

MITSUBISHI

Temperature Control Module

MITSUBISHI
General-Purpose PROGRAMMABLE CONTROLLER

User's Manual (Hardware)

Q64TCTT
Q64TCTTBW

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

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

MELSEC-Q
Mitsubishi
Programmable Controller

MODEL	Q64TCTT-U-H-JE
MODEL CODE	13JQ97
IB(NA)-0800120-C(0709)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 programmable controller CPU.
Doing so can malfunction the programmable controller 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 programmable controller in an environment that meets the general specifications contained in the CPU user's manual.
Using this programmable controller 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 programmable controller.
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.

[STARTUP AND MAINTENCE PRECAUTIONS]

CAUTION

- Mounting/removing the module to/from the base and the terminal block is limited to 50 times after using a product. (IEC 61131-2-compliant)
Failure to do so may cause malfunctions.

REVISIONS

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

Print Date	* Manual Number	Revision
Jun.,2000	IB (NA)-0800120-A	First edition
Mar.,2006	IB (NA)-0800120-B	Partial correction Chapter 3, 4
Sep.,2007	IB (NA)-0800120-C	Partial correction SAFETY PRECAUTIONS, CONTENTS, Conformance to the EMC Directive/Low Voltage Directive, Section 2.1, 2.2, 3.1, 5.2, Chapter 4, 6

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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	SH-080108 (13JT11)

Conformance to the EMC Directive/Low Voltage Directive

When Mitsubishi programmable controller conforming to the EMC Directive/Low Voltage Directive is mounted into your product and the product is made to conform to the EMC Directive/Low Voltage Directive, refer to the user's manual of the module.

The EMC Directive/Low Voltage Directive-conforming model of the programmable controller has 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.

- Q64TCTT temperature control module
- Q64TCTTBW temperature control module with wire break detection feature

2. SPECIFICATIONS

The specifications of the Q64TCTT(BW) are indicated below.

2.1 Performance Specifications

Item		Specifications	
		Q64TCTT	Q64TCTTBW
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	Full scale × (±0.3%)	
	Ambient temperature: 0°C to 55°C	Full scale × (±0.7%)	
Cold junction temperature compensation accuracy (Ambient temperature: 0°C to 55°C)	Temperature measurement value: -100°C or more	Within ±1.0°C	
	Temperature measurement value: -150 to -100°C	Within ±2.0°C	
	Temperature measurement value: -200 to -150°C	Within ±3.0°C	
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 compensation value setting		-50.00 to 50.00%	
Operation at sensor input disconnection		Upscale processing	
Temperature control system		PID ON/OFF pulse or 2-position control	
PID constant range	PID constant setting	Setting can be made by auto tuning	
	Proportional band (P)	0.0 to 1000.0% (0: 2-position control)	
	Integral time (I)	1 to 3600s	
	Derivative time (D)	0 to 3600s (Set 0 for PI control.)	
Set value setting range		Within temperature range set to the used thermocouple	
Dead band setting range		0.1 to 10.0%	

Item		Specifications	
		Q64TCTT	Q64TCTTBW
Transistor output	Output signal	ON/OFF pulse	
	Rated load voltage	10 to 30VDC	
	Max. load current	0.1A/point 0.4A/common	
	Max. inrush current	0.4A 10ms	
	Leakage current at OFF	0.1mA or less	
	Max. voltage drop at ON	1.0VDC (TYP) 0.1A	2.5VDC (MAX) 0.1A
	Response time	OFF→ON: 2ms or less	ON→OFF: 2ms or less
Insulation method		Between input and grounding Between input and channel	: Transformer insulation : Transformer insulation
Dielectric withstand voltage		Between input and grounding Between input and channel	: 500VAC for 1 minute : 500VAC for 1 minute
Insulation resistance		Between input and grounding Between input and channel	: 500VDC 20MΩ or more : 500VDC 20MΩ or more
Heater disconnection 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		Full scale × (±1.0%)
	Number of alert delays		3 to 255
I/O occupied points*2		16 points/slot (I/O assignment: 16 intelligent points)	32 points/2 slots (Default I/O assignment: 16 free points + 16 intelligent points)
Connection terminals		18-point terminal block	Two 18-point terminal blocks
Applicable wire size (mm ²)		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) × 98 (H) × 112 (D)	55.2 (W) × 98 (H) × 112 (D)

