

Two segment display PID temperature controller TCN4 SERIES

OPERATION INSTRUCTIONS



For your safety, please read the following before use

※ "Pay attention to safety" is to use the product safely and correctly to prevent dangerous accidents. Please observe the following contents.

※ Attention to safety can be divided into two parts: warning and attention

WARNING Failure to do so may result in serious injury or injury.

NOTICE Failure to do so may result in minor injury or product damage.

※ The symbols in the operating instructions are as follows

△ Accidents or dangers may occur under special conditions

WARNING

- When it is used for machines that have great impact on personal and property (such as nuclear power control, medical devices, ships, vehicles, railways, aviation, inflammable devices, safety devices, disaster prevention / anti-theft devices), double safety protection devices must be installed. Otherwise, it may cause fire, personal injury or property loss.
- The panel must be installed when using. Otherwise, there is a risk of electric shock.
- Do not carry out maintenance work under power on state. Otherwise, there is a risk of electric shock.
- Please confirm the terminal number before wiring. Otherwise, it may cause fire.
- The product shall not be modified except for the maintenance personnel of the company. Otherwise, electric shock or fire may be caused.

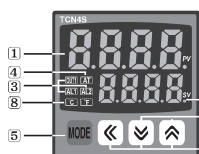
NOTICE

- Do not use the product outdoors. Otherwise, the service life of the product may be shortened.
- When wiring the power input terminal and relay output terminal, please use AWG 20 (0.50mm²) cable, and keep the screw tightening torque between 0.74N·m ~ 0.90N·M. Poor contact may cause fire.
- Please use the product within the rated specifications. Otherwise, the service life of the product will be shortened and there will be fire hazard.
- Please use the load less than the allowable capacity of the relay for electric shock. Otherwise, it will cause poor insulation, contact adhesion, poor contact, relay damage, fire, etc.
- Do not use water or mending solvent when cleaning, but wipe with towel. Otherwise, contact or fire may be caused.
- Avoid using the product in inflammable, explosive, humid, direct sunlight, thermal radiation, vibration and other places. Otherwise, the ash may cause fire or explosion.
- Do not allow dust or cable residue to enter the product interior. Otherwise, it may cause fire or damage to the product.
- Please connect the thermocouple wiring correctly after confirming the polarity of the terminal. Otherwise, it may cause fire or explosion.
- In order to achieve the purpose of strengthening insulation, please use the power supply device that can ensure the strengthened insulation above.

Model description

T	CN	4	S	-	2	4	R	
								Control output
								Supply voltage
								Auxiliary output
								Dimensions
								Display number
								Setting method
								Series
								R Relay output+SSR output (AC power supply type) Relay output+SSP output (AC/DC power supply type)
								2 24VAC 50/60Hz, 24~48VDC
								4 100~240VAC 50/60Hz
								1 One way Alarm output
								2 Two way Alarm output
								S DIN W48×H48mm
								M DIN W72×H72mm
								H DIN W48×H96mm
								L DIN W96×H96mm
								4 9999 (4bits)
								CN 2-segment display type, button setting type
								T Temperature controller

Name of each part



- Current value (PV) display (red)
The current measured value (PV) is displayed in the operation mode, and the internal parameter name is displayed in the setting mode.
- Set point (SV) display (green)
The set value (SV) of control target is displayed in operation mode, and the current setting value of the parameter is displayed in the setting mode.
- Control alarm output indicator
- Out: the light is on when the main control output is on.
- When SSR controls the cycle / phase control of driving output mode, the light will be on when the operation amount exceeds 10% (except AC power supply type).
- AL1/AL2: when the alarm output is on, the light will be on.
- Self-tuning indicator: when self-tuning is performed, the at lamp flashes in a cycle of 1 second.
- key: used to enter parameter group setting, return to operation mode, switch parameter group and save setting value.
- Direction key: used to enter the setting value change mode or move the number of digits to change the value up / down.
- Function key
[] + [] press 3 seconds at the same time to start the [4-H] digital input key function (run / stop, alarm clear, self-tuning) setting.
- Temperature unit (°C/°F) indicator: displays the current temperature unit.

