

## 隔爆热电阻、热电偶

## Explosion-proof tc and rtd (Eptc and eprtd)

在化学工业、石化业、天然气和冶金等生产现场常伴有各种易燃、易爆气体、蒸汽、使用普通的热电偶、热电阻容易引起环境气体爆炸。因此，必须使用隔爆型热电偶、热电阻用温度传感器，隔爆型热电偶、热电阻产品适用在dIIBT4和dIICT5温度级别区间内具有爆炸性气体的场所内使用。符合IEC60079标准，GB3836标准。

Regular TC and RTD may cause explosion in certain fields of production where there are inflammable and explosive gas and steam, in such case, EPTC and EPRTD must be used as temperature detector. This type of product is suitable to be used where the explosive vapor may be present in DIIBT4 and DIICT5 areas. It shall comply with IEC60079 standards and GB3836 standards.

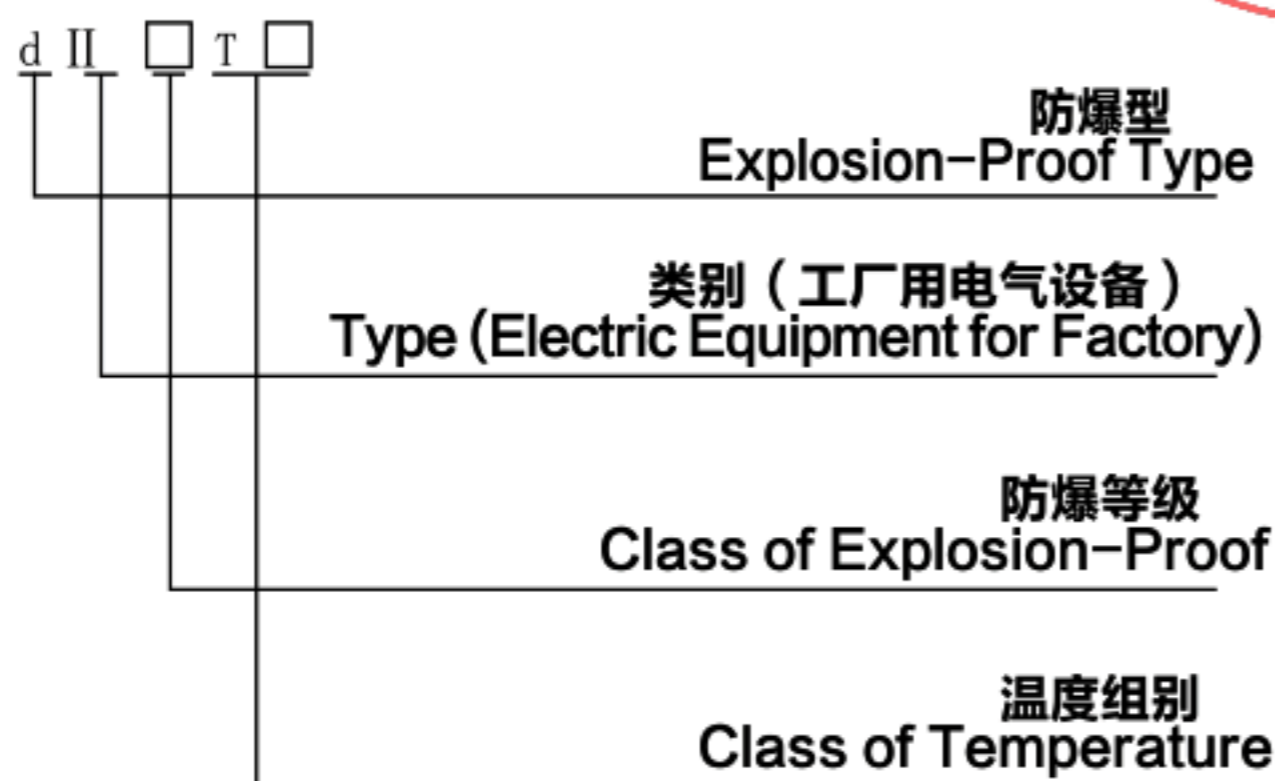


### 防爆标志、类别、级别和温度组别

Explosive mark, category, class and temperature class  
LABEL, TYPE, CLASS LF EP AND

### 隔爆热电阻、热电阻的防爆标志表示方法

Type, Class Of Electrical Equipment and Class of EPTC AND EPRTD.



