MITSUBISHI

Thermocouple Input Module

MITSUBISHI
General-Purpose PROGRAMMABLE LOGIC CONTROLLER

User's Manual
(Hardware)

Q64RD

Thank you for purchasing the Mitsubishi general-purpose programmable logic controller MELSEC-Q series.

Prior to use, please read this manual thoroughly and familiarize yourself with the product

MELSEC-Q
Mitsubishi Programmable Logic Controller

MODEL	Q64RD-U-H-JE
MODEL CODE	13JT31
IB(NA)-0800156-A(0011)MEE	

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.
These SAFETY PRECAUTIONS classify the safety precautions into two categories: “DANGER” and “CAUTION”.

⚠ DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury, if not carried out properly.
⚠ CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by ⚠ CAUTION may also be linked to serious results.
In any case, it is important to follow the directions for usage.

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

[DESIGN PRECAUTIONS]

⚠ DANGER

● Do not write data into the "system area" of the buffer memory of intelligent function modules. Also, do not use any "prohibited to use" signals as an output signal to an intelligent function module from the PLC CPU.
Writing data into the "system area" or outputting a signal for "prohibited to use" may cause a PLC system malfunction.

⚠ CAUTION

● Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
They should be installed 100 mm(3.94 inch) or more from each other.
Not doing so could result in noise that may cause malfunction.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION

- Use the PLC in an environment that meets the general specifications contained in the CPU user's manual.
  Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- When installing the module, securely insert the module fixing tabs into the mounting holes of the base module while pressing the installation lever located at the bottom of the module downward.
  Improper installation may result in malfunction, breakdown or the module coming loose and dropping. Securely fix the module with screws if it is subject to vibration during use.
- Tighten the screws within the range of specified torque.
  If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.
  If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.
- Switch all phases of the external power supply off when mounting or removing the module.
  Not ding so may cause electric shock or damage to the module.
- Do not directly touch the conductive area or electronic components of the module. Doing so may cause malfunction or failure in the module.

[WIRING PRECAUTIONS]

⚠ CAUTION

- Always ground the FG terminal for the PLC.
  There is a risk of electric shock or malfunction.
- When turning on the power and operating the module after wiring is completed, always attach the terminal cover that comes with the product.
  There is a risk of electric shock if the terminal cover is not attached.
- Tighten the terminal screws within the range of specified torque.
  If the terminal screws are loose, it may result in short circuits or malfunction.If the terminal screws are tightened too much, it may cause damage to the screw and/or the module, resulting in short circuits or malfunction.
- Be careful not to let foreign matter such as sawdust or wire chips get inside the module.They may cause fires, failure or malfunction.

[WIRING PRECAUTIONS]

⚠ CAUTION
● The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring. Do not remove this film until the wiring is complete. Before operating the system, be sure to remove the film to provide adequate ventilation.

REVISIONS

* The manual number is given on the bottom right of the top cover.

Print Date	* Manual Number	Revision
Nov.,2000	IB (NA)-0800156-A	First edition

CONTENTS

About the Manuals

The following manuals are related to this product.
Referring to this list, please request the necessary manuals.

Detailed manual

Manual Name	Manual Number (Model Code)
Thermocouple Input Module User's Manual Q64RD / GX Configurator-TI (SW1D5C-QTIU-E)	SH-080142 (13JR31)

Conformance to the EMC Directive/Low Voltage Directive

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please see Chapter 3, "EMC Directive and Low Voltage Instruction" of the User's Manual (Hardware) of the PLC CPU to use.
The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.

1. OVERVIEW

This user's manual provides the specifications, handling, part names and others of the Q64RD platinum temperature-measuring resistor thermocouple input module used with the MELSEC-Q series CPU module.

2. SPECIFICATIONS

The following are the specifications of the Q64RD.

