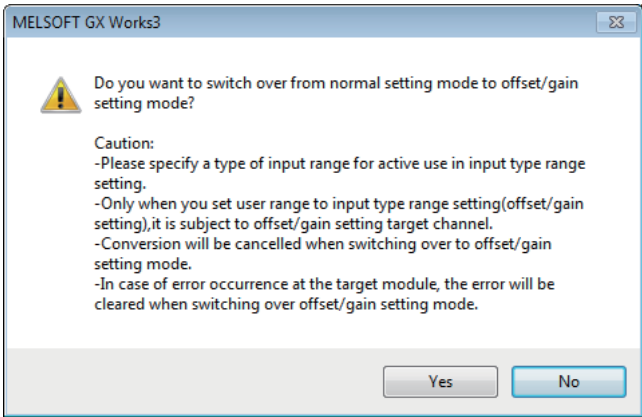
[Tool] ⇨ [Module Tool List]



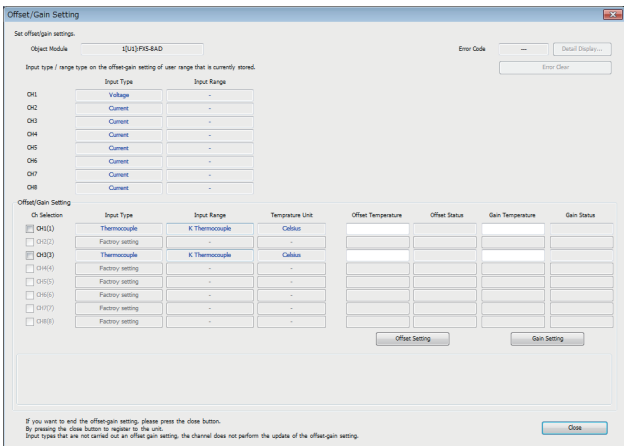
1. Select "Multiple Input" ⇨ "Offset/gain setting", and click [OK] button.



2. Select the target module for the offset/gain setting, and click [OK] button.



3. Click [Yes] button.



4. Mark the checkbox of the channel where offset and gain values are to be set.  
5. Write the temperature setting value corresponding to the offset value to "Offset Setting Value".

**Offset/Gain Setting**

Set offset/gain settings.

Object Module:  Error Code:  Default Display...

Input type / range type on the offset/gain setting of user range that is currently stored.

|     | Input Type | Input Range |
|-----|------------|-------------|
| DI1 | Voltage    | -           |
| DI2 | Current    | -           |
| DI3 | Current    | -           |
| DI4 | Current    | -           |
| DI5 | Current    | -           |
| DI6 | Current    | -           |
| DI7 | Current    | -           |
| DI8 | Current    | -           |

**Offset/Gain Setting**

| On Selection                             | Input Type      | Input Range    | Temperature Unit | Offset Temperature | Offset Status | Gain Temperature | Gain Status |
|------------------------------------------|-----------------|----------------|------------------|--------------------|---------------|------------------|-------------|
| <input checked="" type="checkbox"/> Q102 | Thermocouple    | K Thermocouple | Celsius          | 0.0                |               |                  |             |
| <input type="checkbox"/> Q103            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q104            | Thermocouple    | K Thermocouple | Celsius          |                    |               |                  |             |
| <input type="checkbox"/> Q105            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q106            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q107            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q108            | Factory setting | -              | -                |                    |               |                  |             |

Settable temperature range:  
 conditions 1  
 temperature is input to the terminal offset value + gain value  
 offset setting value and the gain setting value offset setting value + gain setting value  
 use of the temperature Lowest value, please perform the adjustment of the offset gain in the vicinity of the highest value in the case of Fahrenheit -328.0m/2192.0F  
 Conditions 2  
 K Thermocouple  
 In the case of Celsius -200.0m/1200.0C  
 In the case of Fahrenheit -328.0m/2192.0F

If you want to end the offset/gain setting, please press the close button.  
 By pressing the close button to register to the unit.  
 Input types that are not carried out an offset/gain setting, the channel does not perform the update of the offset/gain setting.

**MELSOFT GX Works3**

 Executes the offset settings.  
 Please press the Yes button after setting the voltage/current/temperature to the target channel.

**Offset/Gain Setting**

Set offset/gain settings.

Object Module:  Error Code:  Default Display...

Input type / range type on the offset/gain setting of user range that is currently stored.

|     | Input Type | Input Range |
|-----|------------|-------------|
| DI1 | Voltage    | -           |
| DI2 | Current    | -           |
| DI3 | Current    | -           |
| DI4 | Current    | -           |
| DI5 | Current    | -           |
| DI6 | Current    | -           |
| DI7 | Current    | -           |
| DI8 | Current    | -           |

**Offset/Gain Setting**

| On Selection                             | Input Type      | Input Range    | Temperature Unit | Offset Temperature | Offset Status | Gain Temperature | Gain Status |
|------------------------------------------|-----------------|----------------|------------------|--------------------|---------------|------------------|-------------|
| <input checked="" type="checkbox"/> Q102 | Thermocouple    | K Thermocouple | Celsius          | 0.0                | Changed       | 200.0            |             |
| <input type="checkbox"/> Q103            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q104            | Thermocouple    | K Thermocouple | Celsius          |                    |               |                  |             |
| <input type="checkbox"/> Q105            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q106            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q107            | Factory setting | -              | -                |                    |               |                  |             |
| <input type="checkbox"/> Q108            | Factory setting | -              | -                |                    |               |                  |             |

Settable temperature range:  
 conditions 1  
 temperature is input to the terminal offset value + gain value  
 offset setting value and the gain setting value offset setting value + gain setting value  
 use of the temperature Lowest value, please perform the adjustment of the offset gain in the vicinity of the highest value in the case of Fahrenheit -328.0m/2192.0F  
 Conditions 2  
 K Thermocouple  
 In the case of Celsius -200.0m/1200.0C  
 In the case of Fahrenheit -328.0m/2192.0F

If you want to end the offset/gain setting, please press the close button.  
 By pressing the close button to register to the unit.  
 Input types that are not carried out an offset/gain setting, the channel does not perform the update of the offset/gain setting.

**MELSOFT GX Works3**

 Executes the gain settings.  
 Please press the Yes button after setting the voltage/current/temperature to the target channel.

6. Click [Offset Setting] button.

7. Apply a value that becomes an offset value to the terminal of the corresponding channel, and click [Yes] button.

8. Check that "Offset Status" has changed to "Changed".

9. Write the temperature setting value corresponding to the gain value to "Gain Setting Value".

10. Click [Gain Setting] button.

11. Apply a value that becomes a gain value to the terminal of the corresponding channel, and click [Yes] button.

**12.** Check that "Gain Status" has changed to "Changed", and click [Close] button.

**13.** Click [Yes] button.



When the input type is "resistance temperature detector" or "thermocouple", offset value - gain value > 0.1°C

## Precautions

If a broken wire is detected while setting the offset and gain, the offset and gain channel change error (error code: 1EB□H) will occur. The channel where the error occurred will remain unadjusted, so set the offset and gain again after repairing the broken wire.

# 3.9 Programming

This section describes the programming procedure and the basic program of a multiple input module.

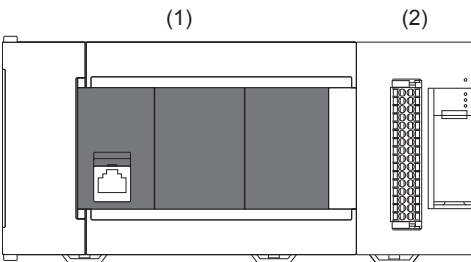
## Programming procedure

Take the following steps to create a program for running a multiple input module:

1. Set parameters.
2. Create a program.

### System configuration example

#### ■System configuration



- (1) CPU module (FX5U CPU module)  
(2) Multiple input module (FX5-8AD)

#### ■Parameter settings

Perform an initial setting in the module parameter of GX Works3. The refresh settings do not need to be changed here.

- Basic setting

Configure the basic setting as shown below.

1[U1]:FX5-8AD Module Parameter

Setting Item List

Input the Setting Item to S

Setting Item

| Item                                                  | CH1                                                                                                                                      | CH2                | CH3                              | CH4                | CH5                                | CH6                | CH7                                | CH8                |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------|--------------------|------------------------------------|--------------------|------------------------------------|--------------------|
| <b>Range switching function</b>                       | The input range of the analog input can be set for each channel and the input conversion attribute can be changed.                       |                    |                                  |                    |                                    |                    |                                    |                    |
| Input type                                            | 4: Thermocouple                                                                                                                          | 0: Conversion dis  | 1: Current                       | 0: Conversion dis  | 3: RTD                             | 0: Conversion dis  | 2: Voltage                         | 0: Conversion dis  |
| Input range                                           | 4:R                                                                                                                                      | 0: Conversion dis  | 0.4 to 20mA                      | 0: Conversion dis  | 0:Pt100(-200 to 8                  | 0: Conversion dis  | 2:-10V to 10V                      | 0: Conversion dis  |
| Setting Input type/range (Offset/gain setting)        | Factory default sv                                                                                                                       | Factory default sv | Factory default sv               | Factory default sv | Factory default sv                 | Factory default sv | Factory default sv                 | Factory default sv |
| <b>Centigrade/Fahrenheit display setting function</b> | Select the display method of the digital output value (Centigrade/Fahrenheit display) when the input type is set to RTD or thermocouple. |                    |                                  |                    |                                    |                    |                                    |                    |
| Centigrade/Fahrenheit display setting                 | Fahrenheit [°F]                                                                                                                          | Centigrade [°C]    | Centigrade [°C]                  | Centigrade [°C]    | Centigrade [°C]                    | Centigrade [°C]    | Centigrade [°C]                    | Centigrade [°C]    |
| <b>Operation mode setting function</b>                | The three operation modes, "Normal mode" to execute the normal conversion, "Offset/gain setting mode" to execute the offset/gain :       |                    |                                  |                    |                                    |                    |                                    |                    |
| Operation mode setting                                | Normal mode                                                                                                                              |                    |                                  |                    |                                    |                    |                                    |                    |
| Number of conversion enable channels                  | 0                                                                                                                                        |                    |                                  |                    |                                    |                    |                                    |                    |
| <b>Conversion method</b>                              | Set the conversion control method.                                                                                                       |                    |                                  |                    |                                    |                    |                                    |                    |
| Average processing setting                            | Sampling process: Count average                                                                                                          |                    | Sampling process: Moving average |                    | Sampling process: Sampling process |                    | Sampling process: Sampling process |                    |
| Time average/Count average/Moving average setting     | 0                                                                                                                                        | 0                  | 50 times                         | 0                  | 100 times                          | 0                  | 0                                  | 0                  |

Explanation

The input range of the analog input can be set for each channel and the input conversion attribute can be changed.

Item List Find Result

Check Restore the Default Settings

Configure the application setting as shown below.

| Item                                                       | CH1                                                                                                                                                | CH2               | CH3               | CH4               | CH5               | CH6               | CH7               | CH8               |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| <b>Scaling function</b>                                    | <b>Configure the setting for the scaling at the conversion.</b>                                                                                    |                   |                   |                   |                   |                   |                   |                   |
| Scaling enable/disable setting                             | Disable                                                                                                                                            | Disable           | Disable           | Disable           | Disable           | Disable           | Enable            | Disable           |
| Scaling upper limit value                                  | 0                                                                                                                                                  | 0                 | 0                 | 0                 | 0                 | 0                 | 10000             | 0                 |
| Scaling lower limit value                                  | 0                                                                                                                                                  | 0                 | 0                 | 0                 | 0                 | 0                 | -10000            | 0                 |
| <b>Shift function</b>                                      | <b>Configure the setting for the shift function at the conversion.</b>                                                                             |                   |                   |                   |                   |                   |                   |                   |
| Conversion value shift                                     | 0                                                                                                                                                  | 0                 | 0                 | 0                 | 0                 | 0                 | 2000              | 0                 |
| <b>Digitalclip function</b>                                | <b>Configure the setting for the digital clipping function at the conversion.</b>                                                                  |                   |                   |                   |                   |                   |                   |                   |
| Digitalclip enable/disable setting                         | Disable                                                                                                                                            | Disable           | Disable           | Disable           | Disable           | Disable           | Enable            | Disable           |
| <b>Warning output function (Process alarm)</b>             | <b>Set an alert at the conversion.</b>                                                                                                             |                   |                   |                   |                   |                   |                   |                   |
| Warning output setting (Process alarm)                     | Disable                                                                                                                                            | Disable           | Enable            | Disable           | Disable           | Disable           | Disable           | Disable           |
| Process alarm upper upper limit value                      | 0                                                                                                                                                  | 0                 | 32000             | 0                 | 0                 | 0                 | 0                 | 0                 |
| Process alarm upper lower limit value                      | 0                                                                                                                                                  | 0                 | 28000             | 0                 | 0                 | 0                 | 0                 | 0                 |
| Process alarm lower upper limit value                      | 0                                                                                                                                                  | 0                 | 4000              | 0                 | 0                 | 0                 | 0                 | 0                 |
| Process alarm lower lower limit value                      | 0                                                                                                                                                  | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| <b>Warning output function (Rate alarm)</b>                | <b>Set an alert at the conversion.</b>                                                                                                             |                   |                   |                   |                   |                   |                   |                   |
| Warning output setting (Rate alarm)                        | Enable                                                                                                                                             | Disable           | Disable           | Disable           | Disable           | Disable           | Disable           | Disable           |
| Rate alarm change rate selection                           | Rate                                                                                                                                               |                   |                   |                   |                   |                   |                   |                   |
| Rate alarm detection cycle setting                         | 5 times                                                                                                                                            | 0 times           | 0 times           | 0 times           | 0 times           | 0 times           | 0 times           | 0 times           |
| Rate alarm upper limit value                               | 25.0 %                                                                                                                                             | 0.0 %             | 0.0 %             | 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 %             | 0.0 %             | 0.0 %             |
| <b>Input signal error detection function</b>               | <b>Configure the setting for the input signal at the conversion.</b>                                                                               |                   |                   |                   |                   |                   |                   |                   |
| Input signal error detection setting                       | Disable                                                                                                                                            | Disable           | Upper limit detec | Disable           | Disable           | Disable           | Upper/lower limit | Disable           |
| Input signal error detection lower limit setting value     | 5.0 %                                                                                                                                              | 5.0 %             | 5.0 %             | 5.0 %             | 5.0 %             | 5.0 %             | 15.0 %            | 5.0 %             |
| Input signal error detection upper limit setting value     | 5.0 %                                                                                                                                              | 5.0 %             | 20.0 %            | 5.0 %             | 5.0 %             | 5.0 %             | 3.0 %             | 5.0 %             |
| <b>Disconnection detection function</b>                    | <b>Configure the setting for the disconnection detection at the conversion.</b>                                                                    |                   |                   |                   |                   |                   |                   |                   |
| Disconnection detection function enable/disable setting    | Enable                                                                                                                                             | Enable            | Enable            | Enable            | Disable           | Enable            | Enable            | Enable            |
| Conversion setting for disconnection detection             | Value immediate                                                                                                                                    | Down Scale        | Down Scale        | Down Scale        | Down Scale        | Down Scale        | Down Scale        | Down Scale        |
| Conversion setting value for disconnection detection       | 0                                                                                                                                                  | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |
| <b>Input signal error detection function/disconnection</b> | <b>Set whether to enable or disable auto-clearing of input signal errors and disconnection by using the input signal error detection function.</b> |                   |                   |                   |                   |                   |                   |                   |
| Input signal error/disconnection detection auto-clear      | Disable                                                                                                                                            |                   |                   |                   |                   |                   |                   |                   |
| <b>Logging function</b>                                    | <b>Configure the setting for the logging function at the conversion.</b>                                                                           |                   |                   |                   |                   |                   |                   |                   |
| Logging enable/disable setting                             | Disable                                                                                                                                            | Disable           | Disable           | Disable           | Disable           | Disable           | Disable           | Disable           |
| Logging data setting                                       | Digital operation                                                                                                                                  | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation | Digital operation |
| Logging cycle setting value                                | 40 ms                                                                                                                                              | 40 ms             | 40 ms             | 40 ms             | 40 ms             | 40 ms             | 40 ms             | 40 ms             |
| Logging cycle unit setting                                 | ms                                                                                                                                                 | ms                | ms                | ms                | ms                | ms                | ms                | ms                |
| Level trigger condition setting                            | Disable                                                                                                                                            | Disable           | Disable           | Disable           | Disable           | Disable           | Disable           | Disable           |
| Logging points after trigger                               | 5000                                                                                                                                               | 5000              | 5000              | 5000              | 5000              | 5000              | 5000              | 5000              |
| Trigger data                                               | 402                                                                                                                                                | 602               | 802               | 1002              | 1202              | 1402              | 1602              | 1802              |
| Trigger setting value                                      | 0                                                                                                                                                  | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 | 0                 |

**Explanation**

Configure the setting for the scaling at the conversion.

Check Restore the Default Settings

## Program example

### Label settings

| Classification | Device                                                 | Description                                     | Device       |
|----------------|--------------------------------------------------------|-------------------------------------------------|--------------|
| Module label   | FX5_8AD_1.bConversionCompletedFlag_D                   | Conversion completed flag                       | U1\G69, b14  |
|                | FX5_8AD_1.bModuleREADY_D                               | Module READY                                    | U1\G69, b0   |
|                | FX5_8AD_1.bOperatingConditionSettingCompletedFlag_D    | Operating condition setting completed flag      | U1\G69, b9   |
|                | FX5_8AD_1.stnMonitor_D[0].wDigitalOutputValue_D        | Digital output value                            | U1\G400      |
|                | FX5_8AD_1.stnMonitor_D[2].wDigitalOutputValue_D        | Digital output value                            | U1\G800      |
|                | FX5_8AD_1.stnMonitor_D[4].wDigitalOutputValue_D        | Digital output value                            | U1\G1200     |
|                | FX5_8AD_1.stnMonitor_D[6].wDigitalOutputValue_D        | Digital output value                            | U1\G1600     |
|                | FX5_8AD_1.uConversionCompletedFlag_D.0                 | Conversion completed flag                       | U1\G42, b0   |
|                | FX5_8AD_1.uConversionCompletedFlag_D.2                 | Conversion completed flag                       | U1\G42, b2   |
|                | FX5_8AD_1.uConversionCompletedFlag_D.4                 | Conversion completed flag                       | U1\G42, b4   |
|                | FX5_8AD_1.uConversionCompletedFlag_D.6                 | Conversion completed flag                       | U1\G42, b6   |
|                | FX5_8AD_1.stnControl_D[4].uMaxResetReq_D.0             | Maximum value reset completed flag              | U1\G1273, b0 |
|                | FX5_8AD_1.stnControl_D[4].uMinResetReq_D.0             | Minimum value reset completed flag              | U1\G1274, b0 |
|                | FX5_8AD_1.stnMonitor_D[4].uMaxResetCmpFlg_D.0          | Maximum value reset completed flag              | U1\G1222, b0 |
|                | FX5_8AD_1.stnMonitor_D[4].uMinResetCmpFlg_D.0          | Minimum value reset completed flag              | U1\G1223, b0 |
|                | FX5_8AD_1.stnMonitor_D[4].wMaxValue_D                  | Maximum value                                   | U1\G1204     |
|                | FX5_8AD_1.stnMonitor_D[4].wMinValue_D                  | Minimum value                                   | U1\G1206     |
|                | FX5_8AD_1.uWarningOutputFlagProcessAlarmLowerLimit_D.2 | Warning output flag (Process alarm lower limit) | U1\G37, b2   |
|                | FX5_8AD_1.uWarningOutputFlagProcessAlarmUpperLimit_D.2 | Warning output flag (Process alarm upper limit) | U1\G36, b2   |
|                | FX5_8AD_1.uWarningOutputFlagRateAlarmLowerLimit_D.0    | Warning output flag (Rate alarm lower limit)    | U1\G39, b0   |
|                | FX5_8AD_1.uWarningOutputFlagRateAlarmUpperLimit_D.0    | Warning output flag (Rate alarm upper limit)    | U1\G38, b0   |
|                | FX5_8AD_1.bErrorClearRequest_D                         | Error clear request                             | U1\G70, b15  |
|                | FX5_8AD_1.bInputSignalErrorDetectionSignal_D           | Input signal error detection signal             | U1\G69, b12  |
|                | FX5_8AD_1.uInputSignalErrorDetectionFlag_D.6           | Input signal error detection flag               | U1\G40, b6   |
|                | FX5_8AD_1.uLatestAlarmCode_D                           | Latest alarm code                               | U1\G2        |
|                | FX5_8AD_1.uDisconnectionDetectionFlag_D.0              | Disconnection detection flag                    | U1\G41, b0   |
|                | FX5_8AD_1.bErrorFlag_D                                 | Error flag                                      | U1\G69, b15  |
|                | FX5_8AD_1.uLatestErrorCode_D                           | Latest error code                               | U1\G0        |

Labels to be defined Define global labels as shown below:

|    | Label Name          | Data Type                           | Class      | Assign (Device/Label) |
|----|---------------------|-------------------------------------|------------|-----------------------|
| 1  | CH1_DigOutValue     | Word [Signed]                       | VAR_GLOBAL | D11                   |
| 2  | CH3_DigOutValue     | Word [Signed]                       | VAR_GLOBAL | D12                   |
| 3  | CH5_DigOutValue     | Word [Signed]                       | VAR_GLOBAL | D13                   |
| 4  | CH7_DigOutValue     | Word [Signed]                       | VAR_GLOBAL | D14                   |
| 5  | CH5_DigMaxVal       | Word [Signed]                       | VAR_GLOBAL | D15                   |
| 6  | CH5_DigMinVal       | 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 | CH7_InputSigErr     | Bit                                 | VAR_GLOBAL | F4                    |
| 12 | DigitOutValSig      | Bit                                 | VAR_GLOBAL | X10                   |
| 13 | CH1_Disconnection   | Bit                                 | VAR_GLOBAL | F5                    |
| 14 | MaxMinReadSig       | Bit                                 | VAR_GLOBAL | X11                   |
| 15 | MaxMinResetSig      | Bit                                 | VAR_GLOBAL | X12                   |
| 16 | UnitErrCode         | Word [Unsigned]/Bit String [16-bit] | VAR_GLOBAL |                       |
| 17 | UnitAlarmCode       | Word [Unsigned]/Bit String [16-bit] | VAR_GLOBAL |                       |
| 18 | ErrSet              | Bit                                 | VAR_GLOBAL |                       |
| 19 | ErrOutSig           | Bit                                 | VAR_GLOBAL |                       |
| 20 | UnitErrResetSig     | Bit                                 | VAR_GLOBAL | X13                   |
| 21 | InSigErrResetSig    | Bit                                 | VAR_GLOBAL | X14                   |

## ■ Program example

### • Digital output value readout processing

|       |                       |                                         |                                                     |                                                                        |                                                       |  |  |  |     |                                                                |                        |
|-------|-----------------------|-----------------------------------------|-----------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------|--|--|--|-----|----------------------------------------------------------------|------------------------|
| (0)   | DigitOutValSig<br>X10 | FX5_8AD_1.bModule<br>READY_D<br>U1W69.0 | FX5_8AD_1.bConversion<br>CompletedFlag_D<br>U1W69.E | FX5_8AD_1.bOperating<br>ConditionSettingComp<br>letedFlag_D<br>U1W69.9 | FX5_8AD_1.uConversion<br>CompletedFlag_D.0<br>U1W42.0 |  |  |  | MOV | FX5_8AD_1.stnMonitor_D<br>[0].wDigitalOutputValue_D<br>U1W400  | CH1_DigOutValue<br>D11 |
|       |                       |                                         |                                                     |                                                                        | FX5_8AD_1.uConversion<br>CompletedFlag_D.2<br>U1W42.2 |  |  |  | MOV | FX5_8AD_1.stnMonitor_D<br>[2].wDigitalOutputValue_D<br>U1W800  | CH3_DigOutValue<br>D12 |
|       |                       |                                         |                                                     |                                                                        | FX5_8AD_1.uConversion<br>CompletedFlag_D.4<br>U1W42.4 |  |  |  | MOV | FX5_8AD_1.stnMonitor_D<br>[4].wDigitalOutputValue_D<br>U1W1200 | CH5_DigOutValue<br>D13 |
|       |                       |                                         |                                                     |                                                                        | FX5_8AD_1.uConversion<br>CompletedFlag_D.6<br>U1W42.6 |  |  |  | MOV | FX5_8AD_1.stnMonitor_D<br>[6].wDigitalOutputValue_D<br>U1W1600 | CH7_DigOutValue<br>D14 |
| (156) |                       |                                         |                                                     |                                                                        |                                                       |  |  |  |     |                                                                | —END—                  |

### • Maximum/minimum value readout/clear processing

|       |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             |                                             |
|-------|---------------------------------------------|--------------------------------------------------|--------------------------------------|-----------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--|--|--|--|-----|---------------------------------------------|---------------------------------------------|
| (0)   | MaxMinReadSig                               | FX5_8AD_1.bModuleREADY_D                         | FX5_8AD_1.bConversionCompletedFlag_D | FX5_8AD_1.bOperatingConditionSettingCompletedFlag_D | FX5_8AD_1.stnMonitor_D [4].uMaxResetCompFlag_D.0 | FX5_8AD_1.stnMonitor_D [4].uMinResetCompFlag_D.0 |  |  |  |  | MOV | FX5_8AD_1.stnMonitor_D [4].wMaxValue_D      | CH5_DigMaxVal                               |
|       | X11                                         | U1WG69.0                                         | U1WG69.E                             | U1WG69.9                                            | U1WG1222.0                                       | U1WG1223.0                                       |  |  |  |  |     | U1WG1204                                    | D15                                         |
|       |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  | MOV | FX5_8AD_1.stnMonitor_D [4].wMinValue_D      | CH5_DigMinVal                               |
|       |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     | U1WG1206                                    | D16                                         |
| (79)  | MaxMinResetSig                              |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     | SET                                         | FX5_8AD_1.stnControl_D [4].uMaxResetReq_D.0 |
|       | X12                                         |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             | U1WG1273.0                                  |
|       |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     | SET                                         | FX5_8AD_1.stnControl_D [4].uMinResetReq_D.0 |
|       |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             | U1WG1274.0                                  |
| (133) | FX5_8AD_1.stnControl_D [4].uMaxResetReq_D.0 | FX5_8AD_1.stnMonitor_D [4].uMaxResetCompFlag_D.0 |                                      |                                                     |                                                  |                                                  |  |  |  |  | RST | FX5_8AD_1.stnControl_D [4].uMaxResetReq_D.0 |                                             |
|       | U1WG1273.0                                  | U1WG1222.0                                       |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             | U1WG1273.0                                  |
| (165) | FX5_8AD_1.stnControl_D [4].uMinResetReq_D.0 | FX5_8AD_1.stnMonitor_D [4].uMinResetCompFlag_D.0 |                                      |                                                     |                                                  |                                                  |  |  |  |  | RST | FX5_8AD_1.stnControl_D [4].uMinResetReq_D.0 |                                             |
|       | U1WG1274.0                                  | U1WG1223.0                                       |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             | U1WG1274.0                                  |
| (197) |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             | —END—                                       |
|       |                                             |                                                  |                                      |                                                     |                                                  |                                                  |  |  |  |  |     |                                             |                                             |

### • Process alarm occurrence processing

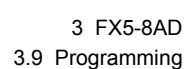
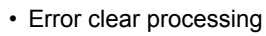
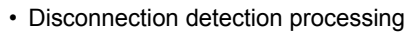
|      |                                                                   |  |  |  |  |  |  |  |     |                           |
|------|-------------------------------------------------------------------|--|--|--|--|--|--|--|-----|---------------------------|
| (0)  | FX5_8AD_1.uWarningOutputFlagProcessAlarmUpperLimit_D.2<br>U1W36.2 |  |  |  |  |  |  |  | SET | CH3_ProcAlmUpLimit<br>F0  |
| (49) | FX5_8AD_1.uWarningOutputFlagProcessAlarmLowerLimit_D.2<br>U1W37.2 |  |  |  |  |  |  |  | SET | CH3_ProcAlmLowLimit<br>F1 |
| (81) |                                                                   |  |  |  |  |  |  |  |     | —END—                     |

### • Rate alarm occurrence processing

|      |                                                                |  |  |  |  |  |  |  |     |                           |
|------|----------------------------------------------------------------|--|--|--|--|--|--|--|-----|---------------------------|
| (0)  | FX5_8AD_1.uWarningOutputFlagRateAlarmUpperLimit_D.0<br>U1W38.0 |  |  |  |  |  |  |  | SET | CH1_RateAlmUpLimit<br>F2  |
| (46) | FX5_8AD_1.uWarningOutputFlagRateAlarmLowerLimit_D.0<br>U1W39.0 |  |  |  |  |  |  |  | SET | CH1_RateAlmLowLimit<br>F3 |
| (76) |                                                                |  |  |  |  |  |  |  |     | —END—                     |



## 3



## 3.10 Troubleshooting

This section describes errors that may occur in the use of a multiple input module and those troubleshooting.

