

Programmable Controller

MELSEC iQ-F
series

MELSEC iQ-F

FX5 User's Manual

(Analog Control - Intelligent function module)

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].

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

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  Page 108 Buffer Memory Areas.

[DESIGN PRECAUTIONS]

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]

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, Cl₂, H₂S, SO₂ or NO₂), 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]

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]

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]

CAUTION

- Perform class D grounding (grounding resistance: 100 Ω or less) of the grounding terminal on the CPU module and extension modules with a wire 2 mm² or thicker.
Do not use common grounding with heavy electrical systems ( Page 80 Grounding).
 - 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.
-

[STARTUP AND MAINTENANCE PRECAUTIONS]

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.
-

[STARTUP AND MAINTENANCE PRECAUTIONS]

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
-

[OPERATION PRECAUTIONS]

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.
-

[DISPOSAL PRECAUTIONS]

CAUTION

- Please contact a certified electronic waste disposal company for the environmentally safe recycling and disposal of your device.
-

[TRANSPORTATION PRECAUTIONS]

CAUTION

- 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.
-

INTRODUCTION

This manual contains text, diagrams and explanations which will guide the reader in the correct installation, safe use and operation of the 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

CONTENTS

SAFETY PRECAUTIONS	1
INTRODUCTION	6
RELEVANT MANUALS	10
TERMS	11
CHAPTER 1 OVERVIEW	13
CHAPTER 2 SPECIFICATIONS	14
2.1 General Specifications	14
2.2 Power Supply Specifications	14
2.3 Performance Specifications	14
Voltage/current input specifications	15
Thermocouple input specifications	15
Resistance temperature detector (RTD) input specifications	16
2.4 I/O Conversion Characteristics	17
2.5 Accuracy	20
2.6 Part Names	22
LED display	22
CHAPTER 3 PROCEDURES BEFORE OPERATION	23
CHAPTER 4 FUNCTIONS	24
4.1 Function List	25
4.2 Processing of Each Function	26
4.3 Operation Mode	27
4.4 Input Type/Range Setting Function	28
4.5 Conversion Method	29
4.6 Scaling Function	33
4.7 Alert Output Function	36
Process alarm	36
Rate alarm	38
4.8 Disconnection Detection Function	43
4.9 Input Signal Error Detection Function	46
4.10 Shift Function	53
4.11 Digital Clipping Function	56
4.12 Maximum Value/Minimum Value Hold Function	58
4.13 Logging Function	59
Stopping the Logging Operation	64
Logging hold request	67
Level trigger	68
Initial settings of the logging function	71
4.14 Offset/Gain Initialization Function	71
4.15 FX2N Allocation Mode Function	72
4.16 2CH Conversion Mode Function	73

CHAPTER 5	SYSTEM CONFIGURATION	75
CHAPTER 6	WIRING	76
6.1	Spring Clamp Terminal Block	76
6.2	Terminal Arrangement	79
6.3	Power Supply Wiring	80
	Grounding	80
6.4	Wiring Precautions	80
6.5	External Wiring Example	81
CHAPTER 7	PARAMETER SETTING	82
7.1	Basic Setting	82
7.2	Application Setting	83
7.3	Refresh Setting	84
7.4	Offset/Gain Setting	85
	Setting procedure	85
CHAPTER 8	PROGRAMMING	91
8.1	Programming Procedure	91
	System configuration example	91
	Program example	93
CHAPTER 9	TROUBLESHOOTING	96
9.1	Troubleshooting with the LEDs	96
9.2	Troubleshooting by Symptom	96
	When the input type is "current", and "voltage"	96
	When the input type is "resistance temperature detector", and "thermocouple"	98
9.3	List of Error Codes	100
9.4	List of Alarm Codes	103
APPENDICES		104
Appendix 1	External Dimensions	104
Appendix 2	Standards	105
	Certification of UL, cUL standards	105
	Compliance with EC directive (CE Marking)	105
	Requirement for compliance with EMC directive	105
	Caution for compliance with EC Directive	105
Appendix 3	Module Label	107
Appendix 4	Buffer Memory Areas	108
	List of buffer memory areas	108
	Details of buffer memory addresses	121
INDEX		174
REVISIONS		176
WARRANTY		177
TRADEMARKS		178

RELEVANT MANUALS

Manual name <manual number>	Description
MELSEC iQ-F FX5 User's Manual (Startup) <JY997D58201>	Performance specifications, procedures before operation, and troubleshooting of the CPU module.
MELSEC iQ-F FX5U User's Manual (Hardware) <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) <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) <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) <JY997D55701>	Describes specifications of ladders, ST, FBD/LD, and other programs and labels.
MELSEC iQ-F FX5 Programming Manual (Instructions, Standard Functions/Function Blocks) <JY997D55801>	Describes specifications of instructions and functions that can be used in programs.
MELSEC iQ-F FX5 User's Manual (Serial Communication) <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) <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) <JY997D56101>	Describes MODBUS serial communication.
MELSEC iQ-F FX5 User's Manual (Ethernet Communication) <JY997D56201>	Describes the functions of the built-in Ethernet port communication function.
MELSEC iQ-F FX5 User's Manual (SLMP) <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) <JY997D64201>	Describes CC-Link IE field network module.
MELSEC iQ-F FX5 User's Manual (CC-Link) <SH-081793ENG>	Describes CC-Link system master/intelligent device module.
MELSEC iQ-F FX5 User's Manual (ASLINK) <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) <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) <SH-081805ENG>	Describes the positioning module.
MELSEC iQ-F FX5 Simple Motion Module User's Manual (Startup) <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) <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) <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) <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) <SH-081802ENG> (This manual)	Describes the multiple input module (voltage, current, thermocouple, and resistance temperature detector).
MELSEC iQ-F FX5 User's Manual (Temperature Control) <SH-081799ENG>	Describes the temperature control module.
GX Works3 Operating Manual <SH-081215ENG>	System configuration, parameter settings, and online operations of GX Works3.
Transition from MELSEC FX3U, FX3UC Series to MELSEC iQ-F Series Handbook <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.

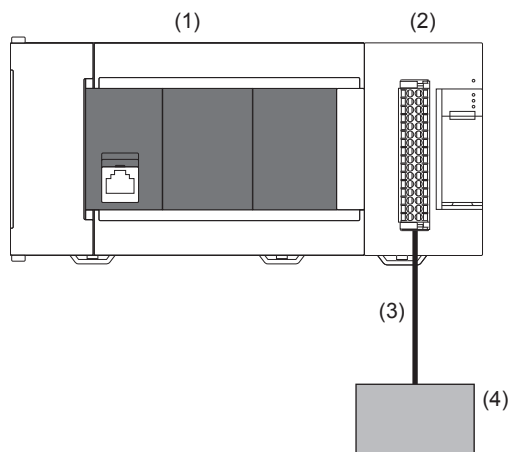
Terms	Description
■Devices	
FX5	Generic term for FX5U and FX5UC PLCs
FX3	Generic term for FX3S, FX3G, FX3GC, FX3U, and FX3UC PLCs
FX5 CPU module	Generic term for FX5U CPU module and FX5UC CPU module
FX5U CPU module	Generic term for FX5U-32MR/ES, FX5U-32MT/ES, FX5U-32MT/ESS, FX5U-64MR/ES, FX5U-64MT/ES, 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, and FX5UC-96MT/DSS
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, and FX5-C32EX/DS
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, and FX5-C32EYT/DSS
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 and FX5-C32ET/DSS
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 FX5-8AD, 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.)

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.)

2 SPECIFICATIONS

This chapter describes the specifications of FX5-8AD.

2.1 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	

2.2 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

2.3 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 ^{*1}
	Thermocouple/ Resistance temperature detector	40 ms/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) FX5UC CPU module ^{*2} (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 M Ω)		
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
	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
	Current	0 to 20 mA	0 to 32000
		4 to 20 mA	0 to 32000
		-20 to +20 mA	-32000 to +32000
Accuracy (accuracy for the full scale digital output value)	Ambient temperature 25 $\pm$ 5°C: within $\pm$ 0.3% ($\pm$ 192 digits) Ambient temperature -20 to 55°C: within $\pm$ 0.5% ($\pm$ 320 digits)		
Absolute maximum input	Voltage: $\pm$ 15 V, Current: $\pm$ 30 mA		

*1 For details on the input characteristics, refer to  Page 17 I/O 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) 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) J: -40 to +750°C (-40.0 to +1382.0°F) T: -200 to +350°C (-328.0 to +662.0°F) B: 600 to 1700°C (1112.0 to 3092.0°F) R: 0 to 1600°C (32.0 to 2912.0°F) 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) J: -400 to +7500 (-400 to +13820) T: -2000 to +3500 (-3280 to +6620) B: 6000 to 17000 (11120 to 30920) R: 0 to 16000 (320 to 29120) S: 0 to 16000 (320 to 29120)	
Accuracy	Ambient temperature 25 $\pm$ 5°C	K: $\pm$ 3.5°C (-200°C to -150°C) K: $\pm$ 2.5°C (-150°C to -100°C) K: $\pm$ 1.5°C (-100°C to +1200°C) J: $\pm$ 1.2°C T: $\pm$ 3.5°C (-200°C to -150°C) T: $\pm$ 2.5°C (-150°C to -100°C) T: $\pm$ 1.5°C (-100°C to +350°C) B: $\pm$ 2.3°C R: $\pm$ 2.5°C S: $\pm$ 2.5°C
	Ambient temperature -20 to 55°C	K: $\pm$ 8.5°C (-200°C to -150°C) K: $\pm$ 7.5°C (-150°C to -100°C) K: $\pm$ 6.5°C (-100°C to +1200°C) J: $\pm$ 3.5°C T: $\pm$ 5.2°C (-200°C to -150°C) T: $\pm$ 4.2°C (-150°C to -100°C) T: $\pm$ 3.1°C (-100°C to +350°C) B: $\pm$ 6.5°C R: $\pm$ 6.5°C S: $\pm$ 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) Ni100: -60 to +250°C (-76 to +482°F)
Digital output value (16-bit signed binary)		Pt100: -2000 to +8500 (-3280 to +15620) Ni100: -600 to +2500 (-760 to +4820)
Accuracy	Ambient temperature 25±5°C	Pt100: ±0.8°C Ni100: ±0.4°C
	Ambient temperature -20 to +55°C	Pt100: ±2.4°C Ni100: ±1.2°C

*1 Only 3-wire type resistance temperature detectors can be used.

2.4 I/O Conversion Characteristics

The I/O 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

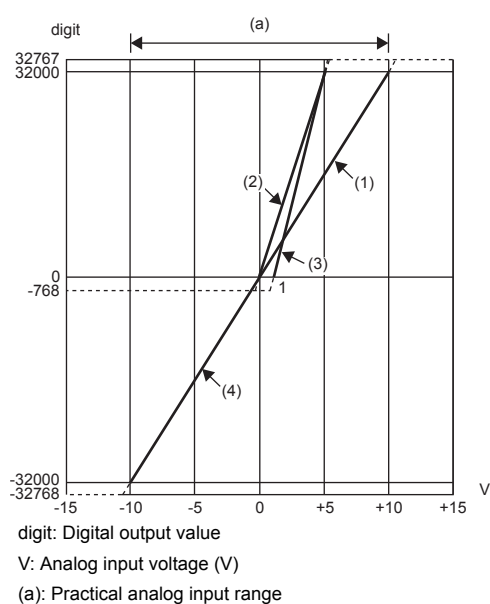
This value is the analog input value (voltage or current) where the corresponding digital output value is 0.

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.



No.	Input range setting	Offset value	Gain value	Digital output value*2	Resolution
(1)	0 to 10 V	0 V	10 V	0 to 32000	312.5 μ V
(2)	0 to 5 V	0 V	5 V		156.25 μ V
(3)	1 to 5 V	1 V	5 V		125 μ V
(4)	-10 to +10 V	0 V	10 V	-32000 to +32000	312.5 μ 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.

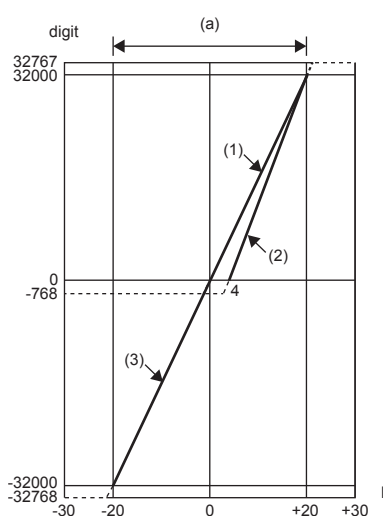
Input range setting	Digital output value	
	Minimum	Maximum
0 to 10 V	-768	+32767
0 to 5 V		
1 to 5 V		
-10 to +10 V	-32768	

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 ± 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 ≤ 20 mA, offset value ≥ 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	

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 voltage over ± 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.

2.5 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.

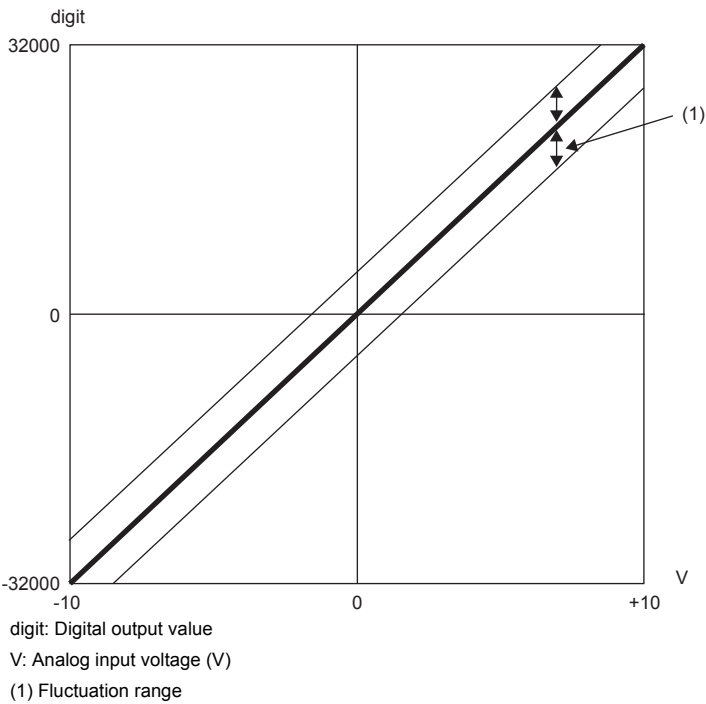
The fluctuation range varies as follows depending on ambient temperature and input range.

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



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 (at operating ambient temperature 25±5°C)	Conversion accuracy (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:

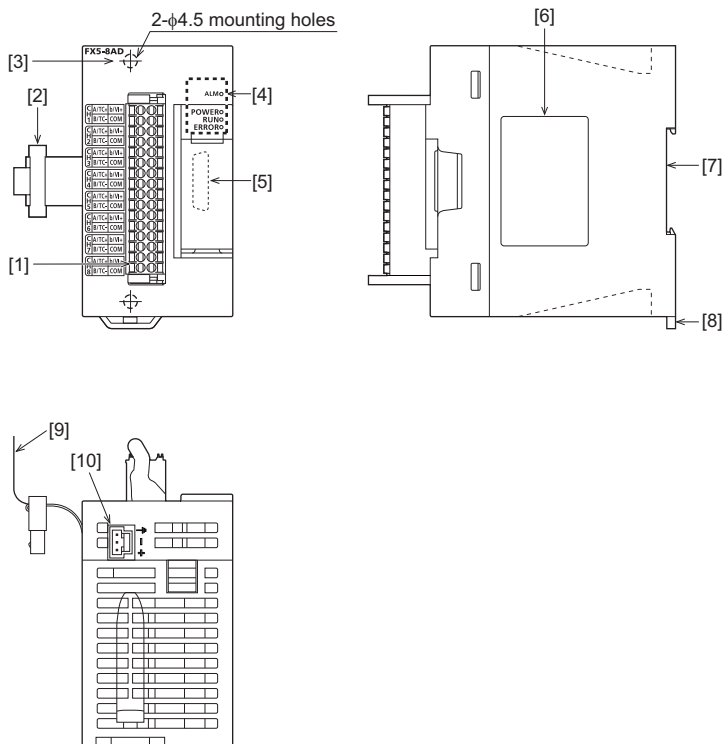
Conversion accuracy + Temperature characteristic × Operating ambient temperature change + Allowable tolerance of used resistance temperature detector

■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

2.6 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 22 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]	Pullout tab	They are used when drawing out an extension cable.
[10]	Power connector	Connector for connecting the power cable. (☞ Page 80 Power Supply Wiring)

LED display

The following table lists the LED display.

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

3 PROCEDURES BEFORE OPERATION

This chapter describes the procedures before operation.

1. Check of multiple input module specifications

Check the multiple input module specifications. (📖 Page 14 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 82 PARAMETER SETTING)

6. Offset/gain setting

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

7. Programming

Create a program.

4 FUNCTIONS

This chapter 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 108 Buffer Memory Areas

Point

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

 Page 100 List of Error Codes

 Page 103 List of Alarm Codes

4.1 Function List

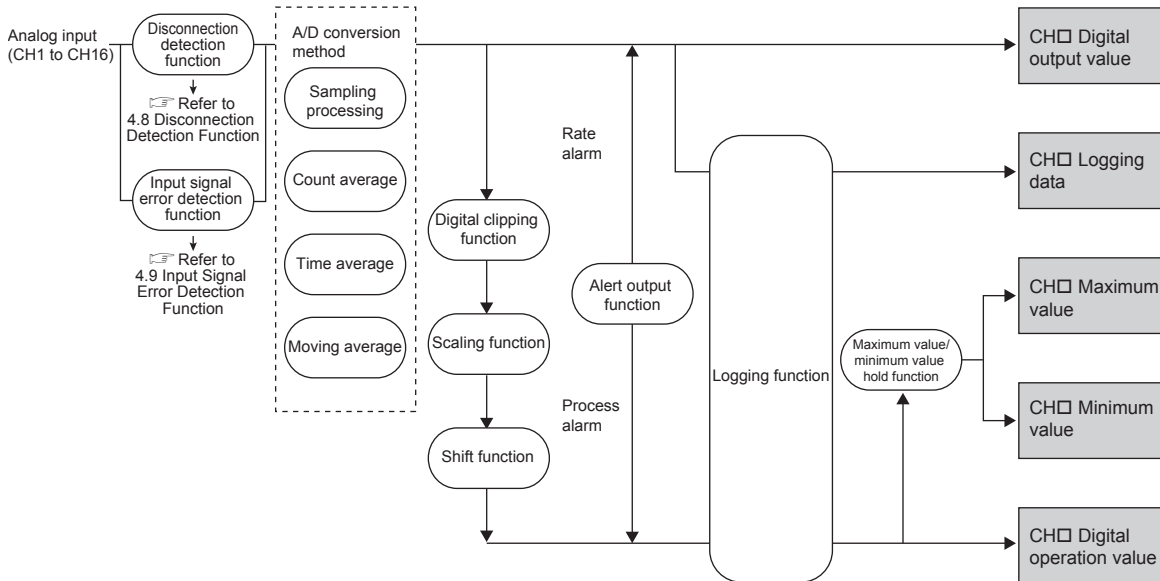
This chapter lists the functions of multiple input module.

Item			Description	Reference
Operation mode			Select the operation mode (normal mode, 2CH conversion mode, offset/gain setting mode) of the multiple input module.	Page 27
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 28
Conversion method	Sampling processing		Converts analog input values and temperature conversion values at every sampling period, storing them in buffer memory areas.	Page 29
	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 30
		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 31
		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 31
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 time taken for creating a scale conversion program.	Page 33
Alert output function	Process alarm		Outputs an alert when a digital operation value falls within the preset alert output range.	Page 36
	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 38
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. • Value just before disconnection • Upscale • Downscale • Any value	Page 43
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 46
	Simple disconnection detection		Outputs an alarm when an analog input value is 0.5 V or smaller or 2 mA or smaller.	Page 48
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 53
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 56
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 58
Logging function			Logs (records) digital output values or digital operation values. 10000 points of data can be logged for each channel.	Page 59
Offset/gain setting function			Allows the correction of errors in digital output values.	Page 71
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 72
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 73

4.2 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



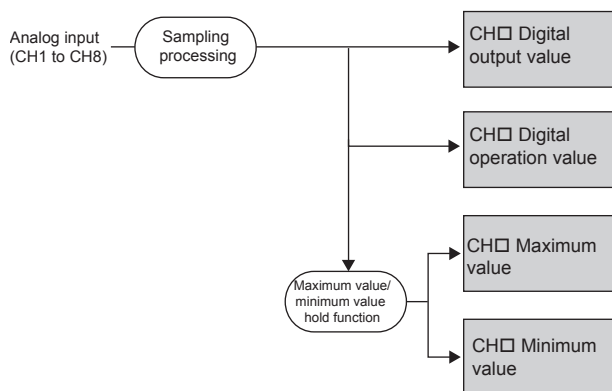
Point

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.

4.3 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 ^{*1}	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.

^{*1} It cannot be used in FX2N allocation mode.

4.4 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	• Factory default setting • User range setting
	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.

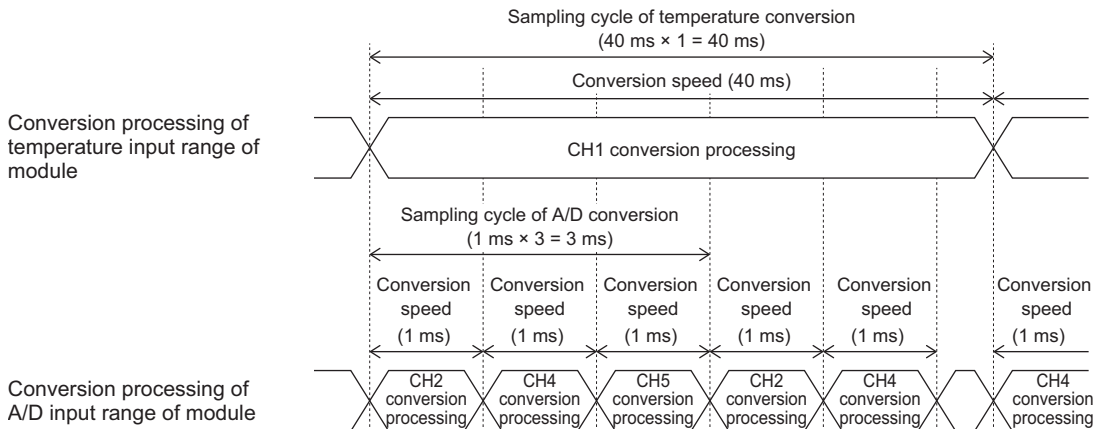
4.5 Conversion Method

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) $\times$ number of A/D conversion enabled channels".
- The temperature conversion sampling cycle is "conversion speed (40 ms) $\times$ 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 ($40\text{ ms} \times 2$).

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 calculated value is stored in the buffer memory area.

- 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.

$$\text{Processing time of A/D conversion} = \text{Set number of times} \times (\text{Number of A/D conversion enabled channels} \times \text{Conversion speed (1 ms)})$$
$$\text{Processing time of temperature conversion} = \text{Set number of times} \times (\text{Number of temperature conversion enabled channels} \times \text{Conversion speed (40 ms)})$$

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

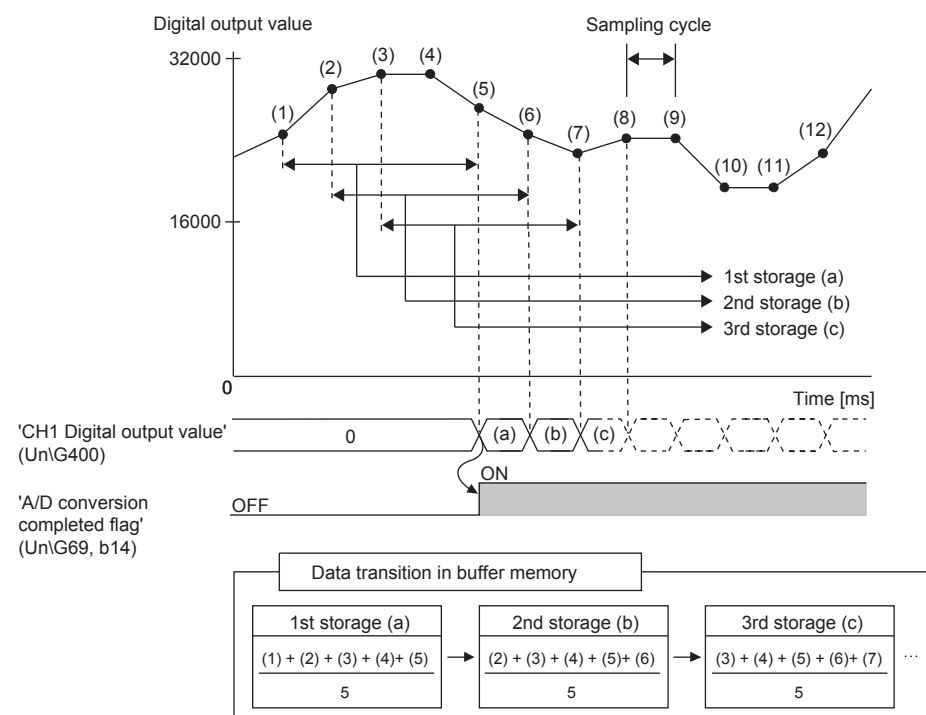
Because the count average requires a sum of at least two counts excluding the maximum and minimum values, the set number of times should be four or more.