2.1 Performance Specifications

Item		Specifications
Number of channels		4 channels
Output	Temperature conversion value	16-bit, signed binary data (-2000 to 8500: Value to the first decimal place × 10 times) 32-bit, signed binary data (-200000 to 850000: Value to the third decimal place × 1000 times)
	Scaling value	16-bit, signed binary
Usable platinum temperature-measuring resistors		Pt100(JIS C1604-1997,IEC 751 1983), JPt100(JIS C1604-1981)
Measured temperature range	Pt100	-200 to 850℃
	JPt100	-180 to 600℃
Range changing	Pt100	-20 to 120℃ / -200 to 850℃
	JPt100	-20 to 120℃ / -180 to 600℃
Accuracy *1	Ambient temperature 0 to 55℃	±0.25% (accuracy relative to full-scale value)
	Ambient temperature 25±5℃	±0.08% (accuracy relative to full-scale value)
Resolution		0.025℃
Conversion speed		40ms/channel *2
Number of analog input points		4 channels/module
Temperature detecting output current		1mA
Insulation system		Across platinum temperature-measuring resistor input and PLC power supply : Transformer insulation Across platinum temperature-measuring resistor input channels : No insulation
Dielectric withstand voltage		1780VrmsAC/3 cycles (altitude 2000m)
Insulation resistance		Across thermocouple input and earth : 500VDC 100MΩ or more using insulation resistance tester Across thermocouple input channels : 500VDC 10MΩ or more using insulation resistance tester
Wire break detection		Yes (Each channel independent) *3
Number of occupied points		16 points
Connection terminals		18-point terminal block
Applicable wire size		0.3 to 0.75mm^2
Applicable crimping terminals		1.25-3 R1.25-3 (Sleeved crimping terminals are unusable)
Cables between Q64RD and platinum temperature-measuring resistor		Total resistance not more than 2kΩ
Internal current consumption (5VDC)		0.60A
Weight		0.17kg
Outline dimensions		98(H) × 27.4(W) × 90(D)mm

*1: The selection ranges and accuracies have the following relationships.

Selection Range / Ambient Temperature	Pt100 and JPt100 : -20 to 120℃	Pt100 : -200 to 850℃	JPt100 : -180 to 600℃
0 to 55℃	±0.3℃	±2.125℃	±1.5℃
25±5℃	±0.096℃	±0.68℃	±0.48℃

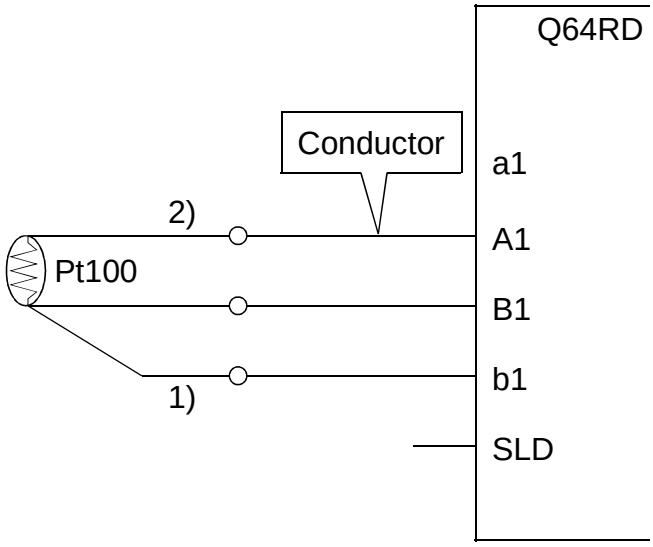
*2: The conversion speed is a period from when a temperature is input and converted into a corresponding digital value until the value is stored into the buffer memory.
When two or more channels are used, the conversion speed is "40ms × number of conversion enabled channels".
*3: At wire break detection, the temperature conversion value right before wire break occurrence is held.

