

公司承诺不断提高产品质量，因此保留在不经通知的情况下对本手册内容进行修改权利。

The Company promises to constantly improve product quality and therefore reserves the right to modify the contents of the Manual without notice.

使用说明书 Operation Instruction



THERMAL RESISTANCE

热电阻



防爆/一体化温度变送器 Explosion-Proof/Integrated temperature transmitter

温度测量 Temperature measurement

- | | |
|---------|----------------------|
| • 石油 | Petroleum • |
| • 化工 | Chemical • |
| • 冶金 | Metallurgy • |
| • 电力 | Electricity • |
| • 食品 | Food • |
| • 药业 | Pharmaceutical • |
| • 建材 | Building materials • |
| • | • |



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热电阻使用说明书

Operation Instruction for Thermal Resistance



关于本公司

About The Company

安徽天康（集团）股份有限公司是一家国内知名的仪器仪表设计与制造公司，产品用于流程工业、过程控制，实现温度测量，压力测量、流量测量、物位测量及控制系统集成。

作为工业现场参数测量仪表的主要生产商之一，我们为国内外的客户提供应用方面的专业知识、服务及支持。

公司产品的质量、精度及性能来自于四十年的经验，以及对于最新技术的创新设计与持久开发。

Anhui Tiankang (Group) Co., Ltd is a company famous for the manufacturing and design of instruments and meters at home, its products are applied to process industry, process control, achievement of temperature measurement, stress measurement, flow measurement, level measurement and control system integration.

As one of the main producers of industrial field parameter measuring instruments, we provide professional knowledge, service and support in the application for domestic and oversea clients.

The quality, accuracy and performance of the Company's products come from forty years of experience, as well as innovative design and sustainable development of the latest technology.

健康与安全

Health And Safety

为了确保我们的产品安全，不影响健康，务必注意以下各点：

1、使用前必须仔细阅读说明书的有关章节；

2、必须遵守容器或包装上的警示标签；

3、必须由经过培训的人员按照所列信息进行安装、操作、维护及保养，一切由于违反本说明书而造成的后果均由用户承担；

4、务必遵守一般的注意事项，以避免在高压或高温下运行时发生事故。

In order to ensure our product safety and do not affect the health, make sure to pay attention to the following points:

1. Make sure to read relevant chapters of the Instructions carefully before use.

2. Make sure to follow caution Label on the container or packaging.

3. Make sure that installation, operation, maintenance and preservation are performed by trained staff according to information listed. All consequences caused by violation of the Instructions shall be assumed by users.

4. Make sure to follow general notes to avoid accident in operation under high pressure and temperature.

有关本手册所述设备使用的安全事项或任何相关的危害数据表（适用时）可以从公司取得，地址如封底所示，同时提供保养及备件信息。

Safety precautions relevant to equipment use described in the Manual and any relevant hazard data table (where applicable) can be obtained from the Company. Address is shown as the back cover and information on maintenance and spare parts is provided at the same time.

热电阻使用说明书

Operation Instruction for Thermal Resistance



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一. 引言 Introduction

天仪®系列热电阻是由安徽天康（集团）股份有限公司推出，通常和显示仪表、电子计算机配套使用，直接测量和各种生产过程中的-200℃~500℃范围内液体、蒸汽和气体介质及固体表面测温。天康集团近40年得产品研发、改进和应用经验，凭借着原有的基础，不断的引进先进技术和设备使热电阻产品性能更可靠、性价比更高。

Tianyi® series thermal resistance is released by Anhui Tiangkang (Group) Co., Ltd, adopting the way of field installation. It's commonly used with display instrument and electronic computer; it directly measures the temperature of liquid, steam and gas media and the surface of solid with the temperature ranging from -200℃ to 500℃ at various production processes. Forty years of R&D on product, improvement and application experience, Anhui Tiangkang (Group) Co., Ltd depended on original basis continuously introduces the advanced technologies and devices to make the thermal resistance products more reliable in performance and higher in cost performance.

天仪®系列热电阻现已开发的有：铠装热电阻、装配式热电阻、防爆热电阻、电站热电阻、石油化工热电阻、特殊热电阻、核电热电阻、WZPB2功能安全型热电阻。

- 1、抗震性能好
- 2、无需补偿导线，节省费用；
- 3、测量精度高
- 4、机械强度高、耐压性能好
- 5、用的是进口薄膜电阻元件、性能可靠稳定
- 6、热响应时间少、减少动态误差
- 7、直径小，长度不受限制

Tianyi® series thermal resistance products are: WZPK, Assembling thermal resistance, SY-WAPJ, power plant heat resistance, petrochemical engineering heat resistance, special thermal resistance, nuclear power heat resistance, secure heat resistance with WZPB2 function.

1. Good anti-seismic property;
2. No need for compensating lead wire and cost saving;
3. High measurement accuracy;
4. High mechanical strength and good pressure-resistant properties;
5. Adopt the imported thin-film resistor elements which contribute to the reliable and stable performance;
6. Less thermal response time, dynamic error reduced;
7. Small diameter and unlimited length.

