

mitsubishi

Temperature Control Module

MITSUBISHI
General-Purpose PROGRAMMABLE LOGIC CONTROLLER

User's Manual (Installation)

Q64TCRT
Q64TCRTBW

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	Q64TCRT-U-H-JE
MODEL CODE	13JQ98
IB(NA)-0800121-A(0006)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 to the "read-only area" in the buffer memory of the intelligent function module.
Do not turn on/off the "reserved" signals among the I/O signals to/from the PLC CPU.
Doing so can malfunction the PLC system.
- Depending on the malfunction of the external output transistor, there may be cases where the output is ON or OFF status. Install external monitoring circuitry for output signals that may lead to major accidents.

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 doing 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

- Be careful not to let foreign matters such as sawdust or wire chips get inside the module.
They may cause fires, failure or malfunction.
- 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 heat ventilation.
- Be sure to fix communication cables or power supply cables leading from the module by placing them in the duct or clamping them.
Cables not placed in the duct or without clamping may hang or shift, allowing them to be accidentally pulled, which may cause a module malfunction and cable damage.

[WIRING PRECAUTIONS]

CAUTION

- Do not grab on the cable when removing the communication or power cable connected to the module.
When disconnecting a cable without a connector, first loosen the screws on the part that is connected to the module.
Pulling the cable when it is still connected to the module may cause damage to the module or cable, or misoperation due to cable contact failure.
- Always ground the shielded cable for the PLC.
There is a risk of electric shock or malfunction.
- When wiring, be sure to verify the rated voltage of the product as well as the terminal layout. Fire or failure may result if incorrect voltage is input or incorrect wiring is performed.
- Connecting terminals with incorrect voltage may result in malfunction or mechanical failure.

REVISIONS

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

Print Date	* Manual Number	Revision
Jun.,2000	IB (NA)-0800121-A	First edition

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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)
Q64TCTT, Q64TCTTBW, Q64TCRT, Q64TCRTBW type Temperature Control Module User's Manual (details)	SH-080108 (13JT11)

Conformance to the EMC Directive/Low Voltage Directive

When our PLC conforming to the EMC Directive/Low Voltage Directive is installed into your product and your product is made to conform to the EMC Directive/Low Voltage Directive, refer to the user's manual (details) of this module.

The EMC Directive/Low Voltage Directive-conforming model of the PLC have a CE logo on its rating plate.

1. OVERVIEW

This user's manual provides the specifications, handling, part names and others of the following temperature control modules used with the MELSEC-Q series CPU modules.

- Q64TCRT temperature control module
- Q64TCRTBW temperature control module with wire break detection feature

2. SPECIFICATIONS

The specifications of the Q64TCRT(BW) are indicated below.

2.1 Performance Specifications

Item		Specifications	
		Q64TCRT	Q64TCRTBW
Control output		Transistor output	
Number of temperature input points		4 channels/module	
Usable thermocouple		Refer to Section 2.2	
Accuracy	Ambient temperature: 25°C ±5°C	Input range width × (±0.3%)	
	Ambient temperature: 0°C to 55°C	Input range width × (±0.7%)	
Sampling period		0.5s/4 channels (constant independently of the number of channels used)	
Control output period		1 to 100s	
Input impedance		1MΩ	
Input filter		0 to 100s (0: Input filter OFF)	
Sensor correction value setting		-50.00 to 50.00%	
Operation at sensor input wire break		Upscale processing	
Temperature control system		PID ON/OFF pulse or 2-position control	
PID constant range	PID constant setting	Setting by auto tuning enabled	
	Proportional band (P)	0.0 to 1000.0% (0: 2-position control)	
	Integral time (I)	1 to 3600s	
	Differential time (D)	0 to 3600s (Set 0 for PI control.)	
Set value setting range		Usable platinum temperature measuring resistor	
Dead zone setting range		0.1 to 10.0%	
Transistor output	Output signal	ON/OFF pulse	
	Rated load voltage	DC10 to 30V	
	Max. load current	0.1A/1 point	0.4A/common
	Max. inrush current	0.4A 10ms	
	OFF-time leakage current	0.1mA max.	
	ON-time max. voltage drop	DC1.0V(TYP) 0.1A	DC2.5V(MAX) 0.1A
	Response time	OFF→ ON: 2ms max.	ON→ OFF: 2ms max.