### \* 电气设备的类别、级别和温度组别说明

Introduction of category, grade and temperature class of electric equipment

电气设备分为二类：I类——煤矿井下用电气设备；

II类——工厂用电气设备。

I The designational expression of the explosive mark of Label Of EPTC And EPRTD

Two classes for electric equipment: Class I -For mining  
d II T II -For factory

### \* 防爆等级 Explosion-proof Classes

隔爆热电阻、热电阻的防爆等级按其适用于爆炸性气体混合物最大安全间隙分A、B、C三级。

Explosion-proof Class of EPTC AND EPRTD are classified as A.B and C dependant on the applicability to the miximum safety clearance of explosive vapor mixture.

### \* 温度组别 Classes Of Temperature

隔爆热电阻、热电阻的温度组别按其外露部分最高表面温度分为T1~T6六组。

Temperature of EPTC and EPRTD is divided into 6 groups: T1~T6 according to the highest surface temperature of the exposed parts.

防爆级组: d II BT4、Ex d II CT5、Ex ia II CT5(本安)、DIP DT T11 (粉尘)。

Type and Classes of explosion-proof (EP) Explosion-proof Classes: d II BT4, Ex d II CT5, Ex ia II CT5 (Intrinsic safety). DIP DT T11 (Powder)

外壳防护等级: IP54、IP65(GB4208标准)。

Protection level of case: IP54 and IP65 (GB4208 Standard).

### 温度组别与最高表面温度和引燃温度的对应关系

### Relationship between temperature class/maximum surface temperature and ignition temperature

温度级别 Class of Temperature	允许最高表面温度 (°C) Allowable Highest Surface Temperature(°C)	引燃温度t, (°C) Ignition temperature
T1	450	450<t
T2	300	300<t≤450
T3	200	200<t≤300
T4	135	135<t≤200
T5	100	100<t≤135
T6	85	85<t≤100

注: 应在环境温度为-20~+40°C, 空气相对湿度≤95% (在+25°C时) 范围内运行。高于此环境条件下运行, 则会降低其温度组别。

Note: When operating, the environment temperature shall be -20°C~+40°C, the temperature relative humidity shall ≤95% (at +25°C). The temperature class will be lowered if environmental condition beyond this range.

### 热电偶、热电阻类别、测量范围、等级与允差

### Type, Measuring Range and Tolerance of Various TC and RTD

类型 Type	分度号 Graduation mark	代号 Code	测量范围 (°C) Measuring Range(°C)	精度等级 Accuracy Class	允许偏差Δt(°C) ToleranceΔt(°C)
热电偶 Thermocouple	K	WRN	0~800	1	*±1.5°C or ±0.004t
				2	*±2.5°C or ±0.0075t
热电偶 Thermocouple	E	WRE	0~600	1	*±1.5°C or ±0.004t
				2	*±2.5°C or ±0.0075t
热电偶 Thermocouple	J	WRJ	0~500	1	*±1.5°C or ±0.004t
				2	*±2.5°C or ±0.0075t
热电偶 Thermocouple	T	WRT	-40~+350	1	*±0.5°C or ±0.004t
				2	*±1°C or ±0.0075t
铂热电阻 Platinum Thermocouple	Pt100	WZP	-200~+850	A	-200~+650 ±(0.15+0.002  t )
				B	-200~+850 ±(0.30+0.005  t )

注: (1) 式中“|t|”为感温元件的实测温度。

(2) “\*”表示允许偏差两者中取其大者。

Note: (1) “|t|” is the measured temperature of the temperature-sensing element.

(2) “\*” means to choose the bigger one between the two tolerances.

### 外壳防护等级IP与NEMA对应关系Coincidence relation of the degree of protection of case and NEMA

IP代码	IP30	IP32	IP64	IP32	IP64	IP66	IP66	IP67	IP65	IP65
NEMA代码	1	2	3	3R	3S	4	4X	6	12	13

注: 由于NEMA将额外的环境因素考虑在内, 所以外壳防护类型不相同于IEC外壳归类。不能简单由IP代码直接转换成NEMA形式。

Note: Since NEMA is concerned with additional environmental conditions, the protective type of case is different from the IEC classification. So the NEMA form coming from the direct conversion of simple IP code is not available.

