DRW170598AB

Autonics

High Accuracy PID Temperature Controller

TK4 SERIES

INSTRUCTION MANUAL

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

▣ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ **Warning** Failure to follow these instructions may result in serious injury or death.
⚠ **Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

1. **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 fire, personal injury, or economic loss.
2. **Install on a device panel to use.**
   Failure to follow this instruction may result in electric shock.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in electric shock or fire.
4. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.
5. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in electric shock or fire.

⚠ Caution

1. **When connecting the power input and relay output, use AWG 20 (0.50mm²) cable or over and tighten the terminal screw with a tightening torque of 0.74~0.90N·m.**
   When connecting the sensor input and communication cable without dedicated cable, use AWG 28~16 cable or over and tighten the terminal screw with a tightening torque of 0.74~0.90N·m.
   Failure to follow this instruction may result in fire or malfunction due to contact failure.
2. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
3. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
   Failure to follow this instruction may result in electric shock or fire.
4. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in fire or explosion.
5. **Keep metal chip, dust, and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.

▣ Ordering Information

TK 4 N - 1 4 R N

OUT2 control output※3	Standard	N	None ※Select in case of standard control (heating or cooling)		
	Heating&Cooling	R	Relay output		
		C	Current output or SSR drive output selectable		
OUT1 control output※2	R	Relay output			
	S※4	SSR drive output (standard ON/OFF, cycle control, phase control)			
	C	Current output or SSR drive output selectable			
Power supply	2※5	24VAC 50/60Hz, 24-48VDC			
	4	100-240VAC 50/60Hz			
Input/Output option※1	N	1	Standard	Alarm output 1+CT input※6	
			Heating&Cooling	Alarm output 2※7	
		2	Standard	Alarm output 1+Alarm output 2	
		D	Standard	Alarm output 1+Digital input (DI-1, DI-2)	
			Heating&Cooling	Digital input (DI-1, DI-2)	
		R	Standard	Alarm output 1+Transmission output	
			Heating&Cooling	Transmission output	
		T	Standard	Alarm output 1+RS485 communication output	
			Heating&Cooling	RS485 communication output	
	SP	1	Alarm output 1		
	S	1	Alarm output 1		
	M	2	Alarm output 1+Alarm output 2		
	W	R	Alarm output 1+Transmission output		
	H	T	Alarm output 1+RS485 communication output		
	L	A	Alarm output 1+Alarm output 2+Transmission output		
		B	Alarm output 1+Alarm output 2+RS485 communication output		
		D	Alarm output 1+Alarm output 2+Digital input (DI-1, DI-2)※8		
Size	N	DIN W48×H24mm			
	SP	DIN W48×H48mm (11pin plug type)※9			
	S	DIN W48×H48mm (terminal block type)			
	M	DIN W72×H72mm			
	W	DIN W96×H48mm			
	H	DIN W48×H96mm			
	L	DIN W96×H96mm			
Digit	4	9999 (4-digit)			
Item	TK	Temperature / Process Controller			

※1. In case of TK4N/SP Series, option control selection and digital input will be limited due to number of terminals.
※2. "S" represents SSR drive output support models which SSRP function (standard ON/OFF, cycle, phase) control are available. "C" represents selectable current and SSR drive output support models.
※3. Select "R" or "C" type in case of using heating&cooling control and "N" type in case of using standard control.
※4. Does not support in AC/DC voltage type model.
※5. Does not support in TK4N.
※6. The CT input model of TK4N is selectable only for standard model which has alarm output 1.
※7. The heating&cooling model of TK4N-1□□□ has only alarm output 2.
※8. Only for TK4S-D□□□ OUT2 output terminal is used as DI-2 input terminal.
※9. 11Pin socket (PG-11, PS-11(N)) for TK4SP: sold separately.

※Shaded descriptions are upgraded or added functions from the before TK Series.
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual, user manual and the technical descriptions (catalog, homepage).

