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Chongqing Chuanyi Instrument No.17 Factory Co., Ltd. Address: Longfengqiao Bridge, Beibei District, Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

Special thermocouple (resistance) used in petrochemical industry

WRNT−01blowing−type thermocouple

WRT−CQ core−pulling blowing−type nonmetal casing thermocouple

WRKT− TS anti−scouring thermocouple of the riser reactor

WRKC−COT inserting−type thermocouple used for ethylene cracking furnace

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WR − T GL thermocouple with corundum protective tube of glass furnance

WR − F GL thermocouple with corundum protective tube of glass furnance (connector−type)

WR − P GL thermocouple with platinum protective tube of glass furnanc (junction box type)

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K□

Sheathed Cable

Chongqing Chuanyi Instrument No.17 Factory Co., Ltd. Address: Longfengqiao Bridge, Beibei District, Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

K□ Sheathed Cable 加个小写的s

Sheathed cable is the arbitrarily-bendable and solid assembly, which is machined through putting the thermocouple wires into the metal sheath with the insulation material. Sheathed cable, as the key component of thermoucouple, is widely applied in many fields.

■Principal Features

Small diameter, Short reaction, good air-tightness, long life, Large measuring range, anti-seismic, low/high temperature resistance, narrow intallation space;

■Main Technical Specification

As per the national standard GB/T 18404-2001, equivalent to the international standard IEC61515:1995;

Industry Standard JB/T 8205-1999;

●Sheath Material， Outer Diameter and Highest Temperature

Name	Code No.	Type	Sheath Material	Diameter Φmm	Highest Utility Temperature℃	
					Long-term	Short-term
Nickel chrome-nickel silicon TC Cable	KK	K	0Cr18Ni9Ti	0.25	250	300
				0.5、1.0	400	600
				1.5、2.0	600	700
				3.0、4.0、4.5、5.0、6.0、8.0	800	900
			0Cr25Ni20	0.25	300	350
				0.5、1.0	500	600
				1.5、2.0、3.0	800	900
				4.0、4.5、5.0	900	1000
				6.0、8.0	1000	1100
			Gh3030 or Inconel600	0.25	300	350
				0.5、1.0	500	600
				1.5、2.0、3.0	800	900
				4.0、4.5、5.0	900	1000
				6.0、8.0	1000	1100
Nickel chrome silicon - nickel silicon magnesium TC Cable	KN	N	0Cr18Ni9Ti	0.25	250	300
				0.5、1.0	400	600
				1.5、2.0	600	700
				3.0、4.0、4.5、5.0、6.0、8.0	800	900
			Gh3030 or Inconel600	0.25	300	350
				0.5、1.0	500	600
				1.5、2.0、3.0	800	900
				4.0、4.5、5.0	900	1000
				6.0、8.0	1000	1100
Nickel chrome-Nickel copper （Constantan） TC Cable	KE	E	0Cr18Ni9Ti	0.5、1.0	400	500
				1.5、2.0	500	600
				3.0、4.0、4.5	600	700
				5.0、6.0、8.0	700	800
Iron-Nickel copper（Constantan） TC Cable	KJ	J	0Cr18Ni9Ti	0.5、1.0	300	400
				1.5、2.0	400	500
				3.0、4.0、4.5	500	600
				5.0、6.0、8.0	600	750
Copper-Nickel copper（Constantan） TC Cable	KT	T	0Cr18Ni9Ti	0.5、1.0	200	250
				1.5、2.0、3.0、4.0、4.5	250	300
				5.0、6.0、8.0	300	400
Platinum Rhodium 10- Platinum TC Cable	KS	S	GH3039	2.0、3.0、4.0、4.5	1000	1100
				5.0、6.0、8.0	1100	1200
Platinum Rhodium 13- Platinum TC Cable	KR	R	GH3039	2.0、3.0、4.0、4.5	1000	1100
				5.0、6.0、8.0	1100	1200
Platinum Rhodium 30- Platinum 6 TC Cable	KB	B	GH3039	2.0、3.0、4.0、4.5、5.0、6.0、8.0	1200	1300
			Platinum Rhodium 6	2.0、3.0	1200	1300
				4.0、4.5、5.0、6.0、8.0	1300	1400

Note:The utility temperature depends on the sheath diameter, the sheath material, the medium status and the thermocouple construction, etc., the temperature in the following sheet are only recommended;

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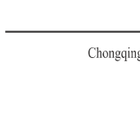
●Tolerance

TC Wire Type	Type	Tolerance Class					
		Class 1		Class 2		Class P	
		Tolerance Value	Temperature Scope℃	Tolerance Value	Temperature Scope℃	Tolerance Value	Temperature Scope℃
Nickel chrome-nickel silicon	K	±1.5℃ or ±0.4%|t|	-40～1000	±2.5℃ or ±0.75%|t|	-40～1100	/	/
Nickel chrome silicon - nickel silicon magnesium	N						
Nickel chrome-Nickel copper （Constantan）	E		-40～800		-40～800		
Iron-Nickel copper（Constantan）	J		-40～750		-40～750	/	/
Copper-Nickel copper（Constantan）	T	±0.5℃ or ±0.4%|t|	-40～350	±1℃ or ±0.75%|t|	-40～350	/	/
Platinum Rhodium 10- Platinum	S	/	/	/	/	±3℃ or ±0.5%|t|	0～1200
Platinum Rhodium 13- Platinum	R						
Platinum Rhodium 30- Platinum Rhodium 6	B	/	/	/	/	±4℃ or ±0.5%|t|	600～1400

Remark： 1. t stands for the thermal field temperature; 2. the tolerance value: the absolute value, which is bigger, is chosen;

●Sheathed Cable Specification

	Sheath Dimension (mm)		Nominal Diameter (mm)		Sheath Material			Length ≤m/Piece
	Diameter	Nominal Thickness	K、N、E、J、T Type	S、R、BType	K. NType	E. J. TType	S. RType	BType	
Single 	0.25	0.025-0.035	0.04-0.05	-	Gh3030 or Inconel 600 or 0Cr18Ni9Ti	0Cr18Ni9Ti	GH3039	GH3039or Platinum Rhodium 6	135
	0.5	0.05-0.10	0.08-0.12	-					100
	1.0	0.10-0.20	0.15-0.20	-					200
	1.5	0.15-0.25	0.23-0.30	0.15-0.20					100
	2.0	0.20-0.35	0.30-0.50	0.20-0.25					90
	3.0	0.30-0.45	0.45-0.60	0.30-0.25					83
	4.0	0.40-0.60	0.55-0.70	0.40-0.45					47
	4.5	0.45-0.65	0.68-0.80	0.40-0.45					37
	5.0	0.50-0.80	0.70-0.90	0.45-0.50					55
	6.0	0.60-0.90	0.90-1.10	0.45-0.50					40
	8.0	0.80-1.20	1.20-1.40	-					20
Duplex	3.0	0.30-0.45	0.45-0.60	0.30-0.35					83
	4.0	0.40-0.60	0.55-0.70	0.40-0.45					47
	4.5	0.45-0.65	0.68-0.80	0.40-0.45					37
	5.0	0.50-0.80	0.70-0.90	0.45-0.50					55
	6.0	0.60-0.90	0.90-1.10	0.45-0.50					40
	8.0	0.80-1.20	1.20-1.40	-					20

Remark:1. Φ0.25 is only for K and N type;2. The length is beyond the largest length requirement, the further discussion is needed;

■Model

□ □ — □ □ — □ □

Core Quantity
No Designation: Duplex-core Materials
4：Quard-core Materials

Outer Sheath Material：
G：0Cr18Ni9Ti
P：0Cr25Ni20
B：GH3030
N：Inconel600
C：GH3039
D：Platinum Rhodium 6

Diameter（mm）
M：Φ0.25
A：Φ0.5
B：Φ1.0
C：Φ1.5
D：Φ2.0
E：Φ3.0
F：Φ4.0
G：Φ4.5
H：Φ5.0
J：Φ6.0
K：Φ8.0

Tolerance Class
1：Class 1
2：Class 2
P：Common Class

Sheathed Cable：

KK：Nickel chrome-nickel silicon TC Cable，Type：K

KN：Nickel chrome silicon - nickel silicon magnesium TC Cable，Type：N

KE：Nickel chrome-Nickel copper（Constantan） TC Cable，Type：E

KJ：Iron-Nickel copper（Constantan） TC Cable，Type：J

KT：Copper-Nickel copper（Constantan） TC Cable，Type：T

KS：Platinum Rhodium 10- Platinum TC Cable，Type：S

KR：Platinum Rhodium 13- Platinum TC Cable，Type：R

KB：Platinum Rhodium 30- Platinum 6 TC Cable，Type：B

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WR Series TC

WRG□K Sheathed TC

WRG□K Sheathed TC

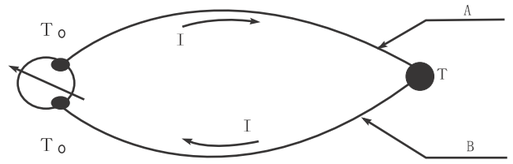
Sheathed thermocouple, with the advantages of a slender body, the short thermal response time, acceptable long life cycle and acceptable etc., is widely acceptable for the narrow pipeline and some special temperature-measuring positions in many fields, such as aviation, atomic energy, chemical industry, metal industry, machine industry, power generation, etc.;

WRG□K series armored thermocouples, with its unique and novel structure, are a new series manufactured in a full range of varieties with full sets of equipment and technology from Okazaki (Japan). They are listed as the 18th batch of import substitute products by Ministry of Mechanic and Electronic Industry, and well received among users.

Armored thermocouples are typically made up of parts such as as armored thermocouple components, fixing devices used in mounting, wiring devices.

■Working Principle

The isentropic conductor (electric pole A and isentropic) build up a closed loop, when temperature of the two contacts is different, there will be current passing through the loop, and the thermo-emf generated between two contacts is referred as Seebeck Thermoemf. (See the schematic diagram below for the operating principle). Thermoemf is related to isentropic conductor and temperature difference of the two ends. Thermocouples measuretemperature with this principle.



Operating Principle

■Features

Featuring wide temperature measurement range, fast response, smaller outer diameter, faster response to temperature change, ease of installation, longer life, better air impermeability, higher mechanical strength, they are used at places with high vibration and having, high and low temperature conditions.

■Technical Data

As per the national standard GB/T 18404-2001, equivalent to the international standard IEC61515:1995;

Industry Standard JB/T 8205-1999;

● Mt'l, O.D. and Max. temperature of Protection Tube

Type	Materials	Diameter	Recommended max. temperature
K	0Cr18Ni9Ti	0.25	250
		0.5、1.0	400
		1.5、2.0	600
		3.0、4.0、4.5 5.0、6.0、8.0	800
	0Cr25Ni20	0.25	300
		0.5、1.0	500
		1.5、2.0、3.0	800
		4.0、4.5、5.0	900
		6.0、8.0	1000
	GH3030 or Incone1600	0.25	300
		0.5、1.0	500
		1.5、2.0、3.0	800
		4.0、4.5、5.0	900
		6.0、8.0	1000
N	0Cr18Ni9Ti	0.25	250
		0.5、1.0	400
		1.5、2.0	600
		3.0、4.0、4.5 5.0、6.0、8.0	800
	GH3030 or Incone1600	0.25	300
		0.5、1.0	500
		1.5、2.0、3.0	800
		4.0、4.5、5.0	900
		6.0、8.0	1000
E	0Cr18Ni9Ti	0.5、1.0	400
		1.5、2.0	500
		3.0、4.0、4.5	600
		5.0、6.0、8.0	700
J	0Cr18Ni9Ti	0.5、1.0	300
		1.5、2.0	400
		3.0、4.0、4.5	500
		5.0、6.0、8.0	600
T	0Cr18Ni9Ti	0.5、1.0	200
		1.5、2.0、3.0 4.0、4.5	250
		5.0、6.0、8.0	300
S	GH3039	2.0、3.0、4.0、4.5	1000
		5.0、6.0、8.0	1100
R	GH3039	2.0、3.0、4.0、4.5	1000
		5.0、6.0、8.0	1100
B	GH3039	2.0、3.0、4.0、4.5 5.0、6.0、8.0	1200
	RtRh6	2.0、3.0	1200
		4.0、4.5、5.0	1300
		6.0、8.0	

Note: Working temperature depends on state of the tested media, environmental conditions, structure of thermocouple measured end. In the event of an exposed end type, working temperature shall be lowered correspondingly.

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●Type and Tolerance

Type	Specification	Type	Tolerance Class		
			Class 1	Class 2	Class P
Nickel chrome-nickel silicon	WRGKK	K	±1.5℃ or ±0.4%|t|	±2.5℃ or ±0.75%|t|	/
Nickel chrome silicon - nickel silicon magnesium	WRGNK	N			
Nickel chrome-Nickel copper（Constantan）	WRGEK	E			
Iron-Nickel copper（Constantan）	WRGJK	J			
Copper-Nickel copper（Constantan）	WRGTK	T	±0.5℃ or ±0.4%|t|	±1℃ or ±0.75%|t|	/
Platinum Rhodium 10- Platinum	WRGSK	S	/	/	±3℃ or ±0.5%|t|
Platinum Rhodium 13- Platinum	WRGRK	R			
Platinum Rhodium 30- Platinum Rhodium 6	WRGBK	B	/	/	±4℃ or ±0.5%|t|

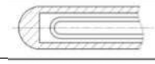
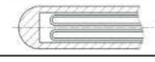
●Response Time $\tau_{0.5}$

Diameter mm / Thermal Response Time $\tau_{0.5}$ / Hot Junction Structure	0.25	0.5	1.0	1.5	2.0	3.0	4.0	4.5	5.0	6.0	8.0
Exposed	-	-	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1.0
Grounded	0.1	0.2	0.2	0.3	0.4	0.6	0.8	1.0	1.2	2.0	4.0
Un-grounded	0.2	0.4	0.6	0.8	1.0	2.0	2.5	3.0	4.0	6.0	8.0

●Length Allowance

Item	Dimension Range（mm）	Tolerance（mm）
Total Length L or Insertion Depth l	≤150	±3.0
	>150	±2%L(ℓ)
Compensating Cable Length S	≤1000	±15
	>1000	±1.5%S

●Measuring End Structure

Designation	Form	Construction	Sheath Diameter mm	
			Single	Duplex
1	Exposed		Φ1.0～Φ8.0	Φ3.0～Φ8.0
2	Grounded		Φ0.25～Φ8.0	
3	Un-grounded		Φ0.5～Φ8.0	
4	Sperately-isolated			Φ3.0～Φ8.0

●Room-temperature Insulation Resistance

If surrounding air temperature is between 15 and 35℃, insulation resistance between thermocouple wire and outer protecting tube shall meet the table below (applicable to isolated insulation type).

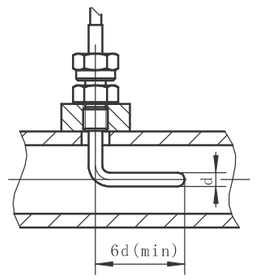
Sheath Diameter mm	Test Voltage Vd.c	Insulation Resistance MΩ.m	
		L≤1m	L>1m
Φ0.25	50±5	≥1000	$\geq \frac{1000M\Omega.m}{L}$
Φ0.5-1.5		≥1000	$\geq \frac{1000M\Omega.m}{L}$
>Φ1.5	500±50		

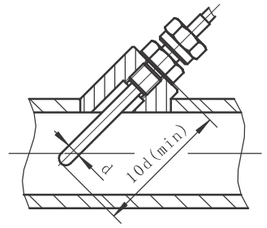
Note 1: As to armor thermocouples with compensation lead, the normal temperature insulation resistance should be as per the criteria for compensation lead, i.e. no less than 5MΩ.m/L every 10 m.

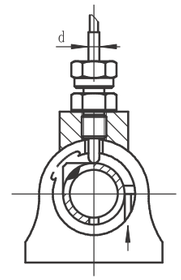
2: As to armor thermocouples with metal socket connectors, the normal temperature insulation resistance should be ≥100MΩ.m/L.

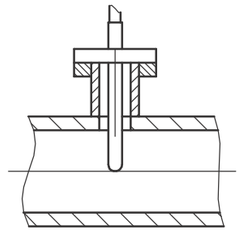
3: Exposed type or Grounded type is excluded in the sheet above;

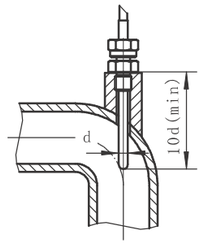
■Installation Method

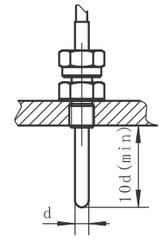


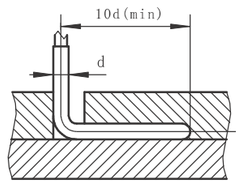


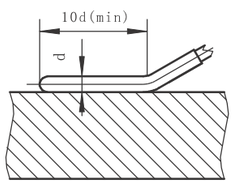


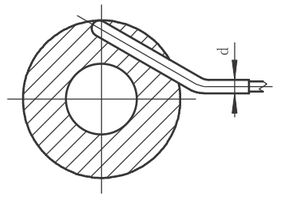


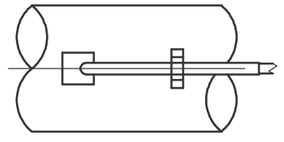


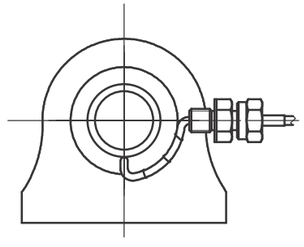












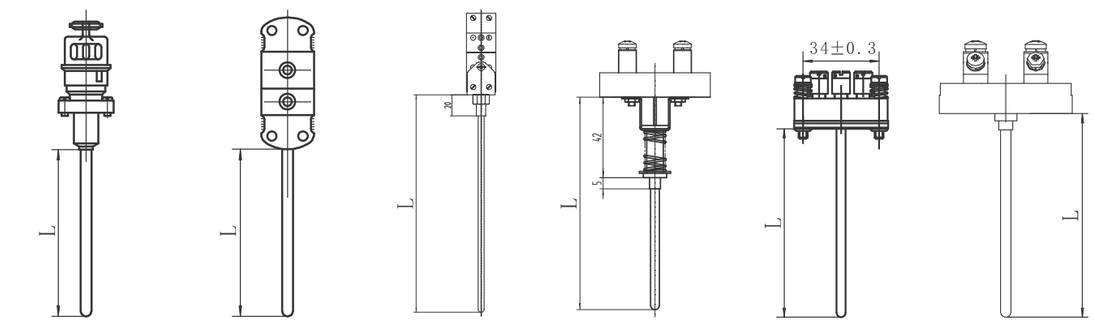
●WRG K series sheathed thermocouple- Okazaki structure（non-junction box type）

① ② ③ ④⑤⑥⑦⑧ ⑨

WRG□K□ −1□□ − □□□□□/□

WRG K-1A			Metal socket type			
WRG K-1B			Plastic socket type			
WRG K-1C			Imported socket type			
WRG K-1D			Crimping terminal plate with the spring thermocouple			
WRG K-1G			Falling-off resistance wiring board thermocouple			
WRG K-1N			Wiring board thermocouple			
Class	①	Graduation No.	K：NiCr-Nisi N：NiCrSi- Nickel silicon magnesium E：NiCr- CuNi（constantane） J：Fe-CuNi（constantane） T： Cu-CuNi（constantane）		S：Pt-Rh10-Pt R：Pt-Rh 13-Pt B：Pt-Rh 30-Pt-Rh6	
	②	Pairs of the thermocouple	No mark：Single-branch		2. Double-branch（suitable for sheathed even diameter Φ3~Φ8）	
Type	③	Type of the measuring end	1.Exposed junction type	2. Shorted junction type	3. Isolated junction type	
Temperature measuring elements	④	Tolerance grade	K， E， J， N	T	S， R	B
			1：±1.5℃ or ±0.4%|t|℃	1：±0.5℃ or ±0.4%|t|℃	P：±3℃ or ±0.5%|t|℃	P：±4℃ or ±0.5%|t|℃
			2：±2.5℃ or ±0.75%|t|℃	2：±1.0℃ or ±0.75%|t|℃		
	⑤	Sheathed thermocouple diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8	
	⑥	Total length L（mm）				
	⑦	Material of the casing	G：0Cr18Ni9Ti	B：GH3030	Notes：For marking methods of other materials see P159	
			H：316	C：GH3039		
			HL：316L	N：Incone 1600		
	⑧	Inserting length 1（mm） Notes：Suitable for fixed thread no marking for non-fixed thread				
Additional unit	⑨	See P157-P158				

●Structure Profile



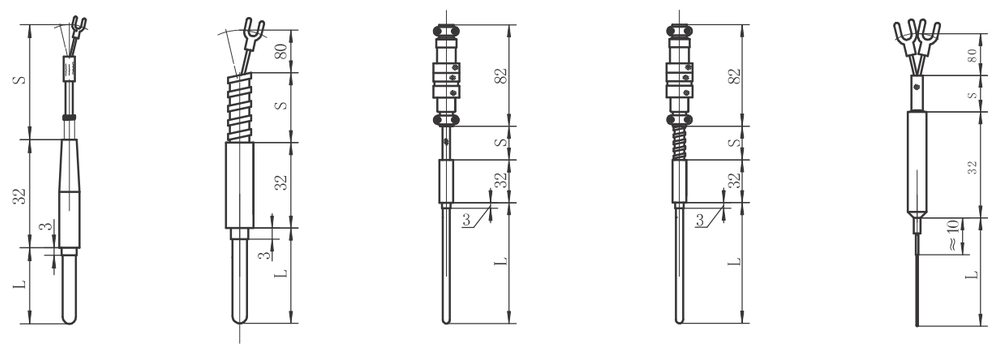
WRG□ K-1□ A　WRG□ K-1□ B　WRG□ K-1□ C　WRG□ K-1□ D　WRG□ K-1□ G　WRG□ K-1□ N

① ② ③ ④⑤⑥⑦ ⑧⑨ ⑩

WRG□K□ −1□□ − □□□□ − □□/□

WRG□K□ −1□1 WRG□K□ −1□2 WRG□K□ −1□3A WRG□K□ −1□4A WRG□K□ −1□5			Wiring fork type with compensating lead Wiring fork type with compensating lead sleeve flexible conduit Metal socket type with compensating lead (for the connector, see page 156) Metal socket type with compensating lead sleeve flexible conduit (for the connector, see page 156) Sheathed micro thermocouple (only for K and N types)			
Class	①	Graduation No.	K：K type NiCr-NiSi N：N type NiCrSi- Nickel silicon magnesium E：E type NiCr-CuNi（constantane） J：J type Fe-CuNi （constantane） T：T type Cu-CuNi （constantane）		S：S type Pt-Rh10-Pt R：R type Pt-Rh13-Pt B：B type Pt-Rh30- Pt-Rh6	
	②	Pairs of the thermocouple	No mark：Single branch 2：Double branch （Suitable for sheathed thermocouple diameter：Φ3~Φ8）			
Type	③	Type of the measuring end	1：Exposed junction type （Not applicable for sheathed fine thermocouple）	2：Shorted junction type		3：Isolated junction type （Sheathed thermocouple diameter≥Φ0.5）
	④	Tolerance grade	K，E，J，N	T	S，R	B
			1：±1.5℃ or ±0.4%|t|℃ 2：±：2.5℃ or ±0.75%|t|℃	1：±0.5℃ or ±0.4%|t|℃ 2：±：1.0℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃	P：±4℃ or ±0.5%|t|℃
Temperature measuring elements	⑤	Sheathed thermocouple diameter（mm）	M：Φ0.25 A：Φ0.5 B：Φ1	C：Φ1.5 D：Φ2 E：Φ3	F：Φ4 G：Φ4.5 H：Φ5	J：Φ1.5 K：Φ8
			Notes：M and A are only used for sheathed fine thermocouple			
	⑥	Total length L（mm）				
	⑦	Material of the casing	G：0Cr18Ni9Ti H：316 HL：316L	P：310S B：GH3030 C：GH3039	Notes：For marking methods of other materials， see P159	
Compensating lead	⑧	S：General heatproof compensating lead SP：General heatproof compensating lead， with the shielding layer SS：General heatproof， oil resistance compensating lead				
	⑨	Length of the compensating lead （mm）				
Additional device	⑩	See P157-P158				

●Structure Profile



WRG□ K-1□ 1　WRG□ K-1□ 2　WRG□ K-1□ 3A　WRG□ K-1□ 4A　WRG□ K-1□ 5

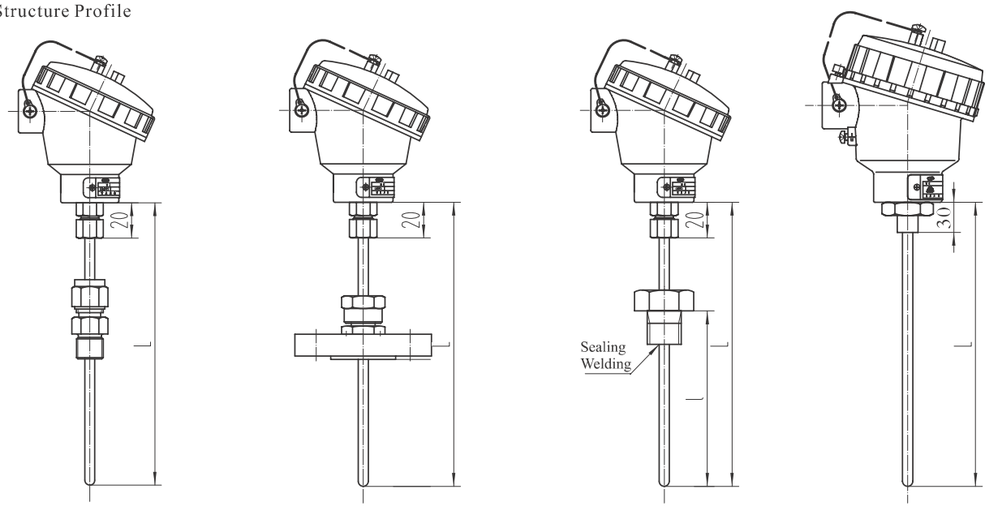
●WRG□K Sheathed TC-Japan OKAZAKI Structure(with Junction Box)

① ② ③④ ⑤⑥⑦⑧⑨ ⑩⑪⑫ ⑬⑭⑮

WRG□K□ – □□ – □□□□□ – □□□ – □□□

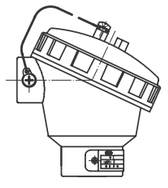
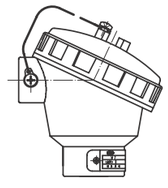
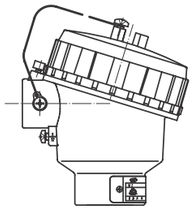
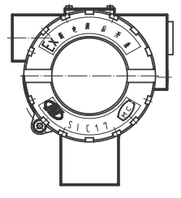
WRG□K□ —□ □ Type			No-installation Type			
Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickelcopper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	②	Sensor Quantity	No designation： Single 2：Duplux			
Model	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	④	Hot Junction Structure	1：Exposed Type 2：Grounded Type 3：Isolated Type			
Sensor	⑤	Accuracy	K、E、J、N 1：±1.5℃or± 0.4%|t|℃ 2：± 2.5℃or± 0.75%|t|℃	T 1：±0.5℃or± 0.4%|t|℃ 2：± 1.0℃or± 0.75%|t|℃	S、R P：± 3℃or± 0.5%|t|℃	B P：± 4℃or± 0.5%|t|℃
	⑥	Diameter (mm)	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8	
	⑦	Total Length L（mm）				
	⑧	Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Inconel600	Remarks: Other materials are listed in Page 159	
	⑨	Insertion depth l（mm）(Applied for the fixed thread type)				
J.B. Specification	⑩	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread		
	⑪	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑫	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types	
Process Connection	⑬	Installation	No mark: bare stem 1： Fixed Thread	2：compression-fitting thread	6：on-fitting flange（ Dual ）	
	⑭	Installation Material	A：304 H：316	HL：316L	Remark：Any other material is listed in Page 159	
	⑮	Installation Size	fitting Thread	Compresson-fitting Flange		
			M12：M12*1.5 M27：M27*2 M16：M16*1.5 N1：NPT1/2" M20：M20*1.5 Z1：ZG1/2"	Flange quantity	1：Single 2：Duplex and with fastenings	
				Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face	
			Remarks：1.Any other size of thread is designed like：(Specific Size)，Ex.：M27*1.5：(M27*1.5)；			

● Structure Profile

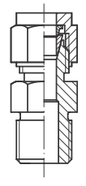
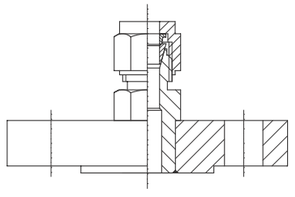
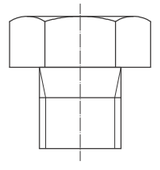


Remarks： L=l+150mm

● J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.	JDY J.B.
Skecth				
Designation	3：Die Casting 3A：SS	5：Die Casting 5A：SS	7：Die Casting 7A：SS	8：Water-proof (die casting) 9：Explosion-proof (die casting)
Enclosure Grade	IP65	IP65	IP65	IP65
Remark:Detailed specifications are listed in Page 154~155				

● Installation

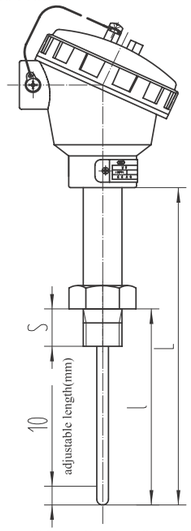
Name	Compression-fitting Thread	Compression-fitting flange	Welded thread
Skecth			
Designation	2： Compression-fitting Thread	6： Compression-fitting Flange	1： Fixed Thread
Remark:Detailed specifications are listed in Page 157~158			

① ② ③④⑤ ⑥⑦⑧⑨⑩ ⑪⑫⑬ ⑭⑮ ⑯

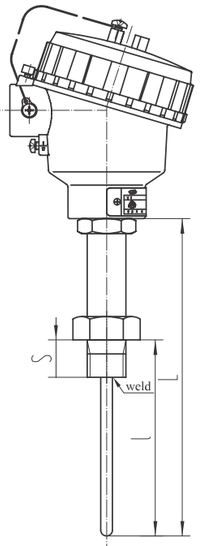
WRG□K□ – □□□ – □□□□□ – □□□ – □□ / □

WRG□K□-□□□ Type			Not-adjustable-nipple-bolt Type			
Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）	S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6		
	②	Sensor Quantity	No designation：Single 2：Duplux			
Model	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.	3A：Water-proof SS J.B. 5A：Water-proof SS J.B. 7A：Explosion-proof SS J.B.(Spring-loaded) 9A：SS JDY J.B.		
	④	Hot Junction Structure	1：Exposed Type 2：Grounded Type 3：Isolated Type			
	⑤	Extension Type	SG：Fixed-bolt Type SGK: Compression-fitting sealing type	SGH：Welded sealing Type Remarks：the spring-loaded structure is invalid for the sealing welded type		
Sensor	⑥	Accuracy	K、E、J、N	T	S、R	B
			1：±1.5℃or±0.4%|t|℃ 2：±2.5℃or±0.75%|t|℃	1：±0.5℃or±0.4%|t|℃ 2：±1.0℃or±0.75%|t|℃	P：±3℃or±0.5%|t|℃	P：±4℃or±0.5%|t|℃
	⑦	Diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8	
	⑧	Total Length L（mm）				
	⑨	Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Incone1600	Remarks: Other materials are listed in Page 159;	
	⑩	Insertion depth ℓ（mm）	Remarks: no marking here when 16 would be marked			
J.B. Specification	⑪	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1.Any other size of thread is designed like：(Specific Size)，Ex.：M27*1.5：(M27*1.5)；	
	⑫	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑬	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark: No designation for Water-proof Types；	
Process Connection	⑭	Bolt Material	A：304 H：316	HL：316L	Remark：Any other material is listed in Page 159	
	⑮	Bolt Size	M20：M20*1.5			
	⑯	Extra Attachments	Fixed Thread Type (welded Type) Protection Tube		Flanged type	
			Bl01 BL03 BH01	Refer to：P145-P148	BF02A BF02B BF03	Refer to：P148-P149

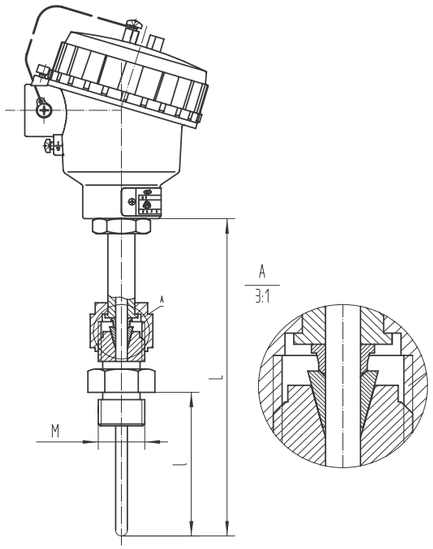
●Structure Profile



WRG□ K-5□ SG



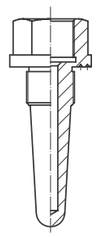
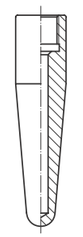
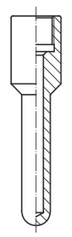
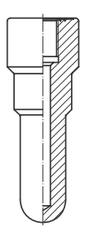
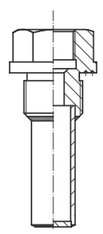
WRG□ K-7□ SGH

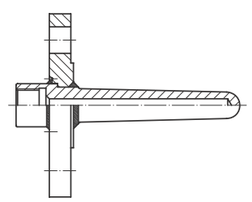
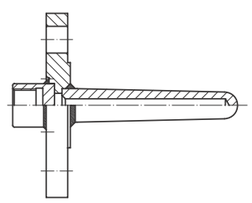
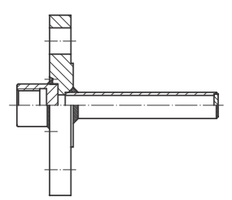


WRG□ K-7□ SGK

Remark: L=ℓ+150mm

●Extra Attachments

Name	Fixed Thread Type (welded Type) Protection Tube				
Sketch					
Designation	BL01	BH01T	BH01S	BH01L	BL03
Remark：Specific dimensions，refer to Page 145~147；					

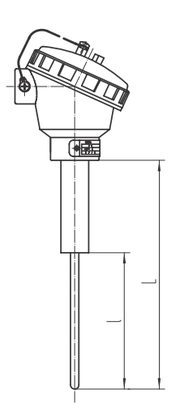
Name	Fixed Flange Type Protection Tube		
Sketch			
Designation	BF02A	BF0213	BF03
Remark：Specific dimensions，refer to Page 148~149；			

① ② ③④⑤ ⑥⑦⑧⑨⑩ ⑪⑫⑬ ⑭⑮⑯

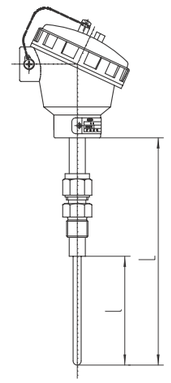
WRG□K□ – □□□ – □□□□□ – □□□ – □□□

W□RGK□-□□□ Type			Reinforcing Pipe Type		
Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）	S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	②	Sensor Quantity	No designation：Single 2：Duplux		
Model	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.	3A：Water-proof SS J.B. 5A：Water-proof SS J.B. 7A：Explosion-proof SS J.B.(Spring-loaded） 9A：SS JDY J.B.	
	④	Hot Junction Structure	1：Exposed Type 2：Grounded Type 3：Isolated Type		
	⑤	Extension Type	S：Reinforcing Pipe Type	SH: Welded reinforcing pipe type (applicable for those of the diameter Φ5)	
Sensor	⑥	Accuracy	K、E、J、N 1：±1.5℃ or ± 0.4%|t|℃ 2：± 2.5℃ or ± 0.75%|t|℃	T 1：±0.5℃ or ± 0.4%|t|℃ 2：± 1.0℃ or ± 0.75%|t|℃	S、R P：± 3℃ or ± 0.5%|t|℃	B P：± 4℃ or ± 0.5%|t|℃
	⑦	Diameter（mm）	E：Φ3 F：Φ4	G：Φ4. 5 H：Φ5	J：Φ6 K：Φ8	
	⑧	Total Length L（mm）				
	⑨	Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Inconel600	Remarks: Other materials are listed in Page 159;	
	⑩	Insertion depth ℓ（mm）				
J.B. Specification	⑪	Electric Connection	M：M20*1.5Internal Thread N：NPT1/2"Internal Thread	G：G1/2"Internal Thread Z：ZG1/2"Internal Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）；	
	⑫	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑬	Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Process Connection	⑭	Installation Method	No designation：No Installation 2：Compression-fitting Thread		6：Compression-fitting Flange 7：Adjustable Flange	
	⑮	Fixing Device Material	A：304 H：316	HL：316L	Remark：Any Other Material Designation refers to Thermowell Materials';	
	⑯	Fixing Device Material	Compression-fitting Thread	Fixed Thread and Compresson-fitting Flange		
			M12：M12*1.5 M27：M27*2 M16：M16*1.5 N1：NPT1/2" M20：M20*1.5 Z1：ZG1/2"	Flange quantity	1：Single 2：Duplex and with fastenings	
				Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face	
			Remarks：1.Any other size of thread is designed like：(Specific Size)，Ex.：M27*1.5：(M27*1.5)；			

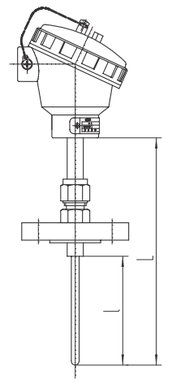
●Structure Profile



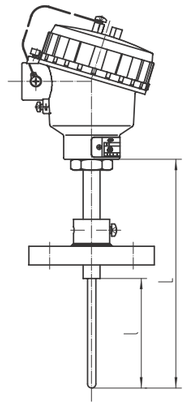
WRG□ K-$\frac{3}{5}$□ $\frac{S}{SH}$Type
(No Installation Type)



WRG□ K-$\frac{3}{5}$□ $\frac{S}{SH}$ Type
(Compression-fitting Thread Type)



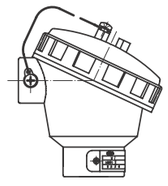
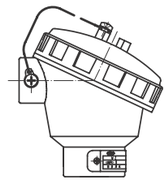
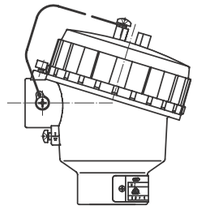
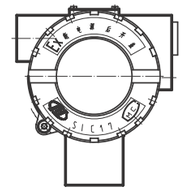
WRG□ K-$\frac{3}{5}$□ $\frac{S}{SH}$Type
(Compression-fitting Flange Type)



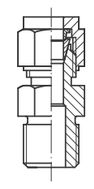
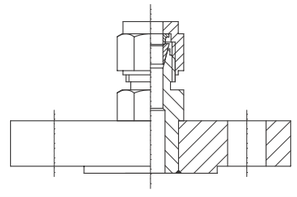
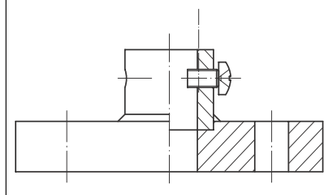
WRG□ K-7□ $\frac{S}{SH}$Type
(Adjustable Flange Type)

Remark： 1. L=l+150mm
2. Fixing device is fixed on the reinforcing pipe；If fixed on the sheath, it must be defined in order;

●J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.	JDY J.B.
Sketch				
Designation	3： Die-casting Al 3A： SS	5： Die-casting Al 5A： SS	7： Die-casting Al 7A： SS	8：Water-proof Type(Die-casting Al) 9：Explosion-proof Type(Die-casting Al)
Enclosure Protection Class	IP65	IP65	IP65	IP65
Remark：Specific dimensions（ refer to Page 136~140 ）				

●Fixing Device

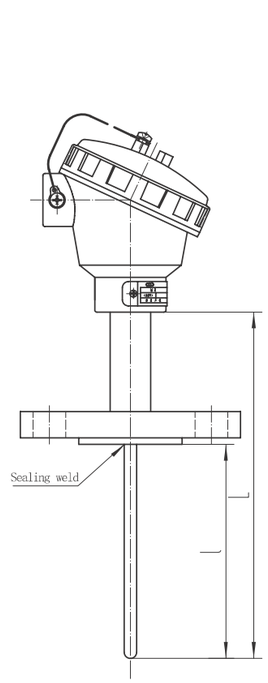
Name	Compression-fitting Thread	Compression-fitting Flange	Adjustable Flange
Sketch			
Designation	2：Compression-fitting Thread	6：Compression-fitting Flange	7：Adjustable Flange
Remark：Specific dimensions（ refer to Page 157~158 ）			

① ② ③④⑤ ⑥⑦⑧⑨⑩ ⑪⑫⑬ ⑭⑮⑯

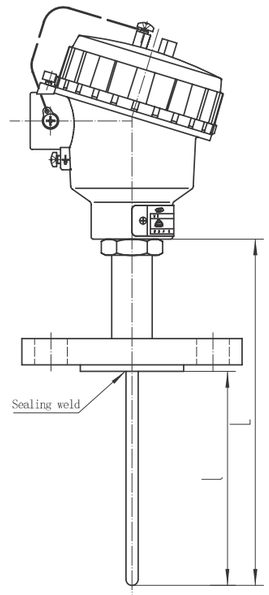
WRG□K□ – □□□ – □□□□□ – □□□ – □□□

W□RGK□-□□□ Type		Reinforcing Pipe Flanged Type			
Type	① Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	② Sensor Quantity	No designation：Single 2：Duplux			
Model	③ J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 5A：Water-proof SS J.B. 7A：Explosion-proof SS J.B.(Spring-loaded） 9A：SS JDY J.B.	
	④ Hot Junction Structure	1：Exposed Type 2：Grounded Type 3：Isolated Type			
	⑤ Extension Type	SFK:Fixed flange compression-fitting screw sealing type SFH: Fixed flange welded sealing type			
Sensor	⑥ Accuracy	K、E、J、N 1：±1.5℃ or ± 0.4%|t|℃ 2：± 2.5℃ or ± 0.75%|t|℃	T 1：±0.5℃ or ± 0.4%|t|℃ 2：± 1.0℃ or ± 0.75%|t|℃	S、R P：± 3℃ or ± 0.5%|t|℃	B P：± 4℃ or ± 0.5%|t|℃
	⑦ Diameter（mm）	E：Φ3 F：Φ4	G：Φ4. 5 H：Φ5	J：Φ6 K：Φ8	
	⑧ Total Length L（mm）				
	⑨ Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Inconel600	Remarks: Other materials are listed in Page 159;	
	⑩ Insertion depth ℓ（mm）				
J.B. Specification	⑪ Electric Connection	M：M20*1.5Internal Thread N：NPT1/2"Internal Thread	G：G1/2"Internal Thread Z：ZG1/2"Internal Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）： 2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.，which is applied for3，5，3A and 5A in ③：Any other size of gland should be defined in order：	
	⑫ Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑬ Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Process Connection	⑭ Flange material	A：304 ZA：20#	E: Embeded type in 304 SS flange body	Remarks： 1、other materials are detailed in Page 159; 2、if the companion flange material is different, the identification like (upper flange material+bottom flange material);	
	⑮ Flange quantity	1：Single 2：Duplex and with fastenings			
	⑯ Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face			

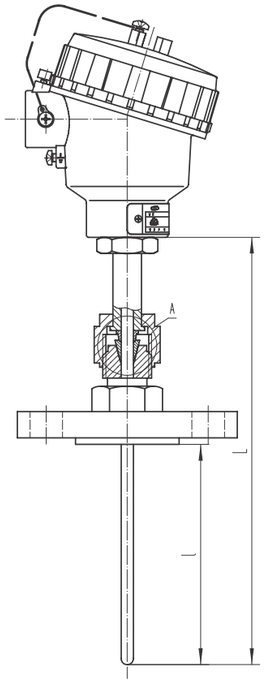
●Structure Profile



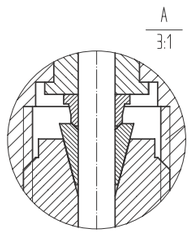
WRG□ K－3□ SFH



WRG□ K－7□ SFH

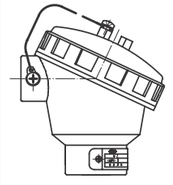
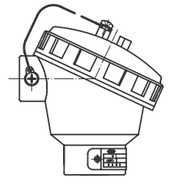
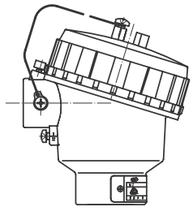
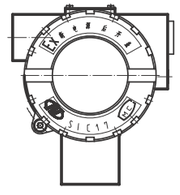


WRG□ K－7□ SFK



Remark： L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.	JDY J.B.
Sketch				
Designation	3：Die-casting Al 3A：SS	5：Die-casting Al 5A：SS	7：Die-casting Al 7A：SS	9:：Die-casting Al 9A：SS
Enclosure Protection Class	IP65	IP65	IP65	IP65
Remark：Specific dimensions（refer to Page 154~155）				

WR Series TC

WR□ Assembly TC

WR□K Sheathed-core Assembly TC

WR□ Assembly TC

Wr□ assembly thermocouple is used for measuring the gas, fluid and solid surface temperature at -200℃~1600℃ and widely applied in many industrial and scientific technological fields, such as aviation, atomic energy, petroluem, chemistry, metallurgy, mechinery, etc.

■Principal Feature

Larger measuring range, longer life, ease of installation, lower price, lower anti-seismic, comparatively lower stability during the longer utility;

■Principal Technical Requirements

Industry Standard Performed:GB/T30429-2013

JB/T8205-1999

● Measuring Scope and Tolerance

Type	Sheath Diameter	Type	Tolerance	Long-term Utility Temperature（℃）※
Nickel chrome-nickel silicon	0.3～3.2	K	±2.5℃ or ±0.75%|t|	-40～1200
Nickel chrome silicon - nickel silicon magnesium		N		-40～1200
Nickel chrome-Nickel copper（Constantan）		E		-40～750
Iron-Nickel copper（Constantan）		J		-40～600
Copper-Nickel copper（Constantan）	0.2～1.6	T	±1℃ or ±0.75%|t|	-40～350
Platinum Rhodium 10- Platinum	0.5	S	±1.5℃ or ±0.25%|t|	0～1300
Platinum Rhodium 13- Platinum		R		0～1300
Platinum Rhodium 30- Platinum 6		B	±4℃ or ±0.5%|t|	600～1700

Remarks: the temperature scope of TC wires is different up to the different diameters;The temperature in the sheet is the highest Long-term utility temperature;

● Protection Tube O.D. and Length

Protection Tube		Length L mm
O.D.	Mt'l	
Φ16、Φ20 Φ25	Metal	300，350，400，450，550，650 900，1150，1650，2150，2650
Φ16	Non-metal	300，350，400，450，550，650 900，1150，1650，2150，2650
Φ25	Non-metal	500，650，1650；2150 (Remarks: For molybdenum disilicide protection tube, length of 2150mm I s inavailable;)
Φ35	Non-metal	500，650，900，1150
Right-angle Protection Tube		500×500，750×750，500×750 750×500

● Thermal Respon.

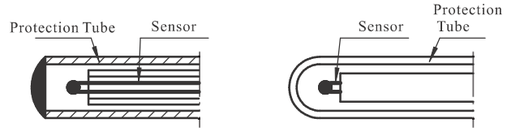
Diameter of Protection Tube（mm）	Tapered Protection Tube	Protection Tube Mt'l τ 0.5 （S）
Φ16	Non-metal	≤240
	Metal	≤180
Φ20	Metal	≤240
Φ25	Non-metal	≤300

● Room-temperature Insulation Resistance

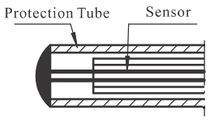
When the ambient temperature is 15~35℃, the relative humidity is no more than 80%, the insulation resistance between TC wires and protection tube should follow the following sheet;

Length	Room-temperature Insulation Resistance	Test Voltage
L≤1m	100M Ω	500±50Vd.c
L>1m	100M Ω/L	

● Hot Junction Structure

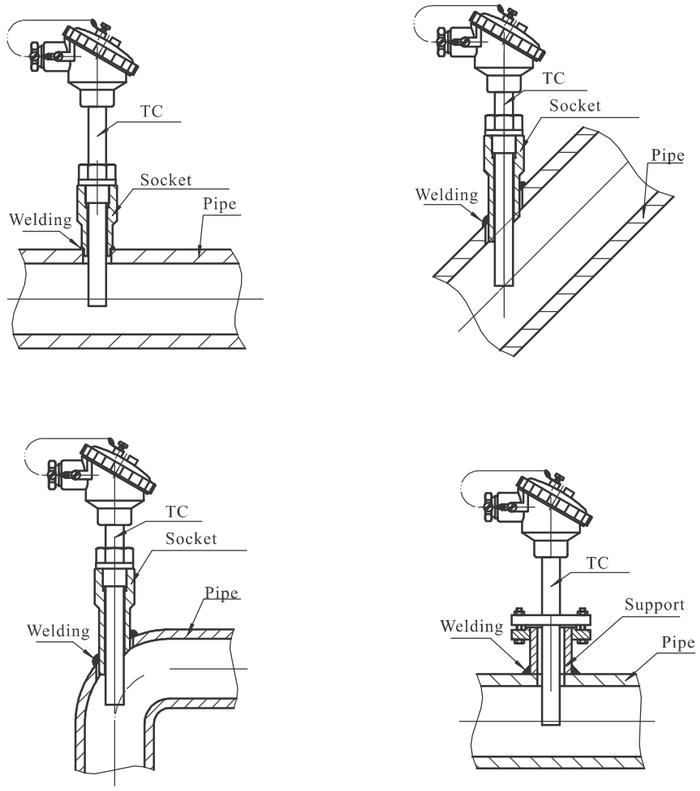


Un-grounded



Grounded(Inertia)

■Installation Method



■Order Specification

Example 1: Explosion-proof, duplex, K type, Class II torlerance, 0~800℃, Fixed thread M27*2, O.D. is 16mm, Mt'l:304, Total Length:1000, Insertion depth: 850mm, Explosion-proof Class: Exd II CT4;

Model: WRK2-2416-2MC4-1000A850-AM27

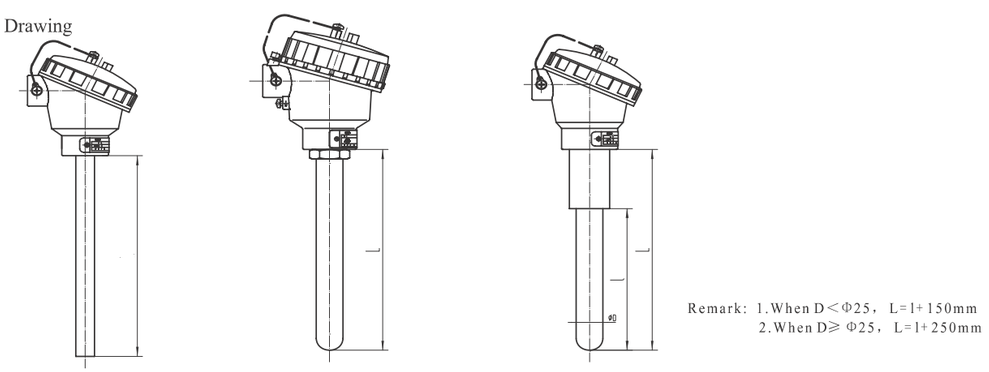
●WR□Assembly TC（No-installation Type）

①② ③④ ⑤⑥⑦⑧ ⑨⑩⑪⑫

WR□□－0□□－□□□□－□□□/□

Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	②	Sensor Quantity	No designation：Single		2：Duplux	
Model	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B.(Spring-loaded） 9A：SS JDY J.B.	
	④	Protection Tube O.D.（mm）	12：Φ12 16：Φ16	20：Φ20 25：Φ25	Remarks:Any other size of thread should be designed like：（specific size of thread）；Example：Φ22：（22）	
Sensor and J.B.	⑤	Tolerance Class	K、E、J、N	T	S、R	B
			1：±1.5℃ or±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	1：±0.5℃ or±0.4%|t|℃ 2：±1.0℃or±0.75%|t|℃	1：±1.0℃ or± {1+0.003*(t-1100)}℃ 2：±1.5℃ or ± 0.25%|t|℃	P：±4℃or±0.5%|t|℃
	⑥	Electric Connection	M：M20*1.5Inner Thread N：NPT1/2"Inner Thread	G：G1/2"Inner Thread Z：ZG1/2"Inner Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.；which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	
	⑦	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑧	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑨	Total Length L（mm）				
	⑩	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantalum ME：Monel	R：Conrundum S：Recrystallized Silicone Carbon SS：Green Silicone Carbon
			Remark: Any other Mt'l is referred in Page 159;			
	⑪	Non-metal Protection Tube Lengthl（mm） Remarks: Not applicable for Metal Protection Tube;				
Others	⑫	Hot Junction Structure	No designation：Un-grounded X：Inertia TC（Limited for K/E/N type grounded Type）			

●Schematic Drawing



Remark: 1.When D＜Φ25，L=l+150mm
2.When D≥Φ25，L=l+250mm

WR□－03□ WR□－07□ WR□－03□（Non-metal Protection Tube）

● WR□ Assembly TC（Thread Type）

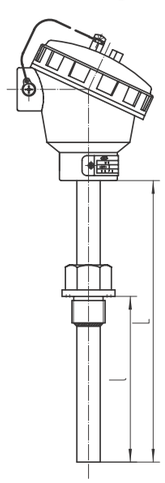
①② ③④⑤ ⑥⑦⑧⑨ ⑩⑪⑫ ⑬⑭⑮

WR□□ – □□□ – □□□□ – □□□ – □□/□

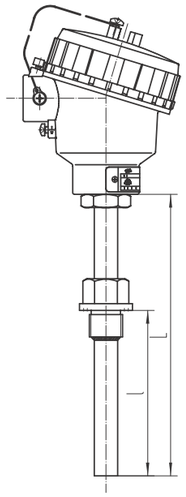
Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	②	Sensor Quantity	No designation：Single 2：Duplux			
Model	③	Bolt Type	1：Fixed Thread Type		2： Compression-fitting Thread Type	
	④	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B.(Spring-loaded） 9A：SS JDY J.B.	
	⑤	Protection Tube O.D. (mm)	12：Φ12 16：Φ16	20：Φ20 25：Φ25	Remarks:Any other size of thread should be designed like：（specific size of thread）；Example：Φ22：（22）	
Sensor and J.B.	⑥	Tolerance Class	K、E、J、N	T	S、R	B
			1：±1.5℃ or±0.4%|t| ℃ 2：±2.5℃ or ±0.75%|t| ℃	1：±0.5℃ or±0.4%|t| ℃ 2：±1.0 ℃or±0.75%|t| ℃	1：± 1.0 ℃ or± {1+0.003*(t-1100)}℃ 2：±1.5℃ or ± 0.25%|t| ℃	P：±4℃or±0.5%|t| ℃
	⑦	Electric Connection	M：M20*1.5F N：NPT1/2"F	G：G1/2"F Z：ZG1/2"F	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.，which is applied for3，5，3A and 5A in ③：Any other size of gland should be defined in order；	
	⑧	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑨	Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑩	Total Length ℓ（mm）				
	⑪	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantalum ME：Monel	R：Conrundum S：Recrystallized Silicone Carbon SS：Green Silicone Carbon
			Remark: Any other Mt'l is referred in Page 153;			
	⑫	Insertion Depth ℓ（mm）				
Process Connection	⑬	Bolt Mt'l	A：304 H：316	HL：316L TT：Ti	Remarks: Any other mt'l ref'er to protection tubes' in Page 159;	
	⑭	Bolt Specification	M20：M20*1.5 M27：M27*2 M33：M33*2	N1：NPT1/2" G1：G1/2" Z1：ZG1/2"	Remarks：Any other size of thread is designed like：（Specific Size），Ex.：M27*1.5：(M27*1.5)；	
Others	⑮	Hot Junction Structure	No designation：Un-grounded X：Inertia TC（Limited for K\E\N type grounded type）			

Remark： Socket is detailed in Page 150;

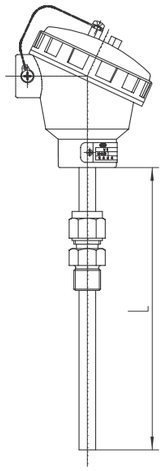
● Schematic Drawing



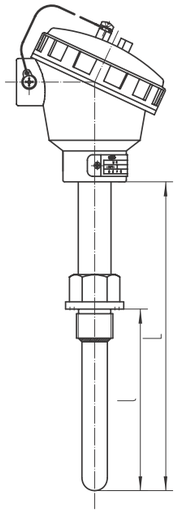
WR□ －13□



WR□ －17□



WR□ －23□

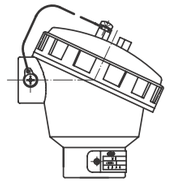
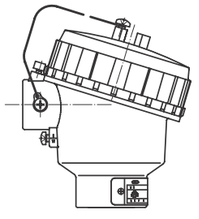
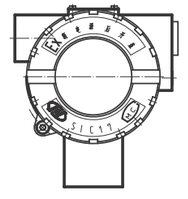


WR□ －13□
（Non-metal protection tube）

Remark 一： L=ℓ+150mm（Applicable for non-metal protection tube）

Remark 二： 1.when D＜Φ25，L=ℓ+150mm
2.whenD≥Φ25，L=ℓ+250mm
（Non-metal protection tube）

● J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Sketch			
Designation	3：Die-casting AL 3A：SS	4：Die-casting AL 4A：SS	9：Die-casting Al 9A：SS
Enclosure Protection	IP65	IP65	IP65

Remark: Refer to Page 154~155: Standard Components;

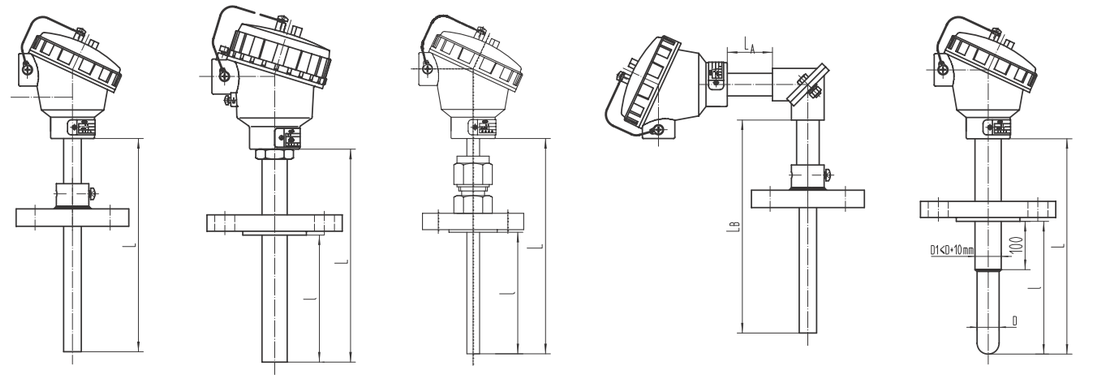
●WR□ Assembly TC（Flanged Type）

①② ③④⑤ ⑥⑦⑧ ⑨⑩⑪ ⑫⑬⑭ ⑮

WR□□ – □□□ – □□□ – □□□ – □□□/□

Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）	S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6		
	②	Sensor Quantity	No designation：Single 2：Duplux			
Model	③	Flange type	5：Fixed flange　6：Compression-fitting flange 7：Flexible flange　8：Right-angle flexible flange			
	④	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.	3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.		
	⑤	Protection Tube O.D.（mm）	12：Φ12 16：Φ16	20：Φ20 25：Φ25	Remarks:Any other size of thread should be designed like：（specific size of thread）；Example：Φ22：（22）	
Sensor and J.B.	⑥	Tolerance Class	K、E、J、N	T	S、R	B
			1：±1.5℃ or±0.4％|t| ℃ 2：±2.5℃ or ±0.75％|t| ℃	1：±0.5℃ or±0.4％|t| ℃ 2：±1.0 ℃or±0.75％|t| ℃	1：± 1.0 ℃ or± {1+0.003*(t-1100)}℃ 2：±1.5℃ or ± 0.25%|t| ℃	P：±4℃or±0.5％|t| ℃
	⑦	Electric Connection	M：M20*1.5 Inner Thread N：NPT1/2" Inner Thread	G：G1/2" Inner Thread Z：ZG1/2" Inner Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.，which is applied for3，3A and 5A in ④；Any other size of gland should be defined in order；	
	⑧	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑨	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑩	Total Length L（mm）	Remark: Length of LA should be defined for right-angle flexible flange;			
	⑪	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel	R：Conrundum S：Recrystallized silicone carbide SS：Green silicone carbide
			Remark: any other mt'l designation refer to Page 159;			
	⑫	Insertion Depth ℓ（mm）	1.Length of LB should be defined for right-angle flexible flange;2.for flexible flange type and compression-fitting flange type, no designation of insertion depth;			
Process Connection	⑬	Flange material	A：304 H：316	E: Embeded type in 304 SS flange body	Remark: any other mt'l designation refer to Page 159;	
	⑭	Flange quantity	1：Single 2：Duplex and with fastenings			
	⑮	Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face			
Others	⑯	Hot Junction Form	No designation：Un-grounded X：Inertia TC (Limited for K/E/N grounded type)			

●Structure Profile

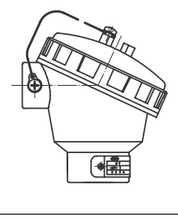
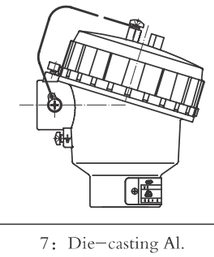
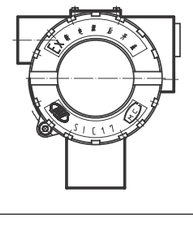


WR□－73□　WR□－57□　WR□－63□　WR□－83□　WR□－53□

（Non-metal protection tube）

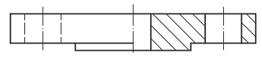
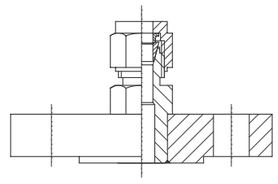
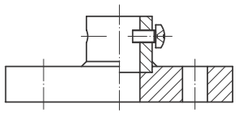
Remark：L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die－casting Al. 3A：SS	7：Die－casting Al. 7A：SS	9：Die-casting Al 9A：SS
Enclosure Protection Class	IP65	IP65	IP65

Remark：Refer to Page145~146: Standard Components

●Fitting Devices

Name	Fixed Flange	Compression-fitting Flange	Flexible Flange
Form			
Designation	5：Fixed Flange	6：Compression-fitting Flange	7：Flexible Flange

Remarks:Refer to Page157-158: Standard Components

●WR□ K Sheathed-core Assembly TC (Thread Type)

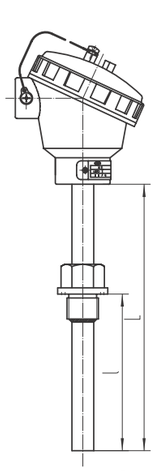
① ② ③④⑤ ⑥⑦⑧⑨⑩⑪⑫ ⑬⑭⑮⑯ ⑰⑱

WR□K□ – □□□ – □□□□□□□□ – □□□□ – □□

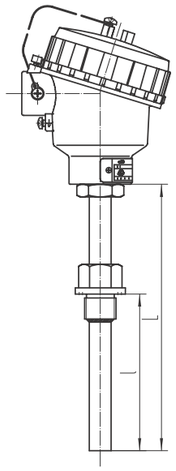
Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	②	Sensor Quantity	No designation：Single		2：Duplux	
Model	③	Thread Type	1：Fixed Thread		2：Compression-fitting Thread	
	④	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.(Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 5A：Water-proof SS J.B.(Spring-loaded） 7A：Explosion-proof SS J.B.(Spring-loaded） 9A：SS JDY J.B.	
	⑤	O.D. of Protection Tube（mm）	12：Φ12 16：Φ16	20：Φ20 25：Φ25	Remarks：1.For tapered fixed thread，only the：Φ18 2.Any other size of thread should be designed like，(specific size of thread)：Example：Φ22：（22）	
Sensor and J.B.	⑥	Tolerance Class	K、E、J、N 1：±15℃or±0.4%｜t｜℃ 2：±25℃or±0.75%｜t｜℃	T 1：±15℃or±0.4%｜t｜℃ 2：±10℃or±0.75%｜t｜℃	S、R P：±3℃or±0.5%｜t｜℃	B P：±4℃or±0.5%｜t｜℃
	⑦	Sheathed TC diameter（mm）	H：Φ5 （Standard specification, recommended）		Remark：Other diameter is designed like：J：Φ6 、K：Φ8、F：Φ8	
	⑧	Sheath Mt'l	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 P：310S	Remark: Refer to Page 159: Material Designation	
	⑨	Hot Junction Structure	1：Exposed Type 2：Grounded Type 3：Isolated Type			
	⑩	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ③；Any other size of gland should be defined in order；	
	⑪	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑫	Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑬	Structure	WH：Plug type	W：Drilled bar type		
	⑭	Total Length ℓ（mm）				
	⑮	Protection Tube Mt'l	A：304 H：316 HL：316L	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel	Remark：Refer to Page 159： Material Designation	
	⑯	Insertion depth ℓ（mm）				
Process Connection	⑰	Thread Type	A：304 H：316	HL：316L TT：Ti	Remark：Refer to Page 159： Material Designation	
	⑱	Thread Specification	M20：M20*1.5 M27：M27*2 M33：M33*2	N1：NPT1/2" G1：G1/2" Z1：ZG1/2"	Remarks：Any other size of thread is designed like: (Specific Size), Ex.： M27*1.5：(M27*1.5);	

Remark： refer to Page 150： Scokets

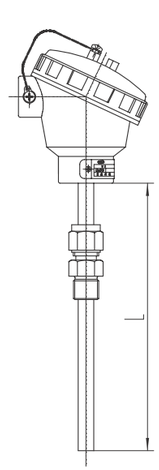
●Structure Profile



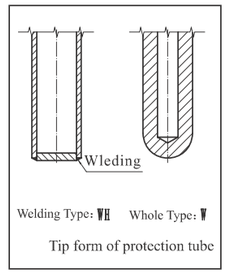
WR□ K－1$\frac{3}{5}$□



WR□ K－14□



WR□ K－2$\frac{3}{5}$□



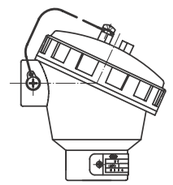
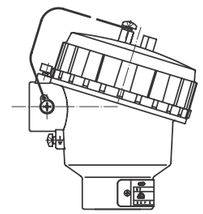
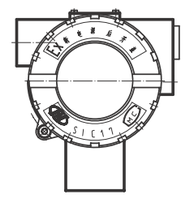
Welding Type: WH Whole Type: W

Tip form of protection tube

Remark 一： L=ℓ+150mm（Applicable for non-metal protection tube）

Remark 二： 1.when D＜Φ25，L=ℓ+150mm
2.whenD≥Φ25，L=ℓ+250mm
（Non-metal protection tube）

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die-casting Al. 3A：SS	7：Die-casting Al. 7A：SS	9:：Die-casting Al 9A：SS
Enclosure Protection Class	IP65	IP65	IP65

Remarks：Refer to Page154~155： Standard Components

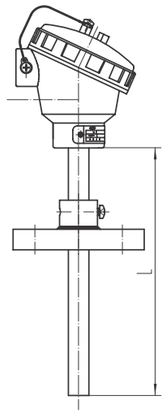
●WR□ K Sheathed-core Assembly TC (Flanged Type)

① ② ③④⑤ ⑥⑦⑧⑨⑩⑪⑫ ⑬⑭⑮⑯ ⑰⑱⑲

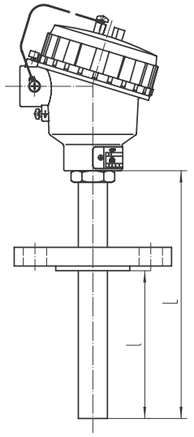
WR□K□ – □□□ – □□□□□□□□ – □□□□ – □□□

Type	① Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	
	② Sensor Quantity	No designation：Single		2：Duplex	
Model	③ Flange Type	3：Flexible Flange Type 4：Fixed Flange Type		8：Flexible Compression-fitting Flange Type 0：Fixed Compression-fitting Flange Type	
	④ J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.(Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 5A：Water-proof SS J.B.(Spring-loaded） 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	⑤ Protection Tube O.D.（mm）	12：Φ12 16：Φ16	20：Φ20 25：Φ25	Remarks:1. Any other size of thread should be designed like：（specific size of thread）；Ex：Φ22：（22）	
Sensor and J.B.	⑥ Tolerance Class	K、E、J、N 1：±1.5℃or±0.4%｜t｜℃ 2：±2.5℃or±0.75%｜t｜℃	T 1：±1.5℃or±0.4%｜t｜℃ 2：±1.0℃or±0.75%｜t｜℃	S、R P：±3℃or±0.5%｜t｜℃	B P：±4℃or±0.5%｜t｜℃
	⑦ Sheath Diameter（mm）	H：Φ5 （Standard Specification， Recommended）		Remark：Other diameter designation is： J：Φ6 、K：Φ8、F：Φ4	
	⑧ Sheath Mt'l	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 P：310S	Remark：Refer to Page 153: Material Designation	
	⑨ Hot Junction Structure	1：Exposed Type 2：Grounded Type 3：Isolated Type			
	⑩ Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ④（Any other size of gland should be defined in order	
	⑪ Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑫ Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑬ Construction	WH：Plug type	W：Drilled-bar-stock type		
	⑭ Total Length ℓ（mm）				
	⑮ Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	HC：Hastelloy C HB：Hastelloy B TT：Ti TA：Tantanum ME：Monel	Remark： refer to Page 159： Mt'l Designation	
	⑯ Insertion depth l（mm） Remark				
Process Connection	⑰ Flange material	A：304 ZA：20#	E: Embeded type in 304 SS flange body		
	⑱ Flange quantity	1：Single 2：Duplex and with fastenings			
	⑲ Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face			

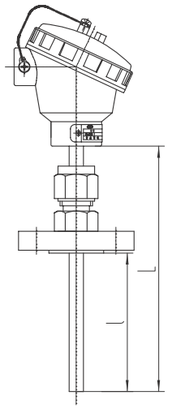
●Struture Profile



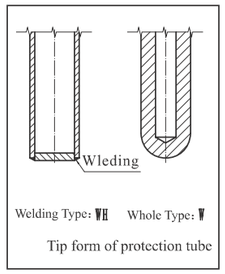
WR□ K－7 3/5□



WR□ K－57□



WR□ K－6 3/5 □

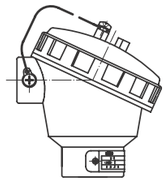
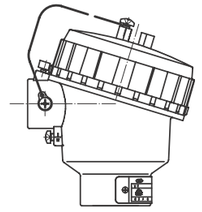
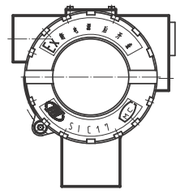


Welding Type: WH Whole Type: W

Tip form of protection tube

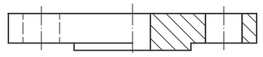
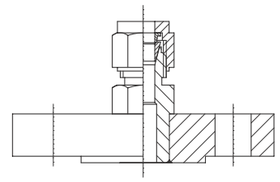
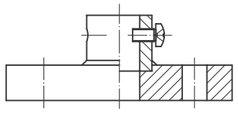
Remarks：L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die-casting Al. 3A：SS	7：Die-casting Al. 7A：SS	9.：Die-casting Al 9A：SS
Enclosure Protection Class	IP65	IP65	IP65

Remarks：Refer to Page154~155： Standard Components

●Fixing Devices

Name	Fixed Flange	Compression-fitting Flange	Flexible Flange
Form			
Designation	5：Fixed Flange	6：Compression-fitting Flange	7：Flexible Flange

Remark：Specific dimensions（refer to Page 157-158）

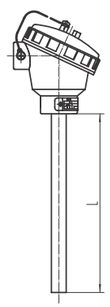
●WR□K Sheathed-core Assembly TC (No-installation Type)

① ② ③④ ⑤⑥⑦⑧⑨⑩⑪ ⑫⑬⑭

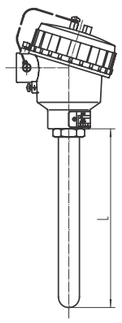
WR□K□ – 0□□ – □□□□□□□□ – □□□

Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon N：N Type Nickel chrome silicon - nickel silicon magnesium E：E Type Nickel chrome-Nickel copper（Constantan） J：J Type Iron-Nickel copper（Constantan） T：T Type Copper-Nickel copper（Constantan）		S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6		
	②	Sensor Quantity	No designation：Single		2：Duplux		
Model	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.(Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Die Casting Al JDY J.B.		3A：Water-proof SS J.B. 5A：Water-proof SS J.B.(Spring-loaded） 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.		
	④	Protection Tube O.D.（mm）	12：Φ12 16：Φ16	20：Φ20 25：Φ25		Remarks：Any other size of thread should be designed like：（specific size of thread）；EX：Φ22：（22）	
Sensor and J.B.	⑤	Tolerance Class	K、E、J、N	T		S、R	B
			1：±1.5℃or±0.4%｜t｜℃ 2：±2.5℃or±0.75%｜t｜℃	1：±1.5℃or±0.4%｜t｜℃ 2：±1.0℃or±0.75%｜t｜℃		P：±3℃or±0.5%｜t｜℃	P：±4℃or±0.5%｜t｜℃
	⑥	Sheath Diameter（mm）	H：Φ5 （Standard specification is recommended）			Remark：Other diameter designation is： J：Φ6 、K：Φ8、F：Φ4	
	⑦	Sheath Mt'l	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 P：310S		Remark：Other mt'ls are designated in Page 159：	
	⑧	Hot Junction Structure	3：Isolated Type	4：Seperatedly isolated Type		2：Grounded Type	1：Exposed Type
	⑨	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread		Remarks：1. Any other size of thread should be designed like：（specific size of thread）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ③；Any other size of gland should be defined in order；	
	⑩	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint		Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑪	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65		Remark：No designation for Water-proof Types：	
Protection Tube	⑫	Construction	WH：Plug type	W：Drilled-bar-stock type			
	⑬	Total Length ℓ（mm）					
	⑭	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel		Remark： Other mt'ls are designated in Page 159:	

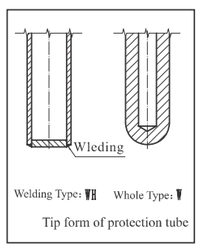
●Structure Profile



WR□K-03□（WH）



WR□K-07□（W）



WZ Series R.T.D.

WZGPK Sheathed Platinum R.T.D.

Chongqing Chuanyi Instrument No.17 Factory Co., Ltd. Address: Longfengqiao Bridge, Beibei District, Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

WZPK Sheathed Pt R.T.D

WZPK series sheathed Pt RTDs are used in combination with display instruments, which automatically detect gas and liquid medium or surface temperature of solid body, Normally, this type of RTDs are preferred and installed in narrow pipeline or the process applications which demands for fast response and where size matters (SLIM SIZE).

WZGPK series sheathed Pt RTDs are manufactured with sheathed thermocouple technology from Okazaki (Japan). Our armored Pt RTD products have been listed as the 18th batch of import substitute products by Ministry of Mechanic and Electronic Industry and well received among users.

Sheathed Pt RTDs are typically made up of such parts as armored Pt RTD temperature sensing components, fixing devices used in mounting, wiring devices.

■Operating principle

RTD measures temperature by the characteristic that its resistance will change along with temperature change of the substance. The heated part (temperature sensing component) of RTD is slender metal wire wrapped around the framework made of insulated material. When temperature gradient exists in the measured medium, the measured temperature is average temperature of medium layer within temperature sensing component range.

■Features

Advantages: compact figure, fast thermal response, anti vibration, long working life and others.

■Technical Data

As per enterprise standard of Chongqing Sichuan Instrument Complex Co., Ltd.: Q/CY235 - 2012

●Tolerance

Type	R(0℃) Ω	W (100℃)	Tolerance	
			Scope℃	Grade
Pt10	10	1.385	−200~600	A class: ±（0.15+0.2%｜t｜）
Pt100	100			B class: ±（0.3+0.5%｜t｜）

Note: Pt assembly RTD with graduation Pt10 shall be supplied on agreement To customers' requirements, we can supply products with DIN and JIS standard graduation by means of "technique agreement".

●Room-temperature Insulation Resistance

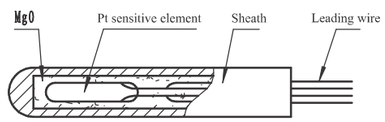
If surrounding air temperature is between 15 and 35℃, relative humidity is less than 80%, insulation resistance value between lead and outer protecting tube shall not be less than 100MΩ. (Tested voltage is 10~100Vd.c).

●Thermal Response Time

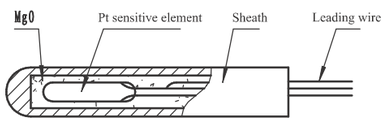
Sheath Diameter mm	Thermal Response Time $\tau_{0.5}$ S
≤ Φ5	≤8
> Φ5	≤18

●Hot Junction Construction

Four-wires system：



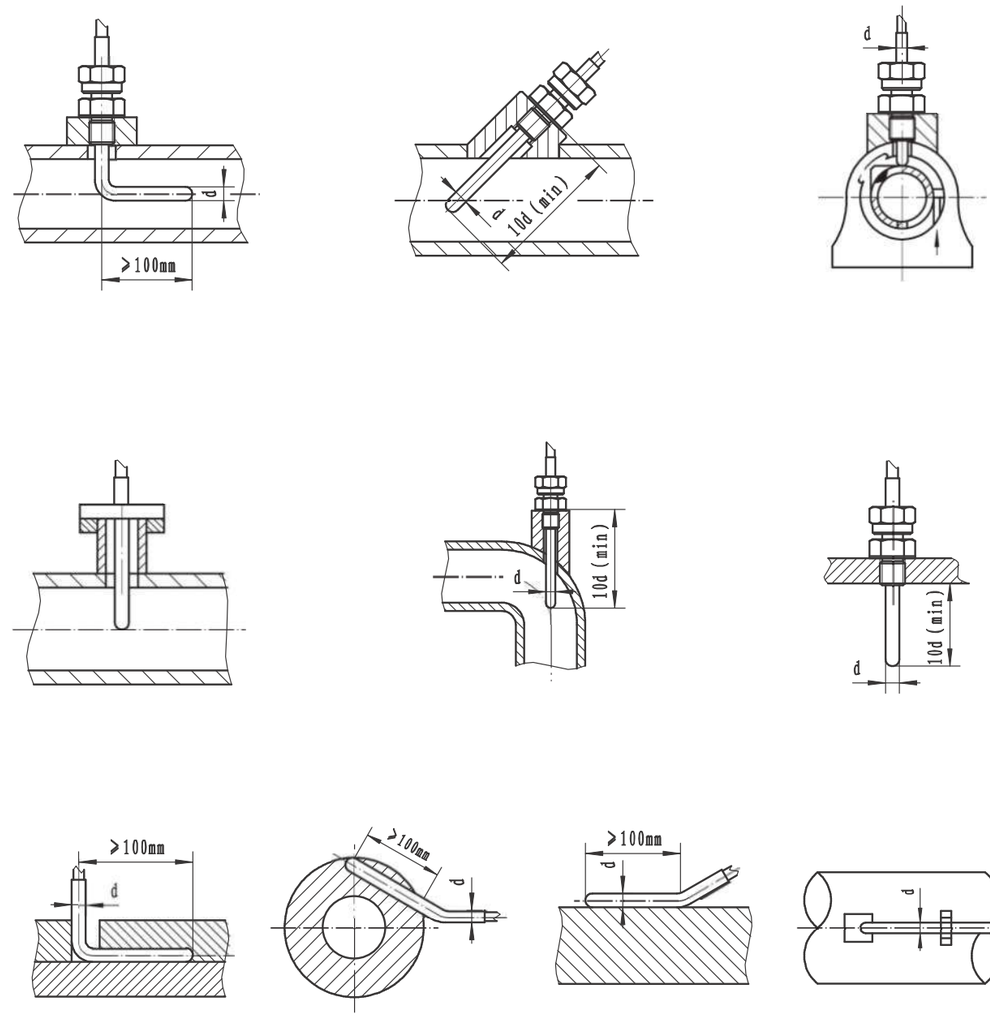
Three-wire system：



●Sheath Diameter and Length

Type	Diameter（mm）	Length （mm）	Mt'l
Duplex Diameter	Φ3	100~10000	0Cr18Ni9Ti 316
	Φ4	100~10000	
	Φ5	100~10000	
	Φ6	100~8000	
	Φ8	100~6000	

■Installation Method



Chongqing Chuanyi Instrument No.17 Factory Co., Ltd. Address: Longfengqiao Bridge, Beibei District, Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

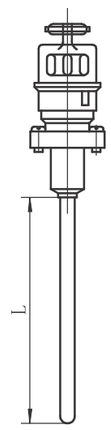
●WZGPK Sheathed R.T.D.-Japan Okazaki Structure （non-J.B.）

①　②　③④⑤⑥⑦⑧

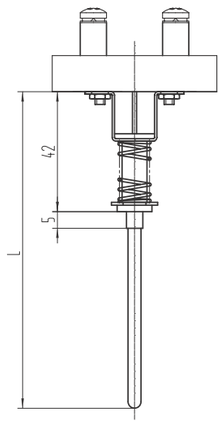
WZGPK□－1□□－□□□□□□□

WZGPK□□1□ Type		Basis type			
WZGPK□□6□A Type		Connector type			
WZGPK□□10 □ Type		Terminal block type			
WZGPK□□10 □G Type		Anti-slip terminal block type			
Type	①	R.T.D. element quantity	No designation：Single 2：Duplex（Applicable for the diameter：Φ5~Φ8）		
Model	②	Hot Junction Type	3：Three-wire system 4：Four-wire system		
Sensor and J.B.	③	Type	P2：Pt100 P3：Pt1000		
	④	Torlerance Class	A（TA）：±（0.15 +0.2% | t |）℃	B（TB）：±（0.3 +0.5% | t |）℃	Remarks：TA or TB shall be chosen when temperature lies between -200℃~600℃
	⑤	Sheath Diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8
	⑥	Total Length L（mm）			
	⑦	Sheath Mt'l	G：0Cr18Ni9Ti H：316	HL：316L	
Extra Attachments	⑧	Refer to Page 157~158: Standard Components;			

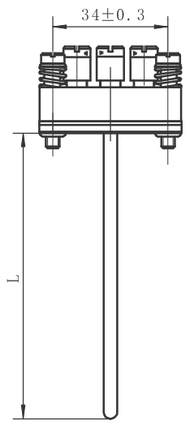
●Structure Profile



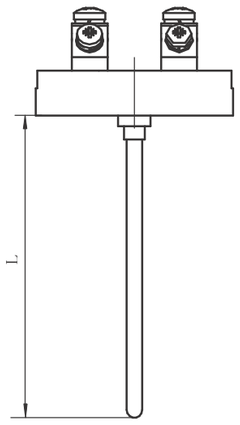
WZGPK—1□ A



WZGPK-1□ D



WZGPK-1□ G



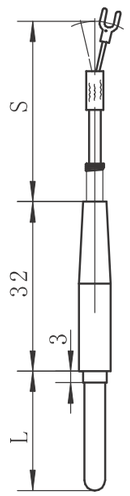
WZGPK－1□ N

①　②　③④⑤⑥⑦　⑧⑨　⑩

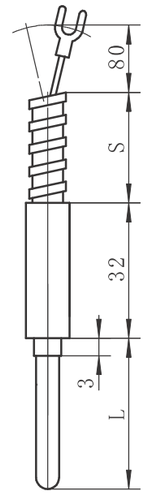
WZGPK□－1□□－□□□□□－□□/□

WZGPK□－1□1 WZGPK□－1□2 WZGPK□－1□3A WZGPK□－1□4A			Wiring fork type with compensating lead Wiring fork type with compensating lead sleeve flexible conduit Metal socket type with compensating lead (for the connector, see page 156) Metal socket type with compensating lead sleeve flexible conduit (for the connector, see page 156)		
Type	①	Sensor Quantity	No designation：Single 2：Duplex（Applicable for the diameter:：Φ5~Φ8）		
Model	②	Hot Junction Type	3：Three-wire system 4：Four-wire system		
Sensor and J.B.	③	Type	P2：Pt100 P3:Pt1000		
	④	Tolerance Class	A(TA)：±（0.15 +0.2% | t |）℃	B(TB)：±（0.3 +0.5% | t |）℃	Remarks：TA or TB shall be chosen when temperature lies between -200℃~600℃
	⑤	Sheath Diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8
	⑥	Total Length L（mm）			
	⑦	Sheath Mt'l	G：0Cr18Ni9Ti H：316	HL:316L	
Leading wire	⑧	Leading wire type	S：Silver-coated Pt R.T.D. leading wire		
	⑨	Leading wire length（mm）			
Extra Attachments	⑩	Refer to Page 157~158: Standard Components;			

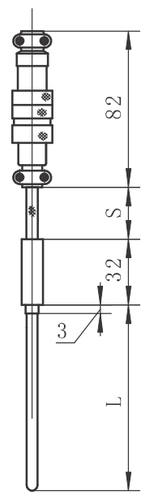
●Structure Profile



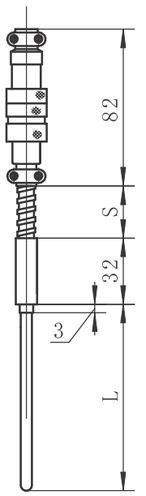
WZGPK－1□ 1P



WZGPK—1□ 2



WZGPK—1□ 3A



WZGPK—1□ 4A

●WRZGPK Sheathed RTD-Japan OKAZAKI Structure（with Junction Box）

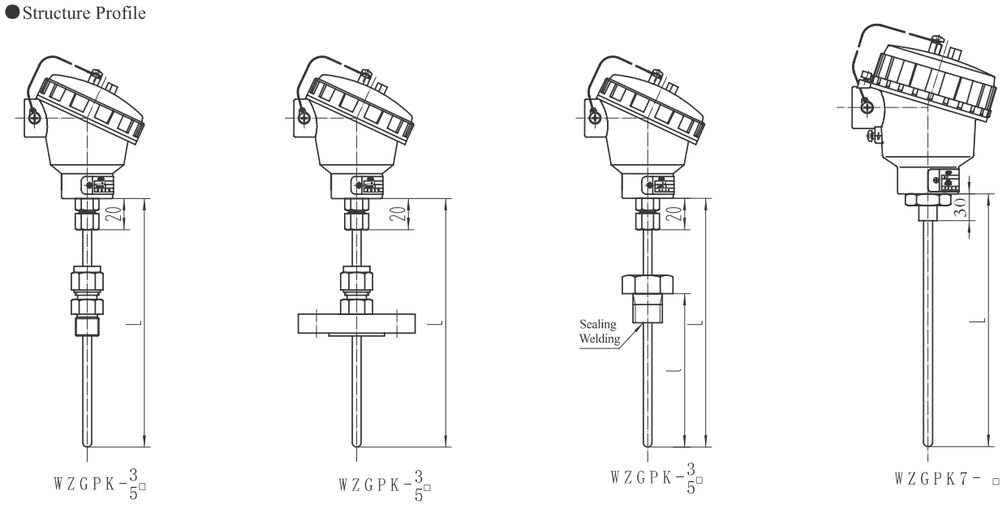
① ②③ ④⑤⑥⑦⑧⑨ ⑩⑪⑫ ⑬⑭⑮

WZGPK□－□□－□□□□□□－□□□－□□□

WZGPK□－□□ Type			No-installation Type		
Type	①	Sensor Quantity	No designation：Single 2：Duplux（Applicable for the diameter：Φ5~Φ8）		
Model	②	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B.	3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	③	Hot Junction Structure	3：Three-wire system 4：Four-wire system		
Sensor	④	Type	P2：Pt100 P3：Pt1000		
	⑤	Tolerance Class	A（TA）：±（0.15＋0.2%｜t｜）℃	B（TB）：±（0.3＋0.5%｜t｜）℃	Remarks：TA or TB shall be chosen when temperature lies between -200℃~600℃
	⑥	Sheath Diameter（mm）	E:Φ3 F:Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8
	⑦	Total Length L（mm）			
	⑧	Sheath Mt'l	G：0Cr18Ni9Ti H：316	HL：316L	
	⑨	Insertion Depth ℓ（mm）	Remark: applicable for fixed thread type, no designation for non-fixed thread type;		
J.B. Specification	⑩	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ②（Any other size of gland should be defined in order）
	⑪	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑫	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；
Process Connection	⑬	Installation	No mark：No-extension Type 2：Compression-fitting thread	1：Fixed Thread	6： Compression-fitting flange
	⑭	Installation Material	A：304 H：316	HL：316L	Remark：Any other material is listed in Page 153；
	⑮	Installation Size	Compression-fitting Thread、Fixed Thread	Flange	
			M12：M12*1.5 N1：NPT1/2" M16：M16*1.5 Z1：ZG1/2" M20：M20*1.5 M27：M27*2	Flange quantity	1：Single 2：Duplex and with fastenings
				Flange Specification	Standard specification: the designations are detailed in Page 157~158； Standard flange：standard number-nominal diameter-pressure ratio-sealing face
			Remarks：Any other size of thread is designed like：（Specific Size），Ex.：M27*1.5：(M27*1.5)；		

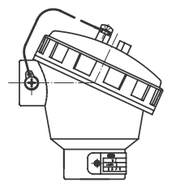
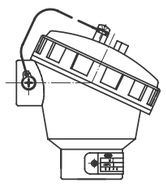
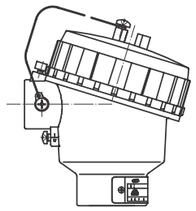
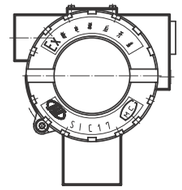
Remarks：1.Any other size of thread is designed like：（Specific Size），Ex.：M27*1.5：（M27*1.5）；

●Structure Profile

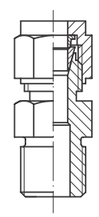
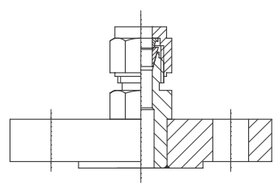
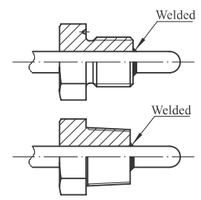


Remark：L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.	JDY J.B.
Skecth				
Designation	3：Die-casting Al. 3A：SS	5：Die-casting Al. 5A：SS	7：Die-casting Al. 7A：SS	8：Water-proof type（die-casting AL.） 9：Explosion-proof Type（die-casting AL.）
Enclosure Grade	IP65	IP65	IP65	IP65
Remarks：Refer to Page154~155： Standard Components				

●Installation

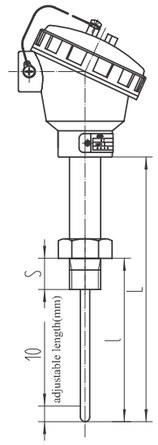
Name	Compression-fitting Thread	Compression-fitting flange	Welded thread
Skecth			
Designation	2：Compression-fitting Thread	3：Fixed Compression-fitting Flange	1：Fixed Thread
Remark：Detailed specifications are listed in Page157~158；			

① ②③④ ⑤⑥⑦⑧⑨⑩ ⑪⑫⑬ ⑭⑮ ⑯

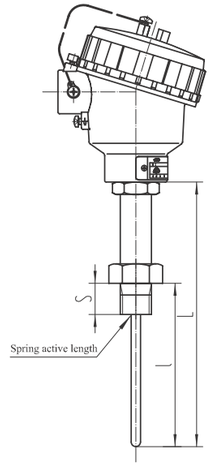
WZGPK□ – □□□ – □□□□□□ – □□□ – □□ / □

WZGPK□–□□□ Type			With reinforcing-pipe bolted type		
Type	①	Sensor Quantity	No designation：Single 2：Duplex（Applicable for the diameter：Φ5~Φ8）		
Model	②	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.（Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B.	3A：Water-proof SS J.B. 5A：Water-proof SS J.B.（Spring-loaded） 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	③	Hot Junction Structure	3：Three-wire system 4：Four-wire system		
	④	Construction	SG：Reinforcing-pipe fixed threaded type G：Reinforcing-pipe flexible threaded type	SGH：Welded reinforcing-pipe fixed threaded type GH：Welded reinforcing-pipe flexible threaded type	
Sensor	⑤	Type	P2： Pt100 P3:Pt1000		
	⑥	Tolerance class	A（TA）：±（0.15 +0.2%｜t｜）℃	B（TB）：±（0.3+0.5%｜t｜）℃	Remarks：TA or TB shall be chosen when temperature lies between -200℃~600℃
	⑦	Diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8
	⑧	Total Length L（mm）			
	⑨	Sheath Material	G：0Cr18Ni9Ti H：316	HL：316L	
	⑩	Insertion depth ℓ（mm） Remark：Insertion depth is not designed for the types with JB protection tube⑯：			
J.B. Specification	⑪	Electric Connection	M： M20*1.5 Internal Thread N： NPT1/2" Internal Thread	G： G1/2" Internal Thread Z： ZG1/2" Internal Thread	Remarks：1.Any other size of thread is designed like：(Specific Size)，Ex.： M27*1.5：(M27*1.5)；
	⑫	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑬	Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark: No designation for Water-proof Types；
Process Connection	⑭	Bolt Material	A ： 304 H ： 316	HL ： 316L	Remark：Any other material is listed in Page 159
	⑮	Bolt Size	M20 ： M20*1.5		
	⑯	Extra Attachments	Fixed Thread Type (welded Type) Protection Tube		Flanged type
			BI01 BL03 BH01	Refer to：P145-P148	BF02A BF02B BF03 — Refer to：P148-P149

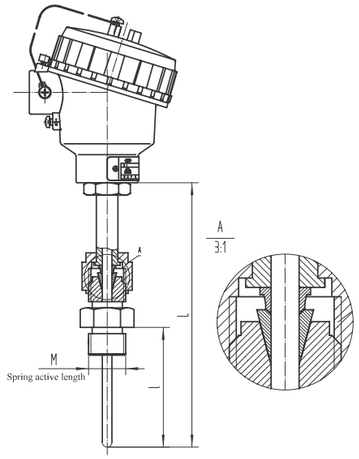
● Structure Profile



WZGPK-$\frac{3}{5}$□ SG



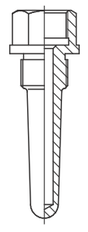
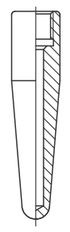
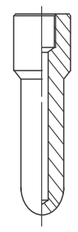
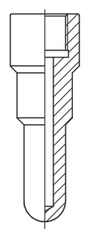
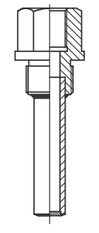
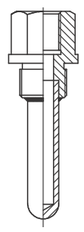
WZGPK-7□ SGH

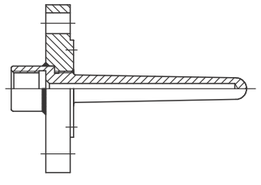
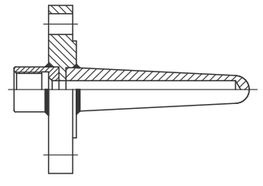
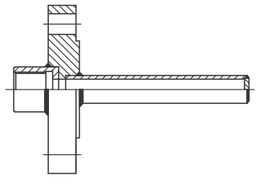


WZGPK-7□ SGK

Remarks：L=ℓ+150mm

● Extra Attachments

Name	Fixed Thread Type (welded Type) Protection Tube					
Sketch						
Designation	JB01A	JB01E-T	JB01E-S	JB01F	JB03A	JB03B
Remark：Specific dimensions，refer to Page 136~140；						

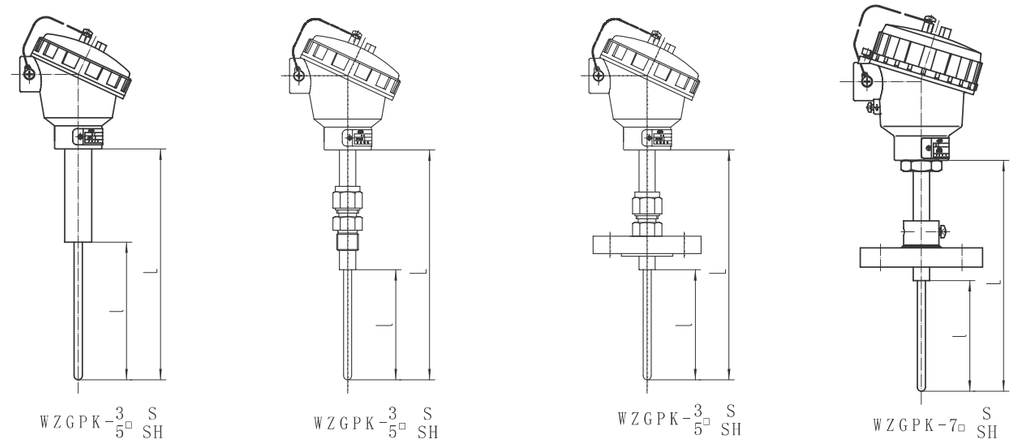
Name	Fixed Flange Type Protection Tube		
Sketch			
Designation	JB02A	JB02B	JB04B
Remark：Specific dimensions，refer to Page 141~142；			

① ②③④ ⑤⑥⑦⑧⑨⑩ ⑪⑫⑬ ⑭⑮⑯

WZGPK□ – □□□ – □□□□□□ – □□□ – □□□

WZGPK□ – □□□Type			With reinforcing-pipe type		
Type	①	Sensor Quantity	No designation：Single 2：Duplex（Applicable for the diameter：Φ5~Φ8）		
Model	②	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B. 7：Explosion-proof Die Casting AL J.B.（Spring-loaded） 9：Explosion-proof JDY J.B.	3A：Water-proof SS J.B. 5A：Water-proof SS J.B.（Spring-loaded） 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	③	Hot Junction Structure	3：Three-wire system 4：Four-wire system		
	④	Construction	S：Reinforcing Pipe Type	SH: Welded reinforcing pipe type (applicable for those of the diameter Φ5)	
Sensor	⑤	Type	P2：Pt100 P3：Pt1000		
	⑥	Tolerance class	A（TA）：±（0.15 +0.2%｜t｜）℃	B（TB）：±（0.3+0.5%｜t｜）℃	Remarks：TA or TB shall be chosen when temperature lies between -200℃~600℃
	⑦	Diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8
	⑧	Total Length L（mm）			
	⑨	Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Inconel600	Remarks: Other materials are listed in Page 159;
	⑩	Insertion depth ℓ（mm）			
J.B. Specification	⑪	Electric Connection	M：M20*1.5Internal Thread N：NPT1/2"Internal Thread	G：G1/2"Internal Thread Z：ZG1/2"Internal Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）：
	⑫	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑬	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；
Process Connection	⑭	Installation Method	No designation：No Installation 2：Compression-fitting Thread		6：Compression-fitting Flange 7：Adjustable Flange
	⑮	Fixing Device Material	A：304 H：316	HL：316L	Remark：Any Other Material Designation refers to Thermowell Materials'；
	⑯	Fixing Device Material	Compression-fitting Thread	Fixed Thread and Compresson-fitting Flange	
			M12：M12*1.5 M27：M27*2 M16：M16*1.5 N1：NPT1/2" M20：M20*1.5 Z1：ZG1/2"	Flange quantity	1: Single 2: Duplex and with fastenings
				Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange: standard number-nominal diameter-pressure ratio-sealing face
			Remarks：1.Any other size of thread is designed like：（Specific Size），Ex.：M27*1.5：(M27*1.5)；		

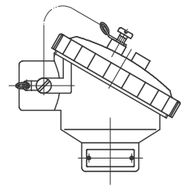
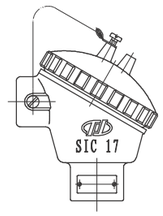
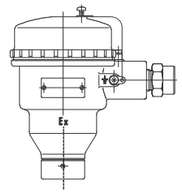
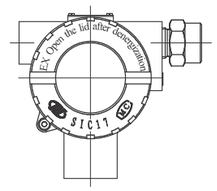
● Structure Profile



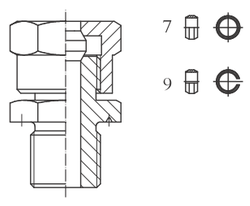
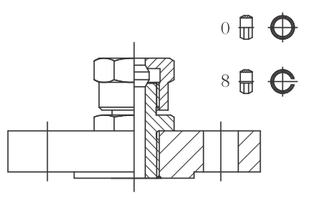
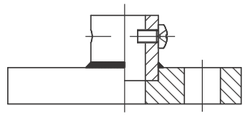
WZGPK-$\frac{3}{5\square}$ $\frac{S}{SH}$ WZGPK-$\frac{3}{5\square}$ $\frac{S}{SH}$ WZGPK-$\frac{3}{5\square}$ $\frac{S}{SH}$ WZGPK-7□ $\frac{S}{SH}$

Remark: 1.L=l+150mm
2. fixing devices are mounted on the reinforcing pipe, if on sheath, the defination is needed;

● J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.	JDY J.B.
Sketch				
Designation	3：Die-casting Al. 3A：SS	5：Die-casting Al. 5A：SS	7：Die-casting Al. 7A：SS	8：Water-proof type(die-casting Al.) 9：Explosion-proof type (die-casting Al.)
Enclosure Protection Class	IP65	IP65	IP65	IP65
Remark：Specific dimensions，refer to Page 136~140；				

● Fixing device

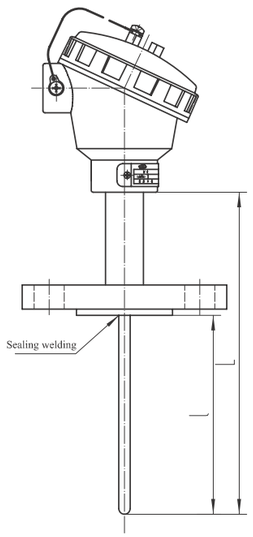
Name	Compression-fitting thread	Compression-fitting flange	Flexible Flange
Sketch			
Designation	7：Fixed compression-fitting thread 9：Flexible compression-fitting thread	0：Fixed compression-fitting flange 8：Flexible compression-fitting flange	3：Flexible Flange
Remark：Specific dimensions，refer to Page 148~150；			

① ②③④ ⑤⑥⑦⑧⑨⑩ ⑪⑫ ⑬⑭⑮

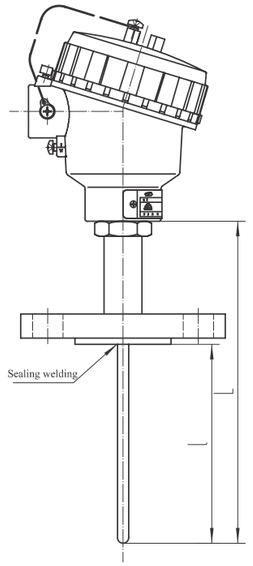
WZGPK□ – □□□ – □□□□□□ – □□ – □□□

WZGPK□-□□□ Type			Reinforcing pipe flanged type		
Type	①	Sensor Quantity	No designation：Single 2：Duplex（Applicable for the diameter：Φ5~Φ8）		
Model	②	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.（Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B.（Applicable for Integrated TT with Display）	3A：Water-proof SS J.B. 5A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	③	Hot Junction Structure	3：Three-wire system 4：Four-wier system		
	④	Construction	SFK:Fixed flange compression-fitting screw sealing type SFH: Fixed flange welded sealing type		
Sensor	⑤	Type	P2：Pt100 P3：Pt1000		
	⑥	Accuracy	A（TA）：±（0.15 +0.2%|t|）℃	B（TB）：±（0.3+0.5%|t|）℃	Remarks：TA or TB shall be chosen when temperature lies between -200℃~600℃
	⑦	Diameter（mm）	E：Φ3 F：Φ4	G：Φ4.5 H：Φ5	J：Φ6 K：Φ8
	⑧	Total Length L(mm)			
	⑨	Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Inconel600	Remarks: Other materials are listed in Page 159;
	⑩	Insertion depth ℓ(mm)			
J.B. Specification	⑪	Electric Connection	M：M20*1.5Internal Thread N：NPT1/2"Internal Thread	G：G1/2"Internal Thread Z：ZG1/2"Internal Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）： 2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.，which is applied for3，5，3A and 5A in ③：Any other size of gland should be defined in order：
	⑫	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑬	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；
Process Connection	⑭	Flange material	A: 304 ZA: 20#	E: Embeded type in 304 SS flange body	Remarks: 1、other materials are detailed in Page 159; 2、if the companion flange material is different, the identification like (upper flange material+bottom flange material);
	⑮	Flange quantity	1: Single 2: Duplex and with fastenings		
	⑯	Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face		

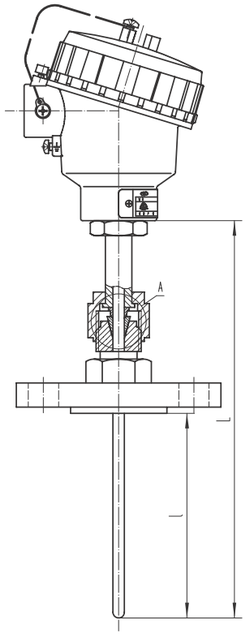
● Structure Profile



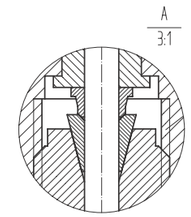
WZGPK-3□ SFH



WZGPK-7□ SFH

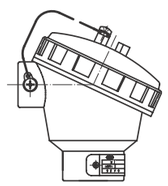
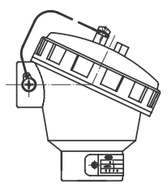
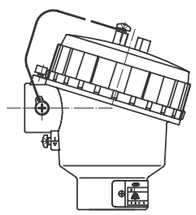
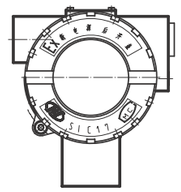


WZGPK-7□ SFK



Remark：L=ℓ+150mm

● J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.	JDY J.B.
Sketch				
Designation	3：Die-casting Al. 3A：SS	5：Die-casting Al. 5A：SS	7：Die-casting Al. 7A：SS	8：Water-proof type(die-casting Al.) 9：Explosion-proof type (die-casting Al.)
Enclosure Protection Class	IP65	IP65	IP65	IP65
Remark：Specific dimensions，refer to Page 145~146；				

WZ Series R.T.D

WZ□ Assembly R.T.D

WZPK Sheathed-core Assembly R.T.D.

WZ□Assembly R.T.D

Higher accuracy, more specifications and functions; the temperature of gas, liquid and solid surface @ -200~600℃in many fields, such as aviation, atomic energy, chemical industry, metal industry, machine industry, power generation, etc.

Assembly TC is composed of sensitive element, protection tube, J.B. and fixing devices, etc.

■Feature

Higher accuracy, more specifications and functions;

■Main Technical Data

Platinum RTD and Sensor： GB/T30121-2013、JB/T 8622-1997、IEC60751-2008、JB/T8623-2015;

●Scope and Tolerance

Type	Norminal resistance value @ 0℃Ω	Resistance ratioW (100℃)	Scope Tolerance	
			Scope℃	Tolerance
Pt10	10	1.3851	Ceramic element: -200 ~600 Mica element: -200~420	ClassA: ±（0.15+0.2%｜t｜）℃ ClassB: ±（0.3+0.5%｜t｜）℃
Pt100	100			
Cu50	50	1.4280	-50~100	±（0.3+0.6%｜t｜）℃
Cu100	100			

Note 1: Type Pt10 assembly R.T.D. supply is consultative;
2.High-sensitive/type Pt500/Pt1000 assembly R.T.D. is also consultative;

●Length Specification mm

O.D. of Protection Tube	Length L
Φ12	225、250、350、400、450、550、650、900、1150
Φ16	300、350、450、500、650、900、1150、1650、2150

Remark:Insertion depth of assembly R.T.D.：t=L-150mm

●Thermal response time

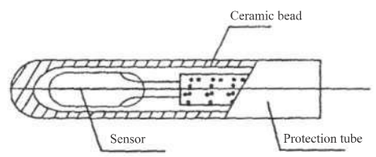
Diameter mm		Protection tube	Thermal response time t0.5 S
Pt R.T.D.	Φ12	SS：316L SS：304	30—90
	Φ16		
Copper Φ16			<180

●Room-temperature Insulation Resistance

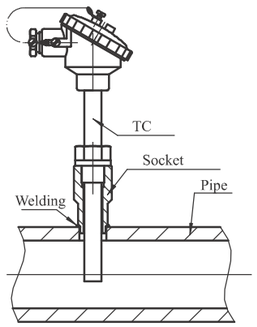
When the ambient temperature is 15~35℃, the relative humidity is no more than 80%, the insulation resistance between TC wires and protection tube should follow the following sheet.

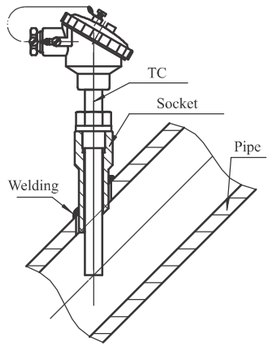
R.T.D. Type	Room-temperature Insulation ResistanceMΩ	Test Voltage
Pt R.T.D.	≥100MΩ	10～100Vd.c
Cu R.T.D.	≥50MΩ	

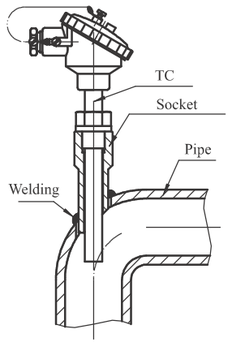
●Hot Junction Structure

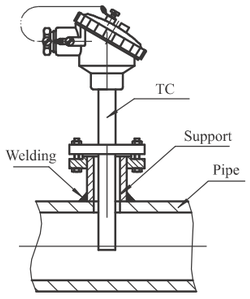


■Installation









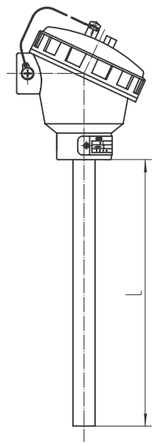
●WZ□ Assembly R.T.D.(Non-installation)

①② ③④ ⑤⑥⑦⑧⑨⑩ ⑪⑫

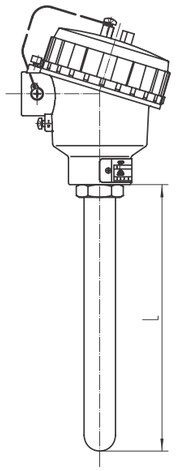
Wz□□－0□□－□□□□□□－□□

Type	①	Sensor Type	P：Pt R.T.D. C：Cu R.T.D.		
	②	Sensor Quantity	No designation：Single 2：Duplex（not applicable for copper R.T.D.）		
Model	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B. （Applicable for Integrated TT with Display）	3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	④	O.D. of protection tube	12：Φ12 16：Φ16	Remarks：Any other size of thread should be designed like：（specific size of thread）；Ex.：Φ22：（22）	
Sensor and J.B.	⑤	Tolerance Class	PtR.T.D.		Cu R.T.D.
			A：±（0.15+0.2%|t|）℃（Not applicable for two-wire system） B：±（0.3+0.5%|t|）℃		C：±（0.3+0.6%|t|）℃
	⑥	Hot Junction Structure	2：Two-wire system（applicable for the products, of which the length ≤1500mm）； 3：Three-wire system（consultative）		4：Four-wire system（consultative）
	⑦	Type	P2：Pt100		C1：CU50 / C2：CU100
	⑧	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in③（Any other size of gland should be defined in order）
	⑨	Explosion-proof Class	B1~B6：ExdIIBT1~BT6 C1~C6：ExdIICT1~CT6	A：ExiaIICT6	Remark：No designation for Water-proof Types；
Protection tube	⑩	Total length L（mm）			
	⑪	Protection tube mt'l	A：304 H：316 HL：316L	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel	Remark： refer to Page 159: other materials' designation；

●Structure Profile



WZ□－03□



WZ□－07□

●WZ□ Assembly R.T.D.（Thread type）

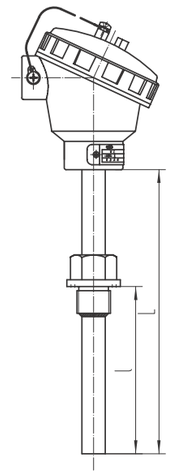
①② ③④⑤ ⑥⑦⑧⑨⑩⑪ ⑫⑬⑭ ⑮⑯

WZ□□－□□□－□□□□□□－□□□－□□

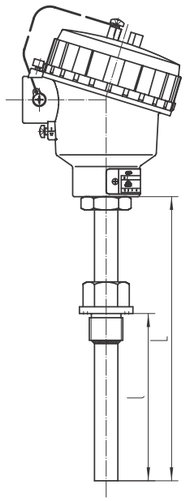
Type	①	Sensor Type	P：Pt R.T.D. C：Cu R.T.D.			
	②	Sensor Quantity	No designation：Single 2：Duplex（not applicable for copper R.T.D.）			
Model	③	Thread type	2：Fixed Thread 6：Tapered fixed thread		7：Fixed compression-fitting thread 9：Flexible compression-fitting thread	
	④	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B. （Applicable for Integrated TT with Display）		3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	⑤	O.D. of protection tube	12：Φ12 16：Φ16	Remarks：1.For tapered fixed thread，only the Any other size of thread should be designed like：（specific size of thread）；EX.：Φ22：（22）		
Sensor and J.B.	⑥	Tolerance Class	PdR.T.D.		CuR.T.D.	
			A：±（0.15+0.2%|t|）℃（Not applicable for two-wire system） B：±（0.3+0.5%|t|）℃		C：±（0.3+0.6%|t|）℃	
	⑦	Hot Junction Structure	2：Two-wire system（applicable for the products, of which the length ≤1500mm）； 3：Three-wire system（consultative）		4：Four-wire system（consultative）	
	⑧	Type	P2：Pt100		C1：CU50	C2：CU100
	⑨	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in④（Any other size of gland should be defined in order）	
	⑩	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑪	Explosion-proof Class	B1~B6 : ExdIIBT1~T6 Gb C1~C6 : ExdIICT1~T6 Gb	A : ExiaIICT6 Ga T : ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑫	Total Length ℓ（mm）				
	⑬	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantalum ME：Monel	R：Conrundum S：Recrystallized Silicone Carbon SS：Green Silicone Carbon
			Remark: Any other Mt'l is referred in Page 153;			
	⑭	Insertion Depth ℓ（mm）				
Process Connection	⑮	Bolt Mt'l	A：304 H：316	HL：316L TT：Ti	Remarks: Any other mt'l ref'er to protection tubes' in Page 159;	
	⑯	Bolt Specification	M20：M20*1.5 M27：M27*2 M33：M33*2	N1：NPT1/2" G1：G1/2" Z1：ZG1/2"	Remarks：Any other size of thread is designed like：（Specific Size），Ex.：M27*1.5：(M27*1.5)；	

Remark: Socket specification is detailed in Page 150;

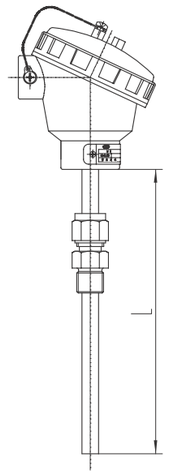
●Structure Profile



WZ□－13□



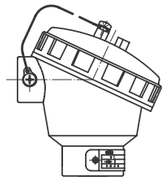
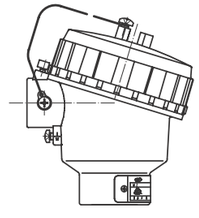
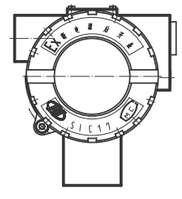
WZ□－17□



WZ□－23□

Remarks： L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die-casting Al. 3A：SS	7：Die-casting Al. 7A：SS	9：die-casting Al. 9A：SS
Enclosure Protection Class	IP65	IP65	IP65

Remark：Specific dimensions，refer to Page 154~155；

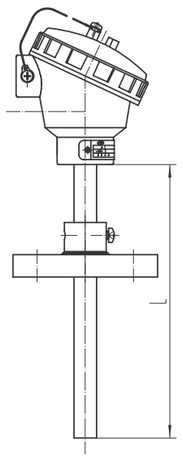
●WZ□ Assembly R.T.D.（flanged type)）

①② ③④⑤ ⑥⑦⑧⑨⑩⑪ ⑫⑬⑭⑮⑯ ⑰⑱⑲

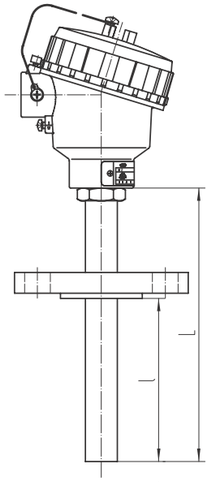
WZ□□－□□□－□□□□□□－□□□□□－□□□

Type	①	Sensor Type	P：Cu R.T.D. C：Pt R.T.D.			
	②	Sensor Quantity	No designation：Single 2：Duplex（not applicable for copper R.T.D.）			
Model	③	Flange type	3：Flexible flange 5：Fixed flange		6：Compression-fitting flange 7：Flexible flange	
	④	J.B. Specification	3：Water-proof Die Casting Al J.B. 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B. （Applicable for Integrated TT with Display）		3A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.	
	⑤	J.B. Specification（mm）	12：Φ12 16：Φ16	Remarks：Any other size of thread should be designed like：（specific size of thread）；Ex.：Φ22：（22）		
Sensor and J.B.	⑥	Tolerance Class	Pt R.T.D.		Cu R.T.D.	
			A：±（0.15+0.2%|t|）℃（Not applicable for two-wire system） B：±（0.3+0.5%|t|）℃		C：±（0.3+0.6%|t|）℃	
	⑦	Hot Junction Structure	2：Two-wire system（applicable for the products, of which the length ≤1500mm）； 3：Three-wire system（consultative）		4：Four-wire system（consultative）	
	⑧	Type	P2：Pt100		C1：CU50	C2：CU100
	⑨	Electric Connection	M：M20*1.5 Inner Thread N：NPT1/2" Inner Thread	G：G1/2" Inner Thread Z：ZG1/2" Inner Thread	Remarks:1. Any other size of thread should be designed like；（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，3A and 5A in ④；Any other size of gland should be defined in order；	
	⑩	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑪	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；	
Protection Tube	⑫	Total Length L（mm）	Remark: Length of LA should be defined for right-angle flexible flange;			
	⑬	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel	R：Conrundum S：Recrystallized silicone carbide SS：Green silicone carbide
			Remark: any other mt'l designation refer to Page 159;			
	⑭	Insertion Depth ℓ（mm）	1.Length of LB should be defined for right-angle flexible flange;2.for flexible flange type and compression-fitting flange type, no designation of insertion depth;			
Process Connection	⑮	Surface Treatment	No designation: no surface treatment;	F：PTFE-coated		
	⑯	Length of surface treatment ℓ1（mm）			Remark：when ℓ1=l，no need for designation；	
	⑰	Flange material	A：304 H：316	E: Embeded type in 304 SS flange body	Remark: any other mt'l designation refer to Page 159;	
	⑱	Flange quantity	1：Single 2：Duplex and with fastenings			
	⑲	Flange Specification	Standard specification: the designations are detailed in Page 157~158; Standard flange：standard number-nominal diameter-pressure ratio-sealing face			

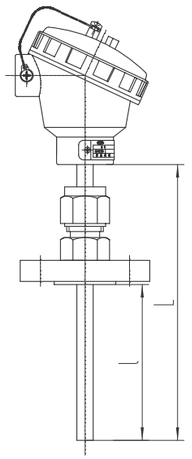
●Structure Profile



WZ□－73□ 型



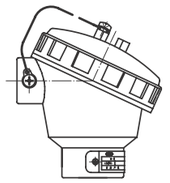
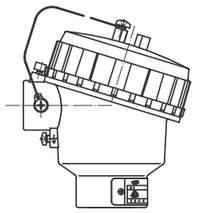
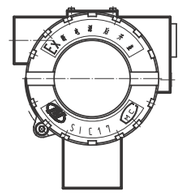
WZ□－57□ 型



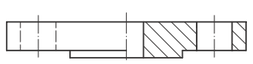
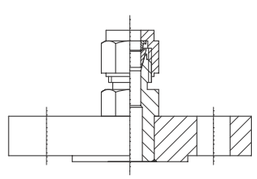
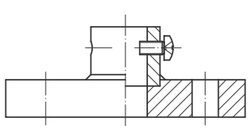
WZ□－63□ 型

Remarks： L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die-casting Al. 3A：SS	7：Die-casting Al. 7A：SS	9：Die-casting Al. 9A：SS
Enclosure Protection Class	IP65	IP65	IP65
Remark：Specific dimensions，refer to Page 154~155；			

●Fixing Devices

Name	Fixed Flange	Compression-fitting flange	Flexible Flange
Form			
Designation	5：Fixed Flange	6：Compression-fitting flange	7：Flexible Flange
Remark：Specific dimensions，refer to Page 157~158；			

●WZPK□Sheathed-core Assembly R.T.D. (thread type)

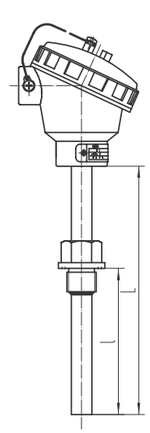
① ②③④ ⑤⑥⑦⑧⑨⑩⑪⑫ ⑬⑭⑮⑯ ⑰⑱

WZPK□－□□□－□□□□□□□□－□□□□－□□

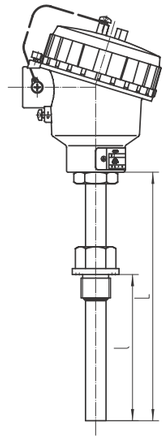
Type	①	Sensor Quantity	No designation：Single 2：Duplex		
Model	②	Thread type	1：Fixed thread		2：Compression-fitting thread
	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.（Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B. （Applicable for Integrated TT with Display）		3A：Water-proof SS J.B. 5A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.
	④	O.D. of Protection Tube（mm）	12：Φ12 16：Φ16	Remarks：1.For tapered fixed thread，only the Any other size of thread should be designed like：（specific size of thread）；EX.：Φ22：（22）	
Sensor and J.B.	⑤	Tolerance Class	A□ TA□□±□0.15＋0.2%｜t｜）℃		B□ TB□□±□0.3＋0.5%｜t｜）℃
	⑥	Hot Junction Structure	3：Three-wire system		4：Four-wire system
	⑦	Type	P2：Pt100		P3：Pt1000
	⑧	Sheath Diameter（mm）	J：Φ6 （Standard specification, recommended）		Remark：other diameters are designed like： H：Φ5 、K：Φ8、F：Φ4
	⑨	Sheath Mt'l	G：0Cr18Ni9Ti H：316	HL：316L	
	⑩	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ③；Any other size of gland should be defined in order；
	⑪	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑫	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；
Protection Tube	⑬	Structure	WH：Plug type	W：Drilled bar type	
	⑭	Total Length ℓ（mm）			
	⑮	Protection Tube Mt'l	A：304 H：316 HL：316L	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel	Remark：Refer to Page 159： Material Designation
	⑯	Insertion depth ℓ（mm）			
Process Connection	⑰	Thread Type	A：304 H：316	HL：316L TT：Ti	Remark：Refer to Page 159： Material Designation
	⑱	Thread Specification	M20：M20*1.5 M27：M27*2 M33：M33*2	N1：NPT1/2" G1：G1/2" Z1：ZG1/2"	Remarks：Any other size of thread is designed like: (Specific Size), Ex.： M27*1.5：(M27*1.5);