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

*2 : When using the Q64TCTTBW, 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 Q64TCTT: Y1 When using Q64TCTTBW: Y11

*3 : For the noise immunity, withstand voltage, insulation resistance and others in the programmable controller 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 Thermocouples

Thermocouple type	°C		°F	
	Measured temperature range	Data resolution	Measured temperature range	Data resolution
R	0 to 1700	1	0 to 3000	1
K	0 to 500 0 to 800 0 to 1300	1	0 to 1000 0 to 2400	1
	-200.0 to 400.0 0.0 to 400.0 0.0 to 500.0 0.0 to 800.0	0.1	0.0 to 1000.0	0.1
J	0 to 500 0 to 800 0 to 1200	1	0 to 1000 0 to 1600 0 to 2100	1
	0.0 to 400.0 0.0 to 500.0 0.0 to 800.0	0.1	0.0 to 1000.0	0.1
T	-200 to 400 -200 to 200 0 to 200 0 to 400	1	0 to 700 -300 to 400	1
	-200.0 to 400.0 0.0 to 400.0	0.1	0.0 to 700.0	0.1
S	0 to 1700	1	0 to 3000	1
B	0 to 1800	1	0 to 3000	1
E	0 to 400 0 to 1000	1	0 to 1800	1
	0.0 to 700.0	0.1	————	————
N	0 to 1300	1	0 to 2300	1
U	0 to 400 -200 to 200	1	0 to 700 -300 to 400	1
	0.0 to 600.0	0.1	————	————
L	0 to 400 0 to 900	1	0 to 800 0 to 1600	1
	0.0 to 400.0 0.0 to 900.0	0.1	————	————
PL II	0 to 1200	1	0 to 2300	1
W5Re/W26Re	0 to 2300	1	0 to 3000	1

3. LOADING AND INSTALLATION

3.1 Handling Instructions

There are the following instructions for handling the Q64TCTT(BW).