工业过程温度测量领域，天康集团用心为您的工厂服务，在天仪系列仪表的帮助下，您可以非常自信地为您的需要作出最佳选择。

In the field of industrial process temperature measurement, Anhui Tiangkang Co., Ltd diligently provides service for your factory and you can make the best choice for your needs confidently with the help of Tianyi-series instrument.

二. 运输 Transportation

包装成箱的热电阻，在避免雨（雪）淋的条件下需遵守JB/T9329-1999《仪器仪表运输贮存基本环境条件》GB/T15464-1995《仪器仪表包装通用技术条件》运输标准。热电阻及其附件在安装前，必须贮存在不受震动和碰撞的地方。

Thermal resistance packed with box needs to follow transportation standard of JB/T9329-1999 Basic Environmental Conditions for Instruments Transportation and Storage and GB/T15464-1995 General-purpose Specification for the Packaging of Instrumentation Products under the condition of keeping away from rain (snow). Thermal resistance and its accessory must be stored at the place without being shaken or impacted before the installation.

三. 搬运 Handling

搬动仪表时无需任何特殊保护措施，但需遵守轻搬轻放等注意事项。

When handling instrument, no any special protective measure is needed, but follow notes of light moving and light placing.

四. 储藏 Storage

热电阻及其附件在安装前必须贮存在不受震动和碰撞的地方，最合适的贮存场所条件为：环境温度10~35℃、相对湿度不大于80%，周围空气不含有可能造成热电阻零件腐蚀杂质。

Thermal resistance and its accessory must be stored at the place without being shaken or impacted before the installation and the conditions of most suitable storage place: environment temperature is 10-35℃; the relative humidity is not more than 80%; there is no impurity which will be likely to cause the corrosion of thermal resistance components.

五. 工作原理 Working principle

装配式热电阻 铠装热电阻

热电阻是利用物质在温度变化时，其电阻随着发生变化的特征来测量温度的。当阻值变化时，工作仪表显示出阻值所对应的温度值。

Assembled thermal resistance, sheathed thermal resistance

Thermal resistance relies on its feature that its resistance changes following with the temperature change to measure the temperature. When the resistance value changes, the operating instrument displays the temperature value in correspondence with the resistance value.

隔爆热电阻

Explosion-proof thermal resistance

利用物间隙隔爆原理,设计具有足够强度的接线盒等部件,将所有会产生火花、电弧和危险温度的零部件都密封在盒腔内,当腔内发生爆炸时,能通过接合面间隙熄火冷却,使爆炸的火焰和温度传不到腔外,从而进行隔爆。

Utilize the object interval explosion-proof theory to design junction box and other parts which have enough strength, seal all accessories that will create spark, electric arc and dangerous temperature into the junction box, cooled via the interval flameout box at the adjoining plane, which makes the flame and temperature not to be spread out of the box when there is explosion occurring in the box and thus the explosion proof can be realized.

六. 热电阻性能概述

Performance overview of thermal resistance

产品执行标准: IEC60751 JB/T8622-1997

Product performance standard: IEC60751 JB/T8622-1997

测温范围及允差

Measurement range and tolerance

型号 Model	分度号 Graduation No.	允差等级 Permissible deviation level	有效温度范围/℃ Effective temperature range/℃		允差值/℃ Permissible deviation value / ℃
			线绕元件 Wire-wound component	膜式元件 Membrane component	
WZP	PT100	A	-100~+450	-30~+300	$\pm (0.15+0.002 t)$
		B	-196~+600	-50~+500	$\pm (0.3+0.005 t)$
		C	-196~+600	-50~+600	$\pm (0.6+0.01 t)$
WZC	Cu50	—	-50~+100		$\pm (0.3+0.006 t)$
	Cu100				

| t | =温度绝对值, 单位为℃。
| t | = absolute value of temperature, unit /℃.

常温绝缘电阻

Insulation resistance of normal temperature

钨装热电阻在环境温度 $15\sim 35^{\circ}\text{C}$ ，相对湿度不大于80%，实验电压为10~100V（直流）电极与外套管之间的绝缘电阻 $\geq 100\text{M}\Omega$ 。

In the case that the environment temperature is 15-35°C, relative humidity is not more than 80% and the laboratory voltage is 10-100V (direct current), insulation resistance between the electrode and outer sleeve of sheathed thermal resistance is $\geq 100\text{M}\Omega$.

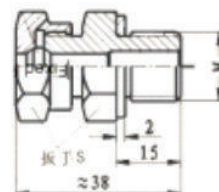
电阻丝直径材料及材质

Diameter, material and texture of resistance wire

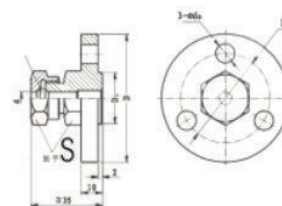
元件形式	Component form	单支式	Single type	双支式	Double type
套管直径	Sleeve diameter	Φ3	Φ4	Φ5	Φ6 Φ8
套管材质	Sleeve material	321		321	

