

Simultaneous Heating&Cooling Output PID Temperature Controllers



TK Series CATALOG

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

- 50ms high-speed sampling rate and $\pm 0.3\%$ display accuracy
- Simultaneous heating and cooling control function (patent) *
- Switch between current output and SSR drive output
- SSR drive output (SSRP function) control options : ON/OFF control, cycle control, phase control
- Communication output models available : RS485 (Modbus RTU)
- Parameter configuration via PC (RS485 communication)
 - DAQMaster software included (comprehensive device management software)
 - Communication converter sold separately : SCM-US (USB to serial converter), SCM-381 (RS-232C to RS485 converter), SCM-US481 (USB to RS485 converter)
- User-friendly parameter features
- Heater disconnect alarm function (CT input)
 - Current transformer (CT) sold separately : CSTC-E80LN, CSTC-E200LN
- SV preset function (up to 4 set values) using digital input terminals
- Available in various DIN sizes : (48×24, 48×48, 72×72, 96×48, 48×96, 96×96 mm)

*Korea Patent Registration 10-1002582, U.S.A. Patent Registration 8645000, Japan Patent Registration 3184816, China Patent Registration ZL200980111733.X, Vietnam Patent Registration 1-0012131, India Patent Registration 291573, Indonesia Patent Registration IDP0032166

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 K 4 ① - ② ③ ④ ⑤

① Size

- N: DIN W 48 × H 24 mm
- SP: DIN W 48 × H 48 mm (11 pin plug type)
- S: DIN W 48 × H 48 mm
- M: DIN W 72 × H 72 mm
- W: DIN W 96 × H 48 mm
- H: DIN W 48 × H 96 mm
- L: DIN W 96 × H 96 mm

③ Power supply

- 2: 24 VAC~ 50/60 Hz, 24-48 VDC==
- 4: 100-240 VAC~ 50/60 Hz

④ OUT1 Control output

- R: Relay
- S: SSR drive
- C: Selectable current or SSR drive output

② Option in/output

Size: N		
PN	OUT2	Function
1	Normal type ⁰¹⁾	Alarm 1 + CT input
	Heating & Cooling	Alarm 2
2	Normal type	Alarm 1 + Alarm 2
	Heating & Cooling	Alarm 1 + Digital input 1/2
D	Normal type	Digital input 1/2
	Heating & Cooling	Digital input 1/2
R	Normal type	Alarm 1+Transmission output
	Heating & Cooling	Transmission output
T	Normal type	Alarm output 1 + RS485 communication
	Heating & Cooling	RS485 communication

⑤ OUT2 Control output

- N: Normal type [No OUT2 (Heating or Cooling)]
- R: Heating & Cooling type [Relay output]⁰³⁾
- C: Heating & Cooling type [Selectable current or SSR drive output]⁰⁴⁾

Size: SP

PN	Function
1	Alarm 1

Size: S, M, W, H, L

PN	Function
1	Alarm 1
2	Alarm 1 + Alarm output 2
R	Alarm 1 + Transmission output
T	Alarm 1 + RS485 communication
A	Alarm 1 + Alarm 2 + Transmission output
B	Alarm 1 + Alarm 2 + RS485 communication
D	Alarm 1 + Alarm 2 + Digital input 1/2 ⁰²⁾

01) The CT input model of TK4N can be selected only in the normal type model with alarm output 1. (except TK4SP)

02) Only for TK4S-D, OUT2 output terminal is used as DI-2 input terminal.

03) When operating mode is heating or cooling control, OUT2 can be used as alarm output 3 (except TK4N).





04) When operating mode is heating or cooling control, OUT2 can be used as transmission output 2.

Software

Download the installation file and the manuals from the Autonics website.

■ DAQMaster

DAQMaster is comprehensive device management program. It is available for parameter setting, monitoring.