### 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 GX Works3.

A state of a multiple input module can be checked with the RUN LED, ERROR LED, and ALM LED. The following table shows the relation of these LEDs and a state of a multiple input module.

| Name      | Description                                                                                                                                                                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RUN LED   | Indicates the operating status of the module.<br>On: Normal operation<br>Flashing: Offset/gain setting mode<br>Off: Error                                                           |
| ERROR LED | Indicates the error status of the module. *1<br>On: Minor error or major error<br>Flashing: Moderate error or major error<br>Off: Normal operation                                  |
| ALM LED   | Indicates the alarm status of the module. *2<br>On: Process alarm or rate alarm issued<br>Flashing: Input signal error or disconnection detection detected<br>Off: Normal operation |

\*1 For details, refer to the following.

☞ Page 412 List of error codes

\*2 For details, refer to the following.

☞ Page 415 List of alarm codes

### Troubleshooting by symptom

#### When the input type is “current”, and “voltage”

##### ■When the RUN LED flashes or turns off

- When flashing

| Check item                                               | Cause                                                                                                                                                                                          | Corrective action                                                                                                                                          |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the module is in offset/gain setting mode. | The programmable controller has been powered off→on, or the CPU module has been reset when the operation mode is set to offset/gain setting mode in the module parameter setting of GX Works3. | In the module parameter setting of GX Works3, set the operation mode to normal mode and power off→on the programmable controller, or reset the CPU module. |
|                                                          | The value in the mode switching setting has been changed and the mode has been switched to offset/gain setting mode.                                                                           | Review the program that uses the mode switching setting to check whether the mode has been switched erroneously.                                           |

- When it is off

| Check item                                              | Corrective action                                                                                                                                                                              |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the power is supplied.                    | Check that the supply voltage of the multiple input module is within the rated range.                                                                                                          |
| Check whether the capacity of the CPU module is enough. | Calculate the current consumption of the 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.                                                                                                                                                        |
| Cases other than the above                              | Reset the CPU module, and check if the RUN LED turns on. If the RUN LED still remains off, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |

## ■When the ERROR LED turns on or flashes

- When it is on

| Check item                            | Corrective 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 412 List of error codes |

- When flashing

| Check item                                                         | Corrective action                                                                                                                                                                                                                    |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether 24 V DC external supply power shutdown has occurred. | Check that FX5-8AD and 24 V DC external power supply are properly connected.<br>Additionally, before turning on the system power supply, check that the voltage supply from the 24 V DC external power supply is started to FX5-8AD. |

## ■When the ALM LED turns on or flashes

- When it is on

| Check item                               | Corrective action                                                                                                                                                                                                                                                                       |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any alert has been issued. | Check Alert output flag (Process alarm upper limit), Alert output flag (Process alarm lower limit), Alert output flag (Rate alarm upper limit), and Alert output flag (Rate alarm lower limit).<br>Take actions described in the list of alarm codes.<br>☞ Page 415 List of alarm codes |

- When flashing

| Check item                                         | Corrective action                                                                                                                                                       |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any input signal error has occurred. | Check Input signal error detection signal or Input signal error detection flag.<br>Take actions described in the list of alarm codes.<br>☞ Page 415 List of alarm codes |

## ■When a digital output value cannot be read

| Check item                                                                                                                           | Corrective action                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether an analog signal line is disconnected from the multiple input module.                                                  | Visually check signal lines and correctly connect analog signal lines.                                                                                                                                                                                                                                                                                                                                                            |
| Check whether the CPU module is in the STOP state.                                                                                   | Change the state of the CPU module to RUN.                                                                                                                                                                                                                                                                                                                                                                                        |
| Check whether the offset/gain setting in the user range setting is correct.                                                          | Check that the offset/gain setting is correct.<br>If the user range setting is selected, change the other input range to the factory shipment setting, and check that the conversion is performed.<br>Reconfigure the offset/gain setting when the conversion is correct.                                                                                                                                                         |
| Check whether the input type/input range setting are correct.                                                                        | Check CH□ Input type/Range monitor with GX Works3. When the input type/input range setting are incorrect, reconfigure the input type and input range setting again.                                                                                                                                                                                                                                                               |
| Check whether 'Operating condition setting request' (Un\G70, b9) has been executed.                                                  | Turn off→on→off*1 'Operating condition setting request' (Un\G70, b9) and check that a digital output value is stored in 'CH1 Digital output value' (Un\G400) using GX Works3. If the stored value is correct, check the program.                                                                                                                                                                                                  |
| Check whether the setting value of the time average is correct when the time average is selected in Averaging process specification. | When the time average is selected for processing, set the time average value in CH1 Time average/Count average/Moving average setting so that the value satisfies the following condition:<br>• Time average setting value $\geq 4 \text{ (times)} \times 1 \text{ (ms)} \times \text{Number of input type current/voltage specified channel}$<br>If the condition above is not satisfied, the digital output value results in 0. |

\*1 The conversion does not start when 'Operating condition setting request' (Un\G70, b9) is on. After turning off→on, check that 'Operating condition setting completed flag' (Un\G69, b9) is off, and then make sure to turn on→off.

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

| Check item                                                        | Corrective 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. |
| Is an external input being made to a conversion disabled channel? | Do not input to a conversion disabled channel from an external device.            |

## ■Digital output value varies

| Check item                                                               | Corrective action                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether a conversion method other than sampling processing is set. | Check the setting of average processing specification from the "Module parameter setting" screen of GX Works3.<br>Review the setting of average processing specification and check the state of variation of 'CH1 Digital output value' (Un\G400) again. |

## ■Conversion completed flag does not turn on

| Check item                                                    | Corrective action                                                                                                                                                                                                                                |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether all channels are set to be conversion disabled. | Check the setting of input type with GX Works3.<br>If there is no channel other than conversion disabled, please set the input type setting to one other than "Conversion disabled" for one or more channels from GX Works3 or sequence program. |

## When the input type is “resistance temperature detector”, and “thermocouple”

### ■When the RUN LED flashes or turns off

- When flashing

| Check item                                               | Cause                                                                                                                                                                                          | Corrective action                                                                                                                                          |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the module is in offset/gain setting mode. | The programmable controller has been powered off→on, or the CPU module has been reset when the operation mode is set to offset/gain setting mode in the module parameter setting of GX Works3. | In the module parameter setting of GX Works3, set the operation mode to normal mode and power off→on the programmable controller, or reset the CPU module. |
|                                                          | The value in the mode switching setting has been changed and the mode has been switched to offset/gain setting mode.                                                                           | Review the program that uses the mode switching setting to check whether the mode has been switched erroneously.                                           |

- When it is off

| Check item                                              | Corrective action                                                                                                                                                                              |
|---------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the power is supplied.                    | Check that the supply voltage of the multiple input module is within the rated range.                                                                                                          |
| Check whether the capacity of the CPU module is enough. | Calculate the current consumption of the 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.                                                                                                                                                        |
| Cases other than the above                              | Reset the CPU module, and check if the RUN LED turns on. If the RUN LED still remains off, the possible cause is a failure of the module. Please consult your local Mitsubishi representative. |

### ■When the ERROR LED turns on or flashes

- When it is on

| Check item                            | Corrective 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 412 List of error codes |

- When flashing

| Check item                                                         | Corrective action                                                                                                                                                                                                                    |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether 24 V DC external supply power shutdown has occurred. | Check that FX5-8AD and 24 V DC external power supply are properly connected.<br>Additionally, before turning on the system power supply, check that the voltage supply from the 24 V DC external power supply is started to FX5-8AD. |

## ■When the ALM LED turns on or flashes

- When it is on

| Check item                               | Corrective action                                                                                                                                                                                                                                                                                                                                                       |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any alert has been issued. | Check Alert output flag (Process alarm upper limit), Alert output flag (Process alarm lower limit), Alert output flag (Rate alarm upper limit), and Alert output flag (Rate alarm lower limit).<br>Take actions described in the list of alarm codes.<br> Page 415 List of alarm codes |

- When flashing

| Check item                                         | Corrective action                                                                                                                                                                                                                             |
|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether any disconnection has been occurred. | Check Disconnection detection signal or Disconnection detection flag.<br>Take actions described in the list of alarm codes.<br> Page 415 List of alarm codes |

## ■When a digital output value cannot be read

| Check item                                                                                                                           | Corrective action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether an analog signal line is disconnected from the multiple input module.                                                  | Visually check signal lines and correctly connect analog signal lines.                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Check whether a thermocouple and compensation lead wire are correctly connected.                                                     | Correctly connect a thermocouple or compensation lead wire to the multiple input module. The following is the check point. <ul style="list-style-type: none"> <li>• A shielded cable for the used channel is grounded or not.</li> <li>• The thermocouple and compensation lead wire are reversely connected or not.</li> </ul>                                                                                                                                                                                        |
| Check whether the CPU module is in the STOP state.                                                                                   | Change the state of the CPU module to RUN.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Check whether the offset/gain setting is correct.                                                                                    | Check that the offset/gain setting is correct.<br>If the user range setting is used, change to the factory shipment setting, and check that the conversion is performed.<br>When the conversion is correct, perform the offset/gain setting again.                                                                                                                                                                                                                                                                     |
| Check whether the input type/input range setting are correct.                                                                        | Check 'CH1 Input type/Range monitor' (Un\G430) with GX Works3. When the input type/input range setting are incorrect, reconfigure the input type and input range setting again.                                                                                                                                                                                                                                                                                                                                        |
| Check whether 'Operating condition setting request' (Un\G70, b9) has been executed.                                                  | Turn off→on→off*1 'Operating condition setting request' (Un\G70, b9) and check that a digital output value is stored in 'CH1 Digital output value' (Un\G400) using GX Works3.                                                                                                                                                                                                                                                                                                                                          |
| Check whether the setting value of the time average is correct when the time average is selected in Averaging process specification. | When the time average is selected for processing, set the time average value in CH1 Time average/Count average/Moving average setting so that the value satisfies the following condition: <ul style="list-style-type: none"> <li>• Time average setting value <math>\geq 4 \text{ (times)} \times 40 \text{ (ms)} \times \text{Number of Input type thermocouple/resistance temperature detector specified channel}</math></li> </ul> If the condition above is not satisfied, the digital output value results in 0. |

\*1 The conversion does not start when 'Operating condition setting request' (Un\G70, b9) is on. After turning off→on, check that 'Operating condition setting completed flag' (Un\G69, b9) is off, and then make sure to turn on→off.

## ■Digital output value does not vary

| Check item                                                                           | Corrective action                                                                                                                                           |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether disconnection of a thermocouple or compensation lead wire is detected. | Eliminate the cause of disconnection, by replacing the thermocouple or compensation lead wire for instance, and check 'CH1 Digital output value' (Un\G400). |

## ■The digital output value is not converted to an expected value

| Check item                                                        | Corrective action                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether the input type/input range setting are correct.     | Check the setting of input type, and input range from the "Module parameter setting" screen of GX Works3.<br>If the setting range is not correct, set input range from "Module parameter setting" screen again.                                                                   |
| Check whether the offset/gain setting is correct.                 | Check that the offset/gain setting is correct. If the user range setting is used, change to the factory shipment setting, and check that the conversion is performed.<br>When the conversion is correct, perform the offset/gain setting again.                                   |
| Check whether average processing specification is correct.        | Check the setting of average processing specification from the "Module parameter setting" screen of GX Works3.<br>If the setting is different from the average processing you want to use, reset the average processing specification from the "Module parameter setting" screen. |
| Is an external input being made to a conversion disabled channel? | Do not input to a conversion disabled channel from an external device.                                                                                                                                                                                                            |

## ■Digital output value varies

| Check item                                                               | Corrective action                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether a conversion method other than sampling processing is set. | Check the setting of average processing specification from the "Module parameter setting" screen of GX Works3.<br>Review the setting of average processing specification and check the state of variation of 'CH1 Digital output value' (Un\G400) again. |

## ■Conversion completed flag does not turn on

| Check item                                                    | Corrective action                                                                                                                                                                                                                                |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Check whether all channels are set to be conversion disabled. | Check the setting of input type with GX Works3.<br>If there is no channel other than conversion disabled, please set the input type setting to one other than "Conversion disabled" for one or more channels from GX Works3 or sequence program. |

## List of error codes

If an error occurs during operation, a multiple input module stores the error code into 'Latest error code' (Un\G0) of the buffer memory. In addition, 'Error flag' (Un\G69, b15) turns on. Turning on 'Error clear request' (Un\G70, b15) clears the error code in 'Latest error code' (Un\G0) and turns off 'Error flag' (Un\G69, b15).

Error codes of a multiple input module are classified in minor errors or moderate errors.

- Minor error: This error is caused by the setting failure of programs and parameters, and after eliminating the error cause, each function normally executes. (1000H to 1FFFH)
- Moderate error: Hardware failures. The A/D conversion, and temperature conversion do not continue. (3000H to 3FFFH)

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

□: This symbol indicates the number of the channel where an error has occurred. A numerical value of 0 to 7 is used to correspond to CH1 to 8.

(CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5, CH7: 6, CH8: 7)

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

| Error code | Error name                                                 | Description and cause                                                                                                                                                                                       | Corrective 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.                                                                                                                   |
| 1090H      | Conversion enabled CH combination unavailable error        | In 2CH conversion mode, CH used for conversion enabled CH number is out of combination range.                                                                                                               | Reconfigure CH to the conversion enabled with the correct combination for conversion enabled CH number.                                                                                     |
| 1861H      | Offset/gain setting continuous write occurrence error      | The setting value has been continuously written to the flash memory 26 times or more in the offset/gain setting.                                                                                            | For the offset/gain setting, write the setting value only once per setting.                                                                                                                 |
| 190□H      | Input type/Range setting range error                       | <ul style="list-style-type: none"> <li>• A value out of the range is set in CH□ Input type/Range setting.</li> <li>• A value out of the range is set in CH□ Range setting (Offset/gain setting).</li> </ul> | <ul style="list-style-type: none"> <li>• Set CH□ Input type/Range setting to the value within the range again.</li> <li>• Set 0 or 1 in CH□ Range setting (Offset/gain setting).</li> </ul> |

| Error code | Error name                                                 | Description and cause                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Corrective action                                                                                                                                                                                                                                       |
|------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 191□H      | Averaging process specification setting range error        | A value other than 0 to 3 is set in CH□ Average processing specification.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Set a value of 0 to 3 in CH□ Average processing specification again.                                                                                                                                                                                    |
| 192□H      | Time average setting range error                           | ■When the input type is "current", and "voltage"<br>When Time average is selected in CH□ Average processing specification, a value other than 4 to 10000 is set in CH□ Time average/Count average/Moving average setting.                                                                                                                                                                                                                                                                                                                                                    | ■When the input type is "current", and "voltage"<br>Set a value of 4 to 10000 in CH□ Time average/Count average/Moving average setting.                                                                                                                 |
|            |                                                            | ■When the input type is resistance temperature detector, and thermocouple<br>When Time average is selected in CH□ Average processing specification, a value other than 160 to 10000 is set in CH□ Time average/Count average/Moving average setting.                                                                                                                                                                                                                                                                                                                         | ■When the input type is resistance temperature detector, and thermocouple<br>Set a value of 160 to 10000 in CH□ Time average/Count average/Moving average setting.                                                                                      |
| 193□H      | Count average setting range error                          | When Count average is set in CH□ Average processing specification, a value other than 4 to 10000 is set in CH□ Time average/Count average/Moving average setting.                                                                                                                                                                                                                                                                                                                                                                                                            | Set a value of 4 to 10000 in CH□ Time average/Count average/Moving average setting again.                                                                                                                                                               |
| 194□H      | Moving average setting range error                         | When the moving average is set in CH□ Averaging processing specification, a value other than 2 to 1000 is set in CH□ Time average/Count average/Moving average setting.                                                                                                                                                                                                                                                                                                                                                                                                      | Set a value of 2 to 1000 in CH□ Time average/Count average/Moving average setting again.                                                                                                                                                                |
| 198□H      | Celsius/Fahrenheit display setting range error             | A value other than 0 and 1 is set in CH□ Celsius/Fahrenheit display setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Set 0 or 1 in CH□ Celsius/Fahrenheit display setting again.                                                                                                                                                                                             |
| 1A0□H      | Scaling enable/disable setting range error                 | A value other than 0 and 1 is set in CH□ Scaling enable/disable setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Set 0 or 1 in CH□ Scaling enable/disable setting.                                                                                                                                                                                                       |
| 1A1□H      | Scaling setting range error                                | A value other than -32000 to +32000 is set in CH□ Scaling lower limit value or CH□ Scaling upper limit value.                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Set CH□ Scaling lower limit value or CH□ Scaling upper limit value to -32000 to +32000 again.                                                                                                                                                           |
| 1A2□H      | Scaling upper/lower limit value setting error              | CH□ Scaling lower limit value and CH□ Scaling upper limit value are set as CH□ Scaling lower limit value = CH□ Scaling upper limit value.                                                                                                                                                                                                                                                                                                                                                                                                                                    | Set CH□ Scaling lower limit value and CH□ Scaling upper limit value as CH□ Scaling lower limit value ≠ CH□ Scaling upper limit value again.                                                                                                             |
| 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.                                                                                                                                                                                              |
| 1AA□H      | Maximum value reset request setting range error            | A value other than 0 and 1 is set in CH□ Maximum value reset request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Set 0 or 1 in CH□ Maximum value reset request again.                                                                                                                                                                                                    |
| 1AB□H      | Minimum value reset request setting range error            | A value other than 0 and 1 is set in CH□ Minimum value reset request.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Set 0 or 1 in CH□ Minimum value reset request again.                                                                                                                                                                                                    |
| 1B0□H      | Alert output setting (Process alarm) range error           | A value other than 0 and 1 is set in CH□ Alert output setting (Process alarm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Set 0 or 1 in CH□ Alert output setting (Process alarm).                                                                                                                                                                                                 |
| 1B△□H      | Process alarm upper lower limit value setting range error  | The values not satisfying the following condition are set in CH□ Process alarm upper upper limit value to CH□ Process alarm lower lower limit value:<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      | Alert output setting (Rate alarm) range error              | A value other than 0 and 1 is set in CH□ Alert output setting (Rate alarm).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Set 0 or 1 in CH□ Alert output setting (Rate alarm).                                                                                                                                                                                                    |
| 1B9□H      | Rate alarm alert detection cycle setting range error       | A value other than 1 to 32000 is set in CH□ Rate alarm alert detection cycle setting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Set a value of 1 to 32000 in CH□ Rate alarm alert detection cycle setting.                                                                                                                                                                              |
| 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 again.                                                                                                                               |
| 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.                                                                                                                                                                                           |

| Error code | Error name                                                   | Description and cause                                                                                                                                                                               | Corrective action                                                                                                                                                                                                      |
|------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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 lower limit setting value or CH□ Input signal error detection upper limit setting value.                                     | Set CH□ Input signal error detection lower limit setting value or CH□ Input signal error detection upper limit setting value to 0 to 250.                                                                              |
| 1C5□H      | Disconnection detection enable/disable setting range error   | A value other than 0 and 1 is set in CH□ Disconnection detection enable/disable setting.                                                                                                            | Set 0 or 1 in CH□ Disconnection detection enable/disable setting.                                                                                                                                                      |
| 1C6□H      | Disconnection detection enabled range setting range error    | CH□ Input signal error detection setting is set in Simple disconnection detection, and the Input range is set in other than the following:<br>• 4 to 20 mA<br>• 1 to 5 V                            | For channels for simple disconnection detection using the input signal error detection function, set Input range setting to either of the following again.<br>• 4 to 20 mA<br>• 1 to 5 V                               |
| 1D0□H      | Logging enable/disable setting range error                   | A value other than 0 and 1 is set in CH□ Logging enable/disable setting.                                                                                                                            | Set 0 or 1 in CH□ Logging enable/disable setting.                                                                                                                                                                      |
| 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 the value(s) within the range in one or both of CH□ Logging cycle setting value and CH□ Logging cycle unit setting.                                                                                                |
| 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 the conversion cycle of the object to be logged or more.                                                           |
| 1D3□H      | Logging data setting range error                             | A value other than 0 and 1 is set in CH□ Logging data setting.                                                                                                                                      | Set 0 or 1 in CH□ Logging data setting.                                                                                                                                                                                |
| 1D4□H      | Post-trigger logging points setting range error              | A value other than 1 to 10000 is set in CH□ Post-trigger logging points.                                                                                                                            | Set a value of 1 to 10000 in CH□ Post-trigger logging points.                                                                                                                                                          |
| 1D5□H      | Level trigger condition setting range error                  | A value other than 0 to 3 is set in CH□ Level trigger condition setting.                                                                                                                            | Set a value of 0 to 3 in CH□ Level trigger condition setting.                                                                                                                                                          |
| 1D6□H      | Trigger data setting range error                             | A value other than 0 to 9999 is set in CH□ Trigger data.                                                                                                                                            | Set a value of 0 to 9999 in CH□ Trigger data.                                                                                                                                                                          |
| 1D7□H      | Logging hold request range error                             | A value other than 0 and 1 is set in CH□ Logging hold request.                                                                                                                                      | Set 0 or 1 in CH□ Logging hold request.                                                                                                                                                                                |
| 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                                                                                                       |
| 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.                                                                                               |
| 1E9□H      | Offset/gain setting out-of-range error                       | The offset setting value and gain setting value 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                                                                                                       |
| 1EB□H      | Offset/gain channel change error                             | The channel where disconnection has occurred or channel where the conversion is disabled is specified when Channel change request (Un\G70, b11) has been turned on.                                 | Check wiring for disconnection, or specify the channel where the conversion is enabled.                                                                                                                                |
| 1EC□H      | Offset/gain setting for specified channel out-of-range error | The offset setting value or gain setting value for the specified channel is out of the measuring range when Channel change request (Un\G70, b11) has been turned on.                                | Set a value within the measuring range as the offset setting value or gain setting value for the specified channel.                                                                                                    |



| Error code | Error name                                           | Description and cause                                                                                                                                                              | Corrective action                                                                                                                                                                                                                                                                                              |
|------------|------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1ED□H      | Setting Input type/range (offset/gain setting) error | The "Setting Input type/range (Offset/gain setting)" for the specified channel is set to the factory default setting when Channel change request (Un\G70, b11) has been turned on. | Set the "Setting Input type/range (Offset/gain setting)" for the specified channel to the user range setting again.                                                                                                                                                                                            |
| 1EF□H      | User range setting input type mismatch error         | The presently set input type differs from the input type stored in the flash memory when the "Setting Input type/range (Offset/gain setting)" is set to the "User range setting".  | Set the input type to be used as the offset/gain setting.                                                                                                                                                                                                                                                      |
| 1F08H      | Module power supply error                            | The 24 V DC power supply is not normally supplied to the multiple input module.                                                                                                    | Check the wiring of the cable or the supplied voltage. After the check, turn off→on→off Error clear request (Un\G70, b15) 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 multiple input module.                                                                                                           | Power off→on the module. 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. If the values are abnormal, please consult your local Mitsubishi representative.                                                                                                                                                                                              |

## List of alarm codes

If an alarm occurs during operation, a multiple input module stores the alarm code into 'Latest alarm code' (Un\G2) of the buffer memory. Turning on 'Error clear request' (Un\G70, b15) clears the alarm code in 'Latest alarm code' (Un\G2).

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

□: This symbol indicates the number of the channel where an alarm has occurred. A numerical value of 0 to 7 is used to correspond to CH1 to 8.

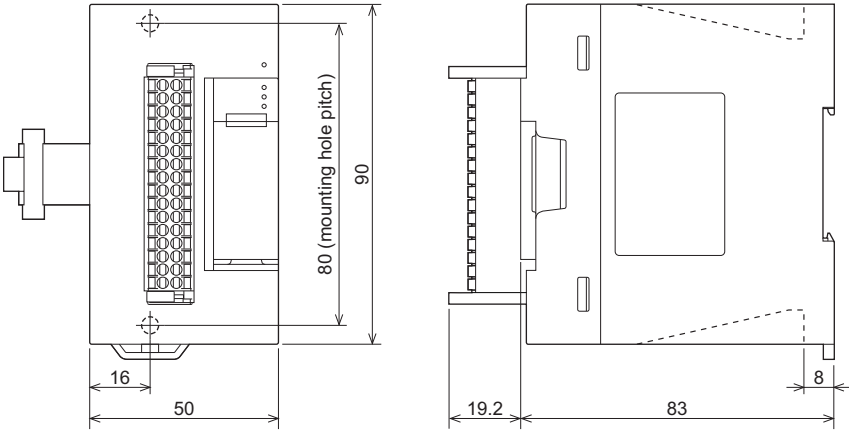
(CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5, CH7: 6, CH8: 7)

| Alarm code | Alarm name                                          | Description and cause                                                  | Corrective 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 range. As a result, the corresponding bit of CH□ Alert output flag (Process alarm upper limit) and/or CH□ Alert output flag (Process alarm lower limit), and Alert output signal (Un\G69, b8) turn off automatically.       |
| 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 range. As a result, the corresponding bit of CH□ Alert output flag (Rate alarm upper limit) or CH□ Alert output flag (Rate alarm lower limit), and Alert output signal (Un\G69, b8) turn off automatically. |
| 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□.          | Adjust the analog input value to fall within the range, and then turn off→on→off Error clear request (Un\G70, b15). As a result, the corresponding bit of Input signal error detection flag and Input signal error detection signal turn off.                                     |
| 091□H      | Input signal error detection (lower limit)          | An input signal error (lower limit) has been detected in CH□.          |                                                                                                                                                                                                                                                                                   |
| 092□H      | Input signal error detection (simple disconnection) | An input signal error (simple disconnection) has been detected in CH□. |                                                                                                                                                                                                                                                                                   |
| 0A0□H      | Disconnection detection                             | Disconnection has been detected in CH□.                                | Re-establish the connection and turn off→on→off Error clear request (Un\G70, b15). As a result, the corresponding bit of Disconnection detection flag, and Disconnection detection signal (Un\G69, b6) turn off, and the alarm code of Latest alarm code is cleared.              |

# APPENDICES

## Appendix 9 External Dimensions

This chapter describes the external dimensions of the multiple input module.



(Unit: mm)

# Appendix 10 Standards

## Certification of UL, cUL standards

The FX5-8AD supports UL (UL, cUL) standards.

For models that support UL standards, refer to the following.

UL, cUL file number: E95239

## Compliance with EC directive (CE marking)

This note does not guarantee that an entire machine produced in accordance with the contents of this note will comply with the following standards.

Compliance to EMC directive and LVD directive of the entire mechanical module should be checked by the user/manufacturer. For more details please contact to the local Mitsubishi Electric sales site.

## Requirement for compliance with EMC directive

The following products have shown compliance through direct testing (of the identified standards below) and design analysis (through the creation of a technical construction file) to the European Directive for Electromagnetic Compatibility (2014/30/EU) when used as directed by the appropriate documentation.

### Attention

This product is designed for use in industrial applications.

### Product compatibility

Type: Programmable controller (open type equipment)

Models: FX5 manufactured

| from April 1st, 2017                                                          | FX5-8AD                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Electromagnetic compatibility (EMC) directive                                 | Remarks                                                                                                                                                                                                                                                                                                                         |
| EN61131-2:2007 Programmable controllers<br>- Equipment requirements and tests | Compliance with all relevant aspects of the standard.<br>EMI<br>• Radiated emission<br>• Conducted emission<br>EMS<br>• Radiated electromagnetic field<br>• Fast transient burst<br>• Electrostatic discharge<br>• High-energy surge<br>• Voltage drops and interruptions<br>• Conducted RF<br>• Power frequency magnetic field |

## Caution for compliance with EC directive

### Caution for when the FX5-8AD is used

When the FX5-8AD is used, attach a ferrite core to the power supply of the CPU module.

Make 2 turns around the ferrite core and attach within approximately 200 mm from the terminal block and connectors of the power cable. (Ferrite core used in Mitsubishi Electric's test: E04SR401938 manufactured by SEIWA ELECTRIC MFG. CO., LTD.)

A

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If accuracy in measuring and control is required when using in an environment exposed to electrical stress, such as an EMS test, implementing the following details is recommended.

For users of proprietary cables (dedicated for sensors or actuators), these users should follow those manufacturers' installation requirements.

Mitsubishi Electric recommends that shielded cables be used. If no other EMC protection is provided, users may experience temporary loss of accuracy between +10%/-10% in very heavy industrial areas.

However, Mitsubishi Electric suggests that if adequate EMC precautions are followed with general good EMC practice for the user's complete control system, users should expect normal errors as specified in this manual.

- Sensitive analog cables should not be laid in the same trunking or cable conduit as high voltage cabling. Where possible, users should run analog cables separately.
  - Good cable shielding should be used. When terminating the shield at Earth - ensure that no earth loops are accidentally created.
  - When reading analog values, EMC induced errors can be smoothed out by averaging the readings. This can be achieved either through functions on the analog devices or through a user's program.
-

# Appendix 11 Module Label

The functions of the multiple input module can be set by using module labels.