Remark： refer to Page 150： Scokets

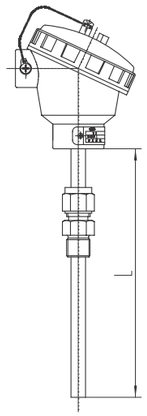
●Structure Profile



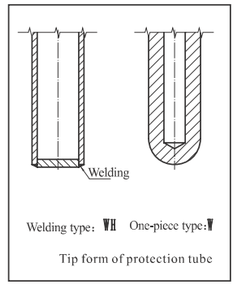
WZPK-1$\frac{3}{5}$□ 型



WZPK-17□ 型

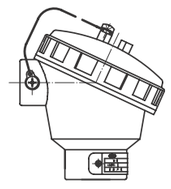
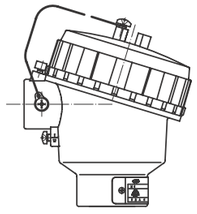
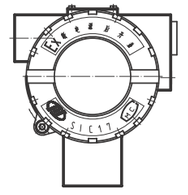


WZPK-2$\frac{3}{5}$□ 型



Remark： L=ℓ+150mm

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die-casting Al. 3A：SS	7：Die-casting Al. 7A：SS	9：Die-casting Al. 9A：SS
Enclosure Protection Class	IP65	IP65	IP65
Remark：Specific dimensions，refer to Page 145~146；			

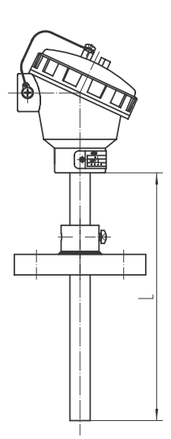
●WZPK□Sheathed-core Assembly R.T.D. (Flanged type)

① ②③④ ⑤⑥⑦⑧⑨⑩⑪ ⑫⑬⑭⑮⑯⑰ ⑱⑲⑳

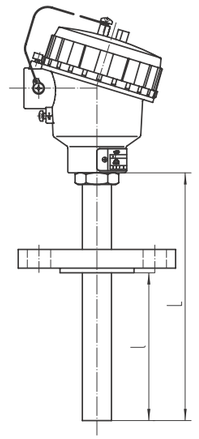
WZPK□－□□□－□□□□□□□－□□□□□□－□□□

Type	①	Sensor Quantity	No designation：Single 2：Duplex		
Model	②	Thread type	5：Flange thread		6：Compression-fitting Flange 7：Flexible Flange
	③	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.（Spring-loaded） 7：Explosion-proof Die Casting AL J.B. 9：Explosion-proof JDY J.B. （Applicable for Integrated TT with Display）		3A：Water-proof SS J.B. 5A：Water-proof SS J.B. 7A：Explosion-proof SS J.B. 9A：SS JDY J.B.
	④	O.D. of Protection Tube（mm）	12：Φ12 16：Φ16	Remarks：1.For tapered fixed thread, only the Any other size of thread should be designed like：（specific size of thread）；EX.：Φ22：（22）	
Sensor and J.B.	⑤	Tolerance Class	A□ TA□□±□0.15＋0.2%｜t｜）℃		B□ TB□□±□0.3＋0.5%｜t｜）℃
	⑥	Hot Junction Structure	3：Three-wire system		4：Four-wire system
	⑦	Type	P2：Pt100		P3：Pt1000
	⑧	Sheath Diameter（mm）	J：Φ6 （Standard specification, recommended）		Remark：other diameters are designed like： H：Φ5 、K：Φ8、F：Φ4
	⑨	Sheath Mt'l	G：0Cr18Ni9Ti H：316	HL：316L	
	⑩	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks:1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ④（Any other size of gland should be defined in order）
	⑪	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑫	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；
Protection Tube	⑬	Construction	WH：Plug type	W：Drilled-bar-stock type	
	⑭	Total Length ℓ（mm）			
	⑮	Protection Tube Mt'l	A：304 H：316 HL：316L P：310S	HC：Hastelloy C HB：Hastelloy B TT：Ti TA：Tantanum ME：Monel	Remark：refer to Page 159： Mt'l Designation
	⑯	Insertion depth l（mm） Remark			
Process Connection	⑰	Flange material	A：304 ZA:20#	E: Embeded type in 304 SS flange body	
	⑱	Flange quantity	1：Single 2：Duplex and with fastenings		
	⑲	Flange Specification	Standard specification: the designations are detailed in Page 157~158 Standard flange：standard number-nominal diameter-pressure ratio-sealing face		

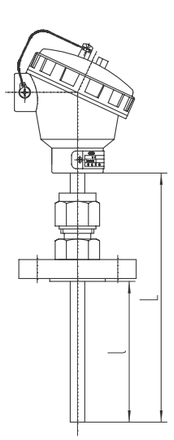
●Stucture Profile



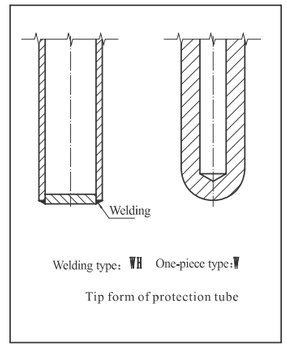
WZPK-7$\frac{3}{5}$□



WZPK-57□

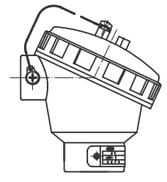
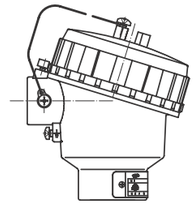
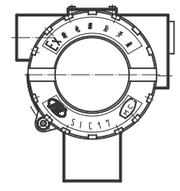


WZPK-6$\frac{3}{5}$□



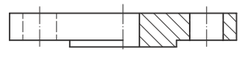
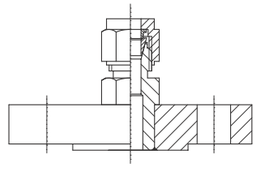
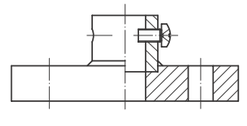
Remark： L=l+150mm

●J.B. Specification

Name	Water-proof J.B.	Explosion-proof J.B.	JDY J.B.
Form			
Designation	3：Die-casting Al. 3A：SS	7：Die-casting Al. 7A：SS	9：Die-casting Al. 9A：SS
Enclosure Protection Class	IP65	IP65 IP65	IP65

Remark：Specific dimensions，refer to Page 145~146；

●安装固定装置

Name	Fixed Flange	Compression-fitting flange	Flexible Flange
Form			
Designation	4：Fixed Flange	0：Fixed compression-fitting flange 8：Flexible compression-fitting flange	3：Flexible Flange

Remark：Specific dimensions，refer to Page 148~150；

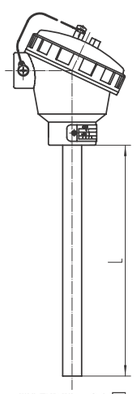
●WZPK□Sheathed-core Assembly R.T.D. （non-installation type）

①　②③　④⑤⑥⑦⑧⑨⑩　⑪⑫⑬

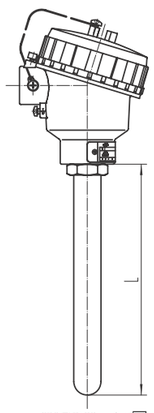
WZPK□－1□□－□□□□□□□□－□□□

Type	①	Sensor Quantity	No designation：Single 2：Duplex		
Model	②	J.B. Specification	3：Water-proof Die Casting Al J.B. 5：Water-proof Die Casting J.B.（Spring-loaded） 7：Explosion-proof Die Casting AL J.B.（Spring-loaded） 8：Water-proof JDY J.B.（Applicable for Integrated TT with Display） 9：Explosion-proof JDY J.B. （Applicable for Integrated TT with Display）		3A：Water-proof SS J.B. 5A：Water-proof SS J.B.（Spring-loaded） 7A：Explosion-proof SS J.B.（Spring-loaded）
	③	O.D. of Protection Tube（mm）	12：Φ12 16：Φ16	Remarks：For tapered fixed thread，only the Any other size of thread should be designed like：（specific size of thread）；EX.：Φ22：（22）	
Sensor and J.B.	④	Tolerance Class	A：±（0.15+0.2%｜t｜）℃		B：±（0.3+0.5%｜t｜）℃
	⑤	Hot Junction Structure	3：Three-wire system		4：Four-wire system
	⑥	Type	P1：Pt10	P2：Pt100	P3：Pt1000
	⑦	Sheath Diameter（mm）	J：Φ6 （Standard specification，recommended）		Remark：other diameters are designed like： H：Φ5 、K：Φ8、F：Φ4
	⑧	Sheath Mt'l	G：0Cr18Ni9Ti H：316	HL：316L	
	⑨	Electric Connection	M：M20*1.5 Internal Thread N：NPT1/2" Internal Thread	G：G1/2" Internal Thread Z：ZG1/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in②（Any other size of gland should be defined in order）
	⑩	Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F:Stainless steel explosion insulation cable joint	Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑪	Explosion-proof Class	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIIIC T120℃ Db IP65	Remark：No designation for Water-proof Types；
Protection Tube	⑫	Total Length L（mm）			
	⑬	Mt'l of Protection Tube	A：304 H：316 HL：316L	HC：HastelloyC HB：HastelloyB TT：Ti TA：Tantanum ME：Monel	Remark：any other mt'l designation is detailed

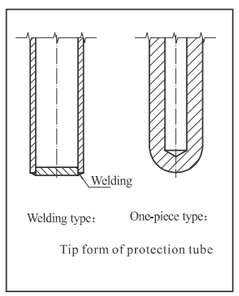
●Structure Profile



WZPK－03□



WZPK－07□



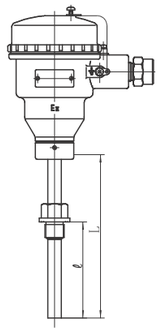
Special TC（or R.T.D.）

Chongqing Chuanyi Instrument No.17 Factory Co., Ltd. Address: Longfengqiao Bridge, Beibei District, Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

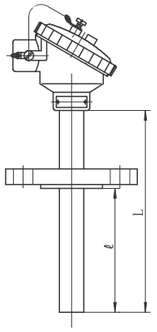
■w_Z^R□□L Wear-resistant TC（RTD）

Wear-resisting thermocouple/RTD is made up of wear-resisting protecting tube, temperature sensing component, fixing devices used in mounting and junction box. It could be used for temperature measurement of flowing medium including coal dust in power station, petroleum cracking and construction asphalt mixture. Cutting-off wear-resisting thermocouple could immediately shut off dump valve attached in the products when protecting tube wears and leaks. For temperature measurement with high leak-proof requirements, inside leak-proof wear-resisting clamp thermocouple could be used to effectively avoid measured medium leakage through fixed clamp thread joint with good sealing performance.

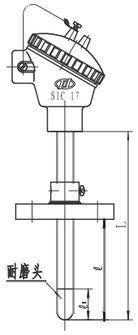
● Structure Profile



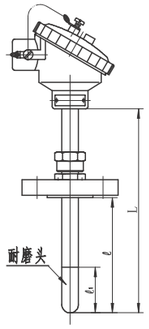
W_Z^R□ □ L−24□ Type



W_Z^R□ □ L−4S3□ Type



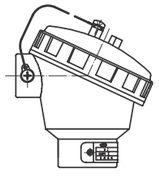
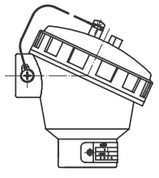
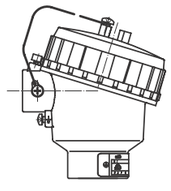
W_Z^R□ □ L−3S5□ Type



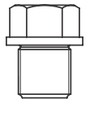
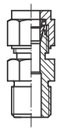
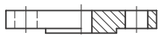
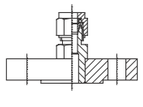
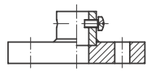
W_Z^R□ □ L$\frac{0}{8}$S3□ Type

Remark: L = ℓ +150mm

●J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.
Figure			
Designation	3：Die−casting Al. 3A: SS	5：Die−casting Al. 5A: SS	7：Die−casting Al. 7A: SS
Enclosure Protection Class	IP65	IP65	IP65
Remark： Specific dimensions are detailed in Page 150 Standard Components；			

●Fixing Devices

Name	Welded Bolt	Compression-fitting Bolt	Fixed Flange	Compression-fitting Flange	Flexible Flange
Figure					
Designation	1：Fixed Thread	2：Compression-fitting Thread	5：Fixed Flange	5：Compression-fitting flange	3：Flexible Flange
Remark： Specific dimensions are detailed in Page 157~158 Standard Components；					

① ② ③ ④ ⑤ ⑥⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬⑭ ⑮ ⑯ ⑰ ⑱⑲ ⑳ ㉑

W□ □ □L□−□ □ □−□ □ □ □ □□−□ □ □ □□ −□ □

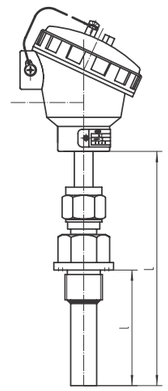
W□□□L□−□□□Type			Wear-resistant TC/RTD-General Type		
Type	①	Classification	R：TC		Z：RTD
	②	Type	TC		RTD
			K: K Type N: N Type E: E Type J: J Type	S: SType R: RType B: BType	P： Pt100
	③	Sensor Classification	No designation: Assembly core		K: Sheathed Core
	④	Quantity of Sensor	No designation: single		2: Duplex
Model	⑤	Fixing Devices	0：No installation 1：Fixed thread 2：compression-fitting thread		5：Fixed flange（single） 6：Compression-fitting flange 7：Flexible flange（single）
	⑥	J.B. Specification	3：Water-proof B type die-casting Al J.B. 5：Water-proof D type die-casting Al. J.B. Spring-loaded 4：Explosion-proof die-casting Al. J.B.		3A：Water-proof SS J.B.（not applicable for duplex sheathd-core RTD） 5A：Water-proof SS J.B.（not applicable for assembly-core type） 4A：Explosion-proof SS J.B.
	⑦	O.D. of Protection Tube(mm)	16： Φ16 20： Φ20 22： Φ22	25： Φ25 28： Φ28 34： Φ34	Remark： any other dimension is designated like：（specific dimension），for example： Φ40：（40）
Sensor and J.B.	⑧	Sheath Mt'l	G：0Cr18Ni9Ti H：316 HL：316L Sheath Diameter（mm）	B：GH3030 C：GH3039 P：310S J： Φ6（Standard specification, recommended）	Remark：Refer to Page 153: Material Designation Remark：other diameters are designed like： H：Φ5 、K：Φ8、F：Φ4
	⑨	Sheath Diameter（mm）	J： Φ6	K： Φ8	H： Φ5
			Remark：No designation for assembly-core type；		
	⑩	Sheath Mt'l	G：0Cr18Ni9Ti H：316 HL：316L	P：310S B：GH3030 C：GH3039	Remark：1. Any other mt'ls' designation is detailed in Page 153(consultative)；2. No designation for assembly-core type；
	⑪	Hot Junction Structure	TC		R.T.D.
			3：Ungrouned	4：Seperately un-grounded	3：Three-wire system / 4：Four-wire system
	⑫	Electric Connection	M：M20*1.5 Female Thread N：NPT1/2" Female Thread	G：Gl/2" Female Thread Z：ZGl/2" Female Thread	Remarks：1.Any other size of thread should be designed like：（specific size of thread）；2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ⑥；Any other size of gland should be defined in order；
	⑬	Explosion-proof Class	B1~B6： ExdIIBT1~BT6 C1~C6： ExdIICT1~CT6	A： ExiaIICT6	Remark： no designation for Water-proof Types；
Protection Tube	⑭	Total Length L（mm）			
	⑮	Protection Tube Mt'l	When the wear-resistant section mt'l differs from the protection tube's		When the wear-resistant section mt'l is the same as the protection tube's.
			A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	T：CYT101（Not applicable for RTD） TB：CYT104
			Remark：Any other material is designated in Page 153；		
	⑯	Insertion Depth ℓ（mm）			
	⑰	Wear-resistant section material	T：CYT101 （Not applicable for RTD） TB：CYT104		W：Metal base + Cobalt Hard-facing Alloy Layer SW： Metal base + Spary welding Layer SC：Metal base + Coating Layer
			Remark：When the wear-resistant section mt'l is the same as the protection tube's, no designation；		
	⑱	Wear-resistant section length ℓ（mm）： When l= ℓ1， no designation；			
Process Connection	⑲	Fixing Device Material	A：304	Z：Carbon Structucture Steel＋blackening E：Embedded（flange base material is 304SS）	
			Remark：refer to protection tube materials；		
	⑳	Fixing Device Specification	Fixed & Compression−fitting Thread		Flexible、Fixed、 Compression−fitting Flange
			M27： M27*2 M33： M33*2	N1： NPT1/2″ Z1： ZG1/2″	Any other size of flange is designed like：flange standard code number−nominal diameter−nominal pressure−seal face−form
			Remark：Any other dimension of thread is designated like：（specific size） Ex.：M27*1.5：（M27*1.5）		

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳

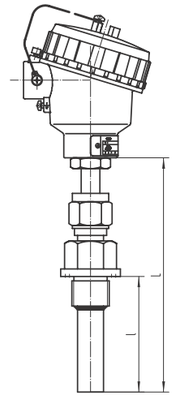
W□ □ KL□−□ □ □K−□ □ □ □ □ □ □□ −□ □ □ □ □−□ □

W□□KL□−□□□K type			Wear-resistant TC/RTD-Compression-fitting leakage-preventive type			
Inner Core	①	Type	R： TC	Z：RTD		
	②	Type	热电偶		热电阻	
			K：K Type Nickel chrome-nickel silicon N： N Type Nickel chrome silicon - nickel silicon magnesium E： E Type Nickel chrome-Nickel copper (Constantan) J：J Type Iron-Nickel copper（Constantan）	S：S Type Platinum Rhodium 10- Platinum R：R Type Platinum Rhodium 13- Platinum B：B Type Platinum Rhodium 30- Platinum 6	P：Pt100	
	③	Sensor Quantity	No designation： single	2：Duplex		
Type	④	Fixing Devices	2：Fixed Thread	4S：Fixed Flange（single）	4C：Fixed flange（duplex flange and Fastenings）	
	⑤	J.B. Specification	3： Water-proof B type die-casting Al J.B.（Not applicable for duplex sheathed-core R.T.D.） 5：Water-proof D type die-casting Al. J.B.（not applicable for assembly-core type） 4：Explosion-proof die-casting Al. J.B.		3A：Water-proof SS J.B.（not applicable for duplex sheathd-core RTD） 5A：Water-proof SS J.B.（not applicable for assembly-core type） 4A：Explosion-proof SS J.B.	
	⑥	O.D. of Protection Tube (mm)	16：Φ16 20：Φ20 22：Φ22	25：Φ25 28：Φ28 34：Φ34	Remark:any other dimension is designated like：（specific dimension）， for example：Φ40：（40）	
Sensor and J.B.	⑦	Tolerance Class	TC			RTD
			K、E、J、N	S、R	B	Pt100
			1：±1.5℃ or ±0.4%｜t｜℃ 2：±2.5℃ or ±0.75%｜t｜℃	P：±3℃ or±0.5%｜t｜℃	P：±4℃ or ±0.5%｜t｜℃	A：±(0.15+0.2%｜t｜)℃ B：±(0.3+0.5%｜t｜)℃
	⑧	Sheath Diameter（mm）	J：Φ6	K：Φ8	H：Φ5	
	⑨	Sheath Mt'l	G：0Cr18Ni9Ti H：316 HL：316L	P：310S B：GH3030 C：GH3039	Remark：1. Any other mt'ls' designation is detailed in Page 153（consultative）；	
	⑩	Hot Junction Structure	TC		RTD	
			3： Ungrounded	4：Separately ungrounded（applicable for duplex type）；	3： three-wire system	4： four-wire system
	⑪	Electric Connection	M：M20*1.5 Internal thread N：NPTl/2" Internal thread	G： Gl/2" Internal thread Z： ZGl/2" Internal thread	Remark：1. Any other size of thread should be designed like：（specific size of thread）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.，which is applied for3，5，3A and 5A in ⑥：Any other size of gland should be defined in order.	
	⑫	Explosion-proof Class	B1~B6： ExdIIBT1~BT6 C1~C6： ExdIICT1~CT6	A：ExiaIICT6	Remark： No designation for water-proof type；	
Protection Tube	⑬	Total Length L（mm）				
	⑭	Protection Tube Mt'	When the wear-resistant section mt'l differs from the protection tube's		When the wear-resistant section mt'l is the same as the protection tube's	
			A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	T：CYT101（Not applicable for RTD） TB： CYT104	
			Remark：ny other material is designated in Page 153；			
	⑮	Insertion Depth ℓ（mm）				
	⑯	Wear-resistant section material	T：CYT101（Not applicable for RTD） TB： CYT104		W：Metal base + Cobalt Hard-facing Alloy Layer SW：Metal base + Spary welding Layer SC：Metal base + Coating Layer	
			Remark：When the wear-resistant section mt'l is the same as the protection tube's, no designation;			
	⑰	Wear-resistant section length ℓ1（mm）： When ℓ1=ℓ， no designationl1				
Process Connection	⑱	Fixing Device Material	A：304	Z：Carbon Structucture Steel＋blackening E：Embedded （flange base material is 304SS）		
			Remark：refer to protection tube materials；			
	⑲	Fixing Device Specification	FixedThread		Fixed Flange	
			M27：M27*2 M33：M33*2	N1：NPT1/2″ Z1：ZG1/2″	Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form	
			Remark： Any other dimension of thread is designated like：（specific size）Ex.：M27*1.5：（M27*1.5）			

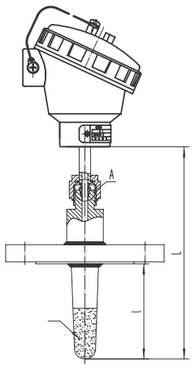
● Structure Profile



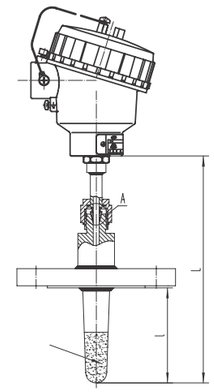
W^{R}_{Z}□ KL-13□ K



W^{R}_{Z}□ KL-17□ K



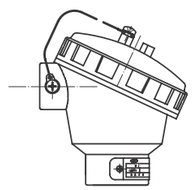
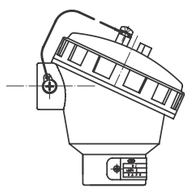
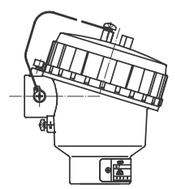
W^{R}_{Z}□ KL-53□ K



W^{R}_{Z}□ KL-57□ K

Remark：L＝ℓ+150mm

● J.B. Specification

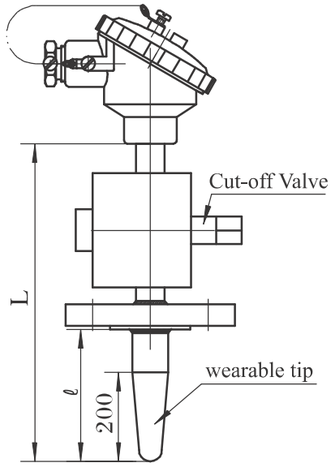
Name	Water-proof J.B.		Explosion-proof J.B.
Figure			
Designation	3： Die-casting Al. 3A： SS	5： Die-casting Al. 5A： SS	7： Die-casting Al. 7A： SS
Enclosure Protection Class	IP65	IP65	IP65
Remark： Specific dimensions are detailed in Page 150 Standard Components；			

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳

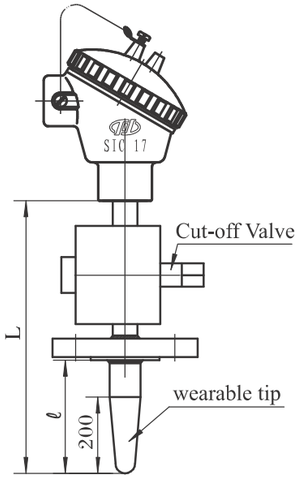
W□ □KL□ – □ □ □Q□ – □ □ □ □ □ □ – □ □ □ □ □ – □ □ □

W□□KL□-□□□Q Type		Wear-resistant TC/RTD-cut-off type（carbon steel cut-off valve）				
W□□KL□-□□□QAType		Wear-resistant TC/RTD-cut-off type（stainless steel cut-off valve）				
Inner Core	① Type	R: TC	Z: RTD			
	② Type	TC		RTD		
		K：K type Nickel chrome-nickel silicon N：N type Nickel chrome silicon - nickel silicon magnesium E：E type Nickel chrome-Nickel copper（Constantan） J：J type Iron-Nickel copper（Constantan）	S：S type Platinum Rhodium 10- Platinum R： type Platinum Rhodium 13- Platinum B：B type Platinum Rhodium 30- Platinum 6	P：Pt100		
	③ Sensor Quantity	No designation：single	2： duplex：			
Specification	④ Fixing Device	4： Fixed flange				
	⑤ J.B. Specification	3：Water-proof B type die-casting Al J.B.（Not applicable for duplex sheathed-core R.T.D.） 5：Water-proof D type die-casting Al. J.B.（not applicable for assembly-core type） 4：Explosion-proof die-casting Al. J.B.		3A： Water-proof SS J.B.（not applicable for duplex sheathd-core RTD） 5A：Water-proof SS J.B.（not applicable for assembly-core type） 4A：Explosion-proof SS J.B.		
	⑥ O.D. of Protection Tube（mm）	16：Φ16 20：Φ20 22：Φ22	25：Φ25 28：Φ28 34：Φ34	Remark：any other dimension is designated like：（specific dimension），for example：Φ40：（40）		
Sensor and J.B.	⑦ Tolerance Class	TC			RTD	
		K、E、J、N	S、R	B	Pt100	
		1：±1.5℃ or ±0.4%｜t｜℃ 2：±2.5℃ or ±0.75%｜t｜℃	P：±3℃ or ±0.5%｜t｜℃	P：±4℃ or ±0.5%｜t｜℃	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	⑧ Sheath Diameter（mm）	F：Φ4	H：3Φ5	J：Φ6		
	⑨ Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	P：310S H：GH3030 G：GH3039	Remark： 1. Any other mt'ls' designation is detailed in Page 153（consultative）；		
	⑩ Hot Junction Structure	TC		RTD		
		3：Ungrounded	4：Separately ungrounded	3：Three－wire system	4：Four－wire system	
	⑪ Electric connection	M： M20*1.5 Internal Thread N： NPTl/2" Internal Thread	G：Gl/2" Internal Thread Z： ZGl/2" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ⑥：Any other size of gland should be defined in order；		
	⑫ Explosion-proof Class	B1~B6： ExdIIBT1~BT6 C1~C6： ExdIICT1~CT6	A：ExiaIICT6	Remark： No designation for water-proof type；		
Protection Tube	⑬ Total Length L（mm）					
	⑭ Protection Tube Mt'l	When the wear-resistant section mt'l differs from the protection tube's		When the wear-resistant section mt'l is the same as the protection tube's		
		A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Inconel600 K：Incoloy800	T：CYT101（Not applicable for RTD） TB：CYT104		
		Remark：1. Any other mt'ls' designation is detailed in Page 153（consultative）；				
	⑮ Insertion Depth ℓ（mm）					
	⑯ Wear-resistant Section material	T：CYT101（Not applicable for RTD） TB：CYT104		W：Metal base + Cobalt Hard-facing Alloy Layer SW：Metal base + Spary welding Layer SC：Metal base + Coating Layer		
		Remark：When the wear-resistant section mt'l is the same as the protection tube's，no designation；				
	⑰ Wear-resistant section length ℓ1（mm）： When ℓ1= ℓ，no designation ℓ1					
Process Connection	⑱ Flange Mt'l	A：304	Z：Carbon Structucture Steel＋blackening E： Embedded（flange base material is 304SS）			
		Remark： refer to protection tube materials；				
	⑲ Quantity	1：Single	2： Duplex flanges and fastenings			
	⑳ Specification	Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form				

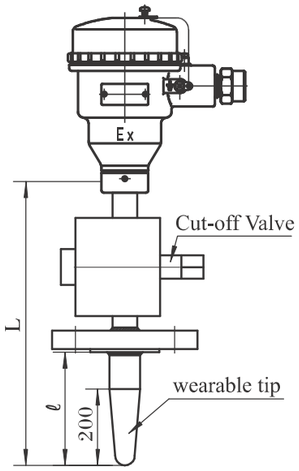
● Structure Profile



W_Z^R□ KL-43□ Q Type



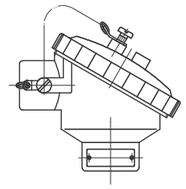
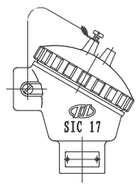
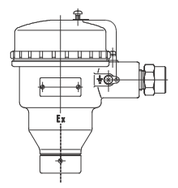
W_Z^R□ KL-45□ Q Type



W_Z^R□ KL-44□ Q Type

Remark：L = ℓ +150mm

● J.B. Specification

Name	Water-proof J.B.		Explosion-proof J.B.
Figure			
Designation	3：Die-casting Al. 3A： SS	5：Die-casting Al. 5A：SS	7：Die-casting Al. 7A： SS
Enclosure Protection Class	IP65	IP65	IP65
Remark：Specific dimensions are detailed in Page 145~146 Standard Components；			

Special TC(R.T.D.)

■WR□ KS Multi-Point Sheathed Thermocouple（Patent No.:ZL03233996.8）

Sheathed thermocouples (multi-point type), as one of the new temperature sensors, is composed of terminals and multi-point sheathed sensor, protection tube and fixing devices, etc.. It could be used for temperature measurement in -40~1300℃ various occasions, especiall for some narrow temperature positions of different depths in the convertors, reactors and heating furnace of the various fields, such as petrolum chemical, metal, mechanics, etc.

●Features

1. Multi-point TC with single-layer sheath is composed of 2~4 pairs of sensors, outer thermowell and inorganic insulation mt'ls; each pair of thermocouples is ramified uniformly in different depths;
2. Multi-point TC with single-layer sheath is composed of 2~20 pieces of sheathed thermocouples, outer sheath, inorganic insulation material, each piece of sheathed thermocouple is ramified uniformly in the outer sheath. Therefore, the thermocouple wires are protected by two layers of sheaths;
3. Various fixing devices can be used, such as straight thread, tapered thread or flange, etc.;
4. A variety of terminals and outer protection tubes can satisfy different conditions, such as explosive or corrosive ones;
5.The hot junction is seperately un-grounded, each piece of sensor cannot interfere with each others;
6. It's pressure-resistant, quake-resistant, stable and reliable, as well as of a long life cycle;

●Structure Profile

A Sheathed Multi-point TC with Single-layer Sheath

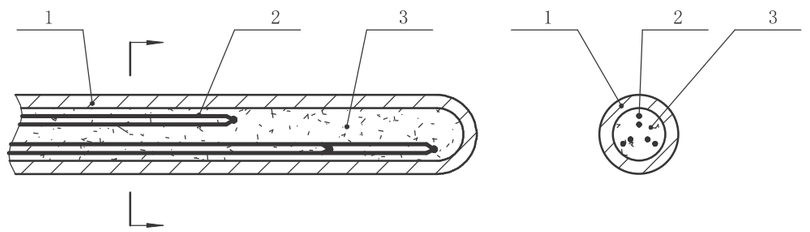


Fig. 1 Fig. 2

1-Outer Protection Tube 2-Thermocouple Wire 3-Insulation Mt'l

B Sheathed Multi-point TC with Duplex-layer Sheath

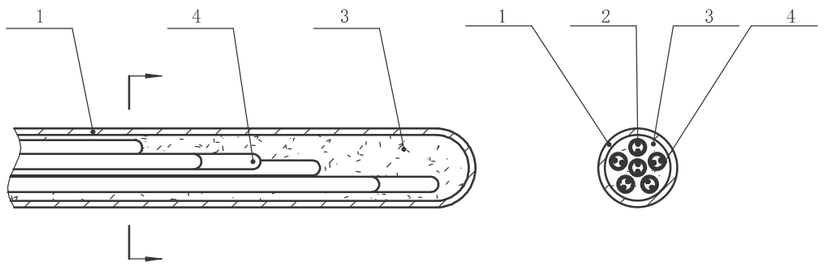


Fig. 3 Fig. 4

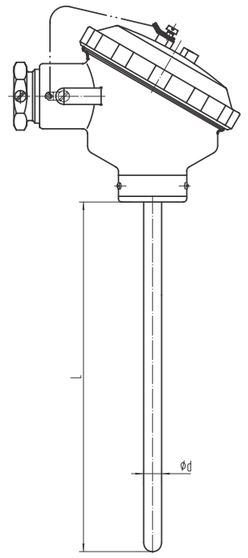
1-Outer Protection Tube 2-Thermocouple Wire 3-Insulation Mt'l 4-Sheated TC

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯

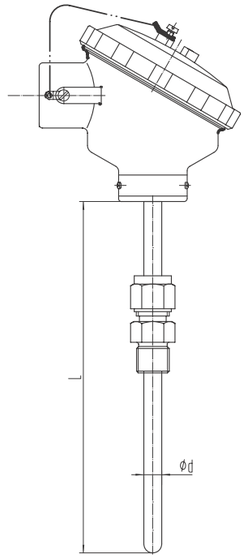
WR□KT□ □－□ □D－□ □ □ □ □ □－□ □ □ □ □－□ □

WR□KT□□-□□□D			Multi-point Sheathed TC			
Type	①	Sensor Type	K：K Type Nickel chrome-nickel silicon	N：N Type Nickel chrome silicon －nickel silicon magnesium	E：E Type Nickel chrome-Nickel copper（Constantan）	
	②	Sheath Layer Quantity	No designation：Single-layer	K：Dual-layer		
	③	Sensor Quantity	2：2 Point 3：3 Point 4：4 Point 5：5 Point 6：6 Point	7：7 Point 8：8 Point 9：9 Point 10：10 Poin t 11：11Poin t	12：12 Poin t 13：13 Poin t 14：14 Poin t 15：15 Poin t 16：16 Point	17：17 Poin t 18：18 Point 19：19 Point 20：20 Point
Model	④	Installation	1：No Installation 2：Fixed Compression-fitting thread 3：Flexible Compression-fitting thread 6：Fixed Thread	4S：Fixed Compression-fitting flange（single） 5S：Flexible Compression-fitting flange（single） 7S：Fixed Flange（single）	4C：Fixed Compression-fitting flange（Dual） 5C：Flexible Compression-fitting flange（Dual） 7C：Fixed Flange（Dual）	
	⑤	J.B. Specification	0：No J.B. Type 2：C Type Splash-proof Cuboid Cabon Steel J.B.（Applicable for 7~24 points） 3：E Type Water-proof Die-casting Al J.B.（Applicable for 3~6 points） 4：A Type Explosion-proof Die-casting Al J.B.（Applicable for 2~4 points） 4A：A Type Explosion-proof Die-casting SS J.B.（Applicable for 2~4 points） 6：E Type Explosion-proof SS J.B.（Applicable for 5~15 points）（Patent No.:ZL03233995）			
Sensor	⑥	Tolerance	1：±1.5℃ or ±0.4%|t|℃	2：±2.5℃ or ±0.75%|t|℃		
	⑦	Sheath Diameter（mm）	H：Φ5 J：Φ6	K：Φ8 Q：Φ10		
	⑧	Total Length L（mm）				
	⑨	Sheath Material	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Inconel600	Remarks: Other materials are listed in Page 153;	
	⑩	Insertion depth ℓ（mm）	ℓ1（ ） ℓ2（ ） ℓ3（ ） ℓ4（ ） ℓ5（ ）	ℓ6（ ） ℓ7（ ） ℓ8（ ） ℓ9（ ） ℓ10（ ）	ℓ11（ ） ℓ12（ ） ℓ13（ ） ℓ14（ ） ℓ15（ ）	ℓ16（ ） ℓ17（ ） ℓ18（ ） ℓ19（ ） ℓ20（ ）
J.B. Specification	⑪	Quantity of Electric Connection	1 Type Electric Connection	C Type Splash-proof Cuboid & E Type Explosion-proof J.B.		E Type Water-proof J.B.
			1：1 Electric Connection Size 2：2 Electric Connection Size	1：1 Electric Connection Size 2：2 Electric Connection Size	3：3 Electric Connection Size 4：4Electric Connection Size	1：1 Electric Connection Size
	⑫	Electric Connection Size	M20：M20*1.5 Internal Thread M33：M33*2 Internal Thread N1：NPT1/2" Internal Thread	N3：NPT1" Internal Thread G1：G1/2" Internal Thread G1：G1" Internal Thread	Remarks：1. Any other size of thread should be designed like：（specific size of thread）；	
	⑬	Cable Diameter（mm）	Remarks：Applicable for 6：E Type Explosion-proof SS J.B. and C type Splash-proof Cuboid Cabon Steel J.B. in Designation⑤；			
	⑭	Explosion-proof Class	B1~B6：ExdIIBT1~BT6 C1~C6：ExdIICT1~CT	A：ExiaIICT6	Remark：No designation for Water-proof Types；	
Process Connection	⑮	Installation Material	A：304	Cabon steel and Blackening Treatment		
			Remark：Any other material is listed in Page 153；			
	⑯	Installation Size	Compression-fitting Thread、Fixed Thread		Compresson-fitting Flange、fixed flange	
			M16：M16*1.5 M20：M20*1.5 M27：M27*2	N1：NPT1/2" Z1：ZG1/2"	Any other size of flange is designed like: flange standard code number-nominal diameter-nominal pressure-seal face-form	
			Remarks：Any other size of thread is designed like：（Specific Size），Ex.：M27*1.5：（M27*1.5）；			

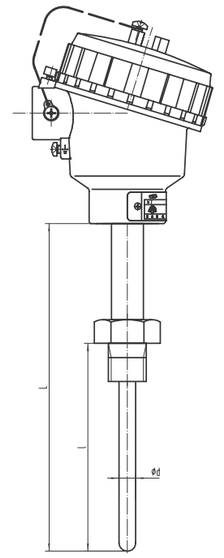
● Structure Profile



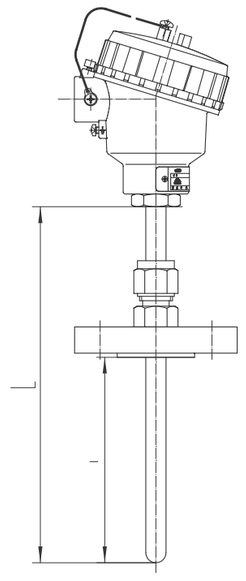
WR□ KT□ -6□



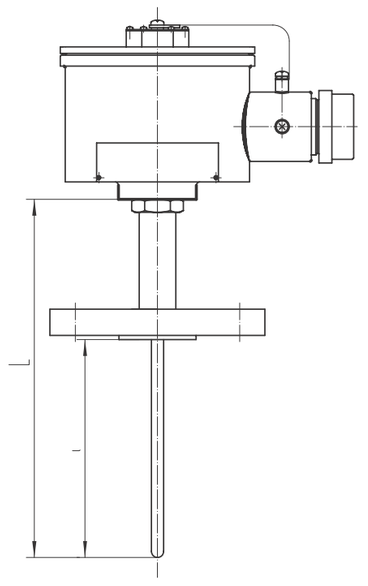
WR□ KS□ -6□



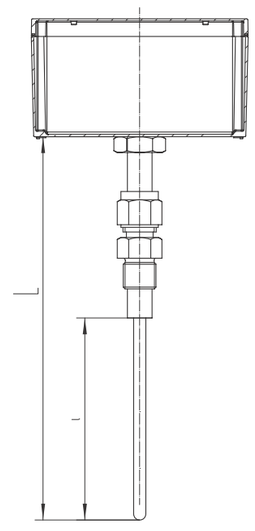
WR□ KS-7SH□



WR□ KS-7□



WR□ KS□ -8ASH□



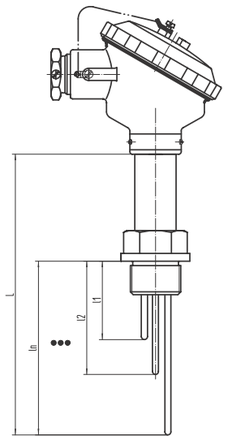
WR□ KS□ -2SH□

Remarks：L=ℓ+150mm

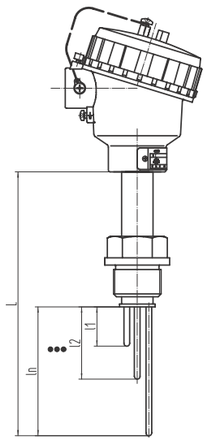
■WR□ KM-sheathed multi-branch thermocouple

The sheathed multi-branch Pt thermocouple is a kind of new-type sensor consisted of the junction box, multi-branch sheathed thermal resistance elements, fixed unit and other main parts, such thermocouple can be used for temperature measuring in various cases at -40~1300℃, outer protective tube of the multi-branch sheathed thermocouple shall be provided by users, or our company produce complete thermocouple, or the thermocouple can only be used in common pressure and non-corrosion environment.

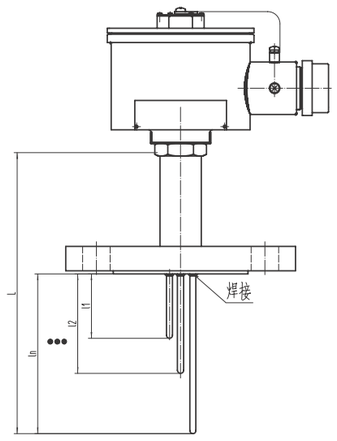
●Structural diagram



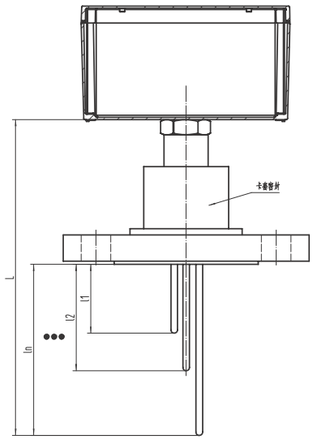
WP□ KM-163□
Multi-branch thermocouple
With fixed thread



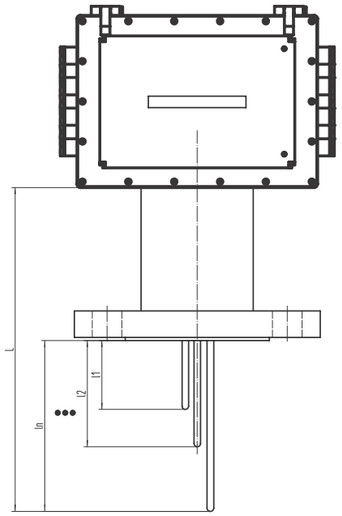
WP□ KM-373□
Multi-branch thermocouple
with active thread



WZPKM-58A3H-□
Multi-branch thermocouple
with welded fixed flange for sealing



WR□ KM-523K-□
Multi-branch thermocouple
With fixed flange sleeve seal



WR□ KM-52A3K-□
Multi-branch thermocouple
with fixed flange sleeve seal

Notes: L=ℓ+150mm

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳

WR□KT□/□－□ □ □DD－□ □ □ □ □ □－□ □ □ □－□ □ □－□ □

WR KM type			The sheathed multi-branch thermocouple			
Class of the thermocouple	①	Graduation No.	K：K type	E：E type	T：T type	R：R type
			N：N type	J：J type	S：S type	B：B type
	②	Branch number of the temperature measuring point	NA：N-branch single-branch type	NB：N-branch double branch type （suitable for Φ3~Φ8）		
Type of the thermocouple	③	Installation method	0：No fixed device		1：Fixed bolts	
			3：Active bolts		5：Fxied flange	
	④	Class of the junction box	2：Water-proof aluminum casting junction box（see P155）		2A：Explosion insulation stainless steel junction box（see P155）	
			3：Water-proof aluminum casting junction box （2-4 measuring points）		3A：Waterproof stainless steel junction box （2-4 measuring points）	
			6：Water-proof multi-point aluminum casting junction box （2-6 measuring points）		7A：Explosion insulation stainless steel junction box （2-4 measuring points）	
			7：Explosion insulation aluminum casting junction box （2-4 measuring points）		8A：Explosion insulation multi-point junction box （5-8 measuring points）	
	⑤	Type of the measuring end	3.Isolated junction type			
	⑥	Sealed structure	No mark：Standard configuration（non-sealed） H：Welded seal （suitable for the thermocouple material of Φ5 and above）		K：Sleeve seal type（supplied according to the agreement）	
	⑦	Structural form	No mark：Standard configuration		G：Wall-attaching （supplied according to the agreement）	
	⑧	Inner diameter of the protective tube（mm）	Note：The attaching-wall products shall be marked			
Temperature measuring element	⑨	Tolerance grade	K，N，E，J	T	S，R	B
			1：±1.5℃ or ±0.4%|t|℃	1：±0.5℃ or ±0.4%|t|℃	P：±3℃ or ±0.5%|t|℃	P：±4℃ or ±0.5%|t|℃
			2：±：2.5℃ or ±0.75%|t|℃	2：±：1.0℃ or ±0.75%|t|℃		
	⑩	Sheathed thermocouple diameter	C：Φ1.5（not suitable for explosion insulation type）	E：Φ3	G：Φ4.5	J：Φ6
			D：Φ2（not suitable for explosion insulation type）	F：Φ4	H：Φ5	K：Φ8
	⑪	Total length（mm）				
	⑫	Material of the casing	G：0Cr18Ni9Ti	H：316	HL：316L	Notes：For marking methods of other materials，see P159
	⑬	Length inserted ℓ（mm）	ℓ1/ℓ2/……ℓn	Note：When B protective tube in the additional unit with the mark of 20 is selected the length inserted shall be calculated according to inserting depth of B protective tube.		
Junction box	⑭	Quantity of the electrical interface	n：n pieces	Notes：For quantity of the electrical interface corresponding to the junction box see P154-P155		
	⑮	Size of the electrical interface	M20：M20*1.5（F）	N1：NPT1/2″ （F）	Note：Other dimensions shall be marked as（Specifications of the threads）	
			M33：M33*2（F）	N2：NPT3/4″ （F）		
			G3：G1″ （F）	N3：NPT1″ （F）		
	⑯	Joint of the cables	No mark：Provide Nylon cable joint/dust-proof cap E：Nickel plated copper explosion insulation cable joint	D：Stainless steel waterproof cable joint F：Stainless steel explosion insulation cable joint	Notes：1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
	⑰	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb	A：ExiaIICT6 Ga	The non-explosion insulation products shall be not marked	
			C1~C6：ExdIICT1~T6 Gb			
Process connection	⑱	Material of the fixed unit	A：304	ZA：20#（for the flange）		Marking for other materials：see P159
			H：316	E：Built-in（material of the flange's basal body：304）		
			HL：316L			
	⑲	Specifications of the fixed unit	Fixed thread，active thread	Fixed flange		
			M27：M27*2 M33：M33*2	Configuration of the flange	1：Single flange 2：Companion flange and fasteners	
				Standard of the flange	Standard configuration Marking method See P157-P158 Standard flange Standard code-diameter-pressure-sealed surface	
Additional unit	⑳	Protective tube	Fixed thread-type（welding type）protective tube		Flange-type protective tube	
			BL01 BL03 BH01	See：P145-P147	BF02A BF02B BF03	See：P148-P149

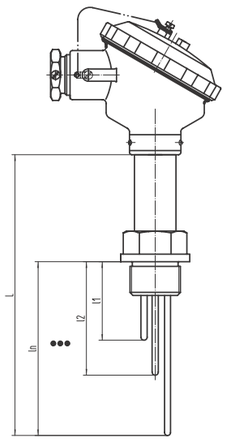
1. Structure of the product equipped with protective tube：Active bolts+ B protective tube；

2. Fixing of multi-point junction box of products and the cables on site shall adopt cable joints, the product without being provided with cable joint can't be used to clamp and fix the cables on site，and only the electrical interface thread can be provided on site.

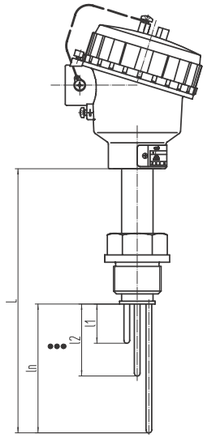
■WZPKM-Armored multi-branch thermal resistance

The armored multi-branch thermocouple is consisted of the junction box, elements of armored multi-branch thermocouple, fixed installation components and other main parts, it is a new-type temperature, and it can be used for temperature measuring in various cases of -40℃~1300℃, outer protective tube of the armored multi-branch thermocouple shall be provided by users, or our company produce complete products, otherwise, the products can only be used under normal pressure and in non-corrosion environment.

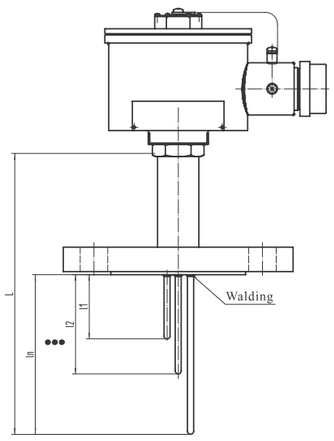
●Structural diagram



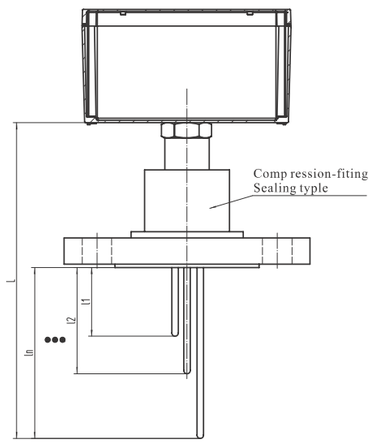
WP□ KM-163
Multi-branch thermocouple with
Fixed threads



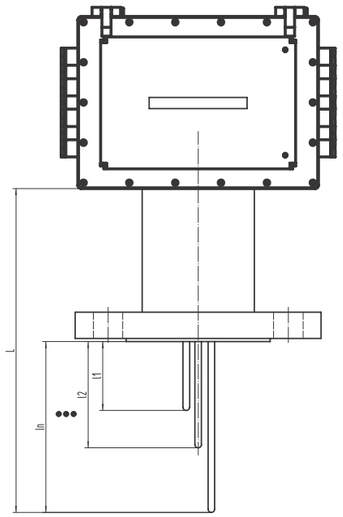
WP□ KM-373
Multi-branch thermocouple
with active threads



WZPKM-58A3H
Multi-branch thermocouple
with fixed welded seal of the flange



WR□ KM-523K
Multi-branch thermocouple with
Fixed flange sleeve seal



WR□ KM-52A3K
Multi-branch thermocouple
fixed flange sleeve seal

Notes: L=ℓ+150mm

① ②③④⑤⑥⑦ ⑧⑨⑩⑪⑫⑬ ⑭⑮⑯⑰ ⑱⑲ ⑳

WZPKM□—□□□□□□—□□□□□□—□□□□—□□/□

WZPKM	Armored multi-branch thermal resistance				
	① Branch number of the temperature measuring points	NA: N branches（ Single branch type） NB: N branches（Double branch type）			
Type of the thermocouple	② Installation method	0: No fixed device	1: Fixed bolts		
		3: Active bolts	5: Fxied flange		
	③ Class of the junction box	2: Water-proof aluminum casting junction box（see P155） 3: Water-proof aluminum casting junction box（2-4 measuring points） 6: Water-proof multi-point aluminum casting junction box（2-4 measuring points） 7: Explosion insulation aluminum casting junction box（2measuring points）	3A: Waterproof stainless steel junction box （2 measuring points） 7A: Explosion insulation stainless steel junction box （2 measuring points） 8A: Explosion insulation multi-point junction box （3-5 measuring points）		
	④ Type of the measuring end	3: Three-wire system	4: Four-wire system（ordering according to the agreement）		
	⑤ Sealed structure	No mark: Standard configuration（non-sealed） H: Welded seal （suitable for the thermocouple material of Φ5 and above）	K: Sleeve seal type （supplied according to the agreement）		
	⑥ Structural form	No mark Standard configuration	G: Attaching-wall type （supplied according to the agreement）		
	⑦ Inner diameter of the protective tube（mm）	Note: The attaching-wall products shall be marked			
Temperature measuring element	⑧ Graduation No.	P2: Pt100		P3: Pt1000	
	⑨ Tolerance grade	A/TA: ±（0.15℃ ±0.2%|t|）℃ B/TB: ±（0.3℃ ±0.5%|t|）℃	Notes: When the temperature range is -200℃~-50℃ or 400~600℃, TA or TB shall be selected		
	⑩ Sheathed thermocouple diameter	E: Φ3 F: Φ4	G: Φ4.5 H: Φ5		J: Φ6 K: Φ8
	⑪ Total length（mm）				
	⑫ Material of the casing	G: 0Cr18Ni9Ti	H: 316	HL: 316L	Notes: For marking methods of other materials, see P159
	⑬ Length inserted ℓ（mm）	ℓ1/ℓ2/……ℓn	Note: When B protective tube in the additional unit with the mark of 20 is selected, the length inserted shall be calculated according to inserting depth of B protective tube.		
Electrical parameters	⑭ Quantity of the electrical interface	n: n pieces	Notes: For quantity of the electrical interface corresponding to the junction box, see P154-P155		
	⑮ Size of the electrical interface	M20: M20*1.5（F） M33: M33*2（F） G3: G1″ （F）	N1: NPT1/2″ （F） N2: NPT3/4″ （F） N3: NPT1″ （F）		Note: Other dimensions shall be marked as: （Specifications of the threads）
	⑯ Joint of the cables	No mark: Provide Nylon cable joint/dust-proof cap E: Nickel plated copper explosion insulation cable joint	D: Stainless steel waterproof cable joint F: Stainless steel explosion insulation cable joint		Notes: 1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑰ Explosion insulation grade	B1~B6: ExdIIBT1~T6 Gb C1~C6: ExdIICT1~T6 Gb	A: ExiaIICT6 Ga		The non-explosion insulation products shall be not marked
Process connection	⑱ Material of the fixed unit	A: 304 H: 316 HL: 316L	ZA: 20#（for the flange） E: Built-in（material of the flange's basal body 304）		Marking for other materialssee P159
	⑲ Specifications of the fixed unit	Fixed thread active thread	Fixed flange		
		M27: M27*2 M33: M33*2	Configuration of the flange		1.Single flange 2.Companion flange and fasteners
			Standard of the flange		Standard configuration: Marking method: See P157-P158 Standard flange: Standard code-diameter-pressure-sealed surface
Additionalunit	⑳ Protective tube	Fixed thread-type（welding type）protective tube	Flange-type protective tube		
		BL01 BL03 BH01	See: P145-P147	BF02A BF02B BF03	See: P148-P149

■Armored Cutting-edge Type Thermocouple

WR KT-DR Armored Cutting-edge Type Thermocouple

The armored cutting-edge type thermocouple is a temperature measuring instrument used for detecting surface temperature of the heating furnace tube （wall）and the flue，it is widely used in the industrial departments，such as oil refining，chemical fiber and electric power etc，and the products can also be used in the industrial departments and research fields，such as metallurgy，machinery，and food etc，such thermocouple can be used at the temperatures of 871℃（material of the protective tube is 304）and 1100℃（material of the protective tube is GH3030）according to different materials of the protective tubes.

●Structural diagram

●WRG KT-DR Armored Cutting-edge Type Thermocouple

① ② ③④ ⑤⑥⑦⑧ ⑨⑩⑪ ⑫⑬⑭ ⑮ ⑯ ⑰⑱

WRG□KT□ -□□ DR - □□ - □□□□ - □□□ - □□□/□R□/□□

WRG KT-01DR Type			Cutting-edge type thermocouple		
WRG KT-02DR Type			Shielded cutting-edge type thermocouple		
Class	①	Graduation No.	K：K type NiCr-Nisi N：N type NiCrSi-Nickel silicon magnesium E：E type NiCr-CuNi（constantan）		
	②	Pairs of the thermocouple	No mark：Single-branch 2：Double-branch		
Type	③	Type of the junction box	3：Water-proof aluminum casting junction box（2-4 measuring points） 7：Explosion insulation aluminum casting junction box（2-4 measuring points） 9：JDY aluminum casting junction box	3A：Waterproof stainless steel junction box（2-4 measuring points） 7A：Explosion insulation stainless steel junction box 9A：JDY stainless steel junction box	
	④	Type of the measuring end	2：Shorted junction type 3：Isolated junction type（recommended type：Φ8）		
Temperature measuring element	⑤	Precision grade	1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃		
	⑥	Sheathed thermocouple diameter（mm）	K：Φ8	Q：Φ10	R：Φ12.7
	⑦	Total length L（mm）			
	⑧	Material of the casing	G：0Cr18Ni9Ti H：316 HL：316L	B：GH3030 C：GH3039 N：Incone 1600	Notes：For marking methods of other materials see P159
Junction box	⑨	Size of the electrical interface	M：M20*1.5（inner thread） N：NPT1/2″（inner thread）	G：G1/2″ （inner thread） Z：Z1/2″ （inner thread）	Note：1.Other dimensions shall be marked as（Specifications of the threads） 2. When the electrical interface is not M20*1.5 or NPT1/2，the thread adapter shall be added.
	⑩	Joint of the cables	No mark：Provide Nylon cable joint/dust-proof cap E：Nickel plated copper explosion insulation cable joint	D：Stainless steel waterproof cable joint F：Stainless steel explosion insulation cable joint	Notes：1. The explosion products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint
	⑪	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga T：ExtIII T120℃Db Ip65	Notes：The non-explosion insulation products shall be not marked
Process connection	⑫	Installation method	No mark：No fixed unit	2：Sleeve thread	6：Sleeve flange
	⑬	Material of the fixed unit	A：304 H：316	HL：316L	Notes：Marking for other materials：see P159 2.When materials of the companion flanges are different，the marks shall be：（materials of upper flange+materials of lower flange）
	⑭	Specifications of the fixed unit	Sleeve thread	Sleeve flange	
			M20：M20*1.5 M27：M27*2 N1：NPT1/2″ Z1：ZG1/2″	Configuration of the flange	1.：Single flange 2.Companion flange and fasteners
			Notes：Marking for other thread size：（specific size）	Standard of the flange	Standard configuration Marking method SeeP158 Standard flange：Standard code-diameter-pressure-sealed surface
Additional unit	⑮	Material of the shielding cover	P：310S（Notes：The internal filling thermal insulation materials and other materials shall be supplied according to the agreement）		Notes：In the case of no shielding cover this item shall be not selected
	⑯	Radius of the pipe（mm）			
Positioning fixed card	⑰	Material of the positioning fixed card	P：310S	A：304	Other materials shall be supplied according to the agreement / Notes：In the case of no shielding cover，this item shall be not selected
	⑱	Quantity of the positioning fixed card			Notes：In the case of no positioning strip，this item shall be not selected

Examples：Outer diameter of the cutting-edge type thermocouple：12.7， length：13000mm， material：GH3039， with fixed sleeve flange HG20617-97-DN40-PN2.0-RF，material of the flange：316-material of the protective cover：GH3039， pipe：Φ120， with 6 installation fixed cards （materials：310s）， explosion insulation type：CT4

Selection：WRKKT-01DR-43-1R13000C-NC4-61HHG20617-97-DN40-PN2.0-RF/CR60/P6

WSS industrial bimetal thermometer

WSS industrial bimetal thermometer is on-site measurement industrial instrument applicable to medium and low temperature measurement. It could directly measure temperature of gas and liquid and is widely used in petroleum, chemical industry, ship, mechanical industry, medicament and electric power. It is a substitute of glass thermometer.

Our WSS industrial bimetal thermometer has complete specifications and types of products, including common bimetal thermometer, electric contact type, adjustable angle type, integral type, full stainless steel corrosion-proof bimetal thermometer and products needing special mounting, specifications and corrosion –proof requirements. We also manufacture other protecting tubes. The quality and supply in time are promised.

■Operating principle

Bimetal thermometer is made up of spiral bimetal temperature sensing components. Bimetal expands when heated. It will twist because of different expansion factor of active layer and passive layer of bimetal. Then thermal energy turns to mechanical energy, which will drive pointer revolve so that temperature of measured medium will be displayed.

■ Features

- ●Direct temperature display，visualized readings and convenience.
- ●Firm structure, anti-knock，anti-worn.
- ●Complete types and specifications，many safe methods，wide range of protecting tube materials.

■Type

- ●Bimetal thermometer–ordinary，dial pointer indicates temperature on site；
- ●Electric contact bimetal thermometer–besides temperature indication on site，contacts will close or disconnect when temperature reaches to set value，so that relay in control circuit will work and automatically control and alarm.
- ●Thermocouple（RTD）integral bimetal thermometer–– armored thermocouple（RTD）is installed in protecting tube of bimetal thermometer, which will meet requirements of temperature measurement on site and remote transmission.
- ●Bimetal thermocouple （RTD）integrated temperature transmitter––Integral composition of bimetal thermometer and thermocouple （RTD0）integrated temperature transmitter will indicate temperature on site and also remotely transmit 0~20mA standard signal, so that automatic measurement and control will be achieved.
- ●Explosion–proof bimetallic thermometer：Combinatin of electric contact and explosion resistance；Measuring the liquid, gas or solid suface in the range of –80℃~+500℃；Application in the fields where explosive gas（IIB or IIC，T1～T6）exists，such as hydrocarbons，etc.