Item		Specifications	
		Q64TCRT	Q64TCRTBW
Insulation system		Across input and earth : Transformer insulation	Across input and channel : Transformer insulation
Dielectric withstand voltage		Across input and earth : 500VAC for 1 minute	Across input and channel : 500VAC for 1 minute
Insulation resistance		Across input and earth : 500VDC 20M Ω or more	Across input and channel : 500VDC 20M Ω or more
Heater wire break detection specifications	Current sensor*1	————	The following current sensor made by URD Co., Ltd. Input accuracy • CTL-12-S36-8(0.0 to 100.0A) • CTL-6-P-H(0.00 to 20.00A)
	Input accuracy		Input range width \times (\pm 1.0%)
	Alarm delay count		3 to 255
Number of occupied I/O points*2		16 points/1 slot (I/O assignment: 16 intelligent points)	32 points/2 slots (Default I/O assignment: 16 empty points + 16 intelligent points)
Connection terminals		18-point terminal block	18-point terminal block \times 2
Applicable wire size (mm)		0.3 to 0.75	
Applicable crimping terminals		R1.25-3,1.25-YS3,RAV1.25-3,V1.25-YS3A	
Internal current consumption (A)		0.55	0.64
Weight (kg)		0.20	0.30
Outline dimensions (mm)		27.4 (W) \times 98 (H) \times 112 (D)	55.2 (W) \times 98 (H) \times 112 (D)

*1 : Only the current sensor of URD Co., Ltd. may be used.

*2 : When using the Q64TCRTBW, the device numbers of the I/O signals are incremented by 16 points due to the empty points of the left-hand side slot. In this manual, therefore, read the I/O signals as indicated below depending on the module used.

Example) When the signal is indicated as Yn1

When using Q64TCRT: Y1 When using Q64TCRTBW: Y11

*3 : For the noise immunity, withstand voltage, insulation resistance and others in the PLC system using this module, refer to the power supply module specifications given in the used CPU module user's manual.

2.2 Types, Measured Temperature Ranges and Data Resolutions of Usable Platinum Temperature Measuring Resistors

Platinum Temperature Measuring Resistor Type	°C		°F	
	Measured temperature range	Data resolution	Measured temperature range	Data resolution
Pt100	-200.0 to 600.0	0.1	-300 to 1100	1
	-200.0 to 200.0		-300.0 to 300.0	0.1
JPt100	-200.0 to 500.0	0.1	-300 to 900	1
	-200.0 to 200.0		-300.0 to 300.0	0.1

3. LOADING AND INSTALLATION

3.1 Handling Instructions

There are the following instructions for handling the Q64TCRT(BW).

