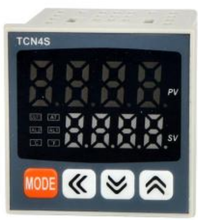
# VXT-TCN4 Series

## Dual Display PID Temperature Controllers

4-Digit Dual Display | Auto-Tuning Fuzzy Logic PID | Universal Input | Relay + SSR Output




**TCN4S**
48 x 48 mm


**TCN4M**
72 x 72 mm


**TCN4H**
48 x 96 mm


**TCN4L**
96 x 96 mm

### Product Overview

The VXT-TCN4 Series is a family of economical dual display PID temperature controllers designed for precise temperature regulation in industrial applications. Featuring auto-tuning fuzzy logic PID control with 100ms high-speed sampling, dual 4-digit LED display (PV: Red, SV: Green), and universal sensor input supporting 6 thermocouple and 2 RTD types, these controllers deliver reliable and accurate performance. Each unit has built-in Relay and SSR dual output — users can select the desired output mode via parameter setting. Available in four industry-standard DIN panel sizes with 1 or 2 alarm outputs, the series offers a versatile and cost-effective solution for heating and cooling control across diverse applications.

### Key Features

- ✓ 4-digit dual LED display (PV: Red, SV: Green)
- ✓ Auto-tuning Fuzzy Logic PID with 100ms sampling
- ✓ Universal input: TC (K, J, L, T, R, S) + RTD (Pt100, Cu50)
- ✓ Built-in dual output: Relay (250VAC 3A) + SSR (12VDC)
- ✓ Multiple control modes: ON/OFF, P, PI, PD, PID
- ✓ Alarm output: 1 relay (2 Alarms on TCN4L)
- ✓ 9 alarm modes including LBA heater disconnection
- ✓ Power supply: 100-240VAC, 50/60Hz
- ✓ Available in 4 standard DIN panel sizes

### Applications

Packaging Machinery • Plastic Injection Molding • Heat Treatment Furnaces • Ovens & Dryers • Extruders • Food Processing • Textile Machinery • HVAC Systems • Laboratory Equipment • Incubators • Sealing Machines

### Input Specifications

| Input Type | Sensor | Range (°C) | Input Type | Sensor | Range (°C) |
|---|---|---|---|---|---|
| **TC** | K (CA) | -50 ~ 1200°C | **TC** | T (CC) | -50 ~ 400°C |
| **TC** | J (IC) | -30 ~ 800°C | **TC** | R (PR) | 0 ~ 1700°C |
| **TC** | L (IC) | -40 ~ 800°C | **TC** | S (PR) | 0 ~ 1700°C |
| **RTD** | DPt100Ω | -100 ~ 400°C | **RTD** | Cu50Ω | -50 ~ 200°C |

## General Specifications

| | |
|---|---|
| **DISPLAY** | |
| **Display Type** | 4-digit, 7-segment dual LED display |
| **Upper Display (PV)** | Red LED — Process Value / Measured Temperature |
| **Lower Display (SV)** | Green LED — Set Value / Parameter Display |
| **LED Indicators** | OUT (control output), AT (auto-tuning), AL1, AL2, °C/°F |
| **CONTROL** | |
| **Control Mode** | ON/OFF, P, PI, PD, PID |
| **Auto-Tuning** | Fuzzy Logic PID auto-tuning (AT indicator flashes during operation) |
| **Proportional Band (P)** | 0.1 ~ 999.9°C |
| **Integral Time (I)** | 0 ~ 9999 seconds |
| **Derivative Time (D)** | 0 ~ 9999 seconds |
| **Control Period (T)** | 0.5 ~ 120.0 seconds |
| **Manual Reset** | 0.0 ~ 100.0% |
| **Sampling Period** | 100ms (high-speed) |
| **Output Action** | Heating / Cooling selectable |
| **OUTPUT** | |
| **Control Output (Relay)** | 250VAC 3A 1a (resistive load) |
| **Control Output (SSR)** | 12VDC ± 2V, 20mA max. (voltage pulse drive) |
| **Note** | Both outputs built into each unit. Select one mode via parameter setting. |
| **Alarm Output (TCN4S/M/H)** | 1 relay (AL1): 250VAC 1A |
| **Alarm Output (TCN4L)** | 2 relays (AL1 + AL2): 250VAC 1A each |
| **INPUT** | |
| **Sensor Input** | Universal: TC (K, J, L, T, R, S) / RTD (DPt100Ω, Cu50Ω) |
| **RTD Wiring** | 3-wire, allowable single wire impedance ≤ 5Ω |
| **Accuracy (Room Temp.)** | (PV ±0.5% or ±1°C, whichever is greater) ± 1 digit |
| **Accuracy (Outside Room)** | (PV ±0.5% or ±2°C, whichever is greater) ± 1 digit |
| **Room Temperature Ref.** | 23°C ± 5°C |
| **ELECTRICAL** | |
| **Power Supply** | 100 - 240VAC, 50/60Hz |
| **Allowable Voltage Range** | 90% ~ 110% of rated voltage |
| **Power Consumption** | Below 5VA |
| **ENVIRONMENT** | |
| **Operating Temperature** | -10°C to 50°C (non-condensing) |
| **Storage Temperature** | -20°C to 60°C (non-condensing) |
| **Ambient Humidity** | 35% ~ 85% RH |
| **Vibration Resistance** | 5 ~ 55Hz, 0.75mm amplitude, X/Y/Z, 2 hours |
| **ADDITIONAL FEATURES** | |
| **Insulation Resistance** | ≥ 100MΩ at 500VDC |
| **Dielectric Strength** | 2000VAC, 50/60Hz for 1 min (input to power terminal) |
| **Noise Immunity** | ± 2kV square wave (pulse width 1μs) |
| **Memory Retention** | Approx. 10 years (non-volatile semiconductor memory) |
| **Insulation Type** | Double insulation / Reinforced insulation |
| **Relay Life (Mechanical)** | OUT: ≥ 5,000,000 ops \| AL1/2: ≥ 5,000,000 ops |