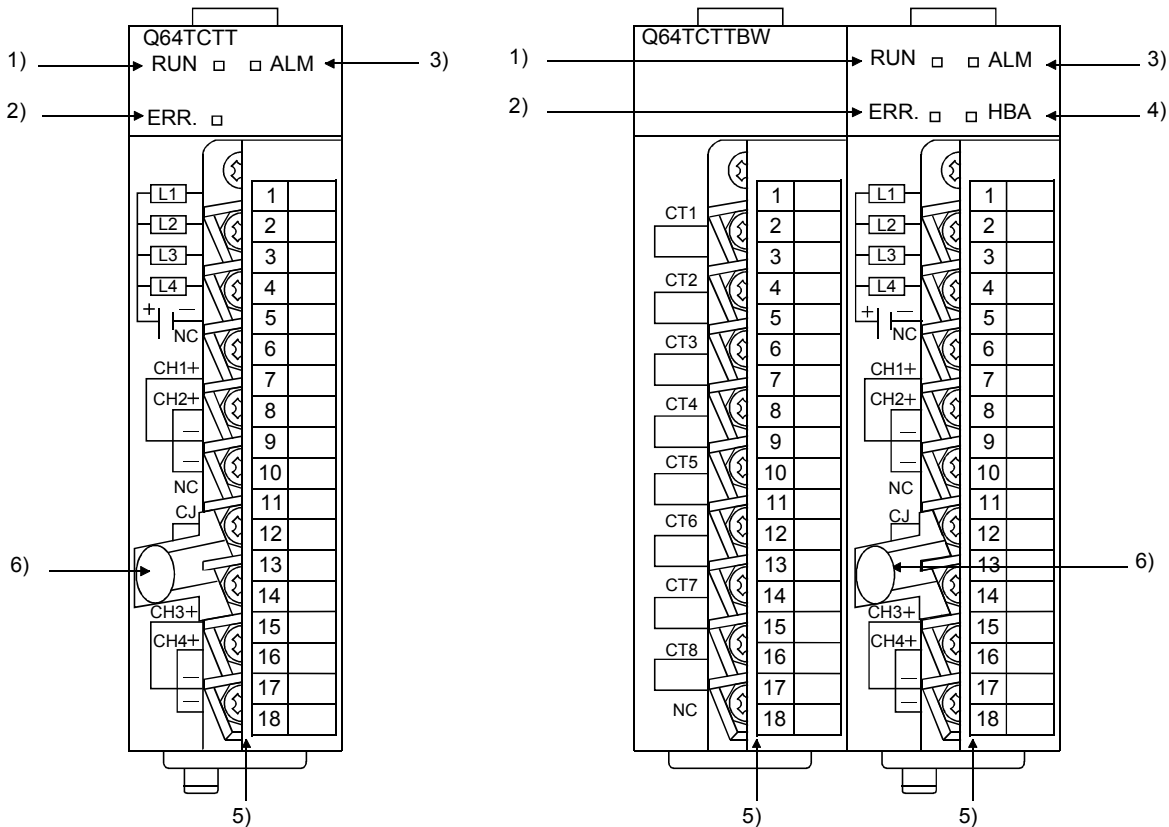
- (1) Do not drop the case and connectors of the module and subject them to hard impact.
- (2) Tighten the mounting and terminal screws of the module within the following ranges.

Screw Location	Tightening Torque Range
Module fixing screw (M3 screw)	0.36 to 0.48N · m
Terminal block terminal screw (M3 screw)	0.42 to 0.58N · m
Terminal block fixing screw (M3.5 screw)	0.66 to 0.89N · m

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 Q64TCTT(BW). On : Operating normally. Off : 5V power switched off, a watchdog timer error occurred, in the module changeable status during online module change, 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 Q64TCTT(BW). On : Hardware fault (including the case where no cold junction temperature compensation resistor is connected) Flicker : Write data error occurrence Off : Operating normally.
3)	ALM LED	Indicates the alarm status of the Q64TCTT(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 Q64TCTTBW. 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.
6)	Cold junction temperature compensation resistor	Used for Cold junction temperature compensation.

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

(1) When using Q64TCTT

Terminal Number	Signal Name
1	L1
2	L2
3	L3
4	L4
5	COM-
6	Reserved
7	CH1+
8	CH2+
9	CH1-
10	CH2-
11	Reserved
12	CJ
13	Reserved
14	CJ
15	CH3+
16	CH4+
17	CH3-
18	CH4-

(2) When using Q64TCTTBW

Terminal Number	Signal Name	
1	Reserved	L1
2	CT1+	L2
3	CT1-	L3
4	CT2+	L4
5	CT2-	COM-
6	CT3+	Reserved
7	CT3-	CH1+
8	CT4+	CH2+
9	CT4-	CH1-
10	CT5+	CH2-
11	CT5-	Reserved
12	CT6+	CJ
13	CT6-	Reserved
14	CT7+	CJ
15	CT7-	CH3+
16	CT8+	CH4+
17	CT8-	CH3-
18	Reserved	CH4-

5. WIRING

5.1 Wiring Instructions

- (1) Use separate cables for the AC control circuit and Q64TCTT(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 programmable controller.

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.