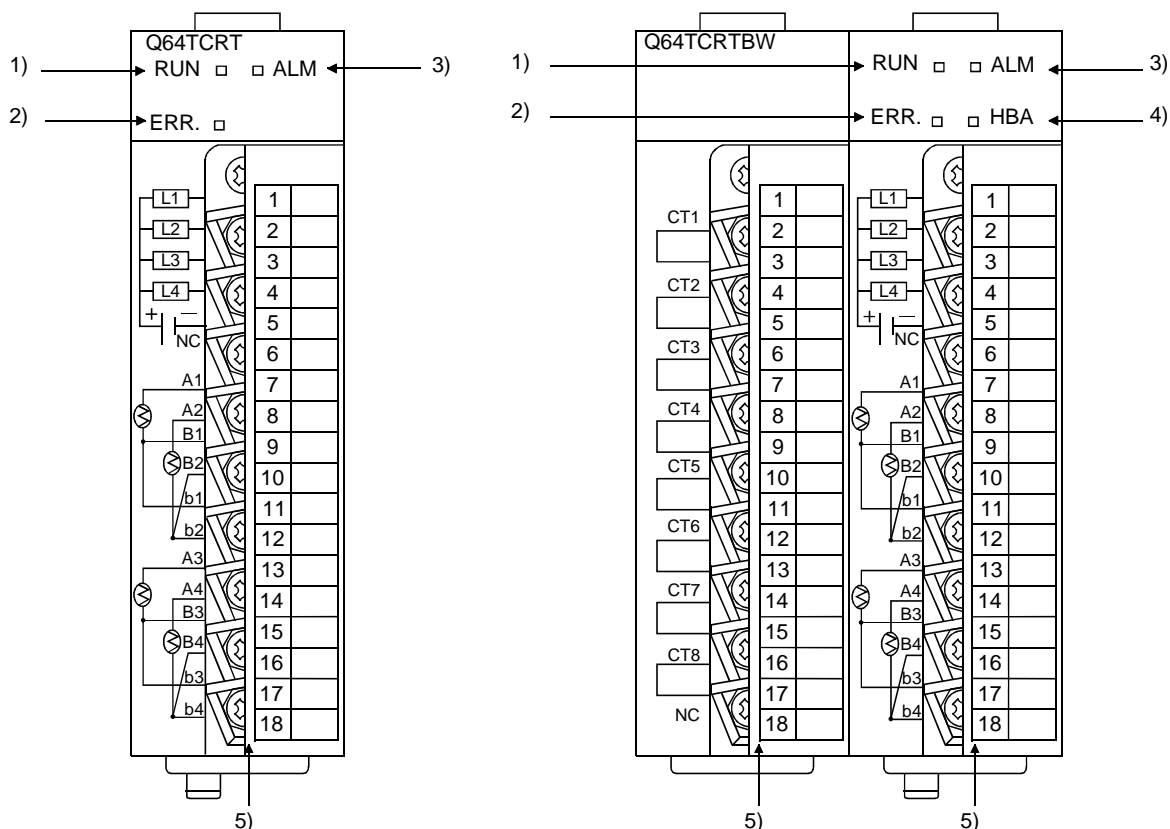
- (1) Do not drop the case and connectors of the module and subject them to hard impact.
- (2) Tighten the mounting and terminal screws of the module within the following ranges.

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

3.2 Installation Environment

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

4. NAMES AND SETTINGS OF THE PARTS



Number	Name and Appearance	Description
1)	RUN LED	Indicates the operating status of the Q64TCRT(BW). On : Operating normally. Off : 5V power switched off, a watchdog timer error occurred, or a CPU stop error occurred when the intelligent function module switches of all channels are set to "CLEAR".
2)	ERR LED	Indicates the error status of the Q64TCRT(BW). On : Hardware fault Flicker : Write data error occurrence Off : Operating normally.
3)	ALM LED	Indicates the alarm status of the Q64TCRT(BW). On : Alarm occurrence Flicker : Process value (PV) is outside the measured temperature range. Loop wire break was detected. Sensor is not connected. Off : No alarm occurrence
4)	HBA LED	Indicates the heater wire break detection status of the Q64TCRT(BW). On : Heater wire break was detected. Off : Heater wire break is not detected.
5)	Terminal block*	Used for temperature sensor input, transistor output and current sensor (CT) input.

* : The terminal block layout depends on the module used.
The respective terminal block layouts are shown on the next page.

(1) When using Q64TCRT

Terminal Number	Signal Name
1	L1
2	L2
3	L3
4	L4
5	COM-
6	Reserved
7	A1
8	A2
9	B1
10	B2
11	b1
12	b2
13	A3
14	A4
15	B3
16	B4
17	b3
18	b4

(2) When using Q64TCRTBW

Terminal Number	Signal Name	
1	Reserved	L1
2	CT1+	L2
3	CT1-	L3
4	CT2+	L4
5	CT2-	COM-
6	CT3+	Reserved
7	CT3-	A1
8	CT4+	A2
9	CT4-	B1
10	CT5+	B2
11	CT5-	b1
12	CT6+	b2
13	CT6-	A3
14	CT7+	A4
15	CT7-	B3
16	CT8+	B4
17	CT8-	b3
18	Reserved	b4