2.2 Specifications for Connection of Platinum Temperature-Measuring Resistor

(1) For 3 conductor type

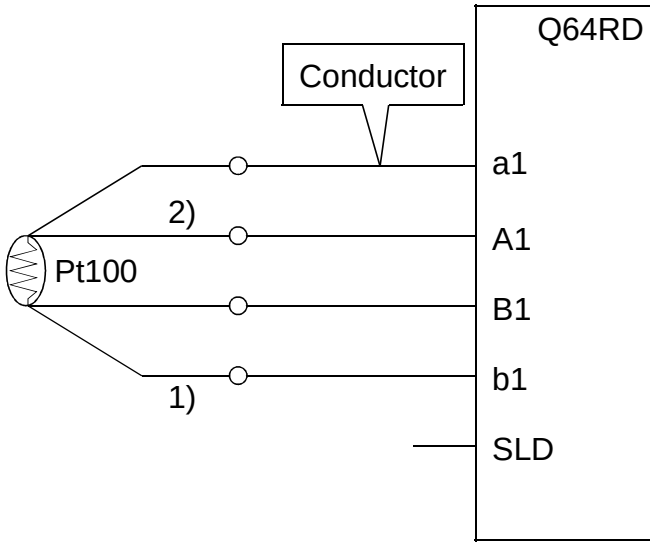
The conductor resistance value should satisfy the condition of 1) + 2) ≦ 2Ω max.

In addition, the difference of the conductor resistance value between 1) and 2) should be 10Ω max.



(2) For 4 conductor type

The conductor resistance value should satisfy the condition of 1) + 2) ≦ 2Ω max.



POINT
When making offset/gain adjustment, set the conductor resistance value actually used.

3. LOADING AND INSTALLATION

3.1 Handling Instructions

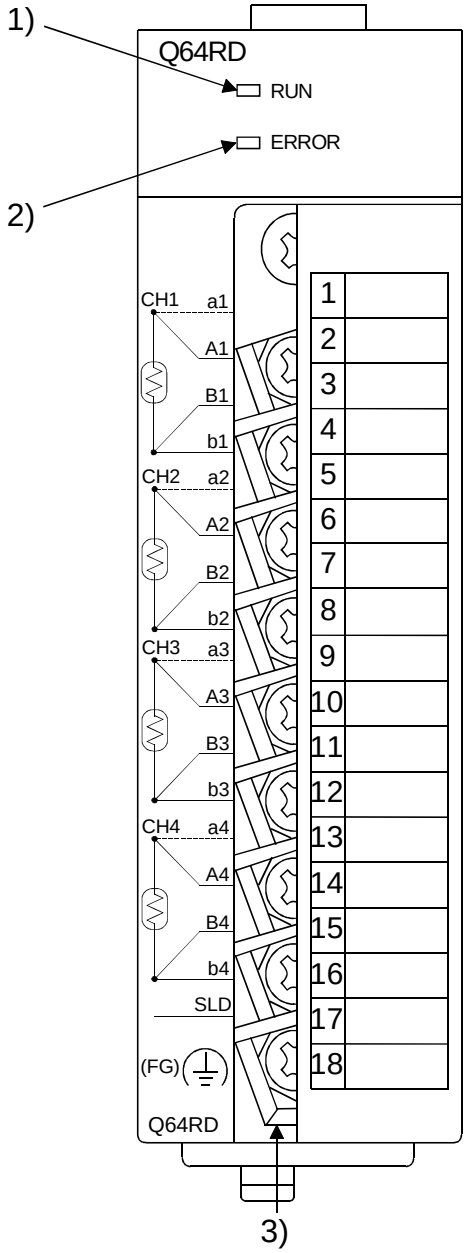
(1) Do not drop the case and connectors of the module and subject them to hard impact.
(2) Do not remove the printed circuit boards of the module from the case. Doing so can cause a failure.
(3) Be careful to prevent wire-offcuts and other foreign matter from entering the module. They can cause a fire, failure or malfunction.
(4) To prevent wire-offcuts and other foreign matter from entering the module during wiring, the module carries a foreign matter ingress prevention label at its top. During wiring, do not remove this label. For system operation, always remove this label to ensure adequate heat dissipation.
(5) Tighten the mounting and terminal screws of the module within the following ranges.

Screw Location	Tightening Torque Range
Module mounting screw (M3 screw)	36 to 48NPcm
Terminal block terminal screw (M3 screw)	42 to 58NPcm
Terminal block mounting screw (M3.5 screw)	66 to 89NPcm

3.2 Installation Environment

Refer to the user's manual of the CPU module used.

