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Thermocouple Wire Specifications & Tolerances

Calibration	Standard Calibration Points °F1
SERV-RITE®Thermocouple Wire Standard Calibration Temperatures	
E	300, 500, 1000, 1600
J	200, 500, 1000, 1400
K	300, 500, 1000, 1600, 2000
N	300, 500, 1000, 1600, 2000
T	200, 500
SERV-RITE®Extension Wire Standard Calibration Temperatures	
BX	212, 400
CX	200, 300, 400, 500
EX	200, 400
JX	200, 400
KX	200, 300, 400
NX	200, 300, 400
RX	400
SX	400
TX	200, 400
XACTPAK®Calibration Temperatures	
B	1600, 2000, 22002, 27002
E	300, 500, 1000, 1600
J	200, 500, 1000, 1500
K	300, 500, 1000, 1600, 20002, 22002
N	300, 500, 1000, 1600, 20002, 22002
R	1000, 1500, 2000, 27002
S	1000, 1500, 2000, 27002
T	200, 500

1 Calibration not made when temperature exceeds wire insulation rating.

2 These calibration temperatures are checked if the sheath and insulation are rated to this temperature.

Initial Calibration Tolerances for SERV-RITE Wire And Cable Reference Junction 0°C (32°F)

Calibration Type	Temperature Range		Tolerances1 (whichever is greater)	
	°C	°F	Standard	Special
Thermocouple Wire Type				
B	870 to 1700	1598 to 3092	±0.5%	
E	0 to 900	32 to 1652	±1.7°C or ±0.5%	±1.0°C or ±0.4%
J	0 to 750	32 to 1382	±2.2°C or ±0.75%	±1.1°C or ±0.4%
K	0 to 1250	32 to 2282	±2.2°C or ±0.75%	±1.1°C or ±0.4%
N	0 to 1250	32 to 2282	±2.2°C or ±0.75%	±1.1°C or ±0.4%
R or S	0 to 1450	32 to 2642	±1.5°C or ±0.25%	±0.6°C or ±0.1%
T	0 to 350	32 to 662	±1.0°C or ±0.75%	±0.5°C or ±0.4%
Extension Wire Type				
EX	0 to 200	32 to 392	±1.7°C	±1.0°C
JX	0 to 200	32 to 392	±2.2°C	±1.1°C
KX	0 to 200	32 to 392	±2.2°C	±1.1°C
NX	0 to 200	32 to 392	±2.2°C	±1.1°C
TX	0 to 100	32 to 212	±1.0°C	±0.5°C
Compensating Extension Wire Type				
BX2	0 to 200	32 to 3925	±3.7°C	
CX3	0 to 870	32 to 16005	±6.8°C	
RX, SX4	0 to 200	32 to 3925	±5°C	
Cryogenic Range Wire Type				
E6	-200 to 0	-328 to 32	±1.7°C or ±1%	
K6	-200 to 0	-328 to 32	±2.2°C or ±2%	7
T6	-200 to 0	-328 to 32	±1.0°C or ±1.5%	

1. Where tolerances are given in percent, the percentage applies to the temperature being measured in degrees Celsius. For example, the standard tolerance of Type J over the temperature range 277 to 750ºC is ± 0.75 percent. If the temperature being measured is 538ºC, the tolerance is ± 0.75 percent of 538ºC, or ± 4.0ºC. To determine the tolerance in degrees Fahrenheit, multiply the tolerance in degrees Celsius times 1.8.
2. Copper versus copper compensating extension wire, usable to 100ºC (212ºF) with maximum deviations as indicated, but with no significant deviation over 32 to 0 to 50ºC (122ºF) range. Matched proprietary alloy compensating wire is available for use over the range 0 to 200ºC (32 to 392ºF) with tolerances of ±0.033 mV (±3.7ºC5).
3. Not an ANSI symbol.
4. Copper (+) versus copper nickel alloy (-).
5. Due to the non-linearity of the Types B, C R and S temperature-EMF curves, the error introduced into a thermocouple system by the compensating wire will be variable when expressed in degrees. The degree C tolerances given are based on the following measuring junction temperatures:

Type Wire Measuring Junction Temperature

1. BX Greater than 1000ºC (1832ºF)
2. SX Greater than 870ºC (1598ºF)

6. Thermocouples and thermocouple material are normally supplied to meet the tolerances specified in the table for the normal specified range. The same materials, however, may not fall within the cryogenic tolerances in the second section of the table. If materials are required to meet the cryogenic tolerances, the purchase order must so state. Selection of materials usually will be required. Tolerances indicated in this table are not necessarily an indication of the accuracy of temperature measurements in use after initial heating of the materials.
7. Little information is available to justify establishing special tolerances for cryogenic temperatures. Limited experience suggests the following tolerances for Types E and T thermocouples:

1. Type E -200 to 0ºC ±1.0ºC or ±0.5% (whichever is greater)
2. Type T -200 to 0ºC ±0.5ºC or ±0.8% (whichever is greater)

**These tolerances are given only as guide for discussion between purchaser and supplier. Due to the characteristics of the materials, cryogenic tolerances for Type J thermocouples and special cryogenic tolerances for Type K thermocouples are not listed.