TD Series Temperature Controller Manual

Features

- ⊙ TC / RTD universal input, selected by software menu.
- ⊙ Displaying and controlling function, 4 digit LED display.
- ⊙ Advanced Two Degrees of Freedom PID Arithmetic.
- ⊙ Auto-tuning PID function for heating controlled system.
- ⊙ Optional Relay / SSR control output.
- ⊙ One alarm output, optional alarm mode.

For your safe, please read the below content carefully before you use the temperature controller!

▣ Safe Caution

※ Please read the manual carefully before you use the temperature controller.
※ Please comply with the below important points. ⚠ Warning An accident may happen if the operation does not comply with the instruction. ⚠ Notice An operation that does not comply with the instruction may lead to product damage.
※ The instruction of the symbol in the manual is as below. ⚠ An accident danger may happen in a special condition.

⚠ Warning

1. A safty protection equipment must be installed or please contact with us for the relative information if the product is used under the circumstance such as nuclear control, medical treatment equipment, automobile, train, airplane, aviation and equipment etc.. Otherwise, it may cause serious loss, fire or person injury.
2. A panel must be installed, otherwise it may cause creepage (leakage).
3. Do not touch wire connectors when the power is on, otherwise you may get an electric shock.
4. Do not dismantle or modify the product. If you have to do so, please contact with us first. Otherwise it may cause electric shock and fire.
5. Please check the connection number while you connect the power supply wire or input signal, otherwise it may cause fire.

⚠ Caution

1. This product cannot be used outdoors. Otherwise the working life of the product will become shorter, or an electric shock accident may happen.
2. When you connect wire to the power input connectors or signal input connectors, the moment of the No.20 AWG (0.50 mm2) screw tweaked to the connector is 0.74n.m - 0.9n.m. Otherwise the connectors may be damaged or get fire.
3. Please comply with the rated specification. Otherwise it may cause electric shock or fire, and damage the product.
4. Do not use water or oil base cleaner to clean the product. Otherwise it may cause electric shock or fire and damage the product.
5. This product should be avoid working under the circumstance that is flammable, explosive, moist, under sunshine, heat radiation and vibration. Otherwise it may cause explosion.
6. In this unit it must not have dust or deposit, otherwise it may cause fire or mechanical malfunction.
7. Do not use gasoline, chemical solvent to clean the cover of the product because such solvent can damage it. Please use some soft cloth with water or alcohol to clean the plastic cover.

1. Model

TD □ □ □ □

- Input: 10: Single input (Multi input type TC / RTD)
- Alarm: B: One alarm output
- Output: R: Relay output S: Logic output (SSR)
- Dimension: 4: 48W×48H 6: 48W×96H 7: 72W×72H 8:96W×48H 9: 96W×96H
- TD series temperature controller

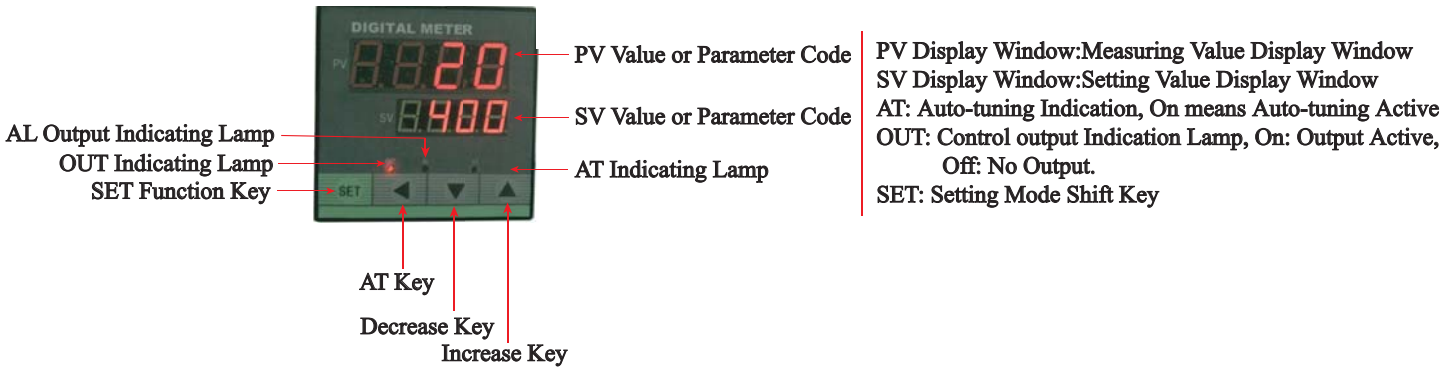
2. Model indication

Model	Control Output Mode	Alarm Output
TD□-RB10	Relay output	One relay output
TD□-SB10	Logic output	One relay output

