








Series EXtemp, Model TRC 22E

Skin-Point thermometer with RTD sensor.
Signal transmission in Mineral Insulated Cable.



	Application
<p>The skin-point temperature assembly EXtemp TRC 22E is manufactured with sensor Pt100 Class A inserted in mineral insulated cable, crimped in a stainless-steel block. The process temperature is measured by block contact, through bore as process connection.</p>	
<p>All metallic parts are in SS 316 grade, ensuring a reliable utilization of the EXtemp TRC 22E at temperatures up to 500°C.</p>	
<p>Robust construction, high immunity to vibrations, suitable for use in industrial harsh environments.</p>	
<p>Primarily developed for steel industry and cement plants.</p>	

	Your Advantages
	Class A
	Manufactured with M.I. cable
	Up to 500°C
	Standard single or double sensor
	Customizable



Informative Signs		
	Information	This symbol contains device-oriented information which does not result in personal injury.
	Checking	This symbol contains procedures and other facts to get the most of the device and which do not result in personal injury.
	Caution	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in damaged device and which do not result in personal injury.
	Warning	This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
	Danger	This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

Product Overview	
<p>The skin-point temperature assembly EXtemp TRC 22E is manufactured with sensor Pt100 Class A inserted in mineral insulated cable, crimped in a stainless-steel block. The process temperature is measured by block contact, through bore as process connection.</p> <p>The signal transmission is made by mineral insulated cable, the best solution for harsh environments, due to its temperature and mechanical resistance.</p> <p>Secondary process connection is made by compression fitting adapted in the other end of mineral insulated cable, on pot steel. Acting as cable gland it will allow tight and safe electrical connection even at high ambient temperatures as high as 250°C. The connection wires are PFA insulated, for easy electrical wiring in temperature acquisition system.</p> <p>The measurement principle of an RTD (Resistance Temperature Detector) consists of the sensor element with an electrical resistance that varies with temperature. In the case of the Pt100 sensor, it has a resistance of 100 Ω at 0°C, increasing this value with increasing temperature, due to the characteristic of the platinum coefficient used in this type of sensor. Extremely linear, it makes temperature assemblies based on this measurement principle the most used in the industry, by complying with IEC 60751 with a coefficient $\alpha = 3.85 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$, calculated between 0 and 100°C.</p> <p>The sensor element is available in two versions, Thin-film (TF) or ceramic (Wire Wound), the second with a wider measurement range, greater long-term stability and better accuracy.</p> <p>If there are vibrations, the Thin-film (TF) sensor can offer advantages, but its behaviour depends on the intensity, direction and frequency of the main harmonic of the vibration. This type of sensor also presents a faster response time when assembled in a similar way to the ceramic sensor.</p> <p>The most used configurations are for single elements with 2, 3 and 4 wires and with redundancy, double elements with 4 and 6 wires. The 4-wire configuration guarantees the best accuracy, due to impedance full compensation introduced by the signal transmission cables, or even by the connections within an extended length immersion sheath, which in the case of the configuration single to two wires or double to 4 wires adds to the resistive value of the Pt100, contributing to the loss of accuracy. In single 3-wire or double 6-wire configurations, the associated error is practically null.</p> <p>For the range of -200°C to 0°C we have: For the range of 0°C to 850°C we have: $R_t = R_0[1 + At + Bt^2 + C(t - 100^\circ\text{C}) t^3]$ $R_t = R_0(1 + At + Bt^2)$</p> <p>where: R_t is the resistance to a temperature t; R_0 is resistance with $t = 0^\circ\text{C}$</p> <p>The constants in these equations are: $A = 3.9083 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$ $B = -5.775 \cdot 10^{-7} \text{ } ^\circ\text{C}^{-2}$ $C = -4.183 \cdot 10^{-12} \text{ } ^\circ\text{C}^{-4}$</p>	



	Installation
---	---------------------

The temperature assemblies of type EXtemp TRC 22E are intended to be applied in large pipelines and storage tanks in processes that require high robustness and reliability and where measurements must be carried by the outside.

The skin block is manufactured with 13 mm bore diameter, to suit on M12 screw as process connection. The M12 screw is not included on scope of supply.

