General information
TEMPERATURE SENSORS Pt 100 Ω

PRINCIPLE

The measurement is based on variation of resistance from metallic wires (resistors) against variations of temperature. Materials most often used are platinum and nickel.

Platinum offers a large temperature range and a good linearity. His pureness and chemical inertia guarantee a high stability of sensor itself.

Relation between platinum resistance and temperature according Standard CEI 751 is as following formula (restricted):

$$R_t = R_o [1 + At + Bt^2 + Ct^3 (t - 100)]$$

R_t: Sensor resistance at temperature t
R_o: Sensor resistance at 0°C
t: Temperature in °C
A B C: Coefficients according to previous calibration (C = 0 for positive temperature in °C)

Industrial probes and boards are based on:

R_o = 100 Ω at 0°C
R_{100} = 138.5 Ω at 100°C

STANDARDS & TOLERANCES

FRANCE: **NFC 42330**
GERMANY: **DIN 43760**
GREAT BRITAIN: **BS 1904**
INTERNATIONAL: **CEI 751**

Acceptance tolerances in °C:

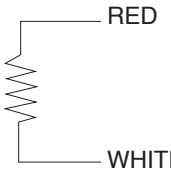
Class A: ± (0.15 + 0.002[t])
Class B: ± (0.3 + 0.005[t])

[t] is temperature value in °C.

Temperature [°C]	Acceptances tolerances Class A		Class B	
	Ω	°C	Ω	°C
-200	±0.24	±0.55	±0.56	±1.3
-100	±0.14	±0.35	±0.32	±0.8
0	±0.06	±0.15	±0.12	±0.3
100	±0.13	±0.35	±0.30	±0.8
200	±0.20	±0.55	±0.48	±1.3
300	±0.27	±0.75	±0.64	±1.8
400	±0.33	±0.95	±0.79	±2.3
500	±0.38	±1.15	±1.06	±3.3
600	±0.43	±1.35	±1.06	±3.3
650	±0.46	±1.45	±1.13	±3.6
700			±1.17	±3.8
800			±1.28	±4.3
850			±1.34	±4.6

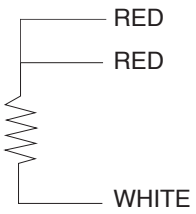
SETTINGS & CONNECTIONS

Below are three types of wiring we are used to propose:



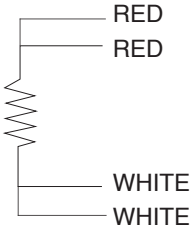
2 wires

The most simple but influenced by line resistance.



3 wires

Often used for industrial applications. This setting limits the effect of line resistance



4 wires

The most accurate setting, compensating signal errors due to line resistance and temperature variations effect on wires.

(Often used in laboratories)

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