



660.025 / 030

### Resistance thermo detector for air measurement

<b>Type</b>	: TES 3
<b>Head</b>	: Type C in light metal
<b>Sheath</b>	: AISI 304
<b>Dimensions</b>	: L = 10" (or upon request) Ø 8mm
<b>Connection</b>	: Type M - 1/2" BSP
<b>RTD element</b>	: 1 x PT100 or 2 x PT100 (3 wires)
<b>Max. Temp.</b>	: +300°C



667.060

### Thermocouple measurements in laboratory

Light execution for small ovens

<b>Type</b>	: LM-C-R 1'400°C
<b>Head</b>	: Type LM in aluminium
<b>Sheath</b>	: Ceramic 610 (7 x 1mm)
<b>Length</b>	: 140...480mm
<b>Calibration</b>	: S=Pt-Rh 10% / Pt or R= 13%
<b>Wires Ø</b>	: 0.5mm or 0.35mm
<b>Working temp.</b>	: 1'400°C



660.055 / 078

### Process measurement high pressure

<b>Head</b>	: Type B in light metal
<b>Sheath</b>	: AISI 316
<b>Dimensions</b>	: Foll. Norms D1 to D6 (280 to 400 mm).
<b>Weld-in well</b>	: Ø 24 - 30 mm down from 9-11-14 mm from bar in AISI 316
<b>Insert</b>	: interchangeable Ø 6mm
<b>Calibration</b>	: PT100 / Fe-Co / Cr-Al (1x or 2x)



660.031 / 054

### Process head and well assembly

<b>Head</b>	: Type B in light metal
<b>Sheath</b>	: AISI 316
<b>Dimensions</b>	: L upon request
<b>Ø</b>	: 9 -11 - 14 mm
<b>Connection</b>	: fixed below head or of 140 / 170 mm
<b>Threads</b>	: G / NPT / Metric : standard G 1/2"
<b>Insert</b>	: interchangeable Ø 6-8mm
<b>Calibration</b>	: PT100 / Fe-Co / Cr-Al (1x or 2x)



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### Process measurement "Ex" execution

<b>Head</b>	: Type ADF - explosion proof in cast iron for "Ex" - area NEC norm
<b>Thermowell</b>	: Drawn from bar with norm flange in St. St. 316
<b>Extension</b>	: 3 pieces in steel
<b>Insert</b>	: Interchangeable Ø 6mm
<b>Calibration</b>	: PT100 / Fe-Co / Cr-Al (1x or 2x)



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### Thermocouple for industrial ovens

<b>Type</b>	: A-CC-B-1'650°C
<b>Head</b>	: Type A in light metal
<b>Connection</b>	: Metal SS holder
<b>Sheath internal</b>	: Ceramic 710 / gasproof pure alumina Ø 15 x 10
<b>Sheath external</b>	: Ceramic 530 porous as thermic shock protection Ø 24 x 18
<b>Element</b>	: Type B - Pt-Rh 10%/Pt-Rh 6% Ø 0.5mm other calibrations available
<b>Working temp.</b>	: 1'650 °C

663.000 / 001  
(delivered without cable)

### Precision air temperature sensor

<b>663.000</b>	: Indoor temperature
<b>663.001</b>	: Outdoor temperature PT100 with 1 or 1/3 or 1/10 DIN tolerance accuracy < 0.1°C between -30...+50°C
<b>Accuracy</b>	: < 0.1°C between -30...+50°C
<b>System</b>	: 3 or 4 wires



662.000

### Thermocouples for plastic industries

METRA delivers all types of thermocouples or resistance thermo detectors for the plastic industry. Including the high quality types with metal sheathed thermocouple.

<b>Calibration</b>	: Fe-Co / Cr-Al / PT100
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## Industrial temperature sensors



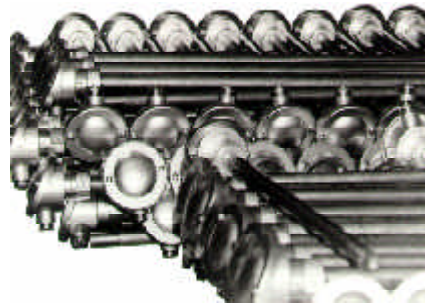
667.000

### Sheathed thermocouple

Sensors used in many process systems for instance.

