

NUZEZCJG TCN6-D

NUZEZCJG TCN6-D Intelligent PID Temperature Controller User Manual

Model: TCN6-D (Output Relay)

1. INTRODUCTION

This manual provides detailed instructions for the installation, operation, and maintenance of the NUZEZCJG TCN6-D Intelligent PID Temperature Controller. This device is designed for precise temperature control in industrial applications, featuring a digital display, RS485 Modbus communication, and relay output. Please read this manual thoroughly before using the product to ensure safe and efficient operation.

2. SAFETY INFORMATION

Important Safety Instructions:

- Always disconnect power before installation, wiring, or maintenance to prevent electric shock.
- Ensure all wiring is performed by qualified personnel and complies with local electrical codes.
- Do not operate the device in environments with flammable gases, vapors, or excessive dust.
- Verify that the power supply voltage matches the specifications of the controller.
- Avoid exposing the device to direct sunlight, high temperatures, high humidity, or corrosive gases.
- Do not disassemble or modify the controller; doing so will void the warranty and may cause damage or injury.

3. PRODUCT OVERVIEW

The TCN6-D is a compact, intelligent PID temperature controller designed for DIN rail mounting. It offers high-speed sampling, precise temperature control, and versatile output options.

3.1 Key Features

- Compact design with 22.5mm width.

- High-speed 100ms sampling period.
- $\pm 0.5\%$ display accuracy.
- Simultaneous heating and cooling control.
- Relay output (this model).
- RS485 (Modbus RTU) communication.
- Digital display and physical buttons for data checking and parameter setting.
- Special custom LED display for dual 4-digit readings.

3.2 Components and Display





Figure 1: Front View of TCN6-D Controller. This image displays the front panel of the TCN6-D, highlighting the dual digital display for process value (PV) and set value (SV), the 'MODE' button, navigation buttons (up/down/left/right), and the terminal block numbering (1-12 at top, 13-20 at bottom). Status indicators for AT, OUT, AL1, AL2, and C/F are also visible.





Figure 2: Angled Front View. This image provides an angled perspective of the controller, emphasizing its compact form factor and the clarity of the digital display from an off-center view. The DIN rail mounting clip is partially visible on the side.

The front panel features a dual 4-digit LED display. The upper display (red) typically shows the Process Value (PV), which is the current measured temperature. The lower display (green) shows the Set Value (SV), which is the target temperature. Below the display are status indicators and control buttons:

- **AT (Auto-Tuning):** Indicator for auto-tuning process.
- **OUT (Output):** Indicator for control output status.
- **AL1, AL2 (Alarms):** Indicators for alarm conditions.
- **C/F:** Indicator for Celsius or Fahrenheit unit.
- **MODE Button:** Used to enter parameter setting modes and confirm selections.
- **Up/Down/Left/Right Buttons:** Used for navigating menus and adjusting values.

4. SPECIFICATIONS

Specification	Value
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Specification	Value
Display Size	2.0 - 3.9 Inches
Sampling Period	100ms
Working Voltage	220V
Structural Style	DIN rail type
Output Type (This Model)	Relay Output
Communication	RS485 (Modbus RTU)
Display Accuracy	±0.5%
Package Dimensions	1.18 x 0.79 x 0.39 inches
Item Weight	1.76 ounces
Assembly Required	No

5. SETUP AND INSTALLATION

The TCN6-D controller is designed for easy mounting on standard DIN rails. Ensure the installation location is free from excessive vibration, moisture, and extreme temperatures.

