

Programmable Controller

MELSEC iQ-R
series

MELSEC iQ-R Channel Isolated Temperature/ Micro Voltage Input Module User's Manual

R60TRD4-G

SAFETY PRECAUTIONS

(Read these precautions before using this product.)

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

The precautions given in this manual are concerned with this product only. For the safety precautions of the programmable controller system, refer to the user's manual for the CPU module used.

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

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

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

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

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

[Design Precautions]

WARNING

- Configure safety circuits external to the programmable controller to ensure that the entire system operates safely even when a fault occurs in the external power supply or the programmable controller. Failure to do so may result in an accident due to an incorrect output or malfunction.
 - (1) Emergency stop circuits, protection circuits, and protective interlock circuits for conflicting operations (such as forward/reverse rotations or upper/lower limit positioning) must be configured external to the programmable controller.
 - (2) When the programmable controller detects an abnormal condition, it stops the operation and all outputs are:
 - Turned off if the overcurrent or overvoltage protection of the power supply module is activated.
 - Held or turned off according to the parameter setting if the self-diagnostic function of the CPU module detects an error such as a watchdog timer error.
 - (3) All outputs may be turned on if an error occurs in a part, such as an I/O control part, where the CPU module cannot detect any error. To ensure safety operation in such a case, provide a safety mechanism or a fail-safe circuit external to the programmable controller. For a fail-safe circuit example, refer to the MELSEC iQ-R Module Configuration Manual.
 - (4) Outputs may remain on or off due to a failure of a component such as a relay and transistor in an output circuit. Configure an external circuit for monitoring output signals that could cause a serious accident.
 - In an output circuit, when a load current exceeding the rated current or an overcurrent caused by a load short-circuit flows for a long time, it may cause smoke and fire. To prevent this, configure an external safety circuit, such as a fuse.
 - Configure a circuit so that the programmable controller is turned on first and then the external power supply. If the external power supply is turned on first, an accident may occur due to an incorrect output or malfunction.
 - Configure a circuit so that the external power supply is turned off first and then the programmable controller. If the programmable controller is turned off first, an accident may occur due to an incorrect output or malfunction.
-

WARNING

- For the operating status of each station after a communication failure, refer to manuals for the network used. For the manuals, please consult your local Mitsubishi representative. Incorrect output or malfunction due to a communication failure may result in an accident.
 - When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents. When a Safety CPU is used, data cannot be modified while the Safety CPU is in SAFETY MODE.
 - Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
 - Do not write any data to the "system area" and "write-protect area" of the buffer memory in the module. Also, do not use any "use prohibited" signals as an output signal from the CPU module to each module. Doing so may cause malfunction of the programmable controller system. For the "system area", "write-protect area", and the "use prohibited" signals, refer to the user's manual for the module used. For areas used for safety communications, they are protected from being written by users, and thus safety communications failure caused by data writing does not occur.
-

[Design Precautions]

WARNING

- If a communication cable is disconnected, the network may be unstable, resulting in a communication failure of multiple stations. Configure an interlock circuit in the program to ensure that the entire system will always operate safely even if communications fail. Incorrect output or malfunction due to a communication failure may result in an accident. When safety communications are used, an interlock by the safety station interlock function protects the system from an incorrect output or malfunction.
-

[Design Precautions]

CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to electromagnetic interference. Keep a distance of 100mm or more between those cables.
 - During control of an inductive load such as a lamp, heater, or solenoid valve, a large current (approximately ten times greater than normal) may flow when the output is turned from off to on. Therefore, use a module that has a sufficient current rating.
 - After the CPU module is powered on or is reset, the time taken to enter the RUN status varies depending on the system configuration, parameter settings, and/or program size. Design circuits so that the entire system will always operate safely, regardless of the time.
 - Do not power off the programmable controller or reset the CPU module while the settings are being written. Doing so will make the data in the flash ROM and SD memory card undefined. The values need to be set in the buffer memory and written to the flash ROM and SD memory card again. Doing so also may cause malfunction or failure of the module.
 - When changing the operating status of the CPU module from external devices (such as the remote RUN/STOP functions), select "Do Not Open by Program" for "Opening Method" of "Module Parameter". If "Open by Program" is selected, an execution of the remote STOP function causes the communication line to close. Consequently, the CPU module cannot reopen the line, and external devices cannot execute the remote RUN function.
 - The base unit and modules mounted on the base unit must be powered by a power supply that complies with Safety Extra-Low Voltage (SELV) and Limited Energy Circuit (LIM) or one that complies with UL 1310 Class 2.
-

[Security Precautions]

WARNING

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

[Installation Precautions]

WARNING

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

[Installation Precautions]

CAUTION

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

[Wiring Precautions]

WARNING

- Shut off the external power supply (all phases) used in the system before installation and wiring. Failure to do so may result in electric shock or cause the module to fail or malfunction.
- After installation and wiring, attach a blank cover module (RG60) to each empty slot before powering on the system for operation. Also, attach an extension connector protective cover ^{*1} to each unused extension cable connector as necessary. Directly touching any conductive parts of the connectors while power is on may result in electric shock.

^{*1} For details, please consult your local Mitsubishi Electric representative.

[Wiring Precautions]

CAUTION

- Individually ground the FG and LG terminals of the programmable controller with a ground resistance of 100 ohms or less. Failure to do so may result in electric shock or malfunction.
 - Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
 - Check the rated voltage and signal layout before wiring to the module, and connect the cables correctly. Connecting a power supply with a different voltage rating or incorrect wiring may cause fire or failure.
 - Connectors for external devices must be crimped or pressed with the tool specified by the manufacturer, or must be correctly soldered. Incomplete connections may cause short circuit, fire, or malfunction.
 - Securely connect the connector to the module. Poor contact may cause malfunction.
 - Do not install the control lines or communication cables together with the main circuit lines or power cables. Doing so may result in malfunction due to noise. Keep a distance of 100mm or more between those cables. (Except for the RJ71GN11-SX)
 - Place the cables in a duct or clamp them. If not, dangling cables may swing or inadvertently be pulled, resulting in malfunction or damage to modules or cables.
In addition, the weight of the cables may put stress on modules in an environment of strong vibrations and shocks.
Do not clamp the extension cables with the jacket stripped. Doing so may change the characteristics of the cables, resulting in malfunction.
 - Check the interface type and correctly connect the cable. Incorrect wiring (connecting the cable to an incorrect interface) may cause failure of the module and external device.
 - Tighten the terminal screws or connector screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, fire, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, fire, or malfunction.
 - When disconnecting the cable from the module, do not pull the cable by the cable part. For the cable with connector, hold the connector part of the cable. For the cable connected to the terminal block, loosen the terminal screw. Pulling the cable connected to the module may result in malfunction or damage to the module or cable.
 - When wiring, shield the module using a cover or similar means to prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction. Remove the shield for heat dissipation before operating the system.
 - When a protective film is attached to the top of the module, remove it before system operation. If not, inadequate heat dissipation of the module may cause a fire, failure, or malfunction.
-

[Wiring Precautions]

CAUTION

- Programmable controllers must be installed in control panels. Connect the main power supply to the power supply module in the control panel through a relay terminal block. Wiring and replacement of a power supply module must be performed by qualified maintenance personnel with knowledge of protection against electric shock. For wiring, refer to the MELSEC iQ-R Module Configuration Manual.
 - For Ethernet cables to be used in the system, select the ones that meet the specifications in the user's manual for the module used. If not, normal data transmission is not guaranteed.
-

[Startup and Maintenance Precautions]

WARNING

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

[Startup and Maintenance Precautions]

CAUTION

- When connecting an external device with a CPU module or intelligent function module to modify data of a running programmable controller, configure an interlock circuit in the program to ensure that the entire system will always operate safely. For other forms of control (such as program modification, parameter change, forced output, or operating status change) of a running programmable controller, read the relevant manuals carefully and ensure that the operation is safe before proceeding. Improper operation may damage machines or cause accidents.
 - Especially, when a remote programmable controller is controlled by an external device, immediate action cannot be taken if a problem occurs in the programmable controller due to a communication failure. To prevent this, configure an interlock circuit in the program, and determine corrective actions to be taken between the external device and CPU module in case of a communication failure.
 - Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire.
 - Use any radio communication device such as a cellular phone or PHS (Personal Handy-phone System) 25cm or more away in all directions from the programmable controller. Failure to do so may cause malfunction.
 - Shut off the external power supply (all phases) used in the system before mounting or removing the module. Failure to do so may cause the module to fail or malfunction.
 - Tighten the screws within the specified torque range. Undertightening can cause drop of the component or wire, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
-

[Startup and Maintenance Precautions]

CAUTION

- After the first use of the product, do not perform each of the following operations more than 50 times (IEC 61131-2/JIS B 3502 compliant).
Exceeding the limit may cause malfunction.
 - Mounting/removing the module to/from the base unit
 - Inserting/removing the extended SRAM cassette or battery-less option cassette to/from the CPU module
 - Mounting/removing the terminal block to/from the module
 - Connecting/disconnecting the extension cable to/from the base unit
 - After the first use of the product, do not insert/remove the SD memory card to/from the CPU module more than 500 times. Exceeding the limit may cause malfunction.
 - Do not touch the metal terminals on the back side of the SD memory card. Doing so may cause malfunction or failure of the module.
 - Do not touch the integrated circuits on the circuit board of an extended SRAM cassette or a battery-less option cassette. Doing so may cause malfunction or failure of the module.
 - Do not drop or apply shock to the battery to be installed in the module. Doing so may damage the battery, causing the battery fluid to leak inside the battery. If the battery is dropped or any shock is applied to it, dispose of it without using.
 - Startup and maintenance of a control panel must be performed by qualified maintenance personnel with knowledge of protection against electric shock. Lock the control panel so that only qualified maintenance personnel can operate it.
 - Before handling the module, touch a conducting object such as a grounded metal to discharge the static electricity from the human body. Wearing a grounded antistatic wrist strap is recommended. Failure to discharge the static electricity may cause the module to fail or malfunction.
 - After unpacking, eliminate static electricity from the module to prevent electrostatic discharge from affecting the module. If an electrostatically charged module comes in contact with a grounded metal object, a sudden electrostatic discharge of the module may cause failure.
For details on how to eliminate static electricity from the module, refer to the following.
Antistatic Precautions Before Using MELSEC iQ-R Series Products (FA-A-0368)
 - Use a clean and dry cloth to wipe off dirt on the module.
-

[Operating Precautions]

CAUTION

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

[Computer Connection Precautions]

CAUTION

- When connecting a personal computer to a module having a USB interface, observe the following precautions as well as the instructions described in the manual for the personal computer used. Failure to do so may cause the module to fail.
 - (1) When the personal computer is AC-powered
 - When the personal computer has a 3-pin AC plug or an AC plug with a grounding wire, connect the plug to a grounding receptacle or ground the grounding wire. Ground the personal computer and the module with a ground resistance of 100 ohms or less.
 - When the personal computer has a 2-pin AC plug without a grounding wire, connect the module to the computer by following the procedure below. For power supplied to the personal computer and the module, using the same power source is recommended.
 - 1. Unplug the personal computer from the AC receptacle.
 - 2. Check that the personal computer is unplugged. Then, connect the personal computer to the module with a USB cable.
 - 3. Plug the personal computer into the AC receptacle.
 - (2) When the personal computer is battery-powered
 - The personal computer can be connected to the module without taking specific measures. For details, refer to the following.
 - Cautions When Using Mitsubishi Programmable Controllers or GOTs Connected to a Personal Computer With the RS-232C/USB Interface (FA-A-0298)
 - When the USB cable used is the GT09-C30USB-5P manufactured by Mitsubishi Electric, specific measures are not required to connect the AC-powered personal computer to the module. However, note that the signal ground (SG) is common for the module and its USB interface. Therefore, if an SG potential difference occurs between the module and the connected devices, it causes failures of the module and the connected devices.

[Disposal Precautions]

CAUTION

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

[Transportation Precautions]

CAUTION

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

INTRODUCTION

Thank you for purchasing the Mitsubishi Electric MELSEC iQ-R series programmable controllers.

This manual describes the specifications, functions, procedures before operation, wiring, parameter settings, programming, and troubleshooting of the relevant product listed below.

Before using this product, please read this manual and the relevant manuals carefully and develop familiarity with the functions and performance of the MELSEC iQ-R series programmable controller to handle the product correctly.

When applying the program examples provided in this manual to an actual system, ensure the applicability and confirm that it will not cause system control problems.

Please make sure that the end users read this manual.



Unless otherwise specified, this manual provides program examples in which the I/O numbers of X/Y0 to X/YF are assigned to a temperature input module. Assign I/O numbers when applying the program examples to an actual system. For I/O number assignment, refer to the following.

 MELSEC iQ-R Module Configuration Manual

Relevant product

R60TRD4-G

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RELEVANT MANUALS

The manuals related to this product are shown below.

Manuals

Manual name [Manual number]	Description
MELSEC iQ-R Channel Isolated Temperature/Micro Voltage Input Module User's Manual [SH-082734ENG] (this manual)	Procedures before operation, wiring, parameter settings, system configuration, specifications, functions, operation examples, troubleshooting, error codes, alarm codes, I/O signals, and buffer memory of channel isolated temperature/micro voltage input modules
MELSEC iQ-R Module Configuration Manual [SH-081262ENG]	Common information on the hardware configuration of all modules, overview of each system configuration, and specifications of the power supply module, base unit, SD memory card, and battery
MELSEC iQ-R Temperature Input Module Function Block Reference [BCN-P5999-0462]	Function blocks of the channel isolated thermocouple input module, channel isolated RTD input module, and channel isolated temperature/micro voltage input module
GX Works3 Operating Manual [SH-081215ENG]	System configuration, parameter settings, and online operations of GX Works3
MELSEC iQ-R Online Module Change Manual [SH-081501ENG]	Online module change, which allows a module to be changed without stopping the system for MELSEC iQ-R series programmable controllers

Guidelines

Guideline name [Guideline number]	Description
FA SYSTEM SECURITY GUIDELINE -SEPARATE VOLUME [MELSEC]- [BCN-P5999-1474]	Mitsubishi Electric approach to security for the MELSEC series and information for using the MELSEC series safely and securely in an FA system

This manual does not include detailed information on the following:

- General specifications
- Applicable combinations of CPU modules and the other modules, and the number of mountable modules
- Installation

For details, refer to the following.

 MELSEC iQ-R Module Configuration Manual

TERMS

Unless otherwise specified, this manual uses the following terms.

Term	Description
Buffer memory	Memory in an intelligent function module to store data such as setting values and monitor values. For CPU modules, it refers to memory to store data such as setting values and monitor values of the Ethernet function, or data used for data communication of the multiple CPU system function.
Engineering tool	A tool used for setting up programmable controllers, programming, debugging, and maintenance
Global label	A label that is valid for all the program data when multiple program data are created in the project. There are two types of global label: a module specific label (module label), which is generated automatically by GX Works3, and an optional label, which can be created for any specified device.
Module label	A label that represents one of memory areas (I/O signals and buffer memory areas) specific to each module in a given character string. For the module used, GX Works3 automatically generates this label, which can be used as a global label.
Q compatible (RD) mode	This Q compatible mode provides compatibility with the buffer memory address layout of MELSEC iQ-R series channel isolated RTD input modules. Only RTD can be set as the input type for each channel.
Q compatible (TD) mode	This Q compatible mode provides compatibility with the buffer memory address layout of MELSEC iQ-R series channel isolated thermocouple input modules. Only thermocouple and micro voltage can be set as the input type for each channel.
Q compatible mode	A mode in which the module operates with the buffer memory map converted to the equivalent one of the MELSEC-Q series
R mode	A mode in which the module operates with the buffer memory map that has been newly laid out in the MELSEC iQ-R series
Watchdog timer error	A watchdog timer is a timer to monitor whether internal processing of a module is performed normally. A watchdog timer error is an error that occurs when internal processing is not performed normally.

GENERIC TERMS AND ABBREVIATIONS

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

Generic term/abbreviation	Description
Cold junction compensation resistor (RTD)	An abbreviation for the resistance temperature detector (RTD) used for cold junction compensation
Q compatible mode	A generic term for the Q compatible (RD) mode and Q compatible (TD) mode
Remote head module	An abbreviation for the RJ72GF15-T2 CC-Link IE Field Network remote head module
Temperature input module	An abbreviation for the MELSEC iQ-R series channel isolated temperature/micro voltage input module

MEMO

PART 1 OVERVIEW

Part 1 consists of the following chapter.

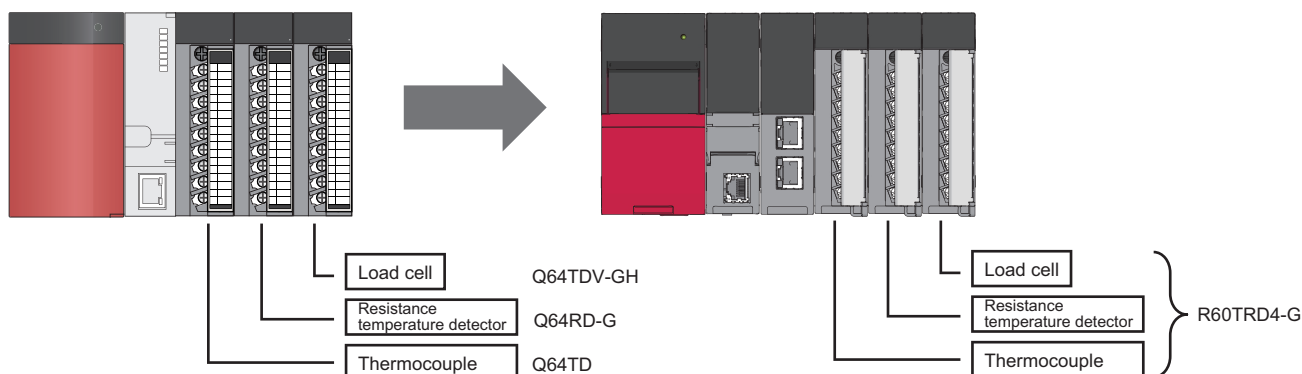
1 WHAT THIS MODULE CAN DO

1 WHAT THIS MODULE CAN DO

A single module to support RTDs, thermocouples, micro voltage, and resistors

This one module supports various types of sensors.

Dedicated modules that were conventionally prepared for each sensor type can be unified into this singular module, facilitating spare parts management.



Use of MELSEC-Q series programs

The buffer memory address layouts of the temperature input modules are equivalent to those of the following modules from the MELSEC-Q series for controlling operations. The compatible mode function enables the utilization of programs that have proven performance on MELSEC-Q series modules.

- RTD input modules, channel isolated RTD input modules: Q64RD, Q64RD-G
- Thermocouple input modules, channel isolated thermocouples/micro voltage input modules: Q64TD, Q64TDV-GH

For details, refer to the following.

📖 Page 111 Q Compatible Mode Function

MEMO

PART 2

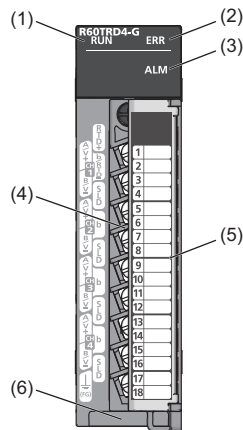
PART NAMES

Part 2 consists of the following chapter.

2 PART NAMES

2 PART NAMES

This chapter describes the part names of temperature input modules.



No.	Name	Description
(1)	RUN LED	Indicates the operating status of the module. On: Normal operation Flashing: The module for online module change selected Off: 5V power supply interrupted or watchdog timer error occurred, module change for online module change possible
(2)	ERR LED	Indicates the error status of the module.* ¹ On: Error occurred Off: Normal operation
(3)	ALM LED	Indicates the alarm status of the module.* ² On: Alert (process alarm or rate alarm) issued Flashing: Disconnection being detected Off: Normal operation
(4)	Terminal block	18-point screw terminal block. Connects input signal wires of external devices and others
(5)	Terminal block cover	This cover prevents electric shock while the power is on.
(6)	Production information marking	Shows the product information (16 digits) of the module.

*1 For details, refer to the following.

☞ Page 140 LIST OF ERROR CODES

*2 For details, refer to the following.

☞ Page 143 LIST OF ALARM CODES

MEMO

PART 3

PROCEDURES BEFORE OPERATION

PART 3

Part 3 consists of the following chapters.

3 START-UP PROCEDURE

4 WIRING

5 PARAMETER SETTINGS

3 START-UP PROCEDURE

This chapter describes the procedures before operation.

1. Mounting a module

Mount a temperature input module in any desired configuration.

☞ Page 114 OPERATION EXAMPLES OF WHEN THE CPU MODULE IS MOUNTED

☞ Page 121 OPERATION EXAMPLES OF WHEN THE REMOTE HEAD MODULE IS MOUNTED

2. Wiring

Perform wiring of external devices to a temperature input module.

☞ Page 31 Wiring Method

3. Adding a module

Add a temperature input module by using the engineering tool. For details, refer to the following.

📖 GX Works3 Operating Manual

4. Module settings

Set up the parameters of the temperature input module by using the engineering tool. For details, refer to the following.

☞ Page 37 PARAMETER SETTINGS

5. Programming

Create a program. For details, refer to the following.

☞ Page 114 OPERATION EXAMPLES OF WHEN THE CPU MODULE IS MOUNTED

☞ Page 121 OPERATION EXAMPLES OF WHEN THE REMOTE HEAD MODULE IS MOUNTED

4 WIRING

This chapter describes the wiring of a temperature input module.

4.1 Terminal Block

Precautions

Tighten the module fixing screws within the specified torque range.

Screw type	Tightening torque range
Module fixing screw (M3 screw)* ¹	0.37 to 0.48N-m
Terminal screw (M3 screw)	0.42 to 0.58N-m
Terminal block mounting screw (M3.5 screw)	0.66 to 0.89N-m

*1 Modules can easily be fixed to the base unit with the hook located at the top of the modules. However, fixing the modules with the module fixing screws is recommended for locations that often vibrate.

The following table lists the applicable solderless terminal to be attached to the terminal block. When wiring, use a wire that complies with the following table and attach it within the applicable tightening torque range. Use a UL/CSA-certified solderless terminal. When adjusting the terminal, use the tools recommended by the solderless terminal manufacturer. In addition, solderless terminals with an insulation sleeve cannot be used.

Solderless terminal		Wire			
Model	Applicable tightening torque	Wire diameter	Type	Material	Temperature rating
R1.25-3* ²	0.42 to 0.58N-m	0.3 to 0.75mm ² (22 to 18 AWG)	Stranded wire	Copper wire	75°C or higher

*2 When this product acquired UL/cUL certification, the solderless terminals manufactured by J.S.T.MFG.CO.,LTD. were used.

Terminal block signal name

The following table lists the signal names of the terminal block.

Terminal block	Terminal No.	Signal name	
	1	RTD+	
	2	CH1	A/V+
	3		b/RTD-
	4		B/V-
	5	SLD	
	6	CH2	A/V+
	7		b
	8		B/V-
	9	SLD	
	10	CH3	A/V+
	11		b
	12		B/V-
	13	SLD	
	14	CH4	A/V+
	15		b
	16		B/V-
	17	SLD	
	18	FG	

Point

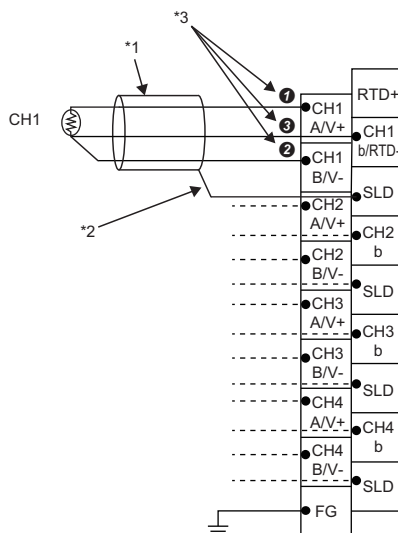
When a cold junction compensation resistor (RTD) is used, a resistance temperature detector or resistor cannot be connected to CH1.

4.2 Wiring Method

Wiring to the terminal block

This section shows wiring to the terminal block.

For the RTD input



*1 Use a shielded cable for wiring.

*2 Connect the shielded cable for each channel to the SLD terminal to ground the FG terminal.

*3 Perform wiring so that the length of ❶ the conductor between the RTD and the A/V+ terminal is the same length as ❷ the conductor between the RTD and the B/V- terminal.

Place ❶ the conductor between the RTD and the A/V+ terminal, ❷ the conductor between the RTD and the B/V- terminal, and ❸ the conductor between the RTD and the b/RTD- terminal at locations that minimize the wiring length, and adjust them so that their conductor resistance values are equal to or smaller than 150Ω.

The table below lists the rate of accuracy error per 1Ω of the conductor resistance value.

If the above conditions are not satisfied, the accuracy may exceed the range. (☞ Page 50 Accuracy during RTD input)

RTD type	Accuracy error per 1Ω of conductor resistance value
Pt100	0.016°C/Ω
JPt100	0.015°C/Ω
Pt1000	0.005°C/Ω
Pt50	0.029°C/Ω
Ni100	0.012°C/Ω

Point

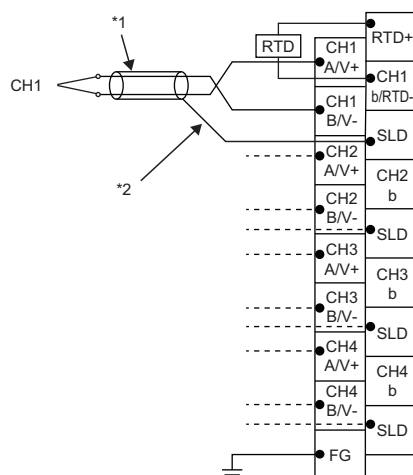
If the conversion is enabled while the conductor between terminals of an unused channel is left open, unstable digital values may be output.

To prevent this phenomenon, disable conversion on unused channels.

For details on the conversion enable/disable setting function, refer to the following.

☞ Page 60 Conversion Enable/Disable Setting Function

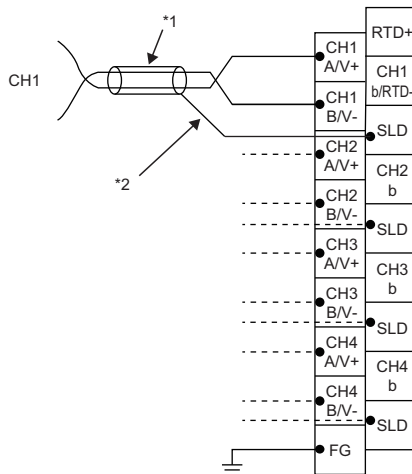
For the thermocouple input



*1 Use a shielded compensation lead wire for wiring.

*2 Connect the shielded cable of the compensation lead wire for each channel to the SLD terminal to ground the FG terminal.

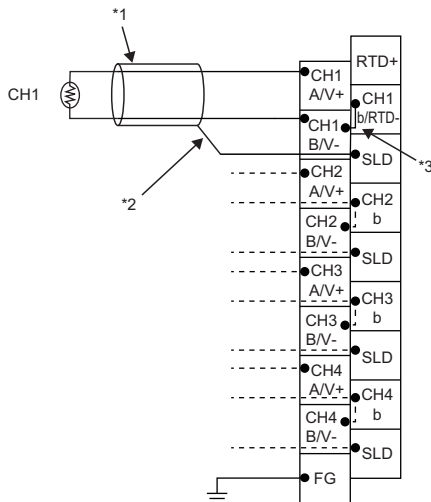
For the micro voltage input



*1 Use a 2-core shielded twisted pair cable for wiring.

*2 Connect the shielded cable of the wire for each channel to the SLD terminal to ground the FG terminal.

For the resistor input



*1 Use a shielded cable for wiring.

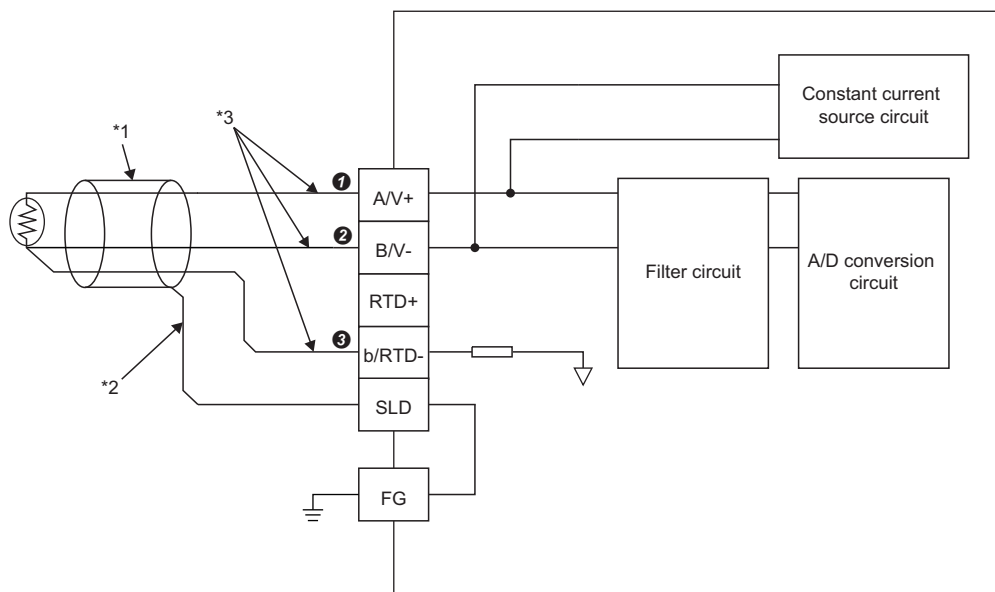
*2 Connect the shielded cable for each channel to the SLD terminal to ground the FG terminal.

*3 For the resistor input, connect the terminals between (B/V-) and (b/RTD- or b).

External wiring examples

This section shows the examples of external wiring.

For the RTD input



*1 Use a shielded cable for wiring.

*2 Connect the shielded cable for each channel to the SLD terminal to ground the FG terminal.

*3 Perform wiring so that the length of ❶ the conductor between the RTD and the A/V+ terminal is the same length as ❷ the conductor between the RTD and the B/V- terminal.

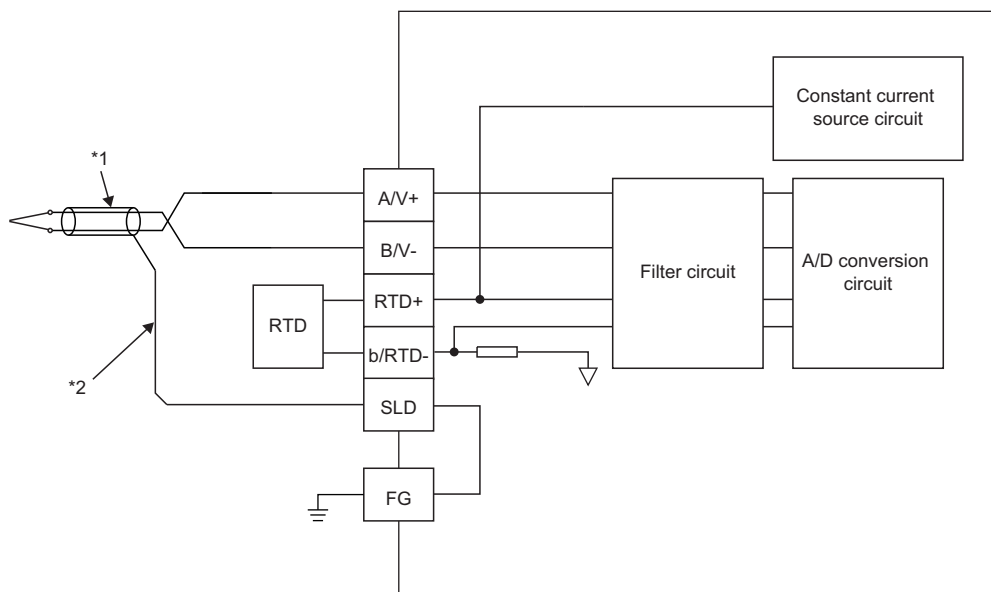
Place ❶ the conductor between the RTD and the A/V+ terminal, ❷ the conductor between the RTD and the B/V- terminal, and ❸ the conductor between the RTD and the b/RTD- terminal at locations that minimize the wiring length, and adjust them so that their conductor resistance values are equal to or smaller than 150Ω.

The table below lists the rate of accuracy error per 1Ω of the conductor resistance value.

If the above conditions are not satisfied, the accuracy may exceed the range. (☞ Page 50 Accuracy during RTD input)

RTD type	Accuracy error per 1Ω of conductor resistance value
Pt100	0.016°C/Ω
JPt100	0.015°C/Ω
Pt1000	0.005°C/Ω
Pt50	0.029°C/Ω
Ni100	0.012°C/Ω

For the thermocouple input

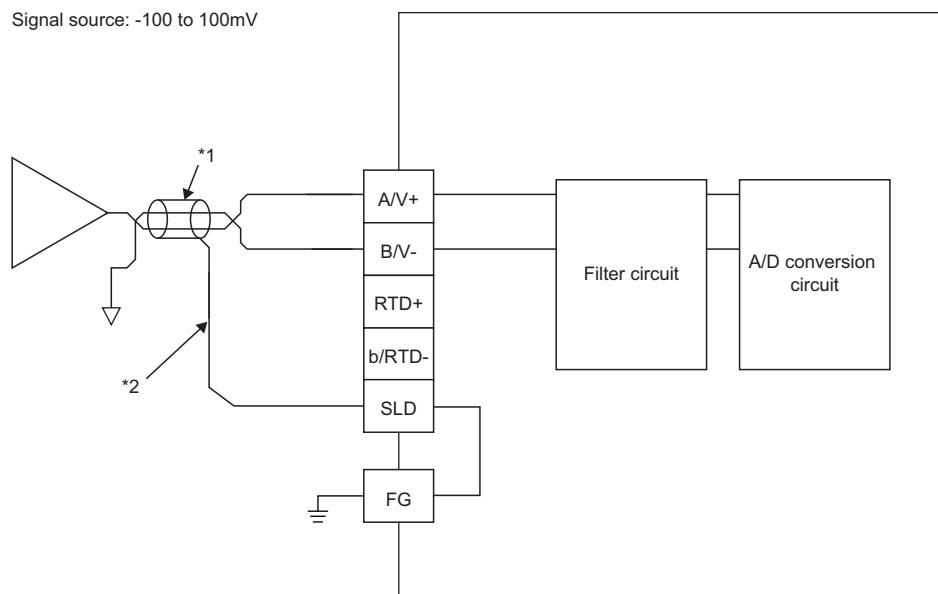


*1 Use a shielded compensation lead wire for wiring.

*2 Connect the shielded cable of the compensation lead wire for each channel to the SLD terminal to ground the FG terminal.

For the micro voltage input

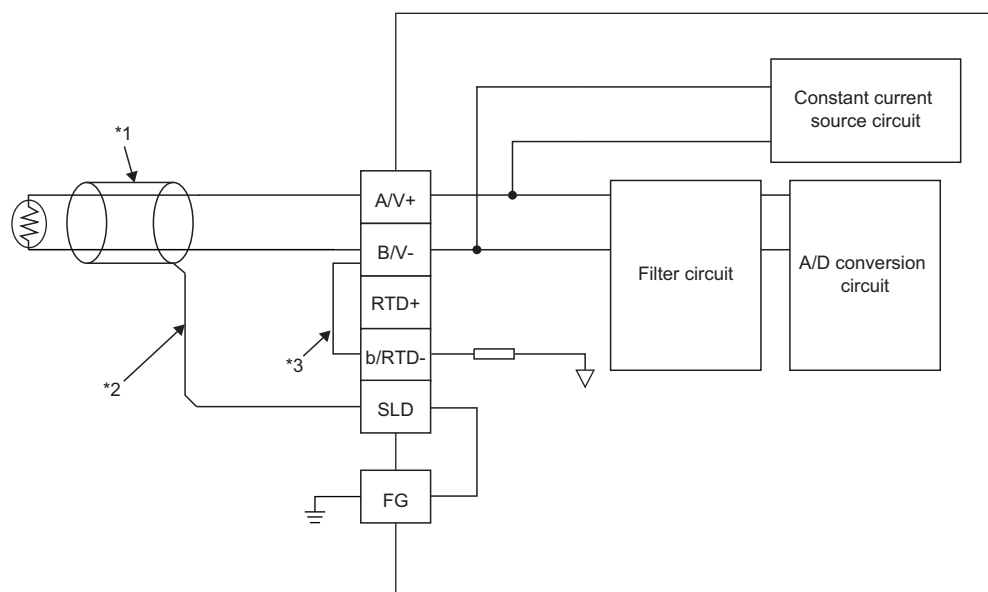
Signal source: -100 to 100mV



*1 Use a 2-core shielded twisted pair cable for wiring.

*2 Connect the shielded cable of the wire for each channel to the SLD terminal to ground the FG terminal.

For the resistor input



*1 Use a shielded cable for wiring.

*2 Connect the shielded cable for each channel to the SLD terminal to ground the FG terminal.

*3 For the resistor input, connect the terminals between (B/V-) and (b/RTD- or b).

5 PARAMETER SETTINGS

Set the parameters of each channel.

Setting parameters here eliminates the need to program them.

5.1 Basic Setting

Setting procedure

Open "Basic setting" of the engineering tool.

1. Start Module parameter.

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

The screenshot shows the '0000:R60TRD4-G Module Parameter' window. On the left is a tree view of settings, with 'Basic setting' selected. The main area is titled 'Setting Item' and contains a table with columns for 'Item', 'CH1', 'CH2', 'CH3', and 'CH4'. The table lists various settings like 'Input type/range setting function', 'Cold junction compensation setting function', 'Conversion enable/disable setting function', and 'Conversion system'. Below the table is an 'Explanation' section with the text 'Set the input type and input range for each channel.' At the bottom are 'Check' and 'Restore the Default Settings' buttons.

Item	CH1	CH2	CH3	CH4
Input type/range setting function	Set the input type and input range for each channel.			
Range setting (input type setting)	Pt100 (-200 to 850 C)	Pt100 (-200 to 850 C)	Pt100 (-200 to 850 C)	Pt100 (-200 to 850 C)
Cold junction compensation setting function	Set the cold junction compensation with/without.			
Cold junction compensation setting	With cold junction compensation (use standard terminal block)			
Conversion enable/disable setting function	Set whether to enable or disable the output of the conversion value.			
Conversion enable/disable setting	Conversion disable	Conversion disable	Conversion disable	Conversion disable
Conversion system	Set the conversion control system.			
Average processing setting	Sampling processing	Sampling processing	Sampling processing	Sampling processing
Time average/Count average/Moving average/Primary delay filter constant setting	0	0	0	0

Explanation
Set the input type and input range for each channel.

Check Restore the Default Settings

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

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

Click the [▼] 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.

5.2 Application Setting

Setting procedure

Open "Application setting" of the engineering tool.

1. Start Module parameter.

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

0000:R60TRD4-G Module Parameter

Setting Item List

Input the Setting Item to Search

Basic setting
Application setting
Scaling function
Shift function
Warning output function (Process alarm)
Warning output function (Rate alarm)
Disconnection detection function
Logging function
Interrupt setting
Refresh settings

Setting Item

Item	CH1	CH2	CH3	CH4
Scaling function	Configure the setting for the scaling at the conversion.			
Scaling enable/disable setting	Disable	Disable	Disable	Disable
Scaling range upper limit value	0	0	0	0
Scaling range lower limit value	0	0	0	0
Scaling width upper limit value	0	0	0	0
Scaling width lower limit value	0	0	0	0
Scaling range upper limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Scaling range lower limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Scaling width upper limit value (32 bits)	0	0	0	0
Scaling width lower limit value (32 bits)	0	0	0	0
Shift function	Set the Conversion value shift amount at the conversion.			
Conversion value shift amount	0	0	0	0
Conversion value shift amount (32 bits)	0	0	0	0
Warning output function (Process alarm)	Set an alert at the conversion.			
Warning output setting (Process alarm)	Disable	Disable	Disable	Disable
Process alarm upper upper limit value	12000	12000	12000	12000
Process alarm upper lower limit value	12000	12000	12000	12000
Process alarm lower upper limit value	-2000	-2000	-2000	-2000
Process alarm lower lower limit value	-2000	-2000	-2000	-2000
Process alarm upper upper limit value (32 bits)	850.000 C	850.000 C	850.000 C	850.000 C
Process alarm upper lower limit value (32 bits)	850.000 C	850.000 C	850.000 C	850.000 C
Process alarm lower upper limit value (32 bits)	-200.000 C	-200.000 C	-200.000 C	-200.000 C
Process alarm lower lower limit value (32 bits)	-200.000 C	-200.000 C	-200.000 C	-200.000 C
Warning output function (Rate alarm)	Set an alert at the conversion.			
Warning output setting (Rate alarm)	Disable	Disable	Disable	Disable
Rate alarm detection cycle setting	0 times	0 times	0 times	0 times
Rate alarm upper limit value	0	0	0	0
Rate alarm lower limit value	0	0	0	0
Rate alarm upper limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Rate alarm lower limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection function	Configure the setting for the disconnection detection at the conversion.			
Disconnection detection function enable/disable setting	Enable	Enable	Enable	Enable
Conversion setting for disconnection detection	Down Scale	Down Scale	Down Scale	Down Scale
Conversion setting value for disconnection detection	0	0	0	0
Conversion setting value for disconnection detection (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection automatic clear enable/disable setting	Disable	Disable	Disable	Disable
Logging function	Configure the setting for the logging function at the conversion.			
Logging enable/disable setting	Disable	Disable	Disable	Disable
Logging data setting	Digital output value	Digital output value	Digital output value	Digital output value
Logging cycle setting value	40 ms	40 ms	40 ms	40 ms
Logging cycle unit setting	ms	ms	ms	ms
Level trigger condition setting	Disable	Disable	Disable	Disable
Logging points after trigger	500	500	500	500
Trigger data	400	600	800	1000
Trigger setting value	0	0	0	0
Loading interrupt enable/disable setting	Disable	Disable	Disable	Disable
Logging load points setting value	100	100	100	100

Explanation

Item List Find Result

Check Restore the Default Settings

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

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

Click the [▼] 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.

5.3 Interrupt Setting

Setting procedure

Open "Interrupt setting" of the engineering tool.

1. Start Module parameter.

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

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

Explanation

(1) Set an interrupt factor to be detected.
- Disable
- Error flag
- Warning output flag (Process alarm)
- Warning output flag (Rate alarm)
- Disconnection detection flag
- Conversion completed
- Logging hold flag
- Logging read

(2) An interrupt request to CPU will be issued when the X signal or the buffer memory which was set in the "Condition target setting" is turned from OFF to ON.

(3) An interrupt request to CPU will be issued in every conversion cycle if "Conversion completed" has been set.

(4) An interrupt request to CPU will be issued in every time when the number of logged data by logging function reaches the points specified in Logging read points setting value if "Logging read" has been set.

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

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

Click the [▼] 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.

5.4 Refresh Setting

Setting procedure

Set the buffer memory area of a temperature input module to be refreshed.

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

1. Start Module parameter.

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

The screenshot shows the '0000-R60TRD4-G Module Parameter' window. The 'Setting Item List' on the left includes 'Basic setting', 'Application setting', 'Interrupt setting', and 'Refresh settings'. The 'Setting Item' pane on the right shows the 'Refresh at the set timing' section, which is expanded to show 'Transfer to the intelligent function module.' and 'Transfer to the CPU.' The 'Transfer to the intelligent function module.' section lists items like 'Level data 0' through 'Level data 9', 'Logging hold request', 'Conversion value shift amount', and 'Conversion value shift amount (32 bits)'. The 'Transfer to the CPU.' section lists items like 'Latest error code', 'Latest address of error history', 'Latest alarm code', 'Latest address of alarm history', 'Interrupt factor detection flag 1' through 'Interrupt factor detection flag 16', 'Warning output flag (Process alarm upper limit)', and 'Warning output flag (Process alarm lower limit)'. The 'Explanation' pane at the bottom is empty. The 'Target' dropdown is set to 'Device'. The 'Number of transfers to intelligent function module' and 'Number of transfers to CPU' are both set to 0. The 'CH1' through 'CH4' columns are empty.

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

- When "Target" is "Module Label"

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

- When "Target" is "Refresh Data Register (RD)"

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

- When "Target" is "Device"

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

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

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

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

Point

With refresh enabled, the value of the refresh destination takes effect at the timing of refresh which is set up by the engineering tool. As this happens, the buffer memory is overwritten with the value of the refresh destination. To change the value of a buffer memory area to be refreshed, change the value of module label or device at the refresh destination in the program.

Refresh processing time

A refresh processing time [μs] is a constituent of the scan time of the CPU module. For the scan time, refer to the manual for the CPU module used.

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

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

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

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

The following table lists the refresh read time and refresh write time with an R04CPU module used.

Model	Classification	When using the refresh settings
R mode	Refresh read time	21.60 μs
	Refresh write time	12.30 μs
Q compatible (RD) mode	Refresh read time	22.24 μs
	Refresh write time	11.06 μs
Q compatible (TD) mode	Refresh read time	21.54 μs
	Refresh write time	11.02 μs

When "Target" is "Device"

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

PART 4

SYSTEM CONFIGURATION

Part 4 consists of the following chapter.

6 SYSTEM CONFIGURATION

6 SYSTEM CONFIGURATION

For system configurations using the MELSEC iQ-R series modules, CPU modules that can be used with the temperature input module, and the number of mountable modules, refer to the following.

 MELSEC iQ-R Module Configuration Manual

6.1 Precautions for System Configuration

Cold junction compensation with the cold junction compensation resistor (RTD) of the temperature input module is based on the temperature at the location where the cold junction compensation resistor (RTD) of the terminal block is connected. However, the temperature distribution of the terminal block becomes uneven due to the effects of module heat production, depending on the system configuration (for example, when the terminal block is mounted adjacent to a module that generates a large amount of heat, such as a power supply module, CPU module, and analog module). As a result, using the cold junction compensation with a cold junction compensation resistor (RTD) may increase temperature errors in the measured temperature of a thermocouple.

In such cases, take the following countermeasures.

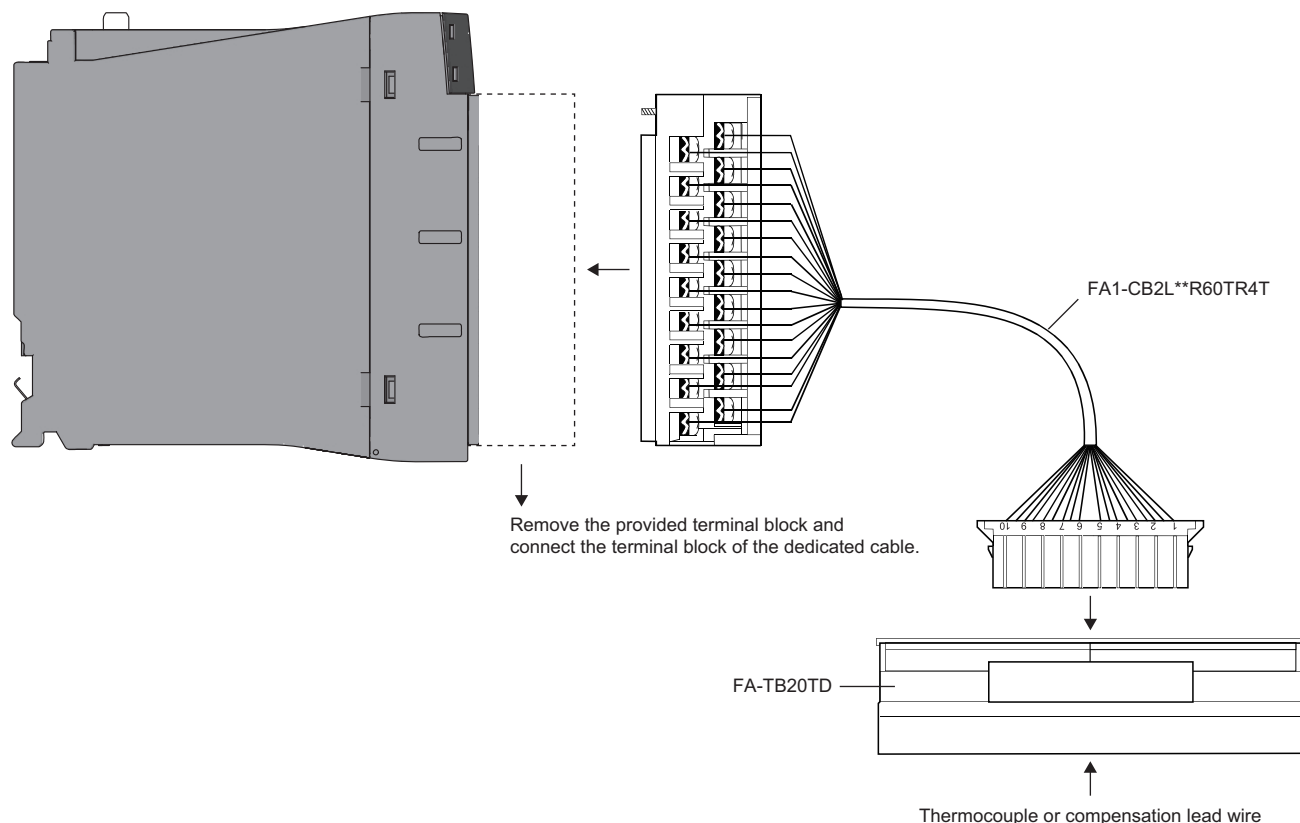
Changing the system configuration

By changing the system configuration as described below, errors due to module heat effects can be mitigated.

- When the base unit has an empty slot, do not mount any modules in the slots adjacent to the temperature input module.

Using a terminal block converter module and dedicated cable

When the input type is thermocouple for all the channels used, errors due to module heat effects can be mitigated by using the terminal block converter module and dedicated cable.



Product name	Model	Contact
Connection cable with a terminal block for temperature/micro voltage input modules	FA1-CB2L**R60TR4T (**: cable length)	Your local Mitsubishi Electric sales office or representative
Terminal block converter module for thermocouple input module	FA-TB20TD	

Point

When using the terminal block converter module and dedicated cable, set the input type of all the conversion-enabled channels to thermocouple, and set "Cold junction compensation setting" to "With cold junction compensation (terminal block converter module)".

If the above conditions are not satisfied, the accuracy may exceed the specification range. (☞ Page 48 Performance Specifications)

For details on the cold junction compensation operation, refer to the following.

☞ Page 69 Cold Junction Compensation Setting Function

PART 5

SPECIFICATIONS

Part 5 consists of the following chapter.

7 SPECIFICATIONS

7 SPECIFICATIONS

This chapter describes the performance specifications and accuracy of temperature input modules.

7.1 Performance Specifications

This section describes the performance specifications of temperature input modules.

Item		Specifications	
Model		R60TRD4-G ^{*1}	
Number of analog input points		4 points (4 channels) + Cold junction compensation channel per module	
Analog input ^{*2}	Resistance temperature detector ^{*3}	Usable types	5 types Pt100 (IEC 60751 2008, JIS C 1604-2013) JPt100 (JIS C 1604-1981) Pt1000 (IEC 60751 2008, JIS C 1604-2013) Ni100 (DIN 43760 1987) Pt50 (JIS C 1604-1981)
	Thermocouple	Usable types	8 types B, R, S, N, K, E, J, T (IEC 60584-1 (2013), JIS C 1602-2015)
		Cold junction compensation	Cold junction compensation resistor (RTD)
	Micro voltage		-100 to 100mVDC
	Resistor ^{*4}		0 to 500Ω, 0 to 4000Ω, 0 to 16000Ω
	Maximum rated voltage		Between the V+/- terminals (for the thermocouple/micro voltage input): ±5V Between the A/B(b) terminals (for the RTD/resistor input): 0 to 5V Between the RTD+/RTD- terminals: 0 to 5V
	Maximum rated current		±10mA
Output	Digital output value	Resistance temperature detector	16-bit signed binary data (-2000 to 8500: Value up to one decimal place × 10) 32-bit signed binary data (-200000 to 850000: Value up to three decimal places × 1000)
		Thermocouple	16-bit signed binary data (-2700 to 18200: Value up to one decimal place × 10)
		Micro voltage	16-bit signed binary data (-25000 to 25000)
		Resistor ^{*5}	16-bit signed binary data (0 to 32000)
	Digital operation value	Resistance temperature detector	16-bit signed binary data 32-bit signed binary data
		Thermocouple	16-bit signed binary data
		Micro voltage	16-bit signed binary data
		Resistor	16-bit signed binary data
Accuracy	Resistance temperature detector		For details, refer to the following. ☞ Page 50 Accuracy during RTD input
	Thermocouple ^{*6}		For details, refer to the following. ☞ Page 51 Accuracy during thermocouple input
	Cold junction compensation (Cold junction compensation resistor (RTD))		±1.0°C
	Micro voltage ^{*6}		For details, refer to the following. ☞ Page 52 Accuracy during micro voltage input
	Resistor ^{*6}		For details, refer to the following. ☞ Page 52 Accuracy during resistor input
Resolution	Resistance temperature detector		0.025°C/0.1°C
	Thermocouple		B, R, S, N: 0.3°C K, E, J, T: 0.1°C
	Micro voltage		4μV
	Resistor		0 to 500Ω: 0.015625Ω, 0 to 4000Ω: 0.125Ω, 0 to 16000Ω: 0.5Ω

Item		Specifications
Excitation current	Resistance temperature detector	Pt100, JPt100, Pt50, Ni100: 1mA Pt1000: 0.1mA
	Resistor	0 to 500Ω: 1mA 0 to 4000Ω, 0 to 16000Ω: 0.1mA
	External cold junction compensation resistor	1mA
Conversion speed ^{*7}		40ms/4 channels
Isolation method	Between temperature input channel and programmable controller power supply	Digital isolator isolation/Transformer isolation
	Between temperature input channels	Digital isolator isolation/Transformer isolation
	Between cold junction compensation channel and programmable controller power supply	Digital isolator isolation/Transformer isolation
Withstand voltage	Between temperature input channel and programmable controller power supply	500VDC 1 minute
	Between temperature input channels	1000VDC 1 minute
	Between cold junction compensation channel and programmable controller power supply	500VDC 1 minute
Insulation resistance	Between temperature input channel and programmable controller power supply	500VDC 10MΩ or more
	Between temperature input channels	500VDC 10MΩ or more
	Between cold junction compensation channel and programmable controller power supply	500VDC 10MΩ or more
Disconnection detection		Built-in
Number of occupied I/O points		16 points (I/O assignment: Intelligent 16 points)
External interface		18-point terminal block (Screw terminal block)
Applicable wire size		0.3 to 0.75mm ² (22 to 18 AWG)
Applicable solderless terminal		R1.25-3 (Solderless terminals with an insulation sleeve cannot be used.)
Internal current consumption (5VDC)		0.21A
External dimensions	Height	106mm
	Width	27.8mm
	Depth	110mm
Weight		0.23kg

*1 For power supplies connected to this device (including those of external devices), use either of the following.

- Power supplies that comply with Safety Extra Low Voltage (SELV) and Limited Energy Circuit (LIM)
- Power supplies that comply with Safety Extra Low Voltage (SELV) and UL 1310 Class 2

*2 Since input terminals do not have a measurement category, do not use them for measurement of the main power supply circuit.

*3 An usable resistance temperature detector is 3-wire type only. A resistance temperature detector of 2-wire type or 4-wire type cannot be used.

*4 For resistor input, use the 2-wire type.

*5 The digital output values of resistor input represent the following calculation results.

$$(\text{Digital output value}) = (\text{Resistance value of the measured object}) / (\text{Resolution}) + (\text{Conversion accuracy}) + (\text{Wiring resistance}) / (\text{Resolution})$$

The value for conversion accuracy assumes that the measured object is connected near the terminal block and the wiring resistance is ignored.

*6 Except for the conditions under noise influence.

*7 This conversion speed is the time required to store a digital output value into the buffer memory in sampling processing.

For details on the conversion speed, refer to the following.

📖 Page 61 Conversion Method

7.2 Accuracy

This section describes the accuracy of temperature input modules.

Accuracy during RTD input

The accuracy (°C) is calculated from the following formula.

For the allowance of the resistance temperature detector, refer to the manual for the resistance temperature detector used.

$$A_C + AL_{RTD}$$

A_C : Conversion accuracy

AL_{RTD} : Allowance of the resistance temperature detector used

■ Usable resistance temperature detector, conversion accuracy

RTD type	Temperature measuring range ^{*1}	Conversion accuracy (for operating ambient temperature 25 ± 5°C)	Conversion accuracy (for operating ambient temperature 0 to 55°C)
Pt100	-200 to 850°C	±0.553°C	±1.615°C
	-20 to 120°C	±0.090°C	±0.300°C
	0 to 200°C	±0.145°C	±0.470°C
JPt100	-180 to 600°C	±0.390°C	±1.140°C
	-20 to 120°C	±0.090°C	±0.300°C
	0 to 200°C	±0.145°C	±0.470°C
Ni100	-60 to 250°C	±0.135°C	±0.450°C
Pt50	-200 to 650°C	±0.8°C	±2.4°C
Pt1000	-200 to 850°C	±0.553°C	±1.615°C

*1 If a value outside the temperature measuring range in the table is input from a resistance temperature detector, the value is regarded as the maximum value or minimum value of the temperature measuring range.

Accuracy during thermocouple input

The accuracy (°C) is calculated from the following formula.

$$A_C + T_C \times C_{OAT} + A_{CJ}$$

A_C : Conversion accuracy

T_C : Temperature characteristics

C_{OAT} : Operating ambient temperature change

A_{CJ} : Cold junction compensation accuracy

Note that the operating ambient temperature change indicates the extent to which the operating ambient temperature is out of the range of $25 \pm 5^\circ\text{C}$.

