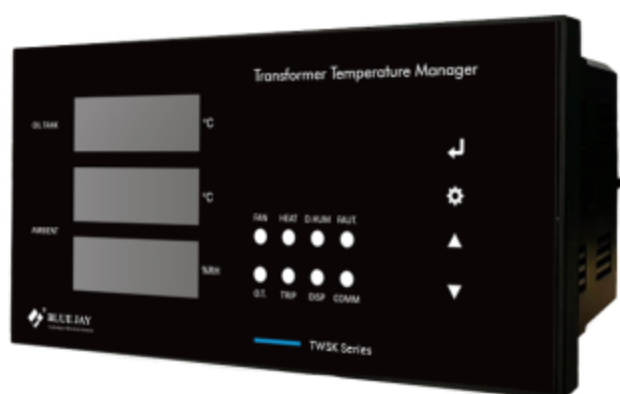


TWSK Series Transformer Temperature Controller

User Manual



Version: 1.10

Revision: 2025.1

Read me

When you use TWSK Series Transformer Temperature Controller, be sure to carefully read this user manual, and be able to fully understand the implications, the correct guidance of operations in accordance with user manual, which will help you make better use TWSK Series Transformer Temperature Controller, and help to solve the various problems at the scene.

1. Before the meter turning on the power supply, be sure that the power supply within the provisions of the instrument;
2. When installation, the current input terminal must non-open, voltage input terminals must Non-short circuit;
3. Communication terminal (RS232 or RS485) is strictly prohibited to impose high pressure;
4. Be sure the instrument wiring consistent with the internal system settings;
5. When communicating with the PC, instrument communication parameters must be consistent with the PC.



- **Please read carefully before using this user manual**
- **Please save this document**

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1.- SUMMARIZE

The TWSK Series transformer temperature controller is specifically designed for the container transformer stations. It accurately measures the oil temperature of the transformer and the environment temperature. Real-time control the cooling fans, heaters, alarms, and trip actions based on transformer winding temperature sensors and custom programming. When the oil temperature exceeds the threshold, it automatically triggers over-temperature alarms or trips, when the ambient temperature rises, it starts the fan for cooling, and when humidity approaches condensation levels, it activates the heater for dehumidification.

The temperature sensor adopts an armored PT100 liquid sensor with a three-wire connection, supporting cable lengths of up to 20 meters. It provides precise temperature readings without the need for compensation or calibration. The controller is also equipped with RS485 communication for remote monitoring and data transmission.

FEATURES

- 3-digit LED display;
- Automatic fan/heater control;
- Over temperature alarm;
- PT100 temperature sensor input;
- Two DC 4-20mA analog outputs;
- Temperature monitoring from -50 ~ 150°C;
- RS485 with Modbus RTU protocol.

APPLICATION

- Electrical power system;
- Photovoltaic system transformers;
- LV / MV container transformer station;
- Transmission and distribution industry.

2.- SPECIFICATIONS

Working power

| | |
|--------------|--------------|
| Power supply | 220VAC, 50Hz |
| Consumption | ≤1VA |

Measurement

| | |
|-----------------------------|---------------------------------|
| Oil temp. measure range | -50 ~ 150°C |
| Ambient temp. measure range | -50 ~ 150°C |
| Humidity range | 10 ~90%RH |
| Resolution | 0.1 |
| Response speed | <1s |
| Accuracy error | Temperature: <1°C Humidity: <5% |

Output

| | |
|---------------|--|
| Relay output | 3* relay outputs, 5A@AC250V contact capacity |
| Analog output | DC 4~20mA |
| Communication | RS-485/ MODBUS – RTU (9600; n,8,1) |

Safety

| | |
|-------------------|---|
| Withstand voltage | 2kV AC RMS 1 minute, between input / output / case / power supply; 1kV AC RMS 1 minute, between output and power supply. |
| Insulation | Input, output and power supply to the chassis ≥5 MΩ |

Environment

| | |
|---------------------|--|
| Protection (TH) | Anti-containing acid, alkali, salt gas |
| Work environment | -40~80°C; Noncondensing |
| Storage environment | -40~85°C; Noncondensing |

Others

| | |
|----------------|---|
| Display method | Programmable 3-rows LED switching display |
| Dimension | 160W*80H*80Dmm; Hole size: 152×72mm |

3.- INSTALLATION AND START-UP



The manual you hold contains information and warnings that -users should follow in order to guarantee a proper operation of all the instrument functions and keep it in safety conditions. The instrument must not be powered on and used until its definitive assembly is on the cabinet's door.

