I. When using the temperature control module for the first time, you need to set several parameters to use it normally. For setting methods and principles, please see the user manual. There are also some advanced functions to improve performance, please see the user manual.

	set up	instructions
1	Sensor Settings	The sensors included in the kit can be used with the default configuration.
2	Sensor open circuit protection	Default configuration can be used for room temperature operation
3	Temperature Options	Limit the temperature adjustment range and set the number of decimal places in the temperature display
4	overtemperature protection	Alerts the user when the actual temperature of the target is out of range.
5	Overcurrent protection threshold setting	Less than the maximum current that the TEC can withstand to protect the TEC
6	Overvoltage protection threshold setting	Less than the maximum voltage the TEC can withstand to protect the TEC
7	Maximum output voltage setting	The maximum permissible voltage of the thermostat output to the TEC terminals, corresponding to the maximum temperature control power, must be set. Default output voltage is 1V, which is not enough in most cases.
8	Output Mode Setting	Three modes of heating, cooling and two-way automatic are available.

II. Some common temperature control anomalies, possible causes and solutions. For some of these terms, please see the user manual.

Problem 1: There is always a gap between the temperature control temperature and the target temperature.	
Possible causes	Solutions to the corresponding causes
1. PID type error set to P	1. Reset to PI or PID.
2. Insufficient temperature control power	1. Adjust the maximum output voltage of the thermostat; 2. Replace the high power TEC; 3. Replace the thermostat with a more powerful one;
3. Power supply voltage too low	1. The output voltage can only reach 70% to 85% of the supply voltage (model phase). (Off) If the power supply voltage is too low for the output voltage to reach the setting Please select a higher voltage power supply for the "Maximum Output Voltage" of the "Maximum Output Voltage" of the "Maximum Output Voltage" of the "Maximum Output Voltage" of the "Maximum Output Voltage."
4. Insufficient power due to current limitation	1. If this is the cause, increase the overcurrent protection value reasonably.
5. Insufficient heat dissipation	1. Improve heat dissipation at the hot end of the TEC, e.g. larger heat sinks, or more fans. 2. Apply thermal grease evenly to both sides of the TEC.
Problem 2: Temperature control is too slow	
Possible causes	Solutions to the corresponding causes

1. Not enough power for temperature control	1. Adjust the maximum output voltage of the thermostat; 2. Replace the high power TEC; 3. Replace the thermostat with a more powerful one; 4. If the output voltage is current limited and cannot be increased. Please reasonably increase the over Current protection value.
2. Too much credit time	1. Decrease the integration time; or use auto-tuning.
3. Ramp speeds too small	1. Increase the parameter "Temperature Setting Ramp Speed" or "Temperature Control Speed Limit".
4. Temperature control target heat capacity too high oldest	1. Increase the maximum output voltage of the thermostat within the safe range to improve the temperature control. Power; 2. Replace the high power TEC; 3. Replace the thermostat with a more powerful one; 4. Optimise the temperature control target volume to be as small as possible.

Problem 3: The temperature control overshoots a lot, or oscillates too much.

Possible causes	Solutions to the corresponding causes
1. thermal contact	1. Improved thermal contact between sensor and temperature control target. 2. Reduces the thermal resistance between the temperature control target and the TEC.

2. Too large a scale factor	1. Decrease the scaling factor; or use auto-tuning.
3. Integral time is too small	1. Increase the integration time; or use auto-tuning.
4. No differentiation	1. Select PID and set the appropriate differential time; or use auto-tuning.
5. Unstable thermal environment	1. Enhancement of insulation measures for temperature-controlled targets and surroundings.
6. Switching window too small	1. Make it bigger.
7. PID settings are not appropriate for the particular systems	Phenomenon: In some systems (e.g., large lag systems, or systems with characteristics If the thermal capacity is too small, so that the temperature is very sensitive to the power of the temperature control, or if the ambient heat exchange is t o o far away from the working temperature,the positional temperature control leads to temperature fluctuations and the difference between the actual temperature and the regulated temperature is always in the "switching control window". Solution 1: Change the calculation method of PID from the commonly used positional formula to the incremental formula. Volume type (to use auto-tuned PID parameters)
	Solution 2: Still use the positional type, but increase the switching window to not Shock until (may reduce initial temperature control speed)