■ 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 ^{*1}	When the input type is current, and voltage: 4 to 10000 (ms) 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)

^{*1} 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)

4.6 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
- Current (0 to 20 mA, 4 to 20 mA) - Voltage (0 to 10 V, 0 to 5 V, 1 to 5 V)	$\frac{D_x \times (S_H - S_L)}{D_{Max}} + S_L$	D _x : Digital output value D _{Max} : Maximum digital output value of the input range in use D _{Min} : Minimum digital output value of the input range in use S _H : Scaling upper limit value S _L : Scaling lower limit value
- Current (-20 to +20 mA) - Voltage (-10 to +10 V)	$\frac{D_x \times (S_H - S_L)}{(D_{Max} - D_{Min})} + \frac{(S_H + S_L)}{2}$	
- Resistance temperature detector - Thermocouple	$\frac{(D_x - D_{Min}) \times (S_H - S_L)}{(D_{Max} - D_{Min})} + S_L$	

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".

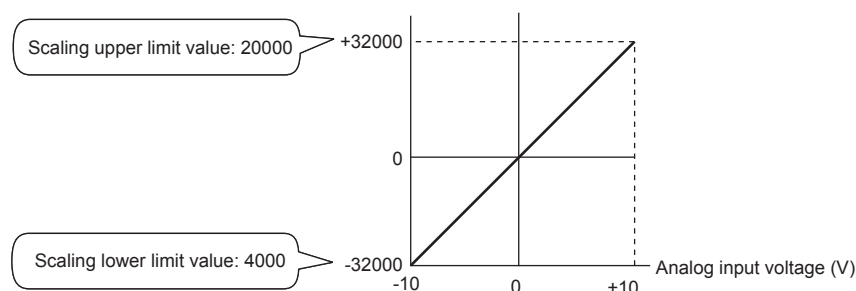
Setting example

■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.



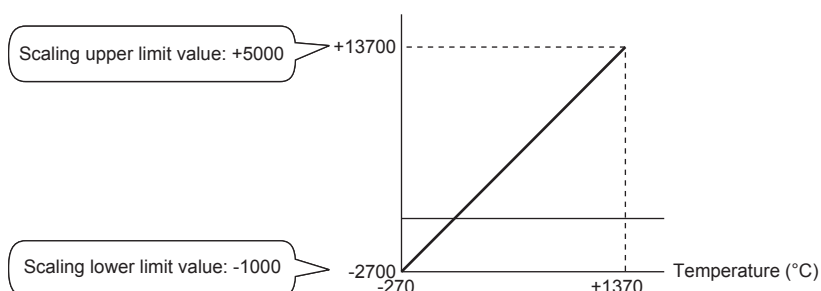
Analog input voltage (V)	Digital output value	Digital operation value (scaling value)
-10	-32000	4000
-5	-16000	8000
0	0	12000
+5	+16000	16000
+10	+32000	20000

■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.

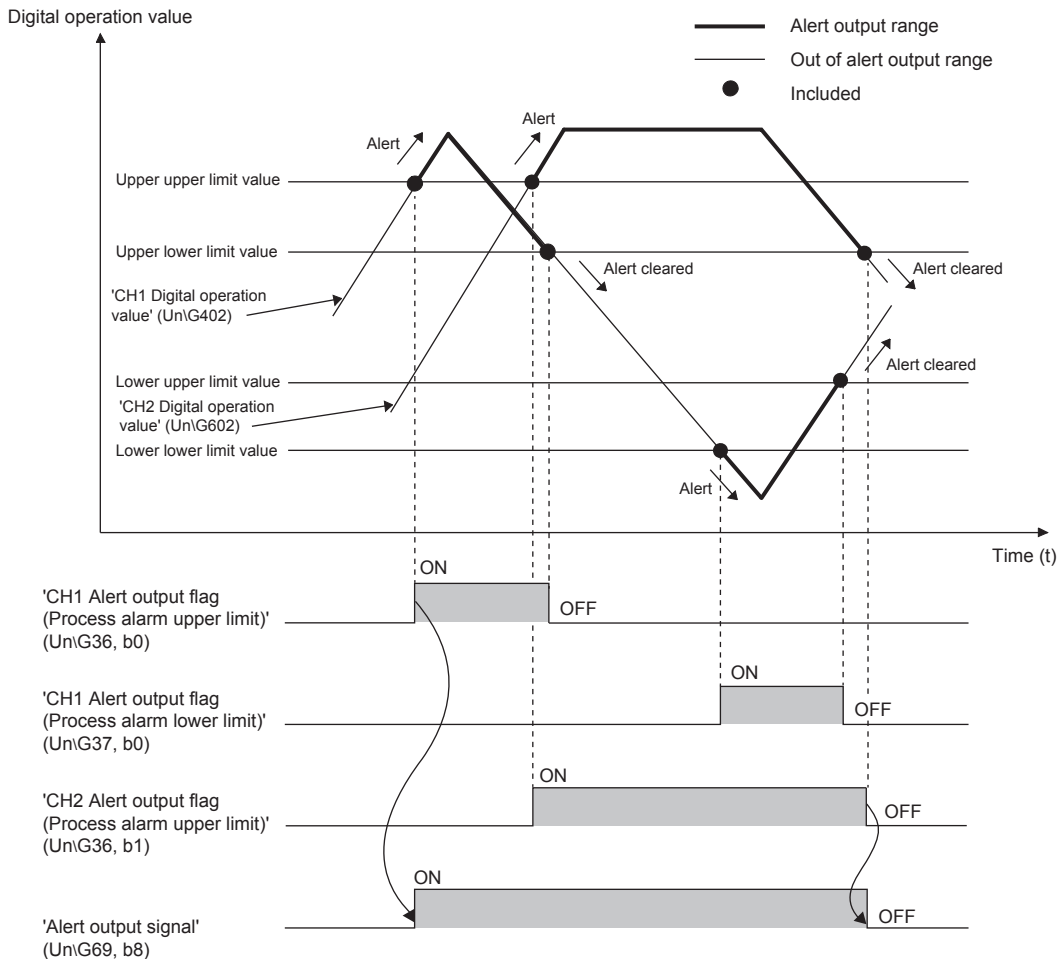
☞ Page 56 Digital Clipping Function

4.7 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' (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 'Alert output flag (Process alarm upper limit)' (UnG36) or 'Alert output flag (Process alarm lower limit)' (UnG37).
- 'Alert output signal' (UnG69, b8) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (UnG2). (Page 103 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 limit value' (Un\G516) or being greater than 'CH1 Process alarm lower 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^{*1}.

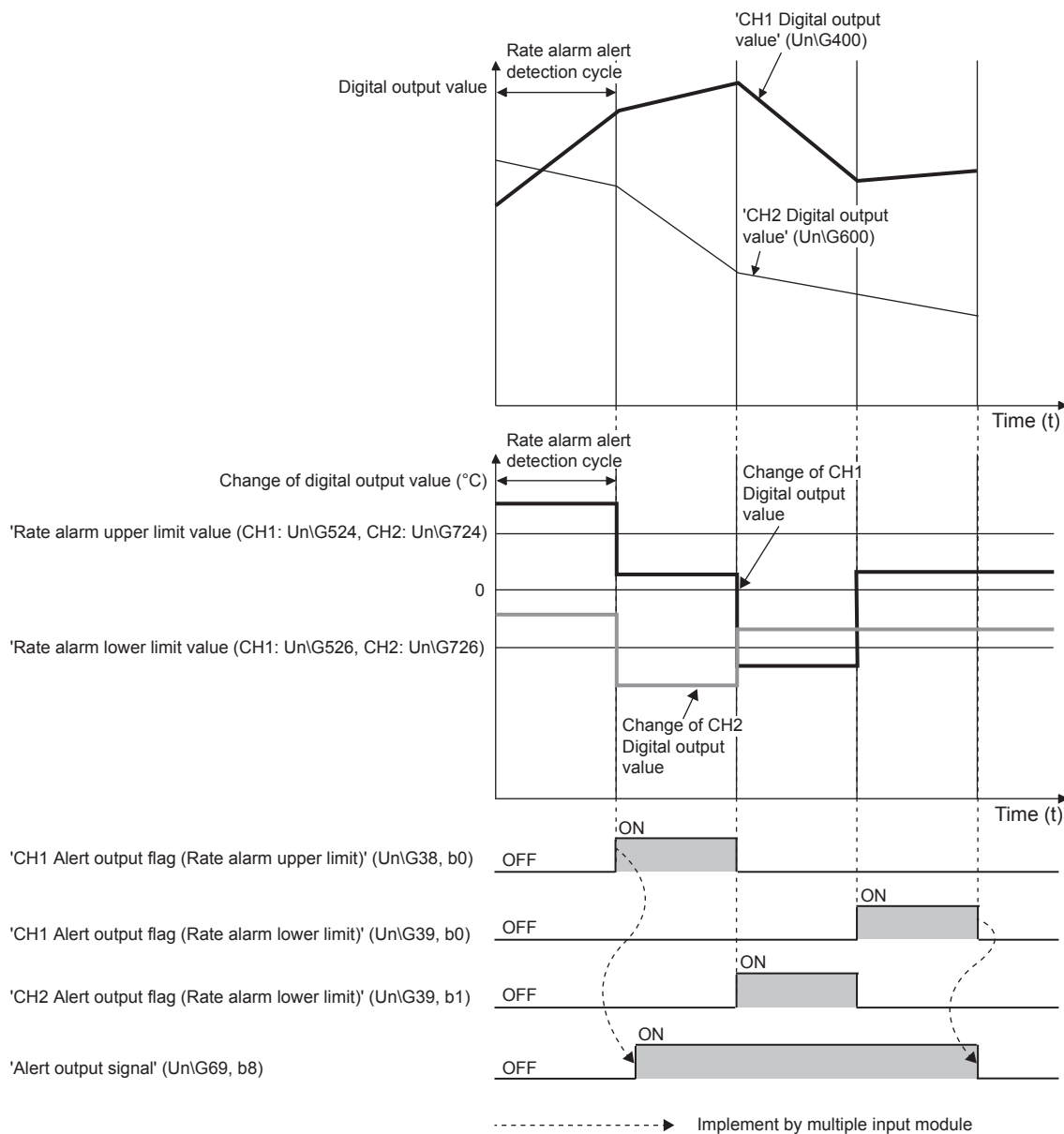
^{*1} When "RTD" or "Thermocouple" is set as the input type, set it in units of 0.1°C (°F) unit.



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 103 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) ^{*1} × 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) ^{*1} × 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 (= $250 \times 0.1 \times 0.01 \times 32000$) digit or more or 1600 (= $50 \times 0.1 \times 0.01 \times 32000$) digit or less.

■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 $\geq$ Rate alarm upper limit value ^{*1}
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 ^{*1}

*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.

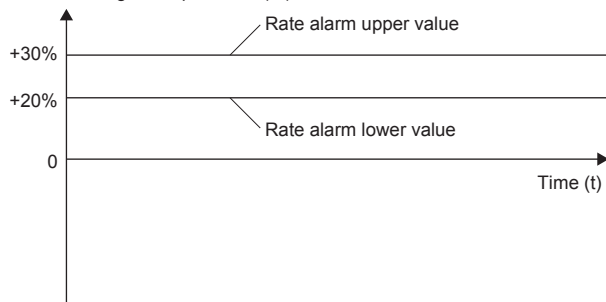
Application examples of rate alarms

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

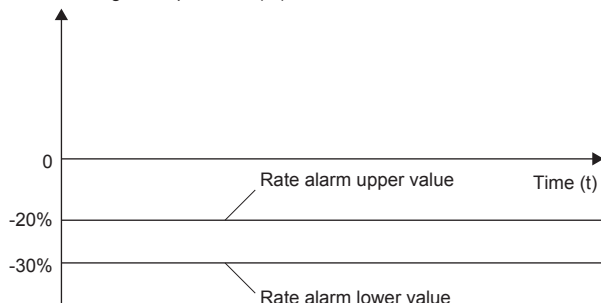
Change rate of the digital output value (%)



■Example 2

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

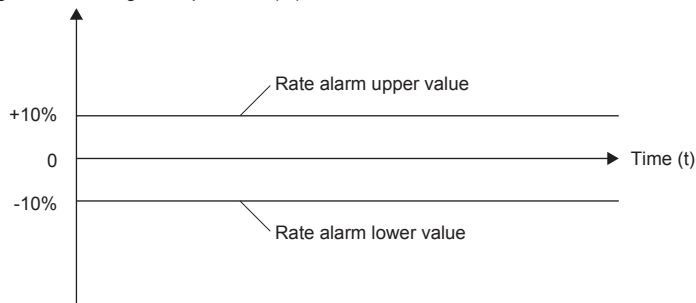
Change rate of the digital output value (%)



■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)

4.8 Disconnection Detection Function

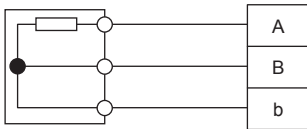
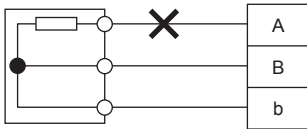
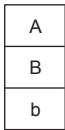
This function detects disconnection of a thermocouple or resistance temperature detector.

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 103 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
 No disconnection	Conversion enable	0 (OFF)
	Conversion disable	0 (OFF)
 Disconnection	Conversion enable	1 (ON)
	Conversion disable	0 (OFF)
 No connection	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	• Up Scale • Down Scale • Given Value • Value immediately before disconnection

4. When "Given Value" is set, set "Conversion setting value for disconnection detection".

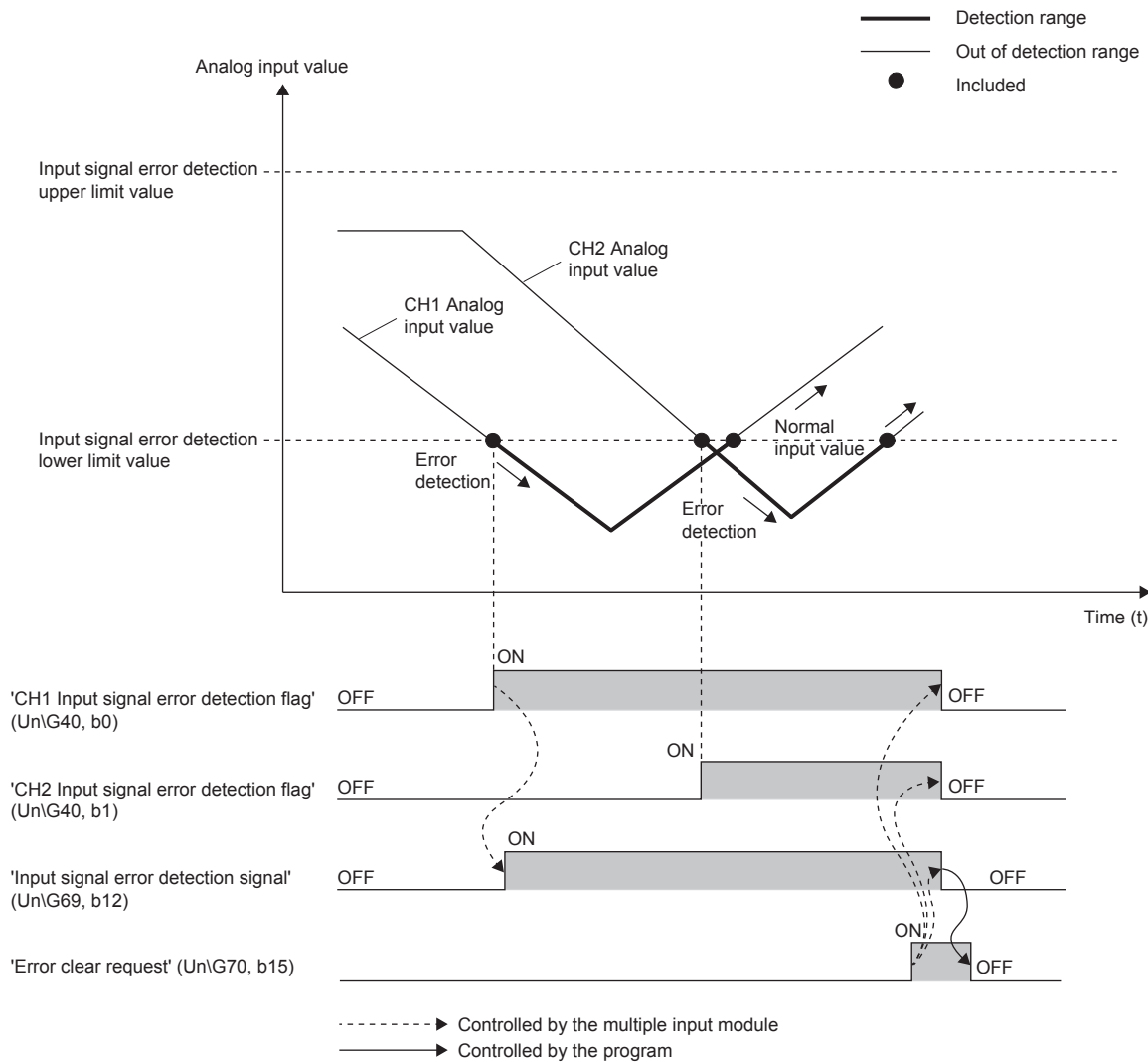
Item	Setting range
Conversion setting value for disconnection detection	-32768 to +32767 (0.1°C unit)

Point

It takes up to 355 ms to detect a broken wire.

4.9 Input Signal Error Detection Function

Outputs an alarm when an analog input value exceeds the preset range.



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

☞ Page 49 Clearing input signal errors

Detection method

One of the following detection methods can be selected.

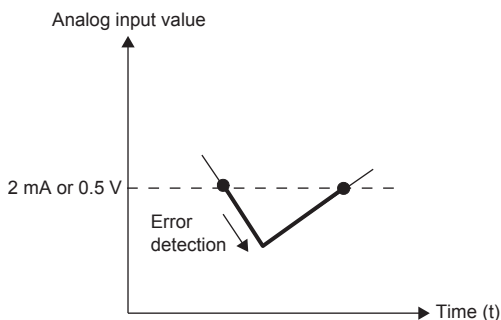
Detection method	Detection condition	
0: Disable	Input signal errors are not detected.	—
1: Upper and lower limit detection	An input signal error is detected when the analog input value is equal to or greater than the input signal error detection upper limit value, or when the analog input value is equal 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. Page 48 Simple disconnection detection	

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 ≤ 2 mA
1 to 5 V	Analog input value ≤ 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 103 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 detection auto-clear enable/disable setting' (Un\G302).

■When Input signal error detection 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.



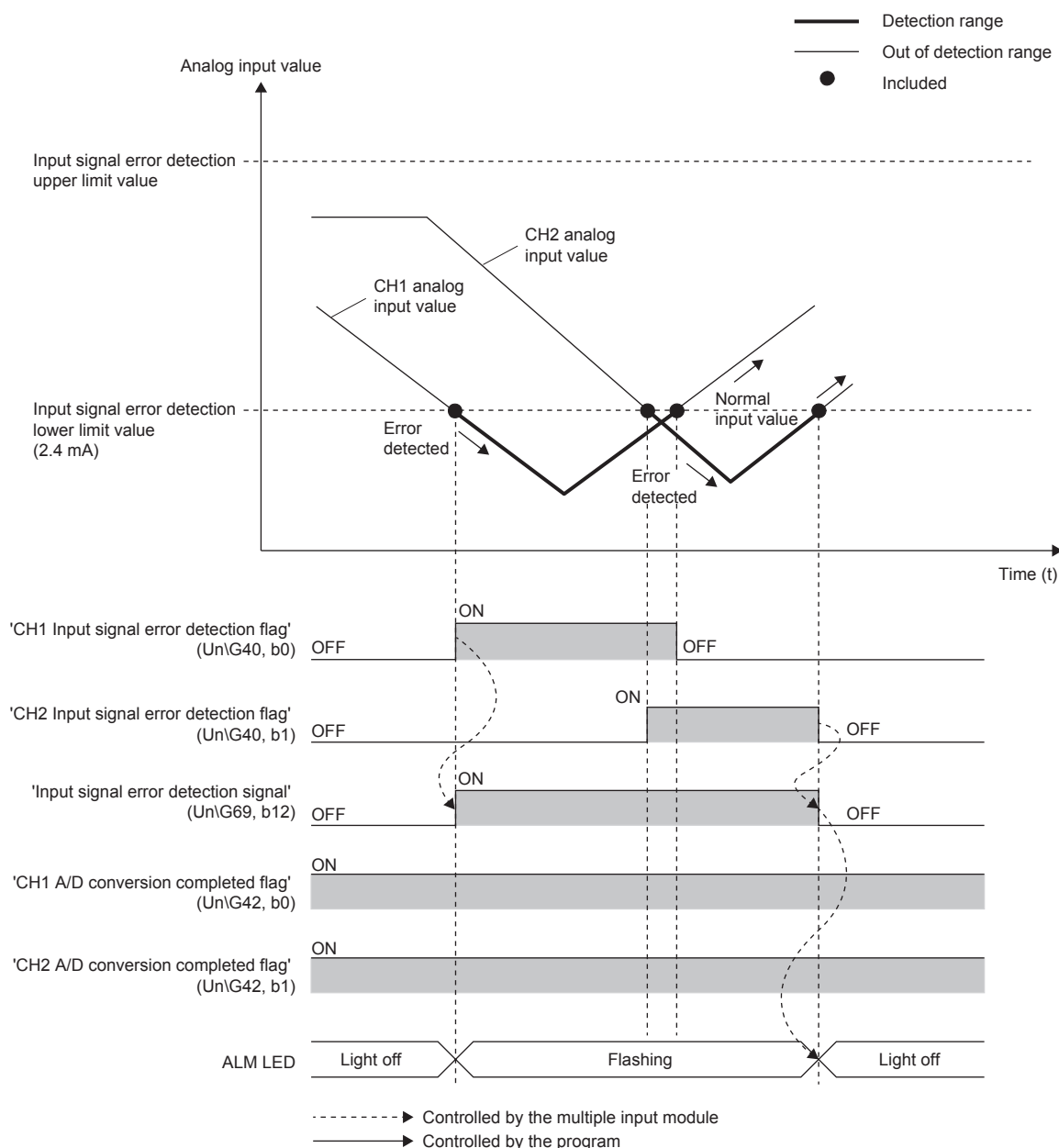
'Latest alarm code' (Un\G2) is not cleared.

