



Thermocouple : type N

up to 1 300°C
outstanding thermoelectric stability

Type N

NiCrSi (+) - NiSi (-)

This thermocouple has an outstanding thermoelectric stability which can be compared with platinum based thermocouples. This type has an excellent resistance to high temperature oxidation phenomena.

This thermocouple is ideally suited for accurate measurements in air up to 1300°C. In vacuum or controlled atmosphere, it can withstand 1300°C depending on sheath materials and diameter.



Various experiments held at THERMOCOAX show that type N thermocouples are behaving similarly to platinum based thermocouples. They drift 10 to 20 times less than type K thermocouples between 1000 and 1200°C.

Little sensitivity to Short Range Ordering

In the temperature range 300-600°C a crystalline phenomenon occurs in nickel-chromium alloys which leads to a reversible thermocouple sensitivity drift.

Even if a thermocouple is used in the 900-1300°C range, part of it is submitted to that 300-600°C range, in the application temperature gradient (e.g.: entrance of a furnace) and this section contributes to the total e.m.f. generation. Type N thermocouples are at least 50% less sensitive to this phenomenon than type K.

Little sensitivity to cold work effect

The thermoelectric force is little sensitive to cold work effect. This advantage allows fixing in sinuous lines without inducing local errors of homogeneity, leading thus to e.m.f. interferences.

Resistance to oxidation

There is a good resistance to oxidation since the addition of silicium to both thermoelectric alloys allows to put a protecting silicium film all over the outer surface of the thermoelectric wires.

Use in air

Over 1100°C, the sheath must be carefully selected depending on the environment and Inconel® 600 alloy is a very good compromise in terms of corrosion and e.m.f. stability (protection and compatibility with type N wires).

Nimonic® sheath

When requested, type N thermocouples can be equipped with Nimonic® 75 sheath, offering thus an excellent resistance to corrosion, especially in exhaust gas.

This range is standard:

- Other diameters
- Other sheath materials
- Other construction

Please consult us.

| Thermocouple | | | | | Sheath | | | | | |
|------------------------|------|-----------------------------------|--------------------------------|------|----------|----------------|-----|-----|-----|-----|
| Wire Materials | Type | Mean Sensitivity $\mu V/^\circ C$ | Working Temperature $^\circ C$ | Code | Material | Diameter in mm | | | | |
| | | | | | | 0.5 | 1.0 | 1.5 | 2.0 | 3.0 |
| NiCrSi (+) NiSi (-) | N | 37 | -40 to +1300 | 2 LM | I | ● | ● | ● | ● | ● |
| | | | | | Nm | ● | ● | ● | ● | ● |
| | | | | | Ig | | ● | ● | ● | ● |
| | | | | | If | | ● | ● | ● | ● |

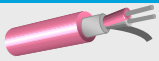


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Extension cable

The thermocouple is connected to the measurement device by means of an extension cable.

The extension cables have two cores (each made of one single wire individually insulated

| Wire Materials | Type | Sheath Material | Maximum temperature | Outer Diameter 2.5 mm Code | Loop Resistance Ω/m | IEC 584.3 Identification |
|-----------------------|----------|-----------------|---------------------|----------------------------|----------------------------|---|
| NiCrSi-(+) NiSi(-) | N | PVC | 100°C | 2LM25 | 17 |  |
| | | PTFE | 250°C | 2LM25T | | |

with P.V.C. (2LM25) or P.T.F.E. (2LM25T) and one tinned copper earth wire. All three are totally screened by a flexible

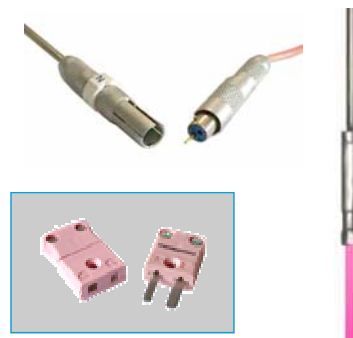
aluminum ribbon and again insulated by P.V.C. Their outer diameter is 2.5 mm.

Connection

In order to ensure the faultless function of the thermocouples, the end has to be closed by means of an organic sealing compound to avoid any ingress of moisture.

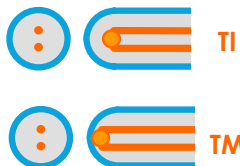
As connection to the plastic

sheathed cable, transferring the measurement signal to the instrument, direct connections are used. Besides this, it is often necessary, especially when being confronted with difficult of complicated measurement problems or specifications, to develop special connections.



Hot junctions

The hot junction is the point where the two cores are joined. This therefore is the sensing part and can take a number of different forms.



- TI** insulated hot junction
- TM** grounded hot junction
- TIS** swaged insulated hot junction
- TMS** swaged grounded hot junction
- TIL** laminated insulated hot junction

Accessories

Any form of brazing or welding of a thermocouple through a wall requires some skill, and to facilitate thermocouple mounting, a range of small seal-glands have been developed and adapted for the standard THERMOCOAX dimensions.



Quality

Whether they are standard or manufactured to customers specifications, all THERMOCOAX products are developed with the same procedures, the same control principles, the same feed back and the same qualified personnel.

Control and tests:

- X-ray of the hot junction
- Sheath integrity test
- Metallographic test on sample
- Calibration with appropriate thermal treatment...

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