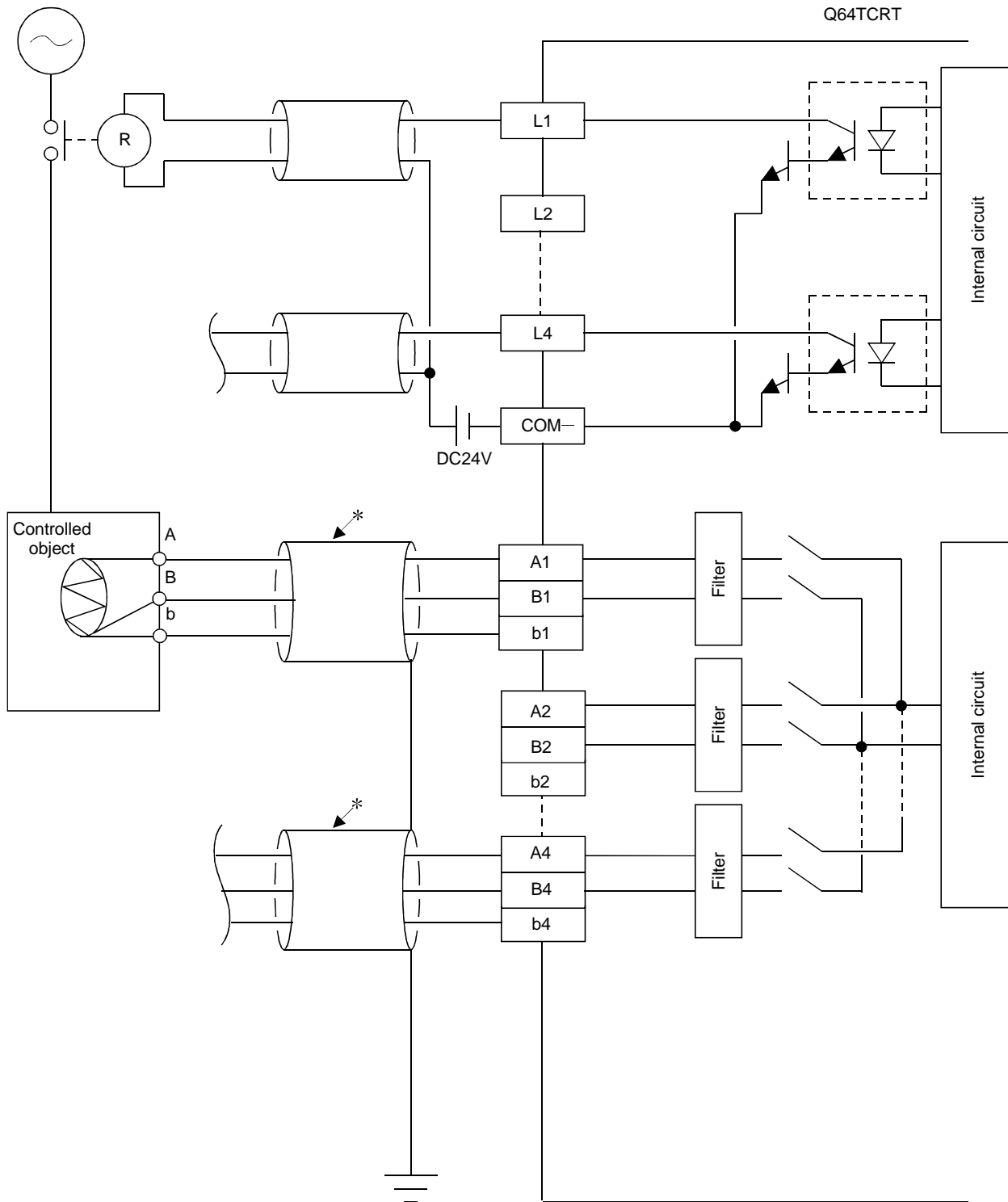
5. WIRING

5.1 Wiring Instructions

- (1) Use separate cables for the AC control circuit and Q64TCRT(BW)'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.
Always place the temperature sensors more than 100mm (3.94inch) away from the main circuit cables and AC control circuit. Fully keep the sensors away from high-voltage cables and circuits which include high frequencies, e.g. inverter's main load circuit.
Not doing so can make the sensors 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.

