

T2 – TEMPERATURE PROBES WITH CABLE

The label *Trafag Industrial Components* extends the Trafag brand name to instruments manufactured by qualified partner companies. *Trafag Industrial Components* complement the genuine Trafag product range to offer customers a complete portfolio from one single source.

Trafag Industrial Components offer a wide range of thermocouples and resistance thermometers. Thermocouples (TC) are temperature sensors that generate a voltage directly dependent on temperature. Resistance thermometers (RTD) are equipped with platinum sensor elements which change its electrical resistance as a function of temperature.



Applications

- Hydrogen
- Chemical
- Food & Beverage
- Oil & Gas
- Hydraulics
- Test & Measurement
- Shipbuilding

RTD-Features

- Very accurate measurement
- Measure repeatability
- Construction flexibility

RTD-Reference

- EN 60751

TC-Features

- High temperatures
- Robustness
- Construction flexibility

TC-Reference

- EN 60584-1

12/2024

Data sheet H20037

RTD – Standard specifications

Sensing element	PT100, PT1000, PTC, NTC
Connection wires	Single or Double element
Sensor construction	Traditional insulation, MgO insulation
Sensor sheat	AISI316 L, INCONEL 600, PTFE (...)
Cable	PVC, Kapton, PTFE/MFA, Silicone, Glass fibre
Process connection	From 1/8" to 1", BSP or NPT, male or female, CLAMP and other sanitary versions
Stem diameter	From 3 to 12 mm

TC – Standard specifications

Sensing element	K, N, J, T, E, S
Connection wires	Single or Double element
Sensor construction	Traditional insulation, MgO insulation
Sensor sheat	AISI316 L, INCONEL 600, PTFE (...)
Cable	PVC, Kapton, PTFE/MFA, Silicone, Glass fibre
Process connection	From 1/8" to 1", BSP or NPT, male or female, CLAMP and other sanitary versions
Stem diameter	From 1,5 to 12 mm

Ordering code

		STDT2	-	XX	X	X	XX	-	XX	XX	XXX	X	-	XX	XXXX	-	XX
1. Version	Standard	STDT2															
	Shipbuilding ¹	MRNT2															
	Ex-ia	EXIT2															
2. Sensig Element	PT100, A CLASS (STD)	01															
	PT100, B CLASS	02															
	PT 100, 1/3 DIN	23															
	PT 100, 1/5 DIN	25															
	PT 100, 1/10 DIN	20															
	PT 1000, A CLASS	03															
	PT 1000, B CLASS	04															
	PT 1000, 1/3 DIN	43															
	PT 1000, 1/5 DIN	45															
	PT 1000, 1/10 DIN	40															
	T/C "K"	0K															
	T/C "J"	0J															
	T/C "T"	0T															
	T/C "E"	0E															
	T/C "S"	0S															
	T/C "N"	0N															
	PTC ⁵	09															
	NTC ⁵	10															
	OTHERS ⁶	99															
3. Number of conductors ²	SINGLE ELEMENT, 2 WIRES	1															
	SINGLE ELEMENT, 3 WIRES	2															
	SINGLE ELEMENT, 4 WIRES	3															
	DOUBLE ELEMENT, 2 + 2 WIRES	4															
	DOUBLE ELEMENT, 3 + 3 WIRES ⁷	5															
	DOUBLE ELEMENT, 4 + 4 WIRES ⁷	6															
4. Construction	TUBE	1															
	BARSTOCK ⁸	2															
	MINERAL INSULATED CABLE (MIC)	3															
5. Sensor sheat	SKIN POINT (25x20x3 mm)	01															
	PIERCED FOR AIR	02															
	PTFE ROD ⁹	03															
	INCONEL 600	04															
	PTFE COATING ¹⁰	05															
	AISI 316 L (STD)	06															
	CERAMIC 610	07															
	ALUMINA 710	08															
	HASTELLOY	09															
	OTHERS ⁶	99															
6. Cable	PTFE / MFA	01															
	PVC	02															
	KAPTON	03															
	SILICONE	04															
	GLASS FIBRE	05															
	OTHERS ⁶	99															

