








## Series Eltemp, Model EIR 50

PFA wired RTD insert






Single or double sensor configurations. Customized versions up to 240°C



	Application
<p>The RTD insert Eltemp EIR 50 is manufactured with resistance sensor, Pt100, Pt1000 or PTC1000@25°C insulated and encapsulated in a Aisi 316L protective tube.</p> <p>The Eltemp EIR 50 is spare part for threaded temperature assemblies PROtemp TRH 1xP or hygienic type HIGHtemp TRH 30B.</p> <p>If requested, can be supplied with temperature transmitter, PC or HART programmable 4...20mA 2 wires technology, according to customer requested range.</p> <p>Making use of industry standards for instrumentation, it could be used as spare part of other manufacturer's temperature assemblies.</p>	

	Your Advantages
	Class A or better
	Aisi 316L sheath
	Up to 240°C
	Standard single or double sensor
	OEM customization

Informative Signs		
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	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		
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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.




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. 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.

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.

For the range of -200°C to 0°C we have:  $R_t = R_0[1 + At + Bt^2 + C(t - 100^\circ\text{C}) t^3]$       For the range of 0°C to 850°C we have:  $R_t = R_0(1 + At + Bt^2)$

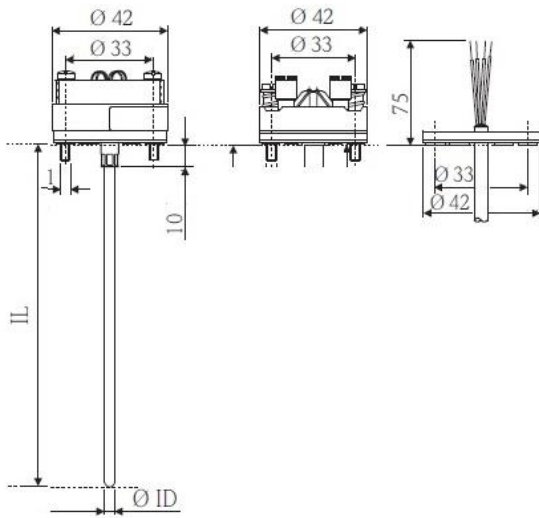
where:  
 $R_t$  is the resistance to a temperature  $t$ ;  $R_0$  is resistance with  $t = 0^\circ\text{C}$

The constants in these equations are:  
 $A = 3.9083 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$      $B = -5.775 \cdot 10^{-7} \text{ } ^\circ\text{C}^{-2}$      $C = -4.183 \cdot 10^{-12} \text{ } ^\circ\text{C}^{-4}$

	This device is intended to be installed inside a RTD assembly and cannot be installed directly in the process.	
	Please note ambient temperature cannot be greater than measuring insert sealing.	
	Make sure the measuring insert has the correct immersion length and load springs are compressing the insert against the bottom of the thermowell/protective tube.	



Generic Configuration



All dimensions in millimetres (mm)

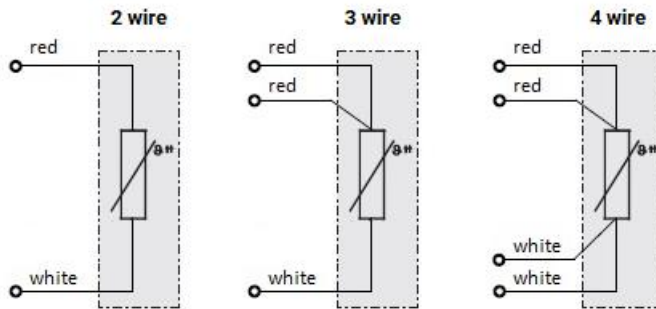
- Left: Device with temperature transmitter.
- Middle: Device with standard ceramic terminal block
- Right: Device with soft free end wires



