

# WZ□□系列工业热电阻

WZ □ □ series of industrial thermal resistance

## 安 装 使 用 说 明 书

Installation Manual

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## 一、概述

WZ□系列工业热电阻是我厂生产的温度传感器中的一个系列，它测温的精度较热电偶高，与显示仪表配套，以直接测量生产过程中-200℃— +600℃范围内的液体、气体介质以及固体表面等的温度。它广泛用于石油、化工、机械、冶金、电力、轻纺、食品、原子能、宇航等工业部门和科技领域。

## 二、工作原理

热电阻的作用是利用物质在温度变化时本身电阻也随着发生变化的特性来测量温度。

## 三、选择

1. 根据测量的范围和对象，选择适当的工业热电阻型号以及保护管材料，热电阻的“最高使用”压力不可超过在该工作温度下保护管所能承受的压力。
2. 选用工业热电阻的分度号必须与显示仪表的分度号一致。
3. 除双支式的工业热电阻外，在不使用切换开关的情况下，每支工业热电阻不可同时和两支显示仪表连接使用。

## 四、工业热电阻的基本性能

1. 在 0℃时公称电阻值 (R<sub>0</sub>) 及测温允差 (见下表):

| 型号  | 分度号                                  | 0℃时的公称电阻值<br>R (0℃) (Ω) | 电阻比<br>R <sub>100</sub> /R(0℃) | 测温范围、精度等级和允差       |                                         |
|-----|--------------------------------------|-------------------------|--------------------------------|--------------------|-----------------------------------------|
|     |                                      |                         |                                | 测温范围 (℃)           | 精度等级和允差                                 |
| WZP | PT10                                 | 10                      | 1.3850                         | 陶瓷元件：<br>-200~+600 | A级：±(0.15+0.2% t )<br>B级：±(0.3+0.5% t ) |
|     | PT100                                | 100                     |                                | 玻璃元件：<br>-200~+500 |                                         |
|     |                                      |                         | 云母元件：<br>-100~+420             |                    |                                         |
| WZC | 分度号                                  | 0℃时的电阻值<br>R (0℃) Ω     | 电阻比<br>R <sub>100</sub> /R(0℃) | 测温范围、精度等级和允差       |                                         |
|     | Cu50                                 | 50.000±0.05             | 1.4280±0.0020                  | -50~+100           | ±(0.30+0.006 t )                        |
|     | Cu100                                | 100.00±0.10             |                                |                    |                                         |
| 备注  | 分度号为 Cu100 的铜热电阻和分度号为 PT10 的铂电阻需协议供货 |                         |                                |                    |                                         |

注：1) | t | 为被测温度的绝对值。

2) 分度号为 Pt10、Pt100 的工业铂电阻符合 ZBY301-85 《工业铂电阻技术条件及分度表》标准。

3) 分度号为 Cu50、Cu100 工业铜电阻符合 ZBNI1010-88 《工业铜电阻技术条件及分度表》标准。

2. WZ□系列工业热电阻的常温绝缘电阻

1) .工业铂热电阻的常温绝缘电阻值应不小于 100MΩ。

2) .工业铜热电阻的常温绝缘电阻应不小于 50MΩ。

常温绝缘电阻的试验电压为 10~100±10VDC (环境温度应在 15~35℃范围内，相对湿度不大于 80%)。

### 3. WZ□系列工业热电阻的热响应时间

| 保护管直径 (d) | 保护管材料                                      | 热响应时间 (秒) $\tau_{0.5}$ |
|-----------|--------------------------------------------|------------------------|
| φ 12      | 黄铜 H62<br>碳钢 20#                           | 30~90                  |
| φ 16      | 不锈钢<br>0Cr18Ni12M02Ti<br>不锈钢<br>1Cr18Ni9Ti | 30~90                  |
| 锥形保护管     | 不锈钢<br>1Cr18Ni9Ti                          | 90~180                 |
| 铜热电阻 φ 12 | 黄铜 H62<br>碳钢 20#<br>不锈钢<br>1Cr18Ni9Ti      | < 180                  |

### 4. WZ□系列工业热电阻的长度规格 (单位: mm)

1) . φ 12 保护管规格 (总长 L) 有: 225, 250, 300, 350, 400, 450, 550, 650, 900, 1150。

2) . φ 16 保护管规格 (总长 L) 有: 300, 350, 400, 450, 500, 650, 900, 1150, 1650, 2150。

3) . 锥形保护管 (总长 L) 有: 225, 250, 300, 350, 400。

注: WZ□系列工业热电阻的插入长度  $l=L-150\text{mm}$ 。

## 五、 安装

1. 工业热电阻的安装地点, 应避免安装在炉门旁边和避免与加热物体距离过近之处。

2. 工业热电阻的接线盒不可碰到被测介质的容器壁, 接线盒的温度不宜超过 100℃, 并尽可能地保持稳定不变。

3. 工业热电阻的插入深度, 浸入被测介质中的长度应不小于保护管外径的 10 倍。

## 六、 使用注意事项

1. 连接导线应采用绝缘 (最好是屏蔽) 铜线, 截面积视工业热电阻与显示仪表间的距离而定

2. 但一般不得小于 1.5mm<sup>2</sup>。导线的电阻值应按显示仪表技术条件规定的数据配准 (一般为 5~15Ω), 导线的电阻值可用惠斯顿电桥来调整。增加被测介质的循环, 使工业热电阻与被测介质间的对流传热增加。

3. 当工业热电阻用来测量变化的温场时, 常有动态误差的存在, 请注意选用具有适当热响应时

间的工业热电阻，因为热响应时间的大小是决定动态误差大小的主要因素，并与之成正比，它对温度的自动调节和控制起着相当重要的作用。

4. 根据用户需要，我厂可为用户提供各种要求特殊性能规格和尺寸的工业热电阻。可来人来函联系以技术协议的形式供货。

## 七、 运输与保存

工业热电阻在安装使用前，应保存在不受震动和碰撞的地方。最合适的存放场所条件为：

环境温度 $-20^{\circ}\text{C}$ ~ $+40^{\circ}\text{C}$ 。相对湿度不大于80%的通风室内。且不含有对工业热电阻起腐蚀作用的有害杂质。

## 八、 可能发生故障和修理

| 序号 | 故障现象               | 可能原因                    | 修理方法                                                                                   |
|----|--------------------|-------------------------|----------------------------------------------------------------------------------------|
| 1  | 显示仪表指示值比实际值低或示值不稳定 | 保护管或接线盒内有水、金属屑、灰尘或热电阻短路 | (1) 倒出水或消除灰尘，并将潮湿部分加以干燥处理（不得用火烤）、提高绝缘性能。<br>(2) 用万能表检查短路或界限地部分，并消除之，如系感温元件短路，应进行修复或更换。 |
| 2  | 显示仪表指示值无限大         | 热电阻短路                   | (1) 用万用表检查短路部位，确定是连接导线还是感温元件短路。<br>(2) 如系连接导线短路，可以更换或修复。<br>(3) 如系感温元件短路，应进行更换         |
| 3  | 显示仪表指针反向标尺下限值      | (1) 热电阻短路(2) 与现实表接线接错   | (1) 用万用表确定短路部位，并消除之，如系感温元件短路，应进行修复或更换。<br>(2) 重新连接导线。                                  |

## 九、 补充说明

产品验收：收到本产品后，请及时按产品国家标准或我厂标准规定的出厂检验项目验收。若有质量问题，请于收货之日起一个月内（以用户来函邮戳日期为准）函告我厂，我厂将及时受理。逾期则视为已验收合格。

# **WZ □ □ series of industrial thermal resistance installation Manual**

## **I. Overview**

WZ □ series of industrial heat resistance is my factory production of temperature sensors in a series, the accuracy of its temperature higher than the thermocouple, and display instruments complementary to direct measurement of the production process -200 °C - +600 °C within the scope of Liquid, gas, and other media and the solid surface temperature. It widely used in petroleum, chemical, mechanical, metallurgical, power, textile, food, atomic energy, aerospace and other industrial sectors and technology areas.