安装固定形式

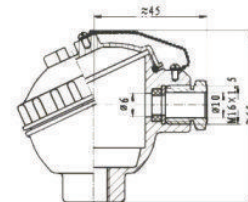
Installation and fixing form



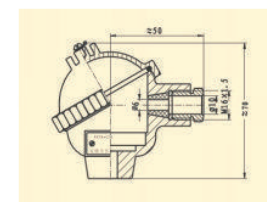
代号和尺寸 Code and size	铠装阻外径 Outer diameter of sheathed thermal resistance	
	F8 F6 F5	F4 F3
M	M16*1.5	M12*1.5
S	22	19



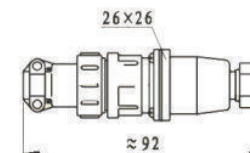
代号和尺寸 Code and size	铠装阻外径 Outer diameter of sheathed thermal resistance	
	F8 F6 F5	F4 F3
D	F60	F50
D ₀	F42	F36
D ₁	F24	F20
S	F22	F19
d ₂	F9	F7



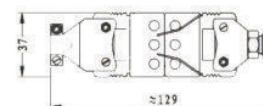
防噴式
Blowout control type



防水式
Waterproof type



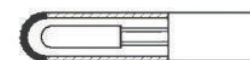
扁接插式
Flat plug-in type



圆接插式
Circle plug-in type



帶补偿导线式
Compensating leading wire type



热电阻使用说明书

Operation Instruction for Thermal Resistance



装配热电阻

Assembled thermal resistance

测量范围及允差

Measurement range and tolerance

型号 Model	分度号 Graduation No.	允差等级 Permissible deviation level	有效温度范围/℃ Effective temperature range/℃		允差值/℃ Permissible deviation value / ℃
			线绕元件 Wire-wound component	膜式元件 Membrane component	
WZP	PT100	A	-100~+450	-30~+300	$\pm (0.15+0.002 t)$
		B	-196~+600	-50~+500	$\pm (0.3+0.005 t)$
		C	-196~+600	-50~+600	$\pm (0.6+0.01 t)$
WZC	Cu50	—	-50~+100		$\pm (0.3+0.006 t)$
	Cu100				

| t | = 温度绝对值, 单位为℃。

| t | = absolute value of temperature, unit /℃.

防爆热电阻

Explosion thermal resistance

测量范围及允差

Measurement range and tolerance

型号 Model	分度号 Graduation No.	允差等级 Permissible deviation level	有效温度范围/℃ Effective temperature range/℃		允差值/℃ Permissible deviation value / ℃
			线绕元件 Wire-wound component	膜式元件 Membrane component	
WZP	PT100	A	-100~+450	-30~+300	$\pm (0.15+0.002 t)$
		B	-196~+600	-50~+500	$\pm (0.3+0.005 t)$
		C	-196~+600	-50~+600	$\pm (0.6+0.01 t)$
WZC	Cu50	—	-50~+100		$\pm (0.3+0.006 t)$
	Cu100				

| t | = 温度绝对值, 单位为℃。

| t | = absolute value of temperature, unit /℃.

防爆分组形式

Explosion-proof grouping form



热电阻使用说明书

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电气设备类别

Electrical device class

I——煤矿井下用电气设备

I----Electrical device for the use under coal mine

II——工厂用电气设备

II----Electrical device for plant use

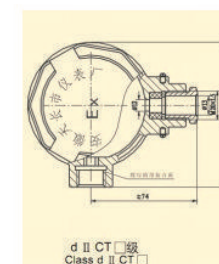
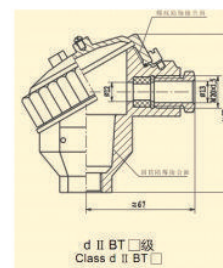
防爆热电阻的防爆等级按其使用爆炸性气体混合物最大试验安全间隙为A、B、C三级。

Explosion-proof grade of explosion thermal resistance is divided into three grades of A, B and C according to the maximum experimental safe gap of the used explosive gas mixture.

类别 Category	级别 Grade	最大试验安全间隙 Maximum experimental safe gap
II	A	0.9=MESG
	B	0.5<MESG<0.9
	C	MESG≤0.5

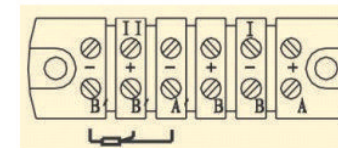
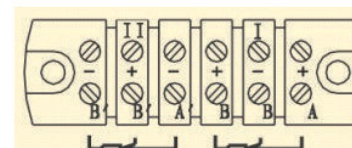
接线盒形式

Junction box type



安装端子形式

Installed terminal form



热电阻使用说明书

Operation Instruction for Thermal Resistance



一体化式防爆热电阻

Integrated explosion-proof thermal resistance

工作原理

Working principle

防爆热电阻利用间隙隔爆原理，当腔内发生爆炸时，能通过接合面间隙熄火和冷却，使爆炸后的火焰全温度传不到腔外，从而进行防爆。

热电阻产生的热电势电阻经过温度变送器的电桥产生不平衡信号，经放大后转换成4~20mA的直流电信号给工作仪表，工作仪表便显示出所对应的温度值。

Explosion-proof thermal resistance utilizes the interval explosion-proof principle to be cooled via the interval flameout box at the adjoining plane, which makes the flame and temperature not to be spread out of the box when there is explosion occurring in the box and thus the explosion proof can be realized.