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 detection 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



■When Input signal error detection 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 detection 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 detection auto-clear enable/disable setting' (Un\G302)	Disable (1)
'CH1 Input signal error detection setting' (Un\G528)	Upper and lower limit detection (1)

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

- Input signal error detection lower limit value: -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]

$$\begin{aligned} \text{Input signal error detection lower limit setting value} &= \frac{-10.0 - (-10.24)}{10.0 - 0.0} \times 1000 \\ &= 24 \text{ (2.4\%)} \end{aligned}$$

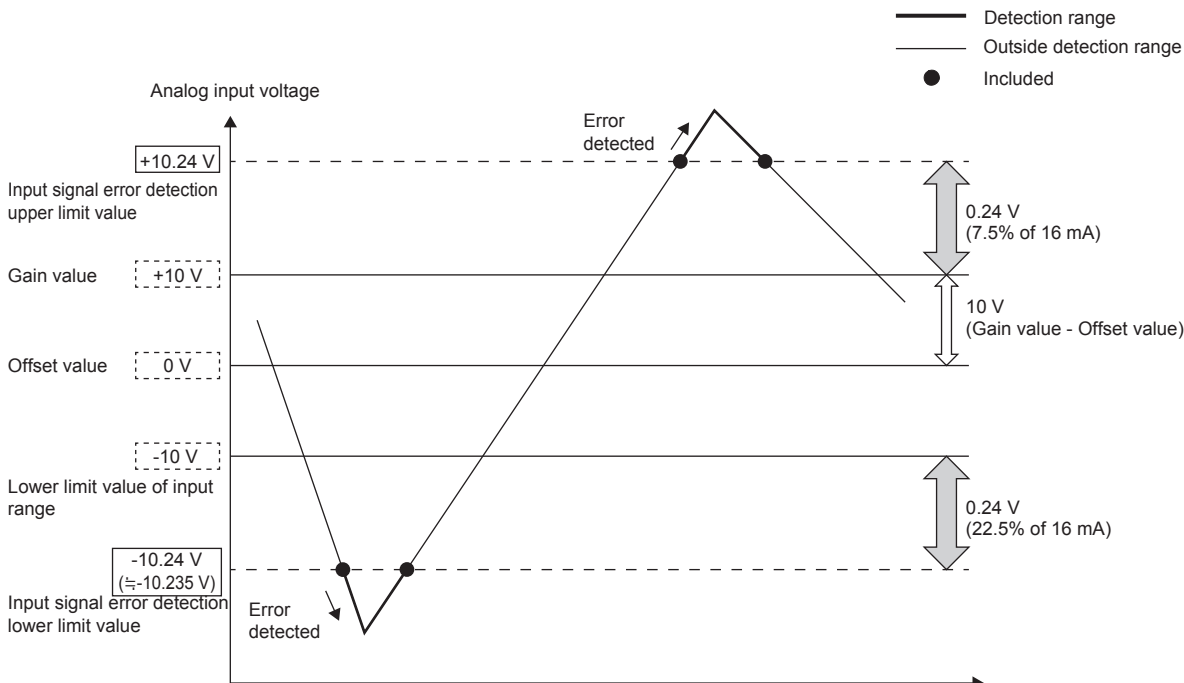
Set 'CH1 Input signal error detection lower limit set value' (Un\G529) to 24 (2.4%).

[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.



4.10 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".

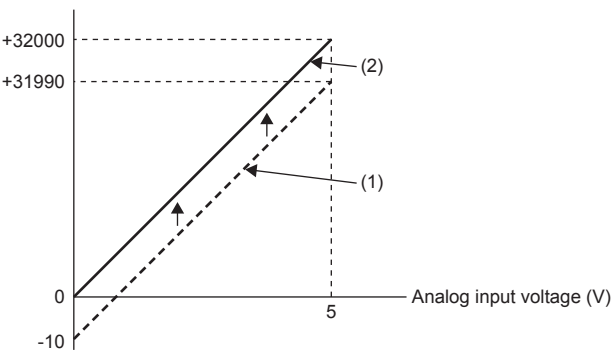
[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter] ⇒ [Application setting] ⇒ [Shift function]

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

Setting example

Ex.

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

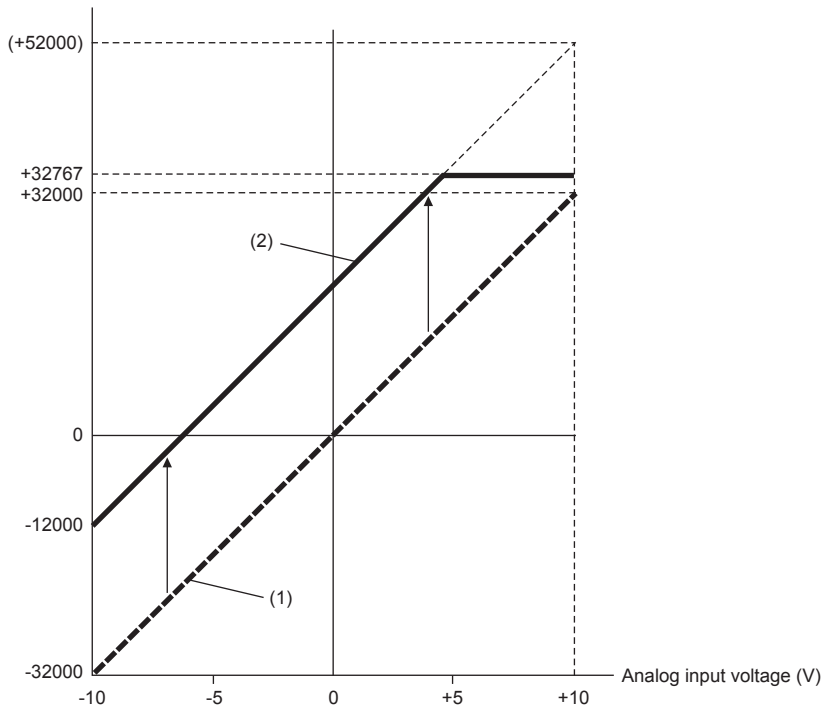


- (1) 'CH1 Digital output value' (Un\G400)
+
'CH1 Conversion value shift amount' (Un\G472) "+10"
↓
(2) 'CH1 Digital operation value' (Un\G402)

Voltage input (V)	Digital output value	Digital operation value
0	-10	0
5	31990	32000

Ex.

When the I/O 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)

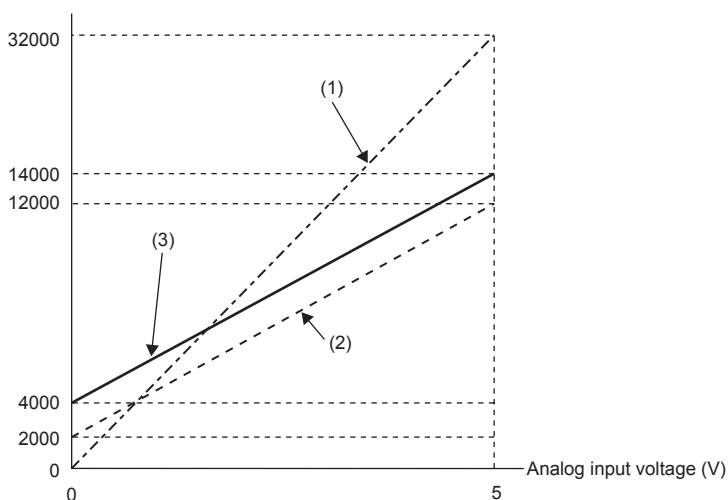
Voltage input (V)	Digital output value	Digital operation value
-10	-32000	-12000
-5	-16000	+4000
0	0	+20000
+5	+16000	+32767 ^{*1}
+10	+32000	+32767 ^{*1}

*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 shift amount' (Un\472)	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 57 Setting example

4.11 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		



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".

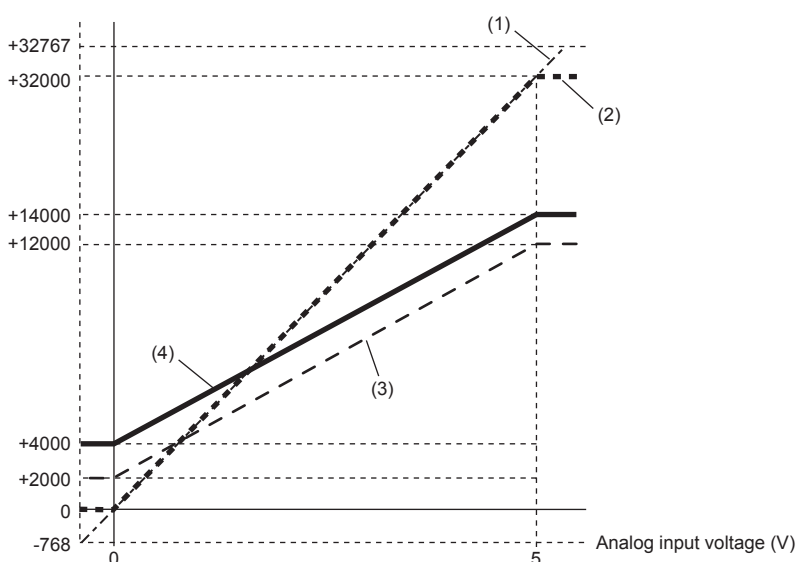
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Module Parameter]
⇒ [Application setting] ⇒ [Digital clipping function]

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 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.

4.12 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^{*1} 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).

^{*1} When "Conversion disabled" is set to 'CH1 Input type/Range setting' (Un\G598), 0 is stored in 'CH1 Maximum value' (Un\404) and 'CH1 Minimum value' (Un\406).

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.

4.13 Logging Function

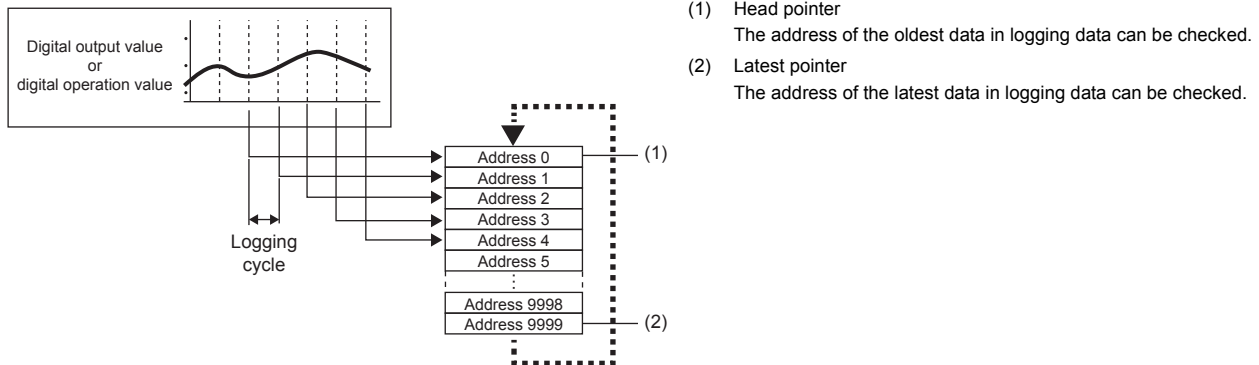
Logs (records) digital output values or digital operation values. 10000 points of data can be logged for each channel. Logging data are stored in the buffer memory area. In addition, the data collection can be stopped by using the status change of the data as a trigger. This function also helps the error 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).



4

Point

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

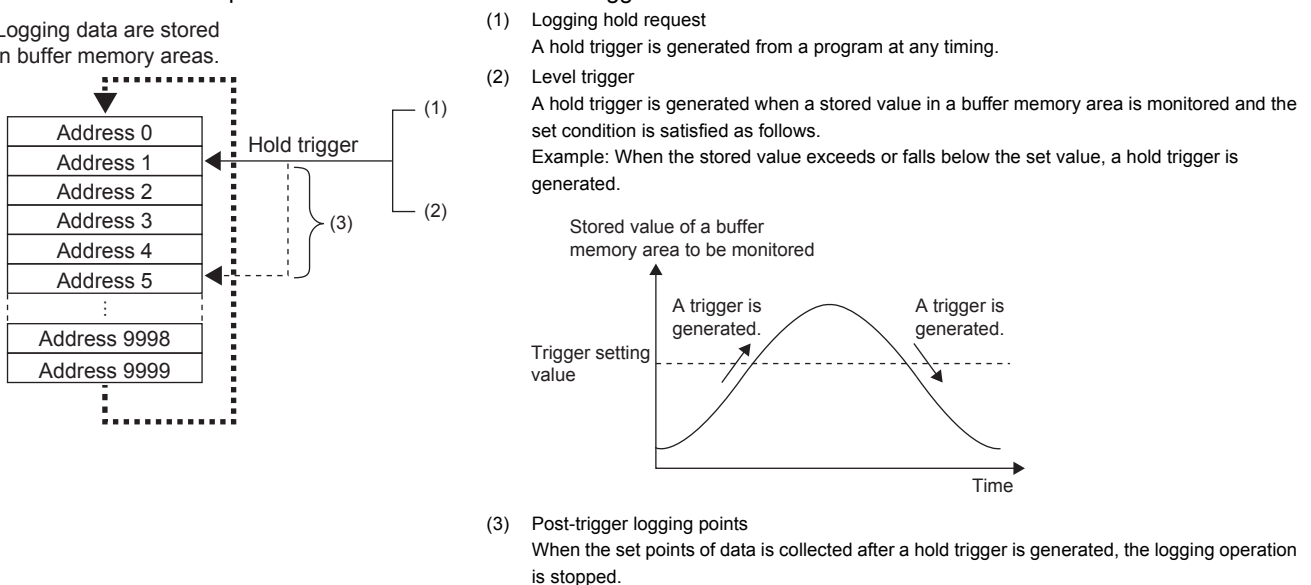
■Stopping the logging operation

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.

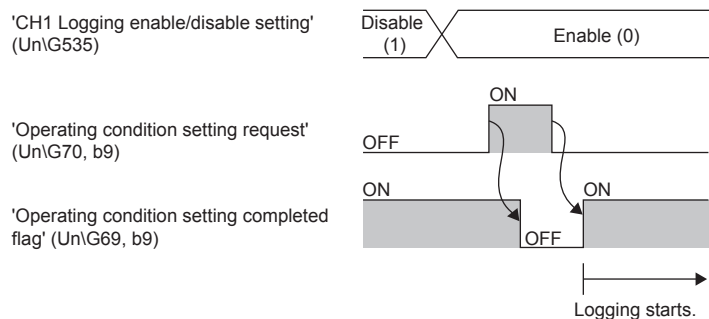


Operation of logging

■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)	• 1 to 32767 (When the input range is "current", and "voltage") • 40 to 32767 (When the input range is thermocouple, and resistance temperature detector)
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)

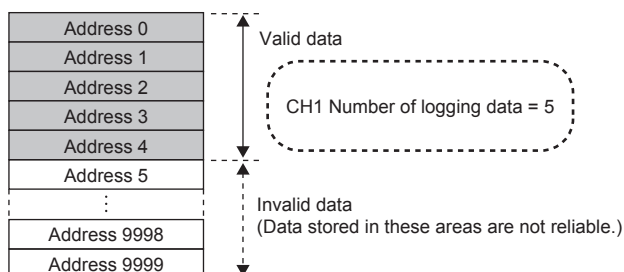
Point

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.

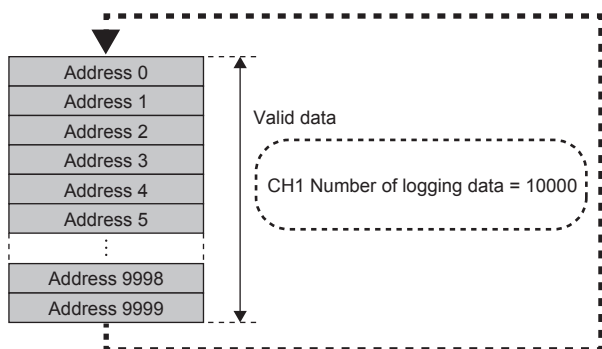
■Number of logging data

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.

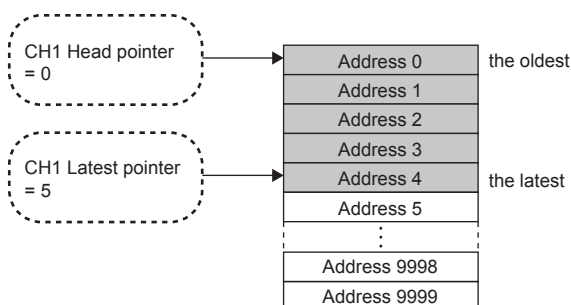
When CH1 Logging data (Un\G10000 to Un\G19999) becomes full (Number of logging data = 10000), the next data is stored in the head address of CH1 Logging data (Un\G10000 to Un\G19999), and the logging operation continues overwriting the existing data. In this case, the number of logging data is fixed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

■Head pointer and latest pointer

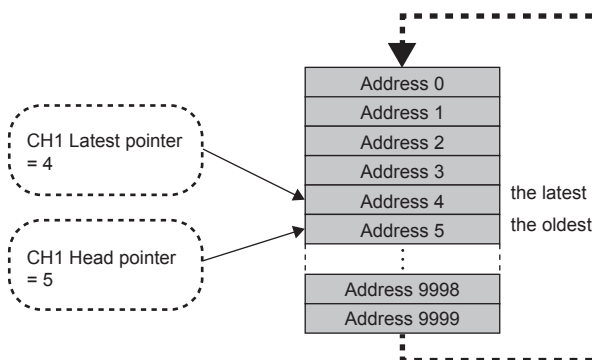
The storage location of the oldest data and the latest data in CH1 Logging data (Un\G10000 to Un\G19999) can be checked with the following buffer memory areas.

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.

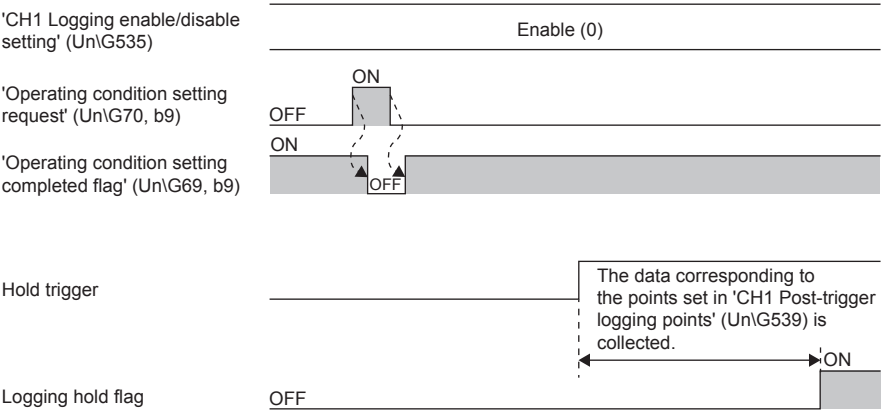
(Page 64 Stopping the Logging Operation)

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 67 Logging hold request
- Page 68 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).

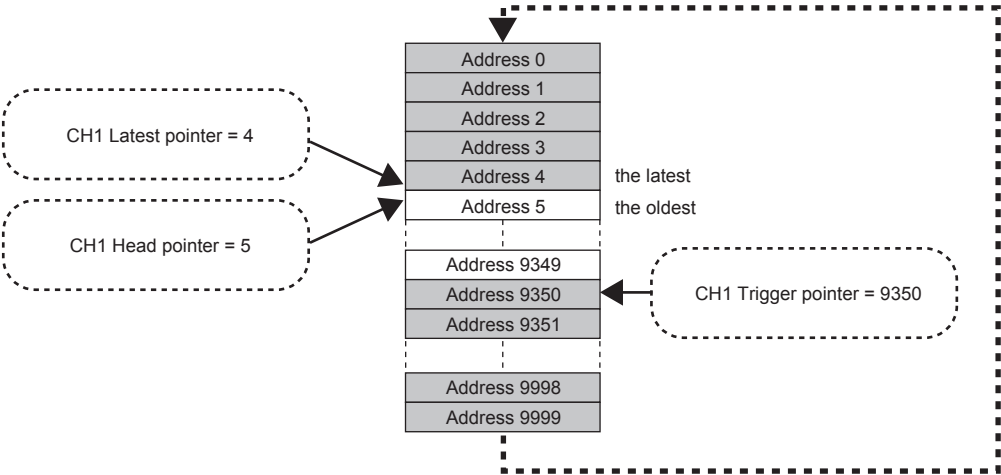
Checking data when a hold trigger has occurred

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. • Sunday: 00H • Monday: 01H • Tuesday: 02H • Wednesday: 03H • Thursday: 04H • Friday: 05H • Saturday: 06H	01H
Millisecond (higher-order digits)/Millisecond (lower-order digits)	Stored in BCD code.	0628H

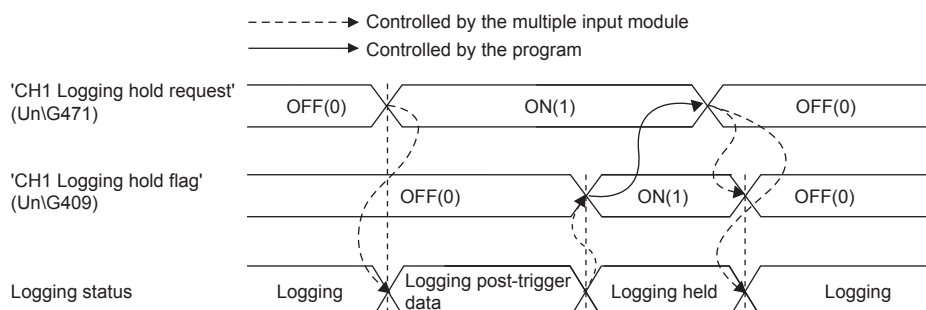
*1 These values assume that a trigger is generated at 10:35 and 40.628 seconds on Monday, January 30th, 2017.

Resuming the logging

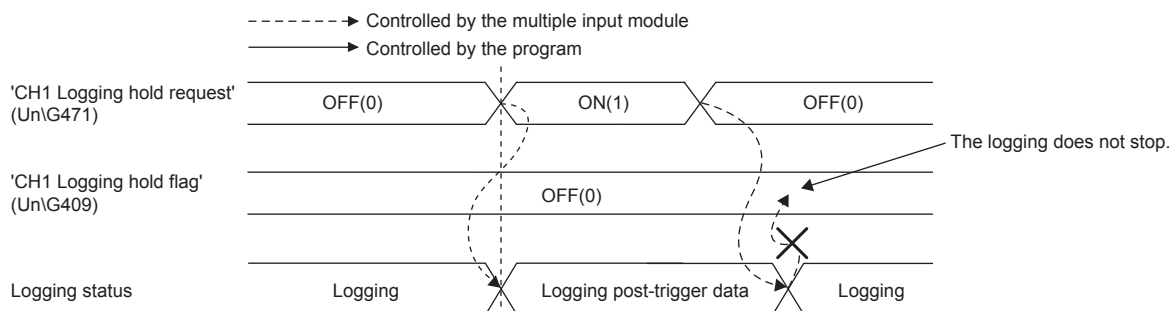
It may take time until ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) after 'CH1 Logging hold request' (Un\G471) is changed off→on.

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

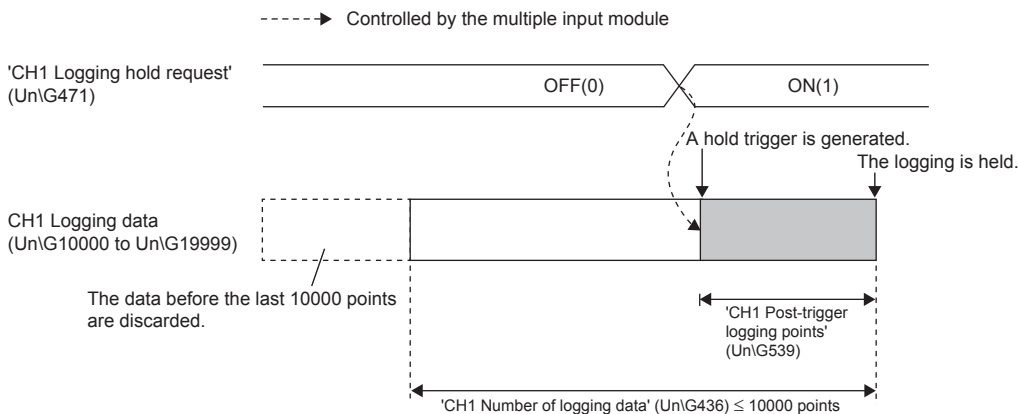
The following table shows the buffer memory area status when logging resumes.

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. 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.



4

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), '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.

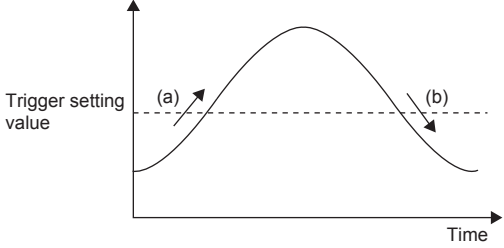


Point

- 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).