## **II. the principle of**

Heat resistance is the role of temperature change in the use of substances at their own resistance to change also with the characteristics to measure temperature.

## **III. Choose**

1. According to measure the scope and targets, select appropriate models of industrial heat resistance and the protection of materials, heat resistance, "the maximum use of" pressure should be less than the temperature under the protection of the work can bear the pressure.
2. Selection of the industrial sub-degree heat resistance, the instrument must be displayed at the same degree of.
3. In addition to the double-supported industrial thermal resistance, is not in use, switch the circumstances, every industrial thermal resistance can not be displayed at the same time, and two connecting the use of instruments.

#### IV. industrial thermal resistance of the basic properties

1. 0 °C at the nominal value of resistance (R<sub>0</sub>) and temperature tolerance (see table below):

| Model            | Indexing                                                                                                                         | 0 °C at the nominal Value<br>R (0 °C) (Ω) | Resistance than R100 / R (0 °C) | Temperature range, accuracy class and Tolerance                                                     |                                                                       |
|------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
|                  |                                                                                                                                  |                                           |                                 | Temperature range (°C)                                                                              | Accuracy class and Tolerance                                          |
| WZP              | PT10                                                                                                                             | 10                                        | 1.3850                          | Ceramic components: -200 to +600<br>Glass components: -200 to +500<br>Mica components: -100 to +420 | Grade A: ± (0.15 + 0.2%   t   )<br><br>Grade B: ± (0.3 + 0.5%   t   ) |
|                  | PT100                                                                                                                            | 100                                       |                                 |                                                                                                     |                                                                       |
| WZC              | Indexing                                                                                                                         | 0 °C at the nominal Value<br>R (0 °C) (Ω) | Resistance than R100 / R (0 °C) | Temperature range, accuracy class and Tolerance                                                     |                                                                       |
|                  |                                                                                                                                  |                                           |                                 | Temperature range (°C)                                                                              | Accuracy class and Tolerance                                          |
|                  |                                                                                                                                  |                                           |                                 |                                                                                                     |                                                                       |
| Cu100            | 100.00±0.10                                                                                                                      |                                           |                                 |                                                                                                     |                                                                       |
| Preparation Note | Cu100 points for the degree of copper and sub-degree heat resistance, resistance to PT10 to be the Prajna agreement Availability |                                           |                                 |                                                                                                     |                                                                       |

Note: 1) | t | for the measured temperature of absolute value.

2), for sub-degree Pt10, Pt100 industrial platinum resistance with ZBY301-85 "industrial platinum heat resistance and technical conditions at Table" standard.

3), for sub-degree Cu50, Cu100 industrial copper resistance with ZBNI1010-88 "Copper resistance technology industry conditions and sub-Table" standard.

2.WZ □ series of industrial heat resistance of insulation resistance at room temperature

- 1). Industrial platinum resistance at room temperature thermal insulation resistance value of not less than 100 M Ω.
- 2). Industrial copper at room temperature thermal resistance of the insulation resistance should be not less than 50 M Ω.

At room temperature insulation resistance of the test voltage of 10 ~ 100 ± 10VDC (ambient temperature should be 15 ~ 35 °C range, relative humidity of not more than 80 per cent).