Through the electrical bridge of temperature transmitter, the thermoelectric force resistance produced by thermal resistance will produce the unbalanced signals, which are converted into the direct current signals of 4~20mA after being amplified to the working instrument which thus will displays the corresponding temperature value.

产品执行标准

Product performance standard:

IEC60751 GB/T26768-2011

测量范围及允差

Measurement range and tolerance

型号 Model	分度号 Graduation No.	允差等级 Permissible deviation level	有效温度范围/℃ Effective temperature range/℃		允差值/℃ Permissible deviation value / ℃
			线绕元件 Wire-wound component	膜式元件 Membrane component	
WZP	PT100	A	-100~+450	-30~+300	$\pm (0.15+0.002 t)$
		B	-196~+600	-50~+500	$\pm (0.3+0.005 t)$
		C	-196~+600	-50~+600	$\pm (0.6+0.01 t)$
WZC	Cu50	—	-50~+100		$\pm (0.3+0.006 t)$
	Cu100	—			

|t| = 温度绝对值，单位为℃。

|t| = absolute value of temperature, unit/℃.

工作环境

Working environment

安装场所等级 Installation site grade	温度 Temperature	相对湿度 Relative humidity	大气压力 Atmospheric pressure
CX1	-25~+55	5-95	86-106
CX2	-25~+70		
CX3	-40~+80		

精度等级

Accuracy grade

温度变送器精度等级：0.1；0.2；0.5

Accuracy grade of temperature transmitter: 0.1; 0.2; 0.5

of display: Grade 2.5 for simulative indicator type; Grade 1.0 for digital display type

热电阻使用说明书

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显示器精度等级：模拟指示式2.5级；数字显示式1.0级

Accuracy grade of display: Grade 2.5 for simulative indicator type; Grade 1.0 for digital display type

输出型号

Output model

4~20mA, 负载电阻250Ω

4~20mA, load resistance is 250Ω

传输导线电阻100Ω

Transmission conductor resistance is 100Ω

绝缘电阻

Insulation resistance

仪表输出接线端子与外壳之间的绝缘电阻应不小于50 MΩ

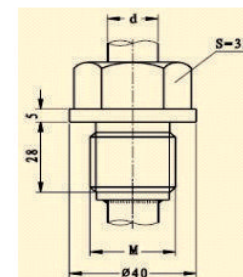
The insulation resistance between output connection terminal of instrument and case shall not be less than 50 MΩ.

安装固定形式

Installation and fixing form

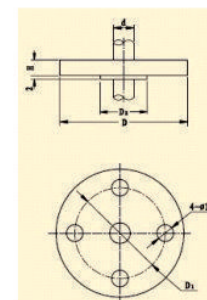
固定螺纹式

Fixed thread type



固定法兰式

Fixed flange form



型号 Model	螺纹规格 Thread specification		d
	代号 Code	M	
WZPB-240		M27*2	F16
WZPB-240A	A	G3/4	F12
WZPB-240C	C	NPT3/4	
WZPB-240G		M27*2	
WZPB-240GA	A	G3/4	
WZPB-240GC	C	NPT3/4	

型号 Model	法兰规格 Flange specification				
	D	D ₁	D ₂	H	d
WZPB-420	F95	F65	F46	14	F16
WZPB-420G	F95	F65	F46		
WZPB-421	F95	F65	F46	14	F12
WZPB-421G	F95	F65	F46		

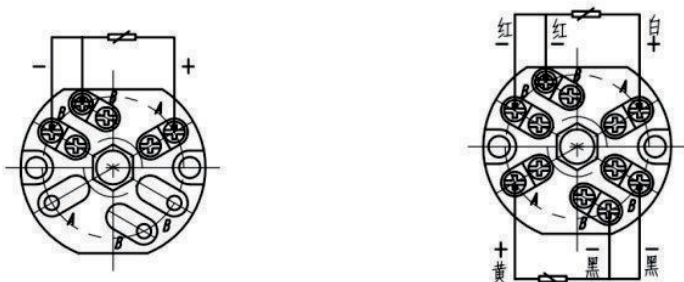
热电阻使用说明书

Operation Instruction for Thermal Resistance



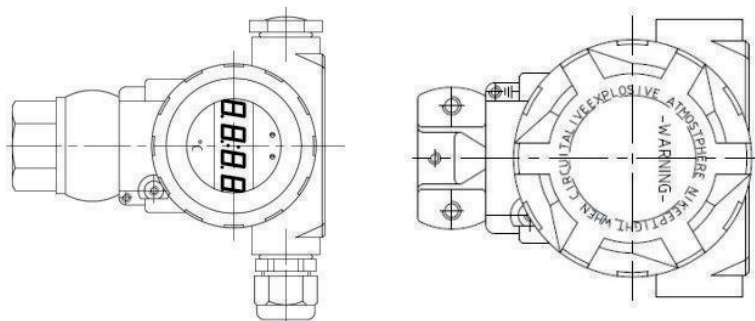
接线方式

Mode of connection



接线盒形式

Junction box type



热电阻使用说明书

Operation Instruction for Thermal Resistance



WZPB2功能安全型热电阻

WZPB2 functional security thermal resistance

WZPB2的SIL适用度

SIL applicability of WZPB2

WZPB2型热电阻通过了中国功能安全中心的功能安全评估，符合：

WZPB2-type thermal resistance has passed the functional security evaluation of China Functional Security Center and conforms to:

1) GB/T20438.1-2006 idt IEC61508-1:1998 ;

2) GB/T20438.2-2006 idt IEC61508-2:2000,

具有SIL2适用度。可用于SIL2及以下的安全控制回路。

It possesses the SIL2 applicability and can be used into SIL2 and following security control loop.