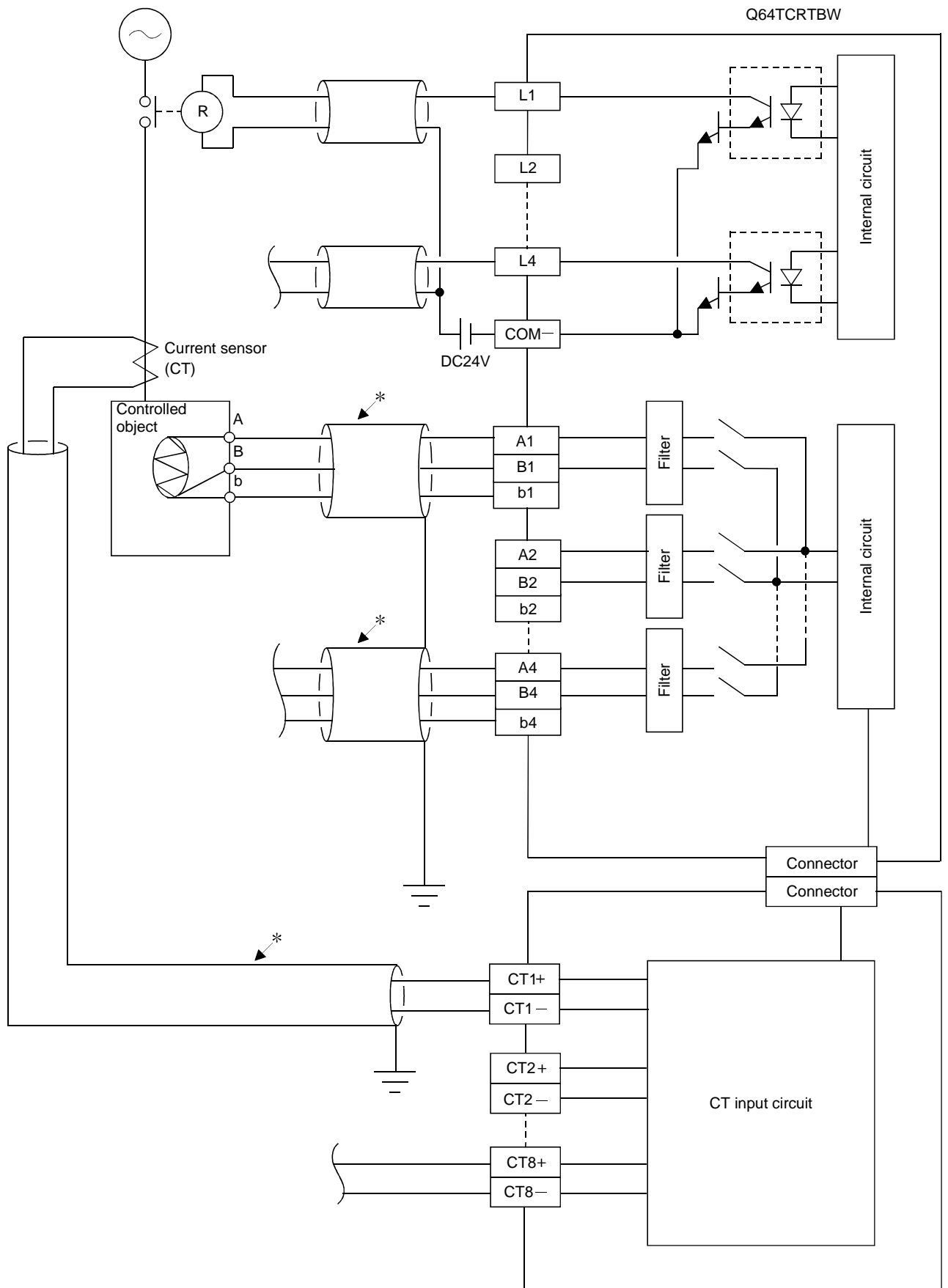
5.2 External Wiring

(1) When using Q64TCRT



* : Always use shielded wires for cables.

