Dear clients, thanks for choosing SCANTECH TCM Series Temperature Controller! Before installing and operating the products, please read this instruction manual carefully. For any questions, please contact our sales people immediately.

PREREAD INSTRUCTIONS

⚠ SAFETY CAUTIONS:
● Make sure the power is at "OFF" status before connecting the wires to avoid electric shock and strictly follow the connection diagram given out by the factory.
● Make sure the power OFF when cleaning the product.
● Working beyond the stated power supply is prohibited so as to avoid damage to the product or cause fire.
● Make sure the OUTPUT RELAY is used at the rated load and electrical life, if the contact of the output reply works against the electrical life, it may melt or burned or even cause fire.
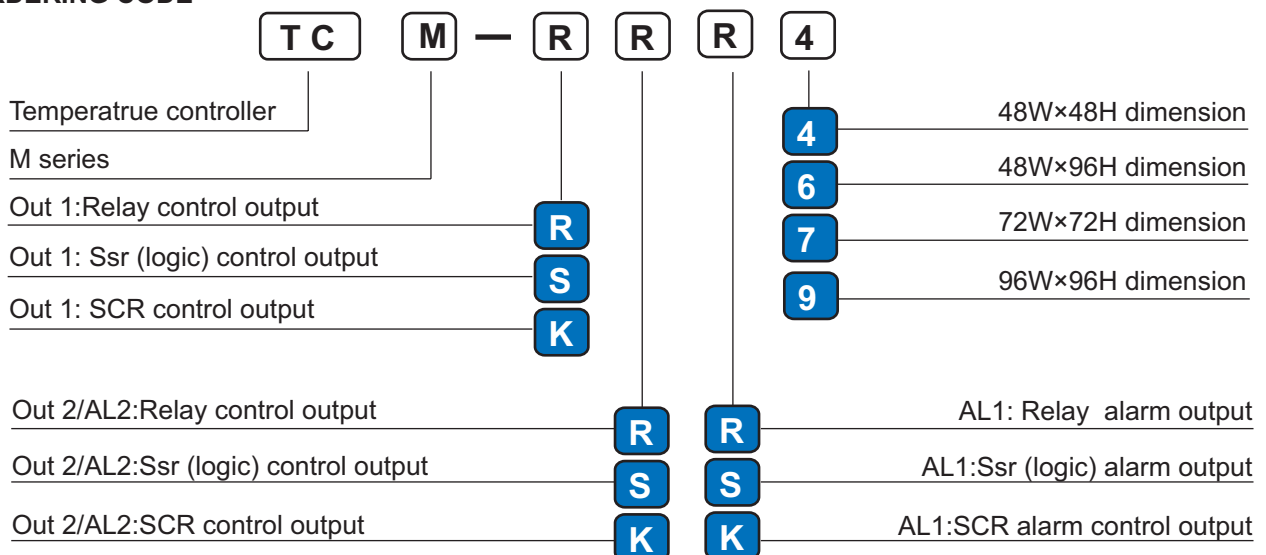
⚠ INSTALLATION NOTICE:
● The product can not be installed outdoors, otherwise will shorten the operation life or cause electrical shock accidents.
● Ambient temperature: 0℃(32℉) ~ 50℃(122℉)
● Avoid to use the product in the such conditions as the dusty, flammable, explosive gas, vapor, water and oil spray environments.
● Prevent from strong surge & impact, high interference or other bad influences conditions.
● The product does not include a switch or fuse, if necessary, user needs to install by themselves, suggested spec. of fuse: rated voltage: 250V AC, rated current: 0.5A, with delay function.
● The output is active after the power ON for 10s, please consider this when configuring control loop.
● The instrument signal cable/power supply cable should be separate from the large current transmit cable to reduce influence of the electromagnetism radiation to the instrument. In case such case is unavoidable, suggest to use independent wire tube or shielded wires with protect cover.
● For the surrounding noisy devices (e.g.: motor/transducer/coil tube/ magnetism windings or other devices with inducing components), please configure current wave suppresser or noise filter.
● Safety devices must be configured when the product is used in the conditions such as nuclear energy control, medical treatment devices, autos, trains, aviation, entertainment equipments…etc, for more details, please contact us.