■Technical Data As per PRC industrial standard of mechanics JB/T8802—1998

- ●Nominal dimensions of standard scale: Φ60mm, Φ100mm, 1500mm
- ●Accuracy：

  Bimetal thermometer：Class 1.0，1.5

  Armored RTD（Pt100）：Class B±（0.3±0.005|t|）

  Armored thermocouple （K，E）： Class I±1.5℃ or ±0.004|t|

  Class II：±2.5℃ or ±0.0075|t|
- ●Temperature transmitter：Class 0.1，0.2，0.5，1.0
- ●Thermal response time

Diameter of protecting tube（mm）	Φ6×0.5	Φ8×1	Φ10×1	Φ12×1.5	Φ14×1.5
Thermal response time（S）	≤40	≤40	≤40	≤60	≤90

- ●Enclosure Protection Class：IP65
- ●Error of angel adjustment（adjustable angle type，angel adjustment 90°）
  Error of angel adjustment is no larger than 1.0% of span
- ●Return difference：Return difference of thermometer is no larger than the absolute value of basic error limit
- ●RepeatabilityThe range of thermometer repeatability is no larger than 1/2 of the basic error limit
- ●Ambient temperature：-20~60℃
- ●Relative temperature：<85%
- ●Temperature span

Unit：℃

-80~40	-40~80	0~50	0~60	0~80	0~100	0~120
0~150	0~200	0~300	0~350	0~400	0~500	0~600

- ●Values on scale：1℃，2℃，5℃，10℃
- ●Standard Dimension

Type		Nominal Diameter	D	A	E	C	d_1	d	L(mm)
Axial		Φ100	Φ120	34	Preference: M20X1.5, E=20M27X2, E=25	53	Φ24	Φ6、Φ8、Φ10、Φ12	75 100 150 200 250 300 400 500 800 1000 1200 1500 2000 （remark）
		Φ150	Φ165	34		53	Φ24		
Radial		Φ100	Φ120	55		110	Φ24	Φ6 Φ8 Φ10 Φ12	
		Φ150	Φ165	72		134	Φ24		
Adjustable		Φ100	Φ120	24		100	Φ24		
		Φ150	Φ150	30		100	Φ24		
Electrical contact	Axial	Φ100	Φ120	65		53	Φ24		
	Radial	Φ100	Φ120	86		110	Φ24		
	Adjustable	Φ100	Φ120	65		100	Φ24		
Integrated		Φ100	Φ120	24		65	Φ24	Φ14	
Explosion-proof type		Φ100	Φ120	80		80	Φ24	Φ6、Φ8、Φ10、Φ12	

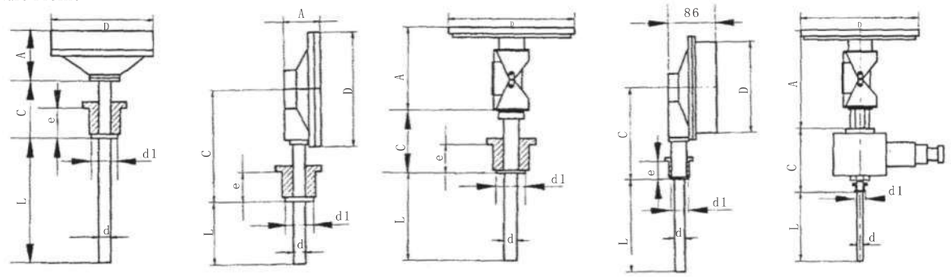
Remark 1:

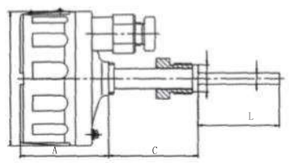
when stem is Φ 6mm,
- ●and Range=0~50℃℃℃℃℃℃℃℃ or 0~60, L>=120mm;
- ●and Range=0~80, L>=100mm;
- ●For other range and other diameters, L>=75 shall be guaranteed;
- ●Except all above, when L<75 or L>2000mm, please consult us.

when stem is Φ 8mm,
- ●and Range=0~50℃℃℃℃℃℃℃℃ or 0~60, L>=100mm;
- ●and Range=0~80, L>=80mm;

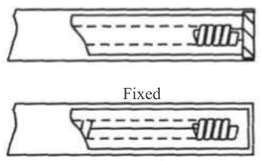
Remark 2: For explosion–proof bimetallic thermometer with thread，the thread shall be ⩾M27 for ensuring the strength；
Remark 3：M27*2 is preferred for Integrated bimetallic thermometer;
Remark 4: When stem material is Ti, flexible core is preferred;

- ●Structure Profile





- ●Hot Junction Structure



■Electrical data and Terminal for Electric Contact Type

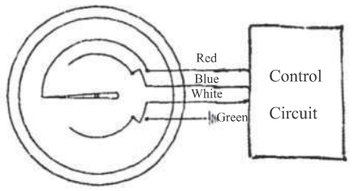
●Electrical data

Rated Power: 10VA

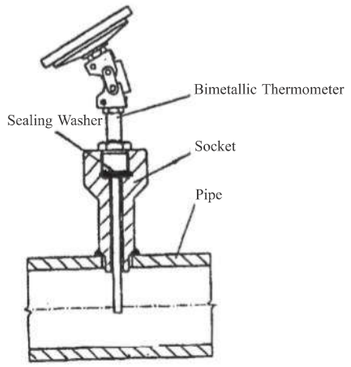
Operating Voltage: 220/380V.A.C

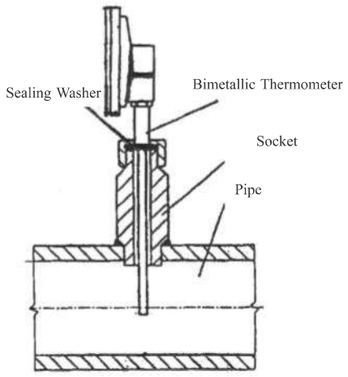
Max. Allowable Current: 0.7A

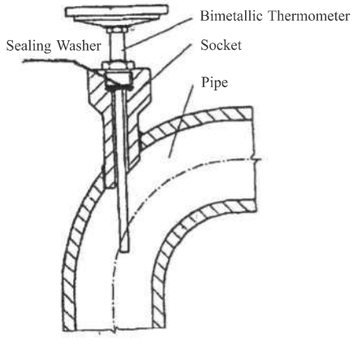
●Connection Method

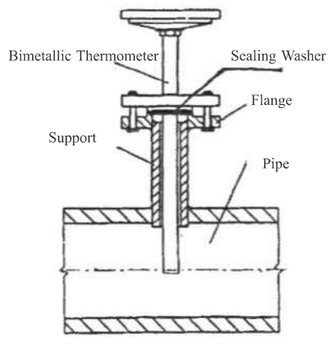


■Installation Method









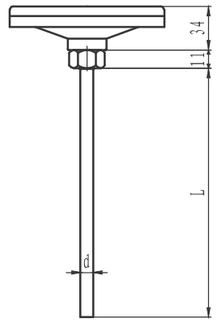
●WSS industrial bimetal thermometer (no-installation type)

①② ③ ④⑤⑥ ⑦⑧⑨

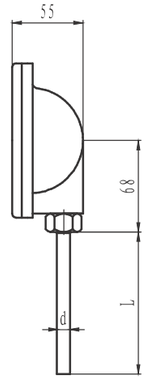
WSS—□□0□—□□□—□□□

Model	①	Diameter (mm)	4: Φ100	5: Φ150	
	②	Structure	0: Axial type-Dail and protection tube form a right angle; 1: Raidial type-Dail and protection tube are parallel; 6: Adjustable type-Dail can twirl in the right angle;		
	③	Hot junction	No designation: fixed	C: flexible-core type (applied for the protection tube of the diameter ⩾10mm)	
Sensor and Dial	④	Accuracy	P: Class 1.5	A: Class 1.0	
			Remark: other accuracy is designated like: (specific accuracy), for example: Class 2.5: (2.5)		
	⑤	Range	-80~40: -80~40℃ -40~80: -40~80℃ 0~50: 0~50℃ 0~60: 0~60℃ 0~80: 0~80℃	0~100: 0~100℃ 0~120: 0~120℃ 0~150: 0~150℃ 0~200: 0~200℃ 0~300: 0~300℃	0~350: 0~350℃ 0~400: 0~400℃ 0~500: 0~500℃ 0~600: 0~600℃
			Remark: the order for other range is designated like: (specific range);		
	⑥	Mt'l	Axial type	Radial type	Adjustable type
			No designation: die-casting Al A: SS	No designation: die-casting Al.	No designation: SS
Protection Tube	⑦	Diameter (mm)	6: Φ6 8: Φ8	10: Φ10 12: Φ12	
			Remark: other size is designated like: (specific O.D.), for example: Φ14: (14)		
	⑧	Material	A: 304 H: 316	HL: 316L TT: Ti	
			Remark: other material is designated in Page 153;		
	⑨	Insertion Length L (mm) Note 1: Note 1: For range of 0~50°C&0~60°C: L⩾120mm;			

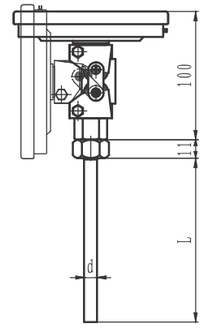
●Structure Profile



WSS-400



WSS-410



WSS-460

Remark: L⩽2000mm

●WSS Industrial Bimetallic Thermometer （General Thread Type）

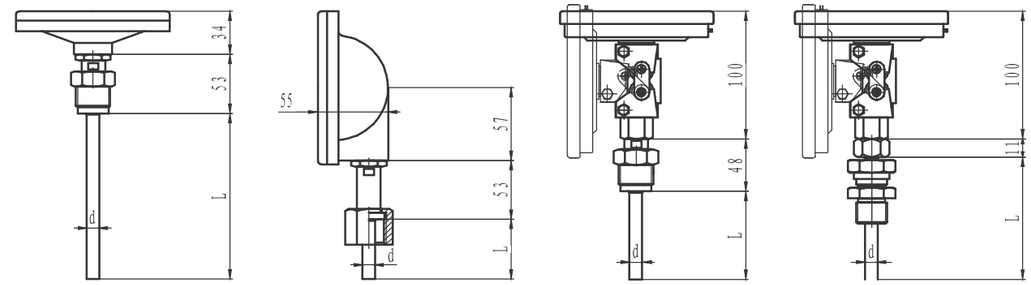
①②③④ ⑤⑥⑦ ⑧⑨⑩⑪⑫ ⑬⑭ ⑮

WSS—□□□□—□□□—□□□□□□—□□ / □

Model	①	Dial Diameter(mm)	4： Φ100	5： Φ150	
	②	Form	0： Axial Type, perpendicular to protection tube; 1： Radial Type, parallel with protection tube; 6： Adjustable, flexible at the right angle;		
	③	Stem Connection Type	1：Flexible external thread 2：Flexible internal thread 3：Fixed external thread	5：Fixed compression-fitting thread 7：Flexible compression-fitting thread	
	④	Hot Junction Type	No designation：Fixed	C：Replaceable（Applicable for the protection tube ≥10）	
Sensor and Dial	⑤	Accuracy	P：1.5class	A：1.0class	
			Remark: Any other accuracy class is designed like:(specific accuracy)		
	⑥	Scope	−80~40：−80~40℃ −40~80：−40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark: Any other accuracy class is designed like:(specific accuracy)		
	⑦	Dial Material	Axial Type	Radial Type	Adjustable
			No designation：Die-casting A：SS	No designation：Die-casting	No designation：SS
Protection Tube	⑧	Diameter (mm)	6: Φ6 8: Φ8	10: Φ10 12: Φ12	
			Remark: Any other diameter is designed like:(specific accuracy), eg.: Φ14 (14)		
	⑨	Protection tube Material	A：304 H：316	HL：316L TT：Ti	
			Remarks: Other materials are listed in Page 153		
	⑩	Insertion DepthL (mm)	Remarks： 1. When the scope is 0~50℃ or 0~60℃, the insertion depth should be ≥120mm; 2. When equipped with JB protection tube in⑮extra attachments, the insert depth may not be designed;		
	⑪	Surface Treatment	No designation：No surface treatment	SW: Metal base + Spray weld SC: Metal base + Spray coating	
	⑫	Surface Treatment Length ℓ(mm) When ℓ equals to L, the length of surface treatment is not designed;			
Process Connection	⑬	Screw Material	A: 304 H: 316	HL: 316L TT: Ti	Remarks: Other materials are listed in Page 153;
	⑭	Screw Size	M20: M20*1.5 M27: M27*2	N1: NPT1/2" G1: G1/2" Z1: ZG1/2"	Remark: 1.Tapered thread is not for flexible external thread;2.Other size can be designed like:(specific size), eg.:M27*1.5:(M27*1.5);
Extra Attachments	⑮	Extra Attachments	Fixed Thread Type (welded Type) Protection Tube		Fixed Flange Type Protection Tube
			JB01A Type Protection Tube JB01E Type Protection Tube JB01F Type Protection Tube JB03A Type Protection Tube JB03B Type Protection Tube	Refer to:P136-P140	JB02A Type Protection Tub JB02B Type Protection Tub JB04B Type Protection Tub Refer to：P141-P142

Remark：Socket Model is detailed in Page 143

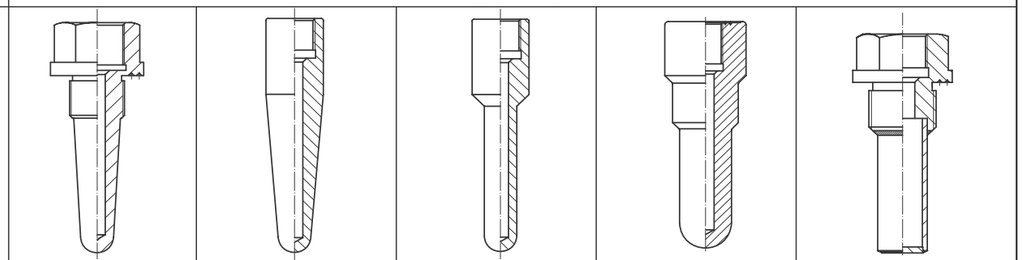
●Structure Profile



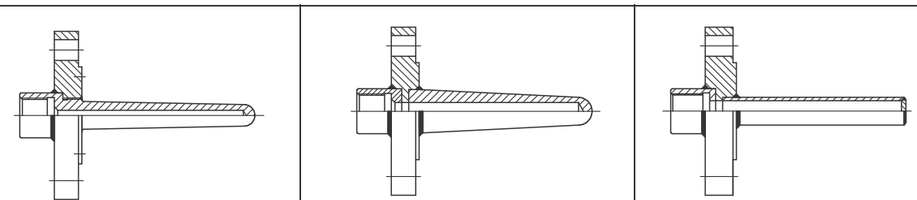
WSS-401 WSS-412 WSS-461 WSS-46$\frac{5}{7}$

Remark：L≤2000mm

●Extra Attachments

Name	Fixed Thread Type (welded Type) Protection Tube				
Sketch					
Designation	BL01	BH01T	BH01S	BH01L	BL03

Remark：Specific dimensions，refer to Page 136~140；

Name	Fixed Flange Type Protection Tube		
Sketch			
Designation	BF02A	BF02B	BF03

Remark：Specific dimensions，refer to Page 148~149；

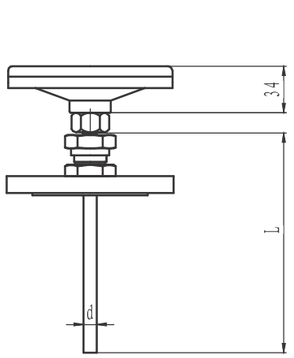
●WSS□ industrial bimetal thermometer（general flange）

①②③④ ⑤⑥⑦ ⑧⑨⑩ ⑪⑫⑬

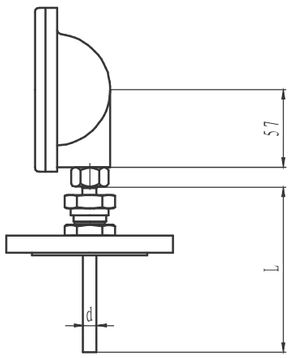
WSS—□□□□—□□□—□□□—□□□

Model	①	Diameter（mm）	4： Φ100	5： Φ150	
	②	Structure	0：Axial type-Dail and protection tube form a right angle； 1：Raidial type-Dail and protection tube are parallel； 6：Adjustable type-Dail can twirl in the right angle；		
	③	Installation	6：fixed compression-fitting flange	8：flexible compression-fitting flange	
	④	Hot junction	No designation：fixed	C：flexible-core type （applied for the protection tube of the diameter ≥10mm）	
Sensor and Dial	⑤	Accuracy			
	⑥	Range	−80~40：−80~40℃ −40~80：−40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark：the order for other range is designated like：（specific range）；		
	⑦	Mt'l	Axial type	Radial type	Adjustable type
			No designation：die-casting Al. A：SS	No designation： die-casting Al	No designation：SS
Protection Tube	⑧	Diameter（mm）	6：Φ6 8：Φ8	10：Φ10 12：Φ12	
			Remark：other size is designated like：（specific O.D.）， for example：Φ14：（14）		
	⑨	Material	A：304 H：316	HL：316L TT：Ti	
			Remark：other material is designated in Page 153；		
	⑩	Insertion Length L（mm）	Note 1：Note 1：For range of 0~50°C&0~60°C：L≥120mm；		
Process Connection	⑪	Flange Mt'l	A：304 Z：Carbon Structure Steel + Blackening	E：embedded type（flange base material is 304）	
			Remark：designation for other material is similar to ⑨		
	⑫	Flange Quantity	1：single	2：duplex and fastenings	
	⑬	Flange Specification	Standard specification：refer to page 149~150 Remark：Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form		

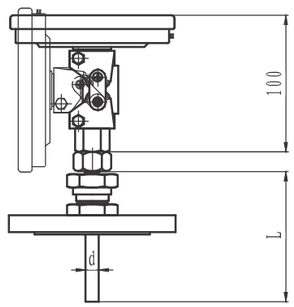
●Structure Profile



WSS−406



WSS−416



WSS−466

Remark：L≤2000mm

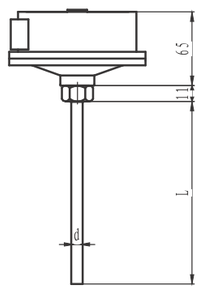
●WSS□ Industrial Thermometer（electric contact type without fixing devices）

① ②③ ④ ⑤⑥⑦⑧ ⑨⑩⑪

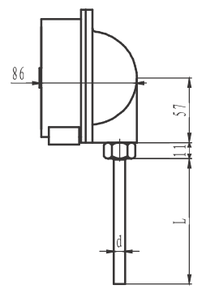
WSSX□—□□0□—□□□□—□□□

Type	①	Type	No designation：not-explosion-proof type	B：explosion-proof type	
Model	②	Dial diameter（mm）	4：Φ100	5：Φ150（not applicable for explosion-proof type）	
	③	Structure	0：Axial type-Dail and protection tube form a right angle； 1：Raidial type-Dail and protection tube are parallel； 6：Adjustable type-Dail can twirl in the right angle.		
	④	Hot junction	No designation：fixed	C：flexible-core type（applied for the protection tube of the diameter ≥ 1 0 mm）	
Sensor and Dial	⑤	Accuracy	P：Class 1.5	A：Class 1.0	
			Remark：other accuracy is designated like：（specific accuracy），for example：Class 2.5：（2.5）		
	⑥	Range	−80~40：−80~40℃ −40~80：−40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark：the order for other range is designated like：（specific range）		
	⑦	Electrc Contact Classification	A：Upper-lower limit	B：Bi-upper limit	
	⑧	Explosion-proof class	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	
			Remark：no designation for non-explosion-proof type		
Protection Tube	⑨	Diameter（mm）	6：Φ6 8：Φ8	10：Φ10 12：Φ12	
			Remark：other size is designated like：（specific O.D.），for example：Φ14：（14）		
	⑩	Material	A：304 H：316	HL：316L TT：Ti	
			Remark：other material is designated in Page 153		
	⑪	Insertion Length L（mm）	Note 1：For range of 0~50°C&0~60°C：L≥120mm；		

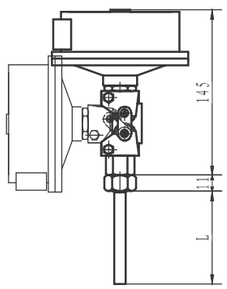
●Structure Profile



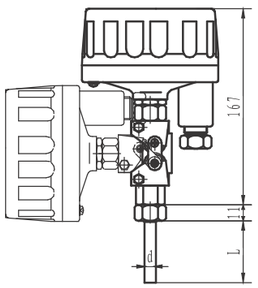
WSSX−400



WSSX−410



WSSX−460



WSSXB−460

Remark：L≤2000mm

●WSS□ Industrial Thermometer（Electric contact type with thread）

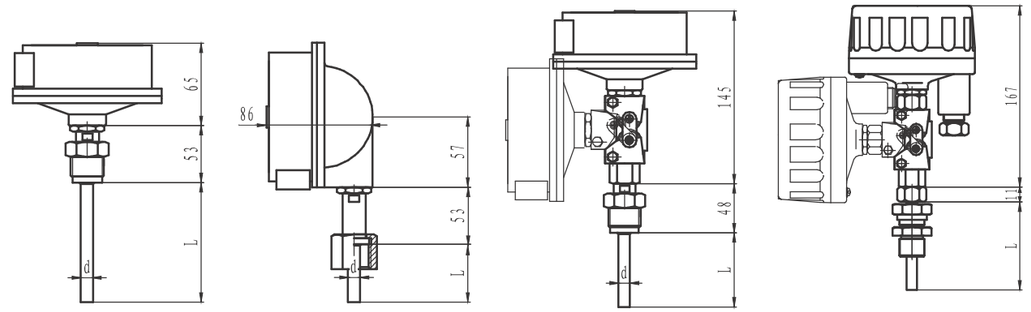
① ②③④⑤ ⑥⑦⑧⑨ ⑩⑪⑫⑬⑭ ⑮⑯ ⑰

WSSX□—□□□□—□□□□—□□□□□—□□/□

Type	①	type	No designation: not-explosion-proof type	B：explosion-proof type	
Model	②	Dial diameter（mm）	4：Φ100	5：Φ150（not applicable for explosion-proof type）	
	③	Structure	0：Axial type-Dail and protection tube form a right angle； 1：Raidial type-Dail and protection tube are parallel； 6：Adjustable type-Dail can twirl in the right angle.		
	④	Installation	1：flexible male thread 2：flexible female thread 3：fixed male thread	5：fixed compression-fitting thread 7：flexible compression-fitting thread	
	⑤	Hot junction	No designation：fixed	C：flexible-core type（applied for the protection tube of the diameter ≥10mm）	
Sensor and Dial	⑥	Accuracy	P：Class 1.5	A：Class 1.0	
			Remark：other accuracy is designated like：（specific accuracy），for example：Class 2.5：（2.5）		
	⑦	Range	-80~40：-80~40℃ -40~80：-40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark：the order for other range is designated like：（specific range）		
	⑧	Electrc Contact Classification	A：Upper-lower limit	B：Bi-upper limit	
	⑨	Explosion-proof class	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	
			Remark：no designation for non-explosion-proof type		
Protection Tube	⑩	Diameter（mm）	6：Φ6 8：Φ8	10：Φ10 12：Φ12	
			Remark：other size is designated like：（specific O.D.），for example：Φ14：（14）		
	⑪	Material	A：304 H：316	HL：316L TT：Ti	
			Remark：other material is designated in Page 153		
	⑫	Insertion Length L（mm）	Notel：1.For range of 0~50°C&0~60°C：L≥120mm； 2.if JB protection tube in Designation⑮is equipped，no designation for insertion depth		
	⑬	Surface Treatment	No designation：no surface treatment	SW：metal base + spray welding layer SC：metal base + coating layer	
	⑭	Surface treatment length（mm）：when ℓ=L，no designation for surface treatment length ℓ			
Process Connection	⑮	Bolt Mt'l	A：304 H：316	HL：316L TT：Ti	Remark： Other material designation is detailed in Page 153
	⑯	Bolt Size	M20：M20*1.5 M27：M27*2	N1：NPT1/2" G1：G1/2" Z1：ZG1/2"	Notel：no flexible male thread for tapered thread 2. the designation for other specification is like：（specific size），for example：M27*1.5：（M27*1.5）
Extra Attachment	⑰	Extra Attachment	Protection tube with fixed thread （welding）		Protection tube with fixed flange
			JB01A type Protection tube JB01E type Protection tube JB01F type Protection tube JB03A type Protection tube JB03B type Protection tube	Refer to：P136-P140	JB02A type Protection tube JB02B type Protection tube JB04B type Protection tube / Refer to：P141-P142

Remark：Refer to Page 143--sockets

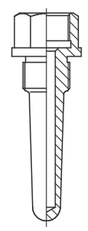
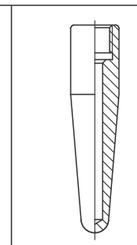
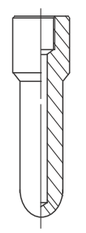
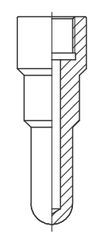
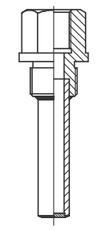
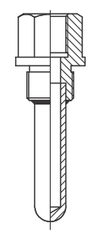
●Structure Profile

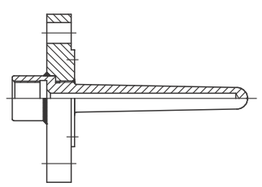
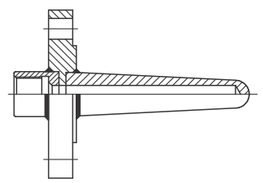
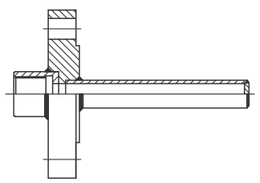


WSSX-401 WSSX-412 WSSX-461 WSSXB-46 5/7

Remark：L≤2000mm

●Extra Attachments

Name	Protection tube with fixed thread （welding）					
Form						
Designation	JB01A	JB01E-T	JB01E-S	JB01F	JB03A	JB03B
Remark：the specific dimension refers to standard componens in Page 136~140						

Name	Protection Tube with fixed flange		
Form			
Designation	JB02A	JB02B	JB04B
Remark：the specific dimension refers to standard componens in Page 141~142			

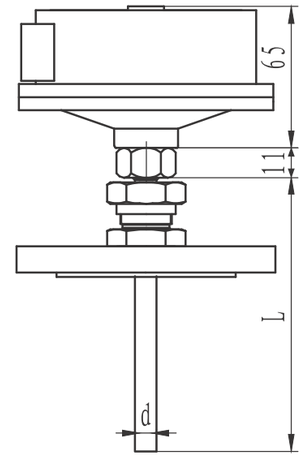
●WSSX Industrial Thermometer（electric contact type without fixing devices）

①　②③④⑤　⑥⑦⑧⑨　⑩⑪⑫　⑬⑭⑮

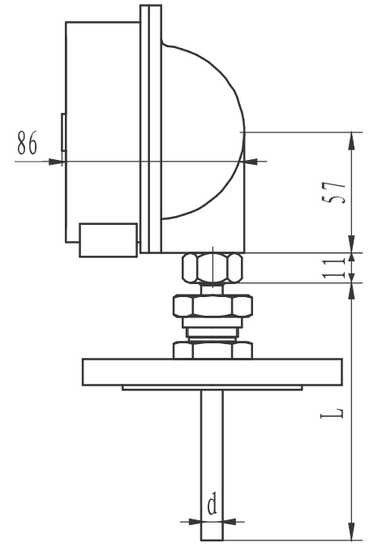
WSSX□—□□□□—□□□□—□□□—□□□

Type					
Model	①	Type	No designation：not-explosion-proof type	B：explosion-proof type	
	②	Diameter（mm）	4：Φ100	5：Φ150（not applicable for explosion-proof type）	
	③	Structure	0：Axial type-Dail and protection tube form a right angle； 1：Raidial type-Dail and protection tube are parallel； 6：Adjustable type-Dail can twirl in the right angle；		
	④	Installation	6：fixed compression-fitting flange	8：flexible compression-fitting flange	
	⑤	Hot junction	No designation：fixed	C：flexible-core type （applied for the protection tube of the diameter ⩾10mm）	
Sensor and Dial	⑥	Accuracy	P：Class 1.5	A：Class 1.0	
			Remark：other accuracy is designated like：（specific accuracy）for example：Class 2.5：（2.5）		
	⑦	Range	−80~40：−80~40℃ −40~80：−40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark：the order for other range is designated like：（specific range）；		
	⑧	Electrc Contact Classification	A：Upper-lower limit	B：Bi-upper limit	
	⑨	Explosion-proof class	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	
			Remark：no designation for non-explosion-proof type		
Protection Tube	⑩	Diameter（mm）	6：Φ6 8：Φ8	10：Φ10 12：Φ12	
			Remark：other size is designated like：（specific O.D.）， for example：Φ14：（14）		
	⑪	Material	A：304 H：316	HL：316L TT：Ti	
			Remark：other material is designated in Page 153；		
	⑫	Insertion Length L（mm）	Note 1. For range of 0~50°C&0~60°C：L⩾120mm；		
Process Connection	⑬	Flange Mt'l	A：304 Z：Carbon Structure Steel + Blackening	E：embedded type（flange base material is 304）	
			Remark：designation for other material is similar to ⑨；		
	⑭	Flange Quantity	1：single	2：duplex and fastenings	
	⑮	Flange Specification	The standard configuration：Refer to P149-P150 Remark：Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form		

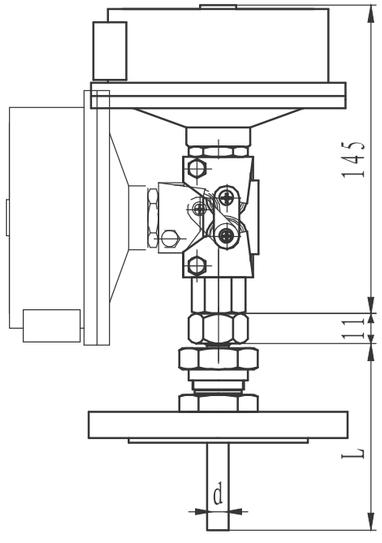
●Structure Profile



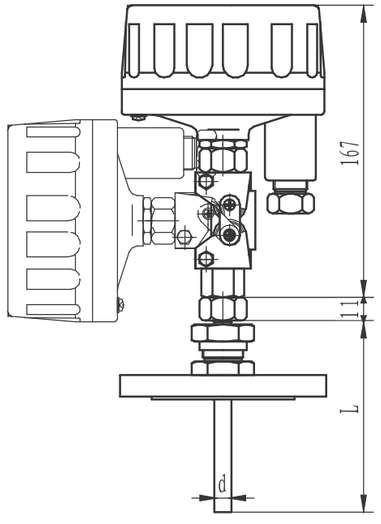
WSSX-406
Remark：L⩽2000mm



WSSX-416



WSSX-466



WSSXB-466

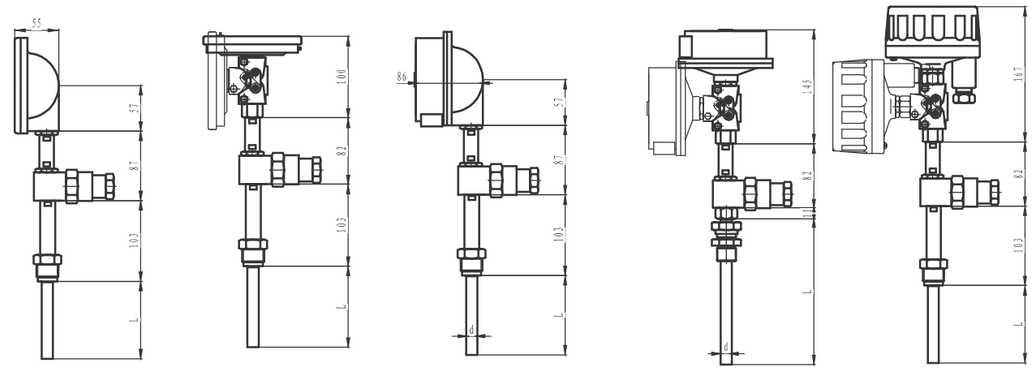
●WSS□ Industrial Thermometer（Integrated type with thread）

①②③ ④⑤⑥⑦ ⑧⑨⑩⑪ ⑫⑬⑭⑮ ⑯⑰⑱⑲⑳ ㉑㉒ ㉓

WSS □□□—□□□□—□□□□—□□□□—□□□□□—□□/□

Type	①	Type	No designation：non-electric contact type X：Electric contact type	XB：Explosion-proof typ	
	②	Feature 1	P：with Pt100 RTD	K：with k type sheathed TC E： with E type sheathed TC	
	③	Feature 2	No designation： without TT	Z：带温度变送器	
Model	④	Sheath Diameter（mm）	4：Φ100	5：Φ150（not applicable for explosion-proof type）	
	⑤	Structure	0：Axial type-Dail and protection tube form a right angle 1：Raidial type-Dail and protection tube are parallel 6：Adjustable type-Dail can twirl in the right angle		
	⑥	Installation	1：flexible male thread 2：flexible female thread 3：fixed male thread	5：fixed compression-fitting thread 7：flexible compression-fitting thread	
	⑦	Hot junction	No designation：fixed	C：flexible-core type	
Sensor	⑧	Accuracy	P：Class 1.5	A：Class 1.0	
			Remark：other accuracy is designated like：（specific accuracy），for example：Class 2.5：（2.5）		
	⑨	Range	−80~40：−80~40℃ −40~80：−40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark：the order for other range is designated like：（specific range）		
	⑩	RTD（TC） DAT	Sheathed RTD	Sheathed TC	
			B：Class B 3-wire system A：Class A 3-wire system	B：Class 2 A：Class 1	
	⑪	TT Accuracy	0.1：Class 0.1	0.2：Class 0.2	
			Remark：For no-TT type，no designation：		
Sensor and Dail	⑫	Electrc Contact Classification	A：Upper-lower limit	B：Bi-upper limit	Remark：no designation for non-electric contact
	⑬	Terminals	无标记：按我公司标准配置（不适用于带温度变送器） 3：Water-proof Die Casting J.B. 4：Explosion-proof Die Casting AL J.B.		3A：Water-proof SS J.B. 4A：Explosion-proof SS J.B.
	⑭	Ex-proof Class of Bimetallic	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	Remark：No designation for Water-proof Types：
	⑮	Ex-proof Class of J.B.	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	A：ExiaIICT6
			Remark：no designation for non-explosion-proof type：		
Protection Tube	⑯	O.D.	14：Φ14	16：Φ16	
			Remark：other size is designated like：（specific O.D.）for example：Φ18：（18）		
	⑰	Material	A：304 H：316	HL：316L HC：Hastelloy C	HB：HastelloyB
			Remark：other material designation is detailed in Page 153；		
	⑱	Insertion Depth L（mm）	Note：1.For range of 0~50°C&0~60°C：L⩾120mm； 2. if JB protection tube in Designation㉓ is equipped，no designation for insertion depth；		
	⑲	Surface Treatment	No designation：no surface treatment	SW：metal base + spray welding layer SC：metal base + coating layer	
	⑳	Surface treatment length（mm）：when ℓ=L，no designation for surface treatment length ℓ			
Process Connection	㉑	Bolt Mt'l	A：304 H：316	HL：316L HC：Hastelloy C	HB：HastelloyB
			Remark：Other material designation is detailed in Page 153		
	㉒	Bolt Size	M20：M20*1.5 M27：M27*2	N1：NPT1/2" G1：G1/2" Z1：ZG1/2"	Note1：no flexible male thread for tapered thread 2. the designation for other specification is like：（specific size），for example：M27*1.5：（M27*1.5）
Extra Attachment	㉓	Extra Attachment	Protection tube with fixed thread （welding）		Protection tube with fixed flange
			JB01A type Protection tube JB01E（F）type Protection tube JB03A（F） type Protection tube	Refer to：P136-P140	JB02A type Protection tube JB02B type Protection tube JB04B type Protection tube / Refer to：P141-P142

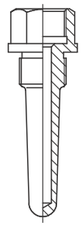
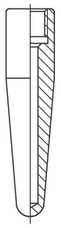
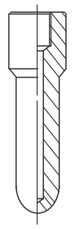
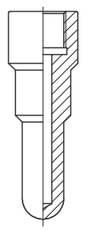
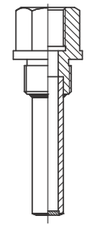
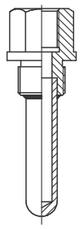
●Structure Profile

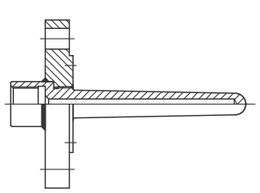
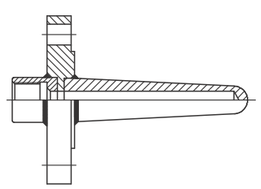
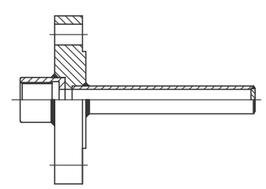


WSSP-411 WSSP-461 WSSXP-411 WSSXP-4、657 WSSXBP-461

Remark：L≤2000mm

●Extra Attachments

Name	Protection tube with fixed thread（welding）					
Form						
Designation	JB01A	JB01E-T	JB01E-S	JB01F	JB03A	JB03B
Remark：the specific dimension refers to standard componens in Page 136~140；						

Name	Protection Tube with fixed flange		
Form			
Designation	JB02A	JB02B	JB04B
Remark：the specific dimension refers to standard componens in Page 141~142；			

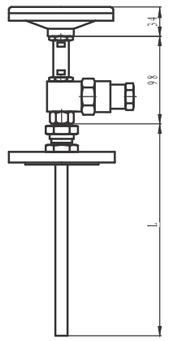
●WSS□ Industrial Thermometer（Integrated type with thread）

①②③ ④⑤⑥⑦ ⑧⑨⑩⑪ ⑫⑬⑭⑮ ⑯⑰⑱⑲⑳ ㉑㉒㉓

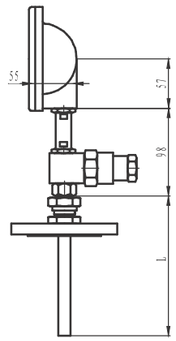
WSS□□□—□□□□—□□□□—□□□□—□□□□—□□□—□□□

Type	①	Type	No designation：non-electric contact type X：Electric contact type	XB：Explosion-proof typ	
	②	Feature1	P：with Pt100 RTD	K：with k type sheathed TC E： with E type sheathed TC	
	③	Feature2	No designation： without TT	Z：With TT	
Model	④	Sheath Diameter（mm）	4：Φ100	5：Φ150（not applicable for explosion-proof type）	
	⑤	Structure	0：Axial type-Dail and protection tube form a right angle； 1：Raidial type-Dail and protection tube are parallel； 6：Adjustable type-Dail can twirl in the right angle；		
	⑥	Installation	4：Fixed Flange	6：fixed compression-fitting flange	8：Flexible Compression-fitting flange
	⑦	Hot junction	No designation：fixed	C：flexible-core type	
Sensor	⑧	Accuracy	P：Class 1.5	A：Class 1.0	
			Remark：other accuracy is designated like：（specific accuracy），for example：Class 2.5：（2.5）		
	⑨	Range	−80~40：−80~40℃ −40~80：−40~80℃ 0~50：0~50℃ 0~60：0~60℃ 0~80：0~80℃	0~100：0~100℃ 0~120：0~120℃ 0~150：0~150℃ 0~200：0~200℃ 0~300：0~300℃	0~350：0~350℃ 0~400：0~400℃ 0~500：0~500℃ 0~600：0~600℃
			Remark：the order for other range is designated like：（specific range）		
	⑩	RTD（TC） DAT	Sheathed RTD	Sheathed TC	
			B：Class B 3-wire system A：Class A 3-wire system	B：Class 2 A：Class 1	
	⑪	TT Accuracy	0.1：Class 0.1	0.2：Class 0.2	
			Remark：For no-TT type，no designation；		
Dail and J.B.	⑫	Electrc Contact Classification	A：Upper-lower limit	B：Bi-upper limit	Remark：no designation for non-electric contact；
	⑬	Terminals	无标记：按我公司标准配置（不适用于带温度变送器） 3：Water-proof Die Casting J.B. 4：Explosion-proof Die Casting AL J.B.		3A：Water-proof SS J.B. 4A：Explosion-proof SS J.B.
	⑭	Ex-proof Class of Bimetallic	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	Remark：No designation for Water-proof Types；
	⑮	Ex-proof Class of J.B.	B1~B6：ExdIIBT1~BT6	C1~C6：ExdIICT1~CT6	A：ExiaIICT6
			Remark：no designation for non-explosion-proof type；		
Protection Tube	⑯	O.D.	14：Φ14	16：Φ16	
			Remark：other size is designated like：（specific O.D.），for example：Φ18：（18）；		
	⑰	Material	A：304 H：316	HL：316L HC：Hastelloy C	HB：HastelloyB
			Remark：other material designation is detailed in Page 153；		
	⑱	Insertion Depth L（mm）	Note 1.For range of 0~50°C&0~60°C：L≥120mm；		
	⑲	Surface Treatment	No designation：no surface treatment	F：衬四氟（适用于固定法兰）	
	⑳	Surface treatment length ℓ（mm）：when ℓ=L，no designation for surface treatment length ℓ；			
Process Connection	㉑	Flange Mt'l	A：304 Z：Carbon Structure Steel + Blackening	E：embedded type（flange base material is 304）	
			Remark：designation for other material is similar to⑰		
	㉒	Quantity	1：single	2：duplex and fastenings	
	㉓	Specification	Standard specification：refer to page 149~150 Remark：Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form		

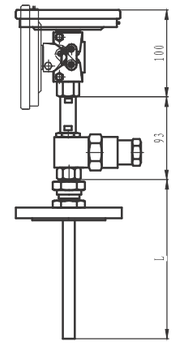
●Structure Profile



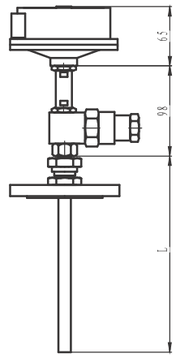
WSSP-406



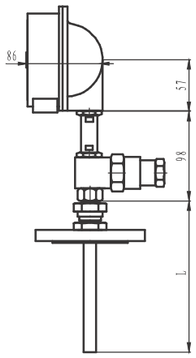
WSSP-416



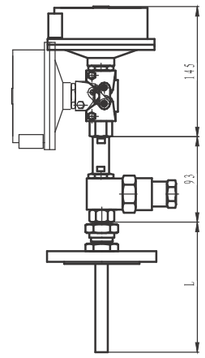
WSSP-466



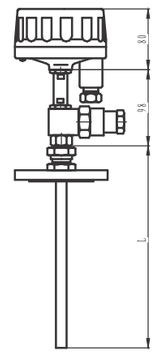
WSSXP-406



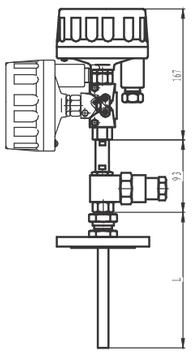
WSSXP-416



WSSXP-466



WSSXBP-406



WSSXBP-466

Remark：L≤2000mm

●WSS□ Industrial Thermometer (Integrated type with thread)

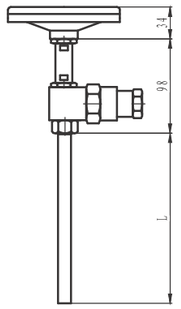
①②③ ④⑤ ⑥ ⑦⑧⑨⑩ ⑪⑫⑬⑭ ⑮⑯⑰

WSS□□□—□□0□—□□□□—□□□□—□□□

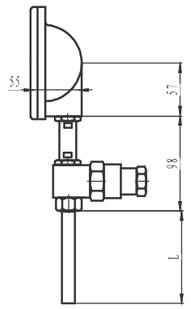
Type	①	Type	No designation: non-electric contact type X: Electric contact type	XB: Explosion-proof typ	
	②	Feature 1	P: with Pt100 RTD	K: with k type sheathed TC E: with E type sheathed TC	
	③	Feature 2	No designation: without TT	Z:带温度变送器	
Model	④	Sheath Diameter (mm)	4: Φ100	5: Φ150 (not applicable for explosion-proof type)	
	⑤	Structure	0: Axial type-Dail and protection tube form a right angle 1: Raidial type-Dail and protection tube are parallel 6: Adjustable type-Dail can twirl in the right angle		
	⑥	Hot junction	No designation: fixed	C: flexible-core type	
Sensor	⑦	Accuracy	P: Class 1.5	A: Class 1.0	
			Remark: other accuracy is designated like: (specific accuracy), for example: Class 2.5: (2.5)		
	⑧	Range	-80~40: -80~40℃ -40~80: -40~80℃ 0~50: 0~50℃ 0~60: 0~60℃ 0~80: 0~80℃	0~100: 0~100℃ 0~120: 0~120℃ 0~150: 0~150℃ 0~200: 0~200℃ 0~300: 0~300℃	0~350: 0~350℃ 0~400: 0~400℃ 0~500: 0~500℃ 0~600: 0~600℃
			Remark: the order for other range is designated like: (specific range)		
	⑨	RTD (TC) DAT	Sheathed RTD B: Class B 3-wire system A: Class A 3-wire system	Sheathed TC B: Class 2 A: Class 1	
	⑩	TT Accuracy	0.1: Class 0.1	0.2: Class 0.2	
			Remark: For no-TT type, no designation;		
Sensor and Dail	⑪	Electrc Contact Classification	A: Upper-lower limit	B: Bi-upper limit	Remark: no designation for non-electric contact
	⑫	Terminals	No designation: MFR standard(not applicable for the type without TT) 3: Water-proof Die Casting J.B. 4: Explosion-proof Die Casting AL J.B.		3A: Water-proof SS J.B. 4A: Explosion-proof SS J.B.
	⑬	Ex-proof Class of Bimetallic	B1~B6: ExdIIBT1~BT6	C1~C6: ExdIICT1~CT6	Remark: No designation for Water-proof Types:
	⑭	Ex-proof Class of J.B.	B1~B6: ExdIIBT1~BT6	C1~C6: ExdIICT1~CT6	A: ExiaIICT6
			Remark: no designation for non-explosion-proof type;		
Protection Tube	⑮	Insertion Depth L (mm)	14: Φ14	16: Φ16	
			Remark: other size is designated like: (specific O.D.) for example: Φ18: (18)		
	⑯	Surface Treatment	A: 304 H: 316	HL: 316L HC: Hastelloy C	HB: HastelloyB
			Remark: other material designation is detailed in Page 153;		
	⑰	Insertion Depth L (mm) Note 1.For range of 0~50°C&0~60°C: L≥120mm;			

contact

●Extra Attachments



WSSP-400



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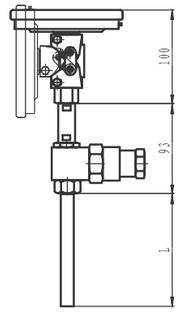

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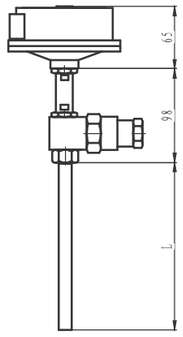

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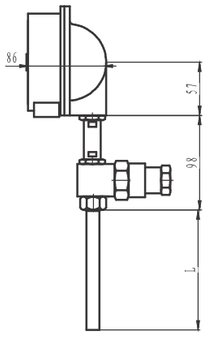

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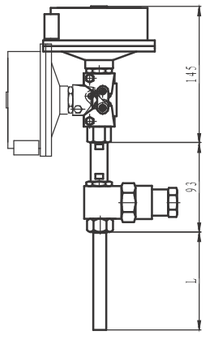
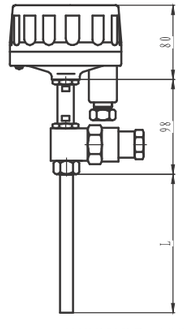
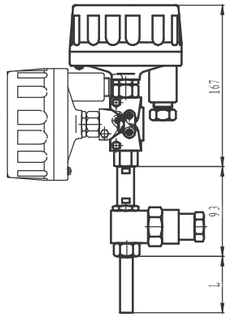


WSSXP-460



WSSXBP-400



WSSXBP-460

Remark: L≤2000mm

■End Surface TC（RTD）

End surface thermocouple/RTD is applied for measuring temperature of the solid surface, especially for turbine thrust bearing and the pipe of dual inner water cooled generator, as well as the bearing for the general unit, draught fan, air compressor, etc.

●Main technical data

Name	Model	Type	Range ℃	Tolerance Class		Thermal response time τ0.5S	Nominal pressure Mpa	Total length L mm	Remark
				Class 1（A）	Class 2（B）				
	WRKM–001 D Q	K	0～200	±1.5t: or ±（0.4%|t|）	±2.5t: or ±（0.75%|t|）	≤6	Costant Pressure	500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7000 7500 8000	When ℓ≠13mm, the length shall be defined;
	WRKM2–001 D Q	K							
	WRNM–001 D Q	N							
	WRNM2–001 D Q	N							
	WREM–001 D Q	E							
	WREM2–001 D Q	E							
	WZCM–001D	Cu50	–50～100	±（0.3℃+0.6%|t|）		≤30	Costant Pressure		
	WZCM–001Q	Cu50	–50～100	±（0.3℃+0.6%|t|）		≤30	Costant Pressure		
	WZPM–001D	Pt100	0～200	±（0.15℃+0.2%|t|）	±（0.3℃+0.5%|t|）	≤30	Costant Pressure		
	WZPM–001Q	Pt100	0～200	±（0.15℃+0.2%|t|）	±（0.3℃+0.5%|t|）	≤30	Costant Pressure		

① ② ③ ④⑤⑥⑦ ⑧ ⑨

WZ□M□－001□－□□□□－□－□

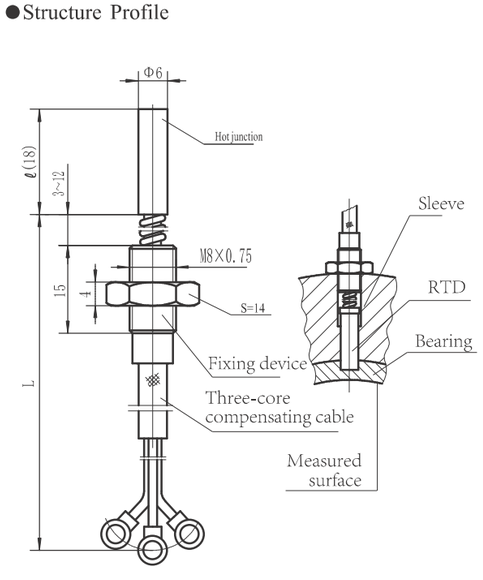
WZ□ M□ -001 type			End surface RTD	
Specification	①	Type	P：Pt100 C ：Cu50	
	②	Sensor Quantity	No designation: single 2: duplex	
Model	③	Structure	No designation: no fixing device DMotortype QTurbinetype	
Sensor	④	Tolerance Class	A：±（0.15＋0.2%|t|）° C B：±（0.3＋0.5%|t|）° C	C：±（0.3＋0.6%|t|）（applicable for Cu RTD）
	⑤	Hot junction structure	3：three-wire	
	⑥	Sheath diameter （mm）	E：Φ3 F：Φ4 G：Φ4.5	H：Φ5 J：Φ6 K：Φ8
	⑦	Hot junction length （mm）	18： 18mm Remark：other length is designated like ：（specific length）	
Leading wire	⑧	Leading wire length L （mm）		
Process connection	⑨	Bolt specification （applicable for motor type）	M8： M8* 0.75 Remark：other specification is designated like ：（specific size）， for example: M12*1.5 ： （M12*1.5）	

① ② ③ ④⑤⑥ ⑦ ⑧

WR□M□－001□－□□□－□－□

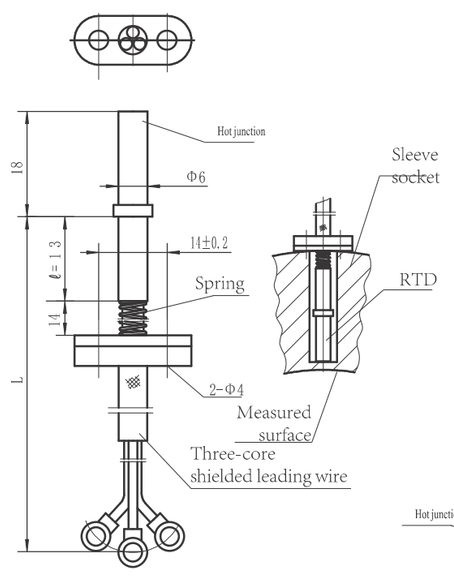
WR□ M□ ?01 type			End surface TC	
Type	①	type	K: K type Nickel chrome-nickel silicon N: N type Nickel chrome sili con - nickel silicon magnesium E: E type Nickel chrome-Nickel copper （Constantan）	
	②	TC Quantity	No designation：single （hot junction is ungrounded） 2: duplex （hot junction is separately ungrounded）；	
Model	③	Structure	No designation： no fixing decices D：Motor type Q：Turbine type	
Sensor	④	Tolerance class	1：± 1.5℃ or ±0.4%|t| ℃ 2：± 2.5℃ or ± 0.75%|t| ℃	
	⑤	Sheath diameter （mm）	E：Φ3 F：Φ4 G：Φ4.5	H：Φ5 J：Φ6 K：Φ8
	⑥	Hot junction length （mm）	18： 18mm Remark：other length is designated like ：（specific length）；	
Compensating calbe	⑦	Length of compensating cable L （mm）		
Process Connection	⑧	Bolt type （applicable for turbine type）	M8： M8* 0.75 Remark：other specification is designated like ：（specific size）， for example： M12*1.5 ：（ M12* 1.5 ）	

●Structure Profile



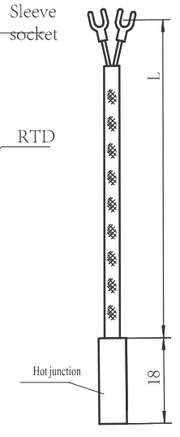
W R Z □ M–001D

（Motor type）



W R Z □ M–001Q

（Turbine type）



W R Z □ M–001

（Fiber type）

■SBW Integrated Temperature Transmitter with the Thermocouple （Resistance）

SBW series of integrated temperature transmitters with the thermocouple/thermal resistance are the integrated on-site installation and transmitting units of DDZ-S series of temperature instruments，they can be used to detect transit and display surface temperature of the solid，liquid and gas. The transmitter is widely used in many industrial and research fields，such as oil，chemical industry， metallurgy，electric power，electromechanical，foods and medicines etc，it is a new kind of mechatronics temperature instrument.

The SBW series of integrated temperature transmitters with the thermocouple/thermal resistance are mainly consisted of the temperature sensor （thermocouple or thermal resistance）and two-wire system temperature module， for the display-type product， the digital display meter shall be provided. The temperature module and display meter can be directly installed in junction box of the sensor，or separately installed on the on-site pipe，to achieve integration of the temperature's sensing，transmitting and display.

●Characteristics

The temperature module shall be sealed with silicone，it has the functions of anti-corrosion， damp-proof， anti-vibration， such module can adapt wide environmental temperatures， and it can be used under various on-site conditions;

High precision， lower static consumption， stable and reliable， with long service life.

Adopt two-wire system output， large signal output of 4mA.dc.~20mA.dc， strong anti-interference ability， and large transmitting distance;

Has the functions of digital cold junction compensation and non-linear correction， the output signal and temperature measured are in linear relationship;

The product has intrinsic safe anti-explosion and anti-corrosion functions; it can be easily installed on the explosive site;

The transmitter can directly display the temperature measured on site with the digital header， and it can be matched with the secondary instruments， and can also be input to control system of the computer.

The input/output signals of the separated temperature transmitter are separated， with stronger anti-electric magnetic and RF interference capacity;

The temperature transmitter with HART protocol can locally or remote adjust and monitor parameters of the temperature transmitter by the manual operator.

●Working principle

The thermocouple and thermal resistance temperature sensor can convert the temperature measured electric signals and input them to the temperature module; the standard temperature module can handle the signals with V/T converter and output them as the electric current of 4mA.dc.~20mA.dc; the intelligent temperature module can operate the signals with A/D converter and then conduct D/A conversion， at last， handle them with V/I converter.

■Main technical parameters

●Main technical parameters shall execute the enterprise standards of SIC：Q/CY 165-2015

Product name		Integrated temperature transmitter	
Sensor		Thermocouple/thermal resistance	
Display meter	Precision	4 1/2， ±0.1%	
	Environmental temperature	-20~60℃ （LCD display meter	-20~60℃ （LCD display meter）
	Input signal	4~20mA.dc simulation signal	
	Power supply	Less than 4V.dc	
Temperature transmitter	Precision	See the measurement error table	
	Input signal	Signals of the thermocouplethermal resistance	
	Output signal	4~20mA.dc simulation signal （TS300 temperature transmitter can output the communication signal of HART protocol digital in superposition）	
	Relationship of input/output	Non-separation（Suitable for TS100 temperature transmitter）	
		Separated（Suitable for TS200，TS300 temperature transmitter）	
	Measuring range	See the measuring error table	
	Power supply	Common type：12~42V d.c	Intrinsic safety type：12~28V d.c
	Load resistance	（V_{aux}-12）/0.022A（Unit：Ω）	
	Anti-explosion grade	ExiaIICT6 Ga	
	Environmental temperature	Common type -40~80℃	Intrinsic safety type：−20~50 ℃
	Installation dimensions	Outer diameter Φ44×20	Center distance of the installation hole：Φ33

●Measuring error

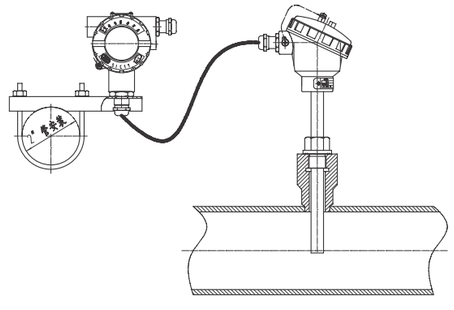
Input	Measuring range	Minimum measurable range	Measuring precision （take maximum）
	℃	℃	℃
Pt100	-200~850	10	±0.1% range or±0.1
Pt1000	-200~350	10	±0.1% range or±0.15
K	-230~1370	50	±0.1% range or±0.5
N	-200~1300	50	±0.1% range or±0.5
E	-200~1000	50	±0.1% range or±0.5
J	-210~1200	50	±0.1% range or±0.5
T	-200~400	50	±0.1% range or±0.5
R	-50~1760	100	±0.1% range or±1
S	-50~1760	100	±0.1% range or±1
B	0~1820	100	±0.1% range or±1
Notes：When the thermocouple is used for measuring， the cold-end compensation error shall also be added （the internal cold end error is less than 0.5℃）			

■Installation form

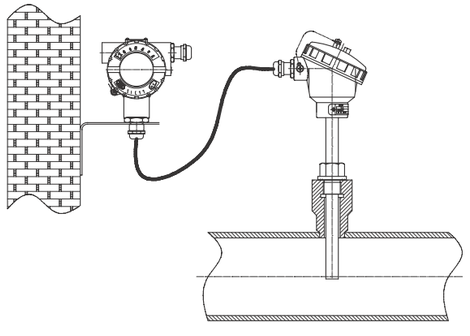
●Integrated installation on site

For the installation method is the same with that of the sensor， see relevant chapters of the senor.

●The installation shall be separated from the sensor



2"管道式分体安装

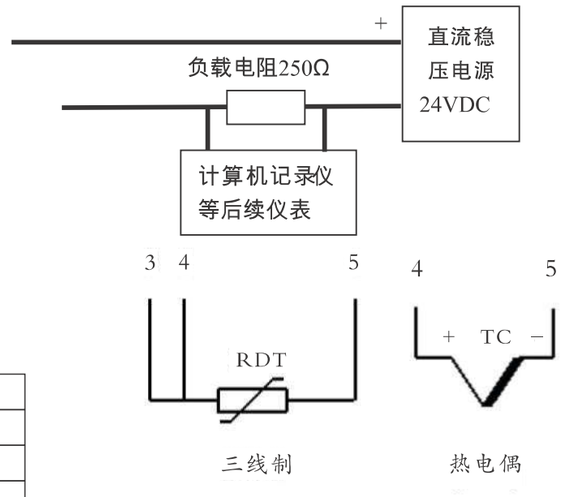


墙壁式分体安装

Installation of 2″pipe
Separate installation of 2″pipe
Wall-type separate installation

■Electrical connection

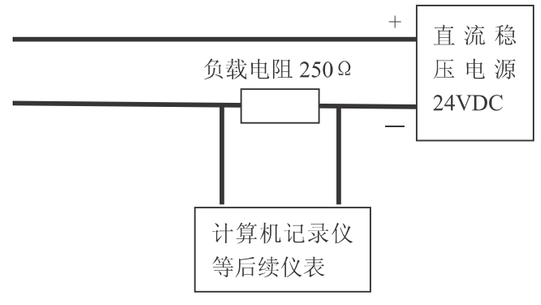
●TS100 temperature transmitter

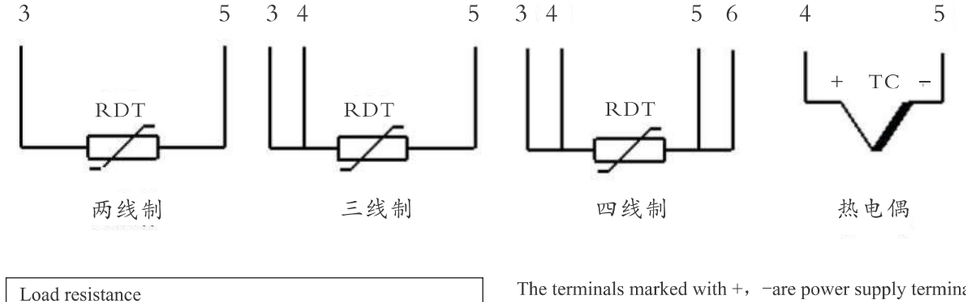


Load resistance
DC stabilized voltage supply
Computer recorder and other subsequent instruments
Three-wire system
Thermocouple

The terminals marked with +， − are power supply terminals， + is connected to positive pole of the power supply， − is connected to negative pole of the power supply.
The terminals marked with 3，4 and 5 are signal input terminals， the connecting methods and instructions are as the diagram.
Notes：The power supply can't be connected to the signal terminals.

