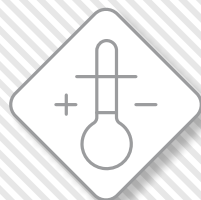




LEA\_IT\_TEM1001000



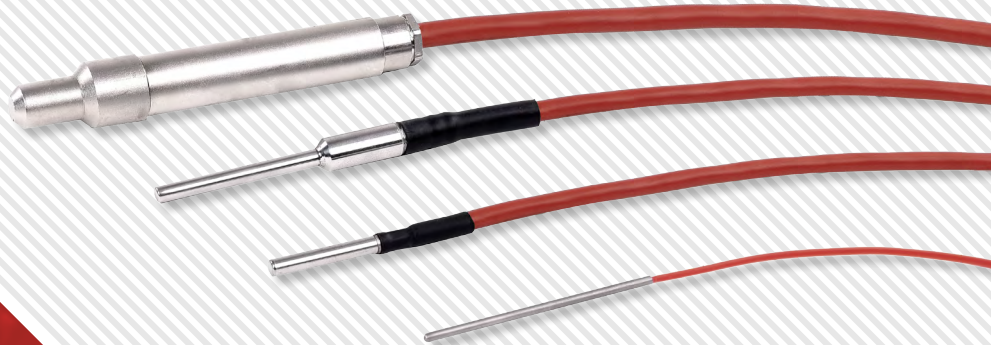
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# Thermometers

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[www.pizzi-instruments.it](http://www.pizzi-instruments.it)  
Instruments and Systems for Geotechnical and Structural Monitoring

## Thermometers



### Description

The NTC thermometer allows precise and stable measurement of temperature over time. Given its very small size, it can be easily integrated into other sensors for determining temperature, which at times is indispensable for compensating primary measurements. These sensors are also used in thermometers for measuring the temperature of air, water and concrete in dams and other geotechnical and structural environments.

RTD, PT100 and CU30 are generally used in geotechnical and structural sectors for monitoring temperature; they are accurate and reliable in the medium and long term duration .

The electrical resistance of a sensor, either copper (CU30), or platinum (PT100), or any other material, varies its resistivity as a function of temperature.

This principle is used for many of our thermometers for measuring air, water or concrete.

In some models of vibrating wire instrument produced by Pizzi Instruments, temperature is measured by means of the same copper coils used for wire excitation.

PT100 resistance thermometers are also available.

Thermocouples are generally used in geotechnical and structural sectors, for temperature monitoring in the short or medium term. For long periods of observation, RTD sensors or thermistors are preferred.

Thermocouples are an excellent instrument, as they are simple and inexpensive; they are constituted by two conductors of suitable material, welded together at one end and which produce between the two free ends, a voltage which is a function of the temperature of the welded point.

They are widely used in RCC dams, directly embedded in the concrete.

## Features and benefits \_\_\_\_\_

- **Precise**
- **Robust**
- **Easy to install**
- **Reliable**
- **Easy reading**

Our thermometers are supplied already adapted for specific requirements.

We produce thermometers for:

- **Air**
- **Water**
- **Concrete**
- **Outdoor application**
- **Indoor application**
- **Thermo hygrometers (see “meteorological” sensors)**

## Applications \_\_\_\_\_

- **Any structure where measurement of temperature is important**
- **Dams**
- **Bridges**
- **Galleries**
- **Civil and historic buildings**
- **Monuments**
- **Museums**
- **Archaeological sites**
- **Various**

## Technical assistance \_\_\_\_\_

If you have any requests or questions about our instruments or if you have special needs that require different solutions from the standard, please contact us. Our team will provide all the necessary information and will be very happy to work with you to study, develop and customize instruments and solutions suitable for your specific needs.

## Measurement principle \_\_\_\_\_

As previously outlined, there are various possible operating principles each with different functional characteristics.

We offer:

- **RTD sensors**
- **Thermistors**
- **Thermocouples**
- **Vibrating wire sensors**

**RTD (Resistance Temperature Detector)** focus their measuring principle on the characteristic of their materials changing the resistivity in accordance with the temperature variations, maintaining a linear proportion.

Once measured the resistance, you have the temperature. In our instruments the sensor element is composed by a copper coil, with 29,83 Ohm resistance at 20°C (CU30) or in platinum with a resistance 100 Ohm at 0°C (PT100), sealed in a rugged protective housing.

Thanks to their functional and construction characteristics, our thermometers are the suitable instruments to be embedded in concrete or to be immersed in water.

Easy to be measured and to be automated with our Datalogger DEC3000 or acquisition unit DAC3000 or with other datalogger normally available on the market.

**Thermistors** focus their operation principle on the variability of the electrical resistance of a material with temperature. They are similar to the resistance thermometer with the only difference that the sensor element is not a conductor but a semiconductor. Easy to be measured and to be automated with Datalogger.

**Thermocouples** exploit the characteristic taken from the thermoelectric properties of conductor or semiconductor materials to generate electricity when subjected to a thermal gradient. Once taken two conductors or semiconductors composed by different materials and joined together to one end, if this one is subjected to a temperature gradient, across the two conductors is generated a voltage difference proportional to the applied temperature. To take measurements they require specific datalogger for these sensors.

**Vibrating Wire Thermometers** exploit the characteristic of a wire stretched between two points which, subjected to a variation in temperature, change their length and then their frequency of vibration. These instruments also require datalogger specific for the vibrating wire instruments.



## Technical features

### RTD

Range	-30°C ÷ 80°C (other ranges available on request)
Accuracy	0,5°C

### Thermistors

Range	-100°C ÷ 150°C
Accuracy	0,2°C

### Thermocouple Type K

Range	-100°C ÷ 250°C
Accuracy	0,5°C ÷ 1°C

### Vibrating Wire Thermometer

Range	-10°C ÷ 70°C
Accuracy	0,5% f.s.

## Accessories and related products

Junction Box	Available in different models for the connection of different instruments
Selection and Measurement Box	Complete measurement box with MUX cards for automatic selection
Measurement Box	Simple Measurement Box
Multiwire cable	Available with different conductors for the connection of different sensors to one cable.
Special cable for thermocouple	Special cable for thermocouple
Connectors for thermocouple	Special connectors for the cable junction of the thermocouples
3 x 1 mm <sup>2</sup> Cable	Special cable insulated in santoprene, D.Ext= 11 mm, for the connection of RTD to be embedded in water or incorporated in concrete.
Datalogger for thermocouple	Portable Datalogger for the thermocouple reading
DEC3000	Portable Datalogger
CUM3000	Multichannel Datalogger
MUX	Multiplexer for connecting several sensors to the Datalogger

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The product information may be subject to variations at any time.  
Please carefully check the release and contact Pizzi Instruments for further details.

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