

# Refrigeration Temperature Controllers



## TC3YT Series PRODUCT MANUAL

**For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.**

The specifications, dimensions, etc are subject to change without notice for product improvement. Some models may be discontinued without notice.

### Features

- Display method : 3-digit 7-segment LED
- Control method : ON/OFF control, P control
- Input specification : Thermocouple: K (CA), J (IC)
- RTD: DPt100 Ω
- Sampling cycle : 500 ms
- Control output : Relay (3 A)
- Power supply : 100-240 VAC~ 50/60 Hz
- Protection structure : IP65 (front panel)

### Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

**⚠ Warning** Failure to follow instructions may result in serious injury or death

- 01. Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss.** (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)  
Failure to follow this instruction may result in personal injury, economic loss or fire.
- 02. Do not use the unit in the place where flammable/explosive/corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**  
Failure to follow this instruction may result in explosion or fire.
- 03. Install on a device panel to use.**  
Failure to follow this instruction may result in electric shock.
- 04. Do not connect, repair, or inspect the unit while connected to a power source.**  
Failure to follow this instruction may result in fire or electric shock.
- 05. Check 'Connections' before wiring.**  
Failure to follow this instruction may result in fire.
- 06. Do not disassemble or modify the unit.**  
Failure to follow this instruction may result in fire or electric shock.

**⚠ Caution** Failure to follow instructions may result in injury or product damage

- 01. When connecting the power input and relay output, use AWG 28 to 12 (0.50 mm<sup>2</sup>) cable or over and tighten the terminal screw with a tightening torque of 0.3 to 0.4 N.m.**  
**When connecting the sensor input and communication cable without dedicated cable, use AWG 28 to 16 cable and tighten the terminal screw with a tightening torque of 0.3 to 0.4 N.m.**  
Failure to follow this instruction may result in fire or malfunction due to contact failure.
- 02. Use the unit within the rated specifications.**  
Failure to follow this instruction may result in fire or product damage
- 03. Use a dry cloth to clean the unit, and do not use water or organic solvent.**  
Failure to follow this instruction may result in fire or electric shock.
- 04. Keep the product away from metal chip, dust, and wire residue which flow into the unit.**  
Failure to follow this instruction may result in fire or product damage.

### Cautions during Use

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Check the polarity of the terminals before wiring the temperature sensor. For RTD temperature sensor, wire it as 3-wire type, using cables in same thickness and length. For thermocouple (CT) temperature sensor, use the designated compensation wire for extending wire.
- Keep away from high voltage lines or power lines to prevent inductive noise. In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line. Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.

- Do not use the unit for other purpose (e.g. voltmeter, ammeter), but temperature controller.
- Make a required space around the unit for radiation of heat. For accurate temperature measurement, warm up the unit over 20 min after turning on the power.
- Make sure that power supply voltage reaches to the rated voltage within 2 sec after supplying power.
- Do not wire to terminals which are not used.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude Max. 2,000 m
  - Pollution degree 2
  - Installation category II

## Ordering Information

This is only for reference, the actual product does not support all combinations. For selecting the specified model, follow the Autonics website.