Specifications

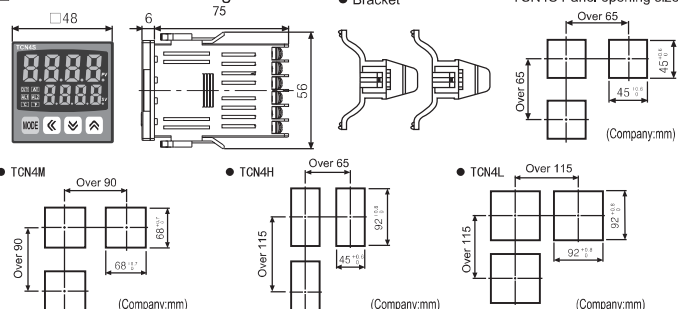
SERIES	TCN4S		TCN4M		TCN4H	TCN4L
Power supply	AC Power supply type					100~240VAC 50/60Hz
Voltage	AC/DC Power supply type					24VAC 50/60Hz, 24~48VDC
Allowable voltage range	90% ~ 110% of rated voltage					
Power consumption	Below 5VA (100~240VAC 50/60Hz, 24VAC 50/60Hz)					
	Below 3W (24~48VDC)					
Display mode	7segment LED (PV: Red, SV: Green)					
Character Size	PV(W×H)	7.0×15.0mm	9.5×20.0mm	7.0×14.6mm	11.0×22.0mm	
	SV(W×H)	5.0×9.5mm	7.5×15.0mm	6.0×12.0mm	7.0×14.6mm	
Input type	Thermal resistance	DP100Ω, Cu50Ω (Allowable single wire impedance Below 5Ω)				
	Thermocouple	K(CA), J(C), L(IC), T(CC), R(P), S(P)				
Input accuracy	Thermal resistance	At room temperature (23 ± 5 °C): (PV ± 0.5% or ± 1 °C) ± 1 bit				
	Thermocouple	Outside normal temperature: (PV ± 0.5% or ± 2 °C) ± 1 bit				
Control output	Relay	250VAC 3A 1a				
	S S R	Below 12VDC ± 2V 20mA				
Alarm output	AL1, AL2 relay: 250VAC 3A 1A					
Control Mode	ON/OFF, P, PI, PD, PID CONTROL					
Control Accuracy	1~100°C / 0.1~50.0°C					

- (※ 1): ① Normal atmospheric temperature (23°C ± 5°C)
- Thermocouple R, s below 200 °C (PV ± 0.5% or ± 3 °C) ± 1 bit
- Thermocouple L, J(C), thermal resistance Cu50 Ω (PV ± 0.5% or ± 2 °C) ± 1 bit
② Outside normal temperature
- Thermocouple R, s below 200 °C (PV ± 1.0% or ± 6 °C) ± 1 bit
- Thermocouple L, J(C), thermal resistance Cu50 Ω (PV ± 0.5% or ± 2 °C) ± 1 bit
- Thermal resistance Cu50 Ω (PV ± 0.5% or ± 3 °C) ± 1 bit

SERIES	TCN4S	TCN4M	TCN4H	TCN4L
Proportional band (P)	0.1~999.9°C			
Integral time (I)	0~9999S			
Differential time (D)	0~9999S			
Control period (T)	0.5~120.0S			
Manual reset	0.0~100.0%			
Sampling period	100ms			
Withstand voltage	2000vac 50 / 60Hz 1 min (between input terminal and power supply terminal)			
Vibration resistance	1000VAC 50 / 60Hz 1 min (between input terminal and power supply terminal)			
Relay life	5 ~ 55Hz (cycle 1 minute) amplitude 0.75mm x, y, z direction 2 hours			
Relay life	Mechanics OUT: 500 More than 10000 times, AL1 / 2: more than 5 million times			
Relay life	Electrical OUT: 200 More than 10000 times (250VAC 3A resistive load), AL1 / 2: more than 30000 times (250VAC 1A resistive load)			
Insulation impedance	Above 100m Ω (500VDC as reference)			
Anti-interference	Square wave interference of jamming simulator (pulse width 1 μs) ± 2KV, R phase, S phase			
Memory preservation	About 10 years (using nonvolatile semiconductor storage)			
Ambient temperature	-10~50°C (not frozen)			
Storage temperature	-20~60°C (not frozen)			
Ambient humidity	35~85%RH, Storage: 35~85%RH			
Insulation type	Double insulation or enhanced insulation (Ident/Fixation: detect the dielectric strength between the input part and the power supply part. AC power supply type: 20V, AC / DC power supply type: 10V)			
Authentication	CE			
Weight	About 100g	About 133g	About 124g	About 179g

※ The above weight does not include the outer packing.