●TS300 intelligent temperature transmitter

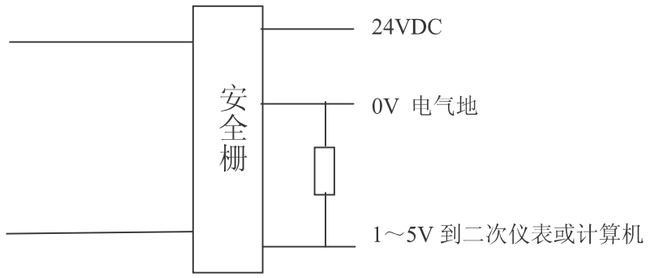




Load resistance
DC stabilized voltage supply
Computer recorder and other subsequent instruments
Two-wire system
Three-wire system
Four-wire system
Thermocouple

The terminals marked with +，−are power supply terminals，+is connected to positive pole of the power supply，−is connected to negative pole of the power supply.
The terminals marked with 3，4，5 and 6 are signal input terminals，the connecting methods and instructions are as the diagram.
Notes：The power supply can't be connected to the signal terminals.

Installation diagram of the intrinsic safety anti-explosion type temperature transmitter
（All the transmitters above meet the requirements of intrinsic safety：Exia II CT1~6 Ga）



Safety barrier
Electrical ground
1~5v is connected to secondary instruments or computers

■SBW integrated temperature transmitter with the thermocouple

①② ③④ ⑤ ⑥ ⑦ ⑧ ⑨⑩⑪⑫ ⑬

SBW□□-□□-□（□）□/□ □□□□/□

Class	①	Class of the sensor	R：Thermocouple	Z：Thermal resistance	
	②	Temperature variation	n：n temperature variations， when n=1， no mark		
Type	③	Graduation number	Thermocouple	Thermal resistance	
			1：K type NiCr-Nisi 2：E type NiCr- CuNi （constantane） 3：J type Fe-CuNi （constantane） 4：T： Cu-CuNi （constantane）	5：S type Pt-Rh10-Pt 6：R type Pt-Rh 13-Pt 7：B type Pt-Rh 30-Pt-Rh6 8：N type NiCrSi- Nickel silicon magnesium	1：Copper thermal resistance CU50 2：Copper thermal resistance CU100 4：Pt thermal resistance Pt100 5：Pt thermal resistance Pt1000
	④	Display class on site	No mark：No digital display instrument	S：LCD digital display instrument	E：LED digital display instrument
			Notes：The digital display instrument is only suitable for single temperature transmitter, and JDY junction box shall be selected		
Module of the temperature transmitter	⑤	Type of the temperature transmitter	See the codes for temperature transmitters in P91		
	⑥	Temperature range(℃)			
	⑦	Surge protection	No mark：Not provided	L：Screw-in type surge protector	
Separated-type installation（if no separation requirement，such item can be not selected）	⑧	Separated-type junction box	3：Water-proof aluminum casting junction box	7：Explosion insulation，waterproof aluminum casting junction box	9：JDY aluminum casting junction box
			Notes：Material of the junction box is defaulted as aluminum casting; the other materials shall be added with trademark of the materials behind the number. For example：304A explosion insulation junction box shall be marked as：7A		
	⑨	The electrical interface	M：M20*1.5（inner thread	G：G1/2″ （inner thread）	Notes：1.Other dimensions shall be marked as：（specific dimensions）
	⑩	Installation form	1：Wall-mounted	2：Pipe type（2″ pipe）	
	⑪	Cable type	GB：Explosion insulation cable	SS：Common shielded lead	
	⑫	Length of the cable S（mm）			
	⑬	See corresponding type spectrums for thermocouple or thermal resistance			

●Code table of the temperature transmitter

Code	Brand of the mperature transmitter	Type of the perature transmitter	Intrinsic safety type	Separation	Protocol	Application range	Overall dimensions	Safety certification
TS1	SIC	TS100	√			Thermocouple thermal resistance	Φ44* 20.5	-
TS2		TS200	√	√		Thermocouple thermal resistance	Φ44* 20.5	-
TS3		TS300	√	√	HART	Thermocouple thermal resistance	Φ44* 20.5	-
TSR1		TSR100	√			Thermocouple thermal resistance	109.5* 94.5* 12.5	-
TSR2		TSR200	√	√		Thermocouple thermal resistance	109.5* 94.5* 12.5	-
TSR3		TSR300	√	√	HART	Thermocouple thermal resistance	109.5* 94.5* 12.5	-
MT1	Siemens	TH100				Thermal resistance	Φ44* 20.8	-
MT1A		TH100_EXi	√			Thermal resistance	Φ44* 20.8	-
MT2		TH200		√		Thermocouple thermal resistance	Φ44* 26.3	SIL 2/3
MT2A		TH200_EXi	√	√		Thermocouple thermal resistance	Φ44* 26.3	SIL 2/3
MT3		TH300	√	√	HART	Thermocouple thermal resistance	Φ44* 26.3	SIL 2/3
MT4		TH400	√	√	PA，FF protocols	Thermocouple thermal resistance	Φ44* 20.5	-
MTR2		TR200	√	√		Thermocouple thermal resistance	114* 99* 22.5	SIL 2/3
MTR3		TR300	√	√	HART	Thermocouple thermal resistance	114* 99* 22.5	SIL 2/3

●Selection examples of the products

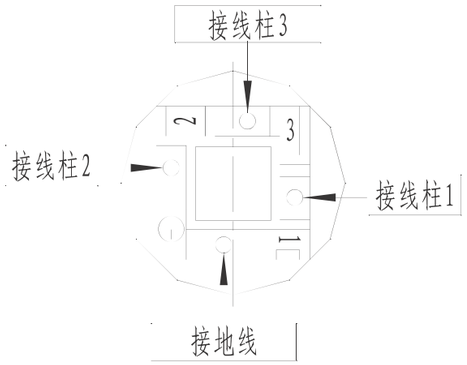
Examples：The integrated temperature transmitter with armored thermocouple has the following parameters：The range is 0-600℃， with HART protocol，surge protector，2″pipe-type separated installation，with 2m of common shielded cable，LCD display，electrical interface：M20*1.5，armored thermocouple's outer diameterΦ6，graduation：k，total length：1000mm，sleeve thread：M16*1.5， and material：304。

Selection of the products：SBWR-1S-TS3 （0-600） L-9M 2SS 2000/WRGKK-33-1J1000G-M-2AM16.

●SBWZ-1460 Small Integrated Temperature Transmitter

The small integrated temperature transmitter is a kind of compact temperature sensor with built-in transmitter. It is specially suitable for narrow industrial area， the product has excellent temperature measuring precision and reliability. The product adopts imported film elements as the temperature elements， and the integration sealing technology is used to fix the temperature transmitter and elements into the protective casing ofΦ 5~Φ 8. Temperature range of the medium：－50℃~150℃， the applicable environmental temperature：－40℃~75℃.

Terminal
Grounding line



Terminal 1：Power supply +
Terminal 2：Power supply －
Terminal 3： Unused
Grounding line：Without being connected to shell of the product

Features of the product	Output signal：4~20mA current signal	The metal materials adopt stainless steel materials （For example：304/316/316L etc）
	The product is small， easy to install	Threads used for installation can be made according to requirements of the user

●Mechanical features

Haltzman joint	Plastic
Metal casing	304/316/316L （the material shall meet requirements of the user）
Installation method	Installation with fixed thread （Specifications of the thread shall meet requirements of the user）

●Product parameters

Temperature measuring range	Arbitrarily select from -50~150℃
Output signal	4~20mA
Electrical connection	Introduction of the power line
Thermal response time	T0.5≤18s
Precision	≤0.5% *FS （temperature range：FS≥25℃）
Supply voltage	10~30V
Insulation resistance	＞100MΩ （100V d.c）
Load	R＜ （Supply voltage-Minimum supply voltage）/0.02

●Environmental conditions

Medium temperature	-50℃~150℃	
Environmental temperature	-40℃~75℃	
RF electromagnetic field	GB/T 17626.3-2006	
Surge noise immunity	GB/T 17626.5-2008	
Seismic stability	4g， 10HZ~2000HZ	GB/T 18271.3-2000
Protective grade	IP 65	
Withstand voltage	100 br	

●Specifications

①②③ ④ ⑤⑥
SBWZ−1460−□−□□−□−□□

SBWZ-1460	Small integrated temperature transmitter				
Temperature transmitter	①	Range of the temperature transmitter	Select according to the user's requirements from-50℃~150℃		
Temperature measuring element	②	Diameter of the protective tube	H：Φ5	J：Φ6	K：Φ8
	③	Inserting depth	Select from 50~200mm		
Technological connection	④	Specifications of the fixed unit	M16：M16*1.5	G1/2：G1/2″	The remaining threads shall be designed according to requirements of the user
			M20：M20*1.5	G1/4：G1/4″	
Supply lead	⑤	Power line	Y：With power line	N：No power line	
	⑥	Specifications of the power line	Φd*L：diameter of the power line*length of the power line		

■SBWZL Type Passive Digital Display Thermometer

SBWZL type passive digital display thermometer is an industrial instrument used for measuring medium and lower temperature on site in the industries. It can be used to directly measure surface temperature of the gas， liquid or equipment， such equipment is widely used in many industries：Such as oil， chemical industry， metallurgy， electric power， and ships etc.

SBWZL type passive digital display thermometer is mainly consisted of the armored Pt resistance temperature sensor and the temperature transmitter module with the display instruments ，there is a disposable 3.6V lithium battery in the junction box， therefore， it shall be not connected to additional power line， such thermometer can substitute bimetal thermometer and other industrial thermometers in most working conditions.

■Characteristics

●The thermometer can be used in the industrial environment of -20~60℃， and the seismic property is better than traditional bimetal thermometer;

●There is built-in replaceable 3.6v lithium battery ， normal service life of the battery is one year and above;

●The five-bit LCD digital display or triggering-type 10s LCD digital backlight display are adopted， so that the readings are perceptual intuition and convenient;

●The header and sensor adopt adjustable angle connection， so that vision direction of the header on site can be adjusted;

● The sensor adopts level-A armoredΦ3~Φ8mm Pt 100 Pt resistance sensor ， the heat response is fast， with wide application range;

●The thermometer can be used to measure under the medium conditions of -196~600℃；

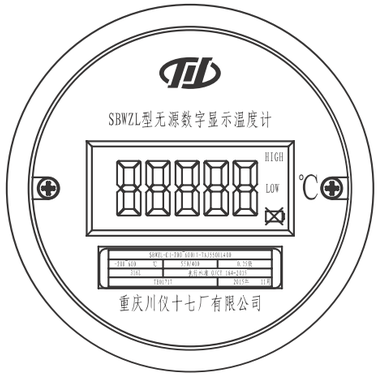
●Overall precision of the product is level 0.25， and the temperature measurement is more accurate.

●Main technical parameters execute the enterprise standard of SIC ： Q/CY 164-2015.

Graduation No.		Range of temperature measuring （℃）	Overall precision level of the product （%）
Pt 100	Level A porcelain element	−196~600	Level 0.25
	Level A film element	-50~400	Level 0.25
Notes：In general， temperature measurement range of the products provided by our company includes：-196~600， and -50~400， the measurement range can also be determined according to the user's requirements （the range shall be -196~600℃）.			

●Heat response time：Equal to armored Pt 100 resistance

●Diameter of the dial plate：Φ100mm



SBWZL type passive digital display thermometer
Level 0.25
November， 2015
Chongqing Chuanyi Instrument No.17 Factory Co.， Ltd.
Execution standard

The figure on the left refers to the dial plate， and the contents on it include the following several aspects：

1.Temperature displayed

2.The symbol expressing that the temperature exceeds upper limit

3.The symbol expressing that the temperature exceeds lower limit

4.Symbol of low electric quantity

5.Nameplate of the product， the nameplate mainly includes the following contents：

A.Product type.

B.Temperature range measured with the product.

C.Precision of the product.

D. Tag number of the product.

E.Production date.

①②③④ ⑤⑥⑦⑧ ⑨⑩⑪ ⑫

SBWZL-□□□□-□□□□-□□□/□

SBWZL-			SBWZL Type Passive Digital Display Thermometer		
Type	①	Class of the display instruments on site	C: On-site LCD display E: Triggering-type 10s backlight LCD display		
	②	Range (℃)	−196~600 −50~400	The temperature range can be defined by the user.	
	③	Connection form of the junction box	0: Axial direction 1: Radial direction	4: Axial direction, adjustable angle. 6: Radial direction, adjustable angle	
	④	Structural form	No: Polish rod type S: With compensation tube	SH: With the compensation tube, sealed welding (suitable for the thermocouple material ofΦ5 and above). SFH: Fixed flange, sealed welding (suitable for the thermocouple material of Φ5 and above).	
Temperature measuring elements and junction box	⑤	Casing diameter (mm)	E: Φ3 H: Φ5	F: Φ4 J: Φ6	G: Φ4. 5 K: Φ8
	⑥	Total length L (mm)			
	⑦	Material of the casing	G: 0Cr18Ni9Ti H: 316	HL: 316L	Notes: For marking methods of other materials, see P159
	⑧	Inserting length 1 (mm) Notes: When the B series of protective tube in the additional units marked with12 is used, the inserting length is not marked.			
Process connection	⑨	Installation methods	0: No fixed unit	2: Sleeve thread	6: Sleeve flange
	⑩	Materials of fixed unit	A: 304	ZA: 20# (Suitable for the flange) E: Built-in (Suitable for the flange, basal materials of the flange is 304)	
			Notes: For the marking methods of other materials, see P 159		
	⑪	Specifications of the fixed units	Sleeve thread	Sleeve flange	
			M12: M12*1.5 M16: M16*1.5 M27: M27*2 M33: M33*2	N1: NPT1/2″ Z1: ZG1/2″	1: Single flange 2: Companion flange and fasteners
			Notes: The marking methods of other dimensions of the threads shall be marked as: (specific dimensions). For example: M27*1.5 (M27*1.5)	The marking method is : Mark code-diameter- pressure-sealed surface-structural form	
	⑫	Additional unit	See P157-P 158		

Notes : When SFH is selected, 9 is not selected.

■Examples of product selection

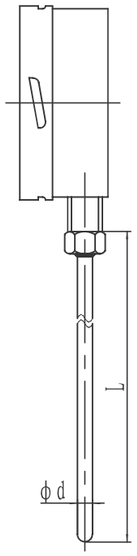
Example 1: Local LCD display on site, no outer power supply, radial adjustable angle , the medium temperature is 0~300℃, diameter of the thermal resistance isΦ6, material of the casing: 316, installation of M16 sleeve thread, the inserting depth is 300.

Selection of the product: SBWZL-C (−50~400) 6-J450H300-2HM16.

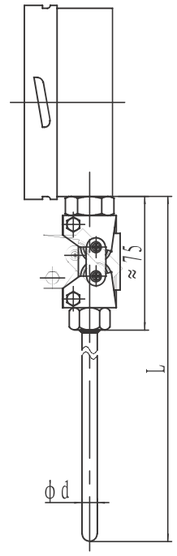
Example 2: Local LCD display on site, no outer power supply, radial direction , the medium temperature is -196~50℃, diameter of the thermal resistance isΦ8, material of the casing: 316L, installation of HG/T20592-2009 DN25 PN16 RF fixed flange, material of single flange: 316L, the inserting depth is 400.

Selection of the product: SBWZL-C (−196~600) 1SFH-J550HL400-HL1HG/T20592-2009 DN25 PN16 RF.

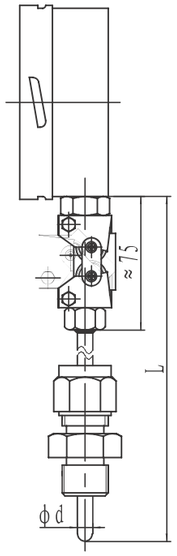
●Structural diagram



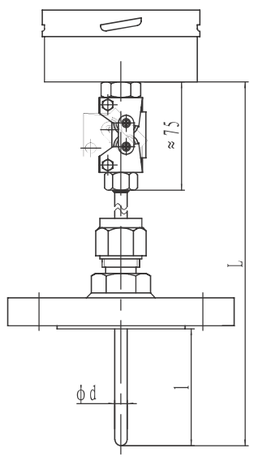
SBWZL - □□1



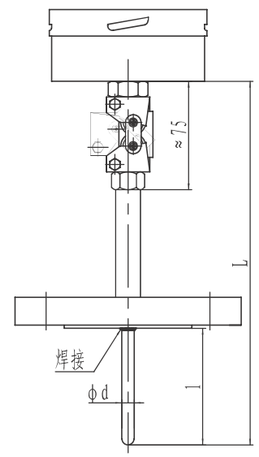
SBWZL - □□6



SBWZL - □□6



SBWZL - □□4



SBWZL - □□4SFH

Notes: 1. L=1+150mm

■SBW-WT Wireless Temperature Transmitter

SBW-WT wireless temperature transmitter is a set of temperature measuring solutions for high-precision temperature measurement and transmission of wireless signal; it is consisted of temperature sensor， temperature transmitter， wireless launcher and wireless receiving station， the product shall be used in the environments where on-site wiring is inconvenient or the distance between the control instruments and control cabinet is large. The transmitter has the following characteristics：Easy to install， long transmission distance， anti-interference， high-precision， and no field wiring. The integrated wireless temperature transmitter provided with the sensor can send the signals collected to wireless receiving terminal， and to the control system at last， so that the medium measured can be monitored in real time.

■Main Characteristics

● Multi-mode data transmission： RS485， GPRS，4~20mA etc data transmission modes;

●Application environment：-40℃~+80℃；

●The temperature transmitter is provided with a display header，adopts disposable lithium battery， output of wireless signal， therefore， no field wiring;

●The wireless receiving station adopts field powering-up， the voltage：5-24VDC±10%；

●Automatic temperature compensation at cold end， non-linear correction circuit;

●High-precision， anti-interference and free-maintenance;

●The product can achieve temperature calibration on site; the data can be handled with the single-chip，with high stability.

■Main technical parameters

Metrological characteristics	Input signal	Thermocouple/thermal resistance
Characteristics of the battery	Power supply	Powered up by the built-in disposable 3.6V lithium thionyl chloride battery
	Static electric current	＜20μA
	Maximum working current	＜40mA
	Service life of the battery	1~2 years （sampling period：30s）
Radio parameters	Frequency band used	ISM frequency band 433.00~434.79MHz （special frequency band can be supplied according to the agreement）.
	Maximum transmission distance	5km
	Launching period	5s~24hours/time （can be set according to field demands）
Collection methods of the data	Hand-type collect of mobile data	
	Collection of field data of the receiving station	
	Collection of GPRS remote data	

●**Display header of the transmitter**

Interface of the digital instrument includes the following contents：

●Environmental temperature

●State of the battery

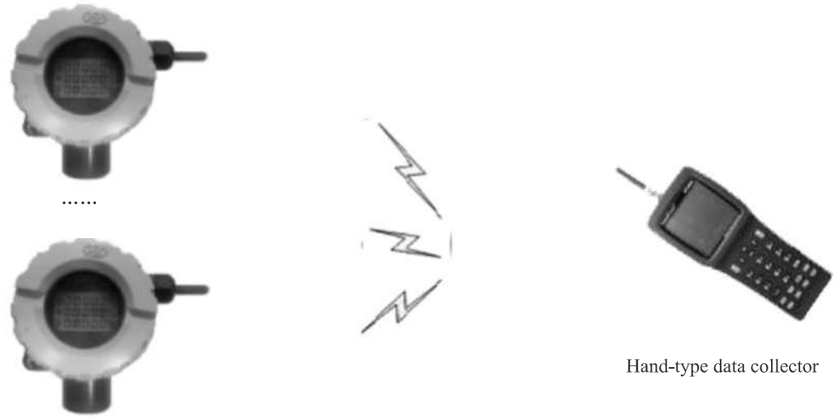
●Passageway number and No.

●Temperature of the collecting point.

■Date collecting program

In general， the wireless temperature transmitter is used by matching with the wireless receiving station， upper computer's monitoring system， and the hand-type data collector etc. Through wireless transmission to monitor and collection the temperature data on site in real time， and store， trim and analyze the data. The transmitter can provide excellent wireless temperature measuring program for users according to actual situations， such as：The user's demands， field environment etc.

1.Collection of hand-type mobile data

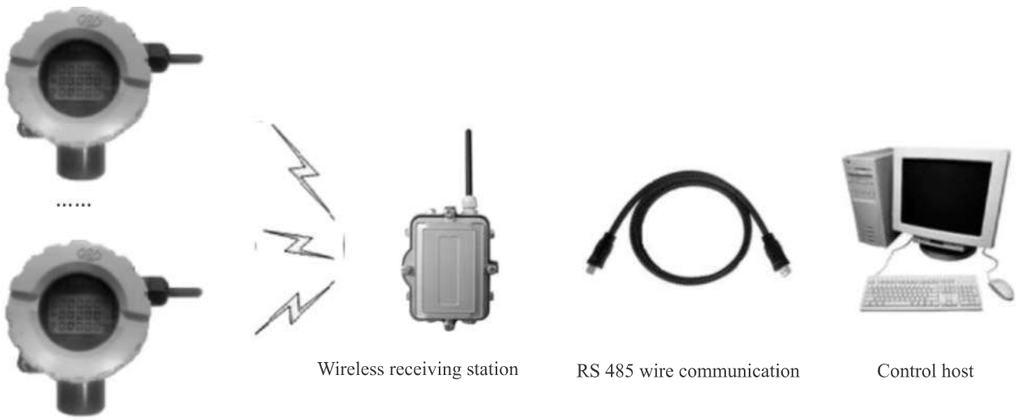


Wireless temperature transmitter

Hand-type data collector

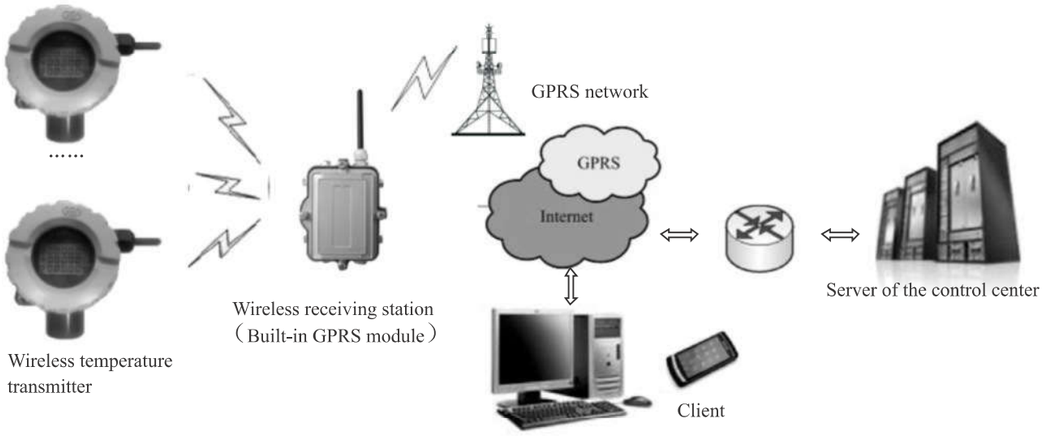
The hand-type collecting program of mobile data is mainly used in the cases of real-time collection of field data， maintenance and detection of the instruments etc. The maintenance personnel can complete instrument inquiry， data collection， ID setting of the instrument， as well as calibration of temperature values of various channels etc with the hand-type data collector， wireless mode and dual-direction data exchange of the integrated wireless temperature transmitter.

2. Collection of field data at the receiving station



The field data collection program of receiving station is consisted of the wireless temperature transmitter， wireless receiving station， RS 485 communication and control host. The wireless receiving station is installed on site， it can achieve dual-direction data exchange through wireless mode and temperature transmitter， while， the wireless receiving station can transmit the data received to the control host with RS485 wire communication.

3. GPRS remote data collection



Install GRPS module and SIM card in the wireless receiving station， thus， the data received can be transmitted to server of the control center. At the same time， the workers can also achieve remote monitoring to field instruments through GPRS.

■Characteristics of Remote Data Collection with GPRS：

●Strong timeliness：The data management center can keep connection with each temperature collection point in real time， thus can well meet requirements of the system for collecting data and timeliness of transmission;

●Remote monitoring： Read remote data of the temperature transmitter， and achieve adjustment of the parameters;

●Wide range：The coverage range of GPRS is wide， infinite expansion， the access locations are not limited， which can meet the application requirements that the field is far away from the control center;

● GPRS transmission has high data safety and accuracy， no special wiring， the prophase investment is small， quick returns，upgrade at later stage， low maintenance costs; And the equipment is easy to install and maintain;

●Selection of the product;

●Selection of wireless temperature measurement transmitter.

①　②③ ④ ⑤
SBW□－WT－□ □－□/□

Class	①	Class of the sensor	R：Thermocouple	Z：Thermal resistance
	②	Channels	N：N channels （1~3）	
Type	③	Graduation No.	Thermocouple	Thermal resistance
			1：K type 5：S type 2：E type 6：R type 8：N type 7：B type	4：Pt resistance Pt 100 5：Pt resistance Pt 1000
Module	④	Measuring range （℃）		
Structure	⑤	Structural form of the sensor		

●Selection of wireless receiving terminal

①②③
SBW－WBS－□ □/□

Class	①	Output type	A：4~20mA	B：RS485 C：GPRS
	②	Channels	N：N channels	Notes：4~20mA upper output limit is 8 channels （More than 8 channels shall be customized ）. RS485， GPRS shall be supplied according to the agreement.
Type	③	Hand-type data collector	No mark：Not supplied	
			Y：Supplied	

■Examples for selection of the product

Example 1：Wireless transmission， the medium temperature：0~1000℃， diameter of the thermocouple：Φ8， material of the casing：GH 3030， installation of fixed M20 thread， the inserting depth：300.

Product type selected：SBWR-WT-11 （0~1000）/WRGKK-93SG-1K450B300-M-AM20

Example 2：Receiving station， 8 channels， output of 4~20mA， the hand-type data collector is not supplied.

Product type selected：SBW-WBS-A8

■Special Thermocouple （Resistance） Used in Petrochemical industry

●WRNT Armored Blowing-type NiCr-Nisi Thermocouple

The armored blowing-type NiCr-Nisi thermocouple is the key temperature measuring instrument on the complete unit with annual output of 0.3million tons of synthesis ammonia.

Structural principle of the armored blowing-type thermocouple is to form gas circuits between temperature-sensing elements of the armored thermocouple and the protective tube， and then add inertia gas with certain of pressure to remove or reduce penetration of reduction gas under the conditions of high-temperature and high-pressure， the addition of microcrystalline Tantalum element can enhance inhale features of the blowing-type thermocouple， and lengthen service life of the armored thermocouple.

Temperature range：800~1100℃

Blowing pressure：＞1.03×105Pa

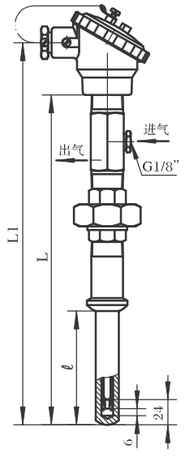
●Specifications

①　　②③④⑤⑥⑦

WRNT□－01－□□□□□□

WRNT -01	①	The armored NiCr-Nisi thermocouple- blowing-type graduation No.： K type		
Class	②	Pairs of the thermocouple	No mark：Single branch 2：Double branch	
Temperature measuring element	③	Type of the junction box	3：Water-proof aluminum casting junction box	
	④	Type of the measuring end Tolerance grade	2：Shorted junction type 1：±1.5℃ or ±0.4%|t|℃	
	⑤	Total length L （mm）	2：±2.5℃ or ±0.75%|t|℃	
	⑥	Material of the casing and protective tube	C：GH3039	Notes：For marking methods of other materials， see P159
	⑦	Inserting length （mm）		

●Structural diagram



WRNT-01型

出气	Outlet
进气	Inlet
WRNT-01型	WRNT-01 type

●Total length，inserting length l and overall characteristics

Total length （mm）	Inserting length l （mm）	Overall dimensions L1（mm）	Matching quantity （branches ）	Piece weight （Kg）	Remark
900	710	945	3	3.1	Used for tag number：118， 119， 120
1050	860	1095	1	3.35	Used for tag number：117
1070	880	1115	2	3.41	Used for tag number：85， 90

■WRT Core-pulling Blowing-type Nonmetal Casing Thermocouple

The core-pulling blowing-type nonmetal casing thermocouple is a key temperature-measuring instrument used on the sulfur production unit and sulphur recovery unit.

Structural principle of the core-pulling blowing-type nonmetal casing thermocouple is to form gas circuits between temperature-sensing elements of the thermocouple and the protective tube, and then add inertia gas with certain of pressure to remove or reduce penetration of reduction gas under the conditions of high-temperature. At the same time, an armored inner core tube of K/N graduation is used for temperature measurement at baking stage of the sulfur production unit and sulphur recovery unit.

●Blowing pressure：1×105Pa＜P＜6×105Pa

●Installation type：Installation of the flange

●Temperature measuring range and tolerance

Class	Wire diameter of the thermocouple	Graduation No.	Tolerance	Temperature range used for a long time （℃）
PtRh10-Pt	0.5	S	Level I：±1.0℃or±{1+0.003*（t-1100）}℃	0~1300
PtRh13-Pt		R	Level II：±1.5℃ or ±0.25%|t|	
PtRh30- PtRh6		B	Level P：±4℃ or ±0.5%|t|	600~1600

●The standby inner core of the armored thermocouple （used at the baking stage）

Class	Diameter of the armored thermocouple	Graduation No.	Tolerance grade：grade II	Material of the casing	Temperature range used for a long time （℃）
Ni Cr-NiSi	Φ1.5	K	±2.5℃ or ±0.75%|t|	GH3039	0~800
NiCrSi-NiCrMg		N			

●Outer diameter and material of the protective tube

Outer diameter	Φ25	Φ30	Φ35
Material	Imported silicon carbide tube （single layer） Domestic alundum tube （double layers） Imported alundum tube （double layers）	Domestic silicon carbide tube （double layers） Imported silicon carbide tube （single layer）	Domestic silicon carbide tube （double layers）

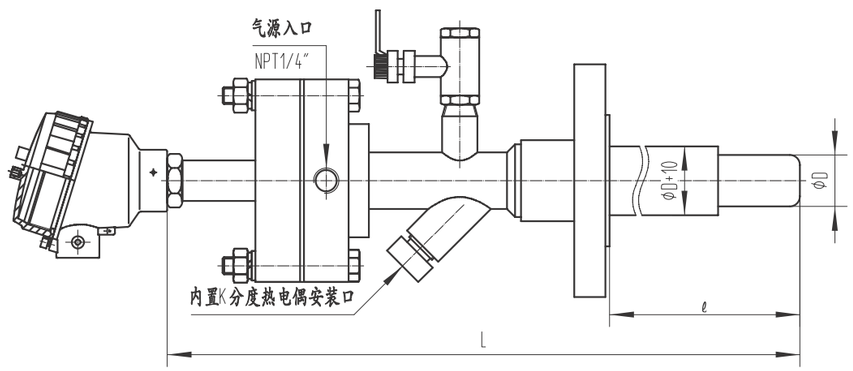
●Specifications

①②③④⑤⑥⑦⑧⑨⑩⑪⑫⑬⑭

WR□T□－5□□CQ－□□□－□□□－□□□－□

Class	①	Graduation No.	S：S type Pt-Rh10-Pt R：R type Pt-Rh 13-Pt B：B type Pt-Rh 30-Pt-Rh6	
	②	Pairs of the thermocouple	No mark：Single-branch 2. Double-branch	
Type	③	Type of the junction box	3：Water-proof aluminum casting junction box. 3A：Waterproof stainless steel junction box.	7：Explosion insulation aluminum casting junction box. 7A：Explosion insulation stainless steel junction box
	④	Outer diameter of the protective tube	25：Φ25 30：Φ30 35：Φ35	
Temperature measuring element and junction box	⑤	Tolerance grade	S， R	
			1：±1.0℃ or ±{1+0.003×（t-1100）}℃ 2：±：1.5℃ or ±0.25%|t|℃	P：±：4℃ or ±0. 5%|t|℃
	⑥	The electrical interface	M：M20*1.5 inner thread N1：NPT1/2″ inner thread	G：G1/2″ inner thread Z：Z G1/2″ inner thread Note：Other dimensions shall be marked as：（Specific dimensions）
	⑦	Explosion insulation grade	A：ExiaIICT6 Ga The non-explosion insulation products shall be not marked	
Protective tube	⑧	Total length L （mm）		
	⑨	Material of the protective tube	R：Alundum JR：Imported alundum	S：Recrystallized silicon carbide SS：New silicon carbide JS：Imported silicon carbide Marking for other materials：see P159
	⑩	Length inserted L（mm）		
Process connection	⑪	Material of the flange	A：304 ZA：20#	Marking for other materials：see P159
	⑫	Configuration of the flange	1：Single flange 2：Companion flange and fasteners	
	⑬	Standard flange	Standard code-diameter-pressure-sealed surface	
Standby armored thermocouple	⑭	Graduation No.	K：Graduation K N：Graduation N	Notes：If there isn抉 standby thermocouple （that is， core-pulling is not needed）， this item shall be not marked， the level shall be level II.

●Overall diagram of the product



气源入口	Inlet of gas supply
内置K分度热电偶安装口	Built-in installation port of the thermocouple with graduation K

Notes：L=ℓ+300mm

■WRKT- TS Anti-Scouring Thermocouple of the Riser Reactor

According to the characteristics of the riser reactor for heavy oil fluid catalytic cracking, our company has developed the anti-scouring thermocouple of the riser reactor for heavy oil fluid catalytic cracking, which can effectively solve the two difficulties of wear-resisting and leakage separation in a long period, to ensure safe operation of the anti-scouring wear-resisting thermocouple of the riser reactor in the long period.

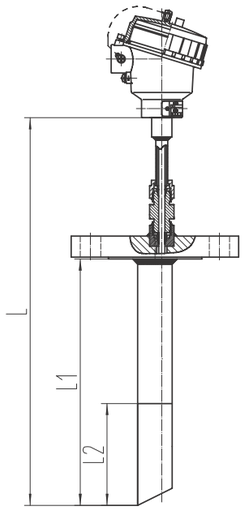
For structure at measuring end of the thermocouple's casing, the product is specially designed, to reduce scouring of the medium to the measuring end, and lengthen service life of the thermocouple. At the same time, the thermocouple adopts double-sleeve leakage separation technology and two levels of sealing unit, to achieve effective prevention and leakage separation.

In addition, our company has also developed the wear-resisting thermocouple of coal pyrolysis riser, which is mainly installed on the riser-type powdered coal pyrolysis unit, and such thermocouple is consisted of the noumenon and ceramic wearing-resisting head.

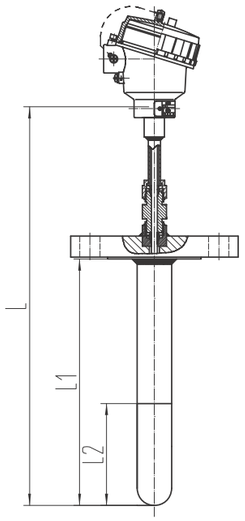
Ceramic wearing-resisting head of the product adopt excellent thermostability, wear-resisting ceramic powder materials, it has the characteristics of thermostability and wear-resisting. At the same time, connection of the ceramic wearing-resisting head adopts mechanical connection, so that the wearing-resisting head can be replaced as a whole.

Structural diagram

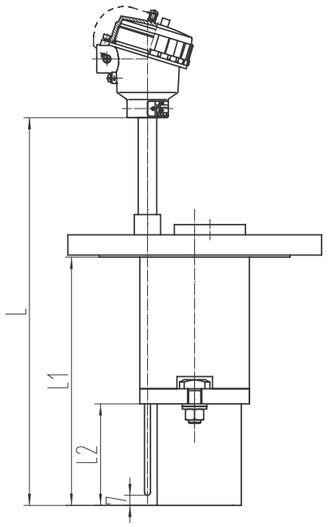
●Structural diagram



WR□KT-57□TS
（Bevel-angle cutting edge type）



WR□KT-57□TS
（Straight form）



WR□KT-57□TS
（Combination type）

① ② ③④⑤ ⑥⑦⑧⑨⑩⑪ ⑫⑬⑭⑮⑯⑰ ⑱⑲⑳

WR□KT□-□□□TS-□□□□□□-□□□□□□-□□□

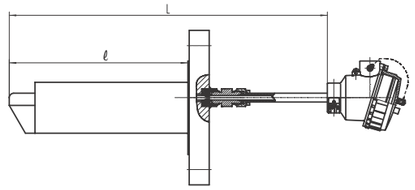
WR KT- TS			The anti-scouring thermocouple of the riser reactor		
Class	①	Graduation No.	K：K type	S：S type R：R type	
	②	Pairs of the thermocouple/ branches of the thermal resistance elements	No mark：Single-branch	2. Double-branch	
Type	③	Installation methods	5：Fixed flange		
	④	Type of the junction box	7：Explosion insulation aluminum casting junction box.	7A：Explosion insulation stainless steel junction box	
	⑤	Outer diameter of the protective tube	34：Φ34	25：Φ25	Note：Other dimensions shall be marked as：（Specific dimensions）
Temperature measuring element	⑥	Tolerance grade	K	S，R	
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃	
	⑦	Armored thermocouple's diameter（mm）	H：Φ5	J：Φ6	K：Φ8
	⑧	Material of the casing	P：310S B：GH3030 C：GH3039	N：Incone 1600 K：Incoloy 800	
	⑨	Type of the measuring end	2：Shorted junction type	3：Isolated junction type	
	⑩	The electrical interface	M：M20*1.5 inner thread N1：NPT1/2″ inner thread	G：G1/2″ inner thread Z：Z G1/2″ inner thread	Note：Other dimensions shall be marked as：（Specific dimensions）
	⑪	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga	
Protective tube	⑫	Total length ℓ（mm）			
	⑬	Material of the protective tube	P：310S B：GH3030 C：GH3039	N：Incone 1600 K：Incoloy800	TD：CYT301 TE：CYT302
			Notes：For marking methods of other materials， see P159		
	⑭	Length inserted ℓ（mm）			
	⑮	Material of the wear-resisting head	W：Metal basal+ cobalt-base alloys R：Corundum compound type	TD：CYT301 TF：CYT302	Notes：R type is only suitable for combination type
	⑯	Length of the wear-resisting head L2 （mm）			
	⑰	Type	A：Bevel-angle cutting edge type	B：Straight form	C：Combination type （only for the pyrolysis unit of powdered coal）
Process connection	⑱	Material of the fixed unit	A：304 H：316	HL：316L	ZA：20# E：Built-in （material of the flange's basal body：304）
			Notes：Marking for other materials：see P159		
	⑲	Quantity of the flange	1.：Single flange 2.Companion flange and fasteners	Notes：For thread installation， this item shall be not marked.	
	⑳	Specifications of the flange	The marking method：Code-diameter-pressure-sealed surface-structural form		

■WRKC-COT Inserting-type Thermocouple Used for Ethylene Cracking Furnace

In the development of ethylene industry, accurate control of the temperature at port of the cracking furnace（for short：COT temperature）is an important link, it concerns the ethylene's cracking depth and improvement of recovery, therefore, the temperature is an important control parameter.

The product is mainly used for measuring temperature at outlet of the ethylene cracking furnace, it is mainly consisted of armored thermocouple, the wear-resisting head made of compound materials for preventing internal leakage, it has the features:Thermostability, wear-resisting and anti-corrosion.

●Structural diagram



WR□KC-57□COT型

①　②　③④⑤　　⑥⑦⑧⑨⑩⑪　⑫⑬⑭⑮⑯　⑰⑱⑲

WR□KC□-□□□COT-□□□□□□-□□□□□-□□□

WR KC- COT					
Class	①	Graduation No.	K：K type S：S type R：R type		
	②	Pairs of the thermocouple/ branches of the thermal resistance elements	No mark：Single-branch	2. Double-branch	
Type	③	Installation methods	5：Fixed flange		
	④	Type of the junction box	7：Explosion insulation aluminum casting junction box.	7A：Explosion insulation stainless steel junction box	
	⑤	Outer diameter of the protective tube	69：Φ69 25：Φ25	28：Φ28 34：Φ34	Note：Other dimensions shall be marked as：（Specific dimensions）， supplied according to the agreement
Temperature measuring element	⑥	Tolerance grade	K	S、R	
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃	
	⑦	Armored thermocouple's diameter（mm）	H：Φ5	J：Φ6	K：Φ8
	⑧	Material of the casing	P：310S B：GH3030 C：GH3039	N：Incone 1600 K：Incoloy 800	
	⑨	Type of the measuring end	3：Isolated junction type		
	⑩	The electrical interface	M：M20*1.5 inner thread N1：NPT1/2″ inner thread	G：G1/2″ inner thread Z：Z G1/2″ inner thread	Note：Other dimensions shall be marked as：（Specific dimensions）
	⑪	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga	
Protective tube	⑫	Total length ℓ(mm)			
	⑬	Material of the protective tube	P：310S B：GH3030 C：GH3039	N：Incone 1600 K：Incoloy800	
			Notes：For marking methods of other materials， see P159		
	⑭	Length inserted ℓ(mm)			
	⑮	Material of the wear-resisting head	W：Metal basal+ cobalt-base alloys	TE：CYT302	R：Corundum compound type
	⑯	Length of the wear-resisting head ℓ2 （mm）			
Process connection	⑰	Material of the fixed unit	A：304 H：316 HL：316L	ZA：20#（suitable for the flange） E：Built-in（suitable for the flange， material of the flange's basal body：304）	
			Notes：Marking for other materials：see P159		
	⑱	Quantity of the flange	1.：Single flange 2.Companion flange and fasteners	Notes：For thread installation， this item shall be not marked.	
	⑲	Specifications of the flange	The marking method：Code-diameter-pressure-sealed surface-structural form		

•WR KB-COT the Thermocouple on Surface of the Ethylene Cracking Furnace

The thermocouple on surface of the ethylene cracking furnace is equipped with the welded protective sleeve; the outer sheath is directly welded to the furnace tube or surface of the tube wall, to avoid scouring of the retarded flow, as well as the damage role of high-temperature medium to the temperature measuring elements. Materials of the protective sleeve shall be the alloy materials that can be able to prevent corrosion of Hydrogen and sulfur, with good anti-sulfuration.

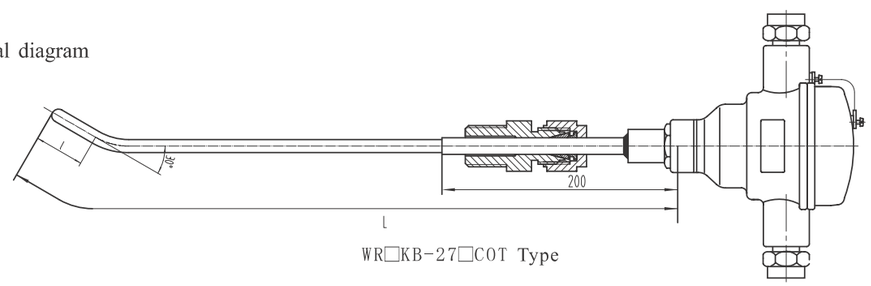
The reference end adopts lengthened structure, which can avoid high-temperature zone on site, so that reference end of the thermocouple can be in normal temperature state, avoid high-temperature interference, and ensure precision and stability of measurements.

①　②　③　④　　⑤⑥⑦⑧⑨⑩　⑪⑫⑬　⑭⑮

WR□KB□-□□COT-□□□□□□-□□□-□□

WR KB- COT					
Class	①	Graduation No.	K：K type S：S type R：R type		
	②	Pairs of the thermocouple/ branches of the thermal resistance elements	No mark：Single-branch	2. Double-branch	
Type	③	Installation methods	2：Sleeve thread		
	④	Type of the junction box	7：Explosion insulation aluminum casting junction box.	7A：Explosion insulation stainless steel junction box	
Temperature measuring element	⑤	Tolerance grade	K	S、R	
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃	
	⑥	Armored thermocouple's diameter（mm）	H：Φ5	J：Φ6	K：Φ8
	⑦	Material of the casing	P：310S B：GH3030 C：GH3039	N：Incone 1600 K：Incoloy 800	
	⑧	Type of the measuring end	3：Isolated junction type		
	⑨	The electrical interface	M：M20*1.5 inner thread N：NPT1/2″ inner thread	G：G1/2″ inner thread Z：ZG1/2″ inner thread	Note：1.Other dimensions shall be marked as：（Specific dimensions）
	⑩	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga	
Protective tube	⑪	Total length ℓ（mm）			
	⑫	Material of the protective tube	P：310S B：GH3030 C：GH3039	N：Incone 1600 K：Incoloy800	
			Notes：For marking methods of other materials， see P159		
	⑬	Length inserted ℓ（mm）			
Process connection	⑭	Material of the fixed unit	A：304	H：316	HL：316L
			Notes：Marking for other materials：see P159		
	⑮	Specifications of the fixed unit	M27：M27*2 N1：NPT1/2″	Note：Other dimensions of the threads shall be marked as：（Specific dimensions） For example：M27*1.5：（M27*1.5）	

●Structural diagram



WR□KB-27□COT Type

WR KH Multi-point Thermocouple Used on the High-pressure Hydrogenation Reactor （with leakage measuring unit）

The multi-point thermocouple used on the high-pressure Hydrogenation reactor（with leakage measuring unit）is suitable for hydrogenation refining，hydrogenation desulfuration and hydrogenation cracking units in oil refining industry，and suitable for temperature measuring of various hydrogenation reaction unit in the chemical industry.

Hydrogenation reaction：In general，the reaction must be conducted at high reaction temperature，the thermocouple must adapt the environments of high-temperature，and high pressure，flammable and combustible when hydrogen is present，and the thermocouple shall have the function of on-line leakage detection，more reliable sealing and safety，to ensure safety of the equipment.

Characteristics

1. The multi-point thermocouple used on the high-pressure Hydrogenation reactor（with leakage measuring unit）shall meet the working conditions of high-pressure，high-temperature，hydrogen present，toxic，and strong corrosion medium.

2. The multi-point thermocouple used on the high-pressure Hydrogenation reactor（with leakage measuring unit）shall meet the following requirements：Response time，operation pressure，operation temperature，measuring range，measuring precision，anti-explosion grade and protection grade etc.

3. The thermocouple must pass the safety certification of S1L2 function.

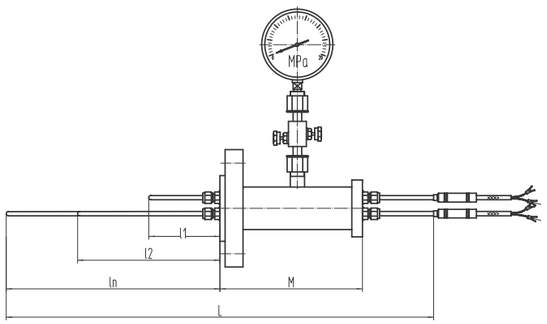
4. The product shall have level-II sealing detection system; adopt double sealing structure，and entire welding.

5. The level-II sealing detection system shall be equipped with pressure gauge or pressure transmitter.

6. The manufacturing of armored high-pressure hydrogenation reactor thermocouple adopts military industrial technology，extrusion process，so that there is compact magnesia powder among the thermocouple wires，the high-compression ratio magnesia powder and the drying process of military products can ensure insulation performance among the thermocouple wires.

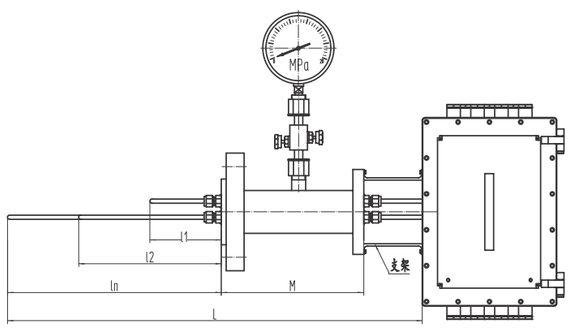
7. Inspection of heat pole adopts X - ray inspection，which can effectively ensure welding reliability of the heat pole.

8. The welding and inspection personnel shall have military industry and nuclear power qualifications.



WR□ KH-503K

Non-junction box type sleeve seal



WR□KH-52A3K

Explosion insulation junction box type sleeve seal

① ② ③④⑤⑥⑦⑧ ⑨⑩⑪⑫⑬ ⑭⑮⑯⑰ ⑱⑲⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖

WR□KH□-□□□□□□□-□□□□□□-□□□□-□□□-□ □ □ □ □/□

WR KH-			The multi-branch thermocouple used on the high-pressure Hydrogenation reactor			
Class	①	Graduation No.	K：K type N：N type	E：E type J：J type	T：T type S：S type	R：R type B：B type
	②	Branches of the thermal resistance elements	nA：n branch single point		nB：n branch double point （suitable for Φ3~Φ8）	
Type	③	Installation methods	1：Fixed thread		5：Fixed flange	
	④	Type of the junction box	0：No junction box 2：Water-proof aluminum casting junction box（see P155） 2A：Explosion insulation stainless steel junction box （see P155）		6：E type water-proof aluminum casting junction box（2-6 measuring points） 7：Explosion insulation aluminum casting junction box. （2-4 measuring points） 8A：E type explosion insulation stainless steel junction box （5-12 measuring points）	
	⑤	Form of the measuring end	3.Isolated junction type			
	⑥	Sealed structure	H：Welding seal （suitable for the thermocouple material of Φ5 and above）			
			K：Sleeve sealing type （supplied according to the agreement）			
	⑦	Structural form	No mark：Standard configuration	G：Wall attaching mode （supplied according to the agreement）		
	⑧	Inner diameter of the protective tube（mm）	Notes：The wall attaching product shall be marked			
Temperature measuring element	⑨	Tolerance grade	K，N，E，J	T	S，R	B
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	1：±0.5℃ or ±0.4%|t|℃ 2：±1℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃	P：±4℃ or ±0.5%|t|℃
	⑩	Armored thermocouple's diameter（mm）	C：Φ1.5 （not suitable for explosion insulation type，supplied according to the agreement） E：Φ3	G：Φ4.5	J：Φ6	
			D：Φ2 （not suitable for explosion insulation type，supplied according to the agreement） F：Φ4	H：Φ5	K：Φ8	
	⑪	Total length ℓ(mm)				
	⑫	Material of the casing	G：0Cr18Ni9Ti H：316 HL：316L Notes：For marking methods of other materials， see P159			
	⑬	Inserting length （mm）				
Junction box	⑭	Quantity of the electrical interface	n：n pieces	Notes：For quantity of the electrical interface corresponding to the junction box，see P154-P155		
	⑮	Size of the electrical interface	M20：M20*1.5 inner thread M33：M33*2 inner thread G3：G1″ inner thread	N1：NPT1/2″ inner thread N2：NPT3/4″ inner thread N3：NPT1″ inner thread	Note：Other dimensions shall be marked as：（Specific dimensions）	
	⑯	Joint of the cables	No mark：Provide Nylon cable joint/dust-proof cap		Notes：1. The explosion insulation products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.	
			D：Stainless steel waterproof cable joint E：Nickel plated copper explosion insulation cable joint F：Stainless steel explosion insulation cable joint			
	⑰	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga	Notes：Non explosion insulation products shall be not marked	
Process connection	⑱	Material of the fixed unit	A：304 H：316 HL：316L ZA：20#	E：Built-in （basal material of the flange is 304）		
	⑲	Specifications of the fixed unit	Fixed thread	Flange		
			M27：M27*2 M33：M33*2	1.：Single flange	2.Companion flange and fasteners	
	⑳	Standards of the flange	Standard configuration：Marking method：See P159	Standard flange：Standard code-diameter-pressure- seal surface		
	㉑	Pressure range	A：0-10MPa	B：0-25MPa		
Two-level sealing unit	㉒	Pressure detection equipment	Y：Pressure gauge	YT：Pressure transmitter	Notes：The pressure detection equipment is equipped with the stop valve， release valve and tee joint.	
	㉓	Seismic resistance function of the pressure gauge	Not mark：not filled	Filled with silicone oil		
	㉔	Length of the sealing unit M（mm）				
	㉕	Standard of the connecting flange		Standard flange：Standard code-diameter-pressure-seal surface		
Additional unit	㉖	For the marking method：See P157-P158				

Special Thermocouple in the Coal Chemical Industry

■ WRT-57 QH Special Thermocouple for the CWS Gasification Furnace （ZL 2012 1 0187655.5）

The special thermocouple for the CWS gasification furnace is mainly used for Texaco gasification furnace， the product is mainly consisted of explosion insulation junction box，installation flange，damper unit，wear-resisting protective tube and precious metal thermocouple.

■Main characteristics

The product adopts imported pressureless sintering submicron silicon carbide，it has the following features：High heat conduction，ultrahigh wear-resisting performance at high temperature，the inserting depth can be adjusted，the thermocouple adopts reliable anti-leakage structure，the maximum pressure-bearing is 12 MPa，the thermocouple elements adopts sealing protection，no Nitrogen protection ，the wear-resisting protective tube can be replaced.

■Technical parameters

Applicable standard：JB/T9238-1999

Protection grade：IP68

Heat insulation resistance at normal temperature：Room temperature of 20℃， the insulation resistance shall be not less than 5MΩ.

Temperature measuring range： Maximum temperature value of 1500℃（ continuous measuring） ，maximum temperature value of 1700℃ （short-term or interval measuring）.

Service life：3 months and above.

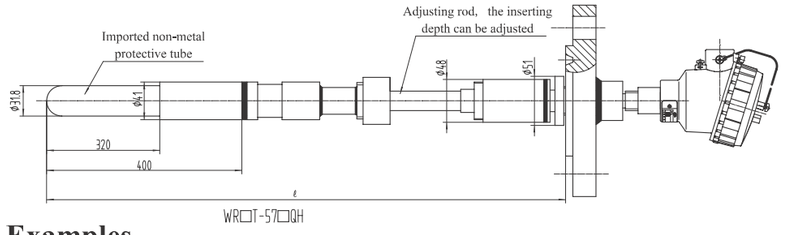
①　②　③④⑤　⑥　⑦⑧⑨

WR□T-57□QH-□□□ -JS□-□□□

Class	①	Graduation No.	S：PtRh10-Pt	R：PtRh13-Pt	B：PtRh30-PtRh6
Diameter	②	Diameter of the protective tube（mm）	25:25.4		
			32:31.8		
Elements and electrical parameters	③	Precision grade	S，R		B
			1：±1.0℃ or ±{1+0.003×（t-1100）}℃		P：±：4℃ or ±0．5%|t|℃
			2：±：1.5℃ or ±0.25%|t|℃		
	④	The electrical interface	M：M20×1.5 inner thread		Notes：Other dimensions shall be marked as（Specific dimensions
			N1：NPT1/2″ inner thread		
	⑤	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb		A：ExiaIICT6 Ga
			C1~C6：ExdIICT1~T6 Gb		
Protective tube	⑥	Inserting depth L（mm）	As actual mark：For example：900~1100		
Fixed unit	⑦	Material	A：304		Marking for other materials see P159
	⑧	Quantity of flange	1：Single flange		
			2：Companion flange and fasteners		
	⑨	Specifications	Standard code-structure-diameter-pressure-seal surface		

Notes：If number 6 refers to fixed inserting depth， the length shall be marked， for example：The inserting depth is 1000mm，which shall be marked as 1000.

Inner core’s length of the product shall be the longest inserting depth+280mm， when only the inner core is supplied， for example：The longest inserting depth is 1100mm， graduation B， level P， the mark shall be ：WRBT-QH-P-1380.



■Selection Examples

Parameters：Graduation B， level P， fixed flange：HG20592-97-WN-DN50-PN10.0-RJ-304， imported silicon carbide Φ31.8mm， the inserting depth ：900~1100mm， electrical interface：M20×1.5.

Selection：WRBT- 5732QH- PM- JS900~1100- A1HG 20592- 97- WN-50 -10 – RJ

■WR KR Special Multi-branch Thermocouple Used for Methanation Reactor （ZL 2012 2 0258148.1）

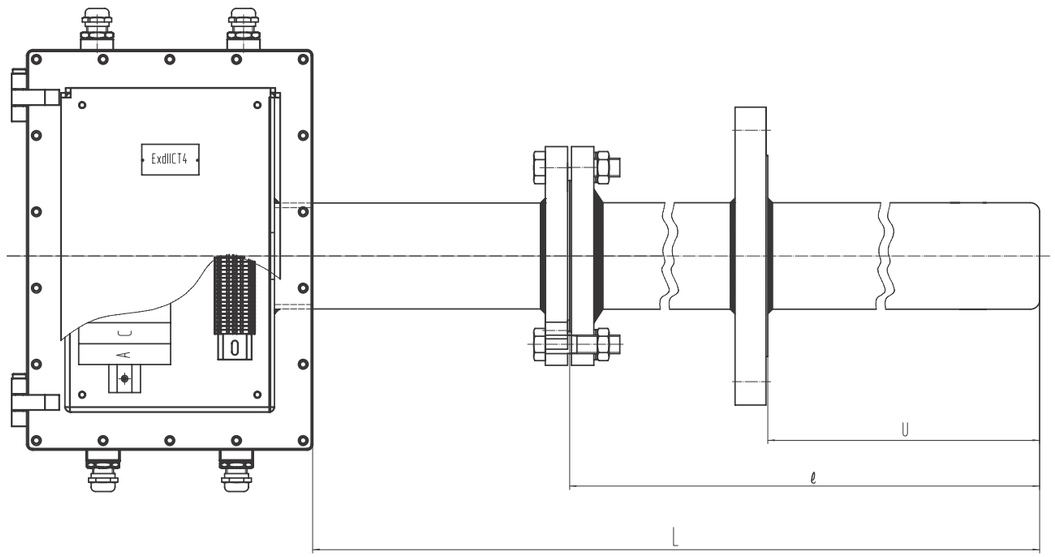
Our company has designed special multi-branch thermocouple used for methanation reactor according to the features of strong methanation heat-release reaction. The product is mainly used on the LNG production unit with coke oven gas， and the methyl alcohol production with natural gas （UK DAVY process）.

1.The unique wall attaching structure can be designed according the inner hole of pressure-bearing casing， to shorten the response time.

2.Inner core of the thermocouple has replaceable function of single branch.

3.When the thermocouple is used in extreme cold environment， the junction box can be provided with electric heat tracing unit with military industrial quality.

●Structural diagram



WR□KR-523KG□

Special multi-branch thermocouple used for methanation reactor

① ② ③④ ⑤⑥⑦⑧ ⑨⑩⑪⑫⑬ ⑭⑮⑯⑰ ⑱⑲⑳ ㉑ ㉒ ㉓㉔ ㉕

WR□KR□－□□□□□□－□□□□□－□□□□－□□□－□ □－□□/□

Class	①	Graduation No.	K：K type N：N type T：T type	E：E type J：J type	S：S type R：R type B：B type	
	②	Branches of the temperature measuring points	nA：n branch single point		nB：n branch double point （suitable for Φ3~Φ8）	
Type of the thermocouple	③	Installation methods	5：Fixed flange			
	④	Type of the junction box	0：No junction box 2：Water-proof aluminum casting junction box（see P155） 2A：Explosion insulation stainless steel junction box （see P155）		6：E type water-proof multi-point aluminum casting junction box（2-6 measuring points） 7：Explosion insulation aluminum casting junction box.（2-4 measuring points） 8A：Explosion insulation multi-point stainless steel junction box （5-8 measuring points）	
	⑤	Form of the measuring end	1.Exposed junction type		2. Shorted junction type	3.Isolated junction type
	⑥	Sealed structure	H：Welding seal （suitable for the thermocouple material of Φ5 and above）			
			K：Sleeve sealing type （supplied according to the agreement）			
	⑦	Structural form	No mark：Standard configuration		G：Wall attaching mode （supplied according to the agreement）	
	⑧	Inner diameter of the protective tube（mm）	Notes：The wall attaching product shall be marked			
Temperature measuring element	⑨	Tolerance grade	K，N，E，J		T	S，R / B
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃		1：±0.5℃ or ±0.4%|t|℃ 2：±1℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃ / P：±4℃ or ±0.5%|t|℃
	⑩	Armored thermocouple's diameter（mm）	C：Φ1.5 （not suitable for explosion insulation type， supplied according to the agreement） E：Φ3 D：Φ2 （not suitable for explosion insulation type， supplied according to the agreement） F：Φ4		E：Φ3 F：Φ4 G：Φ4.5	H：Φ5 J：Φ6 K：Φ8
	⑪	Total length （mm）			Notes：Count from the connection position of upper flange's sealing surface	
	⑫	Material of the casing	G：0Cr18Ni9Ti		H：316 / HL：316L	Notes：For marking methods of other materials， see P159
	⑬	Inserting length L（mm）	L1/L2……/Ln			
Junction box	⑭	Quantity of the electrical interface	n：n pieces		Notes：For quantity of the electrical interface corresponding to the junction box， see P154-P155	
	⑮	Size of the electrical interface	M20：M20*1.5 inner thread		M33：M33*2 inner thread	N1：NPT1/2″ inner thread
			Note：Other dimensions shall be marked as：（Specific of the threads）			
	⑯	Joint of the cables	No mark：Provide Nylon cable joint/dust-proof cap E：Nickel plated copper explosion insulation cable joint		D：Stainless steel waterproof cable joint F：Stainless steel explosion insulation cable joint	Notes：1. The explosion insulation products shall be equipped with explosion insulation cable joint; 2. The non-explosion insulation products shall be equipped with standard Nylon waterproof cable joint.
	⑰	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb		A：ExiaIICT6 Ga	Notes：Non explosion insulation products shall be not marked
Process connection	⑱	Material of the fixed unit	A：304 H：316 HL：316L		ZA：20#（suitable for the flange） E：Built-in （basal material of the flange is 304）	Marking for other materials：see P159
	⑲	The fixed unit	Flange			
			1.：Single flange		2.Companion flange and fasteners	
	⑳	Standards of the flange	1.Standard configuration：Marking method：See P157-P158		2.Standard flange：Standard code-diameter-pressure- seal surface	
Connecting unit	㉑	Length of the pressure-bearing casing u（mm）				
	㉒	Standard of the pressure-bearing flange	Standard flange：Standard code-diameter-pressure- seal surface			
Protective tube	㉓	Specifications of the protective tube	Diameter-grade of the wall thickness， for example：DN100-Sch80			
	㉔	Material of the protective tube	A：304 H：316 HL：316L	B：3030 C：GH3039 P：310S	N：Inconel600 K：Incoloy800	
Additional unit	㉕	Marking methods：See P157-158				

■MR K/MPK Thermal Radiation Prevention Thermocouple （ZL 2012 2 0268997.5） （ZL 2012 2 0269061.4）

The medium measured with the thermal radiation prevention thermocouple is smoke， the maximum using temperature is 1100℃. When temperature of the thermocouple， according to principle of heat conduction， the heat will be conducted to the cold objects around in the manner of radiation， so that the temperature measured with the thermocouple is not true，therefore，the measuring end shall be added with a shielding cover，thus can greatly reduce conduction of the radiation heat between the measuring end and the objects around.