Ex.

Accuracy when B thermocouple is used, the operating ambient temperature is 35°C , and measured temperature is 1000°C
 $(\pm 1.0^\circ\text{C}) + (\pm 0.29^\circ\text{C}) \times (35^\circ\text{C} - 30^\circ\text{C}) + (\pm 1.0^\circ\text{C}) = \pm 3.45^\circ\text{C}$

■ Usable thermocouple, conversion accuracy, and effect per wiring resistance 1Ω

The following table shows the relation of usable thermocouple, conversion accuracy, and effect per wiring resistance 1Ω .

Usable thermocouple	Temperature measuring range*1	Conversion accuracy (for operating ambient temperature $25 \pm 5^\circ\text{C}$)	Temperature characteristics (for 1°C of operating ambient temperature change)	Maximum temperature error when ambient temperature is 55°C	Effect per wiring resistance 1Ω *3
B	0 to 600°C	—*2	—*2	—*2	—*2
	600 to 800°C	$\pm 1.3^\circ\text{C}$	$\pm 0.3^\circ\text{C}$	$\pm 8.8^\circ\text{C}$	$0.042^\circ\text{C}/\Omega$
	800 to 1700°C	$\pm 1.0^\circ\text{C}$	$\pm 0.29^\circ\text{C}$	$\pm 8.25^\circ\text{C}$	$0.036^\circ\text{C}/\Omega$
	1700 to 1820°C	—*2	—*2	—*2	—*2
R	-50 to 0°C	—*2	—*2	—*2	—*2
	0 to 300°C	$\pm 1.5^\circ\text{C}$	$\pm 0.4^\circ\text{C}$	$\pm 11.5^\circ\text{C}$	$0.05^\circ\text{C}/\Omega$
	300 to 1600°C	$\pm 0.8^\circ\text{C}$	$\pm 0.29^\circ\text{C}$	$\pm 8.05^\circ\text{C}$	$0.028^\circ\text{C}/\Omega$
	1600 to 1760°C	—*2	—*2	—*2	—*2
S	-50 to 0°C	—*2	—*2	—*2	—*2
	0 to 300°C	$\pm 1.5^\circ\text{C}$	$\pm 0.4^\circ\text{C}$	$\pm 11.5^\circ\text{C}$	$0.05^\circ\text{C}/\Omega$
	300 to 1600°C	$\pm 0.8^\circ\text{C}$	$\pm 0.29^\circ\text{C}$	$\pm 8.05^\circ\text{C}$	$0.028^\circ\text{C}/\Omega$
	1600 to 1760°C	—*2	—*2	—*2	—*2
K	-270 to -200°C	—*2	—*2	—*2	—*2
	-200 to 0°C	$\pm 0.5^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.1\%$	$\pm 5.5^\circ\text{C}$	$0.017^\circ\text{C}/\Omega$
	0 to 1200°C	$\pm 0.3^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.02\%$	$\pm 6.3^\circ\text{C}$	$0.007^\circ\text{C}/\Omega$
	1200 to 1370°C	—*2	—*2	—*2	—*2
E	-270 to -200°C	—*2	—*2	—*2	—*2
	-200 to 0°C	$\pm 0.5^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.15\%$	$\pm 8.0^\circ\text{C}$	$0.01^\circ\text{C}/\Omega$
	0 to 900°C	$\pm 0.2^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.02\%$	$\pm 4.7^\circ\text{C}$	$0.005^\circ\text{C}/\Omega$
	900 to 1000°C	—*2	—*2	—*2	—*2
J	-210 to -40°C	—*2	—*2	—*2	—*2
	-40 to 750°C	$\pm 0.2^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.02\%$	$\pm 3.95^\circ\text{C}$	$0.006^\circ\text{C}/\Omega$
	750 to 1200°C	—*2	—*2	—*2	—*2
T	-270 to -200°C	—*2	—*2	—*2	—*2
	-200 to 0°C	$\pm 0.5^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.1\%$	$\pm 5.5^\circ\text{C}$	$0.016^\circ\text{C}/\Omega$
	0 to 350°C	$\pm 0.4^\circ\text{C}$	Larger value of $\pm 0.06^\circ\text{C}$ or the measured temperature $\pm 0.02\%$	$\pm 2.15^\circ\text{C}$	$0.007^\circ\text{C}/\Omega$
	350 to 400°C	—*2	—*2	—*2	—*2

Usable thermocouple	Temperature measuring range ^{*1}	Conversion accuracy (for operating ambient temperature 25 ± 5°C)	Temperature characteristics (for 1°C of operating ambient temperature change)	Maximum temperature error when ambient temperature is 55°C	Effect per wiring resistance 1Ω ^{*3}
N	-270 to -200°C	— ^{*2}	— ^{*2}	— ^{*2}	— ^{*2}
	-200 to 0°C	±0.5°C	Larger value of ±0.06°C or the measured temperature ± 0.2%	±6.2°C	0.025°C/Ω
	0 to 1250°C	±0.5°C	Larger value of ±0.06°C or the measured temperature ± 0.02%	±6.75°C	0.01°C/Ω
	1250 to 1300°C	— ^{*2}	— ^{*2}	— ^{*2}	— ^{*2}

*1 If a value outside the temperature measuring range in the table is input from a thermocouple, the value is regarded as the maximum value or minimum value of the temperature measuring range.

*2 The accuracy is not guaranteed though temperature measurement is possible.

*3 The value indicates a temperature error generated per wiring resistance 1Ω of a thermocouple. Check the resistance value and calculate the temperature error of the system. If the error is beyond the allowable range of the system used, correct the digital output value with the following functions.

☞ Page 78 Shift Function

☞ Page 73 Scaling Function

☞ Page 239 Offset/Gain Correction Using the Shift Function and Scaling Function

Accuracy during micro voltage input

The following table shows the relation between the conversion accuracy for the micro voltage input and the effect per wiring resistance 1Ω.

Input range setting	Conversion accuracy (for operating ambient temperature 25 ± 5°C)	Conversion accuracy (for operating ambient temperature 0 to 55°C)	Effect per wiring resistance 1Ω ^{*1}
-100 to 100mV	±0.2mV	±0.8mV	0.15μV/Ω

*1 The value indicates a voltage error generated per wiring resistance 1Ω. Check the resistance value and calculate the voltage error of the system. If the error is beyond the allowable range of the system used, correct the digital output value with the following functions.

☞ Page 78 Shift Function

☞ Page 73 Scaling Function

☞ Page 239 Offset/Gain Correction Using the Shift Function and Scaling Function

Accuracy during resistor input

The following table shows the conversion accuracy during resistor input.

Input range setting	Conversion accuracy (for operating ambient temperature 25 ± 5°C)	Conversion accuracy (for operating ambient temperature 0 to 55°C)
0 to 500Ω	0.15% (±48 digits)	0.20% (±64 digits)
0 to 4000Ω	0.05% (±16 digits)	0.10% (±32 digits)
0 to 16000Ω	0.05% (±16 digits)	0.10% (±32 digits)

Micro voltage input characteristics

Micro voltage input characteristics refer to the slope of the straight line formed by connecting the offset value and the gain value that are used when converting the analog signals (micro voltage) from outside the programmable controller into digital values.

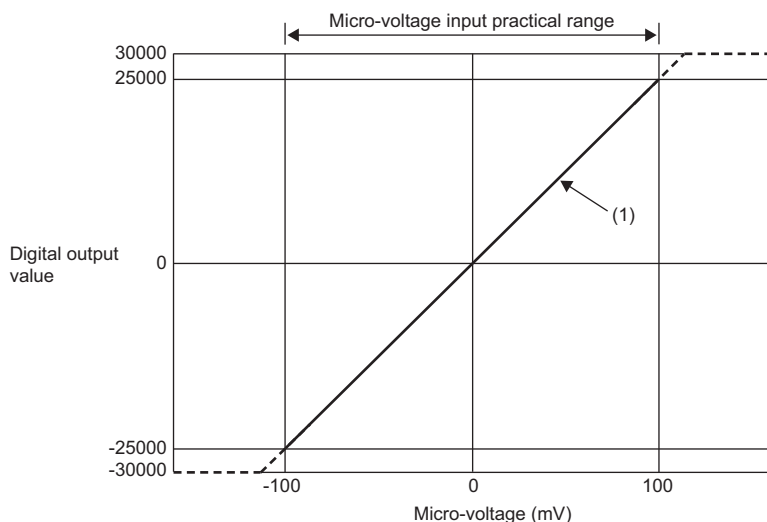
- Offset value

Analog input value when the digital output value becomes 0

- Gain value

Analog input value when the digital output value becomes 25000

The following graph shows the micro voltage input characteristics.



No.	Input range setting	Offset value	Gain value	Digital output value ^{*1}	Resolution
(1)	-100 to 100mV	0mV	100mV	-25000 to 25000	4 μ V

*1 When the analog input exceeds the range of digital output values, the digital output value is fixed to the maximum or minimum value.

Input range setting	Digital output value	
	Minimum	Maximum
-100 to 100mV	-30000	30000

Ex.

When the micro voltage is 51.3mV, 12825 is stored in CH□ digital output value.

Point

- Use the modules within the micro voltage input actual use range of each input range. If the input exceeds the range, the maximum resolution and accuracy may exceed the performance specification range. (Avoid use along the dotted-line part of the micro voltage input characteristics graph.)
- Do not input voltage beyond $\pm 5V$. Otherwise, devices may break.

Resistor input characteristics

Resistor input characteristics refer to the slope of the straight line formed by connecting the offset value and the gain value that are used when converting the analog signals (resistor) from outside the programmable controller into digital values.

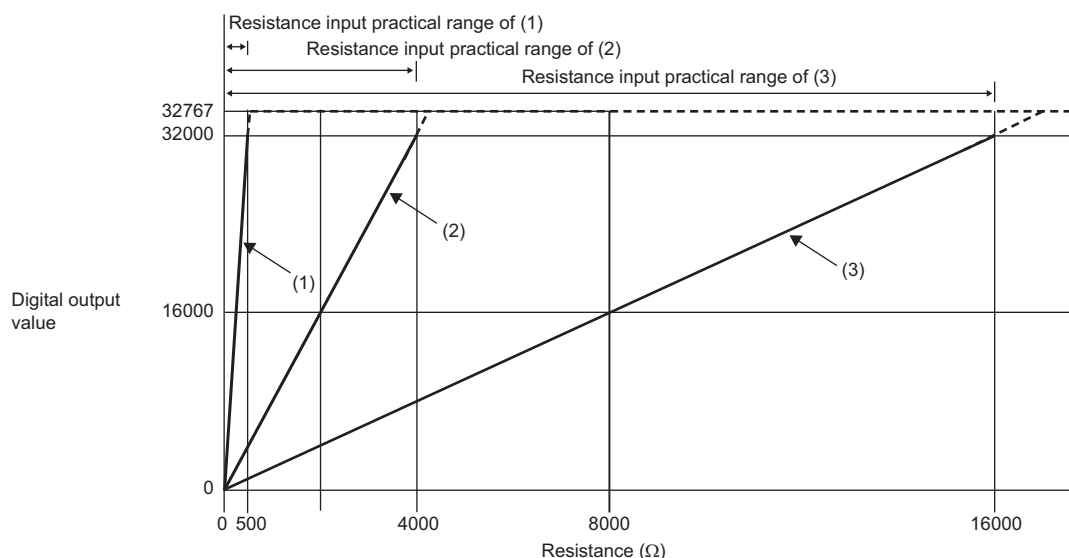
- Offset value

Analog input value when the digital output value becomes 0

- Gain value

Analog input value when the digital output value becomes 32000

The following graph shows the resistor input characteristics.



No.	Input range setting	Offset value	Gain value	Digital output value ^{*1}	Resolution
(1)	0 to 500 Ω	0 Ω	500 Ω	0 to 32000	0.015625 Ω
(2)	0 to 4000 Ω	0 Ω	4000 Ω	0 to 32000	0.125 Ω
(3)	0 to 16000 Ω	0 Ω	16000 Ω	0 to 32000	0.5 Ω

*1 When the analog input exceeds the range of digital output values, the digital output value is fixed to the maximum or minimum value.

Input range setting	Digital output value	
	Minimum	Maximum
0 to 500 Ω	0	32767
0 to 4000 Ω	0	32767
0 to 16000 Ω	0	32767

Ex.

When the input range setting is between 0 and 16000 Ω and the resistance is 10000 Ω , 20000 is stored in CH $\square$ digital output value.

Point

Use the modules within the resistor input actual use range of each input range. If the input exceeds the range, the maximum resolution and accuracy may exceed the performance specification range. (Avoid use along the dotted-line part of the resistor input characteristics graph.)

PART 6

FUNCTIONS

Part 6 consists of the following chapter.

8 FUNCTIONS

8 FUNCTIONS

This chapter lists the functions of a temperature input module and describes the details and the setting procedures for those functions. For details on the I/O signals and the buffer memory, refer to the following.

☞ Page 149 I/O Signals

☞ Page 155 Buffer Memory Areas

Point

- This chapter describes buffer memory addresses for CH1 in R mode. For details on the buffer memory addresses after CH2 or in Q compatible mode, refer to the following.
☞ Page 155 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, respectively. For details on the numerical values, refer to the following.
☞ Page 140 LIST OF ERROR CODES
☞ Page 143 LIST OF ALARM CODES
- This chapter describes the 16-bit buffer memory addresses for the storage locations of digital output values and digital operation values. When the input type is RTD or the Q compatible (RD) mode is used, replace the addresses with 32-bit buffer memory addresses. For the specifications and addresses of 32-bit buffer memory, refer to the following.
☞ Page 155 List of buffer memory areas

FUNCTION LIST

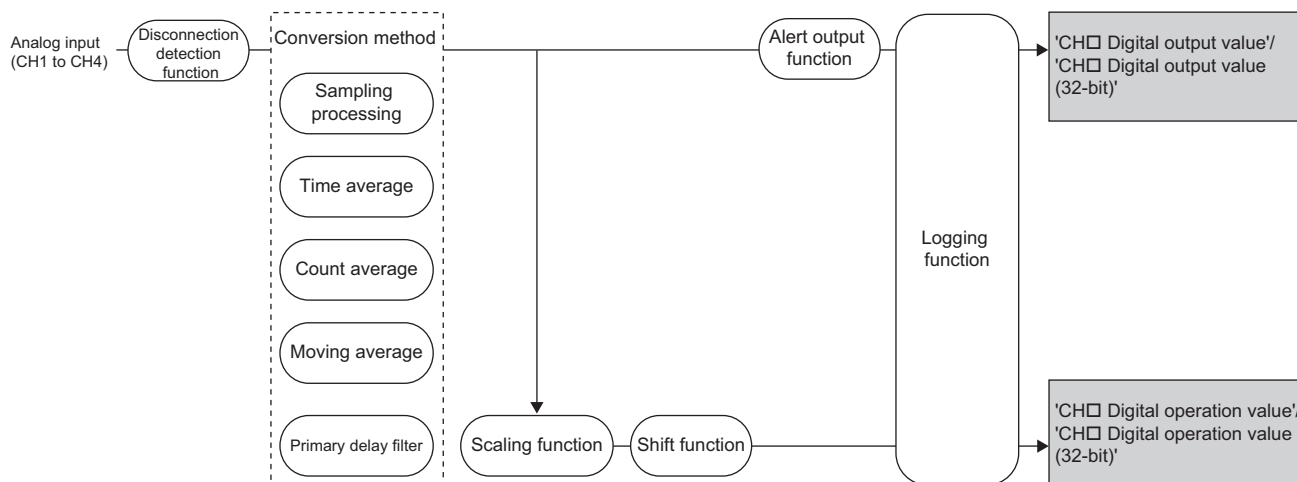
This chapter lists the functions of temperature input modules.

Item			Description	Reference
Input type/range setting function			Allows selection of the input type (RTD, thermocouple, micro voltage input, or resistor input) and input range to be used for each channel.	Page 59 Input Type/Range Setting Function
Conversion enable/disable setting function			Sets whether to enable or disable the conversion for each channel.	Page 60 Conversion Enable/Disable Setting Function
Conversion method	Sampling processing		Executes the conversion of the input temperature, micro voltage, and resistance value every conversion cycle and stores the converted values in buffer memory areas as digital output values.	Page 61 Sampling processing
	Averaging processing	Time average	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.	Page 61 Time average
		Count average	Executes the conversion for a set number of times and averages the total value excluding the maximum value and the minimum value. The calculated value is stored in the buffer memory area. The time taken to store the average value obtained by the processing in the buffer memory area varies depending on the set number of times.	Page 62 Count average
		Moving average	Averages digital output values taken at every conversion cycle for a specified number of times, and stores the averaged value in the buffer memory area. Because the target range for averaging processing is moved in response to every conversion cycle, the latest digital output value can be obtained.	Page 62 Moving average
	Primary delay filter		Performs the conversion where the transient noise of temperature, micro voltage, and resistor input is smoothed depending on the set time constant. The smoothed digital output value is stored in the buffer memory area.	Page 63 Primary delay filter
Disconnection detection function			Outputs an alarm when disconnection of a resistance temperature detector, thermocouple, compensation lead wire, micro voltage signal line, or resistor is detected. A digital output value to be stored at the disconnection detection is selected from the following. <ul style="list-style-type: none">• Upscale• Downscale• Any value• Value immediately before disconnection	Page 65 Disconnection Detection Function

Item		Description	Reference
Cold junction compensation setting function		Enables two types of cold junction compensation (using a cold junction compensation resistor or an external method (cooling bath)) by setting whether to use a cold junction compensation resistor.	Page 69 Cold Junction Compensation Setting Function
Cold junction compensation resistor disconnection detection function		Outputs an error when disconnection of a cold junction compensation resistor (RTD) is detected for a channel whose input type is set to thermocouple.	Page 71 Cold Junction Compensation Resistor Disconnection Detection Function
Scaling function		Performs scale conversion from a digital output value to a value calculated using the ratio (%) of the set scaling width to the set scaling range. The converted value is stored in the buffer memory area.	Page 73 Scaling Function
Shift function		Adds (shifts) the set conversion value shift amount onto the digital output value and stores the result in the buffer memory area.	Page 78 Shift Function
Alert output function	Process alarm	Outputs an alert when a digital output value enters the preset alert output range.	Page 80 Process alarm
	Rate alarm	Outputs an alert when the change of a digital output value is equal to or greater than the rate alarm upper limit value, or equal to or smaller than the rate alarm lower limit value.	Page 83 Rate alarm
Interrupt function		Executes an interrupt program of the CPU module when an interrupt factor such as alert output or disconnection is detected.	Page 88 Interrupt Function
Logging function		Logs (records) digital output values or digital operation values. Data of 1000 points can be logged for each channel.	Page 92 Logging Function
Q compatible mode function		Controls operations of the temperature input module with its buffer memory address layout converted to equivalent one to the compatible modules of the MELSEC-Q series. This compatibility enables the utilization of programs that have proven performance on MELSEC-Q series modules.	Page 111 Q Compatible Mode Function
Online module change		Allows to replace a module without stopping the system.	 MELSEC iQ-R Online Module Change Manual
Firmware update function		Enables users to update the firmware versions of modules by using firmware update files. (For the firmware update file, please consult your local Mitsubishi representative.)	 MELSEC iQ-R Module Configuration Manual

8.1 Processing of Each Function

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



Digital output value/Digital output value (32-bit)

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

The buffer memory name and value to be stored vary depending on the input type.

Input type	Buffer memory name	Value to be stored
Thermocouple Micro voltage Resistor	CH□ digital output value	Stores values after sampling processing, each averaging processing, or primary delay filter has been performed.
Resistance temperature detector	CH□ digital output value (32-bit)	Stores values after sampling processing, each averaging processing, or primary delay filter has been performed. The values are stored in units of 0.001°C.
	CH□ digital output value	Stores values after sampling processing, each averaging processing, or primary delay filter has been performed. The values are stored in units of 0.1°C.

Digital operation value/Digital operation value (32-bit)

These values are determined by running calculations on the digital output values via the scaling function and shift function. When the scaling function and shift function are not used, the same value as the digital output value is stored.

The buffer memory name and value to be stored vary depending on the input type.

Input type	Buffer memory name	Value to be stored
Thermocouple Micro voltage Resistor	CH□ digital operation value	Stores the value determined by running calculations on the CH□ digital output value. When the scaling function and shift function are not used, the value is the same as the CH□ digital output value.
Resistance temperature detector	CH□ digital operation value (32-bit)	Stores the value determined by running calculations on the CH□ digital output value (32-bit). When the scaling function and shift function are not used, the value is the same as the CH□ digital output value (32-bit).
	CH□ digital operation value	Stores the same value as CH□ digital operation value (32-bit). However, the range of the stored values is from -32768 to 32767. If CH□ digital operation value (32-bit) exceeds 32767, then 32767 is stored. If CH□ digital operation value (32-bit) falls below -32768, then -32768 is stored.

8.2 Input Type/Range Setting Function

This function allows selection of the input type (RTD, thermocouple, micro voltage input, or resistor input) and input range to be used for each channel.

Available input type and input range

Specify the input type and input range by using 'CH1 Range setting (Input type setting)' (Un\G598).

Also, 'CH1 Range setting monitor (Input type setting)' (Un\G430) can be used to monitor the input type and input range settings for each channel.

The following table lists combinations of the available input types, input ranges, and setting values/monitor values.

Input type	Input range	Setting value/monitor value
Resistance temperature detector	Pt100 (-200 to 850°C)	0000H
	Pt100 (-20 to 120°C)	0001H
	JPt100 (-180 to 600°C)	0002H
	JPt100 (-20 to 120°C)	0003H
	Pt100 (0 to 200°C)	0004H
	JPt100 (0 to 200°C)	0005H
	Pt1000 (-200 to 850°C)	0006H
	Ni100 (-60 to 250°C)	0008H
	Pt50 (-200 to 650°C)	0009H
Thermocouple	K thermocouple (-270 to 1370°C)	0010H
	E thermocouple (-270 to 1000°C)	0011H
	J thermocouple (-210 to 1200°C)	0012H
	T thermocouple (-270 to 400°C)	0013H
	B thermocouple (0 to 1820°C)	0014H
	R thermocouple (-50 to 1760°C)	0015H
	S thermocouple (-50 to 1760°C)	0016H
	N thermocouple (-270 to 1300°C)	0017H
Micro voltage	-100 to 100mV	0020H
Resistor	0 to 500Ω	0030H
	0 to 4000Ω	0031H
	0 to 16000Ω	0032H

Setting procedure

Specify the input type and input range to be used in "Range setting (Input type setting)".

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Input Type/Range Setting Function]

Point

The input type and input range cannot be changed for channels where conversion is disabled. To change the input type and input range, set "Conversion enable/disable setting" to "Conversion enable".

Precautions

To enable cold junction compensation using a cold junction compensation resistor (RTD), apply either of the following settings to CH1.

- Set "Conversion enable/disable setting" to "Conversion disable".
- Set the input type to thermocouple or micro voltage.

If the CH1 settings are incorrect, a cold junction compensation resistor use prohibited error (error code: 1F1□H) occurs in the conversion-enabled channels whose input type is thermocouple. In this case, conversion is disabled for CH1 and the corresponding channels, and no conversion is performed.

8.3 Conversion Enable/Disable Setting Function

This function sets whether to enable or disable conversion for each channel.

Conversion is only performed for channels where the conversion is enabled, and the results are stored as digital output values in the buffer memory areas.

Setting procedure

Set "Conversion enable/disable setting" to "Conversion enable".

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Conversion enable/disable setting function]

8.4 Conversion Method

This function sets methods for converting the input temperature, micro voltage, and resistance value for each channel.

Sampling processing

A temperature input module executes the conversion of the input temperature, micro voltage, and resistance value every conversion cycle and stores the converted values in buffer memory areas as digital output values.
The sampling processing does not depend on the number of conversion enabled channels, and its conversion cycle is fixed to 40ms.

Averaging processing

A temperature input module performs the averaging processing on the temperature, micro voltage, and resistance value for each channel. The calculated values are stored as digital output values in the buffer memory area.
The following three types of averaging processing are provided.

- Time average
- Count average
- Moving average

Time average

A temperature 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 as a digital output value in the buffer memory area.

Number of processing times (times) = $\frac{\text{Setting time}}{\text{Conversion speed}}$

Ex.

This example shows the number of processing times when the settings are as follows.

Item	Setting
Setting time	250ms

$\frac{250}{40} = 6.25^{*1}$

*1 Values after the decimal point are omitted.
Conversion is processed 6 times and the mean value is output.

Count average

A temperature 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 calculated value is stored in the buffer memory area.

Processing time = Set number of times × Conversion speed

Ex.

This example shows the processing time when the settings are as follows.

Item	Setting
Set number of times	Five times

$5 \text{ (times)} \times 40 \text{ (ms)} = 200 \text{ (ms)}$

A mean value is output every 200ms.

Point

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

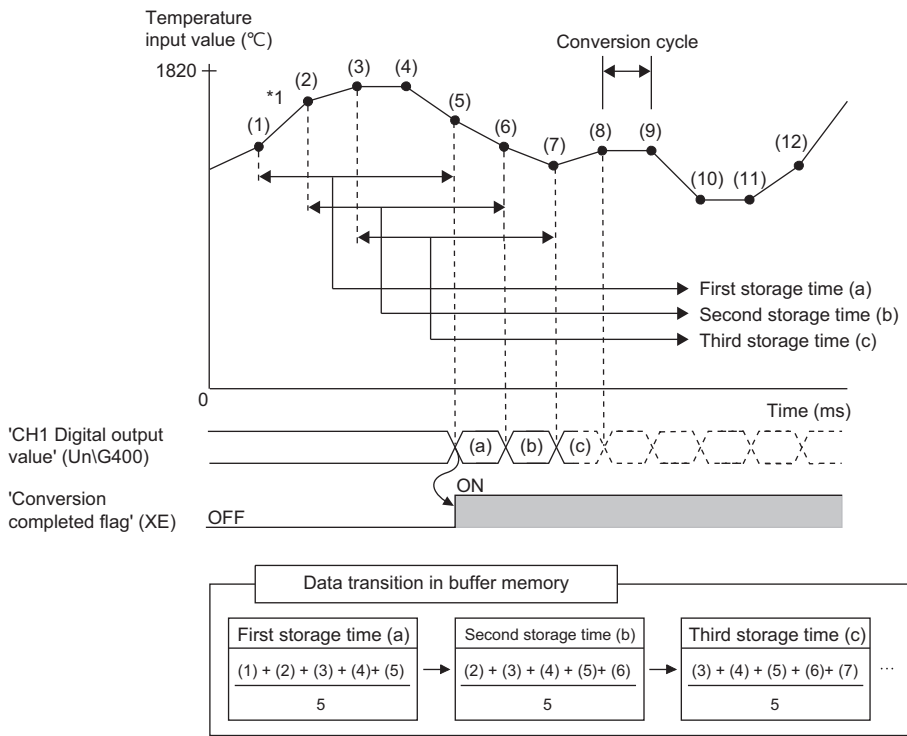
Moving average

A temperature input module executes the conversion for a set number of times and averages the total value. The calculated value is stored as a digital output value in the buffer memory area.

Because the target range for averaging processing is moved at every conversion cycle, the latest digital output value is constantly obtained.

Ex.

The following figure shows the moving average processing of when the set number of times is five.



*1 The moving average processing value is not calculated at timings (1) to (4). The previous value is stored as a digital output value.

Primary delay filter

A temperature input module smooths the transient noise of temperature, micro voltage, and resistor input according to the set time constant and measures it. The smoothed measured value is stored as a digital output value in the buffer memory area. Time constant is the time taken for the measured temperature value to reach 63.2% of the steady-state value. The degree of smoothing changes depending on the setting of a time constant. A time constant is calculated by the following formula.

- Time constant = (Conversion speed) × (Setting value of 'CH1 Time average/Count average/Moving average/Primary delay filter constant setting' (Un\G502))

The following table lists the relational expressions of time constants, digital output values, and present number of sampling (n).

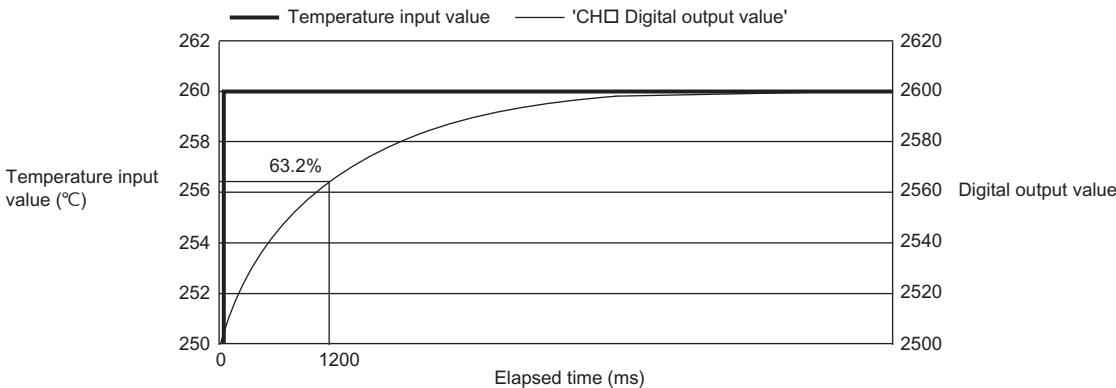
Present number of sampling	Relational expression	Element
n = 1	$Y_n = 0$	Y_n : Present digital output value
n = 2	$Y_n = X_{n-1} + \frac{\Delta t}{\Delta t + TA} (X_n - X_{n-1})$	Y_{n-1} : Last measured digital output value n: Number of sampling X_n : Digital output value before smoothing X_{n-1} : Last measured digital output value before smoothing
n ≥ 3	$Y_n = Y_{n-1} + \frac{\Delta t}{\Delta t + TA} (X_n - Y_{n-1})$	Δt : Conversion time TA: Time constant

'Conversion completed flag' (XE) turns on when n ≥ 2.

Ex.

Digital output value when a temperature input value is changed from 250.0°C to 260.0°C

The following figure shows the change of the digital output value with the time constant set to be 30 times (1200ms). After 1200ms from when the temperature input value becomes 260.0°C, the digital output value reaches 63.2% of its change range from the 'CH□ Digital output value' when the sampling processing is selected.



Setting procedure

Sampling processing

Set "CH□ Averaging process specification" to "Sampling processing".

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Conversion system]

Averaging processing and primary delay filter

1. Set "CH□ Averaging process specification" to "Time average", "Count average", "Moving average", or "Primary delay filter".

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Conversion system]

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

Item	Setting range
Time average	160 to 5000 (ms)
Count average	4 to 500 (times)
Moving average	2 to 200 (times)
Primary delay filter	1 to 500 (times)

8.5 Disconnection Detection Function

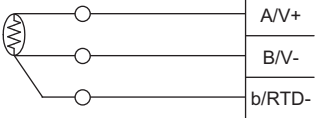
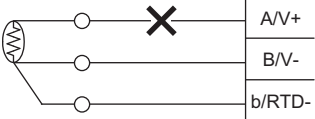
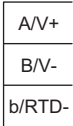
This function detects disconnection of a resistance temperature detector, thermocouple, compensation lead wire, micro voltage signal line, or resistor.

Notification of disconnection

- Disconnection detection (1) is stored in a bit position corresponding to the channel number of 'Disconnection detection flag' (Un\G41).
- 'Disconnection detection signal' (XC) turns on.
- The ALM LED flashes.
- An alarm code is stored in 'Latest alarm code' (Un\G2). ( Page 143 LIST OF ALARM CODES)
- A value specified in 'CH1 Conversion setting at disconnection detection' (Un\G531) (Value just before disconnection, Upscale, Downscale, or Any value) is stored in 'CH1 Digital output value' (Un\G400).

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 enable/disable setting"	Disconnection detection flag
 No disconnection	Conversion enable	Enable	Off
	Conversion disable		
 Disconnection	Conversion enable		On
	Conversion disable		Off
 No connection	Conversion enable		On
	Conversion disable		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 'Disconnection detection automatic clear enable/disable setting' (Un\G303).

■When 'Disconnection detection automatic clear enable/disable setting' (Un\G303) is set to 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' (XC) automatically turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. Turn on and off 'Error clear request' (YF) to clear the alarm code.

■When 'Disconnection detection automatic clear enable/disable setting' (Un\G303) is set to Disable (1)

'Disconnection detection flag' (Un\G41), 'Disconnection detection signal' (XC), 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 on and off 'Error clear request' (YF).

■Digital output value after the recovery

Updates of the digital output value resume when recovery from disconnection is complete, regardless of the 'Disconnection detection flag' (Un\G41) status.

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\G531). Doing so enables disconnection detection only by checking 'CH1 Digital output value' (Un\G400), not by monitoring 'Disconnection detection signal' (XC). The default value of 'CH1 Conversion setting at disconnection detection' (Un\G531) is Downscale (1). Change the setting value if necessary.

Conversion setting at disconnection detection	Operation performed when disconnection is detected
Upscale (0)	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).
Downscale (1)	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).
Any value (2)	A value set in 'CH1 Conversion setting value at disconnection detection' (Un\G532) is stored in 'CH1 Digital output value' (Un\G400).
Value just before disconnection (3)	'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.

- For RTD input

Input range	Temperature measuring range	Downscale	Upscale
Pt100 (-200 to 850°C)	-200 to 850°C	-252.5°C	902.5°C
Pt100 (-20 to 120°C)	-20 to 120°C	-27.0°C	127.0°C
Pt100 (0 to 200°C)	0 to 200°C	-10.0°C	210.0°C
JPt100 (-180 to 600°C)	-180 to 600°C	-219.0°C	639.0°C
JPt100 (-20 to 120°C)	-20 to 120°C	-27.0°C	127.0°C
JPt100 (0 to 200°C)	0 to 200°C	-10.0°C	210.0°C
Pt1000 (-200 to 850°C)	-200 to 850°C	-252.5°C	902.5°C
Ni100 (-60 to 250°C)	-60 to 250°C	-75.5°C	265.5°C
Pt50 (-200 to 650°C)	-200 to 650°C	-242.5°C	692.5°C

- For thermocouple input

Input range	Temperature measuring range	Downscale	Upscale
K thermocouple	-270 to 1370°C	-352.0°C	1452.0°C
E thermocouple	-270 to 1000°C	-333.5°C	1063.5°C
J thermocouple	-210 to 1200°C	-280.5°C	1270.5°C
T thermocouple	-270 to 400°C	-303.5°C	433.5°C
B thermocouple	0 to 1820°C	-91.0°C	1911.0°C
R thermocouple	-50 to 1760°C	-140.5°C	1850.5°C
S thermocouple	-50 to 1760°C	-140.5°C	1850.5°C
N thermocouple	-270 to 1300°C	-348.5°C	1378.5°C

- For micro voltage input

Input range	Voltage measuring range	Downscale	Upscale
-100 to 100mV	-30000 to 30000	-32768 ^{*1}	32767 ^{*2}

*1 -32768 is stored because the value calculated from the lower limit value - 5% of the measuring range is -32768 or less.

*2 32767 is stored because the value calculated from the upper limit value + 5% of the measuring range is 32767 or more.

- For resistor input

Input range	Resistance measuring range	Downscale	Upscale
0 to 500Ω	0 to 32767	-1638	32767 ^{*3}
0 to 4000Ω			
0 to 16000Ω			

*3 32767 is stored because the value calculated from the upper limit value + 5% of the measuring range is 32767 or more.

■Any value

A value set in the conversion setting value at disconnection detection is stored in the digital output value.

- When the input type is thermocouple, micro voltage, or resistor

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). Any value set in 'CH1 Conversion setting value at disconnection detection (32-bit)' (Un\G582, Un\G583) is ignored.

- When the input type is RTD

At the time of the disconnection detection, a value set in 'CH1 Conversion setting value at disconnection detection (32-bit)' (Un\G582, Un\G583) is stored in 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411). Any value set in 'CH1 Conversion setting value at disconnection detection' (Un\G532) is ignored.

- The default value of the conversion setting value at disconnection detection is 0.

Point

When the scaling function is used, a value according to the setting of 'CH1 Conversion setting at disconnection detection' (Un\G531) is scale converted and then stored in 'CH1 digital operation value' (Un\G402) and 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413) as a scaling value.

Setting procedure

1. Set "Disconnection detection function enable/disable setting" to "Enable".

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

2. Set "Disconnection detection Automatic clear enable/disable setting" to "Enable" or "Disable".

3. Using "Conversion setting for disconnection detection", set what value is to be stored in 'CH1 Digital output value' (Un\G400) at the time of the disconnection detection.

Item	Setting range
Conversion setting at disconnection detection	<ul style="list-style-type: none"> • Upscale • Downscale • Any value • Value immediately before disconnection

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

Input type	Item	Setting range
Thermocouple	Conversion setting value for disconnection detection	-3276.8 to 3276.7 (°C)
Micro voltage, resistor		-32768 to 32767
Resistance temperature detector	Conversion setting value for disconnection detection (32-bit)	-2147483.648 to 2147483.647 (°C)

8.6 Cold Junction Compensation Setting Function

The cold junction compensation setting function enables two types of cold junction compensation (using a cold junction compensation resistor or an external method (cooling bath)) by setting whether to use a cold junction compensation resistor. This function is available only when the input type is set to thermocouple.

Operation

This section describes operations in the following cases:

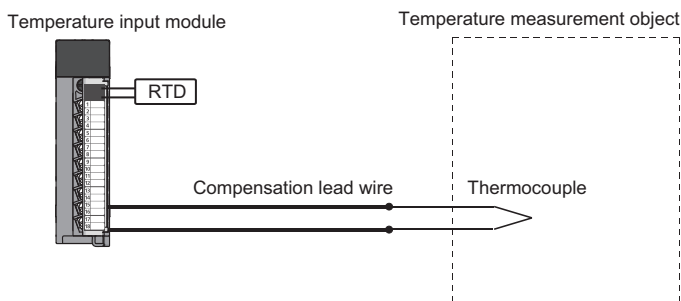
- Cold junction compensation using a cold junction compensation resistor
- Cold junction compensation using an external method

■ Cold junction compensation using a cold junction compensation resistor

- For the standard terminal block

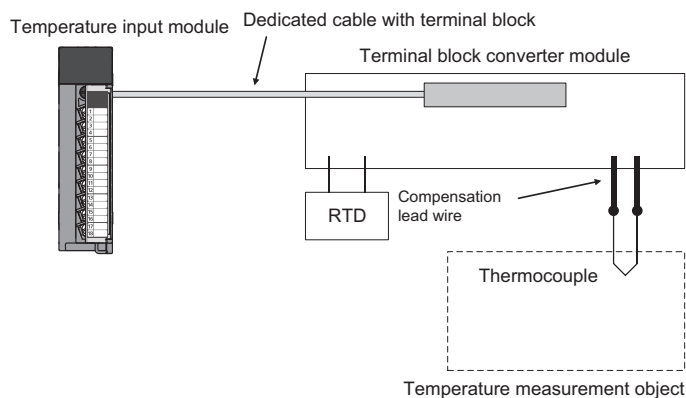
Cold junction compensation using a cold junction compensation resistor (RTD) is automatically executed by setting 'Cold junction compensation setting' (Un\G298) to With cold junction compensation (standard terminal block) (0).

Wire the module as shown below.



- For the terminal block converter module

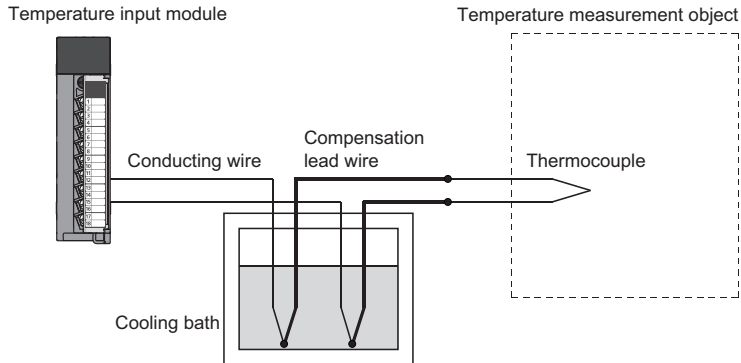
Cold junction compensation using a cold junction compensation resistor (RTD) is automatically executed by setting 'Cold junction compensation setting' (Un\G298) to With cold junction compensation (terminal block converter module) (2).



■Cold junction compensation using an external method

Set 'Cold junction compensation setting' (Un\G298) to Without cold junction compensation (1), and externally install a cooling bath (high-precision). Because the thermoelectromotive force generated at reference junction of the thermocouple conducts to the temperature input module without change, the cold junction compensation accuracy is improved. Use this type of compensation to perform highly accurate temperature measurement where an error generated by the compensation using a cold junction compensation resistor (RTD) is not allowed.

Wire the module as shown below. Note that the connection of the cold junction compensation resistor (RTD) is not required.



Point

The cooling bath has a structure where a thermocouple and a conducting wire is connected inside the bath which temperature is controlled to be 0°C. Therefore, the thermoelectromotive force generated by the thermocouple at the contact site of the thermocouple and the conducting wire becomes 0V. This prevents unnecessary thermoelectromotive force that causes an error.

Setting procedure

1. Set "Cold junction compensation setting" to "With cold junction compensation (standard terminal block)", "With cold junction compensation (terminal block converter module)", or "Without cold junction compensation".
☞ [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Cold junction temperature compensation with/without setting function]

8.7 Cold Junction Compensation Resistor Disconnection Detection Function

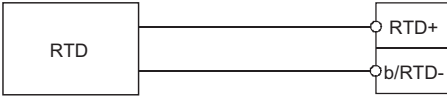
Outputs an error when disconnection of a cold junction compensation resistor (RTD) is detected. This function is available only when a conversion-enabled channel has its input type set to thermocouple.

Notification of disconnection

- 'Error flag' (XF) turns on.
- The ERR LED turns on.
- An error code is stored in 'Latest error code' (Un\G0). (🔗 Page 140 LIST OF ERROR CODES)
- The conversion stops for all the conversion-enabled channels whose input type is set to thermocouple. At that time, 'Conversion completed flag' (Un\G42) turns off for all the channels.
- 'CH1 Digital output value' (Un\G400) and 'Measured temperature value of cold junction compensation resistor' (Un\G44) hold a value just before the disconnection.

Relationship of disconnection detection and conversion enable/disable setting

Disconnection detection is executed when 'Cold junction compensation setting' (Un\G298) is set to With cold junction compensation (standard terminal block) (0) or With cold junction compensation (terminal block converter module) (2) and the conversion is enabled for one channel or more. The following table shows the relationship of disconnection detection and setting state of each item.

Connection status	Cold junction compensation setting	State of conversion enable/disable setting for channels that use a thermocouple	'Error flag' (XF)
 No disconnection	With cold junction compensation (standard terminal block)	Conversion enabled for one or more channels	Off
	With cold junction compensation (terminal block converter module)	Conversion disabled for all channels	
	Other than the above	Conversion enabled for one or more channels	
 Disconnection	With cold junction compensation (standard terminal block)	Conversion enabled for one or more channels	On
	With cold junction compensation (terminal block converter module)	Conversion disabled for all channels	Off
	Other than the above	Conversion enabled for one or more channels	
 No connection	With cold junction compensation (standard terminal block)	Conversion enabled for one or more channels	On
	With cold junction compensation (terminal block converter module)	Conversion disabled for all channels	Off
	Other than the above	Conversion enabled for one or more channels	
		Conversion disabled for all channels	



Disconnection is not detected when the conversion is disabled for all the channels that use a thermocouple.

Recovery from disconnection

Even after recovery from disconnection of the cold junction compensation resistor (RTD), the conversion does not resume for the conversion-enabled channels whose input type is set to thermocouple. Turn on and off 'Error clear request' (YF) to restart the conversion.

8.8 Scaling Function

This function performs scale conversion from a digital output value to a value calculated using the ratio (%) of the set scaling width to the set scaling range. The converted value is stored in the buffer memory area. The calculation of a value is performed using a scaling range upper limit value, scaling range lower limit value, scaling width upper limit value, and scaling width lower limit value, all of which are set arbitrarily.

The value after scale conversion is stored in 'CH1 digital operation value' (Un\G402) or 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413). When the input type is set to RTD, 32-bit values are used, so the buffer memory area and setting range differ from other input types.

Concept of scaling setting

The concepts of each setting item are described below.

■Scaling range upper limit value, scaling range lower limit value

Set the upper and lower limit values of a digital output value to be scale converted.

Ex.

For thermocouple

When 5000 (500.0°C) is set in Scaling range upper limit value and -1000 (-100.0°C) is set in Scaling range lower limit value, a digital output value between -100.0 and 500.0°C is scale converted. If a value greater than 500.0°C or smaller than -100.0°C is set, the value set in Scaling width upper limit value or Scaling width lower limit value is stored in 'CH1 digital operation value' (Un\G402).

Ex.

For the RTD input

When 500000 (500.000°C) is set in Scaling range upper limit value and -100000 (-100.000°C) is set in Scaling range lower limit value, a digital output value between -100.000 and 500.000°C is scale converted. If a value greater than 500.000°C or smaller than -100.000°C is set, the value set in Scaling width upper limit value or Scaling width lower limit value is stored in 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413).

■Scaling width upper limit value, scaling width lower limit value

Set the range of a digital output value after scale conversion. A value within the range set here is stored in 'CH1 digital operation value' (Un\G402) or 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413).

- For Scaling width upper limit value, set a value corresponding to the scaling range upper limit value of the digital output value.
- For Scaling width lower limit value, set a value corresponding to the scaling range lower limit value of the digital output value.

Ex.

The scaling value with a thermocouple under the following conditions

- A value of 5000 (500.0°C) is set in Scaling range upper limit value, and -1000 (-100.0°C) is set in Scaling range lower limit value.
- A value of 100 is set in Scaling width upper limit value, and 0 is set in Scaling width lower limit value.

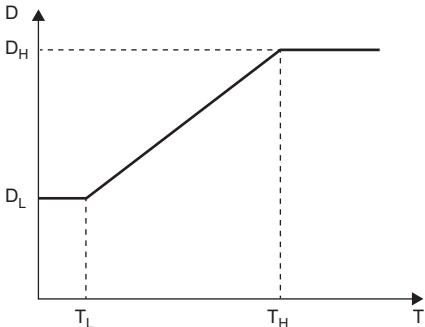
In 'CH1 digital operation value' (Un\G402), 100 is stored when a digital output value is 5000 (500.0°C), and 0 is stored when a digital output value is -1000 (-100.0°C).

Calculating the scaling value

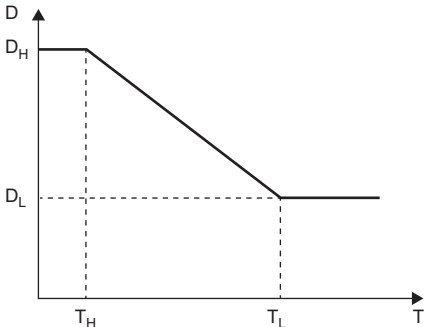
The scale conversion is based on the following formulae. (In scale conversion, values are rounded off to the nearest whole number.)

The calculation formula for a digital operation value varies depending on the relationship of a scaling range upper limit value and scaling range lower limit value.

- For scaling range lower limit value < scaling range upper limit value

Relational expression	Element	Conceptual graph
$D=D_L$ (for $T < T_L$)	T: Digital output value D: Digital operation value T_L : Scaling range lower limit value T_H : Scaling range upper limit value D_L : Scaling width lower limit value D_H : Scaling width upper limit value	
$\frac{(D_H - D_L) \times (T - T_L)}{(T_H - T_L)} + D_L$ (for $T_L \leq T \leq T_H$)		
$D=D_H$ (for $T > T_H$)		

- For scaling range lower limit value > scaling range upper limit value

Relational expression	Element	Conceptual graph
$D=D_H$ (for $T < T_H$)	T: Digital output value D: Digital operation value T_L : Scaling range lower limit value T_H : Scaling range upper limit value D_L : Scaling width lower limit value D_H : Scaling width upper limit value	
$\frac{(D_L - D_H) \times (T - T_H)}{(T_L - T_H)} + D_H$ (for $T_H \leq T \leq T_L$)		
$D=D_L$ (for $T > T_L$)		

Setting procedure

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

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

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

Input type	Item	Setting range
Thermocouple	Scaling range upper limit value	-3276.8 to 3276.7 (°C)
	Scaling range lower limit value	
Micro voltage, resistor	Scaling range upper limit value	-32768 to 32767
	Scaling range lower limit value	
Resistance temperature detector	Scaling range upper limit value (32-bit)	-2147483.648 to 2147483.647 (°C)
	Scaling range lower limit value (32-bit)	

3. Set values for "Scaling width upper limit value" and "Scaling width lower limit value".

Input type	Item	Setting range
Thermocouple, micro voltage, resistor	Scaling width upper limit value	-32768 to 32767
	Scaling width lower limit value	
Resistance temperature detector	Scaling width upper limit value (32-bit)	-2147483648 to 2147483647
	Scaling width lower limit value (32-bit)	

Point

- Set different values for "Scaling range upper limit value" and "Scaling range lower limit value". If same values are set, a scaling setting range error (error code: 1A3□H) occurs.
- Set different values for "Scaling width upper limit value" and "Scaling width lower limit value". If same values are set, a scaling setting range error (error code: 1A3□H) occurs.

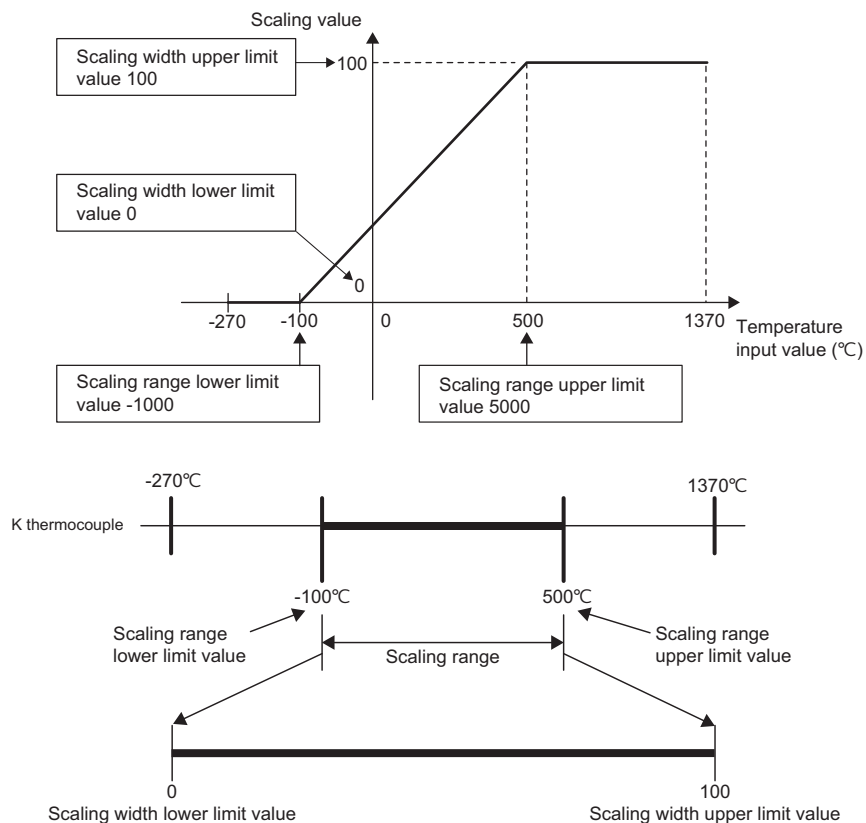
Setting example

■Example 1

This example assumes that the thermocouple input is used with the following settings for the channel where a K thermocouple (-270 to 1370°C) is connected.

- "Scaling enable/disable setting": "Enable"
- "Scaling range upper limit value": 5000
- "Scaling range lower limit value": -1000
- "Scaling width upper limit value": 100
- "Scaling width lower limit value": 0

The digital output values and digital operation values are as shown below.



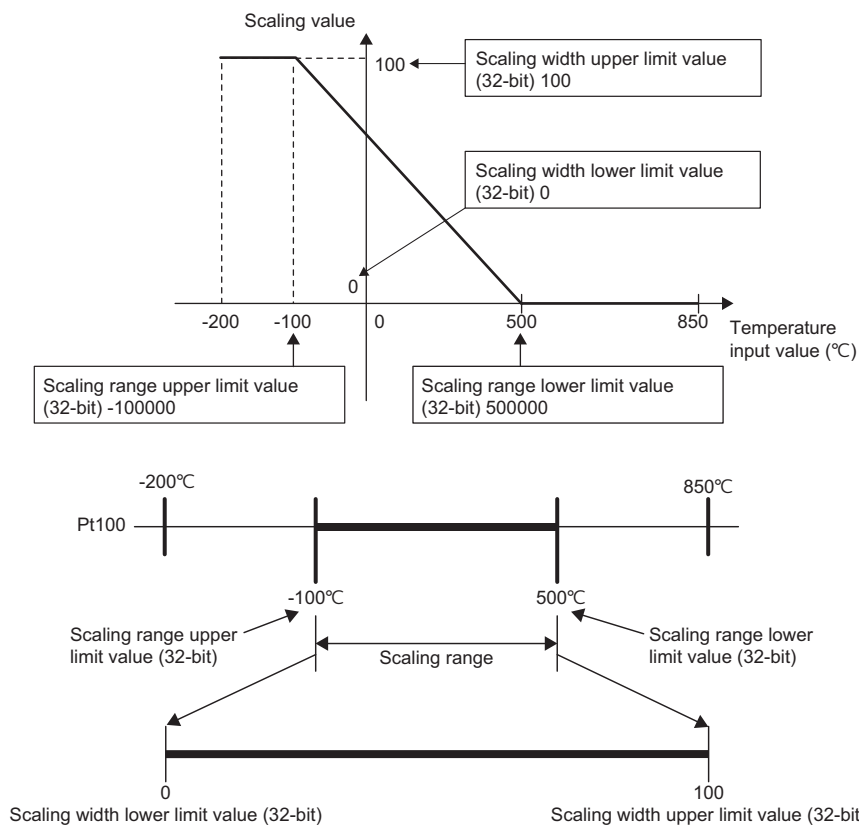
Temperature input value	Digital output value	Digital operation value
-100.1°C or lower	-1001 or lower	0
-100.0°C	-1000	0
50.0°C	500	25
200.0°C	2000	50
350.0°C	3500	75
500.0°C	5000	100
500.1°C or higher	5001 or higher	100

■Example 2

This example assumes that the RTD input is used with the following settings for the channel where Pt100 (-200 to 850°C) is connected.

- "Scaling enable/disable setting": "Enable"
- "Scaling range upper limit value (32-bit)": -100000
- "Scaling range lower limit value (32-bit)": 500000
- "Scaling width upper limit value (32-bit)": 100
- "Scaling width lower limit value (32-bit)": 0

The digital output values (32-bit) and digital operation values (32-bit) are as shown below.



Temperature input value	Digital output value (32-bit)	Digital operation value (32-bit)
-100.001°C or lower	-100001 or lower	100
-100.000°C	-100000	100
50.000°C	50000	75
200.000°C	200000	50
350.000°C	350000	25
500.000°C	500000	0
500.001°C or higher	500001 or higher	0

8.9 Shift Function

This function adds (shifts) the set conversion value shift amount onto the digital output value and stores the result in the buffer memory area. The change in the conversion value shift amount is reflected on the digital operation value in real time, which facilitates fine adjustments at system start-up. When the input type is set to RTD, 32-bit values are used, so the buffer memory area and setting range differ from other input types.

Operation

- When a value is set for the conversion value shift amount, the set conversion value shift amount will be added to the digital operation value regardless of whether 'Operating condition setting request' (Y9) is turned on or off.
- The digital operation value after the shift-and-add is stored in 'CH1 digital operation value' (Un\G402) or 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413).
- The conversion value shift amount is added at every sampling cycle in sampling processing or at every averaging process cycle in averaging processing, and the result is stored in 'CH1 digital operation value' (Un\G402) or 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413).

Setting procedure

- Set a value for "Conversion value shift amount".

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

Input type	Item	Setting range
Thermocouple, micro voltage, resistor	Conversion value shift amount	-32768 to 32767
Resistance temperature detector	Conversion value shift amount (32-bit)	-2147483648 to 2147483647

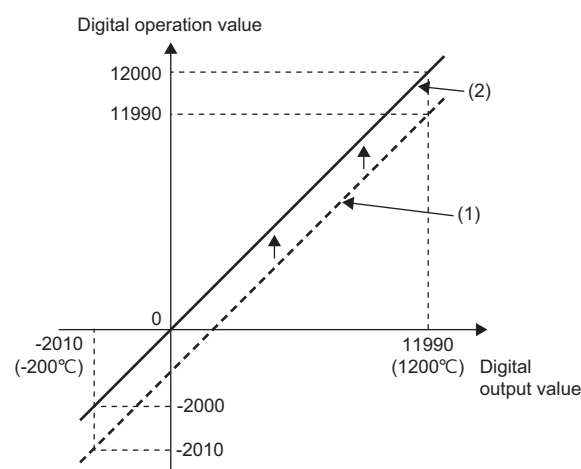
Point

To set or change the conversion value shift amount during operation, set a value in 'CH1 Conversion value shift amount' (Un\G472)

Setting example

Ex.

