

Temperature Linear Type Sensors Continuous Thermocouple[®]

A Continuous Thermocouple[®] consists of a special 2-wire cable with a metal MCT or a techopolymer sheath FCT. The 2-wires, normally type "K" (chromel/alumel) conductors, are calibrated according to the **ANSI MC-96.1**, standard tolerance, and insulated from each other and the sheath by means of a mineral oxide powder with high negative temperature coefficient.

Working Principle

Unlike the traditional thermocouples which have a hot junction made by the physical union of two conductors, the continuous thermocouple has NOT a real hot junction. In fact the sensor is able to create a 'local' hot junction just in the position interested by an overtemperature (**hot-spot**) in wherever it is shown all along its length.

This peculiarity is, due to the special characteristic of the negative temperature coefficient of the mineral oxide, placed between the two conductors and the sheath and able to reduce, in the event of temperature increase, its electrical resistance creating a temporary hot junction.

The measured signal (millivolt) generated by the continuous thermocouple is proportional, in case of local overtemperature, to the highest temperature (**hot-spot**) along its length.

**MCT****FCT**

Operating Range

The continuous thermocouple can operate in the following temperature ranges:

-29 ÷ 400 °C for the **MCT** Model, divided into 6 class (see Table)

-40 ÷ 150 °C for the **FCT** Model

Advantages

- Continuous monitoring of the interested zone and warranty of non-stop working of the plants
- Thermocouple signal (millivolt) self-generation without any power supply
- Possibility of being employed in classified area.
- Mechanically robust, it can be installed without any other mechanical protection (this feature is referred only to **MCT** model).

Operating Conditions

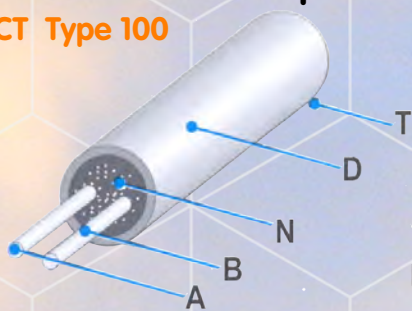
- Self-reinstatement of normal working conditions after any **hot-spot**:
 - _not more than 900°C for **MCT** model
 - _not more than 177°C for **FCT** model
- the high accuracy allows to set alarm thresholds close to the operative temperature for the chosen class of thermocouple
- immune from false alarm conditions



TECHNICAL SPECIFICATION

Metallic Continuous Thermocouples®

MCT Type 100



MCT Type 300



Caption

- A** – Negative wire
- B** – Positive wire
- C** – Internal sheath
- D** – External sheath
- N** – NTC powder
- O** – MgO powder
- T** – PTFE coating (option)

Technical Characteristics

- Conductors **Chromel/Alumel** according **ANSI MC-96.1**
- Insulation mat. high negative temperature coefficient **mineral oxide**
- Sheath **Inconel 600** standard
- Diameters **Type 100** 3 - 4,5 mm
- Diameters **Type 300** 4,5 - 6 mm
- Tolerances on diameters $\pm 5\%$
- Bending curve radius of > 12 times the sheath diameter
- Operative range **-30 ÷ 900 °C**
- Accuracy ± 3 °C in the operative ambient temperature class

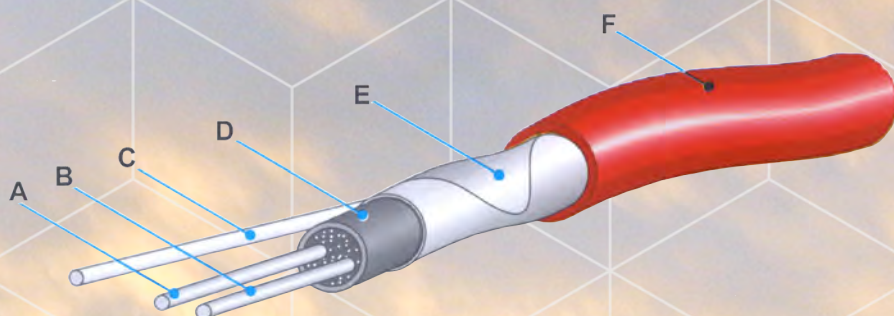


Range of operative Temperature

Class I	Class II	Class III	Class IV	Class V	Class VI
-29 ÷ 38 °C	0 ÷ 65 °C	38 ÷ 177 °C	121 ÷ 232 °C	160 ÷ 300 °C	288 ÷ 400 °C