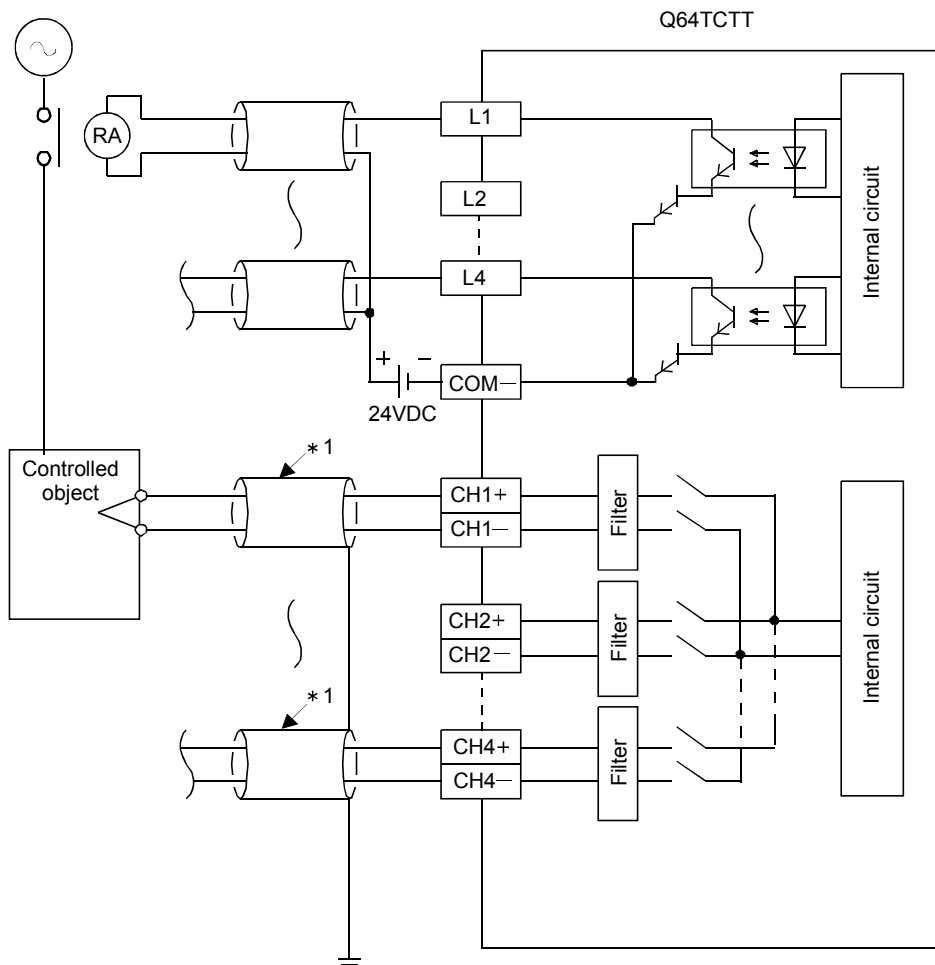
Not doing so can make the sensors more susceptible to noises, surges and inductions.

- (3) Earth the shielded wire or shielded cable to FG of the programmable controller.

However, depending on the external noise conditions, external earthing may be recommended.

