



中外技术合作企业 Sino-Foreign Technical Cooperation Enterprise
权威注册 Authoritative Registration: CE / API / TSG
国家级高级技术企业 National High-Tech Enterprise

P -025

铠装热电偶

Sheath thermocouple

WREK、WRNK、WRCK 系列
WREK、WRNK、WRCK Series

WREK、WRNK、WRCK 系列 铠装热电偶

WREK、WRNK、WRCK Series
Sheath thermocouple



概述

铠装热电偶具有能弯曲、耐高压、热响应时间快和坚固耐用等许多优点，它和工业用装配式热电偶一样，作为测量温度的传感器，通常和显示仪表、记录仪表和电子调节器配套使用，同时，亦可以作为装配式热电偶的感温组件。它可以直接测量各种生产过程中从0℃~800℃范围内的液体、蒸汽和气体介质以及固体表面的温度，应符合GB/T18404-2001标准。

主要技术指标 Main technical index

测温范围和准确度 Measure range and accuracy

类别 Category	代号 Code	分度号 Graduation	套管外径 mm Outer diameter of well	常用温度℃ Temperature	最高使 用温度℃ Max temperature	允许偏差△t Allowed error	
						测量范围℃ Measure range	允差值 Allowed error
镍铬-铜镍 NiCr-CuNi	WREK	E	≥ Φ 3	600	700	0~700	± 2.5°C or ± 0.0075 t
镍铬-镍硅 NiCr-NiSi	WRNK	K	≥ Φ 3	800	950	0~900	± 2.5°C or ± 0.0075 t
铜-铜镍 Cu-CuNi	WRCK	T	≥ Φ 3	350	400	< -200	未做规定 Not provide
						-40~350	± 1°C or ± 0.0075 t

注: (1)t 为被测温度的绝对值。
(2)T型分度号产品需与厂方协商订货。

Overview

Armoured thermocouple has many advantages, can be bend and high-pressure resistant, fast thermal response time and durability, it is can be used as a temperature sensor. It is the same to the industrial fabricated thermocouple, usually used with display instrument, record instrument and electronic regulator, at the same time, also can be temperature components of the fabricated thermocouple. In the process of production, it can directly measure all liquid, steam and gas and solids surface temperature from 0°C ~800 °C , comply with GB/T18404-2001 standard.

Note: (1)t is the absolute value of temperature
(2)T graduation product should contact manufacturer before orders.

铠装热电偶热响应时间

在温度出现阶跃变化时，热电偶的输出变化值相当于该阶跃变化的50%所需的时间称为热响应时间，用T_{0.5}表示。
铠装热电偶热响应时间不大于下表的规定：

Thermal response time of armored thermocouple

When temperature appears step change, the output variation of the thermocouple is 50% of the step change, and the time needed is called thermal response time which is expressed as T_{0.5} of the armored thermocouple asked not less than the following table.



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热响应时间 $\tau_{0.5}$ 套管直径 (min) Thermal response time Diameter of well	接壳式 Shell connecting type	绝缘式 Isolation type
2.0	0.4	0.5
3.0	0.6	1.2
4.0	0.8	2.5
5.0	1.2	4.0
6.0	2.0	6.0
8.0	4.0	8.0

绝缘电阻

当周围空气温度为 $20 \pm 15^{\circ}\text{C}$ ，相对湿度不大于 80% 时，绝缘型铠装热电偶的偶丝与外套管之间的绝缘电阻值应符合下表的规定。

套管直径 mm Well diameter	试验电压 V-DC Test Voltage	绝缘电阻 M Ω ·m Insulation resistance
0.5~1.5	50 ± 5	≥ 1000
> 1.5	500 ± 50	≥ 1000

Insulation resistance

When the ambient air temperature is $20 \pm 15^{\circ}\text{C}$, relative humidity is not more than 80% The insulation resistance between the thermo wires and the outer tube of the insulation armoured type thermocouple should accord to the following rule.

