

3 1/2 Digit 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.
- Δ symbol indicates caution due to special circumstances in which hazards may occur.

Δ 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.

Δ 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 mm²) 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 - ① ② ③ ④

① Control method

B: ON/OFF / Proportional

② Power supply

4: 100 - 240 VAC

③ Control output

R: Relay

④ Relay type

3: 250 VAC 3 A 1c

16: 250 VAC 16 A 1c

Product Components

- Product
- Instruction manual
- Bracket × 2

Specifications

Series	TC3YT Series	
Power supply	100 - 240 VAC~ 50/60 Hz	
Permissible voltage range	90 to 110 % of rated voltage	
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 to 100 °C	
Proportional band	0 to 100%	
Offset correction	0 to 100%	
Control period	1 to 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 the charging part and the case: 2,000 VAC~ 60 Hz for 1 min	
Vibration	0.75 mm amplitude at frequency of 10 to 55Hz 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)	
Certification	CE, UL, EAC	
Unit weight	• TC3YT-B4R3: ≈ 99 g • TC3YT-B4R16: ≈ 103 g	

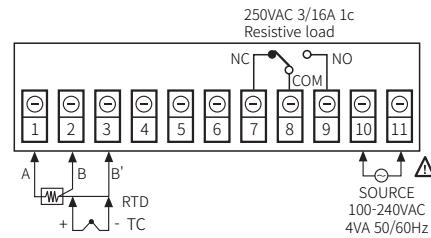
Input Type and Using Range

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

■ Display accuracy

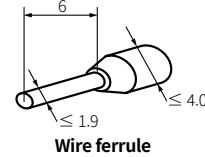
(PV ±0.5% or ±1°C higher one) rdg ±1digit

Connections



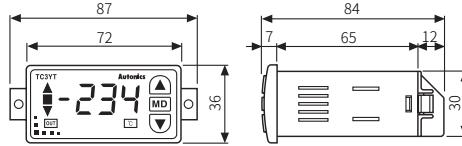
Crimp Terminal Specifications

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

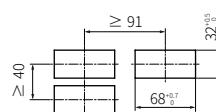


Dimensions

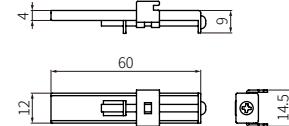
- Unit: mm, For the detailed drawings, follow the Autonics website.



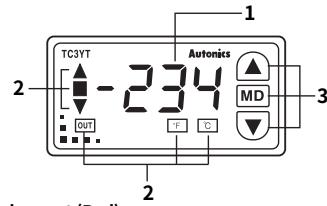
■ Panel cut-out



■ Bracket



Unit Descriptions



1. Temperature display part (Red)

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

2. Indicator

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

Errors

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

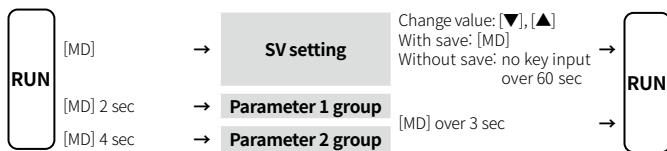
(1) Be careful that when H H H / L L L error occurs, the control output may occur by recognizing the maximum or minimum input depending on the control type.

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	J1 E	r L Y	250

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) to 100%	-
1-2 Proportional control cycle	t	10	1 to 120 sec	1-1 Proportional band: > 0
1-3 Offset correction for proportional control	r 5t	50	0 to 100%	-
1-4 ON/OFF control hysteresis	HYS	2	1 to 100 °C	1-1 Proportional band: = 0
1-5 Input correction	I n.b	0	-30 to 30 °C	1-1 Proportional band: > 0

Parameter 2 group

Parameter	Display	Default	Setting range	Condition
2-1 Input specification	I n.t.	J1 E	Refer to 'Input Type and Using Range: Input specification'.	-
2-2 SV high limit	HSL	400	Refer to 'Input Type and Using Range: Using range'.	-
2-3 SV low limit	LSL	0	Refer to 'Input Type and Using Range: Using range'.	-
2-4 Control output mode	oFt	HET	HET: Heating, COL: Cooling	-
2-5 Error, output	oEr	OFF	ON, OFF	-
2-6 Temperature unit	Unt	oE	°C, °F	-
2-7 Lock	Loc	oFF	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
I	1	J	J	I	1	J	J
2	2	K	K	2	2	K	K
3	3	L	L	3	3	L	L
4	4	M	M	4	4	M	M
5	5	N	N	5	5	N	N
6	6	O	O	6	6	O	O
7	7	P	P	7	7	P	P
8	8	Q	Q	8	8	Q	Q
9	9	R	R	9	9	R	R
R	A	S	S	R	A	S	S
b	B	T	T	b	B	T	T
C	C	U	U	C	C	U	U
d	D	U	V	d	D	V	V
E	E	W	W	E	E	W	W
F	F	X	X	F	F	X	X
G	G	Y	Y	G	G	Y	Y
H	H	Z	Z	H	H	Z	Z