When the I/O conversion characteristic is adjusted with the shift function for channels whose input type is set to thermocouple (K thermocouple (-270 to 1370°C))



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

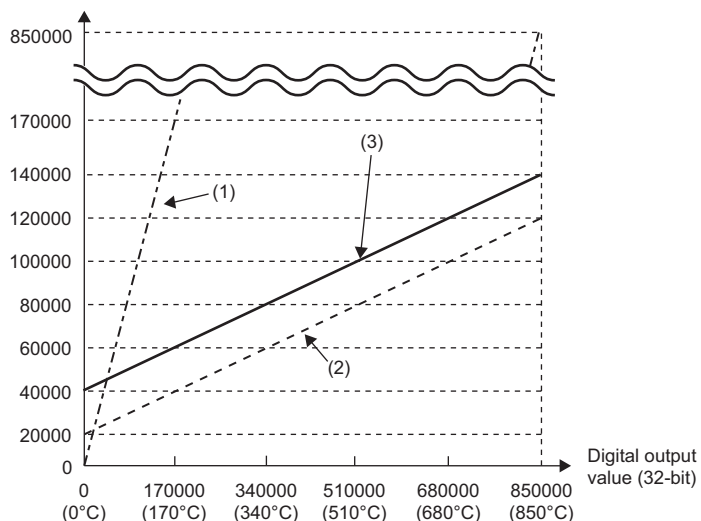
Temperature input value	Digital output value	Digital operation value
-200.0°C	-2010	-2000
1200.0°C	11990	12000

Ex.

When the following settings are applied to channels whose input type is set to RTD Pt100 (-200 to 850°C)

- 'CH1 Scaling enable/disable setting' (Un\G546): Enable (0)
- 'CH1 Scaling range upper limit value (32-bit)' (Un\G586, Un\G587): 850000
- 'CH1 Scaling range lower limit value (32-bit)' (Un\G588, Un\G589): 0
- 'CH1 Scaling width upper limit value (32-bit)' (Un\G590, Un\G591): 120000
- 'CH1 Scaling width lower limit value (32-bit)' (Un\G592, Un\G593): 20000
- 'CH1 Conversion value shift amount (32-bit)' (Un\G474, Un\G475): 20000

Digital operation value (32-bit)



- (1) 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411)
Scaling
0 to 850000
↓
20000 to 120000
- (2) Value after scaling
'CH1 Conversion value shift amount (32-bit)' (Un\G474, Un\G475) "+2000"
↓
- (3) 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413)

Temperature input value	Digital output value (32-bit)	Value after scaling	Digital operation value (32-bit)
0.000°C	0	20000	40000
170.000°C	170000	40000	60000
340.000°C	340000	60000	80000
510.000°C	510000	80000	100000
680.000°C	680000	100000	120000
850.000°C	850000	120000	140000

Point

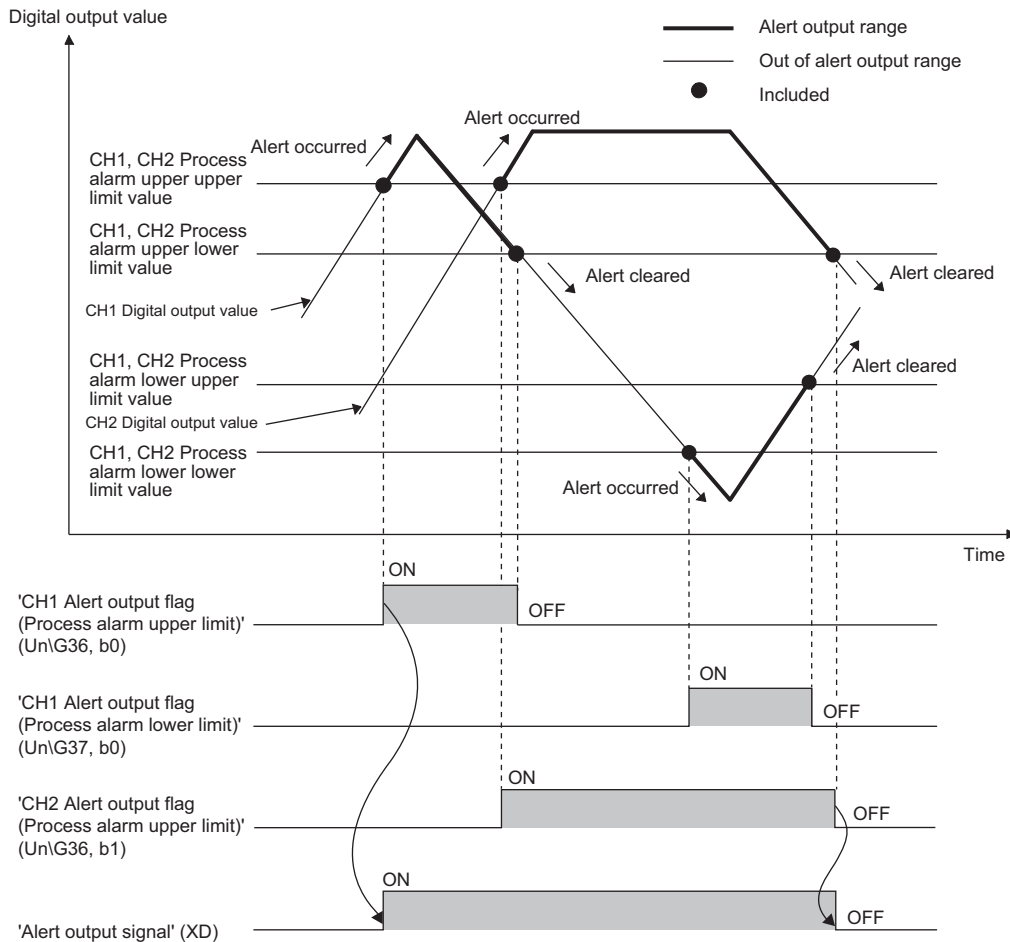
When the shift function is used together with the scaling function, the shift-and-add is applied after scale conversion. Therefore, the range of digital operation values is from -32768 to 32767 (or -2147483648 to 2147483647 for RTD input).

8.10 Alert Output Function

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

Process alarm

This function outputs an alert when a digital output value enters the preset alert output range.



Operation

■ Operation performed when an alert is output

When a digital output value is equal to or greater than the process alarm upper upper limit value, or the value is equal to or smaller than the process alarm lower lower limit value and the value enters the alarm output range, an alert is output as follows.

- Alarm ON (1) is stored in the bit position corresponding to the channel number of 'Alert output flag (Process alarm upper limit)' (Un\G36) or 'Alert output flag (Process alarm lower limit)' (Un\G37).
- 'Alert output signal' (XD) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (Un\G2). (Page 143 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 output value becomes smaller than the process alarm upper lower limit value or greater than the process alarm lower upper limit value, Normal (0) is stored in a bit position corresponding to the channel number of 'Alert output flag (Process alarm upper limit)' (Un\G36) or 'Alert output flag (Process alarm lower limit)' (Un\G37).

In addition, when Normal (0) is stored in all the bits of 'Alert output flag (Process alarm upper limit)' (Un\G36) and 'Alert output flag (Process alarm lower limit)' (Un\G37), 'Alert output signal' (XD) turns off and the ALM LED turns off. However, the alarm code stored in 'Latest alarm code' (Un\G2) is not cleared. Turn on and off 'Error clear request' (YF) 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, moving average, and primary delay filter is specified, this function works at every sampling cycle.

Detection target for outputting an alert

'CH1 Digital output value' (Un\G400) and 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411) are the targets for outputting an alert. The target is the same for when the scaling function or shift function is enabled.

Operation performed when disconnection is detected

At disconnection detection, a process alarm may occur as well because the digital output value changes according to 'CH1 Conversion setting at disconnection detection' (Un\G531). When the process alarm occurs at the same time as disconnection detection, the ALM LED flashes.

Setting procedure

1. Set "Warning output setting (Process alarm)" to "Enable" on the channels where the process alarm will be used.

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

2. Set values for "Process alarm upper upper limit value", "Process alarm upper lower limit value", "Process alarm lower upper limit value", and "Process alarm lower lower limit value" for each channel where the process alarm will be used.
The setting range varies depending on the input range.

- Setting range of process alarm upper upper limit value to process alarm lower lower limit value for resistance temperature detectors

Item	Input range	Setting range
Process alarm upper upper limit value (32-bit) Process alarm upper lower limit value (32-bit) Process alarm lower upper limit value (32-bit) Process alarm lower lower limit value (32-bit)	Pt100 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000 (°C))
	Pt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000 (°C))
	Pt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000 (°C))
	JPt100 (-180 to 600°C)	-180000 to 600000 (-180.000 to 600.000 (°C))
	JPt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000 (°C))
	JPt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000 (°C))
	Pt1000 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000 (°C))
	Ni100 (-60 to 250°C)	-60000 to 250000 (-60.000 to 250.000 (°C))
	Pt50 (-200 to 650°C)	-200000 to 650000 (-200.000 to 650.000 (°C))

- Setting range of process alarm upper upper limit value to process alarm lower lower limit value for thermocouples

Item	Input range	Setting range
Process alarm upper upper limit value	K thermocouple (-270 to 1370°C)	-2700 to 13700 (-270.0 to 1370.0 (°C))
Process alarm upper lower limit value	E thermocouple (-270 to 1000°C)	-2700 to 10000 (-270.0 to 1000.0 (°C))
Process alarm lower upper limit value	J thermocouple (-210 to 1200°C)	-2100 to 12000 (-210.0 to 1200.0 (°C))
Process alarm lower lower limit value	T thermocouple (-270 to 400°C)	-2700 to 4000 (-270.0 to 400.0 (°C))
	B thermocouple (0 to 1820°C)	0 to 18200 (0.0 to 1820.0 (°C))
	R thermocouple (-50 to 1760°C)	-500 to 17600 (-50.0 to 1760.0 (°C))
	S thermocouple (-50 to 1760°C)	-500 to 17600 (-50.0 to 1760.0 (°C))
	N thermocouple (-270 to 1300°C)	-2700 to 13000 (-270.0 to 1300.0 (°C))

- Setting range of process alarm upper upper limit value to process alarm lower lower limit value for micro voltage

Item	Input range	Setting range
Process alarm upper upper limit value	-100 to 100mV	-30000 to 30000
Process alarm upper lower limit value		
Process alarm lower upper limit value		
Process alarm lower lower limit value		

- Setting range of process alarm upper upper limit value to process alarm lower lower limit value for resistors

Item	Input range	Setting range
Process alarm upper upper limit value	0 to 500Ω	0 to 32767
Process alarm upper lower limit value	0 to 4000Ω	
Process alarm lower upper limit value	0 to 16000Ω	
Process alarm lower lower limit value		

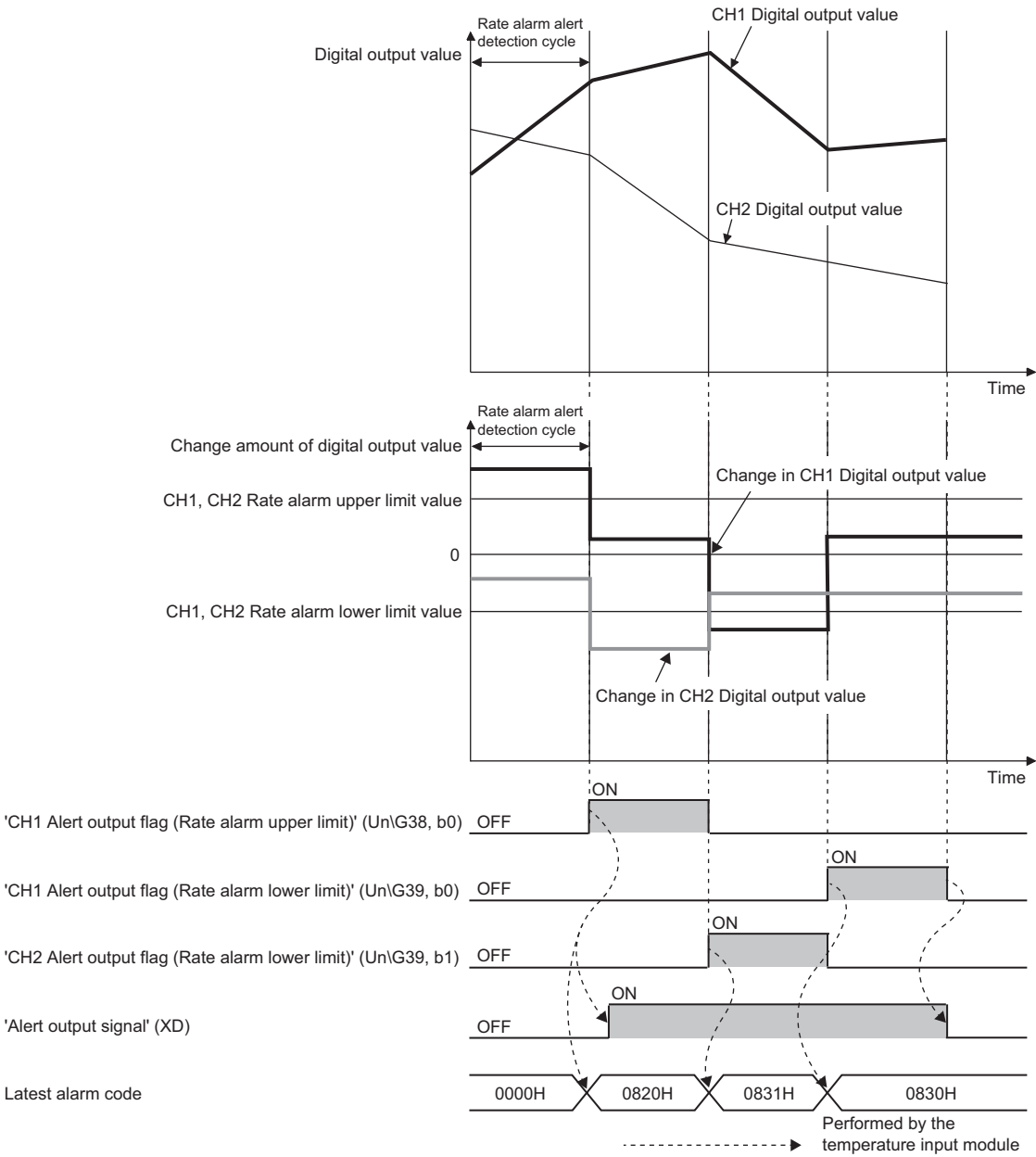
Point

Set the alert output function (process alarm) to satisfy the following condition. If a value out of the range is set, a process alarm upper lower limit value setting range error (error code: 1B△□H) occurs.

Process alarm upper upper limit value $\geq$ Process alarm upper lower limit value $\geq$ Process alarm lower upper limit value $\geq$ Process alarm lower lower limit value

Rate alarm

This function outputs an alert when the change of a digital output value is equal to or greater than the rate alarm upper limit value, or 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 greater 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 a bit position corresponding to the channel number of 'Alert output flag (Rate alarm upper limit)' (Un\G38) or 'Alert output flag (Rate alarm lower limit)' (Un\G39).
- 'Alert output signal' (XD) turns on.
- The ALM LED turns on.
- An alarm code is stored in 'Latest alarm code' (Un\G2). ( Page 143 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 the digital output value becomes smaller than the rate alarm upper limit value or greater than the rate alarm lower limit value, Normal (0) is stored in a bit position corresponding to the channel number of 'Alert output flag (Rate alarm upper limit)' (Un\G38) or 'Alert output flag (Rate alarm lower limit)' (Un\G39).

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

Conversion cycle is the cycle for updating digital output values, which is determined by the conversion speed (40ms) and "CH□ Averaging process specification".

Conversion method	Conversion cycle
Sampling processing	Conversion speed
Time average	$\left(\frac{\text{Time set in CH1 Time average/Count average/Moving average/Primary delay filter constant setting}}{\text{Conversion speed}} \right)^{*1} \times \text{Conversion speed}$
Count average	Number of times set for CH1 Time average/Count average/Moving average/Primary delay filter constant setting × Conversion speed
Moving average	Conversion speed
Primary delay filter	Conversion speed

*1 Values after the decimal point are omitted.

Ex.

Rate alarm alert detection cycle under the following conditions

- Conversion method: Sampling processing
- 'CH1 Rate alarm alert detection cycle setting' (Un\G522): 5 times

The rate alarm alert detection cycle for CH1 is 200ms. (40ms × 5 (times))

Judgment of rate alarm

A change rate is judged with the following formulae every rate alarm alert detection cycle.

- For alert outputting of rate alarm upper limit
(Digital output value of this time) - (Digital output value of previous detection cycle) $\geq$ (Rate alarm upper limit value)
- For alert outputting of rate alarm lower limit
(Digital output value of this time) - (Digital output value of previous detection cycle) $\leq$ (Rate alarm lower limit value)

Ex.

Judgment of rate alarm for the RTD input with the following conditions

- CH1 Averaging process specification: Sampling processing
- Rate alarm alert detection cycle setting: 5 (times)
- CH1 Rate alarm upper limit value: 50000 (50.000°C)
- CH1 Rate alarm lower limit value: 30000 (30.000°C)

A digital output value of this time is compared to the previous value (digital output value 200ms before), every rate alarm alert detection cycle of 200ms (40ms $\times$ 5). From the comparison, whether the increase in the digital output value is 50000 (50.000°C) or more, or 30000 (30.000°C) or less is judged.

Ex.

Judgment of rate alarm for thermocouple input with the following conditions

- CH1 Averaging process specification: Sampling processing
- Rate alarm alert detection cycle setting: 5 (times)
- CH1 Rate alarm upper limit value: 500 (50.0°C)
- CH1 Rate alarm lower limit value: 300 (30.0°C)

A digital output value of this time is compared to the previous value (digital output value 200ms before), every rate alarm alert detection cycle of 200ms (40ms $\times$ 5). From the comparison, whether the increase in the digital output value is 500 (50.0°C) or more, or 300 (30.0°C) or less is judged.

Detection target for outputting an alert

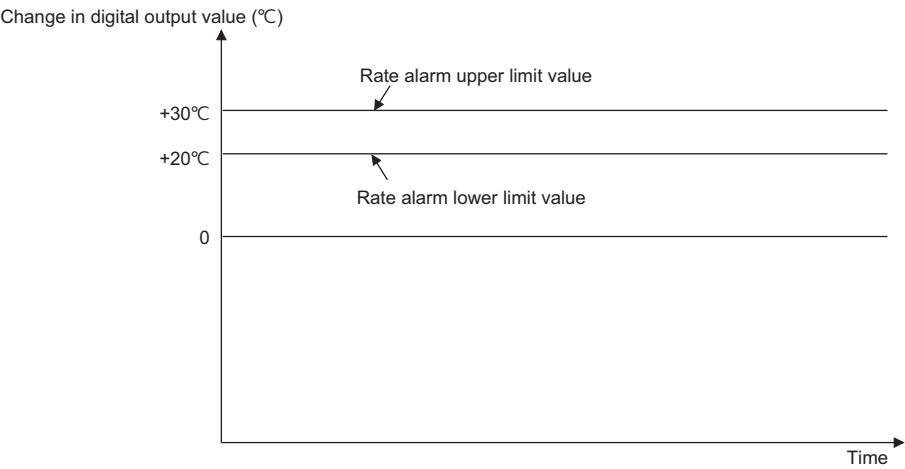
'CH1 Digital output value' (Un\G400) and 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411) are the targets for outputting an alert. The target is the same for when the scaling function or shift function is enabled.

Application examples of rate alarms

A rate alarm serves to monitor the change of a digital output value in a limited range as shown below.

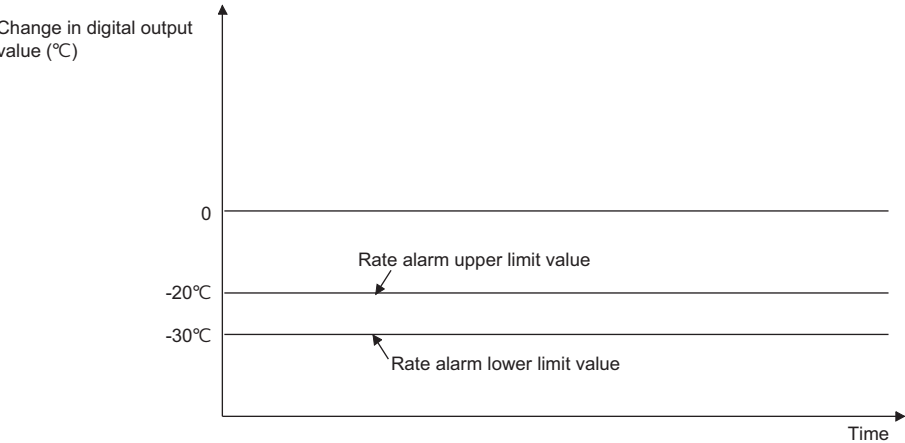
Ex.

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



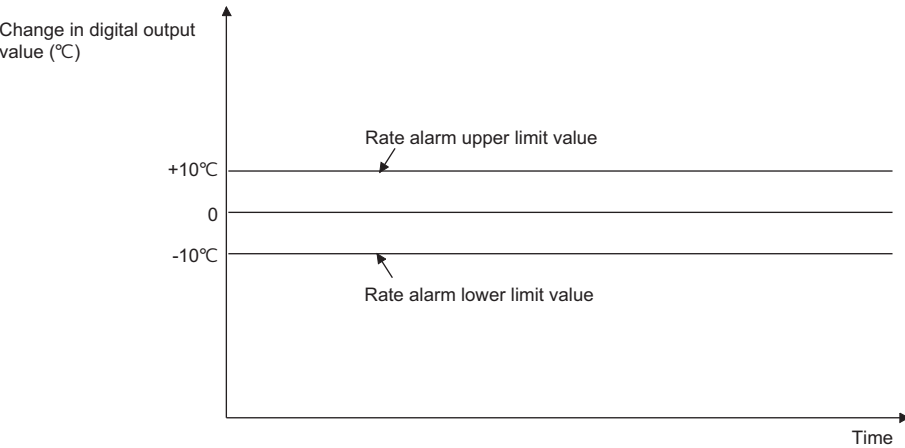
Ex.

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



Ex.

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



Operation performed when disconnection is detected

- At disconnection detection, a rate alarm may occur as well because the digital output value 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 the 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" on the channels where the rate alarm will be used.

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

2. Set a value in "Rate alarm detection cycle setting".

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

3. Set values for "Rate alarm upper limit value" and "Rate alarm lower limit value" for each channel where the rate alarm will be used. The setting range varies depending on the input type.

Input type	Item	Setting range
Resistance temperature detector	Rate alarm upper limit value (32-bit) Rate alarm lower limit value (32-bit)	-2147483648 to 2147483647 (-2147483.648 to 2147483.647 (°C)) ^{*1}
Thermocouple, micro voltage, resistor	Rate alarm upper limit value Rate alarm lower limit value	<div> <div>■ For thermocouple</div> <div>-32768 to 32767 (-3276.8 to 3276.7 (°C))^{*2}</div> <div>■ For micro voltage or resistors</div> <div>-32768 to 32767 (-3276.8 to 3276.7 (%))^{*3}</div> </div>

*1 When the input type is RTD, set the value of CH□ digital output value (32-bit).

*2 When the input type is thermocouple, set the value of CH□ digital output value.

*3 When the input type is micro voltage, set the percentage of the maximum value (25000) of the CH□ digital output value in increments of 0.1%.

When the input type is resistor, set the percentage of the maximum value (32000) of the CH□ digital output value in increments of 0.1%.

Point

Set the alert output function (rate alarm) to satisfy the following condition. If a value out of the range is set, a rate alarm upper/lower limit setting value inversion error (error code: 1BA□H) occurs.

Rate alarm upper limit value > Rate alarm lower limit value

8.11 Interrupt Function

This function executes an interrupt program of the CPU module when an interrupt factor such as alert output or disconnection is detected.

For a temperature input module, the maximum number of interrupt pointers available is 16 per module.

Operation

■Detecting an interrupt factor

By setting 'Interrupt factor mask [n]' (Un\G124 to Un\G139) to Mask clear (Interrupt used) (1) beforehand, interrupt factors can be detected. When an interrupt factor occurs, an interrupt request is sent to the CPU module at the same time as 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) turns to Interrupt factor (1).

■How to reset an interrupt factor

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

Setting procedure

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

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

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

■Condition target setting

Select a factor of the condition target setting for the interrupt detection.

Setting value	Description
Disable	The interrupt detection is not executed.
Error flag	The rise (OFF to ON) of 'Error flag' (XF) is detected.
Warning output flag (Process alarm)	The rise (OFF to ON) of Alert output flag (Process alarm) is detected. (The channel must be specified.)
Warning output flag (Rate alarm)	The rise (OFF to ON) of Alert output flag (Rate alarm) is detected. (The channel must be specified.)
Disconnection detection flag	The rise (OFF to ON) of Disconnection detection flag is detected. (The channel must be specified.)
Conversion completed	Detection is executed every time conversion is complete (at every conversion cycle) (The channel must be specified.) ^{*1}
Logging hold flag	The rise (OFF to ON) of Logging hold flag is detected. (The channel must be specified.)
Logging read	The logging completion of data amount equivalent to logging read points is detected. (The channel must be specified.)

^{*1} An interrupt is detected, even if the cold junction compensation resistor (RTD) is disconnected.

■Condition target channel setting

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

■Interrupt factor transaction setting

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

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

■Interrupt pointer

Specify the number of an interrupt pointer that is initiated at the detection of an interrupt factor. For details on interrupt pointers, refer to the manual for the CPU module used.

Precautions

- If 'Condition target setting [n]' (Un\G232 to Un\G247) is Disable (0), an interrupt request is not sent to the CPU module.
- To reset the interrupt factor, set Reset request (1) until 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) changes to No interrupt factor (0).
- Resetting interrupt factors is executed only when 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) changes from No reset request (0) to Reset request (1).
- Multiple interrupt pointers can also share the same setting of 'Condition target setting [n]' (Un\G232 to Un\G247). When interrupts with the same settings in 'Condition target setting [n]' (Un\G232 to Un\G247) occur, the interrupt program is executed in order of the priority of the interrupt pointers. For details on the priority of interrupt pointers, refer to the manual for the CPU module used.
- When All channels (0) is set for 'Condition target channel setting [n]' (Un\G264 to Un\G279) and an interrupt detection target is set for the channels of 'Condition target setting [n]' (Un\G232 to Un\G247), the interrupt requests that have the same interrupt factor are sent to the CPU module if alerts are issued in multiple channels. In this case, the CPU module executes multiple interrupt programs and judges that the program cannot be normally finished due to the scan monitoring function, and a CPU module error may occur. If a CPU module error occurs, refer to the manual for the CPU module used.

Setting example

Ex.

To execute the interrupt program (I51) at the disconnection detection in any channel of the temperature input module

- Parameter setting

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

No.	Condition target setting	Condition target channel setting	Interrupt pointer
2	Disconnection detection flag	All CH specification	I51

- Label settings

Classification	Label name	Description	Device												
Module label	RCPU.stSM.bAlways_ON	Always ON	SM400												
	RCPU.stSM.bAfter_RUN1_Scan_ON	ON for one scan after RUN	SM402												
	R60TRDG_1.unInterruptFactorMask_D[1].0	Interrupt factor mask [2]	U0\G125.0												
	R60TRDG_1.unInterruptFactorResetRequest_D[1].0	Interrupt factor reset request [2]	U0\G157.0												
Label to be defined	Define global labels as shown below:														
	<table><tr><th></th><th>Label Name</th><th>Data Type</th><th></th><th>Class</th><th>Assign (Device/Label)</th></tr><tr><td>1</td><td>G_bErrorDetection</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>F0</td></tr></table>				Label Name	Data Type		Class	Assign (Device/Label)	1	G_bErrorDetection	Bit	...	VAR_GLOBAL	F0
	Label Name	Data Type		Class	Assign (Device/Label)										
1	G_bErrorDetection	Bit	...	VAR_GLOBAL	F0										



- (0) Enable only the interrupt pointer I51.
- (10) Turn on 'Interrupt factor reset request [2]' (U0\G157).
Perform the processing of when disconnection is detected.

8.12 Logging Function

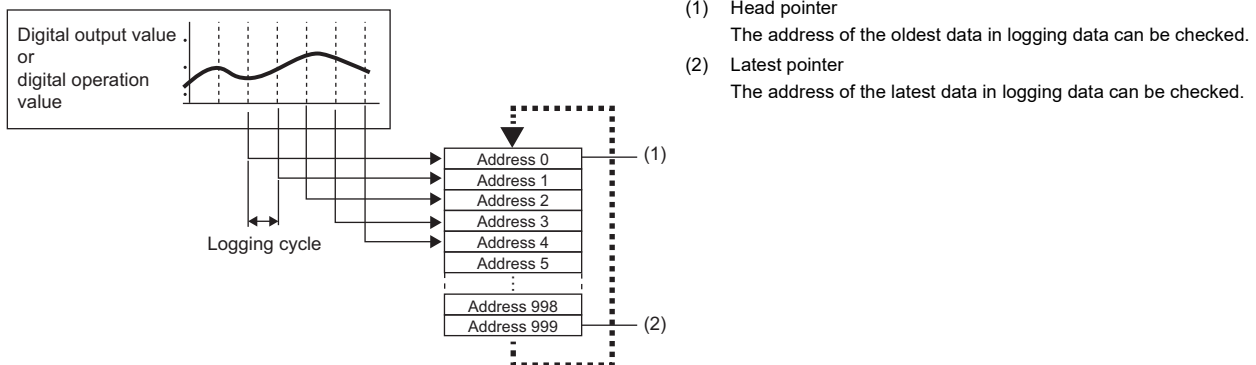
Logs (records) digital output values or digital operation values. Data of 1000 points can be logged for each channel. Logged data is stored in the buffer memory area. In addition, the data collection can be stopped by using the status change of the data as a trigger. This function also helps the error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

Logging function

■Collecting logging data

Logging data is collected as follows.

- For each channel, 1000 points of the latest digital output values or digital operation values can always be collected.
- The data can be collected at intervals of 40ms at minimum and of 3600s at maximum.



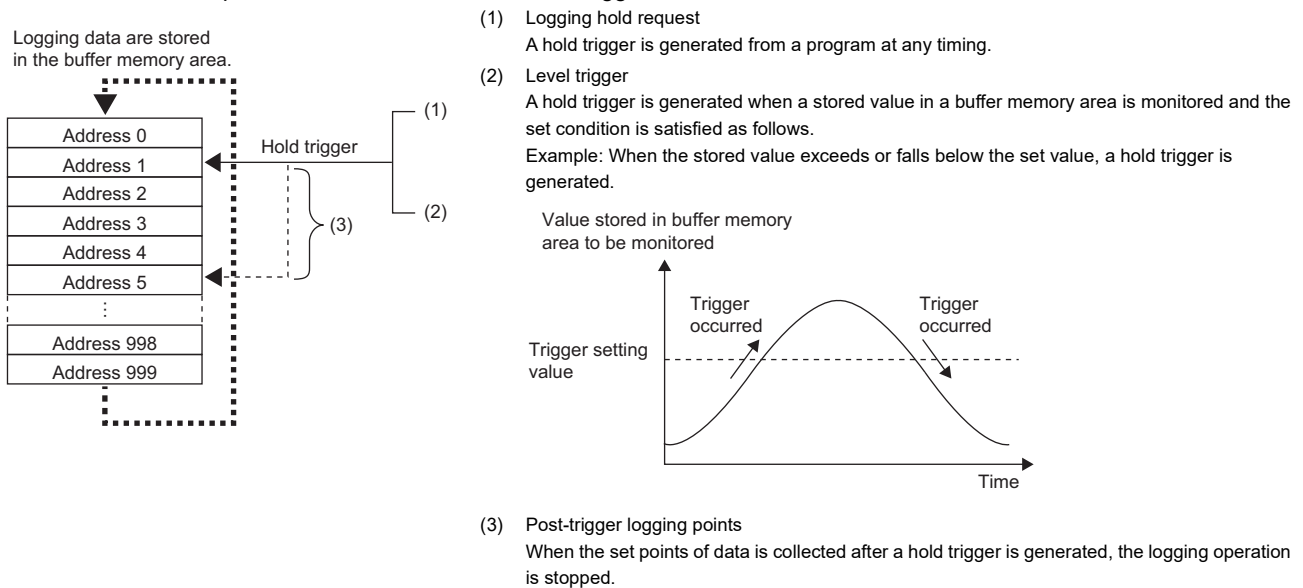
Logging data are stored in the buffer memory area. When the number of stored data points is 1001 or greater, data is sequentially overwritten from address 0 with new data.

■Stopping the logging operation

The logging data is refreshed at high speed during logging. Stop logging when the logging data needs to be referred without paying attention to the refreshing cycle.

Logging can be stopped by the hold trigger.

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



■Saving logging data into a CSV file

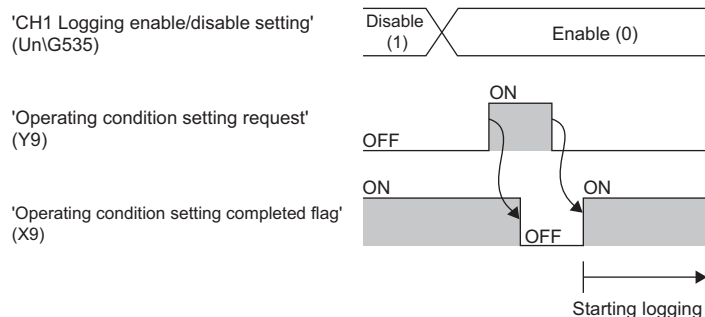
The data in CH1 Logging data (Un\G10000 to Un\G10999) disappears when the temperature input module is powered off. However, the data can be saved in a CSV file by using module function blocks.

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' (Y9) is turned on and off.

The data in 'CH1 Digital output value' (Un\G400) or 'CH1 digital operation value' (Un\G402) is stored in CH1 Logging data (Un\G10000 to Un\G10999) on the set logging cycle.



■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\G10999
CH2	Un\G11000 to Un\G11999
CH3	Un\G12000 to Un\G12999
CH4	Un\G13000 to Un\G13999

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

■Logging data setting

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

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

Point

Regardless of the input type, digital output values and digital operation values that can be set for 'CH1 Logging data setting' (Un\G536) are 16-bit information.

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)	40 to 32767
s (2)	1 to 3600

The logging cycle must be an integral multiple of the conversion cycle. Even if the setting is not an integral multiple, the actual logging cycle is adjusted to the integral multiple of the conversion cycle within a limit of the set logging cycle.

The following table lists the conversion cycle for each conversion method.

Conversion method	Conversion cycle
Sampling processing	Conversion speed
Time average	$\left(\frac{\text{Time set in CH1 Time average/Count average/Moving average/Primary delay filter constant setting}}{\text{Conversion speed}} \right)^{*1} \times \text{Conversion speed}$
Count average	Number of times set for CH1 Time average/Count average/Moving average/Primary delay filter constant setting × Conversion speed
Moving average	Conversion speed
Primary delay filter	Conversion speed

*1 Values after the decimal point are omitted.

Ex.

When the following settings are applied, the conversion cycle is 40ms and the actual logging is performed every 7480ms (integral multiple of 40ms) cycle.

- CH1 Averaging process specification: Sampling processing
- CH1 Logging cycle setting value: 7500
- CH1 Logging cycle unit setting: ms

The following values are stored in 'CH1 Logging cycle monitor value (s)' (Un\G441) and 'CH1 Logging cycle monitor value (ms)' (Un\G442).

Buffer memory address	Item	Stored value
441	'CH1 Logging cycle monitor value (s)' (Un\G441)	7
442	'CH1 Logging cycle monitor value (ms)' (Un\G442)	480

■When the logging function becomes disabled

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

- Error code (192□H to 195□H): Setting errors of 'CH1 Time average/Count average/Moving average/Primary delay filter constant setting' (Un\G502)
- Error code (1D0□H to 1D7□H): Setting errors of the logging function
- Error code (1D8□H, 1D9□H): Setting errors of the logging read function

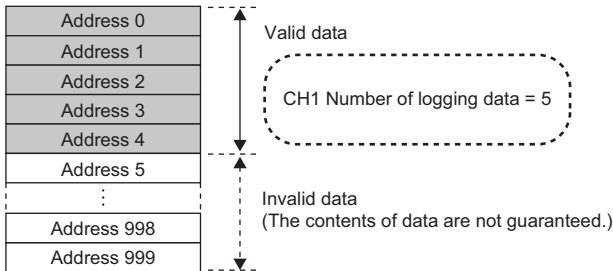
Point

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

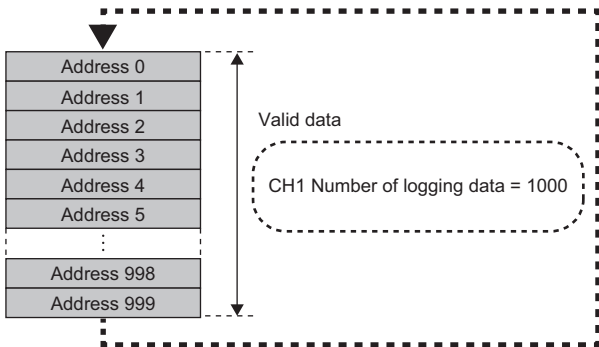
Number of logging data

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

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



- When the number of collected data points reaches 1000



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

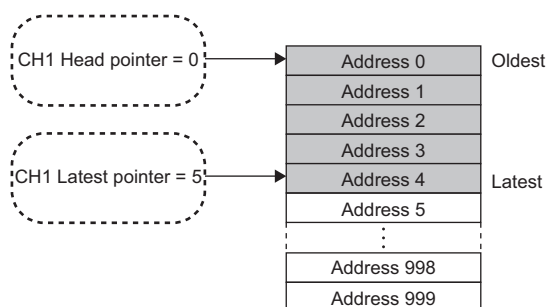
When CH1 Logging data (Un\G10000 to Un\G10999) becomes full (Number of logging data = 1000), the next data is stored in the head address of CH1 Logging data (Un\G10000 to Un\G10999), and the logging operation continues overwriting the existing data. In this case, the number of logging data is fixed to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

■Head pointer and latest pointer

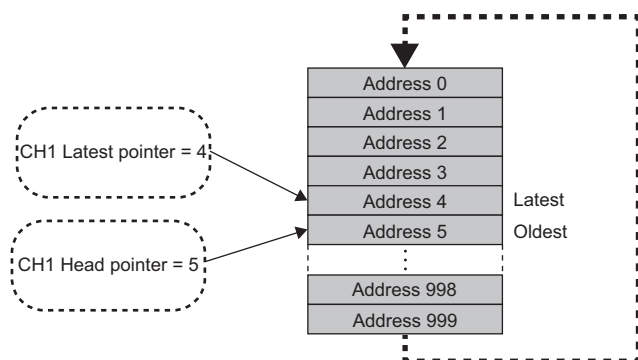
The storage location of the oldest data and the latest data in CH1 Logging data (Un\G10000 to Un\G10999) can be checked with the following buffer memory areas.

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

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



- When the number of collected data points reaches 1000



The head pointer does not change until CH1 Logging data (Un\G10000 to Un\G10999) becomes full after the logging start. (fixed to 0).

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

■Checking logging data without stopping the logging operation

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

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

- Set the cycle to 'CH1 Logging cycle setting value' (Un\G537) so that data checking and reading surely complete before logging data is refreshed. If the logging cycle is short, logging data may be refreshed during data checking and reading.
- After obtaining the logging data which needs to be checked, monitor the variation of 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.

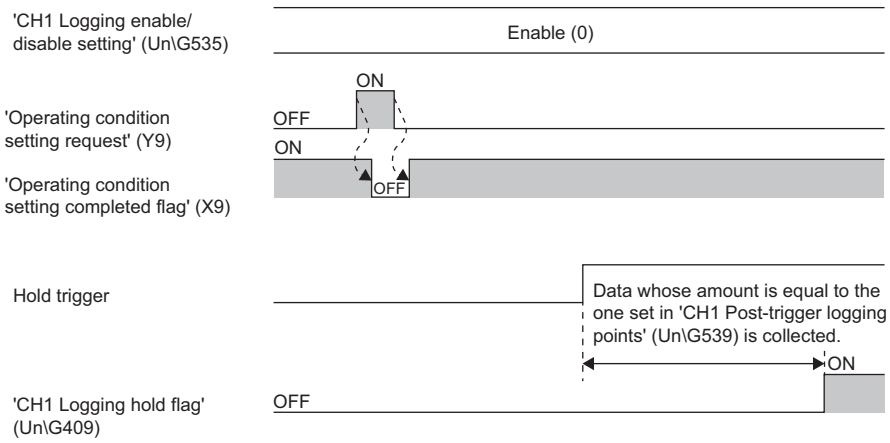
Stop the logging operation when the logging data needs to be checked without paying attention to the logging cycle. (Page 97 Stopping the logging operation)

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 100 Logging hold request
- ☞ Page 101 Level trigger

When a hold trigger is detected during data collection, the logging operation stops after the points of the data set in 'CH1 Post-trigger logging points' (Un\G539) are collected.



Post-trigger logging points

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

Checking that the logging has stopped

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

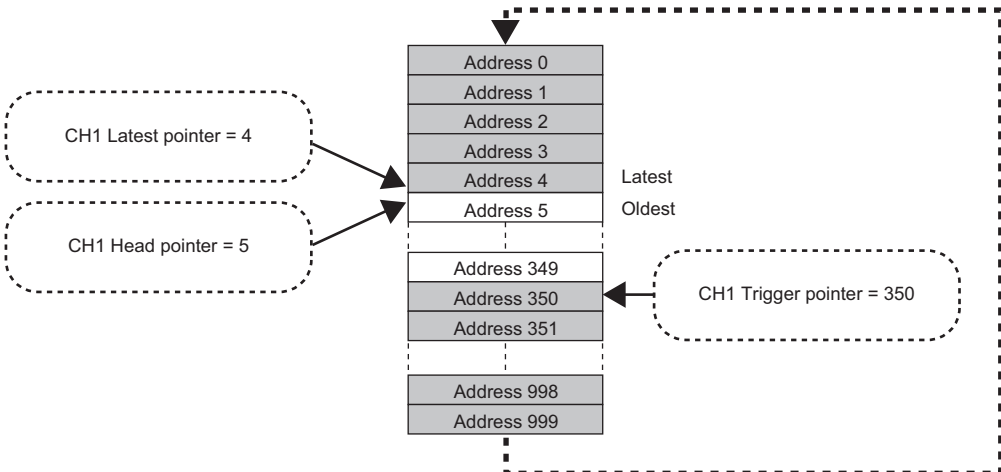
Checking data when a hold trigger has occurred

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

Ex.

The value stored in 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: 350th data



■Checking the trigger generation time

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

Ex.

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

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

Item	Storage contents	Storage example*1
First two digits of the year/Last two digits of the year	Stored in BCD code.	2025H
Month/Day		0130H
Hour/Minute		1035H
Second		40H
Day of the week	One of the following values is stored in BCD code. <ul style="list-style-type: none">• Sunday: 00H• Monday: 01H• Tuesday: 02H• Wednesday: 03H• Thursday: 04H• Friday: 05H• Saturday: 06H	04H
Millisecond (higher-order digits)/Millisecond (lower-order digits)	Stored in BCD code.	0628H

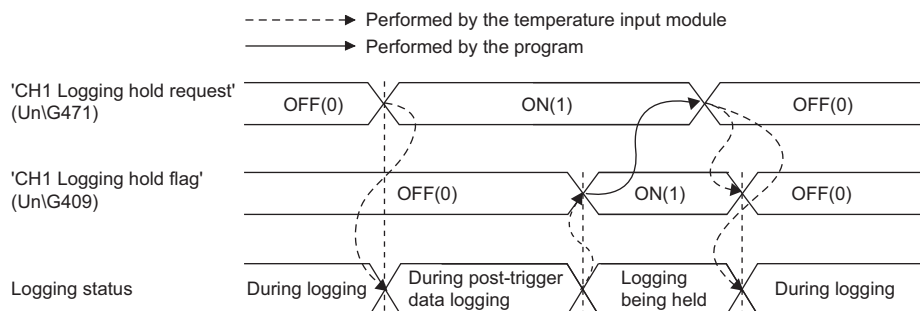
*1 These values assume that a trigger is generated at 10:35 and 40.628 seconds on Thursday, January 30th, 2025.

Resuming the logging

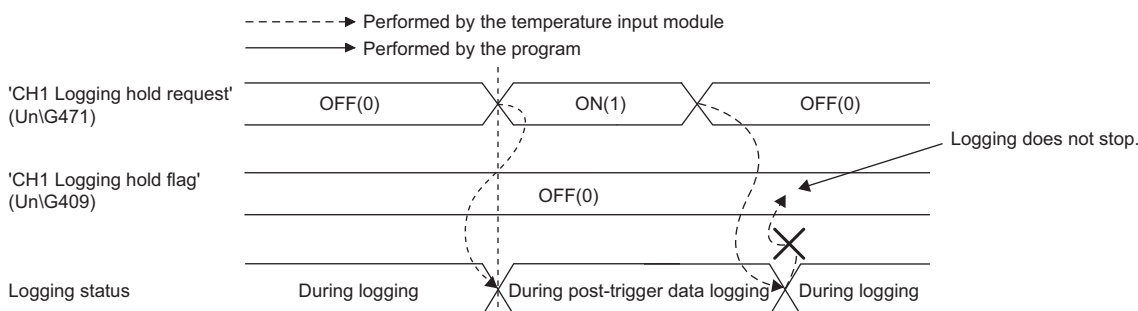
It may take time until ON (1) is stored in 'CH1 Logging hold flag' (Un\G409) after 'CH1 Logging hold request' (Un\G471) is changed from off to on.

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

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



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



■ Buffer memory area status when logging resumes

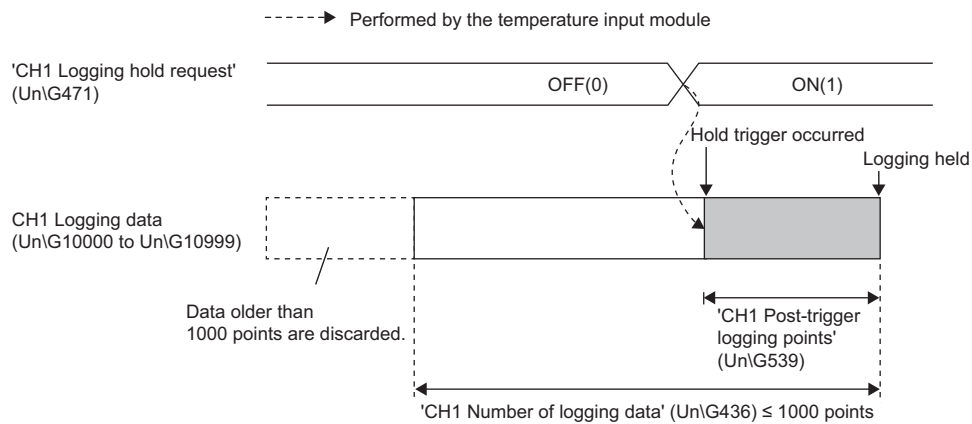
The following table shows the buffer memory area status when logging resumes.

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

Logging hold request

A hold trigger is generated from a program at any timing.

After 'CH1 Logging hold request' (Un\G471) is changed from OFF (0) to ON (1), a preset number of data is collected and then the logging stops.



Point

- The following delay time occurs until a temperature input module receives a hold trigger after the value in 'CH1 Logging hold request' (Un\G471) is changed from OFF (0) to ON (1).
Trigger delay = Logging cycle (Cycle at which logging is actually performed) + Scan time of the CPU module
- When 'CH1 Logging hold request' (Un\G471) is changed from ON (1) to OFF (0) before 'CH1 Logging hold flag' (Un\G409) turns to ON (1), the 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' (XF) and the ERR 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 a temperature input module satisfies a preset condition, a hold trigger is generated.

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

Initial setting of a level trigger

■Setting a target to be monitored

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

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

To monitor a device value of a module other than a temperature 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 □' (Un\G90 to Un\G99)

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

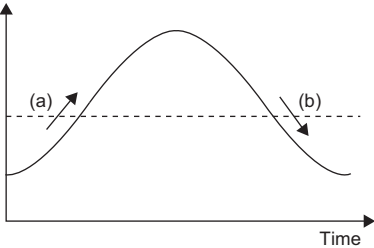
- Set 'CH1 Trigger data' (Un\G541) to 91 (buffer memory address of Level data 1) (when Level data 1 is used).
- Store the storage data of D100 in 'Level data 1' (Un\G91) by the program continuously.

Point

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

■Setting the monitoring condition

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

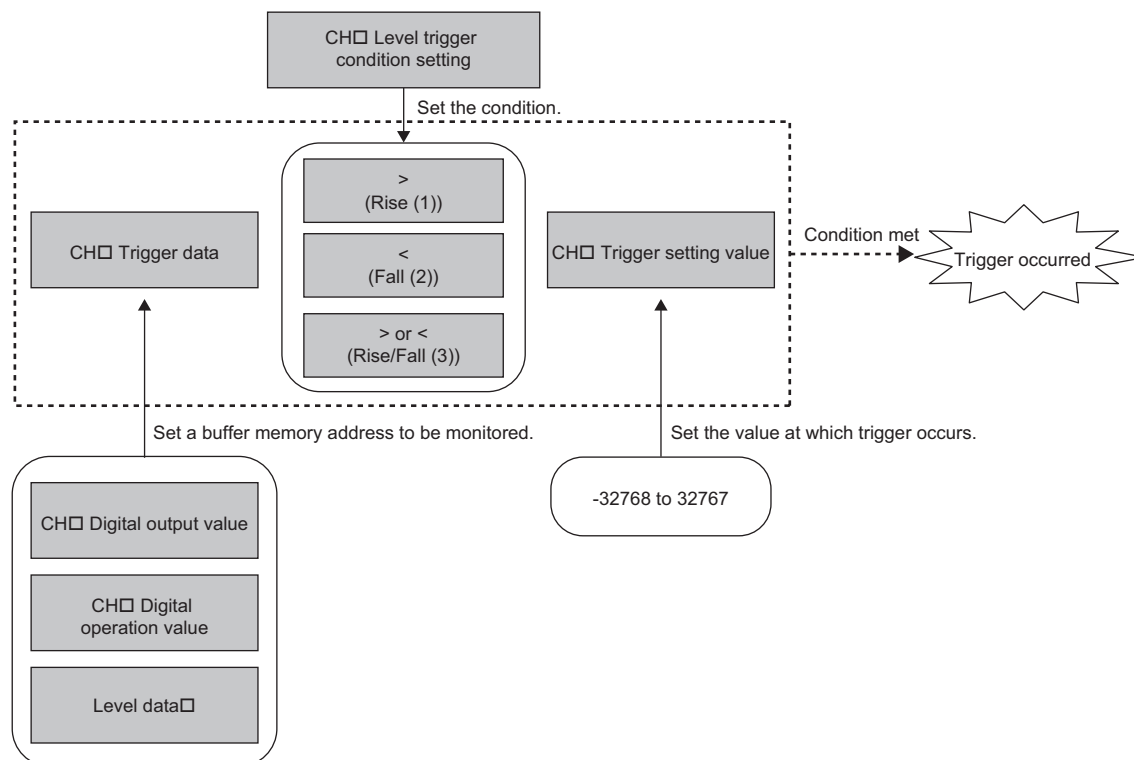
Setting value	Description	
Level trigger (condition: Rise) (1)	<p>Value stored in buffer memory area to be monitored</p>  <p>Trigger setting value</p> <p>(a) (b)</p> <p>Time</p> <p>(a) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored $\leq$ Trigger setting value" to "Stored value of a buffer memory area to be monitored $>$ Trigger setting value".</p> <p>(b) A hold trigger is generated when the relation between the values changes from "Stored value of a buffer memory area to be monitored $\geq$ Trigger setting value" to "Stored value of a buffer memory area to be monitored $<$ Trigger setting value".</p>	A hold trigger is generated under the condition (a).
Level trigger (condition: Fall) (2)		A hold trigger is generated under the condition (b).
Level trigger (condition: Rise and fall) (3)		A hold trigger is generated under the condition (a) or (b).

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

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

Point

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



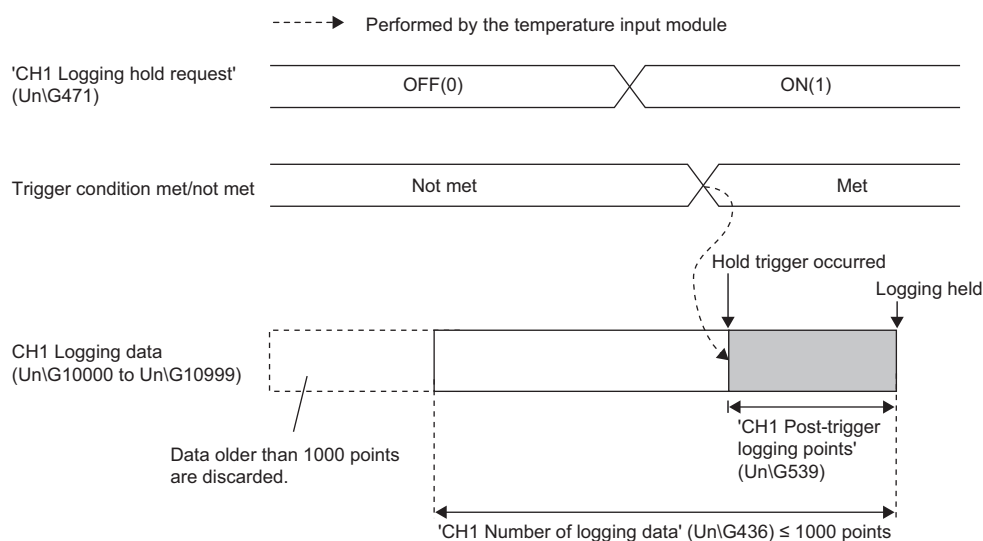
To generate a hold trigger when a value in CH1 Digital output value exceeds 1000, set as follows.

- '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

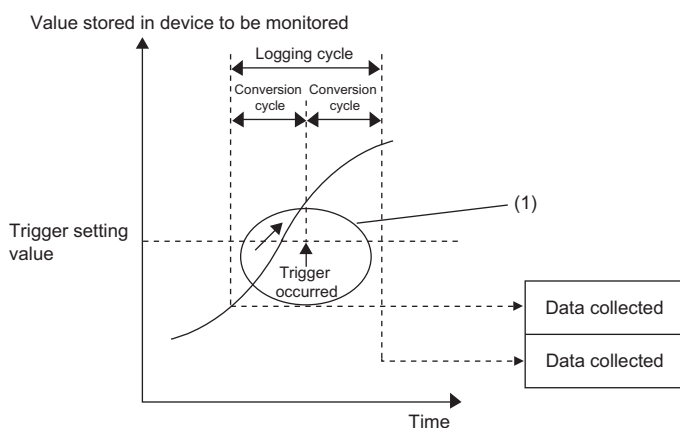
To use a level trigger, set ON (1) to 'CH1 Logging hold request' (Un\G471) in advance. At the point where ON (1) has been set to 'CH1 Logging hold request' (Un\G471), the module becomes the trigger condition wait status.

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 measured temperature value or the scaling value. Therefore, the data when a hold trigger is generated may not be stored in CH1 Logging data (Un\G10000 to Un\G10999) depending on the setting of the logging cycle. To store the data at the timing when a hold trigger is generated in CH1 Logging data (Un\G10000 to Un\G10999), arrange related settings so that the conversion cycle of the monitoring target value (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 "Conversion enable/disable setting" to "Conversion enable".
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Conversion enable/disable setting function]
- 2.** Set "Logging enable/disable setting" to "Enable".
 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Application setting] ⇒ [Logging function]
- 3.** Set the target data to be logged in "Logging data setting". Set either "Digital output value" or "Digital operation value" for each channel.
- 4.** Set the cycle to store the logging data to "Logging cycle setting value".
- 5.** Select a unit of the logging cycle setting value in "Logging cycle unit setting".
- 6.** Set a condition to generate a hold trigger in "Level trigger condition setting". To use a logging hold request, 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 "Logging points after trigger".
- 8.** Set a buffer memory address to be monitored for a level trigger to "Trigger data".
- 9.** Set whether to enable or disable the logging read function in "Logging loading enable/disable setting".
- 10.** Set a level where a level trigger operates for "Trigger setting value".

Logging read function

More than 1000 points of logging data can be stored by transferring the device data to the file register of the CPU module without stopping logging. This function reduces the takt time in a test demanding high-speed conversion.

Overview of the logging read function

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

A temperature input module has 16 points of the interrupt factor (SI) to correspond to the logging reading of each channel.

Setting interrupt pointers

Assign the interrupt factors (SI) of a temperature input module and interrupt pointers of the CPU module using the interrupt pointer setting of the engineering tool.

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

Starting the logging read function

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

■The number of logging read points

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

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

A value of CH1 Logging read points setting value	A value of CH1 Logging read points monitor value
100	100
90	50
110	100
650	500
400	250

Data checking method

■Current logging read pointer

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

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

■Previous logging read pointer

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

Ex.