3.WZ □ series of industrial heat resistance of thermal response time.

| Protection of the diameter (d) | Protection of materials                                            | Heat response time (seconds)<br>τ0.5 |
|--------------------------------|--------------------------------------------------------------------|--------------------------------------|
| φ12                            | Brass H62<br>20 # carbon steel                                     | 30~90                                |
| φ16                            | Stainless steel<br>0Cr18Ni12M02Ti<br>Stainless steel<br>1Cr18Ni9Ti | 30~90                                |
| Cone of protection             | Stainless steel<br>1Cr18Ni9Ti                                      | 90~180                               |
| Copper thermal resistance φ12  | Brass H62<br>20 # carbon steel<br>Stainless steel<br>1Cr18Ni9Ti    | < 180                                |

4、WZ □ series of industrial heat resistance of the length specifications (unit: mm)

- 1). Φ12 protection of the specifications (General L): 225,250,300,350,400,450,550,650,900,1150.
- 2). Φ16 protection of the specifications (General L): 300,350,400,450,500,650,900,1150,1650,2150.
- 3). Cone of protection (General L): 225,250,300,350,400.

Note: WZ □ series of industrial heat resistance insert length 1 = L-150mm.

## V. the installation

1. Thermal resistance of industrial locations, should be avoided in the Furnace Door installed next to the heating and avoid objects in the distance over the past.
2. Industrial thermal resistance junction box can not meet the vessel wall measured media, the temperature junction box should not be 超过 100 °C, and as far as possible to maintain stability unchanged.
3. Industrial thermal resistance insertion depth, immersion in the medium measured the length of protection should be not less than 10 times the diameter.

## VI. the use of Attention

1. Connecting wire insulation should be used (preferably shielding) copper wire, cross-sectional area as industrial heat resistance and display meters and the distance between, but generally not less than 1.5 mm<sup>2</sup>. Wire resistance values should be the instrument showed that technical requirements of the registration data (normally 5 ~ 15 Ω), wire-resistance values can be used to adjust the Houston Bridge.
2. Tested medium to increase the cycle of industrial tested medium heat resistance and the spread of the increase.
3. When the industrial thermal resistance used to measure changes in temperature field, often the existence of dynamic error, please note that with the proper choice of response time of industrial heat resistance, because the thermal response time is to determine the size of the main dynamic error, And with proportional to its temperature of the automatic adjustment and control plays a very important role.
4. Based on user needs, I can plant to provide users with special requirements of performance specifications and size of industrial heat resistance. Can be our link to technology in the form of supply agreement.

## VII. transportation and predervation

Industrial thermal resistance in the installation, should be kept free of vibration, and the collision area. The most suitable conditions for the storage places:  
Ambient temperature of -20 ~ +40 °C. Relative humidity of not more than 80 per cent of the indoor ventilation. Does not contain the industrial thermal resistance from the corrosive effect of harmful impurities.

## VIII. probably to a fault and repair

| No. | Occurrence                                                     | Possible reasons for                                                        | Repair Methods                                                                                                                                                                                                                 |
|-----|----------------------------------------------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Display Instrument instructions value or lower than the actual | Protection of water or cable boxes, metal shavings, dust or heat resistance | (1) Dispose of water or eliminate dust and damp to drying part (should not use a plate) to improve insulation properties.<br>(2) a universal inspection table to short-circuit or some limits, and the elimination of, such as |

|   |                                                               |                                                                                     |                                                                                                                                                                                                                                                                                         |
|---|---------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | value indication of instability                               | short circuit                                                                       | temperature components of the short circuit, should be repaired or replaced.                                                                                                                                                                                                            |
| 2 | Display Instrument instructions infinite value                | Thermal resistance short circuit                                                    | (1) a short-circuit multimeter site inspection to determine connecting wires or short-circuit temperature components.<br>(2) In the case of connecting wires short-circuit, can be replaced or repaired.<br>(3) In the case of short-circuit temperature components, should be replaced |
| 3 | Instrument reverse benchmark indicators show that lower limit | (1) heat resistance short circuit (2) and the reality connection to the wrong table | (1) a short-circuit multimeter determine location, and the elimination of, such as temperature components of the short circuit, should be repaired or replaced.<br>(2) re-connecting wires.                                                                                             |

## IX. added

Product acceptance: receipt of this product, please timely products by national standards or our factory standards for factory acceptance test items. If it has quality problems, from the date of the receipt within one month (postmark date of the communication users), I set out plants, I plant will promptly accepted. Late acceptance is deemed to have qualified.