1.FEATURES

● Micro processor PID temperature controller, with built in SMT technology and digit filter circuit.
● Auto-tune PID, Fuzzy PID, ON-OFF function; cooling/heating function.
● Soft buttons, easily operate; high precision and anti-interference
● Dual line 4 LED digit display: upper LED: red; lower LED: green
● Universal input:TC(K, E, J,T); RTD(Pt100, Cu50), configurable by software
● Control output: Relay, SSR(Logic), SCR
● 2 alarm output, up to 5 alarm mode settings
● Optional instrument size: 48W×48H×80mm;48W×96H×100mm;72W×72H×100mm; 96W×96H×100mm.
● Application ranges: food&beverage, oven, furnance, plastic extruder, chemicals processing, heating process, packing& packaging & printing machine...etc. (For temperature measuring and control)
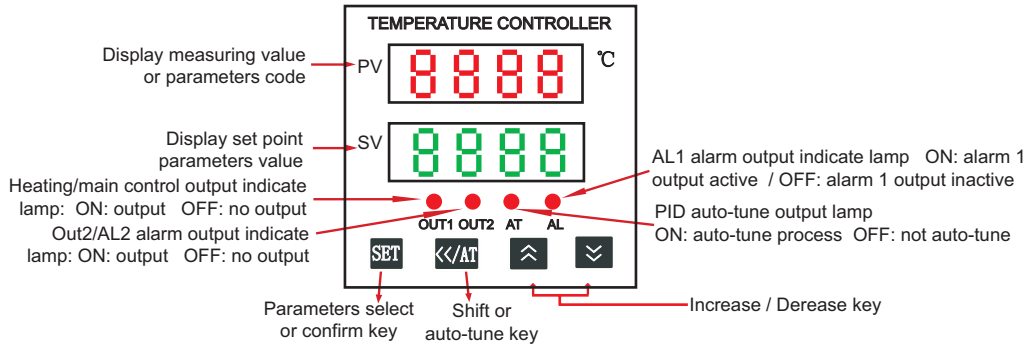
2.ORDERING CODE

| T C | M | — | R | R | R | 4 |

Temperatrue controller

M series

Out 1:Relay control output — R

Out 1: Ssr (logic) control output — S

Out 1: SCR control output — K

4 — 48W×48H dimension
6 — 48W×96H dimension
7 — 72W×72H dimension
9 — 96W×96H dimension

Out 2/AL2:Relay control output — R   R — AL1: Relay alarm output

Out 2/AL2:Ssr (logic) control output — S   S — AL1:Ssr (logic) alarm output

Out 2/AL2:SCR control output — K   K — AL1:SCR alarm control output

Notice: 1, Out2 (output 2) and AL2 (alarm 2) use the same termincal points, user can select either Out2 or AL2.
　　　2, Out2 (output 2) is used as cooling function related to heating function.
　　　3, If user have special request besides the ordering code, please indicate when order.

3. PANEL ILLUSTRATIONS

Display measuring value or parameters code → PV

Display set point parameters value → SV

Heating/main control output indicate lamp: ON: output   OFF: no output

Out2/AL2 alarm output indicate lamp: ON: output   OFF: no output

TEMPERATURE CONTROLLER

℃

OUT1 OUT2 AT AL

SET <</AT

AL1 alarm output indicate lamp   ON: alarm 1 output active / OFF: alarm 1 output inactive

PID auto-tune output lamp
ON: auto-tune process OFF: not auto-tune

Increase / Derease key

Parameters select or confirm key

Shift or auto-tune key

4. TECHNICAL SPECIFICATIONS:

Power supply:	**TCM-□4:90-260V AC 50/60HZ** **TCM-□6/7/9: 220/110V AC 50/60HZ (± 10%)**
Power consumption:	**≤ 5VA**
Measuring range:	**-1999~9999℃**
Accuracy:	**0.3% F.S ± 2 digit (under normal conditions)**
Sampling rate:	**<500ms**
Main control output:	**Relay: NO., contact capacity: AC 250V /3A orDC 30V /3A Cosφ=1** **SSR/Logic: DC 24V ±2V/20mA (TCM-□4)** **DC12V ±1V / 20mA (TCM-□6/7/9)**
Alarm output:	**Relay: NO., contact capacity: AC 250V /3A or DC 30V /3A Cosφ=1** **SSR/Logic: DC 24V ±2V/20mA (TCM-□4)** **DC12V ±1V / 20mA (TCM-□6/7/9)**
Input:	**TC** — **K** — **0～999℃** **J** — **0～999℃** **T** — **-150～400℃** **E** — **0～999℃** **RTD** — **Pt100** — **-199～600℃** **Cu50** — **-50～150℃** **Others** **Please indicate when order**
Withstand voltage:	**1500V Rms (between terminal points and the plastic case)**
Insulation strength:	**Min. 50m Ω (500V DC, between the terminal points and case)**
Ambient temperature:	**0～50℃**
Stock temperature:	**-10～60℃**
Humidity:	**35~85%(RH)**
Weight:	**250g (G.W) (TCM-□4)** **400g (G.W) (TCM-□6/7/9)**