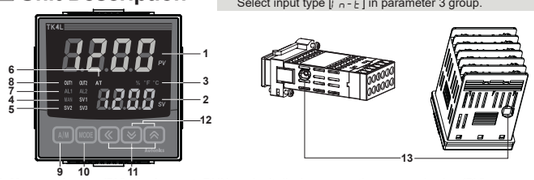
▣ Specifications

Series		TK4N	TK4SP	TK4S	TK4M	TK4W	TK4H	TK4L
Power supply	AC voltage	100-240VAC⎓ 50/60Hz						
	AC/DC voltage	—	24VAC⎓ 50/60Hz, 24-48VDC⎓					
Allowable voltage range		90 to 110% of rated voltage						
Power consumption	AC voltage	Max. 6VA	Max. 8VA					
	AC/DC voltage	—	Max. 8VA (24VAC 50/60Hz), max. 5W (24-48VDC)					
Display method		7-segment (PV: red, SV: green), other display part (green, yellow, red) LED method						
Character size	PV (W×H)	4.5×7.2mm	7.0×14.0mm		9.5×20.0mm	8.5×17.0mm	7.0×14.6mm	11.0×22.0mm
	SV (W×H)	3.5×5.8mm	5.0×10.0mm		7.5×15.0mm	6.0×12.0mm	6.0×12.0mm	7.0×14.0mm
Input type	RTD	JPt 100Ω, DPt 100Ω, DPt 50Ω, Cu 100Ω, Cu 50Ω, Nikel 120Ω (6 types)						
	Thermcouple	K, J, E, T, L, N, U, R, S, B, C, G, PLII (13 types)						
	Analog	·Voltage: 0-100mVDC⎓, 0-5VDC⎓, 1-5VDC⎓, 0-10VDC⎓ (4 types) ·Current: 0-20mA, 4-20mA (2 types)						
Display accuracy	RTD	·At room temperature (23°C ±5°C): (PV ±0.3% or ±1°C, select the higher one) ±1-digit※1 ·Out of room temperature ranges: (PV ±0.5% or ±2°C, select the higher one) ±1-digit In case of TK4SP Series, ±1°C will be added.						
	Thermcouple							
	Analog	·At room temperature (23°C ±5°C): ±0.3% F.S. ±1-digit ·Out of room temperature ranges: ±0.5% F.S. ±1-digit						
	CT input	±5% F.S. ±1-digit						
Control output	Relay	OUT1, OUT2: 250VAC~ 3A, 30VDC⎓ 3A, 1a						
	SSR	Max. 11VDC⎓ ±2V 20mA						
	Current	DC4-20mA or DC0-20mA selectable (resistance load: max. 500Ω)						
Alarm output	Relay	AL1, AL2: 250VAC~ 3A 1a ※TK4N AL2: 250VAC~ 0.5A, 1a (max. 125VA), TK4SP has only AL1						
Option output	Transmission	DC4-20mA (resistance load: max. 500Ω, output accuracy: ±0.3% F.S.)						
	Communication	RS485 communication output (Modbus RTU)						
Option input	CT	0.0-50.0A (primary heater current reading range) ※CT ratio is 1/1000 (except TK4SP)						
	Digital input	·Contact input: ON - max. 2kΩ, OFF - min. 90kΩ ·Non-contact input: ON - residual votage max. 1.0VDC⎓, OFF - leakage current max. 0.1mA ·Outflow current: approx. 0.5mA per input ※TK4S/M: 1 (TK4S-D□□□: 2, TK4SP: none), TK4N/H/W/L: 2 (except TK4SP)						
Control method	Heating, Cooling Heating&Cooling	ON/OFF, P, PI, PD, PID control mode						
Hysteresis		·RTD/Thermcouples: 1 to 100°C/°F (0.1 to 100.0°C/°F) variable ·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 9999 sec						
Derivative time (D)		0 to 9999 sec						
Control period (T)		·Relay output, SSR drive output: 0.1 to 120.0 sec ·Current output+SSR drive output: 1.0 to 120.0 sec						
Manual reset value		0.0 to 100.0%						
Sampling period		50ms						
Dielectric strength		2,000VAC 50/60Hz for 1 min (between power source terminal and input terminal)						
Vibration		0.75mm amplitude at frequency of 5 to 55Hz (for 1 min) in each X, Y, Z direction for 2 hours						
Relay life cycle	Mechanical	·OUT1/OUT2: min. 5,000,000 operations, ·AL1/AL2: min. 20,000,000 operations (TK4H/W/L: min. 5,000,000 operations)						
	Electrical	OUT1/OUT2, AL1/AL2: min. 100,000 operations						
Insulation resistance		Over 100MΩ (at 500VDC megger)						
Noise immunity		Square shaped noise by noise simulator (pulse width 1μs) ±2kV R-phase, S-phase						
Memory retention		Approx. 10 years (non-volatile semiconductor memory type)						
Environment	Ambient temp.	-10 to 50°C, storage: -20 to 60°C						
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH						
Protection		IP65 (front panel) ※TK4SP: IP50 (front panel)						
Insulation type		Double insulation or reinforced insulation (mark: ▣ dielectric strength between the measuring input part and the power part : 2kV)						
Approval		cULus						
Weight※2		Approx. 140g (approx. 70g)	Approx. 130g (approx. 65g)	Approx. 150g (approx. 105g)	Approx. 210g (approx. 140g)	Approx. 211g (approx. 141g)		Approx. 294g (approx. 198g)

※1: ○At room temperature range (23°C±5°C)
・Thermocouple K, J, T, N, E type, below -100°C / Thermocouple L, U, PLII, Cu50Ω, DPt 50Ω: (PV ±0.3% or ±2°C, select the higher one) ±1-digit
・Thermocouple C, G, R, S type, below 200°C: (PV ±0.3% or ±3°C, select the higher one)±1-digit
・Thermocouple B type, below 400°C: there is no accuracy standards.
○Out of room temperature range
・RTD Cu50Ω, DPt50Ω: (PV ±0.5% or ±3°C, select the higher one) ±1-digit
・Thermocouple R, S, B, C, G type: (PV ±0.5% or ±5°C, select the higher one) ±1-digit
・Others, below -100°C: within ±5°C
In case of TK4SP Series, ±1°C will be added to the degree standard.
※2: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Unit Description

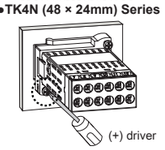
※ The input selection switch (TC, RTD/mV, V, mA) disappeared. Select input type [in-t] in parameter 3 group.



