

# **WR□N 系列耐磨热电偶**

**WR□N Series Wear-resistant thermocouple**

## **安 装 使 用 说 明 书**

## **Installation Manual**

**上海南浦仪表厂**

**Shanghai nanpu meter factory**



## 一、 概述

WR□N 系列耐磨热电偶，与二次仪表配套，可实现对高压、高流速的酸性或碱性介质的温度进行测量和控制。

耐磨热电偶（简称“耐磨偶”）分普通型和隔膜型两种。隔爆型的防爆等级为 d II BT4。

## 二、 主要技术指标

### 2.1 测温范围及允差值

品种	分度号	测温范围	允差值
镍铬—镍硅	K	0-800℃	2.5℃或 0.75%t
镍铬硅—镍硅	N		
镍铬—铜硅	E	0-600℃	

### 2.2 常温绝缘电阻

长度  $L > 1\text{m}$  时， $100\text{M}\Omega$ 。试验电压： $500 \pm 50$  VDC

### 2.3 时间常数

$\tau 0.5 \leq 180\text{S}$ 。

## 三、 工作原理及特点

### 3.1 工作原理

#### 3.1.1 测温原理

利用塞贝克效应进行测温。

#### 3.1.2 隔爆原理

间隔隔爆原理

### 3.2 特点

当耐磨头损坏时，可立即关闭切割阀，阴止被测介质泄漏。

## 四、 安装和使用

### 4.1 安装



#### 4.1 普通型耐磨偶的安装

- (1) 应避免安装在下列场所：炉门旁边;与加热物体过近外;强磁场处。
- (2) 接线盒不可碰到被测介质的容器壁，参比端（即接线盒端）的温度不应超过 100℃，并尽量保持其稳定。
- (3) 耐磨偶浸入被测介质的长度 150~200mm。

补偿导线从接线盒的出线孔的橡胶塞内引出，并拧紧穿线螺栓，极性不可接反，不得有曲折迂回现象。为保护补偿导线不受外来机械损伤和由于外磁场而造成对电子显示仪表的影响，应对其加以屏蔽。

##### 4.1.2 隔爆型耐磨偶的安装

对于隔爆型耐磨偶，在安装时除按普通型耐磨偶的安装外，还应注意如下事项：

##### (1) 安装环境条件（GB 3836.1 规定）

- A. 温度：-20~40℃
- B. 相对湿度：≤80%
- C. 大气压力：0.08~0.11Mpa

- (2) 隔爆型耐磨偶只能用于可燃性气体场所，不能用于粉末场所，且限于 1 区、2 区危险场所，切不可在 0 区使用。使用时，应符合 GB3836.1 对相应防爆等级的规定。

#### 4.2 耐磨偶的使用

耐磨偶在使用过程中应注意如下事项：

- (1) 不得随意关闭切断阀。一旦关闭，热电偶丝即被切断。
- (2) 当耐磨头损坏时，应立即将切断阀关闭，即将阀芯旋转 90°。
- (3) 对于隔爆型耐磨偶，还应注意：



- a、 断电源后，方可打开接线盒盖
- b、 防止热流引爆
- c、 对隔爆外壳材质有明显腐蚀的环境不能使用
- d、 应采用外径为  $\phi 10$ ，芯线截面积不小于  $1.5\text{mm}^2$  的阻燃型导线为补偿导线
- e、 接地必须可靠
- f、 铭牌应保持清晰、完好、不得丢失
- g、 严禁随意拆卸热电偶中的零部件。

## 五、 可能发生的故障及其修理

耐磨偶在使用过程中，可能发生的故障及其修理方法

序号	故障现象	可能原因	修理方法
1	热电势比实际应有的小(仪表指示值偏低)	1.耐磨偶内部电极漏电(短路) 2.耐磨偶接线盒内接线柱短路 3.耐磨偶偶丝变或测量端损坏	1.将热电极取出，检查漏电原因，若是因潮湿引起，应将热电极烘干，若是绝缘管绝缘不良，则应更换。 2.打开接线盒清洁接线柱，清除造成短路的原因。 3.把变质部分剪去，重新焊接测量端或重新更换新的感温元件。
2	指示仪表无指示	耐磨偶断路	1.将感温元件取出，若是测量端断路，重新焊接。 2.若因变质断路，则剪去变质部分，重新焊接测量端或重新更换新的感温元件。
3	仪表指示值不稳定(仪表本身无故障的情况下)	1.接线盒内感温元件和补偿导线接触不良。 2.热电极有断续短路和断续接地现象。 3.耐磨偶安装不牢而发生振动。	1.打开接线盒，重新接好并紧固。 2.取出感温元件，找出断续短路或接地的部分，并加以排除。 3.将耐磨偶牢固安装。

## 六、 说明

- 1、 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。

- 2、 关于热电势测试问题。热电势是微电压测试，加上外界影响，温度偏差控制诸多因素， $\mu\text{V}$  级测试准确十分困难，加之耐磨偶固有热电势受温度、机械振动等多种条件影响很难做到固定不变。请各位用户在验收时注意几个问题：（1）采用相应等级标准监测温度（2）标准偶与被测偶的测量端必须在同一等温区（3）保证足够的浸入深度（4）避免因绝缘体或保护管污染和漏电造成测试误差（5）测试时必须温度稳定（6）标准偶与被测偶参比端置于同一冰点（7）连接相同等级的补偿导线。



## I .Summary

WR □ L series of wear-resistant thermocouple, and the second instrument complementary to achieve the high-pressure, high velocity of the acid or alkaline medium temperature measurement and control.

Wear-resistant TC (referred to as the "wear-resistant dual") of ordinary two-and-divide. Flameproof grade for the explosion-proof d II BT4.