Specifications					
Series		TK4N	TK4SP	TK4S	TK4M
Power supply	AC type	100 - 240 VAC ~ 50/60 Hz ± 10%			
	AC/DC type	-	24 VAC ~ 50/60 Hz ± 10%, 24-48 VDC = ± 10%		
Power consumption	AC type	≤ 6 VA			
	AC/DC type	-	AC: ≤ 8 VA, DC ≤ 5W		
Unit weight (packaged)		≈ 70 g (≈ 140 g)	≈ 85 g (≈ 130 g)	≈ 105 g (≈ 150 g)	≈ 140 g (≈ 210 g)
	Series		TK4W	TK4H	TK4L
Power supply	AC type	100 - 240 VAC ~ 50/60 Hz ± 10%			
	AC/DC type	24 VAC ~ 50/60 Hz ± 10%, 24-48 VDC = ± 10%			
Power consumption	AC type	≤ 8 VA			
	AC/DC type	AC: ≤ 8 VA, DC ≤ 5W			
Unit weight (packaged)		≈ 141 g (≈ 211 g)	≈ 141 g (≈ 211 g)	≈ 198 g (≈ 294 g)	
	Sampling period	50 ms			
Input specification	Refer to 'Input Type and Using Range'				
Option input	CT input	<ul style="list-style-type: none"> 0.0-50.0 A (primary current measurement range) CT ratio: 1/1,000 Measurement accuracy: ± 5% F.S. ± 1 digit 			
	Digital input	<ul style="list-style-type: none"> Contact - ON: ≤ 2 kΩ, OFF: ≥ 90 kΩ Non contact - residual voltage ≤ 1.0 V, leakage current ≤ 0.1 mA Outflow current: ≈ 0.5 mA per input 			
Control output	Relay	250 VAC ~ 3 A, 30 VDC = 3 A 1a			
	SSR	11 VDC = ± 2 V, ≤ 20 mA			
Alarm output	Relay	AL1, AL2: 250 VAC ~ 3 A 1a • TK4N-AL2: 250 VAC ~ 0.5 A 1a (≤ 125 VA)			
	Current	DC 4-20 mA or DC 0-20 mA (parameter), Load resistance: ≤ 500 Ω			
Option output	Transmission	DC 4 - 20 mA (Load resistance: ≤ 500 Ω, Output accuracy: ± 0.3% F.S.)			
	RS485 comm.	Modbus RTU			
Display type	7 segment (red, green, yellow), LED type				
Control type	Heating, Cooling	ON/OFF, P, PI, PD, PID Control			
	Heating & Cooling				
Hysteresis	<ul style="list-style-type: none"> Thermocouple, RTD: 1 to 100 (0.1 to 100.0) °C/°F Analog: 1 to 100 digit 				
Proportional band (P)	0.1 to 999.9 °C/°F (0.1 to 999.9%)				
Integral time (I)	0 to 9,999 sec				
Derivative time (D)	0 to 9,999 sec				
Control cycle (T)	<ul style="list-style-type: none"> Relay output, SSR drive output: 0.1 to 120.0 sec Selectable current or SSR drive output: 1.0 to 120.0 sec 				
Manual reset	0.0 to 100.0%				
Relay life cycle	Mechanical	OUT1/2: ≥ 5,000,000 operations AL1/2: ≥ 20,000,000 operations (TK4H/W/L: ≥ 5,000,000 operations)			
	Electrical	≥ 100,000 operations			
Dielectric strength	Between power source terminal and input terminal: 2,000 VAC ~ 50/60 Hz for 1 min				
Vibration	0.75 mm amplitude at frequency of 5 to 55 Hz (for 1 min) in each X, Y, Z direction for 2 hours				
Insulation resistance	≥ 100 MΩ (500 VDC = megger)				
Noise immunity	± 2 kV square shaped noise by noise simulator (pulse width: 1 μs) 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, storage: 35 to 85%RH (no freezing or condensation)				
Protection structure	IP65 (Front panel, IEC standards) • TK4SP: IP50 (Front panel, IEC standards)				
Insulation type	Double insulation or reinforced insulation (mark:  , dielectric strength between the measuring input part and the power part: 2 kV)				
Accessory	Bracket, Terminal protection cover (TK4N)				
Approval	  				

Communication Interface

■ RS485	
Comm. protocol	Modbus RTU
Connection type	RS485
Application standard	EIA RS485 compliance with
Maximum connection	31 units (address: 01 to 99)
Synchronous method	Asynchronous
Comm. Method	Two-wire half duplex
Comm. effective range	≤ 800 m
Comm. speed	2,400 / 4,800 / 9,600 (default) / 19,200 / 38,400 bps (parameter)
Response time	5 to 99 ms (default: 20 ms)
Start bit	1 bit (fixed)
Data bit	8 bit (fixed)
Parity bit	None (default), Odd, Even
Stop bit	1 bit, 2 bit (default)