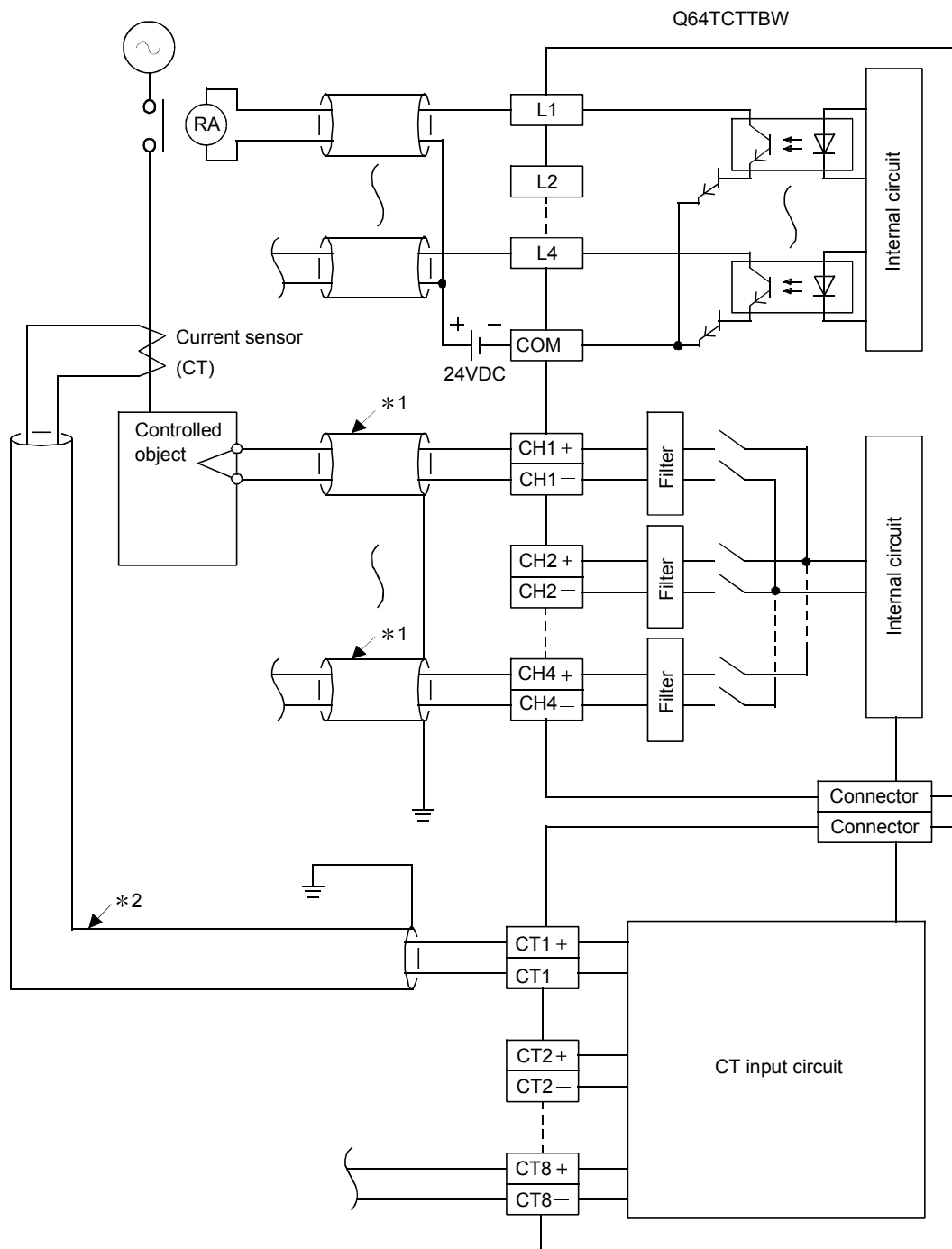
5.2 External Wiring

- (1) When using Q64TCTT



*1 : Please use shielded compensation conductors.

(2) When using Q64TCTTBW



*1 : Please use shielded compensation conductors.

*2 : Always use shielded cables.

POINT

When using the heater wire break detection feature, you need to make CT input channel assignment setting.

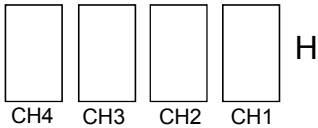
In the above wiring example, as CT1 is used with the loop of channel 1, set 1 (channel 1) to the channel assignment setting buffer memory (108H) of CT1.

6. SETTING FROM GX Developer

The Q64TCTT(BW) allows you to set the output status at an error stop of the programmable controller CPU by making the intelligent function module switch setting.

