

WMTC-Ex Ex-proof Thermocouple



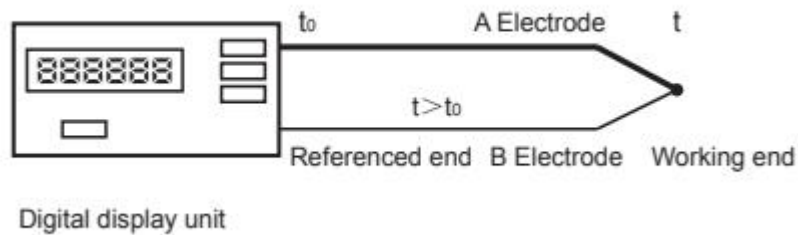
As a sensor for temperature measuring and controlling, thermocouple is usually connected with display meter or other transmitters to measure temperature of liquid, vapor, gas and solid surface ranging from -40°C to 1800°C . Thermocouple is based on physical phenomenon that two conductor of different materials is connected to form return circuit. When temperature on both end is different, it results in thermoelectric potential in return circuit. Thermocouple in practical applications is usually composed with temperature sensing element, mounting & fixing device and junction box. WMTC-Ex Ex-proof Thermocouple is subjects to IEC international standard graduating number, including the thermocouple of PtRh30-PtRh6, PtRh10-Pt, PtRh13-Pt, NiCr-NiSi, NiCr-CuNi, Cu-CuNi, Fe-CuNi, etc.

Type of thermocouple	Graduating	Measurement range	Allowed deviation $\Delta t^{\circ}\text{C}$
PtRh30- PtRh6	B	0~1800	$\pm 1.5^{\circ}$ or $\pm 0.25\%t$
PtRh10- Pt	S	0~1600	$\pm 1.5^{\circ}$ or $\pm 0.25\%t$
PtRh13- Pt	R	0~1600	$\pm 1.5^{\circ}$ or $\pm 0.75\%t$
NiCr – NiSi	K	0~1300	$\pm 2.5^{\circ}$ or $\pm 0.75\%t$
NiCr – CuNi	E	0~800	$\pm 2.5^{\circ}$ or $\pm 0.75\%t$
Cu - CuNi	T	0~350	$\pm 1^{\circ}$ or $\pm 0.75\%t$
Fe - CuNi	J	0~750	$\pm 2.5^{\circ}$ or $\pm 0.75\%t$

For various inflammable, explosive chemical gas, steam often occur on production site in chemical factory, it is unsafe to use normal thermal resistor, which is easy to cause atmosphere explosion. Therefore, explosion isolation thermal resistor shall be used as temperature sensor under these cases, under the situation where with explosive gas within the temperature group dIIBT4~dIICT6. WMTC-Ex Ex-proof thermal resistor is using special explosion prevention structure and ex-proof case which is made of aluminum alloy with high mechanical strength. Therefore, even if explosive mixed gas in joint box is exploded, its thermal energy caused during it cannot be spread out. WMTC-Ex thermocouple can be made by assembly structure or sheathed structure. In comparison with assembly type, the sheathed is with small diameter, easy to bend, perfect vibration endurance, suitable for the place where assembly type is not suitable.

Principle

Two ends of conductor with different compositions form loop, direct measurement end is called measurement end, and joint terminal is called reference end. When there is temperature difference between measurement end and reference end, thermal current will be generated between loops. Thermal voltage of the thermocouple will be increased with the temperature rise at measuring end. The thermal voltage value is only related with thermocouple conductor material and temperature difference at both ends. A thermocouple mainly consists of joint box, protection tube, insulated sleeve, joint terminal, and thermal polar along with various fixtures.



Nominal pressure of thermocouple

In general, it indicates the static external pressure undertaken by protection tube at room temperature, without break occurred. In fact, allowed working pressure is not only related with protection material, diameter, wall thickness, also with structure, installation method, probing depth, and flow and type of measured media.