## Module Label

The module label name is defined with the following structure:

"Module name"\_"Module number".b"Label name" or "Module name"\_"Module number".b"Label name"\_D

Ex.

FX5\_8AD\_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.

## 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.

FX5\_8AD\_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 7 is used to correspond to CH1 to 8. (CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5, CH7: 6, CH8: 7)

### ■Data format

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

| Data format | Description                         |
|-------------|-------------------------------------|
| b           | Bit                                 |
| u           | Word [Unsigned]/Bit string [16-bit] |
| w           | Word [Signed]                       |

### ■Label name

The label identifier unique to a module is given.

### ■\_D

This string indicates that the module label is for the direct access. Values that are read from or written to the module label is reflected in the module instantly.

# Appendix 12 Buffer Memory Areas

## List of buffer memory areas

This section lists the buffer memory areas of the multiple input module. For details on the buffer memory, refer to the following.

☞ Page 434 Details of buffer memory addresses

The buffer memory areas of the multiple input module are classified into the data types described below.

| Data type    | Description               |                                                                                                                                         |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Setting data | Description               | The data to be customized to suit the connected devices and the purpose of the system.                                                  |
|              | Read and write attributes | Read and write is possible.                                                                                                             |
|              | Setting procedure         | Use GX Works3 or a program to set the data.                                                                                             |
|              | Setting timing            | After a change of value, turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the setting value to take effect. |
| Control data | Description               | The data used for controlling the multiple input module.                                                                                |
|              | Read and write attributes | Read and write is possible.                                                                                                             |
|              | Setting procedure         | Use GX Works3 or a program to set the data.                                                                                             |
|              | Setting timing            | As soon as the values are changed, the set values become effective.                                                                     |
| Monitor data | Description               | The data used for checking the status of the multiple input module.                                                                     |
|              | Read and write attributes | Only read is possible and write is not possible.                                                                                        |
|              | Setting procedure         | —                                                                                                                                       |
|              | Setting timing            | —                                                                                                                                       |



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 the normal mode

○: With refresh setting, ×: Without refresh setting

#### ■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 29           | 4H to 1DH             | System area                                     | —             | —         | —            |
| 30                | 1EH                   | Module Information                              | 61E0H         | Monitor   | ×            |
| 31                | 1FH                   | Firmware version                                | 0             | Monitor   | ×            |
| 32 to 35          | 20H 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                   | Disconnection detection flag                    | 0000H         | Monitor   | ○            |
| 42                | 2AH                   | Conversion completed flag                       | 0000H         | Monitor   | ○            |
| 43 to 59          | 2BH to 3BH            | System area                                     | —             | —         | —            |
| 60                | 3CH                   | Operation mode monitor                          | 0             | Monitor   | ×            |
| 61 to 68          | 3DH to 44H            | System area                                     | —             | —         | —            |
| 69                | 45H                   | Input signals                                   | 0             | Monitor   | ×            |

| Address<br>(decimal) | Address<br>(hexadecimal) | Name                                                                              | Default value | Data type | Auto refresh |
|----------------------|--------------------------|-----------------------------------------------------------------------------------|---------------|-----------|--------------|
| 70                   | 46H                      | Output signals                                                                    | 0             | Control   | ×            |
| 71 to 89             | 47H 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 295           | 64H to 127H              | System area                                                                       | —             | —         | —            |
| 296, 297             | 128H, 129H               | Mode switching setting                                                            | 0             | Setting   | ×            |
| 298                  | 12AH                     | System area                                                                       | —             | —         | —            |
| 299                  | 12BH                     | Rate alarm change rate selection                                                  | 1             | Setting   | ×            |
| 300 to 303           | 12CH to 12FH             | System area                                                                       | —             | —         | —            |
| 304                  | 130H                     | Input signal error/Disconnection detection automatic clear enable/disable setting | 1             | Setting   | ×            |
| 305                  | 131H                     | Offset/gain initialization enable code                                            | 0             | Setting   | ×            |
| 306 to 399           | 132H to 18FH             | System area                                                                       | —             | —         | —            |

## ■Un\G400 to Un\G3599

| Address<br>Decimal (hexadecimal)   |                                    |                                    |                                      |                                         |                                      |                                      |                                      | Name                                      | Default<br>value | Data<br>type | Auto<br>refresh |
|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------------|------------------|--------------|-----------------|
| CH1                                | CH2                                | CH3                                | CH4                                  | CH5                                     | CH6                                  | CH7                                  | CH8                                  |                                           |                  |              |                 |
| 400<br>(190H)                      | 600<br>(258H)                      | 800<br>(320H)                      | 1000<br>(3E8H)                       | 1200<br>(4B0H)                          | 1400<br>(578H)                       | 1600<br>(640H)                       | 1800<br>(708H)                       | CH□ Digital output value                  | 0                | Monitor      | ○               |
| 401<br>(191H)                      | 601<br>(259H)                      | 801<br>(321H)                      | 1001<br>(3E9H)                       | 1201<br>(4B1H)                          | 1401<br>(579H)                       | 1601<br>(641H)                       | 1801<br>(709H)                       | System area                               | —                | —            | —               |
| 402<br>(192H)                      | 602<br>(25AH)                      | 802<br>(322H)                      | 1002<br>(3EAH)                       | 1202<br>(4B2H)                          | 1402<br>(57AH)                       | 1602<br>(642H)                       | 1802<br>(70AH)                       | CH□ Digital operation value               | 0                | Monitor      | ○               |
| 403<br>(193H)                      | 603<br>(25BH)                      | 803<br>(323H)                      | 1003<br>(3EBH)                       | 1203<br>(4B3H)                          | 1403<br>(57BH)                       | 1603<br>(643H)                       | 1803<br>(70BH)                       | System area                               | —                | —            | —               |
| 404<br>(194H)                      | 604<br>(25CH)                      | 804<br>(324H)                      | 1004<br>(3ECH)                       | 1204<br>(4B4H)                          | 1404<br>(57CH)                       | 1604<br>(644H)                       | 1804<br>(70CH)                       | CH□ Maximum value                         | 0                | Monitor      | ○               |
| 405<br>(195H)                      | 605<br>(25DH)                      | 805<br>(325H)                      | 1005<br>(3EDH)                       | 1205<br>(4B5H)                          | 1405<br>(57DH)                       | 1605<br>(645H)                       | 1805<br>(70DH)                       | System area                               | —                | —            | —               |
| 406<br>(196H)                      | 606<br>(25EH)                      | 806<br>(326H)                      | 1006<br>(3EEH)                       | 1206<br>(4B6H)                          | 1406<br>(57EH)                       | 1606<br>(646H)                       | 1806<br>(70EH)                       | CH□ Minimum value                         | 0                | Monitor      | ○               |
| 407, 408<br>(197H,<br>198H)        | 607, 608<br>(25FH,<br>260H)        | 807, 808<br>(327H,<br>328H)        | 1007,<br>1008<br>(3EFH,<br>3F0H)     | 1207,<br>1208<br>(4B7H,<br>4B8H)        | 1407,<br>1408<br>(57FH,<br>580H)     | 1607,<br>1608<br>(647H,<br>648H)     | 1807,<br>1808<br>(70FH,<br>710H)     | System area                               | —                | —            | —               |
| 409<br>(199H)                      | 609<br>(261H)                      | 809<br>(329H)                      | 1009<br>(3F1H)                       | 1209<br>(4B9H)                          | 1409<br>(581H)                       | 1609<br>(649H)                       | 1809<br>(711H)                       | CH□ Logging hold flag                     | 0                | Monitor      | ○               |
| 410 to<br>419<br>(19AH to<br>1A3H) | 610 to<br>619<br>(262H to<br>26BH) | 810 to<br>819<br>(32AH to<br>333H) | 1010 to<br>1019<br>(3F2H to<br>3FBH) | 1210 to<br>1219<br>(4BAH<br>to<br>4C3H) | 1410 to<br>1419<br>(582H to<br>58BH) | 1610 to<br>1619<br>(64AH to<br>653H) | 1810 to<br>1819<br>(712H to<br>71BH) | System area                               | —                | —            | —               |
| 420<br>(1A4H)                      | 620<br>(26CH)                      | 820<br>(334H)                      | 1020<br>(3FCH)                       | 1220<br>(4C4H)                          | 1420<br>(58CH)                       | 1620<br>(654H)                       | 1820<br>(71CH)                       | CH□ Conversion status                     | 0                | Monitor      | ×               |
| 421<br>(1A5H)                      | 621<br>(26DH)                      | 821<br>(335H)                      | 1021<br>(3FDH)                       | 1221<br>(4C5H)                          | 1421<br>(58DH)                       | 1621<br>(655H)                       | 1821<br>(71DH)                       | System area                               | —                | —            | —               |
| 422<br>(1A6H)                      | 622<br>(26EH)                      | 822<br>(336H)                      | 1022<br>(3FEH)                       | 1222<br>(4C6H)                          | 1422<br>(58EH)                       | 1622<br>(656H)                       | 1822<br>(71EH)                       | CH□ Maximum value reset<br>completed flag | 0                | Monitor      | ×               |

| Address<br>Decimal (hexadecimal)      |                                    |                                    |                                      |                                         |                                         |                                      |                                      | Name                                                                  | Default<br>value | Data<br>type | Auto<br>refresh |
|---------------------------------------|------------------------------------|------------------------------------|--------------------------------------|-----------------------------------------|-----------------------------------------|--------------------------------------|--------------------------------------|-----------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                                   | CH2                                | CH3                                | CH4                                  | CH5                                     | CH6                                     | CH7                                  | CH8                                  |                                                                       |                  |              |                 |
| 423<br>(1A7H)                         | 623<br>(26FH)                      | 823<br>(337H)                      | 1023<br>(3FFH)                       | 1223<br>(4C7H)                          | 1423<br>(58FH)                          | 1623<br>(657H)                       | 1823<br>(71FH)                       | CH□ Minimum value reset<br>completed flag                             | 0                | Monitor      | ×               |
| 424 to<br>429<br>(1A8H to<br>1ADH)    | 624 to<br>629<br>(270H to<br>275H) | 824 to<br>829<br>(338H to<br>33DH) | 1024 to<br>1029<br>(400H to<br>405H) | 1224 to<br>1229<br>(4C8H<br>to<br>4CDH) | 1424 to<br>1429<br>(590H to<br>595H)    | 1624 to<br>1629<br>(658H to<br>65DH) | 1824 to<br>1829<br>(720H to<br>725H) | System area                                                           | —                | —            | —               |
| 430<br>(1AEH)                         | 630<br>(276H)                      | 830<br>(33EH)                      | 1030<br>(406H)                       | 1230<br>(4CEH)                          | 1430<br>(596H)                          | 1630<br>(65EH)                       | 1830<br>(726H)                       | CH□ Input type/Range<br>monitor                                       | 0000H            | Monitor      | ×               |
| 431<br>(1AFH)                         | 631<br>(277H)                      | 831<br>(33FH)                      | 1031<br>(407H)                       | 1231<br>(4CFH)                          | 1431<br>(597H)                          | 1631<br>(65FH)                       | 1831<br>(727H)                       | CH□ Input type/Range<br>monitor (Offset/gain setting)                 | 0                | Monitor      | ×               |
| 432, 433<br>(1B0H,<br>1B1H)           | 632, 633<br>(278H,<br>279H)        | 832, 833<br>(340H,<br>341H)        | 1032,<br>1033<br>(408H,<br>409H)     | 1232,<br>1233<br>(4D0H,<br>4D1H)        | 1432,<br>1433<br>(598H,<br>599H)        | 1632,<br>1633<br>(660H,<br>661H)     | 1832,<br>1833<br>(728H,<br>729H)     | System area                                                           | —                | —            | —               |
| 434<br>(1B2H)                         | 634<br>(27AH)                      | 834<br>(342H)                      | 1034<br>(40AH)                       | 1234<br>(4D2H)                          | 1434<br>(59AH)                          | 1634<br>(662H)                       | 1834<br>(72AH)                       | CH□ Head pointer                                                      | 0                | Monitor      | ×               |
| 435<br>(1B3H)                         | 635<br>(27BH)                      | 835<br>(343H)                      | 1035<br>(40BH)                       | 1235<br>(4D3H)                          | 1435<br>(59BH)                          | 1635<br>(663H)                       | 1835<br>(72BH)                       | CH□ Latest pointer                                                    | 0                | Monitor      | ×               |
| 436<br>(1B4H)                         | 636<br>(27CH)                      | 836<br>(344H)                      | 1036<br>(40CH)                       | 1236<br>(4D4H)                          | 1436<br>(59CH)                          | 1636<br>(664H)                       | 1836<br>(72CH)                       | CH□ Number of logging data                                            | 0                | Monitor      | ×               |
| 437<br>(1B5H)                         | 637<br>(27DH)                      | 837<br>(345H)                      | 1037<br>(40DH)                       | 1237<br>(4D5H)                          | 1437<br>(59DH)                          | 1637<br>(665H)                       | 1837<br>(72DH)                       | CH□ Trigger pointer                                                   | 0                | Monitor      | ×               |
| 438 to<br>440<br>(1B6H to<br>1B8H)    | 638 to<br>640<br>(27EH to<br>280H) | 838 to<br>840<br>(346H to<br>348H) | 1038 to<br>1040<br>(40EH to<br>410H) | 1238 to<br>1240<br>(4D6H<br>to<br>4D8H) | 1438 to<br>1440<br>(59EH to<br>5A0H)    | 1638 to<br>1640<br>(666H to<br>668H) | 1838 to<br>1840<br>(72EH to<br>730H) | System area                                                           | —                | —            | —               |
| 441<br>(1B9H)                         | 641<br>(281H)                      | 841<br>(349H)                      | 1041<br>(411H)                       | 1241<br>(4D9H)                          | 1441<br>(5A1H)                          | 1641<br>(669H)                       | 1841<br>(731H)                       | CH□ Logging cycle monitor<br>value (s)                                | 0                | Monitor      | ×               |
| 442<br>(1BAH)                         | 642<br>(282H)                      | 842<br>(34AH)                      | 1042<br>(412H)                       | 1242<br>(4DAH)                          | 1442<br>(5A2H)                          | 1642<br>(66AH)                       | 1842<br>(732H)                       | CH□ Logging cycle monitor<br>value (ms)                               | 0                | Monitor      | ×               |
| 443<br>(1BBH)                         | 643<br>(283H)                      | 843<br>(34BH)                      | 1043<br>(413H)                       | 1243<br>(4DBH)                          | 1443<br>(5A3H)                          | 1643<br>(66BH)                       | 1843<br>(733H)                       | System area                                                           | —                | —            | —               |
| 444<br>(1BCH)                         | 644<br>(284H)                      | 844<br>(34CH)                      | 1044<br>(414H)                       | 1244<br>(4DCH)                          | 1444<br>(5A4H)                          | 1644<br>(66CH)                       | 1844<br>(734H)                       | CH□ Trigger generation time<br>(First/Last two digits of the<br>year) | 0                | Monitor      | ×               |
| 445<br>(1BDH)                         | 645<br>(285H)                      | 845<br>(34DH)                      | 1045<br>(415H)                       | 1245<br>(4DDH)                          | 1445<br>(5A5H)                          | 1645<br>(66DH)                       | 1845<br>(735H)                       | CH□ Trigger generation time<br>(Month/Day)                            | 0                | Monitor      | ×               |
| 446<br>(1BEH)                         | 646<br>(286H)                      | 846<br>(34EH)                      | 1046<br>(416H)                       | 1246<br>(4DEH)                          | 1446<br>(5A6H)                          | 1646<br>(66EH)                       | 1846<br>(736H)                       | CH□ Trigger generation time<br>(Hour/Minute)                          | 0                | Monitor      | ×               |
| 447<br>(1BFH)                         | 647<br>(287H)                      | 847<br>(34FH)                      | 1047<br>(417H)                       | 1247<br>(4DFH)                          | 1447<br>(5A7H)                          | 1647<br>(66FH)                       | 1847<br>(737H)                       | CH□ Trigger generation time<br>(Second/Day of the week)               | 0                | Monitor      | ×               |
| 448<br>(1C0H)                         | 648<br>(288H)                      | 848<br>(350H)                      | 1048<br>(418H)                       | 1248<br>(4E0H)                          | 1448<br>(5A8H)                          | 1648<br>(670H)                       | 1848<br>(738H)                       | CH□ Trigger generation time<br>(Millisecond)                          | 0                | Monitor      | ×               |
| 449 to<br>451<br>(1C1H<br>to<br>1C3H) | 649 to<br>651<br>(289H to<br>28BH) | 849 to<br>851<br>(351H to<br>353H) | 1049 to<br>1051<br>(419H to<br>41BH) | 1249 to<br>1251<br>(4E1H to<br>4E3H)    | 1449 to<br>1451<br>(5A9H to<br>5ABH)    | 1649 to<br>1651<br>(671H to<br>673H) | 1849 to<br>1851<br>(739H to<br>73BH) | System area                                                           | —                | —            | —               |
| 452<br>(1C4H)                         | 652<br>(28CH)                      | 852<br>(354H)                      | 1052<br>(41CH)                       | 1252<br>(4E4H)                          | 1452<br>(5ACH)                          | 1652<br>(674H)                       | 1852<br>(73CH)                       | CH□ Celsius/Fahrenheit<br>display monitor                             | 0                | Monitor      | ×               |
| 453<br>(1C5H)                         | 653<br>(28DH)                      | 853<br>(355H)                      | 1053<br>(41DH)                       | 1253<br>(4E5H)                          | 1453<br>(5ADH)                          | 1653<br>(675H)                       | 1853<br>(73DH)                       | CH□ NowSetting user range<br>base input type monitor                  | 1                | Monitor      | ×               |
| 454<br>(1C6H)                         | 654<br>(28EH)                      | 854<br>(356H)                      | 1054<br>(41EH)                       | 1254<br>(4E6H)                          | 1454<br>(5AEH)                          | 1654<br>(676H)                       | 1854<br>(73EH)                       | CH□ NowSetting user range<br>base input range monitor                 | 0000H            | Monitor      | ×               |
| 455 to<br>470<br>(1C7H<br>to<br>1D6H) | 655 to<br>670<br>(28FH to<br>29EH) | 855 to<br>870<br>(357H to<br>366H) | 1055 to<br>1070<br>(41FH to<br>42EH) | 1255 to<br>1270<br>(4E7H to<br>4F6H)    | 1455 to<br>1470<br>(5AFH<br>to<br>5BEH) | 1655 to<br>1670<br>(677H to<br>686H) | 1855 to<br>1870<br>(73FH to<br>74EH) | System area                                                           | —                | —            | —               |



| Address<br>Decimal (hexadecimal)   |                                    |                                    |                                      |                                      |                                      |                                      |                                      | Name                                                        | Default<br>value | Data<br>type | Auto<br>refresh |
|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                                | CH2                                | CH3                                | CH4                                  | CH5                                  | CH6                                  | CH7                                  | CH8                                  |                                                             |                  |              |                 |
| 471<br>(1D7H)                      | 671<br>(29FH)                      | 871<br>(367H)                      | 1071<br>(42FH)                       | 1271<br>(4F7H)                       | 1471<br>(5BFH)                       | 1671<br>(687H)                       | 1871<br>(74FH)                       | CH□ Logging hold request                                    | 0                | Control      | ○               |
| 472<br>(1D8H)                      | 672<br>(2A0H)                      | 872<br>(368H)                      | 1072<br>(430H)                       | 1272<br>(4F8H)                       | 1472<br>(5C0H)                       | 1672<br>(688H)                       | 1872<br>(750H)                       | CH□ Conversion value shift<br>amount                        | 0                | Control      | ○               |
| 473<br>(1D9H)                      | 673<br>(2A1H)                      | 873<br>(369H)                      | 1073<br>(431H)                       | 1273<br>(4F9H)                       | 1473<br>(5C1H)                       | 1673<br>(689H)                       | 1873<br>(751H)                       | CH□ Maximum value reset<br>request                          | 0                | Control      | ×               |
| 474<br>(1DAH)                      | 674<br>(2A2H)                      | 874<br>(36AH)                      | 1074<br>(432H)                       | 1274<br>(4FAH)                       | 1474<br>(5C2H)                       | 1674<br>(68AH)                       | 1874<br>(752H)                       | CH□ Minimum value reset<br>request                          | 0                | Control      | ×               |
| 475 to<br>500<br>(1DBH<br>to 1F4H) | 675 to<br>700<br>(2A3H to<br>2BCH) | 875 to<br>900<br>(36BH to<br>384H) | 1075 to<br>1100<br>(433H to<br>44CH) | 1275 to<br>1300<br>(4FBH<br>to 514H) | 1475 to<br>1500<br>(5C3H<br>to 5DCH) | 1675 to<br>1700<br>(68BH to<br>6A4H) | 1875 to<br>1900<br>(753H to<br>76CH) | System area                                                 | —                | —            | —               |
| 501<br>(1F5H)                      | 701<br>(2BDH)                      | 901<br>(385H)                      | 1101<br>(44DH)                       | 1301<br>(515H)                       | 1501<br>(5DDH)                       | 1701<br>(6A5H)                       | 1901<br>(76DH)                       | CH□ Averaging process<br>specification                      | 0                | Setting      | ×               |
| 502<br>(1F6H)                      | 702<br>(2BEH)                      | 902<br>(386H)                      | 1102<br>(44EH)                       | 1302<br>(516H)                       | 1502<br>(5DEH)                       | 1702<br>(6A6H)                       | 1902<br>(76EH)                       | CH□ Time Average/Count<br>Average/Moving Average<br>setting | 0                | Setting      | ×               |
| 503<br>(1F7H)                      | 703<br>(2BFH)                      | 903<br>(387H)                      | 1103<br>(44FH)                       | 1303<br>(517H)                       | 1503<br>(5DFH)                       | 1703<br>(6A7H)                       | 1903<br>(76FH)                       | System area                                                 | —                | —            | —               |
| 504<br>(1F8H)                      | 704<br>(2C0H)                      | 904<br>(388H)                      | 1104<br>(450H)                       | 1304<br>(518H)                       | 1504<br>(5E0H)                       | 1704<br>(6A8H)                       | 1904<br>(770H)                       | CH□ Scaling enable/disable<br>setting                       | 1                | Setting      | ×               |
| 505<br>(1F9H)                      | 705<br>(2C1H)                      | 905<br>(389H)                      | 1105<br>(451H)                       | 1305<br>(519H)                       | 1505<br>(5E1H)                       | 1705<br>(6A9H)                       | 1905<br>(771H)                       | System area                                                 | —                | —            | —               |
| 506<br>(1FAH)                      | 706<br>(2C2H)                      | 906<br>(38AH)                      | 1106<br>(452H)                       | 1306<br>(51AH)                       | 1506<br>(5E2H)                       | 1706<br>(6AAH)                       | 1906<br>(772H)                       | CH□ Scaling upper limit<br>value                            | 0                | Setting      | ×               |
| 507<br>(1FBH)                      | 707<br>(2C3H)                      | 907<br>(38BH)                      | 1107<br>(453H)                       | 1307<br>(51BH)                       | 1507<br>(5E3H)                       | 1707<br>(6ABH)                       | 1907<br>(773H)                       | System area                                                 | —                | —            | —               |
| 508<br>(1FCH)                      | 708<br>(2C4H)                      | 908<br>(38CH)                      | 1108<br>(454H)                       | 1308<br>(51CH)                       | 1508<br>(5E4H)                       | 1708<br>(6ACH)                       | 1908<br>(774H)                       | CH□ Scaling lower limit<br>value                            | 0                | Setting      | ×               |
| 509<br>(1FDH)                      | 709<br>(2C5H)                      | 909<br>(38DH)                      | 1109<br>(455H)                       | 1309<br>(51DH)                       | 1509<br>(5E5H)                       | 1709<br>(6ADH)                       | 1909<br>(775H)                       | System area                                                 | —                | —            | —               |
| 510<br>(1FEH)                      | 710<br>(2C6H)                      | 910<br>(38EH)                      | 1110<br>(456H)                       | 1310<br>(51EH)                       | 1510<br>(5E6H)                       | 1710<br>(6AEH)                       | 1910<br>(776H)                       | CH□ Digital clipping enable/<br>disable setting             | 1                | Setting      | ×               |
| 511<br>(1FFH)                      | 711<br>(2C7H)                      | 911<br>(38FH)                      | 1111<br>(457H)                       | 1311<br>(51FH)                       | 1511<br>(5E7H)                       | 1711<br>(6AFH)                       | 1911<br>(777H)                       | System area                                                 | —                | —            | —               |
| 512<br>(200H)                      | 712<br>(2C8H)                      | 912<br>(390H)                      | 1112<br>(458H)                       | 1312<br>(520H)                       | 1512<br>(5E8H)                       | 1712<br>(6B0H)                       | 1912<br>(778H)                       | CH□ Alert output setting<br>(Process alarm)                 | 1                | Setting      | ×               |
| 513<br>(201H)                      | 713<br>(2C9H)                      | 913<br>(391H)                      | 1113<br>(459H)                       | 1313<br>(521H)                       | 1513<br>(5E9H)                       | 1713<br>(6B1H)                       | 1913<br>(779H)                       | CH□ Alert output setting<br>(Rate alarm)                    | 1                | Setting      | ×               |
| 514<br>(202H)                      | 714<br>(2CAH)                      | 914<br>(392H)                      | 1114<br>(45AH)                       | 1314<br>(522H)                       | 1514<br>(5EAH)                       | 1714<br>(6B2H)                       | 1914<br>(77AH)                       | CH□ Process alarm upper<br>upper limit value                | 0                | Setting      | ×               |
| 515<br>(203H)                      | 715<br>(2CBH)                      | 915<br>(393H)                      | 1115<br>(45BH)                       | 1315<br>(523H)                       | 1515<br>(5EBH)                       | 1715<br>(6B3H)                       | 1915<br>(77BH)                       | System area                                                 | —                | —            | —               |
| 516<br>(204H)                      | 716<br>(2CCH)                      | 916<br>(394H)                      | 1116<br>(45CH)                       | 1316<br>(524H)                       | 1516<br>(5ECH)                       | 1716<br>(6B4H)                       | 1916<br>(77CH)                       | CH□ Process alarm upper<br>lower limit value                | 0                | Setting      | ×               |
| 517<br>(205H)                      | 717<br>(2CDH)                      | 917<br>(395H)                      | 1117<br>(45DH)                       | 1317<br>(525H)                       | 1517<br>(5EDH)                       | 1717<br>(6B5H)                       | 1917<br>(77DH)                       | System area                                                 | —                | —            | —               |
| 518<br>(206H)                      | 718<br>(2CEH)                      | 918<br>(396H)                      | 1118<br>(45EH)                       | 1318<br>(526H)                       | 1518<br>(5EEH)                       | 1718<br>(6B6H)                       | 1918<br>(77EH)                       | CH□ Process alarm lower<br>upper limit value                | 0                | Setting      | ×               |
| 519<br>(207H)                      | 719<br>(2CFH)                      | 919<br>(397H)                      | 1119<br>(45FH)                       | 1319<br>(527H)                       | 1519<br>(5EFH)                       | 1719<br>(6B7H)                       | 1919<br>(77FH)                       | System area                                                 | —                | —            | —               |
| 520<br>(208H)                      | 720<br>(2D0H)                      | 920<br>(398H)                      | 1120<br>(460H)                       | 1320<br>(528H)                       | 1520<br>(5F0H)                       | 1720<br>(6B8H)                       | 1920<br>(780H)                       | CH□ Process alarm lower<br>lower limit value                | 0                | Setting      | ×               |
| 521<br>(209H)                      | 721<br>(2D1H)                      | 921<br>(399H)                      | 1121<br>(461H)                       | 1321<br>(529H)                       | 1521<br>(5F1H)                       | 1721<br>(6B9H)                       | 1921<br>(781H)                       | System area                                                 | —                | —            | —               |
| 522<br>(20AH)                      | 722<br>(2D2H)                      | 922<br>(39AH)                      | 1122<br>(462H)                       | 1322<br>(52AH)                       | 1522<br>(5F2H)                       | 1722<br>(6BAH)                       | 1922<br>(782H)                       | CH□ Rate alarm alert<br>detection cycle setting             | 0                | Setting      | ×               |