安全功能

Security functions

WZPB2系列热电阻能将温度测量范围能力内（内置变送器范围可调）的任意温度输入信号转换成对应的4~20mA电流输出信号，并可用于安全相关系统中的安全动作触发信号， $t_{0.5} < 90s$ 。

WZPB2-type thermal resistance can convert any temperature input signals within the temperature measurement range (with adjustable range by the built-in transmitter) into the corresponding current output signals of 4~20mA and can be used for the safety action trigger signals in the security-related system, $t_{0.5} < 90s$.

使用方法

Usage

WZPB2系列热电阻用于安全控制时支持以下触发方式：

While being used for the security control, WZPB2-type thermal resistance supports the following trigger ways:

正常工作温度范围低于安全阈值，当测温值高于安全阈值时触发安全动作；

正常工作温度高于安全阈值，当测温值低于安全阈值时触发安全动作。

High trip: its normal working temperature range is lower than safety threshold and safety action is triggered when the measuring temperature value is higher than the safety threshold;

Low trip: its normal working temperature is higher than the safety threshold and safety action is triggered when the measuring temperature value is lower than the safety threshold;

WZPB2接法及其SIL能力关系

Relation of WZPB2 connection and its SIL capacity

将本产品的两个测温通道接入不同的控制回路；

将本产品的两个测温通道形成1oo2表决关系接入同一个控制回路；

将本产品的两个测温通道形成2oo2表决关系接入同一个控制回路。

SIL=0: connect two temperature measurement channels of the product to the different control loops;

SIL=2: form two temperature measurement channels of the product as 1oo2 voting relation and then connect them to the same control loop

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SIL=2: form two temperature measurement channels of the product as 2oo2 voting relation and then connect them to the same control loop;

产品年检的要求

Requirement of product annual inspection

本产品的的设计使用寿命为3年，有关本产品日常维护，详见热电阻的维护章节。

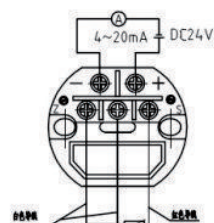
Design service life of the product is 3 years and the details related to daily maintenance of the product can be seen in the maintenance chapter of thermal resistance.

使用注意事项和约束，详见热电阻的使用及注意事项章节。

Notes and restriction for use, see the chapter of usage and notes of thermal resistance for more details.

WZPB2热电阻输入端典型故障时的输出

WZPB2 thermal resistance during the typical fault



SBWZ-1100型输出4~20mA

A	B	B'	故障电流输出 (mA) Fault current output (mA)
x	x	x	>21
v	v	v	<4
x	v	v	>27
v	v	x	>21
v	x	v	<4

注：表中标有v的各端为相互间短接，*表示该端断路。Note: the terminal marked with v in the table is mutual short circuit and * represents that the terminal is in open circuit.

当WZPB2热电阻用于安全控制回路时，热电阻的信号采集设备应具有检测上述故障电流的能力（信号范围检测）。

Signal collecting devices of the thermal resistance shall possess the ability to check out the above fault current (inspection within the signal range) when the WZPB2 thermal resistance is used in the security control loop.

SIL验证所需信息。

Information needed for SIL verification

WZPB2的失效率（依据IEC61508）。

Failure rate of WZPB2 (according to IEC61508)

WZPB2	I_{high}	I_{low}	I_{SD}	I_{SU}	I_{DD}	I_{DU}
通道 A (RTD+SBWZ)	382.44	3.08	0	14.58	0	114.58
Channel A (RTD+SBWZ)						
通道 B (RTD+SBWZ)	382.44	3.08	0	14.58	0	114.58
Channel B (RTD+SBWZ)						
当下级设备具有范围检测功能时	N/A	N/A	382.44	14.58	3.08	114.58
When the subordinate device possesses the range check function						

注：有关本表中的各项失效率定义详见 IEC61508。Note: see in IEC61508 for details of the definition of each failure rate related to the table.