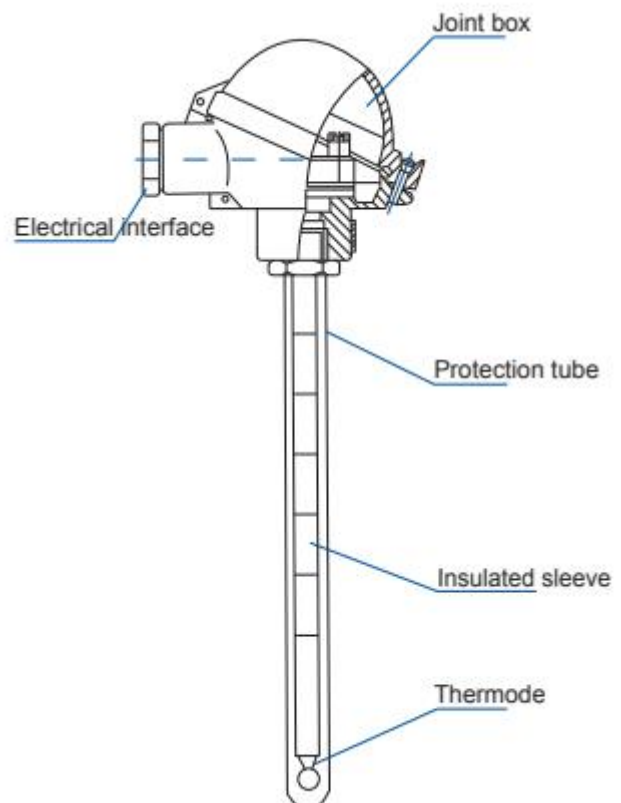
Minimum probing depth of thermocouple

Shall be 8~10 times of the outer diameter of protection tube (except for special products).

Thermocouple insulated resistance (normal temperature)

Trial voltage of insulated resistance at normal temperature shall be DC 500V±50V, condition to measure insulated resistance at normal temperature is 15~35°C, relative humidity is 45% ~ 75%, atmosphere pressure is 86 ~ 106 KPa.

a. For the thermocouple more than 1m, the product of insulated resistance at normal temperature and its length is 100Mohms.m.



That is, $R_{rXL} \geq 100 M\Omega \cdot ML > 1m$

Where, R_r – insulated resistance at normal temperature for thermocouple ($M\Omega$); L – length of thermocouple (m).

b. For the thermocouple equal to or lower than 1m, the insulated resistance at normal temperature shall be less than 100 $M\Omega$.

Upper limit of insulated resistance for thermocouple shall be no less than the specifications in following table:

Upper limit temperature °C	Trial temperature °C	Resistance value $M\Omega$
$100 \leq t_m < 300$	$t = t_m$	10
$300 \leq t_m < 500$	$t = t_m$	2
$500 \leq t_m < 850$	$t = t_m$	0.5
$850 \leq t_m < 1000$	$t = t_m$	0.08
$1000 \leq t_m < 1300$	$t = t_m$	0.02
$t_m > 1300$	$t = 1300$	0.02

Explosion prevention level

Explosion prevention level of explosion isolation thermal resistor can be divided into level A, B, C according to max safe clearance used in explosive air.

Electrical equipment can be divided into 2 types:

Type I - electrical equipment used in coal mining well;

Type II - electrical equipment used by factory

Temperature group of explosion isolated thermal resistor, max surface temperature can be divided into T1 ~ T6 groups.

Temperature group	Allowed max surface temperature °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

Protection grade: Ex dIIBT4~Ex dIICT6

Model Selection

WMTC-Ex	Ex-proof Thermocouple	
-	Case type	C1: Small type C2: Standard type C0: Customer specified
-	Type of thermocouple	B: PtRh30- PtRh6 S: PtRh10- Pt R: PtRh13- Pt K: NiCr – NiSi E: NiCr – CuNi T: Cu - CuNi

		J: Fe - CuNi
-	(Temperature range)	e.g. (0-1000°C) or (0-1800°F) etc.
-	Dual or not	None: Single thermocouple output D: Dual thermocouple output
-	Material of wet parts	-SS: SS wet parts -CR: Ceramic probe -O: specified For SS (stainless steel) , please specified 304SS or 316SS.
-	Signal output	None: thermocouple S1: signal output 4-20mA S2: signal output 0-5V S3: signal output 0-10V S4: signal output RTD S5: signal output thermocouple S0: customer specified
-A	Installment type	1: fixed thread 2: slide adjustable thread 3: rotatable adjustable thread 4: flange 5: clamp 6: none thread or flange 0: customer specified
	Thermo well	None: without TW: with thermo well
-	Size of installment	e.g. for A1, -1/2BSP or -M20*1.5 etc.; for A3, -2" or 3" etc.
-	(Diameter of Probe)	E.g. -6 (6mm), or -1/4". etc.
-	(Length of Probe)	E.g. -200 (200mm), or -8". etc.

Type of Ex-proof case:

Small



Standard



Thermowell:



Dimensions:

