盾安自动化
Dun'an Automation

热 电 偶 （ 阻 ） 使 用 说 明 书

Instructions for use of thermocouple (resistance)

安徽盾安自动化仪表科技有限公司

Anhui Dun 'an Automation Instrument Technology Co. , Ltd.

耐磨热电偶（阻）

Wear-resistant thermocouple (resistance)

安徽盾安自动化仪表科技有限公司独家配方的 G 系列耐磨保护管，是水泥厂系列窑头，窑尾，分解炉，下料管，烟石和电厂系列循环流化床锅炉，沸腾锅炉，粉磨煤机造气炉及化工，冶炼等高温耐磨环境较为理想的高新技术类专用产品，G 系列采列博彩众长，采用独特的工艺配方，在失态平衡中制作出耐磨合金。该产品与普通不锈钢金属，金属陶瓷保护管，市场上同类耐磨合金保护管相比，其使用寿命明显提高，由于环境温度，温控点温度过高，振动较大，鼓风机风速过高，磨损严重，造成温度测量非常困难，使用寿命很短暂，一般的耐磨合金只有 4-10 天就磨透损坏，烧弯，折断，造成热电偶损坏，给用户带来很大的生产成本和不必要的麻烦，本公司生产的 G 系列恰好弥补了这一缺点。

Anhui Dun'an Automation Instrument Technology Co., Ltd.'s G-series wear-resistant protective tubes, developed with exclusive formulas, are ideal high-tech specialized products for high-temperature wear-resistant environments in cement plants (such as kiln heads, kiln tails, decomposing furnaces, material feed pipes, and exhaust stacks) and power plants (including circulating fluidized bed boilers, bubbling boilers, pulverized coal gasifiers, as well as chemical and metallurgical industries). The G-series combines the strengths of various materials, utilizing unique process formulations to produce wear-resistant alloys through dynamic equilibrium. Compared to ordinary stainless steel metal, metal-ceramic protective tubes, and other wear-resistant alloy protective tubes on the market, this product significantly extends service life. In environments with excessively high ambient temperatures, temperature control point temperatures, or severe vibration, as well as high blower airspeeds, wear is extreme, making temperature measurement extremely difficult and resulting in short lifespans—typical wear-resistant alloys only last 4-10 days before wearing through, bending, or breaking, causing thermocouple damage and imposing substantial production costs and unnecessary troubles on users. The G-series produced by our company precisely addresses these shortcomings.

G 系列抗冲刷，耐磨热电偶经过几百家，数万支的使用，反应很好，在很多场合具有领先同行的实力，该产品具有抗振，耐磨，耐腐蚀，灵敏度高，稳定性好，准确性高，使用寿命长等优点，是目前，水泥厂，电厂，化工冶炼厂等高温耐磨领域首选温度测量保护管。目前推出多种系列，化工、电厂专用钨钴合金，水泥厂回转窑专用，钼铬合金，钴钼合金等，与市场上同类产品性价比相比本产品大大优越。在水泥厂其使用寿命提高 1-5 倍。在电厂烟道系统使用中，耐磨套管使用寿命是 1-3 年，在恶劣环境下可使用 6 个月。

测温元件耐磨套管的材质结构是由耐磨头与套管连接，耐磨头材质是由含钴，钼，镍，铬，锰等多种元素的合金和陶瓷喷涂工艺 Aluminium oxide 制成。采用独特的工艺配方，在失态平衡中整体浇铸制作出耐磨合金钢套管。

The G series anti-erosion and wear-resistant thermocouples have been well-received after hundreds of applications and tens of thousands of installations, demonstrating superior performance in many scenarios and leading the industry. These products feature advantages such as vibration resistance, wear resistance, corrosion resistance, high sensitivity, excellent stability, high accuracy, and long service life, making them the preferred temperature measurement protective tubes in high-temperature and wear-resistant fields like cement plants, thermal power plants, and chemical metallurgical plants. Currently, multiple series are available, including tungsten-cobalt alloy for chemical and thermal power plants, specialized versions for cement rotary kilns, molybdenum-chromium alloy, and cobalt-molybdenum alloy. Compared to similar products on the market, this product offers significantly better cost performance. In cement plants, its service life is extended by 1-5 times. In thermal power plant flue gas systems, the wear-resistant protective tubes last 1-3 years, and can endure 6 months in harsh environments.

The material structure of the wear-resistant sleeve for temperature measurement elements consists of a wear-resistant head connected to the sleeve. The wear-resistant head is made of a composite material formed by spraying an alloy and ceramic containing elements such as cobalt, molybdenum, nickel, chromium, and manganese, along with aluminum oxide. Using a unique process formula, the wear-resistant alloy steel sleeve is cast as a whole under unbalanced conditions.

G 系列耐磨产品具体技术指标

测量范围：0-1250℃

保护管洛氏硬度：HRC≥60

插深：300-800mm 900~1500mm

适用范围：电厂、水泥厂、化工厂、冶炼厂等

适用丝材：E、K、N、S 镍铬、镍硅、铂铑等

装配内芯：铠装瓷芯

规格：内芯Φ6、Φ8、外套管 16-34

耐磨头 L200-600

G 系列-1 、－2、 -2A、 －2B、 －2C、

A 中温 0~800℃超强耐磨，防腐，磨煤机

B 高温 0~1150℃水泥厂防腐、耐磨

C 高温耐磨 0~1250℃特殊场合，耐磨、抗震

-1 普通型、-2 高温 0~1100℃电厂

执行标准如下：

IEC 584	热电偶，热电阻
GB/T 16839-1997	热电偶，热电阻
JB/T 9238-1999	工业热电偶技术条件
GB/T18404-2001	铠装热电偶电缆及铠装热电偶
JB/T 5582-1991	铠装热电偶，热电阻
GB 4208-1993	外壳防护等级
HG 20592-1997	钢制管法兰型式、参数
ASME/ANSI-B16.5	管法兰及法兰配件标准
GB/T 15464-1995	仪器仪表包装通用技术条件
JB/T 9329-1991	仪器仪表运输、贮存试验方法

Specific technical indicators of G series wear-resistant products

Measurement range: 0-1250 ℃

Protective tube Rockwell hardness: HRC ≥ 60

Insertion depth: 300-800mm, 900-1500mm

Scope of application: power plants, cement plants, chemical plants, smelters, etc

Applicable wire materials: E, K, N, S nickel chromium, nickel silicon, platinum rhodium, etc

Assembly core: Armored ceramic core

Specifications: Inner core with a diameter of 6 and 8, outer sleeve with a diameter of 16-34

Wear resistant head L200-600

G series -1, -2, -2A, -2B, -2C

A medium temperature of 0-800 ℃, super wear-resistant, anti-corrosion, coal mill

B High temperature 0~1150 ℃ Cement plant anti-corrosion and wear-resistant

C High temperature wear-resistant 0~1250 ℃ Special occasions, wear-resistant and earthquake resistant

-1 ordinary type, -2 high temperature 0~1100 ℃ power plant

Execution standards:

IEC 584 Thermocouples, Thermistors

GB/T 16839-1997 Thermocouples, Thermistors

JB/T 9238-1999 Technical Conditions for Industrial Thermocouples

GB/T18404-2001 Armored Thermocouple Cables and Armored Thermocouples

JB/T 5582-1991 Armored Thermocouples, Thermistors

GB 4208-1993 Degrees of Protection Provided by Enclosures

HG 20592-1997 Steel Pipe Flange Types and Parameters

ASME/ANSI-B16.5 Standard for Pipe Flanges and Flange Accessories

GB/T 15464-1995 General Technical Conditions for Packaging of Instruments and Meters

JB/T 9329-1991 Test Methods for Transportation and Storage of Instruments and Meters

参数及规格：

Parameters and specifications

分度号 Graduation	测温范围℃ Measuring range	公称压力 nominal pressure	流速 velocity of flow	规　格 specifications	
				d	L×l
K	0～1300	≤10Mpa	≤100m/s	Φ16 Φ25	300×150 350×200 400×250 450×300 500×350
E	0～900				
Pt100	-200～500				
S	0-1600				
B	0-1800				
K	0～800	≤30Mpa	≤80m/s	Φ15	550×400 650×500 900×750 1150×1000
E	0～800				
Pt100	-200～500				

测温范围及允差

Measuring Range & Tolerance

型号 Type	分度号 Graduation	允差等级　Tolerance Class			
		I (A)		II (B)	
		允差值 Tolerance Value	测温范围 ℃ Measuring Range	允差值 Tolerance Value	测温范围 ℃ Measuring Range
DAWRN	K	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
DAWRE	E	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~800	±0.0075|t|	333~900
DAWZP	PT100	±0.15+0.002|t|)	-200～+500	±(0.30+0.005|t|)	-200～+500
DAWRP	S	±1℃	0~+1100	±1.5℃	0-600
		±[1+0.003(t-1100)]	1100~1600	±0.0025|t|	600-1600
DAWRR	B	Ⅲ ±4℃	600~800	±1.5℃	600-1700
		±0.005t	800~1700	±0.0025|t|	

G 系列耐磨套管材质

G series wear-resistant liner material

1、坞钴合金：钨（W）82%　钴（Co）15%　铁和其他杂质 3%

2、钴 60 合金：钴（Co）55~60%　铬（Cr）25~30%，钼（Mo）5~8%，镍（Ni）1~3%，钨（W）0~1%.