5.1 Mounting

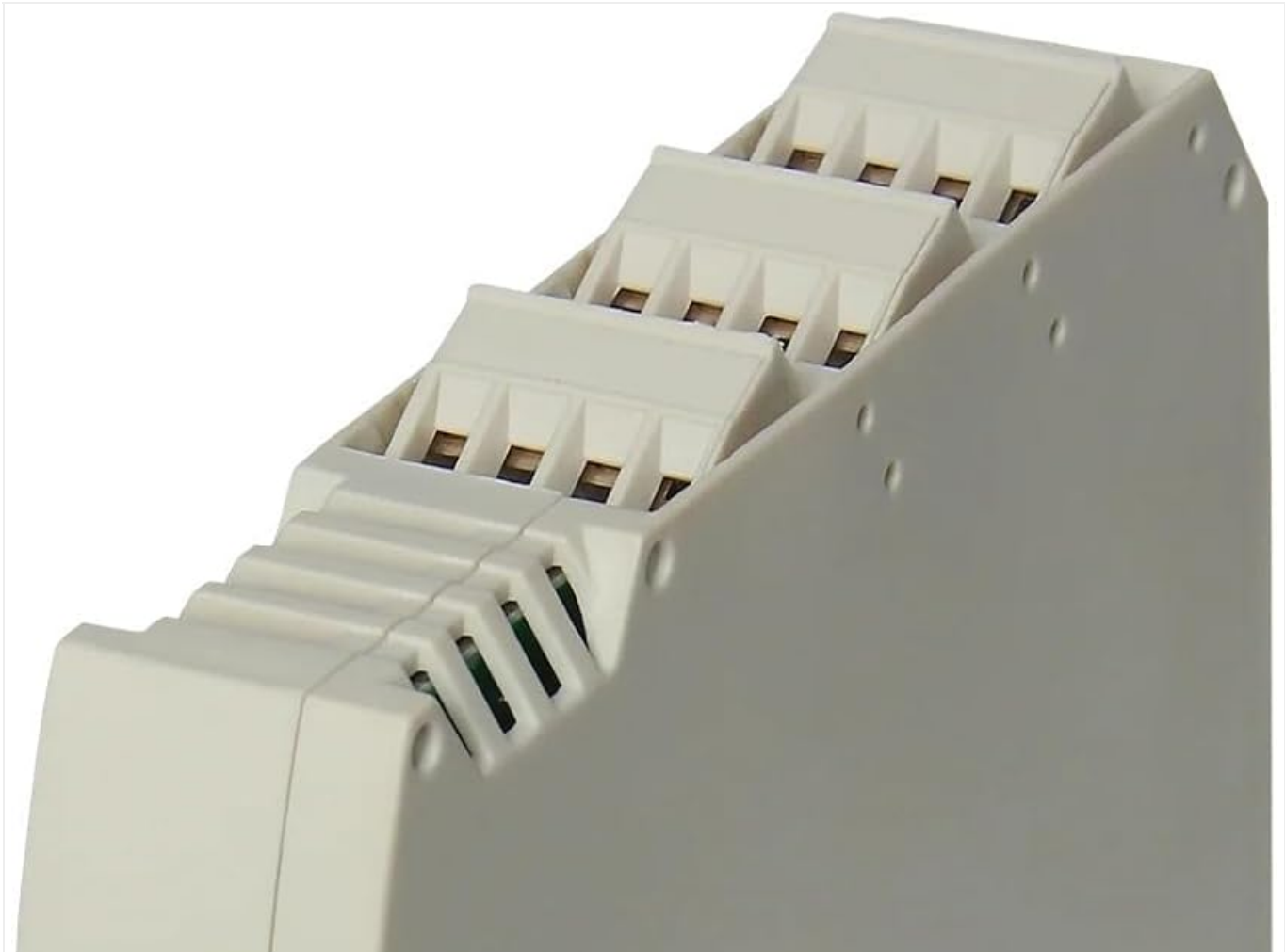




Figure 3: Side View with DIN Rail Clip. This image shows the side of the TCN6-D controller, clearly illustrating the integrated metal clip used for securing the device onto a standard DIN rail. This highlights the ease of installation in industrial control panels.

1. Locate a suitable DIN rail within your control panel.
2. Align the controller's rear mounting groove with the DIN rail.
3. Press the controller firmly onto the rail until the spring-loaded clip engages and locks the device in place.
4. Ensure the controller is securely fastened and does not wobble.

5.2 Wiring

Refer to the wiring diagram printed on the side of the unit or the detailed diagram below for correct connections. Always ensure power is disconnected before wiring.

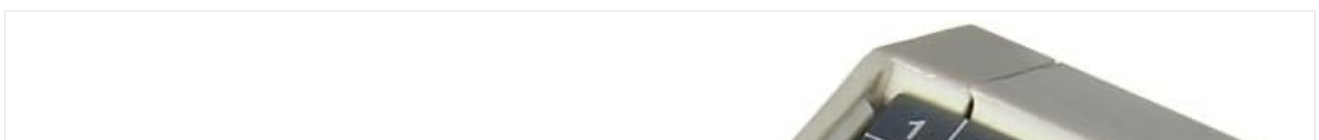






Figure 4: Top-Down View with Wiring Diagram. This image provides a top-down, angled view of the TCN6-D, clearly showing the screw terminal blocks at the top and bottom. A label on the side of the unit contains a simplified wiring diagram, indicating connections for power, sensor input, and output relays.