铠装热电偶外径和名义长度标准规格

The standard specifications of outer diameter and nominal staple length of sheathed thermocouple

铠装热电偶外径 d mm Outer diameter of sheathed thermocouple				
Φ 8	Φ 6	Φ 5	Φ 4	Φ 3
50	50	50	50	50
75	75	75	75	75
100	100	100	100	100
150	150	150	150	150
200	200	200	200	200
250	250	250	250	250
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500
750	750	750	750	750
1000	1000	1000	1000	1000
	1250	1250	1250	1250
	1500	1500	1500	1500
	2000	2000	2000	2000
	2500	2500	2500	2500
	3000	3000	3000	3000
	4000	4000	4000	4000
	5000		5000	5000
	7500		7500	7500
	10000		10000	10000
				15000

型号表示

W R □ K — □ □ □ □

- 多对式 Multi-couples
 - ③ 3 对 3-couples
 - ④ 4 对 4-couples
 - ⑤ 5 对 5-couples
 - ⑥ 6 对 6-couples
- 工作端形式 Working end type
 - 1) 绝缘式 insulation type
 - 2) 接壳式 shell type
 - 7) 接壳式(手柄式) shell type(hand level)
 - 8) 绝缘式(手柄式) insulation(hand level)
- 接线盒形式 connection box type
 - (自由端形式) free end type)
 - ① 绝缘式 insulation type
 - ② 接壳式 shell type
 - ③ 防水式 water-proof type
 - ⑧ 手柄式 hand level type
 - ⑨ 小接线盒式 little connection box
 - ⑩ 带补偿导线 with compensating lead wire
- 安装固定形式 mounting fixed type
 - 1) 无固定装置 none fixed device
 - 2) 固定卡套螺纹 fixed adjustable thread joint
 - 3) 可动卡套螺纹 moved adjustable thread joint
 - 4) 固定卡套法兰 fixed adjustable thread flange
 - 5) 可动卡套法兰 moved adjustable thread flange
- 铠装式 sheathed type
- 测温元件材料 material of thermometric element
 - N| 镍铬 - 镍硅 NiCr-NiSi
 - E| 镍铬 - 铜镍 NiCr-CuNi
 - C| 铜 - 铜镍 Cu-CuNi
- 热电偶 thermocouple
- 温度仪表 temperature instrument

注：①直径为 Φ 3mm 绝缘式铠装热电偶名义总长 L 不得大于 10000mm。

②铠装热电偶直径 ds ≤ 5mm, 并装有防溅式或防水式接线盒的产品, 热电偶露出设备部分, 用户在安装时必须加装支架等辅助支承, 增加其刚度, 确保紧固, 防止接线盒受振动而引起摇摆, 损坏热电偶。

③直径中 Φ 2mm 铠装热电偶须和本厂协商订货。

Note: (1) for 3 mm in diameter insulation type armoured thermocouple name must not be more than 10000 mm presents L.

(2) for sheathed thermocouple of which diameter is not more than 5mm, and with splash-proof or water-proof type junction box, you should add a bracket to avoid damage to the junction box.

(3) if order 2 mm in diameter armoured thermocouple, must consult with our factory.



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工作原理

铠装热电偶的工作原理是，两种不同成分的导体两端经焊接，形成回路，直接测温端叫测量端，接线端叫参比端。当测量端和参比端存在温差时，就会在回路中产生热电流接上显示仪表，仪表上就会指示出热电偶所产生的热电动势的对应温度值。

铠装热电偶的热电动势将随着测量端的温度升高而增长，热电动势的大小只和铠装热电偶导体材质以及两端温差有关，和热电极的长度、直径无关。

铠装热电偶的结构是由导体、绝缘氧化镁和1Cr18Ni9Ti不锈钢保护管经多次拉制而成。铠装热电偶产品主要由接线盒、接线端子和铠装热电偶组成基本结构，并配以各种安装固定装置组成。

铠装热电偶分绝缘式和接壳式两种。

Working principle

Armoured thermocouple working principle is, two conductors with different components are welded at both ends to form a loop, the direct temperature side is called measurement side, the terminal side is called reference junction. When measuring side and reference side have a different temperature, it will generate heat in the loop, then connected to the display instrument, the instrument indicates the corresponding temperature value of the thermal electromotive force generated by the thermocouple.

Armored thermocouple thermoelectric force will grow with the measurement temperature's growth, the size of thermoelectric force is related to the conductor material as well as the differential temperature at both ends, it has nothing to do with the length and diameter of the thermode.

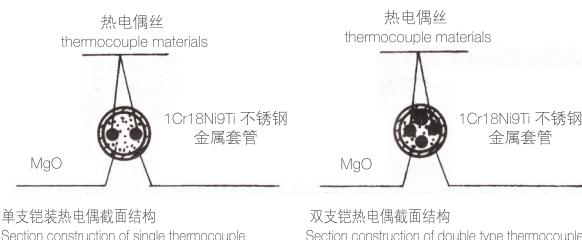
Armoured thermocouple structure is made of the conductor, insulation magnesia and 1Cr18Ni9Ti Stainless steel protection tube after many times drawing. Armoured thermocouple products mainly by the wiring box, terminals and armoured thermocouple, and match with all kinds of installation Fixed device component.