3、钴 43 合金：钴（Co）40~45%　铬（Cr）16~22%，钼（Mo）0~1%，镍（Ni）8~10%，钨（W）10~14%.

4、钴 20 合金：钴（Co）18~22%　铬（Cr）25~30%，镍（Ni）18~22%，钨（W）3~5%.

5、钼铬合金:铬 Cr　26-30% 镍 Ni15-20% 钼 Mo　2-3% 钨 W 3-4% 锰 Mn 1-2%

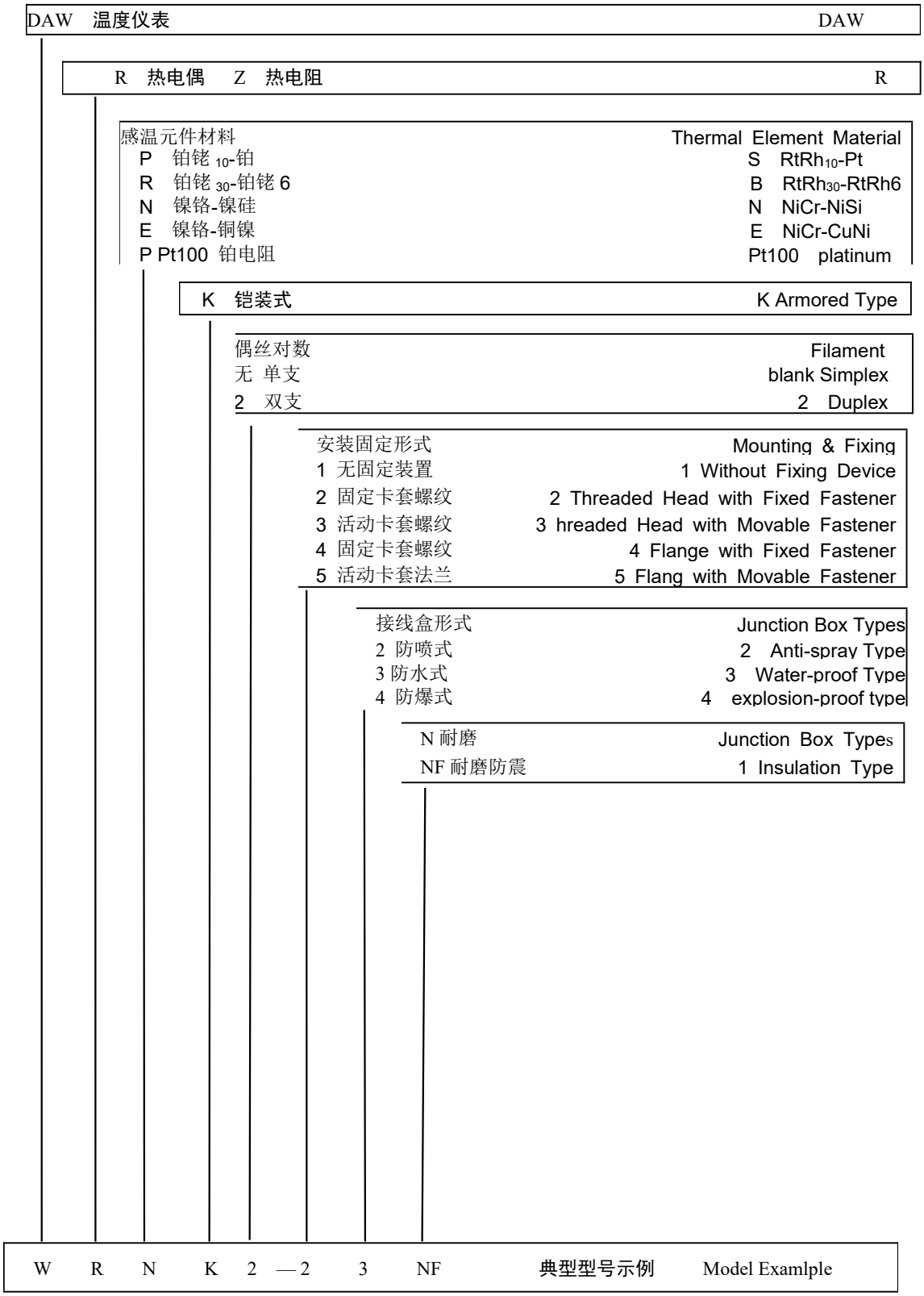
6、镍合金碳化钨喷涂：镍 65%（Ni）　碳化钨（WC）60+35%

7、镍 Ni0.31，钼 Mo0.58,铁 Fe6148,锆 Zr6.63,锌 Zn3.77,钛 0.91,钽 Ta0.34,锰 Mn0.91,铪 Hf0.42,铬 Cr24.34,金 Au0.26,

8、铬 Cr24 25-30% 镍 Ni18-22% 钴（Co）18~22% 钨（W）3~5%.

型号命名方法

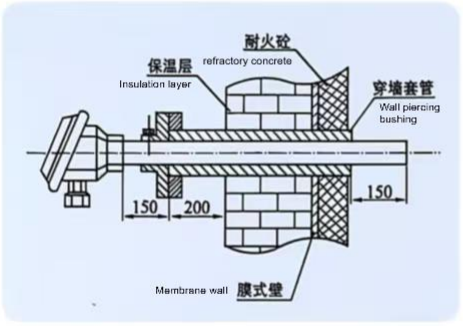
Type Naming Method



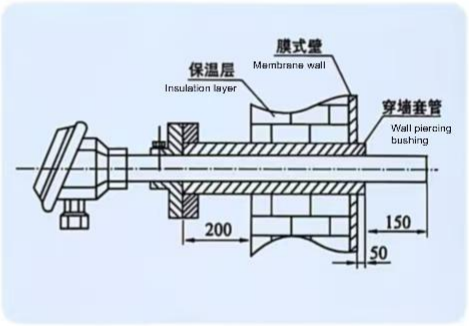
循环硫化床锅炉专用高温穿墙套管、耐磨热电偶安装图

High temperature through wall tube for circulating fluidized bed boiler, abrasion resistant thermocouple installation diagram

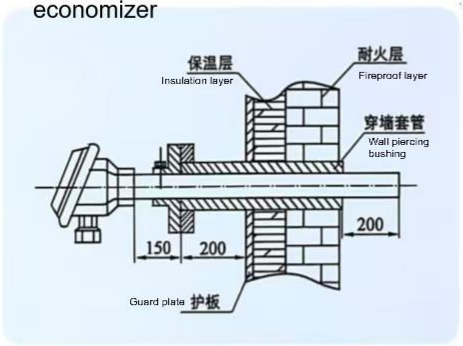
料层、沸腾层上部
Feed layer; upper boiling layer



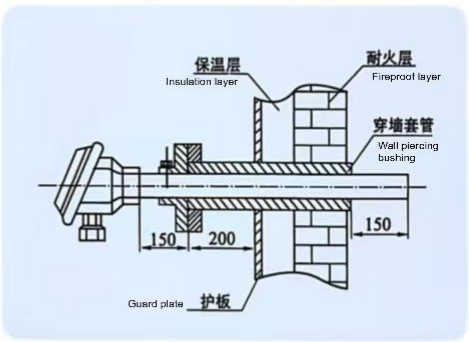
炉膛中、上部
In the furnace, upper part



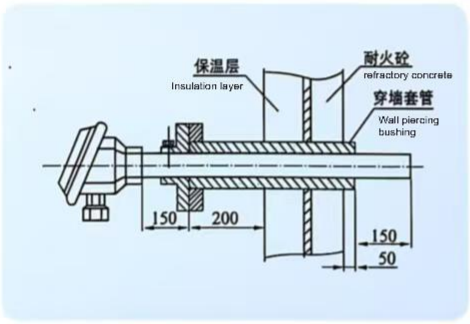
高、低温过热器、省煤器
High and low temperature superheater, economizer



