Digital temperature controller

TC()D/R/K Series

Manual Instructions

PIs read the following safety considerations before use

▣ Safety Considerations

※Please observe all safety considerations for safe and proper product operations to avoid hazards.

※ Safety considerations are categorized as follows.

⚠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 personal injury,fire,or economic loss.
2. **The unit must be installed on a device panel before 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.
4. **Check the terminal numbers before connecting the power source.**
   Failure to follow this instruction may result in fire.
5. **Do not disassemble or modify the unit,Please contact us if necessary.**
   Failure to follow this instruction may result in electric shock or fire.

⚠Caution

1. **Do not use the unit outdoors.**
   Failure to follow this instruction may result in shorten the life cycle of the unit,or electric shock.
2. **When connecting the power input and relay output cables,use AWG20(0.50mm^2)cables and make sure to tighten the terminal screw bolt above 0.74N.m to 0.90N.m.**
   Failure to follow this instruction may result in fire due to contact failure.
3. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in shorten the life cycle of the unit or fire.
4. **Do not use loads beyond the rated switching capacity of the relay contact.**
   Failure to follow this instruction may result in insulation failure,contact melt,contact failure,relay broken or fire.
5. **Do not use water or oil-based detergent when cleaning the unit.Use dry cloth to clean the unit.**
   Failure to follow this instruction may result in electric shock or fire.
6. **Do not use the unit where flammable or explosive gas,humidity,direct sunlight,radiant heat, vibration,or impact may be present.**
   Failure to follow this instruction may result in fire or explosion.
7. **Keep dust and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.
8. **Check the polarity of the measurement input contact before wiring the temperature sensor.**
   Failure to follow this instruction may result in fire or explosion.
9. **For installing the unit with reinforced insulation,use the power supply unit which basic level is ensured.**

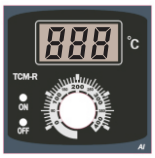
▣ Specifications

Power supply		①220VAC,50/60Hz ②85–265VAC ③24VAC/DC ④380VAC
Allowable voltage range		90–110% of rated voltage
Power consumption		Max.8VA
Input specification	TC	K E J B S R N T
	RTD	Pt100 Cu50
	Linear current	0–20mA 4–20mA
	Linear voltage	0–5V 0–10V
Display accuracy		±0.5%
output specification		Relay contact output 250VAC 5A 1NO1NC
		SSR 12VDC±3V Below 20mA
		Voltage output(0–5v 1–5v)
		Current output(0–20mA 4–20mA)
		SCR output (zero–crossing output 、phase shift output)
Alarm output		Relay 250VAC 5A Max.two sets of alarm outputs
Control method		ON/OFF Position control、PID control
Sampling period		100ms
1Relay life cycle		Mechanical above 2.5 million times Electrical above 100000times
Dielectric strength		2000VAC 50/60Hz for 1min. (between all terminals and case)
Vibration		0.75mm amplitude at frequency 5 to 55HZ(for1min.) in eachX,Y,Z direction for 2 hours
Insulation resistance		Min.100MΩ (500VDC) MEGA
Noise resistance		Square shaped noise by noise simulator(pulse width 1μs) ±2kV R–phase,S–phase
Memory retention		Approx.10years(non–volatile semiconductor memory type)
Environment	Ambient temp.	–5~40℃ storage:–10~50℃
	Ambient humi.	35%~85%RH storage:35~85%RH

▣ 运行

1) Power start

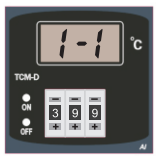
Initialization declaration



2) Enter specifications

Y	K–type thermocouple
E	E–type thermocouple
J	J–type thermocouple
Pt	Pt100 type thermistor
Cu	Cu50 type thermistor

3) control mode



1-1	Positional control heating
1-2	Positional control refrigeration
1-3	PID intelligent temperature control heating

4) Display the current temperature value

▣ Model composition

TC □-□-□ □-□

supply voltage	No Content	220VAC,50/60Hz
	2	85–265VAC
	3	380VAC
	4	24VAC/DC
Enter specifications	K	K–type thermocouple
	E	E–type thermocouple
	J	J–type thermocouple
	Pt	Pt100 type thermistor
	Cu	Cu50 type thermistor
control mode	1	Positional control heating
	2	Positional control refrigeration
	3	PID intelligent temperature control heating
External dimensions	S	W48×H48mm holeW45×H45mm
	H	W48×H96mm holeW45×H92mm
	M	W72×H72mm holeW68×H68mm
	L	W96×H96mm holeW92×H92mm
product type	D	Digital dip switch setting type
	R	Digital dial setting type
	K	Digital dial button upper and lower limit setting type
project name	TC	温度控制器

▣ Temperature setting and control

1. Position control: After the power is turned on, set the desired temperature setting value and start running. When the displayed temperature value is lower than the set value, the ON green light is on, and the normally open point of the output relay is connected and the normally closed point is disconnected. When the displayed temperature value reaches or exceeds the set value, the OFF red light is on, and the normally open point of the output relay is disconnected and the normally closed point is connected.

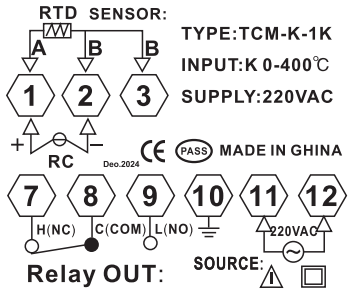
2. PID temperature control refers to the technology of using PID (proportional integral derivative) control algorithm for temperature control. PID temperature control is a closed–loop control system that compares the set temperature value with the actual measured temperature value, and then controls based on the deviation. The PID controller adjusts the control variable based on the magnitude, duration, and rate of change of the deviation, thereby achieving precise temperature control. PID temperature control is widely used in various occasions that require temperature control, such as industrial furnaces, laboratory equipment, food processing, etc.

※ The default hysteresis value is 2 ℃

▣ Error

Display	Description	Troubleshooting
HHH	Input broken or out of input range	PIs check if the input signal is wrong
LLL	Input broken or out of input range	PIs check if the input signal is wrong

▣ Wiring diagram



▣ precautions

1. To eliminate inductive interference, please separate the wiring of this product from high–voltage lines, power lines, etc.
2. When turning on or off the product, please use a power switch or circuit breaker.
3. Try to stay away from high–frequency equipment (high–frequency welding machines, high–frequency sewing machines, high–capacity SCB controllers) as much as possible
4. This product is used in the following environments:
① Indoor ② Pollution level 2
③ Altitude below 2000m ④ Installation classification II

※If you violate the above precautions, it may cause product malfunction. Please be sure to comply.