4. NAMES AND SETTINGS OF THE PARTS



Terminal Block Layout		
Terminal number	Signal name	
1	CH1	a1
2		A1
3		B1
4		b1
5	CH2	a2
6		A2
7		B2
8		b2
9	CH3	a3
10		A3
11		B3
12		b3
13	CH4	a4
14		A4
15		B4
16		b4
17	SLD	
18	FG	

Number	Name and Appearance	Description
1)	RUN LED	Indicates the operating status of the Q64RD. On : Operating normally. Flicker : Offset/gain setting mode Off : 5V power-off or watchdog timer error occurrence
2)	ERR LED	Indicates the error status of the Q64RD. On : Error occurrence Flicker : Switch setting error Switch 5 was set to other than 0 in intelligent function module switch setting of GX Developer. Off : Operating normally.
3)	Terminal block	Used for wiring of the platinum temperature-measuring resistor, etc.

5. WIRING

5.1 Wiring Instructions

(1) Use separate cables for the AC and Q64RD's external input signals to avoid the influence of AC side surges and inductions.

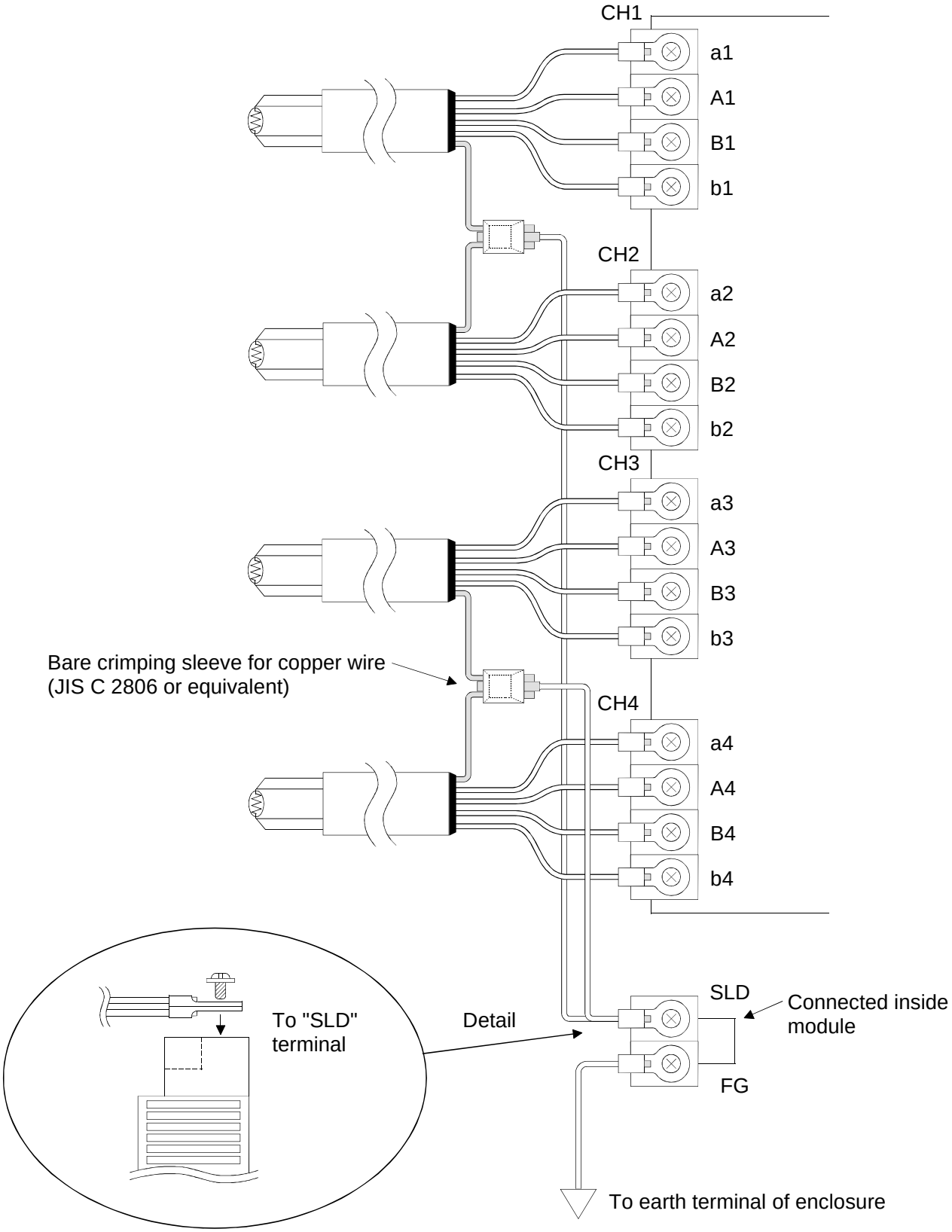
(2) Do not run the module cables near, or bundle them with, the main circuit and high-voltage cables and the load cables from other than the PLC. Not doing so will make the module more susceptible to noises, surges and inductions.