5. INSTRUMENT DIMENSION AND INSTALLATION HOLE DIMENSION(unit: mm)

H   W   a   b   C   D   L
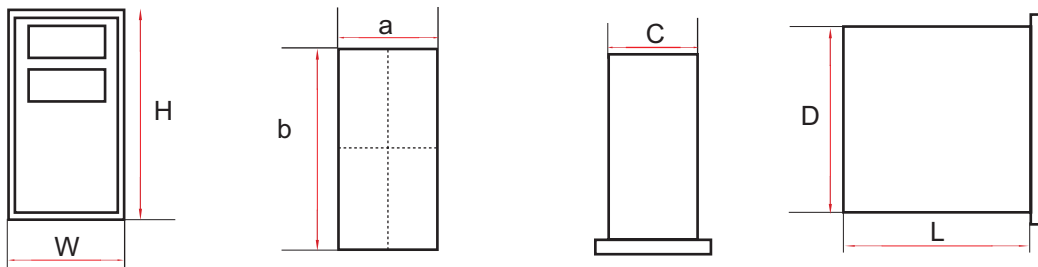
MODE	DIMENSION		INSTALLATION HOLE DIMENSION
	W × H	**C × D × L**	**a × b**
TCM-□□□4	48 × 48	44 × 44 × 80	(45+0.5) × (45+0.5)
TCM-□□□6	48 × 96	42 × 90× 100	(43.5+0.5) × (91+0.5)
TCM-□□□7	72 × 72	66 × 66 × 100	(67.5+0.5) ×(67.5+0.5)
TCM-□□□9	96 × 96	90 × 90 × 100	(91+0.5) × (91+0.5)

6.PARAMETERS SETTINGS:

a.Modify set point: at the processing estate, press "<</AT" key once, the lower LED flashes, the digit can shift at this time, press " ⌃ " / " ⌄ " to modify the set point.

b.Modify parameters value: at the processing estate, press "Set" key for 3s to enter into parameters setting menu, press "set" key once to move parameter need to be modified, press "<</AT" key once, the lower LED flashes, the digit can shift, press " ⌃ " / " ⌄ " to increase or decrease value, at last press "Set" key to confirm the value set. Press "Set" key once again moving to next parameter.

c.Operation parameters menu as below:

Power ON

`8.8.8. 8.8.8.` ········ Self checking, all lamps ON.
····· 3s

`°C ℉` ········ Display unit
········ Display input signals
····· 3s

`999 0.0` ········ Display measuring Hi limit
········ Display measuring Lo limit
····· 3s

`203 100` ········ Display measuring value
········ Display set point

↓ *Press "<</AT" key once, lower LED flashes, press " ⌃ " and " ⌄ " key to modify set point.*

`203 99.9`

↓ ········ Proccessing estate

Press "SET" key for 3s to enter into parameters menu

`AL1 90.0` AL1: Alarm 1 value setting, range:-199~999, factory setting=90.0
········ Press "SET" key

`AO1 2` AL1 alarm output mode: 0: high deviate alarm 1, low deviate alarm 2, High absolute value alarm 3: Low absolute value alarm 4, Outside dead zone respect to the control set point alarm 5,Inside dead zone respect to the control set point alarm 6, Heater break alarm Factory settings="2"
········ Press "SET" key

`AL2 900` AL2: Alarm 2 value setting, range:-199~999, When without this parameter, it means the controller has 2 output, out2 is cooling function.
········ Press "SET" key

`AO2 3` ········ Same as AM1.
········ Press "SET" key

`PUF 0.0` Correction parameter,range=±100,factory settings=0.0
Measuring value=Sampling value - PUF value
········ Press "SET" key

`InP K` Input signals:TC: K, J, E,T; RTD: Pt100, Cu50. factory settings="K"
········ Press "SET" key