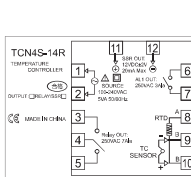
Outline dimension drawing



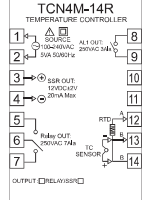
Connection diagram

※ TCN4 series is built-in main control output, relay output and SSR output mode, which can be selected by users according to needs.
The output modes of AC / DC power supply products are relay output and SSR output, without SSR output mode.

TCN4S



TCN4M/4H/4L



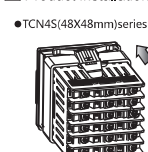
Alarm mode

Mode	Name
Rn0	No alarm
Rn1	Deviation upper limit alarm
Rn2	Deviation lower limit alarm
Rn3	Upper and lower limit of deviation alarm
Rn4	Upper and lower limit of deviation alarm
Rn5	Absolute value upper limit alarm
Rn6	Absolute value lower limit alarm
SbR	Sensor disconnection alarm
LbR	Heater disconnection alarm

Parameter group 2 setting

Parameter	Factory settings
Input sensor	1 n ~ 2 n
Temperature unit	°C
Input bias correction	1 n ~ 0.000
Input digital filtering	A n ~ 0.000
Lower limit of service temperature range	L ~ 5 ~ -050
Upper limit of service temperature range	H ~ 5 ~ 1200
Control output action	C ~ F ~ 0
Control mode	C ~ F ~ 0
Control output type	a ~ 0 ~ 1
SSR control output type	S ~ 5 ~ 0
Proportional band	P ~ 0 ~ 100
Integral time	I ~ 0 ~ 100
Differential time	d ~ 0 ~ 100
Manual reset	r ~ 0 ~ 1
Hysteresis setting	H ~ 0 ~ 1
Alarm output hysteresis value	A ~ 0 ~ 1
LSA monitoring time	L ~ 0 ~ 1
LSA detection width	L ~ 0 ~ 1
Function key function	d ~ 0 ~ 1
Function key function	E ~ 0 ~ 1
Lock key setting	L ~ 0 ~ 1

Product installation method



Factory settings

Parameter group 1 setting

Parameter	Factory settings
SV set point	-
AL1 alarm temperature	RL 1
AL2 alarm temperature	RL 2
Self-tuning	a ~ 0 ~ 1
Proportional band	P ~ 0 ~ 100
Integral time	I ~ 0 ~ 100
Differential time	d ~ 0 ~ 100
Manual reset	r ~ 0 ~ 1
Hysteresis setting	H ~ 0 ~ 1

● In parameter group 2, select one of the standard on / off control [std], cycle control [CYC], and phase control [PHAS] for SSR. M parameter setting. Note: zero trigger SSR should be connected in cycle control (random trigger SSR is also applicable), and random trigger SSR should be connected in phase control in order to use cycle control [cyc] and phase control [PHAS].

Temperature controller (TCN4series) SSR Voltage output (12VDC) SSR module Load

Power 100~240VAC 50/60Hz

Relay output connection

TCN4series A Heater

Capacitor 0.1μF 630V

Magnetic switch contact or relay contact

Please refer to extend the distance between the temperature controller and the load (part a). If the distance is too close, the thermostat may be affected by "C" electromagnetic switch and other interference, resulting in misoperation. If the distance of part a cannot be extended, please connect the capacitor 104 (630V) at both ends to avoid certain interference.