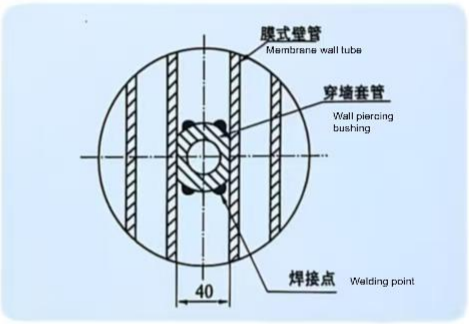
炉料器、分离器
Charge distributor; separator



风室
Wind chamber



膜式壁安装
Membrane wall installation



1、在布风板上竖装耐磨热电偶，虽检温精度高，但造价高，寿命短，安装复杂，运行时无法更换，不能安全运行。

2、斜装耐磨热电偶因置入误差，不能精确检测到应测的温度。

（以上两种安装方式不易提倡推广）

1. Vertical installation of abrasion-resistant thermocouple on the blast furnace wind board has high temperature measurement accuracy, but it is expensive, a short service life, is complicated to install, cannot be replaced during operation, and cannot operate safely.
2. The oblique installation of abrasion-resistant thermocple cannot detect the temperature to be measured due to positioning error.
(The above two installation methods are not easy to advocate and promote)

1、料层温度
Laver temperature

2、沸腾层上部
Upper boiling layer

3、炉膛中部
Mid-furnace

4、炉膛出口
Boiler outlet

5、分离器
Separator

6、返料器
Return material device

7、高温过热器
High temperature superheater

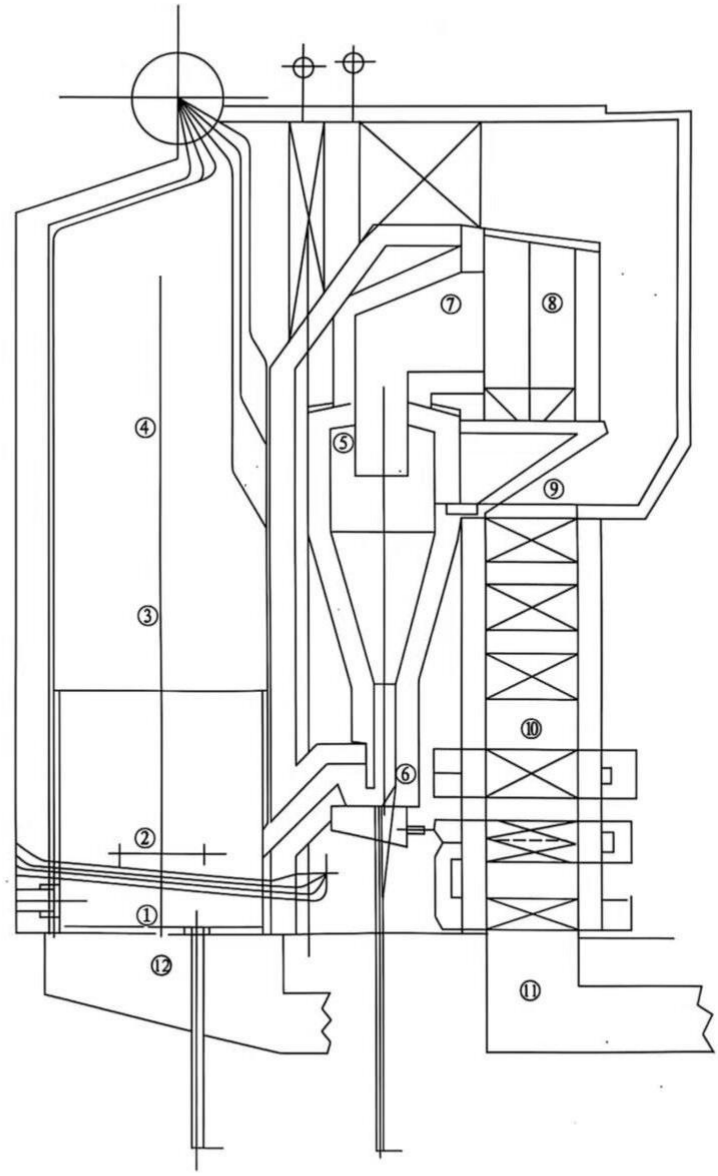
8、低温过热器
Low temperature superheater

9、省煤器前
Before economizer

10、省煤器后
After economizer

11、锅炉出口
Boiler outlet

12、风室
Wind chamber



测点安装，详见循环硫床锅炉专用高温穿墙套管，耐磨热电偶安装图。
抗振耐磨热电偶(阻)分布示意图仅供参考

Measurement point installation, see the installation diagram of the special high-temperature through-wall sleeve for circulating fluidized bed boiler, and the installation diagram of the abion-resistant thermocouple.
The seismic and abrasion-resistant thermocouple (resistance) distribution schematic is for reference only.

装配热电偶
Assembly Thermocouple

应用

通常和显示仪表、记录仪表、电子计算机等配套使用。直接测量各种生产过程中的 0℃～1800℃范围内液体、蒸汽和气体介质以及固体表面温度。

特点

1、装配简单，更换方便；

2、压簧式感温元件，抗振性能好；

3、测量范围大；

4、机械强度高，耐压性能好；

工作原理

热电偶的电极由两根不同导体材质组成。当测量与参比端温差时，就会产生热电势，工作仪表便显示出热电势所对应的温度值。

主要技术参数

产品执行标准

IEC584

JB/T9238

常温绝缘电阻

热电偶在环境温度为 20±15℃，相对湿度不大于 80%，试验电压为 500±50V（直流）电极与外套管之间的绝缘电阻≥1000MΩ·m

Application

It is usually connected with displaymeter,recording meter and computer,etc,to directly measure temperature ofliquid,vapor,gas and solid surface ranging from 0℃to 1800 ℃ during various production process.

Features

1、Easy assembly and convenient for replacement

2、Spring thermal element with good shock-proof performance

3、Wide measuring range

4、 Hight mechanical strength,good press-resistant performance

Operation Theory

The electrodes of assmbly thermocuple are made of different materials. The temperature difference between measuring end and reference end results in pyroelecric potentail,then displaymeter indicates the corresponding temperature to the pyroelectic potential.

Main Techmical Parameters

Executive Standard

IEC584

JB/T9238

Insulation Resistance at Normal Temperature

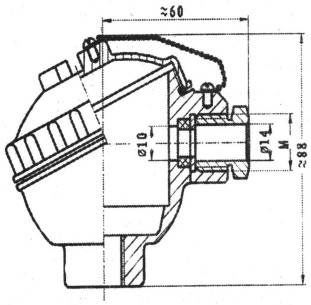
The insulation resistance between electrode and protection tube of assembly thermocouple shall be no than 1000 MΩ · m under condition that environment temeperature is 20±15℃,relative is no more than 80%, and testing voltage is D.C.500±50V

测温范围及允差

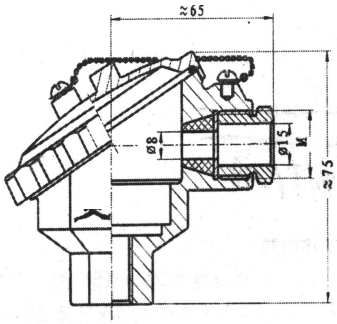
Measuring Range & Tolerance

型号 Type	分度号 Graduation	允差等级 Tolerance Class			
		I		II	
		允差值 Tolerance Value	测温范围 ℃ Measuring Range	允差值 Tolerance Value	测温范围 ℃ Measuring Range
WRN	K	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
WRM	N	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
WRE	E	±1.5℃	-40~375	±2.5℃	-40~333
		±0.004|t|	375~800	±0.0075|t|	333~900
WRF	J	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~750	±0.0075|t|	333~750
WRC	T	±0.5℃	-40~+125	±1.0℃	-40-133
		±0.004|t|	125~350	±0.0075|t|	133-350
WRP	S	±1℃	0~+1100	±1.5℃	0-600
		±[1+0.003(t-1100)]	1100~1600	±0.0025|t|	600-1600
WRQ	R	±1℃	0~+1100	±1.5℃	0-600
		±[1+0.003(t-1100)]	1100~1600	±0.0025|t|	600-1600
WRR	B	III ±4℃	600~800	±1.5℃	600-1700
		±0.005t	800~1700	±0.0025|t|	

