Thermocouple Colour Code & Type Chart

Types J, K, T, E, N, R, S, B — conductors, temperature range, ANSI and IEC colour codes, typical uses

Type	Conductors (+ / –)	Range °C (max)	ANSI MC96.1 colours (extension wire)	IEC 60584-3 colours	Typical use
J	Iron / Constantan	-210 to 1200 (practical 0 to 750)	+ – jkt	+ – jkt	Plastics, ovens, general heating
K	Chromel / Alumel	-270 to 1372	+ – jkt	+ – jkt	Furnaces, kilns, most popular general type
T	Copper / Constantan	-270 to 400	+ – jkt	+ – jkt	Low temperature, cold rooms, food
E	Chromel / Constantan	-270 to 1000	+ – jkt	+ – jkt	Highest output (mV/°C), cryogenics
N	Nicrosil / Nisil	-270 to 1300	+ – jkt	+ – jkt	Stable alternative to K at high temperature
R	Pt-13% Rh / Platinum	-50 to 1768	+ – jkt	+ – jkt	Glass, steel, high-temperature furnaces
S	Pt-10% Rh / Platinum	-50 to 1768	+ – jkt	+ – jkt	Laboratory reference, heat treatment
B	Pt-30% Rh / Pt-6% Rh	0 to 1820	+ – jkt	+ – jkt	Very high temperature (above 1000 °C)

Quick ID: ANSI (USA) — the **negative lead is always red**. IEC (India/Europe) — the **negative lead is always white**; the positive lead and sheath share the type colour. ANSI thermocouple-grade wire (as opposed to extension wire) usually has a brown overall jacket. R and S use the same copper-alloy compensating wire (RX/SX). Max ranges are the standard EMF table limits; practical continuous limits depend on wire size, sheath and atmosphere. Always use extension/compensating cable of the same type.

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Thermocouple Tolerance Chart (Limits of Error)

ASTM E230 / ANSI MC96.1 and IEC 60584 classes — reference junction at 0 °C

Type	ASTM E230 Standard limits	ASTM E230 Special limits	IEC 60584 Class 1	IEC 60584 Class 2
J	0 to 750 °C: ±2.2 °C or ±0.75%	0 to 750 °C: ±1.1 °C or ±0.4%	-40 to 375 °C: ±1.5 °C 375 to 750 °C: ±0.4%	-40 to 333 °C: ±2.5 °C 333 to 750 °C: ±0.75%
K	0 to 1250 °C: ±2.2 °C or ±0.75% -200 to 0 °C: ±2.2 °C or ±2.0%	0 to 1250 °C: ±1.1 °C or ±0.4%	-40 to 375 °C: ±1.5 °C 375 to 1000 °C: ±0.4%	-40 to 333 °C: ±2.5 °C 333 to 1200 °C: ±0.75%
T	0 to 350 °C: ±1.0 °C or ±0.75% -200 to 0 °C: ±1.0 °C or ±1.5%	0 to 350 °C: ±0.5 °C or ±0.4%	-40 to 125 °C: ±0.5 °C 125 to 350 °C: ±0.4%	-40 to 133 °C: ±1.0 °C 133 to 350 °C: ±0.75%
E	0 to 900 °C: ±1.7 °C or ±0.5% -200 to 0 °C: ±1.7 °C or ±1.0%	0 to 900 °C: ±1.0 °C or ±0.4%	-40 to 375 °C: ±1.5 °C 375 to 800 °C: ±0.4%	-40 to 333 °C: ±2.5 °C 333 to 900 °C: ±0.75%
N	0 to 1300 °C: ±2.2 °C or ±0.75% -270 to 0 °C: ±2.2 °C or ±2.0%	0 to 1300 °C: ±1.1 °C or ±0.4%	-40 to 375 °C: ±1.5 °C 375 to 1000 °C: ±0.4%	-40 to 333 °C: ±2.5 °C 333 to 1200 °C: ±0.75%
R / S	0 to 1450 °C: ±1.5 °C or ±0.25%	0 to 1450 °C: ±0.6 °C or ±0.1%	0 to 1100 °C: ±1.0 °C 1100 to 1600 °C: ±[1 + 0.3% × (t – 1100)] °C	0 to 600 °C: ±1.5 °C 600 to 1600 °C: ±0.25%
B	800 to 1700 °C: ±0.5%	Not established	Not established	600 to 1700 °C: ±0.25%

Tolerances apply to the thermocouple wire with the reference junction at 0 °C. Where two values are given (°C or %), the **larger** applies; % is of the measured temperature in °C. Total system error also includes the instrument, extension cable and installation. Summary of ASTM E230 / ANSI MC96.1 and IEC 60584-1/-3 for quick reference — consult the current standards for design or calibration work.