Armoured thermocouple has two kinds: insulation type and shell type.

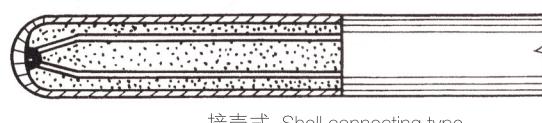
结构 Structure

铠装热电偶材料结构形式

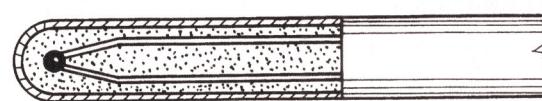
Armoured thermocouple material structure form



测量端 (热端) 结构形式 the measurement (hot end) structure



接壳式 Shell connecting type



绝缘式 insulation type

安装固定形式 Installation

固定装置是供用户安装用。除了无固定装置产品外，铠装热电偶固定装置有：固定卡套式、可动卡套式、固定法兰式、可动法兰式四种结构形式。固定卡套式供用户一次性固定；可动卡套式拥护可多次固定。

Fixed device is for the user with installation. In addition to the products without fixed device, The fixed device of the armoured thermocouple includes: fixed sleeve type, movable sleeve type, fixed flange type, movable flange type. Fixed sleeve is fixed for once, and movable sleeve can be fixed for many times.

为了适应不同行业对固定式法兰盘的焊接结构、尺寸不同的需求，本厂决定增加三种不同焊接方式，不同形式密封的固定法兰安装盘，具体请参照装配式热电偶附表 d=1~8 和表三中的型号。

In order to meet up with different requirements, we have three different welding structure, please refer to model in table three and d=1~8 table of sheathed thermocouple

铠装热电偶自由端 (接线盒) 形式

Armoured thermocouple free (the junction box) form

接线盒供连接热电偶的自由端和显示仪表之用，目前有简易式、防溅式、防水式、手柄式、小接线盒式、接插式、补偿导线式多种结构形式。

Junction box is used to connect thermocouple free end with display, has many structures, like, simply type, water-proof type, splash-proof type, hand type, small junction box type, plug type and compensation wire type.

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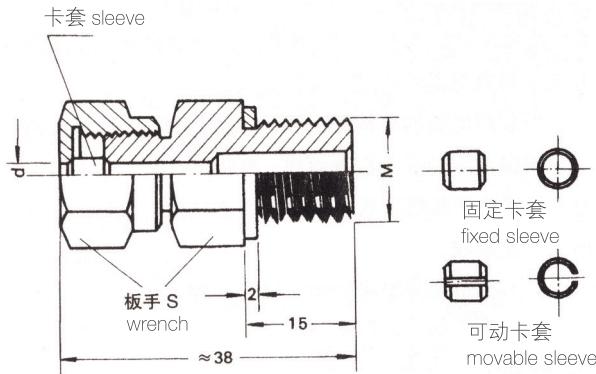


WREK、WRNK、WRCK 系列
WREK, WRNK, WRCK Series

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卡套螺纹接头 sleeve thread

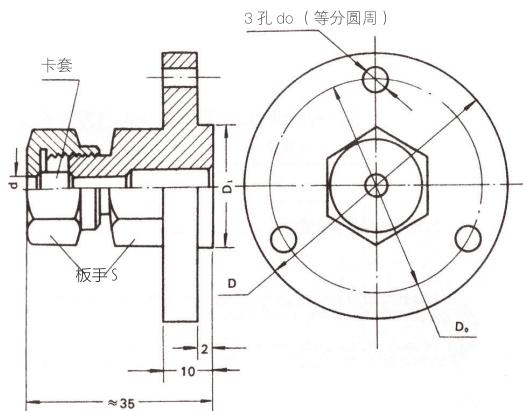
卡套 sleeve



铠装热电偶外径 d Outer diameter of sheathed thermocouple	Φ 8	Φ 6	Φ 5	(Φ 4)	Φ 4	Φ 3	Φ 2
固定装置代号和尺寸 Code and size of fixed device	M16X1.5				M12X1.5		
M	22				19		

注：括号内的数字这一档规格一般不予采用，如需要作特殊规格订货。
Note: the specification that the numbers in brackets are not generally used, need to order for special specification.