(2) When using Q64TCRTBW



*: Always use shielded wires for cables.

POINT

When using the heater wire break detection feature, you need to make CT input channel assignment setting.
In the above wiring example, as CT1 is used with the loop of channel 1, set 1 (channel 1) to the channel assignment setting buffer memory (108H) of CT1.

6. SETTING FROM GPPW

The Q64TCRT(BW) allows you to set the output status at an error stop of the PLC CPU by making the intelligent function module switch setting.

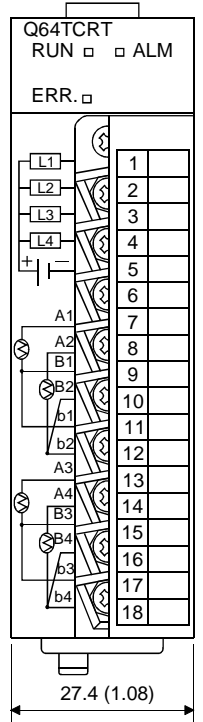
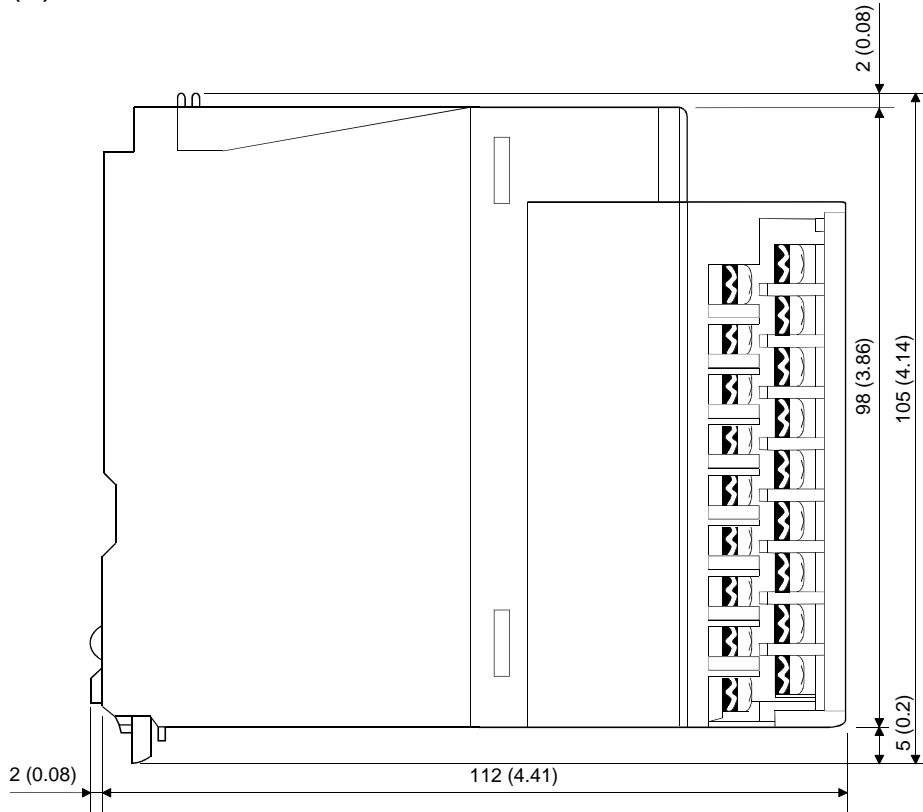
Make the intelligent function module switch setting using the I/O assignment setting of GPPW.

You can make setting easily by entering hexadecimal numbers into 4 digits.