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WZPB2的安全参数（依据IEC61508）

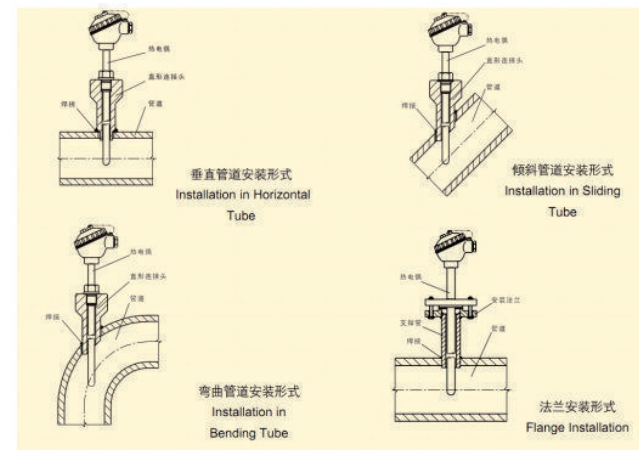
Safety parameter of WZPB2 (according to IEC61508)

检验测试间隔 T(年) Check test interval T (year)	0.25	0.5	1	1.5	2	3
$PFD_{avg}(T), 1002$	1.26E-05	2.52E-05	5.05E-05	7.59E-05	1.01E-04	1.53E-04
硬件故障裕度 (HFT) Hardware fault margin (HFT)	1					
安全失效率 (SFF) Safe failure fraction (SFF)	77.74%					
总失效率 (FIT) Full failure rate (FIT)	1029.36					

七. 热电阻的安装 Mounting of thermal resistance

安装形式

Mounting form

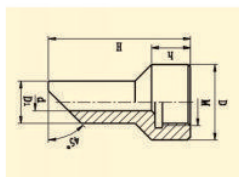
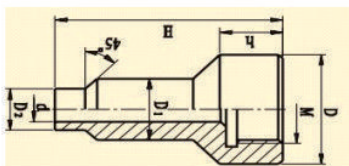


热电阻使用说明书

Operation Instruction for Thermal Resistance



直接连接头
Direct connector



代号 Code	M	D	D ₁	D ₂	d	h	H
TH48A	M12*1.5	F32	F18	F12	F7	27	60.12
TH48B	M16*1.5	F36	F18	F14	F7	27	80
TH48C	M20*1.5	F40	F18	F14	F7	27	60
TH48D	M27*2	F47	F28	F22	F17	32	60
TH48E	M33*2	F55	F36	F30	F21	34	120
TH48F	NPT1/2	F39	F27	F21	F16	35	60
TH48G	NPT3/4	F47	F31	F25	F20	40	120
TH48H	NPT1	F47	F41	F35	F30	45	120

代号 Code	M	D	D ₁	d	h	H
TH48A	M27*2	F47	F28	F18	30	90
TH48B	M33*2	F55	F36	F24	30	150
TH48C	NPT1/2	F39	F27	F16	30	90
TH48D	NPT3/4	F47	F31	F20	35	90
TH48E	NPT1	F47	F41	F30	40	150

八. 使用及注意事项 Usage and notes

热电阻的使用及注意事项

Usage and notes of thermal resistance

热电阻的输出信号为电阻值，应避免安装在腐蚀性和振动大的环境内，热电阻的插入深度为浸入被测介质中的长度不应小于保护管外径的10倍。

热电阻的测温原理是基于导体或半导体的电阻值随着温度的变化而变化的特性。其优点也很多，也可以远传电信号，灵敏度高、稳定性强、互换性及准确性都比较好。热电阻是测量低温的温度传感器。

As the output signal of thermal resistance is resistance value, the installation in the environment of corrosivity and large vibration shall be avoided and insertion depth of thermal resistance which is the length of immersing measured medium shall not be less than 10 times of the outer diameter of protective pipe.

Temperature measurement principle of thermal resistance is based on the feature that resistance value of conductor and semi-conductor changes with the changing of temperature. It has many advantages and also can transmit electronic signals in far distance with high sensitivity, strong stability, good interchangeability and veracity. Thermal resistance is the temperature sensor which measures the low temperature. contain the potential impurities to cause the corrosion of thermal resistance parts.

热电阻使用说明书

Operation Instruction for Thermal Resistance



热电阻的安装
Mounting of thermal resistance

(1) 热电阻的安装应尽可能保持垂直，以防止保护管在高温下产生变形，但在有流速的情况下，则必须迎着被测介质的流向插入，以保证测温元件与流体的充分接触。

(2) 热电阻应安装在有保护层得管道内，以防止热量散失。

(3) 热电阻安装在负压管道中时，必须保证测量处的密封性，以防止外界冷空气进入，使读数偏低。

(4) 热电阻的接线盒面盖应向上，入线口应向下，以避免雨水或灰尘进入接线盒，影响测量精度。

热电阻及其附件在安装前必须贮存在不受震动和碰撞的地方，最合适的贮存场所条件为：环境温度10-35℃、相对湿度不大于80%，周围空气不含有可能造成热电阻零件腐蚀杂质。

Installation of thermal resistance

(1) Installation of thermal resistance shall keep in vertical as much as possible to avoid the protective pipes from being deformation under the high temperature; but in the case of flow velocity, the thermal resistance must be inserted towards the flow direction of the measured mediums to ensure the sufficient contact of temperature measurer and flows.

(2) Thermal resistance shall be installed into the pipeline which has protective layer to avoid the heat loss.

(3) Sealing at the measuring area shall be guaranteed when the thermal resistance is installed into the negative pressure pipeline to avoid the entering of the cold air from the outside world which will lead to the lower reading.

