



# Thermal Protection Device

## User Guide

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## Operating Manual for THPD



### 1. Features :

- THPD is used with HIWIN TMRW series motors.
- Input the three temperature sensors of the motor and then convert to one analog output and two digits output for the controller.
- Real-time temperature can be monitored through temperature lag compensation by software. Avoid motor overheating under harsh operating conditions.
- According to the THPD models, the temperature sensor KTY84/130 or Pt1000 can be selected.
- Providing the complete motor temperature information for controllers by the following methods:
  - Analog temperature output : KTY84/130 or Pt1000
  - Digital alarm output : Alarm
  - Digital error output : Error

**2. Specification :**

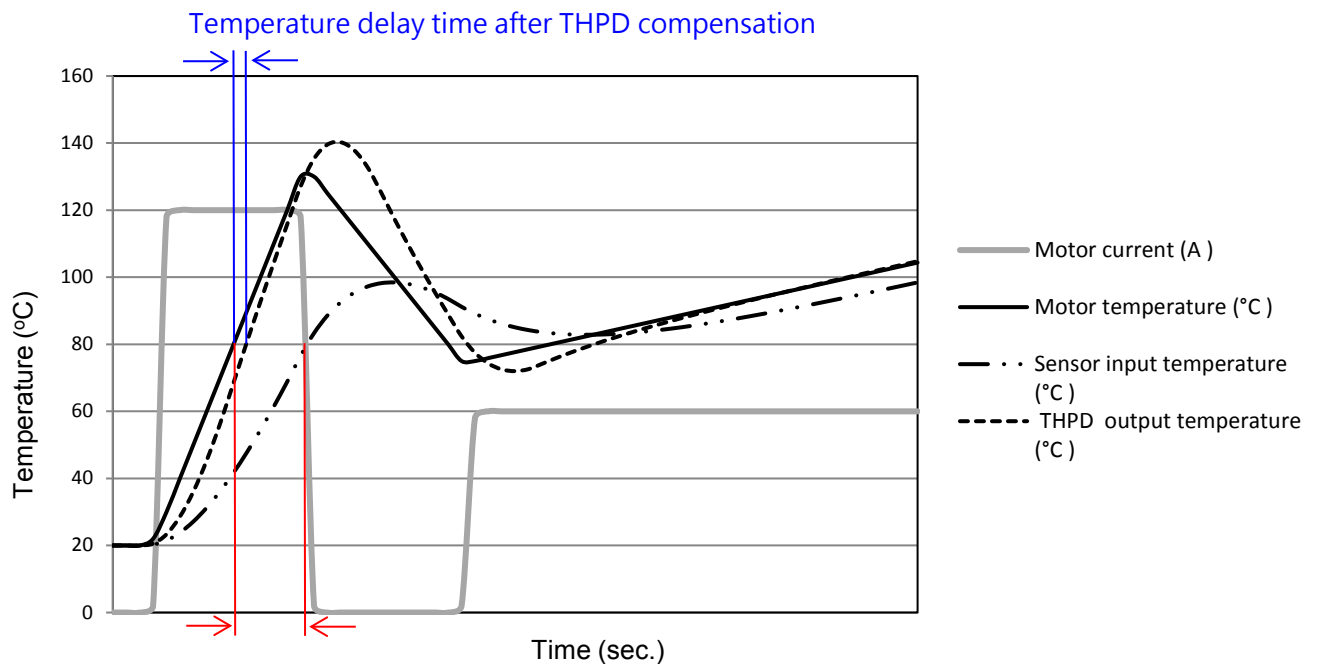
Product specification			
	Minimum	Typical value	Maximum
Power supply voltage	+18VDC	+24VDC	+30VDC
Power supply current (+24VDC)	-	-	100mA
Precision of resistor for analog temperature output (1mA, 0°C to +150°C)	-	-	±2%
Measuring current for analog temperature output	0.5mA	1mA	5mA
Resistance of relay output (Close)	-	-	25Ω
Alarm temperature	86°C	90°C	94°C
Error temperature	116°C	120°C	124°C
Error reset temperature	76°C	80°C	84°C

Absolute maximum ratings	
Power supply voltage	+31VDC
Maximum permissible voltage for solid state relay	+60VDC
Maximum permissible current for solid state relay	100mA
Maximum permissible voltage for analog temperature output	+48VDC
Maximum permissible current for analog temperature output	10mA

### 3. Operational description :

The THPD based on the **maximum temperature** measured by 3 temperature sensors and temperature compensation by software, generating the analog temperature output, alarm and error signal of the KTY84/130 or Pt1000.