Brick plants working continuously at 1'050°C (1'930°F)

- Sheath** : Inconel 600 max temp. 2'100°F
  - Junction** : Grounded or ungrounded
  - Ø** : 0.5 / 1.0 / 3.0 / 3.2 / 4.5 / 6.0 mm
  - Calibration** : Fe-Co / Cr-Al
- Thermo plugs see group 680



### Thermocouple for industrial oven

Type AM-K-1'000°C

- Head** : Type A in light metal
- Sheath** : in refractory SS 310 or 446
- Ø** : 7/8"
- Couple** : Type K Ø 1/8" insulated by pearls in ceramic 610
- Working temp.** : 1'000°C / 1'832°F



### Thermocouple for industrial ovens

Type A-C-S- 1'600°C

- Head** : Type A in light metal
- Connection** : through sliding flange on SS holder
- Sheath** : gasproof ceramic 710 - pure alumina Ø 234 x 18mm
- Couple** : Type S-PtRh 10% / Pt Ø 0.5mm
- Working temp.** : 1'600°C / 2'920°F



### Thermo-Diesel-Thermocouple for exhaust gases

Electrical connection: High temp. screw connector

- Lag extension** : Steel L = 50 Ø 13mm
- Connection to motor** : M-Mobile 1/2" - 3/8BSP steel
- SEnsor calibration** : Inconel sheathed thermocouple K or J
- Dimensions** : L = 150mm (100 x Ø 13 and 50 x Ø 9mm)
- Range** : 0...800°C (0...+ 1480°F)

**METRA INSTRUMENTS** manufactures temperature sensors following **ASA** and **DIN** norms.

RTD	DIN 43'730 Thermoresistance	PT 100 ( $\Omega/0^{\circ}\text{C}$ ) NI 100 ( $\Omega/0^{\circ}\text{C}$ )
T/C	DIN 43'710 Thermocouples	NiCr-Ni (K) Fe/CuNi (J) Cu/CuNi (T) PtRh10/Pt (S) PtRh13/Pt (R) PtRh18 DIN (B)

These **SENSORS** have various **PROTECTION ASSEMBLIES** depending on environment, measured temperature, requested accuracy. The following described sensors are standard, but other dimensions connections and materials can be supplied at short notice.

## General specifications

### Thermo Resistances RTD

#### Standard

- Type Pt 100 single or duplex element foll. DIN 43760
- Accuracy (B)
  - at  $0^{\circ}\text{C} \pm 0.3^{\circ}\text{C}$
  - at  $100^{\circ}\text{C} \pm 0.8^{\circ}\text{C}$
- 3 wires (6 for duplex)
- MGO filled, pressed and vibrated
- Protection tube in AISI 304L

#### Upon request

- Tolerance (A)
  - at  $0^{\circ}\text{C} \pm 0.15^{\circ}\text{C}$
  - at  $100^{\circ}\text{C} \pm 0.35^{\circ}\text{C}$
- or further reduced 1/2A, 1/4A etc.
- Reduced tip at 4 mm (or 3mm) for quicker response time
- Protection tube in AISI 316L or 310 or Any other material.