1. **Measured value (PV) display part**: RUN mode: It displays currently measured value (PV).
   Setting mode: It displays the parameter.
2. **Set value (SV) display part:** RUN mode: It displays the set value (SV).
   Setting mode: It displays the set value of the parameter.
3. **Unit (℃/℉/%) indicator**: It displays the unit set at display unit [unit] in parameter 3 group.
   (In case of TK4N, % is not supported)
4. **Manual control indicator**: It turns ON during manual controlling.
5. **Multi SV indicator**: One of SV1 to 3 lamps will be ON in case of selecting multi SV function.
6. **Auto tuning indicator**: It flashes by 1 sec. when executing auto tuning.
7. **Alarm output (AL1, AL2) indicator**: It turns ON when the alarm output is ON.
8. **Control output (OUT1, OUT2) indicator**: It turns ON when the control output is ON.
   ※During cycle/phase controlling in SSRP function model (TK4□-□4S□), when MV is over 5.0%, it turns ON.
   ※To use current ouput, when MV is 0.0% in manual control, it turns OFF. Otherwise, it always turns ON.
   When MV is over 3.0% in auto control, it turns ON and when MV is below 2.0%, it turns OFF.
9. **A/M key**: It is used when switching auto control to manual control.
   ※TK4N/S/SP do not have the A/M key. The MODE key operates switching simultaneously.
10. **MODE key**: It is used when entering parameter groups, returning to RUN mode, moving parameter, saving the set value.
11. **◁, ▽, △ keys**: It is used when entering the set value changing mode and moving or changing up/down digit.
12. **Digital input key**: When pressing ▽ + △ keys for 3 sec. at the same time, it operates the function (RUN/STOP, alarm clear, auto tuning) set at digital input key [di-k] in parameter 5 group.
13. **PC loader port**: It is the PC loader port for serial communication to set parameter with DAQMaster installed in PC. Use this for connecting SCM-US (USB/Serial converter, sold separately).

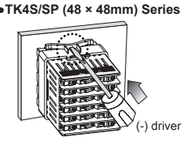
▣ Installation

●TK4N (48 × 24mm) Series

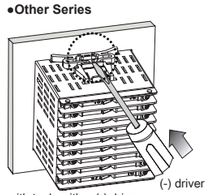


※Insert the unit into a panel, fasten the bolt with a (+) driver.

●TK4S/SP (48 × 48mm) Series



●Other Series



※Insert the unit into a panel, fasten the bracket by pushing with tools with a (-) driver.

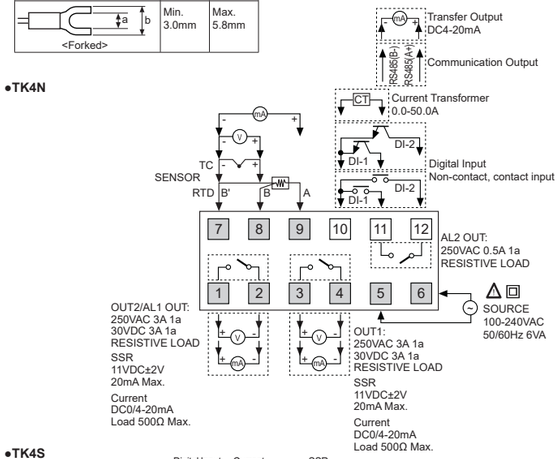
▣ Connections

※Standard model has shaded terminals only.
※When the operation mode of heating&cooling OUT2 relay output model is heating or cooling control, the OUT2 is usable as alarm output 3 (except TK4N Series).
※When the operation mode of heating&cooling OUT2 current output model is heating or cooling control, the OUT2 is usable as transmission output 2.

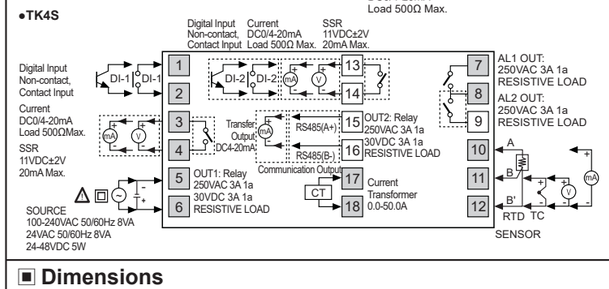
※Use teminals of size specified below.