接线盒形式 Junction Box

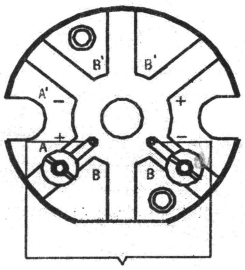


防喷式 Anti-spray Type

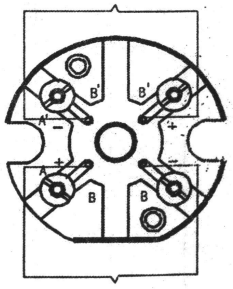


防水式 Water-proof Type

接线方式 Wiring Method



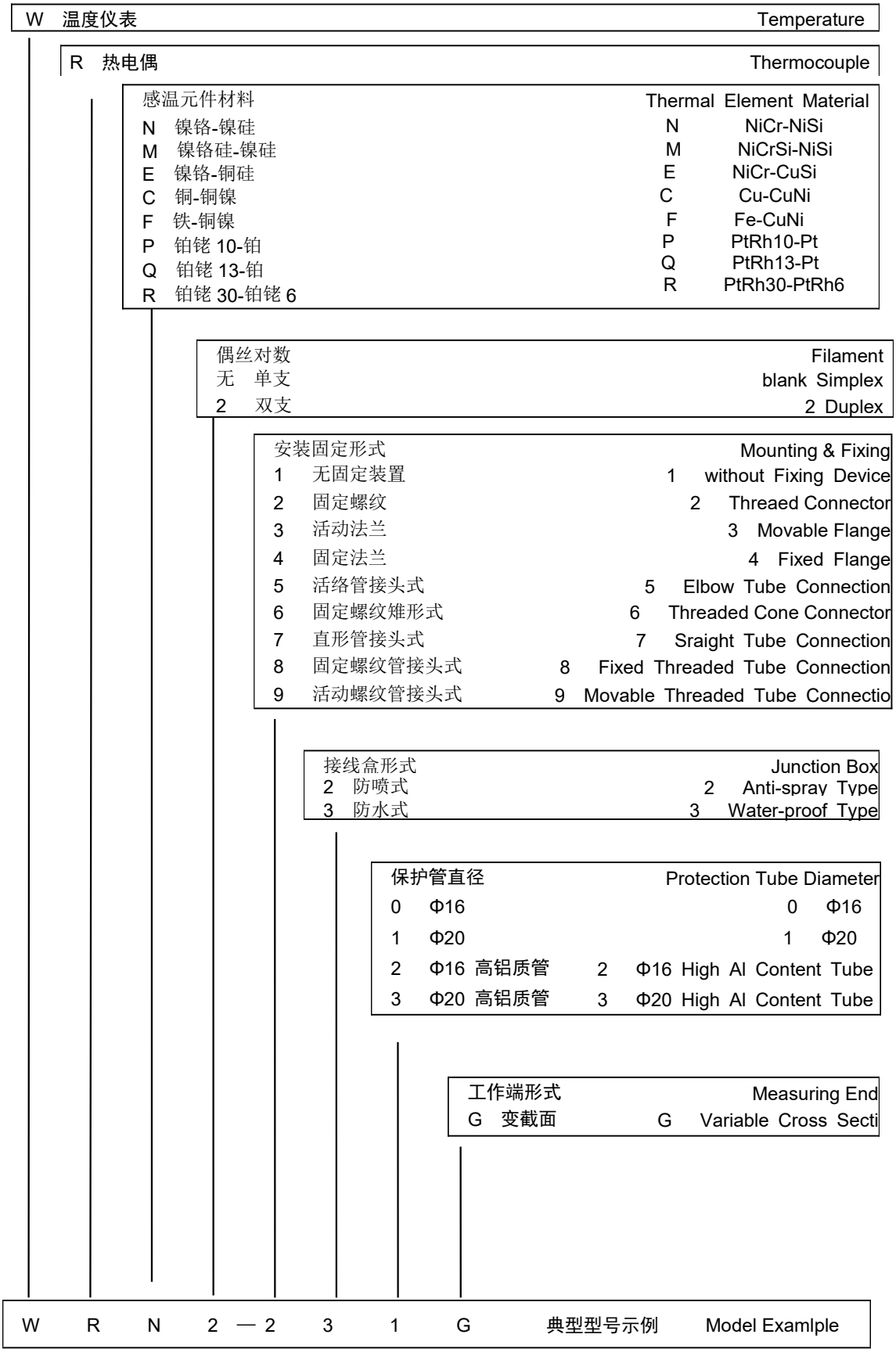
单支接线方法
Wiring Method(simplex)



双支接线方法
Wiring Method(duplex)

型号命名方法

Type Naming Method



铠装热电偶
Armored Thermocouple

应用

通常和显示仪表、记录仪表、电子计算机等配套使用。直接测量各种生产过程中的0℃～1300℃范围内液体、蒸汽和气体介质以及固体表面温度。

Application

It is usually connected with display meter,recording meter and computer,etc,to directly measure temperature of liquid,vapor,gas and solid surface ranging from 0℃to 1300 ℃ during various production process.

特点

1、热响应时间少，减少动态误差；
2、可弯曲安装使用；
3、测量范围大；
4、机械强度高，耐压性能好；

Features

1、With quick response,reducing dymamic error
2、Optional installtion methods
3、Wide measuring range
4、High mechanical strength,good press-resistant performance

工作原理

铠装热电偶的电极由两根不同导体材质组成。当测量端与参比端存在温差时，就会产生热电势，工作仪表便显示出热电势所对应的温度值。

Operation Theory

The electrodes of assmbly thermocuple are made of different materials. The temperature difference between measuring end and reference end results in pyroelecric potentail,then displaymeter indicates the corresponding temperature to the pyroelectic potential.

主要技术参数

产品执行标准
IEC584
GB/T18404

Main Techmical Parameters

Executive Standard
IEC584
GB/T18404

常温绝缘电阻

铠装偶在环境温度为20±15℃，相对湿度不大于80%，试验电压为500±50V（直流）电极与外套管之间的绝缘电阻≥1000MΩ·m。

即1m长的试样的绝缘电阻为1000MΩ；
10 m长的试样的绝缘电阻为100MΩ.

Insulation Resistance at Normal Temperture

The insulation resistance between electrode and protection tube of armored thermocouple is no less than 100M. Ω under condition that environment temperature is 20±15℃,relative humidity is no more than 80%,and voltage is D.C.500±50V.

The insulation resistance of 1m long tested sample is 1000MΩ.and than of 10 m long tested sample is

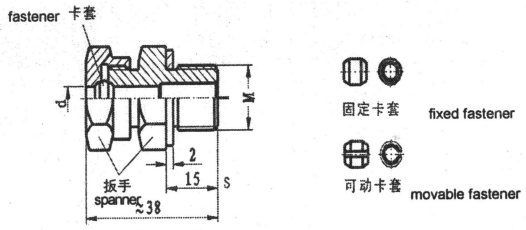
测温范围及允差 Measuring Range & Tolerance

型号 Type	分度号 Graduation	允差等级 Tolerance Class			
		I		II	
		允差值 Tolerance Value	测温范围℃ Measuring Range	允差值 Tolerance Value	测温范围℃ Measuring Range
WRNK	K	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
WRMK	N	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
WREK	E	±1.5℃	-40~375	±2.5℃	-40~333
		±0.004|t|	375~800	±0.0075|t|	333~900
WRFK	J	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~750	±0.0075|t|	333~750
WRCK	T	±0.5℃	-40~+125	±1.0℃	-40~+133
		±0.004|t|	125~350	±0.0075|t|	133~350
WRPK	S	±1℃	0~+1100	±1.5℃	0-600
WRQK	R	±[1+0.003(t-1100)] ℃	1100~1600	±0.0025|t|	600-1600

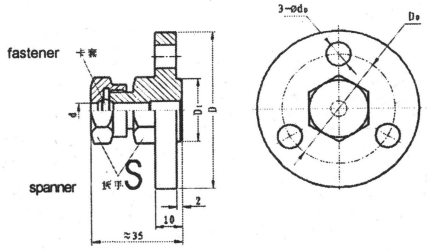
偶丝形式 Filament Form		单支式 simplex ○	双支式 duples○
套管直径 Tube Diameter		Φ2 Φ3 Φ4 Φ5 Φ6 Φ8	Φ3 Φ4 Φ5 Φ6 Φ8
套管材质 Tube Material	E、J、T	1Cr18Ni9Ti	1Cr18Ni9Ti
	K、N	1Cr18Ni9Ti GH3030	1Cr18Ni9Ti GH3030
	S、R	GH3039	GH3039