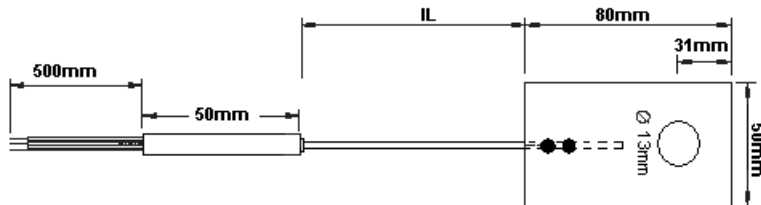
Is supplied as standard a SS316 compression fitting of ¼" NPT, to suit pot seal of 6.0 mm, 50 mm long and to connect to process electrical cabinet/box.

Once installed, we recommend the stainless-steel plate to thermally insulated from ambient temperature, as it can cause extreme influence on measurement, leading to significant measuring errors.





- | | |
|---|--|
|  | Ambient and connections box temperature cannot be greater than 250°C. |
|  | Mineral insulated cable bending radius shall be not less than 5x OD.
For standard product, minimum bending radius is 15 mm. |

	Mechanical Construction
--	--------------------------------

Generic Configuration



Standard product: customized mineral insulated cable length with OD of 3mm

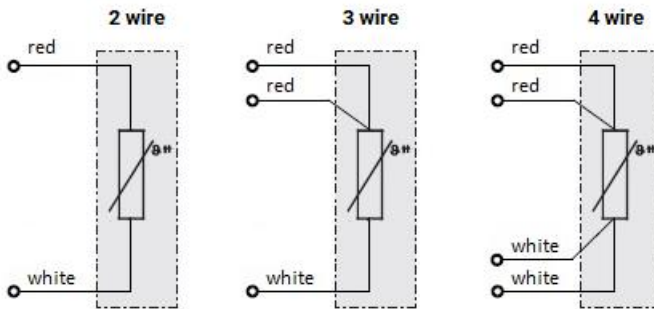
- | | |
|---|---|
|  | If mineral insulated cable is in excess, can be curved according bending radius rules. |
|  | PFA wiring cables can be shortened. |
|  | Mineral insulated cable IL cannot be shortened. |
|  | Handle the skin-point block with care as its weight can cause a bend not supported by the mineral insulation cable. |



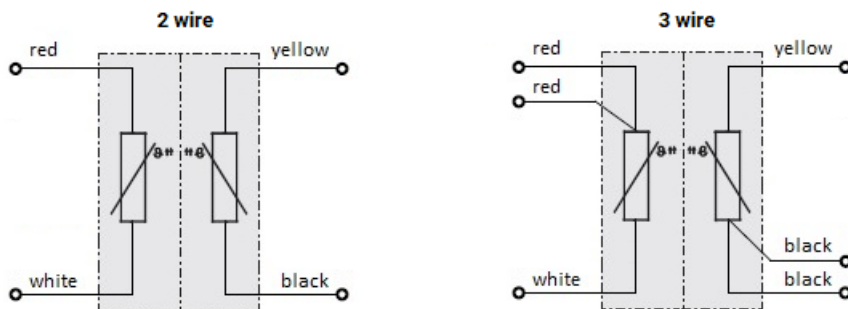
Wirings

The EXtemp TRC 22E is available as standard with single Pt100 3-wire configuration. On request with double Pt100 sensor.

Single Sensor Pt100



Double Sensor Pt100



Standard product is manufactured with Pt100 3-wire sensor. Can be requested different sensor configuration to be included in order code, selection field additional specification.



The versions with double sensor are only available with mineral insulated cable OD greater or equal to 4.5 mm.

	Technical Data
---	-----------------------

Device		
Application	Temperature measurement	
Principle	Resistance	
Installation	Skin-point	
Types	Pt100 thin-film (TF) / wire-wound (WW)	
Accuracy	Class A, IEC60751	
Configuration	Single	Thin-film (TF) 2, 3 and 4 wires
	Double	Wire-wound (WW) 2 and 3 wires
	Default	Thin-film (TF) 3 wires
Process temperature	Absolute Min	-50°C
	Absolute Max	500°C

Electrical Specifications		
Output signal	Resistance	80,31...280,90 Ω
	Temperature coefficient TCR	3850ppm/K
Sensor insulation resistance	>100 MΩ/250 Vdc @room temp. or according to IEC 60751, whichever is greater	