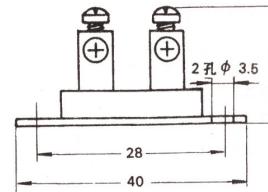
卡套法兰盘 sleeve flange



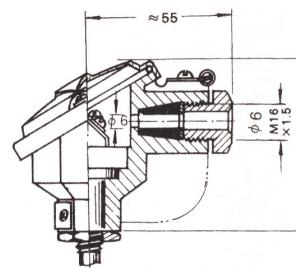
铠装热电偶外径 d Outer diameter of sheathed thermocouple	Φ 8	Φ 6	Φ 5	(Φ 4)	Φ 4	Φ 3	Φ 2
固定装置代号和尺寸 Code and size of fixed device	D	Φ 60			Φ 50		
D		Φ 42			Φ 36		
D ₁		Φ 24			Φ 20		
S		22			19		
d _o		Φ 9			Φ 7		

注：括号内的数字这一档规格一般不予采用，如需要作特殊规格订货。
Generally, the specification in bracket can't be adopted if special ordering is required.

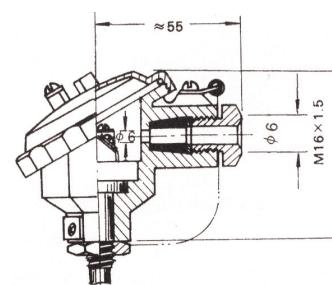
简易式 Simple type



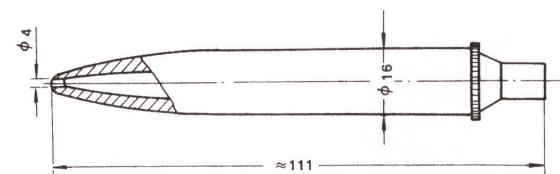
防溅式 Splash type



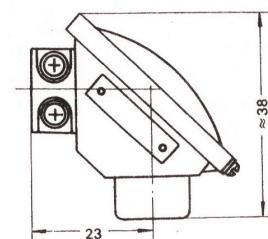
防水式 Waterproof type



手柄式 Handle type



小接线盒 Small junction box type



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铠装热电偶

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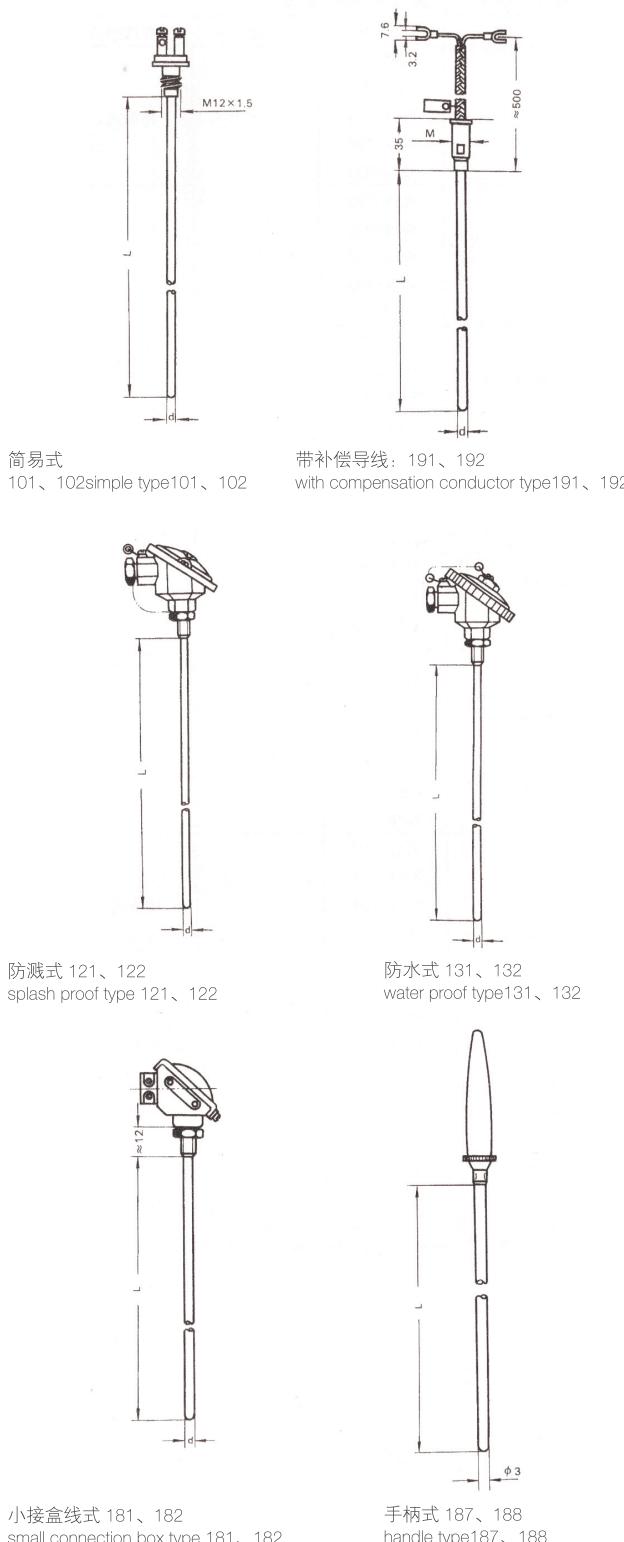
WREK、WRNK、WRCK 系列
WREK、WRNK、WRCK Series

型号规格 Model specification

无固定装置式铠装热电偶 thermocouple without fixed device

名称 Name	型号 Model	分度号 Graduation	工作端形式 Working-end type
单支镍铬 - 铜镍 Single NiCr-CuNi	WREK-101 WREK-121 WREK-131 WREK-181 WREK-187 WREK-191	E	绝缘式 Insulation type
	WREK-102 WREK-122 WREK-132 WREK-182 WREK-188 WREK-192		接壳式 Shell type
	WREK ₂ -121 WREK ₂ -131		绝缘式 Insulation type
	WREK ₂ -122 WREK ₂ -132		接壳式 Shell type
	WREK-101 WREK-121 WREK-131 WREK-181 WREK-187 WREK-191	K	绝缘式 Insulation type
	WREK-102 WREK-122 WREK-132 WREK-182 WREK-188 WREK-192		接壳式 shell type
双支镍铬 - 铜镍 Couple NiCr-CuNi	WRNK ₂ -121 WRNK ₂ -131		绝缘式 Insulation type
	WRNK ₂ -122 WRNK ₂ -132		接壳式 Shell type
	WRNK-101 WRNK-121 WRNK-131 WRNK-181 WRNK-187 WRNK-191	T	绝缘式 Insulation type
	WRNK-102 WRNK-122 WRNK-132 WRNK-182 WRNK-188 WRNK-192		接壳式 Shell type
单支铜 - 铜镍 Single Cu-CuNi	WRCK-101 WRCK-121 WRCK-131 WRCK-181 WRCK-187 WRCK-191		绝缘式 Insulation type
	WRCK-102 WRCK-122 WRCK-132 WRCK-182 WRCK-188 WRCK-192		接壳式 Shell type
	WRCK ₂ -121 WRCK ₂ -131		绝缘式 Insulation type
	WRCK ₂ -122 WRCK ₂ -132		接壳式 Shell type

注: 套管外径 d mm: Φ 1, Φ 2, Φ 3, Φ 4, Φ 5, Φ 6, Φ 8



Notes: Diameter dmm of well: m2, m3, m4, m5, m6, m8

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Sheath thermocouple

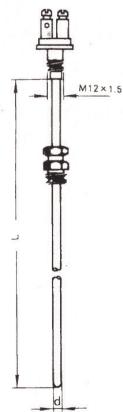


WREK、WRNK、WRCK 系列
WREK、WRNK、WRCK Series

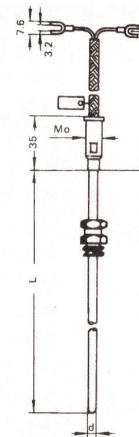
P-030

固定卡套螺纹装置式铠装热电偶
Sheathed thermocouple fixed sleeve thread

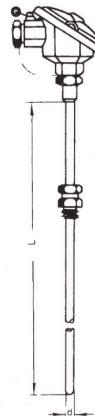
名称 Name	型号 Model	分度号 Graduation	工作端形式 Working end type
单支镍铬 - 铜镍 Single NiCr-CuNi	WREK-201 WREK-221 WREK-231 WREK-281 WREK-291	E	绝缘式 Insulation type
	WREK-202 WREK-222 WREK-232 WREK-282 WREK-292		接壳式 Shell type
	WREK-221 WREK-231		绝缘式 Insulation type
	WREK-222 WREK-232		接壳式 Shell type
	WRNK-201 WRNK-221 WRNK-231 WRNK-281 WRNK-291	K	绝缘式 Insulation type
	WRNK-202 WRNK-222 WRNK-232 WRNK-282 WRNK-292		接壳式 Shell type
	WRNK-221 WRNK-231		绝缘式 Insulation type
	WRNK-222 WRNK-232		接壳式 Shell type
	WRCK-201 WRCK-221 WRCK-231 WRCK-281 WRCK-291	T	绝缘式 Insulation type
	WRCK-202 WRCK-222 WRCK-232 WRCK-282 WRCK-292		接壳式 Shell type
	WRCK-221 WRCK-231		绝缘式 Insulation type
	WRCK-222 WRCK-232		接壳式 Shell type