## 爆炸性危险区域的划分 Geographic division of explosive and dangerous area

0区 0 Area	1区 1 Area	
本质安全型/Ex ia II c Intrinsic safety type	本质安全型/Ex ia/ib II c Intrinsic safety type	隔爆型/Ex d II c Explosion suppression
爆炸性环境中的爆炸性混合物以气体蒸气或薄雾形式连续出现或长时间存在的场所。 Places in the explosive environment where explosive mixture continuously comes out or exists in long time in form of gas, steam or mist.	在正常运行时, 爆炸性环境中出现气体、蒸气或薄雾形式的爆炸性混合物场所。 Places where the explosive mixture comes out in form of gas, steam or mist during normal running.	

## 爆炸性物质的分类和级别 Classification and grade of explosive materials

类/级别 Class/Grade	MESG(mm)	MIC
II A	>0.9	>0.8
II B	0.5~0.9	0.45~0.8
II C	<0.5	<0.45

- 注: (1) MESG—爆炸性气体混合物最大试验安全间隙。  
 (2) MIC—爆炸性气体混合物最小点燃电流的比值。  
 (3) II A、II B、II C也是爆炸性气体混合物的传爆级别。  
 Note: (1) MESG—Maximum Experimental Space Gap.  
 (2) MIC—Minimum Igniting Current.  
 (3) II A, II B and II C — Propagated blast grade.

## 爆炸性气体混合物的分类和分组 Classification and grouping of explosive gas mixture

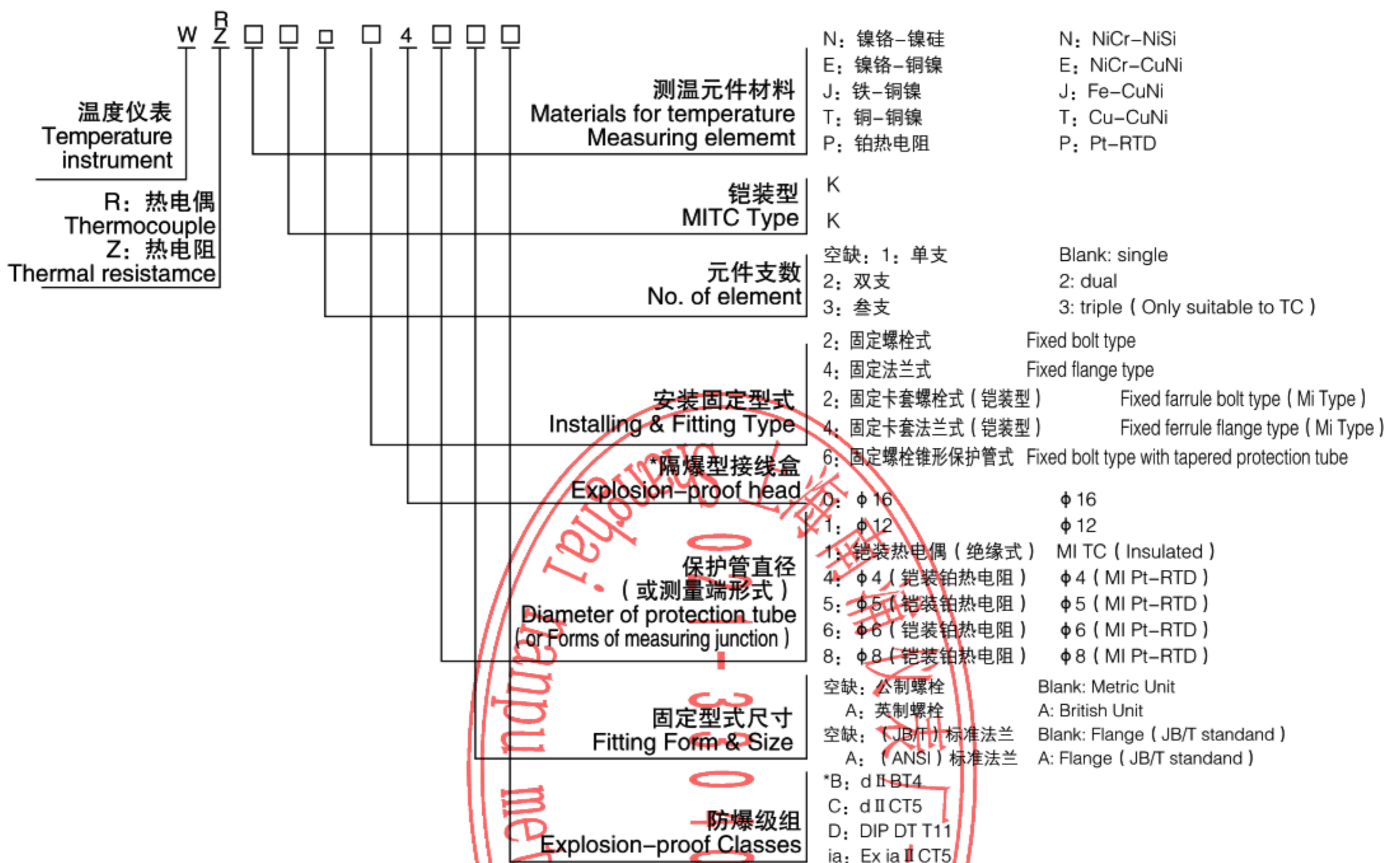
代表性气体 Representative gas	中国/IEC/EN CN	北美 (NEC/CEC) North American
乙炔 Acetylene	II C级 II C grade	I 级, A组 I grade A class
氢气 Hydrogen gas	II C级 II C grade	I 级, B组 I grade B class
乙烯 Ethylene	II B级 II B grade	I 级, C组 I grade C class
丙烷 Propane	II A级 II A grade	I 级, D组 I grade D class