| Address<br>Decimal (hexadecimal)   |                                    |                                    |                                      |                                      |                                      |                                      |                                      | Name                                                          | Default<br>value | Data<br>type | Auto<br>refresh |
|------------------------------------|------------------------------------|------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                                | CH2                                | CH3                                | CH4                                  | CH5                                  | CH6                                  | CH7                                  | CH8                                  |                                                               |                  |              |                 |
| 523<br>(20BH)                      | 723<br>(2D3H)                      | 923<br>(39BH)                      | 1123<br>(463H)                       | 1323<br>(52BH)                       | 1523<br>(5F3H)                       | 1723<br>(6BBH)                       | 1923<br>(783H)                       | System area                                                   | —                | —            | —               |
| 524<br>(20CH)                      | 724<br>(2D4H)                      | 924<br>(39CH)                      | 1124<br>(464H)                       | 1324<br>(52CH)                       | 1524<br>(5F4H)                       | 1724<br>(6BCH)                       | 1924<br>(784H)                       | CH□ Rate alarm upper limit<br>value                           | 0                | Setting      | ×               |
| 525<br>(20DH)                      | 725<br>(2D5H)                      | 925<br>(39DH)                      | 1125<br>(465H)                       | 1325<br>(52DH)                       | 1525<br>(5F5H)                       | 1725<br>(6BDH)                       | 1925<br>(785H)                       | System area                                                   | —                | —            | —               |
| 526<br>(20EH)                      | 726<br>(2D6H)                      | 926<br>(39EH)                      | 1126<br>(466H)                       | 1326<br>(52EH)                       | 1526<br>(5F6H)                       | 1726<br>(6BEH)                       | 1926<br>(786H)                       | CH□ Rate alarm lower limit<br>value                           | 0                | Setting      | ×               |
| 527<br>(20FH)                      | 727<br>(2D7H)                      | 927<br>(39FH)                      | 1127<br>(467H)                       | 1327<br>(52FH)                       | 1527<br>(5F7H)                       | 1727<br>(6BFH)                       | 1927<br>(787H)                       | System area                                                   | —                | —            | —               |
| 528<br>(210H)                      | 728<br>(2D8H)                      | 928<br>(3A0H)                      | 1128<br>(468H)                       | 1328<br>(530H)                       | 1528<br>(5F8H)                       | 1728<br>(6C0H)                       | 1928<br>(788H)                       | CH□ Input signal error<br>detection setting                   | 0                | Setting      | ×               |
| 529<br>(211H)                      | 729<br>(2D9H)                      | 929<br>(3A1H)                      | 1129<br>(469H)                       | 1329<br>(531H)                       | 1529<br>(5F9H)                       | 1729<br>(6C1H)                       | 1929<br>(789H)                       | CH□ Input signal error<br>detection lower limit set value     | 50               | Setting      | ×               |
| 530<br>(212H)                      | 730<br>(2DAH)                      | 930<br>(3A2H)                      | 1130<br>(46AH)                       | 1330<br>(532H)                       | 1530<br>(5FAH)                       | 1730<br>(6C2H)                       | 1930<br>(78AH)                       | CH□ Input signal error<br>detection upper limit set<br>value  | 50               | Setting      | ×               |
| 531<br>(213H)                      | 731<br>(2DBH)                      | 931<br>(3A3H)                      | 1131<br>(46BH)                       | 1331<br>(533H)                       | 1531<br>(5FBH)                       | 1731<br>(6C3H)                       | 1931<br>(78BH)                       | CH□ Disconnection<br>detection enable/disable<br>setting      | 0                | Setting      | ×               |
| 532<br>(214H)                      | 732<br>(2DCH)                      | 932<br>(3A4H)                      | 1132<br>(46CH)                       | 1332<br>(534H)                       | 1532<br>(5FCH)                       | 1732<br>(6C4H)                       | 1932<br>(78CH)                       | CH□ Conversion setting<br>value at disconnection<br>detection | 0                | Setting      | ×               |
| 533<br>(215H)                      | 733<br>(2DDH)                      | 933<br>(3A5H)                      | 1133<br>(46DH)                       | 1333<br>(535H)                       | 1533<br>(5FDH)                       | 1733<br>(6C5H)                       | 1933<br>(78DH)                       | System area                                                   | —                | —            | —               |
| 534<br>(216H)                      | 734<br>(2DEH)                      | 934<br>(3A6H)                      | 1134<br>(46EH)                       | 1334<br>(536H)                       | 1534<br>(5FEH)                       | 1734<br>(6C6H)                       | 1934<br>(78EH)                       | CH□ Conversion setting at<br>disconnection detection          | 1                | Setting      | ×               |
| 535<br>(217H)                      | 735<br>(2DFH)                      | 935<br>(3A7H)                      | 1135<br>(46FH)                       | 1335<br>(537H)                       | 1535<br>(5FFH)                       | 1735<br>(6C7H)                       | 1935<br>(78FH)                       | CH□ Logging enable/disable<br>setting                         | 1                | Setting      | ×               |
| 536<br>(218H)                      | 736<br>(2E0H)                      | 936<br>(3A8H)                      | 1136<br>(470H)                       | 1336<br>(538H)                       | 1536<br>(600H)                       | 1736<br>(6C8H)                       | 1936<br>(790H)                       | CH□ Logging data setting                                      | 1                | Setting      | ×               |
| 537<br>(219H)                      | 737<br>(2E1H)                      | 937<br>(3A9H)                      | 1137<br>(471H)                       | 1337<br>(539H)                       | 1537<br>(601H)                       | 1737<br>(6C9H)                       | 1937<br>(791H)                       | CH□ Logging cycle setting<br>value                            | 1                | Setting      | ×               |
| 538<br>(21AH)                      | 738<br>(2E2H)                      | 938<br>(3AAH)                      | 1138<br>(472H)                       | 1338<br>(53AH)                       | 1538<br>(602H)                       | 1738<br>(6CAH)                       | 1938<br>(792H)                       | CH□ Logging cycle unit<br>setting                             | 1                | Setting      | ×               |
| 539<br>(21BH)                      | 739<br>(2E3H)                      | 939<br>(3ABH)                      | 1139<br>(473H)                       | 1339<br>(53BH)                       | 1539<br>(603H)                       | 1739<br>(6CBH)                       | 1939<br>(793H)                       | CH□ Post-trigger logging<br>points                            | 5000             | Setting      | ×               |
| 540<br>(21CH)                      | 740<br>(2E4H)                      | 940<br>(3ACH)                      | 1140<br>(474H)                       | 1340<br>(53CH)                       | 1540<br>(604H)                       | 1740<br>(6CCH)                       | 1940<br>(794H)                       | CH□ Level trigger condition<br>setting                        | 0                | Setting      | ×               |
| 541<br>(21DH)                      | 741<br>(2E5H)                      | 941<br>(3ADH)                      | 1141<br>(475H)                       | 1341<br>(53DH)                       | 1541<br>(605H)                       | 1741<br>(6CDH)                       | 1941<br>(795H)                       | CH□ Trigger data                                              | *1               | Setting      | ×               |
| 542<br>(21EH)                      | 742<br>(2E6H)                      | 942<br>(3AEH)                      | 1142<br>(476H)                       | 1342<br>(53EH)                       | 1542<br>(606H)                       | 1742<br>(6CEH)                       | 1942<br>(796H)                       | CH□ Trigger setting value                                     | 0                | Setting      | ×               |
| 543 to<br>546<br>(21FH to<br>222H) | 743 to<br>746<br>(2E7H to<br>2EAH) | 943 to<br>946<br>(3AFH<br>to 3B2H) | 1143 to<br>1146<br>(477H to<br>47AH) | 1343 to<br>1346<br>(53FH to<br>542H) | 1543 to<br>1546<br>(607H to<br>60AH) | 1743 to<br>1746<br>(6CFH<br>to 6D2H) | 1943 to<br>1946<br>(797H to<br>79AH) | System area                                                   | —                | —            | —               |
| 547<br>(223H)                      | 747<br>(2EBH)                      | 947<br>(3B3H)                      | 1147<br>(47BH)                       | 1347<br>(543H)                       | 1547<br>(60BH)                       | 1747<br>(6D3H)                       | 1947<br>(79BH)                       | CH□ Celsius/Fahrenheit<br>display setting                     | 0                | Setting      | ×               |
| 548 to<br>561<br>(224H to<br>231H) | 748 to<br>761<br>(2ECH<br>to 2F9H) | 948 to<br>961<br>(3B4H to<br>3C1H) | 1148 to<br>1161<br>(47CH<br>to 489H) | 1348 to<br>1361<br>(544H to<br>551H) | 1548 to<br>1561<br>(60CH<br>to 619H) | 1748 to<br>1761<br>(6D4H<br>to 6E1H) | 1948 to<br>1961<br>(79CH<br>to 7A9H) | System area                                                   | —                | —            | —               |
| 562<br>(232H)                      | 762<br>(2FAH)                      | 962<br>(3C2H)                      | 1162<br>(48AH)                       | 1362<br>(552H)                       | 1562<br>(61AH)                       | 1762<br>(6E2H)                       | 1962<br>(7AAH)                       | CH□ Offset setting value                                      | 0                | Setting      | ×               |
| 563<br>(233H)                      | 763<br>(2FBH)                      | 963<br>(3C3H)                      | 1163<br>(48BH)                       | 1363<br>(553H)                       | 1563<br>(61BH)                       | 1763<br>(6E3H)                       | 1963<br>(7ABH)                       | System area                                                   | —                | —            | —               |
| 564<br>(234H)                      | 764<br>(2FCH)                      | 964<br>(3C4H)                      | 1164<br>(48CH)                       | 1364<br>(554H)                       | 1564<br>(61CH)                       | 1764<br>(6E4H)                       | 1964<br>(7ACH)                       | CH□ Gain setting value                                        | 0                | Setting      | ×               |

| Address<br>Decimal (hexadecimal)   |                                       |                                       |                                         |                                      |                                         |                                      |                                         | Name                                                   | Default<br>value | Data<br>type | Auto<br>refresh |
|------------------------------------|---------------------------------------|---------------------------------------|-----------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------|-----------------------------------------|--------------------------------------------------------|------------------|--------------|-----------------|
| CH1                                | CH2                                   | CH3                                   | CH4                                     | CH5                                  | CH6                                     | CH7                                  | CH8                                     |                                                        |                  |              |                 |
| 565 to<br>597<br>(235H to<br>255H) | 765 to<br>797<br>(2FDH<br>to<br>31DH) | 965 to<br>997<br>(3C5H<br>to<br>3E5H) | 1165 to<br>1197<br>(48DH<br>to<br>4ADH) | 1365 to<br>1397<br>(555H to<br>575H) | 1565 to<br>1597<br>(61DH<br>to<br>63DH) | 1765 to<br>1797<br>(6E5H to<br>705H) | 1965 to<br>1997<br>(7ADH<br>to<br>7CDH) | System area                                            | —                | —            | —               |
| 598<br>(256H)                      | 798<br>(31EH)                         | 998<br>(3E6H)                         | 1198<br>(4AEH)                          | 1398<br>(576H)                       | 1598<br>(63EH)                          | 1798<br>(706H)                       | 1998<br>(7CEH)                          | CH□ Setting Input type/<br>range                       | FH               | Setting      | ×               |
| 599<br>(257H)                      | 799<br>(31FH)                         | 999<br>(3E7H)                         | 1199<br>(4AFH)                          | 1399<br>(577H)                       | 1599<br>(63FH)                          | 1799<br>(707H)                       | 1999<br>(7CFH)                          | CH□ Setting Input type/<br>range (Offset/gain setting) | 0                | Setting      | ×               |
| 2000 to 3599<br>(7D0H to E0FH)     |                                       |                                       |                                         |                                      |                                         |                                      |                                         | System area                                            | —                | —            | —               |

\*1 The following shows the default values.

CH1: 402, CH2: 602, CH3: 802, CH4: 1020, CH5: 1202, CH6: 1402, CH7: 1602, CH8: 1802

## ■Error history (Un\G3600 to Un\G3759)

| Address<br>(decimal) | Address<br>(hexadecimal) | Name            |                  |                                 |                                | Default<br>value | Data type | Auto<br>refresh |   |
|----------------------|--------------------------|-----------------|------------------|---------------------------------|--------------------------------|------------------|-----------|-----------------|---|
| 3600                 | E10H                     | Error history 1 | Error code       |                                 |                                | 0                | Monitor   | ×               |   |
| 3601                 | E11H                     |                 | Error time       | First two digits<br>of the year | Last two digits of<br>the year |                  |           |                 |   |
| 3602                 | E12H                     |                 |                  |                                 |                                |                  |           |                 |   |
| 3603                 | E13H                     |                 |                  |                                 |                                |                  |           |                 |   |
| 3604                 | E14H                     |                 |                  |                                 |                                |                  |           |                 |   |
| 3605                 | E15H                     |                 |                  |                                 |                                |                  |           |                 |   |
| 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<br>(decimal) | Address<br>(hexadecimal) | Name             |                         |                                 |                                | Default<br>value | Data type | Auto<br>refresh |        |                 |
|----------------------|--------------------------|------------------|-------------------------|---------------------------------|--------------------------------|------------------|-----------|-----------------|--------|-----------------|
| 3760                 | EB0H                     | Alarm history 1  | Alarm code              |                                 |                                | 0                | Monitor   | ×               |        |                 |
| 3761                 | EB1H                     |                  | Alarm time              | First two digits<br>of the year | Last two digits of<br>the year |                  |           |                 |        |                 |
| 3762                 | EB2H                     |                  |                         |                                 |                                |                  |           |                 |        |                 |
| 3763                 | EB3H                     |                  |                         |                                 |                                |                  |           |                 | Month  | Day             |
| 3764                 | EB4H                     |                  |                         |                                 |                                |                  |           |                 | Hour   | Minute          |
| 3765                 | EB5H                     |                  |                         |                                 |                                |                  |           |                 | Second | Day of the week |
|                      |                          |                  | 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\G9999)

| Address<br>Decimal (hexadecimal) |                 |                 |                 |                 |                 |                 |                 | Name                                                   | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2             | CH3             | CH4             | CH5             | CH6             | CH7             | CH8             |                                                        |                  |              |                 |
| 4000 to 4131<br>(FA0H to 1023H)  |                 |                 |                 |                 |                 |                 |                 | System area                                            | —                | —            | —               |
| 4132<br>(1024H)                  | 4134<br>(1026H) | 4136<br>(1028H) | 4138<br>(102AH) | 4140<br>(102CH) | 4142<br>(102EH) | 4144<br>(1030H) | 4146<br>(1032H) | CH□ Offset/gain setting<br>mode (offset specification) | 0                | Setting      | ×               |
| 4133<br>(1025H)                  | 4135<br>(1027H) | 4137<br>(1029H) | 4139<br>(102BH) | 4141<br>(102DH) | 4143<br>(102FH) | 4145<br>(1031H) | 4147<br>(1033H) | CH□ Offset/gain setting<br>mode (gain specification)   | 0                | Setting      | ×               |
| 4148 to 9999<br>(1034H to 270FH) |                 |                 |                 |                 |                 |                 |                 | System area                                            | —                | —            | —               |

## ■Logging data (Un\G10000 to Un\G89999)

| Address<br>Decimal (hexadecimal)            |                                             |                                             |                                             |                                             |                                              |                                               |                                               | Name             | Default<br>value | Data<br>type | Auto<br>refresh |
|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------|------------------|------------------|--------------|-----------------|
| CH1                                         | CH2                                         | CH3                                         | CH4                                         | CH5                                         | CH6                                          | CH7                                           | CH8                                           |                  |                  |              |                 |
| 10000 to<br>19999<br>(2710H<br>to<br>4E1FH) | 20000 to<br>29999<br>(4E20H<br>to<br>752FH) | 30000 to<br>39999<br>(7530H<br>to<br>9C3FH) | 40000 to<br>49999<br>(9C40H<br>to<br>C34FH) | 50000 to<br>59999<br>(C350H<br>to<br>EA5FH) | 60000 to<br>69999<br>(EA60H<br>to<br>1116FH) | 70000 to<br>79999<br>(11170H<br>to<br>1387FH) | 80000 to<br>89999<br>(13880H<br>to<br>15F8FH) | CH□ Logging data | 0                | Monitor      | ×               |

## In FX2N allocation function mode

○: With refresh setting, ×: Without refresh setting

| Address<br>Decimal (hexadecimal) |              |              |              |              |              |              |              | Name                                                                 | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2          | CH3          | CH4          | CH5          | CH6          | CH7          | CH8          |                                                                      |                  |              |                 |
| 0 (0H)                           |              |              |              |              |              |              |              | CH1 to 4 Setting Input type/<br>range                                | FFFFH            | Setting      | ×               |
| 1 (1H)                           |              |              |              |              |              |              |              | CH5 to 8 Setting Input type/<br>range                                | FFFFH            | Setting      | ×               |
| 2<br>(2H)                        | 3<br>(3H)    | 4<br>(4H)    | 5<br>(5H)    | 6<br>(6H)    | 7<br>(7H)    | 8<br>(8H)    | 9<br>(9H)    | CH□ Time Average/Count<br>Average/Moving Average<br>setting          | 0                | Setting      | ×               |
| 10<br>(AH)                       | 11<br>(BH)   | 12<br>(CH)   | 13<br>(DH)   | 14<br>(EH)   | 15<br>(FH)   | 16<br>(10H)  | 17<br>(11H)  | CH□ Digital operation value                                          | 0000H            | Monitor      | ○               |
| 18 to 25 (12H to 19H)            |              |              |              |              |              |              |              | System area                                                          | —                | —            | —               |
| 26 (1AH)                         |              |              |              |              |              |              |              | Warning output flag<br>(Process alarm upper limit/<br>lower limit)   | 0000H            | Monitor      | ○               |
| 27 (1BH)                         |              |              |              |              |              |              |              | Warning output flag (Rate<br>alarm upper limit/lower limit)          | 0000H            | Monitor      | ○               |
| 28 (1CH)                         |              |              |              |              |              |              |              | Input signal error detection<br>flag/disconnection detection<br>flag | 0000H            | Monitor      | ○               |
| 29 (1DH)                         |              |              |              |              |              |              |              | Latest error code                                                    | 0                | Monitor      | ○               |
| 30 (1EH)                         |              |              |              |              |              |              |              | Module information                                                   | 61E4H            | Monitor      | ×               |
| 31 (1FH)                         |              |              |              |              |              |              |              | Firmware version                                                     | 0                | Monitor      | ×               |
| 32 to 59 (20H to 3BH)            |              |              |              |              |              |              |              | System area                                                          | —                | —            | —               |
| 60 (3CH)                         |              |              |              |              |              |              |              | Operation mode monitor                                               | 0                | Monitor      | ×               |
| 61<br>(3DH)                      | 62<br>(3EH)  | 63<br>(3FH)  | 64<br>(40H)  | 65<br>(41H)  | 66<br>(42H)  | 67<br>(43H)  | 68<br>(44H)  | CH□ Conversion value shift<br>amount                                 | 0                | Control      | ○               |
| 69 (45H)                         |              |              |              |              |              |              |              | Input signals                                                        | 0                | Monitor      | ×               |
| 70 (46H)                         |              |              |              |              |              |              |              | Output signals                                                       | 0                | Control      | ×               |
| 71<br>(47H)                      | 72<br>(48H)  | 73<br>(49H)  | 74<br>(4AH)  | 75<br>(4BH)  | 76<br>(4CH)  | 77<br>(4DH)  | 78<br>(4EH)  | CH□ Process alarm lower<br>lower limit value                         | 0                | Setting      | ×               |
| 79, 80 (4FH, 50H)                |              |              |              |              |              |              |              | System area                                                          | —                | —            | —               |
| 81<br>(51H)                      | 82<br>(52H)  | 83<br>(53H)  | 84<br>(54H)  | 85<br>(55H)  | 86<br>(56H)  | 87<br>(57H)  | 88<br>(58H)  | CH□ Process alarm upper<br>upper limit value                         | 0                | Setting      | ×               |
| 89, 90 (59H, 5AH)                |              |              |              |              |              |              |              | System area                                                          | —                | —            | —               |
| 91<br>(5BH)                      | 92<br>(5CH)  | 93<br>(5DH)  | 94<br>(5EH)  | 95<br>(5FH)  | 96<br>(60H)  | 97<br>(61H)  | 98<br>(62H)  | CH□ Rate alarm upper limit<br>value                                  | 100              | Setting      | ×               |
| 99, 100 (63H, 64H)               |              |              |              |              |              |              |              | System area                                                          | —                | —            | —               |
| 101<br>(65H)                     | 102<br>(66H) | 103<br>(67H) | 104<br>(68H) | 105<br>(69H) | 106<br>(6AH) | 107<br>(6BH) | 108<br>(6CH) | CH□ Minimum value                                                    | 0                | Monitor      | ○               |
| 109 (6DH)                        |              |              |              |              |              |              |              | Minimum value reset<br>request                                       | 0                | Control      | ×               |
| 110 (6EH)                        |              |              |              |              |              |              |              | Minimum value reset<br>completed flag                                | 0                | Monitor      | ×               |

| Address<br>Decimal (hexadecimal) |                |                |                |                |                |                |                | Name                                                                                         | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------------------------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2            | CH3            | CH4            | CH5            | CH6            | CH7            | CH8            |                                                                                              |                  |              |                 |
| 111<br>(6FH)                     | 112<br>(70H)   | 113<br>(71H)   | 114<br>(72H)   | 115<br>(73H)   | 116<br>(74H)   | 117<br>(75H)   | 118<br>(76H)   | CH□ Maximum value                                                                            | 0                | Monitor      | ○               |
| 119 (77H)                        |                |                |                |                |                |                |                | Maximum value reset request                                                                  | 0                | Control      | ×               |
| 120 (78H)                        |                |                |                |                |                |                |                | Maximum value reset completed flag                                                           | 0                | Monitor      | ×               |
| 121 (79H)                        |                |                |                |                |                |                |                | Latest address of error history                                                              | 0                | Monitor      | ○               |
| 122 (7AH)                        |                |                |                |                |                |                |                | Latest alarm code                                                                            | 0                | Monitor      | ○               |
| 123 (7BH)                        |                |                |                |                |                |                |                | Latest address of alarm history                                                              | 0                | Monitor      | ○               |
| 124 (7CH)                        |                |                |                |                |                |                |                | Conversion completed flag                                                                    | 0                | Monitor      | ○               |
| 125 (7DH)                        |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 126, 127 (7EH, 7FH)              |                |                |                |                |                |                |                | Mode switching setting                                                                       | 0                | Setting      | ×               |
| 128, 129 (80H, 81H)              |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 130 (82H)                        |                |                |                |                |                |                |                | Rate alarm change rate selection                                                             | 1                | Setting      | ×               |
| 131, 132 (83H, 84H)              |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 133 (85H)                        |                |                |                |                |                |                |                | Input signal error/<br>Disconnection detection<br>automatic clear enable/<br>disable setting | 1                | Setting      | ×               |
| 134 to 1000 (86H to 3E8H)        |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1001<br>(3E9H)                   | 1003<br>(3EBH) | 1005<br>(3EDH) | 1007<br>(3EFH) | 1009<br>(3F1H) | 1011<br>(3F3H) | 1013<br>(3F5H) | 1015<br>(3F7H) | CH□ Digital output value                                                                     | 0                | Monitor      | ○               |
| 1002<br>(3EAH)                   | 1004<br>(3ECH) | 1006<br>(3EEH) | 1008<br>(3F0H) | 1010<br>(3F2H) | 1012<br>(3F4H) | 1014<br>(3F6H) | 1016<br>(3F8H) | System area                                                                                  | —                | —            | —               |
| 1017 to 1020 (3F9H to 3FCH)      |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1021<br>(3FDH)                   | 1022<br>(3FEH) | 1023<br>(3FFH) | 1024<br>(400H) | 1025<br>(401H) | 1026<br>(402H) | 1027<br>(403H) | 1028<br>(404H) | CH□ Conversion status                                                                        | 0                | Monitor      | ×               |
| 1029, 1030 (405H, 406H)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1031<br>(407H)                   | 1032<br>(408H) | 1033<br>(409H) | 1034<br>(40AH) | 1035<br>(40BH) | 1036<br>(40CH) | 1037<br>(40DH) | 1038<br>(40EH) | CH□ Input type/Range monitor                                                                 | 0                | Monitor      | ×               |
| 1039, 1040 (40FH, 410H)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1041<br>(411H)                   | 1042<br>(412H) | 1043<br>(413H) | 1044<br>(414H) | 1045<br>(415H) | 1046<br>(416H) | 1047<br>(417H) | 1048<br>(418H) | CH□ Input type/Range monitor (Offset/gain setting)                                           | 0                | Monitor      | ×               |
| 1049, 1050 (419H, 41AH)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1051<br>(41BH)                   | 1052<br>(41CH) | 1053<br>(41DH) | 1054<br>(41EH) | 1055<br>(41FH) | 1056<br>(420H) | 1057<br>(421H) | 1058<br>(422H) | CH□ Celsius/Fahrenheit display monitor                                                       | 0                | Monitor      | ×               |
| 1059, 1060 (423H, 424H)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1061<br>(425H)                   | 1062<br>(426H) | 1063<br>(427H) | 1064<br>(428H) | 1065<br>(429H) | 1066<br>(42AH) | 1067<br>(42BH) | 1068<br>(42CH) | CH□ NowSetting user range base input type monitor                                            | 1                | Monitor      | ×               |
| 1069, 1070 (42DH, 42EH)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1071<br>(42FH)                   | 1072<br>(430H) | 1073<br>(431H) | 1074<br>(432H) | 1075<br>(433H) | 1076<br>(434H) | 1077<br>(435H) | 1078<br>(436H) | CH□ NowSetting user range base input range monitor                                           | 0000H            | Monitor      | ×               |
| 1079, 1080 (437H, 438H)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1081<br>(439H)                   | 1082<br>(43AH) | 1083<br>(43BH) | 1084<br>(43CH) | 1085<br>(43DH) | 1086<br>(43EH) | 1087<br>(43FH) | 1088<br>(440H) | CH□ Averaging process specification                                                          | 0                | Setting      | ×               |
| 1089, 1090 (441H, 442H)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1091<br>(443H)                   | 1092<br>(444H) | 1093<br>(445H) | 1094<br>(446H) | 1095<br>(447H) | 1096<br>(448H) | 1097<br>(449H) | 1098<br>(44AH) | CH□ Scaling enable/disable setting                                                           | 1                | Setting      | ×               |
| 1099, 1100 (44BH, 44CH)          |                |                |                |                |                |                |                | System area                                                                                  | —                | —            | —               |
| 1101<br>(44DH)                   | 1103<br>(44FH) | 1105<br>(451H) | 1107<br>(453H) | 1109<br>(455H) | 1111<br>(457H) | 1113<br>(459H) | 1115<br>(45BH) | CH□ Scaling upper limit value                                                                | 0                | Setting      | ×               |