- The figure below shows how THPD compensates for the measurement delay of the temperature sensor



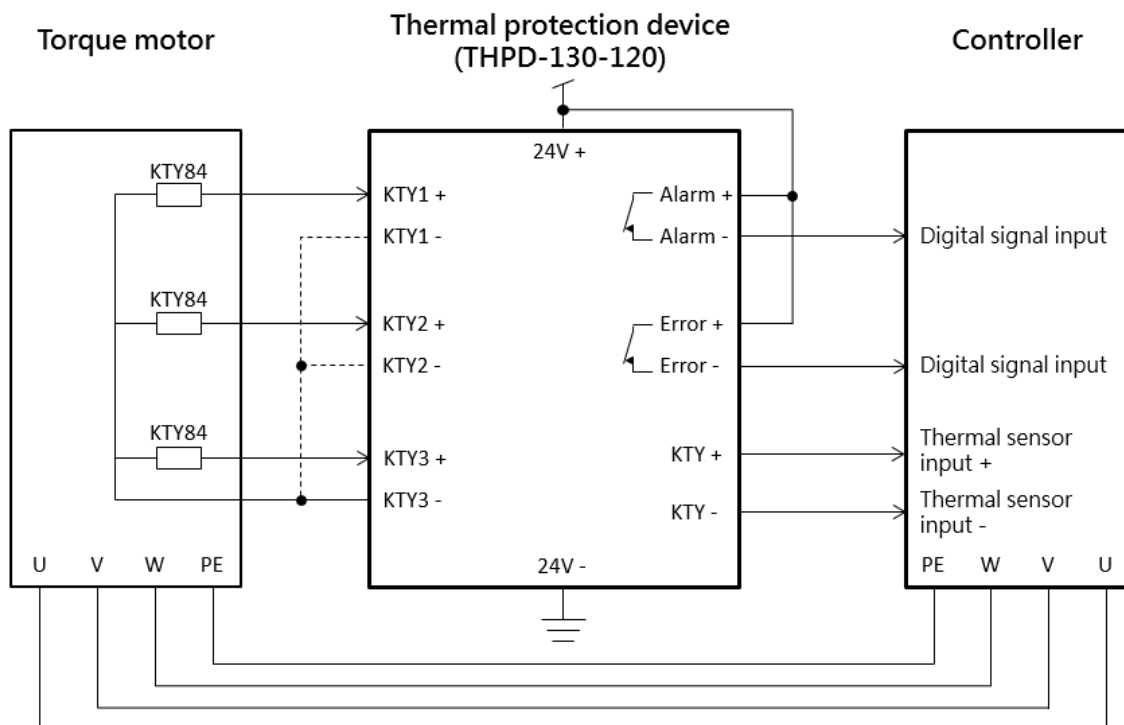
Temperature delay time without THPD compensation

- Solid state relay status description for alarm and error output
  - When the THPD is not powered, the alarm and the error solid state relay are both in open state (open).
  - When the THPD is powered and the motor is at normal temperature, the alarm and the error solid state relay are both in closed state (Close).
  - When the THPD is powered and an alarm occurs, the alarm solid state relay will be in open-circuit (Open) and the error solid state relay will remain closed state (Close).
  - When the THPD is powered and an error occurs, the alarm and error solid state relay are both open state (Open).