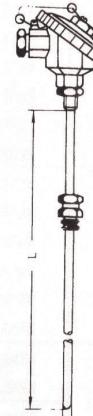
简易式 201、202
Easy type 201,202



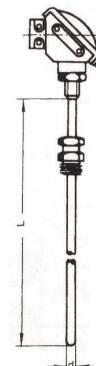
带补偿导线: 291、292
with Compensation conductor type 291,292



防溅式 221、222
Water-splash type 221,222



防水式 231、232
Water-proof 231, 232



小接盒线式 281、282
Little connection box 281, 282

注: 套管外径 d mm: Φ 1, Φ 2, Φ 3, Φ 4, Φ 5, Φ 6, Φ 8

Notes: the casing outside diameter d mm: Φ 1, Φ 2, Φ 3, Φ 4, Φ 5, Φ 6, Φ 8



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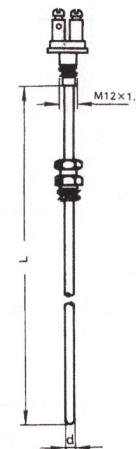
铠装热电偶

Sheath thermocouple

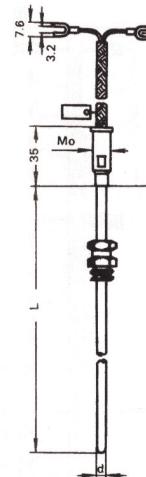
WREK、WRNK、WRCK 系列
WREK、WRNK、WRCK Series

可动卡套螺纹装置式铠装热电偶
Sheathed thermocouple movable sleeve thread

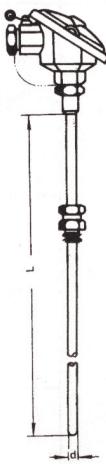
名称 Name	型号 Model	分度号 Graduation	工作端形式 Working-end type
单支镍铬 - 铜镍 Single NiCr-CuNi	WREK-301 WREK-321 WREK-331 WREK-381 WREK-387 WREK-391	E	绝缘式 Insulation type
	WREK-302 WREK-322 WREK-332 WREK-392 WREK-382 WREK-388		接壳式 Shell type
	WREK-321 WREK-331		绝缘式 Insulation type
	WREK-322 WREK-332		接壳式 Shell type
	WRNK-301 WRNK-321 WRNK-331 WRNK-391 WRNK-381 WRNK-387	K	绝缘式 Insulation type
	WRNK-302 WRNK-322 WRNK-332 WRNK-392 WRNK-382 WRNK-388		接壳式 Shell type
双支镍铬 - 镍硅 Couple NiCr-NiSi	WRNK-321 WRNK-331		绝缘式 Insulation type
	WRNK-322 WRNK-332		接壳式 Shell type
	WRCK-301 WRCK-321 WRCK-331 WRCK-391 WRCK-381 WRCK-387	T	绝缘式 Insulation type
	WRCK-302 WRCK-322 WRCK-332 WRCK-392 WRCK-382 WRCK-388		接壳式 Shell type
双支铜 - 铜镍 Couple Cu-CuNi	WRCK-321 WRCK-331		绝缘式 Insulation type
	WRCK-322 WRCK-332		接壳式 Shell type



简易式 301、302
Easy type 301,302



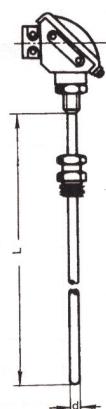
带补偿导线: 391、392
With compensation type 391,392



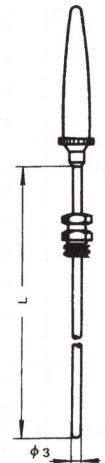
防溅式 321、322
Water-splash type 321,322



防水式 331、332
Water-proof 331、332



小接盒线式 381、382
Little connection box 381, 382



手柄式 387、388
Rein type

注: 套管外径 d mm: Φ 1, Φ 2, Φ 3, Φ 4, Φ 5, Φ 6, Φ 8

Notes: 1) marked *** graduation is a special specification when order
2) diameter dmm of well: m 1、m 2、m3、m 4、m5、m 6、m 8