Flexible Continuous Thermocouples®

FCT



Technical Characteristics

- Conductors **Chromel/Alumel** flexible
- Calibration according **ANSI MC.96.1**
- Insulation mat. high negative temperature coefficient **Ossido minerale**
- Sheath **PTFE** Technopolymer
- Diameters **4 mm**
- Tolerance on diameter $\pm 5\%$
- Bending curve radius of > 10 times sheath diameter
- Operative range **-20 ÷ 210 °C**
- Accuracy ± 5 °C in the operative ambient temperature class
- Operative temperature **-29 ÷ 210 °C**

Caption

- A** – Negative wire
- B** – Positive wire
- C** – Ground wire
- D** – NTC product layer
- E** – Alu/Mylar screen
- F** – PTFE sheath



TECHNICAL SPECIFICATION

APPLICATIONS

- Temperature monitoring of reactor's external surfaces
- Off-shore platforms
- Load stations fuel trucks
- Oil and coal gasificators
- Oil reperation plants
- Overheat detection and protection for floating roof storage tanks
- Power station air pre-heaters
- Combustive dust collectors for burners
- Burners and nearby areas
- Electrostatic precipitators
- Fuel ash filtering
- Oil and gas thrust stations
- Gas turbines
- Steam turbines
- Exhaust gas manifold
- Compressors and pumps
- Transformers, driers and silos
- Hydrogen and oil tight devices
- Coal tripper conveyors
- Coal conveyors
- Cable trays
- Electric boards
- Refrigerators
- Drivers ventilation

The **Continuous Thermocouples[®]** are classified as simple apparatus, each Continuous Thermocouple is intrinsically safe when used with approved safety barriers.

The measured temperature error is proportional to the segment of Continuous Thermocouple[®] interested by the overtemperature referring to the total length and to the difference between the overtemperature and the normal working temperature.

The maximum accuracy is obtained when the 10% or not less than 1 meter of the total length is influenced by the overtemperature. In these conditions the maximum error can be -14°C.

Typical Applications

**Fire Prevention System
Roof Floating Tanks**



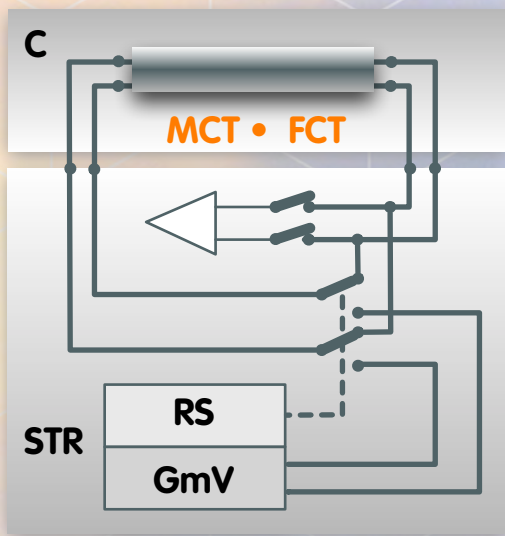
**Temperature Monitoring
external Reactors**

**Temperature Monitoring
Hydrogen Plants**

**Fire Prevention System for Burners
and Boilers**



Reverse Simulation Test



Continuous Thermocouple Sensor Interruption Control

The Continuous Thermocouple® is an 'open circuit' circuitry. If the continuous thermocouple will be interrupted in any point along its length, a normal instrument would continue to measure the segment of thermocouple connected without giving any signal to alert the operator about the continuous thermocouple interruption. In order to avoid this inconvenient, ELECTRONIC NEWS introduced into their instruments a special electronic functionality that, at programmed interval time, is able to verify the interruption of the cable and/or of the continuous thermocouple.

Caption

- C** Field
- MCT** Continuous Thermocouple with metallic sheath
- FCT** Continuous Thermocouple with flexible sheath
- RS** Reverse Simulation
- GmV** mV Generator
- STR** Instrument

Type of Electrical Terminations of the sensor

TAL, Aluminum Head Connection Type, single output without reverse simulation



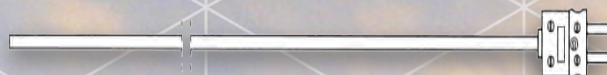
TAL, Aluminum Head Connection Type, double output with reverse simulation



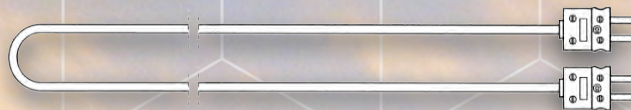
TAL, Aluminum Twin-Head Connection Type, single output with reverse simulation



Treated Junction Terminal for Derivation Box, without reverse simulation



Treated Junction Terminal for Derivation Box, with reverse simulation



Terminal Junction for TAL, Aluminum Head Connection Type, with reverse simulation



Interconnecting Junction Box for two Continuous Thermocouples.



Data Acquisition Instruments



EN2000
Controller / Indicator for single sensor signal



MAS128
Multichannel acquisition system



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