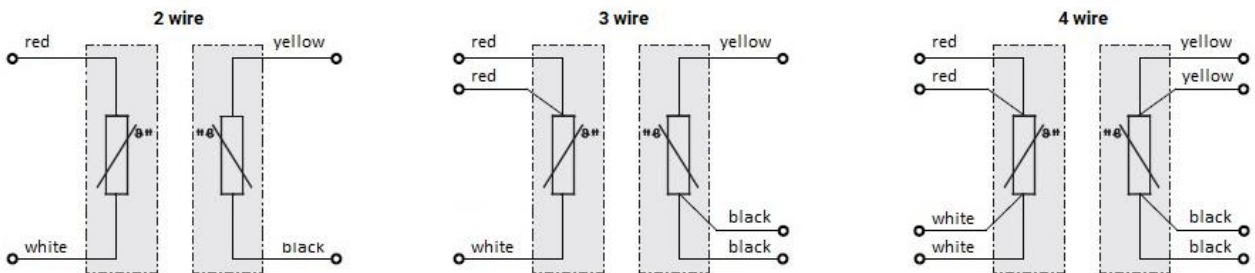
## Wirings

The Eltemp EIR 50 is available with 1 single Pt100/Pt1000 or double Pt100 sensor or with 2 single Pt100/Pt1000 sensors. The PTC versions are only available with single sensor 2-wire.

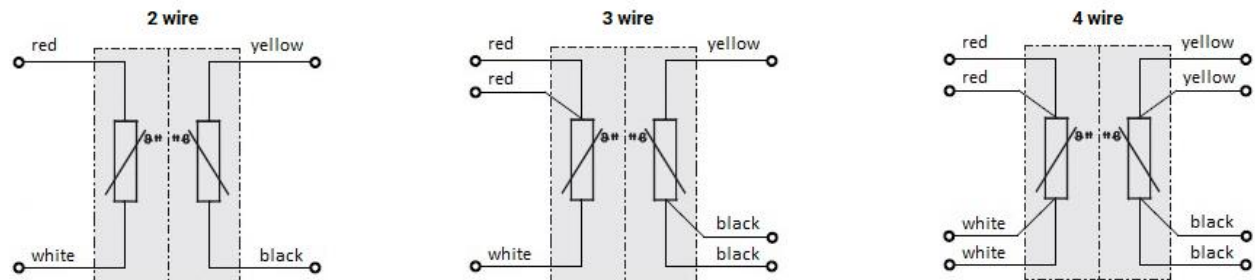
### Single Sensor Pt100/Pt1000/PTC1000-2W



### 2x Single Sensors Pt100/Pt1000



### Double Sensor Pt100



Are available different temperature transmitters, with 4-20mA analogue output or with digital communication. Please refer to specific product datasheet to check wiring configurations.



With temperature transmitter assembled, make sure power supply is switched off during wiring procedures.



This device assembled with PTC/KTY81 is sensitive to Electro Static Discharge (ESD).



With temperature transmitter assembled, make sure power supply is according to specification on device label.



Check if connection cable is according device connector requirements.



For protective tubes of 6mm and over the version with two Pt100 sensors are available.

☰	<b>Technical Data</b>
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Device			
Application	Temperature measurement		
Principle	Resistance		
Types	Pt100, Pt1000; PTC1000@25°C		
Accuracy	Class A IEC60751; Class AA on demand (RTD's only)		
Configuration	Single or double; 2, 3 and 4 wires		
Operating temperature	Pt100 and Pt1000	Absolute Min	-196°C
		Absolute Max	240°C
	PTC1000	Absolute Min	-55°C
		Absolute Max	150°C

Electrical Specifications			
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Output signal	Resistance	20,22...280,90 Ω (x 10) / 332.66 Ω	
	4-20 mA	Loop power 2 wires	
	4-20mA HART	Loop power 2 wires	Version 7
	Digital communication	Profibus PA	Version 3.02
Fieldbus Foundation H1		Profiles 31PS,32L/113	
Temperature Transmitter	Mounting	Housings with Ø 33mm fixing 2 x M4 threads	
	Power supply	Analogue	11 to 35 Vdc
		HART/PA/FF	9 to 32 Vdc
	Input	Pt100/Pt1000	Universal
	Minimum span	25 K	
	Load [RL]	RL ≤ (UB – 8V) / 0.025 A	
Galvanic insulation	Min 500 VAC		
Sensor insulation Resistance	>100 MΩ/250 Vdc @room temp. or according to IEC 60751, whichever is greater		