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

Occurrence of read pointer detection interrupts	Previous logging read pointer	Current logging read pointer	Latest pointer
Default value	-1	-1	0
First time	-1	0	99
Second time	0	100	199
Third time	100	200	299
⋮	⋮	⋮	⋮
10th time	800	900	999
11th time	900	0	99
12th time	0	100	199

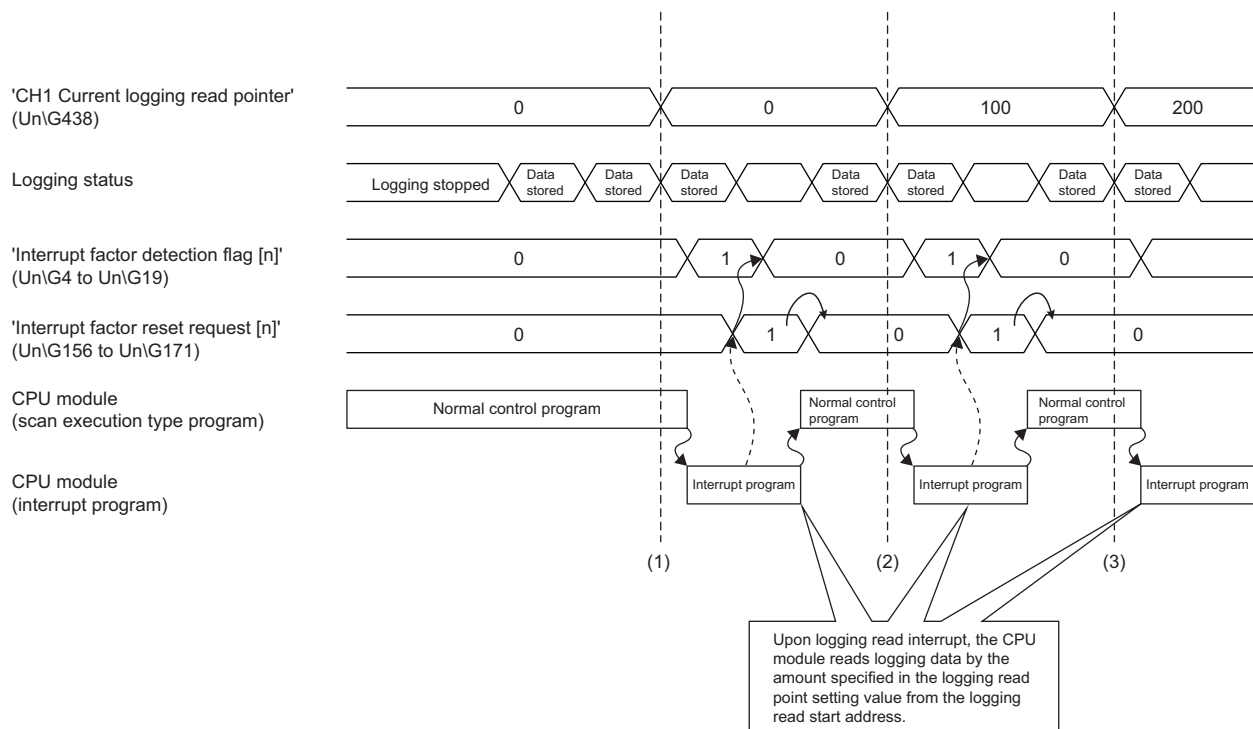
Operation

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

Ex.

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

- Conversion enabled channel: CH1 only
- Logging read points setting value: 100 points



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

Setting procedure

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

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

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

2. Set "Conversion enable/disable setting" to "Conversion enable".

🔍 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ Module model name ⇒ [Basic setting] ⇒ [Conversion enable/disable setting function]

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

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

4. Set the target data to be logged in "Logging data setting".

5. Set the cycle to store the logging data to "Logging cycle setting value".

6. Select a unit of the logging cycle setting value in "Logging cycle unit setting".

7. Set "Logging loading enable/disable setting" to "Enable".

8. Set the number of logging points that generate a read interrupt in "Logging read points setting value".

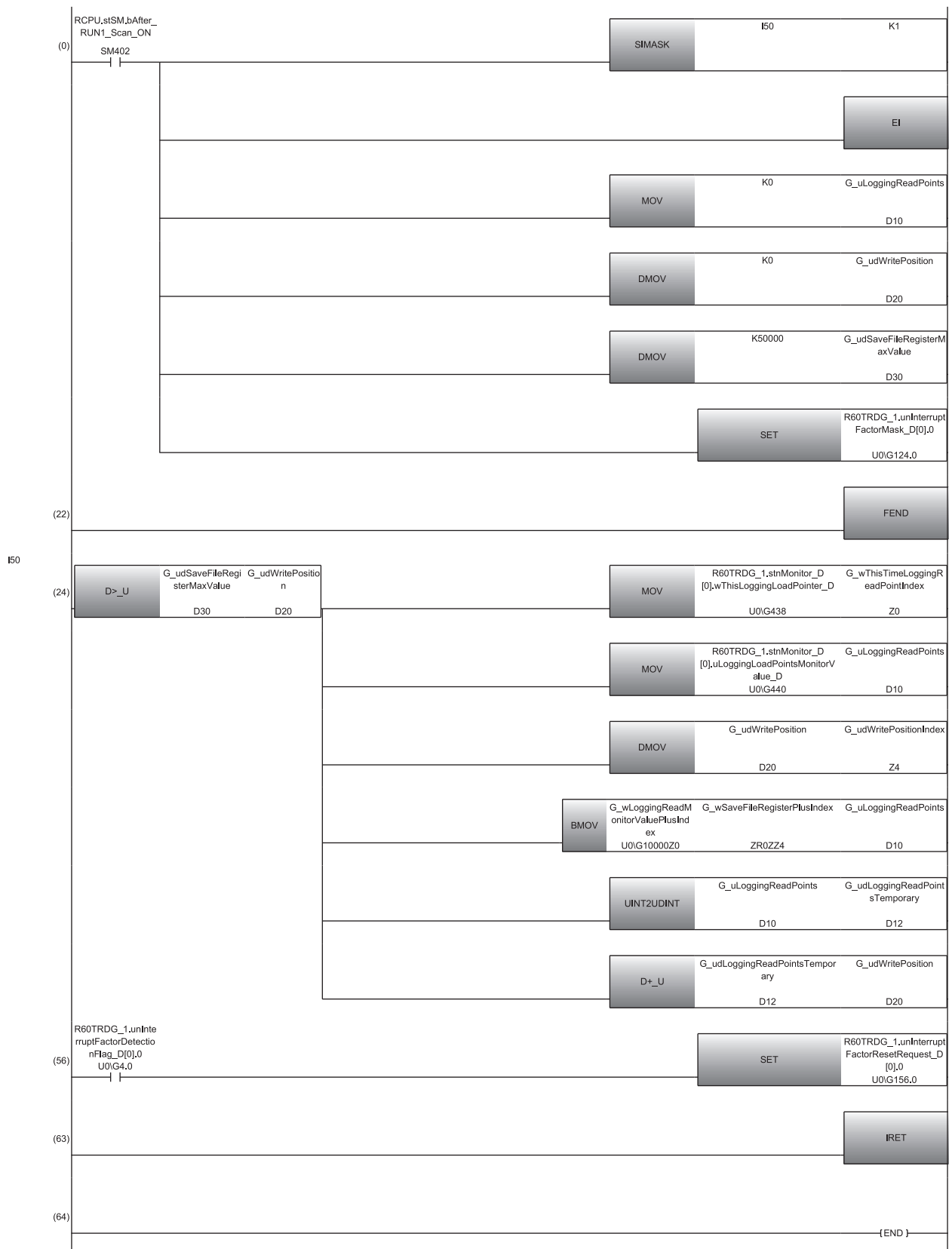
Setting example

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

• Label settings

Classification	Label name	Description	Device
Module label	R60TRDG_1.unInterruptFactorMask_D[0].0	Interrupt factor mask [1]	U0\G124
	R60TRDG_1.unInterruptFactorDetectionFlag_D[0].0	Interrupt factor detection flag [1]	U0\G4
	R60TRDG_1.unInterruptFactorResetRequest_D[0].0	Interrupt factor reset request [1]	U0\G156
	R60TRDG_1.stnMonitor_D[0].wThisLoggingLoadPointer_D	CH1 Current logging read pointer	U0\G438
	R60TRDG_1.stnMonitor_D[0].uLoggingLoadPointsMonitorValue_D	CH1 Logging read points monitor value	U0\G440
Label to be defined	Define global labels as shown below:		
	Label Name	Data Type	Class
1	G_uLoggingReadPoints	Word (Unsigned)/Bit String (16-bit)	VAR_GLOBAL
2	G_uLoggingReadPointsTemporary	Double Word (Unsigned)/Bit String (32-bit)	VAR_GLOBAL
3	G_uWritePosition	Double Word (Unsigned)/Bit String (32-bit)	VAR_GLOBAL
4	G_uSaveFileRegisterMaxValue	Double Word (Unsigned)/Bit String (32-bit)	VAR_GLOBAL
5	G_wThisTimeLoggingReadPointIndex	Word (Signed)	VAR_GLOBAL
6	G_uWritePositionIndex	Double Word (Unsigned)/Bit String (32-bit)	VAR_GLOBAL
7	G_uLoggingReadMonitorValuePlusIndex	Word (Signed)	VAR_GLOBAL
8	G_wSaveFileRegisterPlusIndex	Word (Signed)	VAR_GLOBAL

• Program example



- (0) Enable only the interrupt pointer I50.
 Initialize the variable for storing the logging read points monitor value (word [unsigned]) and the write position of the save destination file register.
 Set the maximum number of stored points of save destination file registers.
 Clear 'Interrupt factor mask [1]' (U0/G124).

- (24) Store 'CH1 Current logging read pointer' (U0\G438) in the index register.
Store 'CH1 Logging read points monitor value' (U0\G440) in the register.
Store the write position of the save destination file register in the index register.
Store CH1 Logging data (Un0\G10000 to U0\G10999) for the logging read points monitor value in the save destination file register.
Add the points of the logging read points monitor value to the write position of the save destination file register and store the obtained value as the write position for the next logging.
- (56) Turn on 'Interrupt factor reset request [1]' (U0\G156) when 'Interrupt factor detection flag [1]' (U0\G4) turns on.

Saving to a CSV file

The logging data stored in the buffer memory areas can be saved to a CSV file by using module function blocks. The save data is sorted in a time series, where the logging data can be easily checked.

However, module function blocks can be executed only when the logging operation is stopped. During the logging operation, the execution of module function blocks is disabled.

Saving a CSV file

To save a CSV file, an SD memory card is required.

CSV files are saved in an SD memory card installed in the CPU module. CSV files cannot be saved in the built-in memory of the CPU module.

Saving procedure

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

Point

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

Data to be saved in a CSV file

The logging data stored in the buffer memory areas is saved.

For how to check the logging data, refer to the following.

📖 Page 97 Checking data when a hold trigger has occurred

CSV file name

The name of the CSV file saved with the module function block is as shown below.

TRD□□△○○○.CSV

Target channel Serial number*1

Middle two digits of the start I/O number
(expressed in four hexadecimal digits)

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

Ex.

The file name under the following condition is TRD453006.CSV.

- Start I/O number of the temperature input module: 0450H
- Target channel: 3
- Saving to a CSV file: 6th time.

Displaying logging data

The CSV file output with the logging function can be displayed graphically by reading the file through GX LogViewer.

For how to display the logging data with GX LogViewer, refer to the following.

📖 GX LogViewer Version 1 Operating Manual

8.13 Q Compatible Mode Function

This function controls operations of the temperature input module with its buffer memory address layout converted to equivalent one to the compatible modules of the MELSEC-Q series.

This compatibility enables the utilization of programs that have proven performance on the addresses of compatible modules of the MELSEC-Q series.

The two Q compatible modes are Q compatible (RD) mode and Q compatible (TD) mode. The following table lists the compatible modules of the MELSEC-Q series and the Q compatible modes used.

Q compatible mode type	Compatible module (MELSEC-Q series)	Description
Q compatible (RD) mode	Q64RD Q64RD-G	This Q compatible mode provides compatibility with the buffer memory address layout of RTD input modules. Only RTD can be set as the input type for each channel.
Q compatible (TD) mode	Q64TD Q64TDV-GH	This Q compatible mode provides compatibility with the buffer memory address layout of thermocouple input modules. Only thermocouple and micro voltage can be set as the input type for each channel.

Operation

Only the buffer memory assignment is changed in the Q compatible mode. The I/O signal assignment is the same as that of the R mode. Therefore, when the MELSEC-Q series program is diverted, a significant modification is not required.

Precautions

In the Q compatible (RD) mode of temperature input modules, the size of the scaling width upper limit value and scaling width lower limit value is changed to 32-bit, as shown below, thereby extending beyond the 16-bit size of the compatible modules. As a result, the buffer memory addresses of the scaling width upper limit value and scaling width lower limit value in the Q compatible (RD) mode are changed from those of the compatible modules (Q64RD, Q64RD-G). Modify the program if necessary.

Buffer memory address of the compatible module (Q64RD, Q64RD-G)			Buffer memory address with the same purpose in a temperature input module (Q compatible (RD) mode)		
Buffer memory name	Address	Size	Buffer memory name	Address	Size
CH1 Scaling width upper limit value	78	16-bit	CH1 Scaling width upper limit value (32-bit)	468	32-bit
CH1 Scaling width lower limit value	79		CH1 Scaling width lower limit value (32-bit)	470	
CH2 Scaling width upper limit value	80		CH2 Scaling width upper limit value (32-bit)	472	
CH2 Scaling width lower limit value	81		CH2 Scaling width lower limit value (32-bit)	474	
CH3 Scaling width upper limit value	82		CH3 Scaling width upper limit value (32-bit)	476	
CH3 Scaling width lower limit value	83		CH3 Scaling width lower limit value (32-bit)	478	
CH4 Scaling width upper limit value	84		CH4 Scaling width upper limit value (32-bit)	480	
CH4 Scaling width lower limit value	85		CH4 Scaling width lower limit value (32-bit)	482	

Note that setting the parameters via an engineering tool rather than a program is recommended.

Restriction

- When the MELSEC-Q series program is diverted, modify the program if necessary because the specifications such as update timing and other contents of buffer memory addresses are changed.
- When the MELSEC-Q series program is diverted and an error code is set as the operating condition or interlock condition, the program does not operate normally.
- When the Q compatible mode function is enabled, a program that uses a module function block or module label cannot be created. When a module function block or module label is used, create a program in the R mode.

Setting procedure

1. When adding a new module, select a module model name listed below according to the type of the Q compatible mode used.

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

Q compatible mode type	Module model name to select
Q compatible (RD) mode	R60TRD4-G (QRD)
Q compatible (TD) mode	R60TRD4-G (QTD)

2. Configure the same parameter setting as the one of when the R mode is used.
3. Restart the CPU module after the module parameter is written.

Point

During the module operation, the mode cannot be switched between the R mode and Q compatible mode. The mode also cannot be switched between the Q compatible (RD) mode and Q compatible (TD) mode.

Part 7 consists of the following chapters.

9 OPERATION EXAMPLES OF WHEN THE CPU MODULE IS MOUNTED

10 OPERATION EXAMPLES OF WHEN THE REMOTE HEAD MODULE IS MOUNTED

9 OPERATION EXAMPLES OF WHEN THE CPU MODULE IS MOUNTED

This chapter describes the programming procedure and the basic program of a temperature input module (when the CPU module is mounted).

9.1 Programming Procedure

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

1. Set parameters.

☞ Page 115 Parameter settings

2. Create a program.

☞ Page 119 Program examples

Point

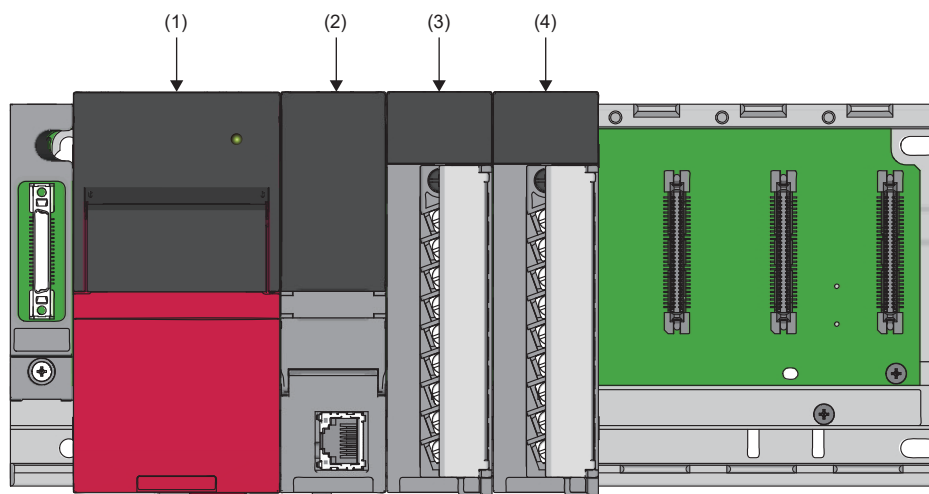
Using a function block can reduce the programming workload and improve the program readability. For details on function blocks, refer to the following.

📖 MELSEC iQ-R Temperature Input Module Function Block Reference

9.2 Program Examples

System configuration

The following figure shows an example of the system configuration.



(1) Power supply module (R61P)

(2) CPU module (R120CPU)

(3) Temperature input module (R60TRD4-G)

(4) Input module (RX10)

Program conditions

This program reads digital output values for which conversion is enabled on CH1, CH2, and CH4 of a temperature input module.

Conversion is performed with sampling processing for CH1, averaging processing every 50 times for CH2, and moving average processing at 10 times for CH4. If an error occurs in the module, an error code is stored in the device.

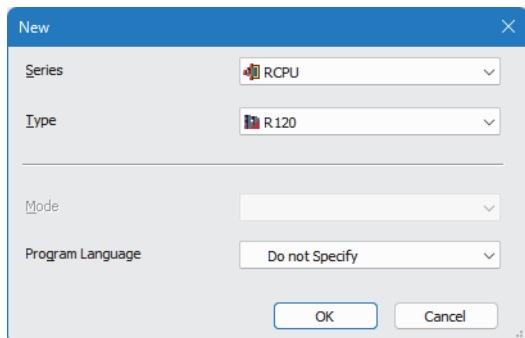
Parameter settings

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

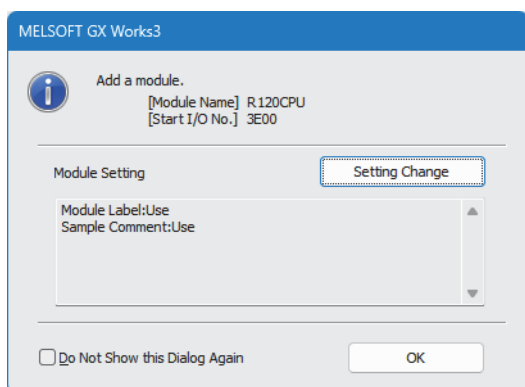
Operating procedure

1. Create the project with the following settings.

 [Project] ⇒ [New]

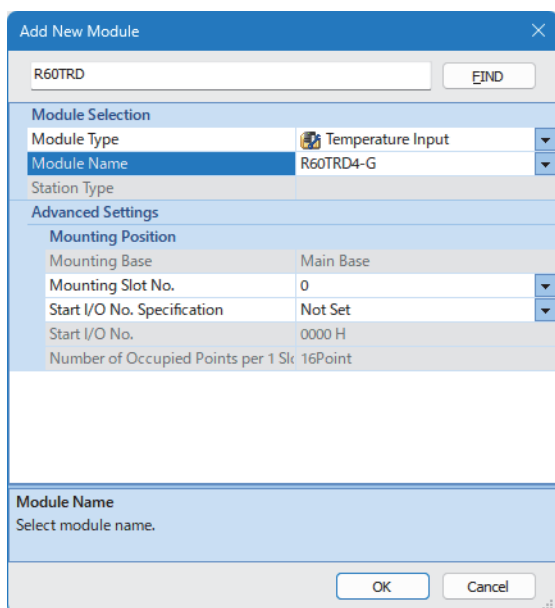


2. Click the [Setting Change] button and set "Module Label" to "Use".

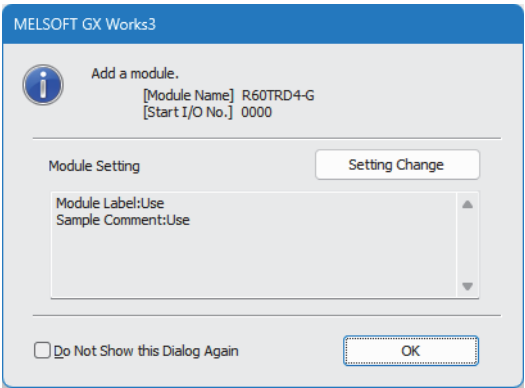


3. Add the temperature input module with the following settings.

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

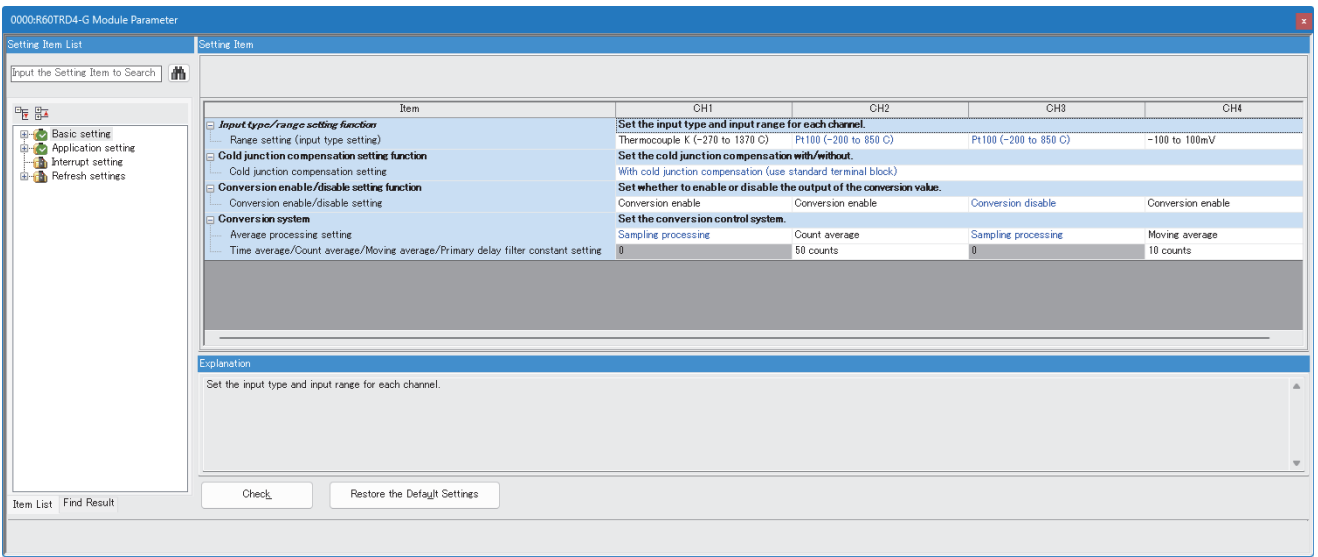


4. Configure the setting to use the module labels and add the module labels of the temperature input module.



5. Set "Basic setting" of the module parameter of the temperature input module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Basic setting]



6. Set "Application setting" of the module parameter of the temperature input module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Application setting]

0000-R60TRD4-G Module Parameter

Setting Item List Setting Item

Input the Setting Item to

- Basic setting
- Application setting**
- Interrupt setting
- Refresh settings

Item	CH1	CH2	CH3	CH4
Scaling function				
Configure the setting for the scaling at the conversion.				
Scaling enable/disable setting	Disable	Enable	Disable	Disable
Scaling range upper limit value	0.0 C	0	0	0
Scaling range lower limit value	0.0 C	0	0	0
Scaling width upper limit value	0	0	0	0
Scaling width lower limit value	0	0	0	0
Scaling range upper limit value (32 bits)	0.000 C	500.000 C	0.000 C	0.000 C
Scaling range lower limit value (32 bits)	0.000 C	-100.000 C	0.000 C	0.000 C
Scaling width upper limit value (32 bits)	0	100	0	0
Scaling width lower limit value (32 bits)	0	0	0	0
Shift function				
Set the Conversion value shift amount at the conversion.				
Conversion value shift amount	0	0	0	0
Conversion value shift amount (32 bits)	0	0	0	0
Warning output function (Process alarm)				
Set an alert at the conversion.				
Warning output setting (Process alarm)	Disable	Enable	Disable	Disable
Process alarm upper upper limit value	1200.0 C	12000	12000	12000
Process alarm upper lower limit value	1200.0 C	12000	12000	12000
Process alarm lower upper limit value	-200.0 C	-2000	-2000	-2000
Process alarm lower lower limit value	-200.0 C	-2000	-2000	-2000
Process alarm upper upper limit value (32 bits)	850.000 C	100.000 C	850.000 C	850.000 C
Process alarm upper lower limit value (32 bits)	850.000 C	50.000 C	850.000 C	850.000 C
Process alarm lower upper limit value (32 bits)	-200.000 C	10.000 C	-200.000 C	-200.000 C
Process alarm lower lower limit value (32 bits)	-200.000 C	0.000 C	-200.000 C	-200.000 C
Warning output function (Rate alarm)				
Set an alert at the conversion.				
Warning output setting (Rate alarm)	Disable	Disable	Disable	Enable
Rate alarm detection cycle setting	0 times	0 times	0 times	10 times
Rate alarm upper limit value	0.0 C	0	0	25.0 %
Rate alarm lower limit value	0.0 C	0	0	-5.0 %
Rate alarm upper limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Rate alarm lower limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection function				
Configure the setting for the disconnection detection at the conversion.				
Disconnection detection function enable/disable setting	Enable	Disable	Disable	Disable
Conversion setting for disconnection detection	Value immediately before disconnection	Down Scale	Down Scale	Down Scale
Conversion setting value for disconnection detection	0.0 C	0	0	0
Conversion setting value for disconnection detection (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection automatic clear enable/disable setting	Disable			
Logging function				
Configure the setting for the logging function at the conversion.				
Logging enable/disable setting	Disable	Disable	Disable	Disable
Logging data setting	Digital output value	Digital output value	Digital output value	Digital output value
Logging cycle setting value	40 ms	40 ms	40 ms	40 ms
Logging cycle unit setting	ms	ms	ms	ms
Level trigger condition setting	Disable	Disable	Disable	Disable
Logging points after trigger	500	500	500	500
Trigger data	400	600	800	1000
Trigger setting value	0	0	0	0
Loading interrupt enable/disable setting	Disable	Disable	Disable	Disable
Logging load points setting value	100	100	100	100

Explanation

Item List Find Result

Check Restore the Default Settings

7. Write the set parameters to the CPU module on the master station. Then reset the CPU module or turn off and on the power.

[Online] ⇒ [Write to PLC]

Label settings

GX Works3 provides functions that support the creation of a program.

The following table lists the module labels and global labels used for the program examples in this section.

There is no need to change the settings of the module labels. For details on the global labels, refer to the following.

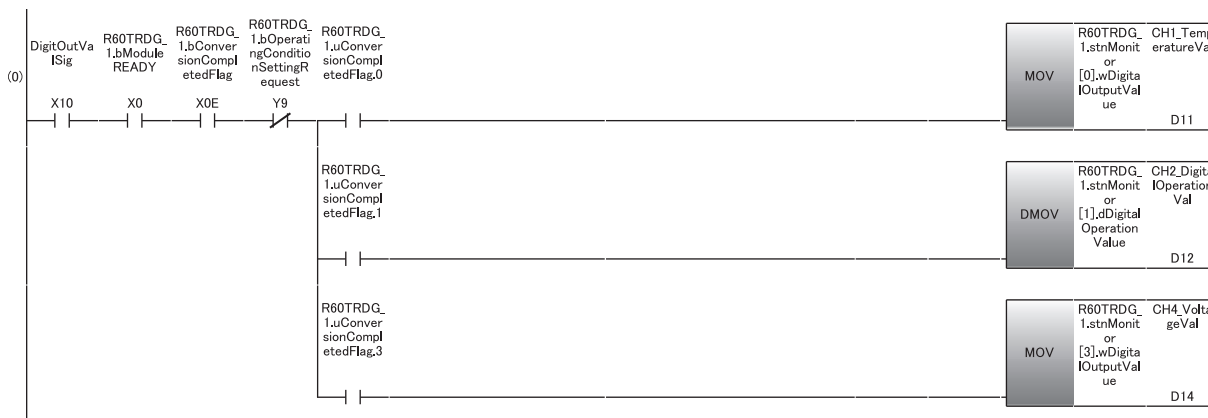
 MELSEC iQ-R Programming Manual (Program Design)

Classification	Label name	Description	Device																																																																																																																							
Module label	R60TRDG_1.bModuleREADY	Module READY	X0																																																																																																																							
	R60TRDG_1.bConversionCompletedFlag	Conversion completed flag	XE																																																																																																																							
	R60TRDG_1.bOperatingConditionSettingRequest	Operating condition setting request	Y9																																																																																																																							
	R60TRDG_1.bDisconnectionDetectionSignal	Disconnection detection signal	XC																																																																																																																							
	R60TRDG_1.bErrorFlag	Error flag	XF																																																																																																																							
	R60TRDG_1.stnMonitor[0].wDigitalOutputValue	CH1 Digital output value	—																																																																																																																							
	R60TRDG_1.stnMonitor[1].dDigitalOperationValue	CH2 Digital operation value (32-bit)	—																																																																																																																							
	R60TRDG_1.stnMonitor[3].wDigitalOutputValue	CH4 Digital output value	—																																																																																																																							
	R60TRDG_1.uConversionCompletedFlag.0	CH1 Conversion completed flag	—																																																																																																																							
	R60TRDG_1.uConversionCompletedFlag.1	CH2 Conversion completed flag	—																																																																																																																							
	R60TRDG_1.uConversionCompletedFlag.3	CH4 Conversion completed flag	—																																																																																																																							
	R60TRDG_1.uWarningOutputFlagProcessAlarmUpperLimit.1	CH2 Alert output flag (Process alarm) upper limit value flag	—																																																																																																																							
	R60TRDG_1.uWarningOutputFlagProcessAlarmLowerLimit.1	CH2 Alert output flag (Process alarm) lower limit value flag	—																																																																																																																							
	R60TRDG_1.uWarningOutputFlagRateAlarmUpperLimit.3	CH4 Alert output flag (Rate alarm) upper limit value flag	—																																																																																																																							
	R60TRDG_1.uWarningOutputFlagRateAlarmLowerLimit.3	CH4 Alert output flag (Rate alarm) lower limit value flag	—																																																																																																																							
	R60TRDG_1.uDisconnectionDetectionFlag.0	CH1 Disconnection detection flag	—																																																																																																																							
Labels to be defined	Define global labels as shown below:																																																																																																																									
	<table><thead><tr><th></th><th>Label Name</th><th>Data Type</th><th></th><th>Class</th><th></th><th>Assign (Device/Label)</th></tr></thead><tbody><tr><td>1</td><td>CH1_TemperatureVal</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>D11</td></tr><tr><td>2</td><td>CH2_DigitalOperationVal</td><td>Word (Signed)(0.1)</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>D12</td></tr><tr><td>3</td><td>CH4_VoltageVal</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>D14</td></tr><tr><td>4</td><td>CH2_ProcAlmUpLimit</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>F0</td></tr><tr><td>5</td><td>CH2_ProcAlmLowLimit</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>F1</td></tr><tr><td>6</td><td>CH4_RateAlmUpLimit</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>F2</td></tr><tr><td>7</td><td>CH4_RateAlmLowLimit</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>F3</td></tr><tr><td>8</td><td>CH1_Disconnection</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>F4</td></tr><tr><td>9</td><td>DigitOutValSig</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>X10</td></tr><tr><td>10</td><td>ErrResetSig</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td>X13</td></tr><tr><td>11</td><td>ErrOperationEN</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td></td></tr><tr><td>12</td><td>ErrOperationENO</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td></td></tr><tr><td>13</td><td>ErrOperationOK</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td></td></tr><tr><td>14</td><td>UnitErrFlg</td><td>Bit</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td></td></tr><tr><td>15</td><td>UnitErrCode</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td></td></tr><tr><td>16</td><td>UnitAlarmCode</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼</td><td></td></tr></tbody></table>		Label Name	Data Type		Class		Assign (Device/Label)	1	CH1_TemperatureVal	Word (Signed)	...	VAR_GLOBAL	▼	D11	2	CH2_DigitalOperationVal	Word (Signed)(0.1)	...	VAR_GLOBAL	▼	D12	3	CH4_VoltageVal	Word (Signed)	...	VAR_GLOBAL	▼	D14	4	CH2_ProcAlmUpLimit	Bit	...	VAR_GLOBAL	▼	F0	5	CH2_ProcAlmLowLimit	Bit	...	VAR_GLOBAL	▼	F1	6	CH4_RateAlmUpLimit	Bit	...	VAR_GLOBAL	▼	F2	7	CH4_RateAlmLowLimit	Bit	...	VAR_GLOBAL	▼	F3	8	CH1_Disconnection	Bit	...	VAR_GLOBAL	▼	F4	9	DigitOutValSig	Bit	...	VAR_GLOBAL	▼	X10	10	ErrResetSig	Bit	...	VAR_GLOBAL	▼	X13	11	ErrOperationEN	Bit	...	VAR_GLOBAL	▼		12	ErrOperationENO	Bit	...	VAR_GLOBAL	▼		13	ErrOperationOK	Bit	...	VAR_GLOBAL	▼		14	UnitErrFlg	Bit	...	VAR_GLOBAL	▼		15	UnitErrCode	Word (Signed)	...	VAR_GLOBAL	▼		16	UnitAlarmCode	Word (Signed)	...	VAR_GLOBAL	▼			
	Label Name	Data Type		Class		Assign (Device/Label)																																																																																																																				
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14	UnitErrFlg	Bit	...	VAR_GLOBAL	▼																																																																																																																					
15	UnitErrCode	Word (Signed)	...	VAR_GLOBAL	▼																																																																																																																					
16	UnitAlarmCode	Word (Signed)	...	VAR_GLOBAL	▼																																																																																																																					

Program examples

Program example 1

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



(0) Reads the CH1 digital output value, CH2 digital operation value, and CH4 digital output value.

Program example 2

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

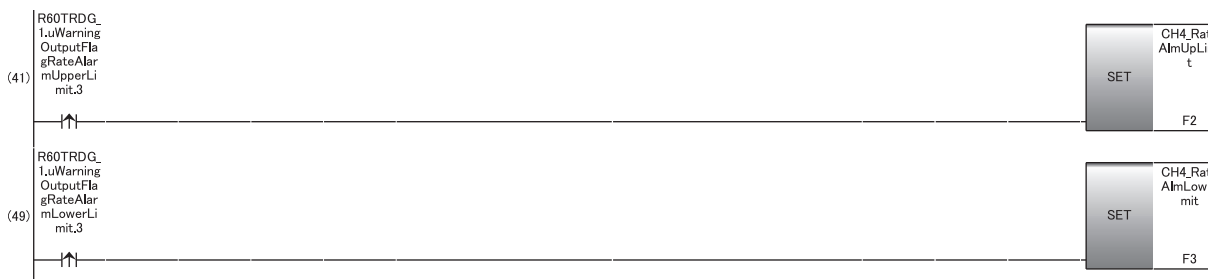


(26) At the time when a process alarm upper limit alert is issued in CH2, the processing is to be performed.

(34) At the time when a process alarm lower limit alert is issued in CH2, the processing is to be performed.

Program example 3

- This program is an example to perform the processing at the time of the issuance of a rate alarm upper/lower limit alert in CH4.



(41) At the time when a rate alarm upper limit alert is issued in CH4, the processing is to be performed.

(49) At the time when a rate alarm lower limit alert is issued in CH4, the processing is to be performed.

Program example 4

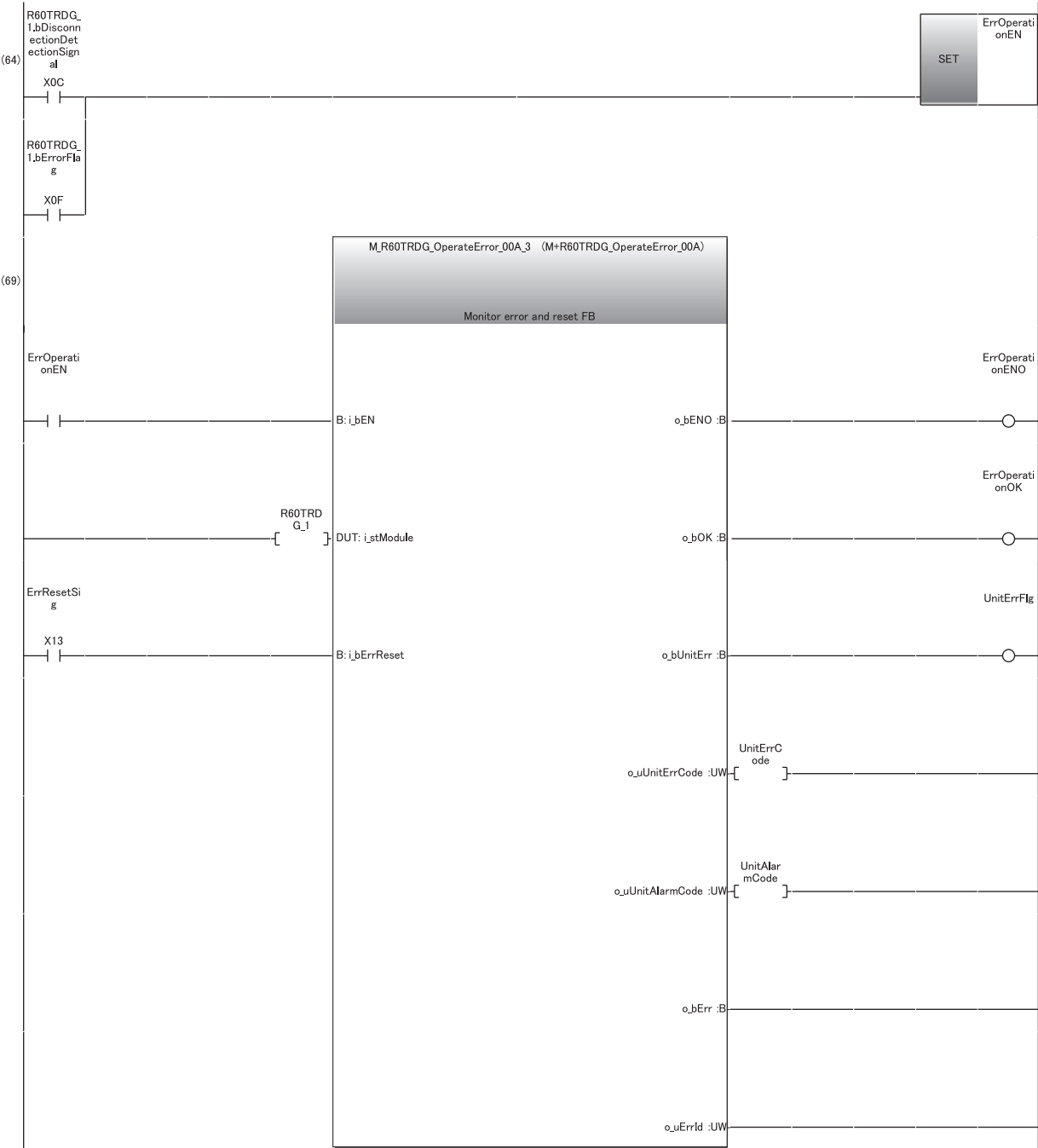
- This program is an example to perform the processing at the time of disconnection detection in CH1.



(56) At the time when disconnection is detected in CH1, the processing is to be performed.

Program example 5

- This program is an example to make the latest error code appear when disconnection is detected or an error has occurred. After this, the program clears the disconnection detection flag, error flag, and stored error code.



(64) Error manipulation start flag is to be turned on.

10 OPERATION EXAMPLES OF WHEN THE REMOTE HEAD MODULE IS MOUNTED

This chapter describes the programming procedure and the basic program of a temperature input module (when the remote head module is mounted).

10.1 Programming Procedure

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

1. Set parameters.

☞ Page 122 Parameter settings

2. Create a program.

☞ Page 130 Program examples

Point

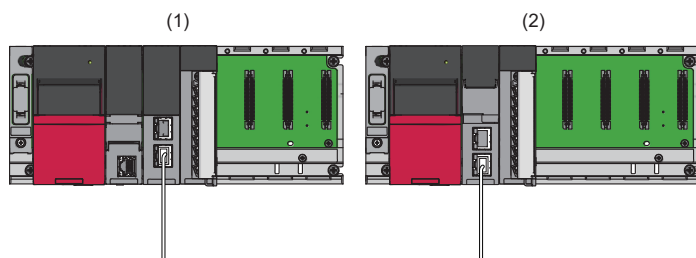
Using a function block can reduce the programming workload and improve the program readability. For details on function blocks, refer to the following.

📖 MELSEC iQ-R Temperature Input Module Function Block Reference

10.2 Program Example

System configuration

The following figure shows an example of the system configuration.



(1) Master station (Network number 1, station number 0)

- Power supply module: R61P
- CPU module: R04CPU
- Master/local module: RJ71GF11-T2 (Start I/O number: 0000H to 001FH)
- Input module: RX10 (Start I/O number: 0020H to 002FH)

(2) Intelligent device station (Network number 1, station number 1)

- Power supply module: R61P
- Remote head module: RJ72GF15-T2
- Temperature input module: R60TRD4-G (Start I/O number: 0000H to 000FH)*1

*1 In the RX/RX setting of the master station, set 1000H to 100FH as the start I/O number of the temperature input module.

Program conditions

This program reads digital output values for which conversion is enabled on CH1, CH2, and CH4 of a temperature input module mounted on the remote head module.

Conversion is performed with sampling processing for CH1, averaging processing every 50 times for CH2, and moving average processing at 10 times for CH4. If an error occurs in the module, an error code is stored in the device.

Parameter settings

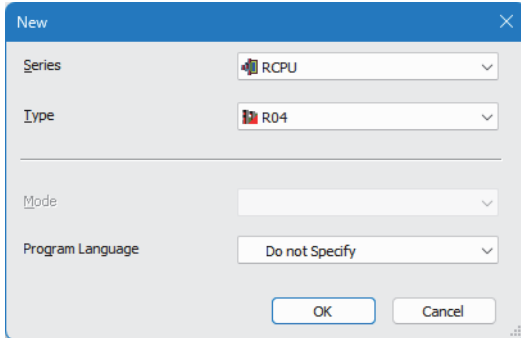
Setting in the master station

Connect the engineering tool to the CPU module of the master station and set parameters.

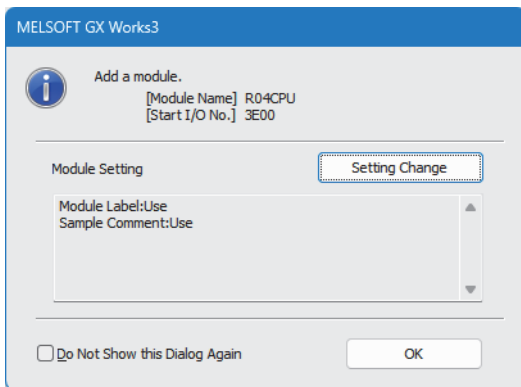
Operating procedure

1. Create the project with the following settings.

 [Project] ⇒ [New]



2. Click the [Setting Change] button and set the module to use the module label.
3. Click the [OK] button in the following window to add the module labels of the CPU module.



4. Add the master/local module with the following settings.

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

5. Click the [OK] button in the following window to add the module labels of the master/local module.

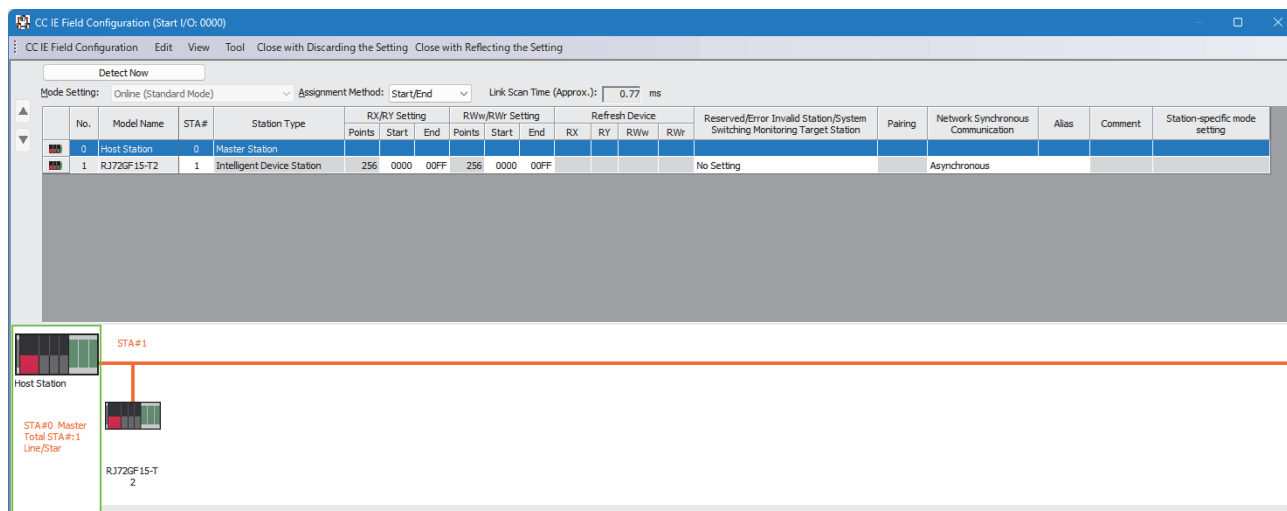
6. Set "Required Settings" of "Module Parameter" of the master/local module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Required Settings]

Item	Setting
Station Type	
Station Type	Master Station
Network No.	
Network No.	1
Station No.	
Setting Method	Parameter Editor
Station No.	0
Parameter Setting Method	
Setting Method of Basic/Application Settings	Parameter Editor

7. Set "Network Configuration Settings" of "Module Parameter" of the master/local module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Basic setting] ⇒ [Network Configuration Settings]



8. Set "Refresh Setting" of "Module Parameter" of the master/local module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [RJ71GF11-T2] ⇒ [Basic setting] ⇒ [Refresh Setting]

No.	Link Side					CPU Side				
	Device Name	Points	Start	End		Target	Device Name	Points	Start	End
-	SB	512	00000	001FF	↔	Module Label				
-	SW	512	00000	001FF	↔	Module Label				
1	RX	256	00000	000FF	↔	Specify Device	X	256	01000	010FF
2	RY	256	00000	000FF	↔	Specify Device	Y	256	01000	010FF
3	RWw	256	00000	000FF	↔	Specify Device	W	256	00000	000FF
4	RWw	256	00000	000FF	↔	Specify Device	W	256	01000	010FF

9. Write the set parameters to the CPU module on the master station. Then reset the CPU module or turn off and on the power.

[Online] ⇒ [Write to PLC]



For parameters of the master/local module which are not described in this procedure, set default values. For details on parameters of the master/local module, refer to the following.

📖 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

Setting in the intelligent device station

Connect the engineering tool to the remote head module of the intelligent device station and set parameters.

Operating procedure

1. Create the project with the following settings.

[Project] ⇒ [New]

2. Set "Network Required Setting" of "CPU Parameter" of the remote head module as shown below.

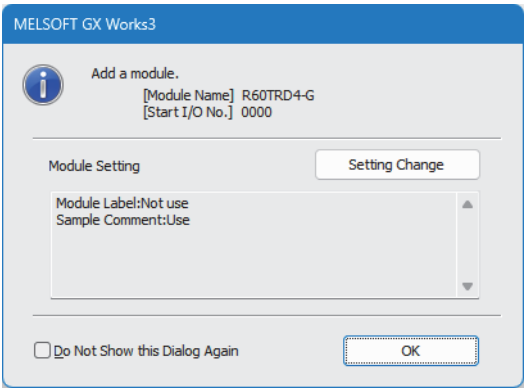
[Navigation window] ⇒ [Parameter] ⇒ [RJ72GF15-T2] ⇒ [CPU Parameter] ⇒ [Network Required Setting]

Item	Setting
Network No.	
Network No.	1
Station No.	
Station No.	1

3. Add the temperature input module with the following settings.

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

4. Configure the setting not to use the module labels.



5. Set "Basic setting" of "Module Parameter" of the temperature input module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Basic setting]

Item	CH1	CH2	CH3	CH4
Input type/range setting function	Set the input type and input range for each channel.			
Range setting (input type setting)	Thermocouple K (-270 to 1370 C)	Pt100 (~200 to 850 C)	Pt100 (~200 to 850 C)	-100 to 100mV
Cold junction compensation setting function	Set the cold junction compensation with/without.			
Cold junction compensation setting	With cold junction compensation (use standard terminal block)			
Conversion enable/disable setting function	Set whether to enable or disable the output of the conversion value.			
Conversion enable/disable setting	Conversion enable	Conversion enable	Conversion disable	Conversion enable
Conversion system	Set the conversion control system.			
Average processing setting	Sampling processing	Count average	Sampling processing	Moving average
Time average/Count average/Moving average/Primary delay filter constant setting	0	50 counts	0	10 counts

6. Set "Application setting" of "Module Parameter" of the temperature input module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Application setting]

0000-R60TRD4-G Module Parameter

Setting Item List

Setting Item

Input the Setting Item to SI

- Basic setting
- Application setting
- Interrupt setting
- Refresh settings

Item	CH1	CH2	CH3	CH4
Scaling function	Configure the setting for the scaling at the conversion.			
Scaling enable/disable setting	Disable	Enable	Disable	Disable
Scaling range upper limit value	0.0 C	0	0	0
Scaling range lower limit value	0.0 C	0	0	0
Scaling width upper limit value	0	0	0	0
Scaling width lower limit value	0	0	0	0
Scaling range upper limit value (32 bits)	0.000 C	500.000 C	0.000 C	0.000 C
Scaling range lower limit value (32 bits)	0.000 C	-100.000 C	0.000 C	0.000 C
Scaling width upper limit value (32 bits)	0	100	0	0
Scaling width lower limit value (32 bits)	0	0	0	0
Shift function	Set the Conversion value shift amount at the conversion.			
Conversion value shift amount	0	0	0	0
Conversion value shift amount (32 bits)	0	0	0	0
Warning output function (Process alarm)	Set an alert at the conversion.			
Warning output setting (Process alarm)	Disable	Enable	Disable	Disable
Process alarm upper upper limit value	12000.0 C	12000	12000	12000
Process alarm upper lower limit value	12000.0 C	12000	12000	12000
Process alarm lower upper limit value	-2000.0 C	-2000	-2000	-2000
Process alarm lower lower limit value	-2000.0 C	-2000	-2000	-2000
Process alarm upper upper limit value (32 bits)	850.000 C	100.000 C	850.000 C	850.000 C
Process alarm upper lower limit value (32 bits)	850.000 C	50.000 C	850.000 C	850.000 C
Process alarm lower upper limit value (32 bits)	-200.000 C	10.000 C	-200.000 C	-200.000 C
Process alarm lower lower limit value (32 bits)	-200.000 C	0.000 C	-200.000 C	-200.000 C
Warning output function (Rate alarm)	Set an alert at the conversion.			
Warning output setting (Rate alarm)	Disable	Disable	Disable	Enable
Rate alarm detection cycle setting	0 times	0 times	0 times	10 times
Rate alarm upper limit value	0.0 C	0	0	25.0 %
Rate alarm lower limit value	0.0 C	0	0	-5.0 %
Rate alarm upper limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Rate alarm lower limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection function	Configure the setting for the disconnection detection at the conversion.			
Disconnection detection function enable/disable setting	Enable	Enable	Enable	Enable
Conversion setting for disconnection detection	Value immediately before	Down Scale	Down Scale	Down Scale
Conversion setting value for disconnection detection	0.0 C	0	0	0
Conversion setting value for disconnection detection (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection automatic clear enable/disable setting	Disable			
Logging function	Configure the setting for the logging function at the conversion.			
Logging enable/disable setting	Disable	Disable	Disable	Disable
Logging data setting	Digital output value	Digital output value	Digital output value	Digital output value
Logging cycle setting value	40 ms	40 ms	40 ms	40 ms
Logging cycle unit setting	ms	ms	ms	ms
Level trigger condition setting	Disable	Disable	Disable	Disable
Logging points after trigger	500	500	500	500
Trigger data	400	600	800	1000
Trigger setting value	0	0	0	0
Loading interrupt enable/disable setting	Disable	Disable	Disable	Disable
Logging load points setting value	100	100	100	100

Explanation

Item List

Find Result

Check

Restore the Default Settings

7. Set "Refresh settings" of "Module Parameter" of the temperature input module as shown below.

[Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Refresh settings]

0000:R60TRD4-G Module Parameter

Setting Item List

Input the Setting Item to

Setting Item

Target Device

Number of transfers to intelligent function module 0

Number of transfers to CPU 11

Item	CH1	CH2	CH3	CH4
Refresh at the set timing.				
Transfer to the intelligent function module.	Transfer the data of specified device to the buffer memory.			
Level data 0				
Level data 1				
Level data 2				
Level data 3				
Level data 4				
Level data 5				
Level data 6				
Level data 7				
Level data 8				
Level data 9				
Logging hold request				
Conversion value shift amount				
Conversion value shift amount (32 bits)				
Transfer to the CPU.	Transfer the buffer memory data to the specified device.			
Latest error code	W1020			
Latest address of error history				
Latest alarm code				
Latest address of alarm history				
Interrupt factor detection flag 1				
Interrupt factor detection flag 2				
Interrupt factor detection flag 3				
Interrupt factor detection flag 4				
Interrupt factor detection flag 5				
Interrupt factor detection flag 6				
Interrupt factor detection flag 7				
Interrupt factor detection flag 8				
Interrupt factor detection flag 9				
Interrupt factor detection flag 10				
Interrupt factor detection flag 11				
Interrupt factor detection flag 12				
Interrupt factor detection flag 13				
Interrupt factor detection flag 14				
Interrupt factor detection flag 15				
Interrupt factor detection flag 16				
Warning output flag (Process alarm upper limit)	W1010			
Warning output flag (Process alarm lower limit)	W1011			
Warning output flag (Rate alarm upper limit)	W1012			
Warning output flag (Rate alarm lower limit)	W1013			
Disconnection detection flag	W1014			
Conversion completed flag	W1000			
Digital output value	W1001			W1004
Digital output value (32 bits)				
Digital operation value				
Digital operation value (32 bits)		W1002		
Temperature value measured by the cold junction compensation resistor				
Logging hold flag				
Refresh Timing	Set refresh timing.			
Refresh Timing	-			
Refresh Group [n](n: 1-64)	1			
Refresh Timing (I/O)	Specify the timing which transfers the I/O device data.			
Refresh Timing	Based on Refresh Timing (Buffer Memory)			

Explanation

Check Restore the Default Settings

8. Write the set parameters to the remote head module on the intelligent device station. Then reset the remote head module or power off and on the system.

[Online] ⇒ [Write to PLC]

Point

For parameters of the remote head module which are not described in this procedure, set default values. For details on parameters of the remote head module, refer to the following.

📖 MELSEC iQ-R CC-Link IE Field Network Remote Head Module User's Manual (Application)

Checking the network status

After setting parameters to the master station and the intelligent device station, check whether data link is normally performed between the master station and the intelligent device station. Check the network status using the CC-Link IE Field Network diagnostics of the engineering tool.

For how to perform the CC-Link IE Field Network diagnostics from the master station, refer to the following.

 MELSEC iQ-R CC-Link IE Field Network User's Manual (Application)

Label settings

GX Works3 provides functions that support the creation of a program.

For program examples in this section, the module labels of the master/local module are used.

Write the programs to the CPU module on the master station.