| Address<br>Decimal (hexadecimal) |                |                |                |                |                |                |                | Name                                                             | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2            | CH3            | CH4            | CH5            | CH6            | CH7            | CH8            |                                                                  |                  |              |                 |
| 1102<br>(44EH)                   | 1104<br>(450H) | 1106<br>(452H) | 1108<br>(454H) | 1110<br>(456H) | 1112<br>(458H) | 1114<br>(45AH) | 1116<br>(45CH) | System area                                                      | —                | —            | —               |
| 1117 to 1120 (45DH to 460H)      |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1121<br>(461H)                   | 1123<br>(463H) | 1125<br>(465H) | 1127<br>(467H) | 1129<br>(469H) | 1131<br>(46BH) | 1133<br>(46DH) | 1135<br>(46FH) | CH□ Scaling lower limit<br>value                                 | 0                | Setting      | ×               |
| 1122<br>(462H)                   | 1124<br>(464H) | 1126<br>(466H) | 1128<br>(468H) | 1130<br>(46AH) | 1132<br>(46CH) | 1134<br>(46EH) | 1136<br>(470H) | System area                                                      | —                | —            | —               |
| 1137 to 1140 (471H to 474H)      |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1141<br>(475H)                   | 1142<br>(476H) | 1143<br>(477H) | 1144<br>(478H) | 1145<br>(479H) | 1146<br>(47AH) | 1147<br>(47BH) | 1148<br>(47CH) | CH□ Digital clipping enable/<br>disable setting                  | 1                | Setting      | ×               |
| 1149, 1150 (47DH, 47EH)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1151<br>(47FH)                   | 1152<br>(480H) | 1153<br>(481H) | 1154<br>(482H) | 1155<br>(483H) | 1156<br>(482H) | 1157<br>(485H) | 1158<br>(486H) | CH□ Input signal error<br>detection setting                      | 1                | Setting      | ×               |
| 1159, 1160 (487H, 488H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1161<br>(489H)                   | 1162<br>(48AH) | 1163<br>(48BH) | 1164<br>(48CH) | 1165<br>(48DH) | 1175<br>(497H) | 1167<br>(48FH) | 1168<br>(490H) | CH□ Input signal error<br>detection lower limit setting<br>value | 24               | Setting      | ×               |
| 1169, 1170 (491H, 492H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1171<br>(493H)                   | 1172<br>(494H) | 1173<br>(495H) | 1174<br>(496H) | 1175<br>(497H) | 1176<br>(498H) | 1177<br>(499H) | 1178<br>(49AH) | CH□ Input signal error<br>detection upper limit setting<br>value | 24               | Setting      | ×               |
| 1179, 1180 (49BH, 49CH)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1181<br>(49DH)                   | 1182<br>(49EH) | 1183<br>(49FH) | 1184<br>(4A0H) | 1185<br>(4A1H) | 1186<br>(4A2H) | 1187<br>(4A3H) | 1188<br>(4A4H) | CH□ Alert output setting<br>(Process alarm)                      | 1                | Setting      | ×               |
| 1189, 1190 (4A5H, 4A6H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1191<br>(4A7H)                   | 1192<br>(4A8H) | 1193<br>(4A9H) | 1194<br>(4AAH) | 1195<br>(4ABH) | 1196<br>(4ACH) | 1197<br>(4ADH) | 1198<br>(4AEH) | CH□ Process alarm upper<br>lower limit value                     | 0                | Setting      | ×               |
| 1199, 1200 (4AFH, 4B0H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1201<br>(4B1H)                   | 1202<br>(4B2H) | 1203<br>(4B3H) | 1204<br>(4B4H) | 1205<br>(4B5H) | 1206<br>(4B6H) | 1207<br>(4B7H) | 1208<br>(4B8H) | CH□ Process alarm lower<br>upper limit value                     | 0                | Setting      | ×               |
| 1209, 1210 (4B9H, 4BAH)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1211<br>(4BBH)                   | 1212<br>(4BCH) | 1213<br>(4BDH) | 1214<br>(4BEH) | 1215<br>(4BFH) | 1216<br>(4C0H) | 1217<br>(4C1H) | 1218<br>(4C2H) | CH□ Alert output setting<br>(Rate alarm)                         | 1                | Setting      | ×               |
| 1219, 1220 (4C3H, 4C4H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1221<br>(4C5H)                   | 1222<br>(4C6H) | 1223<br>(4C7H) | 1224<br>(4C8H) | 1225<br>(4C9H) | 1226<br>(4CAH) | 1227<br>(4CBH) | 1228<br>(4CCH) | CH□ Rate alarm alert<br>detection cycle setting                  | 0                | Setting      | ×               |
| 1229, 1230 (4CDH, 4CEH)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1231<br>(4CFH)                   | 1232<br>(4D0H) | 1233<br>(4D1H) | 1234<br>(4D2H) | 1235<br>(4D3H) | 1236<br>(4D4H) | 1237<br>(4D5H) | 1238<br>(4D6H) | CH□ Rate alarm lower limit<br>value                              | -100             | Setting      | ×               |
| 1239, 1240 (4D7H, 4D8H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1241<br>(4D9H)                   | 1242<br>(4DAH) | 1243<br>(4DBH) | 1244<br>(4DCH) | 1245<br>(4DDH) | 1246<br>(4DEH) | 1247<br>(4DFH) | 1248<br>(4E0H) | CH□ Disconnection<br>detection enable/disable<br>setting         | 0                | Setting      | ×               |
| 1249, 1250 (4E1H, 4E2H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1251<br>(4E3H)                   | 1253<br>(4E5H) | 1255<br>(4E7H) | 1257<br>(4E9H) | 1259<br>(4EBH) | 1261<br>(4EDH) | 1263<br>(4EFH) | 1265<br>(4F1H) | CH1 Conversion setting<br>value at disconnection<br>detection    | 0                | Setting      | ×               |
| 1252<br>(4E4H)                   | 1254<br>(4E6H) | 1256<br>(4E7H) | 1258<br>(4EAH) | 1260<br>(4ECH) | 1262<br>(4EEH) | 1264<br>(4F0H) | 1266<br>(4F2H) | System area                                                      | —                | —            | —               |
| 1267 to 1270 (4F3H to 4F6H)      |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1271<br>(4F7H)                   | 1272<br>(4F8H) | 1273<br>(4F9H) | 1274<br>(4FAH) | 1275<br>(4FBH) | 1276<br>(4FCH) | 1277<br>(4FDH) | 1278<br>(4FEH) | CH□ Conversion setting at<br>disconnection detection             | 1                | Setting      | ×               |
| 1279, 1280 (4FFH, 500H)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |
| 1281<br>(501H)                   | 1282<br>(502H) | 1283<br>(503H) | 1284<br>(504H) | 1285<br>(505H) | 1286<br>(506H) | 1287<br>(507H) | 1288<br>(508H) | CH□ Celsius/Fahrenheit<br>display setting                        | 0                | Setting      | ×               |
| 1289, 1290 (509H, 50AH)          |                |                |                |                |                |                |                | System area                                                      | —                | —            | —               |



| Address<br>Decimal (hexadecimal) |                |                |                |                |                |                |                | Name                                                   | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2            | CH3            | CH4            | CH5            | CH6            | CH7            | CH8            |                                                        |                  |              |                 |
| 1291<br>(50BH)                   | 1292<br>(50CH) | 1293<br>(50DH) | 1294<br>(50EH) | 1295<br>(50FH) | 1296<br>(510H) | 1297<br>(511H) | 1298<br>(512H) | CH□ Offset setting value                               | 0                | Setting      | ×               |
| 1299, 1300 (513H, 514H)          |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 1301<br>(515H)                   | 1302<br>(516H) | 1303<br>(517H) | 1304<br>(518H) | 1305<br>(519H) | 1306<br>(51AH) | 1307<br>(51BH) | 1308<br>(51CH) | CH□ Gain setting value                                 | 0                | Setting      | ×               |
| 1309, 1310 (51DH, 51EH)          |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 1311<br>(51FH)                   | 1312<br>(520H) | 1313<br>(521H) | 1314<br>(522H) | 1315<br>(523H) | 1316<br>(524H) | 1317<br>(525H) | 1318<br>(526H) | CH□ Setting Input type/<br>range (Offset/gain setting) | 0                | Setting      | ×               |
| 1319, 1320 (527H, 528H)          |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 1321<br>(529H)                   | 1322<br>(52AH) | 1323<br>(52BH) | 1324<br>(52CH) | 1325<br>(52DH) | 1326<br>(52EH) | 1327<br>(52FH) | 1328<br>(530H) | CH□ Offset/gain setting<br>mode (offset specification) | 0                | Setting      | ×               |
| 1329, 1330 (531H, 532H)          |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 1331<br>(533H)                   | 1332<br>(534H) | 1333<br>(535H) | 1334<br>(536H) | 1335<br>(537H) | 1336<br>(538H) | 1337<br>(539H) | 1338<br>(53AH) | CH□ Offset/gain setting<br>mode (gain specification)   | 0                | Setting      | ×               |
| 1339 (53BH)                      |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 1340 (53CH)                      |                |                |                |                |                |                |                | Offset/gain initialization<br>enable code              | 0                | Setting      | —               |
| 1341 to 8599 (53DH to 2197H)     |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 8600 to 8609 (2198H to 21A1H)    |                |                |                |                |                |                |                | Error history 1                                        | 0                | Monitor      | ×               |
| 8610 to 8619 (21A2H to 21ABH)    |                |                |                |                |                |                |                | Error history 2                                        | 0                | Monitor      | ×               |
| 8620 to 8629 (21ACH to 21B5H)    |                |                |                |                |                |                |                | Error history 3                                        | 0                | Monitor      | ×               |
| 8630 to 8639 (21B6H to 21BFH)    |                |                |                |                |                |                |                | Error history 4                                        | 0                | Monitor      | ×               |
| 8640 to 8649 (21C0H to 21C9H)    |                |                |                |                |                |                |                | Error history 5                                        | 0                | Monitor      | ×               |
| 8650 to 8659 (21CAH to 21D3H)    |                |                |                |                |                |                |                | Error history 6                                        | 0                | Monitor      | ×               |
| 8660 to 8669 (21D4H to 21DDH)    |                |                |                |                |                |                |                | Error history 7                                        | 0                | Monitor      | ×               |
| 8670 to 8679 (21DEH to 21E7H)    |                |                |                |                |                |                |                | Error history 8                                        | 0                | Monitor      | ×               |
| 8680 to 8689 (21E8H to 21F1H)    |                |                |                |                |                |                |                | Error history 9                                        | 0                | Monitor      | ×               |
| 8690 to 8699 (21F2H to 21FBH)    |                |                |                |                |                |                |                | Error history 10                                       | 0                | Monitor      | ×               |
| 8700 to 8709 (21FCH to 2205H)    |                |                |                |                |                |                |                | Error history 11                                       | 0                | Monitor      | ×               |
| 8710 to 8719 (2206H to 220FH)    |                |                |                |                |                |                |                | Error history 12                                       | 0                | Monitor      | ×               |
| 8720 to 8729 (2210H to 2219H)    |                |                |                |                |                |                |                | Error history 13                                       | 0                | Monitor      | ×               |
| 8730 to 8739 (221AH to 2223H)    |                |                |                |                |                |                |                | Error history 14                                       | 0                | Monitor      | ×               |
| 8740 to 8749 (2224H to 222DH)    |                |                |                |                |                |                |                | Error history 15                                       | 0                | Monitor      | ×               |
| 8750 to 8759 (222EH to 2237H)    |                |                |                |                |                |                |                | Error history 16                                       | 0                | Monitor      | ×               |
| 8760 to 8769 (2238H to 2241H)    |                |                |                |                |                |                |                | Alarm history 1                                        | 0                | Monitor      | ×               |
| 8770 to 8779 (2242H to 224BH)    |                |                |                |                |                |                |                | Alarm history 2                                        | 0                | Monitor      | ×               |
| 8780 to 8789 (224CH to 2255H)    |                |                |                |                |                |                |                | Alarm history 3                                        | 0                | Monitor      | ×               |
| 8790 to 8799 (2256H to 225FH)    |                |                |                |                |                |                |                | Alarm history 4                                        | 0                | Monitor      | ×               |
| 8800 to 8809 (2260H to 2269H)    |                |                |                |                |                |                |                | Alarm history 5                                        | 0                | Monitor      | ×               |
| 8810 to 8819 (226AH to 2273H)    |                |                |                |                |                |                |                | Alarm history 6                                        | 0                | Monitor      | ×               |
| 8820 to 8829 (2274H to 227DH)    |                |                |                |                |                |                |                | Alarm history 7                                        | 0                | Monitor      | ×               |
| 8830 to 8839 (227EH to 2287H)    |                |                |                |                |                |                |                | Alarm history 8                                        | 0                | Monitor      | ×               |
| 8840 to 8849 (2288H to 2291H)    |                |                |                |                |                |                |                | Alarm history 9                                        | 0                | Monitor      | ×               |
| 8850 to 8859 (2292H to 229BH)    |                |                |                |                |                |                |                | Alarm history 10                                       | 0                | Monitor      | ×               |
| 8860 to 8869 (229CH to 22A5H)    |                |                |                |                |                |                |                | Alarm history 11                                       | 0                | Monitor      | ×               |
| 8870 to 8879 (22A6H to 22AFH)    |                |                |                |                |                |                |                | Alarm history 12                                       | 0                | Monitor      | ×               |
| 8880 to 8889 (22B0H to 22B9H)    |                |                |                |                |                |                |                | Alarm history 13                                       | 0                | Monitor      | ×               |
| 8890 to 8899 (22BAH to 22C3H)    |                |                |                |                |                |                |                | Alarm history 14                                       | 0                | Monitor      | ×               |
| 8900 to 8909 (22C4H to 22CDH)    |                |                |                |                |                |                |                | Alarm history 15                                       | 0                | Monitor      | ×               |
| 8910 to 8919 (22CEH to 22D7H)    |                |                |                |                |                |                |                | Alarm history 16                                       | 0                | Monitor      | ×               |
| 8920 to 9009 (22D8H to 2331H)    |                |                |                |                |                |                |                | System area                                            | —                | —            | —               |
| 9010 to 9019 (2332H to 233BH)    |                |                |                |                |                |                |                | Level data 0 to 9                                      | 0                | Control      | ○               |

| Address<br>Decimal (hexadecimal) |                 |                 |                 |                 |                 |                 |                 | Name                                                                  | Default<br>value | Data<br>type | Auto<br>refresh |
|----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------------------------------------------------------------|------------------|--------------|-----------------|
| CH1                              | CH2             | CH3             | CH4             | CH5             | CH6             | CH7             | CH8             |                                                                       |                  |              |                 |
| 9020 (233CH)                     |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9021<br>(233DH)                  | 9022<br>(233EH) | 9023<br>(233FH) | 9024<br>(2340H) | 9025<br>(2341H) | 9026<br>(2342H) | 9027<br>(2343H) | 9028<br>(2344H) | CH□ Logging hold flag                                                 | 0                | Monitor      | ○               |
| 9029, 9030 (2345H, 2346H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9031<br>(2347H)                  | 9032<br>(2348H) | 9033<br>(2349H) | 9034<br>(234AH) | 9035<br>(234BH) | 9036<br>(234CH) | 9037<br>(234DH) | 9038<br>(234EH) | CH□ Head pointer                                                      | 0                | Monitor      | ×               |
| 9039, 9040 (234FH, 2350H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9041<br>(2351H)                  | 9042<br>(2352H) | 9043<br>(2353H) | 9044<br>(2354H) | 9045<br>(2355H) | 9046<br>(2356H) | 9047<br>(2357H) | 9048<br>(2358H) | CH□ Latest pointer                                                    | 0                | Monitor      | ×               |
| 9049, 9050 (2359H, 235AH)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9051<br>(235BH)                  | 9052<br>(235CH) | 9053<br>(235DH) | 9054<br>(235EH) | 9055<br>(235FH) | 9056<br>(2360H) | 9057<br>(2361H) | 9058<br>(2362H) | CH□ Number of logging<br>data                                         | 0                | Monitor      | ×               |
| 9059, 9060 (2363H, 2364H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9061<br>(2365H)                  | 9062<br>(2366H) | 9063<br>(2367H) | 9064<br>(2368H) | 9065<br>(2369H) | 9066<br>(236AH) | 9067<br>(236BH) | 9068<br>(236CH) | CH□ Trigger pointer                                                   | 0                | Monitor      | ×               |
| 9069, 9070 (236DH, 236EH)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9071<br>(236FH)                  | 9074<br>(2372H) | 9077<br>(2375H) | 9080<br>(2378H) | 9083<br>(237BH) | 9086<br>(237EH) | 9089<br>(2381H) | 9092<br>(2384H) | CH□ Logging cycle monitor<br>value (s)                                | 0                | Monitor      | ×               |
| 9072<br>(2370H)                  | 9075<br>(2373H) | 9078<br>(2376H) | 9081<br>(2379H) | 9084<br>(237CH) | 9087<br>(237FH) | 9090<br>(2382H) | 9093<br>(2385H) | CH□ Logging cycle monitor<br>value (ms)                               | 0                | Monitor      | ×               |
| 9073<br>(2371H)                  | 9076<br>(2374H) | 9079<br>(2377H) | 9082<br>(237AH) | 9085<br>(237DH) | 9088<br>(2380H) | 9091<br>(2383H) | 9094<br>(2386H) | System area                                                           | —                | —            | —               |
| 9095 to 9100 (2387H to 238CH)    |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9101<br>(238DH)                  | 9106<br>(2392H) | 9111<br>(2397H) | 9116<br>(239CH) | 9121<br>(23A1H) | 9126<br>(23A6H) | 9131<br>(23ABH) | 9136<br>(23B0H) | CH□ Trigger generation<br>time (First/Last two digits of<br>the year) | 0                | Monitor      | ×               |
| 9102<br>(238EH)                  | 9107<br>(2393H) | 9112<br>(2398H) | 9117<br>(239DH) | 9122<br>(23A2H) | 9127<br>(23A7H) | 9132<br>(23ACH) | 9137<br>(23B1H) | CH□ Trigger generation<br>time (Month/Day)                            | 0                | Monitor      | ×               |
| 9103<br>(238FH)                  | 9108<br>(2394H) | 9113<br>(2399H) | 9118<br>(239EH) | 9123<br>(23A3H) | 9128<br>(23A8H) | 9133<br>(23ADH) | 9138<br>(23B2H) | CH□ Trigger generation<br>time (Hour/Minute)                          | 0                | Monitor      | ×               |
| 9104<br>(2390H)                  | 9109<br>(2395H) | 9114<br>(239AH) | 9119<br>(239FH) | 9124<br>(23A4H) | 9129<br>(23A9H) | 9134<br>(23AEH) | 9139<br>(23B3H) | CH□ Trigger generation<br>time (Second/Day of the<br>week)            | 0                | Monitor      | ×               |
| 9105<br>(2391H)                  | 9110<br>(2396H) | 9115<br>(239BH) | 9120<br>(23A0H) | 9125<br>(23A5H) | 9130<br>(23AAH) | 9135<br>(23AFH) | 9140<br>(23B4H) | CH□ Trigger generation<br>time (Millisecond)                          | 0                | Monitor      | ×               |
| 9141 to 9150 (23B5H to 23BEH)    |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9151<br>(23BFH)                  | 9152<br>(23C0H) | 9153<br>(23C1H) | 9154<br>(23C2H) | 9155<br>(23C3H) | 9156<br>(23C4H) | 9157<br>(23C5H) | 9158<br>(23C6H) | CH□ Logging hold request                                              | 0                | Control      | ○               |
| 9159, 9160 (23C7H, 23C8H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9161<br>(23C9H)                  | 9162<br>(23CAH) | 9163<br>(23CBH) | 9164<br>(23CCH) | 9165<br>(23CDH) | 9166<br>(23CEH) | 9167<br>(23CFH) | 9168<br>(23D0H) | CH□ Logging enable/<br>disable setting                                | 1                | Setting      | ×               |
| 9169, 9170 (23D1H, 23D2H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9171<br>(23D3H)                  | 9172<br>(23D4H) | 9173<br>(23D5H) | 9174<br>(23D6H) | 9175<br>(23D7H) | 9176<br>(23D8H) | 9177<br>(23D9H) | 9178<br>(23DAH) | CH□ Logging data setting                                              | 1                | Setting      | ×               |
| 9179, 9180 (23DBH, 23DCH)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9181<br>(23DDH)                  | 9182<br>(23DEH) | 9183<br>(23DFH) | 9184<br>(23E0H) | 9185<br>(23E1H) | 9186<br>(23E2H) | 9187<br>(23E3H) | 9188<br>(23E4H) | CH□ Logging cycle setting<br>value                                    | 1                | Setting      | ×               |
| 9189, 9190 (23E5H, 23E6H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9191<br>(23E7H)                  | 9192<br>(23E8H) | 9193<br>(23E9H) | 9194<br>(23EAH) | 9195<br>(23EBH) | 9196<br>(23ECH) | 9197<br>(23EDH) | 9198<br>(23EEH) | CH□ Logging cycle unit<br>setting                                     | 1                | Setting      | ×               |
| 9199, 9200 (23EFH, 23F0H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9201<br>(23F1H)                  | 9202<br>(23F2H) | 9203<br>(23F3H) | 9204<br>(23F4H) | 9205<br>(23F5H) | 9206<br>(23F6H) | 9207<br>(23F7H) | 9208<br>(23F8H) | CH□ Post-trigger logging<br>points                                    | 5000             | Setting      | ×               |
| 9209, 9210 (23F9H, 23FAH)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |
| 9211<br>(23FBH)                  | 9212<br>(23FCH) | 9213<br>(23FDH) | 9214<br>(23FEH) | 9215<br>(23FFH) | 9216<br>(2400H) | 9217<br>(2401H) | 9218<br>(2402H) | CH□ Level trigger condition<br>setting                                | 0                | Setting      | ×               |
| 9219, 9220 (2403H, 2404H)        |                 |                 |                 |                 |                 |                 |                 | System area                                                           | —                | —            | —               |

| Address<br>Decimal (hexadecimal)  |                 |                 |                 |                 |                 |                 |                 | Name                      | Default<br>value | Data<br>type | Auto<br>refresh |
|-----------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------------------|------------------|--------------|-----------------|
| CH1                               | CH2             | CH3             | CH4             | CH5             | CH6             | CH7             | CH8             |                           |                  |              |                 |
| 9221<br>(2405H)                   | 9222<br>(2406H) | 9223<br>(2407H) | 9224<br>(2408H) | 9225<br>(2409H) | 9226<br>(240AH) | 9227<br>(240BH) | 9228<br>(240CH) | CH□ Trigger data          | *1               | Setting      | ×               |
| 9229, 9230 (240DH, 240EH)         |                 |                 |                 |                 |                 |                 |                 | System area               | —                | —            | —               |
| 9231<br>(240FH)                   | 9232<br>(2410H) | 9233<br>(2411H) | 9234<br>(2412H) | 9235<br>(2413H) | 9236<br>(2414H) | 9237<br>(2415H) | 9238<br>(2416H) | CH□ Trigger setting value | 0                | Setting      | ×               |
| 9239 to 9999 (2417H to 270FH)     |                 |                 |                 |                 |                 |                 |                 | System area               | —                | —            | —               |
| 10000 to 19999 (2710H to 4E1FH)   |                 |                 |                 |                 |                 |                 |                 | CH1 Logging data          | 0                | Monitor      | ×               |
| 20000 to 29999 (4E20H to 752FH)   |                 |                 |                 |                 |                 |                 |                 | CH2 Logging data          | 0                | Monitor      | ×               |
| 30000 to 39999 (7530H to 9C3FH)   |                 |                 |                 |                 |                 |                 |                 | CH3 Logging data          | 0                | Monitor      | ×               |
| 40000 to 49999 (9C40H to C34FH)   |                 |                 |                 |                 |                 |                 |                 | CH4 Logging data          | 0                | Monitor      | ×               |
| 50000 to 59999 (C350H to EA5FH)   |                 |                 |                 |                 |                 |                 |                 | CH5 Logging data          | 0                | Monitor      | ×               |
| 60000 to 69999 (EA60H to 1116FH)  |                 |                 |                 |                 |                 |                 |                 | CH6 Logging data          | 0                | Monitor      | ×               |
| 70000 to 79999 (11170H to 1387FH) |                 |                 |                 |                 |                 |                 |                 | CH7 Logging data          | 0                | Monitor      | ×               |
| 80000 to 89999 (13880H to 15F8FH) |                 |                 |                 |                 |                 |                 |                 | CH8 Logging data          | 0                | Monitor      | ×               |
| 90000 - (15F90H -)                |                 |                 |                 |                 |                 |                 |                 | System area               | —                | —            | —               |

\*1 The following shows the default values.

CH1: 10, CH2: 11, CH3: 12, CH4: 13, CH5: 14, CH6: 15, CH7: 16, CH8: 17

## Details of buffer memory addresses

This section indicates the details of the buffer memory areas of the multiple input module.



This section describes buffer memory addresses for CH1 in normal mode.

### Latest error code

The latest error code detected in the multiple input module is stored. For details on the error codes, refer to the following.

Page 412 List of error codes

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                   | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Latest error code                                    | 0   |     |     |     |     |     |     |     |
| Latest error code (in FX2N allocation mode function) | 29  |     |     |     |     |     |     |     |

#### ■Clearing an error

Turn 'Error clear request' (Un\G70, b15) off→on→off.

### 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.

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|--------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Latest address of error history                                    | 1   |     |     |     |     |     |     |     |
| Latest address of error history (in FX2N allocation mode function) | 121 |     |     |     |     |     |     |     |

### Latest alarm code

The latest alarm code detected in the multiple input module is stored. For details on the alarm codes, refer to the following.

Page 415 List of alarm codes

#### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                   | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Latest alarm code                                    | 2   |     |     |     |     |     |     |     |
| Latest alarm code (in FX2N allocation mode function) | 122 |     |     |     |     |     |     |     |

#### ■Clearing an alarm

Turn 'Error clear request' (Un\G70, b15) off→on→off.

### Latest address of alarm history

Among Alarm history ☐ (Un\G3760 to Un\G3919), 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.

| Buffer memory name                                                 | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|--------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Latest address of alarm history                                    | 3   |     |     |     |     |     |     |     |
| Latest address of alarm history (in FX2N allocation mode function) | 123 |     |     |     |     |     |     |     |

## Module information

Module information of FX5-8AD is stored. For module information, 61E0H (fixed hexadecimal value) is stored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Module information | 30  |     |     |     |     |     |     |     |

## Module information [FX2N Allocation Mode]

The FX5-8AD module information in FX2N allocation mode function is stored. For model information, 61E4H (fixed hexadecimal value) is stored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                    | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Module information (in FX2N allocation mode function) | 30  |     |     |     |     |     |     |     |

## Firmware version

Firmware version is stored. Firmware version is stored in 4 digit decimal number.

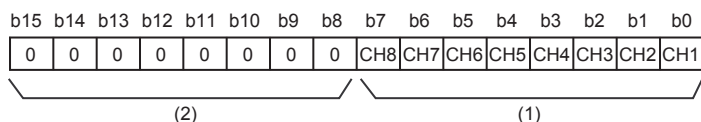
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-----------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Firmware version                                    | 31  |     |     |     |     |     |     |     |
| Firmware version (in FX2N allocation mode function) | 31  |     |     |     |     |     |     |     |

## Warning output flag (Process alarm upper limit)

The upper limit alarm of the process alarm can be checked for each channel.



### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Warning output flag (Process alarm upper limit) | 36  |     |     |     |     |     |     |     |

### ■Alert output flag status

- If the limit specified by the process alarm upper upper limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Process alarm upper limit)' (Un\G36) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital operation value becomes smaller than the process alarm upper lower limit value, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be 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   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

(2)

(1)

(1) 0: Normal, 1: Alarm ON

(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Warning output flag (Process alarm lower limit) | 37  |     |     |     |     |     |     |     |

### ■Alert output flag status

- If the limit specified by the process alarm lower limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Process alarm lower limit)' (Un\G37) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital operation value becomes greater than the process alarm lower upper limit value, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Process alarm upper limit/lower limit) [FX2N allocation mode]

When the FX2N allocation 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                |
| CH8               | CH8               | CH7               | CH7               | CH6               | CH6               | CH5               | CH5               | CH4               | CH4               | CH3               | CH3               | CH2               | CH2               | CH1               | CH1               |
| Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value |

(1)

(1) 0: Normal, 1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|----------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Alert output flag (Process alarm) (in FX2N allocation mode function) | 26  |     |     |     |     |     |     |     |

### ■Alert output flag status

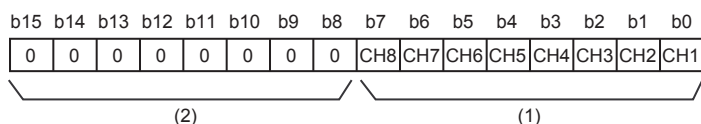
- When the value is out of the range specified in the process alarm upper upper limit value or process alarm lower lower limit value, Alarm ON (1) is stored in Alert output flag (Process alarm upper limit/lower limit) corresponding to each channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital operation value falls within the process alarm upper lower limit value or less, or process alarm lower upper limit value or more, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Rate alarm upper limit)

The upper limit alarm of the rate alarm can be checked for each channel.



(1) 0: Normal, 1: Alarm ON

(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                           | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|----------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Warning output flag (Rate alarm upper limit) | 38  |     |     |     |     |     |     |     |

### ■Alert output flag status

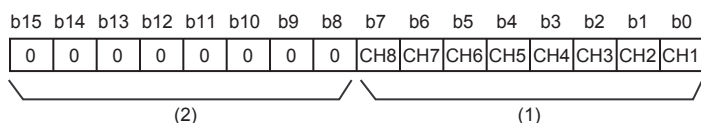
- If the limit specified in the rate alarm upper limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Rate alarm upper limit)' (Un\G38) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Rate alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital output value becomes smaller than the rate alarm upper limit value, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Rate alarm lower limit)

The lower limit alarm of the rate alarm can be checked for each channel.



(1) 0: Normal, 1: Alarm ON

(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                           | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|----------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Warning output flag (Rate alarm lower limit) | 39  |     |     |     |     |     |     |     |

### ■Alert output flag status

- When the value becomes equal to or smaller than the range specified in the rate alarm lower limit value, Alarm ON (1) is stored in 'Alert output flag (Rate alarm lower limit)' (Un\G39) corresponding to each channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Rate alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the digital output value becomes smaller than the rate alarm lower limit value, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Warning output flag (Rate alarm upper limit/lower limit) [FX2N allocation mode]

When the FX2N allocation 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                |
|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| CH8               | CH8               | CH7               | CH7               | CH6               | CH6               | CH5               | CH5               | CH4               | CH4               | CH3               | CH3               | CH2               | CH2               | CH1               | CH1               |
| Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value | Lower limit value | Upper limit value |

(1)

(1) 0: Normal, 1: Alarm ON

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Alert output flag (Rate alarm) (in FX2N allocation mode function) | 27  |     |     |     |     |     |     |     |

### ■Alert output flag status

- If the value is out of the range specified in the rate alarm upper limit value or the rate alarm lower limit value, Alarm ON (1) is stored in Alert output flag (rate alarm) corresponding to each channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert output setting (Process alarm) is enabled, 'Alert output signal' (Un\G69, b8) also turns on.

### ■Clearing Alert output flag

- When the change rate of the digital output value falls within the rate alarm upper limit value or less, or rate alarm lower limit value or more, the flag is automatically cleared.
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Input signal error detection flag

The status of an analog input value can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7  | b6  | b5  | b4  | b3  | b2  | b1  | b0  |
|-----|-----|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

(2)

(1)

(1) 0: Normal, 1: Input signal error

(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Input signal error detection flag | 40  |     |     |     |     |     |     |     |

### ■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 detection flag corresponding to each channel of detection turns to Input signal error (1).
- When an error is detected in any channel where the conversion and the input signal error detection are enabled, 'Input signal error detection signal' (Un\G69, b12) turns on.