3. Main Technical Parameters

Input Signal	For TC: Resolution 1℃ Accuracy 0.5%FS±3digits (below 600℃) 1%FS±3digits (above 600℃) For RTD: Resolution 0.1℃
Output Type	Relay output：Capacity 3A/220VAC
	Logic output：5V Voltage, Load 30mA
Power Supply	220VAC±10%
Total Current	＜30mA（220VAC）
Working Condition	0-50℃ 45-85%RH

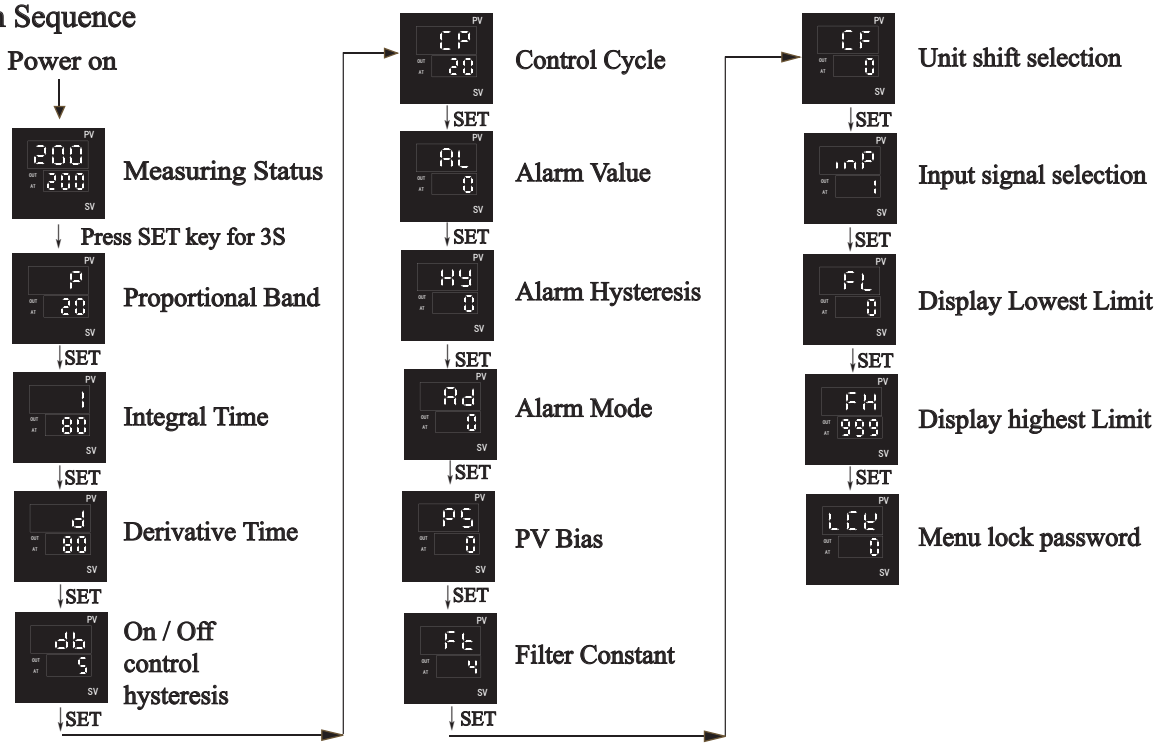
4. Panel Indication



5. Panel Key Operation

（1）SET Key：In normal display status, press AT Key to show SV modifying menu, SV value flashes; press SET key for a few seconds to show setting menu.
（2）“▲”, “▼” Key：Press ▲ or ▼ to set the value in SV value menu or setting menu.
（3）“▲” Key: In modifying SV status, press it for a few seconds to increase SV value quickly.
（4）“▼” Key: In modifying SV status, press it for a few seconds to decrease SV value quickly.
（5）After parameters are changed, press SET key to confirm and save.
（6）“AT” Key: In normal display status, press it for above 3 seconds to start Auto-tuning function.