Classification	Label name	Description	Device																																																																																																																																																	
Module label	GF11_1.bSts_DataLinkError	Data link error status of own station	SB0049																																																																																																																																																	
	GF11_1.bnSts_DataLinkError_Station[1]	Data link status of each station (station number 1)	SW00B0.0																																																																																																																																																	
Label to be defined	Define global labels as shown below:																																																																																																																																																			
	<table><thead><tr><th></th><th>Label Name</th><th>Data Type</th><th>Class</th><th>Assign (Device/Label)</th></tr></thead><tbody><tr><td>1</td><td>Connect_FormationFlag_St1</td><td>Bit</td><td>VAR_GLOBAL</td><td>M0</td></tr><tr><td>2</td><td>DigitOutValue</td><td>Bit</td><td>VAR_GLOBAL</td><td>X20</td></tr><tr><td>3</td><td>ModuleREADY</td><td>Bit</td><td>VAR_GLOBAL</td><td>X1000</td></tr><tr><td>4</td><td>ConversionCompletedFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>X100E</td></tr><tr><td>5</td><td>OperatingConditionSettingRequest</td><td>Bit</td><td>VAR_GLOBAL</td><td>Y1009</td></tr><tr><td>6</td><td>CH1_ConversionCompletedFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1000.0</td></tr><tr><td>7</td><td>CH2_ConversionCompletedFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1000.1</td></tr><tr><td>8</td><td>CH4_ConversionCompletedFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1000.3</td></tr><tr><td>9</td><td>CH1_TempOutVal</td><td>Word [Signed]</td><td>VAR_GLOBAL</td><td>W1001</td></tr><tr><td>10</td><td>CH1_TemperatureVal</td><td>Word [Signed]</td><td>VAR_GLOBAL</td><td>D11</td></tr><tr><td>11</td><td>CH2_DigOutVal</td><td>Double Word [Signed]</td><td>VAR_GLOBAL</td><td>W1002</td></tr><tr><td>12</td><td>CH2_DigitalOperationVal</td><td>Double Word [Signed]</td><td>VAR_GLOBAL</td><td>D12</td></tr><tr><td>13</td><td>CH4_VolOutVal</td><td>Word [Signed]</td><td>VAR_GLOBAL</td><td>W1004</td></tr><tr><td>14</td><td>CH4_VoltageVal</td><td>Word [Signed]</td><td>VAR_GLOBAL</td><td>D14</td></tr><tr><td>15</td><td>CH2_ProcAlmUpLimitFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1010.1</td></tr><tr><td>16</td><td>CH2_ProcAlmUpLimit</td><td>Bit</td><td>VAR_GLOBAL</td><td>F0</td></tr><tr><td>17</td><td>CH2_ProcAlmLowLimitFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1011.1</td></tr><tr><td>18</td><td>CH2_ProcAlmLowLimit</td><td>Bit</td><td>VAR_GLOBAL</td><td>F1</td></tr><tr><td>19</td><td>CH4_RateAlmUpLimitFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1012.3</td></tr><tr><td>20</td><td>CH4_RateAlmUpLimit</td><td>Bit</td><td>VAR_GLOBAL</td><td>F2</td></tr><tr><td>21</td><td>CH4_RateAlmLowLimitFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1013.3</td></tr><tr><td>22</td><td>CH4_RateAlmLowLimit</td><td>Bit</td><td>VAR_GLOBAL</td><td>F3</td></tr><tr><td>23</td><td>CH1_DisconnectionFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>W1014.0</td></tr><tr><td>24</td><td>CH1_Disconnection</td><td>Bit</td><td>VAR_GLOBAL</td><td>F4</td></tr><tr><td>25</td><td>ErrorFlag</td><td>Bit</td><td>VAR_GLOBAL</td><td>X100F</td></tr><tr><td>26</td><td>ErrResetSig</td><td>Bit</td><td>VAR_GLOBAL</td><td>X23</td></tr><tr><td>27</td><td>DisconnectionDetectionSignal</td><td>Bit</td><td>VAR_GLOBAL</td><td>X100C</td></tr><tr><td>28</td><td>ErrorClearRequest</td><td>Bit</td><td>VAR_GLOBAL</td><td>Y100F</td></tr></tbody></table>		Label Name	Data Type	Class	Assign (Device/Label)	1	Connect_FormationFlag_St1	Bit	VAR_GLOBAL	M0	2	DigitOutValue	Bit	VAR_GLOBAL	X20	3	ModuleREADY	Bit	VAR_GLOBAL	X1000	4	ConversionCompletedFlag	Bit	VAR_GLOBAL	X100E	5	OperatingConditionSettingRequest	Bit	VAR_GLOBAL	Y1009	6	CH1_ConversionCompletedFlag	Bit	VAR_GLOBAL	W1000.0	7	CH2_ConversionCompletedFlag	Bit	VAR_GLOBAL	W1000.1	8	CH4_ConversionCompletedFlag	Bit	VAR_GLOBAL	W1000.3	9	CH1_TempOutVal	Word [Signed]	VAR_GLOBAL	W1001	10	CH1_TemperatureVal	Word [Signed]	VAR_GLOBAL	D11	11	CH2_DigOutVal	Double Word [Signed]	VAR_GLOBAL	W1002	12	CH2_DigitalOperationVal	Double Word [Signed]	VAR_GLOBAL	D12	13	CH4_VolOutVal	Word [Signed]	VAR_GLOBAL	W1004	14	CH4_VoltageVal	Word [Signed]	VAR_GLOBAL	D14	15	CH2_ProcAlmUpLimitFlag	Bit	VAR_GLOBAL	W1010.1	16	CH2_ProcAlmUpLimit	Bit	VAR_GLOBAL	F0	17	CH2_ProcAlmLowLimitFlag	Bit	VAR_GLOBAL	W1011.1	18	CH2_ProcAlmLowLimit	Bit	VAR_GLOBAL	F1	19	CH4_RateAlmUpLimitFlag	Bit	VAR_GLOBAL	W1012.3	20	CH4_RateAlmUpLimit	Bit	VAR_GLOBAL	F2	21	CH4_RateAlmLowLimitFlag	Bit	VAR_GLOBAL	W1013.3	22	CH4_RateAlmLowLimit	Bit	VAR_GLOBAL	F3	23	CH1_DisconnectionFlag	Bit	VAR_GLOBAL	W1014.0	24	CH1_Disconnection	Bit	VAR_GLOBAL	F4	25	ErrorFlag	Bit	VAR_GLOBAL	X100F	26	ErrResetSig	Bit	VAR_GLOBAL	X23	27	DisconnectionDetectionSignal	Bit	VAR_GLOBAL	X100C	28	ErrorClearRequest	Bit	VAR_GLOBAL	Y100F		
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Program examples

Common program

- The following figure shows an example of the program to check the data link status of the remote head module (station number 1).



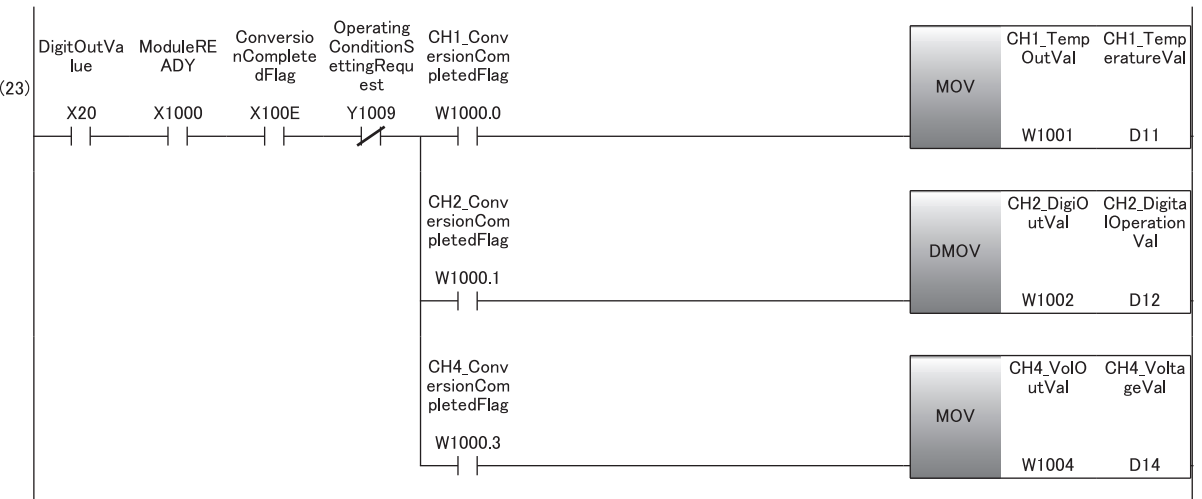
(0) Checks the data link status of the remote head module (station number 1).

Add the MCR instruction shown below to the last of the program.



Program example 1

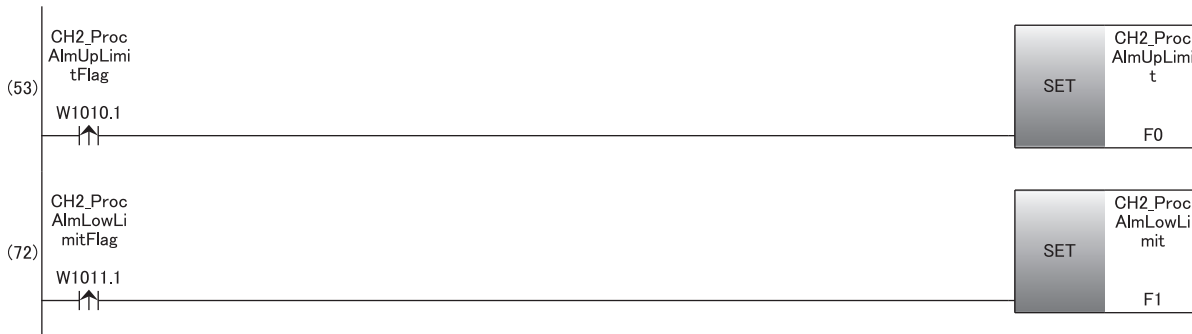
- This program is an example to read and save the measured temperature value of CH1, digital operation value of CH2, and micro voltage conversion value of CH4.



(23) Reads the CH1 measured temperature value, CH2 digital operation value, and CH4 micro voltage conversion value.

Program example 2

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

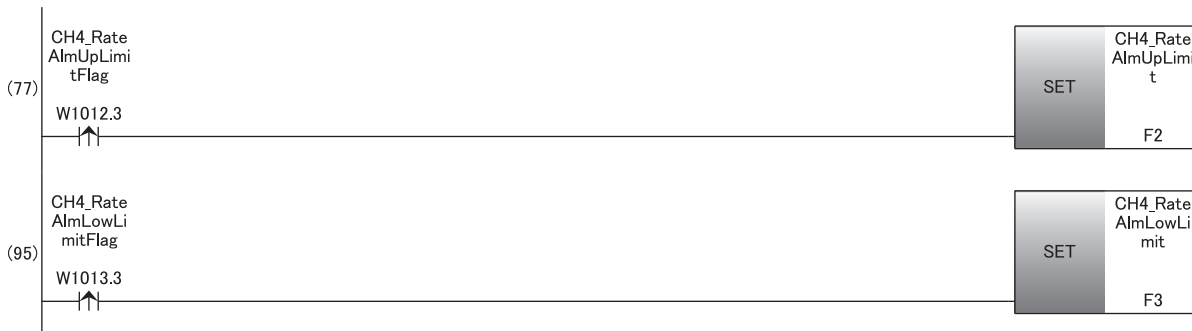


(53) At the time when a process alarm upper limit alert is issued in CH2, the processing is to be performed.

(72) At the time when a process alarm lower limit alert is issued in CH2, the processing is to be performed.

Program example 3

- This program is an example to perform the processing at the time of the issuance of a rate alarm upper/lower limit alert in CH4.

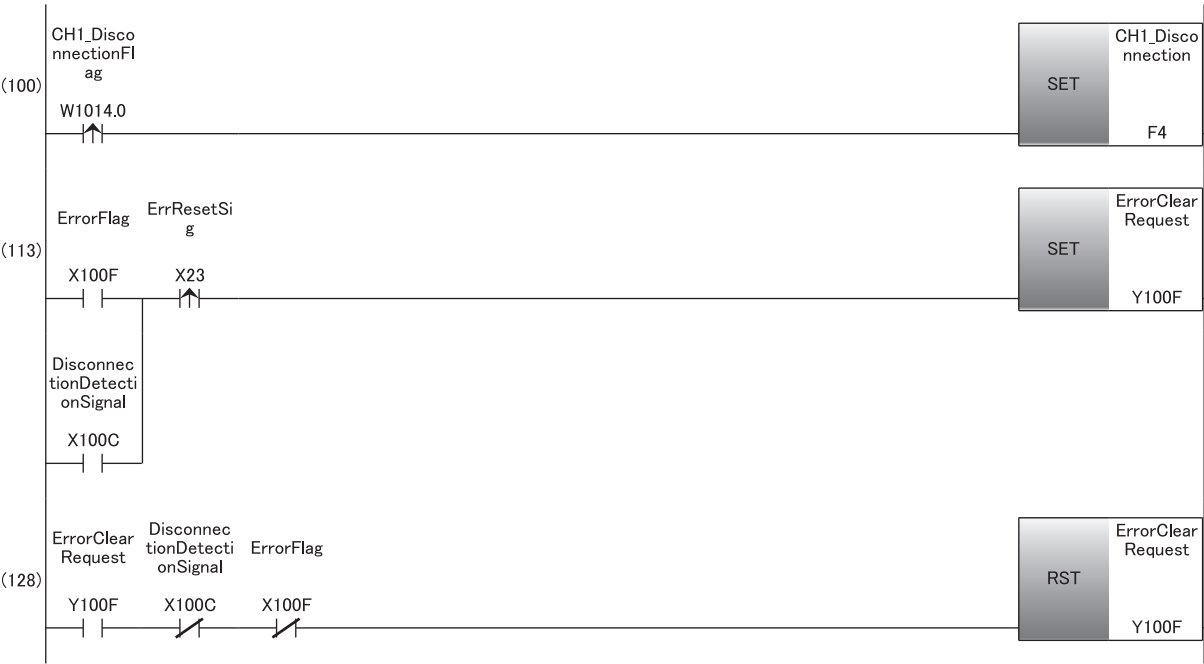


(77) At the time when a rate alarm upper limit alert is issued in CH4, the processing is to be performed.

(95) At the time when a rate alarm lower limit alert is issued in CH4, the processing is to be performed.

Program example 4

- The following figure shows an example of the program to clear Disconnection detection flag, Error flag, and Latest error code if disconnection is detected in CH1 or an error occurs in any of the channels.



- (100) At the time when disconnection is detected in CH1, the processing is to be performed.
(113) Turns on 'Error clear request' (Y100F).
(128) Turns off 'Error clear request' (Y100F).

PART 8 TROUBLESHOOTING

Part 8 consists of the following chapters.

11 TROUBLESHOOTING PROCEDURE

12 TROUBLESHOOTING BY SYMPTOM

13 LIST OF ERROR CODES

14 LIST OF ALARM CODES

11 TROUBLESHOOTING PROCEDURE

This chapter describes each type of error that may occur in the use of a temperature input module, how to identify the cause, and the corresponding corrective actions.

11.1 Troubleshooting with the LEDs

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

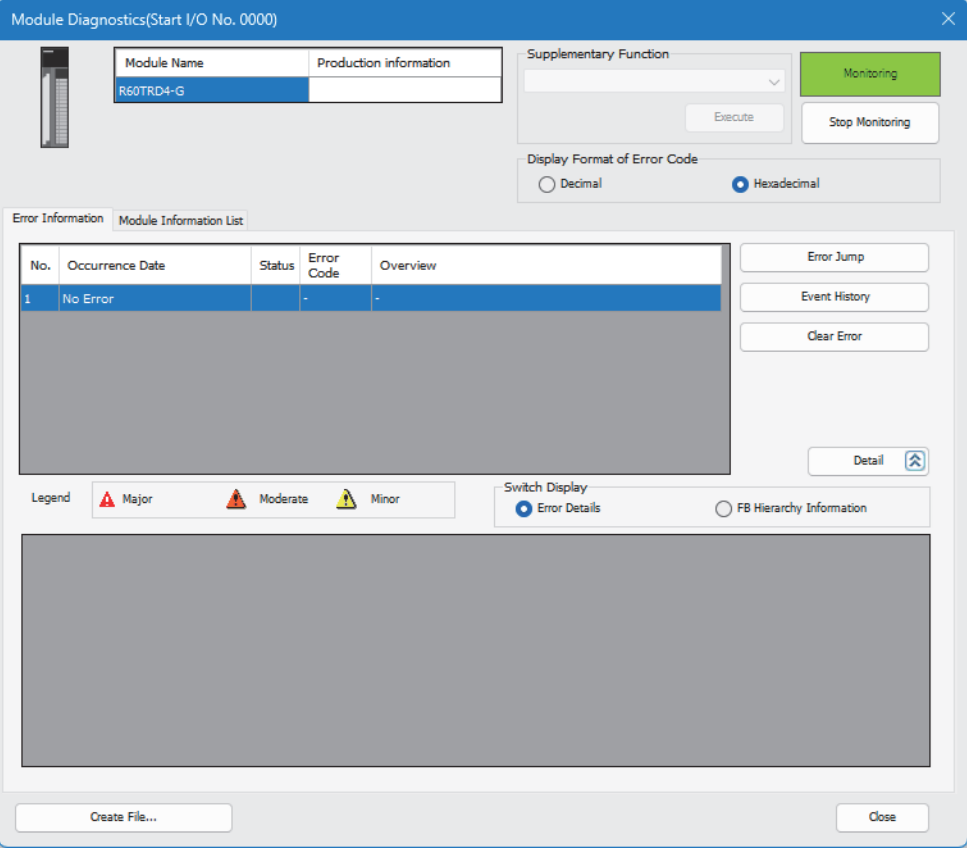
A state of a temperature input module can be checked with the RUN LED, ERR LED, and ALM LED. For the relation between these LEDs and the state of the temperature input module, refer to the following.

📖 Page 24 PART NAMES

11.2 Checking the State of the Module

Open the module diagnostics window of the engineering tool to check the error codes of a temperature input module.

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



Alarm codes, error history, alarm history, and other information can be checked with the event history window of the engineering tool.

[Diagnostics] ⇒ [System Monitor] ⇒ [Event History] button

Event History(CPU (PLC No. 1) Start I/O No. 3E00)

Refresh(U)

Number of Events:54

Refine(D)

Refine

Match All the Conditions

Match Any One of the Conditions

1. Event Type

Including Next

2.

3.

Start Refine

Clear Refine Conditions

No.	Occurrence Date	Event Type	Status	Event Code	Overview	Source	Start I/O No.
00001	2025/10/14 16:03:29.639	System		H00A00	CH1 Disconnection detection	R60TRD4-G	0000
00002	2025/10/14 16:03:28.478	Operation		H24100	Operating status change (RUN)	R04CPU	3E00
00003	2025/10/14 16:02:46.333	Operation		H24101	Operating status change (STOP)	R04CPU	3E00
00004	2025/10/14 16:02:45.305	System		H00400	Power-on and reset	R04CPU	3E00
00005	2025/10/14 16:02:43.497	System		H01000	Power shutoff	R04CPU	3E00
00006	2025/10/14 16:02:38.646	Operation		H24001	Remote operation request accepted	R04CPU	3E00
00007	2025/10/14 16:02:34.562	Operation		H24200	Creation of new folders, writes to files/folders	R04CPU	3E00
00008	2025/10/14 16:02:33.722	Operation		H24001	Remote operation request accepted	R04CPU	3E00

Legend

Major

Moderate

Minor

Warning

Information

Jump

Clear All

Detailed Information

Digital output value (32 bits)

-

-

-252500

-

-

Cause

A disconnection has been detected in CH1.

Corrective Action

After connection is restored, and then turn on and off Error clear request (YF). As a result, the corresponding bit of Disconnection detection flag and Disconnection detection signal (XC) turn off, and an alarm cord of "Latest alarm code" is cleared.

Create File...

Close

11

11 TROUBLESHOOTING PROCEDURE
11.2 Checking the State of the Module

135

12 TROUBLESHOOTING BY SYMPTOM

12.1 The RUN LED Flashes or Turns Off

When flashing

Check item	Action
Check whether the module is selected as the target of online module change.	Turn on the module selection cancellation request flag (SM1615).

When it is off

Check item	Action
Check whether the power is supplied.	Check that the supply voltage of the power supply module is within the rated range.
Check whether the capacity of the power supply module is enough.	Calculate the current consumption of mounted modules, such as the CPU module, I/O modules, and intelligent function modules to check that the power capacity is enough.
Check whether the module is mounted properly.	Check the mounting state of the module.
Check whether module change during online module change is possible.	Perform the online module change. For details, refer to the following manual. 📖 MELSEC iQ-R Online Module Change Manual
Cases other than the above	Reset the CPU module, and check that 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.

12.2 The ERR LED Turns On

Check item	Action
Check whether any error has occurred.	Check 'Latest error code' (Un\G0) and take actions described in the list of error codes. 📖 Page 140 LIST OF ERROR CODES

12.3 The ALM LED Turns On or Flashes

When it is on

Check item	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 143 LIST OF ALARM CODES

When flashing

Check item	Action
Check whether disconnection has occurred.	The resistance temperature detector, thermocouple, compensation lead wire, micro voltage signal line, or resistor may be disconnected. Check 'Disconnection detection flag' (Un\G41). Take actions described in the list of alarm codes. 📖 Page 143 LIST OF ALARM CODES
Check whether Conversion enable (0) is set in CH□ Conversion enable/disable setting of a channel that will not be wired.	Check whether Conversion enable (0) is set in CH□ Conversion enable/disable setting of a channel that will not be wired. If enabled, use the engineering tool or a program to set Conversion disable (1).

12.4 Digital Output Values Cannot Be Read

Check item	Action
Check whether a failure such as detachment or disconnection of an analog signal line has occurred.	<p>■Resistance temperature detector Eliminate the cause of disconnection, by replacing the resistance temperature detector for instance, and check CH□ Digital output value (32-bit) or CH□ Digital output value.</p> <p>■Thermocouple Eliminate the cause of disconnection, by replacing the thermocouple or compensation lead wire for instance, and check CH□ Digital output value. Eliminate the cause of disconnection, by replacing the cold junction compensation resistor (RTD) for instance, and check CH□ Digital output value.</p> <p>■Micro voltage Eliminate the cause of disconnection, by replacing the micro voltage signal line for instance, and check CH□ Digital output value.</p> <p>■Resistor Eliminate the cause of disconnection, by replacing wires to the resistor for instance, and check CH□ Digital output value.</p>
Check whether the terminal block is detached.	Securely fit the terminal block to the temperature input module.
Check whether the connected terminals are the correct ones.	Check whether the wiring is appropriate to the input type by referring to the external wiring examples.  Page 34 External wiring examples
Check whether the CPU module is in the STOP state.	Change the state of the CPU module to RUN.
Check whether the input type and input range settings are correct.	Check the input type and input range set in CH□ Range setting monitor (Input type setting). If the input type or input range setting is incorrect, use the engineering tool or a program to correct the setting of CH□ Range setting (Input type setting).
<p>■Resistance temperature detector Check whether the resistance temperature detector is correctly connected.</p>	Correctly connect the resistance temperature detector to the module. The following is the check point. <ul style="list-style-type: none"> • A shielded cable for the used channel is grounded or not.
<p>■Thermocouple Check whether the thermocouple and compensation lead wire are correctly connected.</p>	Correctly connect the thermocouple and compensation lead wire to the module. The following are the check points. <ul style="list-style-type: none"> • A shielded cable for the used channel is grounded or not. • The thermocouple and compensation lead wire are reversely connected or not.
<p>■Micro voltage Check whether the micro voltage signal line is correctly connected.</p>	Correctly connect the micro voltage signal line to the module. The following is the check point. <ul style="list-style-type: none"> • A shielded cable for the used channel is grounded or not.
<p>■Resistor Check whether the resistor is correctly connected.</p>	Correctly connect the resistor to the module. The following is the check point. <ul style="list-style-type: none"> • A shielded cable for the used channel is grounded or not.
Check whether Conversion disable (1) is set in CH□ Conversion enable/disable setting of the channel to be used.	Use the engineering tool to check CH□ Conversion enable/disable setting of the channel to be used. If the setting is incorrect, use the engineering tool or a program to set CH□ Conversion enable/disable setting to Conversion enable (0).
Check whether 'Operating condition setting request' (Y9) has been executed.	Check that the digital output value is stored in CH□ Digital output value by turning on and off 'Operating condition setting request' (Y9)*1 with the engineering tool. If the stored value is correct, check the program to verify the description of 'Operating condition setting request' (Y9).
Check whether the buffer memory address that reads the digital output value is correct.	CH□ Digital output value (32-bit) may have been read while the input type is specified as thermocouple, micro voltage, or resistor. When the input type is specified as thermocouple, micro voltage, or resistor, read CH□ Digital output value. CH□ Digital output value (32-bit) is not updated unless the input type is specified as resistance temperature detector. When the input type is specified as resistance temperature detector, read CH□ Digital output value to obtain the temperature in units of 0.1°C, and read CH□ Digital output value (32-bit) to obtain the temperature in units of 0.001°C.
Check whether the program to read digital output values is correct.	Use the engineering tool to check CH□ Digital output value and CH□ Digital output value (32-bit). If the digital output value is stored as it is input, review the read program.

*1 The conversion does not start when 'Operating condition setting request' (Y9) is on. After turning on this signal (Y9), check that 'Operating condition setting completed flag' (X9) is off, and then turn off the signal (Y9).

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

12.5 Digital Output Values Are Not Converted to the Expected Values

Check item	Action
Check whether measures to reduce noise are being taken.	Use a shielded cable for connection. Also, check the grounding and influence from adjacent devices, and take measures to reduce noise.
Check whether the input type and input range settings are correct.	Check the input type and input range set in CH□ Range setting monitor (Input type setting). If the input type or input range setting is incorrect, use the engineering tool or a program to correct the setting of CH□ Range setting (Input type setting).
Check whether the conversion method setting is correct.	Use the engineering tool to check whether CH□ Averaging process specification is set to the correct conversion method. If the conversion method is incorrect, use the engineering tool or a program to correct the setting of CH□ Averaging process specification. In addition, if the digital output value fluctuates, review the settings as shown below. <ul style="list-style-type: none"> Set CH□ Averaging process specification to a value other than Sampling processing (0). Review the set contents of CH□ Time average/Count average/Moving average/Primary delay filter constant setting.
<p>■Resistance temperature detector</p> <p>Check whether the terminal block converter module and dedicated cable are used.</p>	When the input type is set to resistance temperature detector, use the standard terminal block.
<p>■Resistance temperature detector</p> <p>Check whether the RTD input has noise interference.</p>	Use a shielded cable for connection and ground the shield cable of each channel. Also, check the influence from neighboring devices, and take measures to reduce noise.
<p>■Resistance temperature detector</p> <p>Check whether the wiring resistance value is large when the RTD input is used. Alternatively, check whether the wiring length matches the distance.</p>	As shown in the external wiring examples, increasing the resistance value of each wiring increases the risk of an accuracy error.  Page 34 External wiring examples Shorten the wiring length by means such as installing the module near the subject of temperature measurement to reduce the wiring resistance value.
<p>■Resistance temperature detector</p> <p>Check whether the buffer memory area from which the measured temperature value is referred is correct.</p>	To refer to the measured temperature value in units of 0.1°C, use CH□ Digital output value. To refer to the measured temperature value in units of 0.001°C, use CH□ Digital output value (32-bit).
<p>■Thermocouple</p> <p>Check whether the cold junction compensation setting is correct.</p>	Use the engineering tool to check 'Cold junction compensation setting status' (UnlG61). When performing the cold junction compensation using a cold junction compensation resistor (RTD), set "Cold junction compensation setting" of Module Parameter to "With cold junction compensation (standard terminal block)" or "With cold junction compensation (terminal block converter module)" according to the terminal block in use. When performing the cold junction compensation using an external method, set "Without cold junction temperature compensation".
<p>■Thermocouple</p> <p>Check whether the thermocouple input has noise interference.</p>	Use a shielded compensation lead wire for connection and ground the shielded compensation lead wire of each channel. Also, check the influence from adjacent devices and take measures to reduce noise.
<p>■Thermocouple</p> <p>Check whether a heat-generating object is beside the module when cold junction compensation is enabled and thermocouple input is being used.</p>	Cold junction compensation with the cold junction compensation resistor (RTD) is based on the temperature at the location where the cold junction compensation resistor (RTD) of the terminal block is connected. Therefore, the temperature distribution of the terminal block becomes uneven due to the effects of module heat production, depending on the system configuration, which can increase the measured temperature errors.  Page 44 Precautions for System Configuration

Check item	Action
■Thermocouple Check whether an external disturbance that causes a sudden temperature change is beside the module when the cold junction compensation is enabled and thermocouple input is used. For example, check whether air is blowing on the module.	The temperature of the module is measured based on the temperature of the terminal block. Therefore, eliminate any disturbance that makes the temperature of the terminal block unstable or uneven.
■Micro voltage Check whether the terminal block converter module and dedicated cable are used.	When the input type is set to micro voltage, use the standard terminal block.
■Micro voltage Check whether the effect of errors due to the wiring resistance is large.	Check the wiring resistance value and calculate the error of the system. If the error is large, it may impact the micro voltage conversion value.  Page 239 Offset/Gain Correction Using the Shift Function and Scaling Function
■Resistor Check whether the terminal block converter module and dedicated cable are used.	When the input type is set to resistor, use the standard terminal block.
■Resistor Check whether the effect of errors due to the wiring resistance is large.	Check the wiring resistance value and calculate the error of the system. If the error is large, it may impact the digital output value.
Check whether the buffer memory address that reads the digital output value is correct.	CH□ Digital output value (32-bit) may have been read while the input type is specified as thermocouple, micro voltage, or resistor. When the input type is specified as thermocouple, micro voltage, or resistor, read CH□ Digital output value. CH□ Digital output value (32-bit) is not updated unless the input type is specified as resistance temperature detector. When the input type is specified as resistance temperature detector, read CH□ Digital output value to obtain the temperature in units of 0.1°C, and read CH□ Digital output value (32-bit) to obtain the temperature in units of 0.001°C.
Check whether the program to read digital output values is correct.	Use the engineering tool to check CH□ Digital output value and CH□ Digital output value (32-bit). If the digital output value is stored as it is input, review the read program.

Point

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

12.6 Conversion Completed Flag Does Not Turn On

Check item	Action
Check whether all channels are set to be conversion disabled.	Check CH□ Conversion enable/disable setting of all channels. If a channel where the conversion is enabled does not exist, set "Conversion enable/disable setting" of Module Parameter to "Conversion enable".
■Thermocouple Check whether the cold junction compensation resistor (RTD) is disconnected.	Eliminate the cause of disconnection, by replacing the cold junction compensation resistor (RTD) for instance, and check CH□ Digital output value.

Point

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

13 LIST OF ERROR CODES

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

Error codes of a temperature input module are classified in minor errors or moderate errors.

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

□: This symbol indicates the number of the channel where an error has occurred. A numerical value of 0 to 3 is used to correspond to CH1 to CH4.

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

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

Error code (Hex)	Error name	Description and cause	Action
0000H	—	There is no error.	—
180△H	Interrupt factor generation setting range error	A value other than 0 to 1 is set in Interrupt factor generation setting [n]. △ indicates the interrupt setting related to the error as below: Setting 1: 0, Setting 2: 1, Setting 3: 2, Setting 4: 3, Setting 5: 4, Setting 6: 5, Setting 7: 6, Setting 8: 7, Setting 9: 8, Setting 10: 9, Setting 11: A, Setting 12: B, Setting 13: C, Setting 14: D, Setting 15: E, Setting 16: F	Set 0 or 1 in Interrupt factor generation setting [n].
181△H	Condition target setting range error	A value other than 0 to 7 is set in Condition target setting [n]. △ indicates the interrupt setting related to the error as below: Setting 1: 0, Setting 2: 1, Setting 3: 2, Setting 4: 3, Setting 5: 4, Setting 6: 5, Setting 7: 6, Setting 8: 7, Setting 9: 8, Setting 10: 9, Setting 11: A, Setting 12: B, Setting 13: C, Setting 14: D, Setting 15: E, Setting 16: F	Set a value of 0 to 7 in Condition target setting [n].
182△H	Condition target channel setting range error	A value other than 0 to 4 is set in Condition target channel setting [n]. △ indicates the interrupt setting related to the error as below: Setting 1: 0, Setting 2: 1, Setting 3: 2, Setting 4: 3, Setting 5: 4, Setting 6: 5, Setting 7: 6, Setting 8: 7, Setting 9: 8, Setting 10: 9, Setting 11: A, Setting 12: B, Setting 13: C, Setting 14: D, Setting 15: E, Setting 16: F	Set a value of 0 to 4 in Condition target channel setting [n].
190□H	Range setting (input type setting) range error	A value out of the range is set in CH□ Range setting (Input type setting).	Set a value within the possible range in CH□ Range setting (Input type setting).
191□H	Averaging process specification setting range error	A value other than 0 to 4 is set in CH□ Averaging process specification.	Set a value of 0 to 4 in CH□ Averaging process specification.
192□H	Time average setting range error	When Time average is selected in CH□ Averaging process specification, a value other than 160 to 5000 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.	Set a value of 160 to 5000 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.
193□H	Count average setting range error	When Count average is selected in CH□ Averaging process specification, a value other than 4 to 500 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.	Set a value of 4 to 500 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.
194□H	Moving average setting range error	When Moving average is selected in CH□ Averaging process specification, a value other than 2 to 200 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.	Set a value of 2 to 200 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.

Error code (Hex)	Error name	Description and cause	Action
195□H	Primary delay filter constant setting range error	When Primary delay filter is selected in CH□ Averaging process specification, a value other than 1 to 500 is set in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.	Set a value of 1 to 500 in CH□ Time average/Count average/Moving average/Primary delay filter constant setting.
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.
1A3□H	Scaling setting range error	<p>■When the input type is thermocouple, micro voltage, or resistor</p> <ul style="list-style-type: none"> The values satisfying the following condition are set in CH□ Scaling range lower limit value and CH□ Scaling range upper limit value. Scaling range lower limit value = Scaling range upper limit value The values satisfying the following condition are set in CH□ Scaling width lower limit value and CH□ Scaling width upper limit value. Scaling width lower limit value = Scaling width upper limit value 	<p>■When the input type is thermocouple, micro voltage, or resistor</p> <ul style="list-style-type: none"> Set the values satisfying the following condition in CH□ Scaling range lower limit value and CH□ Scaling range upper limit value. Scaling range lower limit value ≠ Scaling range upper limit value Set the values satisfying the following condition in CH□ Scaling width lower limit value and CH□ Scaling width upper limit value. Scaling width lower limit value ≠ Scaling width upper limit value
		<p>■When the input type is RTD</p> <ul style="list-style-type: none"> The values satisfying the following condition are set in CH□ Scaling range lower limit value (32-bit) and CH□ Scaling range upper limit value (32-bit). Scaling range lower limit value = Scaling range upper limit value The values satisfying the following condition are set in CH□ Scaling width lower limit value (32-bit) and CH□ Scaling width upper limit value (32-bit). Scaling width lower limit value = Scaling width upper limit value 	<p>■When the input type is RTD</p> <ul style="list-style-type: none"> Set the values satisfying the following condition in CH□ Scaling range lower limit value (32-bit) and CH□ Scaling range upper limit value (32-bit). Scaling range lower limit value ≠ Scaling range upper limit value Set the values satisfying the following condition in CH□ Scaling width lower limit value (32-bit) and CH□ Scaling width upper limit value (32-bit). Scaling width lower limit value ≠ Scaling width upper limit value
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	<p>■When the input type is thermocouple, micro voltage, or resistor</p> <p>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 4: The process alarm lower lower limit value is below the measuring range. 5: The process alarm upper upper limit exceeds the measuring range.</p>	<p>■When the input type is thermocouple, micro voltage, or resistor</p> <ul style="list-style-type: none"> 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 Set values within the measuring range in CH□ Process alarm lower lower limit value and CH□ Process alarm upper upper limit value.
		<p>■When the input type is RTD</p> <p>The values not satisfying the following condition are set in CH□ Process alarm upper upper limit value (32-bit) to CH□ Process alarm lower lower limit value (32-bit): 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 4: The process alarm lower lower limit value is below the measuring range. 5: The process alarm upper upper limit exceeds the measuring range.</p>	<p>■When the input type is RTD</p> <ul style="list-style-type: none"> Set CH□ Process alarm upper upper limit value (32-bit) to CH□ Process alarm lower lower limit value (32-bit) so that the values satisfy the following condition: Upper upper limit value ≥ Upper lower limit value ≥ Lower upper limit value ≥ Lower lower limit value Set values within the measuring range for process alarm lower lower limit value and process alarm upper upper limit value.

Error code (Hex)	Error name	Description and cause	Action
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	■When the input type is thermocouple, micro voltage, or resistor CH□ Rate alarm upper limit value and CH□ Rate alarm lower limit value are set as Lower limit value ≥ Upper limit value.	■When the input type is thermocouple, micro voltage, or resistor Set CH□ Rate alarm upper limit value and CH□ Rate alarm lower limit value as Lower limit value < Upper limit value.
		■When the input type is RTD CH□ Rate alarm upper limit value (32-bit) and CH□ Rate alarm lower limit value (32-bit) are set as Lower limit value ≥ Upper limit value.	■When the input type is RTD Set CH□ Rate alarm upper limit value (32-bit) and CH□ Rate alarm lower limit value (32-bit) as Lower limit value < Upper limit value.
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.
1CA0H	Cold junction compensation resistor disconnection detection error	Disconnection of a cold junction compensation resistor (RTD) has been detected.	Check wiring of the cold junction compensation resistor (RTD).
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 1000 is set in CH□ Post-trigger logging points.	Set a value of 1 to 1000 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.
1D8□H	Loading interrupt enable/disable setting range error	A value other than 0 and 1 is set in CH□ Loading interrupt enable/disable setting.	Set 0 or 1 in CH□ Loading interrupt enable/disable setting.
1D9□H	Logging read points setting value range error	A value other than 1 to 1000 is set in CH□ Logging read points setting value.	Set a value of 1 to 1000 in CH□ Logging read points setting value.
1F00H	Hardware failure (minor)	A hardware failure (minor) has occurred in the module.	The module may be affected by noise. Review and adjust the cable wiring and the installation environment of the programmable controllers. After the adjustment, turn on and off Error clear request (YF) to eliminate this error and resume the conversion. If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative.
1F1□H	Cold junction compensation resistor use prohibited error	When cold junction compensation is performed using a cold junction compensation resistor (RTD), the input range of the resistance temperature detector or resistor is set in CH1 Range setting (Input type setting).	When performing the cold junction compensation using a cold junction compensation resistor (RTD), set the input range of the thermocouple or micro voltage in CH1 Range setting (Input type setting).
3001H	Hardware failure (moderate)	A hardware failure (moderate) has occurred in the module.	Power off and 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.	Power off and on the module. If the error occurs again, the possible cause is a failure of the module. Please consult your local Mitsubishi representative.

14 LIST OF ALARM CODES

If an alarm occurs during operation, a temperature input module stores the alarm code into 'Latest alarm code' (Un\G2) of the buffer memory. Turning on 'Error clear request' (YF) clears the alarm code 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 3 is used to correspond to CH1 to CH4.

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

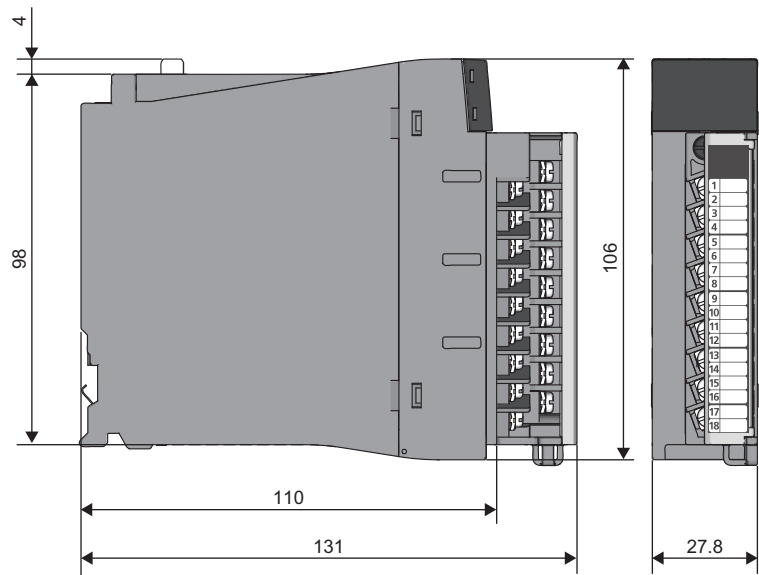
Alarm code (Hex)	Alarm name	Description and cause	Action
080□H	Process alarm (upper limit)	The process alarm (upper limit) has occurred in CH□.	■When the input type is thermocouple, micro voltage, or resistor Adjust CH□ Digital output value to fall within the range. As a result, the corresponding bit of CH□ Alert output flag (Process alarm upper limit) and/or CH□ Alert output flag (Process alarm lower limit), and Alert output signal (XD) turn off automatically.
081□H	Process alarm (lower limit)	The process alarm (lower limit) has occurred in CH□.	■When the input type is RTD Adjust CH□ Digital output value (32-bit) 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 (XD) turn off automatically.
082□H	Rate alarm (upper limit)	The rate alarm (upper limit) has occurred in CH□.	■When the input type is thermocouple, micro voltage, or resistor Adjust the change 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 (XD) turn off automatically.
083□H	Rate alarm (lower limit)	The rate alarm (lower limit) has occurred in CH□.	■When the input type is RTD Adjust the change in CH□ Digital output value (32-bit) 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 (XD) turn off automatically.
0A0□H	Disconnection detection	Disconnection has been detected in CH□.	Re-establish the connection and turn on and off Error clear request (YF). As a result, the corresponding bit of Disconnection detection flag and the Disconnection detection signal (XC) turn off, and the alarm code of 'Latest alarm code' (Un\G2) is cleared.

MEMO

APPENDICES

Appendix 1 External Dimensions

The following figure shows the external dimensions of a temperature input module.



(Unit: mm)

Appendix 2 Compliance with EMC and Low Voltage Directives

Method of ensuring compliance

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

-  MELSEC iQ-R Module Configuration Manual
-  Safety Guidelines (IB-0800525)

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

Additional measures

To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the following manuals.

-  MELSEC iQ-R Module Configuration Manual
-  Safety Guidelines (IB-0800525)

Appendix 3 Module Label

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

Module labels of I/O signals

The module label name of an I/O signal is defined with the following structure:

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

Ex.

R60TRDG_1.bModuleREADY

■Module name

The character string of a module model name is given.

■Module number

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

■Label name

The label identifier unique to a module is given.

■_D

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

Module labels of buffer memory areas

The module label name of a buffer memory area is defined with the following structure:

"Module name"_"Module number"."Data type"_D["(Channel)"]."Data format""Label name"_D

Ex.

R60TRDG_1.stnMonitor_D[0].wDigitalOutputValue_D

■Module name

The character string of a module model name is given.

■Module number

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

■Data type

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

Data type	Description
stnMonitor	Monitor
stnControl	Control
stnSetting	Setting

■Channel

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

■Data format

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

Data format	Description
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. A module label without the string is for the auto refresh. The following table shows the differences between the auto refresh and direct access.

Type	Description	Access timing	Example
Auto refresh	Values that are read from or written to the module label are reflected in the module collectively at the auto refresh. The run time of the program can be reduced. To use the auto refresh, set "Target" to "Module Label" in "Refresh settings" of the module parameter.	At auto refresh	R60TRDG_1.stnMonitor [0].wDigitalOutputValue
Direct access	Values that are read from or written to the module label are reflected in the module instantly. Compared with the auto refresh, the run time of the program becomes longer. However, the responsiveness is high. For the instruction processing time, refer to the following.  MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)	At reading/writing from/to the module label	R60TRDG_1.stnMonitor _D[0].wDigitalOutputValue_D

Appendix 4 I/O Signals

List of I/O signals

The following table lists the I/O signals of a temperature input module.

For details on the I/O signals, refer to the following.

☞ Page 150 Details of input signals

☞ Page 154 Details of output signals

Point

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

Input signal

Device number	Signal name
X0	Module READY
X1 to X8	Use prohibited
X9	Operating condition setting completed flag
XA, XB	Use prohibited
XC	Disconnection detection signal
XD	Alert output signal
XE	Conversion completed flag
XF	Error flag

Output signal

Device number	Signal name
Y0 to Y8	Use prohibited
Y9	Operating condition setting request
YA to YE	Use prohibited
YF	Error clear request

A

Details of input signals

The following describes the details of the input signals for a temperature input module which are assigned to the CPU module. The I/O numbers (X/Y) described in this section are for the case when the start I/O number of a temperature input module is set to 0.



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

☞ Page 155 Buffer Memory Areas

Module READY

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

In the following cases, 'Module READY' (X0) turns off.

- When a watchdog timer error occurs in the temperature input module (In this case, the conversion is not performed.)

■Device number

The following shows the device number of this input signal.

Signal name	CH1	CH2	CH3	CH4
Module READY	X0			

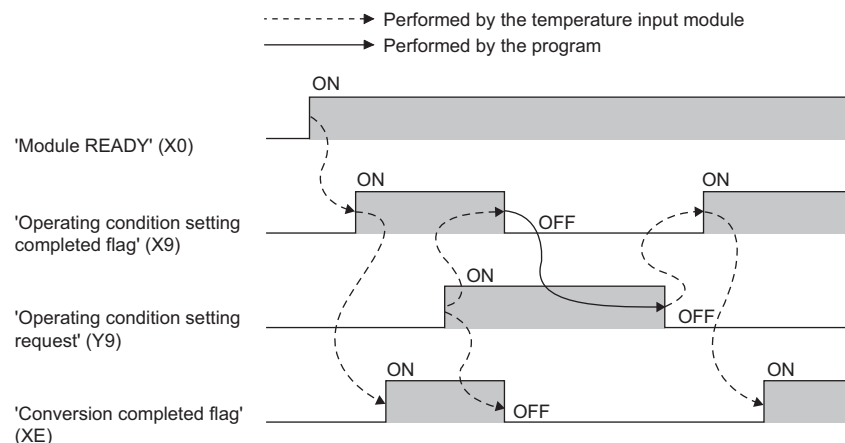
Operating condition setting completed flag

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

☞ Page 155 Buffer Memory Areas

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

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



■Device number

The following shows the device number of this input signal.

Signal name	CH1	CH2	CH3	CH4
Operating condition setting completed flag	X9			

Disconnection detection signal

■Turning on Disconnection detection signal (XC)

Disconnection detection signal (XC) turns on when disconnection is detected for the channel where Enable (0) is set in 'CH1 Disconnection detection enable/disable setting' (Un\G530) and the conversion is enabled.

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

- At the time of the disconnection detection, a value is stored in 'CH1 Digital output value' (Un\G400) according to the settings of 'CH1 Conversion setting at disconnection detection' (Un\G531) and 'CH1 Conversion setting value at disconnection detection' (Un\G532).
- A value is stored in 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411) according to the settings of 'CH1 Conversion setting at disconnection detection' (Un\G531) and 'CH1 Conversion setting value at disconnection detection (32-bit)' (Un\G582, Un\G583).
- The ALM LED flashes.

■Turning off Disconnection detection signal (XC)

The operations related to the turning off of 'Disconnection detection signal' (XC) vary depending on the setting of 'Disconnection detection automatic clear enable/disable setting' (Un\G303).

Setting of 'Disconnection detection automatic clear enable/disable setting' (Un\G303)	Operations related to the turning off of Disconnection detection signal (XC)
Enable (0)	When the cause of disconnection is eliminated and the connection of external devices is established, 'Disconnection detection signal' (XC) automatically turns off and the ALM LED turns off.
Disable (1)	<p>Turn on and off 'Error clear request' (YF) when the cause of disconnection is eliminated and the connection of external devices is established. Accordingly, 'Disconnection detection signal' (XC) turns off and the ALM LED turns off.</p> <div><div><div>-----> Performed by the temperature input module</div><div>-----> Performed by the program</div></div><div><div>'Disconnection detection flag' (Un\G41)</div><div>'Disconnection detection signal' (XC)</div><div>'Error clear request' (YF)</div></div><div><div><div>0</div><div>Disconnection detection</div><div>0</div></div><div><div>OFF</div><div>ON</div><div>OFF</div></div><div><div>OFF</div><div>ON</div><div>OFF</div></div></div></div>

■Device number

The following shows the device number of this input signal.

Signal name	CH1	CH2	CH3	CH4
Disconnection detection signal	XC			



Averaging processing starts over after the conversion resumes.

Alert output signal

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

■Process alarm

When the input type is thermocouple, micro voltage, or resistor

- The signal turns on when 'CH1 Digital output value' (Un\G400) is equal to or greater than the limit specified by 'CH1 Process alarm upper upper limit value' (Un\G514) or is equal to or less than the limit specified by '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.
- The signal turns off when the digital output value falls below the process alarm upper lower limit value or exceeds the process alarm lower upper limit value for all the channels where conversion is enabled. The ALM LED also turns off along with the off of the signal.

When the input type is RTD

- The signal turns on when 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411) is equal to or greater than the limit specified by 'CH1 Process alarm upper upper limit value (32-bit)' (Un\G568, Un\G569) or is equal to or less than the limit specified by 'CH1 Process alarm lower lower limit value (32-bit)' (Un\G574, Un\G575). 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.
- The signal turns off when the digital output value (32-bit) falls below the process alarm upper lower limit value (32-bit) or exceeds the process alarm lower upper limit value (32-bit) for all the channels where conversion is enabled. The ALM LED also turns off along with the off of the signal.

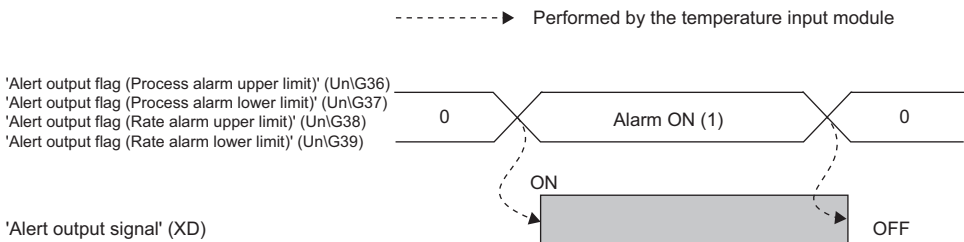
■Rate alarm

When the input type is thermocouple, micro voltage, or resistor

- The signal turns on when the change in 'CH1 Digital output value' (Un\G400) is equal to or greater than the change specified by 'CH1 Rate alarm upper limit value' (Un\G524) or is equal to or less than the change specified by '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.
- The signal turns off when the digital output value falls below the change specified by the rate alarm upper limit value or exceeds the change specified by the rate alarm lower limit value for all the channels where conversion is enabled. The ALM LED also turns off along with the off of the signal.

When the input type is RTD

- The signal turns on when the change of 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411) is equal to or greater than the change specified by 'CH1 Rate alarm upper limit value (32-bit)' (Un\G576, Un\G577) or is equal to or less than the change specified by 'CH1 Rate alarm lower limit value (32-bit)' (Un\G578, Un\G579). 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.
- The signal turns off when the digital output value (32-bit) falls below the change specified by the rate alarm upper limit value (32-bit) or exceeds the change specified by the rate alarm lower limit value (32-bit) for all the channels where conversion is enabled. The ALM LED also turns off along with the off of the signal.



■Device number

The following shows the device number of this input signal.

Signal name	CH1	CH2	CH3	CH4
Alert output signal	XD			

Conversion completed flag

Conversion completed flag (XE) turns on when the first conversion has been completed for all the channels where the conversion is enabled. When reading a digital output value, use this signal or 'Conversion completed flag' (Un\G42) as an interlock.

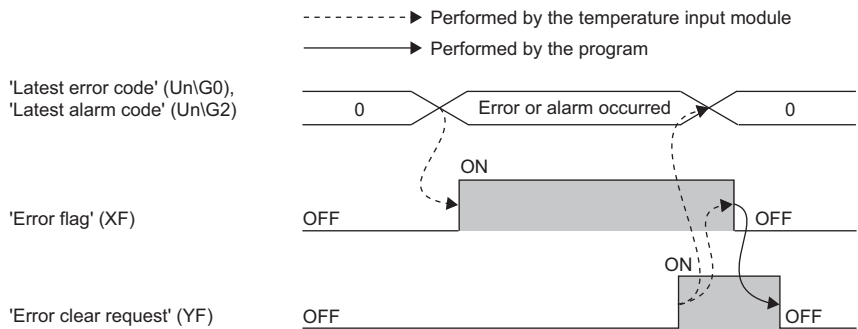
Device number

The following shows the device number of this input signal.

Signal name	CH1	CH2	CH3	CH4
Conversion completed flag	XE			

Error flag

'Error flag' (XF) turns on when an error has occurred.
Turn on and off 'Error clear request' (YF) to clear 'Latest error code' (Un\G0) and 'Latest alarm code' (Un\G2).



Device number

The following shows the device number of this input signal.

Signal name	CH1	CH2	CH3	CH4
Error flag	XF			

Details of output signals

The following describes the details of the output signals for a temperature input module which are assigned to the CPU module.

The I/O numbers (X/Y) described in this section are for the case when the start I/O number of a temperature input module is set to 0.



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

➞ Page 155 Buffer Memory Areas

Operating condition setting request

Turn on and off Operating condition setting request (Y9) to enable the settings of buffer memory areas.

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

➞ Page 150 Operating condition setting completed flag

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

➞ Page 155 Buffer Memory Areas

■Device number

The following shows the device number of this output signal.

Signal name	CH1	CH2	CH3	CH4
Operating condition setting request	Y9			

Error clear request

Turn on and off Error clear request (YF) to clear 'Error flag' (XF), 'Disconnection detection signal' (XC), 'Latest error code' (Un\G0), and 'Latest alarm code' (Un\G2).

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

- ➞ Page 151 Disconnection detection signal
- ➞ Page 153 Error flag

■Device number

The following shows the device number of this output signal.

Signal name	CH1	CH2	CH3	CH4
Error clear request	YF			

Appendix 5 Buffer Memory Areas

List of buffer memory areas

This section lists the buffer memory areas of the temperature input module. For details on the buffer memory, refer to the following.

 Page 173 Details of buffer memory addresses

The buffer memory areas of the temperature 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 the engineering tool or a program to set the data.
	When the setting is enabled	After a change of value, turning on and off 'Operating condition setting request' (Y9) allows the change to take effect.
Control data	Description	The data used for controlling the temperature input module.
	Read and write attributes	Read and write is possible.
	Setting procedure	Use the engineering tool or a program to set the data.
	When the setting is enabled	Upon a change of value, the set value becomes effective.
Monitor data	Description	The data used for checking the status of the temperature input module.
	Read and write attributes	Only read is possible and write is not possible. When data is written, proper operation cannot be guaranteed.
	Setting procedure	—
	When the setting is enabled	—

Point

Do not write data to the system areas and areas whose data type is monitor data in the buffer memory. Writing data into these areas can cause the malfunction of the module.