Ordering code

		STDT2 - XX X X XX - XX XX XXX X - XX XXXX - XX											
7. Cable lenght (m)	0.5							01					
	1							02					
	1.5							03					
	2							04					
	2.5							05					
	3							06					
	4							07					
	5							08					
	6							09					
	8							10					
	10							11					
	OTHERS ⁶							99					
8. Process connection	1/8" BSP ¹¹								11B				
	1/8" NPT ¹¹								11N				
	1/4" BSP								12B				
	1/4" NPT								12N				
	3/8" BSP								13B				
	3/8" NPT								13N				
	1/2" BSP (STD)								14B				
	1/2" NPT								14N				
	3/4" BSP								15B				
	3/4" NPT								15N				
	1" BSP								16B				
	1" NPT								16N				
	Tri-Clamp DIN 32676, DN25								25C				
	Tri-Clamp DIN 32676, DN40								40C				
	Tri-Clamp DIN 32676, DN50								50C				
	Swivel fitting DIN 11851, DN25								25S				
	Swivel fitting DIN 11851, DN40								40S				
	Swivel fitting DIN 11851, DN50								50S				
	None								00X				
	OTHERS ⁶								99X				
9. Junction ³	None	0	Male sliding ¹²	3									
	Male Fixed	1	Female sliding ¹²	4									
	Female Fixed	2											
10. Stem Diameter (mm) ⁴	1.5	01	8						08				
	3	03	10						10				
	4	04	12						12				
	5	05											
	6	06	OTHERS ⁶						99				
11. Immersion lenght (mm)	TO BE DEFINED (Please consider under process connection)										XXXX		
12. Options	Special end wires ¹³	EW	Termination with plug									PL	
	Junction cup (BIC)	BC	Termination with socket									SK	

¹ Refer to the RINA EURO MR certificate with dedicated cable-constructions. Contact the factory

² 3,4,3+3,4+4 wires for RTD only

³ AISI 316 L construction

⁴ According to Tube construction. MIC construction as follows: RTD (3 to 12mm) and TC (1.5 to 12 mm) and TC (1.5/2/3/4.5/6 mm)

⁵ 10kOhm, 25°C as standard with $\beta=39$ constant value. Contact factory while choosing NTC and PTC

⁶ For other version, please contact factory

⁷ Select stem diameter > 4.5 mm with MIC construction or stem diameter > 6.0 mm with TUBE or BARSTOCK construction

⁸ Please contact the factory for technical data validation through VonKarman calculation

⁹ Barstock version only. Process connection PTFE consequently

¹⁰ Tube version only. Process connection not PTFE

¹¹ Available for Stem diameter code 01 and 03 only

¹² Operating pressure < 30 bar

¹³ Tinned wires as standard

Order example

Ex: STDT2-023107-03412B1-31000-BC

- Version: Standard
- Sensing element: PT 100 A CLASS
- Number of conductors: SINGLE ELEMENT, 3 WIRES
- Construction: TUBE
- Sheath construction: AISI 316L
- Cable: KAPTON

- Cable length: 2m
- Process connection: 1/4 " BSP
- Junction: MALE FIXED
- Stem diameter: 3mm (RTD)
- Immersion length: 1000 mm
- Junction cup (BIC)

RTD – Sensing element (PT100 and PT1000)

Tab.1a

Class	°C Range	Tolerance*
B	-50 ÷ 500 °C (ext. -196 ÷ 660°C)	± (0,3 + 0,005 * [t])
A	-30 ÷ 300 °C (ext. -100 ÷ 450°C)	± (0,15 + 0,0025 * [t])
1/3	-0 ÷ 150 °C (ext. -100 ÷ 350°C)	± (0,1 + 0,0017 * [t])
1/5	0 ÷ 80 °C	± (0,06 + 0,0011 * [t])
1/10	0 ÷ 80 °C	± (0,03 + 0,0005 * [t])

* Calculated without the transmitter option. In that case, consider the transmitter own tolerance plus the sensing element one

* According to IEC 751/ITS-90

TC – Sensing element

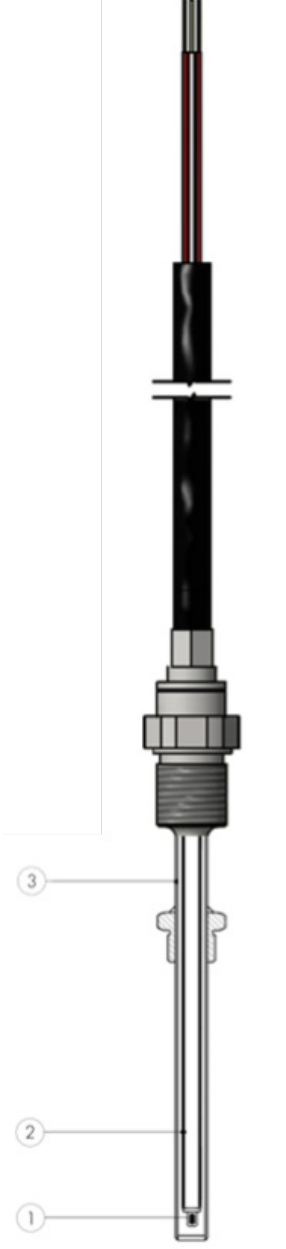
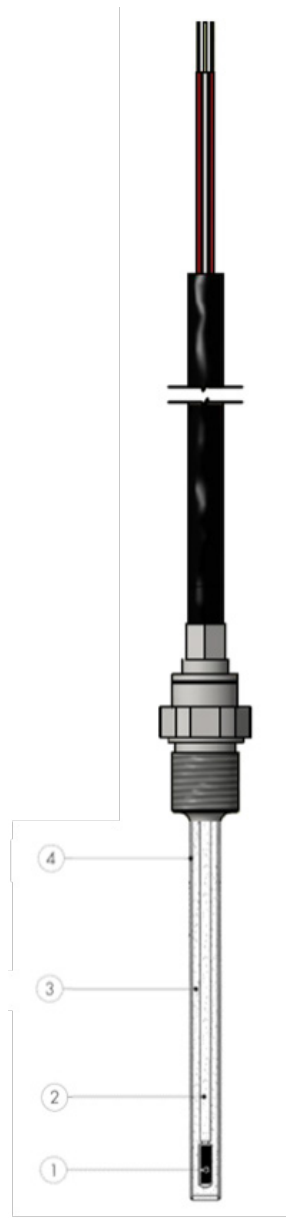
Tab.1b

