Sommario

Thermocouples type 3
International regulations 3

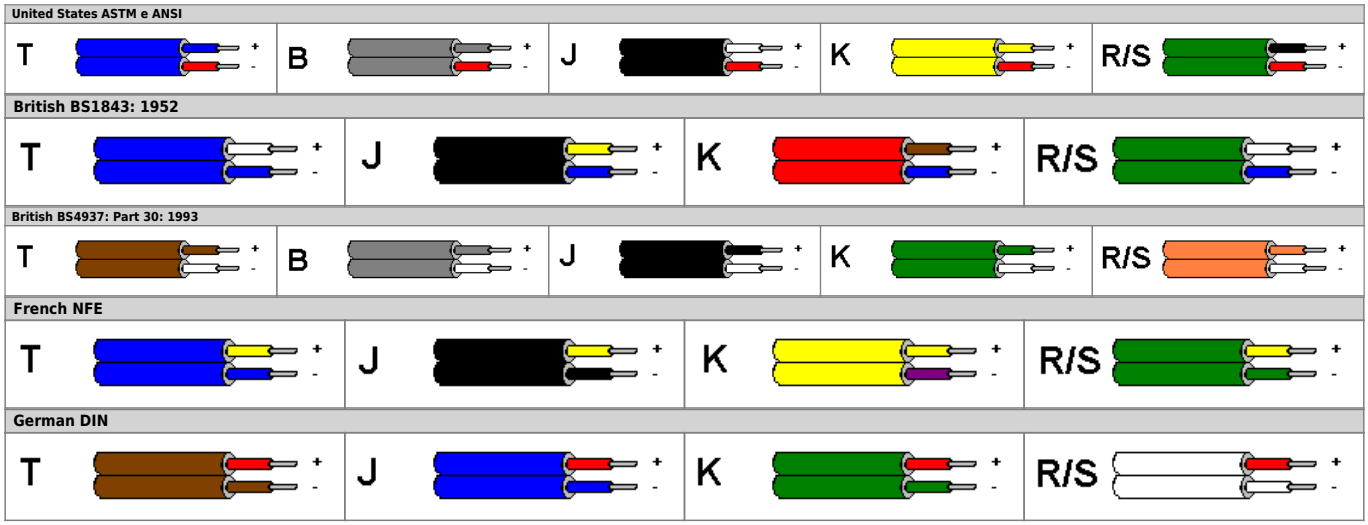
Thermocouples type

International regulations

Due to their wide use, thermocouples are standardized according to international standards.
The various types of thermocouples follow the same literal denomination for all regulations. These are:

Type T	Copper/Constantan
Type J	Iron/Constantan
Type E	Chromel®/Constantan
Type K	Chromel®/Alumel®
Type N	Nicrosil/Nisil
Type R	Platinum 13% Rhodium/Platinum
Type S	Platinum 10% Rhodium/Platinum
Type B	Platinum 30% Rhodium/Platinum

The cables are marked with colours according to the norms followed.
Below you carry out the main regulations with the respective colours.



With the colouring regulations, There are regulations on tolerances and the temperature range of use. These are listed in the following table.
It's noted that the intervals of use and the precision required on the single thermocouple may vary.
It's the single manufacturer of Thermocouples company to provide clarifications on the regulations.