A

In R mode

■Un\G0 to Un\G399

Address (decimal)	Address (hexadecimal)	Name	Default value	Data type	Auto refresh
0	0H	Latest error code	0	Monitor	○
1	1H	Latest address of error history	0	Monitor	○
2	2H	Latest alarm code	0	Monitor	○
3	3H	Latest address of alarm history	0	Monitor	○
4 to 19	4H to 13H	Interrupt factor detection flag [n] ^{*1}	0	Monitor	○
20 to 35	14H to 23H	System area	—	—	—
36	24H	Alert output flag (Process alarm upper limit)	0000H	Monitor	○
37	25H	Alert output flag (Process alarm lower limit)	0000H	Monitor	○
38	26H	Alert output flag (Rate alarm upper limit)	0000H	Monitor	○
39	27H	Alert output flag (Rate alarm lower limit)	0000H	Monitor	○
40	28H	System area	—	—	—
41	29H	Disconnection detection flag	0000H	Monitor	○
42	2AH	Conversion completed flag	0000H	Monitor	○
43	2BH	System area	—	—	—
44	2CH	Measured temperature value of cold junction compensation resistor	0	Monitor	○
45 to 60	2DH to 3CH	System area	—	—	—
61	3DH	Cold junction compensation setting status	1	Monitor	×
62 to 89	3EH to 59H	System area	—	—	—
90	5AH	Level data 0	0	Control	○
91	5BH	Level data 1	0	Control	○
92	5CH	Level data 2	0	Control	○
93	5DH	Level data 3	0	Control	○
94	5EH	Level data 4	0	Control	○
95	5FH	Level data 5	0	Control	○
96	60H	Level data 6	0	Control	○
97	61H	Level data 7	0	Control	○
98	62H	Level data 8	0	Control	○
99	63H	Level data 9	0	Control	○
100 to 123	64H to 7BH	System area	—	—	—
124 to 139	7CH to 8BH	Interrupt factor mask [n] ^{*1}	0	Control	×
140 to 155	8CH to 9BH	System area	—	—	—
156 to 171	9CH to ABH	Interrupt factor reset request [n] ^{*1}	0	Control	×
172 to 199	ACH to C7H	System area	—	—	—
200 to 215	C8H to D7H	Interrupt factor generation setting [n] ^{*1}	0	Setting	×
216 to 231	D8H to E7H	System area	—	—	—
232 to 247	E8H to F7H	Condition target setting [n] ^{*1}	0	Setting	×
248 to 263	F8H to 107H	System area	—	—	—
264 to 279	108H to 117H	Condition target channel setting [n] ^{*1}	0	Setting	×
280 to 297	118H to 129H	System area	—	—	—
298	12AH	Cold junction compensation setting	0	Setting	×
299 to 302	12BH to 12EH	System area	—	—	—
303	12FH	Disconnection detection automatic clear enable/disable setting	1	Setting	×
304 to 399	130H to 18FH	System area	—	—	—

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

■Un\G400 to Un\G3599

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
400 (190H)	600 (258H)	800 (320H)	1000 (3E8H)	CH□ Digital output value	0	Monitor	○
401 (191H)	601 (259H)	801 (321H)	1001 (3E9H)	System area	—	—	—
402 (192H)	602 (25AH)	802 (322H)	1002 (3EAH)	CH□ digital operation value	0	Monitor	○
403 to 408 (193H to 198H)	603 to 608 (25BH to 260H)	803 to 808 (323H to 328H)	1003 to 1008 (3EBH to 3F0H)	System area	—	—	—
409 (199H)	609 (261H)	809 (329H)	1009 (3F1H)	CH□ Logging hold flag	0	Monitor	○
410 (19AH)	610 (262H)	810 (32AH)	1010 (3F2H)	CH□ Digital output value (32-bit) (L)	0	Monitor	○
411 (19BH)	611 (263H)	811 (32BH)	1011 (3F3H)	CH□ Digital output value (32-bit) (H)	0	Monitor	○
412 (19CH)	612 (264H)	812 (32CH)	1012 (3F4H)	CH□ digital operation value (32-bit) (L)	0	Monitor	○
413 (19DH)	613 (265H)	813 (32DH)	1013 (3F5H)	CH□ digital operation value (32-bit) (H)	0	Monitor	○
414 to 429 (19EH to 1ADH)	614 to 629 (266H to 275H)	814 to 829 (32EH to 33DH)	1014 to 1029 (3F6H to 405H)	System area	—	—	—
430 (1AEH)	630 (276H)	830 (33EH)	1030 (406H)	CH□ Range setting monitor (Input type setting)	0000H	Monitor	×
431 to 433 (1AFH to 1B1H)	631 to 633 (277H to 279H)	831 to 833 (33FH to 341H)	1031 to 1033 (407H to 409H)	System area	—	—	—
434 (1B2H)	634 (27AH)	834 (342H)	1034 (40AH)	CH□ Head pointer	0	Monitor	×
435 (1B3H)	635 (27BH)	835 (343H)	1035 (40BH)	CH□ Latest pointer	0	Monitor	×
436 (1B4H)	636 (27CH)	836 (344H)	1036 (40CH)	CH□ Number of logging data	0	Monitor	×
437 (1B5H)	637 (27DH)	837 (345H)	1037 (40DH)	CH□ Trigger pointer	0	Monitor	×
438 (1B6H)	638 (27EH)	838 (346H)	1038 (40EH)	CH□ Current logging read pointer	-1	Monitor	×
439 (1B7H)	639 (27FH)	839 (347H)	1039 (40FH)	CH□ Previous logging read pointer	-1	Monitor	×
440 (1B8H)	640 (280H)	840 (348H)	1040 (410H)	CH□ Logging read points monitor value	0	Monitor	×
441 (1B9H)	641 (281H)	841 (349H)	1041 (411H)	CH□ Logging cycle monitor value (s)	0	Monitor	×
442 (1BAH)	642 (282H)	842 (34AH)	1042 (412H)	CH□ Logging cycle monitor value (ms)	0	Monitor	×
443 (1BBH)	643 (283H)	843 (34BH)	1043 (413H)	System area	—	—	—
444 (1BCH)	644 (284H)	844 (34CH)	1044 (414H)	CH□ Trigger generation time (First/Last two digits of the year)	0	Monitor	×
445 (1BDH)	645 (285H)	845 (34DH)	1045 (415H)	CH□ Trigger generation time (Month/Day)	0	Monitor	×

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
446 (1BEH)	646 (286H)	846 (34EH)	1046 (416H)	CH□ Trigger generation time (Hour/Minute)	0	Monitor	×
447 (1BFH)	647 (287H)	847 (34FH)	1047 (417H)	CH□ Trigger generation time (Second/Day of the week)	0	Monitor	×
448 (1C0H)	648 (288H)	848 (350H)	1048 (418H)	CH□ Trigger generation time (Millisecond)	0	Monitor	×
449 (1C1H)	649 (289H)	849 (351H)	1049 (419H)	System area	—	—	—
451 to 470 (1C3H to 1D6H)	651 to 670 (28BH to 29EH)	851 to 870 (353H to 366H)	1051 to 1070 (41BH to 42EH)	System area	—	—	—
471 (1D7H)	671 (29FH)	871 (367H)	1071 (42FH)	CH□ Logging hold request	0	Control	○
472 (1D8H)	672 (2A0H)	872 (368H)	1072 (430H)	CH□ Conversion value shift amount	0	Control	○
473 (1D9H)	673 (2A1H)	873 (369H)	1073 (431H)	System area	—	—	—
474 (1DAH)	674 (2A2H)	874 (36AH)	1074 (432H)	CH□ Conversion value shift amount (32-bit) (L)	0	Control	○
475 (1DBH)	675 (2A3H)	875 (36BH)	1075 (433H)	CH□ Conversion value shift amount (32-bit) (H)	0	Control	○
476 to 499 (1DCH to 1F3H)	676 to 699 (2A4H to 2BBH)	876 to 899 (36CH to 383H)	1076 to 1099 (434H to 44BH)	System area	—	—	—
500 (1F4H)	700 (2BCH)	900 (384H)	1100 (44CH)	CH□ Conversion enable/disable setting	1	Setting	×
501 (1F5H)	701 (2BDH)	901 (385H)	1101 (44DH)	CH□ Averaging process specification	0	Setting	×
502 (1F6H)	702 (2BEH)	902 (386H)	1102 (44EH)	CH□ Time average/Count average/Moving average/Primary delay filter constant setting	0	Setting	×
503 to 511 (1F7H to 1FFH)	703 to 711 (2BFH to 2C7H)	903 to 911 (387H to 38FH)	1103 to 1111 (44FH to 457H)	System area	—	—	—
512 (200H)	712 (2C8H)	912 (390H)	1112 (458H)	CH□ Alert output setting (Process alarm)	1	Setting	×
513 (201H)	713 (2C9H)	913 (391H)	1113 (459H)	CH□ Alert output setting (Rate alarm)	1	Setting	×
514 (202H)	714 (2CAH)	914 (392H)	1114 (45AH)	CH□ Process alarm upper upper limit value	12000	Setting	×
515 (203H)	715 (2CBH)	915 (393H)	1115 (45BH)	System area	—	—	—
516 (204H)	716 (2CCH)	916 (394H)	1116 (45CH)	CH□ Process alarm upper lower limit value	12000	Setting	×
517 (205H)	717 (2CDH)	917 (395H)	1117 (45DH)	System area	—	—	—
518 (206H)	718 (2CEH)	918 (396H)	1118 (45EH)	CH□ Process alarm lower upper limit value	-2000	Setting	×
519 (207H)	719 (2CFH)	919 (397H)	1119 (45FH)	System area	—	—	—
520 (208H)	720 (2D0H)	920 (398H)	1120 (460H)	CH□ Process alarm lower lower limit value	-2000	Setting	×
521 (209H)	721 (2D1H)	921 (399H)	1121 (461H)	System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
522 (20AH)	722 (2D2H)	922 (39AH)	1122 (462H)	CH□ Rate alarm alert detection cycle setting	0	Setting	×
523 (20BH)	723 (2D3H)	923 (39BH)	1123 (463H)	System area	—	—	—
524 (20CH)	724 (2D4H)	924 (39CH)	1124 (464H)	CH□ Rate alarm upper limit value	0	Setting	×
525 (20DH)	725 (2D5H)	925 (39DH)	1125 (465H)	System area	—	—	—
526 (20EH)	726 (2D6H)	926 (39EH)	1126 (466H)	CH□ Rate alarm lower limit value	0	Setting	×
527 to 529 (20FH to 211H)	727 to 729 (2D7H to 2D9H)	927 to 929 (39FH to 3A1H)	1127 to 1129 (467H to 469H)	System area	—	—	—
530 (212H)	730 (2DAH)	930 (3A2H)	1130 (46AH)	CH□ Disconnection detection enable/disable setting	0	Setting	×
531 (213H)	731 (2DBH)	931 (3A3H)	1131 (46BH)	CH□ Conversion setting at disconnection detection	1	Setting	×
532 (214H)	732 (2DCH)	932 (3A4H)	1132 (46CH)	CH□ Conversion setting value at disconnection detection	0	Setting	×
533, 534 (215H, 216H)	733, 734 (2DDH, 2DEH)	933, 934 (3A5H, 3A6H)	1133, 1134 (46DH, 46EH)	System area	—	—	—
535 (217H)	735 (2DFH)	935 (3A7H)	1135 (46FH)	CH□ Logging enable/disable setting	1	Setting	×
536 (218H)	736 (2E0H)	936 (3A8H)	1136 (470H)	CH□ Logging data setting	0	Setting	×
537 (219H)	737 (2E1H)	937 (3A9H)	1137 (471H)	CH□ Logging cycle setting value	40	Setting	×
538 (21AH)	738 (2E2H)	938 (3AAH)	1138 (472H)	CH□ Logging cycle unit setting	1	Setting	×
539 (21BH)	739 (2E3H)	939 (3ABH)	1139 (473H)	CH□ Post-trigger logging points	500	Setting	×
540 (21CH)	740 (2E4H)	940 (3ACH)	1140 (474H)	CH□ Level trigger condition setting	0	Setting	×
541 (21DH)	741 (2E5H)	941 (3ADH)	1141 (475H)	CH□ Trigger data	*1	Setting	×
542 (21EH)	742 (2E6H)	942 (3AEH)	1142 (476H)	CH□ Trigger setting value	0	Setting	×
543 (21FH)	743 (2E7H)	943 (3AFH)	1143 (477H)	System area	—	—	—
544 (220H)	744 (2E8H)	944 (3B0H)	1144 (478H)	CH□ Loading interrupt enable/disable setting	1	Setting	×
545 (221H)	745 (2E9H)	945 (3B1H)	1145 (479H)	CH□ Logging read points setting value	100	Setting	×
546 (222H)	746 (2EAH)	946 (3B2H)	1146 (47AH)	CH□ Scaling enable/disable setting	1	Setting	×
547 (223H)	747 (2EBH)	947 (3B3H)	1147 (47BH)	System area	—	—	—
548 (224H)	748 (2ECH)	948 (3B4H)	1148 (47CH)	CH□ Scaling range upper limit value	0	Setting	×
549 (225H)	749 (2EDH)	949 (3B5H)	1149 (47DH)	System area	—	—	—
550 (226H)	750 (2EEH)	950 (3B6H)	1150 (47EH)	CH□ Scaling range lower limit value	0	Setting	×
551 (227H)	751 (2EFH)	951 (3B7H)	1151 (47FH)	System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
552 (228H)	752 (2F0H)	952 (3B8H)	1152 (480H)	CH□ Scaling width upper limit value	0	Setting	×
553 (229H)	753 (2F1H)	953 (3B9H)	1153 (481H)	System area	—	—	—
554 (22AH)	754 (2F2H)	954 (3BAH)	1154 (482H)	CH□ Scaling width lower limit value	0	Setting	×
555 to 567 (22BH to 237H)	755 to 767 (2F3H to 2FFH)	955 to 967 (3BBH to 3C7H)	1155 to 1167 (483H to 48FH)	System area	—	—	—
568 (238H)	768 (300H)	968 (3C8H)	1168 (490H)	CH□ Process alarm upper upper limit value (32-bit) (L)	850000	Setting	×
569 (239H)	769 (301H)	969 (3C9H)	1169 (491H)	CH□ Process alarm upper upper limit value (32-bit) (H)	850000	Setting	×
570 (23AH)	770 (302H)	970 (3CAH)	1170 (492H)	CH□ Process alarm upper lower limit value (32-bit) (L)	850000	Setting	×
571 (23BH)	771 (303H)	971 (3CBH)	1171 (493H)	CH□ Process alarm upper lower limit value (32-bit) (H)	850000	Setting	×
572 (23CH)	772 (304H)	972 (3CCH)	1172 (494H)	CH□ Process alarm lower upper limit value (32-bit) (L)	-200000	Setting	×
573 (23DH)	773 (305H)	973 (3CDH)	1173 (495H)	CH□ Process alarm lower upper limit value (32-bit) (H)	-200000	Setting	×
574 (23EH)	774 (306H)	974 (3CEH)	1174 (496H)	CH□ Process alarm lower lower limit value (32-bit) (L)	-200000	Setting	×
575 (23FH)	775 (307H)	975 (3CFH)	1175 (497H)	CH□ Process alarm lower lower limit value (32-bit) (H)	-200000	Setting	×
576 (240H)	776 (308H)	976 (3D0H)	1176 (498H)	CH□ Rate alarm upper limit value (32-bit) (L)	0	Setting	×
577 (241H)	777 (309H)	977 (3D1H)	1177 (499H)	CH□ Rate alarm upper limit value (32-bit) (H)	0	Setting	×
578 (242H)	778 (30AH)	978 (3D2H)	1178 (49AH)	CH□ Rate alarm lower limit value (32-bit) (L)	0	Setting	×
579 (243H)	779 (30BH)	979 (3D3H)	1179 (49BH)	CH□ Rate alarm lower limit value (32-bit) (H)	0	Setting	×
580, 581 (244H, 245H)	780, 781 (30CH, 30DH)	980, 981 (3D4H, 3D5H)	1180, 1181 (49CH, 49DH)	System area	—	—	—
582 (246H)	782 (30EH)	982 (3D6H)	1182 (49EH)	CH□ Conversion setting value at disconnection detection (32-bit) (L)	0	Setting	×
583 (247H)	783 (30FH)	983 (3D7H)	1183 (49FH)	CH□ Conversion setting value at disconnection detection (32-bit) (H)	0	Setting	×
584, 585 (248H, 249H)	784, 785 (310H, 311H)	984, 985 (3D8H, 3D9H)	1184, 1185 (4A0H, 4A1H)	System area	—	—	—
586 (24AH)	786 (312H)	986 (3DAH)	1186 (4A2H)	CH□ Scaling range upper limit value (32-bit) (L)	0	Setting	×
587 (24BH)	787 (313H)	987 (3DBH)	1187 (4A3H)	CH□ Scaling range upper limit value (32-bit) (H)	0	Setting	×
588 (24CH)	788 (314H)	988 (3DCH)	1188 (4A4H)	CH□ Scaling range lower limit value (32-bit) (L)	0	Setting	×
589 (24DH)	789 (315H)	989 (3DDH)	1189 (4A5H)	CH□ Scaling range lower limit value (32-bit) (H)	0	Setting	×
590 (24EH)	790 (316H)	990 (3DEH)	1190 (4A6H)	CH□ Scaling width upper limit value (32-bit) (L)	0	Setting	×
591 (24FH)	791 (317H)	991 (3DFH)	1191 (4A7H)	CH□ Scaling width upper limit value (32-bit) (H)	0	Setting	×

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
592 (250H)	792 (318H)	992 (3E0H)	1192 (4A8H)	CH□ Scaling width lower limit value (32-bit) (L)	0	Setting	×
593 (251H)	793 (319H)	993 (3E1H)	1193 (4A9H)	CH□ Scaling width lower limit value (32-bit) (H)	0	Setting	×
594 to 597 (252H to 255H)	794 to 797 (31AH to 31DH)	994 to 997 (3E2H to 3E5H)	1194 to 1197 (4AAH to 4ADH)	System area	—	—	—
598 (256H)	798 (31EH)	998 (3E6H)	1198 (4AEH)	CH□ Range setting (Input type setting)	0000H	Setting	×
599 (257H)	799 (31FH)	999 (3E7H)	1199 (4AFH)	System area	—	—	—
1200 to 3599 (4B0H to E0FH)				System area	—	—	—

*1 The following shows the default values.

CH1: 400, CH2: 600, CH3: 800, CH4: 1000

■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							
			Millisecond					
3606 to 3609	E16H to E19H	System area				—	—	—
3610 to 3619	E1AH to E23H	Error history 2	Same as error history 1			0	Monitor	×
3620 to 3629	E24H to E2DH	Error history 3						
3630 to 3639	E2EH to E37H	Error history 4						
3640 to 3649	E38H to E41H	Error history 5						
3650 to 3659	E42H to E4BH	Error history 6						
3660 to 3669	E4CH to E55H	Error history 7						
3670 to 3679	E56H to E5FH	Error history 8						
3680 to 3689	E60H to E69H	Error history 9						
3690 to 3699	E6AH to E73H	Error history 10						
3700 to 3709	E74H to E7DH	Error history 11						
3710 to 3719	E7EH to E87H	Error history 12						
3720 to 3729	E88H to E91H	Error history 13						
3730 to 3739	E92H to E9BH	Error history 14						
3740 to 3749	E9CH to EA5H	Error history 15						
3750 to 3759	EA6H to EAFH	Error history 16						

■Alarm history (Un\G3760 to Un\G9999)

Address (decimal)	Address (hexadecimal)	Name				Default value	Data type	Auto refresh
3760	EB0H	Alarm history 1	Alarm code			0	Monitor	×
3761	EB1H		Alarm time	First two digits of the year	Last two digits of the year			
3762	EB2H							
3763	EB3H							
3764	EB4H							
3765	EB5H							
			Month		Day			
			Hour		Minute			
			Second		Day of the week			
			Millisecond					
3766 to 3769	EB6H to EB9H	System area				—	—	—
3770 to 3779	EBAH to EC3H	Alarm history 2	Same as alarm history 1			0	Monitor	×
3780 to 3789	EC4H to ECDH	Alarm history 3						
3790 to 3799	ECEH to ED7H	Alarm history 4						
3800 to 3809	ED8H to EE1H	Alarm history 5						
3810 to 3819	EE2H to EEBH	Alarm history 6						
3820 to 3829	EECH to EF5H	Alarm history 7						
3830 to 3839	EF6H to EFFH	Alarm history 8						
3840 to 3849	F00H to F09H	Alarm history 9						
3850 to 3859	F0AH to F13H	Alarm history 10						
3860 to 3869	F14H to F1DH	Alarm history 11						
3870 to 3879	F1EH to F27H	Alarm history 12						
3880 to 3889	F28H to F31H	Alarm history 13						
3890 to 3899	F32H to F3BH	Alarm history 14						
3900 to 3909	F3CH to F45H	Alarm history 15						
3910 to 3919	F46H to F4FH	Alarm history 16						
3920 to 9999	F50H to 270FH	System area						

■Logging data (Un\G10000 to Un\G17999)

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
10000 to 10999 (2710H to 2AF7H)	11000 to 11999 (2AF8H to 2EDFH)	12000 to 12999 (2EE0H to 32C7H)	13000 to 13999 (32C8H to 36AFH)	CH□ Logging data	0	Monitor	×
14000 to 17999 (36B0H to 464FH)				System area	—	—	—

In Q compatible (RD) mode

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
0 (0H)				Conversion enable/disable setting	000FH	Setting	×
1 (1H)	2 (2H)	3 (3H)	4 (4H)	CH□ Time average/Count average/Moving average/Primary delay filter constant setting	0	Setting	×
5 to 8 (5H to 8H)				System area	—	—	—
9 (9H)				Averaging process specification	0000H	Setting	×
10 (AH)				Conversion completed flag	0000H	Monitor	○
11 (BH)	12 (CH)	13 (DH)	14 (EH)	CH□ Digital output value	0	Monitor	○
15 to 18 (FH to 12H)				System area	—	—	—
19 (13H)				Latest error code	0	Monitor	○
20 (14H)				Range setting monitor (Input type setting)	0	Monitor	×
21 to 46 (15H to 2EH)				System area	—	—	—
47 (2FH)				Alert output setting (Process alarm)	000FH	Setting	×
48 (30H)				Alert output flag (Process alarm)	0000H	Monitor	○
49 (31H)				Disconnection detection flag	0000H	Monitor	○
50 (32H)	51 (33H)	52 (34H)	53 (35H)	CH□ digital operation value	0	Monitor	○
54 (36H)	56 (38H)	58 (3AH)	60 (3CH)	CH□ Digital output value (32-bit) (L)	0	Monitor	○
55 (37H)	57 (39H)	59 (3BH)	61 (3DH)	CH□ Digital output value (32-bit) (H)	0	Monitor	○
62 (3EH)	66 (42H)	70 (46H)	74 (4AH)	CH□ Scaling range lower limit value (32-bit) (L)	0	Setting	×
63 (3FH)	67 (43H)	71 (47H)	75 (4BH)	CH□ Scaling range lower limit value (32-bit) (H)	0	Setting	×
64 (40H)	68 (44H)	72 (48H)	76 (4CH)	CH□ Scaling range upper limit value (32-bit) (L)	0	Setting	×
65 (41H)	69 (45H)	73 (49H)	77 (4DH)	CH□ Scaling range upper limit value (32-bit) (H)	0	Setting	×
78 to 85 (4EH to 55H)				System area	—	—	—
86 (56H)	94 (5EH)	102 (66H)	110 (6EH)	CH□ Process alarm lower lower limit value (32-bit) (L)	-200000	Setting	×
87 (57H)	95 (5FH)	103 (67H)	111 (6FH)	CH□ Process alarm lower lower limit value (32-bit) (H)	-200000	Setting	×
88 (58H)	96 (60H)	104 (68H)	112 (70H)	CH□ Process alarm lower upper limit value (32-bit) (L)	-200000	Setting	×
89 (59H)	97 (61H)	105 (69H)	113 (71H)	CH□ Process alarm lower upper limit value (32-bit) (H)	-200000	Setting	×
90 (5AH)	98 (62H)	106 (6AH)	114 (72H)	CH□ Process alarm upper lower limit value (32-bit) (L)	850000	Setting	×
91 (5BH)	99 (63H)	107 (6BH)	115 (73H)	CH□ Process alarm upper lower limit value (32-bit) (H)	850000	Setting	×
92 (5CH)	100 (64H)	108 (6CH)	116 (74H)	CH□ Process alarm upper upper limit value (32-bit) (L)	850000	Setting	×
93 (5DH)	101 (65H)	109 (6DH)	117 (75H)	CH□ Process alarm upper upper limit value (32-bit) (H)	850000	Setting	×
118 to 133 (76H to 85H)				System area	—	—	—
134 (86H)				Extended averaging process specification	0000H	Setting	×
135 to 143 (87H to 8FH)				System area	—	—	—
144 (90H)				Disconnection detection automatic clear enable/disable setting	1	Setting	×
145 (91H)				System area	—	—	—
146 (92H)				Disconnection detection enable/disable setting	0	Setting	×
147 (93H)				System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
148 (94H)				Conversion setting at disconnection detection	1111H	Setting	×
149 (95H)				System area	—	—	—
150 (96H)	152 (98H)	154 (9AH)	156 (9CH)	CH□ Conversion setting value at disconnection detection (32-bit) (L)	0	Setting	×
151 (97H)	153 (99H)	155 (9BH)	157 (9DH)	CH□ Conversion setting value at disconnection detection (32-bit) (H)	0	Setting	×
158 to 401 (9EH to 191H)				System area	—	—	—
402 (192H)				Range setting (Input type setting)	0000H	Setting	×
403 to 407 (193H to 197H)				System area	—	—	—
408 (198H)				Scaling enable/disable setting	000FH	Setting	×
409 (199H)				System area	—	—	—
410 (19AH)				Alert output setting (Rate alarm)	000FH	Setting	×
411 (19BH)				Alert output flag (Rate alarm)	0000H	Monitor	○
412 (19CH)	413 (19DH)	414 (19EH)	415 (19FH)	CH□ Rate alarm alert detection cycle setting	0	Setting	×
416 to 419 (1A0H to 1A3H)				System area	—	—	—
420 (1A4H)	424 (1A8H)	428 (1ACH)	432 (1B0H)	CH□ Rate alarm upper limit value (32-bit) (L)	0	Setting	×
421 (1A5H)	425 (1A9H)	429 (1ADH)	433 (1B1H)	CH□ Rate alarm upper limit value (32-bit) (H)	0	Setting	×
422 (1A6H)	426 (1AAH)	430 (1AEH)	434 (1B2H)	CH□ Rate alarm lower limit value (32-bit) (L)	0	Setting	×
423 (1A7H)	427 (1ABH)	431 (1AFH)	435 (1B3H)	CH□ Rate alarm lower limit value (32-bit) (H)	0	Setting	×
436 to 451 (1B4H to 1C3H)				System area	—	—	—
452 (1C4H)	454 (1C6H)	456 (1C8H)	458 (1CAH)	CH□ digital operation value (32-bit) (L)	0	Monitor	○
453 (1C5H)	455 (1C7H)	457 (1C9H)	459 (1CBH)	CH□ digital operation value (32-bit) (H)	0	Monitor	○
460 to 467 (1CCH to 1D3H)				System area	—	—	—
468 (1D4H)	472 (1D8H)	476 (1DCH)	480 (1E0H)	CH□ Scaling width lower limit value (32-bit) (L)	0	Setting	×
469 (1D5H)	473 (1D9H)	477 (1DDH)	481 (1E1H)	CH□ Scaling width lower limit value (32-bit) (H)	0	Setting	×
470 (1D6H)	474 (1DAH)	478 (1DEH)	482 (1E2H)	CH□ Scaling width upper limit value (32-bit) (L)	0	Setting	×
471 (1D7H)	475 (1DBH)	479 (1DFH)	483 (1E3H)	CH□ Scaling width upper limit value (32-bit) (H)	0	Setting	×
484 to 507 (1E4H to 1FBH)				System area	—	—	—
508 (1FCH)	510 (1FEH)	512 (200H)	514 (202H)	CH□ Conversion value shift amount (32-bit) (L)	0	Control	○
509 (1FDH)	511 (1FFH)	513 (201H)	515 (203H)	CH□ Conversion value shift amount (32-bit) (H)	0	Control	○
516 to 999 (204H to 3E7H)				System area	—	—	—
1000 (3E8H)	1001 (3E9H)	1002 (3EAH)	1003 (3EBH)	CH□ Logging enable/disable setting	1	Setting	×
1004 to 1007 (3ECH to 3EFH)				System area	—	—	—
1008 (3F0H)	1009 (3F1H)	1010 (3F2H)	1011 (3F3H)	CH□ Logging hold request	0	Control	○
1012 to 1015 (3F4H to 3F7H)				System area	—	—	—
1016 (3F8H)	1017 (3F9H)	1018 (3FAH)	1019 (3FBH)	CH□ Logging hold flag	0	Monitor	○
1020 to 1023 (3FCH to 3FFH)				System area	—	—	—
1024 (400H)	1025 (401H)	1026 (402H)	1027 (403H)	CH□ Logging data setting	0	Setting	×
1028 to 1031 (404H to 407H)				System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
1032 (408H)	1033 (409H)	1034 (40AH)	1035 (40BH)	CH□ Logging cycle setting value	40	Setting	×
1036 to 1039 (40CH to 40FH)				System area	—	—	—
1040 (410H)	1041 (411H)	1042 (412H)	1043 (413H)	CH□ Logging cycle unit setting	1	Setting	×
1044 to 1047 (414H to 417H)				System area	—	—	—
1048 (418H)	1049 (419H)	1050 (41AH)	1051 (41BH)	CH□ Post-trigger logging points	500	Setting	×
1052 to 1055 (41CH to 41FH)				System area	—	—	—
1056 (420H)	1057 (421H)	1058 (422H)	1059 (423H)	CH□ Level trigger condition setting	0	Setting	×
1060 to 1063 (424H to 427H)				System area	—	—	—
1064 (428H)	1065 (429H)	1066 (42AH)	1067 (42BH)	CH□ Trigger data	*1	Setting	×
1068 to 1071 (42CH to 42FH)				System area	—	—	—
1072 to 1081 (430H to 439H)				Level data 0 to 9	0	Control	○
1082 (43AH)	1083 (43BH)	1084 (43CH)	1085 (43DH)	CH□ Trigger setting value	0	Setting	×
1086 to 1089 (43EH to 441H)				System area	—	—	—
1090 (442H)	1091 (443H)	1092 (444H)	1093 (445H)	CH□ Head pointer	0	Monitor	×
1094 to 1097 (446H to 449H)				System area	—	—	—
1098 (44AH)	1099 (44BH)	1100 (44CH)	1101 (44DH)	CH□ Latest pointer	0	Monitor	×
1102 to 1105 (44EH to 451H)				System area	—	—	—
1106 (452H)	1107 (453H)	1108 (454H)	1109 (455H)	CH□ Number of logging data	0	Monitor	×
1110 to 1113 (456H to 459H)				System area	—	—	—
1114 (45AH)	1115 (45BH)	1116 (45CH)	1117 (45DH)	CH□ Trigger pointer	0	Monitor	×
1118 to 1121 (45EH to 461H)				System area	—	—	—
1122 (462H)	1125 (465H)	1128 (468H)	1131 (46BH)	CH□ Logging cycle monitor value (s)	0	Monitor	×
1123 (463H)	1126 (466H)	1129 (469H)	1132 (46CH)	CH□ Logging cycle monitor value (ms)	0	Monitor	×
1124 (464H)	1127 (467H)	1130 (46AH)	1133 (46DH)	System area	—	—	—
1134 to 1153 (46EH to 481H)				System area	—	—	—
1154 (482H)	1158 (486H)	1162 (48AH)	1166 (48EH)	CH□ Trigger generation time (First/Last two digits of the year)	0	Monitor	×
1155 (483H)	1159 (487H)	1163 (48BH)	1167 (48FH)	CH□ Trigger generation time (Month/Day)	0	Monitor	×
1156 (484H)	1160 (488H)	1164 (48CH)	1168 (490H)	CH□ Trigger generation time (Hour/Minute)	0	Monitor	×
1157 (485H)	1161 (489H)	1165 (48DH)	1169 (491H)	CH□ Trigger generation time (Second/Day of the week)	0	Monitor	×
1170 to 1185 (492H to 4A1H)				System area	—	—	—
1186 (4A2H)	1187 (4A3H)	1188 (4A4H)	1189 (4A5H)	CH□ Trigger generation time (Millisecond)	0	Monitor	×
1190 to 1199 (4A6H to 4AFH)				System area	—	—	—
1200 (4B0H)	1201 (4B1H)	1202 (4B2H)	1203 (4B3H)	CH□ Loading interrupt enable/disable setting	1	Setting	×
1204 to 1207 (4B4H to 4B7H)				System area	—	—	—
1208 (4B8H)	1209 (4B9H)	1210 (4BAH)	1211 (4BBH)	CH□ Logging read points setting value	100	Setting	×
1212 to 1215 (4BCH to 4BFH)				System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
1216 (4C0H)	1217 (4C1H)	1218 (4C2H)	1219 (4C3H)	CH□ Current logging read pointer	-1	Monitor	×
1220 to 1223 (4C4H to 4C7H)				System area	—	—	—
1224 (4C8H)	1225 (4C9H)	1226 (4CAH)	1227 (4CBH)	CH□ Previous logging read pointer	-1	Monitor	×
1228 to 1231 (4CCH to 4CFH)				System area	—	—	—
1232 (4D0H)	1233 (4D1H)	1234 (4D2H)	1235 (4D3H)	CH□ Logging read points monitor value	0	Monitor	×
1236 to 1799 (4D4H to 707H)				System area	—	—	—
1800 (708H)				Latest address of error history	0	Monitor	○
1801 to 1809 (709H to 711H)				System area	—	—	—
1810 to 1969 (712H to 7B1H)				Error history 1 to 16	0	Monitor	×
1970 to 3749 (7B2H to EA5H)				System area	—	—	—
3750 (EA6H)				Latest alarm code	0	Monitor	○
3751 (EA7H)				Latest address of alarm history	0	Monitor	○
3752 to 3759 (EA8H to EAFH)				System area	—	—	—
3760 to 3919 (EB0H to F4FH)				Alarm history 1 to 16	0	Monitor	×
3920 to 3999 (F50H to F9FH)				System area	—	—	—
4000 to 4015 (FA0H to FAFH)				Interrupt factor detection flag [n] ^{*2}	0	Monitor	○
4016 to 4031 (FB0H to FBFH)				System area	—	—	—
4032 to 4047 (FC0H to FCFH)				Interrupt factor mask [n] ^{*2}	0	Control	×
4048 to 4063 (FD0H to FDFH)				System area	—	—	—
4064 to 4079 (FE0H to FEFH)				Interrupt factor reset request [n] ^{*2}	0	Control	×
4080 to 4095 (FF0H to FFFH)				System area	—	—	—
4096 to 4111 (1000H to 100FH)				Interrupt factor generation setting [n] ^{*2}	0	Setting	×
4112 to 4127 (1010H to 101FH)				System area	—	—	—
4128 to 4143 (1020H to 102FH)				Condition target setting [n] ^{*2}	0	Setting	×
4144 to 4159 (1030H to 103FH)				System area	—	—	—
4160 to 4175 (1040H to 104FH)				Condition target channel setting [n] ^{*2}	0	Setting	×
4176 to 4999 (1050H to 1387H)				System area	—	—	—
5000 to 5999 (1388H to 176FH)				CH1 Logging data	0	Monitor	×
6000 to 6999 (1770H to 1B57H)				CH2 Logging data	0	Monitor	×
7000 to 7999 (1B58H to 1F3FH)				CH3 Logging data	0	Monitor	×
8000 to 8999 (1F40H to 2327H)				CH4 Logging data	0	Monitor	×
9000 to 17999 (2328H to 464FH)				System area	—	—	—

*1 The following shows the default values.

CH1: 11, CH2: 12, CH3: 13, CH4: 14

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

In Q compatible (TD) mode

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
0 (0H)				Conversion enable/disable setting	000FH	Setting	×
1 (1H)	2 (2H)	3 (3H)	4 (4H)	CH□ Time average/Count average/Moving average/Primary delay filter constant setting	0	Setting	×
5 to 8 (5H to 8H)				System area	—	—	—
9 (9H)				Averaging process specification	0000H	Setting	×
10 (AH)				Conversion completed flag	0000H	Monitor	○
11 (BH)	12 (CH)	13 (DH)	14 (EH)	CH□ Digital output value	0	Monitor	○
15 to 18 (FH to 12H)				System area	—	—	—
19 (13H)				Latest error code	0	Monitor	○
20 (14H)				Range setting monitor (Input type setting)	0	Monitor	×
21 to 44 (15H to 2CH)				System area	—	—	—
45 (2DH)				Cold junction compensation setting status	1	Monitor	×
46 (2EH)				System area	—	—	—
47 (2FH)				Alert output setting (Process alarm)	000FH	Setting	×
48 (30H)				Alert output flag (Process alarm)	0000H	Monitor	○
49 (31H)				Disconnection detection flag	0000H	Monitor	○
50 (32H)	51 (33H)	52 (34H)	53 (35H)	CH□ digital operation value	0	Monitor	○
54 to 61 (36H to 3DH)				System area	—	—	—
62 (3EH)	64 (40H)	66 (42H)	68 (44H)	CH□ Scaling range lower limit value	0	Setting	×
63 (3FH)	65 (41H)	67 (43H)	69 (45H)	CH□ Scaling range upper limit value	0	Setting	×
70 to 77 (46H to 4DH)				System area	—	—	—
78 (4EH)	80 (50H)	82 (52H)	84 (54H)	CH□ Scaling width lower limit value	0	Setting	×
79 (4FH)	81 (51H)	83 (53H)	85 (55H)	CH□ Scaling width upper limit value	0	Setting	×
86 (56H)	90 (5AH)	94 (5EH)	98 (62H)	CH□ Process alarm lower lower limit value	-2000	Setting	×
87 (57H)	91 (5BH)	95 (5FH)	99 (63H)	CH□ Process alarm lower upper limit value	-2000	Setting	×
88 (58H)	92 (5CH)	96 (60H)	100 (64H)	CH□ Process alarm upper lower limit value	12000	Setting	×
89 (59H)	93 (5DH)	97 (61H)	101 (65H)	CH□ Process alarm upper upper limit value	12000	Setting	×
102 to 133 (66H to 85H)				System area	—	—	—
134 (86H)				Extended averaging process specification	0000H	Setting	×
135 to 143 (87H to 8FH)				System area	—	—	—
144 (90H)				Disconnection detection automatic clear enable/disable setting	1	Setting	×
145 (91H)				System area	—	—	—
146 (92H)				Disconnection detection enable/disable setting	0	Setting	×
147 (93H)				System area	—	—	—
148 (94H)				Conversion setting at disconnection detection	1111H	Setting	×
149 (95H)				System area	—	—	—
150 (96H)	151 (97H)	152 (98H)	153 (99H)	CH□ Conversion setting value at disconnection detection	0	Setting	×
154 to 401 (9AH to 191H)				System area	—	—	—
402 (192H)				Range setting (Input type setting)	0000H	Setting	×
403 to 404 (193H to 194H)				System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
405 (195H)				Cold junction compensation setting	0	Setting	×
406 (196H)				Measured temperature value of cold junction compensation resistor	0	Monitor	○
407 (197H)				System area	—	—	—
408 (198H)				Scaling enable/disable setting	000FH	Setting	×
409 (199H)				System area	—	—	—
410 (19AH)				Alert output setting (Rate alarm)	000FH	Setting	×
411 (19BH)				Alert output flag (Rate alarm)	0000H	Monitor	○
412 (19CH)	413 (19DH)	414 (19EH)	415 (19FH)	CH□ Rate alarm alert detection cycle setting	0	Setting	×
416 to 419 (1A0H to 1A3H)				System area	—	—	—
420 (1A4H)	424 (1A8H)	428 (1ACH)	432 (1B0H)	CH□ Rate alarm upper limit value	0	Setting	×
421 (1A5H)	425 (1A9H)	429 (1ADH)	433 (1B1H)	System area	—	—	—
422 (1A6H)	426 (1AAH)	430 (1AEH)	434 (1B2H)	CH□ Rate alarm lower limit value	0	Setting	×
423 (1A7H)	427 (1ABH)	431 (1AFH)	435 (1B3H)	System area	—	—	—
436 to 499 (1B4H to 1F3H)				System area	—	—	—
500 (1F4H)	501 (1F5H)	502 (1F6H)	503 (1F7H)	CH□ Conversion value shift amount	0	Control	○
504 to 999 (1F8H to 3E7H)				System area	—	—	—
1000 (3E8H)	1001 (3E9H)	1002 (3EAH)	1003 (3EBH)	CH□ Logging enable/disable setting	1	Setting	×
1004 to 1007 (3ECH to 3EFH)				System area	—	—	—
1008 (3F0H)	1009 (3F1H)	1010 (3F2H)	1011 (3F3H)	CH□ Logging hold request	0	Control	○
1012 to 1015 (3F4H to 3F7H)				System area	—	—	—
1016 (3F8H)	1017 (3F9H)	1018 (3FAH)	1019 (3FBH)	CH□ Logging hold flag	0	Monitor	○
1020 to 1023 (3FCH to 3FFH)				System area	—	—	—
1024 (400H)	1025 (401H)	1026 (402H)	1027 (403H)	CH□ Logging data setting	0	Setting	×
1028 to 1031 (404H to 407H)				System area	—	—	—
1032 (408H)	1033 (409H)	1034 (40AH)	1035 (40BH)	CH□ Logging cycle setting value	40	Setting	×
1036 to 1039 (40CH to 40FH)				System area	—	—	—
1040 (410H)	1041 (411H)	1042 (412H)	1043 (413H)	CH□ Logging cycle unit setting	1	Setting	×
1044 to 1047 (414H to 417H)				System area	—	—	—
1048 (418H)	1049 (419H)	1050 (41AH)	1051 (41BH)	CH□ Post-trigger logging points	500	Setting	×
1052 to 1055 (41CH to 41FH)				System area	—	—	—
1056 (420H)	1057 (421H)	1058 (422H)	1059 (423H)	CH□ Level trigger condition setting	0	Setting	×
1060 to 1063 (424H to 427H)				System area	—	—	—
1064 (428H)	1065 (429H)	1066 (42AH)	1067 (42BH)	CH□ Trigger data	*1	Setting	×
1068 to 1071 (42CH to 42FH)				System area	—	—	—
1072 to 1081 (430H to 439H)				Level data 0 to 9	0	Control	○
1082 (43AH)	1083 (43BH)	1084 (43CH)	1085 (43DH)	CH□ Trigger setting value	0	Setting	×
1086 to 1089 (43EH to 441H)				System area	—	—	—
1090 (442H)	1091 (443H)	1092 (444H)	1093 (445H)	CH□ Head pointer	0	Monitor	×

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
1094 to 1097 (446H to 449H)				System area	—	—	—
1098 (44AH)	1099 (44BH)	1100 (44CH)	1101 (44DH)	CH□ Latest pointer	0	Monitor	×
1102 to 1105 (44EH to 451H)				System area	—	—	—
1106 (452H)	1107 (453H)	1108 (454H)	1109 (455H)	CH□ Number of logging data	0	Monitor	×
1110 to 1113 (456H to 459H)				System area	—	—	—
1114 (45AH)	1115 (45BH)	1116 (45CH)	1117 (45DH)	CH□ Trigger pointer	0	Monitor	×
1118 to 1121 (45EH to 461H)				System area	—	—	—
1122 (462H)	1125 (465H)	1128 (468H)	1131 (46BH)	CH□ Logging cycle monitor value (s)	0	Monitor	×
1123 (463H)	1126 (466H)	1129 (469H)	1132 (46CH)	CH□ Logging cycle monitor value (ms)	0	Monitor	×
1124 (464H)	1127 (467H)	1130 (46AH)	1133 (46DH)	System area	—	—	—
1134 to 1153 (46EH to 481H)				System area	—	—	—
1154 (482H)	1158 (486H)	1162 (48AH)	1166 (48EH)	CH□ Trigger generation time (First/Last two digits of the year)	0	Monitor	×
1155 (483H)	1159 (487H)	1163 (48BH)	1167 (48FH)	CH□ Trigger generation time (Month/Day)	0	Monitor	×
1156 (484H)	1160 (488H)	1164 (48CH)	1168 (490H)	CH□ Trigger generation time (Hour/Minute)	0	Monitor	×
1157 (485H)	1161 (489H)	1165 (48DH)	1169 (491H)	CH□ Trigger generation time (Second/Day of the week)	0	Monitor	×
1170 to 1185 (492H to 4A1H)				System area	—	—	—
1186 (4A2H)	1187 (4A3H)	1188 (4A4H)	1189 (4A5H)	CH□ Trigger generation time (Millisecond)	0	Monitor	×
1190 to 1199 (4A6H to 4AFH)				System area	—	—	—
1200 (4B0H)	1201 (4B1H)	1202 (4B2H)	1203 (4B3H)	CH□ Loading interrupt enable/disable setting	1	Setting	×
1204 to 1207 (4B4H to 4B7H)				System area	—	—	—
1208 (4B8H)	1209 (4B9H)	1210 (4BAH)	1211 (4BBH)	CH□ Logging read points setting value	100	Setting	×
1212 to 1215 (4BCH to 4BFH)				System area	—	—	—
1216 (4C0H)	1217 (4C1H)	1218 (4C2H)	1219 (4C3H)	CH□ Current logging read pointer	-1	Monitor	×
1220 to 1223 (4C4H to 4C7H)				System area	—	—	—
1224 (4C8H)	1225 (4C9H)	1226 (4CAH)	1227 (4CBH)	CH□ Previous logging read pointer	-1	Monitor	×
1228 to 1231 (4CCH to 4CFH)				System area	—	—	—
1232 (4D0H)	1233 (4D1H)	1234 (4D2H)	1235 (4D3H)	CH□ Logging read points monitor value	0	Monitor	×
1236 to 1799 (4D4H to 707H)				System area	—	—	—
1800 (708H)				Latest address of error history	0	Monitor	○
1801 to 1809 (709H to 711H)				System area	—	—	—
1810 to 1969 (712H to 7B1H)				Error history 1 to 16	0	Monitor	×
1970 to 3749 (7B2H to EA5H)				System area	—	—	—
3750 (EA6H)				Latest alarm code	0	Monitor	○
3751 (EA7H)				Latest address of alarm history	0	Monitor	○
3752 to 3759 (EA8H to EAFH)				System area	—	—	—
3760 to 3919 (EB0H to F4FH)				Alarm history 1 to 16	0	Monitor	×
3920 to 3999 (F50H to F9FH)				System area	—	—	—
4000 to 4015 (FA0H to FAFH)				Interrupt factor detection flag [n] ¹²	0	Monitor	○
4016 to 4031 (FB0H to FBFH)				System area	—	—	—

Address Decimal (hexadecimal)				Name	Default value	Data type	Auto refresh
CH1	CH2	CH3	CH4				
4032 to 4047 (FC0H to FCFH)				Interrupt factor mask [n] ^{*2}	0	Control	×
4048 to 4063 (FD0H to FDFH)				System area	—	—	—
4064 to 4079 (FE0H to FEFH)				Interrupt factor reset request [n] ^{*2}	0	Control	×
4080 to 4095 (FF0H to FFFH)				System area	—	—	—
4096 to 4111 (1000H to 100FH)				Interrupt factor generation setting [n] ^{*2}	0	Control	×
4112 to 4127 (1010H to 101FH)				System area	—	—	—
4128 to 4143 (1020H to 102FH)				Condition target setting [n] ^{*2}	0	Setting	×
4144 to 4159 (1030H to 103FH)				System area	—	—	—
4160 to 4175 (1040H to 104FH)				Condition target channel setting [n] ^{*2}	0	Setting	×
4176 to 4999 (1050H to 1387H)				System area	—	—	—
5000 to 5999 (1388H to 176FH)				CH1 Logging data	0	Monitor	×
6000 to 6999 (1770H to 1B57H)				CH2 Logging data	0	Monitor	×
7000 to 7999 (1B58H to 1F3FH)				CH3 Logging data	0	Monitor	×
8000 to 8999 (1F40H to 2327H)				CH4 Logging data	0	Monitor	×
9000 to 17999 (2328H to 464FH)				System area	—	—	—

*1 The following shows the default values.

CH1: 11, CH2: 12, CH3: 13, CH4: 14

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

Details of buffer memory addresses

This section describes the details on the buffer memory addresses of the temperature input module.



This section describes buffer memory addresses for CH1 in R mode.

Latest error code

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

Page 140 LIST OF ERROR CODES

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Latest error code	0			
Latest error code (in Q compatible mode)	19			

■Clearing an error

Turn on and off 'Error clear request' (YF) or 'Operating condition setting request' (Y9). Note that turning on and off 'Operating condition setting request' (Y9) resets the conversion, which resumes from the beginning.

Latest address of error history

Of Error history $\square$ (Un\G3600 to Un\G3759), the buffer memory start address that stores the latest error code is stored.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Latest address of error history	1			
Latest address of error history (in Q compatible mode)	1800			

A

Latest alarm code

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

Page 143 LIST OF ALARM CODES

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Latest alarm code	2			
Latest alarm code (in Q compatible mode)	3750			

■Clearing an error

Turn on and off 'Error clear request' (YF) or 'Operating condition setting request' (Y9). Note that turning on and off 'Operating condition setting request' (Y9) resets the conversion, which resumes from the beginning.

Latest address of alarm history

Of Alarm history □ (Un\G3760 to Un\G3919), the buffer memory start address that stores the latest alarm code is stored.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Latest address of alarm history	3			
Latest address of alarm history (in Q compatible mode)	3751			

Interrupt factor detection flag [n]

The detection status of the interrupt factor is stored.

Monitor value	Description
0	No interrupt factor
1	Interrupt factor

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

While 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) is set to Interrupt factor (1), an occurrence of the same interrupt factor does not result in an interrupt request being sent to the CPU. An interrupt request is sent if a different interrupt factor occurs.

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

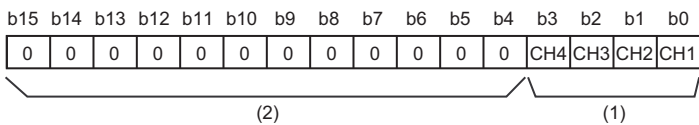
■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Interrupt factor detection flag [n]	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Interrupt factor detection flag [n] (in Q compatible mode)	4000	4001	4002	4003	4004	4005	4006	4007	4008	4009	4010	4011	4012	4013	4014	4015

Alert output flag (Process alarm upper limit) [R mode]

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



- (1) 0: Normal, 1: Alarm ON
- (2) The values of b4 to b15 are fixed to 0.

Buffer memory address

The following shows the buffer memory address of this area.

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

Alert output flag status

- If the input type is set to RTD and the digital output value is equal to or greater than the limit specified by the process alarm upper upper limit value (32-bit), Alarm ON (1) is stored in 'Alert output flag (Process alarm upper limit)' (Un\G36) of the corresponding channel.
- If the input type is set to thermocouple, micro voltage, or resistor and the digital output value is equal to or greater than the limit specified by the process alarm upper upper limit value, 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' (XD) also turns on.

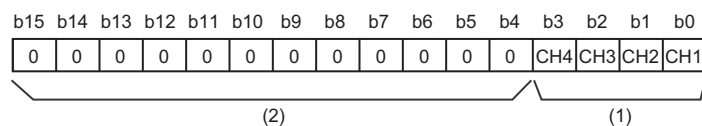
Clearing Alert output flag

- If the input type is set to RTD and the digital output value (32-bit) falls below the limit specified by the process alarm upper lower limit value (32-bit), the flag is automatically cleared.
- If the input type is set to thermocouple, micro voltage, or resistor and the digital output value falls below the limit specified by the process alarm upper lower limit value, the flag is automatically cleared.
- Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.



Alert output flag (Process alarm lower limit) [R mode]

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



(1) 0: Normal, 1: Alarm ON

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

■Buffer memory address

The following shows the buffer memory address of this area.

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

■Alert output flag status

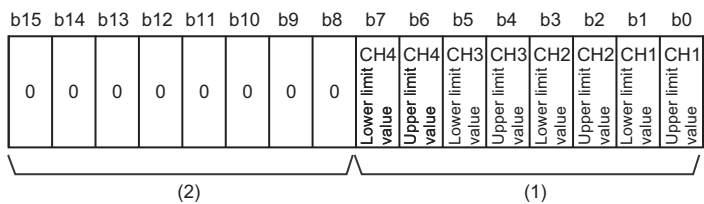
- If the input type is set to RTD and the digital output value is equal to or less than the limit specified by the process alarm lower lower limit value (32-bit), Alarm ON (1) is stored in 'Alert output flag (Process alarm lower limit)' (Un\G37) of the corresponding channel.
- If the input type is set to thermocouple, micro voltage, or resistor and the digital output value is equal to or less than the limit specified by the process alarm lower lower limit value, 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' (XD) also turns on.

■Clearing Alert output flag

- If the input type is set to RTD and the digital output value (32-bit) exceeds the limit specified by the process alarm lower upper limit value (32-bit), the flag is automatically cleared.
- If the input type is set to thermocouple, micro voltage, or resistor and the digital output value exceeds the limit specified by the process alarm lower upper limit value, the flag is automatically cleared.
- Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.

Alert output flag (Process alarm) [Q compatible mode]

When the Q compatible mode function is used, the upper/lower limit alarm of the process alarm can be checked.



- (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
Alert output flag (Process alarm) (in Q compatible mode)	48			

Alert output flag status

- In Q compatible (RD) mode, when the digital output value is equal to or greater than the limit specified by the process alarm upper upper limit value (32-bit) or is equal to or less than the limit specified by the process alarm lower lower limit value (32-bit), Alarm ON (1) is stored in Alert output flag (Process alarm) of the corresponding channel.
- In Q compatible (TD) mode, when the digital output value is equal to or greater than the limit specified by the process alarm upper upper limit value or is equal to or less than the limit specified by the process alarm lower lower limit value, Alarm ON (1) is stored in Alert output flag (Process alarm) 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' (XD) also turns on.

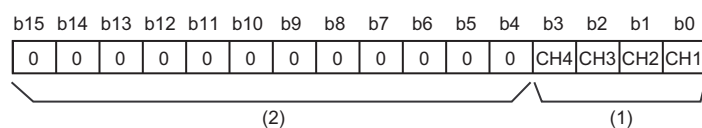
Clearing Alert output flag

- In Q compatible (RD) mode, when the digital output value (32-bit) falls below the limit specified by the process alarm upper lower limit value (32-bit) or exceeds the limit specified by the process alarm lower upper limit value (32-bit), the flag is automatically cleared.
- In Q compatible (TD) mode, when the digital output value falls below the limit specified by the process alarm upper lower limit value or exceeds the limit specified by the process alarm lower upper limit value, the flag is automatically cleared.
- Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.



Alert output flag (Rate alarm upper limit) [R mode]

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



(1) 0: Normal, 1: Alarm ON

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

■Buffer memory address

The following shows the buffer memory address of this area.

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

■Alert output flag status

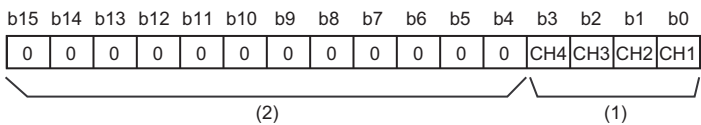
- If the input type is set to RTD and the change in the digital output value is equal to or greater than the amount specified by the rate alarm upper limit value (32-bit), Alarm ON (1) is stored in 'Alert output flag (Rate alarm upper limit)' (Un\G38) of the corresponding channel.
- If the input type is set to thermocouple, micro voltage, or resistor and the change in the digital output value is equal to or greater than the amount specified by the rate alarm upper limit value, 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' (XD) also turns on.

■Clearing Alert output flag

- If the input type is set to RTD and the change in the digital output value (32-bit) falls below the amount specified by the rate alarm upper limit value (32-bit), the flag is automatically cleared.
- If the input type is set to thermocouple, micro voltage, or resistor and the change in the digital output value falls below the amount specified by the rate alarm upper limit value, the flag is automatically cleared.
- Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.

Alert output flag (Rate alarm lower limit) [R mode]

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



(1) 0: Normal, 1: Alarm ON

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

■Buffer memory address

The following shows the buffer memory address of this area.

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

■Alert output flag status

- If the input type is set to RTD and the change in the digital output value is equal to or less than the amount specified by the rate alarm lower limit value (32-bit), Alarm ON (1) is stored in 'Alert output flag (Rate alarm lower limit)' (Un\G39) of the corresponding channel.
- If the input type is set to thermocouple, micro voltage, or resistor and the change in the digital output value is equal to or less than the amount specified by the rate alarm lower limit value, Alarm ON (1) is stored in 'Alert output flag (Rate alarm lower limit)' (Un\G39) 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' (XD) also turns on.

■Clearing Alert output flag

- If the input type is set to RTD and the change in the digital output value (32-bit) exceeds the amount specified by the rate alarm lower limit value (32-bit), the flag is automatically cleared.
- If the input type is set to thermocouple, micro voltage, or resistor and the change in the digital output value exceeds the amount specified by the rate alarm lower limit value, the flag is automatically cleared.
- Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.

Alert output flag (Rate alarm) [Q compatible mode]

When the Q compatible mode function is used, the upper/lower limit alarm of the rate alarm can be checked.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	0	Lower limit value	Upper limit value	Lower limit value	Upper limit value	Lower limit value	Upper limit value	Lower limit value	Upper limit value
(2)								(1)							

(1) 0: Normal, 1: Alarm ON

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Alert output flag (Rate alarm) (in Q compatible mode)	411			

■Alert output flag status

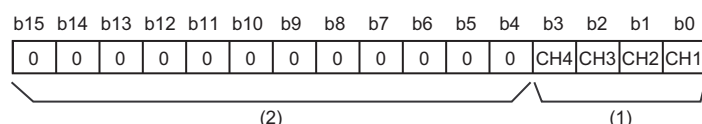
- In Q compatible (RD) mode, when the change in the digital output value is equal to or greater than the amount specified by the rate alarm upper limit value (32-bit) or is equal to or less than the amount specified by the rate alarm lower limit value (32-bit), Alarm ON (1) is stored in Alert output flag (Rate alarm) of the corresponding channel.
- In Q compatible (TD) mode, when the change in the digital output value is equal to or greater than the amount specified by the rate alarm upper limit value or is equal to or less than the amount specified by the rate alarm lower limit value, Alarm ON (1) is stored in Alert output flag (Rate alarm) 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' (XD) also turns on.

■Clearing Alert output flag

- In Q compatible (RD) mode, when the change of the digital output value (32-bit) falls below the amount specified by the rate alarm upper limit value (32-bit) or exceeds the amount specified by the rate alarm lower limit value (32-bit), the flag is automatically cleared.
- In Q compatible (TD) mode, when the change of the digital output value falls below the amount specified by the rate alarm upper limit value or exceeds the amount specified by the rate alarm lower limit value, the flag is automatically cleared.
- Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.

Disconnection detection flag

The status of disconnection can be checked for each channel.



- (1) 0: Normal, 1 Disconnection detection
 (2) The values of b4 to b15 are fixed to 0.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Disconnection detection flag	41			
Disconnection detection flag (in Q compatible mode)	49			

■Status of Disconnection detection flag

If a disconnection is detected in the resistance temperature detectors, thermocouples, compensation lead wires, micro voltage signal lines, or resistors from outside, Disconnection detection flag, which corresponds to the channel where the disconnection is detected, turns to disconnection detection (1). 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 'Disconnection detection automatic clear enable/disable setting' (Un\G303).

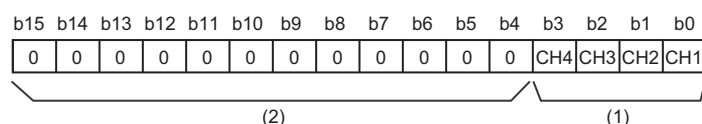
- With 'Disconnection detection automatic clear enable/disable setting' (Un\G303) set to Enable (0), Normal (0) is stored in the bit corresponding to 'Disconnection detection flag' (Un\G41) of the recovered channel.
- With 'Disconnection detection automatic clear enable/disable setting' (Un\G303) set to Disable (1), 'Disconnection detection flag' (Un\G41) holds 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 on and off 'Error clear request' (YF).
- If a disconnection is detected even in one channel, of the channels where conversion is enabled and disconnection detection is enabled, 'Disconnection detection signal' (XC) turns on.

■Clearing Disconnection detection flag

Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.

Conversion completed flag

The status of the conversion can be checked.



- (1) 0: During conversion or unused, 1: Conversion completed
 (2) The values of b4 to b15 are fixed to 0.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Conversion completed flag	42			
Conversion completed flag (in Q compatible mode)	10			

■The status of Conversion completed flag

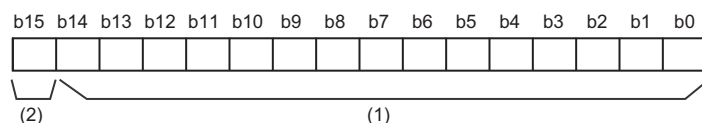
When the first conversion is completed in the channel where conversion is enabled, the flag turns to Conversion completed (1). Upon completion of conversion of all the channels where conversion is enabled, 'Conversion completed flag' (XE) turns on.

■Clearing Conversion completed flag

Turning on and off 'Operating condition setting request' (Y9) 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.

Measured temperature value of cold junction compensation resistor

The temperature measured with the cold junction compensation resistor (RTD) is stored in 'Measured temperature value of cold junction compensation resistor' (Un\G44) in 16-bit signed binary.



(1) Data section

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

The unit of the stored value is 0.1°C.

The following table lists update conditions for 'Measured temperature value of cold junction compensation resistor' (Un\G44).

Conditions	With/without update
When all the following conditions are satisfied <ul style="list-style-type: none"> • 'CH□ Range setting (Input type setting)' of any channel is set to thermocouple. • 'CH□ Conversion enable/disable setting' of the channel whose input type is set to thermocouple is set to enable the conversion. • 'Cold junction compensation setting' (Un\G298) is set to With cold junction compensation (standard terminal block) (0) or With cold junction compensation (terminal block converter module) (2). • A cold junction compensation resistor use prohibited error (error code: 1F1□H) has not occurred. 	With update
Other than the above	Without update (0 is always stored.)