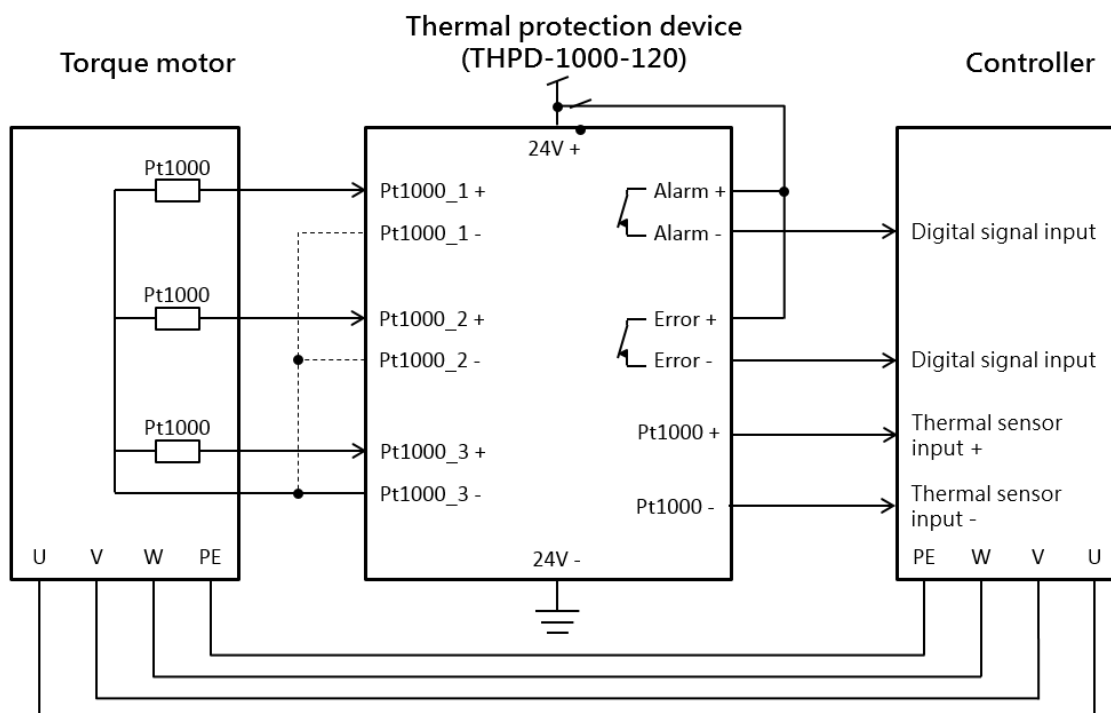
- The LED indicator on the front panel of THPD indicates the four states of THPD, which are:
  - Normal state  
The LED is green, indicating that the motor temperature is less than 90°C.
  - Alarm state  
The LED is orange (red light is on and green light is blinking), indicating that the motor temperature is between 90°C and 120°C. When the motor temperature drops to 90°C, THPD will return to normal state.
  - Error state  
The LED is red, indicating that the motor temperature is greater than 120 °C or the temperature sensor input is not connected or faulty, if you want to return to the normal state, the motor temperature needs to drop below 80°C.
  - Non-working state  
If the LEDs are not lighted, it indicates that the THPD may not be powered or the THPD is abnormal. First, check whether the power is supplied. If there is still no response, the THPD must be sent back to HIWIN for maintenance.

#### 4. Installation :

If the temperature sensor of the motor is KTY84/130, it should be used with THPD-130-120. The wiring diagram is as follows:



If the temperature sensor of the motor is Pt1000, it should be used with THPD-1000-120. The wiring diagram is as follows:



Notice :

- Alarm output, Error output and temperature output KTY or Pt1000, all can be connected to the controller separately.
- The negative terminals KTY1-, KTY2-, KTY3- or Pt1000\_1-, Pt1000\_2-, Pt1000\_3- of the three temperature sensor inputs of THPD are internally connected, so only one of them needs to be connected.

Please follow this process step by step to ensure that THPD is properly connected:

1. Install THPD according to the wiring diagram when the motor is powered off and the motor coil is at ambient temperature.  
If the LED is green, the THPD is properly connected to the temperature sensor.  
If the LED is red, indicates that at least one temperature sensor is not connected or faulty.  
If the LED is not lightening, the THPD is not powered or faulty.
2. If the controller has an alarm or error output provided by THPD, please check that the controller is connected to an alarm or an error state, and the solid state relay that should display the alarm and error should be in close state.
3. If the controller is connected to the temperature output provided by THPD, please check whether the temperature of the controller is connected to KTY 84/130 or Pt1000 and whether it meets the motor temperature.
4. Use the motor temperature information provided by THPD and set the motor protection conditions on the controller.
5. Drive the motor with low-power and disconnect it to one of the three temperature sensors of THPD, check that the LED of THPD is turned red, and that the controller is turning off the motor's power.
6. If all of the above are normal, it means that THPD is properly connected to the motor and controller.



**5. Model number :**

For each type of THPD, the temperature sensor to be used with the generated temperature output is shown as follows:

Product model	Temperature sensor input	Temperature output	Error temperature
THPD-130-120	KTY84/130	KTY84/130	120°C
THPD-1000-120	Pt1000	Pt1000	120°C

**6. Environmental conditions :**

THPD needs to be operated in a non-aggressive and clean environment with environmental conditions:

Environmental condition in use	Minimum value	Typical value	Maximum value
Environment temperature	0°C	-	50°C
Environment humidity	10%	-	85%