## II .Main Specifications

### 2.1 Temperature range and tolerance values

Variety	Indexing	Temperature range	Tolerance of
Ni-Cr - nickel-silicon	K	0-800℃	2.5℃or 0.75%t
Ni-Cr silicon - Silicon Nickel	N		
Ni-Cr - silicon bronze	E	0-600℃	

### 2.2 Insulation resistance at room temperature

Length L> 1m time, 100 M Ω. Test voltage: 500 ± 50 VDC

### 2.3 Time constant

$\tau_{0.5} \leq 180 \text{ S.}$



### **III.principle and characteristics of**

#### **3.1 Principle**

##### **3.1.1 Temperature**

**Seebeck effect of temperature measurement.**

##### **3.1.2 flameproof Principle**

**Principle interval flameproof**

#### **3.2 Features**

**When the wear-resistant head damage, they can immediately cut off valve, Yam only measured media leak.**

### **IV.installation and use of**

#### **4.1 Installation**

##### **4.1 Even ordinary wear-resistant type of installation**

**(1) should be avoided installed in the following places: next to the Furnace Door with heated objects from the past; the strong magnetic field.**

**(2) junction box can not meet the vessel wall measured media, the Senate than the end (that is, junction box side) the temperature should not exceed 100 °C, and to maintain its stability.**

**(3) wear-resistant dual immersion medium measured the length of 150 ~ 200 mm.**



Compensation wire from the junction box Chuxian hole in the rubber Cypriot extraction, and tightening bolt threads, can not access anti-polarity, there are twists and turns can not move back to the phenomenon. Compensation for the protection of wire and without external mechanical damage due to external magnetic field caused by the electronic display the impact of instrument and should be shielded.

#### **4.1.2 Flameproof even the installation of wear-resistant**

The flameproof even wear-resistant, in general at the time of installation Except for the installation of dual-wear-resistant, attention should be paid as follows:

**(1) installation of environmental conditions (GB 3836.1 Provisions)**

**A. Temperature: -20 ~ 40 °C**

**B. The relative temperature:  $\leq 80\%$**

**C. Atmospheric pressure: 0.08 ~ 0.11 Mpa**

**(2) Flameproof wear-resistant even places can only be used flammable gas, can not be used in place powder, and limited to one area, Area 2 dangerous places, must not be used in the 0 zone. Use, should be in line with GB3836.1 Explosion levels of the corresponding provisions.**

#### **4.2 Even the use of wear-resistant**

Even in the use of wear-resistant process should pay attention to the following matters:

**(1) shall not be arbitrarily closed shut-off valve. Once closed, thermocouple wire was cut off.**



**(2) When the wear-resistant head damage, they should immediately shut-off valve closed, rotating spool to be 90 °.**

**(3) Flameproof even wear-resistant, attention should be paid to:**

**a, power off only after the lid open wiring**

**b, to prevent heat detonated**

**c, flameproof shell of material obviously can not use corrosive environment**

**d, should be used for the outer diameter  $\phi 10$ , core-line cross-sectional area of not less than 1.5 mm<sup>2</sup> of fire-retardant conduit for compensation wire**

**e, grounding must be reliable**

**f, nameplate should remain clear and intact, may not be lost**

**g, is prohibited at the demolition of parts of the thermocouple.**

## **VI. the possible failure and its repair**

**Even in the use of wear-resistant process, and the possible failure of the repair methods**

<b>No.</b>	<b>Occurrence</b>	<b>Possible reasons for</b>	<b>Repair Methods</b>
<b>1</b>	<b>Thermoelectric potential than actual should be small (the low value of instrumentation instructions)</b>	<b>1. Wearable dual internal electrode leakage (short circuit) 2. Wearable even short-circuit wiring box Posts 3. Wearable dual dual-wire measurement</b>	<b>1. Electrodes will heat out to check leakage of reasons, if caused by moisture, heat electrodes should be drying, if the insulation bad insulation should be replaced. 2. Posts open the junction box cleaning, removal of a short-circuit the</b>



		damaged or changed	reasons. 3. Metamorphic part of the cut, re-welding or re-measuring the temperature of new components.
2	No direct instructions Instruments	Wear-resistant dual opening	1. Temperature components will be removed, if measured-opening, re-welding. 2. If degenerate opening, then cut degeneration of the re-welded or re-measuring the temperature of new components.
3	Instrument instructions of instability (no fault of their own instrument cases)	1. Temperature inside wiring components and compensation wire connection is bad. 2. Electrodes are opening heat continued intermittent and short-circuit grounding phenomenon. 3. Wearable even in case of the installation is not strong vibration.	1. Open the junction box, then good again and retention. 2. Retrieve temperature components, to identify intermittent short circuit or grounding of the section and be excluded. 3. Wearable dual will firmly installed.

## VII.note

1、 product acceptance. After receiving this product, please promptly by national standards or products in 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.

2 、 thermoelectric potential test on the issue. Potential is a thermoelectric-voltage test, coupled with outside influence, control the temperature deviations many factors, uV level test accuracy is very difficult, plus the wear-resistant thermoelectric potential inherent in the dual temperature, vibration, and other conditions affecting difficult to achieve fixed. Members user acceptance attention when several questions: (1) used to monitor temperature corresponding grades (2) with the dual standards of measurement-even measured in the same, and so must the temperature (3) ensure sufficient depth immersion (4) avoid Insulator, or the protection of the pollution caused by leakage test and error (5) tests the temperature must be stable (6) and measured dual standard dual-placed in the Senate than the same freezing point (7) the same level of compensation for connecting wires.