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Measured temperature value of cold junction compensation resistor	44			
Measured temperature value of cold junction compensation resistor (in Q compatible (TD) mode)	406			

Point

The temperature of the module terminal block measured with the cold junction compensation resistor (RTD) is stored in 'Measured temperature value of cold junction compensation resistor' (Un\G44).

This value can be used as a guideline for the ambient temperature of the module, such as the temperature inside the control panel where the module is installed.

■Refreshing cycle

The value is updated at every sampling cycle.

■Clearing the measured temperature value of cold junction compensation resistor

Turning on and off 'Operating condition setting request' (Y9) allows the flag to be cleared.

Cold junction compensation setting status

When 'CH□ Range setting (Input type setting)' of any conversion-enabled channel is set to thermocouple, the cold junction compensation setting specified by 'Cold junction compensation setting' (Un\G298) can be checked.

Monitor value	Description
0H	With cold junction compensation (standard terminal block)
1H	Without cold junction compensation
2H	With cold junction compensation (terminal block converter module)

If there is no conversion-enabled channel whose 'CH□ Range setting (Input type setting)' is set to thermocouple, the setting is fixed to Without cold junction compensation (1).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Cold junction compensation setting status	61			
Cold junction compensation setting status (in Q compatible (TD) mode)	45			

Point

- This area is not capable of changing the setting of cold junction compensation. Perform the setting of cold junction compensation in "Cold junction compensation setting" of Module Parameter or 'Cold junction compensation setting' (Un\G298).
- 'Cold junction compensation setting' (Un\G298) permits a value of 0 to FH to be set. Setting a value of 1 or 3 to FH results in Without cold junction compensation (1) being stored in this area.

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 temperature input module.

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

 Page 92 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 Q compatible mode)	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081

■Setting range

The possible range is from -32768 to 32767.

■Default value

The default value is 0 for all the channels.

Interrupt factor mask [n]

Set Interrupt factor mask to be used.

Setting value	Setting content
0	Mask (Interrupt unused)
1	Mask clear (Interrupt used)

When 'Interrupt factor mask [n]' (Un\G124 to Un\G139) is changed to Mask clear (Interrupt used) (1) and an interrupt factor occurs, an interrupt request is sent to the CPU module. When the set value is two or larger, the setting is regarded as Mask clear (Interrupt used) (1).

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Interrupt factor mask [n]	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139
Interrupt factor mask [n] (in Q compatible mode)	4032	4033	4034	4035	4036	4037	4038	4039	4040	4041	4042	4043	4044	4045	4046	4047

■Default value

The default value is Mask (Interrupt unused) (0) for all the channels.

Interrupt factor reset request [n]

An interrupt factor reset request is sent.

Setting value	Setting content
0	No reset request
1	Reset request

When 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) corresponding to the interrupt factor is set to Reset request (1), the interrupt factor corresponding to the specified interrupt is reset and 'Interrupt factor detection flag [n]' (Un\G4 to Un\G19) changes to No interrupt factor (0). After that, 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) turns to No reset request (0). When the set value is two or larger, the setting is regarded as Reset request (1).

Interrupt factors can also be reset by turning on and off 'Operating condition setting request' (Y9).

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

■Buffer memory address

The following shows the buffer memory address of this area.

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

■Default value

The default value is No request (0) for all the channels.

Interrupt factor generation setting [n]

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

Setting value	Setting content
0	Interrupt resend request
1	No interrupt resend request

- With 'Interrupt factor generation setting [n]' (Un\G200 to Un\G215) set to Interrupt resend request (0) and an interrupt factor being detected, an occurrence of the same interrupt factor results in an interrupt request being sent to the CPU module again.
- With 'Interrupt factor generation setting [n]' (Un\G200 to Un\G215) set to No interrupt resend request (1) and an interrupt factor being detected, an occurrence of the same interrupt factor does not result in an interrupt request being sent to the CPU module. To send an interrupt request to the CPU module, set 'Interrupt factor reset request [n]' (Un\G156 to Un\G171) to Reset request (1) and reset the interrupt factor before sending it.

Setting a value other than the above causes an interrupt factor generation setting range error (error code: 180△H).

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Interrupt factor generation setting [n]	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215
Interrupt factor generation setting [n] (in Q compatible mode)	4096	4097	4098	4099	4100	4101	4102	4103	4104	4105	4106	4107	4108	4109	4110	4111

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Interrupt resend request (0) for all the channels.

A

Condition target setting [n]

Set an interrupt factor to be detected.

Setting value	Setting content
0	Disable
1	Error flag (XF)
2	Alert output flag (Process alarm) (CH specification)
3	Alert output flag (Rate alarm) (CH specification)
4	Disconnection detection flag (CH specification)
5	Conversion completed (CH specification) ^{*1}
6	Logging hold flag (CH specification)
7	Logging read (CH specification)

When an input signal (X) or a buffer memory area set to 'Condition target setting [n]' (Un\G232 to Un\G247) turns off and on, an interrupt request is sent to the CPU module.

When Conversion completed (5) is set, an interrupt request is sent to the CPU module at every conversion cycle.

When Logging read (7) is set, an interrupt request is sent to the CPU module every time the number of data logged by the logging function reaches the number of points specified by 'CH1 Logging read points setting value' (Un\G545).

Setting a value other than the above causes a condition target setting range error (error code: 181△H).

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

^{*1} When the input type is set to thermocouple, power-on with the cold junction compensation resistor disconnected results in an interrupt being detected since conversion of every channel is complete.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Condition target setting [n]	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247
Condition target setting [n] (in Q compatible mode)	4128	4129	4130	4131	4132	4133	4134	4135	4136	4137	4138	4139	4140	4141	4142	4143

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (0) for all the channels.

Condition target channel setting [n]

Set a channel where an interrupt is detected.

Setting value	Setting content
0	All channels
1	CH1
2	CH2
3	CH3
4	CH4

When a factor for the channel specification is set to 'Condition target setting [n]' (Un\G232 to Un\G247), an interrupt factor in the channel set by this area is monitored. When a factor of the input signal (X) is set, the setting in this area is ignored.

Setting a value other than the above causes a condition target channel setting range error (error code: 182△H).

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Condition target channel setting [n]	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279
Condition target channel setting [n] (in Q compatible mode)	4160	4161	4162	4163	4164	4165	4166	4167	4168	4169	4170	4171	4172	4173	4174	4175

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is All channels (0) for all the channels.

Cold junction compensation setting

Set the cold junction compensation method when the input type is set to thermocouple.

Monitor value	Description	Remarks
0H	With cold junction compensation (standard terminal block)	Use the standard terminal block.
1H	Without cold junction compensation	Use the standard terminal block.
2H	With cold junction compensation (terminal block converter module)	Use the terminal block converter module.

Setting a value other than the above results in Without cold junction compensation (1).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Cold junction compensation setting	298			
Cold junction compensation setting (in Q compatible (TD) mode)	405			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is With cold junction compensation (standard terminal block) (0) for all the channels.

Disconnection detection automatic clear enable/disable setting

Set whether to enable or disable an automatic clear of disconnection detection of the 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
Disconnection detection automatic clear enable/disable setting	303			
Disconnection detection automatic clear enable/disable setting (in Q compatible mode)	144			

■Enabling the setting

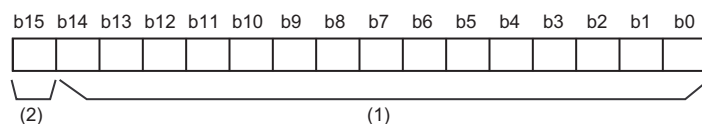
Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

CH1 Digital output value

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



(1) Data section

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Digital output value	400	600	800	1000
CH□ Digital output value (in Q compatible mode)	11	12	13	14

■Refreshing cycle

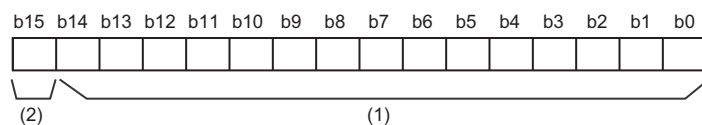
If averaging processing is performed, values are updated at every averaging process cycle, but if not performed, values are updated at every sampling cycle.

CH1 digital operation value

Values determined by the scaling function or shift function are stored in 16-bit signed binary.

When the scaling function and shift function are not used, the following values are stored.

- In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the same value as CH1 Digital output value is stored.
- In R mode with the input type set to RTD, or in Q compatible (RD) mode, the same value as CH1 Digital output value (32-bit) is stored. However, 32767 is stored if the digital operation value (32-bit) exceeds 32767. Similarly, -32768 is stored if the digital operation value (32-bit) falls below -32768.



(1) Data section

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ digital operation value	402	602	802	1002
CH□ digital operation value (in Q compatible mode)	50	51	52	53

■Refreshing cycle

If averaging processing is performed, values are updated at every averaging process cycle, but if not performed, values are updated at every sampling cycle.

CH1 Logging hold flag

The logging holding status can be checked.

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

📖 Page 92 Logging Function

Monitor value	Description
0	Off
1	On

As data collection in CH1 Logging data (Un\G10000 to Un\G10999) comes to a halt, this flag turns to ON (1).

When logging restarts by changing 'CH1 Logging hold request' (Un\G471) from ON (1) to OFF (0), 'CH1 Logging hold flag' (Un\G409) is turned to OFF (0).

■Buffer memory address

The following shows the buffer memory address of this area.

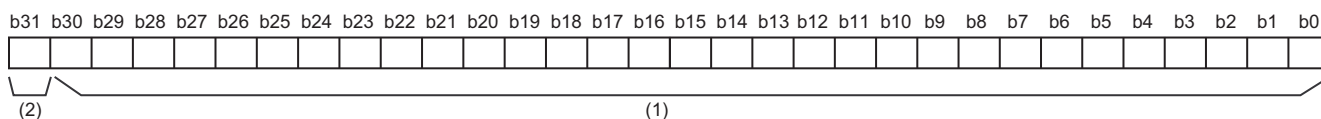
Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging hold flag	409	609	809	1009
CH□ Logging hold flag (in Q compatible mode)	1016	1017	1018	1019

A

CH1 Digital output value (32-bit) (L) (H)

This buffer memory area can be used in R mode and Q compatible (RD) mode.

- In R mode with the input type set to RTD, or in Q compatible (RD) mode, the converted digital output value is stored in 32-bit signed binary.
- In R mode with the input type set to thermocouple, micro voltage, or resistor, the value is fixed to 0.



(1) Data section

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Digital output value (32-bit) (L)	410	610	810	1010
CH□ Digital output value (32-bit) (H)	411	611	811	1011
CH□ Digital output value (32-bit) (L) (in Q compatible (RD) mode)	54	56	58	60
CH□ Digital output value (32-bit) (H) (in Q compatible (RD) mode)	55	57	59	61

■Refreshing cycle

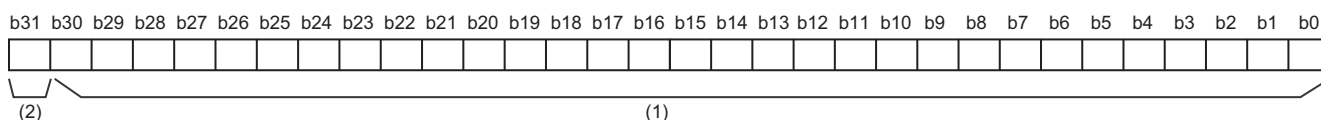
If averaging processing is performed, values are updated at every averaging process cycle, but if not performed, values are updated at every sampling cycle.

CH1 digital operation value (32-bit) (L) (H)

This buffer memory area can be used in R mode and Q compatible (RD) mode.

Digital operation values determined by a calculation with the scaling function or shift function are stored in 32-bit signed binary.

- If the scaling function and shift function are not used while in R mode with the input type set to RTD or in Q compatible (RD) mode, the same value as CH1 Digital output value (32-bit) is stored.
- In R mode with the input type set to thermocouple, micro voltage, or resistor, the value is fixed to 0.



(1) Data section

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ digital operation value (32-bit) (L)	412	612	812	1012
CH□ digital operation value (32-bit) (H)	413	613	813	1013
CH□ digital operation value (32-bit) (L) (in Q compatible (RD) mode)	452	454	456	458
CH□ digital operation value (32-bit) (H) (in Q compatible (RD) mode)	453	455	457	459

■Refreshing cycle

If averaging processing is performed, values are updated at every averaging process cycle, but if not performed, values are updated at every sampling cycle.

CH1 Range setting monitor (Input type setting) [R mode]

The values of the input type and input range specified by 'CH1 Range setting (Input type setting)' (Un\G598) can be checked.

Input type	Input range	Monitor value
Resistance temperature detector	Pt100 (-200 to 850°C)	0000H
	Pt100 (-20 to 120°C)	0001H
	JPt100 (-180 to 600°C)	0002H
	JPt100 (-20 to 120°C)	0003H
	Pt100 (0 to 200°C)	0004H
	JPt100 (0 to 200°C)	0005H
	Pt1000 (-200 to 850°C)	0006H
	Ni100 (-60 to 250°C)	0008H
	Pt50 (-200 to 650°C)	0009H
Thermocouple	K thermocouple (-270 to 1370°C)	0010H
	E thermocouple (-270 to 1000°C)	0011H
	J thermocouple (-210 to 1200°C)	0012H
	T thermocouple (-270 to 400°C)	0013H
	B thermocouple (0 to 1820°C)	0014H
	R thermocouple (-50 to 1760°C)	0015H
	S thermocouple (-50 to 1760°C)	0016H
	N thermocouple (-270 to 1300°C)	0017H
Micro voltage	-100 to 100mV	0020H
Resistor	0 to 500Ω	0030H
	0 to 4000Ω	0031H
	0 to 16000Ω	0032H

Restriction

For channels where conversion is disabled, values stored in this area will not be updated because the input range cannot be changed for these channels. For details, refer to the following.

☞ Page 59 Input Type/Range Setting Function

A

Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Range setting monitor (Input type setting)	430	630	830	1030

Range setting monitor (Input type setting) [Q compatible mode]

- With the Q compatible (RD) mode function used, the value of RTD type, which is set in 'Range setting (Input type setting)' (Un\G402), can be checked.

Input type	Input range	Monitor value
Resistance temperature detector	Pt100 (-200 to 850°C)	0H
	Pt100 (-20 to 120°C)	1H
	JPt100 (-180 to 600°C)	2H
	JPt100 (-20 to 120°C)	3H
	Pt100 (0 to 200°C)	4H
	JPt100 (0 to 200°C)	5H
	Pt1000 (-200 to 850°C)	6H
	Ni100 (-60 to 250°C)	8H
	Pt50 (-200 to 650°C)	9H

- With the Q compatible (TD) mode function used, the value of the thermocouple or micro voltage type, which is set in 'Range setting (Input type setting)' (Un\G402), can be checked.

Input type	Input range	Monitor value
Thermocouple	K thermocouple (-270 to 1370°C)	0H
	E thermocouple (-270 to 1000°C)	1H
	J thermocouple (-210 to 1200°C)	2H
	T thermocouple (-270 to 400°C)	3H
	B thermocouple (0 to 1820°C)	4H
	R thermocouple (-50 to 1760°C)	5H
	S thermocouple (-50 to 1760°C)	6H
	N thermocouple (-270 to 1300°C)	7H
Micro voltage	-100 to 100mV	8H

b15	...	b12	b11	...	b8	b7	...	b4	b3	...	b0
CH4		CH3			CH2			CH1			

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0

(1)

(1) Input range

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Range setting monitor (Input type setting) (in Q compatible mode)	20			



For channels where conversion is disabled, values stored in this area will not be updated because the input range cannot be changed for these channels. For details, refer to the following.

➡ Page 59 Input Type/Range Setting Function

CH1 Head pointer

The buffer memory address of the oldest data in CH1 Logging data (Un\G10000 to Un\G10999) can be checked with this buffer memory area.

The offset value counted from the start address of CH1 Logging data (Un\G10000 to Un\G10999) is stored.

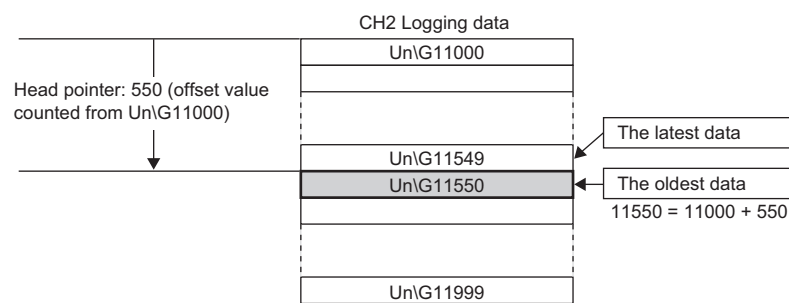
■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Head pointer	434	634	834	1034
CH□ Head pointer (in Q compatible mode)	1090	1091	1092	1093

Ex.

When the value of 'CH2 Head pointer' (Un\G634) is 550



Point

- Until the first 1000 points of data are logged from the beginning of logging, the value in 'CH1 Head pointer' (Un\G434) is fixed to 0 since the oldest data is stored in the start address of CH1 Logging data (Un\G10000 to Un\G10999). On and after the 1001st data, 'CH1 Head pointer' (Un\G434) increases one by one each time data is stored.
- When 'CH1 Logging hold request' (Un\G471) is turned on and off, 'CH1 Head pointer' (Un\G434) is cleared to 0.

A

CH1 Latest pointer

The buffer memory address of the latest data in CH1 Logging data (Un\G10000 to Un\G10999) can be checked with this buffer memory area.

The offset value counted from the start address of CH1 Logging data (Un\G10000 to Un\G10999) is stored.

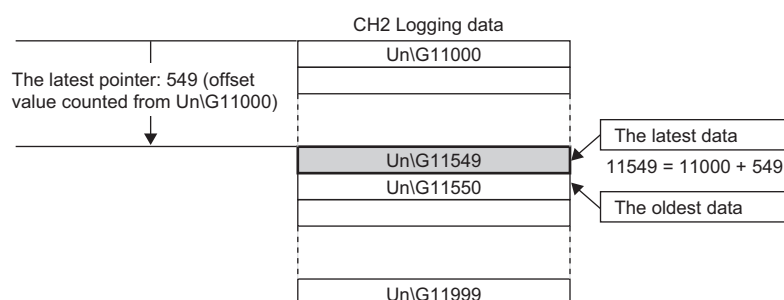
■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Latest pointer	435	635	835	1035
CH□ Latest pointer (in Q compatible mode)	1098	1099	1100	1101

Ex.

When the value of 'CH2 Latest pointer' (Un\G635) is 549



Point

- 'CH1 Latest pointer' (Un\G435) increases one by one each time data is stored from beginning of the logging.
- When 'CH1 Logging hold request' (Un\G471) is turned on and off, 'CH1 Latest pointer' (Un\G435) is cleared to 0.

CH1 Number of logging data

The number of data stored in the logging data storage area can be checked during the logging.

'CH1 Number of logging data' (Un\G436) increases one by one each time data is stored from beginning of the logging.

When the value in the logging data storage area reaches 1000, 'CH1 Number of logging data' (Un\G436) is fixed to 1000 since the value is overwritten from the head again.

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

☞ Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Number of logging data	436	636	836	1036
CH□ Number of logging data (in Q compatible mode)	1106	1107	1108	1109

Point

When 'CH1 Logging hold request' (Un\G471) is turned on and off, 'CH1 Number of logging data' (Un\G436) is cleared to 0.

CH1 Trigger pointer

Of CH1 Logging data (Un\G10000 to Un\G10999), 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\G10999) is stored.

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

 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Trigger pointer	437	637	837	1037
CH□ Trigger pointer (in Q compatible mode)	1114	1115	1116	1117

Point

When 'CH1 Logging hold request' (Un\G471) is turned on and off, 'CH1 Trigger pointer' (Un\G437) is cleared to 0.

CH1 Current logging read pointer

Each time an amount equivalent to the logging read points monitor value is logged, a value calculated by the following formula is stored.

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

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

 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Current logging read pointer	438	638	838	1038
CH□ Current logging read pointer (in Q compatible mode)	1216	1217	1218	1219

CH1 Previous logging read pointer

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

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

 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Previous logging read pointer	439	639	839	1039
CH□ Previous logging read pointer (in Q compatible mode)	1224	1225	1226	1227

CH1 Logging read points monitor value

The number of the actual logging read points is stored.

When 'Operating condition setting request' (Y9) is turned on and off, a value is not stored in the channel where the logging read function is disabled.

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

☞ Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging read points monitor value	440	640	840	1040
CH□ Logging read points monitor value (in Q compatible mode)	1232	1233	1234	1235

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' (Y9) is turned on and 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 92 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
CH□ Logging cycle monitor value (s)	441	641	841	1041
CH□ Logging cycle monitor value (ms)	442	642	842	1042
CH□ Logging cycle monitor value (s) (in Q compatible mode)	1122	1125	1128	1131
CH□ Logging cycle monitor value (ms) (in Q compatible mode)	1123	1126	1129	1132

CH1 Trigger generation time

The time when a trigger is generated is recorded.

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

 Page 92 Logging Function

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

Item	Storage contents	Storage example ^{*1}
First two digits of the year/Last two digits of the year	Stored in BCD code.	2025H
Month/Day		0130H
Hour/Minute		1035H
Second		40H
Day of the week	One of the following values is stored in BCD code. <ul style="list-style-type: none"> • Sunday: 00H • Monday: 01H • Tuesday: 02H • Wednesday: 03H • Thursday: 04H • Friday: 05H • Saturday: 06H 	04H
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 Thursday, January 30th, 2025.

■ Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Trigger generation time (First/Last two digits of the year)	444	644	844	1044
CH□ Trigger generation time (Month/Day)	445	645	845	1045
CH□ Trigger generation time (Hour/Minute)	446	646	846	1046
CH□ Trigger generation time (Second/Day of the week)	447	647	847	1047
CH□ Trigger generation time (Millisecond)	448	648	848	1048
CH□ Trigger generation time (First/Last two digits of the year) (in Q compatible mode)	1154	1158	1162	1166
CH□ Trigger generation time (Month/Day) (in Q compatible mode)	1155	1159	1163	1167
CH□ Trigger generation time (Hour/Minute) (in Q compatible mode)	1156	1160	1164	1168
CH□ Trigger generation time (Second/Day of the week) (in Q compatible mode)	1157	1161	1165	1169
CH□ Trigger generation time (Millisecond) (in Q compatible mode)	1186	1187	1188	1189

A

Point

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

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 92 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
CH□ Logging hold request	471	671	871	1071
CH□ Logging hold request (in Q compatible mode)	1008	1009	1010	1011

■Operation of the logging hold processing

- When 'CH1 Level trigger condition setting' (Un\G540) is set to Disable (0), the logging hold processing starts by turning off and on 'CH1 Logging hold request' (Un\G471).
- When 'CH1 Level trigger condition setting' (Un\G540) is set to a value other than Disable (0), the logging hold processing starts after 'CH1 Logging hold request' (Un\G471) is turned off and on and the set trigger condition is satisfied. When the level trigger is enabled, use this buffer memory area as an interlock condition to operate the level trigger.
- If 'CH1 Logging hold request' (Un\G471) is turned on and off during the logging hold processing, the hold (stop) status is cleared and the logging restarts.

■Default value

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



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

CH1 Conversion value shift amount

This buffer memory area can be used in R mode and Q compatible (TD) mode.

The specified 'CH1 Conversion value shift amount' (Un\G472) is added (shifted) onto 'CH1 Digital output value' (Un\G400), and the result is stored in 'CH1 digital operation value' (Un\G402).

- In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, a value set to 'CH1 Conversion value shift amount' (Un\G472) is added onto 'CH1 digital operation value' (Un\G402) regardless of whether 'Operating condition setting request' (Y9) is turned on or off.



(1) Data section

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

- In R mode with the input type set to RTD, the value of 'CH1 Conversion value shift amount' (Un\G472) is ignored.

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

 Page 78 Shift Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Conversion value shift amount	472	672	872	1072
CH□ Conversion value shift amount (in Q compatible (TD) mode)	500	501	502	503

■Setting range

The possible range is from -32768 to 32767.

■Default value

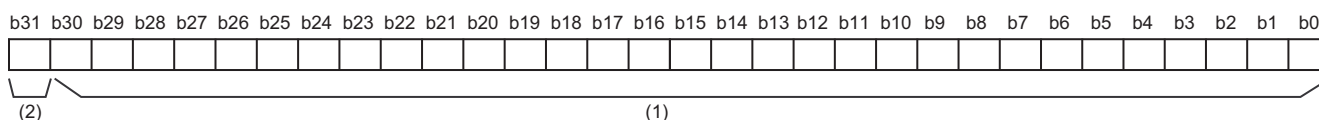
The default value is 0 for all the channels.

CH1 Conversion value shift amount (32-bit)

This buffer memory area can be used in R mode and Q compatible (RD) mode.

The specified 'CH1 Conversion value shift amount (32-bit)' (Un\G474, Un\G475) is added (shifted) onto 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411), and the result is stored in 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413).

- In R mode with the input type set to RTD, or in Q compatible (RD) mode, a value set to 'CH1 Conversion value shift amount (32-bit)' (Un\G474, Un\G475) is added onto 'CH1 digital operation value (32-bit)' (Un\G412, Un\G413) regardless of whether 'Operating condition setting request' (Y9) is turned on or off.



(1) Data section

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

- In R mode with the input type set to thermocouple, micro voltage, or resistor, the value of 'CH1 Conversion value shift amount (32-bit)' (Un\G474, Un\G475) is ignored.

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

☞ Page 78 Shift Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Conversion value shift amount (32-bit) (L)	474	674	874	1074
CH□ Conversion value shift amount (32-bit) (H)	475	675	875	1075
CH□ Conversion value shift amount (32-bit) (L) (in Q compatible (RD) mode)	508	510	512	514
CH□ Conversion value shift amount (32-bit) (H) (in Q compatible (RD) mode)	509	511	513	515

■Setting range

The possible range is from -2147483648 to 2147483647.

■Default value

The default value is 0 for all the channels.

CH1 Conversion enable/disable setting [R mode]

Set whether to enable or disable the conversion.

For details on the conversion enable/disable setting function, refer to the following.

☞ Page 60 Conversion Enable/Disable Setting Function

Setting value	Setting content
0	Conversion enable
1	Conversion disable

Setting a value other than the above results in Conversion disable (1).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Conversion enable/disable setting	500	700	900	1100

■Enabling the setting

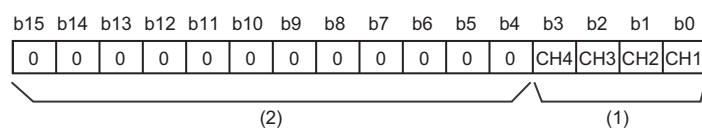
Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Conversion disable (1) for all the channels.

Conversion enable/disable setting [Q compatible mode]

Set whether to enable or disable the conversion with the Q compatible mode function used.



(1) 0: Conversion enable, 1: Conversion disable

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Conversion enable/disable setting (in Q compatible mode)	0			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Conversion disable (1) for all the channels.

CH1 Averaging process specification [R mode]

Select processing to be performed among the sampling processing, averaging processing, and filter processing.

Averaging processing consists of time average, count average, and moving average.

Setting value	Setting content
0	Sampling processing
1	Time average
2	Count average
3	Moving average
4	Primary delay filter

Setting a value other than the above causes an averaging process specification setting range error (error code: 191□H).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Averaging process specification	501	701	901	1101

■Enabling the setting

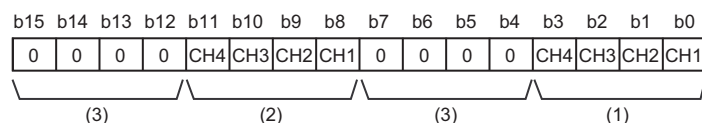
Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Sampling processing (0) for all the channels.

Averaging process specification [Q compatible mode]

For Q compatible mode, select processing to be performed among the sampling processing and averaging processing (count average, time average).



(1) 0: Count average, 1: Time average

(2) 0: Sampling processing, 1: Averaging processing

(3) The values of b4 to b7 and b12 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
Averaging process specification (in Q compatible mode)	9			

- When selecting the averaging processing, set time average or count average.
- When selecting the sampling processing, the time average or count average setting is ignored.
- When a value other than 0000H is written in 'Extended averaging process specification' (Un\G134), the setting in this area is ignored.
- When a value other than 0000H is written in 'Extended averaging process specification' (Un\G134) and 'Operating condition setting request' (Y9) is turned on and off, the setting content of 'Extended averaging process specification' (Un\G134) is applied to 'Averaging process specification' (Un\G9). However, if 'Extended averaging process specification' (Un\G134) is set to "3: Moving average" or "4: Primary delay filter", then "0: Sampling processing" or "0: Count average" is set for the corresponding channel of 'Averaging process specification' (Un\G9).

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

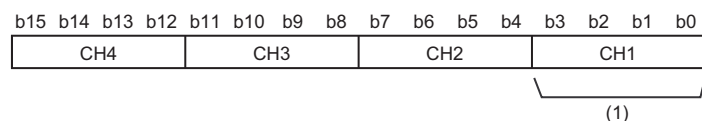
■Default value

The default value is Sampling processing (0) for all the channels.

Extended averaging process specification [Q compatible mode]

For Q compatible mode, select processing to be performed among the sampling processing, averaging processing (count average, time average, moving average), and primary delay filter.

When using moving average or primary delay filter, use this buffer memory area.



(1) 0: Sampling processing, 1: Time average, 2: Count average, 3: Moving average, 4: Primary delay filter

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Extended averaging process specification (in Q compatible mode)	134			

- When a value other than "0000H" is set, the setting for 'Averaging process specification' (Un\G9) is ignored.
- "0: Sampling processing" is set when a value out of the setting range is set.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Sampling processing (0) for all the channels.

CH1 Time average/Count average/Moving average/Primary delay filter constant setting

Configure the time (for averaging), count (for averaging), moving average count, and primary delay filter constant for each channel where the averaging processing is specified.

The following table lists the setting ranges.

Setting value	Setting content
160 to 5000 (ms)	Time average
4 to 500 (times)	Count average
2 to 200 (times)	Moving average
1 to 500 (times)	Primary delay filter constant

Setting a value other than the above causes any of the following: a time average setting range error (error code: 192□H), count average setting range error (error code: 193□H), moving average setting range error (error code: 194□H), or primary delay filter constant setting range error (error code: 195□H). The conversion processing is performed with the settings before the occurrence of the error.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Time average/Count average/Moving average/Primary delay filter constant setting	502	702	902	1102
CH□ Time average/Count average/Moving average/Primary delay filter constant setting (in Q compatible mode)	1	2	3	4

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

Point

- Set a primary delay filter constant for the primary delay filter. The value of the time constant (ms) is the product of the primary delay filter constant and the sampling cycle.
- Since the default value is 0, change the setting value according to the processing method.
- The setting for this area is ignored in the channel where 'CH1 Averaging process specification' (Un\G501) is set to Sampling processing (0).

A

CH1 Alert output setting (Process alarm) [R mode]

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 80 Alert Output Function

Setting value	Setting content
0	Enable
1	Disable

Setting a value other than the above causes an alert output setting (Process alarm) range error (error code: 1B0□H).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Alert output setting (Process alarm)	512	712	912	1112

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

Alert output setting (Process alarm) [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the alert output of process alarms.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	0	0	0	0	0	CH4	CH3	CH2	CH1
(2)												(1)			

(1) 0: Process alarm enabled, 1: Process alarm disabled

(2) The information of b4 to b15 is fixed to 0.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Alert output setting (Process alarm) (in Q compatible mode)	47			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

CH1 Alert output setting (Rate alarm) [R mode]

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 80 Alert Output Function

Setting value	Setting content
0	Enable
1	Disable

Setting a value other than the above causes an alert output setting (Rate alarm) range error (error code: 1B8□H).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Alert output setting (Rate alarm)	513	713	913	1113

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

Alert output setting (Rate alarm) [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the alert output of rate alarms.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	0	0	0	0	0	CH4	CH3	CH2	CH1
(2)												(1)			

(1) 0: Rate alarm enabled, 1: Rate alarm disabled

(2) The information of b4 to b15 is fixed to 0.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Alert output setting (Rate alarm) (in Q compatible mode)	410			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

CH1 Process alarm upper upper limit value

With the following conditions, set an upper upper limit value of the alert output function (Process alarm).

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm upper upper limit value	514	714	914	1114
CH□ Process alarm upper upper limit value (in Q compatible (TD) mode)	89	93	97	101

■Setting range

The possible range varies depending on the input range.

- For the thermocouple input (can be set in increments of 0.1°C)

Input range	Setting range
K thermocouple	-2700 to 13700 (-270.0 to 1370.0°C)
E thermocouple	-2700 to 10000 (-270.0 to 1000.0°C)
J thermocouple	-2100 to 12000 (-210.0 to 1200.0°C)
T thermocouple	-2700 to 4000 (-270.0 to 400.0°C)
B thermocouple	0 to 18200 (0.0 to 1820.0°C)
R thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
S thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
N thermocouple	-2700 to 13000 (-270.0 to 1300.0°C)

- For micro voltage input

Input range	Setting range
-100 to 100mV	-30000 to 30000

- For resistor input

Input range	Setting range
0 to 500Ω	0 to 32767
0 to 4000Ω	0 to 32767
0 to 16000Ω	0 to 32767

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 12000 for all the channels.

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value, upper lower limit value, lower upper limit value, and lower lower limit value.
- A channel where the set values do not satisfy the condition "Upper upper limit value ≥ Upper lower limit value ≥ Lower upper limit value ≥ Lower lower limit value" or where a value out of the measuring range is set for the upper upper limit value causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

CH1 Process alarm upper lower limit value

With the following conditions, set an upper lower limit value of the alert output function (Process alarm).

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm upper lower limit value	516	716	916	1116
CH□ Process alarm upper lower limit value (in Q compatible (TD) mode)	88	92	96	100

■Setting range

The possible range varies depending on the input range.

- For the thermocouple input (can be set in increments of 0.1°C)

Input range	Setting range
K thermocouple	-2700 to 13700 (-270.0 to 1370.0°C)
E thermocouple	-2700 to 10000 (-270.0 to 1000.0°C)
J thermocouple	-2100 to 12000 (-210.0 to 1200.0°C)
T thermocouple	-2700 to 4000 (-270.0 to 400.0°C)
B thermocouple	0 to 18200 (0.0 to 1820.0°C)
R thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
S thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
N thermocouple	-2700 to 13000 (-270.0 to 1300.0°C)

- For micro voltage input

Input range	Setting range
-100 to 100mV	-30000 to 30000

- For resistor input

Input range	Setting range
0 to 500Ω	0 to 32767
0 to 4000Ω	0 to 32767
0 to 16000Ω	0 to 32767

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 12000 for all the channels.

A

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).

CH1 Process alarm lower upper limit value

With the following conditions, set a lower upper limit value of the alert output function (Process alarm).

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm lower upper limit value	518	718	918	1118
CH□ Process alarm lower upper limit value (in Q compatible (TD) mode)	87	91	95	99

■Setting range

The possible range varies depending on the input range.

- For the thermocouple input (can be set in increments of 0.1°C)

Input range	Setting range
K thermocouple	-2700 to 13700 (-270.0 to 1370.0°C)
E thermocouple	-2700 to 10000 (-270.0 to 1000.0°C)
J thermocouple	-2100 to 12000 (-210.0 to 1200.0°C)
T thermocouple	-2700 to 4000 (-270.0 to 400.0°C)
B thermocouple	0 to 18200 (0.0 to 1820.0°C)
R thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
S thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
N thermocouple	-2700 to 13000 (-270.0 to 1300.0°C)

- For micro voltage input

Input range	Setting range
-100 to 100mV	-30000 to 30000

- For resistor input

Input range	Setting range
0 to 500Ω	0 to 32767
0 to 4000Ω	0 to 32767
0 to 16000Ω	0 to 32767

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is -2000 for all the channels.

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value, upper lower limit value, lower upper limit value, and lower lower limit value.
- A channel where the set values do not satisfy the condition "Upper upper limit value ≥ Upper lower limit value ≥ Lower upper limit value ≥ Lower lower limit value" causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

CH1 Process alarm lower lower limit value

With the following conditions, set a lower lower limit value of the alert output function (Process alarm)

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm lower lower limit value	520	720	920	1120
CH□ Process alarm lower lower limit value (in Q compatible (TD) mode)	86	90	94	98

■Setting range

The possible range varies depending on the input range.

- For the thermocouple input (can be set in increments of 0.1°C)

Input range	Setting range
K thermocouple	-2700 to 13700 (-270.0 to 1370.0°C)
E thermocouple	-2700 to 10000 (-270.0 to 1000.0°C)
J thermocouple	-2100 to 12000 (-210.0 to 1200.0°C)
T thermocouple	-2700 to 4000 (-270.0 to 400.0°C)
B thermocouple	0 to 18200 (0.0 to 1820.0°C)
R thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
S thermocouple	-500 to 17600 (-50.0 to 1760.0°C)
N thermocouple	-2700 to 13000 (-270.0 to 1300.0°C)

- For micro voltage input

Input range	Setting range
-100 to 100mV	-30000 to 30000

- For resistor input

Input range	Setting range
0 to 500Ω	0 to 32767
0 to 4000Ω	0 to 32767
0 to 16000Ω	0 to 32767

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is -2000 for all the channels.

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value, upper lower limit value, lower upper limit value, and lower lower limit value.
- A channel where the set values do not satisfy the condition "Upper upper limit value $\geq$ Upper lower limit value $\geq$ Lower upper limit value $\geq$ Lower lower limit value" or where a value out of the measuring range is set for the lower lower limit value causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

A

CH1 Process alarm upper upper limit value (32-bit) (L) (H)

With the following conditions, set an upper upper limit value (32-bit) of the alert output function (Process alarm).

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm upper upper limit value (32-bit) (L)	568	768	968	1168
CH□ Process alarm upper upper limit value (32-bit) (H)	569	769	969	1169
CH□ Process alarm upper upper limit value (32-bit) (L) (in Q compatible (RD) mode)	92	100	108	116
CH□ Process alarm upper upper limit value (32-bit) (H) (in Q compatible (RD) mode)	93	101	109	117

■Setting range

The possible range varies depending on the input range.

- For the RTD input (can be set in increments of 0.001°C)

Input range	Setting range
Pt100 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Pt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
Pt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
JPt100 (-180 to 600°C)	-180000 to 600000 (-180.000 to 600.000°C)
JPt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
JPt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
Pt1000 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Ni100 (-60 to 250°C)	-60000 to 250000 (-60.000 to 250.000°C)
Pt50 (-200 to 650°C)	-200000 to 650000 (-200.000 to 650.000°C)

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 850000 for all the channels.

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value (32-bit), upper lower limit value (32-bit), lower upper limit value (32-bit), and lower lower limit value (32-bit).
- A channel where the set values do not satisfy the condition "Upper upper limit value (32-bit) ≥ Upper lower limit value (32-bit) ≥ Lower upper limit value (32-bit) ≥ Lower lower limit value (32-bit)" or where a value out of the measuring range is set for the upper upper limit value (32-bit) causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

CH1 Process alarm upper lower limit value (32-bit) (L) (H)

With the following conditions, set an upper lower limit value (32-bit) of the alert output function (Process alarm).

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm upper lower limit value (32-bit) (L)	570	770	970	1170
CH□ Process alarm upper lower limit value (32-bit) (H)	571	771	971	1171
CH□ Process alarm upper lower limit value (32-bit) (L) (in Q compatible (RD) mode)	90	98	106	114
CH□ Process alarm upper lower limit value (32-bit) (H) (in Q compatible (RD) mode)	91	99	107	115

■Setting range

The possible range varies depending on the input range.

- For the RTD input (can be set in increments of 0.001°C)

Input range	Setting range
Pt100 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Pt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
Pt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
JPt100 (-180 to 600°C)	-180000 to 600000 (-180.000 to 600.000°C)
JPt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
JPt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
Pt1000 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Ni100 (-60 to 250°C)	-60000 to 250000 (-60.000 to 250.000°C)
Pt50 (-200 to 650°C)	-200000 to 650000 (-200.000 to 650.000°C)

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 850000 for all the channels.

A

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value (32-bit), upper lower limit value (32-bit), lower upper limit value (32-bit), and lower lower limit value (32-bit).
- A channel where the set values do not satisfy the condition "Upper upper limit value (32-bit) ≥ Upper lower limit value (32-bit) ≥ Lower upper limit value (32-bit) ≥ Lower lower limit value (32-bit)" causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

CH1 Process alarm lower upper limit value (32-bit) (L) (H)

With the following conditions, set a lower upper limit value (32-bit) of the alert output function (Process alarm).

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm lower upper limit value (32-bit) (L)	572	772	972	1172
CH□ Process alarm lower upper limit value (32-bit) (H)	573	773	973	1173
CH□ Process alarm lower upper limit value (32-bit) (L) (in Q compatible (RD) mode)	88	96	104	112
CH□ Process alarm lower upper limit value (32-bit) (H) (in Q compatible (RD) mode)	89	97	105	113

■Setting range

The possible range varies depending on the input range.

- For the RTD input (can be set in increments of 0.001°C)

Input range	Setting range
Pt100 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Pt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
Pt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
JPt100 (-180 to 600°C)	-180000 to 600000 (-180.000 to 600.000°C)
JPt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
JPt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
Pt1000 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Ni100 (-60 to 250°C)	-60000 to 250000 (-60.000 to 250.000°C)
Pt50 (-200 to 650°C)	-200000 to 650000 (-200.000 to 650.000°C)

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is -200000 for all the channels.

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value (32-bit), upper lower limit value (32-bit), lower upper limit value (32-bit), and lower lower limit value (32-bit).
- A channel where the set values do not satisfy the condition "Upper upper limit value (32-bit) ≥ Upper lower limit value (32-bit) ≥ Lower upper limit value (32-bit) ≥ Lower lower limit value (32-bit)" causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

CH1 Process alarm lower lower limit value (32-bit) (L) (H)

With the following conditions, set a lower lower limit value (32-bit) of the alert output function (Process alarm).

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Process alarm lower lower limit value (32-bit) (L)	574	774	974	1174
CH□ Process alarm lower lower limit value (32-bit) (H)	575	775	975	1175
CH□ Process alarm lower lower limit value (32-bit) (L) (in Q compatible (RD) mode)	86	94	102	110
CH□ Process alarm lower lower limit value (32-bit) (H) (in Q compatible (RD) mode)	87	95	103	111

■Setting range

The possible range varies depending on the input range.

- For the RTD input (can be set in increments of 0.001°C)

Input range	Setting range
Pt100 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Pt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
Pt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
JPt100 (-180 to 600°C)	-180000 to 600000 (-180.000 to 600.000°C)
JPt100 (-20 to 120°C)	-20000 to 120000 (-20.000 to 120.000°C)
JPt100 (0 to 200°C)	0 to 200000 (0.000 to 200.000°C)
Pt1000 (-200 to 850°C)	-200000 to 850000 (-200.000 to 850.000°C)
Ni100 (-60 to 250°C)	-60000 to 250000 (-60.000 to 250.000°C)
Pt50 (-200 to 650°C)	-200000 to 650000 (-200.000 to 650.000°C)

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is -200000 for all the channels.

A

Point

- When using the process alarm, configure the 4-step settings for the process alarm upper upper limit value (32-bit), upper lower limit value (32-bit), lower upper limit value (32-bit), and lower lower limit value (32-bit).
- A channel where the set values do not satisfy the condition "Upper upper limit value (32-bit) $\geq$ Upper lower limit value (32-bit) $\geq$ Lower upper limit value (32-bit) $\geq$ Lower lower limit value (32-bit)" or where a value out of the measuring range is set for the lower lower limit value (32-bit) causes a process alarm upper lower limit value setting range error (error code: 1B△□H).

CH1 Rate alarm alert detection cycle setting

Set the cycle at which the change rate of digital output values is checked.
The value of the cycle to detect a rate alarm alert is the product of the value in 'CH1 Rate alarm alert detection cycle setting' (Un\G522) and the conversion cycle.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Rate alarm alert detection cycle setting	522	722	922	1122
CH□ Rate alarm alert detection cycle setting (in Q compatible mode)	412	413	414	415

■Setting range

The possible range is from 1 to 32000 (times).

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

Point

- 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

With the following conditions, set an upper limit on the change rate of digital output values to detect a rate alarm.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Rate alarm upper limit value	524	724	924	1124
CH□ Rate alarm upper limit value (in Q compatible (TD) mode)	420	424	428	432

■Setting range

The possible range is from -32768 to 32767.

When the input type is thermocouple, set a value in increments of 0.1°C.

When the input type is micro voltage or resistor, set a value from 0 to the maximum digital output value (25000 for micro voltage and 32000 for resistor) as a percentage (in increments of 0.1%).

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

Point

- 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 do not satisfy the condition "Upper limit value > Lower limit value" causes a rate alarm upper/lower limit setting value inversion error (error code: 1BA□H).

A

CH1 Rate alarm lower limit value

With the following conditions, set a lower limit on the change rate of digital output values to detect a rate alarm.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Rate alarm lower limit value	526	726	926	1126
CH□ Rate alarm lower limit value (in Q compatible (TD) mode)	422	426	430	434

■Setting range

The possible range is from -32768 to 32767.

When the input type is thermocouple, set a value in increments of 0.1°C.

When the input type is micro voltage or resistor, set a value from 0 to the maximum digital output value (25000 for micro voltage and 32000 for resistor) as a percentage (in increments of 0.1%).

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

Point

- 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 do not 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).

CH1 Rate alarm upper limit value (32-bit) (L) (H)

With the following conditions, set an upper limit (32-bit) on the change rate of digital output values to detect a rate alarm.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Rate alarm upper limit value (32-bit) (L)	576	776	976	1176
CH□ Rate alarm upper limit value (32-bit) (H)	577	777	977	1177
CH□ Rate alarm upper limit value (32-bit) (L) (in Q compatible (RD) mode)	420	424	428	432
CH□ Rate alarm upper limit value (32-bit) (H) (in Q compatible (RD) mode)	421	425	429	433

■Setting range

The possible range is from -2147483648 to 2147483647. (can be set in increments of 0.001°C)

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

Point

- When using the rate alarm, configure the 2-step settings for the rate alarm upper limit value (32-bit) and lower limit value (32-bit).
- A channel where the set values do not satisfy the condition "Upper limit value (32-bit) $\geq$ Lower limit value (32-bit)" causes a rate alarm upper/lower limit setting value inversion error (error code: 1BA□H).

A

CH1 Rate alarm lower limit value (32-bit) (L) (H)

With the following conditions, set a lower limit (32-bit) on the change rate of digital output values to detect a rate alarm.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the alert output function, refer to the following.

 Page 80 Alert Output Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Rate alarm lower limit value (32-bit) (L)	578	778	978	1178
CH□ Rate alarm lower limit value (32-bit) (H)	579	779	979	1179
CH□ Rate alarm lower limit value (32-bit) (L) (in Q compatible (RD) mode)	422	426	430	434
CH□ Rate alarm lower limit value (32-bit) (H) (in Q compatible (RD) mode)	423	427	431	435

■Setting range

The possible range is from -2147483648 to 2147483647. (can be set in increments of 0.001°C)

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

Point

- When using the rate alarm, configure the 2-step settings for the rate alarm upper limit value (32-bit) and lower limit value (32-bit).
- A channel where the set values do not satisfy the condition "Upper limit value (32-bit) $\geq$ Lower limit value (32-bit)" causes a rate alarm upper/lower limit setting value inversion error (error code: 1BA□H).

CH1 Disconnection detection enable/disable setting [R mode]

Set whether to enable or disable the disconnection detection function.

For details on the disconnection detection function, refer to the following.

 Page 65 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).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Disconnection detection enable/disable setting	530	730	930	1130

■Enabling the setting

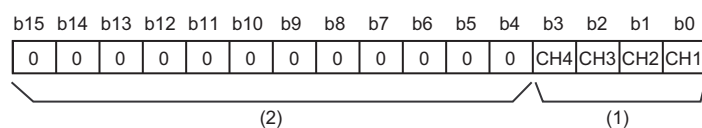
Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Enable (0) for all the channels.

Disconnection detection enable/disable setting [Q compatible mode]

Set whether to enable or disable the disconnection detection function with the Q compatible mode function used.



(1) 0: Disconnection detection enable, 1: Disconnection detection disable

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Disconnection detection enable/disable setting (in Q compatible mode)	146			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Enable (0) for all the channels.

CH1 Conversion setting at disconnection detection [R mode]

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 65 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
CH□ Conversion setting at disconnection detection	531	731	931	1131

■Enabling the setting

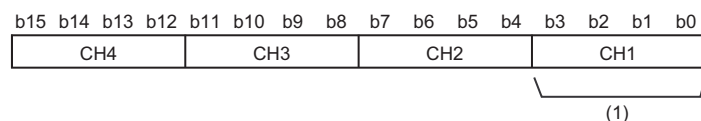
Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Downscale (1) for all the channels.

Conversion setting at disconnection detection [Q compatible mode]

Set what value is to be stored in 'CH1 Digital output value' (Un\G11) at the time of disconnection detection with the Q compatible mode function used.



(1) 0: Upscale, 1: Downscale, 2: Any value, 3: Value immediately 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
Conversion setting at disconnection detection (in Q compatible mode)	148			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Downscale (1) for all the channels.

CH1 Conversion setting value at disconnection detection

Set what value is to be stored in 'CH1 Digital output value' (Un\G400) at the time of disconnection detection.

This area is only enabled when 'CH1 Conversion setting at disconnection detection' (Un\G531) is set to Any value (2) and either of the following conditions is met.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

For details on the disconnection detection function, refer to the following.

☞ Page 65 Disconnection Detection Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Conversion setting value at disconnection detection	532	732	932	1132
CH□ Conversion setting value at disconnection detection (in Q compatible (TD) mode)	150	151	152	153

In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Setting range

The possible range is from -32768 to 32767.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Conversion setting value at disconnection detection (32-bit) (L) (H)

Set what value is to be stored in 'CH1 Digital output value (32-bit)' (Un\G410, Un\G411) at the time of disconnection detection. This area is only enabled when 'CH1 Conversion setting at disconnection detection' (Un\G531) is set to Any value (2) and either of the following conditions is met.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

For details on the disconnection detection function, refer to the following.

 Page 65 Disconnection Detection Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Conversion setting value at disconnection detection (32-bit) (L)	582	782	982	1182
CH□ Conversion setting value at disconnection detection (32-bit) (H)	583	783	983	1183
CH□ Conversion setting value at disconnection detection (in Q compatible (RD) mode) (32-bit) (L)	150	152	154	156
CH□ Conversion setting value at disconnection detection (in Q compatible (RD) mode) (32-bit) (H)	151	153	155	157

In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Setting range

The possible range is from -2147483648 to 2147483647. (can be set in increments of 0.001°C)

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Logging enable/disable setting

Set whether to enable or disable the logging function.

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

 Page 92 Logging Function

Setting value	Setting content
0	Enable
1	Disable

Setting a value other than the above causes a logging enable/disable setting range error (error code: 1D0□H).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging enable/disable setting	535	735	935	1135
CH□ Logging enable/disable setting (in Q compatible mode)	1000	1001	1002	1003

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

CH1 Logging data setting

Set which data is to be collected: digital output value or digital operation value.

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

 Page 92 Logging Function

Setting value	Setting content
0	Digital output value
1	Digital operation value

Setting a value other than the above causes a logging data setting range error (error code: 1D3□H).

When 'CH1 Logging enable/disable setting' (Un\G535) is set to Disable (1), the setting for 'CH1 Logging data setting' (Un\G536) is ignored.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging data setting	536	736	936	1136
CH□ Logging data setting (in Q compatible mode)	1024	1025	1026	1027

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is digital output value (0) for all the channels.

CH1 Logging cycle setting value

Set a cycle for storing the logging data.

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

 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging cycle setting value	537	737	937	1137
CH□ Logging cycle setting value (in Q compatible mode)	1032	1033	1034	1035

■Setting range

The setting range varies depending on the setting in 'CH1 Logging cycle unit setting' (Un\G538).

CH1 Logging cycle unit setting (Un\G538)	Setting range
ms (1)	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 on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 40 for all the channels.

CH1 Logging cycle unit setting

Set a cycle unit for storing the logging data.

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

📖 Page 92 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).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging cycle unit setting	538	738	938	1138
CH□ Logging cycle unit setting (in Q compatible mode)	1040	1041	1042	1043

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default is ms (1) for all the channels.

CH1 Post-trigger logging points

Set a number of data points collected for the time period from the occurrence of a hold trigger to the logging stop.

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

📖 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Post-trigger logging points	539	739	939	1139
CH□ Post-trigger logging points (in Q compatible mode)	1048	1049	1050	1051

■Setting range

The possible range is from 1 to 1000.

Setting a value out of the setting range causes a post-trigger logging points setting range error (error code: 1D4□H). Logging cannot be performed.

When 'CH1 Logging enable/disable setting' (Un\G535) is set to Disable (1), the setting for 'CH1 Post-trigger logging points' (Un\G539) is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 500 for all the channels.

CH1 Level trigger condition setting

Set the condition for the occurrence of a hold trigger when using the level trigger in the logging function.

To use the level trigger, set Level trigger condition setting to any of the following: 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 92 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
CH□ Level trigger condition setting	540	740	940	1140
CH□ Level trigger condition setting (in Q compatible mode)	1056	1057	1058	1059

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (0) for all the channels.

CH1 Trigger data

Set a buffer memory address to be monitored using a level trigger.

Set the buffer memory address where the target data for monitoring is stored.

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

 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Trigger data	541	741	941	1141
CH□ Trigger data (in Q compatible mode)	1064	1065	1066	1067

■Setting range

The possible range is from 0 to 9999.

Setting a value out of the setting range causes a trigger data setting range error (error code: 1D6□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 on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default values are set as shown below.

Channel	In R mode		In Q compatible mode	
	Default value	Buffer memory area to be monitored	Default value	Buffer memory area to be monitored
CH1	400	CH1 Digital output value (Un\G400)	11	CH1 Digital output value (Un\G11)
CH2	600	CH2 Digital output value (Un\G600)	12	CH2 Digital output value (Un\G12)
CH3	800	CH3 Digital output value (Un\G800)	13	CH3 Digital output value (Un\G13)
CH4	1000	CH4 Digital output value (Un\G1000)	14	CH4 Digital output value (Un\G14)

A

CH1 Trigger setting value

Set a level at which a level trigger is generated.

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

 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Trigger setting value	542	742	942	1142
CH□ Trigger setting value (in Q compatible mode)	1082	1083	1084	1085

■Setting range

The possible range is from -32768 to 32767.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Loading interrupt enable/disable setting

Set whether to enable or disable the logging read function.

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

 Page 105 Logging read function

Setting value	Setting content
0	Enable
1	Disable

- Setting a value other than the above causes a read interrupt enable/disable setting error (error code: 1D8□H). Logging cannot be performed.
- When CH1 Logging read enable/disable setting (Un\G544) is set to Enable (0), an interrupt is generated and sent to the CPU module by setting a read pointer each time an amount equivalent to the logging read points setting value is logged.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Loading interrupt enable/disable setting	544	744	944	1144
CH□ Loading interrupt enable/disable setting (in Q compatible mode)	1200	1201	1202	1203

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

CH1 Logging read points setting value

An interrupt is generated to the CPU module each time the number of data logging reaches a predetermined number of points.

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

📖 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging read points setting value	545	745	945	1145
CH□ Logging read points setting value (in Q compatible mode)	1208	1209	1210	1211

■Setting range

The possible range is from 1 to 1000.

Setting a value out of the setting range causes a logging read points setting value range error (error code: 1D9□H). Logging cannot be performed.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 100 for all the channels.

CH1 Scaling enable/disable setting

Set whether to enable or disable the scaling.

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

📖 Page 73 Scaling Function

Setting value	Setting content
0	Enable
1	Disable

Setting a value other than the above causes a scaling enable/disable setting range error (error code: 1A0□H).

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling enable/disable setting	546	746	946	1146

■Enabling the setting

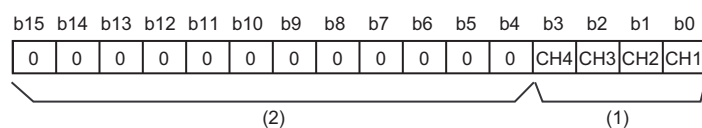
Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

Scaling enable/disable setting [Q compatible mode]

When the Q compatible mode function is used, set whether to enable or disable the scaling.



(1) 0: Scaling enabled, 1: Scaling disabled

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

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Scaling enable/disable setting (in Q compatible mode)	408			

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Disable (1) for all the channels.