	a	b
<Round>	Min. 3.0mm	Max. 5.8mm
<Forked>	Min. 3.0mm	Max. 5.8mm

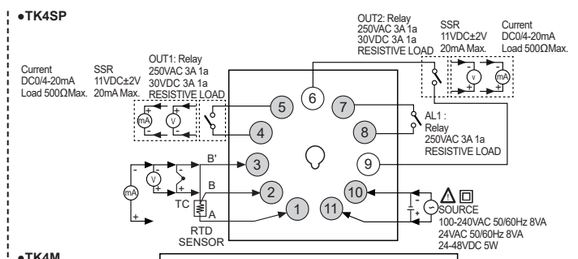
●TK4N



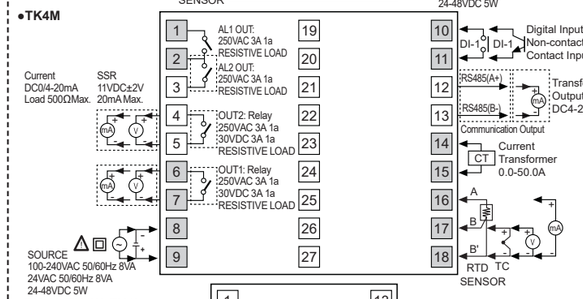
●TK4S



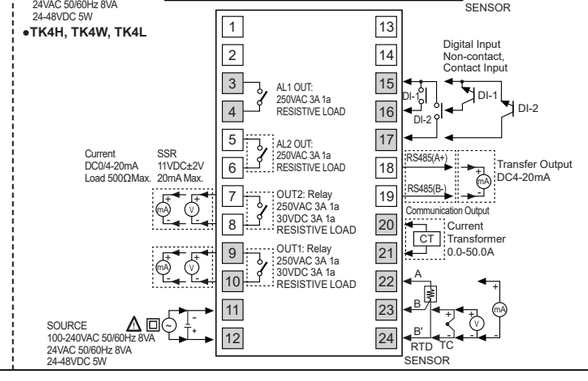
●TK4SP



●TK4M



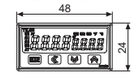
●TK4H, TK4W, TK4L

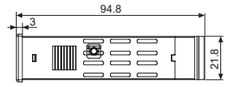


▣ Dimensions

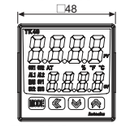
(unit: mm)

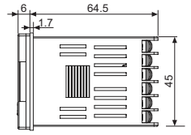
●TK4N Series



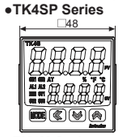


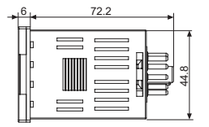
●TK4S Series



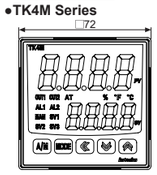


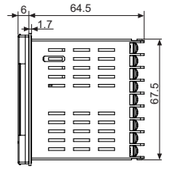
●TK4SP Series



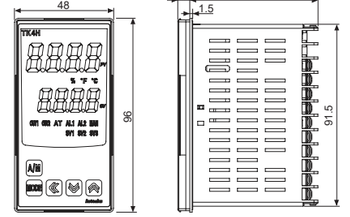


●TK4M Series

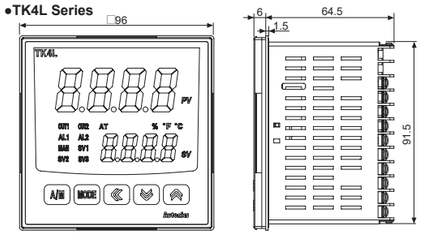




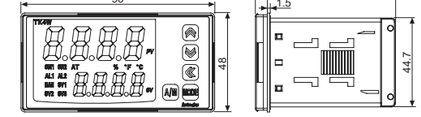
●TK4H Series



●TK4L Series

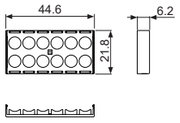


●TK4W Series



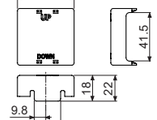
● Terminal cover (sold separately)

● TK4N COVER (48×24mm)

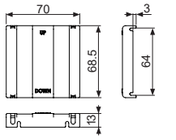


※TK4N COVER is accessory.

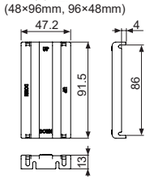
● RSA-COVER (48×48mm)



● RMA-COVER (72×72mm)

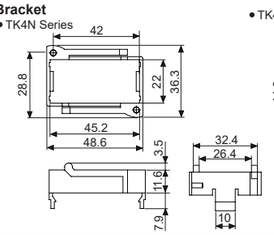


● RHA-COVER (48×96mm, 96×48mm)