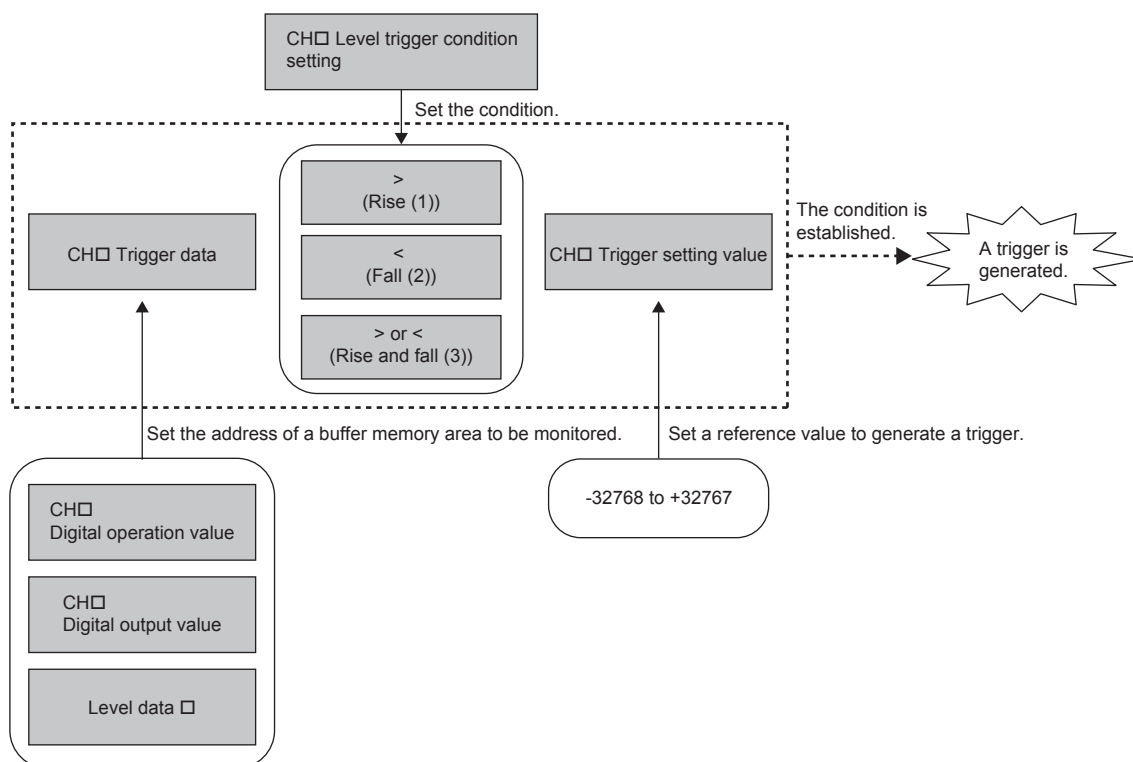
Setting value	Description	
1: Level trigger (Condition: Rise)	 Stored value of a buffer memory area to be monitored Trigger setting value Time (a) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored $\leq$ Trigger setting value" to "Stored value of a buffer memory area to be monitored $>$ Trigger setting value". (b) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored $\geq$ Trigger setting value" to "Stored value of a buffer memory area to be monitored $<$ Trigger setting value".	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.



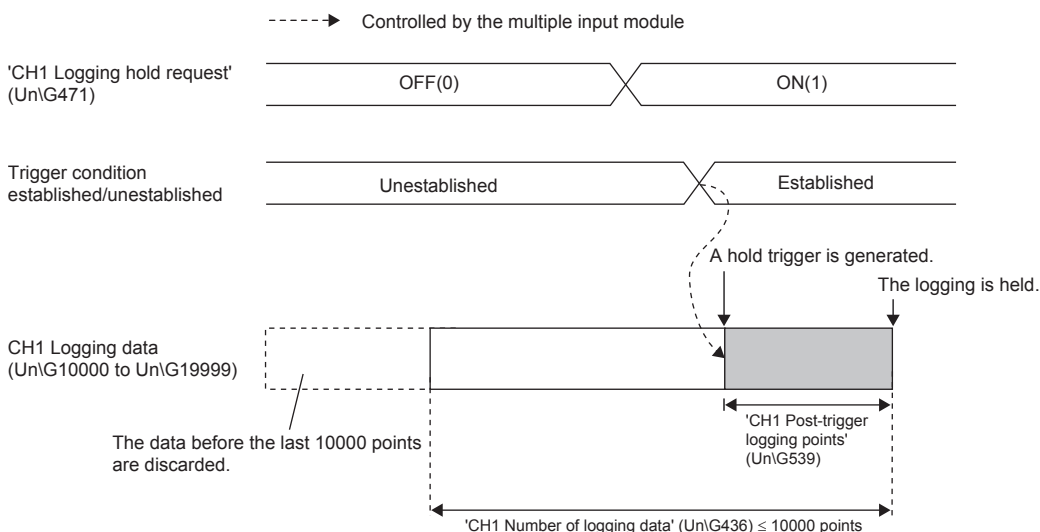
For example if trying to generate a hold trigger when a value in 'CH1 Digital output value' (Un\G400) is greater than 1000, set as follows.

- '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

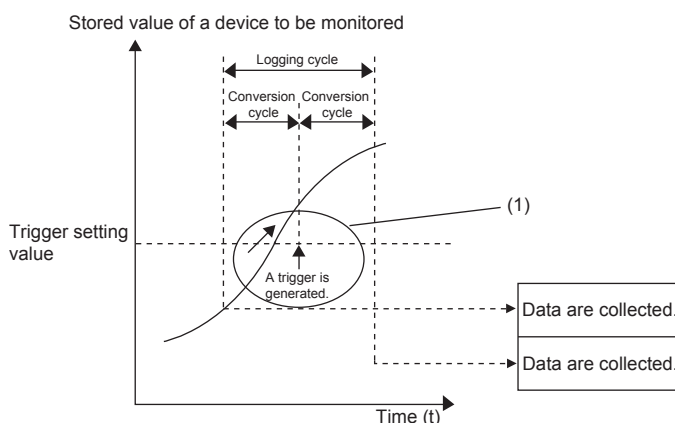
To use a level trigger, set ON (1) to 'CH1 Logging hold request' (Un\G471) in advance. At the point where ON (1) has been set to 'CH1 Logging hold request' (Un\G471), the module becomes the trigger condition wait status.

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".

4.14 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.

4.15 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 115 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 28
Average count	Conversion method	Page 29
Setting change disabled	—	It is unnecessary because the setting is reflected in the operating condition setting request, and erroneous setting is prevented.
I/O characteristics adjustment	Offset/gain setting function	Page 71
High speed conversion CH specification mode	—	No correspondence
Data addition function	Shift function	Page 53
Upper lower limit value detection function	Process alarm function	Page 36
Sudden change detection function	Rate alarm function	Page 38
Peak value hold function	Maximum value/Minimum value hold function	Page 58
Scale over detection function	Input signal error detection function	Page 46
Disconnection detection	Disconnection detection function	Page 43
Data history	Logging function	Page 59
Function initialization	Offset/gain initialization function	Page 71

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.

4.16 2CH Conversion Mode Function

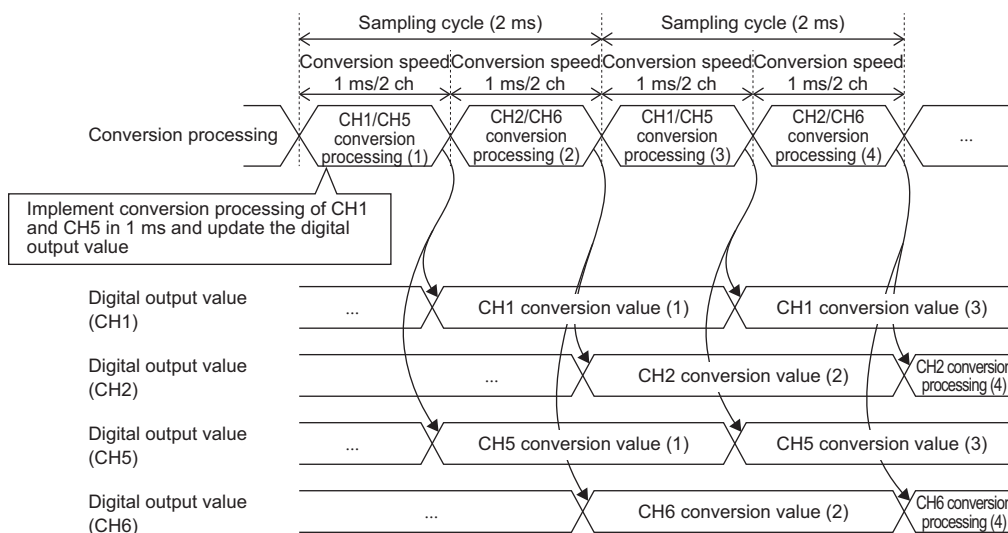
A function that performs A/D conversion of 2CH in 1 ms and can update the digital output value at the same time. Only input type "current", "voltage" are supported.

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

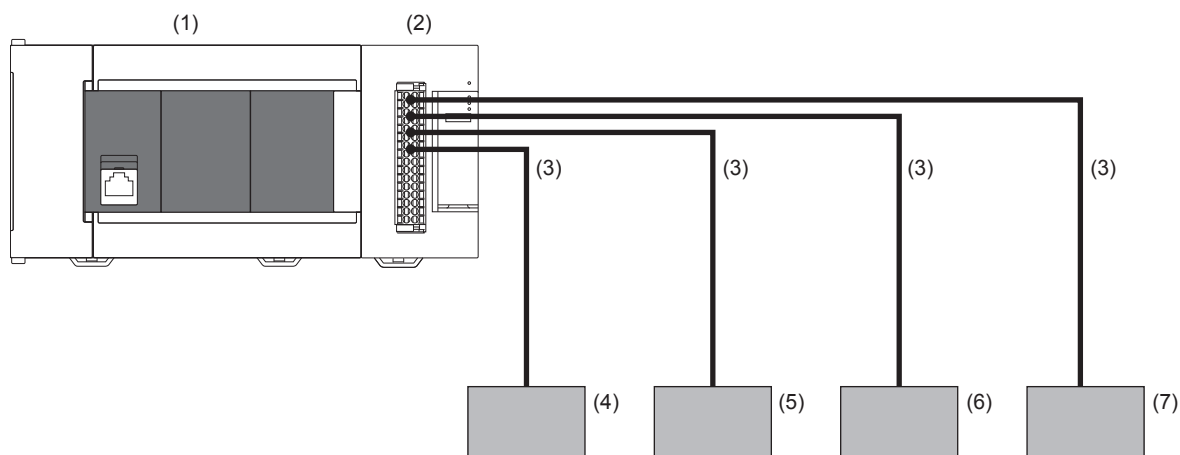
3. Set the "Input type" and "Input range" of the channel to be used.

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

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

6 WIRING

This section explains the multiple input module wiring.

6.1 Spring Clamp Terminal Block

Suitable wiring

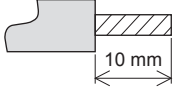
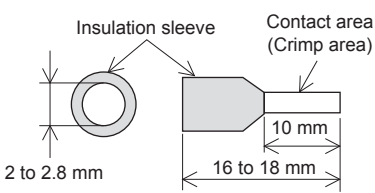
The wires to connect the spring clamp terminal block are described below.

No. of wire per terminal	Wire size	
	Single wire, Strand wire	Ferrule with insulation sleeve
Single wiring	AWG24 to 16 (0.2 to 1.5 mm ²)	AWG23 to 19 (0.25 to 0.75 mm ²)

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 ²	CRIMPFOX 6
	Al 0.75-10 GY	0.75 mm ²	
	Al 1.0-10	1.0 mm ²	
	Al 1.5-10	1.5 mm ²	

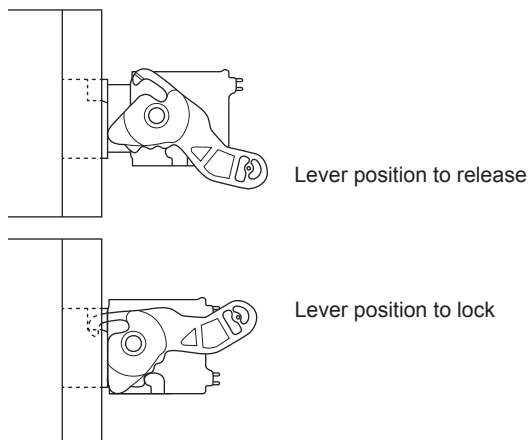
Removing and installing the terminal block

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

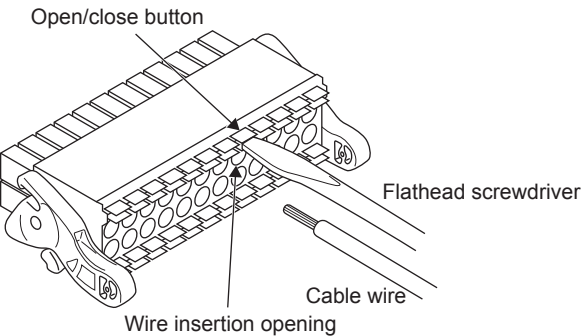
When installing the terminal block, check that the lever is in the release position. If installation is performed while the lever is in the lock position, it may cause damage to the lever.

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

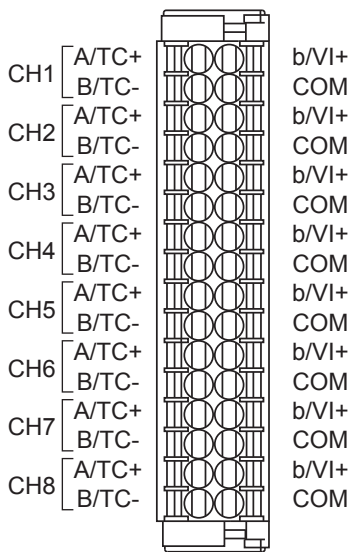
Precautions

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.

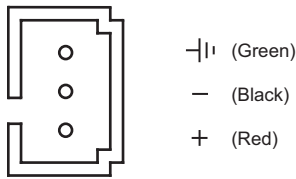
6.2 Terminal Arrangement



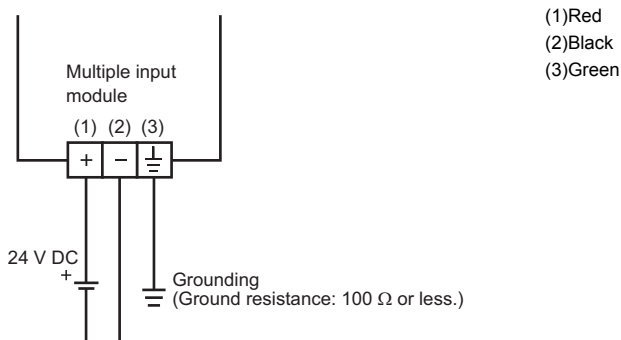
Terminal name		Description
CH1	A/TC+	CH1 Resistance temperature detector input/thermocouple input
	B/TC-	
	b/VI+	CH1 Voltage/current input/resistance temperature detector input
	COM	CH1 Voltage/current input
CH2	A/TC+	CH2 Resistance temperature detector input/thermocouple input
	B/TC-	
	b/VI+	CH2 Voltage/current 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

6.3 Power Supply Wiring

Power connector layout



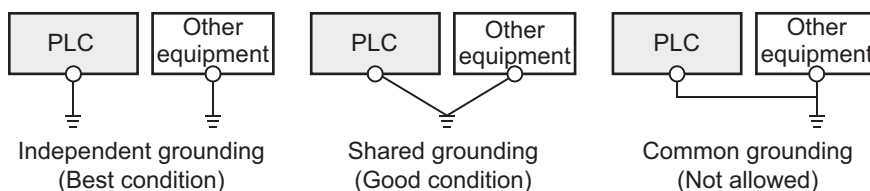
Power supply wiring



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.

6.4 Wiring Precautions

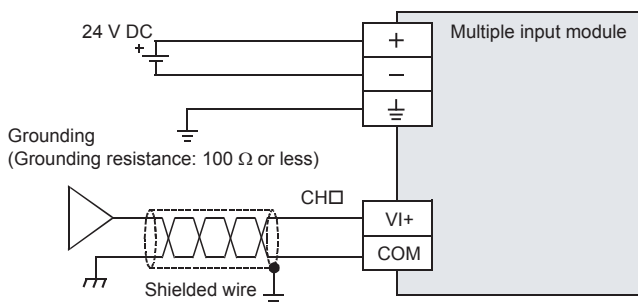
Wiring precautions are indicated below.

- 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.

6.5 External Wiring Example

The followings show the examples of external wiring.

Voltage input, and current input



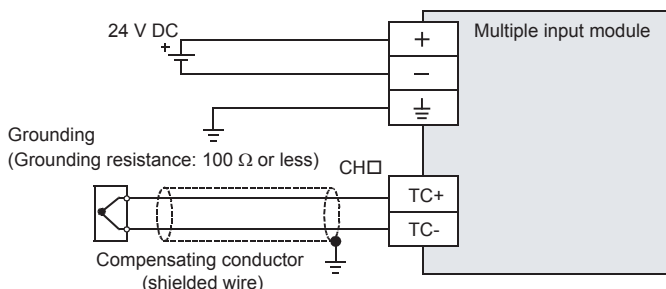
For □ in CH□, the CH number is entered.

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 15 Thermocouple input specifications for the thermocouples that can be used with multiple input module.



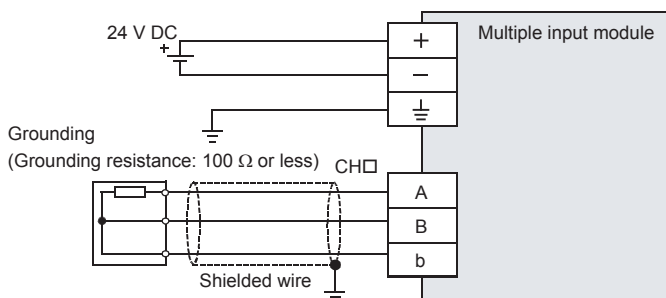
For □ in CH□, the CH number is entered.

Precautions

When using thermocouple input, use the prescribed compensation lead wire.

Resistance temperature detector

Refer to Page 16 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.

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 chapter describes the case in a normal mode.

7.1 Basic Setting

Setting procedure

- 1.** Open "Basic setting" of GX Works3.

 [Navigation window] ⇒ [Parameter] ⇒ [Module information] ⇒ Target module ⇒ [Module Parameter] ⇒ [Basic setting]

1[U1]:FX5-8AD Module Parameter

Setting Item List







- Basic setting
 - Range switching function
 - Centigrade/Fahrenheit display setting function
 - Operation mode setting function
 - Conversion method
 - Application setting
 - Refresh settings

Setting Item

Item	CH1	CH2	CH3	CH4	CH5
Range switching function Input type Input range Setting Input type/range (Offset/gain setting)	The input range of the analog input can be set for each channel and the input conversion attribute can be changed. 0: Conversion dis 0: Conversion dis 0: Conversion dis 0: Conversion dis 0: Conversion dis				
Centigrade/Fahrenheit display setting function Centigrade/Fahrenheit display setting	Select the display method of the digital output value (Centigrade/Fahrenheit) Centigrade [°C] Centigrade [°C] Centigrade [°C] Centigrade [°C] Centigrade [°C]				
Operation mode setting function Operation mode setting Number of conversion enable channels	The three operation modes. "Normal mode" to execute the normal conversion. Normal mode 0				
Conversion method Average processing setting Time average/Count average/Moving average setting	Set the conversion control method. Sampling process: Sampling process: Sampling process: Sampling process: Sampling process 0 0 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

- 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

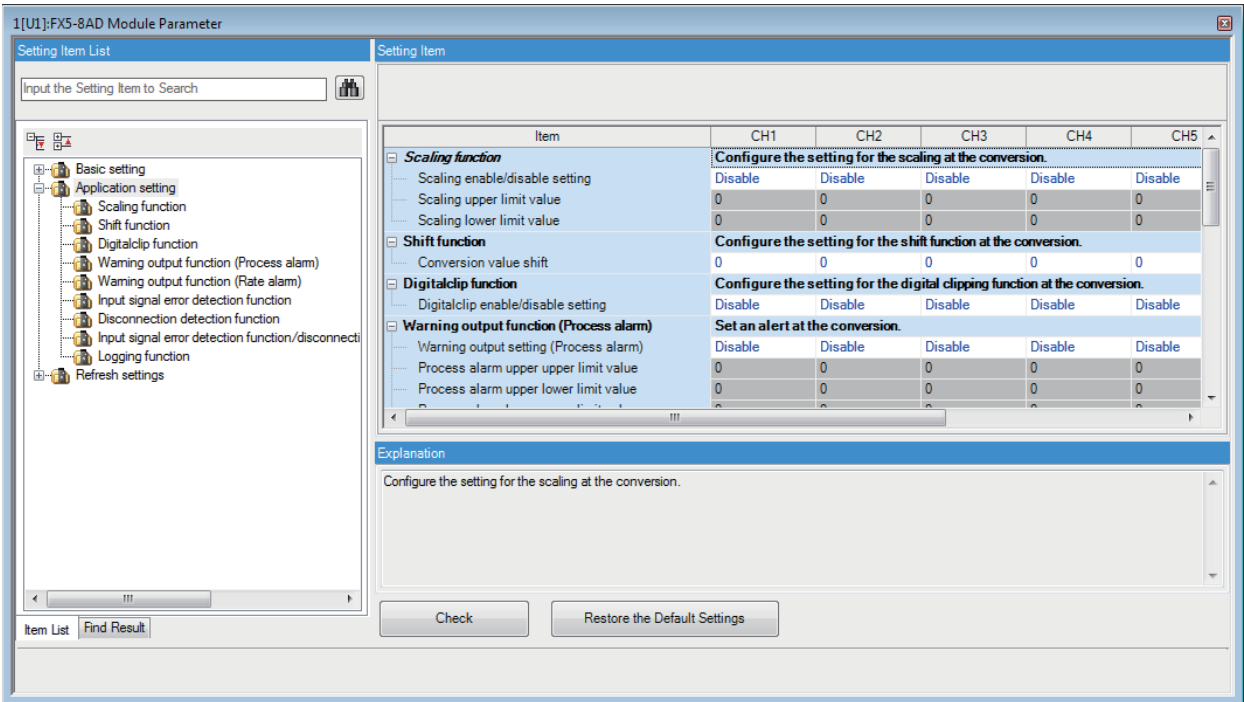
Double-click the item to be set to enter the numeric value.

7.2 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.

7.3 Refresh Setting

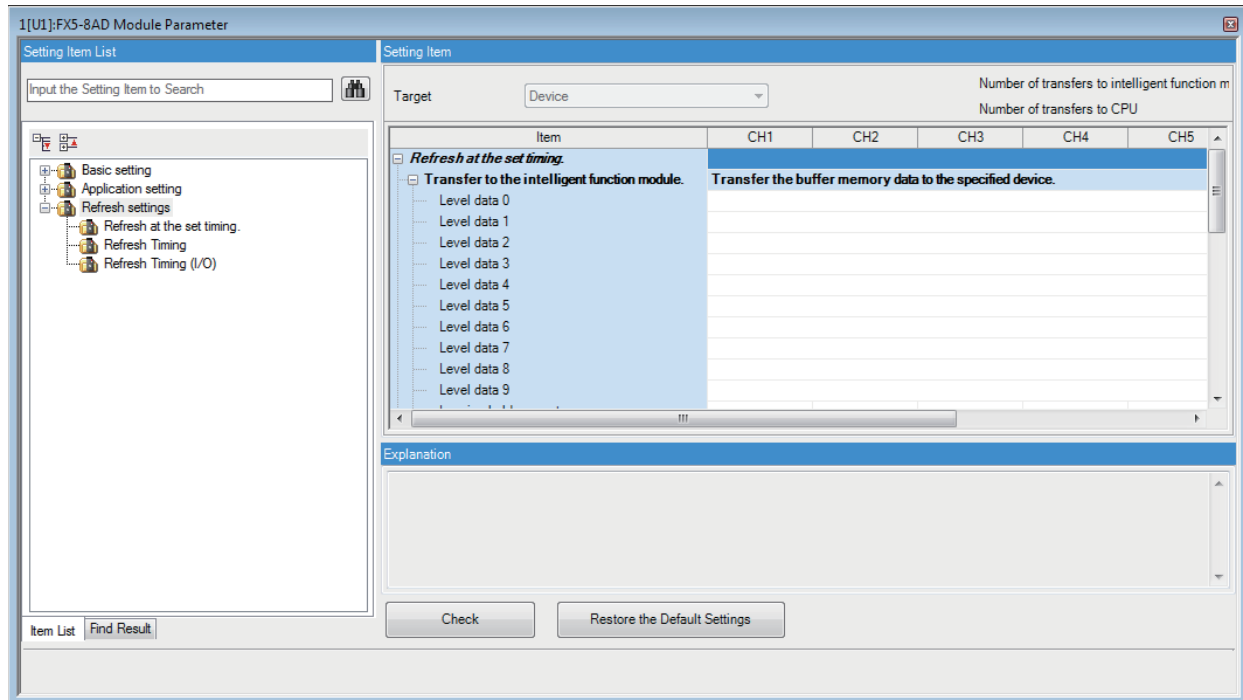
Setting procedure

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 numeric value.