套管直径及材料 Tube Diameter & Materal

卡套螺纹接头 threaded head wit fastener



卡套法兰盘 flange with fastener

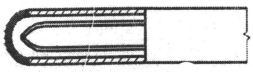


安装固定形式 Installation Figure

代号和尺寸 Code&Size	铠装偶外径 Outer Diameter of Armored Thermocouple	
	Φ8 Φ6 Φ5	Φ4 Φ3 Φ2
M	M16×1.5	M12×1.5
S	22	19

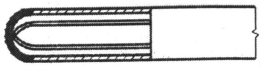
代号和尺寸 Code&Size	铠装偶外径 Outer Diameter of Armored Thermocouple	
	Φ8 Φ6 Φ5	Φ4 Φ3 Φ2
D	Φ60	Φ50
D_0	Φ42	Φ36
D_1	Φ24	Φ20
S	Φ22	Φ19
d_0	Φ9	Φ7

测量端结构形式 Measuring End Structure



绝缘式

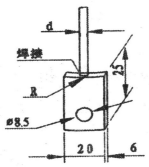
Insulation Type



接壳式

Shell-connecting Type

附加装置形式 Attached Devices

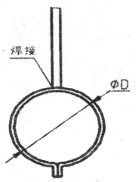


接触块式（代号 M）

Contacting Block Type (Code M)

注：选型时应注明 R 大小（即管壁或炉壁直径）

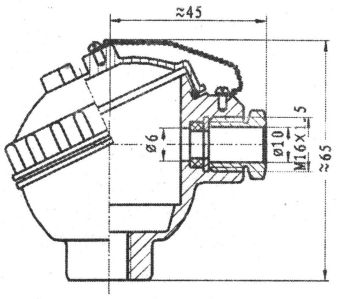
Remarks: Size R should be indicated in ordering.(diameter of tube wall or boiler wall)



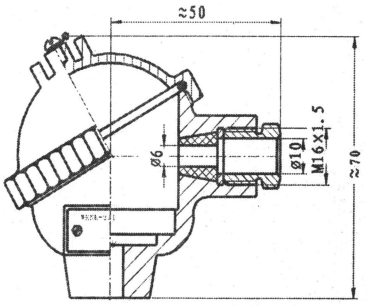
包箍式(代号 G)

Hoop Type (Code G)

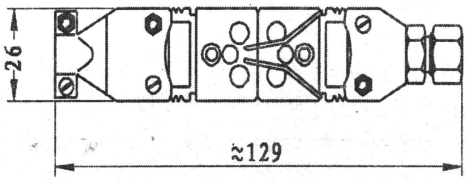
接线盒形式　Juction Box Figures



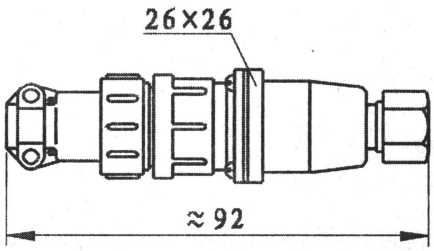
防喷式　Anti-spray Type



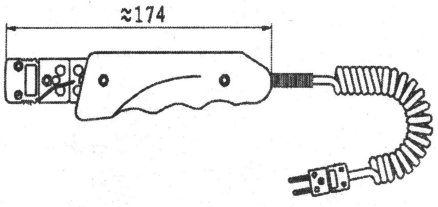
防水式　Water-proof Type



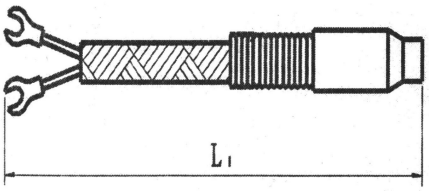
圆接插式　Round Plug Type



扁接插式　Flat Plug Type



手柄式　Handle Type



带补偿导线式　with Compensational Wire

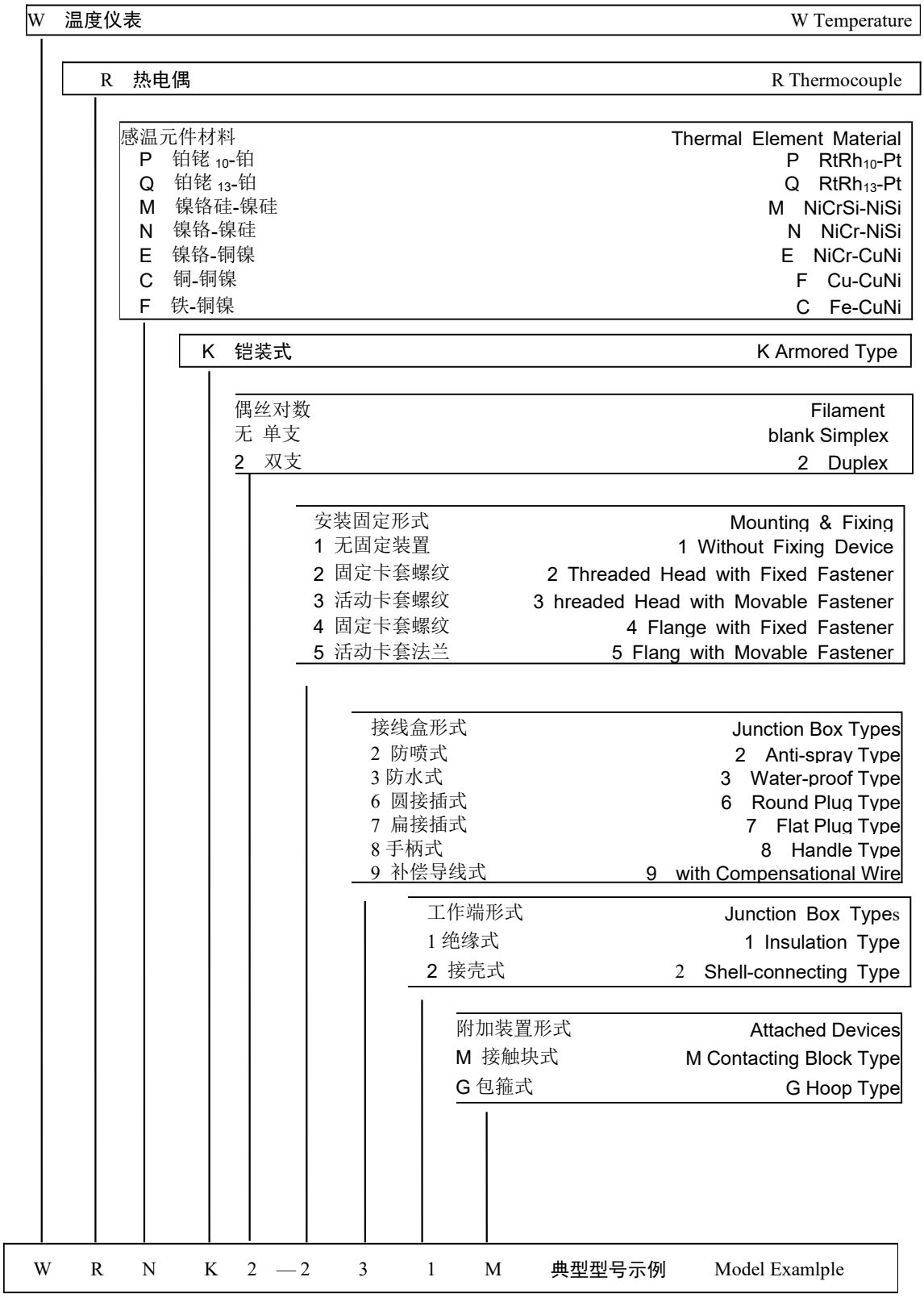
铠装热电偶推荐使用温度

Operation Temperature Recommended of Armored Thermocouple

品种 Category	套管材料 Tube Material	外径 Outer Diameter	使用温度（℃）Operation Temperature	
			长期使用 Long Term	短期使用 Short Term
镍铬-镍硅 NiCr-NiSi	1Cr18Ni9Ti	2.0	600	700
		3.0,4.0,5.0,6.0,8.0	800	900
	GH3030	2.0,3.0	800	900
		4.0,5.0	900	1000
		6.0,8.0	1000	1100
镍铬硅-镍硅 NiCrSi-NiSi	1Cr18Ni9Ti	2.0	600	700
		3.0,4.0,5.0,6.0,8.0	800	900
	GH3030	2.0,3.0	900	1000
		4.0,5.0	1000	1100
		6.0,8.0	1100	1200
	GH3039	2.0,3.0,4.0	1000	1100
		5.0,6.0,8.0	1100	1200
镍铬-铜镍 NiCr-CuNi	1Cr18Ni9Ti	2.0,	500	600
		3.0,4.0,5.0	600	700
		6.0,8.0	700	800
铁-铜镍 Fe-CuNi	1Cr18Ni9Ti	2.0	400	500
		3.0,4.0,5.0	500	600
		6.0,8.0	600	750
铜-铜镍 Cu-CuNi	1Cr18Ni9Ti	2.0,3.0,4.0	250	300
		6.0,8.0	300	350
铂铑 10-铂 PtRh10-Pt 铂铑 13-铂 PtRh13-Pt	GH3030	2.0,3.0,4.0	1000	1100
		5.0,6.0,8.0	1100	1200