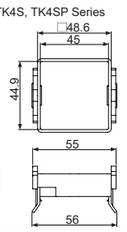


●Bracket

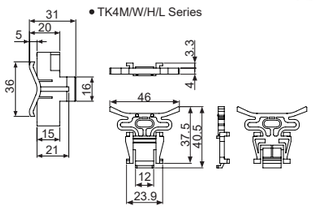
● TK4N



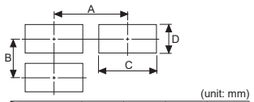
● TK4S, TK4SP Series



● TK4M/W/H/L Series



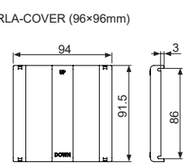
●Panel cut-out



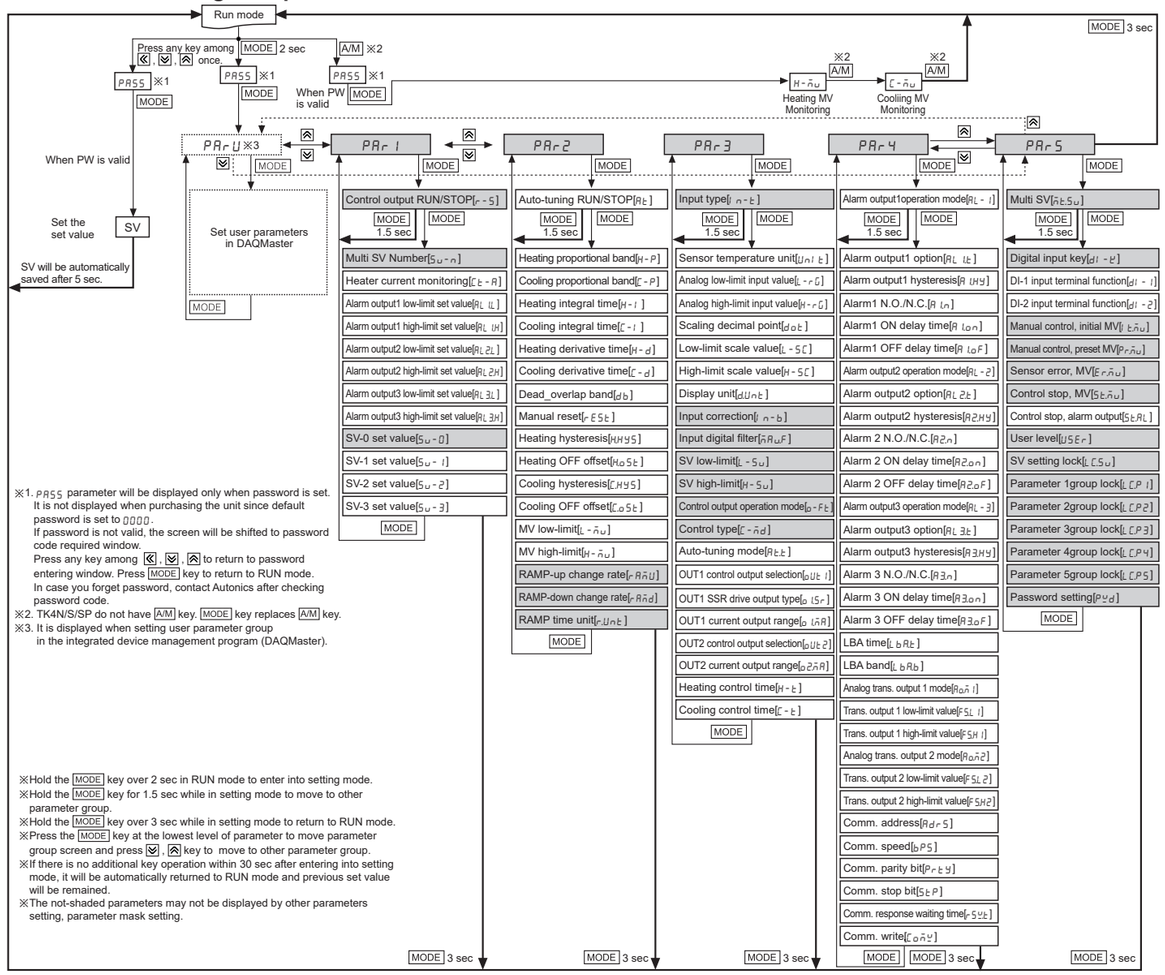
(unit: mm)

Model \ Size	A	B	C	D
TK4N	55	37	45$^{+0.6}_{0}$	22.2$^{+0.3}_{0}$
TK4S	65	65	45$^{+0.6}_{0}$	45$^{+0.6}_{0}$
TK4S (P)	65	65	45$^{+0.6}_{0}$	45$^{+0.6}_{0}$
TK4M	90	90	68$^{+0.7}_{0}$	68$^{+0.7}_{0}$
TK4H	65	115	45$^{+0.6}_{0}$	92$^{+0.8}_{0}$
TK4W	115	65	92$^{+0.8}_{0}$	45$^{+0.6}_{0}$
TK4L	115	115	92$^{+0.8}_{0}$	92$^{+0.8}_{0}$

● RLA-COVER (96×96mm)



▣ Flow Chart for Setting Group



※1. PASS parameter will be displayed only when password is set. It is not displayed when purchasing the unit since default password is set to 0000.
If password is not valid, the screen will be shifted to password code required window.
Press any key among ◁, ▽, △ to return to password entering window. Press MODE key to return to RUN mode.
In case you forget password, contact Autonics after checking password code.
※2. TK4N/S/SP do not have A/M key. MODE key replaces A/M key.
※3. It is displayed when setting user parameter group in the integrated device management program (DAQMaster).

