



Tianjin ZINACA Intelligent Equipment Co., Ltd

ZNC - Industrial Assembly Thermocouple User Manual

Address; No.12 yard in the yard of Outer Ring Industrial Company, Fujin Road, Zhongbei Town,
Xiqing District, Tianjin, China Zip code: 300300 Telephone: 008615320082517
WEB: <https://www.zinacainstruments.com/> E-mail: zinacaoverseas@gmail.com

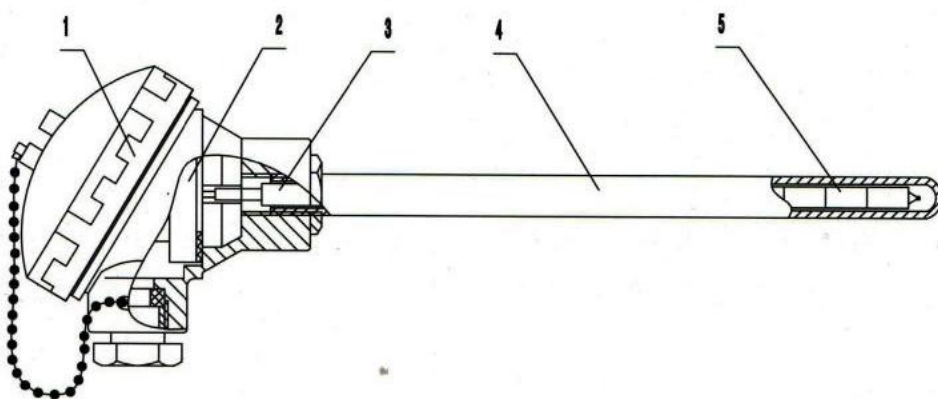
Product Overview

The **Industrial Assembly Thermocouple** is typically used in conjunction with display instruments and computer systems to directly measure the temperature of liquids, steam, gases, and solid surfaces in various production processes, covering a wide range from **-200°C to +1800°C**.

All thermocouples manufactured by our company fully comply with **IEC international standards** and **GB/T 30429 national standards**. We offer eight types: **Platinum-Rhodium 30 – Platinum-Rhodium 6 (B)**, **Platinum-Rhodium 13 – Platinum (R)**, **Platinum-Rhodium 10 – Platinum (S)**, **Nickel-Chromium-Silicon – Nickel-Silicon-Magnesium (N)**, **Nickel-Chromium – Nickel-Silicon (K)**, **Nickel-Chromium – Constantan (E)**, **Iron – Constantan (J)**, and **Copper – Constantan (T)**.

Working Principle

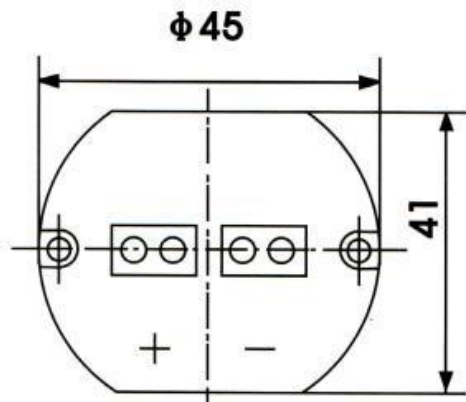
A thermocouple consists of two conductors of different materials (called thermoelements) joined at one end to form a circuit. The junction at the measuring end is called the **measurement junction**, while the other ends connected to the display instrument are called the **reference junctions**. When a temperature difference exists between the measurement junction and the reference junctions, a thermoelectric voltage is generated in the circuit. When connected to a display instrument, the instrument indicates the corresponding temperature based on the thermoelectric voltage.



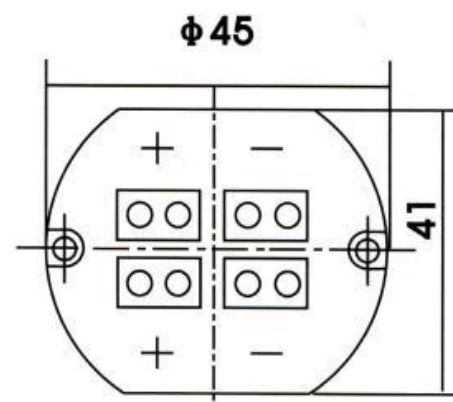
1-Junction Box 2-Terminal Block 3-Standard Assembly Thermocouple Insert

4-Protective Tube 5-Insulation Sleeve

Basic Structure



Single-Element Type



Double-Element Type

Although the external appearance of various thermocouples can differ significantly, their **basic structure** is generally similar. They typically consist of **thermoelements, insulation tubes, protective tubes, terminal blocks, and junction boxes** as the main components.

Terminal Block Configuration

The **double-element thermocouple** is mainly used when a process requires **two display instruments** to simultaneously measure, indicate, record, and control the temperature at the same location.

Thermocouple Tolerance Class

Thermocouple Type	Class 1	Class 2	Class 3
T Type	0.5 or $0.004 \times$	t	$-40^{\circ}\text{C} \sim 350^{\circ}\text{C}$
E Type	1.5 or $0.004 \times$	t	$-40^{\circ}\text{C} \sim 800^{\circ}\text{C}$
J Type	1.5 or $0.004 \times$	t	$-40^{\circ}\text{C} \sim 750^{\circ}\text{C}$
K Type	1.5 or $0.004 \times$	t	$-40^{\circ}\text{C} \sim 1000^{\circ}\text{C}$
N Type	1.5 or $0.004 \times$	t	$-40^{\circ}\text{C} \sim 1000^{\circ}\text{C}$
R / S Type	$t < 1100^{\circ}\text{C} \rightarrow 1.5$ or $0.0025 \times$	t	$t \geq 1100^{\circ}\text{C} \rightarrow [1 + 0.003 \times (t - 1100)]$



Tianjin ZINACA Intelligent Equipment Co., Ltd

			0°C ~ 1600°C
B Type	-	600°C ~ 1700°C	600°C ~ 1700°C

Notes:

- Tolerance values can be expressed either as absolute Celsius deviations or as functions of temperature (ITS-90). The larger of the two values should be applied.
- Base metal thermocouple wires generally meet Class 1 or Class 2 tolerances above -40°C. However, E, K, and N type thermocouples may not meet Class 3 tolerances at low temperatures. If Class 3 compliance is required in addition to Class 1 or 2, it must be explicitly specified when ordering, as wire selection is necessary.
- For T-type thermocouples, a single wire material may not satisfy both Class 2 and Class 3 tolerances across the entire temperature range. In such cases, the effective temperature range should be reduced accordingly.