(3) Earth the shielded wire or shielded cable to FG of the PLC. However, depending on the external noise conditions, external earthing may be recommended.

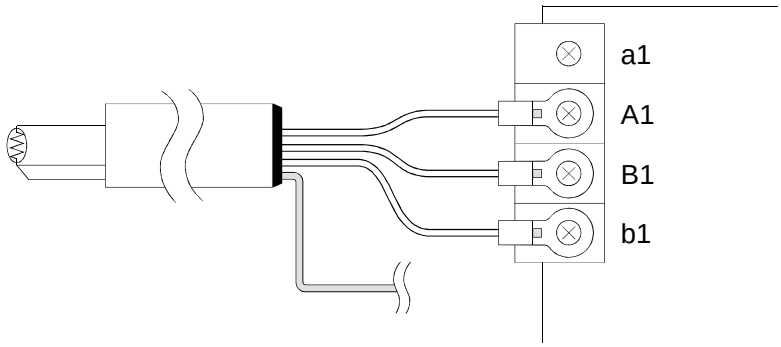
(4) Insulation-sleeved crimping terminals cannot be used with the terminal block.
It is recommended to fit mark tubes or insulation tubes to the wire connection parts of the crimping terminals.

5.2 External Wiring

(1) For 4 conductor type

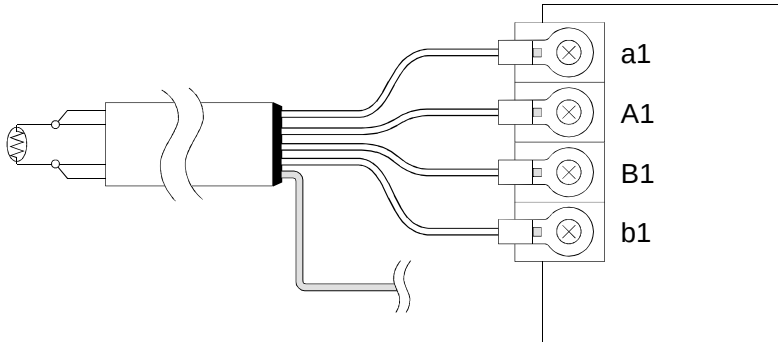


(2) For 3 conductor type

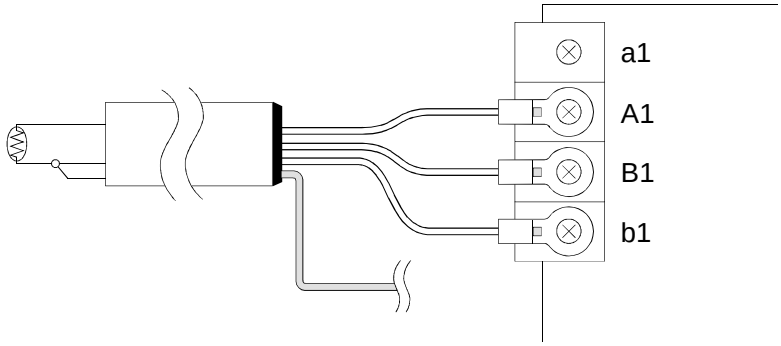


(3) For 2 conductor type

When 4 conductor type is selected in switch 3
of intelligent function module switch setting



When 3 conductor type is selected in switch 3
of intelligent function module switch setting