**T C 3 Y T - B 4 R ①**


### ① Relay type

3: 250 VAC~ 3 A 1c  
16: 250 VAC~ 16 A 1c

## Product Components

- Product
- Instruction manual
- Bracket ×2

## Specifications

Series	TC3YF Series	
Power supply	100 - 240 VAC~ 50/60 Hz ±10%	
Power consumption	≤ 4 VA	
Sampling period	500 ms	
Input specification	Refer to 'Input Type and Using Range'.	
Control output	250 VAC~ 3 A 1c / 250 VAC~ 16 A 1c (model)	
Display type	7 segment (red), LED type	
Control type	ON/OFF, Proportional control	
Hysteresis	1 ~ 100 °C	
Proportional band	0 ~ 100%	
Offset correction	0 ~ 100%	
Control period	1 ~ 120 sec	
Relay life cycle	Mechanical	≥ 10,000,000 operations
	Electrical	≥ 100,000 operations (250 VAC~ 3 A load resistance) ≥ 100,000 operations (250 VAC~ 16 A load resistance)
Dielectric strength	Between all external terminals and case: 2,000 VAC~ 60 Hz for 1 min	
Vibration	0.75 mm amplitude at frequency of 10 to 55Hz (for 1 min) in each X, Y, Z direction for 1 hours	
Insulation resistance	≥ 100 MΩ (500 VDC≡ megger)	
Noise immunity	±2 kV square shaped noise (pulse width 1 μs) by noise simulator R-phase, S-phase	
Memory retention	≈ 10 years (non-volatile semiconductor memory type)	
Ambient temperature	-10 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)	
Ambient humidity	35 to 85%RH (no freezing or condensation)	
Protection structure	IP65 (IEC standards)	
Approval		
Unit weight	• TC3YT-B4R3: ≈ 99 g • TC3YT-B4R16: ≈ 103 g	

## Input Type and Using Range

Input type	Display	Using range (°C)	Using range (°F)	
Thermocouple	K (CA)	KCA	0 ~ 999	32 ~ 999
	J (IC)	JIC	0 ~ 400	32 ~ 752
RTD	Pt H	PT.H	0 ~ 400	32 ~ 752
	Pt L	PT.L	-99 ~ 199	-146 ~ 390

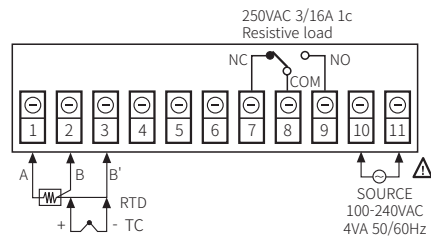
### ■ Display accuracy

(PV ±0.5% or ±1°C higher one) rdg ±1digit

## Errors

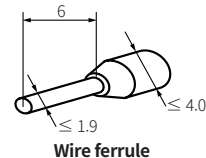
Display	Description	Troubleshooting
□ P n	Flashes at 1 sec when input sensor is disconnected or sensor is not connected.	Check input sensor status.
HHH	Flashes at 1 sec when PV is higher than input range.	When input is within the rated input range, this display disappears.
LLL	Flashes at 1 sec when PV is lower than input range.	

## Connections



## Crimp Terminal Specifications

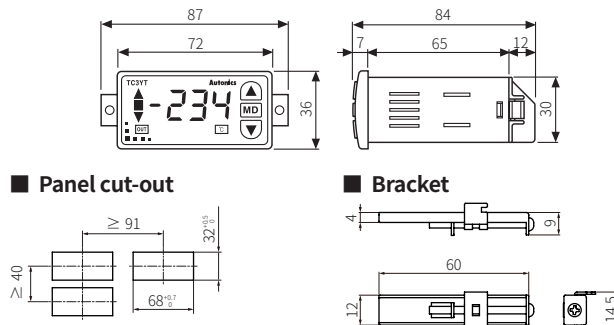
- Unit: mm, Use the crimp terminal of follow shape.



Wire ferrule

## Dimensions

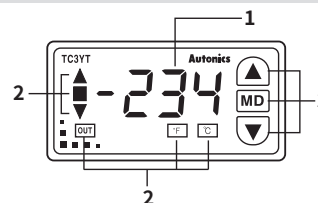
- Unit: mm, For the detailed drawings, follow the Autonics website.



### ■ Panel cut-out

### ■ Bracket

## Unit Descriptions



### 1. Temperature display part (Red)

- Run mode: Displays PV (Present value)
- Setting mode: Displays parameter name

### 2. Indicator

Display	Name	Description
■ (green)	Deviation	The difference between PV and SV is less than 2°C
▲/▼ (red)		The difference between PV and SV is greater than 2°C
OUT (red)	Control output	Control output is ON
°C, °F (yellow)	Temperature unit	Set temperature unit is ON (parameter)

### 3. Input key

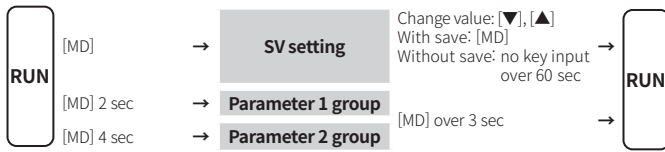
Display	Name
[MD]	Mode key
[▲], [▼]	Setting value control key

## Initial Display When Power is ON

When power is supplied, series and model name are flashed twice sequentially (for 1 sec), and enter into RUN mode.