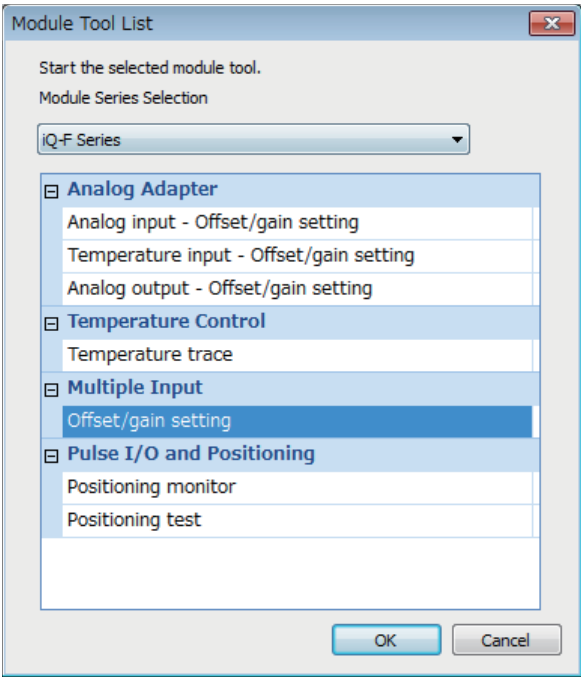
7.4 Offset/Gain Setting

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.

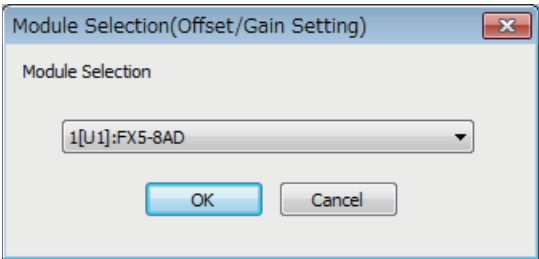
Setting procedure

When input type is current/voltage

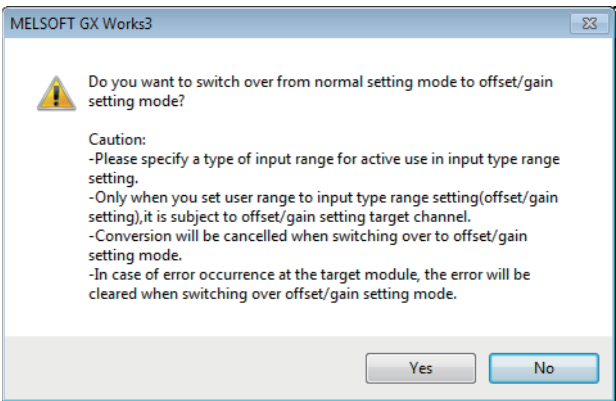
[Tool] ⇒ [Module Tool List]



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.



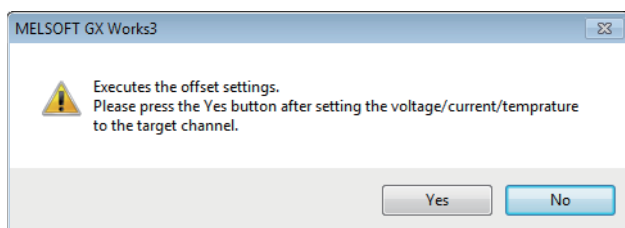
3. Click the [Yes] button.

4. Mark the checkbox of the channel where offset and gain values are to be set.



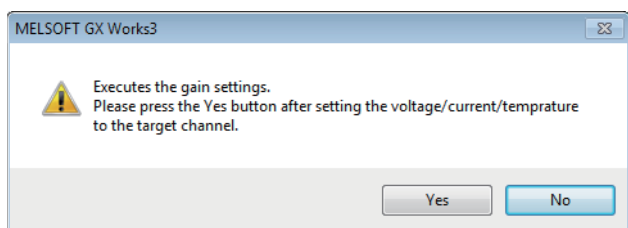
Set the input type (other than conversion disable) to be used in "Input type/Range setting" and "Setting Input type/range (Offset/gain setting)" to the user range setting in advance.

5. Select voltage or current and click the [Offset Setting] button.

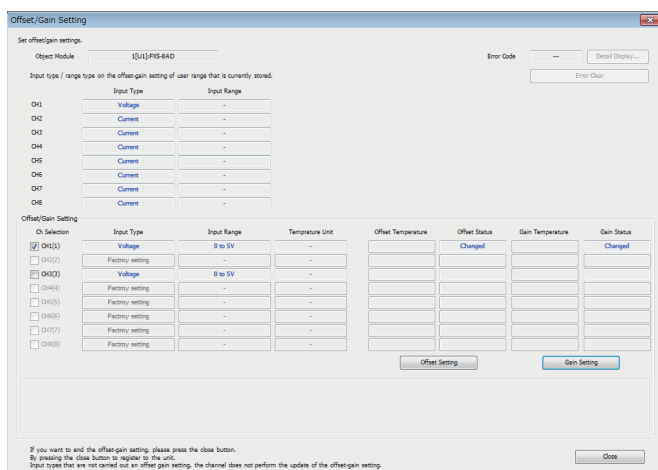


6. Apply the offset voltage or current to the corresponding channel, and click the [Yes] button.

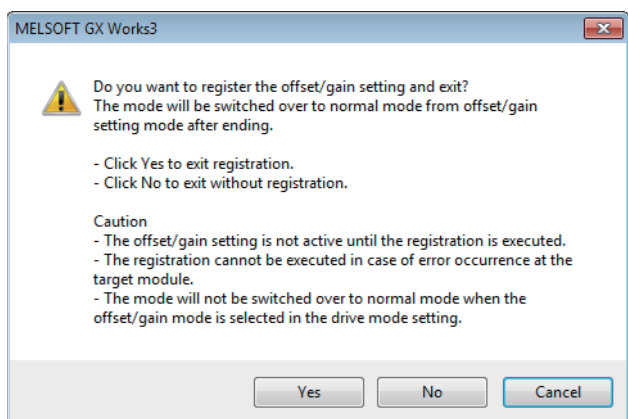
7. Check that "Offset Status" has changed to "Changed", and click the [Gain Setting] button.



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.



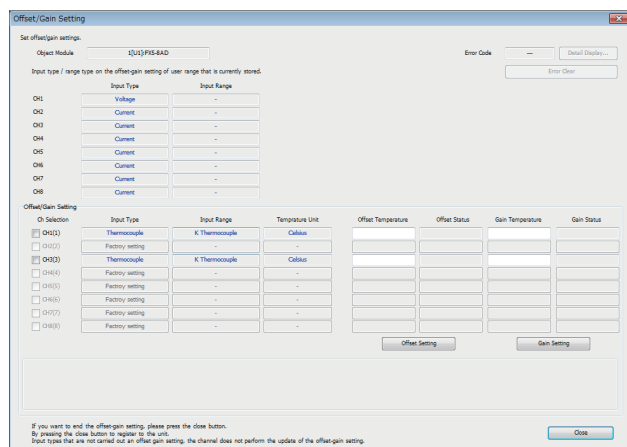
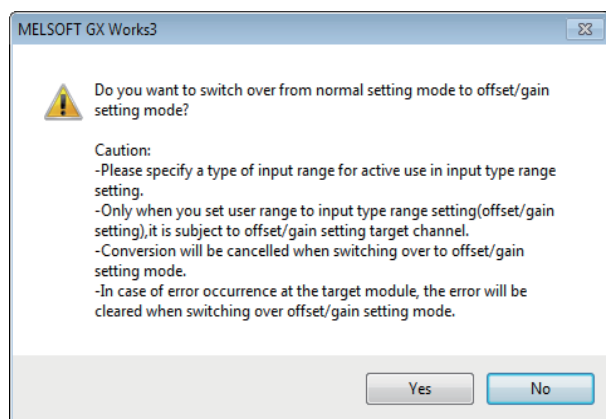
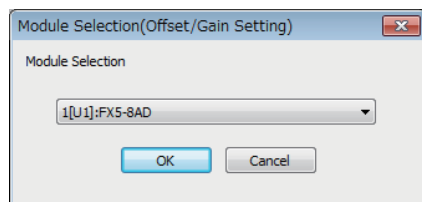
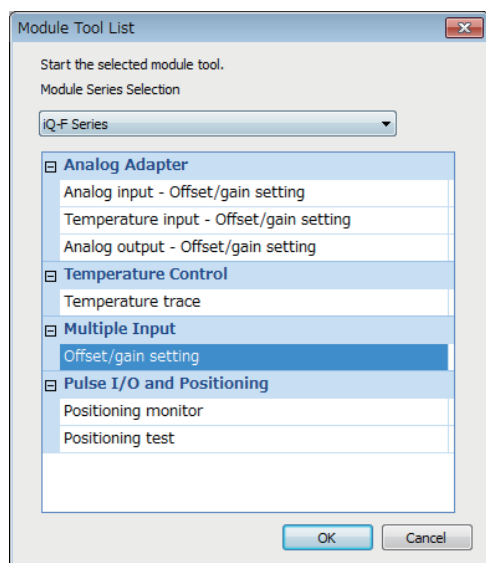
10. Click the [Yes] button.

Point

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: I/QJ/FIS-8AD

Error Code: -- [Default Display...] [Error Clear]

Input type / range type on the offset/gain setting of user range that is currently stored.

Channel	Input Type	Input Range
D1	Voltage	-
D2	Current	-
D3	Current	-
D4	Current	-
D5	Current	-
D6	Current	-
D7	Current	-
D8	Current	-

Offset/Gain Setting

Ch Selection	Input Type	Input Range	Temperature Unit	Offset Temperature	Offset Status	Gain Temperature	Gain Status
☒ CH1(1)	Thermocouple	K Thermocouple	Celsius	0.0	Not Changed	100.0	Not Changed
☐ CH2(2)	Factory setting	-	-	-	-	-	-
☐ CH3(3)	Thermocouple	K Thermocouple	Celsius	-	-	-	-
☐ CH4(4)	Factory setting	-	-	-	-	-	-
☐ CH5(5)	Factory setting	-	-	-	-	-	-
☐ CH6(6)	Factory setting	-	-	-	-	-	-
☐ CH7(7)	Factory setting	-	-	-	-	-	-
☐ CH8(8)	Factory setting	-	-	-	-	-	-

Settable temperature range:
 condition 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 Lower value, please perform the adjustment of the offset gain in the vicinity of the highest value in the case of Fahrenheit: 328.0 to 2192.0 F

Condition 2
 K Thermocouple
 In the case of Celsius: -200.0 to 2200.0 C

If you want to end the offset/gain setting, please press the close button.
 By pressing the close button to register in 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.

[Offset Setting] [Gain Setting] [Close]

MELSOFT GX Works3

Executes the offset settings.
Please press the Yes button after setting the voltage/current/temperature to the target channel.

[Yes] [No]

Offset/Gain Setting

Set offset/gain settings.

Object Module: I/QJ/FIS-8AD

Error Code: -- [Default Display...] [Error Clear]

Input type / range type on the offset/gain setting of user range that is currently stored.

Channel	Input Type	Input Range
D1	Voltage	-
D2	Current	-
D3	Current	-
D4	Current	-
D5	Current	-
D6	Current	-
D7	Current	-
D8	Current	-

Offset/Gain Setting

Ch Selection	Input Type	Input Range	Temperature Unit	Offset Temperature	Offset Status	Gain Temperature	Gain Status
☒ CH1(1)	Thermocouple	K Thermocouple	Celsius	0.0	Changed	100.0	Not Changed
☐ CH2(2)	Factory setting	-	-	-	-	-	-
☐ CH3(3)	Thermocouple	K Thermocouple	Celsius	-	-	-	-
☐ CH4(4)	Factory setting	-	-	-	-	-	-
☐ CH5(5)	Factory setting	-	-	-	-	-	-
☐ CH6(6)	Factory setting	-	-	-	-	-	-
☐ CH7(7)	Factory setting	-	-	-	-	-	-
☐ CH8(8)	Factory setting	-	-	-	-	-	-

Settable temperature range:
 condition 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 Lower value, please perform the adjustment of the offset gain in the vicinity of the highest value in the case of Fahrenheit: 328.0 to 2192.0 F

Condition 2
 K Thermocouple
 In the case of Celsius: -200.0 to 2200.0 C

If you want to end the offset/gain setting, please press the close button.
 By pressing the close button to register in 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.

[Offset Setting] [Gain Setting] [Close]

MELSOFT GX Works3

Executes the gain settings.
Please press the Yes button after setting the voltage/current/temperature to the target channel.

[Yes] [No]

Offset/Gain Setting

Set offset/gain settings.

Object Module: I/QJ/FIS-8AD

Error Code: -- [Default Display...] [Error Clear]

Input type / range type on the offset/gain setting of user range that is currently stored.

Channel	Input Type	Input Range
D1	Voltage	-
D2	Current	-
D3	Current	-
D4	Current	-
D5	Current	-
D6	Current	-
D7	Current	-
D8	Current	-

Offset/Gain Setting

Ch Selection	Input Type	Input Range	Temperature Unit	Offset Temperature	Offset Status	Gain Temperature	Gain Status
☒ CH1(1)	Thermocouple	K Thermocouple	Celsius	0.0	Changed	100.0	Changed
☐ CH2(2)	Factory setting	-	-	-	-	-	-
☐ CH3(3)	Thermocouple	K Thermocouple	Celsius	-	-	-	-
☐ CH4(4)	Factory setting	-	-	-	-	-	-
☐ CH5(5)	Factory setting	-	-	-	-	-	-
☐ CH6(6)	Factory setting	-	-	-	-	-	-
☐ CH7(7)	Factory setting	-	-	-	-	-	-
☐ CH8(8)	Factory setting	-	-	-	-	-	-

Settable temperature range:
 condition 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 Lower value, please perform the adjustment of the offset gain in the vicinity of the highest value in the case of Fahrenheit: 328.0 to 2192.0 F

Condition 2
 K Thermocouple
 In the case of Celsius: -200.0 to 2200.0 C

If you want to end the offset/gain setting, please press the close button.
 By pressing the close button to register in 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.

[Offset Setting] [Gain Setting] [Close]

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.

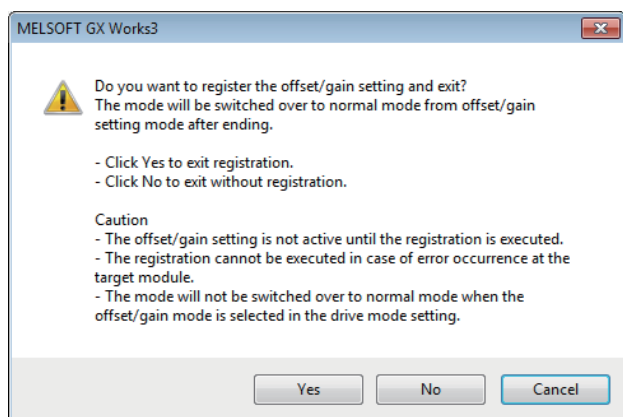
8. Check that "Offset Status" has changed to "Changed".

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.

Point

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.

8 PROGRAMMING

This chapter describes the programming procedure and the basic program of a multiple input module.

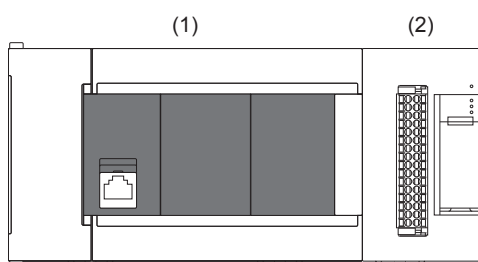
8.1 Programming Procedure

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



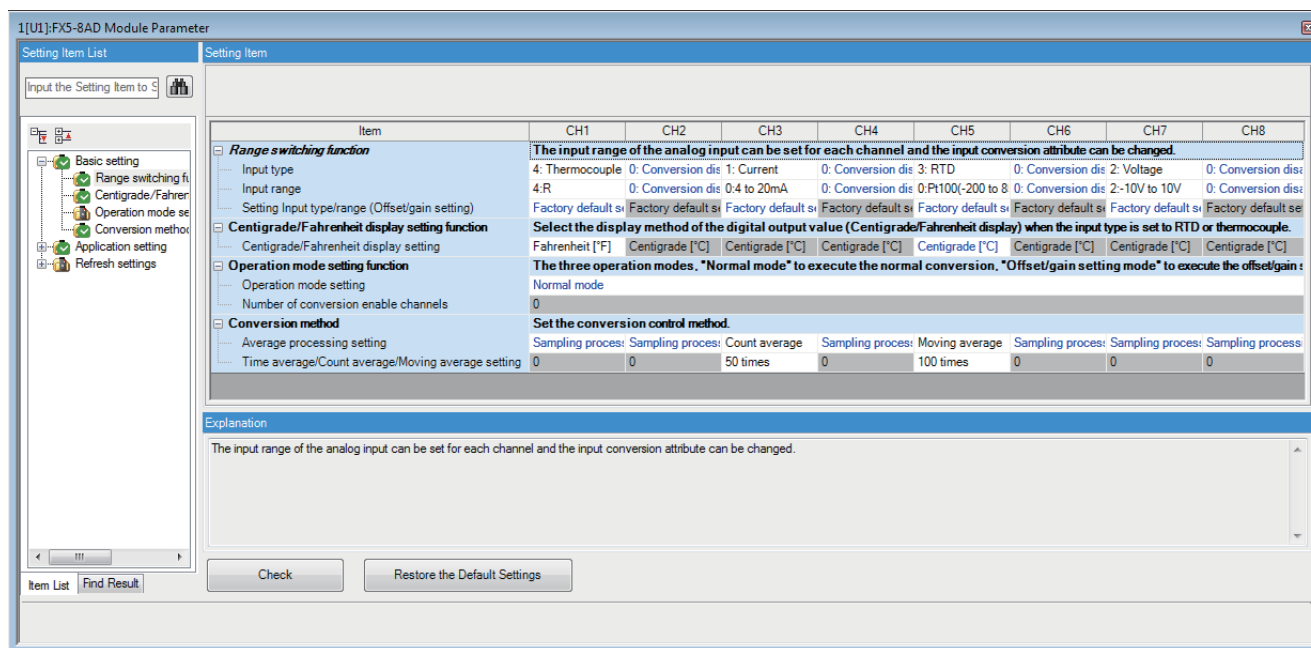
- (1) CPU module (FX5U CPU module)
(2) Multiple input module (FX5-8AD)

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.



■Application setting

Configure the application setting as shown below.

1[U1]:FX5-8AD Module Parameter

Setting Item List

Input the Setting Item to Search

Basic setting
Application setting
Scaling function
Shift function
Digitalclip function
Warning output function (F)
Warning output function (F)
Input signal error detection
Disconnection detection fu
Input signal error detection
Logging function
Refresh settings

Setting Item

Item	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Scaling function	Configure the setting for the scaling at the conversion.							
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
Shift function	Configure the setting for the shift function at the conversion.							
Conversion value shift	0	0	0	0	0	0	2000	0
Digitalclip function	Configure the setting for the digital clipping function at the conversion.							
Digitalclip enable/disable setting	Disable	Disable	Disable	Disable	Disable	Disable	Enable	Disable
Warning output function (Process alarm)	Set an alert at the conversion.							
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
Warning output function (Rate alarm)	Set an alert at the conversion.							
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 %
Input signal error detection function	Configure the setting for the input signal at the conversion.							
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 %
Disconnection detection function	Configure the setting for the disconnection detection at the conversion.							
Disconnection detection function enable/disable setti	Enable	Enable	Enable	Enable	Disable	Enable	Enable	Enable
Conversion setting for disconnection detection	Value immediatel	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
Input signal error detection function/disconnection	Set whether to enable or disable auto-clearing of input signal errors and disconnection by using the input signal error detection function.							
Input signal error/disconnection detection auto-clear	Disable							
Logging function	Configure the setting for the logging function at the conversion.							
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 v
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

Item List Find Result

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
	1 CH1_DigOutValue	Word [Signed]	VAR_GLOBAL
	2 CH3_DigOutValue	Word [Signed]	VAR_GLOBAL
	3 CH5_DigOutValue	Word [Signed]	VAR_GLOBAL
	4 CH7_DigOutValue	Word [Signed]	VAR_GLOBAL
	5 CH5_DigMaxVal	Word [Signed]	VAR_GLOBAL
	6 CH5_DigMinVal	Word [Signed]	VAR_GLOBAL
	7 CH3_ProcAlmUpLimit	Bit	VAR_GLOBAL
	8 CH3_ProcAlmLowLimit	Bit	VAR_GLOBAL
	9 CH1_RateAlmUpLimit	Bit	VAR_GLOBAL
	10 CH1_RateAlmLowLimit	Bit	VAR_GLOBAL
	11 CH7_InputSigErr	Bit	VAR_GLOBAL
	12 DigitOutValSig	Bit	VAR_GLOBAL
	13 CH1_Disconnection	Bit	VAR_GLOBAL
	14 MaxMinReadSig	Bit	VAR_GLOBAL
	15 MaxMinResetSig	Bit	VAR_GLOBAL
	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
	21 InSigErrResetSig	Bit	VAR_GLOBAL
Assign (Device/Label)			
D11			
D12			
D13			
D14			
D15			
D16			
F0			
F1			
F2			
F3			
F4			
X10			
F5			
X11			
X12			
X13			
X14			

Program example

■Digital output value readout processing

(0)	DigitOutValSig	FX5_BAD_1.bModuleREADY_D	FX5_BAD_1.bConversionCompletedFlag_D	FX5_BAD_1.bOperatingConditionSettingCompletedFlag_D	FX5_BAD_1.uConversionCompletedFlag_D.0				MOV	FX5_BAD_1.stnMonitor_D[0].wDigitalOutputValue_D	CH1_DigOutValue
	X10	U1#G69.0	U1#G69.E	U1#G69.9	U1#G42.0					U1#G400	D11
					FX5_BAD_1.uConversionCompletedFlag_D.2				MOV	FX5_BAD_1.stnMonitor_D[2].wDigitalOutputValue_D	CH3_DigOutValue
					U1#G42.2					U1#G800	D12
					FX5_BAD_1.uConversionCompletedFlag_D.4				MOV	FX5_BAD_1.stnMonitor_D[4].wDigitalOutputValue_D	CH5_DigOutValue
					U1#G42.4					U1#G1200	D13
					FX5_BAD_1.uConversionCompletedFlag_D.6				MOV	FX5_BAD_1.stnMonitor_D[6].wDigitalOutputValue_D	CH7_DigOutValue
					U1#G42.6					U1#G1600	D14
(156)											
											(END)

■Maximum/minimum value readout/clear processing

(0)	MaxMinReadSig	FX5_BAD_1.bModuleREADY_D	FX5_BAD_1.bConversionCompletedFlag_D	FX5_BAD_1.bOperatingConditionSettingCompletedFlag_D	FX5_BAD_1.stnMonitor_D[4].uMaxResetCompFlag_D.0	FX5_BAD_1.stnMonitor_D[4].uMinResetCompFlag_D.0			MOV	FX5_BAD_1.stnMonitor_D[4].wMaxValue_D	CH5_DigMaxVal
	X11	U1#G69.0	U1#G69.E	U1#G69.9	U1#G1222.0	U1#G1223.0				U1#G1204	D15
									MOV	FX5_BAD_1.stnMonitor_D[4].wMinValue_D	CH5_DigMinVal
										U1#G1206	D16
(79)	MaxMinResetSig								SET	FX5_BAD_1.stnControl_D[4].uMaxResetReq_D.0	
	X12									U1#G1273.0	
									SET	FX5_BAD_1.stnControl_D[4].uMinResetReq_D.0	
										U1#G1274.0	
(139)	FX5_BAD_1.stnControl_D[4].uMaxResetReq_D.0	FX5_BAD_1.stnMonitor_D[4].uMaxResetCompFlag_D.0							RST	FX5_BAD_1.stnControl_D[4].uMaxResetReq_D.0	
	U1#G1273.0	U1#G1222.0								U1#G1273.0	
(165)	FX5_BAD_1.stnControl_D[4].uMinResetReq_D.0	FX5_BAD_1.stnMonitor_D[4].uMinResetCompFlag_D.0							RST	FX5_BAD_1.stnControl_D[4].uMinResetReq_D.0	
	U1#G1274.0	U1#G1223.0								U1#G1274.0	
(197)											(END)

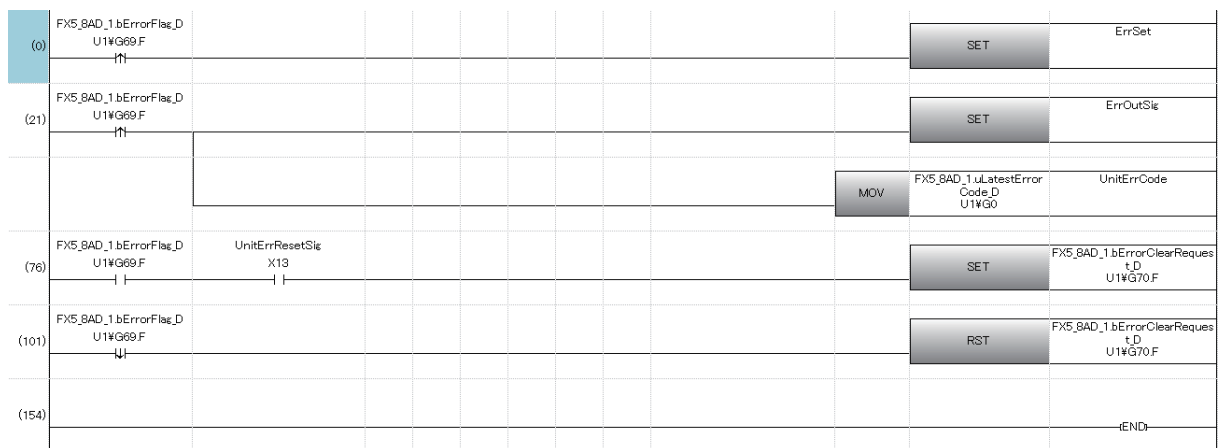
■Process alarm occurrence processing

(0)	FX5_BAD_1.uWarningOutputFlagProcessAlarmUpperLimit_D.2								SET	CH3_ProcAlmUpLimit_F0	
	U1#G36.2										
(49)	FX5_BAD_1.uWarningOutputFlagProcessAlarmLowerLimit_D.2								SET	CH3_ProcAlmLowLimit_F1	
	U1#G37.2										
(81)											(END)

■Rate alarm occurrence processing

(0)	FX5_BAD_1.uWarningOutputFlagRateAlarmUpperLimit_D.0								SET	CH1_RateAlmUpLimit_F2	
	U1#G38.0										
(46)	FX5_BAD_1.uWarningOutputFlagRateAlarmLowerLimit_D.0								SET	CH1_RateAlmLowLimit_F3	
	U1#G39.0										
(76)											(END)

8



9 TROUBLESHOOTING

This chapter describes errors that may occur in the use of a multiple input module and those troubleshooting.