Input specifications and application scope

Input sensor		Display	Input range (°C)	Input range (°F)
(ThermoCouple)	K (CA)	ECRH	-50 ~ 1200	-58 ~ 2192
		ECRL	-50.0 ~ 999.9	-58.0 ~ 999.9
	J (IC)	JICH	-30 ~ 800	-22 ~ 1472
		JICL	-30.0 ~ 800.0	-22.0 ~ 999.9
	L (IC)	LICH	-40 ~ 800	-40 ~ 1472
		LICL	-40.0 ~ 800.0	-40 ~ 999.9
	T (CC)	ECCH	-50 ~ 400	-58~752
		ECCL	-50.0 ~ 400.0	-58.0~752.0
R (PR)	r Pr	0 ~ 1700	32~3092	
S (PR)	S Pr	0 ~ 1700	32~3092	
(RTD)	DPt100Ω	dPt.H	-100 ~ 400	-148 ~ 752
		dPt.L	-100.0 ~ 400.0	-148.0 ~ 752.0
	Cu50Ω	CU5.H	-50 ~ 200	-58 ~ 392
		CU5.L	-50.0 ~ 200.0	-58.0 ~ 392.0

Parameter group setting

① In operation mode, press any key (one touch) to enter SV setting group.

② Press **MODE** key for 2 seconds in operation mode to enter parameter group 1.

③ Press **MODE** key for 4 seconds in operation mode to enter parameter group 2.

④ After entering the parameter group, the first parameter of the parameter group will be displayed.

⑤ In the setting state, press the **MODE** key for 3 seconds to return to the operation mode.

※ However, when SV is set, press the **MODE** key (one touch) to return to the operation mode.

※ Press the **MODE** key for 3 seconds to return to the operation mode. If you press the **MODE** key again within 1 second, you will enter the first parameter of this parameter group.

Parameter setting sequence

Parameter group 1 → SV setting group

Because the parameters of each parameter group are interrelated, please set them in the order of the above parameter groups.

When the parameter of parameter group 2 is changed, the set value of the parameter associated with the parameter must be confirmed.

Parameters of shading in parameter group 2 may not be displayed depending on the model of the product.

Parameters AL1 and AL2 in parameter group 2 may not be displayed according to the selected alarm output mode.

If the alarm action mode in group 2 is set (AL-1, AL-2) by $RdL / SbR / LbR$, [AHYS] parameters will not be displayed.

① AC / DC power supply type (tcn4 □ -22) does not display

② After entering the parameter group setting state, if the key is not pressed for 30 seconds, it will automatically return to the running state, and the corresponding parameters will remain at the original set value.

③ The marked parameters are affected by the associated parameter settings and may not be displayed.

④ AL1: Alarm temperature value (deviation / absolute value) setting

AL2: Alarm temperature value (deviation / absolute value) setting

Self tuning execution / stop

Proportional band setting

Integral time setting

Differential time setting

Manual reset (static deviation correction) setting

On / off hysteresis setting

Input sensor settings

Temperature unit setting

Input bias correction

Input digital filter setting

Use temperature range lower limit setting

Use upper limit setting of temperature range

Control output action setting (refrigeration / heating)

Control mode setting

Control output type setting

SSR control output type setting (※1)

Control cycle setting

AL1 Alarm mode setting

AL2 Alarm mode setting

Alarm output hysteresis value setting

LBA monitoring time setting

LBA detection width setting

Function key function setting

Control the setting of operation quantity in case of disconnection

Lock setting

Parameter group 1 setting

① In operation mode, press any key (one touch) to enter SV setting group.

② After changing the parameter setting value, the **MODE** key will store the parameter setting value and enter the next parameter.

③ Control mode in parameter group 2 [C-nd] Set to PID control.

After entering the parameter setting mode, press the **MODE** key for more than 3 seconds to return to the operation mode.

Setting range: absolute value alarm (input range), deviation alarm (F.S ~ F.S)

If the alarm action mode in group 2 is set (AL-1, AL-2) by $RdL / SbR / LbR$, [AHYS] parameters will not be displayed.

④ AL1 alarm temperature setting

⑤ AL2 alarm temperature setting

⑥ Self tuning execution / stop

⑦ Proportional band setting

⑧ Integral time setting

⑨ Differential time setting

⑩ Manual reset setting

⑪ Hysteresis setting

⑫ The at light on the front panel flashes in a cycle of 1 second when self-tuning is performed.

Setting range: 0.1~999.9°C/°F

Setting range: 0~9999seconds

※ When the value is '0', there is no integral operation.

Setting range: 0~9999seconds

※ When the value is '0', there is no differential operation.