`P 3.0` Proportion band (%), range: 0.1~999, factory settings=3.0, P=OFF means the controller is ON/OFF control.
········ Press "SET" key

`I 240` Integral time (s), range: 0.1~999, I=OFF means cancel integral time, factory settings=240
········ Press "SET" key

`d oFF` Differential time(s), range:0.1~999, d=OFF means cancel Differential time, factory settings=OFF
········ Press "SET" key

`HYS 1.0` P=OFF control hysteresis, this parameter is invalid when P≠OFF, factory setting=1.0
········ Press "SET" key

`CtL 20` Control output mode, range: 1~150, suggest RELAY=20, SSR=1~3, factory settings=20
········ Press "SET" key

`Pc 30` Out2(cooling) function: proportion band, :range 0.1~999, factory setting=3.0
········ Press "SET" key

`Cdb 0.0` Out2(cooling) clearance, range ±90.0, factory setting=0.0
········ Press "SET" key

`C_t 20` Out2(cooling) control, range:1~150, suggest RELAY=20, SSR=1~3, factory settings=20
········ Press "SET" key

`C-F c` Temperature unit, factory settings=℃, ℃=Celsius degree,℉=Fahrenheit
········ Press "SET" key

`StP run` Output prohibited: StP=prohibit control output, factory settings=RUN (auto-adjust)
········ Press "SET" key

`LcK 000` LCK: lock key, LCK=000(parameters can read and write) ; LCK=010(parameters can read only)
········ Press "SET" key

Notice:

a.Out2 and AL2 use the same terminal, user can select when order.

b.If user want to change the temperature unit, only IBEST distributors or representatives can set, please contact the local distributors.

c.If user want to prohibit control output, only IBEST distributors or representatives can set, please contact the local distributors.

d.If it's the first time to use IBEST TCM series temperature controllers, please follow the operation illustration to let the controller enter into auto-tune status, after auto-tune finish, the system will get new appropriate P, I, D value and save the value.

e.The control output cycle of the general machine heater is 20~30s; for large volume electrical oven, the control output cycle can be 30~120s so as to extend the contact operation life; for non-contact output, for example, SSR can be 1~3s.
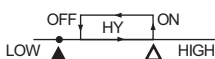
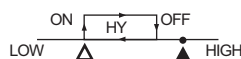## 7. CONTROL OUTPUT AND ALARM OUTPUT MODE:

a.ON/OFF CONTROL:(▲ Set Point)

Heating ON ─ HYS ─ OFF
LOW ▲ HIGH

Cooling OFF ─ HYS ─ ON
LOW ▲ HIGH

b.AlARM OUTPUT :(▲Set Point △ Alarm value)

0: High deviate alarm, AL is deviattion
OFF ─ HY ─ ON
LOW ▲ △ HIGH

1: Low deviate alarm, AL is deviattion
ON ─ HY ─ OFF
LOW △ ▲ HIGH

2: High absolute value alarm ,AL is absolute
OFF ─ HY ─ ON
LOW ▲ △ HIGH
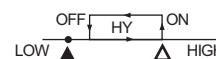
SCANTECH

3: Low absolute value alarm,AL is absolute value
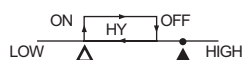
4: Outside dead zone respect to the control set point

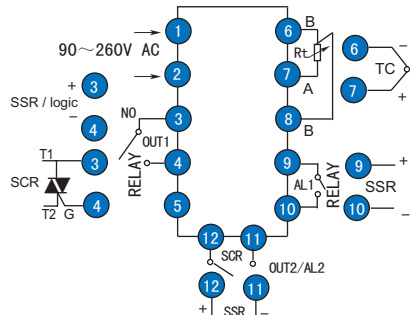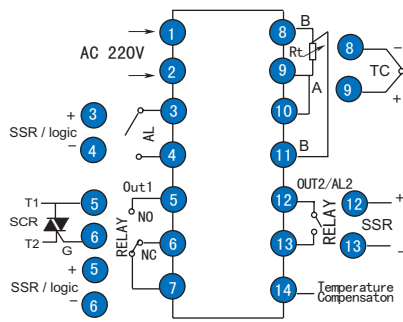

5: Inside dead zone respect to the controlset point alarm

● All alarm hysteresis are set " 1" by factory, if user want to change, please contact us or local distributor.