- **Power Supply:** Connect the 220V AC power supply to the designated terminals (typically marked L and N or 1 and 2).
- **Sensor Input:** Connect your temperature sensor (e.g., thermocouple, RTD) to the appropriate input terminals. Ensure correct polarity for thermocouples.
- **Relay Output:** Connect your heating/cooling element or other controlled device to the relay output terminals. This model provides a relay output.
- **RS485 Communication:** For Modbus RTU communication, connect the A and B lines of your RS485 network to the corresponding terminals.

Note: Specific terminal assignments are usually printed on the device casing. Always double-check these markings before making connections.

6. OPERATING INSTRUCTIONS

Once installed and wired, the TCN6-D is ready for operation. This section covers basic operation and parameter setting.

6.1 Power On and Initial Display

Upon applying power, the controller will perform a self-test and then display the current Process Value (PV) on the upper (red) display and the Set Value (SV) on the lower (green) display.

6.2 Setting the Set Value (SV)

1. In the main display mode, press the **MODE** button briefly. The SV display will start flashing.
2. Use the **Up** and **Down** arrow buttons to adjust the desired Set Value.
3. Use the **Left** and **Right** arrow buttons to move the cursor for faster adjustment of individual digits.
4. Press the **MODE** button again to confirm the new SV and return to the main display.

6.3 Parameter Settings (Advanced)

To access advanced parameters (e.g., PID constants, alarm settings, input type, C/F unit selection), press and hold the **MODE** button for several seconds until the parameter menu appears. Navigate through parameters using the **MODE** button and adjust values using the arrow buttons. Refer to the detailed parameter list (usually provided in a separate technical specification or advanced manual) for specific parameter functions.

- **Auto-Tuning (AT):** The controller supports auto-tuning to automatically determine optimal PID parameters. Activate AT from the parameter menu. The AT indicator will light up during the process.
- **Communication Settings:** Configure RS485 communication parameters (baud rate, parity, address) in the communication settings menu.

7. MAINTENANCE

The TCN6-D controller is designed for reliable operation with minimal maintenance. Regular checks can help ensure longevity and performance.

- **Cleaning:** Gently wipe the display and casing with a soft, dry cloth. Do not use abrasive cleaners, solvents, or water directly on the unit.
- **Connections:** Periodically check all wiring connections for tightness and signs of corrosion. Loose connections can lead to erratic behavior or failure.
- **Environment:** Ensure the operating environment remains within specified temperature and humidity ranges. Protect the unit from dust and moisture ingress.

8. TROUBLESHOOTING

This section provides solutions to common issues you might encounter.

Problem	Possible Cause	Solution
No display/Power off	No power supply; Incorrect wiring; Blown fuse.	Check power connections; Verify wiring according to diagram; Replace fuse if applicable.
PV display shows "HHHH" or "LLLL"	Sensor open circuit; Sensor short circuit; Sensor out of range; Incorrect sensor type setting.	Check sensor wiring; Replace faulty sensor; Ensure sensor range matches application; Verify sensor type in parameters.
Output not activating	Incorrect SV setting; PID parameters not tuned; Output wiring issue; Faulty relay.	Adjust SV; Perform auto-tuning; Check output wiring; Test relay functionality.
Temperature unstable/overshoot	PID parameters not optimized; Sensor placement issue; Load changes.	Perform auto-tuning; Relocate sensor closer to control point; Consider external disturbances.
RS485 communication failure	Incorrect communication settings (baud rate, address, parity); Wiring error (A/B swapped); Termination resistor issue.	Verify all communication parameters; Check A/B wiring; Ensure proper termination.

If the problem persists after attempting these solutions, please contact technical support.

9. WARRANTY AND SUPPORT

This NUZEZCJG product is covered by a standard manufacturer's warranty against defects in materials and workmanship. The warranty period typically begins from the date of purchase. Please retain your proof of purchase for warranty claims. For technical assistance, troubleshooting beyond this manual, or warranty inquiries, please contact your vendor or NUZEZCJG customer support. Provide your product model number (TCN6-D) and a detailed description of the issue when seeking support.

Note: Unauthorized disassembly or modification of the product will void the warranty.