9.1 Troubleshooting with the LEDs

Check the state of the LEDs to narrow down the possible causes of the trouble. This step is the first diagnostics before using 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. On: Normal operation Flashing: Offset/gain setting mode Off: Error
ERROR LED	Indicates the error status of the module.*1 On: Minor error or major error Flashing: Moderate error or major error Off: Normal operation
ALM LED	Indicates the alarm status of the module.*2 On: Process alarm or rate alarm issued Flashing: Input signal error or disconnection detection detected Off: Normal operation

*1 For details, refer to the following.

☞ Page 100 List of Error Codes

*2 For details, refer to the following.

☞ Page 103 List of Alarm Codes

9.2 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.  Page 100 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. 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). Take actions described in the list of alarm codes.  Page 103 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. Take actions described in the list of alarm codes.  Page 103 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. If the user range setting is selected, change the other input range to the factory shipment setting, and check that the conversion is performed. 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: • Time average setting value $\geq 4 \text{ (times)} \times 1 \text{ (ms)} \times \text{Number of input type current/voltage specified channel}$ 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. 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. 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.  Page 100 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. 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). Take actions described in the list of alarm codes. ☞ Page 103 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. Take actions described in the list of alarm codes. ☞ Page 103 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. • A shielded cable for the used channel is grounded or not. • The thermocouple and compensation lead wire are reversely connected or not.
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. If the user range setting is used, change to the factory shipment setting, and check that the conversion is performed. 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: • Time average setting value $\geq 4 \text{ (times)} \times 40 \text{ (ms)} \times \text{Number of Input type thermocouple/resistance temperature detector specified channel}$ 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. If the setting range is not correct, set input range from "Module parameter setting" screen again.

Check item	Corrective action
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. 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. 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. 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. 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.

9.3 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 1FFFH)

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	• A value out of the range is set in CH□ Input type/Range setting. • A value out of the range is set in CH□ Range setting (Offset/gain setting).	• Set CH□ Input type/Range setting to the value within the range again. • Set 0 or 1 in CH□ Range setting (Offset/gain setting).
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.

Error code	Error name	Description and cause	Corrective action
192□H	Time average setting range error	■When the input type is “current”, and “voltage” 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 resistance temperature detector, and thermocouple 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 “current”, and “voltage” 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 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: Upper upper limit value ≥ Upper lower limit value ≥ Lower upper limit value ≥ Lower lower limit value △ indicates that the set values are as follows: 1: Process alarm lower lower limit value > Process alarm lower upper limit value 2: Process alarm lower upper limit value > Process alarm upper lower limit value 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: 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: • 4 to 20 mA • 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. • 4 to 20 mA • 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. 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. 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: Offset value ≥ Gain value	Perform the offset/gain setting again so that the following condition is satisfied: 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: Offset value ≥ Gain value	Perform the offset/gain setting again so that the following condition is satisfied: 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. 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.

9.4 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.

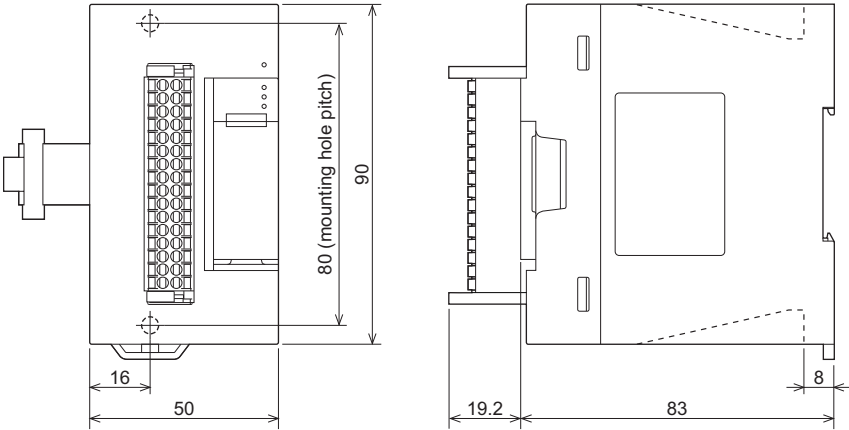
(CH1: 0, CH2: 1, CH3: 2, CH4: 3, CH5: 4, CH6: 5, CH7: 6, CH8: 7)

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 1 External Dimensions

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



(Unit: mm)

Appendix 2 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 - Equipment requirements and tests	Compliance with all relevant aspects of the standard. EMI • Radiated emission • Conducted emission EMS • Radiated electromagnetic field • Fast transient burst • Electrostatic discharge • High-energy surge • Voltage drops and interruptions • Conducted RF • 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

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 3 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 4 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 121 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 (decimal)	Address (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 writing enable code	0	Setting	×
306 to 399	132H to 18FH	System area	—	—	—

■Un\G400 to Un\G3599

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
400 (190H)	600 (258H)	800 (320H)	1000 (3E8H)	1200 (4B0H)	1400 (578H)	1600 (640H)	1800 (708H)	CH□ Digital output value	0	Monitor	○
401 (191H)	601 (259H)	801 (321H)	1001 (3E9H)	1201 (4B1H)	1401 (579H)	1601 (641H)	1801 (709H)	System area	—	—	—
402 (192H)	602 (25AH)	802 (322H)	1002 (3EAH)	1202 (4B2H)	1402 (57AH)	1602 (642H)	1802 (70AH)	CH□ Digital operation value	0	Monitor	○
403 (193H)	603 (25BH)	803 (323H)	1003 (3EBH)	1203 (4B3H)	1403 (57BH)	1603 (643H)	1803 (70BH)	System area	—	—	—
404 (194H)	604 (25CH)	804 (324H)	1004 (3ECH)	1204 (4B4H)	1404 (57CH)	1604 (644H)	1804 (70CH)	CH□ Maximum value	0	Monitor	○
405 (195H)	605 (25DH)	805 (325H)	1005 (3EDH)	1205 (4B5H)	1405 (57DH)	1605 (645H)	1805 (70DH)	System area	—	—	—
406 (196H)	606 (25EH)	806 (326H)	1006 (3EEH)	1206 (4B6H)	1406 (57EH)	1606 (646H)	1806 (70EH)	CH□ Minimum value	0	Monitor	○
407, 408 (197H, 198H)	607, 608 (25FH, 260H)	807, 808 (327H, 328H)	1007, 1008 (3EFH, 3F0H)	1207, 1208 (4B7H, 4B8H)	1407, 1408 (57FH, 580H)	1607, 1608 (647H, 648H)	1807, 1808 (70FH, 710H)	System area	—	—	—
409 (199H)	609 (261H)	809 (329H)	1009 (3F1H)	1209 (4B9H)	1409 (581H)	1609 (649H)	1809 (711H)	CH□ Logging hold flag	0	Monitor	○
410 to 419 (19AH to 1A3H)	610 to 619 (262H to 26BH)	810 to 819 (32AH to 333H)	1010 to 1019 (3F2H to 3FBH)	1210 to 1219 (4BAH to 4C3H)	1410 to 1419 (582H to 58BH)	1610 to 1619 (64AH to 653H)	1810 to 1819 (712H to 71BH)	System area	—	—	—
420 (1A4H)	620 (26CH)	820 (334H)	1020 (3FCH)	1220 (4C4H)	1420 (58CH)	1620 (654H)	1820 (71CH)	CH□ Conversion status	0	Monitor	×
421 (1A5H)	621 (26DH)	821 (335H)	1021 (3FDH)	1221 (4C5H)	1421 (58DH)	1621 (655H)	1821 (71DH)	System area	—	—	—
422 (1A6H)	622 (26EH)	822 (336H)	1022 (3FEH)	1222 (4C6H)	1422 (58EH)	1622 (656H)	1822 (71EH)	CH□ Maximum value reset completed flag	0	Monitor	×

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
423 (1A7H)	623 (26FH)	823 (337H)	1023 (3FFH)	1223 (4C7H)	1423 (58FH)	1623 (657H)	1823 (71FH)	CH□ Minimum value reset completed flag	0	Monitor	×
424 to 429 (1A8H to 1ADH)	624 to 629 (270H to 275H)	824 to 829 (338H to 33DH)	1024 to 1029 (400H to 405H)	1224 to 1229 (4C8H to 4CDH)	1424 to 1429 (590H to 595H)	1624 to 1629 (658H to 65DH)	1824 to 1829 (720H to 725H)	System area	—	—	—
430 (1AEH)	630 (276H)	830 (33EH)	1030 (406H)	1230 (4CEH)	1430 (596H)	1630 (65EH)	1830 (726H)	CH□ Input type/Range monitor	0000H	Monitor	×
431 (1AFH)	631 (277H)	831 (33FH)	1031 (407H)	1231 (4CFH)	1431 (597H)	1631 (65FH)	1831 (727H)	CH□ Input type/Range monitor (Offset/gain setting)	0	Monitor	×
432, 433 (1B0H, 1B1H)	632, 633 (278H, 279H)	832, 833 (340H, 341H)	1032, 1033 (408H, 409H)	1232, 1233 (4D0H, 4D1H)	1432, 1433 (598H, 599H)	1632, 1633 (660H, 661H)	1832, 1833 (728H, 729H)	System area	—	—	—
434 (1B2H)	634 (27AH)	834 (342H)	1034 (40AH)	1234 (4D2H)	1434 (59AH)	1634 (662H)	1834 (72AH)	CH□ Head pointer	0	Monitor	×
435 (1B3H)	635 (27BH)	835 (343H)	1035 (40BH)	1235 (4D3H)	1435 (59BH)	1635 (663H)	1835 (72BH)	CH□ Latest pointer	0	Monitor	×
436 (1B4H)	636 (27CH)	836 (344H)	1036 (40CH)	1236 (4D4H)	1436 (59CH)	1636 (664H)	1836 (72CH)	CH□ Number of logging data	0	Monitor	×
437 (1B5H)	637 (27DH)	837 (345H)	1037 (40DH)	1237 (4D5H)	1437 (59DH)	1637 (665H)	1837 (72DH)	CH□ Trigger pointer	0	Monitor	×
438 to 440 (1B6H to 1B8H)	638 to 640 (27EH to 280H)	838 to 840 (346H to 348H)	1038 to 1040 (40EH to 410H)	1238 to 1240 (4D6H to 4D8H)	1438 to 1440 (59EH to 5A0H)	1638 to 1640 (666H to 668H)	1838 to 1840 (72EH to 730H)	System area	—	—	—
441 (1B9H)	641 (281H)	841 (349H)	1041 (411H)	1241 (4D9H)	1441 (5A1H)	1641 (669H)	1841 (731H)	CH□ Logging cycle monitor value (s)	0	Monitor	×
442 (1BAH)	642 (282H)	842 (34AH)	1042 (412H)	1242 (4DAH)	1442 (5A2H)	1642 (66AH)	1842 (732H)	CH□ Logging cycle monitor value (ms)	0	Monitor	×
443 (1BBH)	643 (283H)	843 (34BH)	1043 (413H)	1243 (4DBH)	1443 (5A3H)	1643 (66BH)	1843 (733H)	System area	—	—	—
444 (1BCH)	644 (284H)	844 (34CH)	1044 (414H)	1244 (4DCH)	1444 (5A4H)	1644 (66CH)	1844 (734H)	CH□ Trigger generation time (First/Last two digits of the year)	0	Monitor	×
445 (1BDH)	645 (285H)	845 (34DH)	1045 (415H)	1245 (4DDH)	1445 (5A5H)	1645 (66DH)	1845 (735H)	CH□ Trigger generation time (Month/Day)	0	Monitor	×
446 (1BEH)	646 (286H)	846 (34EH)	1046 (416H)	1246 (4DEH)	1446 (5A6H)	1646 (66EH)	1846 (736H)	CH□ Trigger generation time (Hour/Minute)	0	Monitor	×
447 (1BFH)	647 (287H)	847 (34FH)	1047 (417H)	1247 (4DFH)	1447 (5A7H)	1647 (66FH)	1847 (737H)	CH□ Trigger generation time (Second/Day of the week)	0	Monitor	×
448 (1C0H)	648 (288H)	848 (350H)	1048 (418H)	1248 (4E0H)	1448 (5A8H)	1648 (670H)	1848 (738H)	CH□ Trigger generation time (Millisecond)	0	Monitor	×
449 to 451 (1C1H to 1C3H)	649 to 651 (289H to 28BH)	849 to 851 (351H to 353H)	1049 to 1051 (419H to 41BH)	1249 to 1251 (4E1H to 4E3H)	1449 to 1451 (5A9H to 5ABH)	1649 to 1651 (671H to 673H)	1849 to 1851 (739H to 73BH)	System area	—	—	—
452 (1C4H)	652 (28CH)	852 (354H)	1052 (41CH)	1252 (4E4H)	1452 (5ACH)	1652 (674H)	1852 (73CH)	CH□ Celsius/Fahrenheit display monitor	0	Monitor	×
453 (1C5H)	653 (28DH)	853 (355H)	1053 (41DH)	1253 (4E5H)	1453 (5ADH)	1653 (675H)	1853 (73DH)	CH□ NowSetting user range base input type monitor	1	Monitor	×
454 (1C6H)	654 (28EH)	854 (356H)	1054 (41EH)	1254 (4E6H)	1454 (5AEH)	1654 (676H)	1854 (73EH)	CH□ NowSetting user range base input range monitor	0000H	Monitor	×
455 to 470 (1C7H to 1D6H)	655 to 670 (28FH to 29EH)	855 to 870 (357H to 366H)	1055 to 1070 (41FH to 42EH)	1255 to 1270 (4E7H to 4F6H)	1455 to 1470 (5AFH to 5BEH)	1655 to 1670 (677H to 686H)	1855 to 1870 (73FH to 74EH)	System area	—	—	—

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
471 (1D7H)	671 (29FH)	871 (367H)	1071 (42FH)	1271 (4F7H)	1471 (5BFH)	1671 (687H)	1871 (74FH)	CH□ Logging hold request	0	Control	○
472 (1D8H)	672 (2A0H)	872 (368H)	1072 (430H)	1272 (4F8H)	1472 (5C0H)	1672 (688H)	1872 (750H)	CH□ Conversion value shift amount	0	Control	○
473 (1D9H)	673 (2A1H)	873 (369H)	1073 (431H)	1273 (4F9H)	1473 (5C1H)	1673 (689H)	1873 (751H)	CH□ Maximum value reset request	0	Control	×
474 (1DAH)	674 (2A2H)	874 (36AH)	1074 (432H)	1274 (4FAH)	1474 (5C2H)	1674 (68AH)	1874 (752H)	CH□ Minimum value reset request	0	Control	×
475 to 500 (1DBH to 1F4H)	675 to 700 (2A3H to 2BCH)	875 to 900 (36BH to 384H)	1075 to 1100 (433H to 44CH)	1275 to 1300 (4FBH to 514H)	1475 to 1500 (5C3H to 5DCH)	1675 to 1700 (68BH to 6A4H)	1875 to 1900 (753H to 76CH)	System area	—	—	—
501 (1F5H)	701 (2BDH)	901 (385H)	1101 (44DH)	1301 (515H)	1501 (5DDH)	1701 (6A5H)	1901 (76DH)	CH□ Averaging process specification	0	Setting	×
502 (1F6H)	702 (2BEH)	902 (386H)	1102 (44EH)	1302 (516H)	1502 (5DEH)	1702 (6A6H)	1902 (76EH)	CH□ Time Average/Count Average/Moving Average setting	0	Setting	×
503 (1F7H)	703 (2BFH)	903 (387H)	1103 (44FH)	1303 (517H)	1503 (5DFH)	1703 (6A7H)	1903 (76FH)	System area	—	—	—
504 (1F8H)	704 (2C0H)	904 (388H)	1104 (450H)	1304 (518H)	1504 (5E0H)	1704 (6A8H)	1904 (770H)	CH□ Scaling enable/disable setting	1	Setting	×
505 (1F9H)	705 (2C1H)	905 (389H)	1105 (451H)	1305 (519H)	1505 (5E1H)	1705 (6A9H)	1905 (771H)	System area	—	—	—
506 (1FAH)	706 (2C2H)	906 (38AH)	1106 (452H)	1306 (51AH)	1506 (5E2H)	1706 (6AAH)	1906 (772H)	CH□ Scaling upper limit value	0	Setting	×
507 (1FBH)	707 (2C3H)	907 (38BH)	1107 (453H)	1307 (51BH)	1507 (5E3H)	1707 (6ABH)	1907 (773H)	System area	—	—	—
508 (1FCH)	708 (2C4H)	908 (38CH)	1108 (454H)	1308 (51CH)	1508 (5E4H)	1708 (6ACH)	1908 (774H)	CH□ Scaling lower limit value	0	Setting	×
509 (1FDH)	709 (2C5H)	909 (38DH)	1109 (455H)	1309 (51DH)	1509 (5E5H)	1709 (6ADH)	1909 (775H)	System area	—	—	—
510 (1FEH)	710 (2C6H)	910 (38EH)	1110 (456H)	1310 (51EH)	1510 (5E6H)	1710 (6AEH)	1910 (776H)	CH□ Digital clipping enable/ disable setting	1	Setting	×
511 (1FFH)	711 (2C7H)	911 (38FH)	1111 (457H)	1311 (51FH)	1511 (5E7H)	1711 (6AFH)	1911 (777H)	System area	—	—	—
512 (200H)	712 (2C8H)	912 (390H)	1112 (458H)	1312 (520H)	1512 (5E8H)	1712 (6B0H)	1912 (778H)	CH□ Alert output setting (Process alarm)	1	Setting	×
513 (201H)	713 (2C9H)	913 (391H)	1113 (459H)	1313 (521H)	1513 (5E9H)	1713 (6B1H)	1913 (779H)	CH□ Alert output setting (Rate alarm)	1	Setting	×
514 (202H)	714 (2CAH)	914 (392H)	1114 (45AH)	1314 (522H)	1514 (5EAH)	1714 (6B2H)	1914 (77AH)	CH□ Process alarm upper upper limit value	0	Setting	×
515 (203H)	715 (2CBH)	915 (393H)	1115 (45BH)	1315 (523H)	1515 (5EBH)	1715 (6B3H)	1915 (77BH)	System area	—	—	—
516 (204H)	716 (2CCH)	916 (394H)	1116 (45CH)	1316 (524H)	1516 (5ECH)	1716 (6B4H)	1916 (77CH)	CH□ Process alarm upper lower limit value	0	Setting	×
517 (205H)	717 (2CDH)	917 (395H)	1117 (45DH)	1317 (525H)	1517 (5EDH)	1717 (6B5H)	1917 (77DH)	System area	—	—	—
518 (206H)	718 (2CEH)	918 (396H)	1118 (45EH)	1318 (526H)	1518 (5EEH)	1718 (6B6H)	1918 (77EH)	CH□ Process alarm lower upper limit value	0	Setting	×
519 (207H)	719 (2CFH)	919 (397H)	1119 (45FH)	1319 (527H)	1519 (5EFH)	1719 (6B7H)	1919 (77FH)	System area	—	—	—
520 (208H)	720 (2D0H)	920 (398H)	1120 (460H)	1320 (528H)	1520 (5F0H)	1720 (6B8H)	1920 (780H)	CH□ Process alarm lower lower limit value	0	Setting	×
521 (209H)	721 (2D1H)	921 (399H)	1121 (461H)	1321 (529H)	1521 (5F1H)	1721 (6B9H)	1921 (781H)	System area	—	—	—
522 (20AH)	722 (2D2H)	922 (39AH)	1122 (462H)	1322 (52AH)	1522 (5F2H)	1722 (6BAH)	1922 (782H)	CH□ Rate alarm alert detection cycle setting	0	Setting	×

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
523 (20BH)	723 (2D3H)	923 (39BH)	1123 (463H)	1323 (52BH)	1523 (5F3H)	1723 (6BBH)	1923 (783H)	System area	—	—	—
524 (20CH)	724 (2D4H)	924 (39CH)	1124 (464H)	1324 (52CH)	1524 (5F4H)	1724 (6BCH)	1924 (784H)	CH□ Rate alarm upper limit value	0	Setting	×
525 (20DH)	725 (2D5H)	925 (39DH)	1125 (465H)	1325 (52DH)	1525 (5F5H)	1725 (6BDH)	1925 (785H)	System area	—	—	—
526 (20EH)	726 (2D6H)	926 (39EH)	1126 (466H)	1326 (52EH)	1526 (5F6H)	1726 (6BEH)	1926 (786H)	CH□ Rate alarm lower limit value	0	Setting	×
527 (20FH)	727 (2D7H)	927 (39FH)	1127 (467H)	1327 (52FH)	1527 (5F7H)	1727 (6BFH)	1927 (787H)	System area	—	—	—
528 (210H)	728 (2D8H)	928 (3A0H)	1128 (468H)	1328 (530H)	1528 (5F8H)	1728 (6C0H)	1928 (788H)	CH□ Input signal error detection setting	0	Setting	×
529 (211H)	729 (2D9H)	929 (3A1H)	1129 (469H)	1329 (531H)	1529 (5F9H)	1729 (6C1H)	1929 (789H)	CH□ Input signal error detection lower limit set value	50	Setting	×
530 (212H)	730 (2DAH)	930 (3A2H)	1130 (46AH)	1330 (532H)	1530 (5FAH)	1730 (6C2H)	1930 (78AH)	CH□ Input signal error detection upper limit set value	50	Setting	×
531 (213H)	731 (2DBH)	931 (3A3H)	1131 (46BH)	1331 (533H)	1531 (5FBH)	1731 (6C3H)	1931 (78BH)	CH□ Disconnection detection enable/disable setting	0	Setting	×
532 (214H)	732 (2DCH)	932 (3A4H)	1132 (46CH)	1332 (534H)	1532 (5FCH)	1732 (6C4H)	1932 (78CH)	CH□ Conversion setting value at disconnection detection	0	Setting	×
533 (215H)	733 (2DDH)	933 (3A5H)	1133 (46DH)	1333 (535H)	1533 (5FDH)	1733 (6C5H)	1933 (78DH)	System area	—	—	—
534 (216H)	734 (2DEH)	934 (3A6H)	1134 (46EH)	1334 (536H)	1534 (5FEH)	1734 (6C6H)	1934 (78EH)	CH□ Conversion setting at disconnection detection	1	Setting	×
535 (217H)	735 (2DFH)	935 (3A7H)	1135 (46FH)	1335 (537H)	1535 (5FFH)	1735 (6C7H)	1935 (78FH)	CH□ Logging enable/disable setting	1	Setting	×
536 (218H)	736 (2E0H)	936 (3A8H)	1136 (470H)	1336 (538H)	1536 (600H)	1736 (6C8H)	1936 (790H)	CH□ Logging data setting	1	Setting	×
537 (219H)	737 (2E1H)	937 (3A9H)	1137 (471H)	1337 (539H)	1537 (601H)	1737 (6C9H)	1937 (791H)	CH□ Logging cycle setting value	1	Setting	×
538 (21AH)	738 (2E2H)	938 (3AAH)	1138 (472H)	1338 (53AH)	1538 (602H)	1738 (6CAH)	1938 (792H)	CH□ Logging cycle unit setting	1	Setting	×
539 (21BH)	739 (2E3H)	939 (3ABH)	1139 (473H)	1339 (53BH)	1539 (603H)	1739 (6CBH)	1939 (793H)	CH□ Post-trigger logging points	5000	Setting	×
540 (21CH)	740 (2E4H)	940 (3ACH)	1140 (474H)	1340 (53CH)	1540 (604H)	1740 (6CCH)	1940 (794H)	CH□ Level trigger condition setting	0	Setting	×
541 (21DH)	741 (2E5H)	941 (3ADH)	1141 (475H)	1341 (53DH)	1541 (605H)	1741 (6CDH)	1941 (795H)	CH□ Trigger data	*1	Setting	×
542 (21EH)	742 (2E6H)	942 (3AEH)	1142 (476H)	1342 (53EH)	1542 (606H)	1742 (6CEH)	1942 (796H)	CH□ Trigger setting value	0	Setting	×
543 to 546 (21FH to 222H)	743 to 746 (2E7H to 2EAH)	943 to 946 (3AFH to 3B2H)	1143 to 1146 (477H to 47AH)	1343 to 1346 (53FH to 542H)	1543 to 1546 (607H to 60AH)	1743 to 1746 (6CFH to 6D2H)	1943 to 1946 (797H to 79AH)	System area	—	—	—
547 (223H)	747 (2EBH)	947 (3B3H)	1147 (47BH)	1347 (543H)	1547 (60BH)	1747 (6D3H)	1947 (79BH)	CH□ Celsius/Fahrenheit display setting	0	Setting	×
548 to 561 (224H to 231H)	748 to 761 (2ECH to 2F9H)	948 to 961 (3B4H to 3C1H)	1148 to 1161 (47CH to 489H)	1348 to 1361 (544H to 551H)	1548 to 1561 (60CH to 619H)	1748 to 1761 (6D4H to 6E1H)	1948 to 1961 (79CH to 7A9H)	System area	—	—	—
562 (232H)	762 (2FAH)	962 (3C2H)	1162 (48AH)	1362 (552H)	1562 (61AH)	1762 (6E2H)	1962 (7AAH)	CH□ Offset setting value	0	Setting	×
563 (233H)	763 (2FBH)	963 (3C3H)	1163 (48BH)	1363 (553H)	1563 (61BH)	1763 (6E3H)	1963 (7ABH)	System area	—	—	—
564 (234H)	764 (2FCH)	964 (3C4H)	1164 (48CH)	1364 (554H)	1564 (61CH)	1764 (6E4H)	1964 (7ACH)	CH□ Gain setting value	0	Setting	×