(4) Cover of the junction box of thermal resistance shall be upward and the wire-entering opening shall be downward to prevent the rainwater and dust from entering into the junction which will influence the measuring accuracy.

Before the usage, the thermal resistance and its accessories must be stored in a place where there is no vibration and collision before installation. The most suitable storage conditions are: ambient temperature 10-35℃; relative humidity is not more than 80%; ambient air does not contain the potential impurities to cause the corrosion of thermal resistance parts.

九. 热电阻的维护 Maintenance of thermal resistance

1、修理必须由制造商或经过培训的人员进行。

2、仪表应经常进行检定应每6个月一次，如发现故障应及时修理。

3、仪表应用有清洗液的湿布清洁，仪表内部在正常使用情况下无需清洁。

4、仪表在使用工程上应经常保持其干燥和洁净。

1. Repair must be carried out by the manufacturer or trained personnel.

2. Instrument should always be tested should be in each 6 month, if any malfunction is found, it should be repaired in time.

3. Instrument should be cleaned by the wet clothe with cleaning liquid; there is no need to clean the instrument inside under the condition of normal use.

4. Instrument in the use of the project should always be dry and clean.

热电阻使用说明书

Operation Instruction for Thermal Resistance



热电阻常见故障及处理方法

Common fault and processing method of thermal resistance

故障现象 Failure phenomena	可能原因 Possible causes	处理方法 Processing method
显示仪表指示值偏低或示值不稳。Indicate that the display value of the instrument is low or the value is not stable.	保护管内金属屑或灰尘，接线柱间积灰以及热电阻短路。There is a metal chip or dust inside the protective pipe, and the dust is accumulated between the connecting posts or short circuit of thermal resistance	除去金属屑，清扫灰尘找出短路点，加好绝缘。Remove metal chips, clean the dust, find out the point of the short circuit, and add a insulation
显示仪表指示无穷大。Display that meter indication is infinite	热电阻或引出线断路。Thermal resistance or lead out wire break	更换热电阻或焊接断线处（焊毕要校验）Replacement of thermal resistance or welding line(check is needed after the welding)
显示仪表指示无穷小。Display that meter indication is infinite	显示仪表与热电阻接线有误或电阻短路。Connection of display instrument and thermal resistance is in error or resistance is in short circuit	改正接线，找出短路处，加好绝缘。Correct wiring, find out the short circuit, add a insulation
阻值与温度的关系有变化。The relationship between the resistance and temperature changes.	热电阻材料受腐蚀变质。Corrosion and deterioration of thermal resistance materials	

热电阻使用说明书

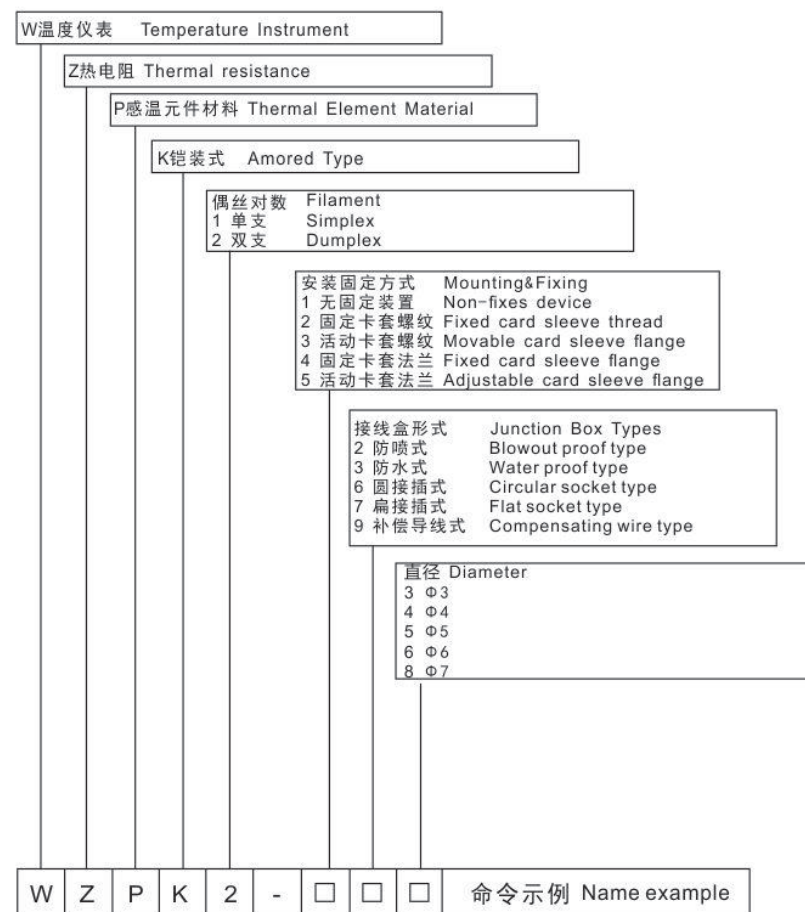
Operation Instruction for Thermal Resistance