### ■Clearing Input signal error detection flag

Clearing input signal errors detection flag differs depending on Input signal error detection/disconnection detection auto-clear enable/disable setting.

When Input signal error detection/disconnection detection auto-clear enable/disable setting is set to Enable (0)

- When an analog input value falls within the normal range, Normal (0) is stored in the corresponding bit of 'Input signal error detection flag' (Un\G40).

When Input signal error/disconnection detection auto-clear enable/disable setting is set to Disable (1)

- When an analog input value falls within the normal range, if turning off→on→off 'Error clear request' (Un\G70, b15), Normal (0) is stored in the corresponding bit of 'Input signal error detection flag' (Un\G40).
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

### Disconnection detection flag

The status of disconnection can be checked for each channel.

| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7  | b6  | b5  | b4  | b3  | b2  | b1  | b0  |
|-----|-----|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| (2) |     |     |     |     |     |    |    | (1) |     |     |     |     |     |     |     |

- (1) 0: Normal, 1: Disconnection detection  
(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name           | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Disconnection detection flag | 41  |     |     |     |     |     |     |     |

### ■Status of Disconnection detection flag

- If a disconnection is detected by the disconnection detection function, disconnection detection flag, which corresponds to the channel where the disconnection is detected, turns to disconnection detection (1).
- If an error is detected even in one channel, of the channels where conversion is enabled and disconnection detection is enabled, 'Disconnection detection signal' (Un\G69, b6) turns on.

### ■Clearing disconnection detection flag

Clearing disconnection detection flag differs depending on Input signal error detection/disconnection detection auto-clear enable/disable setting.

When Input signal error detection/disconnection detection auto-clear enable/disable setting is set to Enable (0)

- When the disconnection cause is eliminated, and the analog input value falls within the normal range, Normal (0) is stored in the corresponding bit of 'Disconnection detection flag' (Un\G41).

When Input signal error/disconnection detection auto-clear enable/disable setting is set to Disable (1)

- When an analog input value falls within the normal range, if turning off→on→off 'Error clear request' (Un\G70, b15), Normal (0) is stored in the corresponding bit of 'Disconnection detection flag' (Un\G41).
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

### Input signal error detection flag/disconnection detection flag [FX2N allocation mode]

The status of an analog input value or disconnection can be checked for each channel.

| b15           | b14                | b13           | b12                | b11           | b10                | b9            | b8                 | b7            | b6                 | b5            | b4                 | b3            | b2                 | b1                | b0                |
|---------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|---------------|--------------------|-------------------|-------------------|
| CH8           | CH8                | CH7           | CH7                | CH6           | CH6                | CH5           | CH5                | CH4           | CH4                | CH3           | CH3                | CH2           | CH2                | CH1               | CH1               |
| Disconnection | Input signal error | Disconnection | Input signal error | Disconnection | Input signal error | Disconnection | Input signal error | Disconnection | Input signal error | Disconnection | Input signal error | Disconnection | Input signal error | Lower limit value | Upper limit value |
| (1)           |                    |               |                    |               |                    |               |                    |               |                    |               |                    |               |                    |                   |                   |

- (1) 0: Normal, 1: Detection

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|----------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Input signal error detection flag/disconnection detection flag | 28  |     |     |     |     |     |     |     |

### ■Status of Input signal error detection flag/disconnection detection flag

- When an analog input value out of the range specified in Input signal error detection setting value is detected, Input signal error detection flag corresponding to each channel turns to Input signal error (1).
- If a disconnection is detected by the disconnection detection function, disconnection detection flag, which corresponds to the channel where the disconnection is detected, turns to disconnection detection (1).
- When an error is detected in any channel where the conversion and the input signal error detection are enabled, 'Input signal error detection signal' (Un\G69, b12) turns on.
- If an error is detected even in one channel, of the channels where conversion is enabled and disconnection detection is enabled, 'Disconnection detection signal' (Un\G69, b6) turns on.

### ■Clearing Input signal error detection flag/disconnection detection flag

Clearing input signal errors detection flag/disconnection detection flag differs depending on Input signal error detection/disconnection detection auto-clear enable/disable setting. (When turning off→on→off, Error clear request (Un\G70, b15) the flag is cleared regardless of the setting.)

When Input signal error detection/disconnection detection auto-clear enable/disable setting is set to Enable (0)

- When an analog input value falls within the normal range, Normal (0) is stored in the corresponding bit of 'Input signal error detection flag/disconnection detection flag' (Un\G28).

When Input signal error/disconnection detection auto-clear enable/disable setting is set to Disable (1)

- When an analog input value falls within the normal range, if turning off→on→off 'Error clear request' (Un\G70, b15), Normal (0) is stored in the corresponding bit of 'Input signal error detection flag/disconnection detection flag' (Un\G28).
- Turning off→on→off 'Operating condition setting request' (Un\G70, b9) allows the flag to be cleared.

## Conversion completed flag

The conversion status can be checked.

|     |     |     |     |     |     |    |    |     |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| b15 | b14 | b13 | b12 | b11 | b10 | b9 | b8 | b7  | b6  | b5  | b4  | b3  | b2  | b1  | b0  |
| 0   | 0   | 0   | 0   | 0   | 0   | 0  | 0  | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| (2) |     |     |     |     |     |    |    | (1) |     |     |     |     |     |     |     |

(1) 0: During conversion or unused, 1: Conversion completed

(2) The values of b8 to b15 are fixed to 0.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                           | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|--------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Conversion completed flag                                    | 42  |     |     |     |     |     |     |     |
| Conversion completed flag (in FX2N allocation mode function) | 124 |     |     |     |     |     |     |     |

### ■The status of Conversion completed flag

When the first conversion is completed in the channel where conversion is enabled, the flag turns to Conversion completed (1). Upon completion of the conversion of all the channels where conversion is enabled, 'Conversion completed flag' (Un\G69, b14) turns on.

### ■Clearing Conversion completed flag

Turning off→on→off 'Operating condition setting request' (Un\G70, b9) turns the flag back to the default (During conversion or unused (0)), and when the first conversion is completed, the flag turns to Conversion completed (1) again.

## Operation mode monitor

The operation mode status in operation can be checked.

| Monitor value | Description              |
|---------------|--------------------------|
| 0             | Normal mode              |
| 1             | Offset/gain setting mode |
| 2             | FX2N Allocation Mode     |
| 3             | 2CH conversion mode      |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                        | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-----------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Operation mode monitor                                    | 60  |     |     |     |     |     |     |     |
| Operation mode monitor (In FX2N allocation mode function) | 60  |     |     |     |     |     |     |     |

## Input signals

A state of a multiple input module can be checked in the buffer memory area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                              | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Input signals                                   | 69  |     |     |     |     |     |     |     |
| Input signal (In FX2N allocation mode function) | 69  |     |     |     |     |     |     |     |

### ■List of input signals

| Buffer Memory Areas | Description                                |
|---------------------|--------------------------------------------|
| b0                  | Module READY                               |
| b1 to 4             | Use not allowed                            |
| b5                  | Offset/gain initialization completed flag  |
| b6                  | Disconnection detection signal             |
| b7                  | Use not allowed                            |
| b8                  | Warning output signal                      |
| b9                  | Operating condition setting completed flag |
| b10                 | Offset/gain setting mode status flag       |
| b11                 | Channel change completed flag              |
| b12                 | Input signal error detection signal        |
| b13                 | Use not allowed                            |
| b14                 | Conversion completed flag                  |
| b15                 | Error flag                                 |

### ■Module READY (b0)

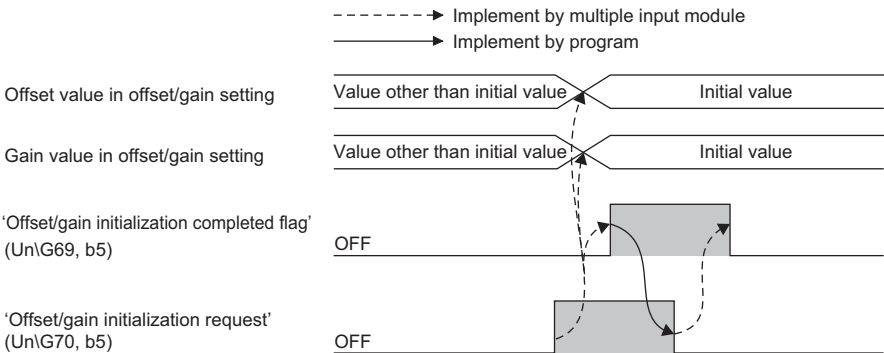
Module READY (b0) turns on to indicate the preparation for the conversion is completed after the power-on or after the reset of the CPU module, and the conversion is performed.

In the following cases, 'Module READY' turns off.

- In the offset/gain setting mode (In this case, the conversion is performed.)
- When a watchdog timer error has occurred in the multiple input module (In this case, the conversion is not performed.)

■Offset/gain initialization completed flag (b5)

- Use as an interlock condition to turn off→on→off 'Offset/gain initialization request' (Un\G70, b5).
- Offset/gain initialization is not be performed unless 'Offset/gain initialization enabled code '(Un\G305) is set to E20FH.
- It is possible to perform offset/gain initialization in normal mode only.
- When 'Offset/gain initialization request' (Un\G70, b5) is off, 'Offset/gain initialization complete flag' (Un\G69, b5) turns off.



■Disconnection detection signal (b6)

Turns on when disconnection is detected for the channel where Enable (0) is set in 'CH1 Disconnection detection enable/disable setting' (Un\G531) and the conversion is enabled.

When 'Disconnection detection signal' (Un\G69, b6) turns on, the following operations are performed.

- A value corresponding to 'CH1 Conversion setting at disconnection detection' (Un\G534) is stored in the temperature measurement value of the relevant channel.
- The ALM LED flashes.

Turning off 'Disconnection detection signal' (Un\G69, b6) differs depending on Input signal error/disconnection detection auto-clear enable/disable setting.

| Input signal error/<br>Disconnection<br>detection automatic<br>clear enable/disable<br>setting | Operations related to the turning off of Disconnection detection signal (Un\G69, b6)                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enable (0)                                                                                     | When the temperature input value is within the setting range and the disconnection is restored, the 'Disconnection detection signal' (Un\G69, b6) automatically turns off, and ALM LED turns off.                                                                                                                                                                                                                                                                                    |
| Disable (1)                                                                                    | <p>Eliminate the disconnection cause, and turn 'Error clear request' (Un\G70, b15) off→on→off. 'Disconnection detection signal' (Un\G69, b6) turns off, ALM LED turns off, and the latest alarm code is cleared.</p> <p>-----&gt; Implement by multiple input module<br/>-----&gt; Implement by program</p> <p>Disconnection detection flag: 0, 1, 0</p> <p>'Disconnection detection signal' (Un\G69, b6): OFF, ON, OFF</p> <p>'Error clear request' (Un\G70, b15): OFF, ON, OFF</p> |

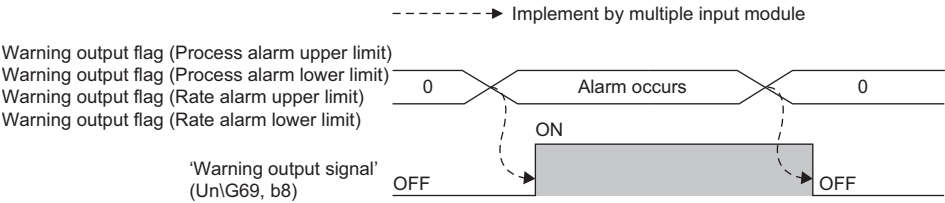


Averaging processing starts over after the conversion resumes.

■Warning output signal (b8)

Alert output signal (Un\G69, b8) turns on when the process alarm or rate alarm has been detected. When the alert output function (process alarm/rate alarm) is disabled for all channels, 'Alert output signal' (Un\G69, b8) is always off.

| Alarm         | Operation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Process alarm | <ul style="list-style-type: none"><li>• Process alarm turns on when 'CH1 Digital operation value' exceeds the range set for 'CH1 Process alarm upper upper limit value' (Un\G514) or 'CH1 Process alarm lower lower limit value' (Un\G520). The ALM LED also turns on along with the on of the signal. The target of alert output is the channels only where the alert output function (process alarm) and the conversion are both enabled.</li><li>• Process alarm turns off when 'CH1 Digital output value' falls within the setting range for all the channels where the conversion is enabled. The ALM LED also turns off along with the off of the signal.</li></ul> |
| Rate alarm    | <ul style="list-style-type: none"><li>• Rate alarm turns on when the change rate of 'CH1 Digital output value' exceeds the range set for 'CH1 Rate alarm upper limit value' (Un\G524) and 'CH1 Rate alarm lower limit value' (Un\G526). The ALM LED also turns on along with the on of the signal. The target of alert output is the channels only where the alert output function (rate alarm) and the conversion are both enabled.</li><li>• Rate alarm turns off when the change rate of 'CH1 Digital output value' falls within the setting range for all the channels where the conversion is enabled. The ALM LED also turns off.</li></ul>                         |



■Operating condition setting completed flag (b9)

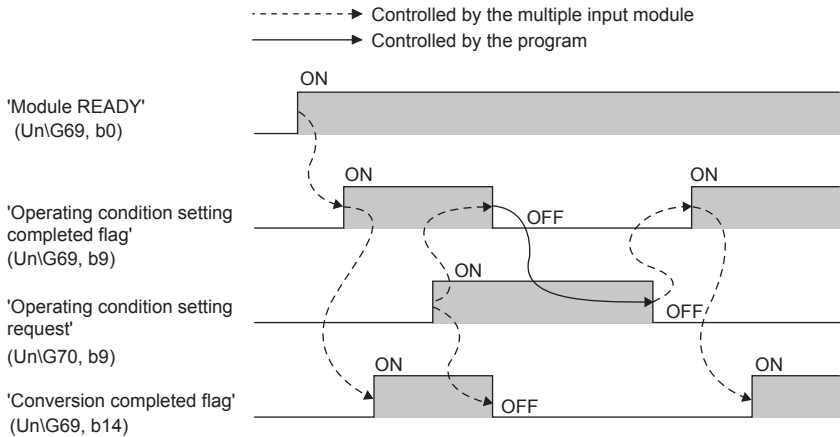
When changing values of the buffer memory, use as an interlock condition to turn off→on→off 'Operating condition setting request' (Un\G70, b9).

For the buffer memory areas which require turning off→on→off of 'Operating condition setting request' (Un\G70, b9) to enable the changed values, refer to the following.

📖 Page 420 Buffer Memory Areas

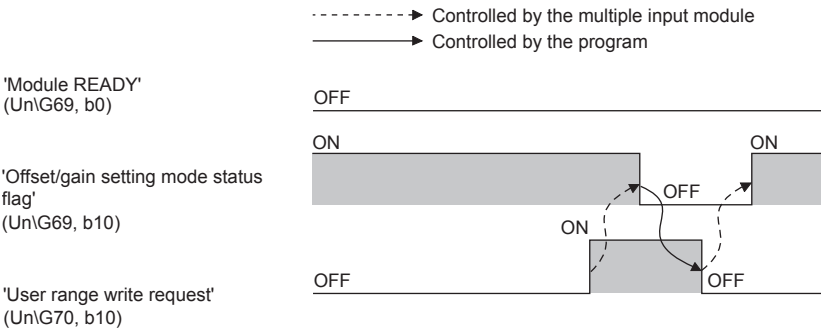
When 'Operating condition setting completed flag' (Un\G69, b9) is off, the conversion is not performed.

When 'Operating condition setting request' (Un\G70, b9) is on, 'Operating condition setting completed flag' (Un\G69, b9) turns off.



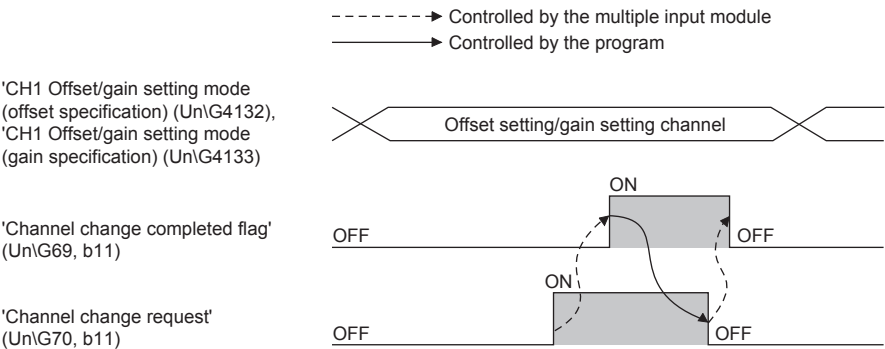
■Offset/gain setting mode status flag (b10)

When registering the value, which has been adjusted with the offset/gain setting, use as an interlock condition to turn off→on→off 'User range write request' (Un\G70, b10).



■Channel change completed flag (b11)

When changing a channel to perform the offset/gain setting, use as an interlock condition to turn off→on→off 'Channel change request' (Un\G70, b11).



■Input signal error detection signal (b12)

Set 'CH1 Input signal error detection setting' (Un\G528) to one of upper lower limit detection, upper limit detection, lower limit detection, and simple disconnection detection, and turns on if the analog input value exceeds the setting range that is set in 'CH1 Input signal error detection lower limit setting value (Un\G529) or 'CH1 Input signal error detection upper limit setting value' (Un\ G530) in the channel where the conversion has been enabled. For the cases where the simple disconnection detection is set, 'CH1 Input signal error detection lower limit setting value' (Un\G529) or 'CH1 Input signal error detection upper limit setting value' (Un\G530) is ignored and turns on at the disconnection detection.

When 'Input signal error detection signal' (Un\G69, b12) turns on, the following operations are performed.

- Digital output value and digital operation value of the relevant channel is held with the value just before the error was detected.
- The ALM LED flashes.

Turning off 'Input signal error detection signal' (Un\G69, b12) differs depending on Input signal error/disconnection detection auto-clear enable/disable setting.

| Input signal error/<br>Disconnection detection<br>automatic clear enable/<br>disable setting | Operations related to the turning off of input signal error detection signal (Un\G69, b12)                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enable (0)                                                                                   | If the input signal is within the setting range, 'Input signal error detection signal' (Un\G69, b12) and 'Input signal error detection flag' (Un\G40) automatically turn off, and ALM LED turns off.                                                                                                                                                                                                                                                                                |
| Disable (1)                                                                                  | <p>Remove the cause of the input signal error and set the input signal within the setting range. Then turn the 'error clear request' (Un\G70, b15) OFF→ON→OFF. The input signal error detection signal 'Un\G69, b12) and the 'input signal error detection flag' (Un\G40) will turn OFF, and the ALM LED will turn off. The latest alarm code will also be cleared.</p> <div><div>-----&gt; Implement by multiple input module</div><div>-----&gt; Implement by program</div></div> |



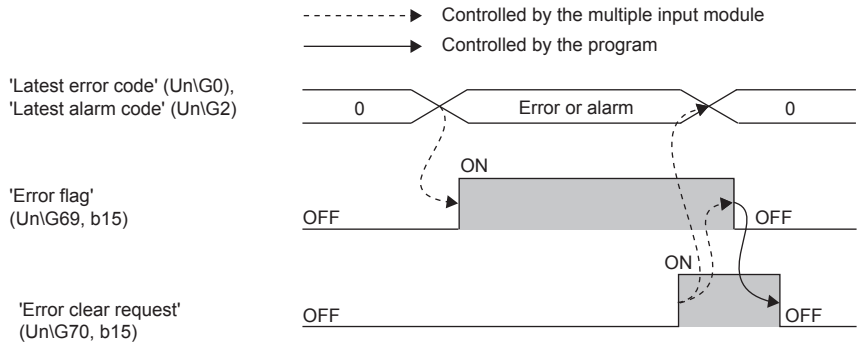
Averaging processing starts over after the conversion resumes.

■Conversion completed flag (b14)

Conversion completed flag (Un\G70, b15) turns on when the first conversion has been completed for all conversion enabled channels. When reading a digital output value, use this signal or 'Conversion completed flag' (Un\G42) as an interlock.

■Error occurrence flag (b15)

Error flag (Un\G69, b15) turns on when an error has occurred.



'Error flag' (Un\G69, b15), 'Latest error code' (Un\G0), and 'Latest alarm code' (Un\G2) are cleared at the timing when 'Error clear request' (Un\G70, b15) turns off→on.

## Output signals

A state of FX5-8AD can be checked in the buffer memory area.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                               | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|--------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Output signals                                   | 70  |     |     |     |     |     |     |     |
| Output signal (In FX2N allocation mode function) | 70  |     |     |     |     |     |     |     |

### ■List of output signals

| Buffer Memory Areas | Description                         |
|---------------------|-------------------------------------|
| b0 to 4             | Use not allowed                     |
| b5                  | Offset/gain initialization request  |
| b6 to 8             | Use not allowed                     |
| b9                  | Operating condition setting request |
| b10                 | User range write request            |
| b11                 | Channel change request              |
| b12 to 14           | Use not allowed                     |
| b15                 | Error clear request                 |

#### ■Offset/gain initialization request (b5)

Turn off→on→off to enable the settings of buffer memory areas.

Offset/gain initialization is not to be performed unless 'Offset/gain initialization enabled code is set to E20FH.

When 'Offset/gain initialization request' (Un\G70, b5) is off, 'Offset/gain initialization complete flag' (Un\G69, b5) turns off.

#### ■Operating condition setting request (b9)

Turn off→on→off to enable the settings of buffer memory areas.

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

☞ Page 443 Operating condition setting completed flag (b9)

#### ■User range write request (b10)

In the offset/gain setting mode, turn off→on→off User range write request (b10) to register values adjusted with the offset/gain setting in a multiple input module. The data is written to the flash memory at the timing when this signal is turned off→on.

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

☞ Page 444 Offset/gain setting mode status flag (b10)

#### ■Channel change request (b11)

Turn off→on→off Channel change request (b11) to change a channel to perform the offset/gain setting.

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

☞ Page 444 Channel change completed flag (b11)

#### ■Error clear request (b15)

Turn off→on→off Error clear request (b15) when Error flag (Un\G69, b15), Disconnection detection signal (Un\G69, b6), Input signal error detection signal (Un\G69, b12), Latest error code (Un\G0), and Latest alarm code (Un\G2) are cleared.

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

- ☞ Page 445 Error occurrence flag (b15)
- ☞ Page 442 Disconnection detection signal (b6)
- ☞ Page 445 Input signal error detection signal (b12)



## 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). These are useful, for example, to generate triggers while monitoring the values of devices other than the multiple input module.

For details on the logging function, refer to the following.

 Page 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                             | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|------------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Level data□                                    | 90   | 91   | 92   | 93   | 94   | 95   | 96   | 97   | 98   | 99   |
| Level data□ (in FX2N allocation mode function) | 9010 | 9011 | 9012 | 9013 | 9014 | 9015 | 9016 | 9017 | 9018 | 9019 |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Default value

The default value is 0 for all the channels.

## Mode switching setting

Set a setting value for the mode to be switched.

| Switching mode           | Setting value |       |
|--------------------------|---------------|-------|
| Buffer memory address    | 296           | 297   |
| Normal mode              | 4658H         | 4144H |
| Offset/gain setting mode | 4144H         | 4658H |

### Point

When a value out of the above is written and 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, the mode setting is not performed and only the operating condition is changed. In this case, this area is cleared to 0.

A

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                        | CH1      | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-----------------------------------------------------------|----------|-----|-----|-----|-----|-----|-----|-----|
| Mode switching setting                                    | 296, 297 |     |     |     |     |     |     |     |
| Mode switching setting (in FX2N allocation mode function) | 126, 127 |     |     |     |     |     |     |     |

### ■Enabling the setting

Turn off→on 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■After the mode is switched

When the mode is switched, this area is cleared to 0 and 'Operating condition setting completed flag' (Un\G69, b9) turns off. After checking that 'Operating condition setting completed flag' (Un\G69, b9) is off, turn off 'Operating condition setting request' (Un\G70, b9).

## Rate alarm change rate selection

Select rate alarm change rate. "Rate specification" that sets the rate alarm upper limit value and the rate alarm lower limit value in units of 0.1% with respect to (the maximum value of the digital output value) - (the minimum value of the digital output value), and "Digital output value specification" that sets in units of digits for the range of digital output values, can be selected.

| Setting value | Description                        |
|---------------|------------------------------------|
| 0             | Rate specification                 |
| 1             | Digital output value specification |

When setting to a value other than the above table, it operates with digital output value specification (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|---------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Rate alarm change rate selection                                    | 299 |     |     |     |     |     |     |     |
| Rate alarm change rate selection (in FX2N allocation mode function) | 130 |     |     |     |     |     |     |     |

### ■Enabling the setting

Turn off→on 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

Digital output value specification (1) is set.

## Input signal error/Disconnection detection automatic clear enable/disable setting

Set whether to enable or disable auto-clear of input signal error or disconnection detection with the input signal error detection function or disconnection detection function.

| Setting value | Description |
|---------------|-------------|
| 0             | Enable      |
| 1             | Disable     |

Setting a value other than in the table above results in operation with Disable (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                                              | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-----------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Input signal error/Disconnection detection automatic clear enable/disable setting                               | 304 |     |     |     |     |     |     |     |
| Input signal error/disconnection detection auto-clear enable/disable setting (in FX2N allocation mode function) | 133 |     |     |     |     |     |     |     |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1) for all the channels.

## Offset/gain initialization enable code

When the offset/gain initialization request (Un/G70, b5) turns off→on by setting the enable code "E20FH" in this area at the time of initialization of offset/gain, the offset value and the gain value in the flash memory of the multiple input module are initialized.

When setting anything other than "E20FH" in this area, initialization is not executed.

### ■Buffer memory address

The following shows the buffer memory address of this area.

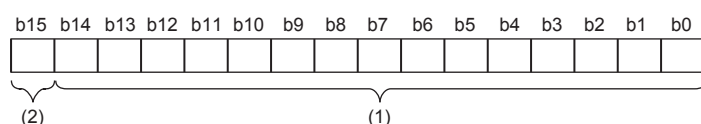
| Buffer memory name                                                        | CH1  | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|---------------------------------------------------------------------------|------|-----|-----|-----|-----|-----|-----|-----|
| Offset/gain initialization enable code                                    | 305  |     |     |     |     |     |     |     |
| Offset/gain initialization enable code (In FX2N allocation mode function) | 1340 |     |     |     |     |     |     |     |

### ■Default value

The default value is set to 0.

## CH1 Digital output value

The converted digital output value is stored in 16-bit signed binary value.



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

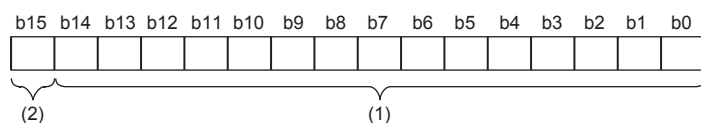
| Buffer memory name                                          | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Digital output value                                    | 400  | 600  | 800  | 1000 | 1200 | 1400 | 1600 | 1800 |
| CH□ Digital output value (in FX2N allocation mode function) | 1001 | 1003 | 1005 | 1007 | 1009 | 1011 | 1013 | 1015 |

### ■Refreshing cycle

The value is updated every conversion cycle.

## CH1 Digital operation value

When the digital clipping function, scaling function, shift function are used, digital values to which the digital clipping, scale conversion, and shift-and-add were performed are stored in 16-bit signed binary in the digital operation value.



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

### ■Buffer memory address

The following shows the buffer memory address of this area.

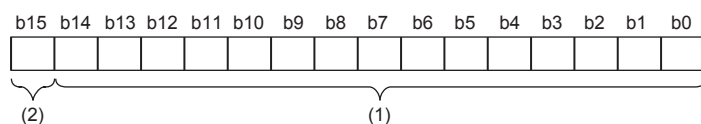
| Buffer memory name                                             | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Digital operation value                                    | 402 | 602 | 802 | 1002 | 1202 | 1402 | 1602 | 1802 |
| CH□ Digital operation value (in FX2N allocation mode function) | 10  | 11  | 12  | 13   | 14   | 15   | 16   | 17   |



When not using the digital clipping function, scaling function, and shift function, the same value as '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.



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

In the following cases, 'CH1 Maximum value' (Un\G404) is updated with the current value.

- When 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, and the setting is changed
- When 'CH1 Maximum value reset request' (Un\G473) is turned off→on→off

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                   | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Maximum value                                    | 404 | 604 | 804 | 1004 | 1204 | 1404 | 1604 | 1804 |
| CH□ Maximum value (In FX2N allocation mode function) | 111 | 112 | 113 | 114  | 115  | 116  | 117  | 118  |

### ■Refreshing cycle

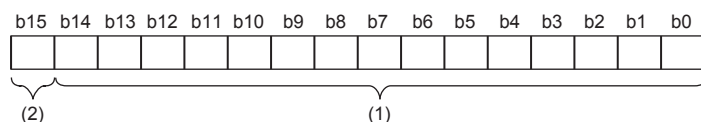
The value is updated every conversion cycle.

