

## 热电偶用补偿导线 Thermocouple extension wire

热电偶用补偿导线是用于延伸热电极，即：移动热电偶的冷端与显示仪表连接构成测温系统。

Thermocouple extension wire is used to extend the thermode, that is, the cold junction of the movable thermocouple connect with indicating instrument to make up temperature measurement system.

补偿导线分为延长型和补偿型两种。与热电偶分度号的两偶丝材料相同的导线称延长型。不同配比的铜-铜镍材料制成的导线，称补偿型。

Extension wire falls into two kinds; one is extension type and the other is compensation type. The wire same with the two thermocouple wires of the Graduation Mark, is known as the extension type. The wire same with, formed by copper-cupronickel materials with different proportion, is called compensation type.

两种补偿导线均有优良的耐酸、碱和耐磨阻燃的性能。常用温度范围为-25~□200℃,可浸入油中长期使用。补偿导线符合GB/T4989-1994标准。

The two kinds of extension wire, both have good property of resistance to acid, alkali, abrasion and fire. Its temperature range used commonly is -25~□200℃. In addition, it can be used for a long time by immersing into the oil. The extension wire complies with GB/T4989-94-1994 standard.

所列补偿导线适用于分度号为S、(R)、K、E、J、T。

The extension wire listed in the table is applicable to the graduation symbol of S, (R), K, E, J and T.

补偿导线型号按产品的型号划分为：SC、KC、KX、EX、JX、TX。

The extension wire types can be divided into SC, KC, KX, EX, JX and TX in accordance with the product type.

### 型号命名 Type designation extension wire

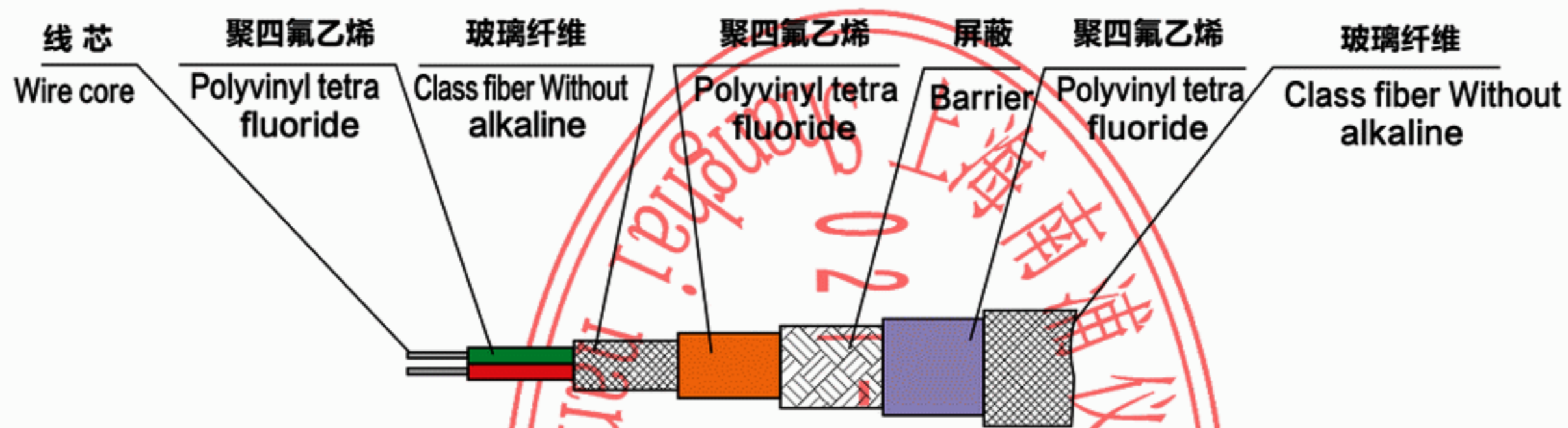
□	□	-	□	□	X	□	□	□	□	□	□
											S: 铂铑10-铂 Platinum-chromium 10-chromium
											K: 镍铬-镍硅 Nickel-chromium-nisiloy
											E: 镍铬-铜镍 Nickel-chromium-cupronickel
											N: 镍铬硅-镍硅镁 Nickel-chromium-silicon-nisiloy
											J: 铁-铜镍 Ferrum-cupronickel
											T: 铜-铜镍 Copper-cupronickel
											X: 延长型 Extension type
											C: 补偿型 Compensation type
											G: 普通用 General use
											H: 耐热用 heat-proof use
											S: 精密级 Precision class
											B: 普通级 General class
											(见表18) (see table 18)
											V: 70℃或105℃聚氯乙烯 Polyvinyl chloride of 70℃ or 105℃ (PVC)
											B: 无碱玻璃纤维纱 (-25~+200℃) Non-alkali glass yarn
											F: 聚四氟乙烯 (-25~+200℃) Polytetrafluoroethene
											P: 屏蔽 Shield
											V: 70℃或105℃聚氯乙烯 Polyvinyl chloride of 70℃ or 105℃ (PVC)
											B: 无碱玻璃纤维纱 (-25~+200℃) Non-alkali glass yarn
											F: 聚四氟乙烯 (-25~+200℃) Polytetrafluoroethene
											P: 屏蔽 Shield
											R: 多股软线芯 Multi-strand flexible core
											空缺: 单股硬线芯 Vacancy: Single-strand hard core
											P: 有屏蔽 shielded
											空缺: 无屏蔽 Vacancy: Non-shielded

