



Tianjin ZINACA Intelligent Equipment Co., Ltd

Intelligent Temperature Transmitter Manual

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I. Overview

The integrated temperature transmitter incorporates a signal amplification and transmission module within a waterproof or explosion-proof connection housing of an assembly-type temperature sensor, forming a fully integrated device. This two-wire transmitter module is PC-configurable and supports input signals from both RTDs and thermocouples. Its measuring range can be customized, and it performs signal linearization for both RTD and thermocouple inputs, outputting a standard 4–20 mA two-wire current signal corresponding to the measured temperature.

The transmitter is designed with a compact structure and low-power circuitry, utilizing low-temperature drift components to minimize heat generation and the impact of ambient temperature on measurement accuracy. Enhanced anti-interference design ensures stable long-term operation in industrial environments ranging from -40°C to +80°C.

One key feature is its built-in LED display, which fully addresses customer demand for a local digital readout. The ultra-low power consumption design allows the LED display to operate reliably within -25°C to +80°C. The display panel is equipped with buttons and an LED human-machine interface (HMI), enabling calibration via communication software or directly through the panel interface.

The integrated temperature transmitter is a contact-type field instrument used for temperature measurement. It is typically connected to secondary instruments or data acquisition systems, providing accurate temperature measurements of various media or objects during production processes. It supports a wide measurement range from -200°C to +1600°C and is widely used in industries such as petroleum, chemical, metallurgy, power, aviation, marine, and food processing.

This product series is designed with reference to national GB standards and JJG calibration regulations, in alignment with relevant IEC standards, and incorporates design improvements based on international products of similar function. The result is a more reliable and accurate transmitter, ideal for temperature measurement in various industrial environments.



II. Features

1. Stable signal output with strong anti-interference capability.
2. High-amplitude 4–20 mA current signal ensures minimal transmission distortion and long-distance signal delivery.
3. High-precision cold junction compensation circuit with compensation error less than 0.5°C across the full temperature range.
4. Encapsulated in specialized epoxy resin for excellent corrosion resistance, shock resistance, and high reliability.
5. Cost-effective with a competitive price-performance ratio.

III. Technical Specifications

- **Input Types:** Thermocouple types K, N, E, J, T, S, R, B; RTD type Pt100
- **Output Signal:**
 - 4–20 mA two-wire
 - 4–20 mA + HART two-wire
 - RS485 four-wire
- **Measuring Range:** -200°C to +1600°C (depending on the selected thermocouple or RTD type)
- **Accuracy:**
 - Intelligent type: $\pm 0.1\%$, $\pm 0.2\%$
 - Analog type: $\pm 0.5\%$
(Includes linearity, hysteresis, and repeatability)
- **Ambient Temperature Effect:**
 - Within specified operating temperature range, signal drift $\leq \pm 0.05\%$ of full span per 10°C change
 - Annual drift $< \pm 0.2\%$
- **Cold Junction Compensation Error (for thermocouples):**
 - Full temperature range: $< \pm 0.5^\circ\text{C}$
 - For S and R types: $< \pm 0.8^\circ\text{C}$
- **Operating Temperature:** -25°C to +85°C
- **Power Supply:** 12–30 VDC, nominal voltage 24 VDC; reverse polarity protection included
- **Optional Display:** 4-digit LED numeric display (optional)

IV. Working Principle

The transmitter's internal circuit functions as follows:

The power input is stabilized via a voltage regulation circuit, which then powers all internal components. Signals from the temperature sensing element (thermocouple or RTD) are received and processed by the transmitter module,



which converts them into a linear 4–20 mA output current proportional to the measured temperature.

V. Structure and Materials

1. **Instrument Housing:** Die-cast aluminum alloy or 304 stainless steel
2. **Sensor Sheath:** 304 stainless steel

VI. Unpacking, Delivery Contents, and Storage

1. **Unpacking:**
 - Carefully inspect the packaging upon receipt to ensure it is undamaged.
 - Avoid using excessive force or impact during unpacking to prevent damage to the device or accessories.
2. **Delivery Contents:**
 - 1 × Integrated Temperature Transmitter
 - 1 × User Manual
 - 1 × Certificate of Conformity
3. **Storage:**
 - Storage temperature: -40°C to +100°C
 - Relative humidity: ≤95%
 - The storage environment should be dry, well-ventilated, and free from corrosive gases that could damage the transmitter.