#### 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, and digital clipping function are used, values calculated by each function are stored in Maximum value and Minimum value.

## CH1 Minimum value

The minimum value of the digital operation value is stored in 16-bit signed binary value.



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

In the following cases, 'CH1 Minimum value' (Un\G406) is updated with the current value.

- When 'Operating condition setting request' (Un\G70, b9) is turned off→on→off, and the setting is changed
- When 'CH1 Minimum value reset request' (Un\G474) is turned off→on→off

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                   | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Minimum value                                    | 406 | 606 | 806 | 1006 | 1206 | 1406 | 1606 | 1806 |
| CH□ Minimum value (In FX2N allocation function mode) | 101 | 102 | 103 | 104  | 105  | 106  | 107  | 108  |

### ■Refreshing cycle

The value is updated every conversion cycle.

#### 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, and digital clipping function are used, values calculated by each function are stored in Maximum value and Minimum value.

## CH1 Logging hold flag

The logging holding status can be checked.

For details on the logging function, refer to the following.

☞ Page 369 Logging function

| Monitor value | Description |
|---------------|-------------|
| 0             | OFF         |
| 1             | ON          |

As data collection in 'CH1 Logging data' (Un\G10000 to Un\G19999) comes to a halt, this flag turns to ON (1).

When logging restarts by changing 'CH1 Logging hold request' (Un\G471) from ON (1)→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.

| Buffer memory name                                       | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging hold flag                                    | 409  | 609  | 809  | 1009 | 1209 | 1409 | 1609 | 1809 |
| CH□ Logging hold flag (in FX2N allocation mode function) | 9021 | 9022 | 9023 | 9024 | 9025 | 9026 | 9027 | 9028 |

## CH1 Conversion status

The conversion status is stored.

| Monitor value | Conversion status                                                                | Setting content                                                                     |
|---------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 0             | Conversion disable                                                               | A status of conversion disable. Conversion of the relevant channel is not executed. |
| 1             | Conversion start                                                                 | A status from the conversion enabled to the initial conversion completed.           |
| 2             | Conversion completed                                                             | A status after the initial conversion completed. Conversion is being executed.      |
| 3             | Input signal error detection in progress/<br>disconnection detection in progress | A status where an input signal error or disconnection is being detected.            |

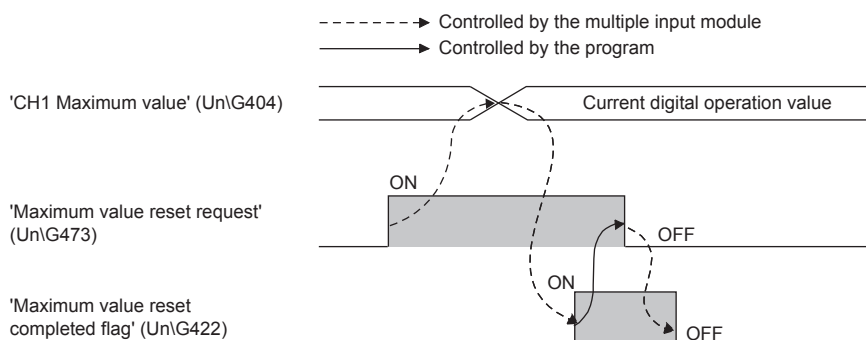
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                       | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Conversion status                                    | 420  | 620  | 820  | 1020 | 1220 | 1420 | 1620 | 1820 |
| CH□ Conversion status (In FX2N allocation mode function) | 1021 | 1022 | 1023 | 1024 | 1025 | 1026 | 1027 | 1028 |

## CH1 Maximum value reset completed flag

The reset status of maximum value can be checked.



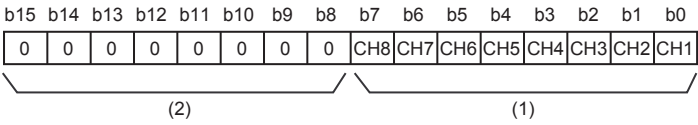
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                     | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Maximum value reset completed flag | 422 | 622 | 822 | 1022 | 1222 | 1422 | 1622 | 1822 |

### Maximum value reset completed flag [FX2N allocation mode]

The reset status of maximum value in FX2N allocation mode can be checked.



- (1) 0: Not completed, 1: Completed  
(2) The values of b8 to b15 are fixed to 0.

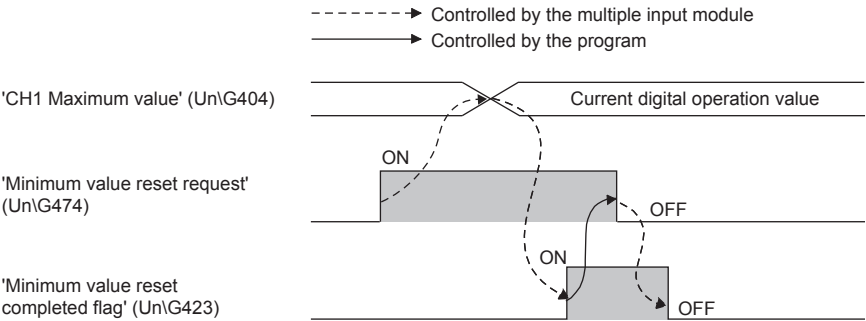
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|---------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| CH□ Maximum value reset completed flag (in FX2N allocation mode function) | 120 |     |     |     |     |     |     |     |

### CH1 Minimum value reset completed flag

The reset status of minimum value can be checked.



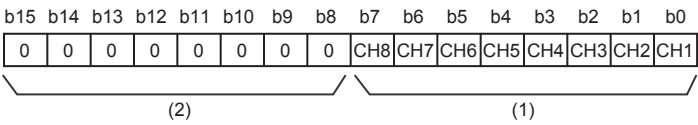
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                     | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Minimum value reset completed flag | 423 | 623 | 823 | 1023 | 1232 | 1423 | 1623 | 1823 |

### Minimum value reset completed flag [FX2N allocation mode]

The reset status of minimum value in FX2N allocation mode can be checked.



- (1) 0: Not completed, 1: Completed  
(2) The values of b8 to b15 are fixed to 0.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|---------------------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| CH□ Minimum value reset completed flag (in FX2N allocation mode function) | 110 |     |     |     |     |     |     |     |

## CH1 Input type/Range monitor

Set input type, and input range can be checked.

| Monitor value | Input type                       | Input range    |
|---------------|----------------------------------|----------------|
| 000FH         | Conversion not allowed (Default) | —              |
| 0003H         | Current                          | 4 to 20 mA     |
| 0010H         |                                  | 0 to 20 mA     |
| 0006H         |                                  | -20 to +20 mA  |
| 0011H         | Voltage                          | 1 to 5 V       |
| 0012H         |                                  | 0 to 5 V       |
| 0000H         |                                  | -10 to +10 V   |
| 0013H         |                                  | 0 to 10 V      |
| 0014H         | Resistance temperature detector  | Pt100          |
| 0015H         |                                  | Ni100          |
| 0016H         | Thermocouple                     | Thermocouple B |
| 0017H         |                                  | Thermocouple R |
| 0018H         |                                  | Thermocouple S |
| 0009H         |                                  | Thermocouple K |
| 000AH         |                                  | Thermocouple J |
| 000BH         |                                  | Thermocouple T |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name           | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Input type/Range monitor | 430 | 630 | 830 | 1030 | 1230 | 1430 | 1630 | 1830 |

## CH1 Input type/Range monitor [FX2N allocation mode]

Set input type, and input range can be checked.

| Monitor value | Input type                       | Input range    |
|---------------|----------------------------------|----------------|
| 000FH         | Conversion not allowed (Default) | —              |
| 0000H         | Voltage                          | -10 to +10 V   |
| 0001H         |                                  |                |
| 0002H         |                                  |                |
| 0003H         | Current                          | 4 to 20 mA     |
| 0004H         |                                  |                |
| 0005H         |                                  | -20 to +20 mA  |
| 0006H         |                                  |                |
| 0007H         |                                  |                |
| 0008H         | Thermocouple                     | Thermocouple K |
| 0009H         |                                  | Thermocouple J |
| 000AH         |                                  | Thermocouple T |
| 000BH         |                                  | Thermocouple K |
| 000CH         |                                  | Thermocouple J |
| 000DH         |                                  | Thermocouple T |
| 000EH         |                                  | Thermocouple T |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Input type/Range monitor (In FX2N allocation mode function) | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 |

A

## CH1 Input type/Range monitor (Offset/gain setting)

Offset/gain values, which are set in 'CH1 Input type/range setting' (Un\G598), can be checked.

| Monitor value | Description             |
|---------------|-------------------------|
| 0             | Factory default setting |
| 1             | 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  | CH7  | CH8  |
|---------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Input type/Range monitor (Offset/gain setting)                                    | 431  | 631  | 831  | 1031 | 1231 | 1431 | 1631 | 1831 |
| CH□ Input type/Range monitor (Offset/gain setting) (In FX2N allocation mode function) | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 |

## CH1 Head pointer

The buffer memory address of the oldest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with this buffer memory area.

The offset value at the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored.

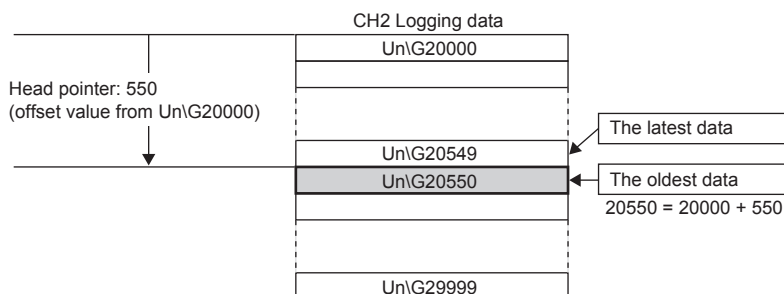
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Head pointer                                    | 434  | 634  | 834  | 1034 | 1234 | 1434 | 1634 | 1834 |
| CH□ Head pointer (in FX2N allocation mode function) | 9031 | 9032 | 9033 | 9034 | 9035 | 9036 | 9037 | 9038 |

**Ex.**

When the value of 'CH2 Head pointer' (Un\G634) is 20550



### 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\G19999) while the data of the first 10000 points is being logged from beginning of the logging. On and after the 10001st data, 'CH1 Head pointer' (Un\G434) increases one by one each time data is stored.
- When 'CH1 Logging hold request' (Un\G471) is turned on→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\G19999) can be checked with this buffer memory area.

The offset value at the start address of CH1 Logging data (Un\G10000 to Un\G19999) is stored.

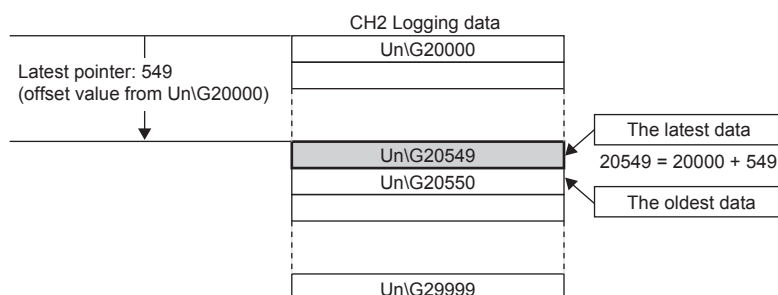
### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                    | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Latest pointer                                    | 435  | 635  | 835  | 1035 | 1235 | 1435 | 1635 | 1835 |
| CH□ Latest pointer (in FX2N allocation mode function) | 9041 | 9042 | 9043 | 9044 | 9045 | 9046 | 9047 | 9048 |

Ex.

When the value of CH2 Latest pointer (Un\G635) is 20549



### 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 on→off, 'CH1 Latest pointer' (Un\G435) is cleared to 0.

## CH1 Logging data points

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 10000, 'CH1 Number of logging data points' (Un\G436) is fixed to 10000 since the value is overwritten from the head again.

For details on the logging function, refer to the following.

📖 Page 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                            | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Number of logging data                                    | 436  | 636  | 836  | 1036 | 1236 | 1436 | 1636 | 1836 |
| CH□ Number of logging data (in FX2N allocation mode function) | 9051 | 9052 | 9053 | 9054 | 9055 | 9056 | 9057 | 9058 |

### Point

When 'CH1 Logging hold request' (Un\G471) is turned on→off, 'CH1 Number of logging data' (Un\G436) is cleared to 0.

A

## CH1 Trigger pointer

In CH1 Logging data (Un\G10000 to Un\G19999), the buffer memory address where the data at the time of a hold trigger event is stored can be checked.

The difference between the buffer memory address where the data at the time of a hold trigger event is stored and the start address in CH1 Logging data (Un\G10000 to Un\G19999) is stored.

For details on the logging function, refer to the following.

 Page 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                     | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Trigger pointer                                    | 437  | 637  | 837  | 1037 | 1237 | 1437 | 1637 | 1837 |
| CH□ Trigger pointer (In FX2N allocation mode function) | 9061 | 9062 | 9063 | 9064 | 9065 | 9066 | 9067 | 9068 |

### Point

When 'CH1 Logging hold request' (Un\G471) is turned on→off, 'CH1 Trigger pointer' (Un\G437) is cleared to 0.

## CH1 Logging cycle monitor 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' (Un\G70, b9) is turned off→on→off, the actual logging cycle is stored in Logging cycle monitor value in the corresponding channel where the logging function is enabled.

For details on the logging function, refer to the following.

 Page 369 Logging function

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

|                                                  |     |    |    |
|--------------------------------------------------|-----|----|----|
|                                                  | b15 | to | 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.

| Buffer memory name                                                      | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging cycle monitor value (s)                                     | 441  | 641  | 841  | 1041 | 1241 | 1441 | 1641 | 1841 |
| CH□ Logging cycle monitor value (ms)                                    | 442  | 642  | 842  | 1042 | 1242 | 1442 | 1642 | 1842 |
| CH□ Logging cycle monitor value (s) (In FX2N allocation mode function)  | 9071 | 9074 | 9077 | 9080 | 9083 | 9086 | 9089 | 9092 |
| CH□ Logging cycle monitor value (ms) (In FX2N allocation mode function) | 9072 | 9075 | 9078 | 9081 | 9084 | 9087 | 9090 | 9093 |

## CH1 Trigger generation time

The time when a trigger is generated is recorded.

For details on the logging function, refer to the following.

 Page 369 Logging function

|                                                                             |                                   |    |                                  |    |    |
|-----------------------------------------------------------------------------|-----------------------------------|----|----------------------------------|----|----|
|                                                                             | b15                               | to | b8 b7                            | to | 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                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that a trigger is generated at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

### ■ Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                                 | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Trigger generation time (First/Last two digits of the year)                                    | 444  | 644  | 844  | 1044 | 1244 | 1444 | 1644 | 1844 |
| CH□ Trigger generation time (Month/Day)                                                            | 445  | 645  | 845  | 1045 | 1245 | 1445 | 1645 | 1845 |
| CH□ Trigger generation time (Hour/Minute)                                                          | 446  | 646  | 846  | 1046 | 1246 | 1446 | 1646 | 1846 |
| CH□ Trigger generation time (Second/Day of the week)                                               | 447  | 647  | 847  | 1047 | 1247 | 1447 | 1647 | 1847 |
| CH□ Trigger generation time (Millisecond)                                                          | 448  | 648  | 848  | 1048 | 1248 | 1448 | 1648 | 1848 |
| CH□ Trigger generation time (First/Last two digits of the year) (In FX2N allocation mode function) | 9101 | 9106 | 9111 | 9116 | 9121 | 9126 | 9131 | 9136 |
| CH□ Trigger generation time (Month/Day) (In FX2N allocation mode function)                         | 9102 | 9107 | 9112 | 9117 | 9122 | 9127 | 9132 | 9137 |
| CH□ Trigger generation time (Hour/Minute) (In FX2N allocation mode function)                       | 9103 | 9108 | 9113 | 9118 | 9123 | 9128 | 9133 | 9138 |
| CH□ Trigger generation time (Second/Day of the week) (In FX2N allocation mode function)            | 9104 | 9109 | 9114 | 9119 | 9124 | 9129 | 9134 | 9139 |
| CH□ Trigger generation time (Millisecond) (In FX2N allocation mode function)                       | 9105 | 9110 | 9115 | 9120 | 9125 | 9130 | 9135 | 9140 |

#### Point

- Time units shorter than one millisecond are not recorded.
- When 'CH1 Logging hold request' (Un\G471) is turned on→off, 'CH1 Trigger generation time' (Un\G444 to Un\G448) is cleared to 0.

## CH1 Celsius/Fahrenheit display monitor

A status of Celsius/Fahrenheit display in operation is stored.

| Monitor value | Setting content |
|---------------|-----------------|
| 0             | Celsius         |
| 1             | Fahrenheit      |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Celsius/Fahrenheit display monitor                                    | 452  | 652  | 852  | 1052 | 1252 | 1452 | 1652 | 1852 |
| CH□ Celsius/Fahrenheit display monitor (In FX2N allocation mode function) | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 |



Celsius (0) is displayed for a conversion disabled channel regardless of the 'CH1 Celsius/Fahrenheit display setting' (UnG547).

## CH1 NowSetting user range base input type monitor

This area is used to check the input type of user range setting that is registered in offset/gain setting mode.

| Monitor value | Setting content                 |
|---------------|---------------------------------|
| 1             | Current                         |
| 2             | Voltage                         |
| 3             | Resistance temperature detector |
| 4             | Thermocouple                    |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ NowSetting user range base input type monitor | 453 | 653 | 853 | 1053 | 1253 | 1453 | 1653 | 1853 |

## CH1 NowSetting user range base input type monitor [FX2N allocation mode]

This area is used to check the input type of user range setting that is registered in offset/gain setting mode in FX2N allocation mode.

| Monitor value | Setting content |
|---------------|-----------------|
| 1             | Current         |
| 2             | Voltage         |
| 4             | Thermocouple    |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                   | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ NowSetting user range base input type monitor (In FX2N allocation mode function) | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 |

## CH1 NowSetting user range base input range monitor

This area is used to check the input range of user range setting that is registered in the offset/gain setting mode.  
When the input type is current, and voltage, 0000H is stored.

| Monitor value                            | Setting content |
|------------------------------------------|-----------------|
| ■Case of resistance temperature detector |                 |
| 0014H                                    | Pt100           |
| 0015H                                    | Ni100           |
| ■Case of thermocouple                    |                 |
| 0016H                                    | B               |
| 0017H                                    | R               |
| 0018H                                    | S               |
| 0009H                                    | K               |
| 000AH                                    | J               |
| 000BH                                    | T               |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                 | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ NowSetting user range base input range monitor | 454 | 654 | 854 | 1054 | 1254 | 1454 | 1654 | 1854 |

## CH1 NowSetting user range base input range monitor [FX2N allocation mode]

This area is used to check the input range of user range setting that is registered in offset/gain setting mode in FX2N allocation mode.

When the input type is current, and voltage, 0 is stored.

| Monitor value | Setting content |
|---------------|-----------------|
| 0009H         | K               |
| 000AH         | J               |
| 000BH         | T               |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                    | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ NowSetting user range base input range monitor (In FX2N allocation mode function) | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 |

## 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 369 Logging function

| Logging hold request | Setting value |
|----------------------|---------------|
| OFF                  | 0             |
| ON                   | 1             |

Setting a value other than the above causes a logging hold request range error (error code: 1D7□H).

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.

| Buffer memory name                                          | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging hold request                                    | 471  | 671  | 871  | 1071 | 1271 | 1471 | 1671 | 1871 |
| CH□ Logging hold request (In FX2N allocation mode function) | 9151 | 9152 | 9153 | 9154 | 9155 | 9156 | 9157 | 9158 |

## ■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 off→on 'CH1 Logging hold request' (Un\G471).
- When a value other than Disable (0) is set to 'CH1 Level trigger condition setting' (Un\G540), the logging hold processing starts after 'CH1 Logging hold request' (Un\G471) is turned off→on and the set level 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 on→off during the logging hold processing, the hold (stop) status is cleared and the logging restarts.

## ■Default value

The default value is off (0).



The stop status of the logging can be checked with 'CH1 Logging hold flag' (Un\G409).

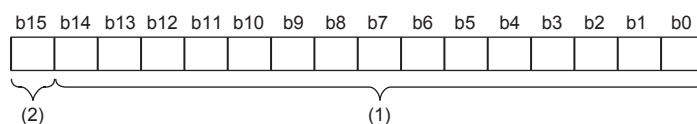
## CH1 Conversion value shift amount

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 346 Shift function



(1) Data section

(2) Sign bit 0: Positive, 1: Negative

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                   | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Conversion value shift amount                                    | 472 | 672 | 872 | 1072 | 1272 | 1472 | 1672 | 1872 |
| CH□ Conversion value shift amount (In FX2N allocation mode function) | 61  | 62  | 63  | 64   | 65   | 66   | 67   | 68   |

## ■Setting range

The possible setting range is from -32768 to +32767.

## ■Enabling the setting

The set value is added to the CH1 Digital operation value regardless of the OFF→ON→OFF status of 'Operating condition setting request' (Un\G70, b9).

## ■Default value

The default value is set to 0.

## CH1 Maximum value reset request

When resetting the maximum value, and updating with the current value, turn off→on.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name              | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Maximum value reset request | 473 | 673 | 873 | 1073 | 1273 | 1473 | 1673 | 1873 |

## ■Enabling the setting

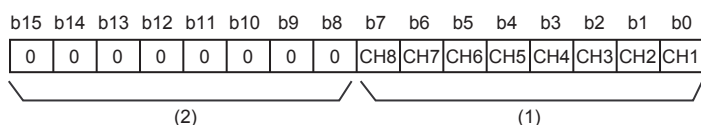
When 'CH1 Maximum value reset request' (Un\G473) turns off→on, 'CH1 Maximum value' (Un\G404) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

## ■Default value

The default value is off (0).

## Maximum value reset request [FX2N allocation mode]

When resetting the maximum value, and updating with the current value in FX2N allocation mode, turn off→on.



(1) 0: No reset request, 1: Reset request

(2) The values of b8 to b15 are fixed to 0.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|----------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Maximum value reset request (In FX2N allocation mode function) | 119 |     |     |     |     |     |     |     |

## ■Enabling the setting

When 'Maximum value reset request' (Un\G119) turns off→on, 'CH1 Maximum value' (Un\G111) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

## ■Default value

The default value is off (0).

## CH1 Minimum value reset request

When resetting the minimum value, and updating with the current value, turn off→on.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name              | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Minimum value reset request | 474 | 674 | 874 | 1074 | 1274 | 1474 | 1674 | 1874 |

## ■Enabling the setting

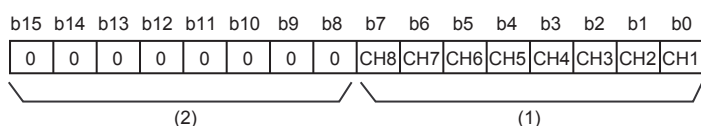
When 'CH1 Minimum value reset request' (Un\G474) turns off→on, 'CH1 Minimum value' (Un\G406) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

## ■Default value

The default value is off (0).

## Minimum value reset request [In FX2N allocation mode]

When resetting the minimum value, and updating with the current value in FX2N allocation mode, turn off→on.



(1) 0: No reset request, 1: Reset request

(2) The values of b8 to b15 are fixed to 0.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                             | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|----------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| Minimum value reset request [In FX2N allocation mode function] | 109 |     |     |     |     |     |     |     |

## ■Enabling the setting

When 'Minimum value reset request' (Un\G109) turns off→on, 'CH1 Minimum value' (Un\G101) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

### ■Default value

The default value is off (0).

## CH1 Average processing specification

Set which processing is to be used, sampling processing or averaging 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      |

Setting a value other than the above causes an averaging process specification setting range error (error code: 191□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                     | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Averaging process specification                                    | 501  | 701  | 901  | 1101 | 1301 | 1501 | 1701 | 1901 |
| CH□ Averaging process specification (In FX2N allocation mode function) | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Sampling processing (0).

## CH1 Time Average/Count Average/Moving Average

Configure the time (for averaging), count (for averaging), and moving average count for each channel where the averaging processing is specified.

The following table lists the setting ranges.

| Setting content | Setting value                                                                                                                                               |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time average    | When the input type is current, and voltage: 4 to 10000 (ms)<br>When the input type is resistance temperature detector, and thermocouple: 160 to 10000 (ms) |
| Count average   | 4 to 10000 (times)                                                                                                                                          |
| Moving average  | 2 to 1000 (times)                                                                                                                                           |

### Point

Setting a value other than the above causes any of time average setting range error (error code: 192□H), count average setting range error (error code: 193□H), moving count setting range error (error code: 194□H), and the conversion processing is executed with the setting before error.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                       | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Time Average/Count Average/Moving Average setting                                    | 502 | 702 | 902 | 1102 | 1302 | 1502 | 1702 | 1902 |
| CH□ Time average/Count average/Moving average setting (In FX2N allocation mode function) | 2   | 3   | 4   | 5    | 6    | 7    | 8    | 9    |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.



## ■Default value

The default value is set to 0.

### Point

- 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 process specification' (Un\G501).

## CH1 Scaling enable/disable setting

Set whether to enable or disable the scaling.

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes a scaling enable/disable setting range error (error code: 1A0□H).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                    | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Scaling enable/disable setting                                    | 504  | 704  | 904  | 1104 | 1304 | 1504 | 1704 | 1904 |
| CH□ Scaling enable/disable setting (In FX2N allocation mode function) | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is Disable (1).

## CH1 Scaling upper limit value

Set an upper limit value for the range of the scale conversion.

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                               | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Scaling upper limit value                                    | 506  | 706  | 906  | 1106 | 1306 | 1506 | 1706 | 1906 |
| CH□ Scaling upper limit value (In FX2N allocation mode function) | 1101 | 1103 | 1105 | 1107 | 1109 | 1111 | 1113 | 1115 |

## ■Setting range

The possible setting range is from -32000 to +32000.

Setting a value out of the range causes a scaling setting range error (error code: 1A1□H).

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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is set to 0.

## CH1 Scaling lower limit value

Set a lower limit value for the range of the scale conversion.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                               | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Scaling lower limit value                                    | 508  | 708  | 908  | 1108 | 1308 | 1508 | 1708 | 1908 |
| CH□ Scaling lower limit value (In FX2N allocation mode function) | 1121 | 1123 | 1125 | 1127 | 1129 | 1131 | 1133 | 1135 |

### ■Setting range

The possible setting range is from -32000 to +32000.

Setting a value out of the range causes a scaling setting range error (error code: 1A1□H).

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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

## 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 349 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.

| Buffer memory name                                                             | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Digital clipping enable/disable setting                                    | 510  | 710  | 910  | 1110 | 1310 | 1510 | 1710 | 1910 |
| CH□ Digital clipping enable/disable setting (In FX2N allocation mode function) | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1).

## CH1 Warning output function (Process alarm)

Set whether to enable or disable the alert output of the process alarm.

For details on the alert output function, refer to the following.

 Page 352 Alert output function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes an alert output setting (Process alarm) range error (error code: 1B0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Alert output setting (Process alarm)                                    | 512  | 712  | 912  | 1112 | 1312 | 1512 | 1712 | 1912 |
| CH□ Alert output setting (Process alarm) (In FX2N allocation mode function) | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1).

## CH1 Warning output setting (Rate alarm)

Set whether to enable or disable the alert output of the rate alarm.

For details on the alert output function, refer to the following.

 Page 352 Alert output function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes an alert output setting (Rate alarm) range error (error code: 1B8□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                       | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Alert output setting (Rate alarm)                                    | 513  | 713  | 913  | 1113 | 1313 | 1513 | 1713 | 1913 |
| CH□ Alert output setting (Rate alarm) (in FX2N allocation mode function) | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1).

## CH1 Process alarm upper upper limit value

Set an upper upper limit value of the alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 352 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                           | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Process alarm upper upper limit value                                    | 514 | 714 | 914 | 1114 | 1314 | 1514 | 1714 | 1914 |
| CH□ Process alarm upper upper limit value (in FX2N allocation mode function) | 81  | 82  | 83  | 84   | 85   | 86   | 87   | 88   |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

## CH1 Process alarm upper lower limit value

Set an upper lower limit value of the alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 352 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                           | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Process alarm upper lower limit value                                    | 516  | 716  | 916  | 1116 | 1316 | 1516 | 1716 | 1916 |
| CH□ Process alarm upper lower limit value (in FX2N allocation mode function) | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

## CH1 Process alarm lower upper limit value

Set a lower upper limit value of the alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 352 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                           | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Process alarm lower upper limit value                                    | 518  | 718  | 918  | 1118 | 1318 | 1518 | 1718 | 1918 |
| CH□ Process alarm lower upper limit value (in FX2N allocation mode function) | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

## CH1 Process alarm lower lower limit value

Set a lower lower limit value of the alert output function (Process alarm).

For details on the alert output function, refer to the following.