CH1 Scaling range upper limit value

With the following conditions, set an upper limit value for the range of the scale conversion.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

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

 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling range upper limit value	548	748	948	1148
CH□ Scaling range upper limit value (in Q compatible (TD) mode)	63	65	67	69

■Setting range

- The possible range is from -32768 to 32767.
- A channel where the set values do not satisfy the condition "Scaling range upper limit value ≠ Scaling range lower limit value" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the setting for 'CH1 Scaling range upper limit value' (Un\G548) is ignored.
- In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Scaling range lower limit value

With the following conditions, set a lower limit value for the range of the scale conversion.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

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

📖 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling range lower limit value	550	750	950	1150
CH□ Scaling range lower limit value (in Q compatible (TD) mode)	62	64	66	68

■Setting range

- The possible range is from -32768 to 32767.
- A channel where the set values do not satisfy the condition "Scaling range upper limit value $\neq$ Scaling range lower limit value" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the setting for 'CH1 Scaling range lower limit value' (Un\G550) is ignored.
- In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Scaling range upper limit value (32-bit) (L) (H)

With the following conditions, set an upper limit value for the range of the scale conversion.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

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

 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling range upper limit value (32-bit) (L)	586	786	986	1186
CH□ Scaling range upper limit value (32-bit) (H)	587	787	987	1187
CH□ Scaling range upper limit value (32-bit) (L) (in Q compatible (RD) mode)	64	68	72	76
CH□ Scaling range upper limit value (32-bit) (H) (in Q compatible (RD) mode)	65	69	73	77

■Setting range

- The possible range is from -2147483648 to 2147483647. (can be set in increments of 0.001°C)
- A channel where the set values do not satisfy the condition "Scaling range upper limit value (32-bit) ≠ Scaling range lower limit value (32-bit)" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the settings for 'CH1 Scaling range upper limit value (32-bit) (L)' (Un\G586) and 'CH1 Scaling range upper limit value (32-bit) (H)' (Un\G587) are ignored.
- In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Scaling range lower limit value (32-bit) (L) (H)

With the following conditions, set a lower limit value (32-bit) for the range of the scale conversion.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

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

📖 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling range lower limit value (32-bit) (L)	588	788	988	1188
CH□ Scaling range lower limit value (32-bit) (H)	589	789	989	1189
CH□ Scaling range lower limit value (32-bit) (L) (in Q compatible (RD) mode)	62	66	70	74
CH□ Scaling range lower limit value (32-bit) (H) (in Q compatible (RD) mode)	63	67	71	75

■Setting range

- The possible range is from -2147483648 to 2147483647. (can be set in increments of 0.001°C)
- A channel where the set values do not satisfy the condition "Scaling range upper limit value (32-bit) ≠ Scaling range lower limit value (32-bit)" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the settings for 'CH1 Scaling range lower limit value (32-bit) (L)' (Un\G588) and 'CH1 Scaling range lower limit value (32-bit) (H)' (Un\G589) are ignored.
- In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

A

CH1 Scaling width upper limit value

With the following conditions, set an upper limit value for the width after scale conversion.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

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

 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling width upper limit value	552	752	952	1152
CH□ Scaling width upper limit value (in Q compatible (TD) mode)	79	81	83	85

■Setting range

- The possible range is from -32768 to 32767.
- A channel where the set values do not satisfy the condition "Scaling upper limit value $\neq$ Scaling lower limit value" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the following setting is ignored.
- In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Scaling width lower limit value

With the following conditions, set a lower limit value for the width after scale conversion.

- In R mode with the input type set to thermocouple, micro voltage, or resistor
- In Q compatible (TD) mode

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

 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling width lower limit value	554	754	954	1154
CH□ Scaling width lower limit value (in Q compatible (TD) mode)	78	80	82	84

■Setting range

- The possible range is from -32768 to 32767.
- A channel where the set values do not satisfy the condition "Scaling upper limit value $\neq$ Scaling lower limit value" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the setting for 'CH1 Scaling width lower limit value' (Un\G554) is ignored.
- In R mode with the input type set to RTD, or in Q compatible (RD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Scaling width upper limit value (32-bit) (L) (H)

With the following conditions, set an upper limit value for the width of the scale conversion.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

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

 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling width upper limit value (32-bit) (L)	590	790	990	1190
CH□ Scaling width upper limit value (32-bit) (H)	591	791	991	1191
CH□ Scaling width upper limit value (32-bit) (L) (in Q compatible (RD) mode)	470	474	478	482
CH□ Scaling width upper limit value (32-bit) (H) (in Q compatible (RD) mode)	471	475	479	483

■Setting range

- The possible range is from -2147483648 to 2147483647.
- A channel where the set values do not satisfy the condition "Scaling width upper limit value (32-bit) ≠ Scaling width lower limit value (32-bit)" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the settings for 'CH1 Scaling width upper limit value (32-bit) (L)' (Un\G590) and 'CH1 Scaling width upper limit value (32-bit) (H)' (Un\G591) are ignored.
- In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

A

CH1 Scaling width lower limit value (32-bit) (L) (H)

With the following conditions, set a lower limit value for the width of the scale conversion.

- In R mode with the input type set to RTD
- In Q compatible (RD) mode

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

 Page 73 Scaling Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Scaling width lower limit value (32-bit) (L)	592	792	992	1192
CH□ Scaling width lower limit value (32-bit) (H)	593	793	993	1193
CH□ Scaling width lower limit value (32-bit) (L) (in Q compatible (RD) mode)	468	472	476	480
CH□ Scaling width lower limit value (32-bit) (H) (in Q compatible (RD) mode)	469	473	477	481

■Setting range

- The possible range is from -2147483648 to 2147483647.
- A channel where the set values do not satisfy the condition "Scaling width upper limit value (32-bit) ≠ Scaling width lower limit value (32-bit)" causes a scaling setting range error (error code: 1A3□H).
- When 'CH1 Scaling enable/disable setting' (Un\G546) is set to Disable (1), the settings for 'CH1 Scaling width lower limit value (32-bit) (L)' (Un\G592) and 'CH1 Scaling width lower limit value (32-bit) (H)' (Un\G593) are ignored.
- In R mode with the input type set to thermocouple, micro voltage, or resistor, or in Q compatible (TD) mode, the value of this buffer memory area is ignored.

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is 0 for all the channels.

CH1 Range setting (Input type setting) [R mode]

This area is used to set up the input type and input range. Set the values according to the input type and input range in use.

Input type	Input range	Setting value
Resistance temperature detector	Pt100 (-200 to 850°C)	0000H
	Pt100 (-20 to 120°C)	0001H
	JPt100 (-180 to 600°C)	0002H
	JPt100 (-20 to 120°C)	0003H
	Pt100 (0 to 200°C)	0004H
	JPt100 (0 to 200°C)	0005H
	Ni100 (-60 to 250°C)	0008H
	Pt50 (-200 to 650°C)	0009H
Thermocouple	K thermocouple (-270 to 1370°C)	0010H
	E thermocouple (-270 to 1000°C)	0011H
	J thermocouple (-210 to 1200°C)	0012H
	T thermocouple (-270 to 400°C)	0013H
	B thermocouple (0 to 1820°C)	0014H
	R thermocouple (-50 to 1760°C)	0015H
	S thermocouple (-50 to 1760°C)	0016H
	N thermocouple (-270 to 1300°C)	0017H
Micro voltage	-100 to 100mV	0020H
Resistor	0 to 500Ω	0030H
	0 to 4000Ω	0031H
	0 to 16000Ω	0032H

- A channel where the set value is out of the above range causes a range setting range error (error code: 190□H).
- The input type and input range cannot be changed for channels where conversion is disabled. To change the input type and input range, set 'CH1 Conversion enable/disable setting' (Un\G500) to Conversion enable (0), and turn on and off 'Operating condition setting request' (Y9).

A

Point

The input type and input range can be set for each channel.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Range setting (Input type setting)	598	798	998	1198

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

The default value is Pt100 (-200 to 850°C) (0) for all the channels.

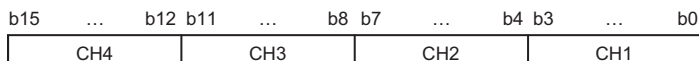
Range setting (Input type setting) [Q compatible mode]

With the Q compatible (RD) mode function used, this area is used to set up the input range for resistance temperature detector. Set up the range according to the resistance temperature detector in use.

Input type	Input range	Setting value
Resistance temperature detector	Pt100 (-200 to 850°C)	0H
	Pt100 (-20 to 120°C)	1H
	JPt100 (-180 to 600°C)	2H
	JPt100 (-20 to 120°C)	3H
	Pt100 (0 to 200°C)	4H
	JPt100 (0 to 200°C)	5H
	Pt1000 (-200 to 850°C)	6H
	Ni100 (-60 to 250°C)	8H
	Pt50 (-200 to 650°C)	9H

With the Q compatible (TD) mode function used, this area is used to set up the input type (thermocouple or micro voltage) and input range. Set up the values according to the thermocouple or micro voltage in use.

Input type	Input range	Setting value
Thermocouple	K thermocouple (-270 to 1370°C)	0H
	E thermocouple (-270 to 1000°C)	1H
	J thermocouple (-210 to 1200°C)	2H
	T thermocouple (-270 to 400°C)	3H
	B thermocouple (0 to 1820°C)	4H
	R thermocouple (-50 to 1760°C)	5H
	S thermocouple (-50 to 1760°C)	6H
	N thermocouple (-270 to 1300°C)	7H
Micro voltage	-100 to 100mV	8H



(1) Input range

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
Range setting (Input type setting) (in Q compatible mode)	402			

- A channel where the set value is out of the above range causes a range setting range error (error code: 190□H).
- The input range cannot be changed for channels where conversion is disabled. To change the input range, set the bit of corresponding channel of 'Conversion enable/disable setting [Q compatibility]' (Un\G0) to Conversion enable (0), and turn on and off 'Operating condition setting request' (Y9).

■Enabling the setting

Turn on and off 'Operating condition setting request' (Y9) to enable the setting.

■Default value

- In Q compatible (RD) mode: The default value is Pt100 (-200 to 850°C) (0) for all the channels.
- In Q compatible (TD) mode: The default value is K thermocouple (0) for all the channels.

Error history

Up to 16 errors that occurred in the 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 (upper)		Millisecond (lower)		
⋮	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.	2025H
Month/Day		0130H
Hour/Minute		1035H
Second		40H
Day of the week	One of the following values is stored in BCD code. <ul style="list-style-type: none"> • Sunday: 0 • Monday: 1 • Tuesday: 2 • Wednesday: 3 • Thursday: 4 • Friday: 5 • Saturday: 6 	04H
Millisecond (higher-order digits)/Millisecond (lower-order digits)	Stored in BCD code.	0628H

^{*1} These values assume that an error occurs at 10:35 and 40.628 seconds on Thursday, January 30th, 2025.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	No.1 to No.16
Error history	3600 to 3759
Error history (in Q compatible mode)	1810 to 1969



Alarm history

Up to 16 alarms that occurred in the module are recorded.

	b15	to	b8 b7	to	b0
Un\G3760	Alarm code				
Un\G3761	First two digits of the year		Last two digits of the year		
Un\G3762	Month		Day		
Un\G3763	Hour		Minute		
Un\G3764	Second		Day of the week		
Un\G3765	Millisecond (upper)		Millisecond (lower)		
⋮	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.	2025H
Month/Day		0130H
Hour/Minute		1035H
Second		40H
Day of the week	One of the following values is stored in BCD code. <ul style="list-style-type: none"> • Sunday: 0 • Monday: 1 • Tuesday: 2 • Wednesday: 3 • Thursday: 4 • Friday: 5 • Saturday: 6 	04H
Millisecond (higher-order digits)/Millisecond (lower-order digits)	Stored in BCD code.	0628H

*1 These values assume that an error occurs at 10:35 and 40.628 seconds on Thursday, January 30th, 2025.

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	No.1 to No.16
Alarm history	3760 to 3919
Alarm history (in Q compatible mode)	3760 to 3919

CH1 Logging data

This area stores the data logged by the logging function.

Up to 1000 points of data can be stored per channel. After the number of stored data points reaches 1000, data collection continues with the data overwritten from the head.

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

📖 Page 92 Logging Function

■Buffer memory address

The following shows the buffer memory address of this area.

Buffer memory name	CH1	CH2	CH3	CH4
CH□ Logging data	10000 to 10999	11000 to 11999	12000 to 12999	13000 to 13999
CH□ Logging data (in Q compatible mode)	5000 to 5999	6000 to 6999	7000 to 7999	8000 to 8999



- Turning off and on 'Operating condition setting request' (Y9) allows the logging data in all the channels to be cleared.
- Turning on and off Logging hold request while Logging hold flag is on allows logging to resume. In this case, the logged data is not cleared.

Appendix 6 Offset/Gain Correction Using the Shift Function and Scaling Function

When an error occurs in the measured digital output values, the error correction (offset/gain correction) can be performed by using the shift function and scaling function.

For offset/gain correction, adjust via the minimum input and maximum input of the measurement range in use.

To measure the range between -200°C and 1200°C using a K thermocouple, make adjustments with the following two points.

- Minimum input: -200°C
- Maximum input: 1200°C

To measure the range between -50mV and 50mV using micro voltage, make adjustments with the following two points.

- Minimum input: -50mV
- Maximum input: 50mV

Point

- Correction is performed first by the scaling function, then by the shift function. ( Page 58 Processing of Each Function)
- When offset/gain correction is performed using the scaling function and shift function, the resolution may drop. Therefore, if correction is possible with the shift function alone, skipping the scaling function correction is recommended.
- When online module change is performed on a module whose offset and gain were corrected using the shift function and scaling function, follow the flow procedure again to perform correction on the module after replacement.

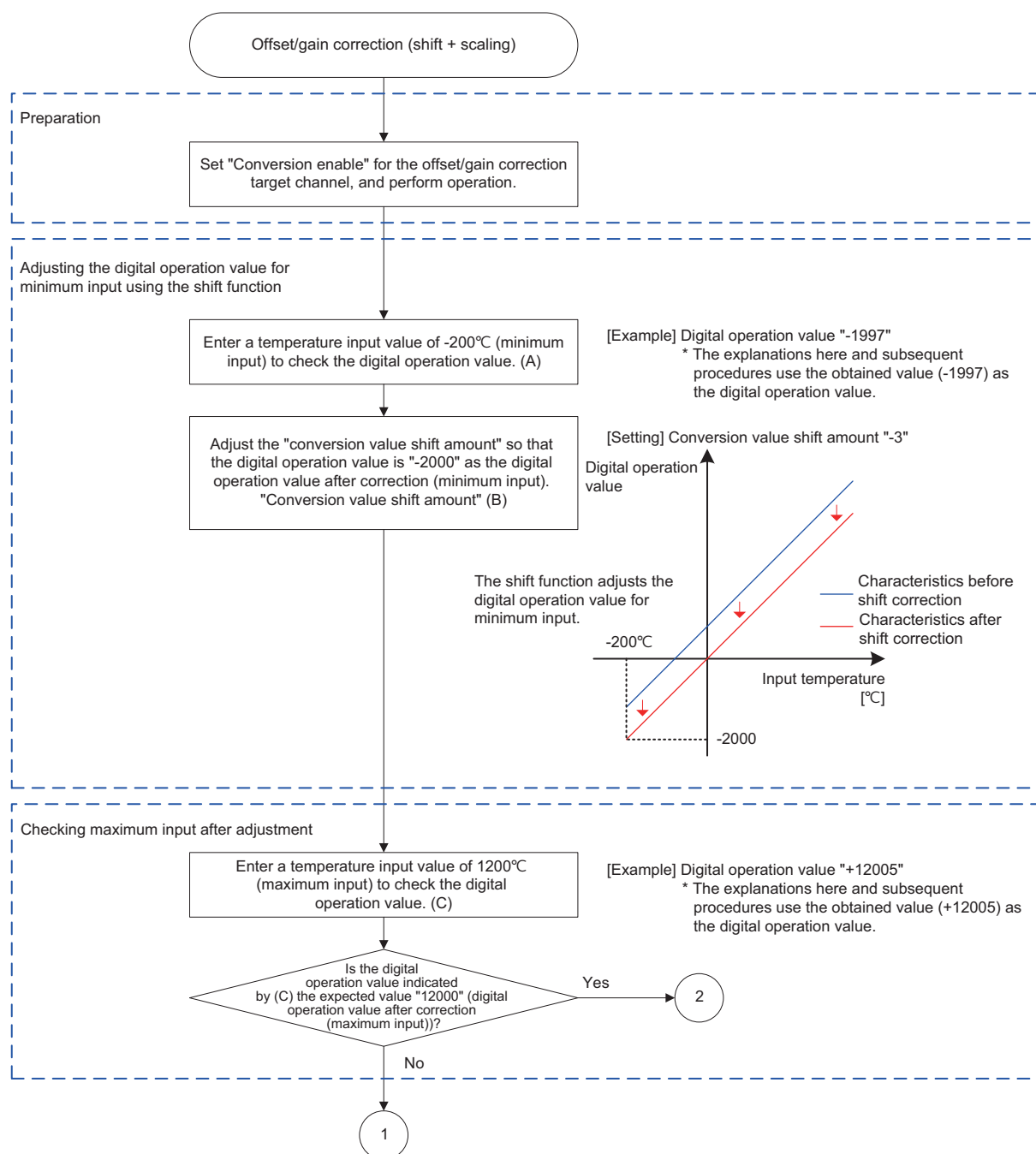
Ex.

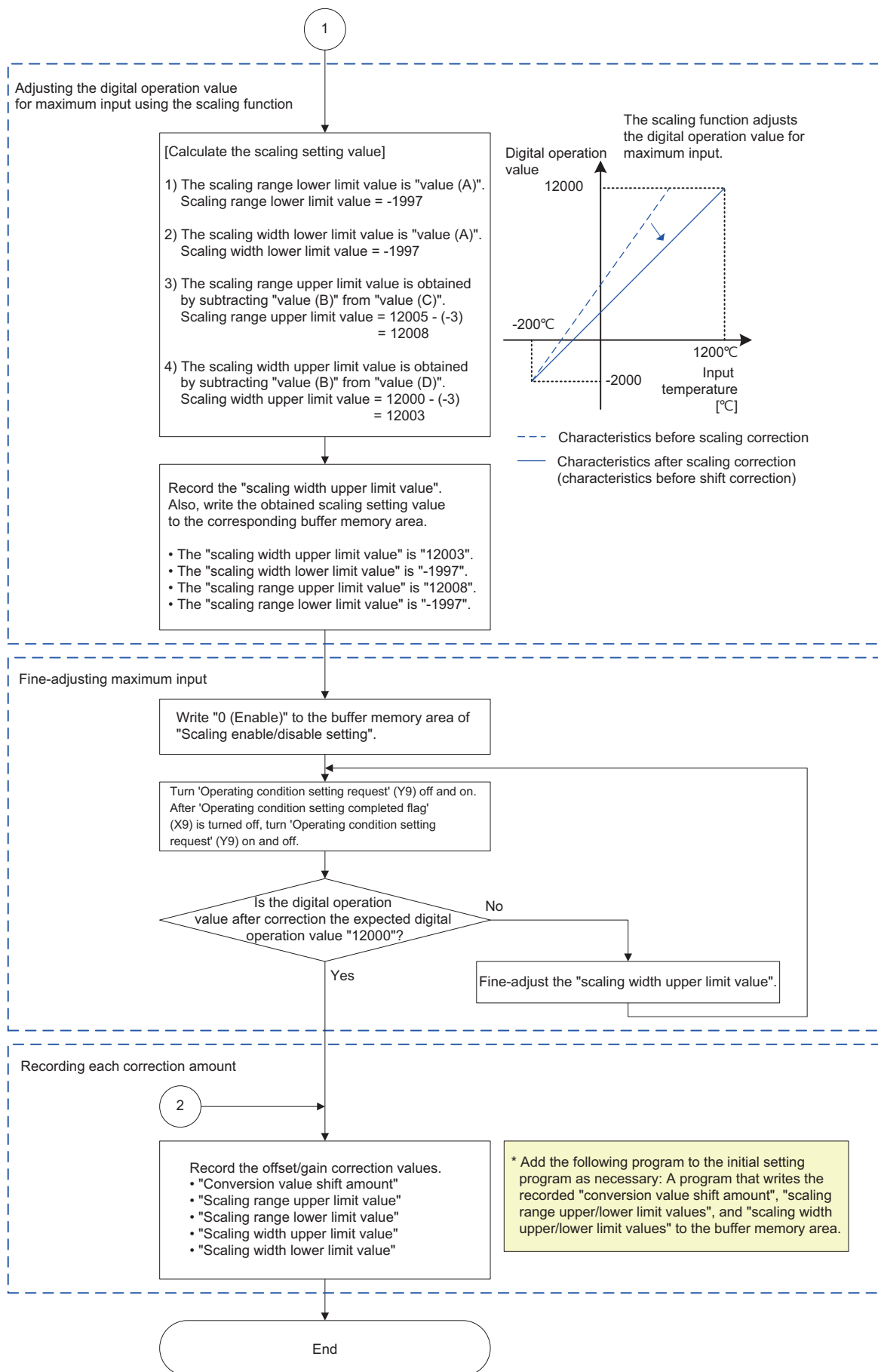
Correction method on a K thermocouple in the range of -200°C to 1200°C

Perform correction so that the digital operation values after offset/gain correction become as shown below.

	Temperature input value	Digital operation value after correction
Minimum input	-200°C	-2000
Maximum input	1200°C	+12000

(D)

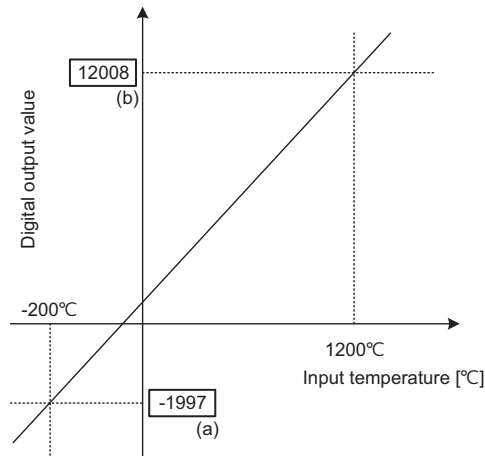




The following describes the correction operations of the scaling function and shift function in the example.

1) Conversion characteristics before correction

In this example, the conversion characteristics before correction are as shown on the left. The details of the data are as follows.

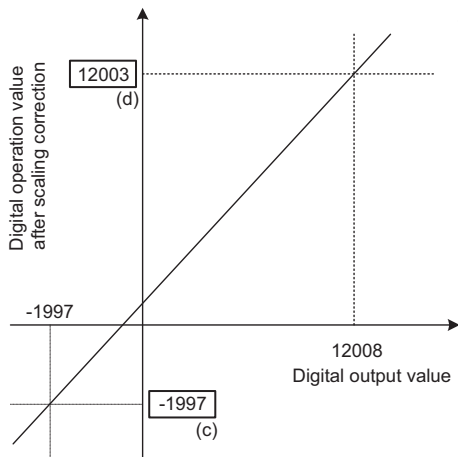


(a) In this example, the digital output value (minimum input) when a temperature of -200°C (minimum input) is entered is "-1997" because the digital output value is the value (A) obtained in the procedure.

(b) The digital output value (maximum input) when a temperature of 1200°C (maximum input) is entered is calculated from the value (C) obtained in the procedure. The value (C) is the "digital operation value (maximum input)" when a temperature of 1200°C (maximum input) is entered, but the shift function is reflected in that calculation. Therefore, the shift amount needs to be reverse-calculated to obtain the value (b). In this example, since the value (C) is 12005 and the conversion value shift amount is -3, the value (b) is "12008".

2) Correction using the scaling function

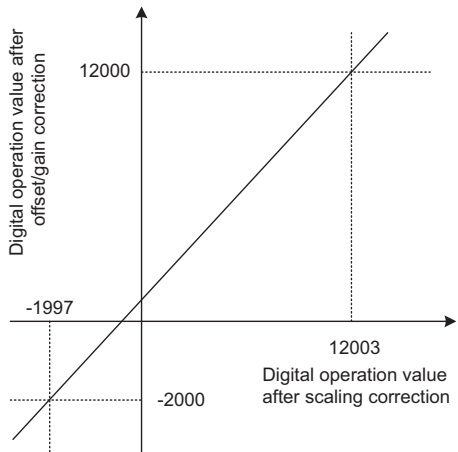
Perform scale conversion on digital output values -1997 to 12008.



(c), (d) The expected digital operation value range is from -2000 to 12000. However, since the shift function performs correction in 3), scale conversion needs to be performed in 2) taking the shift amount into account. In this example, a shift with a conversion value shift amount of -3 is performed in 3). Therefore, scale conversion is performed on -1997 to 12003 in 2) so that the range is from -2000 to 12000 after the shift.

3) Correction using the shift function

By performing a shift based on the results of 2), the expected digital operation value ranging from -2000 to 12000 can be obtained.



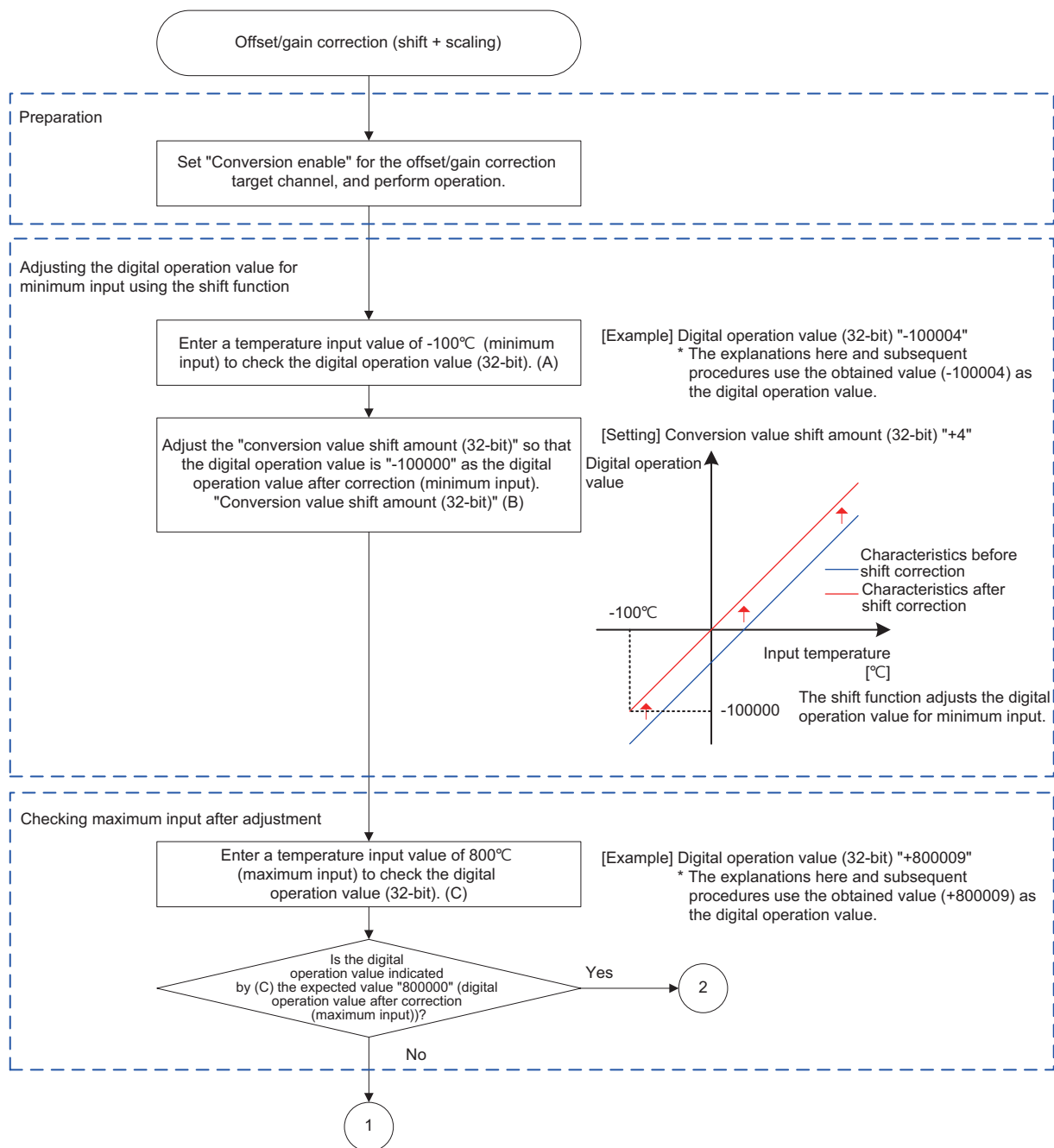
Ex.

Correction method on a Pt100 in the range of -100°C to 800°C

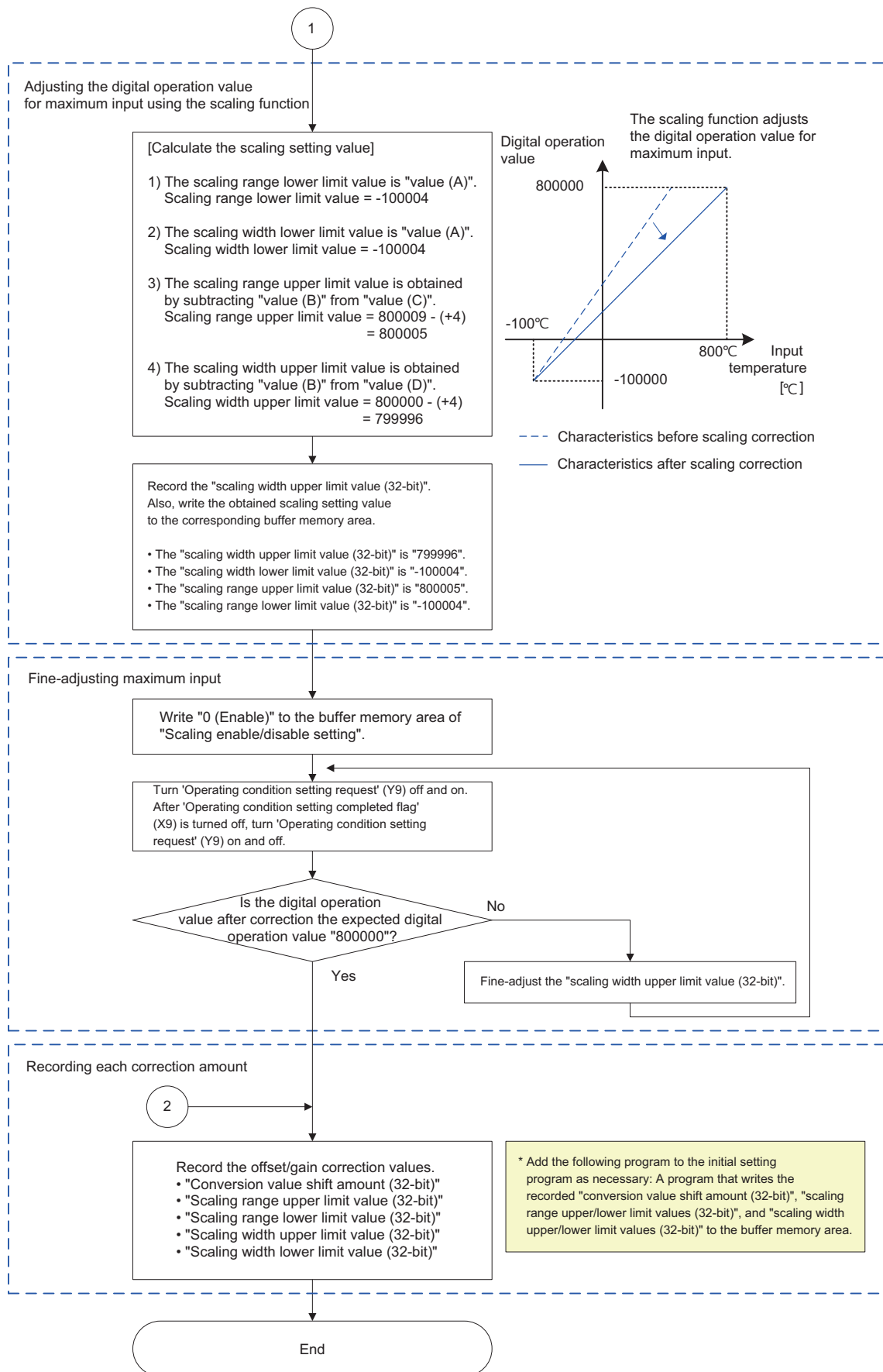
Perform correction so that the digital operation values after offset/gain correction become as shown below.

	Temperature input value	Digital operation value after correction
Minimum input	-100°C	-100000
Maximum input	800°C	+800000

(D)



A



Appendix 7 Example of Program that Converts Resistance Values of Thermistors to Temperature

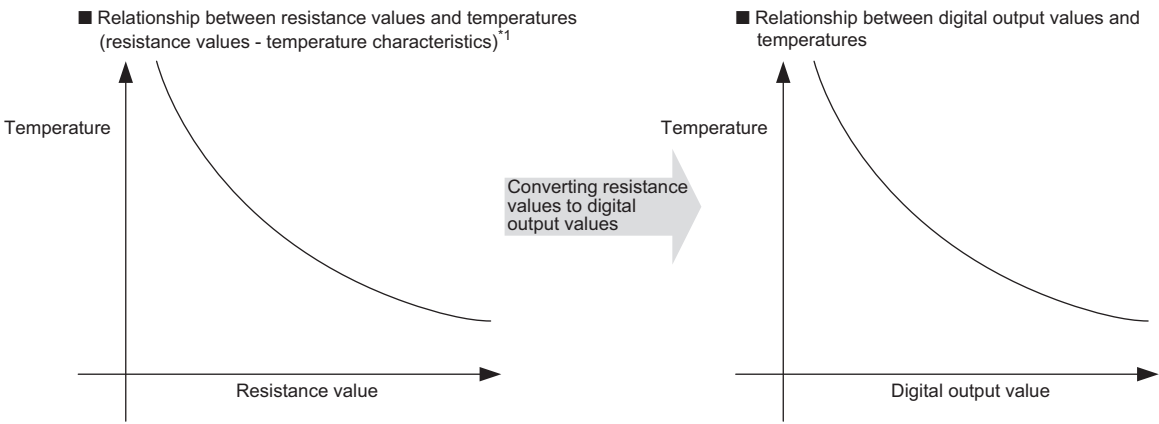
Overview

This section describes an example of a program that converts the resistance value of a thermistor to temperature when the thermistor is connected to CH1.

The resistance value of thermistors - the temperature characteristics (the relation between the resistance value and the temperature) is nonlinear. Therefore, the digital output value is converted to temperature by using an SCL instruction.

Preparation

Calculate the relation between the digital output value and the temperature based on the relation between the resistance value and the temperature of the thermistor in use.

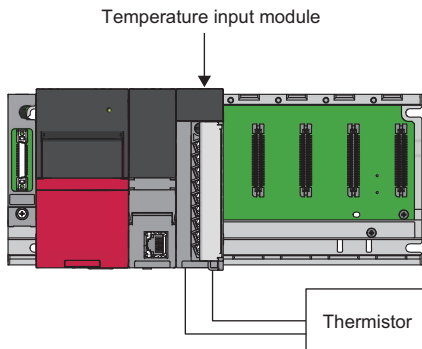


*1 The relation between the resistance value and the temperature (Resistance value - Temperature characteristics) of the thermistor in use is described in the data sheet of the thermistor.

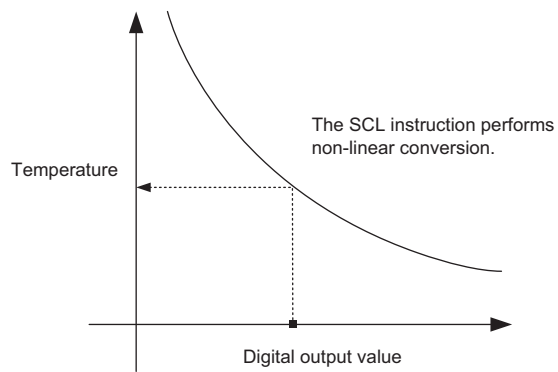
Resistance value → temperature conversion processing

First, measure the resistance value of the thermistor by using a temperature input module.

The measured resistance value is stored in the digital output value of the buffer memory.

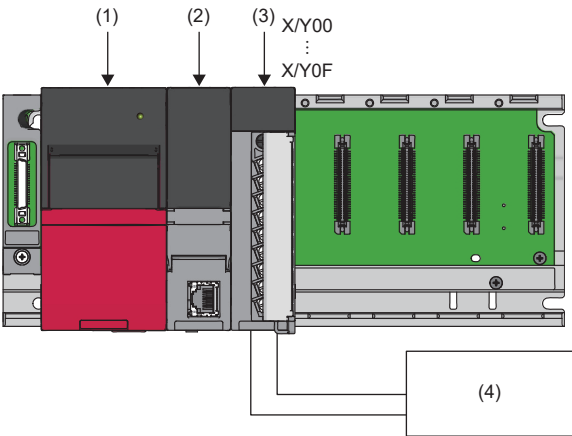


Next, convert the digital output value to the temperature by using an SCL instruction.



System configuration

The following figure shows an example of the system configuration.

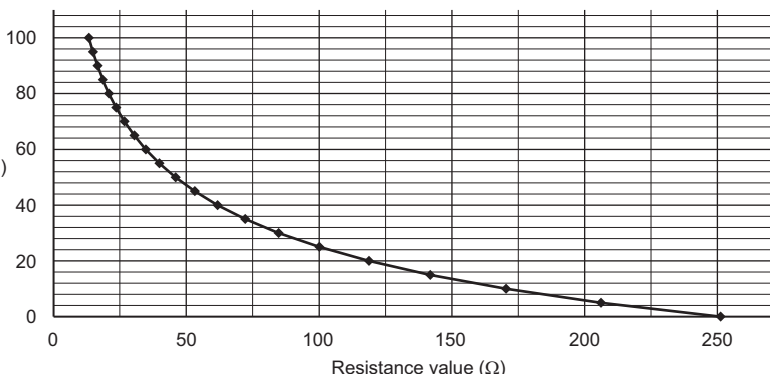


- (1) Power supply module (R61P)
- (2) CPU module (R120CPU)
- (3) Temperature input module (R60TRD4-G)
- (4) Thermistor

The following table lists the specifications for the thermistor used for the program example in this section.

Specification	Description
Type	NTC
Resistance value (25°C)	100Ω
B constant	3000K
Resistance value - Temperature characteristics (Relation between the resistance value and the temperature)	*1

*1 The following table lists the results of Resistance value - Temperature characteristics (the relation between the resistance value and the temperature) of the thermistor.

Temperature (°C)	Resistance value (Ω)	Resistance value - Temperature characteristics graph																																												
0	251.16	<p>The following graph shows the relation between the resistance value and the temperature.</p>  <table><thead><tr><th>Temperature (°C)</th><th>Resistance value (Ω)</th></tr></thead><tbody><tr><td>0</td><td>251.16</td></tr><tr><td>5</td><td>206.16</td></tr><tr><td>10</td><td>170.41</td></tr><tr><td>15</td><td>141.79</td></tr><tr><td>20</td><td>118.72</td></tr><tr><td>25</td><td>100.00</td></tr><tr><td>30</td><td>84.71</td></tr><tr><td>35</td><td>72.14</td></tr><tr><td>40</td><td>61.76</td></tr><tr><td>45</td><td>53.12</td></tr><tr><td>50</td><td>45.91</td></tr><tr><td>55</td><td>39.86</td></tr><tr><td>60</td><td>34.75</td></tr><tr><td>65</td><td>30.41</td></tr><tr><td>70</td><td>26.73</td></tr><tr><td>75</td><td>23.57</td></tr><tr><td>80</td><td>20.87</td></tr><tr><td>85</td><td>18.53</td></tr><tr><td>90</td><td>16.51</td></tr><tr><td>95</td><td>14.76</td></tr><tr><td>100</td><td>13.23</td></tr></tbody></table>	Temperature (°C)	Resistance value (Ω)	0	251.16	5	206.16	10	170.41	15	141.79	20	118.72	25	100.00	30	84.71	35	72.14	40	61.76	45	53.12	50	45.91	55	39.86	60	34.75	65	30.41	70	26.73	75	23.57	80	20.87	85	18.53	90	16.51	95	14.76	100	13.23
Temperature (°C)	Resistance value (Ω)																																													
0	251.16																																													
5	206.16																																													
10	170.41																																													
15	141.79																																													
20	118.72																																													
25	100.00																																													
30	84.71																																													
35	72.14																																													
40	61.76																																													
45	53.12																																													
50	45.91																																													
55	39.86																																													
60	34.75																																													
65	30.41																																													
70	26.73																																													
75	23.57																																													
80	20.87																																													
85	18.53																																													
90	16.51																																													
95	14.76																																													
100	13.23																																													
5	206.16																																													
10	170.41																																													
15	141.79																																													
20	118.72																																													
25	100.00																																													
30	84.71																																													
35	72.14																																													
40	61.76																																													
45	53.12																																													
50	45.91																																													
55	39.86																																													
60	34.75																																													
65	30.41																																													
70	26.73																																													
75	23.57																																													
80	20.87																																													
85	18.53																																													
90	16.51																																													
95	14.76																																													
100	13.23																																													

Parameter settings

Perform an initial setting in the module parameter of the engineering tool.

Change the basic settings and application settings as shown below.

Do not change the interrupt settings and refresh settings from their default settings.

• Basic setting

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Basic setting]

Item	CH1	CH2	CH3	CH4
Input type/range setting function	Set the input type and input range for each channel.			
Range setting (input type setting)	0 to 500Ω	Pt100 (-200 to 850 C)	Pt100 (-200 to 850 C)	Pt100 (-200 to 850 C)
Cold junction compensation setting function	Set the cold junction compensation with/without.			
Cold junction compensation setting	Without cold junction compensation			
Conversion enable/disable setting function	Set whether to enable or disable the output of the conversion value.			
Conversion enable/disable setting	Conversion enable	Conversion disable	Conversion disable	Conversion disable
Conversion system	Set the conversion control system.			
Average processing setting	Sampling processing	Sampling processing	Sampling processing	Sampling processing
Time average/Count average/Moving average/Primary delay filter constant setting	0	0	0	0

• Application setting

 [Navigation window] ⇒ [Parameter] ⇒ [Module Information] ⇒ [R60TRD4-G] ⇒ [Application setting]

Item	CH1	CH2	CH3	CH4
Scaling function	Configure the setting for the scaling at the conversion.			
Scaling enable/disable setting	Disable	Disable	Disable	Disable
Scaling range upper limit value	0	0	0	0
Scaling range lower limit value	0	0	0	0
Scaling width upper limit value	0	0	0	0
Scaling width lower limit value	0	0	0	0
Scaling range upper limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Scaling range lower limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Scaling width upper limit value (32 bits)	0	0	0	0
Scaling width lower limit value (32 bits)	0	0	0	0
Shift function	Set the Conversion value shift amount at the conversion.			
Conversion value shift amount	0	0	0	0
Conversion value shift amount (32 bits)	0	0	0	0
Warning output function (Process alarm)	Set an alert at the conversion.			
Warning output setting (Process alarm)	Disable	Disable	Disable	Disable
Process alarm upper upper limit value	12000	12000	12000	12000
Process alarm upper lower limit value	12000	12000	12000	12000
Process alarm lower upper limit value	-2000	-2000	-2000	-2000
Process alarm lower lower limit value	-2000	-2000	-2000	-2000
Process alarm upper upper limit value (32 bits)	850.000 C	850.000 C	850.000 C	850.000 C
Process alarm upper lower limit value (32 bits)	850.000 C	850.000 C	850.000 C	850.000 C
Process alarm lower upper limit value (32 bits)	-200.000 C	-200.000 C	-200.000 C	-200.000 C
Process alarm lower lower limit value (32 bits)	-200.000 C	-200.000 C	-200.000 C	-200.000 C
Warning output function (Rate alarm)	Set an alert at the conversion.			
Warning output setting (Rate alarm)	Disable	Disable	Disable	Disable
Rate alarm detection cycle setting	0 times	0 times	0 times	0 times
Rate alarm upper limit value	0.0 %	0	0	0
Rate alarm lower limit value	0.0 %	0	0	0
Rate alarm upper limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Rate alarm lower limit value (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection function	Configure the setting for the disconnection detection at the conversion.			
Disconnection detection function enable/disable setting	Disable	Enable	Enable	Enable
Conversion setting for disconnection detection	Down Scale	Down Scale	Down Scale	Down Scale
Conversion setting value for disconnection detection	0	0	0	0
Conversion setting value for disconnection detection (32 bits)	0.000 C	0.000 C	0.000 C	0.000 C
Disconnection detection automatic clear enable/disable setting	Disable			
Logging function	Configure the setting for the logging function at the conversion.			
Logging enable/disable setting	Disable	Disable	Disable	Disable
Logging data setting	Digital output value	Digital output value	Digital output value	Digital output value
Logging cycle setting value	40 ms	40 ms	40 ms	40 ms
Logging cycle unit setting	ms	ms	ms	ms
Level trigger condition setting	Disable	Disable	Disable	Disable
Logging points after trigger	500	500	500	500
Trigger data	400	600	800	1000
Trigger setting value	0	0	0	0
Loading interrupt enable/disable setting	Disable	Disable	Disable	Disable
Logging load points setting value	100	100	100	100

Label settings

The following table lists the module labels and global labels used for the program examples in this section. There is no need to change the settings of the module labels. For details on the global labels, refer to the following.

 MELSEC iQ-R Programming Manual (Program Design)

Classification	Label name	Description	Device																														
Module label	R60TRDG_1.bModuleREADY	Module READY	X0																														
	R60TRDG_1.bConversionCompletedFlag	Conversion completed flag	XE																														
	R60TRDG_1.bOperatingConditionSettingRequest	Operating condition setting request	Y9																														
	R60TRDG_1.uConversionCompletedFlag.0	CH1 Conversion completed flag	—																														
	R60TRDG_1.stnMonitor[0].wDigitalOutputValue	CH1 Digital output value	—																														
Label to be defined	Define global labels as shown below:																																
	<table><thead><tr><th></th><th>Label Name</th><th>Data Type</th><th></th><th>Class</th><th>Assign (Device/Label)</th></tr></thead><tbody><tr><td>1</td><td>CH1_DigitalOutputVal</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼ D11</td></tr><tr><td>2</td><td>CH1_TemperatureConvRangeCompResult</td><td>Bit(0-2)</td><td>...</td><td>VAR_GLOBAL</td><td>▼ D14.0</td></tr><tr><td>3</td><td>CH1_TemperatureVal</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼ D17</td></tr><tr><td>4</td><td>ScalingConvData</td><td>Word (Signed)</td><td>...</td><td>VAR_GLOBAL</td><td>▼ D100</td></tr></tbody></table>		Label Name	Data Type		Class	Assign (Device/Label)	1	CH1_DigitalOutputVal	Word (Signed)	...	VAR_GLOBAL	▼ D11	2	CH1_TemperatureConvRangeCompResult	Bit(0-2)	...	VAR_GLOBAL	▼ D14.0	3	CH1_TemperatureVal	Word (Signed)	...	VAR_GLOBAL	▼ D17	4	ScalingConvData	Word (Signed)	...	VAR_GLOBAL	▼ D100		
	Label Name	Data Type		Class	Assign (Device/Label)																												
1	CH1_DigitalOutputVal	Word (Signed)	...	VAR_GLOBAL	▼ D11																												
2	CH1_TemperatureConvRangeCompResult	Bit(0-2)	...	VAR_GLOBAL	▼ D14.0																												
3	CH1_TemperatureVal	Word (Signed)	...	VAR_GLOBAL	▼ D17																												
4	ScalingConvData	Word (Signed)	...	VAR_GLOBAL	▼ D100																												
For scaling conversion data, the initial value must be set beforehand. For details, refer to the following.																																	
📖 Page 249 Device initial value setting																																	

Device initial value setting

For the device initial value setting, set the relation between the digital output value and the temperature to the scaling conversion data used for the SCL instruction.

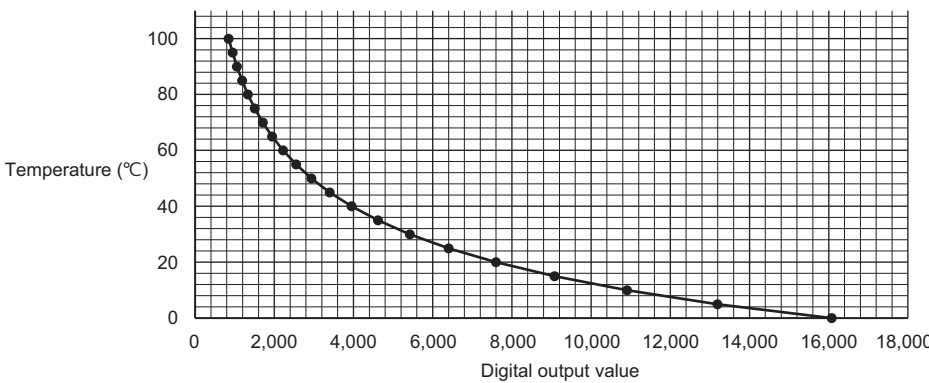
For details on scaling conversion data, refer to the contents regarding SCL instructions in the following manual.

 MELSEC iQ-R Programming Manual (CPU Module Instructions, Standard Functions/Function Blocks)

For the setting method for device initial values, refer to the user's manual for the CPU module used.

Before setting the scaling conversion data, the relation between the digital output value and the temperature must be calculated.

The relation between the digital output value and the temperature can be calculated by referring to the table that contains Resistance value - Temperature characteristics (Relation between the resistance value and the temperature) ( Page 247 System configuration) and converting the value of the resistance value column to the digital output value.

Temperature (°C)	Digital output value	Digital output value - Temperature characteristics graph
0	16074	<p>The following graph shows the relation between the digital output value and the temperature.</p> 
5	13194	
10	10906	
15	9075	
20	7598	
25	6400	
30	5421	
35	4617	
40	3952	
45	3400	
50	2938	
55	2551	
60	2224	
65	1947	
70	1710	
75	1509	
80	1335	
85	1186	
90	1057	
95	945	
100	847	

Next, set the relation between the digital output value and the temperature as the device initial value of the scaling conversion data.

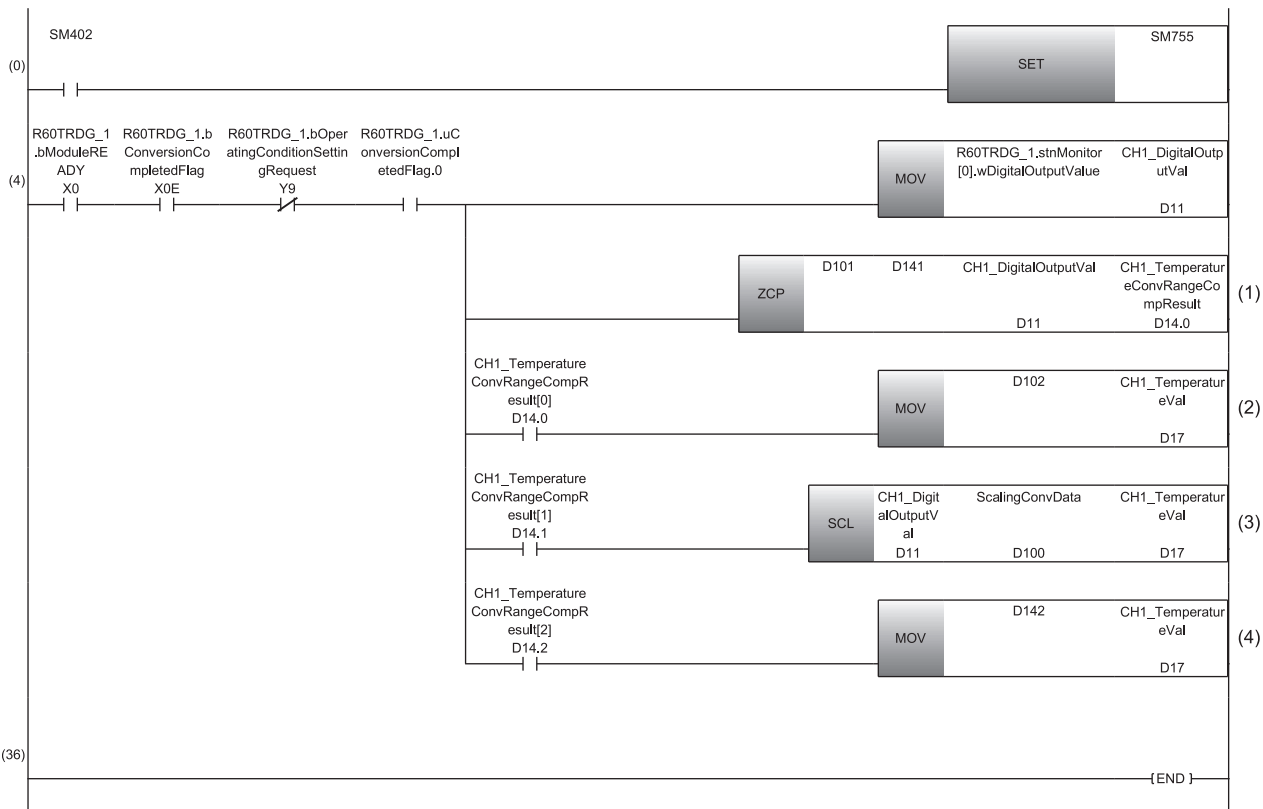
Set the temperature to the Y-coordinate of each point in the scaling conversion data, and the corresponding digital output value to the X-coordinate.

Scaling conversion data setting item		Setting value	Device assignment
Number of coordinate points		21	D100
Point 1	X-coordinate (Digital output value)	847	D101
	Y-coordinate (Temperature)	100	D102
Point 2	X-coordinate (Digital output value)	945	D103
	Y-coordinate (Temperature)	95	D104
⋮	⋮	⋮	⋮
Point 21	X-coordinate (Digital output value)	16074	D141
	Y-coordinate (Temperature)	0	D142

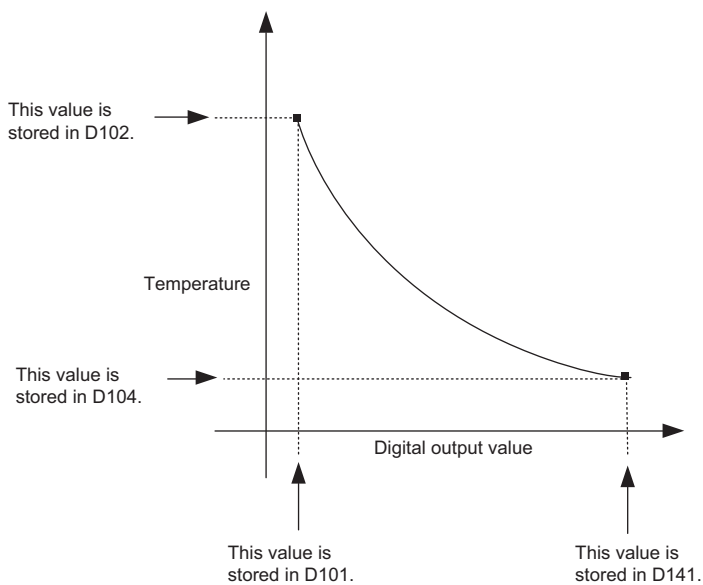
MAIN [Device Memory]										
Device Name		D100								
		Detailed Conditions								
Device Name	+0	+1	+2	+3	+4	+5	+6	+7	String	
D100	21	847	100	945	95	1057	90	1186	.d α _C Z H	
D108	85	1335	80	1509	75	1710	70	1947	U E P P K 4 F 3	
D116	65	2224	60	2551	55	2938	50	3400	A 5 < 7 □ 2 6 5 □	
D124	45	3952	40	4617	35	5421	30	6400	- □ (A #) □	
D132	25	7598	20	9075	15	10906	10	13194	P . L 3 p F	
D140	5	16074	0	0	0	0	0	0	機	
D148	0	0	0	0	0	0	0	0		
D156	0	0	0	0	0	0	0	0		
D164	0	0	0	0	0	0	0	0		
D172	0	0	0	0	0	0	0	0		
D180	0	0	0	0	0	0	0	0		
D188	0	0	0	0	0	0	0	0		
D196	0	0	0	0	0	0	0	0		
D204	0	0	0	0	0	0	0	0		

Program example

- This program is an example to read the digital output value of CH1, convert it to temperature, and save the result.



- Check the range of the digital output value.
- If the digital output value is smaller than the lower limit value (D101), the upper limit value (D102) of the temperature is saved to the temperature conversion value (D17).
- If the digital output value is equal to or greater than the lower limit value (D101) and also equal to or less than the upper limit value (D141), use the SCL instruction to convert the digital output value to temperature, and save the result to the temperature conversion value (D17).
- If the digital output value exceeds the upper limit value (D141), the lower limit value (D142) of the temperature is saved to the temperature conversion value (D17).



Appendix 8 Using the Module in the Redundant System with Extension Base Unit

This chapter describes restrictions and precautions for using a temperature input module that is mounted on the extension base unit in the redundant system.

Restrictions on functions and specifications

The following shows the functions and specifications subject to restrictions when a module is mounted on the extension base unit in the redundant system.

Functions	
Function	Restriction
Logging function	Cannot be used. When the function is used, proper operation cannot be guaranteed.
Interrupt function	The interrupt program cannot be executed.

Module FBs	
Name	Restriction
M+R60TRDG_SetLoggingPARAM	Cannot be used.
M+R60TRDG_SaveLogging	When the FB is used, proper operation cannot be guaranteed.

Precautions

The following shows precautions to take when a module is mounted on the extension base unit in the redundant system.

Program examples

Unless otherwise specified, program examples provided in this manual are for when the module is used in the single CPU system or in the multiple CPU system.

When using the module in the redundant system, refer to the following manual and observe the precautions on programming for when using the Process CPU (redundant mode).

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

Signal flow tracking setting

When using the module FBs and applying the program examples to an actual system, set "Signal Flow Memory Tracking Setting" to "Transfer". If not, the module FBs and programs may not work properly when system switching occurs.

 [CPU Parameter] ⇒ [Redundant System Settings] ⇒ [Tracking Setting]

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REVISIONS

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

Revision date	*Manual number	Description
October 2025	SH(NA)-082734ENG-A	First edition

Japanese manual number: SH-082733-A

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TRANSLATION OF THE ORIGINAL INSTRUCTIONS

SH(NA)-082734ENG-A(2510)MEE

MODEL: R60TRD4-G-U-E

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