	Setting Item										
Switch 1	<table border="0"><tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td><input type="checkbox"/></td><td>H</td></tr><tr><td>CH4</td><td>CH3</td><td>CH2</td><td>CH1</td><td></td></tr></table> <p>Output setting at CPU stop error 0 : CLEAR Other than 0 : HOLD</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H	CH4	CH3	CH2	CH1	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	H							
CH4	CH3	CH2	CH1								
Switch 2	Empty										
Switch 3	Empty										
Switch 4	Empty										
Switch 5	Empty										

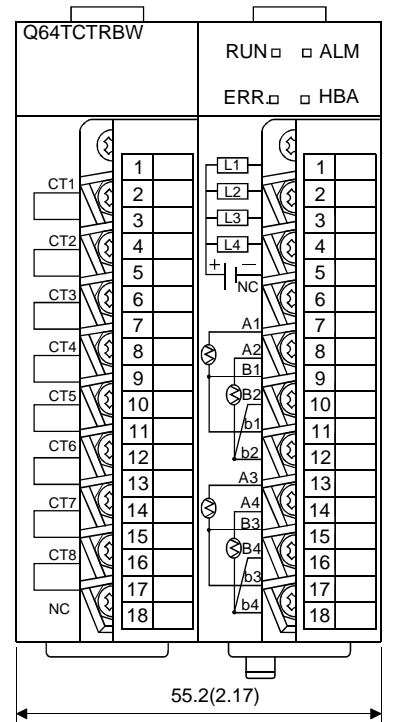
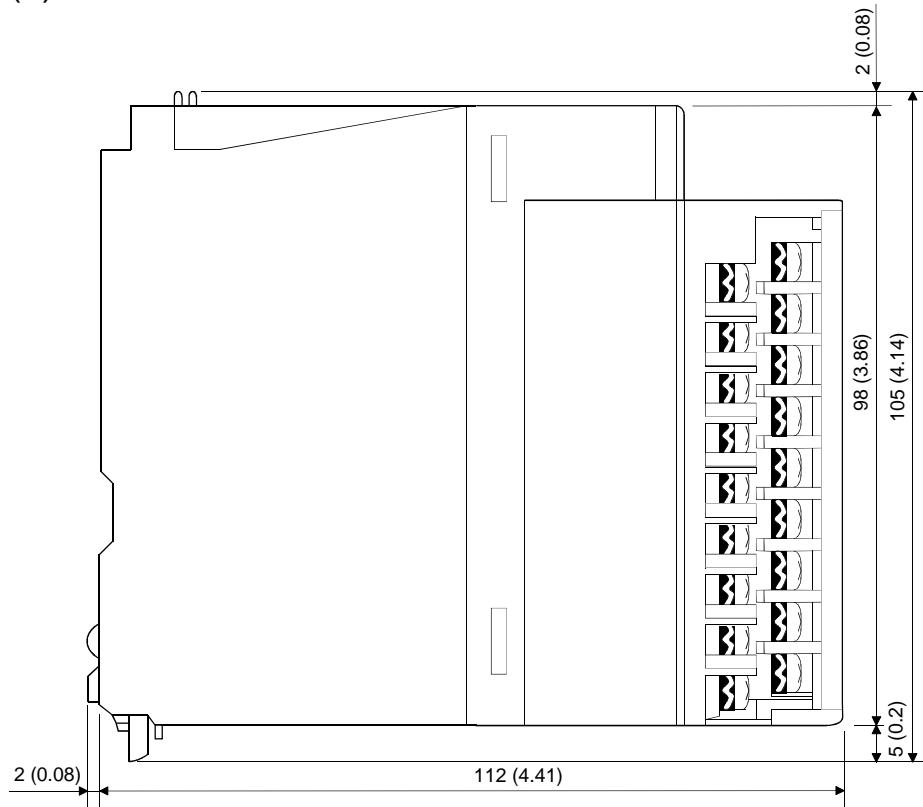
7. OUTLINE DRAWINGS

(1) Q64TCRT



Unit: mm (inch)

(2) Q64TCRTBW



Unit: mm (inch)

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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