Mechanical Characteristics			
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Materials	Protective sheath	Aisi 316L		
	Terminal block	Type B	45% Al2O3	
		Type Mignon	Steatite C 220	
Protective Tube Dimensions	Length	50 to 2000 mm, customized; over 2000 mm on request		
	Diameter	From 3 mm to 12 mm		
	RTD Wall thickness	OD 3.0 mm	Min 0.25 mm	
		OD 4.0 mm	Min 0.35 mm	
		OD 6.0 mm	Min 0.50 mm	
		OD ≥ 8.0 mm	Min 1.00 mm	
PTC Wall thickness	OD 6 mm	0.50 mm		
	OD > 6 mm	Min 1.00 mm		
Terminal Block, Spring Loaded	Mignon, up to 4 poles, non-Ex	Ceramic, posts nickel plated brass, bush SS 316		
	Type B, up to 6 poles, non-Ex	Ceramic, posts nickel plated brass, bush SS 316		
	Type of pole	Post type, screwed, nickel plated brass		

Environmental Conditions	
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Storage temperature	-30 to 80°C
Relative humidity	0 to 95 %RH, non-condensing
Calibration units	°C, °F, K
Weight	Depending on configuration; standard versions from 100 g to 500 g
Protection class (complying with EN 60529)	Refer to assembly housing
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 inserts of Eltemp 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.

### Materials Certificate

A certificate according to EN10204-3.1 is available as option and if necessary, has to be ordered with the device.

### Accessories

As accessories or spare parts, we have available PC programming temperature transmitters and interface kit with software.

### Delivery Time

For small quantities, less than 10 pieces with basic options, the delivery times are likely 4 to 5 working days or express manufacturing (48h) 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
EIR 50-		Mineral Insulated RTD Insert Series Eltemp Model EIR 50
010	✓	Type of RTD Sensor, Class, Wiring
A2		1xPt100 single/WW, Cl. A IEC60751, 3 wires
A3		1xPt100 single/TF, Cl. A IEC60751, 3 wires
AA		1xPt100 single/TF, Cl. AA IEC60751, 4 wires
B2		1xPt100 single/WW, Cl. A IEC60751, 4 wires
B3		1xPt100 single/TF, Cl. A IEC60751, 4 wires
C1		1xPt100 double/WW, Cl. A IEC60751, 2x2 wires
C2		1xPt100 double/WW, Cl. A IEC60751, 2x3 wires
D2		2xPt100 single/TF, Cl. A IEC60751, 2x3 wires
D3		2xPt100 single/TF, Cl. A IEC60751, 2x4 wires
K3		1xPt100 single/TF, Cl. A IEC60751, 2 wires
M2		1xPt1000 single/TF, Cl. A IEC60751, 2 wires
P2		1xPTC 1000@25 °C, 2 wires, -55... 150 °C
Y9		Special version on request
020	✓	Shape of the Tip
S		Straight, standard response
R		Swagged tip, length with 30 mm
D		Swagged tip, length with 50 mm
Y		Special version on request
030	✓	Process Immersion (Sheath) Length IL
1		50 mm
2		100 mm
3		150 mm
4		200 mm
5		250 mm
6		300 mm
7		350 mm
8		400 mm
X		Customized length
9		Special version on request
040	✓	MI Cable, Sheath Diameter and Material
F3		Tube 3.0 mm, Aisi 316L
F4		Tube 4.0 mm, Aisi 316L
F6		Tube 6.0 mm, Aisi 316L
F8		Tube 8.0 mm, Aisi 316L
F0		Tube 9.0 mm, Aisi 316L
FA		Tube 10.0 mm, Aisi 316L
FC		Tube 12.0 mm, Aisi 316L
Y9		Special version on request









	<b>How to Order (continuation)</b>
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050	✓	<b>Terminal Block</b>
B		Installed, type B, without grounding post
M		Installed, type mignon
P		Spring loaded disk with bushing prepared for temperature transmitter (33 mm)
S		Without terminal block; free end wires
Y		Special version on request
060	✓	<b>Temperature Transmitter</b>
A0		Without, standard leads
A1		Without, leads with 150 mm
W5		Universal input, output 4-20mA
S2		Universal input, output 4-20mA HART
Y9		Special version on request
⊕ 070	✓	<b>Label and Product Documentation Language</b>
EN		English
FR		French
PT		Portuguese

<b>Selection Example</b>	
RTD insert type Pt100 class A 3-wire, sheath with diameter of 6mm and length of 310 mm. With temperature transmitter set to range 0°C to 100°C.	
Order code	EIR 50-A3SXF6SW5/310 mm/0...100°C

	<b>Contact</b>
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