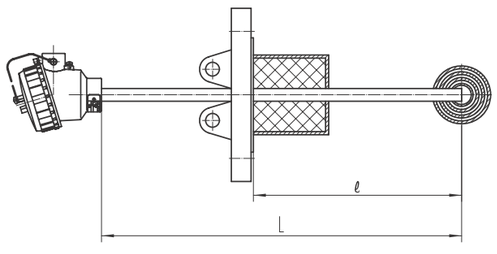
The medium measured with thermal radiation prevention air-extracting thermocouple is smoke，and the high temperature used is 1100℃，the thermocouple is consisted of the two functional parts：Thermal radiation prevention unit and air-extracting unit，the thermal radiation prevention principle is the same with that of the radiation protection thermocouple. The medium （compressed air or high-pressure steam）can be sprayed from an injector，to form negative pressure at nozzle of the injector and large extracting force，so that the medium to be measured can flow through measuring end of the thermocouple at high speed，which can increase convective heat transfer at the measuring end，so that temperature of the smoke measured is more true and accurate.

①②③④⑤⑥⑦⑧⑨⑩⑪⑫⑬⑭⑮⑯⑰⑱
MR□K□－□□□－□□□－□□－□□□□□－□□□

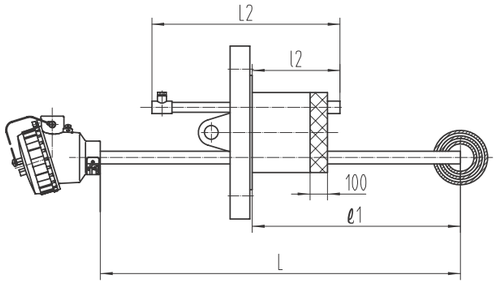
①②③④⑤⑥⑦⑧⑨⑩⑪⑫⑬⑭⑮⑯⑰⑱
MP□K□－□□□－□□□－□□－□□□□□－□□□

WR K-			The thermal radiation prevention thermocouple		
Class	①	Graduation No.	K：K type NiCr-NiSi N：N type NiCrSi-NiSiMg	S：S type PtRh10-Pt R：R type PtRh13-Pt B：B type PtRh30- PtRh6	
	②	Pairs of the thermocouple	No mark：Single-branch	2. Double-branch	
Type	③	Type of the junction box	3：Water-proof aluminum casting junction box 7：Explosion insulation aluminum casting junction box.	3A：Waterproof stainless steel junction box 7A：Explosion insulation stainless steel junction box	
	④	Type of the measuring end	3.Isolated junction type		
	⑤	Outer diameter of the protective tube	S：Φ33.4 Note：Other marking methods of outer diameter shall be marked as：（Specific outer diameter） For example：Outer diameter 35 of the protective tube can be marked as：（35）		
Temperature measuring element	⑥	Tolerance grade	K，N	S，R	B
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	P：±3℃ or ±0.5%|t|℃	P：±4℃ or ±0.5%|t|℃
	⑦	Armored thermocouple's diameter（mm）	E：Φ3		
	⑧	Material of the casing	N：Incone 1600 P：310S	B：GH3030 C：GH3039	Notes：For marking methods of other materials， see P159（supplied according to the agreement ）
Junction box	⑨	The electrical interface	M：M20*1.5 N1：NPT1/2″	G：G1/2″ Z：ZG1/2″	Note：1. Other dimensions shall be marked as：（Specific dimensions） 2.When the electrical interface is not M20*1.5 or NPT1/2″，thread joints shall be increased.
	⑩	Explosion insulation grade	B1~B6：ExdIIBT1~T6 Gb C1~C6：ExdIICT1~T6 Gb	A：ExiaIICT6 Ga	Notes：The non-explosion insulation products need not to be marked.
Protective tube and shielding cover	⑪	Total length L/The length inserted ℓ1（mm）：			
	⑫	Material of the protective tube	A：304 H：316 HL：316L P：310S	B：GH3030 C：GH3039 N：Incone 1600 K：Incoloy800	Notes：For marking methods of other materials， see P159
	⑬	Total length of the air-extracting circuit	Length inserted of the air-extracting circuit ℓ1（mm）：		
	⑭	Specifications of the shielding cover	S：Standard dimensions	Notes：The marking methods of other specifications shall be：（specific size）	
	⑮	Quantity of the shielding cover	3：3 pieces	Notes：The marking methods of other quantity shall be：（specific quantity）	
Process connection	⑯	Material of the flange	A：304 H：316	HL：316L	Notes：The marking methods of other materials：See materials of the protective tube in 12
	⑰	Configuration of the flange	1：Single flange		
	⑱	Specifications of the flange	The marking method：Standard Code-diameter-pressure-sealed surface-structural form		

●Structural diagram



MR□ K the thermal radiation prevention thermocouple



MP□ K the thermal radiation prevention air extracting thermocouple

Special Thermocouple （thermal resistance）in Steel Industry

High-precision Temperature Measuring System for Cooling Water of the Blast Furnace

High-precision temperature measuring system for cooling water of the blast furnace is a new-type temperature instrument jointly developed by SIC and CISDI， it is used for measuring water temperature of the blast furnace cooling water tube. The products have the following characteristics：High-precision measurement of temperature，short flow of temperature measurement，and strong anti-interference capacity etc; In this system，structure of traditional temperature measuring element is newly designed，the system adopts built-in digital analysis transmission，and the patent technology for correction of errors，at the same time，the system can also self-adapt the demands of environmental protection，on the basis of maintaining the overall of original thermometer，temperature detection precision is greatly improved to form a stable，upgraded new-type thermal resistance temperature measuring product.

Using method of high-precision temperature measuring system for cooling water of the blast furnace is the same with traditional thermal resistance thermometer， it is specially suitable for the case that the temperature difference is very small（monitoring of thermal load），paying attention to the place where the temperature is finely distributed （constant temperature area）；in addition，the system also has the information transmission form of “convenient，and quick ”， we can use the system in the transformation projects of mechatronics and intelligentization.

Characteristics

The high- precision temperature measuring system can achieve the deviation of ±0.05℃ within temperature measuring range of 0~100℃， and the annual shifting doesn’t exceed ±0.02℃.

The system is consisted of noumenon of the thermal resistance thermometer， the integrated digital converter and corrector，as well as gateway controller etc，which greatly reduced quantity of the equipment，easy to design，transform，construct and maintain.

The system can support access of 19 mainstream industrial gateways through the gateway controller， adopting the “convenient，quick” information transmission mode，easy to achieve the butting between the high-efficient industrial buses，in favor of communication and management：

Strong anti-interference capacity：The sturdy temperature sensing elements can effectively improve the mechanical strength and service life; at the same time，the system adopts large-current detection method，which is in favor of improving the resolution ratio，and enhancing the anti-interference capacity.

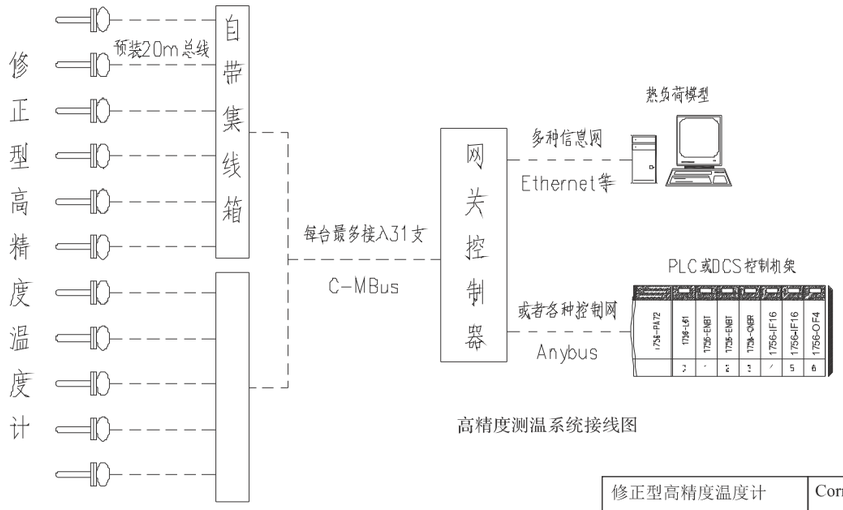
Adaptive environment protection：The system adopts full-sealed design of “Adaptive heat conduction ring”，and the structure of “Adaptive Air Suspension” to play the roles of blocking up the heat flow，magnetic field，and transmission path of the vibration.

Main technical parameters

Product name		Correction-type high precision thermometer	
Basic error	Overall precision	±0.05℃	±0.1℃
	Digital instrument（41/2LCD）	±0.01 digital quantity	
Input signal		Signal of Pt thermal resistance	
Transmission signal		CM-Bus protocol digital quantity	
Output type		Customized according to requirements of the users	
Relationships of input/output		Separation type	
Measuring range of the transmitter		0℃~100℃ note 1	
Load resistance		See “Load limit diagram”	
Power supply		18~42V dc.	
Effect of environmental temperature		Changes per 10 ℃ doesn’t exceeds 0.05℃	
Electrical explosion insulation		Intrinsic safety type	Exia II CT 6
		Explosion insulation type	Exd II CT 6
Environmental temperature note 2		-10℃~40℃	-20℃~60℃
Relative humidity of the environment		（Precision±0.05℃）	（Precision±0.1℃）
		5%~95%	
Atmosphere pressure		86~108kPa	
Power consumption		≤0.1W	

Note1：For other temperature range， the product can be supplied according to the agreement.

Note2：When the environmental temperature exceeds specified using range， the product shall adopt separation installation.



高精度测温系统接线图

修正型高精度温度计	Correction type high-precision thermometer
预装20m总线	Preassembled 20m bus
自带集线箱	Collective wire box equipped
每台最多接入31支	Accessed for 31 branches per set at most
网关控制器	Gateway controller
多种信息网	Multiple information network
热负荷模型	Thermal load model
Ethernet 等	Ethernet etc
或者各种控制网	Or various control network
PLC 或DCS控制机架	PLC or DCS control rack
高精度测温系统接线图	Wiring diagram of the high-precision temperature measuring system

重庆市计量质量检测研究院

检 验 报 告

No：2014061900979 共 2 页第 1 页

产品名称	修正型高精度温度计	规格型号	SBWZ
		商标	无
受检单位	重庆市计量质量检测研究院	委托单位	中冶赛迪电气技术有限公司、重庆川仪十七厂有限公司
生产单位	重庆川仪十七厂有限公司、中冶赛迪电气技术有限公司	样品等级	合格品
抽样地点	/	到样日期	2014-06-19
样品数量	5台	样品状态	完整
抽样基数	/	批(货)号或生产日期	2014年2月
检验依据	JJG 229-2010 《工业铂、铜热电阻检定规程》 Q/CY 165-2014《热电偶(阻)一体化温度变送器》		
检验结论	该样品，按国家规程JJG 229-2010《工业铂、铜热电阻检定规程》和企业标准Q/CY 165-2014《热电偶(阻)一体化温度变送器》检验，所得示值符合MPE：±0.05℃的要求。合格 签发日期 2014年6月25日		
备注	送样		

批准： 审核： 主检：

Identification certificate

■SBWZ-2□-C□CM Correction Type High-precision Thermometer

●Specifications

①　②　③④　⑤　⑥⑦　⑧　⑨⑩

SBWZ−2□−C□CM□/□−□−□□/□/□/□

Module	①	Display class on site	No mark：No digital instrument	S：LCD digital instrument
			Notes：The digital instrument is only suitable for single temperature transmitter， and JDY junction box shall be selected.	
	②	Basic error	0.05：0.05℃	0.1：0.1℃
	③	Temperature measuring range℃	0~100	For other temperature range， the product shall be supplied according to the agreement.
Separated installation（if there isn't separation requirements， this item is not selected）	④	Separated junction box	3：Water-proof aluminum casting junction box. 7：Explosion insulation aluminum casting junction box. 9：JDY aluminum casting junction box	Notes：Material of the junction box is defaulted as aluminum casting， for remaining materials; material trademark shall be attached behind the number. For example：304 A type explosion insulation junction box is marked as：7A.
	⑤	Installation form	1：Wall-mounted	2：Pipe type （2″ pipe）
	⑥	Cable lead	GB：Explosion insulation cable	SS：Common shielded lead
	⑦	Cable length s（mm）		
Thermal resistance	⑧	See corresponding type spectrum of armored thermal resistance （the product is based on four-line system， during selecting， please select four-line system）		
Additional unit	⑨	Adaptive heat ring	No mark：Not supplied	H：Equipped
	⑩	Stop valve and installation base	No mark：Not supplied	J：Equipped
			Notes：Standard length of the stop valve and installation base is 120mm	

■Gateway

①

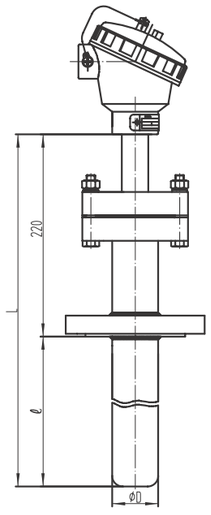
GW−□

Signal transmission	①	Interface protocol of the gateway controller	BI：BAC net/IP BM：BA Cnet MS/TP CO：CAN open CL：CC-Link CN：CompoNet CT：ControlNetDN：Device Net. EC：EtherCAT EI：Ethernet /IP MR：Modbus R TU	MT：Modbus TCP PL：Powerlink PD：Profibus DPV1 PI：Profinet IO SC：Sercos III BT：Bluetooth RS2：RS-232 RS4：RS-485/422 US：USB

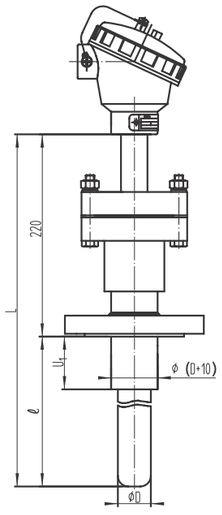
■WR T-RF Special Thermocouple Used for Airheater of the Blast Furnace（Patent No.：ZL200720188275.8）

The special thermocouple used for airheater of the blast furnace is a new product specially developed by our company for steel industry， the product has novel structures， with leakage prevention device， which can completely prevent overflow of high temperature airflow caused by damage of the protective tube， thus can effectively avoid safety accidents. The products are suitable for various airheaters， with the excellent features of bearing high pressure， and withstanding scouring of high-temperature airflow etc.

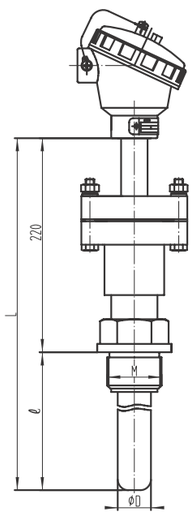
●Structural diagram



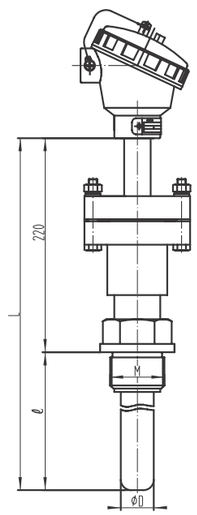
WR□T-53□RF
(Metal tube)



WR□T-53□RF
(Non-metal tube)



WR□T-13□RF
(Non-metal tube)



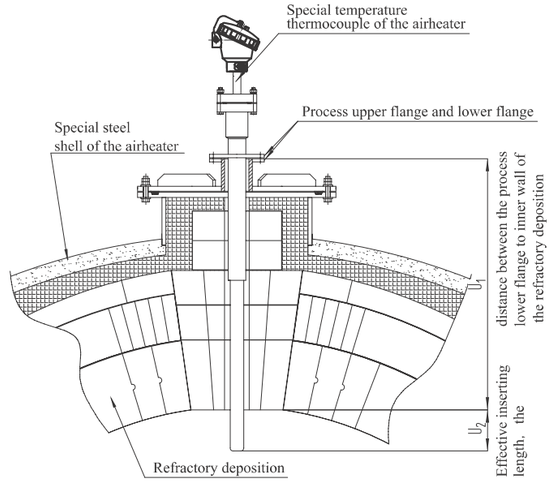
WR□T-13□RF
(Metal tube)

Notes：L=ℓ+220mm U1=300mm

①　②③　④⑤　⑥⑦⑧　⑨⑩
WR□T—□3□ RF—□□—□□□—□ □

WR T-3 RF-			The special thermocouple used for airheater of the blast furnace		
Class	①	Graduation No.	K：K type N：N type	S：S type R：R type	B：B type
Type	②	Installation method	1：Fixed thread	5：Fixed flange	
	③	Diameter of the protective tube	Metal tube	Non-metal tube	Notes：For marking methods of other dimensions：（specific diameter） For example：Φ22（22）
			20：Φ 20 25：Φ 25	25：Φ 25 30：Φ 30 35：Φ 35	
Temperature measuring element	④	Tolerance grade	K，N	S，R	B
			1：±1.5℃ or ±0.4%|t|℃ 2：±2.5℃ or ±0.75%|t|℃	1：±1.0℃or ±{1+0.003 *（t-1100）} 2：±1.5℃ or ±0.25%|t|	P：±4.0℃ or ±0.5%|t|℃
	⑤	The electrical interface	M：M20*1.5 inner thread N1：NPT1/2″ inner thread	Note：Other dimensions shall be marked as：（Specific dimensions）	
Protective tube	⑥	Total length ℓ(mm)			
	⑦	Material of the protective tube	Metal protective tube	Non-metal protective tube	Notes：For marking methods of other materials， see P159
			P：310S B：GH3030 C：GH3039 D：GH214 TC：CYT 108	R：Corundum tube S：Recrystal silicon carbide SS：New silicon carbide JS：Imported silicon carbide	
	⑧	Length inserted ℓ(mm)			
Process connection	⑨	Material of the fixed unit	A：304 H：316 ZA：20#	Notes：For marking methods of other materials， see P159	
	⑩	Specifications of the fixed unit	Fixed thread	Flange	
			M27：M27*2 M33：M33*2	Standard configuration	1.：Single flange 2.Companion flange and fasteners
			Notes：Other thread dimensions， see P157-p157	Standards of the flange	Standard configuration：For the marking method， see P157-P 158
					Standard flange：Standard code-diameter-pressure-sealed surface

●On-site installation diagram of the product



■HO□K Hook-type Sheathed TC for Glass Solution

Hook-type Sheathed TC, composed of water-proof junction box, fixing device and PtRh6 outer protection tube, is named for the insertion terminal form and a new-developed product for glass industry.

Hook-type sheathed TC has such features as wide temperature range, corrosion-resistance to glass solution, fast response and a long life cycle, etc.;

Operating Condition: Glass solution flow pipe, of which the temperature is 1100℃ or so;

Feature: the hook-type hot junction is selected for decrease the lash of the glass solution and effectively measuring the upper layer of the glass solution;

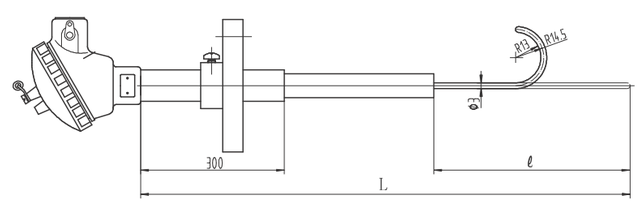
Attentions：During the installation, the hot junction must be positioned between 3cm~7cm from the upper liquid level, of which the temperature is 1100℃； the temperature of the flow pipe is 1060℃， the middle layer is 1300℃ or so, the bottom layer 900℃; The flexible compression-fitting flange is preferred for positioning the insertion of hook-type hot junction;

①　②③④　⑤⑥⑦　⑧⑨⑩

HO□K－3□－□□－□□□－□□□

Type	①	Type	S：S type Platinum Rhodium 10- Platinum R：R type Platinum Rhodium 13- Platinum B：B type Platinum Rhodium 30- Platinum Rhodium 6	
Monel	②	Flange type	3：Flexible flange 4：Fixed flange	0：Fixed compression-fitting flange 8：Flexible compression-fitting flange
Sensor and J.B.	③	Tolerance Class	S、R	B
			P：±3℃ or±0.5%｜t｜℃	P：±4℃ or±0.5%｜t｜℃
	④	Electric connection	M：M20*1.5 Female thread N：NPTl/2" Female thread	G：Gl/2" Female thread Z：ZGl/2"Female thread
			Remarks：1. Any other size of thread should be designed like：（specific size of thread）；2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ③：Any other size of gland should be defined in order;	
Protection tube	⑤	Total Length L（mm）		
	⑥	Sheath Mt'l	DA： PtRh6（Platinum Rhodium 30- Platinum Rhodium 6）	
	⑦	Insertion depth ℓ（mm）		
Process Connection	⑧	Flange Mt'l	A：304	Z：Carbon structure steel + blackening Remark：Any other Mt'l is referred in Page 153;
	⑨	Quantity	1：single	
			2：duplex and fastenings	
	⑩	Size	Fixed flange	Flexible flange Compression-fitting flange
			Standard size: refer to Page 148;	Standard size: refer to Page 148; Standard size: refer to Page 149~150;
			Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form	

● Structure Profile



HO□ K－3□ Type

Chongqing Chuanyi Instrument No.17 Factory Co., Ltd. Address: Longfengqiao Bridge, Beibei District, Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

■WR□-GL Special TC for Glass Furnace

The melting temperature(the whole process temperature is maintained between 800–1500 ℃), as one of the important factors influencing the glass melting, directly affects the glass product quality, yield and cost, etc.; the control of the temperature in melting furnace can improve the furnace production capacity and reduce fuel consumption, in turn ensure the quality of glass.

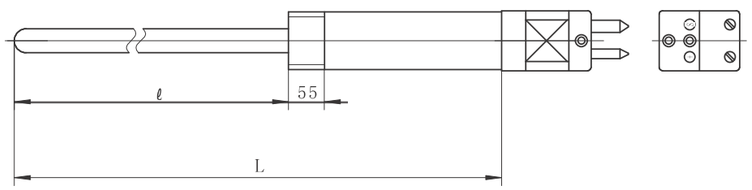
For special thermocouple for glass furnace, the materials of sensitive element and metal protection tube are both platinum & rhodium, special structure is chosen to connect the extension and protection tube, besides, the voltage between extension and protection pipe shall be no less than AC1000V. Long–term temperature is 1600 ℃, short–term temperature 1800 ℃;

①② ③④ ⑤⑥⑦ ⑧

WR□ □－T□ □GL－□ □ □－□

WR□ □－T□ □GL Type				
Type	①	Type	S：S type Platinum Rhodium 10- Platinum R：R type Platinum Rhodium 13- Platinum B：B type Platinum Rhodium 30- Platinum Rhodium 6	
	②	Sensor Quantity	No designation: single	2: duplex
Monel	③	Installation Method	T：Entension with thread 7：Fixed compression-fitting thread	9：Flexible compression-fitting thread
	④	O.D. of Non-metal Protection Tube (mm)	06：Φ6 08：Φ8	10：Φ10
Sensor and Protection Tube	⑤	Tolerance class	S、R	B
			1：±1.0℃ or ±{1+0.003 *(t−1100)}℃ 2：±1.5℃ or ±0.25%｜t｜℃	P：±4℃ or ±0.5%｜t｜℃
	⑥	Protection Tube Mt'l	R: Corundum	
	⑦	Total length L（mm）/ Non-metal tube length ℓ（mm）		
Process Connection	⑧	Thread size	Extension with Thread	Compression-fitting thead
			S:thread length is 55mm; Remark：other size is designated like：（specific diameter） For example: length is 50mm, designation is （50）;	M20：M20*1.5 M27：M27*2 Remark：other specification is designated like：（specific size） For example：M27*1.5：（M27*1.5）

●Structure Profile



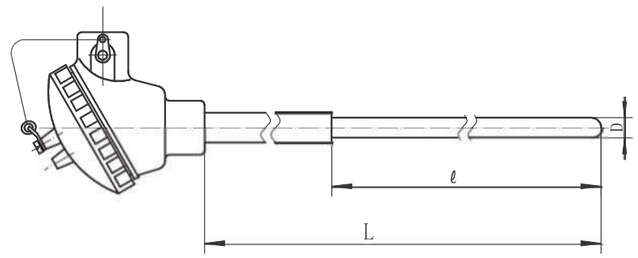
WR□ □ −T□ □ GL type

①② ③④⑤ ⑥⑦ ⑧⑨ ⑩

WR□ □－□ □ □GL－□ □－□ □－□

WR□ □－□ □ □GL Type				
Type	①	Type	S：S type PtRh1-Pt R：R type PtRh13-Pt B：B type PtRh13-PtRh6	
	②	Sensor Quantity	No designation：single	2： duplex
Specification	③	Installation Method	1：No-installatoiin 9： Flexible compression-fitting thread	7：Fixed compression-fitting thread
	④	J.B. specification	3：water-proof die-casting Al. J.B.	3A：water-proof SS J.B.
	⑤	O.D.of Non-metal protection tube D（mm）	08：Φ8 12：Φ12	10：Φ10 16：Φ16
			Remark： other size is designated like：（specific diameter）， for example：Φ14：（14）	
Sensor and J.B.	⑥	Tolerance Class	S、R	B
			1：±1.0℃ or ±{1+0.003 *(t−1100)}℃ 2：±1.5℃ or ±0.25%｜t｜℃	P：±4℃ or ±0.5%｜t｜℃
	⑦	Electric Connection	M：M20*1.5 Female Thread N：NPTl/2" Female Thread	G：Gl/2" Female Thread Z：ZGl/2" Female Thread
			1. Any other size of thread should be designed like：（specific size of thread）； 2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ③； Any other size of gland should be defined in order；	
Protection Tube	⑧	Protection Tube Mt'l	R：Corundum	
	⑨	Total length L（mm）/Non-metal tube length ℓ（mm）：		
Process Connection	⑩	Thread Specification	No-installation	Compression-fitting thread (SS)
			No designation	M20：M20*1.5 M27：M27*2 Remark：other specification is designated like：（specific size），for example：M27*1.5：（M27*1.5）；

●Structure Profile



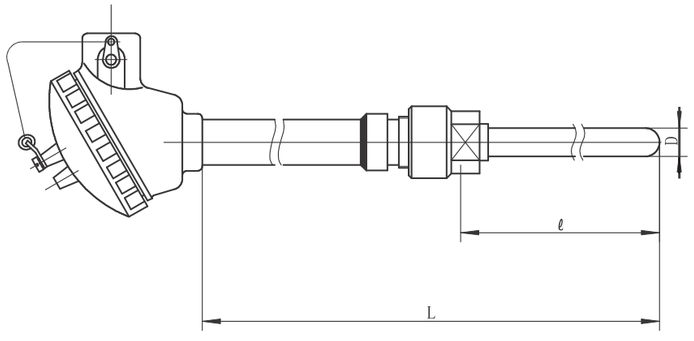
WR□ □ −□ □ □ GL Type
(Non-metal Protection Tube)

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

WR□ □ – □ □ □GL – □ □ – □ □ □ – □

WR□ □ – □ □ □GL型			Junction Boxe type（non-metal protection tube）	
Type	①	Type	S：S type PtRh1-Pt R：R type PtRh13-Pt B：B type PtRh13-PtRh6	
	②	Sensor Quantity	No designation：single	2： duplex
Specification	③	Installation Method	1：No-installatoiin 9： Flexible compression-fitting thread	7：Fixed compression-fitting thread
	④	J.B. specification	3：water-proof die-casting Al. J.B.	3A：water-proof SS J.B.
	⑤	O.D.of Non-metal protection tube D（mm）	08：Φ8 12：Φ12	10：Φ10 16：Φ16
			Remark： other size is designated like：（specific diameter）， for example：Φ14：（14）	
Sensor and J.B.	⑥	Tolerance Class	S、R	B
			1：±1. 0℃ or ±{1+0. 003*(t−1100)}℃ 2：±1. 5℃ or ±0. 25%｜t｜℃	P：±4℃ or ±0. 5%｜t｜℃
	⑦	Electric Connection	M：M20*1.5 Female Thread N：NPTl/2" Female Thread	G：Gl/2" Female Thread Z：ZGl/2" Female Thread
			1. Any other size of thread should be designed like：（specific size of thread）； 2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5，3A and 5A in ③； Any other size of gland should be defined in order；	
Protection Tube	⑧	Thickness（mm）		
	⑨	Material	DA：PtRh6 DC：Pt	DB：PtRh10
	⑩	Total Length L（mm）/Insertion Depth ℓ（mm）：		
Process Connection	⑪	Thread Specification	No-installation	Compression-fitting thread (SS)
			No designation	M20：M20*1.5 M27：M27*2 Remark：other specification is designated like：（specific size），for example：M27*1.5：（M27*1.5）；

● Structure Profile



WR□ □ −□ □ □ GL Type
(Non-metal Protection Tube)

TC/RTD for Power Plant

Chongqing Chuanyi Instrument No.17 Factory Co.，Ltd. Address：Longfengqiao Bridge，Beibei District，Chongqing City Tel.（023）68261222 Fax：（023）68263847 Post Code：400700

Temperature Measuring in Power Plant

TC(RTD)

Power plant temperature measuring thermocouples/RTDs are mainly used to measure temperatures of steam pipes and boilers. Their protecting tubes are combined with armored thermocouples/RTDs. Users may weld protecting tubes or mechanically fix them on equipment, and then equip armored thermocouples/RTDs. Their advantages include increasing of working pressures, longer service life, easiness in maintenance or repair. At present, the structure is widely used at home and abroad. Power plant temperature measuring thermocouples are of five different structures, which have different ways of mounting. Users may choose one according to different requirements on temperature, pressure and steam flow rate.

■ Features

Our protecting tubes are manufactured with deep blind hole technology. Their ends are not welded so as to increase strength and service life of protecting tubes. Armored thermocouple/RTD is of spring load structure. In operation, protecting tube and armored thermocouple/RTD measurement end always well contact with each other to resist shock and reduce thermal response time. Armored thermocouple is insulated so as to avoid magnetic interference

■ Main Technical Data

●For TC

Name	Model	Type	Tolerance Class		Range(℃)	Nominal Pressure (MPa)	Flow Velocity(m/s)	Thermal Response Time τ 0.5(S)	Mt'l of Protection Tube
			Class 1	Class 2					
Heat-shielded TC	WRKKD□-01A(B)	K	±1.5℃ or ±0.4%|t|	±2.5℃ or ±0.75%|t|	0~600	29.4 (42)※	<80	<180	316 304
	WREKD□-01A(B)	E							
Air flue TC	WRKKD□-02A(B)	K			0~800	9.8	<9	<90	304
	WREKD□-02A(B)	E			0~700				
High Pressure TC	WRKKD□-03A(B)	K			0~600	29.4 (42) ※	<80	<180	316 304
	WREKD□-03A(B)	E							
Midium Pressure TC	WRKKD□-04	K			0~600	14.7	<30	<180	304
	WREKD□-04	E							
Low Pressure TC	WRKKD□-05	K			0~600	9.8(14. 7)	<9(30)	<180	304
	WREKD□-05	E							

Remark: 1. Protection tube of other materials can be customerized; 2. ※ means consultative;

●For RTD

Name	Model	Type	Tolerance		Range (℃)	Nominal Pressure (MPa)	Velocity (m/s)	Thermal Response Time τ0.5 (S)	Mt'l of Protection Tube
			Class 1	Class 2					
Heat-shielded TC	WZPKD□-01A(B)	Pt100	±(0.15+0.2%|t|)	±(0.3+0.5%|t|)	0~600	29.4 (42) ※	<80	<180	316 304
Air Flue TC	WZPKD□-02A(B)				0~600	9.8	<9	<90	304
High-pressure TC	WZPKD□-03A(B)				0~600	29.4 (42) ※	<80	<180	316 304
Medium Pressure TC	WZPKD□-04				0~600	14.7	<30	<180	304
Low Pressure TC	WZPKD□-05				0~600	9.8 (14.7)	<9(30)	<180	304

Remark: 1. Protection tube of other materials can be customerized; 2. ※ means consultative;

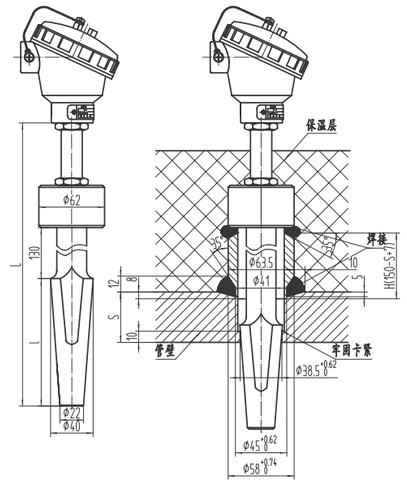
●WR□ DKD Sheathed Thermocouple

① ② ③④⑤ ⑥⑦⑧

WR□KD□-01A-□□□-□□□

WR□KD□-04 type			Medium-pressure type (welded type)	
Classification	①	type	K: K type Nickel chrome-nickel silicon	E: E type Nickel chrome-Nickel copper (Constantan)
	②	Quantity	No designation: single (hot junction is of un-grounded type) 2: duplex (hot junction is seperately ungrounded type)	
Sensor and J.B.	②	Tolerance Class	1: ±1.5℃ or ±0.4%|t|℃ 2: ±2.5℃ or ±0.75%|t|℃	
	④	J.B. Specification	No designation: die-casting Al.	A: SS
	⑤	Elecctric Connection	M: M20*1.5 Female Thread N: NPT1/2" Female Thread	G: G1/2" Female Thread Z: ZG1/2" Female Thread
			Remarks: 1. Any other size of thread should be designed like: (specific size of thread); 2. Nylon sealing gland of M20*1.5 is standard for water-proof J.B., which is applied for3, 5,3A and 5A in ③: Any other size of gland should be defined in order;	
Protection Tube	⑥	Total Length L	470: 470mm	Remark: when L≠470mm, it is consultative;
	⑦	Mt'l of Protection Tube	A: 304 H: 316 HL: 316L ZA: 20# Carbon Steel	ZB: 12Cr1MoV ZC: 15NiCuMoNb5-6-4 ZD: 15CrMo ZE: A335P91
			Remark: any other materials is designated like: (specific brand number);	
	⑧	Insertion Depth ℓ	120: 120mm	Remark: when ℓ≠120mm, it is consultative;

Remark: refer to Page 144;



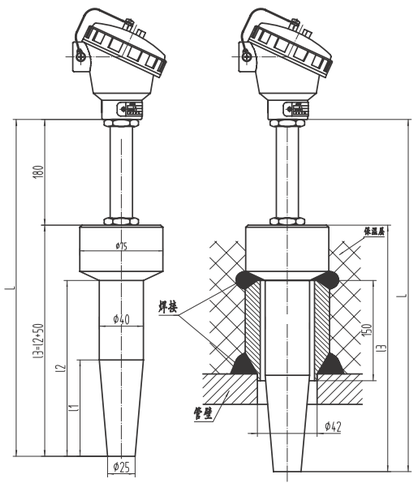
WR □KD-01A型

① ② ③④⑤ ⑥⑦⑧

WR□KD□-01B-□□□-□□□

WR□ KD□ -01B type			Thermal Insulation	
Classification	①	Type	K: K type Nickel chrome-nickel silicon; E: E type Nickel chrome-Nickel copper (Constantan)	
	②	Sensor Quantity	No designation: single (hot junction is of un-grounded type) 2: duplex (hot junction is seperately ungrounded type)	
Sensor and J.B.	③	Tolerance Class	1: ±1.5℃ or ±0.4%|t|℃ 2: ±2.5℃ or ±0.75%|t|℃	
	④	J.B. Mt'l	No designation: die-casting Al.	A: SS
	⑤	Electric Connection	M: M20*1.5 Female Thread N: NPT1/2" Female Thread	G: G1/2" Female Thread Z: ZG1/2" Female Thread
			Remarks: 1.Any other size of thread should be designed like: (specific size of thread); 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B., which is applied for3, 5,3A and 5A in ③: Any other size of gland should be defined in order;	
Protection Tube	⑥	Total Length L (mm)		
	⑦	Mt'l	A: 304 H: 316 HL: 316L ZA: 20# carbon steel	ZB: 12Cr1MoV ZC: 15NiCuMoNb5-6-4 ZD: 15CrMo ZE: A335P91
			Remark: any other materials is designated like: (specific brand number)	
	⑧	Inertion depth l1/l2/l3 (mm)		

Remark: refer to Page 144;



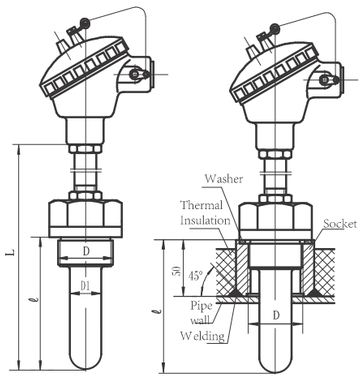
WR □KD-01B型

① ② ③④⑤ ⑥⑦⑧⑨⑩ ⑪

WR□KD□－02A－□ □ □－□ □ □ □ □－□

Classification	①	type	K: K type Nickel chrome–nickel silicon	E: E type Nickel chrome–Nickel copper(Constantan)
	②	Quantity	No designation: single (hot junction is of un–grounded type) 2: duplex (hot junction is seperately ungrounded type)	
Sensor and J.B.	③	Tolerance Class	1: ±1.5℃ or ±0.4% | t |℃ 2: ±2.5℃ or ±0.75% | t |℃	
	④	Material	No designation: die–casting Al.	A SS
	⑤	Electric Connection	M: M20*1.5 Female Thread N: NPT1/2" Female Thread	G G1/2" Female Thread Z ZG1/2" Female Thread
			Remarks: 1.Any other size of thread should be designed like : (specific size of thread) ; 2.Nylon sealing gland of M20*1.5 is standard for water–proof J.B. , which is applied for3 , 5,3A and 5A in ③; Any other size of gland should be defined in order ;	
Protection Tube	⑥	O.D. of Protection Tube (mm)	20: Φ20 28: Φ28	25: Φ25
	⑦	Material	A: 304 H: 316	P: 310S
			Remark: any other materials is designated like : (specific brand number) ;	
	⑧	Inertion Depth L/1(mm)		
	⑨	Surface Treatment	No designation: no surface treatment	SW: Spary welding
	⑩	Length of Surface Treatment l1 (mm) :		
Process Connection	⑪	Bolt Size	M33: M33*2 M60: M60*3	N4: NPT2" Z4: ZG2" R2")
			Remark: M33*2 is not applicable for protection tube, of which the diameter is ≥Φ 28;	

Remark: refer to Page 144——sockets



L	ℓ	D
480	230	M60×3
680	430	
880	630	R2"
1380	1130	NPT2"

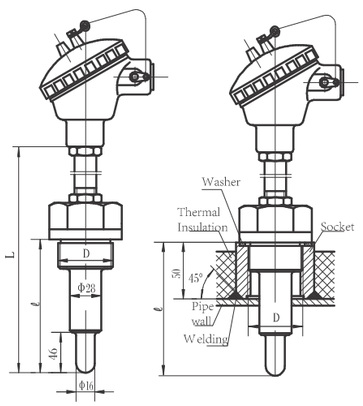
WR□KD-02A type

① ② ③④⑤ ⑥⑦⑧ ⑨

WR□KD□－02B－□ □ □－□ □ □ □－□

WR□KD□–02B type			Air flue type (reducing)	
Classification	①	type	K: K type Nickel chrome–nickel silicon	E: E type Nickel chrome–Nickel copper(Constantan)
	②	Sensor quantity	No designation: single (hot junction is of un–grounded type) 2: duplex (hot junction is seperately ungrounded type)	
Sensor and J.B.	③	Tolerance	1: ±1.5℃ or ±0.4% | t |℃ 2: ±2.5℃ or ±0.75% | t |℃	
	④	Material	No designation: die–casting Al.	A: SS
	⑤	Electric Connection	M: M20*1.5 Female thread N: NPT1/2" Female thread	G: G1/2" Female thread Z: ZG1/2" Female thread
			Remarks: 1.Any other size of thread should be designed like : (specific size of thread) ; 2.Nylon sealing gland of M20*1.5 is standard for water–proof J.B. , which is applied for3 , 5,3A and 5A in ③; Any other size of gland should be defined in order ;	
Protection Tube	⑥	Total Length L (mm)		
	⑦	Protection tube material	A: 304 H: 316	P: 310S
			Remark: other material designati on refers to Page 153 ;	
	⑧	Inertion depth l (mm)		
Process Connection	⑨	Bolt Szie	M60: M60*3 N4: NPT2"	Z4: ZG2" R2")

Remark: refer to Page 144——sockets



L	ℓ	D
480	230	M60×3
680	430	
880	630	R2"
1380	1130	NPT2"

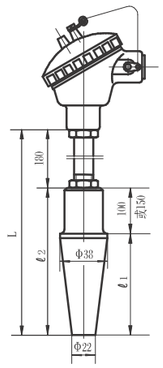
WR□KD-02B type

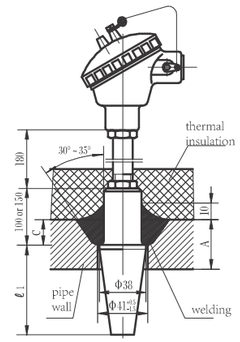
① ② ③④⑤ ⑥⑦⑧⑨

WR□KD□－03A－□ □ □－□ □ □ □

WR□KD□–03A type			High–pressure type	
Classification	①	Type	K: K type Nickel chrome–nickel silicon	E: E type Nickel chrome–Nickel copper(Constantan)
	②	Sensor Quantity	No designation: single (hot junction is of un–grounded type) 2: duplex (hot junction is seperately ungrounded type)	
Sensor and J.B.	②	Tolerance	1: ±1.5℃ or ±0.4% | t |℃ 2: ±2.5℃ or ± 0.75% | t |℃	
	④	Material	No designation: die–casting Al.	A: SS
	⑤	Electric Connection	M: M20*1.5 Female thread N: NPT1/2" Female thread	G G1/2" Female thread Z ZG1/2" Female thread
			Remarks:1.Any other size of thread should be designed like : (specific size of thread) ; 2.Nylon sealing gland of M20*1.5 is standard for water–proof J.B., which is applied for3 , 5,3A and 5A in ③; Any other size of gland should be defined in order ;	
Protection Tube	⑥	Tip O.D. (mm)	A: 22 (applied for the condition of the pressure<35MPa)	
			B: 25 (applied for the condition of the pressure between 35Mpa~42Mpa)	
	⑦	Total length L(mm):		
	⑧	Material	A: 304 H: 316 HL: 316L ZA: 20# carbon steel	ZB: 12Cr1MoV ZC: 15NiCuMoNb5–6–4 ZD: 15CrMo ZE: A335P91
			Remark: any other materials is designated like : (specific brand number)	
	⑨	Insertion depth l1/l2 (mm)		

Remark: refer to Page 144—sockets;





Insertion depth ℓ1: 50, 100, 150, 200, 250

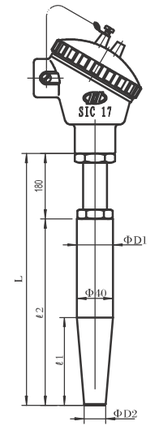
WR□KD—03A type

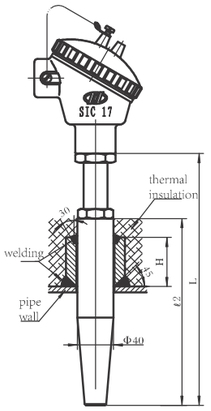
① ② ③④⑤ ⑥⑦⑧⑨

WR□KD□－03B－□ □ □－□ □ □ □

WR□KD□?3B type			High pressure type	
Classification	①	Type	K: K type Nickel chrome–nickel silicon	E: E type Nickel chrome–Nickel copper (Constantan)
	②	Sensor Quantity	No designation: single (hot junction is of un–grounded type) 2: duplex (hot junction is seperately ungrounded type)	
Sensor and J.B.	③	Tolerance	1: ±1.5℃ or ±0.4% | t |℃ 2: ±2.5℃ or ±0.75% | t |℃	
	④	Material	No designation: Al.	A: SS
	⑤	Electric Connection	M: M20*1.5 Female thread N: NPT1/2 Female thread	G: G1/2" Female thread Z: ZG1/2" Female thread
			Remarks: 1.Any other size of thread should be designed like : (specific size of thread) ; 2.Nylon sealing gland of M20*1.5 is standard for water–proof J.B., which is applied for3 , 5,3A and 5A in ③; Any other size of gland should be defined in order;	
Protection Tube	⑥	O.D. D1/D2(mm)	A: 28/18 (applied for the condition of the pressure<35MPa)	
			B: 38/25 (applied for the condition of the pressure between 35Mpa~42Mpa)	
	⑦	Total length L(mm):		
	⑧	Material	A: 304 H: 316 HL: 316L ZA: 20# carbon steel	ZB: 12Cr1MoV ZC: 15NiCuMoNb5–6–4 ZD: 15CrMo ZE: A335P91
			Remark: any other materials is designated like : (specific brand number)	
	⑨	Insertion depth l1/l2(mm)		

Remark: refer to Page 144—sockets;



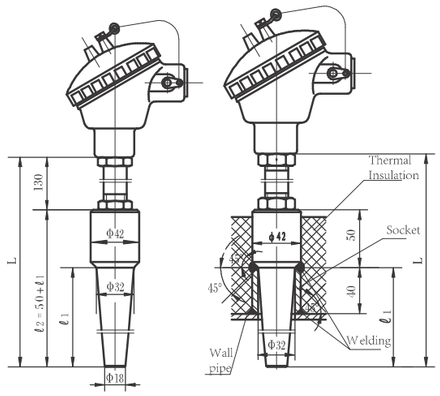


WR□KD-03B type

① ② ③④⑤ ⑥⑦⑧

WR□KD□－04－□ □ □－□ □ □

WR□KD□－4 type			Medium pressure type(welded type)	
Classification	①	type	K: K type Nickel chrome－nickel silicon	E: E type Nickel chrome－Nickel copper（Constantan）
	②	Sensor Quantity	No designation：single（hot junction is of un－grounded type) 2：duplex （hot junction is seperately ungrounded type）	
Sensor and J.B.	③	Tolerance Class	1：±1.5℃ or ±0.4%｜t｜℃ 2：±2.5℃ or ±0.75%｜t｜℃	
	④	Material	No designation: die－casting Al.	A: SS
	⑤	Electric Connection	M：M20*1.5 Female thread N：NPT1/2" Female thread	G G1/2" Female thread Z ZG1/2" Female thread
			Remarks：1.Any other size of thread should be designed like：(specific size of thread)； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	
Protection Tube	⑥	Total length L（mm）:		
	⑦	Material	A：304 H：316	ZB：12Cr1MoV ZC：15NiCuMoNb5－6－4 ZE：A335P91
			ZA：20# carbon steel	
			Remark: any other materials is designa ted like: (specific brand number);	
	⑧	Inertion depth l1/l2（mm）:		



Inertion depth ℓ：50，100，150，200，250，300

WR□KD－04 type

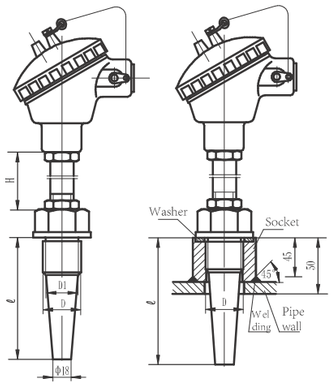
Remark：refer to page 144--sockets；

① ② ③④⑤ ⑥⑦⑧ ⑨

WR□KD□－05－□ □ □－□ □ □－□

WR□KD□--05 type			Medium/low pressure type（welded）		
Classification	①	Type	K：K type Nickel chrome－nickel silicon	E：E type Nickel chrome－Nickel copper（Constantan）	
	②	Sensor quantity	No designation：single （hot junction is of un－grounded type) 2：duplex （hot junction is seperately ungrounded type）		
Sensor and J.B.	③	Tolerance Class	1：±1.5℃ or ±0.4%｜t｜℃ 2：±2.5℃ or ±0.75%｜t｜℃		
	④	Material	No designation：die－casting Al.	A：SS	
	⑤	Electric Connection	M：M20*1.5 Female thread N：NPT1/2" Female thread	G：G1/2" Female thread Z：ZG1/2" Female thread	
			Remarks：1.Any other size of thread should be designed like：（specific size of thread）； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；		
Protection Tube	⑥	Total length L（mm）:			
	⑦	Material	A：304 H：316	HL：316L	
			Remark: any other materials is designated like：（specific brand number）		
	⑧	Insertion depth l（mm）:			
	⑨	Bolt size	M27：M27*2（applicable for the pressure ≤ 9.8MPa） N2：NPT3/4"(applicable for the pressure ≤ 9.8MPa）	M33：M33*2 Z3：ZG1"（R1"）	
			Remark：other size is designation lik：（specific size）		

Remark：refer to page 144－－sockets；



D	D1	H
M33×2 NPT1" R1"	Φ28	Common，H=130；When used in conden sator，H=2000 or 2500；
M27×2	Φ23	

Insertion depth ℓ：100，150，200，250，300，320，400，450，500

WR□KD－05 type

■ WR□T□－11 Boiler Wall TC and Hold Hoop TC

Boiler wall is mainly used to measure surface temperature of boiler tube wall, fire wall and other cylinder.Φ3~Φ6mm armored component is used as temperature measurement end, lead is cable shape. Measurement end is welded or fixed with screw on stainless steel temperature sensing strip （welding is not applicable to thermocouple）. Temperature sensing strip with curved face matching with fire wall is welded or hoped on fire wall（duc） to measure surface temperature of fire wall, duct and cylinder.

●Main Technical Data

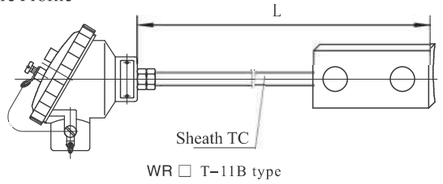
Name	Model	Type	Range ℃	Tolerance Class	Sheath Diameter mm	Hot Junction				Installation
						Thermal Response Time $t_{0.5}$※		Curve surface（mm）		
						Grounded	Insulation	R	D	
Boiler wall TC	WRKT－llA(B)	K	0~800	Class 1 Class 2	Φ4 Φ5 Φ6	≤0. 8S	≤2. 5S	As per the installation dimension of the pipe		Block and the facility is welded or screw－fastened; TC and block are screw－fastened；
	WRNT－llA(B)	N	0~800							
	WRET－llA(B)	E	0~600							
Hold hoop TC	WRKT－11G	K	0~800	Class 1 Class 2	Φ4 Φ5 Φ6	≤2S	≤6S			Hold－hoop－fastened;
	WRNT－11G	N	0~800							
	WRET－11G	E	0~600							

① ② ③④⑤⑥ ⑦⑧

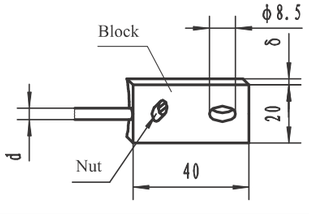
WR□T□－11B－□□□□－□□

WR□T□－11B type			Boiler Wall TC(J.B. type)	
Type	①	Type	K：K type Nickel chrome－nickel silicon N：N type Nickel chrome silicon －nickel silicon magnesium E：E type Nickel chrome－Nickel copper(Constantan)	
	②	Quantity	No designation：single （hot junction is ungrounded） 2： duplex（hot junction is separately ungrounded）	
Sensor	③	Tolerance Class	1：± 1.5℃ or ±0.4%｜t｜℃ 2：± 2. 5℃ or ± 0.75%｜t｜℃	
	④	Sheath diameter（mm）	F：Φ4 H：Φ5	J：Φ6
	⑤	Total Length L（mm）		
	⑥	Sheath material	G： 0Cr18Ni9Ti H：316	HL：316L
			Remark：other material designati on refers to Page 153；	
J.B.	⑦	J.B.	3：water－proof B type die－casting Al. J.B. 3A：water－proof B type SS J.B.	
	⑧	Electric Connection	M： M20*1.5 Female thread N： NPT1/2" Female thread	G： G1/2 Female thread Z： ZG1/2" Female thread
			Remarks: 1. Any other size of thread should be designed like：（specific size of thread）； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	

●Structure Profile



WR□ T－11B type



①　②　　③④⑤⑥　⑦⑧

WR□T□－11A－□□□□－□□

WR□T□－11A type			Boiler Wall TC(compensating cable type)	
Type	①	type	K：K type Nickel chrome–nickel silicon N：N type Nickel chrome silicon – nickel silicon magnesium E：E type Nickel chrome–Nickel copper(Constantan)	
	②	quantity	No designation： single （hot junction is ungrounded） 2： duplex（hot junction is separately ungrounded）；	
Sensor	②	Tolerance Class	1：± 1.5℃ or ± 0.4% | t |℃ 2：± 2.5℃ or ± 0.75% | t |℃	
	④	Sheath Diameter (mm)	F：Φ4 H：Φ5	J：Φ6
	⑤	Total Length L （mm）：		
	⑥	Sheath Material	G： 0Cr18Ni9Ti H： 316	HL： 316L
			Remark： other material designation refers to Page 153;	
Compensting cable	⑦	Compensting cable	S： ordinary thermal–resistant compensating cable SS： ordinary oil–and–heat–resistant shielded compensating cable	
	⑧	Compensting cable length(mm)		

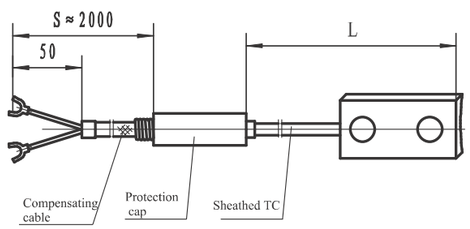
●Block

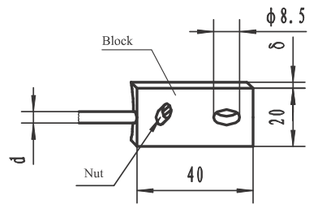
①　②③

PD－B－□R□□

①	Sheath diameter(mm)	4：Φ4 5：Φ5	6：Φ6
②	Curve Radius（m m）		
③	Material	A：304 H：316	HL： 316L
		Remark： other material designati on refers to Page 153;	

●Structure Profile





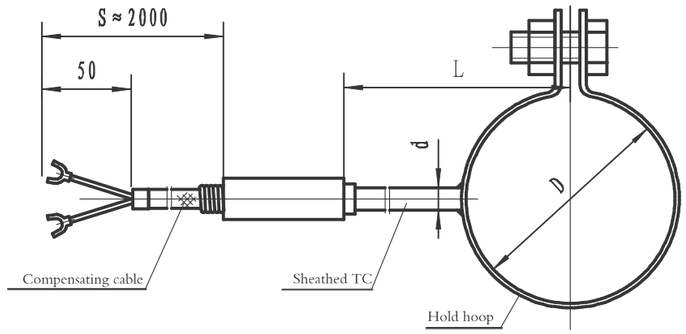
WR □ T-11A type

①　　②③④⑤　⑥⑦　⑧

WR□T－11G－□□□□－□□－□

WR□T－11GTYPE			Hold–hoop TC	
type	①	type	K：K type Nickel chrome–nickel silicon N：N type Nickel chrome silicon – nickel silicon magnesium E：E type Nickel chrome–Nickel copper(Constantan)	
Sensor	②	Tolerance Class	1：± 1.5℃ or ±0.4% | t |℃ 2：± 2.5℃ or ± 0.75% | t |℃	
	③	Sheath Diameter （mm）	F：Φ4 H：Φ5	F：Φ4 H：Φ5
	④	Total Length L （mm）：		
	⑤	Sheath Mt	G： OCr18Ni9Ti H： 316	HL： 316L
			Remark：other material designati on refers to Page 153；	
Compensting cable	⑦	Compensting cable	S： ordinary thermal–resistant compensating cable SS： ordinary oil–and–heat–resistant shielded compensating cable	
	⑦	Compensting cable length （mm）：		
Hold hoop	⑧	Hold–hoop I.D. D （mm）：		

●Structure Profile



WR □ T-11G type

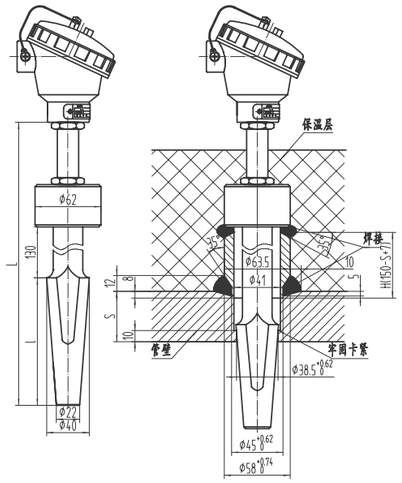
●WZPKD Series Sheathed TC for Power Plant

① ②③④⑤⑥ ⑦⑧⑨

WZPKD□－01A－□□□□□□－□□□

WZPKD□－01A type			Heat-shielded type	
Type	①	Sensor Quantity	No designation： single	2：duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3： three-wire system	4：four-wire system
	④	type	P2： Pt100	
	⑤	J.B. Mt’l	No designation：die-casting Al.	A: SS
	⑥	Electric Connection	M：M20*1.5 Female thread	G：G1/2" Female thread
			N： NPT1/2" Female thread	Z：ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5,3A and 5A in ③; Any other size of gland should be defined in order;	
Protection Tube	⑦	Total Length L	470：470 mm	When L≠470mm, the order is consultatice;
	⑧	Material	A：304 H：316 HL：316L ZA：20# carbon steel	ZB：12Cr1MoV ZC：15NiCuMoNb5-6-4 ZD：15CrMo ZE：A335P91
			Remark: other material is designated like：（specific code no.）；	
	⑨	Inertion Depth S	120： 120mm	Remark：when l≠120mm, the order is consultative；

Remark：refer to page 144--sockets



插入深度l：120 注：S≥20

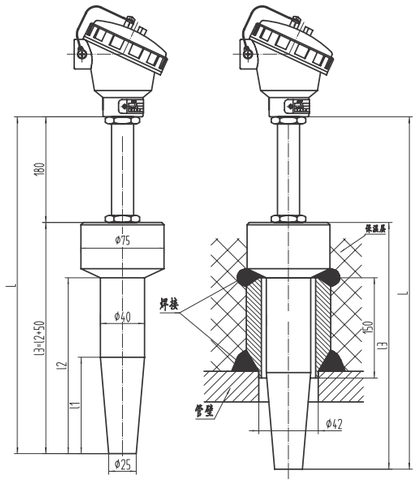
WZPKD-01A型

① ②③④⑤⑥ ⑦⑧⑨

WZPKD□－01B－□□□□□□－□□□

WZPKD□－01B type			Thermal-shielded type	
Type	①	Sensor quantity	No designation：single	2：dupex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3：three-wire system	4：four-wire system
	④	type	P2：Pt100	
	⑤	material	No designation：die-casting Al.	A: SS
	⑥	Electric Connection	M：M20*1.5 Female thread	G：G1/2" Female thread
			N： NPT1/2" Female thread	Z：ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5,3A and 5A in ③; Any other size of gland should be defined in order；	
Protection Tube	⑦	Total Length L（mm）		
	⑧	Material	A： 304 H： 316 HL： 316L ZA： 20# carbon steel	ZB： 12Cr1MoV ZC： 15NiCuMoNb5-6-4 ZD： 15CrMo ZE： A335P91
			Remark： other material is designated like：（specific code no.）；	
	⑨	Insertion depth l1/l2/l3（mm）		