| | |
|---|---|
| **Relay Life (Electrical)** | OUT: ≥ 200,000 (250VAC 3A) \| AL1/2: ≥ 300,000 (250VAC 1A) |

## Alarm Modes

| Mode | Description | Type |
|---|---|---|
| **dA 1** | Deviation upper limit alarm | Deviation |
| **dA 2** | Deviation lower limit alarm | Deviation |
| **dA 3** | Upper and lower limit deviation alarm | Deviation |
| **dA 4** | Upper and lower limit deviation reverse alarm | Deviation |
| **Ab 1** | Absolute value upper limit alarm | Absolute |
| **Ab 2** | Absolute value lower limit alarm | Absolute |
| **Sb r** | Sensor disconnection alarm | Diagnostic |
| **Lb r** | Heater disconnection alarm (LBA) | Diagnostic |
| **nonE** | No alarm | — |

## Model Selection & Dimensions

| Parameter | TCN4S | TCN4M | TCN4H | TCN4L |
|---|---|---|---|---|
| **DIN Size** | 1/16 DIN | 1/4 DIN | 1/8 DIN | 1/4 DIN |
| **Bezel (W × H)** | 48 × 48 mm | 72 × 72 mm | 48 × 96 mm | 96 × 96 mm |
| **Panel Cutout (W × H)** | 45 × 45 mm | 68 × 68 mm | 45 × 92 mm | 92 × 92 mm |
| **Depth (behind panel)** | 65 mm | 65 mm | 65 mm | 65 mm |
| **Alarm Outputs** | 1 (AL1) | 1 (AL1) | 1 (AL1) | 2 (AL1+AL2) |
| **Weight (approx.)** | 100g | 133g | 124g | 179g |
| **PV Display Size** | 7.0×15.0 mm | 9.5×20.0 mm | 7.0×14.6 mm | 11.0×22.0 mm |
| **SV Display Size** | 5.0×9.5 mm | 7.5×15.0 mm | 6.0×12.0 mm | 7.0×14.0 mm |

## Ordering Information

Model Number Format: **VXT-TCN4X-A1 / A2**

| Size Code | Model Number | Panel Size | Output | Alarm |
|---|---|---|---|---|
| **S** | **VXT-TCN4S-A1** | 48 × 48 mm | Relay + SSR | A1 = 1 alarm |
| **M** | **VXT-TCN4M-A1** | 72 × 72 mm | Relay + SSR | A1 = 1 alarm |
| **H** | **VXT-TCN4H-A1** | 48 × 96 mm | Relay + SSR | A1 = 1 alarm |
| **L** | **VXT-TCN4L-A2** | 96 × 96 mm | Relay + SSR | A2 = 2 alarms |

*Example: VXT-TCN4S-A1 = 48×48mm temperature controller with Relay + SSR output, 1 alarm*
*Please specify when ordering: (1) Instrument size (2) Sensor type (3) Temperature range (4) Any special functional requirements*

## Notes

1. Both Relay and SSR outputs are built into each unit. Select the desired output mode via parameter configuration. Only one output type can be active at a time.
2. When using SSR output, three SSR drive modes are available: Standard ON/OFF control, Cycle control (use zero-trigger SSR), and Phase control (use random-trigger SSR).
3. Ensure the correct input sensor type is selected in the controller settings to match the connected sensor.
4. For thermocouple input, use compensation wire of the same material as the thermocouple.
5. When using 3-wire RTD sensors, ensure extension wire material, diameter, and length match the sensor wiring to avoid temperature deviation.
6. Power input lines and sensor signal input lines must not be confused; incorrect connection may damage the instrument.
7. Use AWG 20 (0.50mm²) cable for power input and relay output terminals. Screw tightening torque: 0.74 ~ 0.90 N·m.
8. Instrument power and signal lines should be separated from high current output lines to reduce electromagnetic interference.
9. Install in a panel, indoors, in a non-corrosive environment. Pollution degree 2. Altitude below 2000m.