型号命名方法

Type Naming Method



隔爆热电偶
Explosion-proof Thermocouple

应用

通常和显示仪表、记录仪表、电子计算机等配套使用。直接测量生产现场存在碳氢化合物等爆炸物的0℃～1300℃范围内液体、蒸汽和气体介质以及固体表面温度。

特点

1、多种隔爆形式，隔爆性能好；
2、压簧式感温元件、抗振性能好；
3、测量范围大；
4、机械强度高，耐压性能好；

工作原理

隔爆热电偶是利用间隙爆原理，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接线盒腔内，当腔内发生爆炸时，能通过接合面间隙熄火和冷却，使爆炸后的火焰和温度传不到腔外，从而进行隔爆。

主要技术参数

产品执行标准
IEC584
GB/T16839-1997
JB/T5518-1991
GB3836

常温绝缘电阻

热电偶在环境温度为20±15℃，相对湿度不大于80%，试验电压为500±50V（直流）电极与外套管之间的绝缘电阻≥1000MΩ·m

Application

It is usually connected with display meter,recording meter and computer,etc,to directly measure temperature of liquid,vapor,gas and solid surface ranging from 0℃to 1300 ℃with explosives such as hydrocarbon on production spot.

Features

1 Various explosion-proof types,good explosion-proof performance
2 Spring thermal element with good shock-resitant performance
3 wide measuring range
4 High mechanical strength.good pressure -resistant performance

Operation Theory

Explosion-proof thermocouple has a junction box of enough strength with gaps inside it.All spare parts which might produce spark,electric arc.and dangerous high temperature are sealed in the junction box,When explosion within the box happens,fire and high temperature caused by explosion could be extincted and cooled with the gap.Thus,explosion separation could be realized.

Main Technical Parameters

Executive Standand
IEC584
GB/T16839-1997
JB/T5518-1991
GB3836

Insulation Resitance at Normal Temperature

The insulation resistance between electrode and protection tube of the thermocouple shall be no less than 1000MΩ.m under condition that environment temperatrue is20±15℃,ralative humidity is no more than 80%,and testing volting isD.C.500V±50V

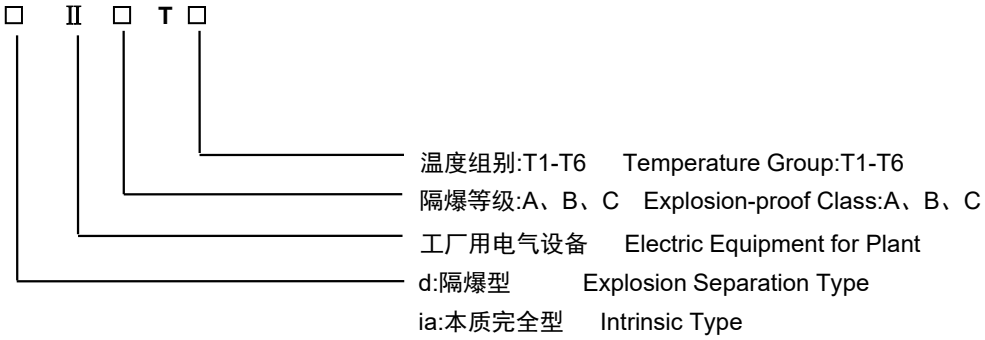
测温范围及允差

Measuring range & Tolerance

型号 Type	分度号 Graduation	允差等级 Tolerance Class			
		I		II	
		允差值 Tolerance Value	测温范围℃ Measuring Range	允差值 Tolerance Value	测温范围℃ Measuring Range
WRN	K	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
WRM	N	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~1000	±0.0075|t|	333~1200
WRE	E	±1.5℃	-40~375	±2.5℃	-40~333
		±0.004|t|	375~800	±0.0075|t|	333~900
WRF	J	±1.5℃	-40~+375	±2.5℃	-40~+333
		±0.004|t|	375~750	±0.0075|t|	333~750
WRC	T	±0.5℃	-40~+125	±1.0℃	-40-133
		±0.004|t|	125~350	±0.0075|t|	133-350

防爆分组形式

Indication of Explosion-proof Function



电气设备类别

Ⅰ类——煤矿井下用电气设备

Ⅱ类——工厂用电气设备

Electric Equipment Category

Ⅰ- Electric Equipment for Coal Mine Well

Ⅱ- Electric Equipment for Plant

隔爆等级

隔爆热电偶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分为 A、B、C 三级。

Explosion-proof Class

It is divided into grade A、Band C according to maximum test safety gap in explosive gas compound.

类别 Category	级别 Class	最大试验安全间隙（MESG）mm Max.Test Safety Gap
Ⅱ	A	0.9≤MESG
	B	0.5＜MESG＜0.9
	C	MESG≤0.5

温度组别

隔爆热电偶的温度组别按其外露部分允许最高面温度分为 T1-T6

Temperature Group

It includes T1-T6 according to the maximum temperature of open part.

温度组别 Temperature Group	允许最高表面温度℃ Max. Surface Temperature Allowed
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