VII. Wiring Diagram

Wiring Instructions:

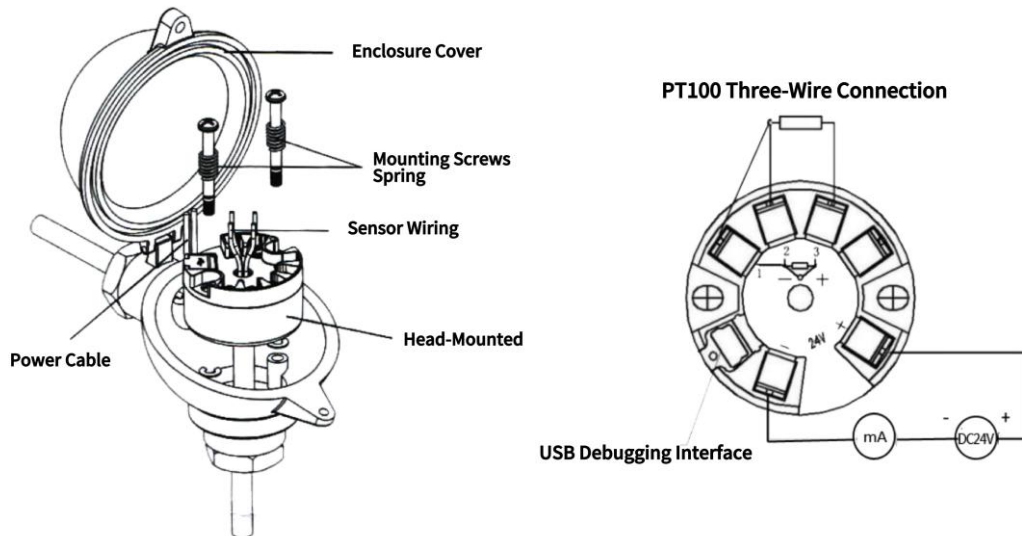
When wiring the temperature transmitter, first open the cover of the junction box. Feed the cable through the cable entry on the junction box, and connect each wire to the corresponding terminal according to the wiring diagram and terminal markings.

After connection, gently pull the cable to ensure a snug fit, then securely tighten the cable gland nut on the junction box. Finally, replace and tighten the cover.

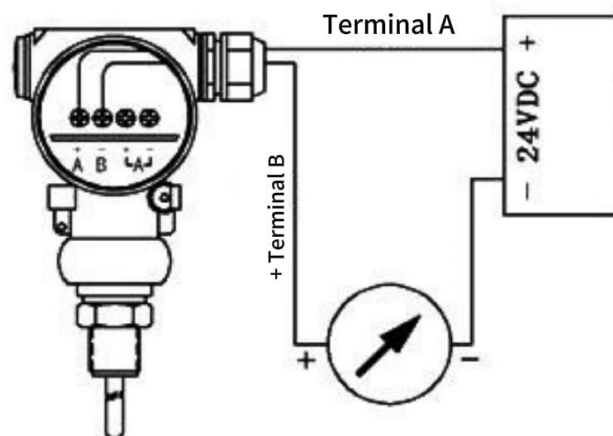
For explosion-proof temperature transmitters:

Explosion-proof conduit must be used. Ensure that the power supply is disconnected before opening the cover after installation.

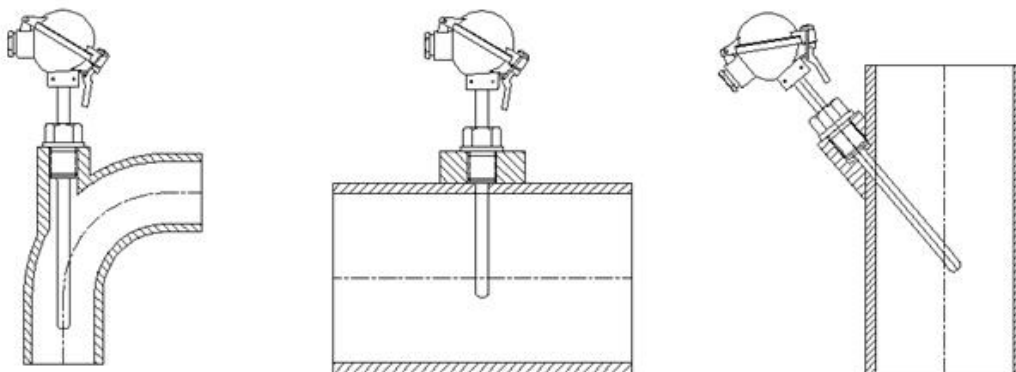
Two-wire 4–20 mA analog signal output (2-wire)



Local display with 4–20 mA analog signal output (2-wire)



VIII. Installation Diagram





1. The temperature transmitter is ready for operation without the need for any user adjustment.

Before starting, please verify that both the mechanical installation and electrical wiring are correctly completed. Once confirmed, power on the device to begin operation.

2. The transmitter will begin functioning as soon as power is applied.

However, for optimal accuracy and signal stability, it is recommended to allow a warm-up period of approximately 30 minutes before relying on output data.