Input Type and Using Range						
The setting range of some parameters is limited when using the decimal point display.						
Input type	Decimal point	Display	Using range (°C)	Using range (°F)		
Thermo-couple	K (CA)	1	℄℄RH	-200 to 1,350	-328 to 2,463	
		0.1	℄℄RL	-199.9 to 999.9	-199.9 to 999.9	
	J (IC)	1	℄℄EH	-200 to 800	-328 to 1,472	
		0.1	℄℄EL	-199.9 to 800.0	-199.9 to 999.9	
	E (CR)	1	℄℄rH	-200 to 800	-328 to 1,472	
		0.1	℄℄rL	-199.9 to 800.0	-199.9 to 999.9	
	T (CC)	1	℄℄EH	-200 to 400	-328 to 752	
		0.1	℄℄EL	-199.9 to 400.0	-199.9 to 752.0	
	RTD	B (PR)	1	b PR	0 to 1,800	32 to 3,272
			1	r PR	0 to 1,750	32 to 3,182
		S (PR)	1	S PR	0 to 1,750	32 to 3,182
			1	n n n	-200 to 1,300	-328 to 2,372
C (TT) ⁰¹⁾		1	℄ ℄ ℄	0 to 2,300	32 to 4,172	
		1	℄ ℄ ℄	0 to 2,300	32 to 4,172	
G (TT) ⁰²⁾		1	L ℄ EH	-200 to 900	-328 to 1,652	
		0.1	L ℄ EL	-199.9 to 900.0	-199.9 to 999.9	
U (CC)		1	℄℄EH	-200 to 400	-328 to 752	
		0.1	℄℄EL	-199.9 to 400.0	-199.9 to 752.0	
Analog	Platinel II	1	PL I I	0 to 1,390	32 to 2,534	
		0.1	℄ ℄ 5	-199.9 to 200.0	-199.9 to 392.0	
	Cu50 Ω	1	℄ ℄ ℄	-199.9 to 200.0	-199.9 to 392.0	
		0.1	℄ ℄ ℄	-199.9 to 200.0	-199.9 to 392.0	
	JPt100 Ω	1	℄ ℄ ℄ H	-200 to 650	-328 to 1,202	
		0.1	℄ ℄ ℄ L	-199.9 to 650.0	-199.9 to 999.9	
	DPT50 Ω	1	℄ ℄ ℄ S	-199.9 to 600.0	-199.9 to 999.9	
		0.1	℄ ℄ ℄ H	-200 to 650	-328 to 1,202	
DPT100 Ω	1	℄ ℄ ℄ L	-199.9 to 650.0	-199.9 to 999.9		
	0.1	℄ ℄ ℄ L	-199.9 to 650.0	-199.9 to 999.9		
Analog	Nickel120 Ω	1	n i ℄ ℄	-80 to 200	-112 to 392	
		-	℄ ℄ ℄	0 to 1,000	0 to 1,800	
	0 to 10V	-	℄ ℄ ℄	0 to 1,000	0 to 1,800	
		-	℄ ℄ ℄	0 to 5,000	0 to 9,000	
	0 to 5V	-	℄ ℄ ℄	1,000 to 5,000	1,800 to 9,000	
		-	℄ ℄ ℄	0 to 1,000	0 to 1,800	
0 to 100 mV	-	℄ ℄ ℄ ℄	0 to 1,000	0 to 1,800		
	-	℄ ℄ ℄ ℄	0 to 2,000	0 to 3,600		
0 to 20 mA	-	℄ ℄ ℄ ℄	0 to 2,000	0 to 3,600		
	-	℄ ℄ ℄ ℄	400 to 2,000	720 to 3,600		