铠装热电偶

Sheath thermocouple

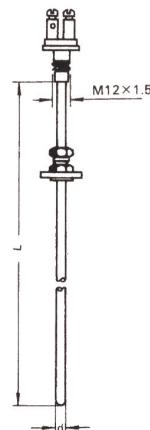


WREK、WRNK、WRCK 系列
WREK、WRNK、WRCK Series

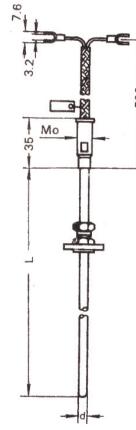
P-032

固定卡套法兰装置式铠装热电偶
Sheathed thermocouple fixed sleeve flange

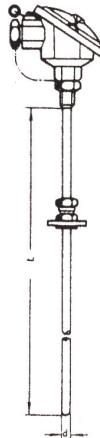
名称 Name	型号 Model	分度号 Graduation	工作端形式 Working-end type
单支镍铬 - 铜镍 Single NiCr-CuNi	WREK-401 WREK-421 WREK-431 WREK-481 WREK-491	E	绝缘式 Insulation type
	WREK-402 WREK-422 WREK-432 WREK-482 WREK-492		接壳式 Shell type
	WREK ₂ -421 WREK ₂ -431		绝缘式 Insulation type
	WREK ₂ -422 WREK ₂ -432		接壳式 Shell type
	WRNK-401 WRNK-421 WRNK-431 WRNK-481 WRNK-491	K	绝缘式 Insulation type
	WRNK-402 WRNK-422 WRNK-432 WRNK-492 WRNK-482		接壳式 Shell type
	WRNK ₂ -421 WRNK ₂ -431		绝缘式 Insulation type
	WRNK ₂ -422 WRNK ₂ -432		接壳式 Shell type
	WRCK-401 WRCK-421 WRCK-431 WRCK-491 WRCK-481	T	绝缘式 Insulation type
	WRCK-402 WRCK-422 WRCK-432 WRCK-492 WRCK-482		接壳式 Shell type
	WRCK ₂ -421 WRCK ₂ -431		绝缘式 Insulation type
	WRCK ₂ -422 WRCK ₂ -432		接壳式 Shell type