防爆级别：Explosion-proof Class

EXd II□T□

EXia II□T□

防护等级：Protection Class

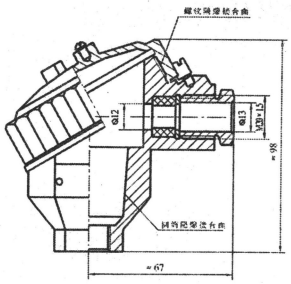
IP65

接线盒形式

Junction Box

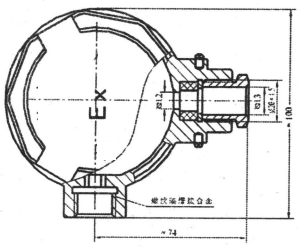
接线盒形式

Junction Box



d Ⅱ BT□级

Class d Ⅱ BT□

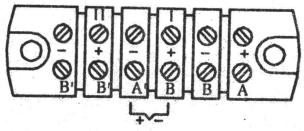


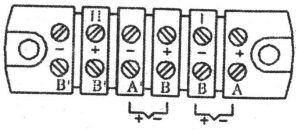
d Ⅱ CT□级

Class d Ⅱ CT□

安装端子形式

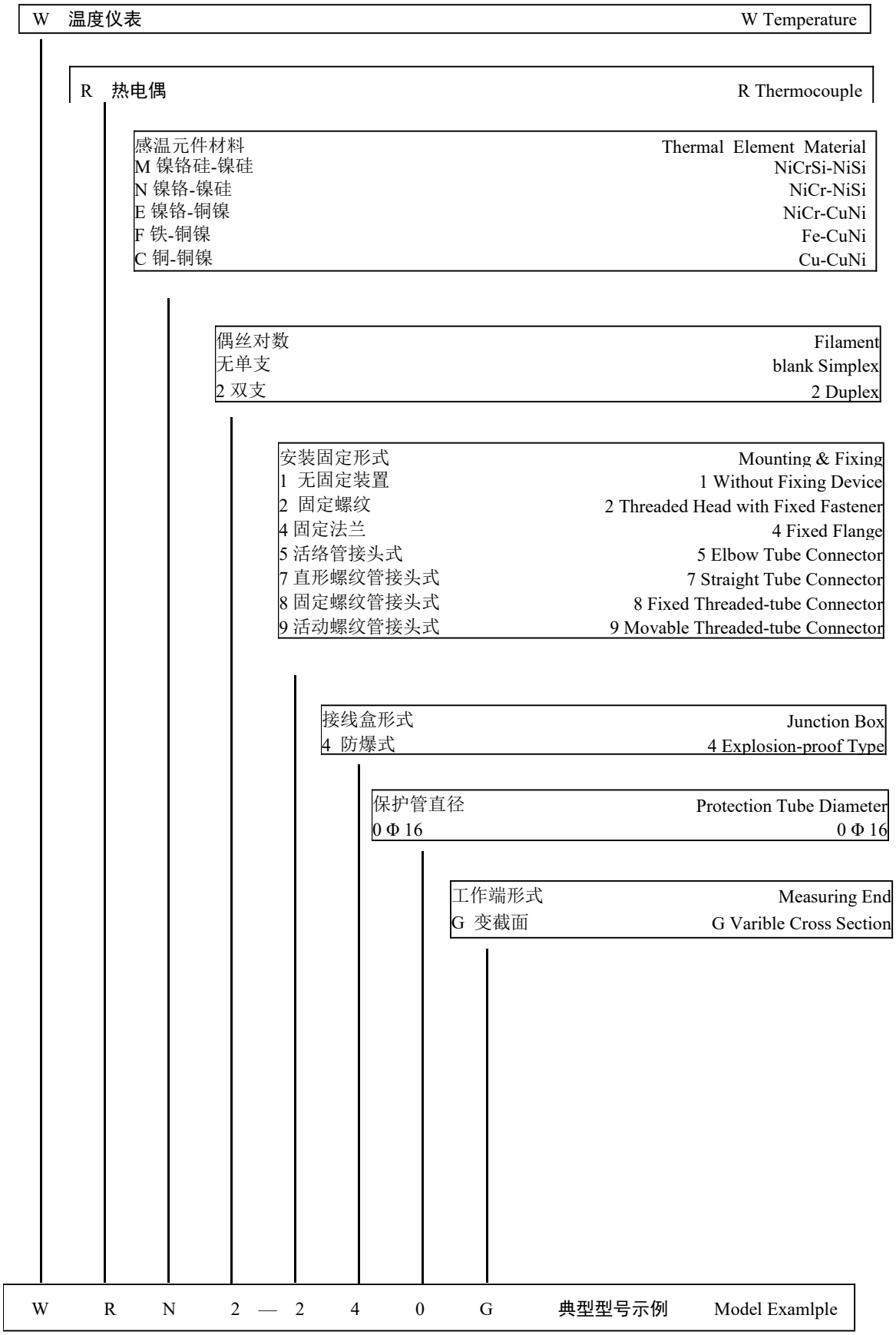
Terminal



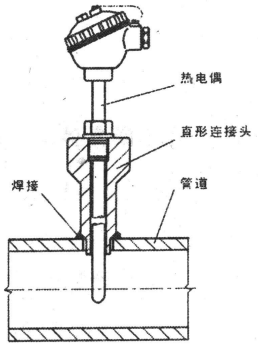


型号命名方法

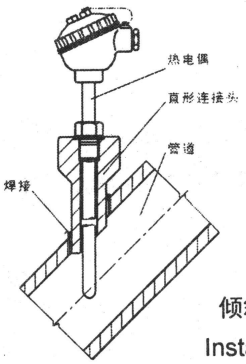
Type Naming Method



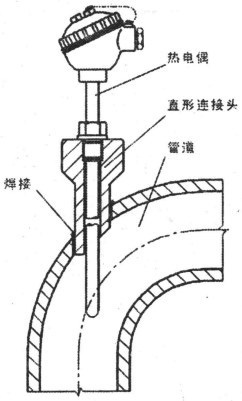
安装形式 Installation Figure



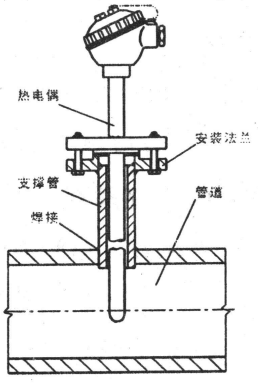
垂直管道安装形式
Installation in Horizontal Tube



倾斜管道安装形式
Installation in Sliding Tube



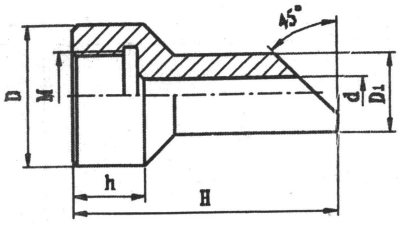
弯曲管道安装形式
Installation in Bending Tube



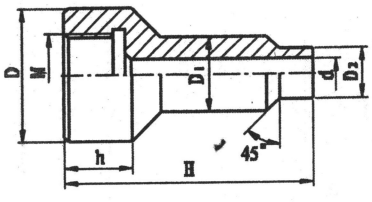
法兰安装形式
Flange Installation

直接连接头 Straight Connector

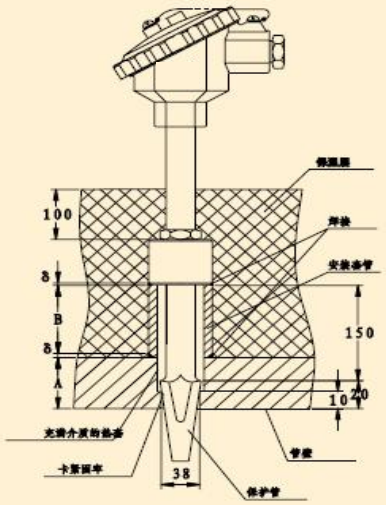
代号 Code	M	D	D_1	d	h	H
TH49A	M27*2	Φ47	Φ28	Φ18	30	90
TH49B	M33*2	Φ55	Φ36	Φ24	30	150
TH49C	NPT1/2	Φ39	Φ27	Φ16	30	90
TH49D	NPT3/4	Φ47	Φ31	Φ20	35	90
TH49E	NPT1	Φ47	Φ41	Φ30	40	150



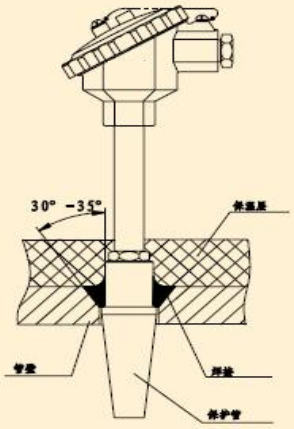
代号 Code	M	D	D_1	D_2	d	h	H
TH48A	M12*1.5	Φ32	Φ18	Φ12	Φ7	27	60.120
TH48B	M16*1.5	Φ36	Φ18	Φ14	Φ7	27	80
TH48C	M20*1.5	Φ40	Φ18	Φ14	Φ7	27	60
TH48D	M27*2	Φ47	Φ28	Φ22	Φ17	32	60
TH48E	M33*2	Φ55	Φ36	Φ30	Φ21	34	120
TH48F	NPT1/2	Φ39	Φ27	Φ21	Φ16	35	60 120
TH48G	NPT3/4	Φ47	Φ31	Φ25	Φ20	40	
TH48H	NPT1	Φ47	Φ41	Φ35	Φ30	45	