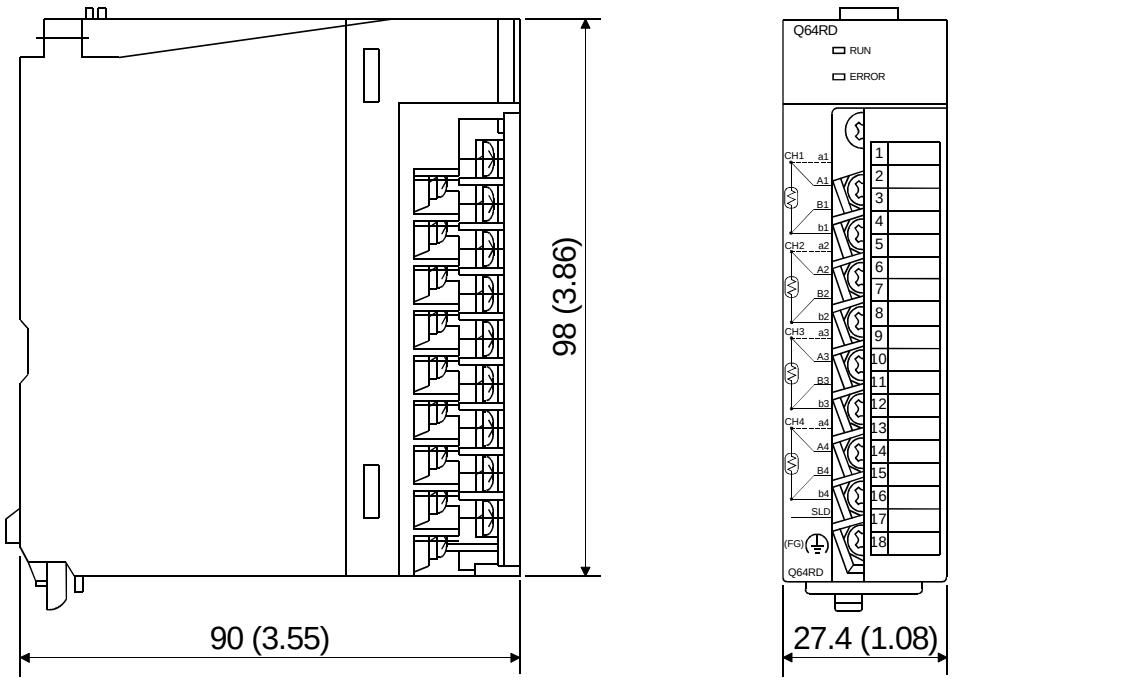


5.3 Intelligent Function Module Switch Setting

Make the intelligent function module switch setting using the I/O assignment setting of GX Developer.
You can make setting easily by entering hexadecimal numbers into 4 digits.

<table>
<tr><th></th><th>Setting Item</th></tr>
<tr><td>Switch 1</td><td>Measurement range setting
□ □ □ □ H
CH4 CH3 CH2 CH1
<table>
<tr><th>Measurement mode</th><th>Measurement range</th><th>Set value</th></tr>
<tr><td rowspan="2">New JIS</td><td>-200 to 850℃</td><td>0</td></tr>
<tr><td>-20 to 120℃</td><td>1</td></tr>
<tr><td rowspan="2">Old JIS</td><td>-180 to 600℃</td><td>2</td></tr>
<tr><td>-20 to 120℃</td><td>3</td></tr>
</table></td></tr>
<tr><td>Switch 2</td><td>Offset/gain setting
□ □ □ □ H
CH4 CH3 CH2 CH1
<table>
<tr><th>Offset/gain setting</th><th>Set value</th></tr>
<tr><td>Factory setting</td><td>0</td></tr>
<tr><td>User setting</td><td>1</td></tr>
</table></td></tr>
<tr><td>Switch 3</td><td>Wiring type setting
□ □ □ □ H
CH4 CH3 CH2 CH1
<table>
<tr><th>Wiring type setting</th><th>Set value</th></tr>
<tr><td>3 conductor type</td><td>0</td></tr>
<tr><td>4 conductor type</td><td>1</td></tr>
</table></td></tr>
<tr><td>Switch 4</td><td>□ □ □ □ H
0H : Normal mode (temperature conversion processing)
1 to FH: Offset/gain setting mode</td></tr>
<tr><td>Switch 5</td><td>0: Fixed</td></tr>
</table>

6. OUTLINE DRAWINGS



Unit: mm (in.)

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

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

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