## 气体和蒸气传爆级别及自燃温度组别的分类

### Classification of the propagated blast grade of gas and steam and spontaneous ignition temperature class

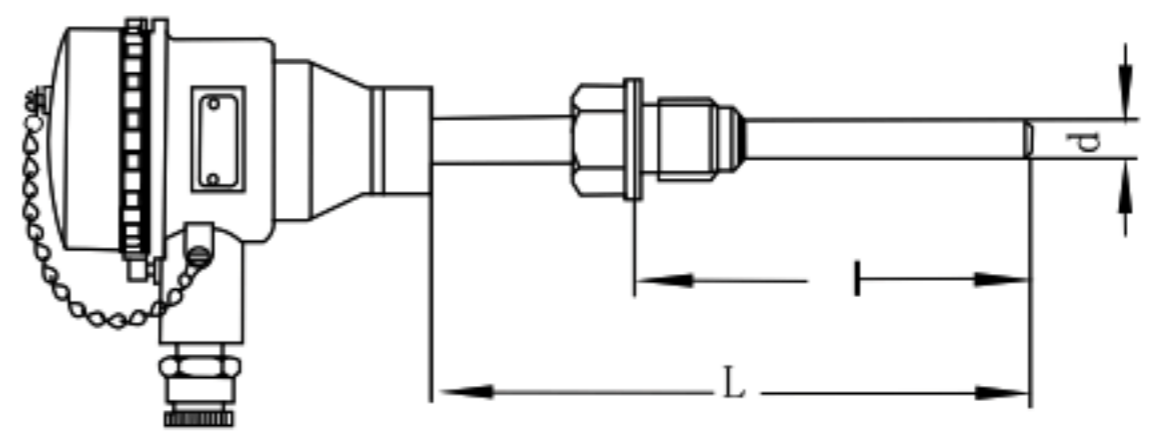
级别/组别 Grade/Class	T1	T2	T3	T4	T5	T6
II A	甲烷, 乙烷, 丙烷, 苯乙烯, 苯, 甲苯, 二甲苯, 三甲苯, 萘, 一氧化碳, 苯酚, 甲酚, 丙酮, 乙酸甲酯, 乙酸, 氯乙酸, 氯苯, 氨, 乙腈, 苯胺 Methane, ethane, propane, styrene, benzene, toluene, xylene, trimethylbenzene, naphthalene, carbon monoxide, carbolic acid, formaldehyde, acetone, methyl acetate, ethane, chloroacetic acid, chlorobenzene, ammonia, cyanogens and aniline.	丁烷, 环戊烷, 丙烯, 乙苯, 异丙苯, 甲醇, 乙醇, 丙醇, 丁醇, 甲酸甲酯, 甲酸乙酯, 乙酸乙酯, 甲基丙烯酸甲酯, 二氯乙烷, 氯乙烯, 甲胺, 二甲胺 Butane, cyclopentane, propylene, ethylbenzene, cumene, methanol, ethanol, propanol, butanol, methyl formate, ethyl formate, ethyl acetate, methyl methacrylate, dichloroethane, chloroethylene, methylamine, and dimethylamine.	戊烷, 乙烷, 庚烷, 辛烷, 壬烷, 癸烷, 环己烷, 松节油, 石脑油, 石油, 汽油, 燃料油, 煤油, 柴油, 戊醇, 乙醇, 环乙醇 Pentane, ethane, heptane, octane, nonane, decane, cyclohexane, turpentine, naphtha, petroleum, gasoline, fuel oil, diesel oil, amylalcohol and ethanol	乙醛, 三甲胺 Acetaldehyde and trimethylamine	-	-
II B	丙炔, 环丙烷, 丙烯腈, 氰化氢, 焦炉煤气 Allylene, cyclopropane, acrylonitrile, hydrogen cyanide and coke oven gas	乙烯, 丁二烯, 环氧乙烷, 环氧丙烷, 环氧乙烷, 丙烯酸甲酯, 丙烯酸乙酯, 呋喃 Ethylene, butadiene, ethylene oxide, propylene oxide, methyl acrylate, ethyl acrylate and furan	二甲醚, 丁烯醛, 丙烯醛, 四氢呋喃, 硫化氢 Dimethyl ether, butenoic aldehyde, tetrahydrofuran and hydrogen sulfide	乙基甲基醚, 二乙醚, 醚, 四氟乙烯 Methyl Ethyl Ether, diethyl ether, ether and tetrafluoroethylene	-	-
II C	氢, 水煤气 Hydrogen and water gas	乙炔 Acetylene	-	-	二硫化碳 Carbon bisulfide	硝酸乙酯 Ethyl nitrite