Problem 4: Slow temperature control, while oscillating strongly

Possible causes	Solutions to the corresponding causes
1. thermal contact	1. Improved thermal contact between sensor and temperature control target. 2. Reduces the thermal resistance between the temperature control target and the TEC.
2. PID switching window too small	1. Make it bigger.

Problem 5: Temperature control target and radiator temperature rise at the same time, unstable temperature

Possible causes	Solutions to the corresponding causes
1. TEC hot and cold surfaces incorrectly installed	1. Change to the right direction
2. TEC cable with wrong positive and negative terminals	1. Change to correct wiring
3. Poor thermal contact on both sides of the TEC	1. Apply thermal grease evenly to both sides of the TEC. 2. Ensure full face contact during installation
4. Insufficient heat dissipation at the hot end of the TEC	1. Improve heat dissipation at the hot end of the TEC, e.g., larger heat sinks, or more fans.

Problem 6: Reboot caused by a sudden drop in power supply voltage

Possible causes	Solutions to the corresponding causes
1. Insufficient power supply	1. Replacement of higher power supply 2. If the current limit value of the power supply can be set, check that the current limit value of the power supply is set. Placement is correct.

2. Too much output power	1. If the maximum output voltage is set too high, it may cause the power supply power Insufficient; under the premise of sufficient temperature control power, the maximum transmission can be appropriately reduced Out voltage.
3. Maximum output voltage setting incorrect	1. In general, this voltage should not exceed the maximum operating voltage of the TEC. 80 per cent of the pressure. 2. Some brands of TECs may have abnormal currents resulting in power supply protection if operated at maximum operating voltage at high temperatures. Therefore, reduce the maximum output Out voltage to less than 80% of the TEC's maximum operating voltage.
4. Output short circuit	1. Check for wiring shorts;
	2. Check the TEC for a short circuit. Some brands of TEC without heat sink Measures, dry burning will be damaged, damage may be open circuit may be short circuit.

Third, temperature control errors. In the process of using, may encounter temperature control module, software and UIM prompt some error messages, encounter these errors, you can refer to the following introduction to deal with.

information	hidden meaning	Response

Over Temp	overheating	1. If the PCB is over-temperature, increase the heat dissipation of the TCM module itself. 2. If the over-temperature protection zone is not correct, reset the zone. 3. If the temperature control target is over-temperature, check the temperature control capability of the temperature control system 4. If the temperature control target is over-temperature, check the temperature control system's radiator
Dangerous Temp	hazardous temperature	Improve heat dissipation in the TCM module itself
Rt Open Circuit	Sensor open circuit	Check that the sensor is connected correctly
Over Current	overcurrent	1. Check output for short circuit 2. Check that the overcurrent protection value is set appropriately 3. Check that the TEC used is appropriate
Over Voltage	overpressure	1. Check that the power input is connected correctly 2. Check that the overvoltage protection value is set appropriately 3. The power supply is underpowered or current limited.

SYSTEM Voltage Error	Power supply voltage error	1. Check that the supply voltage is not out of range (too high or (too low) 2. Check that the power of the power supply is greater than the power required by the TEC. 3. Check that the current limit of the power supply is not too small
CRC Error	Problems storing values	1. Resave the parameter. 2. Turn on storage content protection when the electromagnetic environment is harsh.
Save Successfully	Storage Success	
Mem Protected	Memory is protected state of affairs	Unprotecting Memory from Stored Content
Save Disabled	Parameters cannot be stored	Do not attempt to store this parameter
Can't be saved	Parameters cannot be stored	Do not attempt to store this parameter

After some effort, if you still cannot troubleshoot the problem, contact the manufacturer.