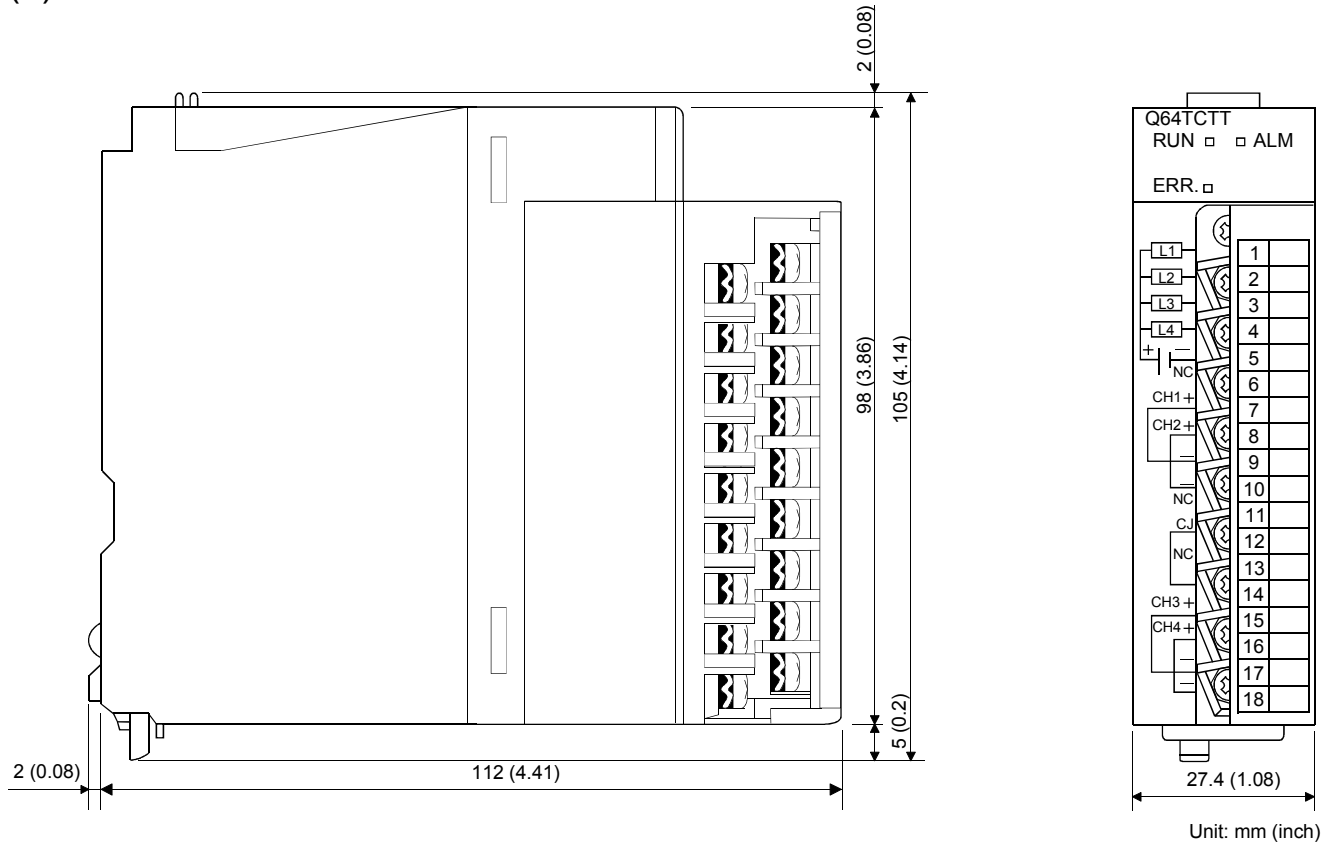
Make the intelligent function module switch setting using the I/O assignment setting of GX Developer.