十. 产品选型 Product selection

铠装热电阻

Sheathed thermal resistance

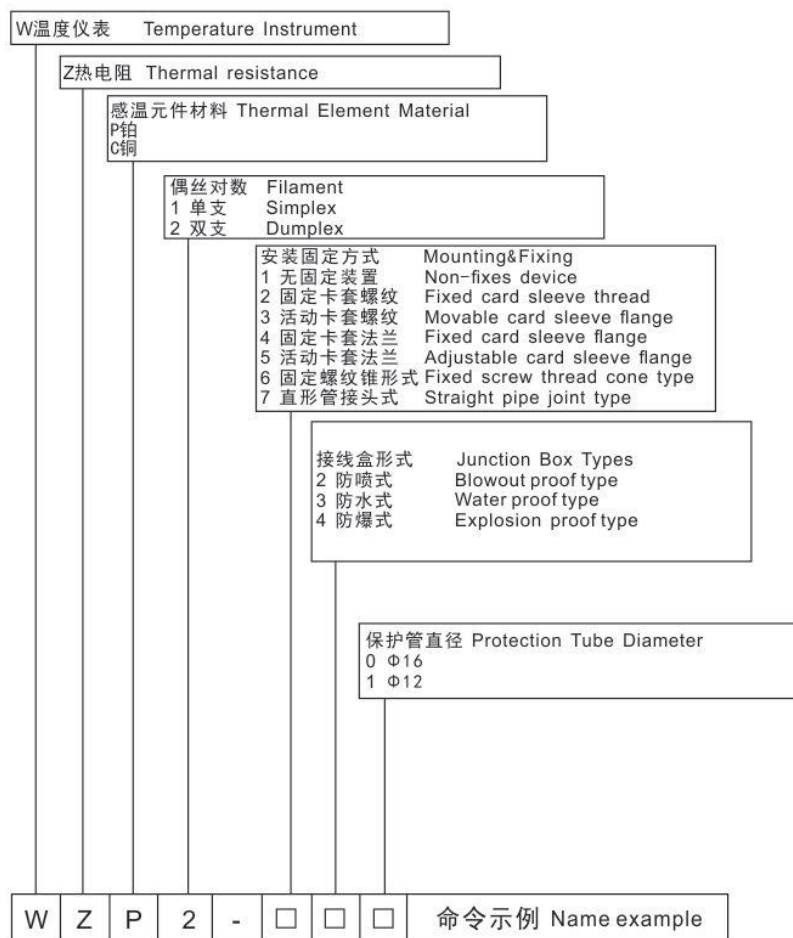


热电阻使用说明书

Operation Instruction for Thermal Resistance



装配热电阻
Assembled thermal resistance

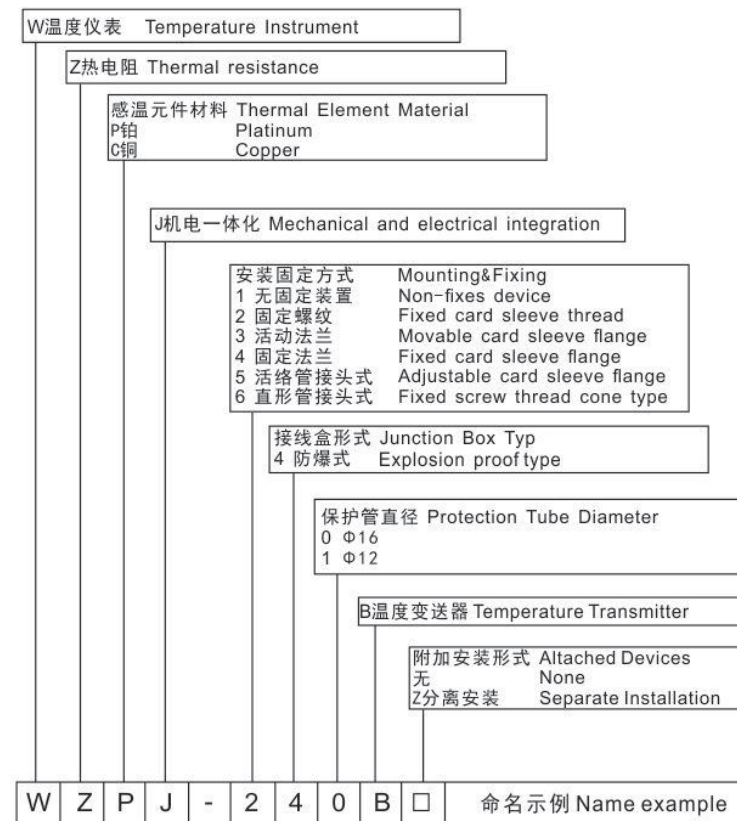


热电阻使用说明书

Operation Instruction for Thermal Resistance



一体化式
Integrated



十一. 订货须知 Ordering instruction

1. 订货时须写明产品的型号、测量范围、安装方式、保护管长度、直径、精度级别等技术参数；

2. 用户有特殊要求时，须注明。

1.Product model, measurement range, installation, length of the protective pipe, diameter, accuracy level and other technical parameters must be indicated when ordering.

2.Special requirements of users shall be indicated.