补偿导线的分类、等级及标志如下表所示：

Classification, grade, and mark of the extension wire are shown as the table.

使用分类 Usage classification	标志 Mark	允差等级及标志 Permissible grade and mark		护层的着色 Coloring of the cover	
		普通级 Ordinary grade	精密级 Precision grade	精密级 Precision grade	普通级 Ordinary grade
一般用 General use	G	B	A	灰色Gray	黑色Black
耐热用 Thermal resistance use	H			黄色Yellow	黑色Black

## 结构型式 Structrue type



绝缘层、护层及屏蔽层用材料及符号如下表所示（等级）：

Materials for insulation layer, cover and shielding layer and the symbol are shown as below (grade):

等级 Grade	绝缘层Insulation layer		护层Cover		屏蔽层Shielding layer	
	材料 Material	符号表示 Symbol	材料 Material	符号表示 Symbol	材料 Material	符号表示 Symbol
一般用 (G) General use	聚氯乙烯 Polyvinyl chloride	PVC	聚氯乙烯 Polyvinyl chloride	PVC	镀锌钢丝 Zinc coated wire 镀锡铜丝 Tinned copper wire	P
耐热用 (H) Thermal resistance use	聚四氟乙烯 Polytetrafluoroethylene 玻璃丝 Glass fiber	F B	玻璃丝 Glass fiber	B	复合铝带 Clad aluminium strip 铜带 Copper strip	

## 产品分度号、符号及代号 Product graduation mark, symbol and code

分度号Graduation Mark	一般用 (G) 产品标号 General Item No.		耐热用 (H) 产品标号 Heat-proof Item No.	
	精密级 Precision grade	普通级 Ordinary grade	精密级 Precision grade	普通级 Ordinary grade
S 或(or) R	SC-GS	SC-GB	—	SC-HB
K	KC-GS	KC-GB	—	KC-HB
	KX-GS	KX-GB	KX-HS	KX-HB
N	NC-GS	NC-GB	NC-HS	NC-HB
E	EX-GS	EX-GB	EX-HS	EX-HB
J	JX-GS	JX-GB	JX-HS	JX-HB
T	TX-GS	TX-GB	TX-HS	TX-HB