Mechanical Characteristics				
Materials	Skin-point block	Aisi 316L		
	MI cable	Aisi 316		
	Compression fitting	Aisi 316		
	Pot seal	Aisi 316L		
	Flexible connection wires	Nickel plated copper, PFA insulated		
Dimensions	Skin-point block	80 x 50 x 6 mm [L x W x T]		
	MI cable length	50 to 20.000 mm, customized; over 20.000 mm on request		
	MI cable sheath OD	3.0 mm, 4.5 mm, 6.0 mm		
	Default MI cable sheath OD	3.0 mm		
	Sheath wall thickness	OD 3 mm	Min 0.2 mm	
		OD > 4 mm	Min 0.8 mm	
	Compression fitting	¼" NPT M bore 6 mm		
	Pot seal	6.0 x 50 mm [OD x L]		
Flexible connection wires	500 mm, OD 1.0 mm AWG24 7/0.2 mm			


Environmental Conditions	
Ambient temperature	-40 to 250°C
Storage temperature	-40 to 100°C
Relative humidity	0 to 98 %RH
Calibration units	°C, °F, K
Weight	215 g + 35 g/m MgO cable
Protection class (complying with EN 60529)	IP67
Approvals, Certifications	RoHS 2, CE

 **Tolerance Classes**

The validity temperature ranges of the tolerance classes are classified in the following table. These tolerances apply to RTD thermometers, according to IEC60751 and for any value of R_0 .

Tolerance Class	Validity Temperature Range [°C]		Tolerance Values 1) [°C]
	Ceramic Sensors WW (Wire Wound)	TF (Thin-Film)	
AA	-50 to +250	0 to +150	$\pm(0.10 + 0.0017 t)$
A	-100 to +450	-30 to +300	$\pm(0.15 + 0.0020 t)$
B	-196 to +600	-50 to +500	$\pm(0.30 + 0.0050 t)$
C	-196 to +600	-50 to +600	$\pm(0.60 + 0.0100 t)$

1) |t| Temperature modulus in °C.

 **Additional Information**

Maintenance

The RTD assemblies of EXtemp series do not require a specific maintenance. The only recommendation is to check periodically the sensor integrity and perform an annual recalibration.

Factory Calibration Protocol

This factory quality protocol is supplied with every unit. This acts as an inspection report that shows compliance with DIN/EN 60751 essential points. One measurement point is issued for the effect.

Factory Calibration Certificate

The factory calibration certificate must be ordered with the device. The measurement points according to customer specifications and inside device operating temperature range.

Accessories

As accessory or spare part, we have compression fittings available for this model. You can also order a stainless-steel TAG plate.

Delivery Time

For small quantities, less than 10 pieces with basic options, the delivery times are likely 15 to 16 working days or express manufacturing (72h) with feasibility according configuration and required quantities.



How to Order

Sign		Instruction
Tick	✓	Single option selection field necessary
Double tick	✓✓	Multiple option selection field available
Added extra	⊕	Not mandatory selection field







Order Code		Description
TRC 22E-		Temperature Assembly Series EXtemp Model TRC 22E
010	✓	Mineral Insulated Cable Length IL
X		Customized length
020	✓	Mineral Insulated Cable Diameter and Material
A		MgO cable 3.0 mm, Aisi 316
B		MgO cable 4.5 mm, Aisi 316
Y		Special version on request
030	✓	Additional Specifications
A		Basic model
Y		Special version on request
⊕ 040	✓	Label and Product Documentation Language
EN		English
FR		French
PT		Portuguese
⊕ 050	✓✓	Quality Assurance Documentation
C2		Factory calibration certificate, 2-point customer specification
C3		Factory calibration certificate, 3-point customer specification
M2		Materials certificate according to EN10204-3.1
Y9		Other on request, according to specification

Selection Example



Skin-point RTD class A sensor, 4-wire configuration, SS316 MgO cable length with 6000mm.

Order code	TRC 22E-XAY+EN/6000mm/4-wire
------------	------------------------------

	Contact
---	---------

	Parque Empresarial Baía do Tejo, Rua 48 N°11 Apartado 5056 2830-571 Barreiro, Portugal		+351 212 070 802 +351 212 070 803 +351 210 900 148
	38.663817, -9.066176		+351 212 070 804
	www.deltasensor.pt		commercial@deltasensor.pt

Subject to modification. All rights reserved to Delta Sensor, Lda

 **Antes de imprimir este documento pense bem se é mesmo necessário fazê-lo: O meio ambiente é de todos.**
 **Please consider the environment before printing this document.**