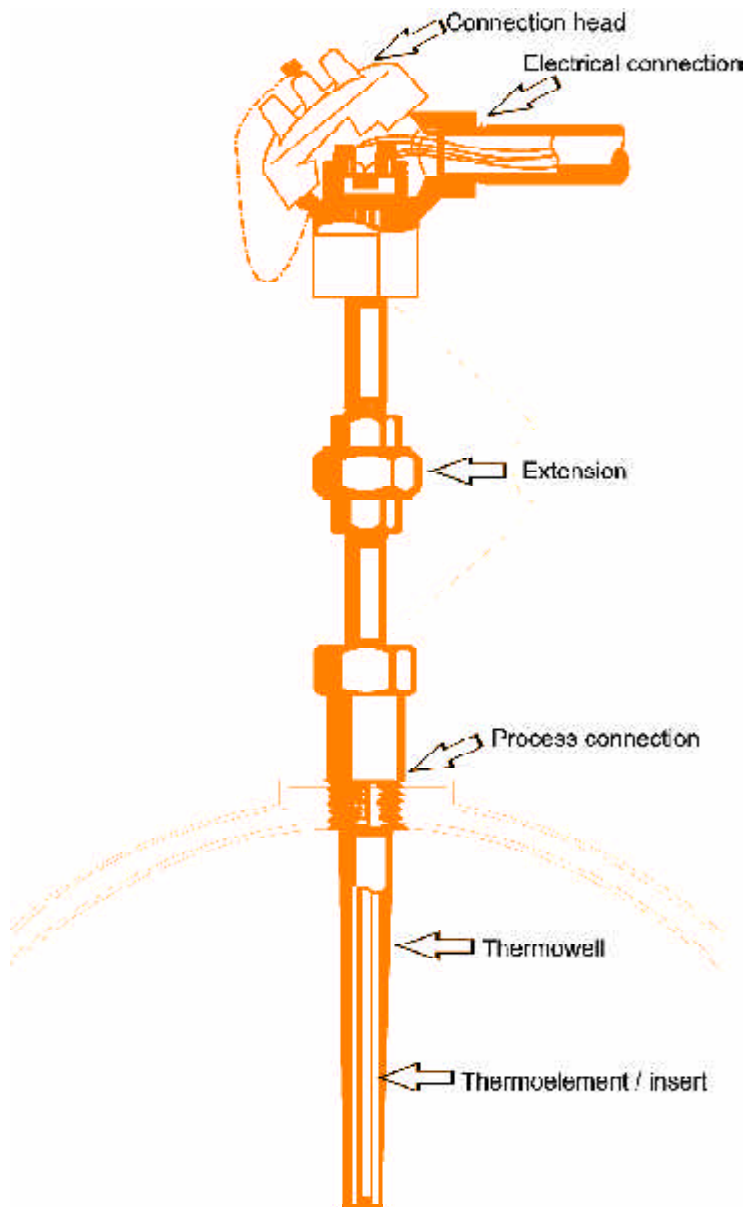
### Thermocouples TC

#### Standard

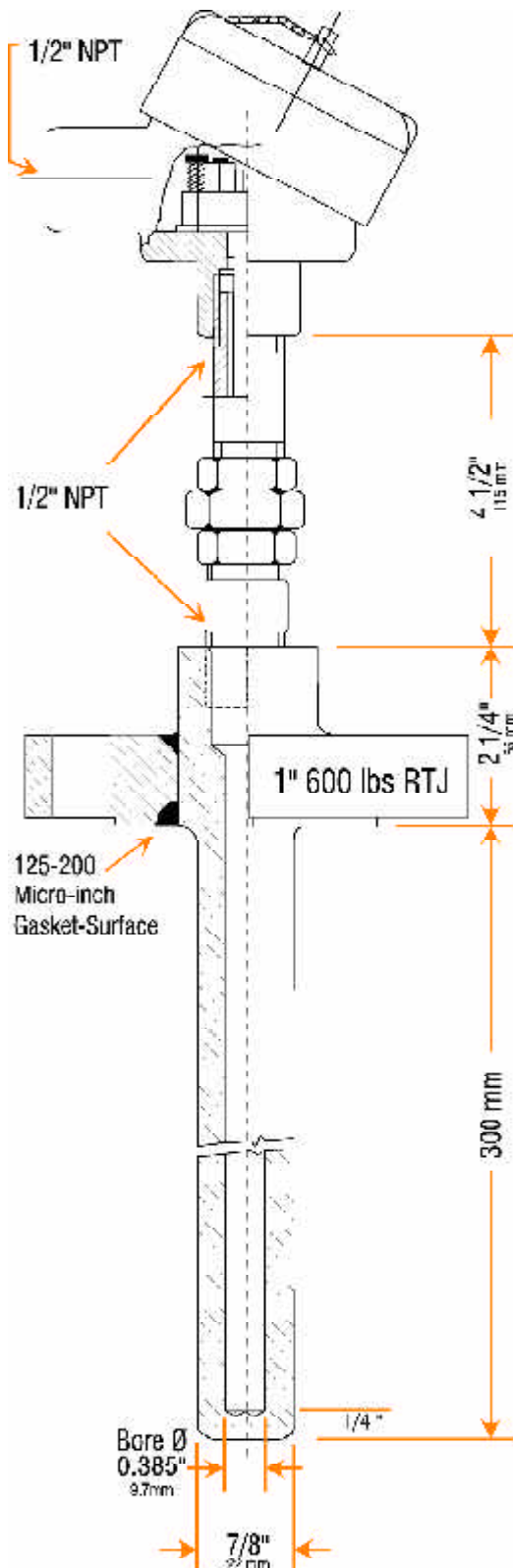
- Type K couple (NiCr-Ni) in sheathed mineral insulated cable  $\varnothing$  6mm
- Temperature max.  $1'100^{\circ}\text{C}$
- Hot junction insulated

#### Upon request

- Hot junction grounded, or exposed
- calibration J/T/S
- all diameters 1, 2, 3, 8 mm etc.



## Example of typical Thermocouple assembly for refineries



### THERMOCOUPLE ASSEMBLY

<b>Thermocouple</b>	Calibration	: J - Fe/Co-Iron/Constantan
	According to	: ANSI C96.1
	Gauge wires	: 14 AWG
	Terminal block	: single
<b>Nipple</b>	Size	: 1/2" sched 40
	Length	: 2"
	Union size	: 1/2"
<b>Head</b>	Material	: galvanized carbon steel
	Cover	: screwed weatherproof IP 67 explosionproof EExd 11B + H2TS
	Cable entry	: 1/2" NPT
	Process connection	: 1/2" NPT
	Material	: die cast alloy

### FLANGED BAR STOCK WELL

<b>Well</b>	Material well	: 316 st.st.
	Material flange	: 316 st. st.
	Process connection	: flanged complying with ANSI B16.5
	Size/rating/face	: 1" 600 Lbs RTJ (ANSI B 16.5)
	Immersion length	: U = 300 mm
	Construction	: bar stock from rod 1-1/4"
	Surface finish	: 16-32 RMS over 85% of "U" dimension
	Welds	: between flange and well standard welds (TX-A1)
	Q. Dia	: 22 mm (7/8")
	Bore dia.	: 9.7 mm (0.385")