6. Operation Sequence



7. Setting Menu

Parameter	Indication	Setting Range	Ex-Factory setting
P	Proportional Band. The smaller the proportional band is, the faster the system heats. Instead, the slower the system heats. Increase proportional band will decrease the oscillation, but increase control bias. Decrease proportional band will decrease control bias, but cause oscillation. (If P=0, it is On/Off control.)	0-Highest Limit	60
I	Integral Time. The smaller the integral time is, the stronger the integral action is and better for eliminating the bias between it and the setting value. If the integral time is too short, it may not eliminate the bias.	0-999	200
d	Derivative Time. To decrease the derivative time to a proper value can prevent the system from oscillating. The bigger the D is, the strongger derivative action is.	0-999	200
db	On / Off control hysteresis. (It is only effective for On / Off control.)	1-15	5
CP	Control cycle, 1 is SSR control output, 4-255 is relay control output.	1-255	20
AL	Alarm Value	0-999	200
HY	Alarm Hysteresis	0-50	1
Ad	Alarm Mode：HL：Absolute low，HH：Absolute high，DL：Relative low，DH: Relative high	HL, HH, DL, DH	HH
PS	PV bias applied to amend the bias caused by the measuring process.	-50-50	0
Ft	Filter constant. The smaller Ft is, the faster response is, but it may cause fluctuation.	1-60	20
CF	Display value unit selection: 0: ℃ 1: °F	0-1	0
inP	Input signal selection: 0: K type 1: J type 2: E type 3: T type 4: PT100 5: CU50 6: CU100	0-6	0
FL	Display lowest limit.	See input signal table	0
FH	Display highest limit.	See input signal table	1200
LCK	Menu lock password. SV value is prohibited to change if rightmost digit is 1. All other value is prohibited to change if tens digit is 1.	0-9999	0

Input signal table

No.	Input signal	Measuring range	Resolution	Accuracy	Input impedance
0	K type TC	-20～1300℃	1℃	0.5%FS±3digits	＞100KΩ
1	J type TC	-20～1200℃	1℃	0.5%FS±3digits	＞100KΩ
2	E type TC	-20～1000℃	1℃	0.5%FS±3digits	＞100KΩ
3	T type TC	-20～400℃	1℃	0.5%FS±3digits	＞100KΩ
4	PT100	-199～600℃	0.1℃	0.5%FS±3digits	（0.2mA）
5	CU50	-50～150℃	0.1℃	0.5%FS±3digits	（0.2mA）
6	CU100	-50～150℃	0.1℃	0.5%FS±3digits	（0.2mA）

8. Advanced Function

P.I.D parameters setting & Auto-tuning operation

1. To set P.I.D. parameters manually;

The default PID value has been pre-set when the product is ex-factory. This P.I.D value is applicable to normal heating system for temperature control. If the temperature control performance is not very good with the default PID value, the value can be changed according to the experience for those users who have the automation control theory & experience.

2. To set P. I. D parameters automatically:

If users do not know how to set the PID value, they can use the Auto-tuning function of the product. The Auto-tuning function will calculate the P. I. D. value it needs automatically as per different heating system to control temperature.

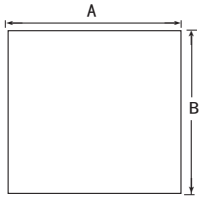
Auto-tuning method: At first set the SV value, then press “AT” for more than 3S. Wait until the “AT” indicating lamp turning on, then release pressing. AT indicating lamp ON means Auto-tuning is running.

Please do not change SV value or other parameters on the controller or the controlled equipments to make sure the Auto-tuning gets an accurate result. After the AT lamp turns off, the controller will refresh the P.I.D value automatically.

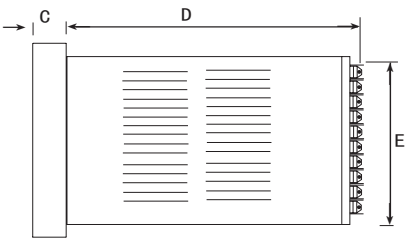
At this time, the controller can control temperature automatically and precisely.