Remark：refer to Page 144—sockets；



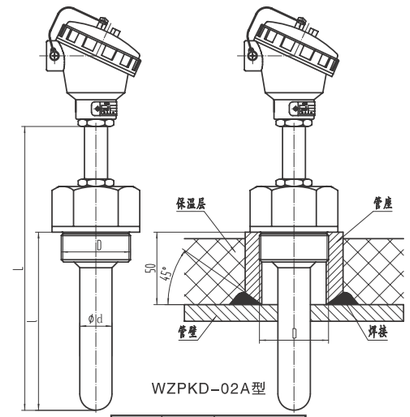
WZPKD-01B型

① ②③④⑤⑥ ⑦⑧⑨⑩⑪ ⑫

WZPKD□－02A－□□□□□□－□□□□□－□

WZPKD□－02A type			Air flue type	
Type	①	Sensor Quantity	No designation：single	2：duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3： three-wire system	4：four-wire system
	④	Type	P2： Pt100	
	⑤	material	No designation: die-casting Al.	A: SS
	⑥	Electric connection	M：M20*1.5 Female thread	G： G1/2" Female thread
			N： NPT1/2" Female thread	Z： ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.，which is applied for3，5,3A and 5A in ③; Any other size of gland should be defined in order；	
Protection Tube	⑧	Protection Tube O.D (mm)	20：Φ20 28：Φ28	25：Φ25
	⑧	material	A： 304 H： 316	HL：316L
			Remark： other material is designated like：（specific code no.）；	
	⑨	Total Length L1（mm）：		
	⑩	Surface Treatment	No designation：no surface treatment	SW: Spray welding
	⑪	Surface treatment length l 1（mm）：		
Process connection	⑫	Bolt size	M33：M33*2 M60：M60*3	N4：NPT2" Z4：ZG2"（R2"）
			Remark: M33*2 is not applicable for the protection tube of the diameter ≥ Φ28;	

Remark：refer to page 144--sockets



WZPKD-02A型

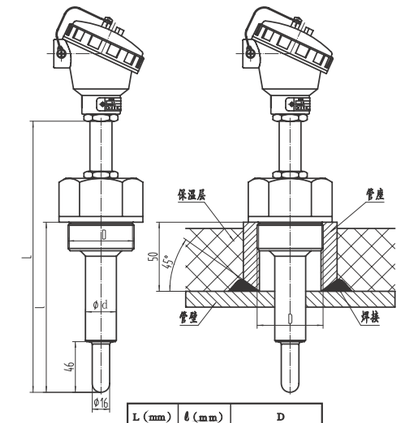
L（mm）	l（mm）	D
480	230	M60×3
680	430	
880	630	R2" NPT2"
1380	1130	

① ②③④⑤⑥ ⑦⑧⑨ ⑩

WZPKD□－02B－□□□□□□－□□□－□

WZPKD□－02B type			Air flue type （reducing）	
Type	①	Sensor Quantity	No designation： single	2：duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3：three-wire system	4：four-wire system
	④	Type	P2：Pt100	
	⑤	material	No designation： die-casting Al.	A: SS
	⑥	Electric connection	M：M20*1.5 Female thread	G：G1/2" Female thread
			N：NPT1/2" Female thread	Z：ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water-proof J.B.， which is applied for3，5,3A and 5A in ③; Any other size of gland should be defined in order；	
Protection Tube	⑦	Total length L（mm）：		
	⑧	material	A： 304 H： 316	HL：316L
			Remark：other material is designated like：（specific code no.）；	
	⑨	Insertion depth l（mm）：		
Process connection	⑩	Bolt size	M60：M60*3 N4：NPT2"	Z4：ZG2"（R2"）

Remark：refer to page 144——sockets；



WZPKD-02B型(对接式)

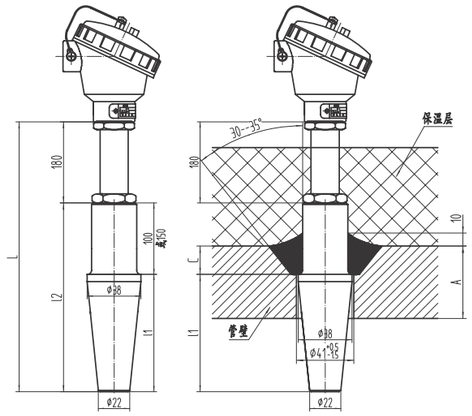
L（mm）	l（mm）	D
480	230	M60×3
680	430	
880	630	R2" NPT2"
1380	1130	

WZPKD-02B型

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

WZPKD□－03A－□ □ □ □ □ □－□ □ □ □

WZPKD□－03A type			High pressure type	
Type	①	Sensor Quantity	No designation： single	2：duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3：three－wire system	4 four－wire system
	④	Type	P2：Pt100	
	⑤	material	No designation:die－casting Al.	A: SS
	⑥	Electric connection	M：M20*1.5 Female thread N： NPT1/2" Female thread	G： G1/2" Female thread Z： ZG1/2" Female thread
			Remarks： 1. Any other size of thread should be designed like：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	
Protection Tube	⑦	Tip O.D.（mm）：	A：22（applicable for pressure <35MPa） B：25（applicable for pressure between 35MPa~42MPa ）	
	⑧	Total length L（mm）：		
	⑨	material	A： 304 H： 316 HL： 316L ZA： 20#carbon steel	ZB： 12Cr1MoV ZC： 15NiCuMoNb5－6－4 ZD： 15CrMo ZE： A335P91
			Remark：other material is designated like ：（specific code no. ）；	
	⑩	Insertion depth l1/l2（mm）：		



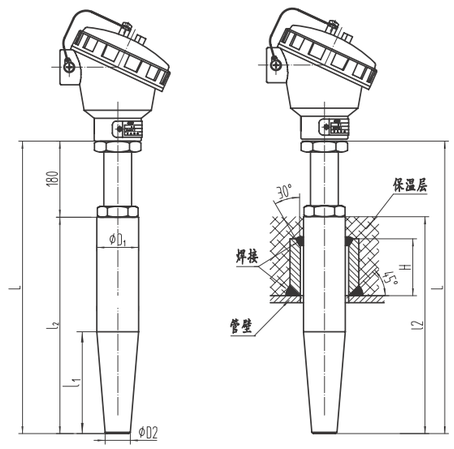
插入深度ℓ1：50,100,150,200,250

WZPKD－03A型

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

WZPKD□－03B－□ □ □ □ □ □－□ □ □ □

WZPKD□－03B type			High pressure type	
Type	①	Sensor Quantity	No designation：single	2：duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3：three－wire system	4：four－wire system
	④	Type	P2：Pt100	
	⑤	material	No designation：die－casting Al.	A：SS
	⑥	Electric connection	M：M20*1.5 Female thread N： NPT1/2" Female thread	G：G1/2" Female thread Z：ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	
Protection Tube	②	O.D.of Protection tbue D1/D2(mm)：	A：28/18（applicable for pressure <35MPa）	
			B：38/25（applicable for pressure between 35MPa~42MPa ）	
	③	Total length L(mm)：		
	⑨	material	A： 304 H： 316 HL： 316L ZA： 20# carbon steel	ZB： 12Cr1MoV ZC： 15NiCuMoNb5－6－4 ZD： 15CrMo ZE： A335P91
			Remark：other material is designated like ：（specific code no. ）；	
	⑩	Insertion depth l1/l2（mm）：		



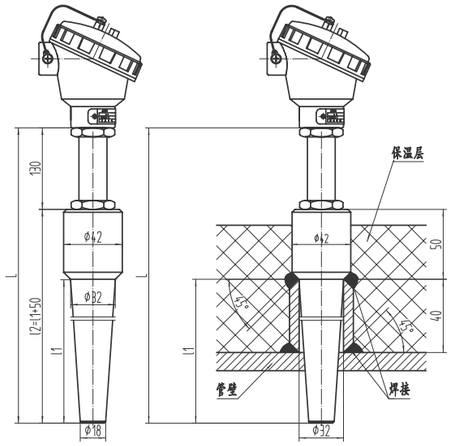
WZPKD－03B型

Remark：refer to Page 144—sockets；

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

WZPKD□－04－□ □ □ □ □ □－□ □ □

WZPKD□－04 type			Medium pressure type(welding)	
Type	①	Sensor Quantity	No designation：single	2:duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	⑤	Hot junction structure	3：three－wire system	4:four－wire system
	⑥	Type	P2：Pt100	
	⑤	material	No designation：die－casting Al.	A: SS
	⑥	Electric connection	M：M20*1.5 Female thread N： NPT1/2" Female thread	G： G1/2" Female thread Z： ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like ：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	
Protection Tube	⑦	Total length L（mm）：		
	⑧	material	A： 304 H： 316 ZA： 20#carbon steel	ZB： 12Cr1MoV ZC： 15NiCuMoNb5－6－4 ZE： A335P91
			Remark：other material is designated like ：（specific code no. ）；	
	⑨	Insertion depth l1/l2（mm）：		



插入深度ℓ：50,100,150,200,250,300

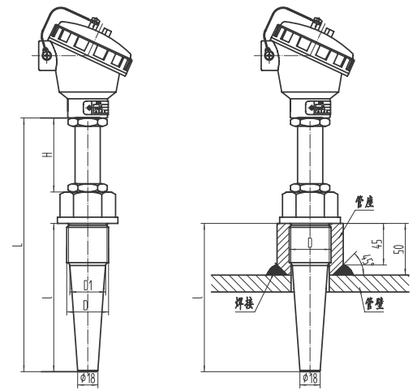
WZPKD－04型

Remark：refer to Page 144—sockets；

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

WZPKD□－05－□ □ □ □ □ □－□ □ □ －□

WZPKD□－05 type			Medium/low－pressure type（thread type）	
Type	①	Sensor Quantity	No designation：single	2：duplex
Sensor and J.B.	②	Tolerance Class	A：±（0.15+0.2%｜t｜）℃ B：±（0.3+0.5%｜t｜）℃	
	③	Hot junction structure	3：three－wire system	4：four－wire system
	④	Type	P2：Pt100	
	⑤	material	No designation：die－casting Al.	A: SS
	⑥	Electric connection	M：M20*1.5 Female thread N： NPT1/2" Female thread	G：G1/2" Female thread Z：ZG1/2" Female thread
			Remarks：1. Any other size of thread should be designed like ：（specific size of thread ）； 2.Nylon sealing gland of M20*1.5 is standard for water－proof J.B.， which is applied for3，5,3A and 5A in ③；Any other size of gland should be defined in order；	
Protection Tube	⑦	Total Length L（mm）		
	⑧	material	A： 304 H： 316	HL：316L
			Remark：other material is designated like ：（specific code no. ）；	
	⑨	Insertion depth l（mm）：		
Process Connection	⑩	Thread size	M60：M60*3 N4：NPT2"	Z4：ZG2"（R2"）
			Remark：Any other size of thread should be designed like ：（specific size of thread ）；	



D	D1	H
M33×2 NPT1" R1" M27×2	Φ28 Φ23	常规产品H=130， 当产品用于冷凝器 时H=2000或2500

插入深度l：100,150,200,250,300,320,400,450,500

WZPKD－05型

Remark：refer to Page 144—sockets；

■Compensation Lead Used for the Thermocouple

The thermocouple compensation lead is a measurement measuring system， it is constructed by connecting the extended hot electrode， that is， cold end of the mobile thermocouple and the display instrument. The products shall meet GB/T4989-2013 the Compensation Lead Used for the Thermocouple， equivalent to the international standard：IEC584-3 （1989） the Thermocouple：Part III- Compensation Lead and Its Tolerance and Color Identifications.

The compensation lead can be divided into extended type and compensation type. The lead that has the same materials with two thermocouple wires of the graduation number is called extended type. And the lead made of Cu-CuNi material in different ratio is called compensation lead.

●Characteristics

The two kinds of compensation leads have good acid-proof， alkali-proof， wear resistance and flame retardant properties.

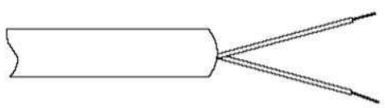
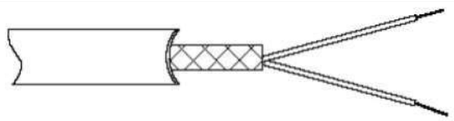
The common temperature range：-25~+200℃，the leads can be used in oil for a long time.

Compensation lead

①② ③ ④ ⑤
□□-□/□ □

Product type		Graduation No.	K：K type NiCr-Nisi N：N type NiCrSi- Nickel silicon magnesium E：E type NiCr- CuNi （constantane） J：J type Fe-CuNi （constantane） T： T type Cu-CuNi （constantane）		S：S type Pt-Rh10-Pt R：R type Pt-Rh 13-Pt B：B type Pt-Rh 30-Pt-Rh6
		Quantity of the leads	1：Single-branch 2：Double-branch		
Specifications		Cross area （diameter of single strand* strand number）	2：（0.2*7）	3：（0.3*7）	Other dimensions shall be supplied according to the agreement
Protective layer		Oil resistance property	N：Oil resistance	Notes：No mark refers to no such function	
		Shielding function	P：Shielding	Notes：No mark refers to no such function	

●Structural diagram

Sheath，insulation，and alloy wire	Sheath， shielding layer， insulation， and alloy wire
	

Temperature Measuring Thermocouple （Thermal Resistance） Used for the Nuclear Power Station

Standard Parts

Chongqing Chuanyi Instrument No.17 Factory Co.，Ltd. Address：Longfengqiao Bridge，Beibei District，Chongqing City Tel.（023）68261222 Fax:（023）68263847 Post Code：400700

SBW□ Series
Integrated TT with TC(RTD)

Chongqing Chuanyi Instrument No.17 Factory Co.，Ltd. Address：Longfengqiao Bridge，Beibei District，Chongqing City Tel.（023）68261222 Fax:（023）68263847 Post Code：400700

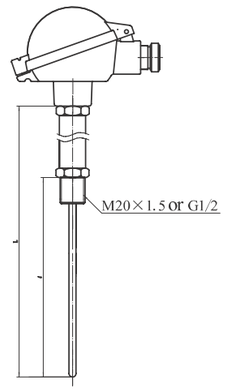
●WR□H Special TC for Nuclear Power Plant

① ② ③④⑤ ⑥⑦⑧⑨⑩ ⑪⑫ ⑬⑭⑮ ⑯

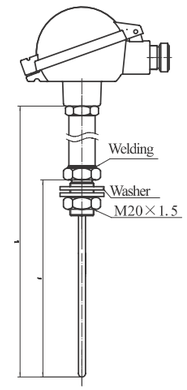
WR□H□－□□□－□□□□□－□□－□□□／□

Type	①	Type	K：K type Nickel chrome-nickel silicon N：N type Nickel chrome silicon - nickel silicon magnesium E：E type Nickel chrome-Nickel copper（Constantan） J：J type Iron-Nickel copper（Constantan） T：T type Copper-Nickel copper（Constantan）	S：S type Platinum Rhodium 10- Platinum R：R type Platinum Rhodium 13- Platinum B：B type Platinum Rhodium 30- Platinum Rhodium 6		
	②	Sensor Quantity	No designation: single	2： duplex		
Specification	③	J.B. Specification	5B：Nuclear water-proof SS J.B. 5C：Nuclear water-proof SS J.B. with two entry 7：explosion-proof die-casting Al. J.B.	8：Water-proof JDY J.B.（applied for integrated TT with display） 9：Explosion-proof JDY J.B.（applied for integrated TT with display） 7A：Explosion-proof SS J.B.		
	④	Hot Junction Structure	3: Ungrounded	4: Seperately grouned	2: Grounded	1: Exposed
	⑤	Strutural Form	No designation：（applied for wall type）	N：with-extension type		
Sensor	⑥	Tolerance Class	K、E、J、N	T 、R	S	B
			1：±1.5℃or±0.4%｜t｜℃ 2：±2.5℃or±0.75%｜t｜℃	1：±0.5℃or±0.4% ｜t｜℃ 2：±1.0℃or±0.75% ｜t｜℃	P：±3℃or±0.5% ｜t｜℃	P：±4℃ or±0.5% ｜t｜℃
	⑦	Sheath Diameter（mm）	J： Φ6（Standard size is recommended）	Remark：other diameter is designated like：H：Φ5、K：Φ8、F：Φ4、 E：Φ3		
	⑧	Total Length L（mm）：				
	⑨	Sheath Mt'l	G：0Crl8Ni9Ti	HL：316L	H：316	P：310S
	⑩	Insertion depth ℓ（mm）， Remark：No designation for HWT protection tube in Designation⑯;				
J.B. Specification	⑪	Electric Connection	M：M20*1.5 Female thread	M2：M27*1.5 Female thread	N：NPT1/2" Female thread	G：G1l/2" Female thread
			Remark：other size is designated like：（specific size）			
	⑫	Explosion-proof Class	B1~B6： ExdIIBT1~BT6 C1~C6： ExdIICT1~CT6	A：ExiaIICT6	Remark：other size is designated like：（specific size）	
Process Connection and Quality-related documents	⑬	Nipple	M20：M20*1.5 N1：NPT1/2"	G1：G1/2" Z1：ZG1/2"	Remark：other size is designated like：（specific size）	
	⑭	Process Washer	No designation: no washer;	A: with one piece stainless steel washer	B: with two pieces of stainless steel washers'	
	⑮	Data Inspection and Finished-product Inspection Report	No designation：no report	R1：with report		
Extra Attachments	⑯	Protection tube	HWT01 type protection tube HWT02 type protection tube HWT03 type protection tube HWT04 type protection tube HWT06 type protection tube	Refer to：Page 93-94	HWT05 type protection tube	Refer to Page 95
					HWT09 wall-type planet	

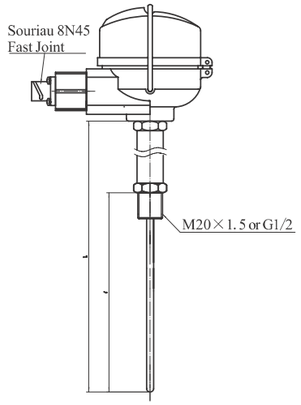
●Structure Profile



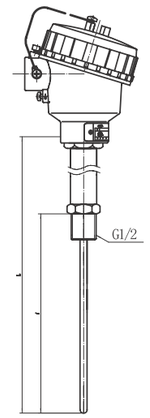
WR□H□－5B□N type



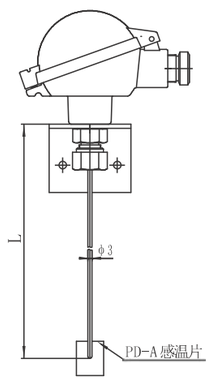
WR□H□－5B□SG type



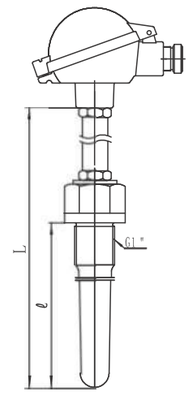
WR□H□－5C□N type



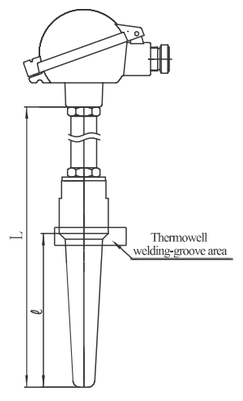
WR□H□－5E□N type



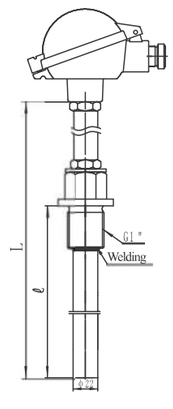
Wall-type Thermocouple



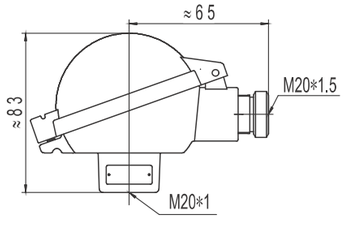
WR□H□－5B□N type
（With HTW01 type thermowell）



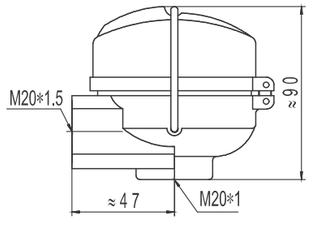
WR□H□－5B□N type
（With HTW04B thermowell）



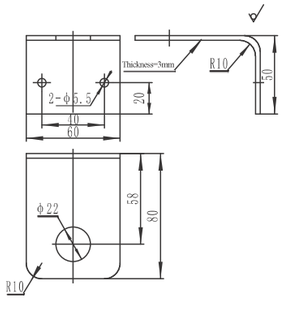
WR□H□－5B□N type
（With HTW03 thermowell）



Designation：5B
Material：SS
Enclosure Protection Class：IP65



Designation：5C
Material：SS
Enclosure Protection Class：IP65



HWT09 wall-type planet

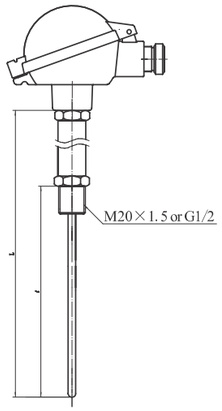
●WZPH Special RTD for Nuclear Power Plant型

① ②③④ ⑤⑥⑦⑧⑨⑩ ⑪⑫ ⑬⑭⑮ ⑯

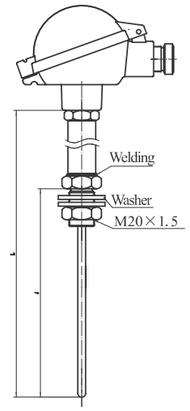
WZPH□－□□□－□□□□□□－□□－□□□／□

Type	①	Sensor Quantity	No designation：single	2：duplex		
Specification	②	J.B. Specification	5B：Nuclear water-proof SS J.B.（Applied for single type 3 wire or 4 wire） 5C：Nuclear water-proof SS J.B. with two entries（applied for single/duplex 3-wire） 5D：water-proof die-casting Al. J.B.（applied for duplex 4-wire type） 5E：water-proof SS J.B.（applied for duplex 4-wire）	6：E type explosion-proof SS J.B.（applied for duplex 4-wire） 8：water-proof JDY J.B.（applied for integrated TT with display） 9：explosion-proof JDY J.B.（applied for integrated TT display）		
	③	Hot Junction Structure	3：three-wire	4：four-wire		
	④	Strucutre	N：with-extension type	SG：with reinforcing pipe and fixed thread		
Sensor	⑤	Type	P2：Pt100	P3：Pt1000	P1：Pt10	
	⑥	Tolerance Class	A：±（0.15+0.2%｜t｜）℃	B：±（0.3+0.5%｜t｜）℃		
	⑦	Sheath Diameter（mm）	J：Φ6 （Standard size is recommended）	Remark：other diameter is designated like：H：Φ5 . K：Φ8. F：Φ4		
	⑧	Total Length（mm）				
	⑨	Sheath Mt'l	G：0Crl8Ni9Ti	HL：316	LH：316	
	⑩	Insertion depth ℓ（mm） Remark：No designation for HWT protection tube in Designation⑯				
J.B. Specification	⑪	Electric Connection	M：M20*1.5 Female thread	M2：M27*1.5 Female thread	N：NPTI/2 Female thread	G：G1/2" Female thread
			Remark：other size is designated like：（specific size）			
	⑫	Explosion-proof Class	B1~B6： ExdIIBT1~BT6 C1~C6： ExdIICT1~CT6	A：ExiaIICT6	Remark：no designation for non-explosion-proof type	
Process connection and Quaity-related document	⑬	Process thread	Extension-type M20：M20*1.5 N1：NPT1/2" G1：G1/2"	Reinforcing pipe and fixed thread type M20：M20*1.5 M27：M27*2 N1：NPT1/2" N2：NPT3/4"	Remark：other size is designated like：（specific size）	
	⑭	Process washer	No designation: no washer	A：with one piece of SS washer	B：with two pieces of SS washer	
	⑮	Process connection and Quaity-related document	No designation：no report	R1：with report		
Extra Attachment	⑯	Protection tube	HWT01 type protection tube HWT02 type protection tube HWT03 type protection tube HWT04 type protection tube HWT06 type protection tube	Refer to Page 93~94	HWT05 type protection tube	Refer to Page 95
					HWT09 wall-type planet	

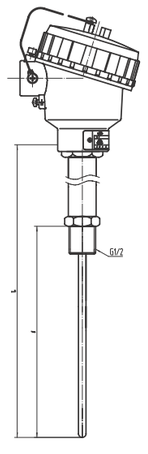
●Structure Profile



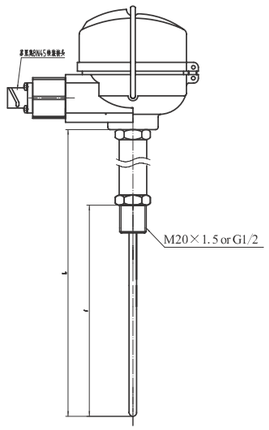
WZPH－5B□N type



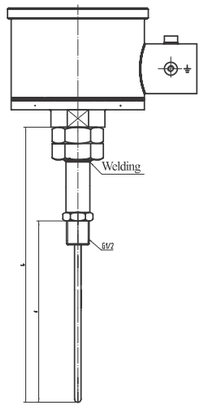
WZPH－5B□SG type



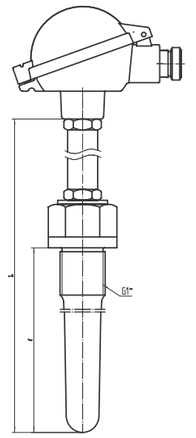
WZHP2－5E□N type



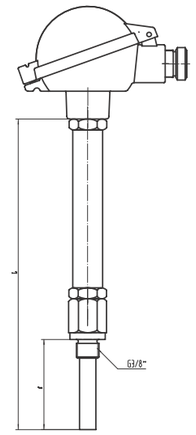
WZPH2－5C□N type



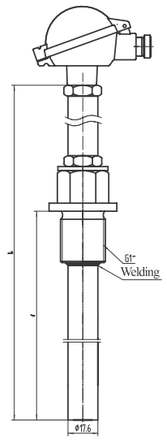
WZPH2－6□N type



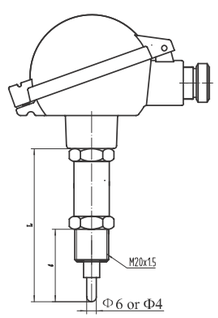
WR□H□－5B□N type
（With HWT01 type thermowell）



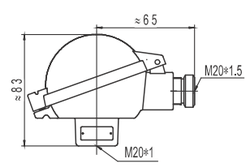
WR□H□－5B□N type
（With HWT02 type thermowell）



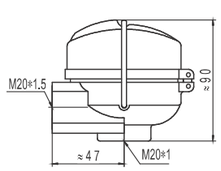
WR□H□－5B□N type
（With HWT03 type thermowell）



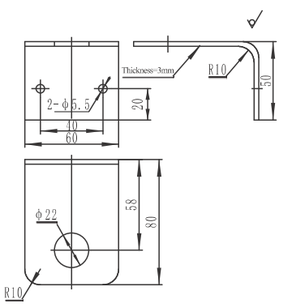
WR□H□－5B□N type
（With HTW06 type thermowell）



Designation：5B
Mt'l：SS
Enclosure protection class：IP65



Designation：5C
Mt'l：SS
Enclosure protection class：IP65



HWT09 type wall-type planet

■HWT□ Nuclear Power Plant Thermometer Thermowell

Nuclear power plant thermometer thermowell, mainly equipped with RTD, TC, bimetallic thermometer and pressure type thermometer, etc., can satisfy the utility in some special conditions, such as anti-high-pressure, corrosion-proof, high-temperature-resistant, etc. According to the different operating pressure, there are two installation methods, thread and welding. It has the characteristics of high mechanical strength, long service life, and convenient installation.

① ②③④⑤ ⑥⑦⑧⑨⑩,

HWT□－□ □ □ □/□ □ □ □ □ □

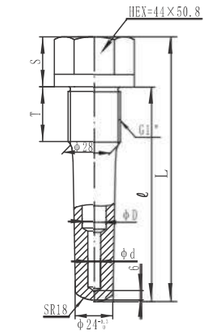
Classification	①	Fixed hexagonal thread type drilled tapered protection tube	01A：01A type	01B：01B type	01C：01C type	01D：01D type	01E：01E type	01F：01F type	
		Fixed hexagonal thread type straight protection tube	02：02 type						
		Fixed hexagonal thread type plugged protection tube	03：03 type						
		Welded and drilled protection tube	04A：04A type	04B：04B type					
		Mini break-through protection tube	06：06 type						
Protection Tube	②	Material	A：304 H：316	HL：316L P：310S	HC：Hastelloy C HB：Hastelloy B	TT：Ti Me：Monel	ZN：Z2CN18−10 ZL：Z2CND17−12		
			Remark：other material is designated like：（specific material）						
	③	Insertion depth ℓ（mm）	Refer to specification datasheet	Remark：other specification can be custermized					
	④	Surface treatment	No designation：no surface treatment	D：acid-pickling & deactivation （below thread）					
	⑤	Attachments	No designation：no dust-proof plug	Y：with stainless steel dust-proof					
Optional Item	⑥	Raw Material Report	No designation：no report	R1：with report					
	⑦	Hydraulic Test Report	No designation：no report	R2：with report					
	⑧	Outer Surface Liquid Penetrate Test Report	No designation：no report	R3：with report					
	⑨	Sheath Bottom Dimension Radiograph Test Report	No designation：no report	R4：with report					
	⑩	Cleanness Report	No designation：no report	R5：with report					
	⑪	Strength Calculation Report	No designation：no report	R6：with report					

●Specification Datasheet

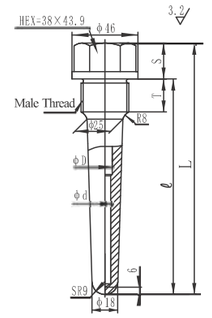
单位：mm

Specificatoin	O.D.（Straight）	O.D.（Tapered）	I.D.（Straight）	I.D.（Stepped hole）	Small bore（for stepped hole）	Female Thread	Male Thread	Total length L	Insertion depth l	S	T	HEX or less	Pressure（Mpa）
01Atype	/	Φ28/Φ24	Φ15	/		G1/2"or NPT1/2"	G1"	=l+32	350、250、215、190、135	32	35	44×0.8	≤17.5
01Btype			/	Φ12/Φ10	75								
01Ctype			/	Φ10/Φ8	75								
01Dtype		Φ25/Φ14	Φ8	/	/			155	130 25	30	30×	4.6	≤7
01Etype		Φ25/Φ18	/	Φ10/Φ8	75			525	500	25	23	38×3.9	≤5
01Ftype			/				M33×2	=l+25	400、350、300、250、200、150				
02type	Φ12	/	Φ7	/	/	G1/2"	G3/8"	=l+30	74、54	30	14	28×2.3	≤5
03type	Φ22	/	Φ16	/	/		G1"	9068、2168	9000、2100	30	38	38×3.9	≤4
04Atype	/	Φ40/Φ25.8	/	Φ10/Φ8	44		/	285	245	/	/	Φ62	≤17.5
04Btype	/	Φ32/Φ18	/	Φ10/Φ8	75		/	=l+50	300、250、200、150	/	/	Φ42	≤14.7
06type	/	/	/	/	/	/	G1/2"	95	45	/	/	Φ22	/

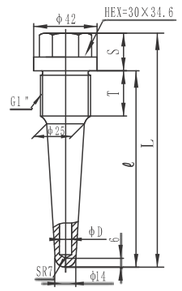
●Structure Profile



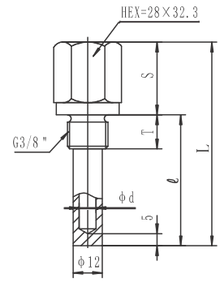
HWT01(A、B、C) type thermowell



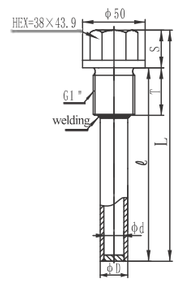
HWT01(E、F) type thermowell



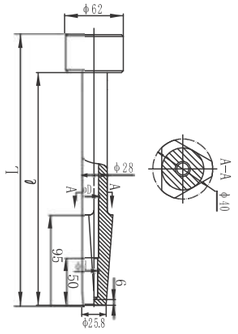
HWT01D type thermowell



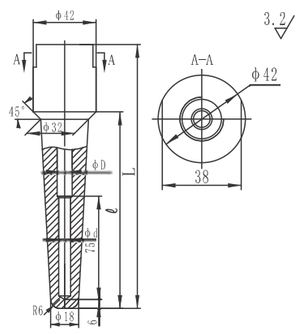
HWT02 type thermowell



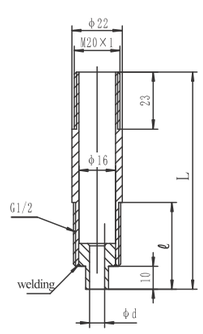
HWT03 type thermowell



HWT04A type thermowell



HWT04B type thermowell



HWT06 type thermowell

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭

HWT□－□ □ □ □－□ □ □/□ □ □ □ □ □

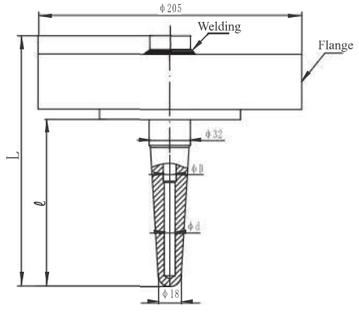
Classification							
Protection Tube	①	Fixed flange drilled protection tube	05A：05A type	05B：05B type			
	②	Material	A：304 H：316	HL：316L P：310S	HC：Hastelloy C HB：Hastelloy B	TT：Ti ME：Monel	ZN：Z2CN18－10 ZL：Z2CND17－12
	③	Insertion depth ℓ（mm）	Refer to the datasheet		Remark：other specification is customerized		
	④	Surface treatment	No designation：no surface treatment		F：PTFE-coated	D：acid-pickling & deactivation（below thread）	
	⑤	Attachments	No designation：no dust-proof plug		Y：with SS dust-proof plug		
Flange	⑥	Material	Method：refer to the protection tube materials in designation ②;				
	⑦	Quantity	1：Single		2：Duplex and fastenings		
	⑧	Specification	Any other size of flange is designed like：flange standard code number-nominal diameter-nominal pressure-seal face-form				
Option	⑨	Raw material record	No designation：no report		R1：with report		
	⑩	Hydraulic Test Report	No designation：no report		R2：with report		
	⑪	Outer surface Liquid Test Report	No designation：no report		R3：with report		
	⑫	Thermowell Bottom Radiography Report	No designation：no report		R4：with report		
	⑬	Cleanness Inspection Report	No designation：no report		R5：with report		
	⑭	Strength Calculation Report	No designation：no report		R6：with report		

● Datasheet

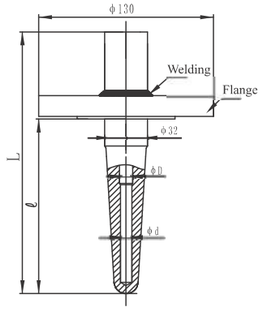
Unit：mm

Specification	O.D. (Tapered)	I.D. (Stepped hole)	Sheath Total Length L	Insertion Depth l	Φ	Pressure(MPa)
05A type	Φ30/Φ18	Φ10/Φ8.5	465	400	Φ32	S22
05B type			315	250		

● Structure Profile



HWT05A type thermowell



HWT05B type thermowell

■HFT□ Expansion Pipe for Nuclear Power Plant Thermometer

Expansion tube for nuclear power plant thermometer, specially dedicated to the REN nuclear sampling system, provide protection tube and the mounting position for the temperature sensor. The different types of expansion tube are composed of sheath, expansion tube and other parts by special welding technology; It is widely used in the REN system of nuclear power plants, due to anti-pressure, anti-corrosion and high security.

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

HFT□－□ □/□ □ □ □ □ □

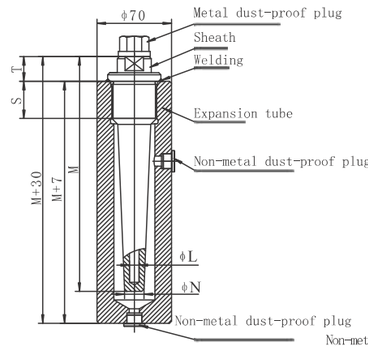
Classification	①	01： 01 type	02A 02A type 02B： 02B type 02C： 02C type 02D： 02D type	03A： 03A type 03B ： 03B type 03C： 03C type
Protection Tube	②	Material	No designation: 0Cr19Ni10 H： 316	A： 304 HL ： 316L
	③	Attachment	N: no dust-proof plug	Y: with SS dust-proof plug
Option	④	Raw Material Report	No designation: no report	R1: with report
	⑤	Hydraulic Test Report	No designation: no report	R2: with report
	⑥	Outer surface Liquid Penetrate Test Report	No designation: no report	R3: with report
	⑦	Sheath Bottom Size Radiography Test Report	No designation: no report	R4: with report
	⑧	Cleaness Inspection Report	No designation: no report	R5 with report
	⑨	Strength Calculation Report	No designation: no report	R6: with report

● Datasheet

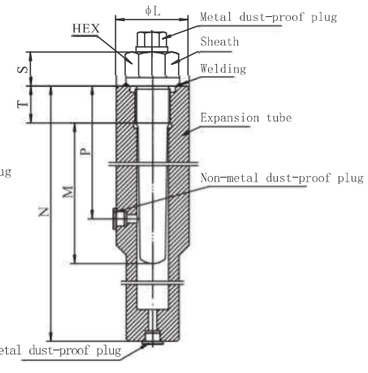
Unit：mm

Specification	Sheath Thread	Expansion Tube Thread	D	M	N	P	S	T	HEX	Pressure (MPa)
01 type	G1 1/4″	G1 1/4″	9	220	18	/	23	35	/	⩽17.2
02A type	G1″	G1″	69	155	242	126	32	35	44x0.8	⩽17.2
02B type			69	315	455	135				
02C type			69	155	242	60				
02D type			78	315	455	135				
03A type	G3/4″	G3/4″ G1 1/4″	9	173	240	/	26	26	28x2.3	⩽5.0
03B type			9	173	240	/				
03C type			9	168	240	/				

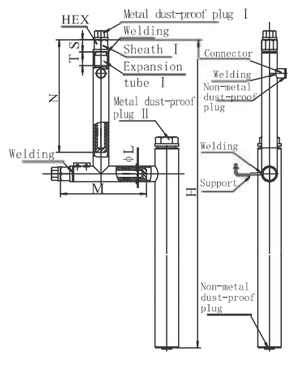
● Struture Profile



HFT01 type Expansion tube



HFT02 type Expansion tube



HFT03 type Expansion tube

■B Protective Tube

① ② ③④⑤ ⑥
BH01 □–□–□□□/□

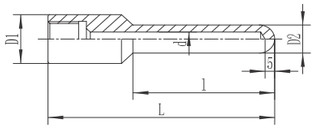
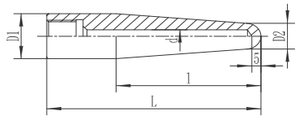
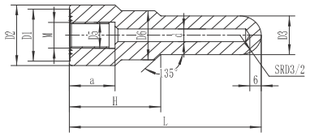
BH01	Welded integrated drill-hole protective tube			
①	Appearance of the protective tube	S straight form	T cone form	L step form
②	Outer diameter of the protective tube	D1/D2		
		S：Standard dimensions （L form can be used， see the table）， special dimensions can be marked as D2/D6/D3		
③	Total length ℓ(mm)			
④	Materials of the protective tube	A：304	H：316	Z：20# ZC：15NiCuMoNb5-6-4
		AT：1Cr18Ni9Ti	HL：316L	ZB：12Cr1MoV ZD：15CrMo
		Notes：For marking methods of other materials， see P159		
⑤	Length inserted ℓ/H(mm)	Recommend to use times of 10mm （when BH01L is used， H value shall be marked）		
⑥	Threads for process connection	No mark：When M20*1.5 （standard configuration） or protective and thermocouple （resistance） are ordered in set.		
		Notes：For special manufacturing of other thread dimensions， the marking methods shall be ： （specific dimensions）.		

Notes：Our Company designs inner diameter of the protective tube according to standard of the thermocouple's material diameter, if only the protective tube is ordered, inner diameter of the protective tube shall be marked.

●Selection Examples

Parameters：Integrated drill-hole welding protective tube， step form， material：304， L/H=180/60， inner hole：12， the process connecting thread：M20*1.5， type：BH01L-S-180A60/12

●Overall structure

Code	Name	Appearance
BH01S	Straight form	
BH01T	Cone form	
BH01L	Step form	

Notes：The pressure born by the protective tube is related to structural form, diameter, wall thickness, length inserted, temperature, flow speed, and welding quality of the protective tube, this table is only used for reference.

Specification Parameters for BH01S and BH01T Protective Tube

Threads for process connection		Outer diameter of the protective tub （mm）		Length （mm）	Applicable pressure
Mark	Specifications of the threads	Outer diameter D1（mm）	Outer diameter D2（mm）	Total length （mm） （max）	（max） （MPa）
M20	M20×1.5	28	18	800	10
M27	M27×2	34	22	800	16

Specification Parameters for BH01L Protective Tube

Threads for process connection		Dimensions									Applicable range	Applicable pressure
Marks	Specifications of the threads	D1	D2	D3	d	D5	D6	a	b	H	（max） （MPa）	（max） （MPa）
M16	M16×1.5	32	36	17	Φ7~Φ20	16.3	23	27	3	60	Thermocouple/	10
M20	M20×1.5	32	36	1		20.5	23	27	3	120	Thermal resistance	10
M27	M27×2	43	47	30		27.4	38	32	4			16
M27	M27×2	43	47	24		27.4	38	20	4	80	Thermometal	16
										140		16

Chongqing Chuanyi Instrument No.17 Factory Co.，Ltd. Address： Longfengqiao Bridge，Beibei District， Chongqing City Tel.（023）68261222 Fax:（023）68263847 Post Code：400700

① ② ③④⑤⑥ ⑦⑧ ⑨

BL □-□-□□□□-□□/□

BL	Fixed-thread type protective tube				
①	Structural form	01：Integration type 03：Copper-tube type			
②	Appearance of the protective tube （mm）	S：Straight form		T：Cone form （not suitable for steel pipe type）	
③	Outer diameter of the protective tube （mm）	D （Straight form） D1/D2 （cone form）			
④	Materials of the protective tube	A：304 AT：1Cr18Ni9Ti	H：316 HL：316L	B：GH3030 C：GH3039	P：310S TT：Ti
		Notes：For marking methods of other materials， see P159			
⑤	Length inserted ℓ(mm)	Times of 10mm			
⑥	Installation of threads	M20：M20*1.5 M27：M27*2 M33：M33*2	N1：NPT1/2″ N2：NPT3/4″ N3：NPT1″	Z1：ZG1/2″ Z2：ZG3/4″ Z3：ZG1″	G1：G1/2″ G2：G3/4″ G3：G1″
		The remaining threads shall be marked as：（Specifications of the threads） For example：NPT1-1/2″ ：（N1-1/2）			
⑦	Surface treatment	No mark：The surface is not treated W：Metal matrix+ cobalt-base alloys bead weld （Suitable for 01 type， and the wall thickness is not less than 3mm）			SW：Spray welding SC：Spraying
⑧	Total length ℓ1 (mm) 1	Times of 50mm			
⑨	Threads for process connection	No mark：When M20*1.5 （standard configuration） or protective tube is supplied in matching with the thermocouple （resistance）			
		Notes：Special fabrication the thread in other dimensions shall be marked as：（Specific dimensions）			

Notes： Our Company designs inner diameter of the protective tube according to standard of the thermocouple's material diameter， if only the protective tube is ordered， inner diameter of the protective tube shall be marked.

●Selection examples

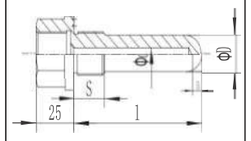
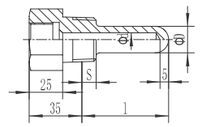
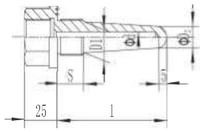
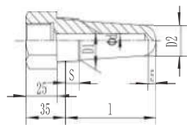
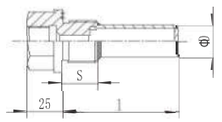
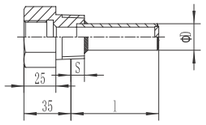
Parameters：The protective tube is installed with fixed threads， integration-type straight form， inserting depth：250mm， protective tube：16mm， threads installed：M 27*2， material：316， bead weld：100mm， inner diameter：7mm， process connection：20*5.

Type：BL 01-S-16H250M27-W 100/7

●Specification parameters of BL01， BL03 protective tube

Threads installed			Outer diameter of the protective tube （Φmm）			Pressure applied （max） （MPa）	
Mark	Specifications of the threads	S （mm）	Straight form D	Cone form D1	Cone form D2	BL01	BL03
M20	M20×1.5	16	≤16	/	/	6.4	4
G1	G1/2″	16					
N2	NPT1/2″	8.2					
R1	R1/2″	8					
M27	M27×2	20	≤23	≤23	16 18	10	4
G2	G3/4″	20					
N2	NPT3/4″	9.5					
R2	R3/4″	8.6					
M33	M33×2	23	≤28	≤28	18 20 22	10	4
G3	G1″	23					
N3	NPT1″	10.4					
R3	R1″	10					

Notes： The pressure born by the protective tube is related to structural form， diameter， wall thickness， length inserted， temperature， flow speed， and welding quality of the protective tube， this table is only used for reference.

Appearance / Type	Straight protective tube		Cone protective tube	
	Straight thread	Cone thread	Straight thread	Cone thread
BL01				
Bl03			—	—

① ② ③④⑤ ⑥⑦ ⑧⑨⑩ ⑪

BF □-□-□□□-□□-□□□/□

BL	Flange type protective tube				
①	Structural form	02：Integration drill hole type 02B： Integration drill hole split type		01：Integration forging type（integrated structure of the flange and protective tube） 03：Steel tube type	
②	Appearance of the protective tube （mm）	S：Straight form		T：Cone form （not suitable for steel pipe type）	
③	Outer diameter of the protective tube （mm）	D （Straight form） D1/D2 （cone form）			
④	Materials of the protective tube	A：304 H：316 HL：316L	AT：1Cr18Ni9Ti P：310S TT：Ti	B：GH3030 C：GH3039 N：Inconel 600	HB：Hastelloy B HC：Hastelloy C ME：Monel
		Notes：For marking methods of other materials， see P159			
⑤	Total length ℓ(mm)	Times of 10mm			
⑥	Surface treatment	No mark：The surface is not treated W：Metal matrix+ cobalt-base alloys bead weld （Suitable for 01 type， and the wall thickness is not less than 3mm） F：Wrapped with Teflon （PTFE）			
⑦	Length inserted ℓ1 (mm)	Times of 50mm			
		A：304	H：316	HL：316L	E：Built-in（Matrix of the flange is 304）
⑧	Material of the flange	Notes：1. Marking for other materials：see P159 2.When materials of companion flanges have different marks：（materials of upper flange+ materials of lower flange）			
⑨	Configuration of the flange	1.Single flange	2：Companion flange and fasteners		
⑩	Specifications of the flanges	Standard flange：Standard code-diameter-pressure-sealed surface			
⑪	Threads for process connection	No mark：When M20*1.5 （standard configuration） or protective tube is supplied in matching with the thermocouple （resistance）			
		Notes：Special fabrication the thread in other dimensions shall be marked as：（Specific dimensions）			

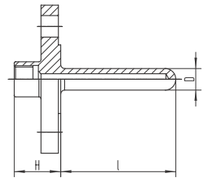
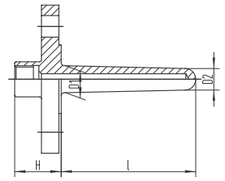
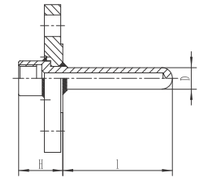
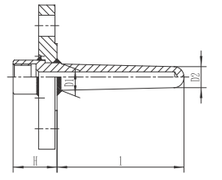
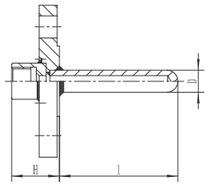
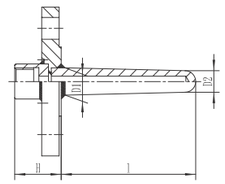
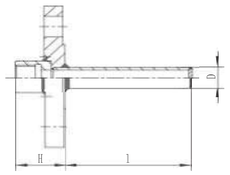
Notes：Our Company designs inner diameter of the protective tube according to standard of the thermocouple's material diameter, if only the protective tube is ordered, inner diameter of the protective tube shall be marked.

●Selection Examples

Parameters：Flange protective tube，cone integrate drill hole，26/22，material 304，depth inserted：200mm，wrapped with Teflon，flange：HG/T 20592-2009-WN 40-pn 40 RF

Type：BF02A-T-26/22A 200F-A1HG/T20592-2009-WN40-PN40-RF

●Overall structure

Appearance / Type	Straight-form protective tube	Cone-form protective tube
BF01		
BF02A		
BF02B		
BF03		——

●Structure and appearance， as well as recommended dimensions for large-small ends of the protective tube

Type	Dimensions recommended		Pressure applied MPa（MAX）
	Straight form ΦD	Cone form ΦD1， ΦD2	
BF01	16、20、24、26、28	20/16、24/20、26/22、28/25	16
BF02	16、20、24、28	20/16、24/20、26/22、28/25	16
BF03	12、16、20、25、28	——	4

Notes：The pressure born by the protective tube is related to structural form, diameter, wall thickness, length inserted, temperature, flow speed, and matching of the flange.

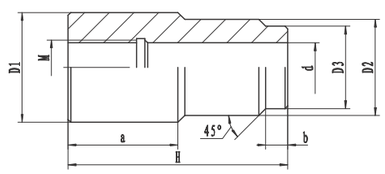
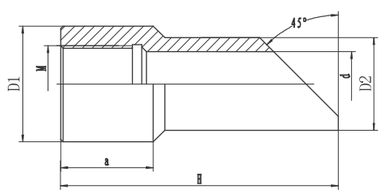
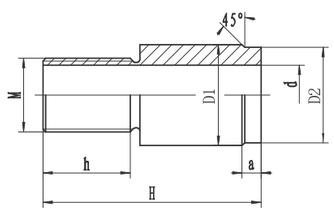
■ Socket

① ② ③ ④ ⑤

SC□-□-□-□-□-□

SSC1 type		Applicable for TC（RTD）			
SC2 type		Applicable for flexible thread type bimetallic thermometer			
SC3 type		Applicable for fixed thread type bimetallic thermometer			
①	type	A：A type	B：B type	C：C type	
②	Thread	M12：M12*1.5 M16：M16*1.5 M20：M20*1.5 M27：M27*2 M33：M33*2	N1：NPT1/2" N2：NPT3/4" N3：NPT1"	ZG1：ZG1/2" ZG2：ZG3/4" ZG3：ZG1"	G1：G1/2" G2：G3/4" G3：G1"
		Remark：other size is designated like：（specific size），for example：NPT1—1/2"：（NPT1-1/2）			
③	Material	A：304 H：316 HL：316L Za：20# Carbon Steel	ZB：12Cr1MoV ZC：15NiCuMoNb5-6-4 ZD：15CrMo ZE：A335P91	Remark：other materials' designation refer to specific code number;	
④	Height H（mm）	80：80mm	120：120mm	Remark：other length designation is like：（specific heigth），for example：50（50）	
⑤	Dust-proof plug	N：without	BZ: with carbon steel type	BA: with SS type	

Unit：mm

Type	Structure Profile	M	D1	D2	D3	a	d	b	h	Applicable O.D.
Atype		M12*1.5	Φ33	Φ22	Φ15	30	Φ10	6	/	≤Φ8
		M16*1.5	Φ33	Φ22	Φ15	30	Φ12	6		≤Φ10
		M20*1.5	Φ40	Φ32	Φ28	30	Φ18	6		≤Φ16
		M27*2	Φ45	Φ35	Φ30	40	Φ22	6		≤Φ20
		M33*2	Φ50	Φ40	Φ34	40	Φ28	6		≤Φ25
Btype		M16*1.5	Φ33	Φ22	/	30	Φ12	/	/	≤Φ10
		M20*1.5	Φ40	Φ32		30	Φ18			≤Φ16
		M27*2	Φ45	Φ35		40	Φ22			≤Φ20
		M33*2	Φ50	Φ40		40	Φ28			≤Φ25
Ctype		M16*1.5	Φ30	Φ20	/	6	Φ12	/	23	≤Φ10
		M20*1.5	Φ32	Φ35		6	Φ18		25	≤Φ16
		M27*2	Φ35	Φ37		6	Φ22		32	≤Φ20

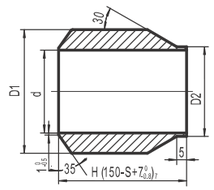
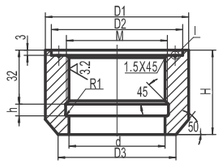
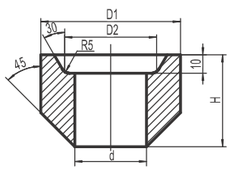
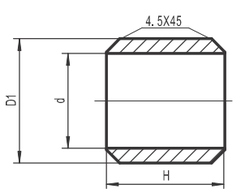
■ Sockets for Power Plant

① ② ③ ④ ⑤

SC□-□-□-□-□

①	Type	01A：01A type 01B：01B type	02A：02A type 02B：02B type	03B：03B type 04：04 type	05：05 type
②	Thread	For 1A、01B、03B、04 type	For 02A、02B type	05 type	Remark：other specification is designated like：（specific size），or example：NPT1—1/2"：（NPT1-1/2）ZG1"（R1"）
		No	M33：M33*2 M60：M60*3 N4：NPT2" Z4：ZG2"（R2"）	M27：M27*2 M33：M33*2 N2：NPT3/4" Z3：	
③	Material	A：304 H：316 HL：316L ZA：20# Carbon Steel	ZB：12Cr1MoV ZC：15NiCuMoNb5-6-4 ZD：15CrMo ZE：A335P91	Remark：other materials are designated like：（specific code number）；	
④	HeightH（mm）	For 01A Type	For 02A、02B、05 type	For 04 type	
		H：（150-S+7）mm Remark：S refers to pipe thickness；	50：50mm	40：40mm	
		Remark：other length is designated like：（specific height， For example：60mm（60）			
⑤	Dust-proof Plug	For 0lA. 01B、03B、04 type	For 02A. 02B、05 type		
		No	N：without plug BZ：with carbon steel plug	BA：with SS dust-proof plug	

Unit：mm

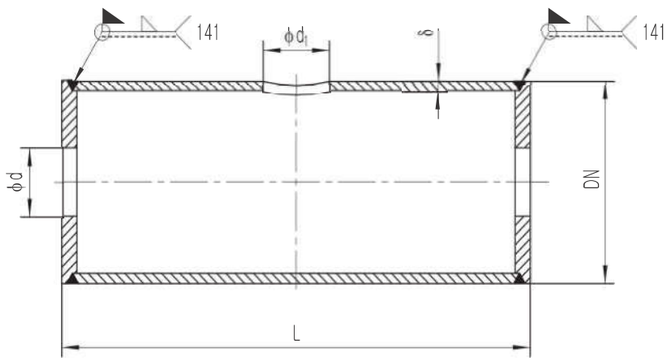
Type	Structure Profile	M	D1	D2	D3	d	h	H
01A Type 01B type		/	63.5 75 89	45	/	Φ41	/	150-S+7 Remark：S refers to thickness；
02A type 02B type 05 type		M27*2	Φ47	Φ42	Φ38	Φ24	5	50 or others；
		M33*2	Φ54	Φ50	Φ43	Φ30	5	
		M60*3	Φ85	Φ78	Φ70	Φ57	7	
03B type		/	Φ76	Φ50	/	Φ38	/	50
04 type		/	Φ42	/	/	Φ32	/	40

■ G□Expansion Tube

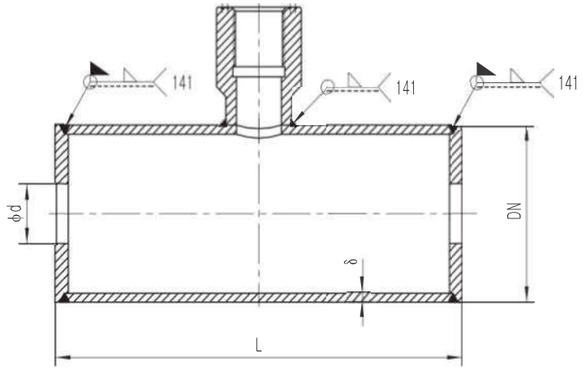
① ② ③ ④ ⑤ ⑥ ⑦⑧

GA−□−□−□−□−□−□/□/□□

①	Material of the expansion tube	A:304 ZA:20#	H:316 ZB:12Cr1MoV	HL:316L ZE:A335P91	Notes: Marking methods of other materials: (Specific trademark)
②	Specification of the expansion tube	80: DN 80	100:DN100	150:DN150	
③	Length of the expansion tube (mm)	200:200mm	Other length can be marked as: (Specific length), for example : 250mm (250)		
④	Outer diameter of the user's pipe (mm)	d	Notes: If the users drill on site, d=0, if only diameter of the pipe is supplied , our company can execute according to metric-system standard.		
⑤	Installation base hole's diameter of the expansion tube	d1	Notes: When it is supplied matched with the installation base, it shall be not marked.		
⑥	Specifications of the installation base	See the specimen P150	Notes: If no installation base is supplied, no mark.		
⑦	Welding of the expansion tube's end cap	A: Welding	No mark: Not welded		
⑧	Welding of the installation base	B; Welding	No mark: Not welded		



GA type

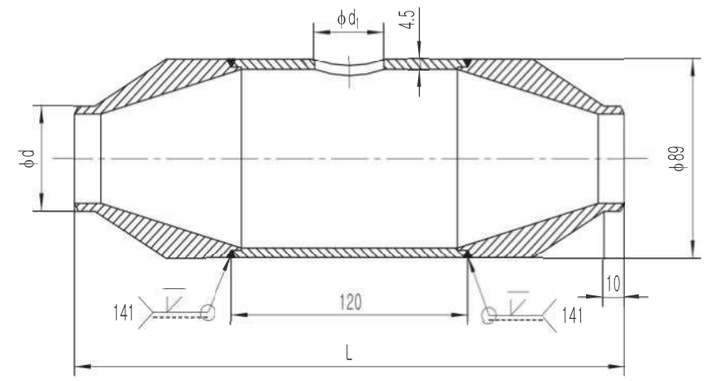


GA type, with installation base

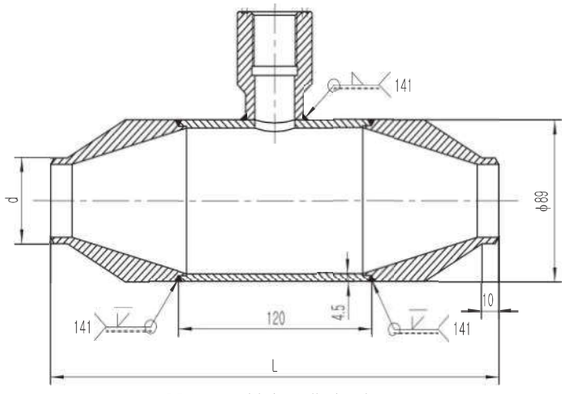
① ② ③ ④ ⑤ ⑥ ⑦⑧

GB−□−□−□−□−□−□/□/□□

①	Material of the expansion tube	A:304 ZA:20#	H:316 ZB:12Cr1MoV	HL:316L ZE:A335P91	Notes: Marking methods of other materials: (Specific trademark)
②	Specification of the expansion tube	80: DN 80	100:DN100	150:DN150	
③	Length of the expansion tube (mm)	A：270			
④	Outer diameter of the user's pipe (mm)	d	Notes: If the users drill on site, d=0, if only diameter of the pipe is supplied , our company can execute according to metric-system standard.		
⑤	Installation base hole's diameter of the expansion tube	d1	Notes: When it is supplied matched with the installation base, it shall be not marked.		
⑥	Specifications of the installation base	See the specimen P150	Notes: If no installation base is supplied, no mark.		
⑦	Welding of the expansion tube's end cap	A: Welding	No mark: Not welded		
⑧	Welding of the installation base	B; Welding	No mark: Not welded		



GB type

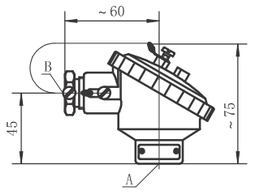


GB type, with installation base

■Termination

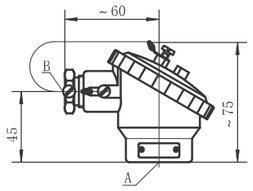
●B type Water-proof J.B.

Unit：mm

Form	Enclosure Protection Class	Connection Dimension						Material	Applications
	IP65	Item	Ordinary Thread			Pipe Thread		Die-casting Al. SS	TC RTD
		Code	2MB1	2MB2	2MB3	2GB1	2GB2		
		A	M20×1	M16×1	M12×1	G1/2"	G1/4"		
		B	M20×1.5			G1/2"			

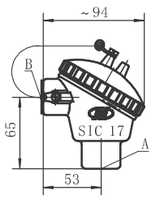
●C type Water-proof J.B.

Unit：mm

Form	Enclosure Protection Class	Connection Dimension					Material	Applications
	IP65	Item	Ordinary			Pipe thread		Die-casting Al.	TC RTD
		Code	2MC1	2MC2	2MC3	2GC1	2GC2		
		A	M33×1	M27×1	M22×1	G1"	G3/4"		
		B	M20×1.5			G1/2"			

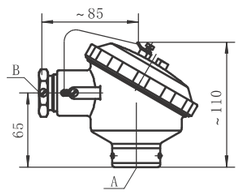
●D type Water-proof J.B.

Unit：mm

Form	Enclosure Protection Class	Connection Dimension					Material	Applications
	IP65	Item	Ordinary Thread		Pipe Thread		Die-casting Al. SS	TC RTD
		Code	2MD1	2MD2	2GD1	2GD2		
		A	M20×1	M27×1	G1/2"	G3/4"		
		B	M20×1.5		G1/2"			

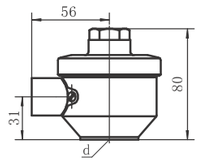
●E type Water-proof Multi-point J.B.