## 补偿导线合金丝极性、绝缘层和护套颜色

### Polarity sheathing and insulating layer color of alloy wires of extension wire

补偿导线类型 Extension wire type	热电偶分度号 Graduation mark of thermocouple	补偿导线合金丝 Alloy wire of extension wire		绝缘层颜色 Insulating layer color		护套颜色 Sheathing color			
		正极 Positive pole	负极 Negative pole	正极 Positive pole	负极 Negative pole	一般用General use		耐热用Heat resisting use	
						普通级 Common	精密级 Precision	普通级 Common	精密级 Precision
SC、RC	S (铂铑10-铂 Rhodium-Platinum10-Rhodium)	SPC (铜 Cuprum)	SNC (铜镍 cupronickel)	红Red	绿Green	黑Black	灰Grey	黑Black	黄Yellow
NC	N (镍铬硅-镍硅 Nickel-chromium-silicon-nickel-silicon)	NPC (铁 Ferrum)	NNC (铜镍 cupronickel)	红Red	灰Grey	黑Black	灰Grey	黑Black	黄Yellow
KC	K (铜-康铜Cuprum-constantan)	KPC (铜 Cuprum)	KNC (铜镍 cupronickel)	红Red	蓝Blue	黑Black	灰Grey	黑Black	黄Yellow
KX	K (镍铬-镍硅Nickel-chromium-nickel-silicon)	KPX (镍 铬Nickel-chromium)	KNX (镍硅 Nickel-silicon)	红Red	黑Black	黑Black	灰Grey	黑Black	黄Yellow
EX	E (镍铬-铜镍 Nickel-chromium-cupronickel)	EPX (镍 铬Nickel-chromium)	ENX (铜镍 cupronickel)	红Red	棕Brown	黑Black	灰Grey	黑Black	黄Yellow
JX	J (铁-铜镍Ferrum-cupronickel)	JPX (铁 Ferrum)	JNX (铜镍 cupronickel)	红Red	紫Purple	黑Black	灰Grey	黑Black	黄Yellow
TX	T (铜-铜镍 Cuprum-cupronickel)	TPX (铜 Cuprum)	TNX (铜镍 cupronickel)	红Red	白White	黑Black	灰Grey	黑Black	黄Yellow

注：本质安全电路用补偿导线，其护套均采用蓝色。

Note: The color of extension wire used for safety circuit and its sheathing shall be blue.

## 补偿导线热电动势、允差范围和往复电阻值

### Extension wire's thermal electromotive force, allowance range and reciprocating resistance value

型号 Type	热电动势和允差 Thermer electromotive force and allowance						往复电阻Reciprocating resistance 20℃时，长度为1m，截面积为1mm <sup>2</sup> When the temperature is 20℃, the length is 1m and the sectional area is 1mm <sup>2</sup> .
	热电动势 Thermer electromotive force $\mu V$	允差Tolerance		热电动势 Thermer electromotive force $\mu V$	允差Tolerance		
		精密级 (A) Precision grade	普通级 (B) Ordinary		精密级 (A) Precision grade	普通级 (B) Ordinary grade	
		0~100℃		0~200℃			
SC	645	$\pm 30 \mu V (\pm 2.5^\circ C)$	$\pm 60 \mu V (\pm 5^\circ C)$	1440		$\pm 60 \mu V (\pm 5^\circ C)$	0.05
KC	4095	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	8137	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	0.52
KX	4095	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	8137	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	1.1
NC	2774	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	5912	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	0.75
NX	2774	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 100 \mu V (\pm 2.5^\circ C)$	5912	$\pm 60 \mu V (\pm 1.5^\circ C)$	$\pm 120 \mu V (\pm 2.5^\circ C)$	1.43
EX	6317	$\pm 120 \mu V (\pm 2.5^\circ C)$	$\pm 120 \mu V (\pm 2.5^\circ C)$	13419	$\pm 120 \mu V (\pm 1.5^\circ C)$	$\pm 120 \mu V (\pm 2.5^\circ C)$	1.25
JX	5268	$\pm 85 \mu V (\pm 1.5^\circ C)$	$\pm 140 \mu V (\pm 2.5^\circ C)$	10777	$\pm 85 \mu V (\pm 1.5^\circ C)$	$\pm 140 \mu V (\pm 2.5^\circ C)$	0.65
TX	4277	$\pm 30 \mu V (\pm 0.5^\circ C)$	$\pm 90 \mu V (\pm 2.5^\circ C)$	9285	$\pm 48 \mu V (\pm 0.8^\circ C)$	$\pm 90 \mu V (\pm 1.5^\circ C)$	0.52