## 型号命名 Type designation



### 固定螺栓式隔爆热电偶、铂热电阻 Fixed-bolt explosion-proof TC and Platinum RTD

型号 Type	分度号 Graduation mark	测量范围 Measuring range (°C)	热响应时间 Thermal response time $\tau \leq 0.5$ (s)	保护管材料 Protection tube material	规格 Specification (mm)	
					d	L x I
WRN-240 (K) WRN <sub>2</sub> -240(K)	K	0~800	$\leq 45$	*1Cr18Ni9Ti	$\phi 16$	250 x 100
WRE-240(K) WRE <sub>2</sub> -240(K)	E	0~600				300 x 150
						350 x 200
WRJ-240(K) WRJ <sub>2</sub> -240(K)	J	0~500				400 x 250
						450 x 300
WRT-240(K) WRT <sub>2</sub> -240(K)	T	-40~+350				550 x 400
			650 x 500			
WZP-240(K) WZP <sub>2</sub> -240(K)	Pt100	-200~+500	$\leq 30$	*1Cr18Ni9Ti	$\phi 12$	900 x 750
						1150 x 1000
WZP-241(K) WZP <sub>2</sub> -241(K)						1650 x 1500
						2150 x 2000



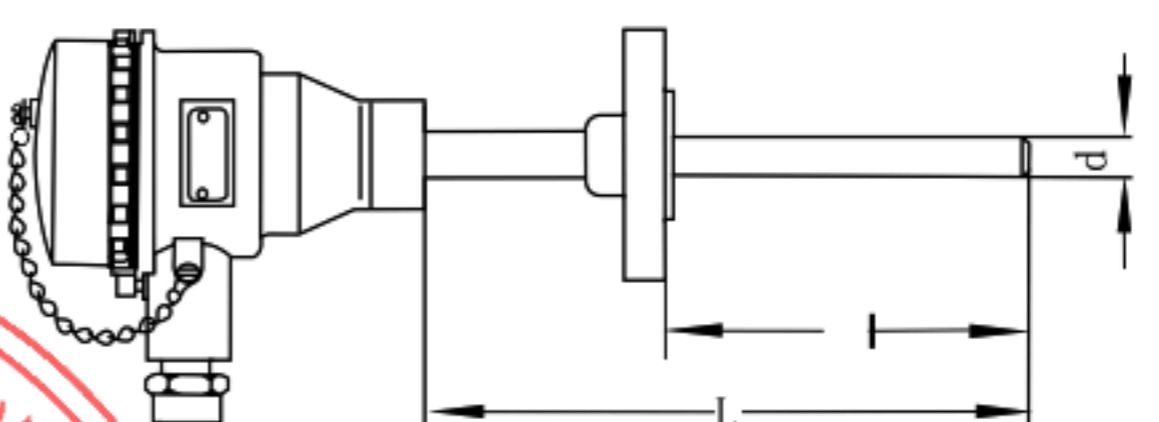
注: (1) 公称压力: 10MPa。(2) K内芯采用铠装元件。(3) 选用英制G3/4 螺栓, 型号后面加A。例: WRN-240A。(4) 直形保护管固定螺栓常规M27\*2 G3/4等可按用户要求制作。“\*”常规供货为1Cr18Ni9Ti, 如需其它材质另行注明。

Note: (1) Nominal pressure is 10Mpa. (2) K inner core is sheathed element. (3) If British system G3/4 bolt is selected, attach A to the

type, for example, WRN-24A. (4) Refer for the specification of straight protection tube fixed bolt. The normal delivery of goods is 1Cr18Ni9Ti, if other material is necessary, please note it separately.