Class	°C Range	Tolerance*
K, N	-40 ÷ 375 °C	± 1,5 °C
	375 ÷ 1100 °C	± 0,004 * [t] °C
J	-40 ÷ 375 °C	± 1,5 °C
	375 ÷ 750 °C	± 0,004 * [t] °C
T	-40 ÷ 125 °C	± 0,5 °C
	125 ÷ 350 °C	± 0,004 * [t] °C
E	-40 ÷ 375 °C	± 1,5 °C
	375 ÷ 800 °C	± 0,004 * [t] °C
S	0 ÷ 1100 °C	± 1,0 °C
	1100 ÷ 1600 °C	± (-2,3 + 0,003 * [t]) °C

* According to IEC 60584-1

Construction

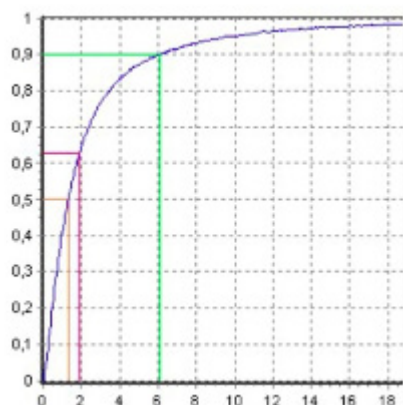
Tab.2

Traditional insulation - Tube*	Mineral Insulated Cable - MIC*
	
1. Measurement junction (Sensing element) 2. Conductors 3. Protective sheath	1. Measurement junction (Sensing element) 2. Conductors 3. Mineral insulation MgO 4. Protective sheath

*P_{max}= 30 bar

Response time

Stem diameter - Ø (mm)	RTD - [t]	TC - [t]
1,5	N/D	400 ms
3	3 s	800 ms
6	6.5 s	3.4 s
8	8.3 s	4.5 s
10	10.2 s	6 s



* Average response time calculated with: 1) AISI316L sheath and MIC (MgO insulation) RTD/TC construction 2) into a laminar flow at >0.2 m/s speed and 3 ΔT of $3^{\circ}\text{C} < T < 30^{\circ}\text{C}$. Response time calculated as temperature difference according to stem diameter and thickness.

** Response time calculation follows the t5 (50% of actual temperature-orange enlighten), t63 (63% of actual temperature-red enlighten), t9 (90% of actual temperature-green enlighten) temperature measurement test. On X-axis (time) and on Y-axis (% actual temperature)

Number of conductors

Tab.3 - RTD

Head/E.C	2 WIRES	3 WIRES	4 WIRES
SINGLE ELEMENT			
DOUBLE ELEMENT			

Tab.3 - TC

TC TYPES	ASTM E230 Thermal line	ASTM E230 Compensa- ting line	BS 1843	DIN 43714	ISC1610- 198	NF C42-323	IEC 60584- 3	IEC 60584- 3
N								
J								
K								
E								
T								
S								

Cable

Tab.4

	T°C Range	RH ¹⁾	ABRASION ¹⁾	FLAME ²⁾	LENGTH ³⁾
PTFE	-200...+280 °C short time 300°C	A	A	AE	From 0.5mto 10m
MFA	-200...+250 °C	A	A	AE	From 0.5mto 10m
FEP	-200...+205 °C	A	A	AE	From 0.5mto 10m
PVC	-60...+105 °C	B	B	AE	From 0.5mto 10m
KAPTON	-200 ...+400°C	B	B	AE	From 0.5mto 10m
SILICONE RUBBER	-40...+200 °C	C	C	AE	From 0.5mto 10m
GLASS FIBRE	-50...+450 °C	D	D	I	From 0.5mto 10m

¹⁾ A = Optimal, B = Good, C = Sufficient, D= mediocre

²⁾ I= Fireproof, AE=Self-extinguishing

³⁾ Standard dimensions. Others upon request

Modification

Index	Date	Description
a	03/2023	New Datasheet