※Hold the MODE key over 2 sec in RUN mode to enter into setting mode.
※Hold the MODE key for 1.5 sec while in setting mode to move to other parameter group.
※Hold the MODE key over 3 sec while in setting mode to return to RUN mode.
※Press the MODE key at the lowest level of parameter to move parameter group screen and press ▽, △ key to move to other parameter group.
※If there is no additional key operation within 30 sec after entering into setting mode, it will be automatically returned to RUN mode and previous set value will be remained.
※The not-shaded parameters may not be displayed by other parameters setting, parameter mask setting.

▣ Input Types and Range

Input type		Decimal point	Display	Input range (℃)	Input range (℉)
Thermocouple	K (CA)	1	tCrH	-200 to 1350	-328 to 2463
		0.1	tCrL	-199.9 to 999.9	-199.9 to 999.9
	J (IC)	1	JI CH	-200 to 800	-328 to 1472
		0.1	JI CL	-199.9 to 800.0	-199.9 to 999.9
	E (CR)	1	ECrH	-200 to 800	-328 to 1472
		0.1	ECrL	-199.9 to 800.0	-199.9 to 999.9
	T (CC)	1	tCCH	-200 to 400	-328 to 752
		0.1	tCCL	-199.9 to 400.0	-199.9 to 752.0
	B (PR)	1	b Pr	0 to 1800	32 to 3272
	R (PR)	1	r Pr	0 to 1750	32 to 3182
	S (PR)	1	S Pr	0 to 1750	32 to 3182
	N (NN)	1	n nn	-200 to 1300	-328 to 2372
	C (TT)※1	1	C tt	0 to 2300	32 to 4172
	G (TT)※2	1	G tt	0 to 2300	32 to 4172
	L (IC)	1	LI CH	-200 to 900	-328 to 1652
		0.1	LI CL	-199.9 to 900.0	-199.9 to 999.9
	U (CC)	1	UCCH	-200 to 400	-328 to 752
		0.1	UCCL	-199.9 to 400.0	-199.9 to 752.0
	Platinel II	1	PLII	0 to 1390	32 to 2534
RTD	Cu 50Ω	0.1	CU S	-199.9 to 200.0	-199.9 to 392.0
	Cu 100Ω	0.1	CU 10	-199.9 to 200.0	-199.9 to 392.0
	JPt 100Ω	1	JPtH	-200 to 650	-328 to 1202
		0.1	JPtL	-199.9 to 650.0	-199.9 to 999.9
	DPt 50Ω	0.1	dPtS	-199.9 to 600.0	-199.9 to 999.9
	DPt 100Ω	1	dPtH	-200 to 650	-328 to 1202
		0.1	dPtL	-199.9 to 650.0	-199.9 to 999.9
	Nickel 120Ω	1	ni 12	-80 to 200	-112 to 392
Analog	Voltage	0-10V	Au 1	-1999 to 9999 (Display point will be changed according to decimal point position.)	
		0-5V	Au2		
		1-5V	Au3		
		0-100mV	AAu 1		
	Current	0-20mA	AAA1		
		4-20mA	AAA2		

※1: C (TT): Same temperature sensor as former W5 (TT)
※2: G (TT): Same temperature sesnor as former W (TT)

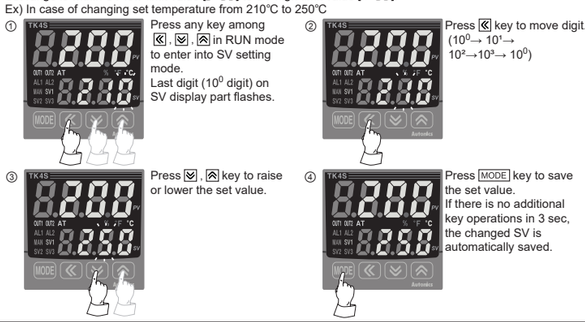
▣ Initial Display When Power ON

When power is supplied, whole display parts flash for 1 sec. Afterwards, model name and input sensor type will be flash twice and then in enters into RUN mode.

① Whole display part ② Model type display ③ Input type display twice ④ Run mode

▣ Set Value (SV) Setting

You can set the temperature to control with ◁, ▽, △ keys.
Set range is within SV low-limit value [L-Su] to SV high-limit value [H-Su].
Ex) In case of changing set temperature from 210℃ to 250℃



① Press any key among ◁, ▽, △ in RUN mode to enter into SV setting mode. Last digit (10^0 digit) on SV display part flashes.
② Press ◁ key to move digit. (10^0→ 10^1→ 10^2→10^3→ 10^0)
③ Press ▽, △ key to raise or lower the set value.
④ Press MODE key to save the set value. If there is no additional key operations in 3 sec, the changed SV is automatically saved.

▣ Parameter Reset

Press ◁ + ▽ + △ to reset all parameters in memory to default value.
Set [Init] parameter to 'YES' to reset all parameters.
In case password function is on, it is required to enter valid password to reset parameters.
Password is also reset.

▣ Parameter Mask

This function is able to hide unnecessary parameters to user environment or less frequently used parameters in parameter group. You can set this in the integrated device management program (DAQmaster).
Masked parameters are not only displayed. The set value of masked parameters are applied.
For more information, refer to the DAQMaster user manual.
Visit our website (www.autonics.com) to download the DAQmaster program and the user manual.

Before applying mask PAr2 → At → H-P → C-P → H-I → C-I → H-d → C-d …

After applying mask PAr2 → H-P → H-I → H-d …

The above is masking auto tuning [At], cooling proportional band [C-P], cooling integral time [C-I], cooling derivative time [C-d] parameters in parameter 2 group.

▣ User Parameter Group [PAr U] Setting

This function is able to set the frequently used parameters to the user parameter group. You can quickly and easily set parameter settings. User parameter group can have up to 30 parameters in the integrated device management program (DAQmaster).
For more information, refer to the DAQMaster user manual.
Visit our website (www.autonics.com) to download the DAQmaster program and the user manual.

Run mode → PAr U → PAr 1 … PAr2 → AL 1L → AL 1H → Su-0 → HHYS → CHYS → In-b → A 1HY → A2HY

The above is setting user parameter group in the DAQMaster with alarm output 1 low-limit value [AL 1L], alarm output 1 high-limit value [AL 1H], SV-0 set value [Su-0] parameter of parameter 1 group, heating hysteresis[HHYS], cooling hysteresis [CHYS] parameters of parameter 2 group, input correction [In-b] parameter of parameter 3 group, alarm output 1 hysteresis [A 1HY], alarm output 2 hysteresis [A2HY] parameters of parameter 4 group.

▣ Auto-tunning

Auto-tuning measures the control subject's thermal characteristics and thermal response rate, and then determines the necessary PID time constant. Application of the PID time constant realizes fast response and high precision temperature control. (when setting control type [C-nd] is set as PId, it is displayed.)
Set [At] parameter to [on] in parameter 2 group to start auto-tuning. To stop auto-tuning, change the set as [oFF]. (It maintains P, I, D values of before auto-tuning.)
If sensor break error [oPEn] occurs during auto-tuning, it stops this operation. If the measured temperature is over or below the input range, it operates continuously.
During auto-tuning operation, whole parameters are only available to check.

▣ Alarm

●Alarm operation

Mode	Name	Alarm operation	Description
oFF	—	—	No alarm output
duCC	Deviation high-limit alarm	OFF H ON; SV 100℃ PV 110℃; High deviation: Set as 10℃ / OFF H ON; PV 90℃ SV 100℃; High deviation: Set as -10℃	If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.
JJdu	Deviation low-limit alarm	ON H OFF; PV 90℃ SV 100℃; Low deviation: Set as 10℃ / ON H OFF; SV 100℃ PV 110℃; Low deviation: Set as -10℃	If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.
JduC	Deviation high/low-limit alarm	ON H OFF H ON; PV 90℃ SV 100℃ PV 120℃; Low deviation : Set as 10℃ , High deviation : Set as 20℃	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be ON.
CduJ	Deviation high/low-limit reserve alarm	OFF H ON H OFF; PV 90℃ SV 100℃ PV 120℃; Low deviation : Set as 10℃ , High deviation : Set as 20℃	If deviation between PV and SV as high/low-limit is lower than set value of deviation temperature, the alarm output will be OFF.
PuCC	Absolute value high-limit alarm	OFF H ON; PV 90℃ SV 100℃; Absolute-value: Set as 90℃ / OFF H ON; SV 100℃ PV 110℃; Absolute-value: Set as 110℃	If PV is higher than the absolute value, the output will be ON.
JJPu	Absolute value low-limit alarm	ON H OFF; PV 90℃ SV 100℃; Absolute-value: Set as 90℃ / ON H OFF; SV 100℃ PV 110℃; Absolute-value: Set as 110℃	If PV is lower than the absoulte value, the output will be ON.
LbA	Loop break alarm	—	It will be ON when it detects loop break.
SbA	Sensor break alarm	—	It will be ON when it detects sensor disconnection.
HbA	Heater break alarm	—	It will be ON when CT detects heater break.

※H: Alarm output ☐ hysteresis[A☐HY]

●Alarm option

Mode	Name	Description
AL-A	Standard alarm	If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.
AL-b	Alarm latch	If it is an alarm condition, alarm output is ON and maintains ON status.
AL-C	Standby sequence 1	First alarm condition is ignored and from second alarm condition, standard alarm operates. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, standard alarm operates.
AL-d	Alarm latch and standby sequence 1	If it is an alarm condition, it operates both alarm latch and standby sequence. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second 1alarm condition, alarm latch operates.
AL-E	Standby sequence 2	First alarm condition is ignored and from second alarm condition, standard alarm operates. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, standard alarm operates.
AL-F	Alarm latch and standby sequence 2	Basic operation is same as alarm latch and standby sequence1. It operates not only by power ON/OFF, but also alarm set value, or alarm option changing. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, alarm latch operates.

※Condition of re-applied standby sequence for standby sequence 1, alarm latch and standby sequence 1: Power ON
Condition of re-applied standby sequence for standby sequence 2, alarm latch and standby sequence 2: Power ON, changing set temperature, alarm temperature [AL 1, AL2] or alarm operation [AL-1, AL-2], switching STOP mode to RUN mode.

▣ Factory Default

●SV setting group [Su]

Parameter	Factory default
Su	0

●Password input parameter

Parameter	Factory default
PASS	0001

●Parameter 1 group [PAr 1]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
r-S	rUn	AL 1H	1550	AL3H	1550	Su-3	0000
Su-n	Su-0	AL2L	1550	Su-0	0000		
Et-A	0.0	AL2H	1550	Su-1	0000		
AL 1L	1550	AL3L	1550	Su-2	0000		

●Parameter 2 group [PAr 2]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
At	oFF	H-d	0000	HoSt	000	rAHU	000
H-P	0 100	C-d	0000	CHYS	002	rAHd	000
C-P	0 100	db	0000	CoSt	000	rUnt	min
H-I	0000	rESt	0500	L-ou	4000		
C-I	0000	HHYS	002	H-ou	1000		

●Parameter 3 group [PAr 3]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
In-t	tCAH	H-SC	1000	o-Ft	HEAt	o 1Sr	Stnd
Unit	°C	dUnt	°Fo		H-C	o 1nA	4-20
L-rG	0000	In-b	0000	C-nd	PId	oUt2	CUrr
H-rG	1000	nAuF	0001		PP	o2nA	4-20
dot	0.0	L-Su	-200	Aut	tUn1	H-t	0200 (Relay)
L-SC	0000	H-Su	1350	oUt 1	CUrr	C-t	0020 (SSR)

●Parameter 4 group [PAr 4]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
AL-1	duCC	A2n	no	LbAt	0000	bPS	96
AL 1t	AL-A	A2on	0000	LbAb	002	Prty	nonE
A 1HY	001	A2oF	0000	Aon1	Pu	StP	2
A 1n	no	AL-3	oFF	FSL1	-200	rSvt	20
A 1on	0000	AL3t	AL-A	FSH1	1350	CoMY	EnA
A 1oF	0000	A3HY	001	Aon2	Pu		
AL-2	JJdu	A3n	no	FSL2	-200		
AL2t	AL-A	A3on	0000	FSH2	1350		
A2HY	001	A3oF	0000	Adrs	01		

●Parameter 5 group [PAr 5]

Parameter	Factory default	Parameter	Factory default	Parameter	Factory default	Parameter	Factory default
mtSu	1	PrAu	0000	LCSu	oFF	LCP5	oFF
di-t	StoP	ErMn	0000	LCP1	oFF	PSd	0000
di-1	oFF	StMn	0000	LCP2	oFF		
di-2	oFF	StAL	Cont	LCP3	oFF		
itMn	AUto	USEr	Stnd	LCP4	oFF		

※Shaded parameters are for the heating&cooling model.

▣ User Manual

For the detail information and instructions, please refer to user manual and user manual for communication, and be sure to follow cautions written in the technical descriptions (catalog, homepage).
Visit our homepage (www.autonics.com) to download manuals.

▣ Comprehensive Device Management Program[DAQMaster]

DAQMaster is a comprehensive device management software for setting parameters and monitoring processes. DAQMaster can be downloaded from our website at www.autonics.com.

Item	Minimum specifications
System	IBM PC compatible computer with Pentium III or above
Operations	Windows 98/NT/XP/Vista/7/8/10
Memory	256MB+
Hard disk	1GB+ of available hard disk space
VGA	Resolution: 1024×768 or higher
Others	RS232C serial port (9-pin), USB port

▣ Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, It may cause unexpected accidents.
2. 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.
3. 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.
4. Do not apply excessive power when connecting or disconnecting the connectors of the product.
5. Install a power switch or circuit breaker in the easily accessible place for supplying or disconnecting the power.
6. Do not use the unit for other purpose (e.g. voltmeter, ammeter), but temperature controller.
7. When changing the input sensor, turn off the power first before changing.
   After changing the input sensor, modify the value of the corresponding parameter.
8. 24VAC, 24-48VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
9. Do not overlapping communication line and power line.
   Use twisted pair wire for communication line and connect ferrite bead at each end of line to reduce the effect of external noise.
10. 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.
11. Make sure that power supply voltage reaches to the rated voltage within 2 sec after supplying power.
12. Do not wire to terminals which are not used.
13. This unit may be used in the following environments.
    ①Indoors (in the environment condition rated in 'Specifications') ②Altitude max. 2,000m
    ③Pollution degree 2 ④Installation category II

▣ Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connector/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System (Fiber, CO_2, Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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