## 固定法兰式隔爆热电偶、铂热电阻 Fixed-flange explosion-proof TC and Platinum RTD

型号Type	分度号 Graduation mark	测量范围 Measuring range (°C)	热响应时 间Thermal response time $\tau$ 0.5(s)	保护管材料 Protection tube material	规格Specification (mm)	
					d	L×l
WRN-440(K) WRN <sub>2</sub> -440(K)	K	0~800	≤45	*1Cr18Ni9Ti	φ16	250×100
WRE-440(K) WRE <sub>2</sub> -440(K)	E	0~600				300×150
						350×200
						400×250
WRJ-440(K) WRJ <sub>2</sub> -440(K)	J	0~500				450×300
WRT-440(K) WRT <sub>2</sub> -440(K)	T	-40~+350	550×400			
WZP-440(K) WZP <sub>2</sub> -440(K)	Pt100	-200~+500	≤30	φ12	650×500	
					900×750	
					1150×1000	
1650×1500						
WZP-441(K) WZP <sub>2</sub> -441(K)					2150×2000	

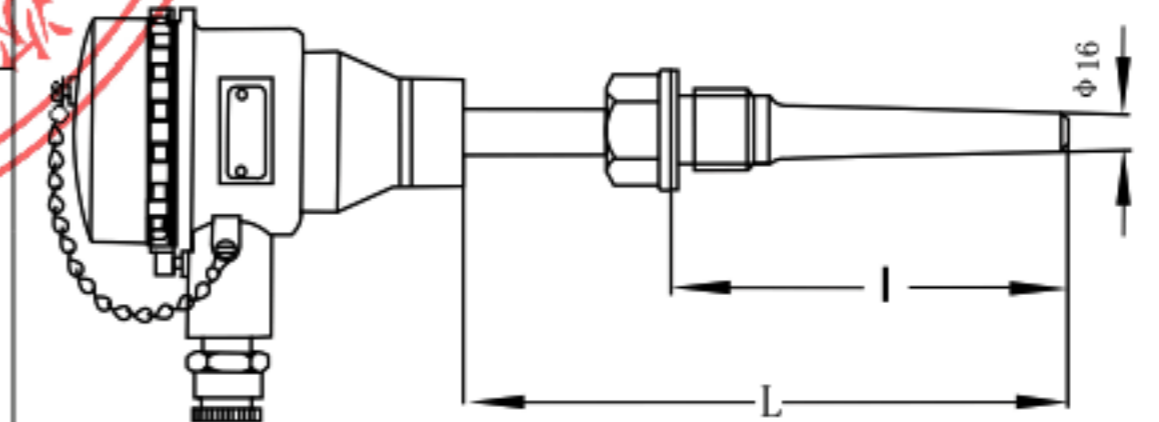


注：(1) 公称压力：2.5MPa。(2) K内芯采用铠装元件。(3) 型号后面加“A”为ANSI标准法兰。例：WRN-440N。选用JB-T标准法兰。“\*” 常规供货为1Cr18Ni9Ti, 如需其它材质另行注明。

Note: (1) Nominal pressure is 2.5 Mpa. (2) K inner core is sheathed element. (3) Those that have “A” attached is ANSI standard flange, for example, WRN-440N. Refer for the JB-T standard a flange. The normal delivery of goods is 1Cr18Ni9Ti, if other material is necessary, please note it separately.