Setting range: 0.0~100.0%

※ It is only displayed in P and PD control mode.

Setting range: ECRH, JICH, LICL, ECCH, rPr, S-P, dPeH, CUSH: 1~100°C/°F

ECRL, JICL, LICL, ECCL, dPeL, CUSL: 0.1~50.0°C/°F

※ ON / OFF control mode.

Parameter group 2 setting

① In operation mode, press any key (one touch) to enter SV setting group.

② After changing the parameter setting value, the **MODE** key will store the parameter setting value and enter the next parameter.

After entering the parameter setting mode, press the **MODE** key for more than 3 seconds to return to the operation mode.

Setting range: please refer to input sensor and temperature range setting.

After changing the input sensor Su , $Ln-d$, $H-Su$, $L-Su$, RdL , LbR will be initialized.

Temperature unit setting

Input bias correction

Input digital filter

Setting range: -999~999°C/°F [dPeL / CUSL: -199.0~999.9°C/°F]

Setting range: 0.1 ~ 120.0 seconds

※ The input signal is filtered, and the stable control and display function can be realized by setting the filtering time.

Use temperature range lower limit setting

Use upper limit setting of temperature range

Setting range: within the use range of the sensor [$L-Su \leq (H-Su-1)$]

※ When the SV setting value is lower than the lower limit value, $ISV < L-Su$, SV Initialize to $L-Su$.

Setting range: within the use range of the sensor [$H-Su \geq (L-Su+1)$]

※ When the SV setting value is lower than the lower limit value, $ISV > H-Su$, SV Initialize to $H-Su$.

Control output action setting

Setting control mode

Control output type setting

SSR control output type setting

※ It is only displayed when the parameter [oUL] is SSR AC / DC power supply type (tcn4 □ -22) is not displayed.

Control cycle setting

Setting range: 0.5~120.0 seconds

When the output mode [oUL] is relay output [rLy], the default value is 20.0 seconds.

2.0 seconds when SSR outputs (SSR).

SSR drive output mode [SSR] is set to CYC, and it is not displayed when PHAS phase is controlled.

AL1 alarm mode setting

AL2 alarm mode setting

Alarm output hysteresis value setting

LBA monitoring time setting

LBA detection width setting

Function key setting

Control the setting of operation quantity in case of disconnection

Lock setting

Setting range: 0.0~100.0%

※ Only 0.0100.0% is displayed in on / off control.

※ When the PID control-ON / OFF control mode is changed, if the operation amount is less than 100.0%, it will be initialized to 0.0%.

LoC1: Lock parameter group 2

LoC2: Lock parameter group 1,2

LoC3: Lock parameter group 1,2 and SV Set value

※ The parameter settings can still be queried in the locked state.

Matters Needing Attention

● In order to avoid interference, please separate the signal line from the power line and high voltage line.

● Please use m3 terminal to connect AC power.

● In order to provide / cut off the power supply for the product, please use the power switch or circuit breaker.

● The power switch or circuit breaker shall be installed near the user for easy control.

● This product is specially used for temperature control. Please do not use it as voltmeter or ammeter.

● When using 3-wire RTD sensor to connect the extension wire, please note that the material, diameter and length of the extension wire are consistent with the sensor wiring, otherwise the temperature deviation will occur.

● If the power line, signal line and other high-voltage lines and power lines of the product cannot be far away, please add a filter at the power input end of the thermostat, and select the shielded wire for the signal line.

● Keep away from high frequency interference equipment (such as high frequency welding machine, high frequency sewing machine, large capacity SCR controller, high power motor, etc.).

● When providing detection input signal, if "good" or "fail" is displayed, the detection input may be faulty, please disconnect the power supply and check the circuit.

● Please install and use this product in the following environment

① Indoor

② Pollution degree 2

③ See level below 2000m

④ Installation category II

⑤ Less than 5.6m

⑥ Less than 5.6m

⑦ Error

Display	Explain	Handle
aPeH	Flashing when sensor is disconnected or disconnected	Check input sensor status
HHHH	When the input of the measuring sensor exceeds the upper limit of the temperature range, it flashes.	When the input returns to the temperature range, it will be cleared automatically
LLLL	Flicker when the input of the measuring sensor is lower than the lower limit of the temperature range	