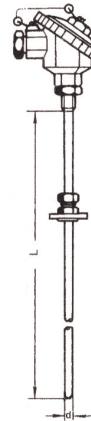
简易式 401、402
Easy type 401、402



带补偿导线: 491、492
With compensation type 491,492



防溅式 421、422
Water-splash type 421、422



防水式 431、432
Water-proof 431、432



小接盒线式 481、482
Little connection box 481, 482



注: 套管外径 d mm: Φ 1, Φ 2, Φ 3, Φ 4, Φ 5, Φ 6, Φ 8

Notes: Diameter dmm of well: m 1, m 2, m3, m 4, m5, m 6, m 8



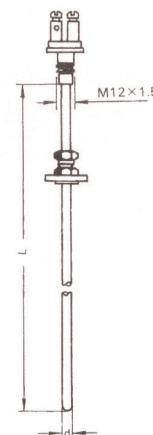
铠装热电偶

Sheath thermocouple

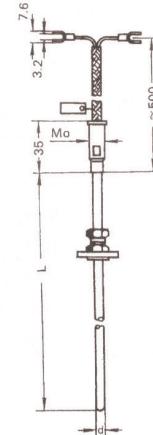
WREK、WRNK、WRCK 系列
WREK、WRNK、WRCK Series

可动卡套法兰装置式铠装热电偶
movable sleeve flange of sheathed thermocouple

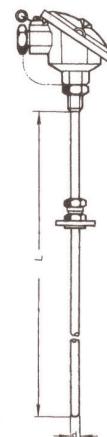
名称 Name	型号 Model	分度号 Graduation	工作端形式 Working-end type
单支镍铬 - 铜镍 Single NiCr-CuNi	WREK-501 WREK-521 WREK-531 WREK-581 WREK-591	E	绝缘式 Insulation type
	WREK-502 WREK-522 WREK-532 WREK-582 WREK-592		接壳式 Shell type
	WREK ₂ -521 WREK ₂ -531		绝缘式 Insulation type
	WREK ₂ -522 WREK ₂ -532		接壳式 Shell type
	WRNK-501 WRNK-521 WRNK-531 WRNK-581 WRNK-591	K	绝缘式 Insulation type
	WRNK-502 WRNK-522 WRNK-532 WRNK-592 WRNK-582		接壳式 Shell type
	WRNK ₂ -521 WRNK ₂ -531		绝缘式 Insulation type
	WRNK ₂ -522 WRNK ₂ -532		接壳式 Shell type
	WRCK-501 WRCK-521 WRCK-531 WRCK-591 WRCK-581	T	绝缘式 Insulation type
	WRCK-502 WRCK-522 WRCK-532 WRCK-592 WRCK-582		接壳式 Shell type
	WRCK ₂ -521 WRCK ₂ -531		绝缘式 Insulation type
	WRCK ₂ -522 WRCK ₂ -532		接壳式 Shell type



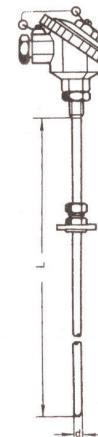
简易式 501、502
Easy type 501、502



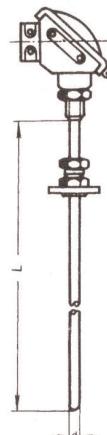
带补偿导线: 591、592
With compensation type 591、592



防溅式 521、522
Water-splash type 521、522



防水式 531、532
Water-proof 531、532



小接盒线式 581、582
Little connection box 581, 582

注: 套管外径 d mm: Φ 1, Φ 2, Φ 3, Φ 4, Φ 5, Φ 6, Φ 8

Notes: Diameter dmm of well: m 1、m 2、m3、m 4、m5、m 6、m 8

铠装热电偶

Sheath thermocouple



WREK、WRNK、WRCK 系列
WREK, WRNK, WRCK Series

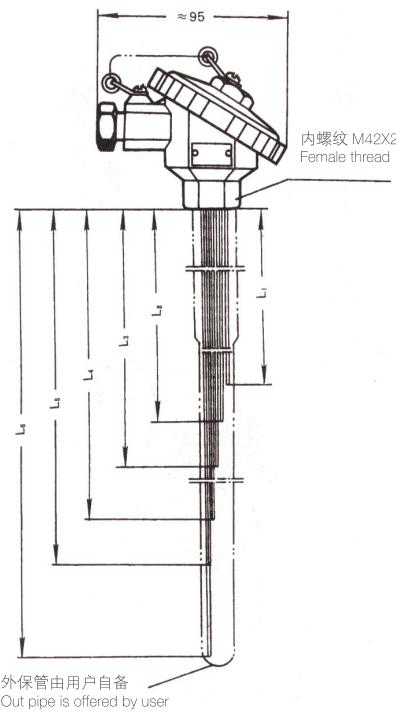
P-034

无固定装置多对式铠装元件热电偶
sheathed thermocouple without fixed device

名称 Name	型号 Model	分度号 Graduation	工作端形式 Working-end type
镍铬-铜镍多对式铠装元件热电偶 NiCrCuNi multi-twin sheathed element thermocouple	WREK-1313	E	绝缘式 Insulation type
	WREK-1314		
	WREK-1315		
	WREK-1316		
	WREK-1323	K	接壳式 Shell type
	WREK-1324		
	WREK-1325		
	WREK-1326		
镍铬-镍硅多对式铠装元件热电偶 NiCrCuSi multi-twin sheathed element thermocouple	WRNK-1313	E	绝缘式 Insulation type
	WRNK-1314		
	WRNK-1315		
	WRNK-1316		
	WRNK-1323	K	接壳式 Shell type
	WRNK-1324		
	WRNK-1325		
	WRNK-1326		

注: (1) 多对式铠装元件外径Φ 3、Φ 4mm 二种。
(2) 多对式热电偶分三对、四对、五对、六对、四种规格。

Note: (1) Multiple type armoured components in the outer diameter 3, Φ 4 mm tow
(2) multi-pair thermocouple has four specification: three-pair type, four-pair type,five-pair type, six-pair type



多对式铠装元件热电偶 Multiple armoured element thermocouple

长度规格
Length specification

单位: mm
Unit

序号 No	L1	L2	L3	L4	L5	L6
I	830	2220	2420	3500	4940	7320
II	890	2320	2470	2600	6080	7370

铠装热电偶安装示图

Armoured thermocouple diagrams of installation