## 固定螺栓锥形保护管式隔爆热电偶、铂热电阻 Fixed-bolt taper protection tube explosion-proof TC and Platinum RTD

型号Type	分度号 Graduation mark	测量范围 Measuring range (°C)	热响应时 间Thermal response time $\tau$ 0.5(s)	保护管材料 Protection tube material	规格Specificaton (mm)	
					d	L×l
WRN-640(K) WRN <sub>2</sub> -640(K)	K	0~600	≤60	*1Cr18Ni9Ti	φ16	250×100
WRE-640(K) WRE <sub>2</sub> -640(K)	E					300×150
						350×200
WZP-640(K) WZP <sub>2</sub> -640(K)	pt100	-200~500	400×250			
			450×300			
			500×350			



注：(1) 公称压力：30Mpa。流速≤80m/s。

(2) K内芯采用铠装元件。

(3) 选用英制G1”螺栓，型号后加A。例：WRN-640(A)。

(4) 锥形保护管固定螺栓规格M33\*2 G1”。“\*” 常规供货为1Cr18Ni9Ti, 如需其它材质另行注明。

Note: (1) Normal pressure: 30Mpa. Flow rate≤80m/s.

(2) K inner core is sheathed element.

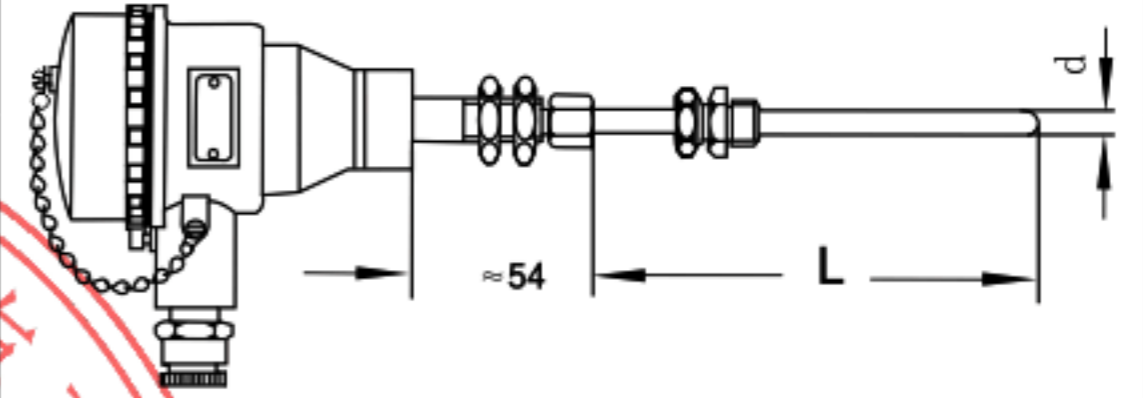
(3) British system G1” that is selected shall mark A behind the type, for example, WRN-640(A).

(4) Refer for specification of taper protection fixed bolt. The normal delivery of goods is 1Cr18Ni9Ti, if other material is necessary, please note it separately.

## 固定卡套螺栓式隔爆铠装热电偶、铂热电阻

### Fixed-ferrule bolt explosion-proof sheathed TC and Platinum RTD

型号Type	分度号 Graduation mark	测量范围 Measuring range (°C)	热响应时间 Thermal response time $\tau \pm 0.5(s)$	保护管材料 Protection tube material	规格Specification (mm)	
					d	L
WRNK-241 WRN K <sub>2</sub> -241	K	0~800	$\leq 1.2$ $\leq 2.5$ $\leq 4$ $\leq 6$ $\leq 8$		$\phi 3$	100
WREK-241 WREK <sub>2</sub> -241	E	0~600			$\phi 4$	150
WRJK-241 WRJK <sub>2</sub> -241	J	0~500			$\phi 5$	200
WRTK-241 WRTK <sub>2</sub> -241	T	-40~+350			$\phi 6$	250
					$\phi 8$	300
WZPK-244 WZPK <sub>2</sub> -244	Pt100	-200~+500	$\leq 5$ $\leq 8$ $\leq 12$ $\leq 18$	*1Cr18Ni9Ti	$\phi 4$	350
					$\phi 5$	400
					$\phi 6$	450
					$\phi 8$	500
					$\phi 4$	550
					$\phi 5$	600
					$\phi 6$	750
					$\phi 8$	1000
WZPK-245 WZPK <sub>2</sub> -245					$\phi 5$	1500
WZPK-246 WZPK <sub>2</sub> -246					$\phi 6$	2000
WZPK-248 WZPK <sub>2</sub> -248					$\phi 8$	2500
						3000