9. Outlook and installation dimension

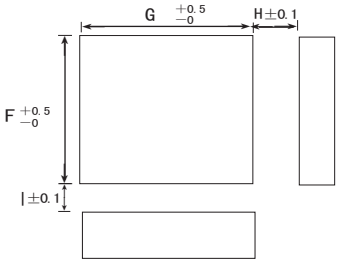
Panel size



Side face size



Mounting size



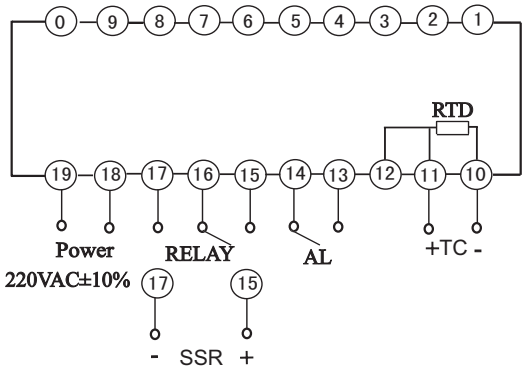
Model	A	B	C	D	E	F	G	H	I
TD4	48	48	6	100	45	46	46	30	30
TD6	48	96	10	100	89.5	91	46	30	30
TD7	72	72	10	100	67	68	68	30	30
TD8	96	48	10	100	45	46	91	30	30
TD9	96	96	10	100	89.5	91	91	30	30

Unit：mm

10. Connection drawing

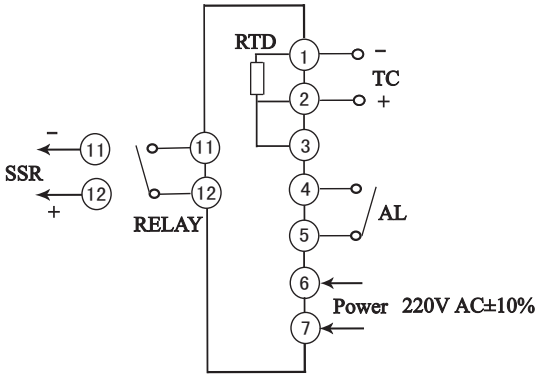
TD9

Power Supply: 220VAC±10%
Voltage Output: DC 5V 30mA
Relay Output: AC 250V 3A



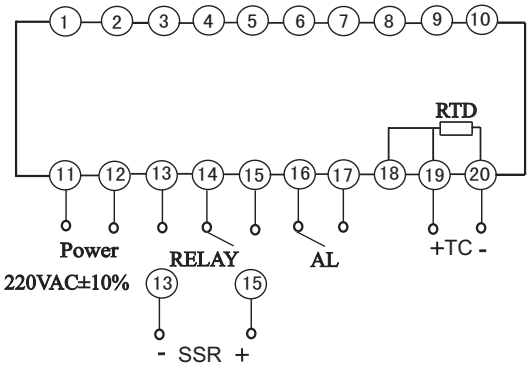
TD7

Power Supply: 220VAC±10%
Voltage Output: DC 5V 30mA
Relay Output: AC 250V 3A



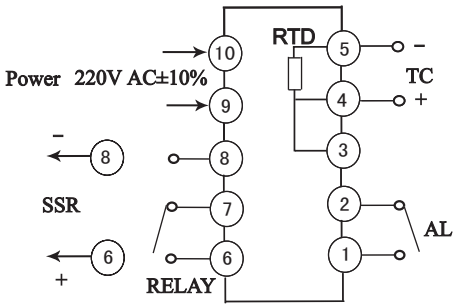
TD6/8

Power Supply: 220VAC±10%
Voltage Output: DC 5V 30mA
Relay Output: AC 250V 3A



TD4

Power Supply: 220VAC±10%
Voltage Output: DC 5V 30mA
Relay Output: AC 250V 3A



Note：Please subject to the drawing on the product as final if it is different from the above one.

11. Simple Problem Shooting

Display Message	Shooting Method
Display Err	To check input signal connection well or not. To check FH, FL value; To check working temperature is OK or not. To check input signal selection is right or not.