 Page 352 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                           | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Process alarm lower lower limit value                                    | 520 | 720 | 920 | 1120 | 1320 | 1520 | 1720 | 1920 |
| CH□ Process alarm lower lower limit value (In FX2N allocation mode function) | 71  | 72  | 73  | 74   | 75   | 76   | 77   | 78   |

### ■Setting range

The possible setting range is from -32768 to +32767.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

#### 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 limit value.
- A channel where the set values do not satisfy the condition "Upper upper limit value  $\geq$  Upper lower limit value  $\geq$  Lower upper limit value  $\geq$  Lower lower limit value" causes a process alarm upper lower limit value setting range error (error code: 1B△□H).
- When setting the input type to "Current" and "Voltage", and when the digital clipping function, scaling function, and shift function are used, the digital operation value to which digital clipping, scale conversion, and shift-and-add are performed is the detection target for outputting an alert.
- When setting the input type to "resistance temperature detector" or "thermocouple", and the scaling function and shift function are used, the digital operation value to which scale conversion, and shift-and-add are performed is the target of outputting an alert (process alarm).

## CH1 Rate alarm alert detection cycle setting

Set the cycle to detect the change amount of digital output values.

The value of the cycle to detect a rate alarm alert is the product of the value in 'CH1 Rate alarm alert detection cycle setting' (Un\G522) and the conversion cycle.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                              | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Rate alarm alert detection cycle setting                                    | 522  | 722  | 922  | 1122 | 1322 | 1522 | 1722 | 1922 |
| CH□ Rate alarm alert detection cycle setting (In FX2N allocation mode function) | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 |

### ■Setting range

The possible setting range is from 1 to 32000 (times).

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.



- A channel where the set value is out of the range causes a rate alarm detection cycle setting range error (error code: 1B9□H).
- Since the default value is 0, change the setting value when setting the rate alarm function.

## CH1 Rate alarm upper limit value

Set an upper limit value of the change rate of digital operation values to detect a rate alarm.

For details on the alert output function, refer to the following.

Page 352 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Rate alarm upper limit value                                    | 524 | 724 | 924 | 1124 | 1324 | 1524 | 1724 | 1924 |
| CH□ Rate alarm upper limit value (In FX2N allocation mode function) | 91  | 92  | 93  | 94   | 95   | 96   | 97   | 98   |

### ■Setting range

The possible setting range is from -32768 to +32767.

Unit of the setting value differs depending on the setting of 'Rate alarm change rate selection' (Un\G299).

| Rate alarm change rate selection (Un\G299) | Unit  |
|--------------------------------------------|-------|
| Rate specification (0)                     | 0.1%  |
| Digital output value specification (1)     | digit |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

## CH1 Rate alarm lower limit value

Set a lower limit value of the change rate of digital operation values to detect a rate alarm.

For details on the alert output function, refer to the following.

 Page 352 Alert output function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                  | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Rate alarm lower limit value                                    | 526  | 726  | 926  | 1126 | 1326 | 1526 | 1726 | 1926 |
| CH□ Rate alarm lower limit value (In FX2N allocation mode function) | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 |

### ■Setting range

The possible setting range is from -32768 to +32767.

Unit of the setting value differs depending on the setting of 'Rate alarm change rate selection' (Un\G299).

| Rate alarm change rate selection (Un\G299) | Unit  |
|--------------------------------------------|-------|
| Rate specification (0)                     | 0.1%  |
| Digital output value specification (1)     | digit |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.



- When using the rate alarm, configure the 2-step settings for the rate alarm upper limit value and lower limit value.
- A channel where the set values satisfy the condition "Rate alarm lower limit value  $\geq$  Rate alarm upper limit value" causes a rate alarm upper/lower limit setting value inversion error (error code: 1BA□H).
- Since the default value is 0, change the setting value.

A

## 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 359 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.

When the 'CH1 Input type/range setting' (Un\G598) is set to resistance temperature detector or thermocouple, the setting of 'CH1 Input signal error detection setting' (Un\G528) is ignored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                          | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Input signal error detection setting                                    | 528  | 728  | 928  | 1128 | 1328 | 1528 | 1728 | 1928 |
| CH□ Input signal error detection setting (In FX2N allocation mode function) | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 |

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is Disable (0).

## CH1 Input signal error detection lower limit setting 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 359 Input signal error detection function

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                            | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Input signal error detection lower limit setting value                                    | 529  | 729  | 929  | 1129 | 1329 | 1529 | 1729 | 1929 |
| CH□ Input signal error detection lower limit setting value (In FX2N allocation mode function) | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 | 1168 |

## ■Setting range

The possible setting range is from 0 to 250 (0 to 25.0%). (Set it in a unit of 0.1%)

If a value other than the above is set, an input signal error detection setting range error (error code: 1C1□H) occurs.

When the 'CH1 Input type/range setting' (Un\G598) is set to resistance temperature detector or thermocouple, the setting of 'CH1 Input signal error detection lower limit setting value' (Un\G529) is ignored.

The input signal error detection lower limit value is calculated by using 'Input signal error detection lower limit setting value' (Un\G529) 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 - (Gain value of each range - Offset value of each range) × (Input signal error detection lower limit setting value/1000)

### Ex.

When 'CH1 Input signal error detection lower limit setting value' (Un\G529) is set to 100 (10%)

Range used: 4 to 20 mA

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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is set to 50.



## CH1 Input signal error detection upper limit setting 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 359 Input signal error detection function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                            | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Input signal error detection upper limit setting value                                    | 530  | 730  | 930  | 1130 | 1330 | 1530 | 1730 | 1930 |
| CH□ Input signal error detection upper limit setting value (In FX2N allocation mode function) | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 |

### ■Setting range

The possible setting range is from 0 to 250 (0 to 25.0%). (Set it in a unit of 0.1%)

If a value other than the above is set, an input signal error detection setting range error (error code: 1C1□H) occurs.

When the 'CH1 Input type/range setting' (Un\G598) is set to resistance temperature detector or thermocouple, the setting of 'CH1 Input signal error detection lower limit setting value' (Un\G529) is ignored.

The input signal error detection upper limit value is calculated by using 'Input signal error detection upper limit setting value' (Un\G530) 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 setting value/1000)

#### Ex.

When 'CH1 Input signal error detection upper limit setting value' (Un\G530) is set to 100 (10%)

Range used: 4 to 20 mA

The input signal error detection upper limit value is calculated as follows:

$$\text{Input signal error detection upper limit value} = 20 + (20 - 4) \times \frac{100}{1000} = 21.6 \text{ mA}$$

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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 50.

## CH1 Disconnection detection enable/disable setting

Set whether to enable or disable the disconnection detection function.

For details on the disconnection detection function, refer to the following.

☞ Page 366 Disconnection detection function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes a disconnection detection enable/disable setting range error (error code: 1C5□H).

When the 'CH1 Input type/range setting' (Un\G598) is set to current or voltage, the setting of 'CH1 Disconnection detection enable/disable setting' (Un\G531) is ignored.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                    | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Disconnection detection enable/disable setting                                    | 531  | 731  | 931  | 1131 | 1331 | 1531 | 1731 | 1931 |
| CH□ Disconnection detection enable/disable setting (In Fx2N allocation mode function) | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Enable (0).

## CH1 Conversion setting value at disconnection detection

When 'CH1 Conversion setting at disconnection detection' (Un\G534) is set to "Any value", the value set in this area is stored in 'CH1 Digital output value' (Un\G400) at the time of disconnection detection.

For details on the disconnection detection function, refer to the following.

☞ Page 366 Disconnection detection function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                         | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Conversion setting value at disconnection detection                                    | 532  | 732  | 932  | 1132 | 1332 | 1532 | 1732 | 1932 |
| CH□ Conversion setting value at disconnection detection (In FX2N allocation mode function) | 1251 | 1253 | 1255 | 1257 | 1259 | 1261 | 1263 | 1265 |

### ■Setting range

The possible setting range is from -32768 to +32767 (-3276.8 to +3276.7°C). (can be set in a unit of 0.1°C)

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 0.

## CH1 Conversion setting at disconnection detection

Set what value is to be stored in 'CH1 Digital output value' (Un\G400) at the time of disconnection detection.

For details on the disconnection detection function, refer to the following.

 Page 366 Disconnection detection function

| Setting value | Setting content                 |
|---------------|---------------------------------|
| 0             | Upscale                         |
| 1             | Downscale                       |
| 2             | Any value                       |
| 3             | Value just before disconnection |

Setting a value other than the above results in operation with Downscale (1).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                   | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Conversion setting at disconnection detection                                    | 534  | 734  | 934  | 1134 | 1334 | 1534 | 1734 | 1934 |
| CH□ Conversion setting at disconnection detection (In FX2N allocation mode function) | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Downscale (1).

## 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 369 Logging function

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Enable          |
| 1             | Disable         |

Setting a value other than the above causes a logging enable/disable setting range error (error code: 1D0□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                    | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging enable/disable setting                                    | 535  | 735  | 935  | 1135 | 1335 | 1535 | 1735 | 1935 |
| CH□ Logging enable/disable setting (In FX2N allocation mode function) | 9161 | 9162 | 9163 | 9164 | 9165 | 9166 | 9167 | 9168 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (1).

## 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 369 Logging function

| Setting value | Setting content         |
|---------------|-------------------------|
| 0             | Digital output value    |
| 1             | Digital operation value |

Setting a value other than the above causes a logging data setting range error (error code: 1D3□H).

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.

| Buffer memory name                                          | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging data setting                                    | 536  | 736  | 936  | 1136 | 1336 | 1536 | 1736 | 1936 |
| CH□ Logging data setting (in FX2N allocation mode function) | 9171 | 9172 | 9173 | 9174 | 9175 | 9176 | 9177 | 9178 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Digital operation value (1).

## CH1 Logging cycle setting value

Set a cycle for storing the logging data.

For details on the logging function, refer to the following.

 Page 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging cycle setting value                                    | 537  | 737  | 937  | 1137 | 1337 | 1537 | 1737 | 1937 |
| CH□ Logging cycle setting value (In FX2N allocation mode function) | 9181 | 9182 | 9183 | 9184 | 9185 | 9186 | 9187 | 9188 |

### ■Setting range

The setting range varies depending on the setting in 'CH1 Logging cycle unit setting' (Un\G538) and 'CH1 Input type/range setting' (Un\G598).

| CH1 Logging cycle unit setting (Un\G538) | CH1 Input type/range setting (Un\G598)       | Setting range |
|------------------------------------------|----------------------------------------------|---------------|
| ms (1)                                   | Current/Voltage                              | 1 to 32767    |
|                                          | Resistance temperature detector/thermocouple | 40 to 32767   |
| s (2)                                    |                                              | 1 to 3600     |

- Setting a value out of the above range causes a logging cycle setting value range error (error code: 1D1□H). 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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 1.

## 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 369 Logging function

| Setting value | Setting content |
|---------------|-----------------|
| 1             | ms              |
| 2             | s               |

- Setting a value other than the above causes a logging cycle setting value range error (error code: 1D1□H). 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.

| Buffer memory name                                                | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Logging cycle unit setting                                    | 538  | 738  | 938  | 1138 | 1338 | 1538 | 1738 | 1938 |
| CH□ Logging cycle unit setting (In FX2N allocation mode function) | 9191 | 9192 | 9193 | 9194 | 9195 | 9196 | 9197 | 9198 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is ms (1).

## CH1 Logging points after trigger

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 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                 | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Post-trigger logging points                                    | 539  | 739  | 939  | 1139 | 1339 | 1539 | 1739 | 1939 |
| CH□ Post-trigger logging points (In FX2N allocation mode function) | 9201 | 9202 | 9203 | 9204 | 9205 | 9206 | 9207 | 9208 |

### ■Setting range

The possible setting range is from 1 to 10000.

Setting a value other than the above causes a post-trigger logging points setting range error (error code: 1D4□H). 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 off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is set to 5000.

## 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, perform level trigger condition setting to one 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 369 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) |

Setting a value other than the above causes a level trigger condition setting range error (error code: 1D5□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                     | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Level trigger condition setting                                    | 540  | 740  | 940  | 1140 | 1340 | 1540 | 1740 | 1940 |
| CH□ Level trigger condition setting (In FX2N allocation mode function) | 9211 | 9212 | 9213 | 9214 | 9215 | 9216 | 9217 | 9218 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (0).

## 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 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Trigger data                                    | 541  | 741  | 941  | 1141 | 1341 | 1541 | 1741 | 1941 |
| CH□ Trigger data (In FX2N allocation mode function) | 9221 | 9222 | 9223 | 9224 | 9225 | 9226 | 9227 | 9228 |

### ■Setting range

The possible setting range is from 0 to 9999.

Setting a value other than the above causes a trigger data setting range error (error code: 1D6□H). Logging cannot be performed.

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default values are set as shown below.

| Channel | In the normal mode      |                                        | In FX2N allocation function mode |                                      |
|---------|-------------------------|----------------------------------------|----------------------------------|--------------------------------------|
|         | Default value (Decimal) | Buffer memory area to be monitored     | Default value (Decimal)          | Buffer memory area to be monitored   |
| CH1     | 402                     | CH1 Digital operation value (Un\G402)  | 10                               | CH1 Digital operation value (Un\G10) |
| CH2     | 602                     | CH2 Digital operation value (Un\G602)  | 11                               | CH2 Digital operation value (Un\G11) |
| CH3     | 802                     | CH3 Digital operation value (Un\G802)  | 12                               | CH3 Digital operation value (Un\G12) |
| CH4     | 1002                    | CH4 Digital operation value (Un\G1002) | 13                               | CH4 Digital operation value (Un\G13) |
| CH5     | 1202                    | CH5 Digital operation value (Un\G1202) | 14                               | CH5 Digital operation value (Un\G14) |
| CH6     | 1402                    | CH6 Digital operation value (Un\G1402) | 15                               | CH6 Digital operation value (Un\G15) |
| CH7     | 1602                    | CH7 Digital operation value (Un\G1602) | 16                               | CH7 Digital operation value (Un\G16) |
| CH8     | 1802                    | CH8 Digital operation value (Un\G1802) | 17                               | CH8 Digital operation value (Un\G17) |

## CH1 Trigger setting value

Set a level to generate a level trigger.

For details on the logging function, refer to the following.

📖 Page 369 Logging function

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                           | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|--------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Trigger setting value                                    | 542  | 742  | 942  | 1142 | 1342 | 1542 | 1742 | 1942 |
| CH□ Trigger setting value (In FX2N allocation mode function) | 9231 | 9232 | 9233 | 9234 | 9235 | 9236 | 9237 | 9238 |

## ■Setting range

The possible setting range is from -32768 to +32767.

## ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

## ■Default value

The default value is set to 0.

## CH1 Celsius/Fahrenheit display setting

Set the display method of 'Digital output value' (Un\G598) when 'CH1 Input type/range setting' (Un\G598) is resistance temperature detector or thermocouple.

| Setting value | Setting content |
|---------------|-----------------|
| 0             | Celsius         |
| 1             | Fahrenheit      |

Setting a value other than the above causes a Celsius/Fahrenheit display setting range error (error code: 198□H).

## ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                        | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Celsius/Fahrenheit display setting                                    | 547  | 747  | 947  | 1147 | 1347 | 1547 | 1747 | 1947 |
| CH□ Celsius/Fahrenheit display setting (In FX2N allocation mode function) | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 |

## ■Default value

The default value is Celsius (0).

## CH1 Offset setting value

As Channel change request (Un\G70, b11) is turned off→on→off in offset/gain setting mode, the measured temperature value is corrected by a value written in this area.

Specify the value of a 16-bit signed binary number.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                          | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Offset setting value                                    | 562  | 762  | 962  | 1162 | 1362 | 1562 | 1762 | 1962 |
| CH□ Offset setting value (In FX2N allocation mode function) | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 |

### ■Setting range

| Input type                      | Input range    | Celsius/Fahrenheit display setting | Setting range   |
|---------------------------------|----------------|------------------------------------|-----------------|
| Resistance temperature detector | Pt100          | Celsius                            | -2000 to +8500  |
|                                 |                | Fahrenheit                         | -3280 to +15620 |
|                                 | Ni100          | Celsius                            | -600 to +2500   |
|                                 |                | Fahrenheit                         | -760 to +4820   |
| Thermocouple*1                  | Thermocouple K | Celsius                            | -2700 to +13700 |
|                                 |                | Fahrenheit                         | -4540 to +24980 |
|                                 | Thermocouple J | Celsius                            | -2100 to +11300 |
|                                 |                | Fahrenheit                         | -3460 to +20660 |
|                                 | Thermocouple T | Celsius                            | -2700 to +4000  |
|                                 |                | Fahrenheit                         | -4540 to +7520  |
|                                 | Thermocouple B | Celsius                            | 0 to 17100      |
|                                 |                | Fahrenheit                         | 320 to 31100    |
|                                 | Thermocouple R | Celsius                            | -500 to +17100  |
|                                 |                | Fahrenheit                         | -580 to +31100  |
|                                 | Thermocouple S | Celsius                            | -500 to +17100  |
|                                 |                | Fahrenheit                         | -580 to +31100  |

\*1 In the case of FX2N allocation mode, only thermocouple K, J and T are setting enabled.

Setting a value out of the range causes an offset/gain temperature setting value range error (error code: 1E□□H).

'CH1 Offset setting value' (Un\G562) and 'CH1 Gain setting value' (Un\G564) must be set to be within the following temperature input range:

- Offset setting value < Gain setting value

A channel where the set value is out of the above range causes an offset/gain temperature setting value setting error (error code: 1E9□H).

### ■Default value

The default value is set to 0.



- An effective way to achieve high accuracy is to set up error correction in 'CH1 Offset setting value' (Un\G562) and 'CH1 Gain setting value' (Un\G564) assuming the minimum and maximum temperatures of the used range.
- Configure 'CH1 Offset setting value' (Un\G562) and 'CH1 Gain setting value' (Un\G564) while reading out digital output values.



## CH1 Gain setting value

As Channel change request (Un\G70, b11) is turned off→on→off in offset/gain setting mode, the measured temperature value is corrected by a value written in this area.

Specify the value of a 16-bit signed binary number.

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                        | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|-----------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Gain setting value                                    | 564  | 764  | 964  | 1164 | 1364 | 1564 | 1764 | 1964 |
| CH□ Gain setting value (In FX2N allocation mode function) | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 |

### ■Setting range

| Input type                      | Input range    | Celsius/Fahrenheit display setting | Setting range   |
|---------------------------------|----------------|------------------------------------|-----------------|
| Resistance temperature detector | Pt100          | Celsius                            | -2000 to +8500  |
|                                 |                | Fahrenheit                         | -3280 to +15620 |
|                                 | Ni100          | Celsius                            | -600 to +2500   |
|                                 |                | Fahrenheit                         | -760 to +4820   |
| Thermocouple*1                  | Thermocouple K | Celsius                            | -2700 to +13700 |
|                                 |                | Fahrenheit                         | -4540 to +24980 |
|                                 | Thermocouple J | Celsius                            | -2100 to +11300 |
|                                 |                | Fahrenheit                         | -3460 to +20660 |
|                                 | Thermocouple T | Celsius                            | -2700 to +4000  |
|                                 |                | Fahrenheit                         | -4540 to +7520  |
|                                 | Thermocouple B | Celsius                            | 0 to 17100      |
|                                 |                | Fahrenheit                         | 320 to 31100    |
|                                 | Thermocouple R | Celsius                            | -500 to +17100  |
|                                 |                | Fahrenheit                         | -580 to +31100  |
|                                 | Thermocouple S | Celsius                            | -500 to +17100  |
|                                 |                | Fahrenheit                         | -580 to +31100  |

\*1 In the case of FX2N allocation mode, only thermocouple K, J and T are setting enabled.

Setting a value out of the range causes an offset/gain temperature setting value range error (error code: 1EC□H).

'CH1 Offset setting value' (Un\G562) and 'CH1 Gain setting value' (Un\G564) must be set to be within the following temperature input range:

- Offset setting value < Gain setting value

A channel where the set value is out of the above range causes an offset/gain temperature setting value setting error (error code: 1E9□H).

### ■Default value

The default value is set to 0.

A



- An effective way to achieve high accuracy is to set up error correction in 'CH1 Offset setting value' (Un\G562) and 'CH1 Gain setting value' (Un\G564) assuming the minimum and maximum temperatures of the used range.
- Configure 'CH1 Offset setting value' (Un\G562) and 'CH1 Gain setting value' (Un\G564) while reading out digital output values.

## CH1 Input type/range setting

This area is for setting an input type and range setting.

| Setting value (Hexadecimal) | Input type                      | Input range    |
|-----------------------------|---------------------------------|----------------|
| 000FH                       | Conversion disable              | —              |
| 0003H                       | Current                         | 4 to 20 mA     |
| 0010H                       |                                 | 0 to 20 mA     |
| 0006H                       |                                 | -20 to +20 mA  |
| 0011H                       | Voltage                         | 1 to 5 V       |
| 0012H                       |                                 | 0 to 5 V       |
| 0000H                       |                                 | -10 to +10 V   |
| 0013H                       |                                 | 0 to 10 V      |
| 0014H                       | Resistance temperature detector | Pt100          |
| 0015H                       |                                 | Ni100          |
| 0016H                       | Thermocouple                    | Thermocouple B |
| 0017H                       |                                 | Thermocouple R |
| 0018H                       |                                 | Thermocouple S |
| 0009H                       |                                 | Thermocouple K |
| 000AH                       |                                 | Thermocouple J |
| 000BH                       |                                 | Thermocouple T |

A channel where the set value is other than the above causes an input type/range setting range error (error code: 190□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name           | CH1 | CH2 | CH3 | CH4  | CH5  | CH6  | CH7  | CH8  |
|------------------------------|-----|-----|-----|------|------|------|------|------|
| CH□ Setting Input type/range | 598 | 798 | 998 | 1198 | 1398 | 1598 | 1798 | 1998 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is conversion disabled (000FH).

## CH1 Input type/range setting [FX2N allocation mode]

When the FX2N allocation mode function is used, this area is for setting an input type and range setting.

|                                           |     |    |     |     |     |    |    |    |     |    |    |    |
|-------------------------------------------|-----|----|-----|-----|-----|----|----|----|-----|----|----|----|
|                                           | b15 | to | b12 | b11 | to  | b8 | b7 | to | b4  | b3 | to | b0 |
| CH1 to 4 input type/range setting (Un\G0) | CH4 |    |     |     | CH3 |    |    |    | CH2 |    |    |    |
|                                           |     |    |     |     |     |    |    |    |     |    |    |    |
|                                           |     |    |     |     |     |    |    |    |     |    |    |    |

|                                           |     |    |     |     |     |    |    |    |     |    |    |    |
|-------------------------------------------|-----|----|-----|-----|-----|----|----|----|-----|----|----|----|
|                                           | b15 | to | b12 | b11 | to  | b8 | b7 | to | b4  | b3 | to | b0 |
| CH5 to 8 input type/range setting (Un\G1) | CH8 |    |     |     | CH7 |    |    |    | CH6 |    |    |    |
|                                           |     |    |     |     |     |    |    |    |     |    |    |    |
|                                           |     |    |     |     |     |    |    |    |     |    |    |    |

| Setting value (Hexadecimal) | Input type         | Input range    |
|-----------------------------|--------------------|----------------|
| 0FH                         | Conversion disable | —              |
| 00H                         | Voltage            | -10 to +10 V   |
| 01H                         |                    |                |
| 02H                         |                    |                |
| 03H                         |                    |                |
| 04H                         | Current            | 4 to 20 mA     |
| 05H                         |                    |                |
| 06H                         |                    |                |
| 07H                         |                    |                |
| 08H                         |                    | -20 to +20 mA  |
| 09H                         |                    |                |
| 0AH                         |                    |                |
| 0BH                         |                    |                |
| 0CH                         | Thermocouple       | Thermocouple K |
| 0DH                         |                    | Thermocouple J |
| 0EH                         |                    | Thermocouple T |
|                             |                    | Thermocouple K |
|                             |                    | Thermocouple J |
|                             |                    | Thermocouple T |

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                              | CH1 | CH2 | CH3 | CH4 | CH5 | CH6 | CH7 | CH8 |
|-----------------------------------------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| CH□ Input type/range setting (In FX2N allocation mode function) | 0   |     |     |     | 1   |     |     |     |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is conversion disabled (0FH).

## CH1 Input type/range setting (Offset/gain setting)

The area is to set the range setting (Offset/gain setting).

| Setting value | Description             |
|---------------|-------------------------|
| 0             | Factory default setting |
| 1             | User range setting      |

Setting a value other than the above causes an input type/range setting range error (error code: 190□H).

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                    | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|---------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Setting Input type/range (Offset/gain setting)                                    | 599  | 799  | 999  | 1199 | 1399 | 1599 | 1799 | 1999 |
| CH□ Setting Input type/range (Offset/gain setting) (In FX2N allocation mode function) | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Factory default setting (0).

## Error history

Up to 16 errors that occurred in the multi input module are recorded.

|          |                                   |    |                                  |    |    |
|----------|-----------------------------------|----|----------------------------------|----|----|
|          | b15                               | to | b8 b7                            | to | 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 | System area                       |    |                                  |    |    |
| :        |                                   |    |                                  |    |    |
| Un\G3609 |                                   |    |                                  |    |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

### ■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 FX2N allocation mode function) | 8600 to 8759  |

# Alarm history

Up to 16 alarms that occurred in the module are recorded.

|          | b15                               | to | b8 b7 | to                               | 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 | System area                       |    |       |                                  |    |
| :        |                                   |    |       |                                  |    |
| Un\G3769 |                                   |    |       |                                  |    |

| Item                                                     | Storage contents                                                                                                                          | Storage example <sup>*1</sup> |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| First two digits of the year/Last two digits of the year | Stored in BCD code.                                                                                                                       | 2017H                         |
| Month/Day                                                |                                                                                                                                           | 0130H                         |
| Hour/Minute                                              |                                                                                                                                           | 1035H                         |
| Second                                                   |                                                                                                                                           | 40H                           |
| Day of the week                                          | One of the following values is stored in BCD code.<br>Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6 | 1H                            |
| Millisecond (upper)                                      | Stored in BCD code.                                                                                                                       | 06H                           |
| Millisecond (lower)                                      |                                                                                                                                           | 28H                           |

\*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

## ■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 FX2N allocation mode function) | 8760 to 8919  |

A

## 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 value | 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). Setting a value other than 0 and 1 causes an offset/gain setting channel range error (error code: 1E8□H).

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.

- When both the offset specification and gain specification of the same channel are set to Setting channel (1)
- When both the offset specification and gain specification of the same channel are set to Disable (0)

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                                                     | CH1  | CH2  | CH3  | CH4  | CH5  | CH6  | CH7  | CH8  |
|----------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| CH□ Offset/gain setting mode (offset specification)                                    | 4132 | 4134 | 4136 | 4138 | 4140 | 4142 | 4144 | 4146 |
| CH□ Offset/gain setting mode (gain specification)                                      | 4133 | 4135 | 4137 | 4139 | 4141 | 4143 | 4145 | 4147 |
| CH□ Offset/gain setting mode (offset specification) (in FX2N allocation mode function) | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 |
| CH□ Offset/gain setting mode (gain specification) (in FX2N allocation mode function)   | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 |

### ■Enabling the setting

Turn off→on→off 'Operating condition setting request' (Un\G70, b9) to enable the setting.

### ■Default value

The default value is Disable (0).

## CH1 Logging data

This area stores the data logged by the logging function.

Up to 10000 points of data can be stored per channel. After the number of stored data points reaches 10000, data collection continues with the data overwritten from the head.

For details on the logging function, refer to the following.

📖 Page 369 Logging function

### ■Buffer memory address

The following shows the buffer memory address of this area.

| Buffer memory name                                  | CH1            | CH2            | CH3            | CH4            | CH5            | CH6            | CH7            | CH8            |
|-----------------------------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| CH□ Logging data                                    | 10000 to 19999 | 20000 to 29999 | 30000 to 39999 | 40000 to 49999 | 50000 to 59999 | 60000 to 69999 | 70000 to 79999 | 80000 to 89999 |
| CH□ Logging data (in FX2N allocation mode function) | 10000 to 19999 | 20000 to 29999 | 30000 to 39999 | 40000 to 49999 | 50000 to 59999 | 60000 to 69999 | 70000 to 79999 | 80000 to 89999 |

### Point

- Turning off→on 'Operating condition setting request' (Un\G70, b9) allows the logging data in all the channels to be cleared.
- Turning on→off Logging hold request while Logging hold flag is on allows logging to resume. In this case, the logged data is not cleared.

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# REVISIONS

| Revision date | Revision | Description                                                                                                                                                                                                            |
|---------------|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| April 2017    | A        | First Edition                                                                                                                                                                                                          |
| November 2017 | B        | ■Added models<br>FX5-4AD, FX5-4DA<br>■Chapter configuration changed<br>Part 1: Analog input module, Part 2: Analog output module, Part 3: Multiple input module<br>■Added or modified parts<br>RELEVANT MANUALS, TERMS |

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Manual number: SH(NA)-081802ENG-B

Model: FX5-U-ANALOG-I-E

Model code: 09R571

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