	1. Input specification	2. Control output	3. RUN mode
Temperature display part	U I C	r L Y	2 5 0

## Mode Setting



## Parameter Setting

- Some parameters are activated/deactivated depending on the model or setting of other parameters. Refer to the descriptions of each item.
- [MD] key: Move to next item after saving / Return to upper level with save (≥ 3 sec)
- [▲] key: Select parameter
- [▲], [▼] key: Change setting value
- If there is no key input over 1 min, return to the RUN mode without saving.

### Parameter 1 group

Parameter	Display	Default	Setting range	Condition
1-1 Proportional band	P	0	0 (ON/OFF control) ~ 100%	-
1-2 Proportional control cycle	t	10	1 ~ 120 sec	1-1 Proportional band: > 0
1-3 Offset correction for proportional control	r 5 t	50	0 ~ 100%	-
1-4 ON/OFF control hysteresis	H Y 5	2	1 ~ 100 °C	1-1 Proportional band: = 0
1-5 Input correction	i n b	0	-30 ~ 30 °C	1-1 Proportional band: > 0

### Parameter 2 group

Parameter	Display	Default	Setting range	Condition
2-1 Input specification	i n t	U I C	Refer to 'Input Type and Using Range: Input specification'.	-
2-2 SV high limit	H 5 C	400	Refer to 'Input Type and Using Range: Using range'.	-
2-3 SV low limit	L 5 C	0		-
2-4 Control output mode	a F t	H E t	HET: Heating, COL: Cooling	-
2-5 Error, output	a E r	a F F	ON, OFF	-
2-6 Temperature unit	U n t	°C	°C, °F	-
2-7 Lock	L o C	a F F	OFF LOC1: Lock parameter 2 group LOC2: Lock parameter 1/2 group LOC3: Lock parameter 1/2 group, SV setting	-

## Segment Table

The segments displayed on the product indicate the following meanings. It may differ depending on the product.

7 segment				11 segment				12 segment				16 segment			
0	0	I	I	0	0	I	I	0	0	I	I	0	0	I	I
1	1	J	J	1	1	J	J	1	1	J	J	1	1	J	J
2	2	K	K	2	2	K	K	2	2	K	K	2	2	K	K
3	3	L	L	3	3	L	L	3	3	L	L	3	3	L	L
4	4	M	M	4	4	M	M	4	4	M	M	4	4	M	M
5	5	N	N	5	5	N	N	5	5	N	N	5	5	N	N
6	6	O	O	6	6	O	O	6	6	O	O	6	6	O	O
7	7	P	P	7	7	P	P	7	7	P	P	7	7	P	P
8	8	Q	Q	8	8	Q	Q	8	8	Q	Q	8	8	Q	Q
9	9	R	R	9	9	R	R	9	9	R	R	9	9	R	R
A	A	S	S	A	A	S	S	A	A	S	S	A	A	S	S
b	B	T	T	b	B	T	T	b	B	T	T	b	B	T	T
c	C	U	U	c	C	U	U	c	C	U	U	c	C	U	U
d	D	V	V	d	D	V	V	d	D	V	V	d	D	V	V
E	E	W	W	E	E	W	W	E	E	W	W	E	E	W	W
F	F	X	X	F	F	X	X	F	F	X	X	F	F	X	X
G	G	Y	Y	G	G	Y	Y	G	G	Y	Y	G	G	Y	Y
H	H	Z	Z	H	H	Z	Z	H	H	Z	Z	H	H	Z	Z