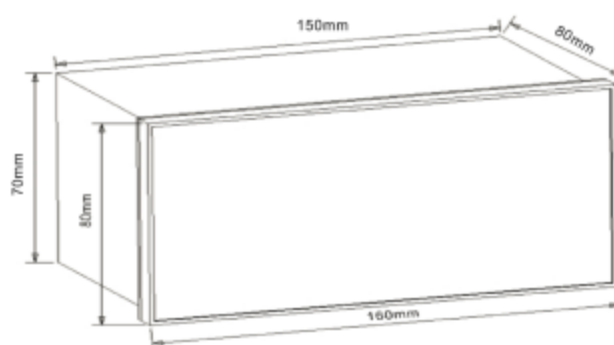
If the instrument is not used as manufacturer's specifications, the protection of the instrument will be damaged.

When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.1.- Installation

Host panel installation

Controller is to be mounted on panel. All connections keep inside the cabinet.

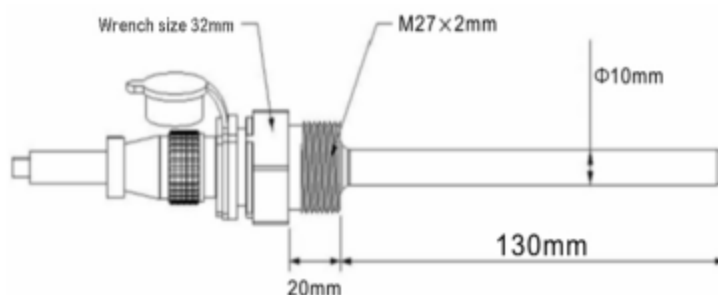


1. Insert the controller through the panel cutout.
2. Insert the mounting bracket into the mounting groove at the top and bottom of the controller and push the mounting bracket forward until the bracket stops at panel wall.
3. Completion status

Warning:

The controller must not be power on until this is completely installed!

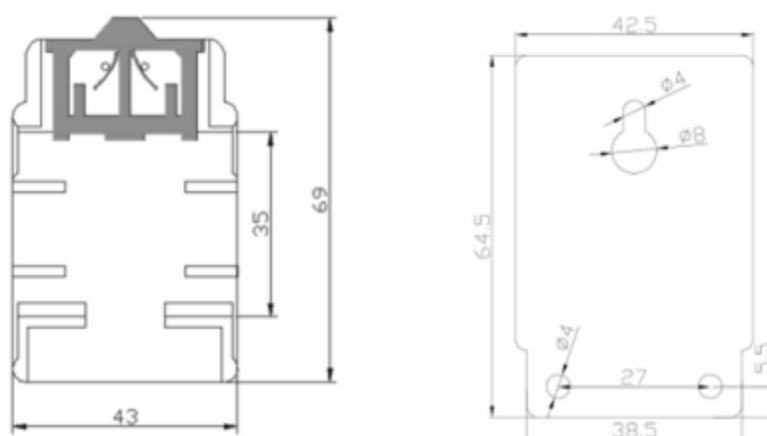
Oil temperature sensor installation



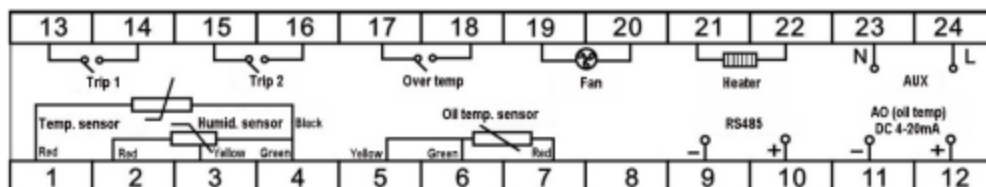
Note:

When remove and installation the temperature sensor, please pay attention to the concave and convex parts of the sensor connection. After confirming that the concave and convex parts are aligned, you can forcefully connect the two parts of the sensor together to prevent damage to the oil temperature sensor.

Ambient sensor installation



3.2.- Terminal connection



Upper terminal

| No. | Marked | Notes |
|----------|------------------|-------------------------------------|
| 13 14 | Trip 1 | Trip output relay 1 |
| 15 16 | Trip 2 | Trip output relay 2 |
| 17 18 | Over temp | Over temperature alarm output relay |
| 19 20 | Fan | Fan control |
| 21 22 | Heater | Heater control |
| 23 24 | AUX | Power supply |

Lower terminal

| No. | Marked | Notes |
|-------------|------------------------|-----------------------------------|
| 1 2 | Temp. sensor | Ambient temperature sensor input |
| 3 4 | Humid. sensor | Ambient humidity sensor input |
| 5 6 7 | Oil temp sensor | Oil temperature sensor input |
| 8 | - | Reserved |
| 9 10 | RS485 | RS485 communication interface |
| 11 12 | AO | Analog output for oil temperature |

Note:

The terminal pin definition may change depends on customer order; please refer to the label on the meter!