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
565 to 597 (235H to 255H)	765 to 797 (2FDH to 31DH)	965 to 997 (3C5H to 3E5H)	1165 to 1197 (48DH to 4ADH)	1365 to 1397 (555H to 575H)	1565 to 1597 (61DH to 63DH)	1765 to 1797 (6E5H to 705H)	1965 to 1997 (7ADH to 7CDH)	System area	—	—	—
598 (256H)	798 (31EH)	998 (3E6H)	1198 (4AEH)	1398 (576H)	1598 (63EH)	1798 (706H)	1998 (7CEH)	CH□ Setting Input type/ range	FH	Setting	×
599 (257H)	799 (31FH)	999 (3E7H)	1199 (4AFH)	1399 (577H)	1599 (63FH)	1799 (707H)	1999 (7CFH)	CH□ Setting Input type/ range (Offset/gain setting)	0	Setting	×
2000 to 3599 (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 (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	×

Address (decimal)	Address (hexadecimal)	Name	Default value	Data type	Auto refresh
3746 to 3749	EA2H to EA5H	System area	—	—	—
3750 to 3755	EA6H to EABH	Error history 16	0	Monitor	×
3756 to 3759	EACH to EAFH	System area	—	—	—

■Alarm history (Un\G3760 to Un\G3999)

Address (decimal)	Address (hexadecimal)	Name	Default value	Data type	Auto refresh
3760	EB0H	Alarm history 1	0	Monitor	×
3761	EB1H	Alarm code			
		Alarm time			
3762	EB2H	First two digits of the year			
3763	EB3H	Last two digits of the year			
3764	EB4H	Month			
		Day	0	Monitor	×
		Hour			
		Minute			
3765	EB5H	Second	0	Monitor	×
		Day of the week			
3766	EB6H	Millisecond	—	—	—
3766 to 3769	EB6H to EB9H	System area	—	—	—
3770 to 3775	EBAH to EBFH	Alarm history 2	0	Monitor	×
3776 to 3779	EC0H to EC3H	System area	—	—	—
3780 to 3785	EC4H to EC9H	Alarm history 3	0	Monitor	×
3786 to 3789	ECAH to ECDH	System area	—	—	—
3790 to 3795	ECEH to ED3H	Alarm history 4	0	Monitor	×
3796 to 3799	ED4H to ED7H	System area	—	—	—
3800 to 3805	ED8H to EDDH	Alarm history 5	0	Monitor	×
3806 to 3809	EDEH to EE1H	System area	—	—	—
3810 to 3815	EE2H to EE7H	Alarm history 6	0	Monitor	×
3816 to 3819	EE8H to EEBH	System area	—	—	—
3820 to 3825	EECH to EF1H	Alarm history 7	0	Monitor	×
3826 to 3829	EF2H to EF5H	System area	—	—	—
3830 to 3835	EF6H to EFBH	Alarm history 8	0	Monitor	×
3836 to 3839	EFCH to EFFH	System area	—	—	—
3840 to 3845	F00H to F05H	Alarm history 9	0	Monitor	×
3846 to 3849	F06H to F09H	System area	—	—	—
3850 to 3855	F0AH to F0FH	Alarm history 10	0	Monitor	×
3856 to 3859	F10H to F13H	System area	—	—	—
3860 to 3865	F14H to F19H	Alarm history 11	0	Monitor	×
3866 to 3869	F1AH to F1DH	System area	—	—	—
3870 to 3875	F1EH to F23H	Alarm history 12	0	Monitor	×
3876 to 3879	F24H to F27H	System area	—	—	—
3880 to 3885	F28H to F2DH	Alarm history 13	0	Monitor	×
3886 to 3889	F2EH to F31H	System area	—	—	—
3890 to 3895	F32H to F37H	Alarm history 14	0	Monitor	×
3896 to 3899	F38H to F3BH	System area	—	—	—
3900 to 3905	F3CH to F41H	Alarm history 15	0	Monitor	×
3906 to 3909	F42H to F45H	System area	—	—	—
3910 to 3915	F46H to F4BH	Alarm history 16	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	CH5	CH6	CH7	CH8				
4000 to 4131 (FA0H to 1023H)								System area	—	—	—
4132 (1024H)	4134 (1026H)	4136 (1028H)	4138 (102AH)	4140 (102CH)	4142 (102EH)	4144 (1030H)	4146 (1032H)	CH□ Offset/gain setting mode (offset specification)	0	Setting	×
4133 (1025H)	4135 (1027H)	4137 (1029H)	4139 (102BH)	4141 (102DH)	4143 (102FH)	4145 (1031H)	4147 (1033H)	CH□ Offset/gain setting mode (gain specification)	0	Setting	×
4148 to 9999 (1034H 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	CH5	CH6	CH7	CH8				
10000 to 19999 (2710H to 4E1FH)	20000 to 29999 (4E20H to 752FH)	30000 to 39999 (7530H to 9C3FH)	40000 to 49999 (9C40H to C34FH)	50000 to 59999 (C350H to EA5FH)	60000 to 69999 (EA60H to 1116FH)	70000 to 79999 (11170H to 1387FH)	80000 to 89999 (13880H to 15F8FH)	CH□ Logging data	0	Monitor	×

In FX2N allocation function mode

○: With refresh setting, ×: Without refresh setting

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
0 (0H)								CH1 to 4 Setting Input type/ range	FFFFH	Setting	×
1 (1H)								CH5 to 8 Setting Input type/ range	FFFFH	Setting	×
2 (2H)	3 (3H)	4 (4H)	5 (5H)	6 (6H)	7 (7H)	8 (8H)	9 (9H)	CH□ Time Average/Count Average/Moving Average setting	0	Setting	×
10 (AH)	11 (BH)	12 (CH)	13 (DH)	14 (EH)	15 (FH)	16 (10H)	17 (11H)	CH□ Digital operation value	0000H	Monitor	○
18 to 25 (12H 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/disconnection detection 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 33H)								System area	—	—	—
60 (34H)								Operation mode monitor	0	Monitor	×
61 (35H)	62 (36H)	63 (37H)	64 (38H)	65 (39H)	66 (3AH)	67 (3BH)	68 (3CH)	CH□ Conversion value shift amount	0	Control	○
69 (3DH)								Input signals	0	Monitor	×
70 (3EH)								Output signals	0	Control	×
71 (3FH)	72 (40H)	73 (41H)	74 (42H)	75 (43H)	76 (44H)	77 (45H)	78 (46H)	CH□ Process alarm lower lower limit value	0	Setting	×
79, 80 (47H, 48H)								System area	—	—	—

A

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
81 (49H)	82 (4AH)	83 (4BH)	84 (4CH)	85 (4DH)	86 (4EH)	87 (4FH)	88 (50H)	CH□ Process alarm upper upper limit value	0	Setting	×
89, 90 (51H, 52H)								System area	—	—	—
91 (53H)	92 (54H)	93 (55H)	94 (56H)	95 (57H)	96 (58H)	97 (59H)	98 (5AH)	CH□ Rate alarm upper limit value	100	Setting	×
99, 100 (5BH, 5CH)								System area	—	—	—
101 (5DH)	102 (5EH)	103 (5FH)	104 (60H)	105 (61H)	106 (62H)	107 (63H)	108 (64H)	CH□ Minimum value	0	Monitor	○
109 (65H)								Minimum value reset request	0	Control	×
110 (66H)								Minimum value reset completed flag	0	Monitor	×
111 (67H)	112 (68H)	113 (69H)	114 (6AH)	115 (6BH)	116 (6CH)	117 (6DH)	118 (6EH)	CH□ Maximum value	0	Monitor	○
119 (6FH)								Maximum value reset request	0	Control	×
120 (70H)								Maximum value reset completed flag	0	Monitor	×
121 (71H)								Latest address of error history	0	Monitor	○
122 (72H)								Latest alarm code	0	Monitor	○
123 (73H)								Latest address of alarm history	0	Monitor	○
124 (74H)								Conversion completed flag	0	Monitor	○
125 (75H)								System area	—	—	—
126, 127 (76H, 77H)								Mode switching setting	0	Setting	×
128, 129 (78H, 79H)								System area	—	—	—
130 (7AH)								Rate alarm change rate selection	1	Setting	×
131, 132 (7BH, 7CH)								System area	—	—	—
133 (7DH)								Input signal error/ Disconnection detection automatic clear enable/ disable setting	1	Setting	×
134 to 1000 (7EH to 3E8H)								System area	—	—	—
1001 (3E9H)	1003 (3EBH)	1005 (3EDH)	1007 (3EFH)	1009 (3F1H)	1011 (3F3H)	1013 (3F5H)	1015 (3F7H)	CH□ Digital output value	0	Monitor	○
1002 (3EAH)	1004 (3ECH)	1006 (3EEH)	1008 (3F0H)	1010 (3F2H)	1012 (3F4H)	1014 (3F6H)	1016 (3F8H)	System area	—	—	—
1017 to 1020 (3F9H to 3FCH)								System area	—	—	—
1021 (3FDH)	1022 (3FEH)	1023 (3FFH)	1024 (400H)	1025 (401H)	1026 (402H)	1027 (403H)	1028 (404H)	CH□ Conversion status	0	Monitor	×
1029, 1030 (405H, 406H)								System area	—	—	—
1031 (407H)	1032 (408H)	1033 (409H)	1034 (40AH)	1035 (40BH)	1036 (40CH)	1037 (40DH)	1038 (40EH)	CH□ Input type/Range monitor	0	Monitor	×
1039, 1040 (40FH, 410H)								System area	—	—	—
1041 (411H)	1042 (412H)	1043 (413H)	1044 (414H)	1045 (415H)	1046 (416H)	1047 (417H)	1048 (418H)	CH□ Input type/Range monitor (Offset/gain setting)	0	Monitor	×
1049, 1050 (419H, 41AH)								System area	—	—	—
1051 (41BH)	1052 (41CH)	1053 (41DH)	1054 (41EH)	1055 (41FH)	1056 (420H)	1057 (421H)	1058 (422H)	CH□ Celsius/Fahrenheit display monitor	0	Monitor	×
1059, 1060 (423H, 424H)								System area	—	—	—
1061 (425H)	1062 (426H)	1063 (427H)	1064 (428H)	1065 (429H)	1066 (42AH)	1067 (42BH)	1068 (42CH)	CH□ NowSetting user range base input type monitor	1	Monitor	×
1069, 1070 (42DH, 42EH)								System area	—	—	—
1071 (42FH)	1072 (430H)	1073 (431H)	1074 (432H)	1075 (433H)	1076 (434H)	1077 (435H)	1078 (436H)	CH□ NowSetting user range base input range monitor	0000H	Monitor	×
1079, 1080 (437H, 438H)								System area	—	—	—

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
1081 (439H)	1082 (43AH)	1083 (43BH)	1084 (43CH)	1085 (43DH)	1086 (43EH)	1087 (43FH)	1088 (440H)	CH□ Averaging process specification	0	Setting	×
1089, 1090 (441H, 442H)								System area	—	—	—
1091 (443H)	1092 (444H)	1093 (445H)	1094 (446H)	1095 (447H)	1096 (448H)	1097 (449H)	1098 (44AH)	CH□ Scaling enable/disable setting	1	Setting	×
1099, 1100 (44BH, 44CH)								System area	—	—	—
1101 (44DH)	1103 (44FH)	1105 (451H)	1107 (453H)	1109 (455H)	1111 (457H)	1113 (459H)	1115 (45BH)	CH□ Scaling upper limit value	0	Setting	×
1102 (44EH)	1104 (450H)	1106 (452H)	1108 (454H)	1110 (456H)	1112 (458H)	1114 (45AH)	1116 (45CH)	System area	—	—	—
1117 to 1120 (45DH to 460H)								System area	—	—	—
1121 (461H)	1123 (463H)	1125 (465H)	1127 (467H)	1129 (469H)	1131 (46BH)	1133 (46DH)	1135 (46FH)	CH□ Scaling lower limit value	0	Setting	×
1122 (462H)	1124 (464H)	1126 (466H)	1128 (468H)	1130 (46AH)	1132 (46CH)	1134 (46EH)	1136 (470H)	System area	—	—	—
1137 to 1140 (471H to 474H)								System area	—	—	—
1141 (475H)	1142 (476H)	1143 (477H)	1144 (478H)	1145 (479H)	1146 (47AH)	1147 (47BH)	1148 (47CH)	CH□ Digital clipping enable/ disable setting	1	Setting	×
1149, 1150 (47DH, 47EH)								System area	—	—	—
1151 (47FH)	1152 (480H)	1153 (481H)	1154 (482H)	1155 (483H)	1156 (482H)	1157 (485H)	1158 (486H)	CH□ Input signal error detection setting	1	Setting	×
1159, 1160 (487H, 488H)								System area	—	—	—
1161 (489H)	1162 (48AH)	1163 (48BH)	1164 (48CH)	1165 (48DH)	1175 (497H)	1167 (48FH)	1168 (490H)	CH□ Input signal error detection lower limit setting value	24	Setting	×
1169, 1170 (491H, 492H)								System area	—	—	—
1171 (493H)	1172 (494H)	1173 (495H)	1174 (496H)	1175 (497H)	1176 (498H)	1177 (499H)	1178 (49AH)	CH□ Input signal error detection upper limit setting value	24	Setting	×
1179, 1180 (49BH, 49CH)								System area	—	—	—
1181 (49DH)	1182 (49EH)	1183 (49FH)	1184 (4A0H)	1185 (4A1H)	1186 (4A2H)	1187 (4A3H)	1188 (4A4H)	CH□ Alert output setting (Process alarm)	1	Setting	×
1189, 1190 (4A5H, 4A6H)								System area	—	—	—
1191 (4A7H)	1192 (4A8H)	1193 (4A9H)	1194 (4AAH)	1195 (4ABH)	1196 (4ACH)	1197 (4ADH)	1198 (4AEH)	CH□ Process alarm upper lower limit value	0	Setting	×
1199, 1200 (4AFH, 4B0H)								System area	—	—	—
1201 (4B1H)	1202 (4B2H)	1203 (4B3H)	1204 (4B4H)	1205 (4B5H)	1206 (4B6H)	1207 (4B7H)	1208 (4B8H)	CH□ Process alarm lower upper limit value	0	Setting	×
1209, 1210 (4B9H, 4BAH)								System area	—	—	—
1211 (4BBH)	1212 (4BCH)	1213 (4BDH)	1214 (4BEH)	1215 (4BFH)	1216 (4C0H)	1217 (4C1H)	1218 (4C2H)	CH□ Alert output setting (Rate alarm)	1	Setting	×
1219, 1220 (4C3H, 4C4H)								System area	—	—	—
1221 (4C5H)	1222 (4C6H)	1223 (4C7H)	1224 (4C8H)	1225 (4C9H)	1226 (4CAH)	1227 (4CBH)	1228 (4CCH)	CH□ Rate alarm alert detection cycle setting	0	Setting	×
1229, 1230 (4CDH, 4CEH)								System area	—	—	—
1231 (4CFH)	1232 (4D0H)	1233 (4D1H)	1234 (4D2H)	1235 (4D3H)	1236 (4D4H)	1237 (4D5H)	1238 (4D6H)	CH□ Rate alarm lower limit value	-100	Setting	×
1239, 1240 (4D7H, 4D8H)								System area	—	—	—
1241 (4D9H)	1242 (4DAH)	1243 (4DBH)	1244 (4DCH)	1245 (4DDH)	1246 (4DEH)	1247 (4DFH)	1248 (4E0H)	CH□ Disconnection detection enable/disable setting	0	Setting	×
1249, 1250 (4E1H, 4E2H)								System area	—	—	—
1251 (4E3H)	1253 (4E5H)	1255 (4E7H)	1257 (4E9H)	1259 (4EBH)	1261 (4EDH)	1263 (4EFH)	1265 (4F1H)	CH1 Conversion setting value at disconnection detection	0	Setting	×
1252 (4E4H)	1254 (4E6H)	1256 (4E7H)	1258 (4EAH)	1260 (4ECH)	1262 (4EEH)	1264 (4F0H)	1266 (4F2H)	System area	—	—	—

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
1267 to 1270 (4F3H, 4F6H)								System area	—	—	—
1271 (4F7H)	1272 (4F8H)	1273 (4F9H)	1274 (4FAH)	1275 (4FBH)	1276 (4FCH)	1277 (4FDH)	1278 (4FEH)	CH□ Conversion setting at disconnection detection	1	Setting	×
1279, 1280 (4FFH, 500H)								System area	—	—	—
1281 (501H)	1282 (502H)	1283 (503H)	1284 (504H)	1285 (505H)	1286 (506H)	1287 (507H)	1288 (508H)	CH□ Celsius/Fahrenheit display setting	0	Setting	×
1289, 1290 (509H, 50AH)								System area	—	—	—
1291 (50BH)	1292 (50CH)	1293 (50DH)	1294 (50EH)	1295 (50FH)	1296 (510H)	1297 (511H)	1298 (512H)	CH□ Offset setting value	0	Setting	×
1299, 1300 (513H, 514H)								System area	—	—	—
1301 (515H)	1302 (516H)	1303 (517H)	1304 (518H)	1305 (519H)	1306 (51AH)	1307 (51BH)	1308 (51CH)	CH□ Gain setting value	0	Setting	×
1309, 1310 (51DH, 51EH)								System area	—	—	—
1311 (51FH)	1312 (520H)	1313 (521H)	1314 (522H)	1315 (523H)	1316 (524H)	1317 (525H)	1318 (526H)	CH□ Setting Input type/ range (Offset/gain setting)	0	Setting	×
1319, 1320 (527H, 528H)								System area	—	—	—
1321 (529H)	1322 (52AH)	1323 (52BH)	1324 (52CH)	1325 (52DH)	1326 (52EH)	1327 (52FH)	1328 (530H)	CH□ Offset/gain setting mode (offset specification)	0	Setting	×
1329, 1330 (531H, 532H)								System area	—	—	—
1331 (533H)	1332 (534H)	1333 (535H)	1334 (536H)	1335 (537H)	1336 (538H)	1337 (539H)	1338 (53AH)	CH□ Offset/gain setting mode (gain specification)	0	Setting	×
1339 (53BH)								System area	—	—	—
1340 (53CH)								Offset/gain writing 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	×

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
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)	9025 (2341H)	9026 (2342H)	9027 (2343H)	9028 (2344H)	CH□ Logging hold flag	0	Monitor	○
9029, 9030 (2345H, 2346H)								System area	—	—	—
9031 (2347H)	9032 (2348H)	9033 (2349H)	9034 (234AH)	9035 (234BH)	9036 (234CH)	9037 (234DH)	9038 (234EH)	CH□ Head pointer	0	Monitor	×
9039, 9040 (234FH, 2350H)								System area	—	—	—
9041 (2351H)	9042 (2352H)	9043 (2353H)	9044 (2354H)	9045 (2355H)	9046 (2356H)	9047 (2357H)	9048 (2358H)	CH□ Latest pointer	0	Monitor	×
9049, 9050 (2359H, 235AH)								System area	—	—	—
9051 (235BH)	9052 (235CH)	9053 (235DH)	9054 (235EH)	9055 (235FH)	9056 (2360H)	9057 (2361H)	9058 (2362H)	CH□ Number of logging data	0	Monitor	×
9059, 9060 (2363H, 2364H)								System area	—	—	—
9061 (2365H)	9062 (2366H)	9063 (2367H)	9064 (2368H)	9065 (2369H)	9066 (236AH)	9067 (236BH)	9068 (236CH)	CH□ Trigger pointer	0	Monitor	×
9069, 9070 (236DH, 236EH)								System area	—	—	—
9071 (236FH)	9074 (2372H)	9077 (2375H)	9080 (2378H)	9083 (237BH)	9086 (237EH)	9089 (2381H)	9092 (2384H)	CH□ Logging cycle monitor value (s)	0	Monitor	×
9072 (2370H)	9075 (2373H)	9078 (2376H)	9081 (2379H)	9084 (237CH)	9087 (237FH)	9090 (2382H)	9093 (2385H)	CH□ Logging cycle monitor value (ms)	0	Monitor	×
9073 (2371H)	9076 (2374H)	9079 (2377H)	9082 (237AH)	9085 (237DH)	9088 (2380H)	9091 (2383H)	9094 (2386H)	System area	—	—	—
9095 to 9100 (2387H to 238CH)								System area	—	—	—
9101 (238DH)	9106 (2392H)	9111 (2397H)	9116 (239CH)	9121 (23A1H)	9126 (23A6H)	9131 (23ABH)	9136 (23B0H)	CH□ Trigger generation time (First/Last two digits of the year)	0	Monitor	×
9102 (238EH)	9107 (2393H)	9112 (2398H)	9117 (239DH)	9122 (23A2H)	9127 (23A7H)	9132 (23ACH)	9137 (23B1H)	CH□ Trigger generation time (Month/Day)	0	Monitor	×
9103 (238FH)	9108 (2394H)	9113 (2399H)	9118 (239EH)	9123 (23A3H)	9128 (23A8H)	9133 (23ADH)	9138 (23B2H)	CH□ Trigger generation time (Hour/Minute)	0	Monitor	×
9104 (2390H)	9109 (2395H)	9114 (239AH)	9119 (239FH)	9124 (23A4H)	9129 (23A9H)	9134 (23AEH)	9139 (23B3H)	CH□ Trigger generation time (Second/Day of the week)	0	Monitor	×
9105 (2391H)	9110 (2396H)	9115 (239BH)	9120 (23A0H)	9125 (23A5H)	9130 (23AAH)	9135 (23AFH)	9140 (23B4H)	CH□ Trigger generation time (Millisecond)	0	Monitor	×
9141 to 9150 (23B5H to 23BEH)								System area	—	—	—
9151 (23BFH)	9152 (23C0H)	9153 (23C1H)	9154 (23C2H)	9155 (23C3H)	9156 (23C4H)	9157 (23C5H)	9158 (23C6H)	CH□ Logging hold request	0	Control	○
9159, 9160 (23C7H, 23C8H)								System area	—	—	—
9161 (23C9H)	9162 (23CAH)	9163 (23CBH)	9164 (23CCH)	9165 (23CDH)	9166 (23CEH)	9167 (23CFH)	9168 (23D0H)	CH□ Logging enable/disable setting	1	Setting	×
9169, 9170 (23D1H, 23D2H)								System area	—	—	—
9171 (23D3H)	9172 (23D4H)	9173 (23D5H)	9174 (23D6H)	9175 (23D7H)	9176 (23D8H)	9177 (23D9H)	9178 (23DAH)	CH□ Logging data setting	1	Setting	×
9179, 9180 (23DBH, 23DCH)								System area	—	—	—
9181 (23DDH)	9182 (23DEH)	9183 (23DFH)	9184 (23E0H)	9185 (23E1H)	9186 (23E2H)	9187 (23E3H)	9188 (23E4H)	CH□ Logging cycle setting value	1	Setting	×
9189, 9190 (23E5H, 23E6H)								System area	—	—	—
9191 (23E7H)	9192 (23E8H)	9193 (23E9H)	9194 (23EAH)	9195 (23EBH)	9196 (23ECH)	9197 (23EDH)	9198 (23EEH)	CH□ Logging cycle unit setting	1	Setting	×
9199, 9200 (23EFH, 23F0H)								System area	—	—	—

Address Decimal (hexadecimal)								Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8				
9201 (23F1H)	9202 (23F2H)	9203 (23F3H)	9204 (23F4H)	9205 (23F5H)	9206 (23F6H)	9207 (23F7H)	9208 (23F8H)	CH□ Post-trigger logging points	5000	Setting	×
9209, 9210 (23F9H, 23FAH)								System area	—	—	—
9211 (23FBH)	9212 (23FCH)	9213 (23FDH)	9214 (23FEH)	9215 (23FFH)	9216 (2400H)	9217 (2401H)	9218 (2402H)	CH□ Level trigger condition setting	0	Setting	×
9219, 9220 (2403H, 2404H)								System area	—	—	—
9221 (2405H)	9222 (2406H)	9223 (2407H)	9224 (2408H)	9225 (2409H)	9226 (240AH)	9227 (240BH)	9228 (240CH)	CH□ Trigger data	*1	Setting	×
9229, 9230 (240DH, 240EH)								System area	—	—	—
9231 (240FH)	9232 (2410H)	9233 (2411H)	9234 (2412H)	9235 (2413H)	9236 (2414H)	9237 (2415H)	9238 (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 100 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							

A

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 103 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.

