

RTD / TC

| Introduction |

Thermocouple (T/C) :

A thermocouple consists of two wires, each made of a different metal material, and welded together at the ends. When this welding point (Measurement connection point) is heated, a thermal current movement occurs, which is equal to the temperature difference between the welding point and the other end (Connection point) at the same temperature.



Therefore, the temperature of the reference contact which is maintained at a fixed value or used the automatic compensation ammeter to measure the forces and motion of the thermal current, the temperature of the measurement contact is can be measured. The thermal current motion of a thermocouple has nothing to do with the size or length of the wire diameter. But it relates to the specifications of the wires. Thermocouples are often placed in the body of the junction and sealed in a protective tube, which is opposite the terminal block and inlay attachment.

RTD platinum resistance :

The temperature can be measured with the resistance of pure metal wires, and the resistance will increase at a fixed ratio as the temperature increases. By using the characteristics of this temperature coefficient, the temperature can be known from the change in resistance. Resistance thermometers are made of platinum, nickel, copper, etc., and platinum is better than other metal materials for its stability and reproducibility. Therefore, it is most commonly used for this. It is wrapped by a pure platinum wire wrapped around an elongated mica sheet, covered with a protective mica sheet, and combined with a thin sheet of rust steel or other material. Some components are wound by a resistance wire around the core structure of glass or mica, and then the combination is sealed in a rigid glass or ceramic tube. This component and the compensation wire contact each other (Two or three) and are placed in the protection tube, it is connected with the terminal box and accessories.



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Applications :

HVAC / VOC / Environment / Agriculture / Temperature and humidity engineering / Hydraulic / Electrical engineering / Electronics / Semiconductor / Air pressure / Water treatment equipment / Petrochemical industry / Boiler / Heating industry

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| TC Thermocouple Specifications |

■ Thermocouple type and operating temperature

Thermocouple type	Wire diameter		Limit of operating temperature		The outer diameter X inner diameter of the protective tube (Unit : Ø mm)	
	Mark	Outer diameter(mm)	Commonly used limit	Overheating use limit	Metal protection tube	Non-metal protective tube
B(Platinum Rhodium 30%, Platinum 6%)	L	0.5	1500°C	1700°C		6.8/10/13/15/17
R(Platinum Rhodium13%-Platinum)	L	0.5	1400°C	1600°C		6.8/10/13/15/17
R(Platinum Rhodium10%-Platinum)	L	0.5	1400°C	1600°C		6.8/10/13/15/17
K +Nickel 90%+Chromium 10% -Nickel 90%+Manganese 2% +Aluminum 2%	D	3.2	1000°C	1200°C	≥15	10/13/15/17
	C	2.3	900°C	1100°C	≥12.7	10/13/15/17
	B	1.6	850°C	1050°C	≥9.5	10/13/15/17
	A	1.0	750°C	950°C	≥6.3	10/13/15/17
	H	0.65	650°C	850°C	≥5	10/13/15/17
E +Nickel 90%+Chromium 10% -Copper 55%+Nickel 45%	B	1.6	550°C	650°C	≥9.5	10/13/15/17
	A	1.0	500°C	550°C	≥6.3	10/13/15/17
	H	0.65	450°C	500°C	≥5	10/13/15/17
	T	0.32	300°C	400°C	≥5	10/13/15/17
J +High purity iron -Copper 55%+ Nickel 45%	C	2.3	550°C	750°C	≥12.7	10/13/15/17
	B	1.6	500°C	650°C	≥9.5	10/13/15/17
	A	1.0	450°C	550°C	≥6.3	10/13/15/17
	H	0.65	400°C	500°C	≥5	10/13/15/17
T +High purity copper -Copper 55%+Nickel 45%	B	1.6	300°C	350°C	≥9.5	
	A	1.0	250°C	300°C	≥6.3	
	H	0.65	200°C	250°C	≥5	
	T	0.32	200°C	250°C	≥5	

| RTD Specification Table |

■ Platinum temperature measuring resistor Pt100 temperature-impedance value comparison table

■ Pt100 Ω(DIN 43760 & JIS-1606)Resistance value unit : Ω

°C	°F	0	-10	-20	-30	-40	-50	-60	-70	-80	-90	-100
-100	-148	60.25	59.19	52.11	48.00	43.87	39.71	35.53	31.32	27.08	22.80	18.49
0	32	100.00	96.09	92.16	88.22	84.27	80.31	76.33	72.33	68.33	64.30	60.25
°C	°F	0	10	20	30	40	50	60	70	80	90	100
0	32	100.00	103.90	107.79	111.67	115.54	119.40	123.24	127.07	130.89	134.70	138.50
100	212	138.50	142.29	146.06	149.82	153.58	157.31	161.04	164.76	168.46	172.16	175.84
200	392	175.84	179.51	183.17	186.82	190.45	194.07	197.69	201.29	204.88	208.45	212.02
300	572	212.02	215.57	219.12	222.65	226.17	229.67	233.17	236.65	240.13	243.59	247.04
400	752	247.04	250.48	253.90	257.32	260.72	264.11	267.49	270.86	274.22	277.56	280.90
500	932	280.90	284.22	287.53	290.83	294.11	297.39	300.65	303.91	307.15	310.38	313.59
600	1112	313.59	316.80	319.99	323.18	326.35	329.51	332.66	335.79	338.92	342.03	345.13
700	1292	345.13	348.22	351.30	354.37	357.42	360.47	363.50	366.52	369.53	372.52	375.51
800	1472	375.51	378.48	381.45	384.40	387.34	390.26	-	-	-	-	-