Tolerances and intervals of use according to the various regulations

TYPE	JIS C 1602			ANSI MC 96.1			DIN 43710		IEC 584-2		
	Temp. range (° C)	Grade	Tolerance (°C)	Temp. range (° C)	Grade	Tolerance (°C)	Temp. range (° C)	Tolerance (°C)	Temp. range (° C)	Grade	Tolerance (°C)
B	200-1700	0.5	± 4°C or ± 0.5%	800-1700	STD	± 0.5%	-	-	600-1700	2	1.5°C 0.0025*|t|
										3	4C 0.005* |t|
R	0-1600	0.25	± 1.5°C or ± 0.25%	0-1450	STD	± 0.6°C or ± 0.1%	-	-	0-1600	1	1°C or [1+0.003 * (t-1100)]
					SP	± 1.5°C or ± 0.25%				2	1.5°C or 0.0025*|t|
S	0-1600	0.25	± 1.5°C or ± 0.25%	0-1450	STD	± 0.6°C or ± 0.1%	0-600	± 3°C		1	1°C or [1+0.003 * (t-1100)]
					SP	± 1.5°C or ± 0.25%	600-1600	± 5°C		2	1.5°C or 0.0025*|t|
K	0-1000	0.4	± 1.5°C or ± 0.4%	0-1250	SP	± 1.1°C or ± 0.4%	0-400	± 3°C	-40-1000	1	1.5°C or 0.004*|t|
	0-1200	0.75	± 2.5°C or ± 0.75%		STD	± 2.2°C or ± 0.75%	400-1200	± 0.75°C	-40-1200	2	2.5°C or 0.0075*|t|
	-200-0	1.5	± 2.5°C or ± 1.5%	-200-0		± 2.2°C or ± 2%			-200-40	3	2.5°C or 0.015*|t|
E	0-800	0.4	± 1.5°C or ± 0.4%	0-900	SP	± 1°C or ± 0.4%	-	-	-40-1000	1	1.5°C or 0.004*|t|
		0.75	± 2.5°C or ± 0.75%		STD	± 1.7°C or ± 0.5%			-40-1200	2	2.5°C or 0.0075*|t|
	-200-0	1.5	± 2.5°C or ± 1.5%	-200-0	STD	± 1.7°C or ± 1%			-200-40	3	2.5°C or 0.015*|t|
J	0-750	0.4	± 1.5°C or ± 0.4%	0-750	SP	± 1.1°C or ± 0.4%	0.400	± 3°C	-40-750	1	1.5°C or 0.004*|t|
		0.75	± 2.5°C or ± 0.75%		STD	± 2.2°C or ± 0.75%	400-900	± 0.75*		2	2.5°C or 0.075*|t|
T	0-350	0.4	± 0.5°C or ± 0.4%	0-350	SP	± 0.5°C or ± 0.4%	0-400	± 3°C	-40-350	1	0.5°C or 0.004*|t|
		0.75	± 1°C or ± 0.75%		STD	± 1°C or ± 0.75%	400-600	± 0.75*		2	1°C or 0.0075*|t|
	-200-0	1.5	± 1°C or ± 1.5%	-	STD	± 1°C or ± 1.5%			-200-40	3	1°C or 0.015*|t|

For the developed thermoelectric voltages, the regulations to be referred to in the same way.
The tables found are similar to the following.

Seebeck emf of thermocouple type N according IEC (ITS 90)

TERMOCOPPIA TIPO "N" (Nicrosil - Nisil) SECONDO IEC 584-1 (ITS 90)

°C	0	-10	-20	-30	-40	-50	-60	-70	-80	-90	°C
	FEM termoelettrica in mV - *Thermoelectric voltage in mV*										
-200	-3,990	-4,083	-4,162	-4,226	-4,313	-4,336	-4,345				-200
-100	-2,407	-2,612	-2,808	-2,994	-3,171	-3,336	-3,491	-3,634	-3,766	-3,884	-100
0	0,000	-0,260	-0,518	-0,772	-1,023	-1,269	-1,509	-1,744	-1,972	-2,193	0
°C	0	-10	-20	-30	-40	-50	-60	-70	-80	-90	°C
°C	0	10	20	30	40	50	60	70	80	90	°C
	FEM termoelettrica in mV - *Thermoelectric voltage in mV*										
0	0,000	0,261	0,525	0,793	1,065	1,340	1,619	1,902	2,189	2,480	0
100	2,774	3,072	3,374	3,680	3,989	4,302	4,618	4,937	5,259	5,585	100
200	5,913	6,245	6,579	6,916	7,255	7,597	7,941	8,288	8,637	8,988	200
300	9,341	9,696	10,054	10,413	10,774	11,136	11,501	11,867	12,234	12,603	300
400	12,974	13,346	13,719	14,094	14,469	14,846	15,225	15,604	15,984	16,366	400
500	16,748	17,131	17,515	17,900	18,286	18,672	19,059	19,447	19,835	20,224	500
600	20,613	21,003	21,393	21,784	22,175	22,566	22,958	23,350	23,742	24,134	600
700	24,527	24,919	25,312	25,705	26,098	26,491	26,883	27,276	27,669	28,062	700
800	28,455	28,847	29,239	29,632	30,024	30,416	30,807	31,199	31,590	31,981	800
900	32,371	32,761	33,151	33,541	33,930	34,319	34,707	35,095	35,482	35,869	900
1.000	36,256	36,641	37,027	37,411	37,795	38,179	38,562	38,944	39,326	39,706	1.000
1.100	40,087	40,466	40,845	41,223	41,600	41,976	42,352	42,727	43,101	43,474	1.100
1.200	43,846	44,218	44,588	44,958	45,326	45,694	46,606	46,425	46,789	47,152	1.200
1.300	47,513										1.300
°C	0	10	20	30	40	50	60	70	80	90	°C

Giunto di riferimento a 0°C

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