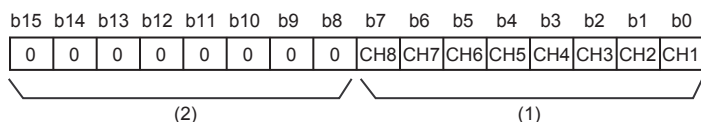
■Buffer memory address

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.



(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 upper limit)	36							

■Alert output flag status

- If the limit specified by the process alarm 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

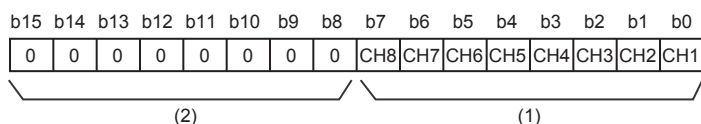
- When the value is out of the range specified in the process alarm upper upper limit value or process alarm lower lower limit value, Alarm ON (1) is stored in Alert output flag (Process alarm upper limit/lower limit) corresponding to each channel.
- If an alert is detected even in one channel, of the 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

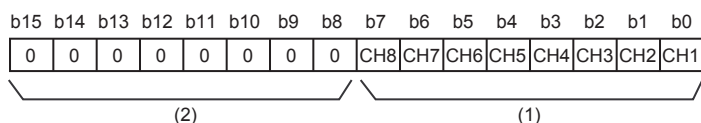
- If the limit specified in the rate alarm upper limit value is equal to or exceeded, Alarm ON (1) is stored in 'Alert output flag (Rate alarm upper limit)' (Un\G38) of the corresponding channel.
- If an alert is detected even in one channel, of the channels where conversion is enabled and the alert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

A

■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)

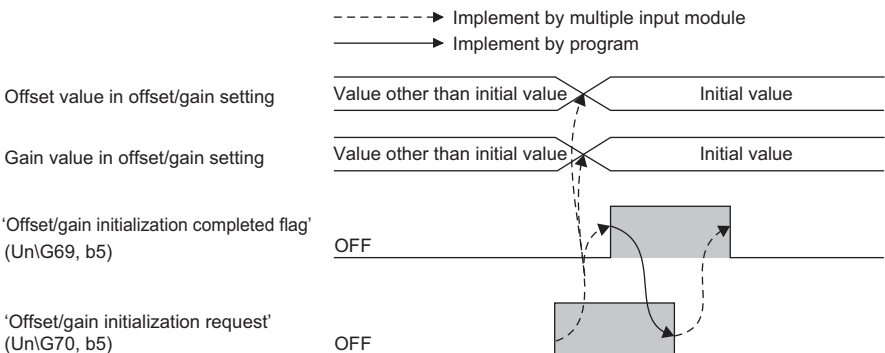
Module READY (b0) turns on to indicate the preparation for the conversion is completed after the power-on or after the reset of the CPU module, and the conversion is performed.

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/ Disconnection detection automatic clear enable/disable 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)	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.



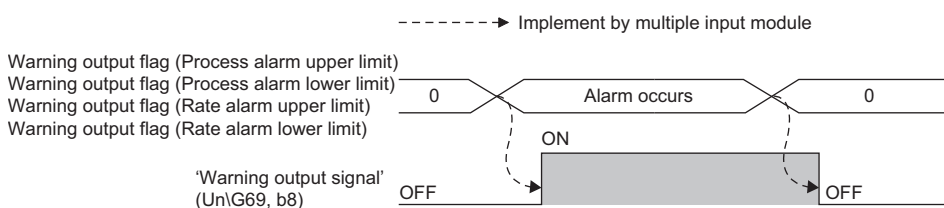
Averaging processing starts over after the conversion resumes.

A

■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	- 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. - 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.
Rate alarm	- 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. - 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.



■Operating condition setting completed flag (b9)

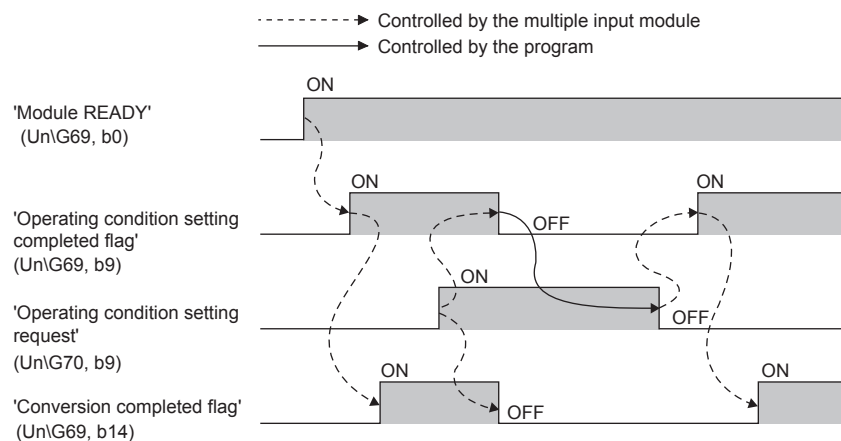
When changing values of the buffer memory, use as an interlock condition to turn off→on→off 'Operating condition setting request' (Un\G70, b9).

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

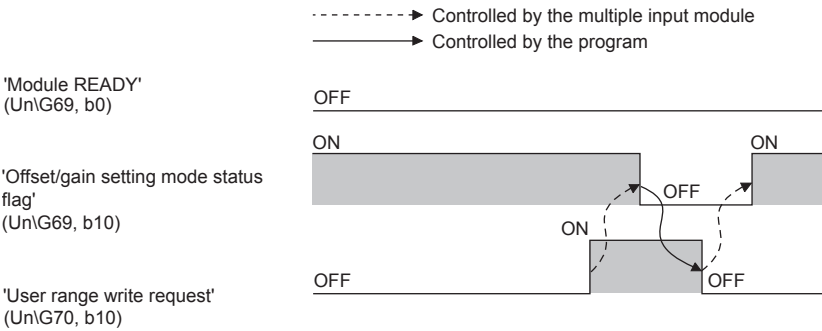
When 'Operating condition setting completed flag' (Un\G69, b9) is off, the conversion is not performed.

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



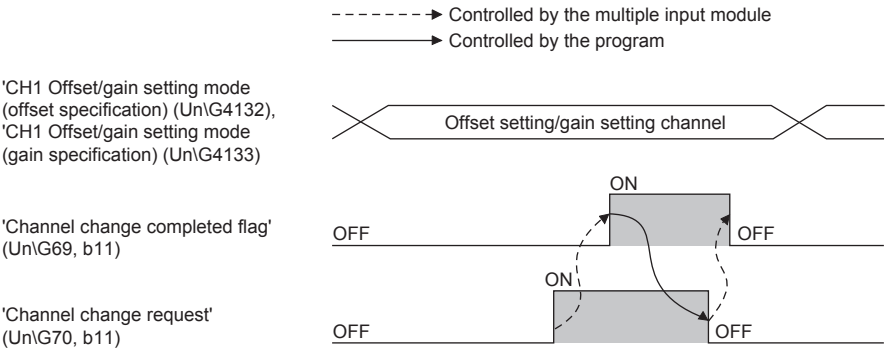
■Offset/gain setting mode status flag (b10)

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/ Disconnection detection 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.
Disable (1)	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. -----> Implement by multiple input module —————> Implement by program Input signal error detection flag: 0 — 0 'Input signal error detection signal' (Un\G69, b12): OFF — ON — OFF 'Error clear request' (Un\G70, b15): OFF — ON — OFF



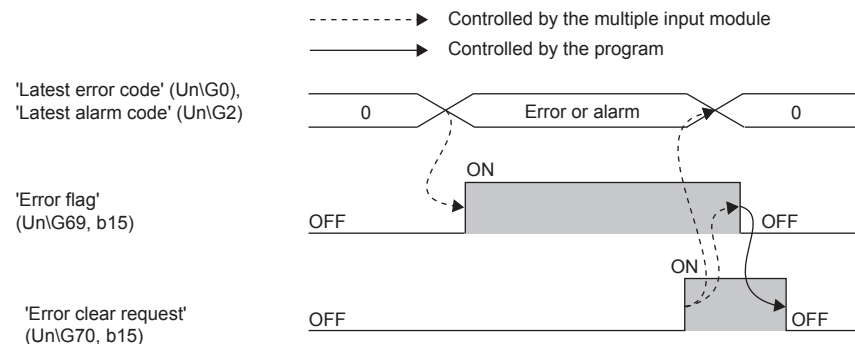
Averaging processing starts over after the conversion resumes.

■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 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 130 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 131 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 131 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), and Latest error code are cleared.

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

- ☞ Page 133 Error flag (b15)
- ☞ Page 129 Disconnection detection signal (b6)
- ☞ Page 132 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 59 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



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.

■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 writing 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.

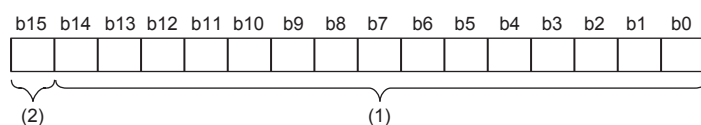
Buffer memory name	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
Offset/gain writing enable code	305							
Offset/gain initialization enable code (In FX2N allocation mode function)	1340							

■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.

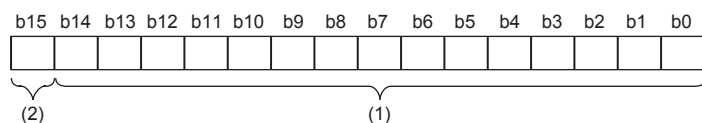
Buffer memory name	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
CH□ Digital output value	400	600	800	1000	1200	1400	1600	1800
CH□ Digital output value (in FX2N allocation mode function)	1001	1003	1005	1007	1009	1011	1013	1015

■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.

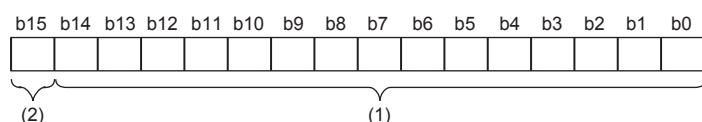
Buffer memory name	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
CH□ Digital operation value	402	602	802	1002	1202	1402	1602	1802
CH□ Digital operation value (in FX2N allocation mode function)	10	11	12	13	14	15	16	17

Point

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.

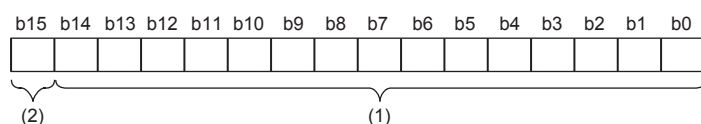
Point

- 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.

A

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 59 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/ disconnection detection in progress	A status where an input signal error or disconnection is being detected.

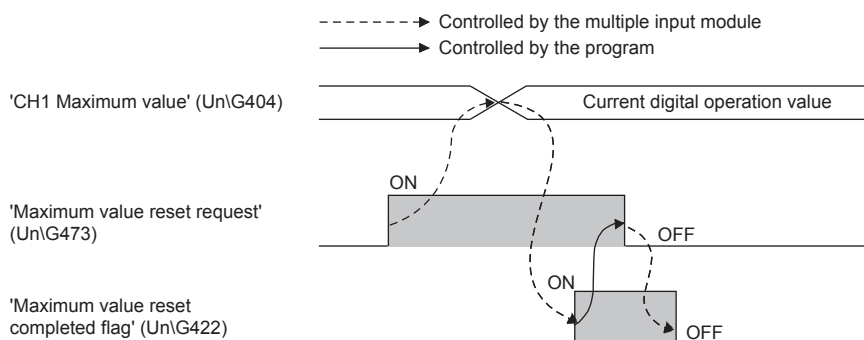
■Buffer memory address

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.



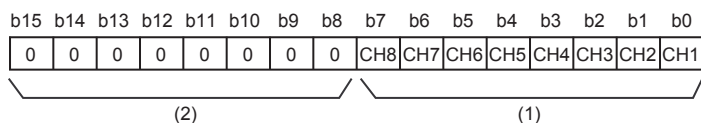
■Buffer memory address

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.

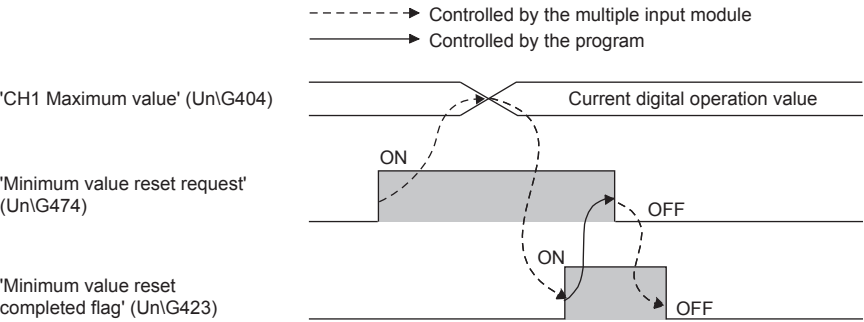
■Buffer memory address

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.



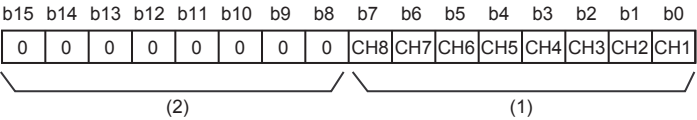
■Buffer memory address

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.

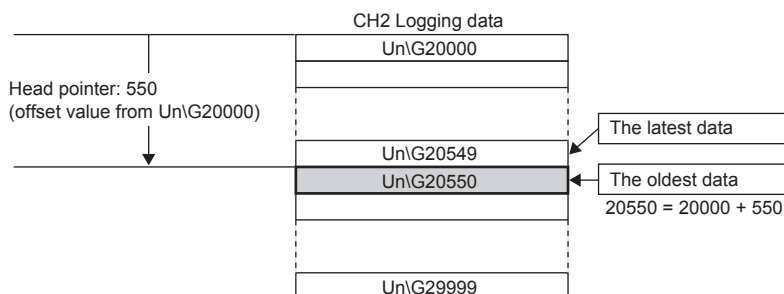
■Buffer memory address

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.

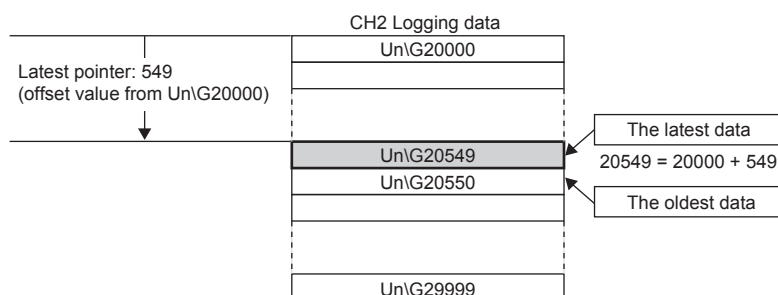
■Buffer memory address

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 59 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 59 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 59 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 59 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* ¹
First two digits of the year/Last two digits of the year	Stored in BCD code.	2017H
Month/Day		0131H
Hour/Minute		1035H
Second		40H
Day of the week	One of the following values is stored in BCD code. Sunday: 0, Monday: 1, Tuesday: 2, Wednesday: 3, Thursday: 4, Friday: 5, Saturday: 6	2H
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 Tuesday, January 31st, 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

A

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

A

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 59 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).

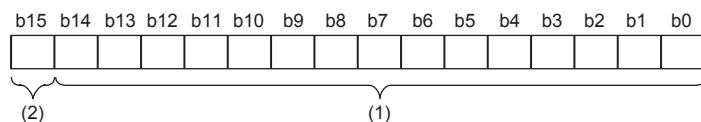
CH1 Conversion value shift amount

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 53 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

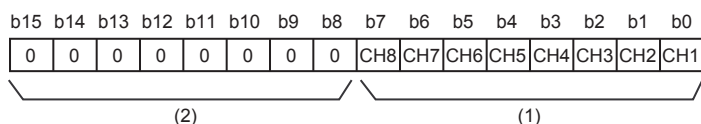
When 'CH1 Maximum value reset request' (Un\G473) turns off→on, 'CH1 Maximum value' (Un\G404) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

■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

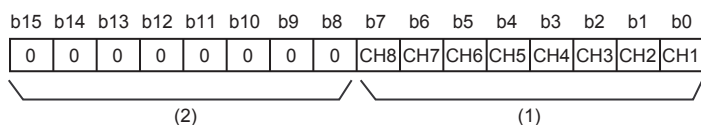
When 'CH1 Minimum value reset request' (Un\G474) turns off→on, 'CH1 Minimum value' (Un\G406) is reset regardless of turning off→on→off of 'Operating condition setting request' (Un\G70, b9), and updated with the current value.

■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) 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)

A



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 56 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 36 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 36 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 36 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 36 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 36 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 36 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 36 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 36 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.

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 46 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 46 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 46 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 43 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 43 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 43 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 59 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 59 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 59 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 59 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 59 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 59 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 59 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 59 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.

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 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: 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 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).

A

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	Thermocouple	-20 to +20 mA
09H		
0AH		Thermocouple K
0BH		Thermocouple J
0CH		Thermocouple T
0DH		Thermocouple K
0EH		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 multiple 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*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. 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 ^{*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. 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

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 59 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.

INDEX

A

Accuracy	20
Accuracy of A/D conversion	20
Alarm history	172
Alert output function	36
Averaging processing	30

C

CH1 Average processing specification	151
CH1 Celsius/Fahrenheit display monitor	146
CH1 Celsius/Fahrenheit display setting	166
CH1 Conversion setting at disconnection detection	162
CH1 Conversion setting value at disconnection detection	161
CH1 Conversion status	139
CH1 Conversion value shift amount	149
CH1 Digital clipping enable/disable setting	153
CH1 Digital operation value	137
CH1 Digital output value	136
CH1 Disconnection detection enable/disable setting	161
CH1 Gain setting value	168
CH1 Head pointer	142
CH1 Input signal error detection lower limit setting value	159
CH1 Input signal error detection setting	158
CH1 Input signal error detection upper limit setting value	160
CH1 Input type/Range monitor	141
CH1 Input type/Range monitor(Offset/gain setting)	142
CH1 Input type/range setting	169, 170
CH1 Input type/range setting (Offset/gain setting)	171
CH1 Latest pointer	143
CH1 Level trigger condition setting	165
CH1 Logging cycle monitor value	144
CH1 Logging cycle setting value	163
CH1 Logging cycle unit setting	164
CH1 Logging data	173
CH1 Logging data points	143
CH1 Logging data setting	163
CH1 Logging enable/disable setting	162
CH1 Logging hold flag	138
CH1 Logging hold request	148
CH1 Logging points after trigger	164
CH1 Maximum value	137
CH1 Maximum value reset completed flag	139
CH1 Maximum value reset request	149
CH1 Minimum value	138
CH1 Minimum value reset completed flag	140
CH1 Minimum value reset request	150
CH1 NowSetting user range base input range monitor	147
CH1 NowSetting user range base input type monitor	146
CH1 Offset setting value	167
CH1 Offset/gain setting mode	173
CH1 Process alarm lower lower limit value	156
CH1 Process alarm lower upper limit value	156
CH1 Process alarm upper lower limit value	155
CH1 Process alarm upper upper limit value	155

CH1 Rate alarm alert detection cycle setting	157
CH1 Rate alarm lower limit value	158
CH1 Rate alarm upper limit value	157
CH1 Scaling enable/disable setting	152
CH1 Scaling lower limit value	153
CH1 Scaling upper limit value	152
CH1 Time Average/Count Average/Moving Average	151
CH1 Trigger data	165
CH1 Trigger generation time	145
CH1 Trigger pointer	144
CH1 Trigger setting value	166
CH1 Warning output function (Process alarm)	154
CH1 Warning output setting (Rate alarm)	154
Conversion completed flag	127
Conversion method	29
Count average	31
Current input characteristics	18

D

Digital clipping function	56
Disconnection detection flag	126
Disconnection detection function	43

E

Error history	171
---------------	-----

F

Firmware version	122
FX2N Allocation Mode Function	72

G

Gain value	17
------------	----

I

Input signal error detection flag	125
Input signal error detection flag/disconnection detection flag	126
Input signal error detection function	46
Input signal error/Disconnection detection automatic clear enable/disable setting	136
Input signals	128
Input Type/Range Setting Function	28

L

Latest address of alarm history	121
Latest address of error history	121
Latest alarm code	121
Latest error code	121
Level data 0 to 9	134
List of Alarm Codes	103
Logging function	59

M

Maximum Value/Minimum Value Hold Function . .	58
Mode switching setting	135
Module Information	122
Module Label	107
Moving average	31

O

Offset value	17
Offset/gain writing enable code	136
Operation mode monitor	128
Output signals	133

P

Process alarm	36
-------------------------	----

R

Rate alarm	38
Rate alarm change rate selection	135

S

Sampling cycle	29
Sampling processing	29
Scaling function	33
Shift function	53
Simple disconnection detection	48

T

Time average	30
------------------------	----

V

Voltage input characteristics.	17
--	----

W

Warning output flag (Process alarm lower limit) .	123
Warning output flag (Process alarm upper limit) .	122
Warning output flag (Rate alarm lower limit) . . .	124
Warning output flag (Rate alarm upper limit) . . .	124

REVISIONS

Revision date	Revision	Description
April 2017	A	First Edition

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

© 2017 MITSUBISHI ELECTRIC CORPORATION

WARRANTY

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

1. Gratis Warranty Term and Gratis Warranty Range

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

[Gratis Warranty Term]

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

[Gratis Warranty Range]

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

2. Onerous repair term after discontinuation of production

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

3. Overseas service

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

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

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- (1) Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

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

6. Product application

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

TRADEMARKS

Microsoft® and Windows® are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Ethernet is a trademark of Xerox Corporation.

Anywire and ANYWIREASLINK is a registered trademark of the Anywire Corporation.

MODBUS® is a registered trademark of Schneider Electric SA.

The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Manual number: SH(NA)-081802ENG-A

Model: FX5-U-ANALOG-I-E

Model code: 09R571

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

Specifications are subject to change without notice.