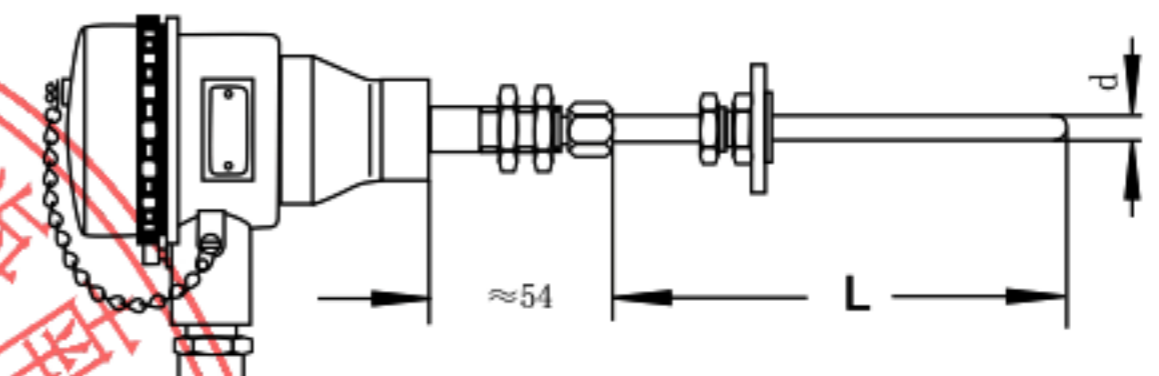


注：公称压力：2.5Mpa。(2) 卡套螺栓规格M27\*2 G3/4。“\*”常规供货为1Cr18Ni9Ti，如需其它材质另行注明。  
 Note: (1) Nominal pressure: 2.5Mpa. (2) Refer for specification of ferrule bolt. The normal delivery of goods is 1Cr18Ni9Ti, if other material is necessary, please note it separately.

## 固定卡套法兰式隔爆铠装热电偶、铂热电阻

### Fixed ferrule flange explosion-proof sheathed TC and Platinum RTD

型号Type	分度号 Graduation mark	测量范围 Measuring range (°C)	热响应时间 Thermal response time $\tau \leq 0.5(s)$	保护管材料 Protection tube material	规格 Specification (mm)	
					d	L
WRNK-441 WRND <sub>2</sub> -441	K	0~800	$\leq 1.2$ $\leq 2.5$ $\leq 4$ $\leq 6$ $\leq 8$			
WREK-441 WREK <sub>2</sub> -441	E	0~600			$\phi 3$	100
WRJK-441 WRJK <sub>2</sub> -441	J	0~500			$\phi 4$	150
					$\phi 5$	200
WRTK-441 WRTK <sub>2</sub> -441	T	-40~+350			$\phi 6$	250
			$\phi 8$	300		
WZPK-444 WZPK <sub>2</sub> -444		-200~+500	$\leq 5$	*1Cr18Ni9Ti	$\phi 3$	350
					$\phi 4$	400
					$\phi 5$	450
					$\phi 6$	500
WZPK-445 WZPK <sub>2</sub> -445	Pt100	-200~+500	$\leq 8$		$\phi 4$	550
					$\phi 5$	600
WZPK-446 WZPK <sub>2</sub> -446		-200~+500	$\leq 12$		$\phi 6$	1000
					$\phi 8$	1500
WZPK-448 WZPK <sub>2</sub> -448		-200~+500	$\leq 18$		$\phi 6$	2000
					$\phi 8$	2500
					$\phi 8$	3000



注：(1) 公称压力：2.5Mpa。

(2) 卡套法兰规格。“\*” 常规供货为1Cr18Ni9Ti，如需其它材质另行注明。

Note: (1) Normal pressure: 2.5Mpa.

(2) Refer for the specification of ferrule flange. The normal delivery of goods is 1Cr18Ni9Ti, if other material is necessary, please note it separately.

### 订货举例 Examples for order

订货时请写明：名称、型号、分度号、装配型式及总长和置入深度，即(L×I)，铠装型应注明铠装体外径及总长L和数量。

例1：隔爆双支热电偶：WRN<sub>2</sub>-240 K 400×250 4支

例2：隔爆单支铠装热电阻：WZP K-245 Pt100 I=2 M 9支

Please write the name, type, graduation mark, assemble form, overall length and placed depth, namely (L×I) when placing the order. For the sheathed type, please note the outer diameter and quantity.

For example, explosion-proof double TC: WRN<sub>2</sub>-240 K 400×250 4;

Explosion-proof single sheathed RTD: WZP K-245 Pt100 =2 M 9