01) C (TT): Same as existing W5 (TT) type sensor

02) G (TT): Same as existing W (TT) type sensor

• Permissible line resistance per line: ≤ 5 Ω

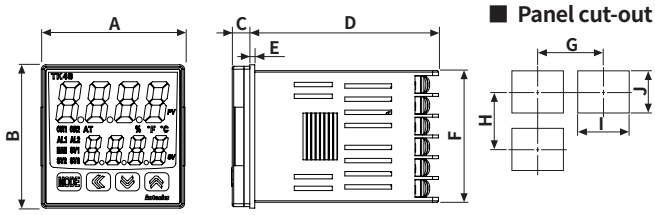
■ Display accuracy

Input type	Using temperature	Display accuracy
Thermo-couple	At room temperature (23°C ± 5°C)	(PV ± 0.3% or ± 1 °C higher one) ± 1-digit • Thermocouple K, J, T, N, E below -100 °C and L, U, PLII, RTD Cu50 Ω, DPT50 Ω: (PV ± 0.3% or ± 2 °C higher one) ± 1-digit • Thermocouple C, G and R, S below 200 °C: (PV ± 0.3% or ± 3 °C higher one) ± 1-digit • Thermocouple B below 400 °C: There is no accuracy standards
	Out of room temperature range	(PV ± 0.5% or ± 2 °C higher one) ± 1-digit • RTD Cu50 Ω, DPT50 Ω: (PV ± 0.5% or ± 3 °C higher one) ± 1-digit • Thermocouple R, S, B, C, G: (PV ± 0.5% or ± 5 °C higher one) ± 1-digit • Other sensors: ≤ ± 5 °C (≤ -100 °C)
Analog	At room temperature (23°C ± 5°C)	± 0.3% F.S. ± 1-digit
	Out of room temperature range	± 0.5% F.S. ± 1-digit

• In case of TK4SP Series, ± 1 °C will be added to the degree standard.

Dimensions

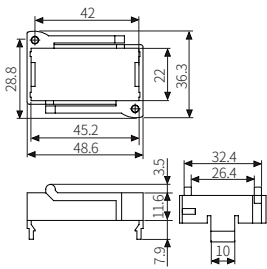
- Unit: mm, For the detailed drawings, follow the Autonics website.
- Below is based on TK4S Series.



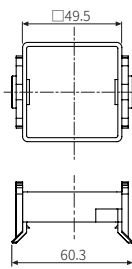
	Body						Panel cut-out			
	A	B	C	D	E	F	G	H	I	J
TK4N	48	24	3	91.8	-	21.8	≥ 55	≥ 37	45 ^{+0.6} ₀	22.2 ^{+0.3} ₀
TK4S	48	48	6	64.5	1.7	45	≥ 65	≥ 65	45 ^{+0.5} ₀	45 ^{+0.5} ₀
TK4SP	48	48	6	72.2	-	44.8	≥ 65	≥ 65	45 ^{+0.5} ₀	45 ^{+0.5} ₀
TK4M	72	72	6	64.5	1.7	67.5	≥ 90	≥ 90	68 ^{+0.7} ₀	68 ^{+0.7} ₀
TK4W	96	48	6	64.5	1.5	44.7	≥ 115	≥ 65	92 ^{+0.8} ₀	45 ^{+0.6} ₀
TK4H	48	96	6	64.5	1.5	91.5	≥ 65	≥ 115	45 ^{+0.6} ₀	92 ^{+0.8} ₀
TK4L	96	96	6	64.5	1.5	91.5	≥ 115	≥ 115	92 ^{+0.8} ₀	92 ^{+0.8} ₀

Bracket

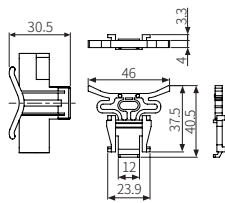
TK4N



TK4S/SP

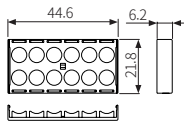


Other series

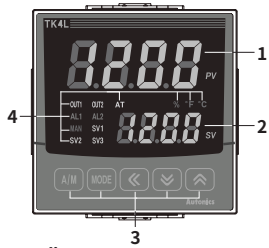


Terminal protection cover

TK4N



Unit Descriptions



1. PV display part (Red)

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

2. SV display part (Green)

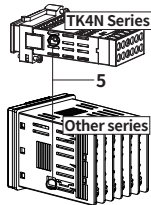
- Run mode: Displays SV (Setting value).
- Setting mode: Displays parameter setting value.

3. Input key

Display	Name
[A/M]	Control switching key
[MODE]	Mode key
[◀], [▼], [▲]	Setting value control key

4. Indicator

Display	Name	Description
°C, %, °F	Unit	Displays selected unit (parameter)
AT	Auto tuning	Flashes during auto tuning every 1 sec
OUT1/2	Control output	Turns ON when the control output is ON • SSR output (cycle/phase control) • MV over 5% ON • Current output Manual control: 0% OFF, over ON Auto control: below 2% OFF, over 3% ON
AL1/2	Alarm output	Turns ON when the alarm output is ON
MAN	Manual control	Turns ON during manual control
SV1/2/3	Multi SV	The SV indicator is ON which is currently displayed. (When using multi SV function)



5. PC loader port:
For connecting communication converter (SCM series).

• For the details about old model, refer to the user manual. Download the manuals from the Autonics website.

Sold Separately

- 11 pin socket: PG-11, PS-11 (N)
- Current transformer (CT)
- Terminal protection cover: RSA / RMA / RHA / RLA Cover
- Communication converter: SCM Series