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

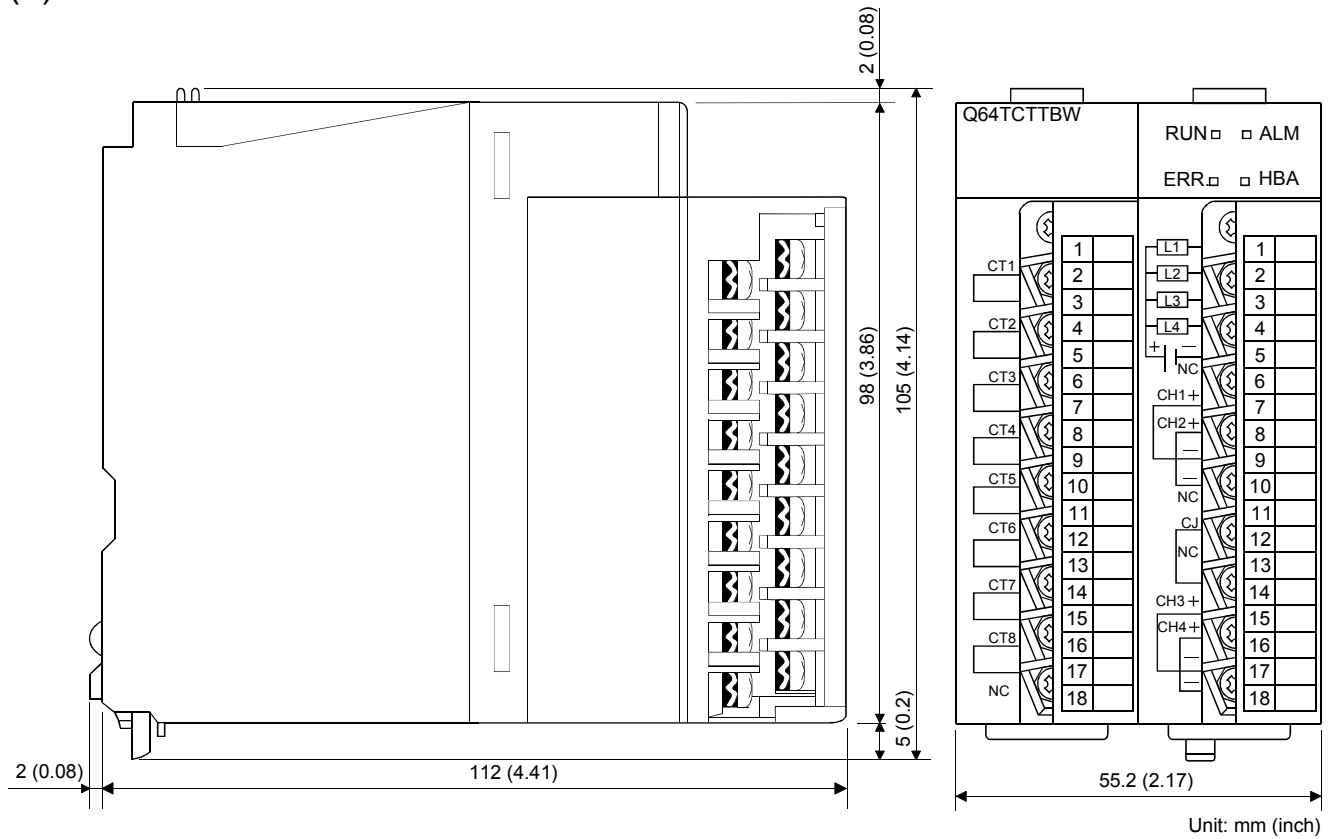
	Setting Item	
Switch 1		Output setting at CPU stop error 0 : CLEAR Other than 0 : HOLD
Switch 2	Empty	
Switch 3	Empty	
Switch 4	Empty	
Switch 5	Empty	

7. OUTLINE DRAWINGS

(1) Q64TCTT



(2) Q64TCTTBW



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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