● Only when there is 1 control output, the control output mode can change, if user want to change, please contact us or local distributor.
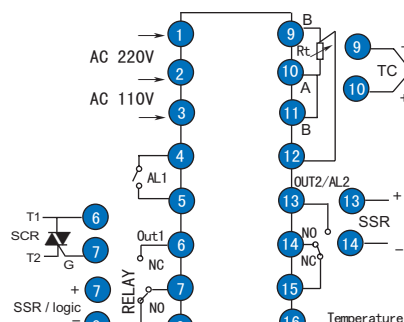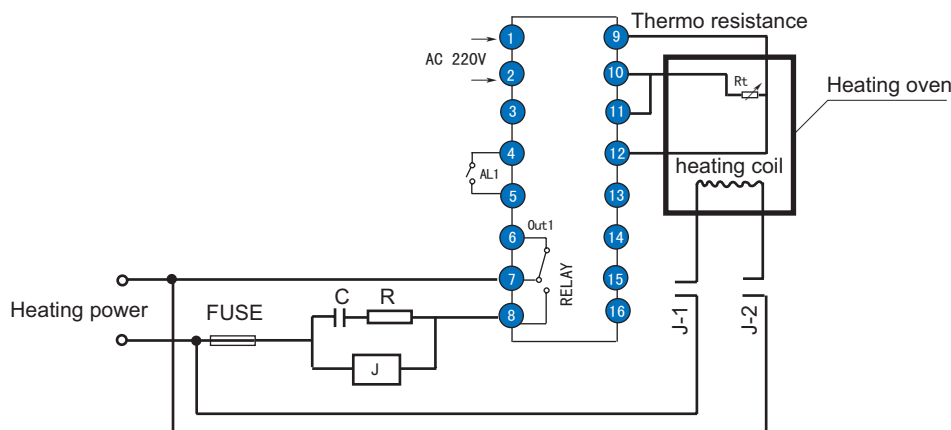
8. Electrical connection diagram:

TCM-□□□4 **TCM-□□□7** **TCM-□□□6 / TCM-□□□9**

9. Application examples:

10. Malfunction and improve methods:

a.Check if the wires are connected correctly, please take special care the instrument power cable and the input signal cable can not be connected wrongly and output terminal can not be short-circuit by strong current.

b.Check if input probe type comply with the instrument input signal.

c.For TC input, please use the compensation cable with thermo couple thread or other corresponding materials.

d.For RTD input, please use 3 wire with same specification and the length should be the same also.

e.To test whether the instrument or the probe are accurate, please put the probe into boiled water and ice water respectively, the instrument should display 100 ℃and 0℃ , if within the accuracy range, means the instrument and probe are accurate.

f.When power ON and use heating function, if the instrument does not rise but fall, please check if the thermo couple wires are connected crossly.

g.When use the controller for a period of time and find the controller display has little fluctuation or hard to reach the set point, if the system has no problem, the controller parameters value is not appropriate, user can auto tune the controller again or re-adjust manually.

h.When the controller control output does not work, please check the control output wires are connected correctly, or the external load is short circuit / break/wrongly connected which may damage the controller internal components. If necessary, please open the controller and inspect whether the terminal point copper foil or input/output protect resistance are damaged.

i.When the controller display "UUU", it means the input signal exceeds the measuring range upper limit; when display "LLL", means the input signal is under the measuring lower upper limit or the input signal wires are wrongly connected; display "cJr", means the thermocouple cooling end compensation goes wrong, please check the compensation diode goes into malfunction.

11. Product maintenance notice:

a.The product should be power ON for 15 minutes before operating.

b.The appropriate ambient temperature is 0~40℃; relative humidity: 85%

c.The product calibration period is 12 months.

d.Avoid shock and impact, prevent operation from heavy dust and poisonous chemical material medica & gas environment.

e.If the input signals are with high-frequency interference, the wires must configure a high-frequency filter.

f.The input wires should not be too long. If the distance between the signal input terminal and the product can not be shortened, please use shielded twisted-pair and the shielded layer connected with the signal low end.

h.Keep from the direct sunlight, the stock temperature is -10~70?/60%(RH). Do not contact the organic solvent and oil.

g.If stock in long terms without operation, please connect to power ever 3 months for min. 4 hours each time.

12. Product maintenance notice:

a.The complete product contains: product with connection diagram and , instruction manual, installing brackets (1 set), inspection certificate and packing box with product label.

b.Guarantee: any defected products under normal operation within 12 months can be returned and replaced by us; Damage by user's wrong operation can not be replaced, if