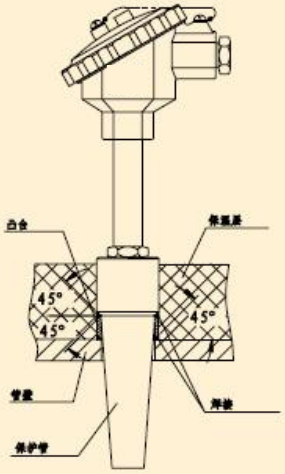
01T 型安装示意
01T Mounting figure



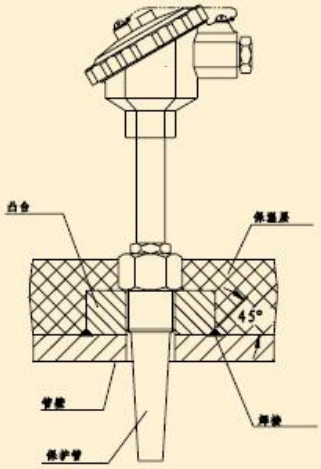
013 T 型安装示意
013T Mounting Figure

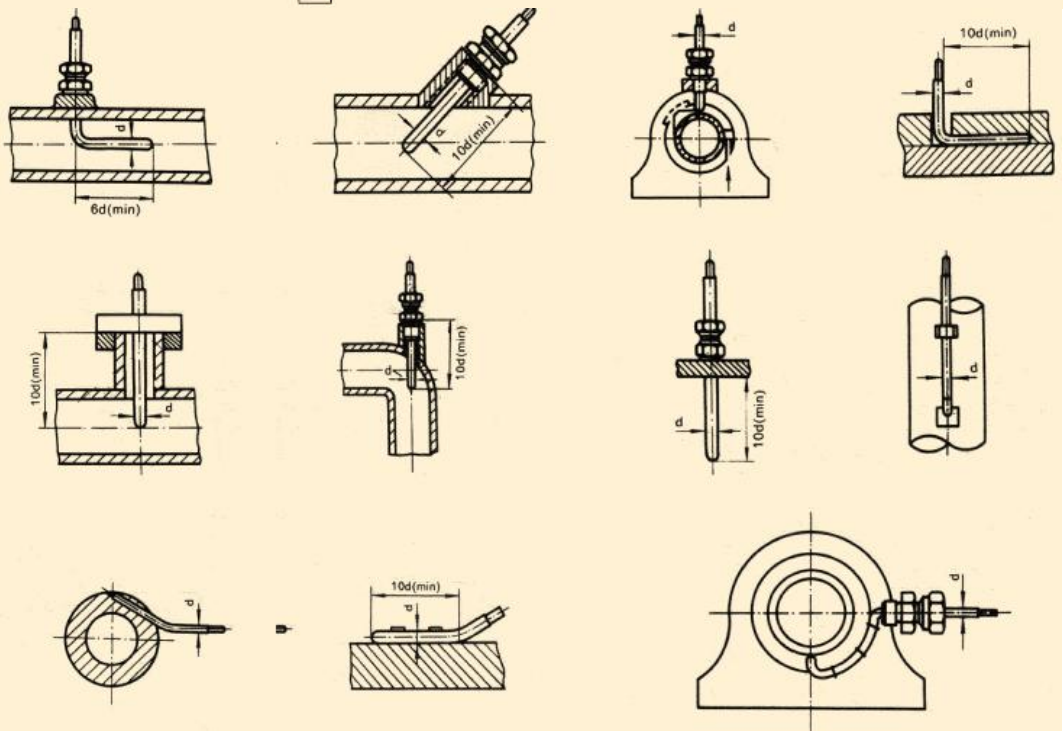


014 T 型安装示意
014T Mounting Figure



015 T 型安装示意
015T Mounting Figure





运输与贮存

热电偶及其附件在安装前,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%*，周围空气中不应含有可能使仪表零件腐蚀的介质。

Storage and transportation

Before fixing,the thernmocouple and its accesscries should be stored away from range shock .the suitable conditions for storage areas follows:temp form 10℃to 35℃ relative humidity less than 80%;awayfrom the corrosive circumstances.

During long-distance transportation,the thermcouple should be wellpackaged.

可能发生的故障及修理

序号	故障现象	可能原因	修理方法
1	热电动势比实际应有的小(测量仪表示值偏低)	(1)热电偶内部电极漏电(短路)。	(1)将热电偶的热电极取出，检查漏电原因，若因潮湿引起，应将热电极烘干，若是因保护管绝缘不良引起，应即予更换。
		(2)热电偶内部潮湿。	(2)将热电偶之热电极取出，把热电偶保护管和热电极分别烘干，并检查保护套管是否漏气，漏水等情况，对不合格的保护套管应予更换。
		(3)热电偶接线盒内接线短路。	(3)打开接线盒盖，清洁接线板，消除造成断路的原因，把接线盒严密拧紧。
		(4)补偿导线短路。	(4)将短路处重新缘缘或更换补偿导线。
		(5)热电偶热电极变质或测量端损坏。	(5)把变质部分剪去，重新焊接测量端或更换新的热电极。
		(6)补偿导线与热电偶的种类配置错误。	(6)换成与热电偶同种类的补偿导线。
		(7)补偿导线与热电极的极性接反。	(7)重新改接。
		(8)热电偶安装位置或受热长度不当。	(8)改变安装位置或方法及插入深度。
		(9)热电偶参比端温度过高。	(9)准确地进行参比端温度补偿。
		(10)热电偶种类与仪表刻度不一致。	(10)更换热电偶及补偿导线，使之与测量仪表种类相同。
2	热电动势比实际应有的大(测量仪表示值偏高)	(1)热电偶种类用错，与测量仪表不符。	(1)更换热电极，使之与测量仪表相符。

序号	故障现象	可能原因	修理方法
2	热电动势比实际应有的大（测量仪表示值偏高）	（2）补偿导线与热电偶种类不符。 （3）热电偶安装方法、位置或插入深度不当。	（2）换成与热电偶同类的补偿导线。 （3）改变热电偶安装方法、位置或插入深度。
3	测量仪表的示值不稳定（在测量仪表无故障情况下）	（1）热电偶接线柱和热电极接触不良。 （2）热电偶有断续短路或断续接地现象。 （3）热电极已断，或将断未断而有时断时连现象。 （4）热电偶安装不牢固，发生摆动。 （5）补偿导线有接地、断续路或断路现象。	（1）清洁接线盒和热电偶端部重新连接好。 （2）将热电极从保护管中取出，找出断续短路或接地地方，加以排除。 （3）重新焊接断开处，并检查其特性有否改变，对不合要求的应予更换。 （4）将热电偶牢固安装。 （5）找出接地、断续短路处加以修理或更换新的补偿导线。
4	热电偶热电动势变化	（1）热电极变质 （2）热电偶的安装位置或方法不当 （3）热电偶保护管表面积垢过多。	（1）更换新电极。 （2）改变安装位置或方法。 （3）拆下热电偶，清除保护管外面积垢。

Troubleshoting

order	Trouble	Possible cause	Remedy
1	The thermoemf is less than the practicai value (the readings of the display decice lower than the practical value)	(1) The thermocouple is short circuited. (2)there is moisture within the thermocouple. (3)the terminal in the terminal head shortcircuited. (4)The compensating wire shortcircuited. (5)Thermoelements have been deteriorated or measuring junction or measuring junction has been dmaged. (6)The compensating wires do not match the thermocouple.	(1)Take out and check thermoelements,if is caused by dampdry out the trermelements;if it is caused by poor insulation, porcelain tubes should be replaced. (2)Take out the thermoelements and dry out the protective tube and the thermoelements separately,then check the leakage of protective tube should be replaced. (3)Open the terminal head and clean the cause of shortcircuit, then terminal head. (4)nsulate the short-circuited part or change the compensation wires. (5)Cut the deteriorated part off and resoldered the measuring junction or replace the thermoelements. (6)Use appropriate compensating wires.

order	Trouble	Possible cause	Remedy
1		(7)The reverse polarity between the comoerstting wire and thermoelement (8)Fixing place or heated length is not approriate. (9)the temp atreference junction is too high. (10)The type of thermocouple is not identical with the graduation of display derice	(7)Make reconnection correctly. (8)Change the fixing place or method and insert depth. (9)Compensate the temp,at reference junction correctly. (10)Change the thermocouple and compensating wires to match measuring instuments.
2	The thermoEMF is greater than the practical val-ue(the display value is higher than the practial value)	(1)The type of thermocople do not conform to the meter. (2)The compensating cables do not conform to the thermocouple type. (3)The fixing method place and insert depth is not proper.	(1)Clean the terminal box and the ends of thermoelements and reconnect them. (2)Take out the elements from the protective tube and eliminiate the cause. (3)Joint the broken thermo
3	The reding of the display instrment are not stable(without failures)	(1)Poor contact between terminal and thermoelement for the thermocouple. (2)The thermocouple is in intermittent shortcircuit or earthing condition.	(1)Change the thermocouple to match the meter. (2)Change the compersating cable

order	Trouble	Possible cause	Remedy
3		(3)The thermoelements have broken or is on and off fixed firmly. (4)The thermocouple is not fixed firmly. (5)The compensating wire been has earthedshotcircuited or broken intermittly.	(3)Change the method,place and insert depth.elements and check its property. Replace it when necessary. (4)Repair or replace the compensating wire
4	The thermoemf is varying	(1)The thermoelement has deteriorated. (2)The fixing place or method is not appropriate. (3)More scale depositad on the surface of protective tube.	(1)Replace it with a new one. (2)Change the place or method. (3)Remove the thermocouple and clean outside wall of the protactive tube.

注：当发生以上故障情况时，应将补偿导线和接线盒分开，分别检查热电偶与补偿导线，待确定故障后，再进行处理。

note:When above failures happen in the thermocouple,campensating wire shoud be disconnected from the terminal head firstly,then check the thermocouple and compensatingcables separately and handle the failure when it is determined.