补偿导线的线芯截面、股数，单线直径及绝缘层、护层和外径尺寸：

Core cross section, number of strands of extension wire, single line diameter and insulation layer, cover and outside dimension

使用分类 Usage category	标称截面 Nominal cross-sectional area	单股线芯 single-strand core		多股线芯 Multi-strand core		绝缘层厚度 Thickness of insulation layer (mm)	护套厚度 Sheath thickness (mm)	外径上限Upper limit external diameter			
		线芯股数 Number of strand (根 piece)	单线直径 Single-wire diameter (mm)	线芯股数 Number of strand (根 piece)	单线直径 Single-wire diameter (mm)			扁平型 Flat type		屏蔽扁平型 Shielding flat type	
								单股线芯 single-strand core	多股线芯 Multi-strand core	单股线芯 single-strand core	多股线芯 Multi-strand core
一般用 General use (G)	0.2	1	0.52	7	0.2	0.4	0.7	3.0×4.6	3.1×4.8	3.8×5.4	3.9×6.0
	0.5	1	0.8	7	0.3	0.5	0.8	3.7×6.4	3.9×6.6	4.5×7.2	4.7×7.4
	1	1	1.13	7	0.43	0.7	1.0	5.0×7.7	5.1×8.0	5.8×8.5	5.9×8.8
	1.5	1	1.37	7	0.52	0.7	1.0	5.2×8.3	5.5×8.7	6.0×9.1	6.3×9.6
	2.5	1	1.76	19	0.41	0.7	1.0	5.7×9.3	5.9×9.8	6.5×10.1	6.7×10.7
耐热用 Heat-proof use (H)	0.2	1	0.52	7	0.2	0.4	0.7	2.3×4.0	2.4×4.2	3.0×5.3	3.1×5.6
	0.5	1	0.8	7	0.3	0.5	0.5	2.6×4.6	2.8×4.8	3.7×5.8	3.8×6.0
	1	1	1.13	7	0.43	0.5	0.5	3.0×5.3	3.1×5.6	4.3×6.5	4.5×6.9
	1.5	1	1.37	7	0.52	0.5	0.6	3.2×5.8	3.4×6.2	4.8×7.3	5.0×7.7
	2.5	1	1.76	19	0.41	0.5	0.6	3.6×6.7	4.0×7.3	5.3×8.1	5.6×8.7

## 订货举例 Examples of order

订货时请写明：名称型号、耐热等级、规格和长度。

Please mark the designation type, thermal endurance class, specification and length when the goods is ordered.

例1: KX-HB 2×1 FFRP 100m

即：用于K分度号热电偶，X型补偿导线，耐热用等级，普通级允差，2芯，每芯1mm<sup>2</sup>，聚四氟乙烯为绝缘层和护套材料，（耐热200℃）多股软芯，有屏蔽，100米长。

For example: KX-HB 2×1 FFRP 100m is used for thermocouple with K graduation mark and X extension wire. It is of heat-proof use class and normal tolerance. It has two cores, of which, each is 1 mm<sup>2</sup>. The material for the insulation layer and sheath is polytetrafluoroethylene. With multi-strand soft core (resistance to a temperature of 200℃), it has shield of 100m long.

例2: EC-GS2×1 VVP 200m

用于E分度号热电偶，G型补偿导线，普通用等级，精密级允差，2芯，每芯1mm<sup>2</sup>，聚氯乙烯为绝缘层和护套材料（耐热105℃以下），硬芯线，有屏蔽，长200米。

For example: EC-GS2×1 VVP 200m is used for thermocouple with E graduation mark and G extension wire. It is of general use class and precision-grade tolerance. It has two cores, of which, each is 1 mm<sup>2</sup>. The material for the insulation layer and sheath is polyvinyl chloride. With solid core (resistance to a temperature below 105℃), it has shield of 200m long.