Unit：mm

Form	Enclosure Protection Class	Connection Dimension			Material	Applications
	IP65	Item	Ordinary	Pipe thread	Die-casting Al.	Multi-point thermocouple /RTD
		Code	3ME1	3GE1		
		A	M27×2	G3/4"		
		B	M33×2	G1"		

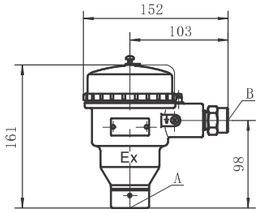
●F Type Water-proof J.B.

Unit：mm

Form	Enclosure Protection Class	Connection Dimension			Material	Applications
	IP65	Item	Ordinary Thread	Pipe Thread	SS	TC RTD
		Code	5MA1	5MA2		
		d	M20×1 M27×1 M33×1	G1/2" G3/4" G1"		

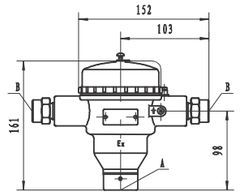
●A Type Explosion-proof J.B.

Unit：mm

Form	Enclosure Protection Class	Explosion-proof Class	Connection Dimension						Material	Applications
	IP65	ExdⅡBT(1~6) ExdⅡCT(1~6)	Item	Ordinary			Pipe thread		Die-casting Al. SS	Thermocouple RTD
		Code	4MA1	4MA2	4MA3	4GA1	4GA2			
		A	M20×1.5							
		B	M20×1	M27×1	M20×1.5	G1/2"	G3/4"			

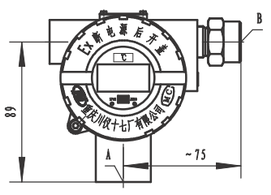
●A Type Explosion-proof J.B. （with two entries）

Unit：mm

Form	Enclosure Protection Class	Explosion-proof Class	Connection Dimension						Material	Applications
	IP65	ExdⅡBT(1~6) ExdⅡCT(1~6)	Item	Ordinary			Pipe thread		Die-casting Al. SS	Thermocouple RTD
		Code	4MA1	4MA2	4MA3	4GA1	4GA2			
		A	M20×1.5							
		B	M20×1	M27×1	M20×1.5	G1/2"	G3/4"			

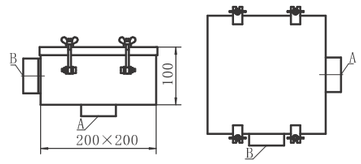
●JDY Type J.B.

Unit：mm

Form	Enclosure Protection Class	Explosion-proof Class	Connection Dimension						Material	Applications
	IP65	ExdⅡBT(1~6) ExdⅡCT(1~6)	Item	Ordinary			Pipe thread		Die-casting Al.	Integrated TT
		Code	4MB1	4MB2	4MB3	4GB1	4GB2			
		A	M20×1.5							
		B	M20×1	M27×1	M20×1.5	G1/2"	G3/4"			

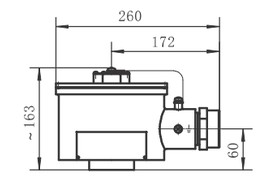
● C Type Splash-proof Multi-point Square J.B.

Unit: mm

Form	Enclosure Protection Class	Connection Dimension					Material	Applications
	IP54	Item	Ordinary		Pipe thread		Q235 SS	Multi-point TC/RTD
		Code	3MC1	3MC2	3GC1	3GC2		
		A	M36×1.5					
		B	M33×2	M27×2	G1"	G3/4"		

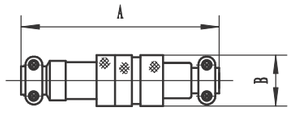
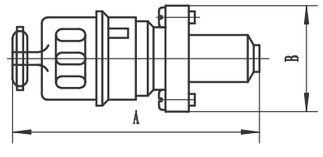
● E type Explosion-proof Multi-point J.B.

Unit: mm

Form	Enclosure Protection Class	Explosion-proof Class	Connection Dimension						Material	Applications
	IP65	ExdⅡBT(1~6) ExdⅡCT(1~6)	Item	Ordinary		Pipe thread			SS	Multi-point TC/RTD
			Code	4ME1	4ME2	4GE1	4GE2	4GE3		
			A	M60×1.5		M60×1.5				
			B	M33×1	M27×1	NPT1/2"	NPT1"	NPT3/4"		

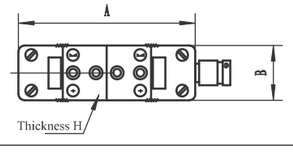
● Metal Connectors

Unit: mm

Form	Dimension			Material	Applications
	Code	A	B		
	6AS1	70	Φ18	Die-casting Al.	Sheathed TC Sheathed RTD
	6AL1	40	Φ17.5		
	6AL2	82	Φ21.5		

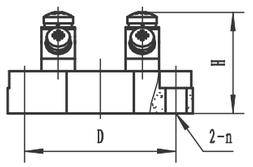
● Plastic Connector

Unit: mm

Form	Connection				Material	Applications
	Code	A	B	H	Plastic	Sheathed TC
	6BS1	52.5	17.1	8		

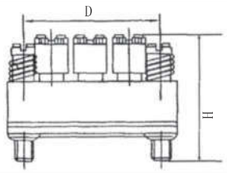
● Terminal Block

Unit: mm

Form	Dimension				Material	Applications
	Sheath Diameter	D	H	n		
	Φ3 ~ Φ5	28	22	Φ3.5	Ceramic	Sheathed TC Sheathed RTD
	Φ6	36	25	Φ4.5		
	Φ8	36	25	Φ4.5		

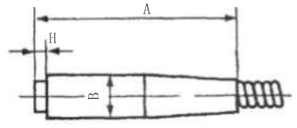
● Artficial Germany Terminal Block

Unit: mm

Form	Dimension			Material	Applications
	Sheath Diameter	D	H		
	Φ3 ~ Φ8	34	26	Ceramic	Sheathed TC Sheathed RTD

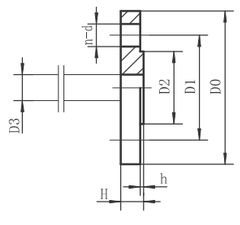
● Plain type Termination Protective Cap

Unit: mm

Form	Dimension			Material	Applications
	A	B	H		
	61	11	5	SS	Sheathed TC Sheathed RTD

■ Fixing Devices

● Fixed Flange

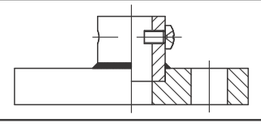


FG □ – □□型

Type	D_2	D_1	D_0	n–d	H	h	D_3	Nominal £EA (MPa)	Diameter
FG01	Φ24	Φ42	Φ60	4–Φ9	10	2	Φ8	2.5	/
FG02	Φ45	Φ65	Φ95	4–Φ14	14	2	Φ12	4.0	DN15
FG03							Φ16		
Fg04	Φ55	Φ75	Φ105		16		Φ20		DN20
FG05	Φ76	Φ110	Φ155	4–Φ22	24	2	Φ39	10	DN32
							Φ43.5		

Remark: The flange of JB, GH, GB, JIS, ANSI and JPI standard, etc. can be machined as per customization;

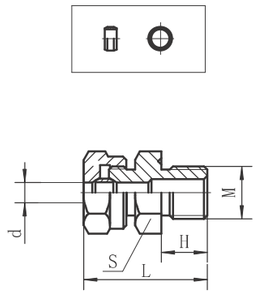
● Flexible Flange



Model	Size mm			Material	d mm	Nominal Pressure Mpa
	D_1	D_0	D_3			
FHZ01	Φ54	Φ70	Φ6	Carbon Steel+ Blackening	Φ8 Φ12 Φ16 Φ20	Normal Pressure
FHH01				304		

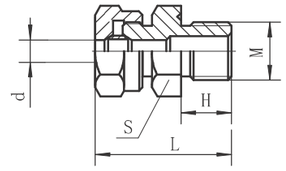
●Fixed Compression-fitting Thread

Unit：mm

Form	Model	M		H	S	L	Material	d	Nominal Pressure Mpa
		Ordinary	Tapered Pipe						
	KGL20	M12×1.5	ZG1/8"	15	19	38	304	Φ2.0	2.5
	KGL30							Φ3.0	
	KGL40							Φ4.0	
	KGL45	M16×1.5		15	22			Φ4.5	
	KGL50							Φ5.0	
	KGL60		ZG1/4"					Φ6.0	
	KGL80							Φ8.0	
	KGL120	M20×1.5	ZG1/2"	15	27			Φ12	
	KGL160	M27×2	ZG3/4"	20	32	45		Φ16	
	KGL200							Φ20	
	KGL220	M33×2	ZG1	22	41			Φ22	
	KGL250							Φ25	

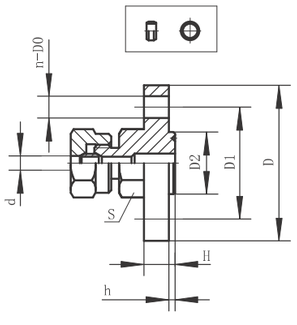
●Flexible Compression-fitting Thread

Unit：mm

Form	Model	M		H	S	L	Material	d	Nominal Pressure Mpa
		Ordinary	Tapered Pipe						
	KHL20	M12×1.5	ZG1/8"	15	19	38	304	Φ2.0	Normal Pressure
	KHL30							Φ3.0	
	KHL40							Φ4.0	
	KHL45	M16×1.5		15	22			Φ4.5	
	KHL50							Φ5.0	
	KHL60		ZG1/4"					Φ6.0	
	KHL80							Φ8.0	
	KHL120	M20×1.5	ZG1/2"	15	27			Φ12	
	KHL160	M27×2	ZG3/4"	20	32	45		Φ16	
	KHL200							Φ20	
	KHL220	M33×2	ZG1	22	41			Φ22	
	KHL250							Φ25	

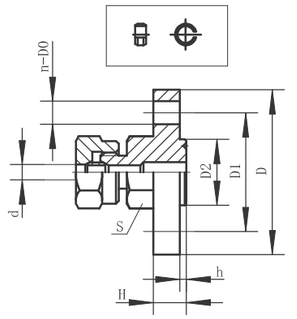
●Flexible Compression-fitting Thread

Unit：mm

Form	Model	D_0	D_1	D_2	d	H	h	S	n	L	Material	d	NominalPressure Mpa
	KGF20	Φ50	Φ36	Φ20	Φ7	10	2	19	3	35	304	Φ2.0	2.5
	KGF30											Φ3.0	
	KGF40											Φ4.0	
	KGF45	Φ60	Φ42	Φ24	Φ9	10	2	22				Φ4.5	
	KGF50											Φ5.0	
	KGF60											Φ6.0	
	KGF80											Φ8.0	
	KGF120	Φ95	Φ65	Φ45	Φ14	16	2	27	4	42		Φ12	
	KGF160	Φ105	Φ75	Φ55	Φ14	16	2	32				Φ16	
	KGF200											Φ20	
	KGF220											Φ22	
	KGF250											Φ25	

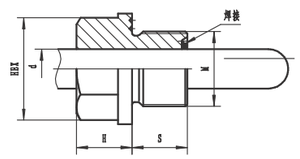
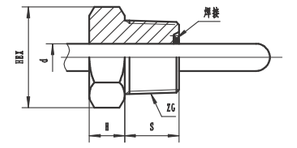
●Flexible Compression-fitting Flange

Unit：mm

Form	Model	D_0	D_1	D_2	n	H	h	S	n	L	Material	D_3	NominalPressure Mpa
	KHF20	Φ50	Φ36	Φ20	Φ7	10	2	19	3	35	304	Φ2.0	Normal Pressure
	KHF30											Φ3.0	
	KHF40											Φ4.0	
	KHF45	Φ60	Φ42	Φ24	Φ9	10	2	22				Φ4.5	
	KHF50											Φ5.0	
	KHF60											Φ6.0	
	KHF80											Φ8.0	
	KHF120	Φ95	Φ65	Φ45	Φ14	16	2	27	4	42		Φ12	
	KHF160	Φ105	Φ75	Φ55	Φ14	16	2	32				Φ16	
	KHF200											Φ20	
	KHF220											Φ22	
	KHF250											Φ25	

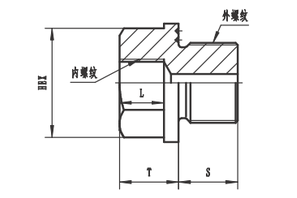
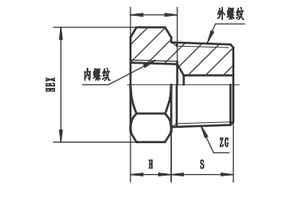
●空心螺栓

Unit：mm

Form	Model	Size	S	H	HEX	O.D. o f Tube	NominalPressure Mpa
	KSM01D	M10×1	10	5.5	13×15	Φ1.5~Φ5.0	10
	KSM02D	M12×1.5	15	7	17×19.6	Φ1.5~ Φ8.0	
	KSM03D	M16×1.5	18	9	21×24.5	Φ10 or less	
	KSM04D	M20×1.5	20	11	26×30	Φ15 or less	
	KSM05D	M27×2	20	13	32×36.9	Φ18 or less	
	KSM06D	M33×2	22	15	36×41.5	Φ25 or less	
	KSG01D	ZG1/8"	12	5.5	11×12.7	Φ1.5~ Φ5.0	10
	KSG02D	ZG1/4"	13	7	14×16.2	Φ1.5~08.0	
	KSG03D	ZG3/8"	14	9	19×21.9	Φ10 or less	
	KSG04D	ZG1/2"	16	11	24×27.7	Φ15 or less	
	KSG05D	ZG3/4"	20	13	30×34.6	Φ18 or less	
	KSG06D	ZG1"	22	15	36×41.5	Φ25 or less	

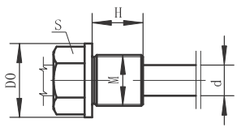
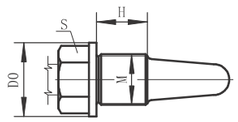
●空心连接螺栓

Unit：mm

Form	Model	Size		S	T	L	HEX	O.D. o f Tube	
		Male	Female					Protection	TubeSheath
	KSM01S	M12×1.5	M10×1	15	7	10	17×19.6	Φ10	Φ1.5 Φ2.0 Φ3.0 Φ4.0 Φ4.5 Φ5.0
	KSM02S	M16×1.5	M10×1	18	9	10	21×24.2		
	KSM03S	M20×1.5	M10×1	20	11	10	26×30		
	KSM04S	M27×2	M10×1	20	13	10	32×36.9		
	KSM05S	M20×1.5	M12×1.5	20	11	13	26×30	Φ12	Φ6.0 Φ8.0
	KSM06S	M27×2	M12×1.5	20	13	13	32×36.9		
	KSM07S	M20×1.5	M16×1.5	20	15	15	26×30	Φ16	Φ6.0 Φ8.0
	KSM08S	M27×1.5	M16×1.5	20	18	15	32×36.9		
	KSM09S	M27×1.5	M20×1.5	20	18	18	32×36.9	Φ20	–
	KSM10S	M33×1.5	M20×1.5	22	20	18	36×41.5		
	KSG01S	ZG1/4"	ZG1/8"	13	7	10	14×16.2	Φ10	Φ1.5 Φ2.0 Φ3.0 Φ4.0 Φ4.5 Φ5.0
	KSG02S	ZG3/8"	ZG1/8"	14	9	10	19×21.9		
	KSG03S	ZG1/2"	ZG1/8"	16	11	10	24×27.7		
	KSG04S	ZG3/4"	ZG1/8"	20	13	10	30×34.6		
	KSG05S	ZG1/2"	ZG1/4"	16	11	13	24×27.7	Φ14	Φ6.0 Φ8.0
	KSG06S	ZG3/4"	ZG1/4"	20	13	13	30×34.6		
	KSG07S	ZG1/2"	ZG3/8"	16	15	15	24×24.7	Φ18	
	KSG08S	ZG3/4"	ZG3/8"	20	18	15	30×34.6		
	KSG09S	ZG3/4"	ZG1/2"	20	18	18	30×34.6	Φ22	
	KSG10S	ZG1"	ZG1/2"	22	20	18	30×41.5		

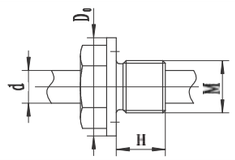
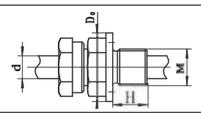
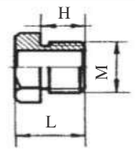
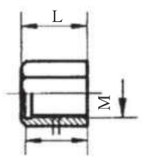
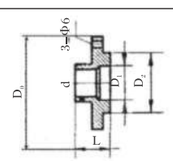
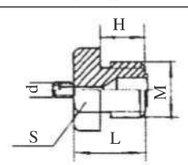
●Fixed Thread

Unit：mm

Form			Protection Tube		Size				Nominal Pressure Mpa
			d	Material	M	H	S	D_0	
Designation：2	Fixed thread with straight tube		Φ6、Φ8	304	M16×1.5	16	21	Φ27	4
			Φ10、Φ12		M20×1.5	20	26	Φ34	
			Φ16		M27×2	30	32	Φ40	
			Φ20		M33×2	33	36	Φ48	
			Φ22、Φ25		M33×2	33	36	Φ48	
Designation：6	Fixed Thread with Tapered tube		锥形	304	M33×2	33	36	Φ48	≤16

●Special Fixing Devices

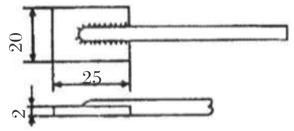
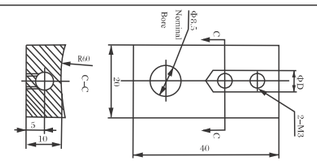
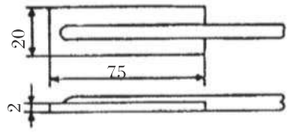
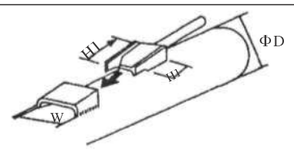
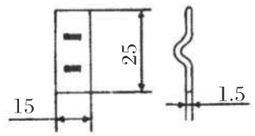
Unit：mm

Form			Protection Tube		Size				Nominal Pressure Mpa
			d	Material	M	H	S	D_0	
Fixed Thread	WZ □-269		Φ12	304	(G1/2")	20	25	Φ34	10
	WZ □-270		Φ6	304	M16×1.5	15	18	Φ23	
	WZ □-280		Φ8	304	M14×1	14	17	Φ22	
Compression-fitting Thread	WZ □-267M		Φ16	304	M27×2	18	32	Φ38	Fixed compression-fitting：2.5
			Φ16	304	M27×2	18	32	Φ38	Flexible compression-fitting：Normal Pressure
Flexible Male Thread	WSS □□		d	Material	M	H	S	L	4.0
			Φ6、Φ8	304	M16×1.5	16	21	24	
			Φ10~Φ14		M27×2	20	32	32	
Flexible Female Thread	WSS □□		d	Material	M	H	S	L	
			Φ6、Φ8	304	M16×1.5	21	21	24	
			Φ10~Φ14		M27×2	25	32	28	
Flexible Flange	WSS □□		D_3	Material	D0	D_1	D_3	H	常压
			Φ10~Φ16	304	Φ70	Φ54	Φ46	19	
			Φ10~Φ14	Die-casting Al.	Φ70	Φ54	Φ46	19	
Fixed Thread	WSS □□		d	Material304	M	H	S	L	10
			Φ6、Φ8	304	M16×1.5	16	21	24	
			Φ10~Φ14	304	M27×2	20	32	32	

Remark：Compression-fitting thread can be used for bimetallic thermometer；For satisfying different requirements，compression-fitting flange and fixed flange，etc. can be chosen：

Chongqing Chuanyi Instrument No.17 Factory Co.，Ltd. Address：Longfengqiao Bridge，Beibei District，Chongqing City Tel.（023）68261222 Fax:（023）68263847 Post Code：400700

● Temperature-sensing slice

Form	Model	Material						Applicable for
	PD–A	304						Φ3.0 Φ4.0 Φ4.5 Φ5.0
 （for power plant）	PD–B	304						Φ3.0 Φ4.0 Φ4.5 Φ5.0 Φ6.0
	PD–R	304						Φ3.0 Φ4.0 Φ4.5 Φ5.0 Φ6.0
	PD–UD	H1	H2	W	High	D	Material	Φ3.0
		46	25	21	13.5	Φ38 ~ Φ54	304	
	PD–UE	45	32	26	16	Φ50.8 or more	304	Φ4.0 Φ4.5 Φ5.0
	ST–D							Φ3.0
	ST–E							Φ4.0 Φ4.5 Φ5.0

形状	Form
型号	Type
材质	Material
适用铠装偶材外径	Outer diameter of the armored thermocouple used
通讯	Communication
电站专用感温片	Special temperature slice for the power station
高	High
材质	Material
以上	Above

Selection Table for Materials of the Protective Tube

Marks	Materials	Corresponding foreign steel specification	The highest temperature used	Features	Purposes
A	0Cr18Ni9	304	800	Low-carbon stainless steel, good intergranular corrosion resistance and welding performance	Chemical industry, spinning, papermaking, manufacturing industry, food processing, nitric acid industry and nuclear power station.
AL	00Cr19Ni10	304L	800	Ultra low-carbon stainless steel, good intergranular corrosion resistance and welding performance	Nitrate, paper pulp, spinning,Dye, manufacturing industry, pharmacy, and nuclear power station.
AT	1Cr18Ni9Ti	321	800	Low-carbon stainless steel, good intergranular corrosion resistance and welding performance	Chemical industry, paper pulp, papermaking, manufacturing industry, food processing , nitric acid industry, and nuclear power station.
H	0Cr17Ni2Mo2	316	800	Tartaric acid, phosphoric acid and sulfuric acid corrosion resistance, good intergranular corrosion resistance and welding performance	Same above
HL	00Cr17Ni14 Mo2	316L	800	Ultra low-carbon stainless steel, corrosion resistance performance is better than 316, with good welding performance.	Same above
P	0Cr25Ni20	310S	1100	Good corrosion resistance performance, anti- chlorine corrosion, oxidation resistance at the same temperature.	Boiler, blast furnace, cement furnace kiln, crude oil and petroleum industry, high-temperature sulfuration bed, and power station.
B	GH3030		1100	Ni-based high temperature alloy, good anti-oxidation performance, anti-corrosion and welding performance.	Equipment used for the combustion furnace, can work at high temperature and low pressure.
C	GH3039		1150	Ni-based high temperature alloy, the anti-oxidation performance is better than GH3030, high using temperature.	Same above
D	GH214		1200	Thermostability, anti high temperature oxidation, anti high temperature air-flow scouring , good high-temperature strength.	Same above
K	0Cr21Ni32 TiAl	Incocloy 800	1100	Good thermostability, the oxide skin is not easy to fall off, anti carburization and nitridation.	Power station, furnace kiln, crude oil and petroleum industry.
N	1Cr15Ni75 Fe	Inconel600	1100	NiCrFe alloy, good anti-corrosion, high-temperature oxidation and welding performance.	Nuclear power station, boiler, blast furnace, heat treatment, papermaking, and food processing.
DA	PtRh6		1300	Anti high temperature under oxidation conditions, good anti-corrosion performance in halogen and acid solutions etc, but easy to be polluted by carbon, silicone and sulfur.	Glass industry, chemical industrial smelting furnace, and annealing furnace etc.
T	CYT101		1200	New high-temperature alloy, with strong high-temperature strength and wear-resistance performance, as well as good anti- sulfuration capacity, and good anti-oxidation capacity, it is suitable to use in the environments of high-temperature and corrosive gas, with good welding and processing performance.	Combustion furnace, heat exchanger, boiler, furnace kiln, papermaking, high-temperature sulfuration bed and power station.
TB	CYT 104		1000	Anti high temperature and particle scouring, with good high temperature resistance, and anti oxidation and sulfuration capacity at high temperature	Same above.
TC	CYT 108		1200	Anti high temperature, high temperature oxidation resistance, anti high temperature air flow scouring, good high-temperature strength.	Same above
TD	CYT301		1250	Anti high temperature, wear resistance, anti-oxidation, not creep, anti high temperature corrosion.	Circular sulfuration bed boiler, incinerator of rubbish (ignition temperature of the rubbish, temperature of upper smoke in rubbish burning)
TE	CYT302		1300	Anti high temperature, wear resistance, anti-oxidation, not creep, anti acid/alkali high temperature corrosion, anti high temperature oil/asphalt corrosion.	Rotary cement kiln(level 3 cylinder, level 4 cylinder, level 5 cylinder, level 3 air duct, decomposing furnace, furnace tail gas room,Hot kiln hood, iron & steel hot blast heater(Vault, supply air duct)), and Petrochemical cracking furnace.
TH	CYT303		1200	Anti high temperature, wear resistance, anti-oxidation, not creep, anti corrosion.	Circular sulfuration bed boiler
CT	Cr25Ti		1200	Poor anti-oxidation, high –temperature wear resistance performance.	Rotary cement kiln
ZA		20# carbon steel	500	Good medium-low temperature strength, and welding performance	Boiler pipes etc
ZB	12Cr1MoV		700	Good medium temperature strength and welding performance.	High-pressure boiler pipes
ZC	15NiCuMoNb5-6-4		700	Good medium temperature strength and welding performance.	High-pressure boiler pipes
ZD	15CrMo		700	Good medium temperature strength and welding performance.	High-pressure boiler pipes
ZE		A335P91	700	Good medium temperature strength and welding performance.	High-pressure boiler pipes
HC		Hastelloy C-276	700	Anti point corrosion, anti intergranular corrosion , good high-temperature mechanical property.	Fine chemical engineering, petrochemical engineering.
HB		Hastelloy B	700	Anti point corrosion, anti intergranular corrosion , good high-temperature mechanical property.	Fine chemical engineering, petrochemical engineering.
TT	Titanium	Ti		Strong acid, and strong alkali	Fine chemical engineering, petrochemical engineering.
TA	Tantalum	Ta		Strong acid, and strong alkali.	Fine chemical engineering, petrochemical engineering.
ME	Monel	MONEL		Anti acid, alkali and seawater corrosion.	Fine chemical engineering, petrochemical engineering.
R	CB1	Corundum	1600	Ceramic protective tube, anti high temperature, acid, and alkali, can be used in corrosion medium, but it can't withstand collision, easy to broken.	High-temperature heating furnace and other cases.
Q	CB2	High aluminum	1300	Ceramic protective tube, the performance is the same with corundum tube, but the using temperature is lower.	Same above
M	MoSi2	Molybdenum dioxide	1600	Metal ceramic protective tube, good anti-high temperature, anti-corrosion performance, good tightness, anti heat impact, anti scouring, but easy to broken.	High-temperature corrosive environments, such as: Petrochemical engineering, natural gas, cement, metallurgy, mechanical industry.
S	SiC	Recrystallization silicon carbide	1600	Non-metal ceramic protective tube, good anti-high temperature oxidation performance, anti-corrosion performance, anti heat impact, anti scouring, but easy to broken.	High-temperature corrosive environments, such as: Petrochemical engineering, natural gas, cement, metallurgy, mechanical industry.
SS	SiC-Si	New-type silicon carbide	1400	Non-metal ceramic protective tube, high strength, anti-corrosion, anti-oxidation, wear-resistance, high heat conductivity, can withstand sharp temperature change.	Metallurgy, glass, cement etc industrial furnace, as well as the places with wear-resistance requirements.

Selection Table for Materials of the Protective Tube

Marks	Materials	Corresponding foreign steel specification	The highest temperature used	Features	Purposes
A	0Cr18Ni9	304	800	Low-carbon stainless steel， good intergranular corrosion resistance and welding performance	Chemical industry，spinning，papermaking，manufacturing industry，food processing，nitric acid industry and nuclear power station.
AL	00Cr19Ni10	304L	800	Ultra low-carbon stainless steel， good intergranular corrosion resistance and welding performance	Nitrate，paper pulp，spinning，Dye，manufacturing industry，pharmacy，and nuclear power station.
AT	1Cr18Ni9Ti	321	800	Low-carbon stainless steel， good intergranular corrosion resistance and welding performance	Chemical industry，paper pulp，papermaking，manufacturing industry，food processing，nitric acid industry，and nuclear power station.
H	0Cr17Ni2Mo2	316	800	Tartaric acid，phosphoric acid and sulfuric acid corrosion resistance，good intergranular corrosion resistance and welding performance	Same above
HL	00Cr17Ni14 Mo2	316L	800	Ultra low-carbon stainless steel，corrosion resistance performance is better than 316，with good welding performance.	Same above
P	0Cr25Ni20	310S	1100	Good corrosion resistance performance，anti- chlorine corrosion，oxidation resistance at the same temperature.	Boiler，blast furnace，cement furnace kiln，crude oil and petroleum industry，high-temperature sulfuration bed，and power station.
B	GH3030		1100	Ni-based high temperature alloy，good anti-oxidation performance，anti-corrosion and welding performance.	Equipment used for the combustion furnace，can work at high temperature and low pressure.
C	GH3039		1150	Ni-based high temperature alloy，the anti-oxidation performance is better than GH3030，high using temperature.	Same above
D	GH214		1200	Thermostability，anti high temperature oxidation，anti high temperature air-flow scouring，good high-temperature strength.	Same above
K	0Cr21Ni32 TiAl	Incocloy 800	1100	Good thermostability，the oxide skin is not easy to fall off，anti carburization and nitridation.	Power station，furnace kiln，crude oil and petroleum industry.
N	1Cr15Ni75 Fe	Inconel600	1100	NiCrFe alloy，good anti-corrosion，high-temperature oxidation and welding performance.	Nuclear power station，boiler，blast furnace，heat treatment，papermaking，and food processing.
DA	PtRh6		1300	Anti high temperature under oxidation conditions，good anti-corrosion performance in halogen and acid solutions etc，but easy to be polluted by carbon，silicone and sulfur.	Glass industry，chemical industrial smelting furnace，and annealing furnace etc.
T	CYT101		1200	New high-temperature alloy，with strong high-temperature strength and wear-resistance performance，as well as good anti- sulfuration capacity，and good anti-oxidation capacity，it is suitable to use in the environments of high-temperature and corrosive gas，with good welding and processing performance.	Combustion furnace，heat exchanger，boiler，furnace kiln，papermaking，high-temperature sulfuration bed and power station.
TB	CYT 104		1000	Anti high temperature and particle scouring，with good high temperature resistance，and anti oxidation and sulfuration capacity at high temperature	Same above.
TC	CYT 108		1200	Anti high temperature，high temperature oxidation resistance，anti high temperature air flow scouring，good high-temperature strength.	Same above
TD	CYT301		1250	Anti high temperature，wear resistance，anti-oxidation，not creep，anti high temperature corrosion.	Circular sulfuration bed boiler，incinerator of rubbish（ignition temperature of the rubbish，temperature of upper smoke in rubbish burning）
TE	CYT302		1300	Anti high temperature，wear resistance，anti-oxidation，not creep，anti acid/alkali high temperature corrosion，anti high temperature oil/asphalt corrosion.	Rotary cement kiln（level 3 cylinder，level 4 cylinder，level 5 cylinder，level 3 air duct，decomposing furnace，furnace tail gas room，Hot kiln hood，iron & steel hot blast heater（Vault，supply air duct），and Petrochemical cracking furnace.
TH	CYT303		1200	Anti high temperature，wear resistance，anti-oxidation，not creep，anti corrosion.	Circular sulfuration bed boiler，
CT	Cr25Ti		1200	Poor anti-oxidation，high –temperature wear resistance performance.	Rotary cement kiln
ZA		20# carbon steel	500	Good medium-low temperature strength，and welding performance	Boiler pipes etc
ZB	12Cr1MoV		700	Good medium temperature strength and welding performance.	High-pressure boiler pipes
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HC		Hastelloy C-276	700	Anti point corrosion，anti intergranular corrosion，good high-temperature mechanical property.	Fine chemical engineering，petrochemical engineering.
HB		Hastelloy B	700	Anti point corrosion，anti intergranular corrosion，good high-temperature mechanical property.	Fine chemical engineering，petrochemical engineering.
TT	Titanium	Ti		Strong acid，and strong alkali	Fine chemical engineering，petrochemical engineering.
TA	Tantalum	Ta		Strong acid，and strong alkali.	Fine chemical engineering，petrochemical engineering.
ME	Monel	MONEL		Anti acid，alkali and seawater corrosion.	Fine chemical engineering，petrochemical engineering.
R	CB1	Corundum	1600	Ceramic protective tube，anti high temperature，acid，and alkali，can be used in corrosion medium，but it can't withstand collision，easy to broken.	High-temperature heating furnace and other cases.
Q	CB2	High aluminum	1300	Ceramic protective tube，the performance is the same with corundum tube，but the using temperature is lower.	Same above
M	MoSi2	Molybdenum dioxide	1600	Metal ceramic protective tube，good anti-high temperature，anti-corrosion performance，good tightness，anti heat impact，anti scouring，but easy to broken.	High-temperature corrosive environments，such as：Petrochemical engineering，natural gas，cement，metallurgy，mechanical industry.
S	SiC	Recrystallization silicon carbide	1600	Non-metal ceramic protective tube，good anti-high temperature oxidation performance，anti-corrosion performance，anti heat impact，anti scouring，but easy to broken.	High-temperature corrosive environments，such as：Petrochemical engineering，natural gas，cement，metallurgy，mechanical industry.
SS	SiC-Si	New-type silicon carbide	1400	Non-metal ceramic protective tube，high strength，anti-corrosion，anti-oxidation，wear-resistance，high heat conductivity，can withstand sharp temperature change.	Metallurgy，glass，cement etc industrial furnace，as well as the places with wear-resistance requirements.

Application Performance of Large Integrated Unit

Executed Years	Unit of the user	Project name
2009-2011	CNPC Fushun Petrochemical Engineering Co.， Ltd	Framework Supply of 10 million-ton/year Oil Refining Project
2010-2012	CNPC Sichuan Petrochemical Engineering Co.， Ltd	Framework Supply of 10 million-ton /year Oil Refining Project and 0.8 million-ton/year Ethylene Project
2014-2016	Jiangsu Sierbang Petrochemical Engineering Co.， Ltd	Framework Supply of 3.6million-ton/year Alcohol Quito Co-production Project
2014-2016	China Pingmei Shengma Group	Framework Supply of 0.25 million-ton/year Adipic Acid and 0.2 million-ton/year Caprolactam projects
2014-2016	Baoshan Iron and Steel Zhanjiang Iron & Steel Co.， Ltd	Framework Supply of New 10 million-ton Steelmaking Project
2007-2009	Shougang Group Jingtang Joint Operation Co.， Ltd	Framework Supply of New 10 million-ton Steelmaking Project
Application Performance in Chemical Engineering Industry		
Years	**Unit of the user**	**Project name**
2015	CNPC Yunan Petrochemical Engineering Co.， Ltd	Sulfur Recovery Joint Unit in the 10million Tons/year Oil Refining Project
2015	CNPC Yunan Petrochemical Engineering Co.， Ltd	Catalytic Cracking Unit of the Heavy Oil in the 10million Tons/year Oil Refining Project
2013	CNPC Hohehot Petrochemical Engineering Co.， Ltd	Quality Upgrading Project of the 1.2 Million Tons/Year Catalytic Gasoline
2015	CPECC	North Azadegan Ground Treatment Project of Crude Oil
2015	China National Offshore Oil Corporation， Ningbo Daxie Petrochemical Engineering Co.， Ltd	Technical Transform for Pretreatment of Raw Materials
2015	CNPC Natural Gas Pipeline Engineering Co.， Ltd	Refined Petroleum Pipeline Project of Yunnan
2015	CNPC Dushanzi Petrochemical Engineering Branch	Hidden Trouble Rectification of the Oil Tank Zone in Raw Material Workshop of the Lightweight Oil Tank Zone
2013	CNPC Jinxi Petrochemical Engineering Branch	Access Project of the Heavy Catalytic Unit
2014	China Technical Synthetic Oil Inner Mongolia Co.， Ltd	The Catalyst Project of 48-thousand ton/year Coal Oil （Phase I）
2013	Xinjiang Petroleum Management Bureau Material Supply Co.,Ltd	Ground Construction Project of Kelamayi Oilfield Kexia Group
2014	Dongying Joint Petrochemical Engineering Co.， Ltd	Catalytic Cracking Unit of the Heavy Oil in the 2 million Tons/year Oil Refining Project
2014	Henan Heyang Petrochemical Engineering Co.， Ltd	Deep Processing Project of 0.45 million-ton/year Liquefied Petroleum Gas
2014	Henan Fengli Petrochemical Engineering Co.， Ltd	0.1 million-ton/year Propylene and Co-produced Aromatic Hydrocarbons Project
2014	Shandong Huifeng Petrochemical Group Co.， Ltd	Continuous Catalytic Reforming Unit of 0.6 million-ton/year
2014	Jiangsu Yangzi Catalyzer Co.， Ltd	Catalytic Reforming and Hydrogenation Catalyst Project o of 2 thousand tons/year
2014	Pucheng Clean Energy Chemical Engineering Co.， Ltd	1.8 million-ton Methyl Alcohol and 0.7 million-ton Polyene Project
2014	Datong Coal Mine Guangfa Chemical Industry Co.， Ltd	0.6 million-ton/year Methyl Alcohol Project
2014	Dalian Dahua Group	0.3 million-ton/year Methyl Alcohol Project
2014	Shanxi Lu'an Coking Co.， Ltd	The Transform and Expansion of 0.2 million-ton/year Methyl Alcohol Project
2013	Xinjiang Xinye Energy Chemical Industry Co.， Ltd	0.1 million-ton/year Methyl Alcohol Project
2013	Mao County Xin New Energy Co.， Ltd	80 thousand tons / year Methyl Alcohol，50 thousand tons /year Dimethyl Ether
2015	Henan Shunda Chemical Engineering Technical Co.， Ltd	0.4 million tons/year Distillation of Coal-based Alcohol
2013	Qianxi County Qianxi Coal Chemical Industry Investment Co.， Ltd	Gasification Unit of 0.3 million tons/ year Ethylene Glycol Project
2015	Yangquan Coal Industry Group， Pingding Chemical Engineering Co.，Ltd	2*0.2million tons/year Ethylene Glycol Project （Phase I Project）
2013	Xinjiang Guanghui New Energy Co.， Ltd	0.8 million tons/year Dimethyl Ether
2013	CNPC Chemical Engineering Co.， Ltd，Hubei Fertilizer Branch	Hydrogenation Refining Project that Using 0.2 million Tons/year Synthetic Gas to Make Ethylene Glycol
2014	Cangzhou Zhengyuan Fertilizer Co.， Ltd	0.6 million tons/year Synthetic Ammonia ， 0.8 million tons/year Urea Project
2015	CNPC Huahe Coal Chemical Engineering Co.， Ltd	0.3 million tons/year Synthetic Ammonia，0.52 million tons/year Large-particle Urea Project
2014	China Sea Petroleum Huahe Coal Checmical Engineering Co. ， Ltd	0.3 million tons/year Urea，0.52million tons/year Synthetic Ammonia Project
2014	Henan Jinmei Tianqing Coal Chemical Engineering Co.， Ltd	0.18 million tons/year Synthetic Ammonia，0.3million tons of Urea

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Application Performance in Chemical Industries

Year	Direct users	Project name
2015	Shanxi Yangmei Fengxi Fertilizer Industry （Group） Co.， Ltd	The Transformation Upgrading Project that Comprehensively Using the Coke Oven Gas to Produce Urea， Co-production LNG
2013	Qinghai Yuntianhua International Frtilizer Co.， Ltd	Exhaust Gas Recovery Project of 0.2 million tons/year Synthetic Ammonia
2015	Hebei Zhongxiang Energy Co.， Ltd	The Project Using120000Nm3/h Coke Oven Gas to Make LNG and Liquefied Ammonia
2015	Hebei Anfeng Iron& Steel Co.， Ltd	Using 110000Nm3/h Coke Oven Gas to Produce LNG
2015	Shanxi Coalbed Methane Co.， Ltd	750000m3 Liquidation Unit
2013	Tangshan Iron & Steel Gas Co.， Ltd	The Project Using 40000 Nm3/h Coke Oven Gas to Produce LNG
2015	Xuzhou Yigao Zhongtai New Energy Co.， Ltd	The Project Using 37500 Nm3/h Coke Oven Gas to Produce LNG
2013	Tangshan Xin'ao Yongshun Clean Energy Co.， Ltd	The Project Using 35000 Nm3/h Coke Oven Gas to Produce LNG
2013	Handan Yutai Coal Chemical Industry Co.， Ltd	The Project Using 30000 Nm3/h Coke Oven Gas to Produce Natural Gas
2015	Shanxibei Strong Energy Co.， Ltd	The Project Using 30000 Nm3/h Coke Oven Gas to Produce LNG
2015	Wuhai Huaxin Coal Coking Co.， Ltd	The Project Using 30000 Nm3/h Coke Oven Gas to Produce LNG
2013	Shanxi Guoxin Zhengtai New Energy Co.， Ltd	The Project Using 30000 Nm3/h Coke Oven Gas to Produce SNG
2015	Shanxi Fuyangyuan Technology and Trade Co.， Ltd	The Project Using 60000 Nm3/h Coke Oven Gas to Produce LNG
2015	Baotou Zhongyuan Lvneng Natural Gas Co.， Ltd	2*0.3million Nm3/d LNG Project
2015	Sinopec Beihai LNG Co.， Ltd	Guangxi Receiving Station Project of LNG
2015	Shaanxi Future Energy Chemical Engineering Co.， Ltd	Fischer Synthetic Unit in the 1million tons/year Coal Indirect Liquidation Demonstration Project
2015	Shanxi Luan Nake Carbon Chemical Engineering Co.， Ltd	40 thousand Tons/year Synthetic Base Oil， 20 thousand Tons/year Environmental Protection Solvent Oil （Polymerization reaction unit）
2015	Inner Mongolia Yitai Chemcial Engineering Co.， Ltd	CO Conversion Unit in Purification Unit of 1.20 million Tons/year Fine Chemicals Project
2013	Jincheng Coal Industry Group Tianxi Coal Oil Branch	The 0.1 million Tons/year Coal-based Synthetic Oil Demonstration Project
2013	Chifeng Boyuan Technology Co.， Ltd	0.45 million Tons/year Coal Tar Hydrogenation Project （Phase I）
2015	Liyuan Coking Group Chemical Engineering Technology Co.， Ltd	0.30 million Tons/year Coal Tar Hydrogenation Project
2014	Xikemo （Jiangsu） Needle Coke Technology Co.， Ltd	60 thousand Tons/year Needle Coke Project
2015	Inner Mongolia Yitai Chemcial Engineering Co.， Ltd	1.20million tons/year Fine Chemicals Project
2013	Baotou Iron& Steel Group	2.10 million tons/year Coking Project （Phase I）
2015	Liyuan Coking Group Chemical Industrial Technical Co.， Ltd	2million tons/ coking project （Phase II）
2014	Yulin Shenmu Industrial Park， Huahang Energy Co.， Ltd	The Project of Ultra High-Power Needle Coke Production with 0.2 million tons/year of Coal Tar
2015	China Pingdingshan Shenma Group Nylon Technology Co.， Ltd	0.25 million Tons /year Adipic Acid， 0.2 million Tons/year Caprolactam Project
2015	Lanhua Technology Entrepreneurship Co.， Ltd New Material Company	0.2 million Tons/year Caprolactam Project， Phase I
2015	Yangmei Group Taiyuan New Chemical Material Co.， Ltd	0.14 million Tons /year Adipic Acid， 0.2 million Tons/year Caprolactam Project
2013	Hebei Sanhan Chemical Industrial Co.， Ltd	0.1 million tons/year Cyclohexanone Project
2013	Cangzhou Xuyang Chemical Industrial Co.， Ltd	0.1 million tons/year Cyclohexanone Project
2013	Guangdong Rongtai Industrial Co.， Ltd， Chemical Engineering Solvent Plant	20 thousand tons/year phthalic anhydride unit
2014	Fujian Coastal Chemical Industry Co.， Ltd	60 thousand tons/yearAcrylic acid and esters
2014	Shanghai Huayi Crylic Acid Co.， Ltd	60 thousand tons/year Acrylic acid unit
2013	Guodian Sinopec Ningxia Energy Chemical Industry Co.， Ltd	46 thousand tons/year PTMEG （polytetrahydrofuran）

Application in Chemical Industry		
Year	**Direct users**	**Project name**
2013	Chongqing Chiyuan Chemical Engineering Co.， Ltd	46 thousand tons/year PTMEG （polytetrahydrofuran）
2013 2015	Pinghu Petrochemical Engineering Co.， Ltd Fude Changzhou Energy Chemical Engineering Co.， Ltd	The acrylic project of annual output of 0.32million tons and 0.30 million tons of acrylate 90 thousand tons/year of C 4 for processing 0CU， 90 thousand million tons/year 0cu unit
2015	Hebei Haiwei Traffic Facility Group Co.， Ltd	0.5 million tons/year propane dehydrogenation project， and the pre-treatment project of 3million tons/raw materials
2015	Sichuan Leshan Fuhua Tongda Pesticide Technology Co.， Ltd	Technical transform project of 50 thousand tons/year dimethoxymethane distillation
2015	Sichuan Leshan Fuhua Tongda Pesticide Technology Co.， Ltd	Lefu I Glyphosate project
2014	Yunnan Anyi Fine Chemical Engineering Co.， Ltd	20 thousand tons/year Glyphosate project
2015	Sichuan Leshan Fuhua Tongda Pesticide Technology Co.， Ltd	80 thousand tons/year glycine technical transform project
2015	Anhui Huajian Chemical Engineering Co.， Ltd	50 thousand tons/year phosphorus trichloride project
2013	Tangsan Jidong Solvent Co.， Ltd	The technical transform project of 15 thousand tons of acetic ether
2014	Panjin Haoye Chemical Engineering Co.， Ltd	0.2 million tons/year C4 comprehensive use project
2014	Nitielong （Jiangsu）Carbon Black Co.， Ltd	50 thousand tons/year carbon black project
2014	Zibo Haiyi Fine Chemical Engineering Co.， Ltd	0.1 million tons/year C4 comprehensive use project and 40 T/h sewage treatment project
2013	China Salt Industry Group， Anhui Hongsifang Co.， Ltd	The unit in phase I， the annual output of 0.105million tons of VCM，0.15 millions of caustic soda， 0.1millions of sodium hydrosulfite
2015	Sinopec Group （Nanjing） Chemical Industrial Co.， Ltd， Lianyungang Alkali Plant	1.2 million tons/year sodium carbonate project
2015	Yangquan Coal Group Xiyang Chlor-Alkali Chemical Engineering Co.， Ltd	0.4million tons/year caustic soda， 0.4million tons/year PVC， 60 thousand tons /year CPE project
2015	Henan Junhua Development Co.， Ltd	0.1million m3/year melamine foam project
2015	Chongqing Chuanwei Hongjin New Material Co.， Ltd	60thousand tons/ year PVB 12 resin project
2015	Shandong Yingke Medical Products Co.， Ltd	20 production lines of rubber gloves
2014	Jiangsu Shenghong Group， Jiangsu Sierbang Petroleum Chemical Engineering Co.， Ltd	80 thousand tons/year SAP unit （high water-absorbent resin）
2015	Shanxi Lanhua Huaming New Material Co.， Ltd	0.5million tons/year new nanometer materials project， phase I
2014	Kailuan Clean Coal Co.， Ltd	0.2 million tons/year crude benzene hydrorefining project
2013	Shaanxi Zhongxin Chemical Engineering Co.， Ltd	0.1 million tons/year crude benzene hydrorefining project
2014	Changzhou Changrun Petroleum Co.， Ltd	50 thousand tons/year waste oil hydrogenation project
2014	Hebei Xinqiyuan Energy Technology Development Co.， Ltd	The hydrogenation test project of 50 thousand tons/year coat tar fluidized bed
2013	Weifang Zhenxing Risheng Chemical Engineering Co.， Ltd	Equipment transform project of crude benzene hydrogenation production line
2015	Huaneng Shandong Laiwu Power Generation Co.， Ltd	2*1000MW ultra supercritical unit （secondary reheat boiler）
2010	Huaneng Qinbei Power Generation Co.， Ltd	2*1000MW ultra supercritical unit （phase III）
2015	China Power Investment Corporation Engineering Co.，Ltd （Xining Power Plant）	2*1050MW ultra supercritical unit
2015	Xishan Coal-Power Group Gujiao Power Plant	2*1000MW ultra supercritical unit
2014	Huaneng Anyuan Power Generation Co.， Ltd	2*6600MW ultra supercritical unit（secondary reheat boiler）
2014	Shenhua Shendong Power Chongqing Wanzhou Power Generation Plant	2*660MW ultra supercritical unit
2015	Guangxi Qinzhou Coal-fired Power Plant	2*660MW ultra supercritical unit
2015	Datang Huayin You County Energy Co.， Ltd	2*660MW supercritical unit
2014	China Huaneng Group Huaneng Weijiamao Coal-power Joint-operation Power Generation Plant	2*660MW supercritical unit （phase I）
2015	Chongqing Songzao Power Co.， Ltd， Anwen Power Plant	2*660MW supercritical unit
2015	Guizhou Jinyuan Tea Garden Power Generation Co.， Ltd	2*660MW ultra supercritical unit
2015	Henan Investment Group Hebi Heqi Power Plant	2*660MW ultra supercritical unit

2015	Guizhou Jinyuan Tea Garden Power Generation Co.， Ltd	2*660MW ultra supercritical unit
2015	Henan Investment Group Hebi Heqi Power Plant	2*660MW ultra supercritical unit
2015	China Power Investment Corporation Guangxi Fangchenggang Power Co.， Ltd	2*660MW ultra supercritical unit
2015	Yuedian Dapu Power Generation Co.， Ltd	2*600MW ultra supercritical unit
2015	Huadian Tanzhai Power Plant	2*600MW supercritical unit
2013	Guizhou Qiangui Power Generation Co.， Ltd	2*600MW supercritical unit
2013	IL&FS Tamil Nadu Power Co.， Ltd， Cuddalore Power Plant	2*600MW subcritical unit
2013	China Electric Power Engineering Co.， Ltd （Laos HONGSA Coal-fired Power Plant）	3*600MW unit
2013	Zhongshan Jiaming Electric Power Co.， Ltd	3*390MW unit
2015	Huaneng Mianchi Thermoelectricity Co.， Ltd	2*350MW unit
2015	Xinjiang Guotai Xinhua Mine Industry Co.， Ltd	2*350MW unit
2015	Dongguan Zhongdian New Energy Thermoelectricity Plant	2*350MW unit
2014	Guizhou Xingyi Qingshuihe Power Plant	2*350MW unit
2013	TBEA Xinjiang Silicone Industry Co.， Ltd	2*350MW unit
2013	China Power Investment Corporation Beibuwan （Guangxi） Thermoelectricity Co.， Ltd	2*350MW unit
2015	Huimin Huihong New Material Co.， Ltd， Huji Power Plant	4*330MW unit （phase II）
2015	Shenhua Guohua Investment （Liuzhou） Power Generation Co.， Ltd	2*330MW unit
2014	Hallen Energy Bayanhaote Thermal Power Plant	2*330MW unit
2014	Erdos Beijiao Thermal Power Co.， Ltd	2*330MW direct air-cooling unit
2015	Zhongshan Thermal Power Generation Co.， Ltd	2*300MW unit
2014	Binzhou Beihai Huihong New Material Co.， Ltd	4*300MW unit （phase II）
2014	Kailuan Xiexin Power Generation Co.， Ltd， Coal Gangue Kengkou Power Plant	2*300MW unit
2013	Huaxi Energy Industrial Co.， Ltd， India Power Plant M	2*300MW unit
2013	Huaxi Energy Industrial Co.， Ltd， India Power Plant T	2*300MW unit
2015	Baise Mining Group Co.， Ltd， Xinlvshan Mine Industry	2*350MW unit （self-generation power plant）

Application Performance in Power Industry

Years	**Direct users**	**Project name**
2013	Xinjiang Jiarun Resource Shareholding Co.， Ltd （self-generation power plant）	2*350MW unit （self-generation power plant）
2014	Zhanhua Huihong New Material Co.， Ltd （self-generation power plant）	2*300MW unit （self-generation power plant）
2014	Shandong Quanlin Comprehensive Utilization of Straws Co.， Ltd （self-generation power plant）	2*300MW unit （self-generation power plant）
2013	Xinjiang Dongfang Hope Nonferrous Metals Co.， Ltd （self-generation power plant）	3*350MW unit （self-generation power plant）
2013	Xinjiang Jinhui Zhaofeng Energy Co.， Ltd （self-generation power plant）	2*350MW unit （self-generation power plant， phase I）
2015	Chongqing Enliji Investment Co.， Ltd， heat island center	2*490t/hCFB boiler
2015	Zhong'an Joint Coal Chemical Engineering Power Center	4*465t/h High-pressure coal-fired unit boiler
2014	Shenhua Coal-oil Xinjiang Coal Chemical Engineering Branch Power Center	4*480t/h high-temperature， high-pressure pulverized coal fired boiler
2015	Xinjiang Yili Energy Co.， Ltd， Power Center	2*460t/h high-temperature， high-pressure pulverized coal fired boiler
2013	Xinjiang Shenhuo Thermal Power Co.， Ltd Power Station	4*350MW unit
2015	Xuzhou Huamei Thermal Power Co.， Ltd	2*350MW unit （CFB boiler）
2011	Inner Mongolia Guodian Energy Investment Co.， Ltd， Hangjin Power Generation Plant	2*300MW unit （CFB boiler）

2010	Shanxi Yuguang Power Generation Co.， Ltd	2*300MW unit （CFB boiler）
2010	Shenzhen Dongang Boiler Control Co.， Ltd	2*300MW unit （CFB boiler）
2011	Inner Mongolia Yinze Mine Industry Investment Co.， Ltd	3*220t/h （CFB boiler）
2015	Zhanjiang Yuefeng Environmental Protection Power Co.， Ltd	1500t/d （rubbish power generation）
2016	Jiangsu Nantong Fantai Enterprise Co.， Ltd， Beijing Gaoantun	2*800t/d （rubbish power generation）
2016	Fuzhou Hongmiaoling Rubbish Incineration Power Generation Co.， Ltd	2*600t/d （rubbish power generation）
2015	Yongqing Enviromental Protection Co.， Ltd （Hengyang）	500t/d （rubbish power generation）
2015	Beijing Sangde Environmental Protection Group （Chongqing Kai County）	400t/d （rubbish power generation）
2015	Guangda Environmental Protection（Dangshan） Co.， Ltd	400t/d （rubbish power generation）
2015	Xinyu Yongqing Environmental Protection Energy Co.， Ltd （Xinyu City）	300t/d （rubbish power generation）
2015	Anshun Green Power Regeneration Energy Co.， Ltd	2*350t/d （rubbish power generation）
2014	Foshan Rubbish Incineration Power Generation Plant I	3*350t/d （rubbish power generation）
2014	Guangxi Guigang Beikongshuiwu Environmental Protection Co.， Ltd （Guigang City）	2*300t/d （rubbish power generation）
2011	Tianjin Taihuan Re-generation Resource Utilization Co.， Ltd （Guanzhuang）	2*30MW unit （rubbish power generation）
2010	Tianjin Binhai Environmental Protection Industrial Development Co.， Ltd	2*15MW unit （rubbish power generation）
2010	Qinhuangdao Linghai Power Generation Co.， Ltd （Qinhuangdao）	2*9MW unit （rubbish power generation）
Years	**Direct users**	**Project name**
2015	Baoshan Iron and Steel Zhanjiang Iron & Steel Co.， Ltd	2*5050m3 blast furnace project
2008	Shougang Group Jingtang Joint Operation Co.， Ltd	2*5500m3 blast furnace project
2010	Henan Anyang Iron & Steel Co.， Ltd	4570m3 blast furnace project
2010	Angang Steel Company Limited， Bayuquan Iron & Steel Branch	4038m3 blast furnace project
2011	Wuhan Iron & Steel Group Egang Company	2800m3 blast furnace project
2012	Hunan Hualing Lianyuan Iron & Steel Co.， Ltd	2800m3 blast furnace project
2011	Hebei Iron & Steel Group， Yanshan Iron & Steel Co.， Ltd	2560m3 3# blast furnace project
2010	Kunming Iron & Steel Group Co.， Ltd	2500m3 blast furnace project
2012	Hebei Zongheng Iron & Steel Corportion	2500m3 blast furnace project
2011	Yingkou Jinghua Iron & Steel Co.， Ltd	2*2300m3 blast furnace project
2014	China Benxi Iron & Steel （Group） Co.， Ltd， Beiying Iron Works	2850m3 new blast furnace project
2014	Angang Steel Company Limited （Strategic user）	2580m3 new blast furnace project
2015	Angang Steel Company Limited	2580m3 blast furnace project （4#）
2015	Angang Steel Company Limited	2580m3 blast furnace （7#）， 2#air heater
2013	Anyang Iron & Steel Co.， Ltd	2800 m3 overhaul of the boiler project
2013	Wukuangying Iron & Steel Co.， Ltd	2*2300m3 blast furnace project
2015	Shaanxi Longmen Iron & Steel （Group） Co.， Ltd	1800m3 blast furnace project
2014	Hebei Iron & Steel Group Jiujiang Wires Co.， Ltd	1080m3 transform project of the blast furnace
2013	Yancheng Lianxin Iron & Steel Co.， Ltd	1080m3 new blast furnace project
2013	Nanjing Iron & Steel Group Co.， Ltd	2*1800m3 new blast furnace project（4#， 5#）
2013	Lianyungang Yaxin Iron & Steel Co.， Ltd	2*1300m3 overhaul of the boiler project
2013	Shandong Xiwang Iron & Steel Co.， Ltd	1080m3 blast furnace project
2014	Rizhao Iron & Steel Shareholding Group Co.， Ltd	1080m3 blast furnace （15#， 16#）， air heater project
2013	Tangshan Wenfeng Iron & Steel Co.， Ltd	850m3 blast furnace project
2013	Panshi Jianlong Iron & Steel Co.， Ltd	550m3 blast furnace project
2014	Shaanxi Longmen Iron & Steel（Group） Co.， Ltd	450m3 blast furnace transform project
2013	Hangzhou Iron & Steel Group Corporation	497m3 blast furnace project
2013	Fujian Sangagn Minguang Co.， Ltd	400m3 boiler overhaul project （3#）
2015	Rizhao Iron & Steel Shareholding Group Co.， Ltd	Flue gas desulfurization project of 2#600m sintering machine

2015	Jiangsu Delong Ni Industry Co.， Ltd	1320mm stainless hot rolling annealing pickling line
2015	Baotou Iron & Steel （Group）Co.， Ltd	Roasting project of the new 5 million tons band-type pelletizing works
2015	Yehui China Technical Material Co.， Ltd	The new project of acid tandem rolling and retreating line
2014	Hebei Jinxi Iron & Steel Group Dafang Zhonggong Technical Co.， Ltd	Transform project of 2# blast furnace
2013	Baoshan Iron & Steel Group Xinjiang Bayi Iron & Steel Co.， Ltd	Luojing 1# COREX furnace is entirely moved to Xinjiang Bayi Iron & Steel Co.， Ltd
Application Performance of the Exported Project		
Years	**Direct users**	**Project name**
2015	Turkey EREN ENER JI ZETES Power Plant	2*660MW supercritical unit （Phase III）
2011	Adani Power Co.， Ltd TIRODA	3*660MW supercritical unit
2011	Saudi Arabia National Power Company	2*660MW ultra supercritical unit
2010	Adani Power Co.， Ltd TIRODA	3*660MW ultra supercritical unit
2010	Jhajjar Power Limited	2*660MW ultra supercritical unit
2011	Adani Power Co.， Ltd KAWAI	2*660MW supercritical unit
2010	Vietnam Power Group Wangmi Thermal Power Plant	1*650MW unit
2011	India Coastal Energy Private Co.， Ltd （Mindouli）	2*600MW supercritical unit
2011	Essar POWER M.P LTD.（EPMPL）	2*600MW subcritical unit
2010	India MAHAN	2*600MW subcritical unit
2015	Pakistan Nishat Chunian Limited	2*110t/h （CFB boiler） 1*46MW unit
2015	Philippines DMCI Company	2*150 MW （CFB boiler）unit
2010	Guohua （Indonesia） South Sudanese Power Generation Co.， Ltd	2*150 MW unit
2014	India Madhucon Company	2*150 MW project
2015	UAE FUJAIRAH Cement Company	12MW waste heat power station
2015	Indonesia Hongfa Weili Aluminium Oxide Company self-generation power plant	2*C30MW+4*B25MW
2015	Taiwan Plastic Industrial Co.， Ltd， Hejing Iron & Steel Co.， Ltd	3*4350M3 blast furnace project
2015	Ethiopia BELES1 Sugar Refinery Self-Generation Power Plant	2*20 MW unit
2011	India Electricity-Steel Comprehensive Co.， Ltd （EIL）	2000M3 blast furnace project
2015	India UGML Iron & Steel Co.， Ltd	630m3 blast furnace （phase II）， 135m2sintering
2013	India Jindal Steel and Power Limited （JSPL）	Upgrading and transform project of 445m3 blast furnace
2010	India Electricity-Steel Comprehensive Co.， Ltd （EIL）	2.2million tons/year steel project
2015	Brazil GUSA Company	Complete project of 50 ton rotary furnace equipment
2015	Philippines Joint Smelting& Refining Company	Concentrate transportation， smelting， and common auxiliary project
2015	Sinopec Engineering Construction Company， Iran Branch （CPECC）	Crude oil treatment project of North Azadegan

Certification of ISO 9001
Quality Management System

Certification of ISO 14000
Environment Management System

Certification of OHSAS18001 Occupational
Health and Safety Management System

Anti-explosion Certification
of NEPSI Products

Certification of CE Products

Certification of SIL2 Products