Temperature-allowable variation comparison table

Specification	JIS C 1606-89		DIN 43760-79		IEC PUB.751-83	
	Level	Allowable variation(°C)	Level	Allowable variation(°C)	Level	Allowable variation(°C)
Pt100 Ω (R100 / R0=1.3850)	A	$\pm(0.15+0.002 t)$	A	$\pm(0.15+0.002 t)$	A	$\pm(0.15+0.002 t)$
	B	$\pm(0.3+0.005 t)$	B	$\pm(0.3+0.005 t)$	B	$\pm(0.3+0.005 t)$
JIS C1604 JPt100 Ω (R100 / R0=1.3916)	0.15	$\pm(0.15+0.002 t)$				
	0.5	$\pm(0.3+0.005 t)$				

| Temperature Sensor Type |


Thread type



High temperature type



Flang type



Explosion-proof type


 Indoor type
(for freezing purpose)


Outlet type

| Connector Type |


KN head



KS head



TN head



TS head



KBS head



Quick socket

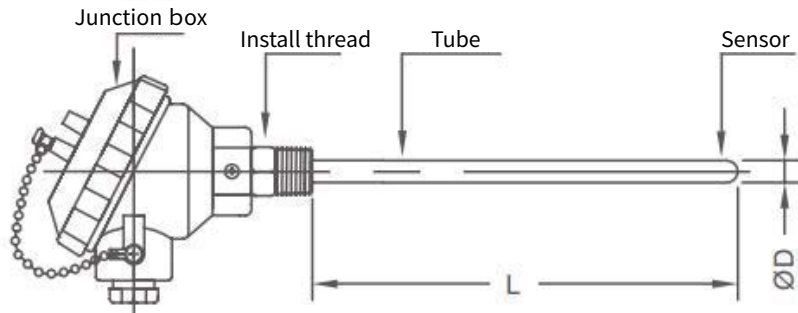


KF type



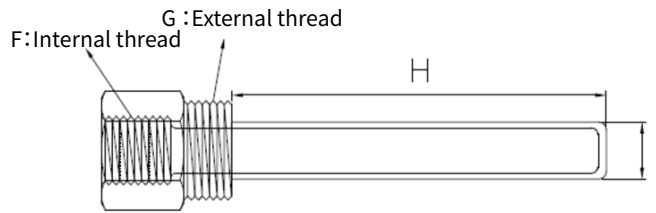
KT type (EX)

| Ordering Guide | Temperatur sensor



Sensor	Tube diameter	Length	Connector	Material	Thread diameter	Lead wire type only	Customization
PT1	6.3D	100MM	A	B	4	M	W
PT1 : Pt100 (RTD) PT2 : Pt1000 (RTD) PTA : Pt100 Class A (RTD) CA : K T : T E : E J : J S : S R : R W : W Custom : Customization	3.2D : 3.2 mm 5D : 5 mm 6.3D : 6.3 mm 8D : 8 mm 9.5D : 9.5 mm 12.7D : 12.7 mm 17D : 17 mm 22D : 22 mm Custom : Customization	50 mm 100 mm 150 mm 200 mm Custom : Customization	A : KN head B : KS head C : TN head D : TS head E : KBS head F : Quick socket G : KF type H : special I : KT type (EX)	A : SUS 316 B : SUS 304 C : Sheath D : Ceramic E : Iron F : PTFE G : Titanium H : Glass T : Stainless steel + Teflon casing I : Other	0 : None 1 : 1/8"PT thread 2 : 1/4"PT thread 3 : 3/8"PT thread 4 : 1/2"PT thread 5 : 5/8"PT thread 6 : 3/4"PT thread 8 : 1"PT thread A : Oval iron F : Flange 9 : Option	1M : 1M(Indicate the material) 2M : 2M(Indicate the material) 3M : 3M(Indicate the material) 4M : 4M(Indicate the material) Custom : Customization (EX : PVC-1M, Glass-2M)	Customization

| Ordering Guide | Tube



*F: Internal thread depends on the temperature sensor

TUBE x **15D** x **4** x **304** x **90** x **Wx**

<p>Tube diameter</p> <p>6.3D : 6.3 mm</p> <p>9.5D : 9.5 mm</p> <p>12.7D : 12.7 mm</p> <p>15D : 15 mm</p> <p>22D : 22 mm</p> <p>Custom : Customization</p>	<p>Process connection</p> <p>4 : 1/2" PT thread</p> <p>6 : 3/4" PT thread</p> <p>8 : 1" PT thread</p> <p>F1 : Flang 1/2"x10K</p> <p>F2 : Flang 1"x10K</p> <p>F3 : Flang 3/4"x10K</p> <p>Custom : Customization</p>	<p>Material</p> <p>304 : SUS304</p> <p>316 : SUS316</p> <p>Custom : Customization</p>	<p>Length</p> <p>50 : 50 mm</p> <p>100 : 100 mm</p> <p>150 : 150 mm</p> <p>200 : 200 mm</p> <p>Custom : Customization</p>	<p>Customization (Serial number)</p>
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