3.2.- LED indicator light description




| | |
|--------------|---|
| FAN | Fan starts for cooling function, light is ON; fan stops, light OFF. |
| HEAT | Heater starts for low-temperature heating function, light ON; the function stops, light OFF. (Optional function). |
| D.HUM | Heater starts for dehumidifier function, light ON; the function stops, light is OFF. |
| FAUT. | Any of the sensor is disconnected, light ON; |
| O.T. | Over temperature relay closed, light ON, Over temperature relay opened, light OFF. |
| TRIP | Trip relay closed, light ON, trip relay opened, light OFF. |
| DISP | When pressing the "Enter" key to query the latest record of oil temperature trip temperature, light ON. |
| COMM | RS485 function starts, light ON, RS485 function stops, light OFF. |

4.- OPERATION MODE

When the device is powered on, the entire symbol will be on, and the meter starts to self- test. After few seconds, the meter is ready for operation and shows firmware, then automatic jump to The first screen.

| Button | In Monitor Screen | In Config Sub-menu | In Parameter Setup |
|---|--|---|-------------------------------|
|  | Screen will move to previous or next page | Move cursor up and down to select function | Move setting cursor to left |
|  | | | Scroll selection number 0 ~ 9 |
|  | Call out password screen | Exit & roll back to up level menu. | |
|  | Call out latest record of oil temperature trip temperature | Confirm the values & Entry or jump to down level menu | |

Note: In Setup menu, if change the setting value, press  for exit menu, device will call out confirm screen ask "SAVE"

Then press  *exit without saving;*

press  *save and exit.*

5.- FUNCTIONS AND USAGE INTRODUCTION

5.1.- Temperature and humidity display






After confirming wiring is correct, you can power on. The screen will immediately display the present oil temperature, ambient temperature and humidity.

The first row screen displays the present oil temperature, and the second and three rows screen displays the ambient temperature and humidity.

5.2.- Temperature and humidity control

- 1.- When the oil temperature/ ambient humidity/ ambient temperature sensor disconnected, the corresponding row of screens will display "---", and the outputs of the related functions will be disabled.
- 2.- When ambient humidity \geq the upper limit of ambient humidity, the heater is automatically started for dehumidification, and the "**D.HUM**" indicator light ON; until the ambient humidity \leq (the upper limit of humidity - 5.0%RH), the dehumidification function stops, then the "**D.HUM**" indicator light OFF;
- 3.- When ambient temperature \geq the upper limit of ambient temperature, the fan is automatically started for cooling, and the "**FAN**" indicator light ON; until the ambient temperature \leq (the upper limit of ambient temperature - hysteresis value), the cooling function stops, and the "**FAN**" indicator light OFF;
- 4.- When transformer oil temperature \geq the oil temperature over-temperature alarm value, the over-temperature alarm relay is closed and the "**O.T.**" indicator light ON; until the transformer oil temperature is \leq (the alarm value - 3.0°C), the alarm relay is opened and the "**O.T.**" indicator light OFF.
- 5.- When transformer oil temperature \geq the oil temperature trip value, the trip relay is closed and the "**TRIP**" indicator light ON; until the transformer oil temperature \leq (the trip value - 3.0°C), the trip relay is opened and the "**TRIP**" indicator light OFF.

6.- SETUP PROCEDURE

Press " " key to enter the login interface. The password area displays "CODE". Press the " " key to display default password "999". User can press the " " key or " " key to change the password to "001". Then press the " " key to enter the menu setup. The menu structure shown below:

| Code | Item | Range | Default value |
|------|----------------------------------|-------------------------------|---------------|
| T-H | Ambient temp. upper limit | -40~149°C | 40°C |
| T-A | Ambient temp. hysteresis value | 1~20°C | 5°C |
| T-b | Ambient temp. compensation value | -9.9~9.9°C | 0.0°C |
| H-H | Ambient humidity upper limit | 1 ~99%RH | 85%RH |
| T-C | Oil over temp. alarm value | -40°C~trip value °C | 80°C |
| T-T | Oil temperature trip value | Over temp. alarm value ~149°C | 95°C |
| Co | Ambient monitoring working mode | 0,1 | 1 |
| Adr | Communication address | 1 | 1 |

7. - SAFETY CONSIDERATIONS



All installation specification described at the previous chapters named:
INSTALLATION AND STARTUP, INSTALLATION MODES and SPECIFICATIONS.

Please note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

- ◆ The device must have a professional installation and maintenance.
- ◆ Any operation of the device, you must cut off the input signal and power.

8.- MAINTENANCE

The TWSK series controller does not require any special maintenance. No adjustment, maintenance or repairing action should be done when the instrument is open and powered on, should those actions are essential, high-qualified operators must perform them.

Before any adjustment, replacement, maintenance or repairing operation is carried out, the controller must be disconnected from any power supply source.

When any protection failure is suspected to exist, the controller must be immediately put out of service. The controller's design allows a quick replacement in case of any failure.

For any inquiry about the instrument performance or whether any failure happens, contact to Blue Jay's technical service.

Blue Jay - After-sales service

For any inquiry about the instrument performance or any failure, contact to Blue Jay's technical service.

Blue Jay - After-sales service

E-mail: tech@cqbluejay.com