

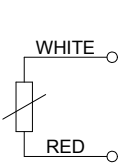
Element Connections

Two-Wire: Provides one connection to each end of the element. This construction is suitable where the resistance of the lead wire may be considered as an additive constant in the circuit, and particularly where the changes in lead resistance due to ambient temperature changes may be ignored.

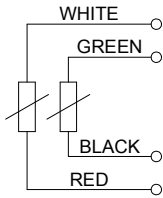
Three-Wire: Provides one connection to one end of the element and two to the other end of the element. Connected to an instrument designed to accept three wire input, sufficient compensation is usually achieved for leadwire resistance and temperature change in leadwire resistance. This is the most commonly used configuration.

Four-Wire: Provides two connections to each end of the element to completely compensate for leadwire resistance and temperature change in leadwire. This configuration is used where highly accurate temperature measurement is vital.

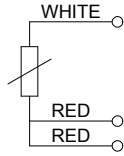
2-WIRE SINGLE



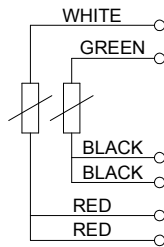
2-WIRE DUPLEX



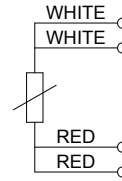
3-WIRE SINGLE



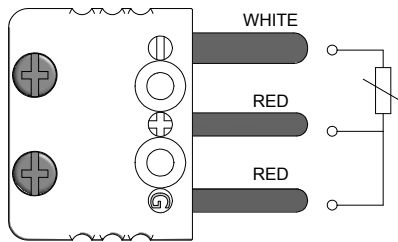
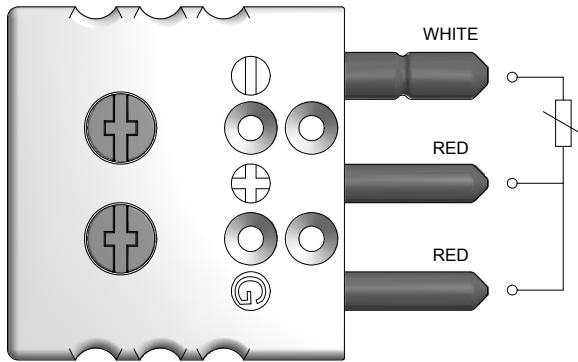
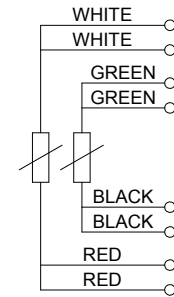
3-WIRE DUPLEX



4-WIRE SINGLE



4-WIRE DUPLEX



Lead resistance has a large effect on RTD temperature measurement accuracy. A 2-wire circuit provides no compensation and can provide large measurement errors. The following table shows the effects of leadwire resistance on temperature measurements using low-temperature RTD assemblies with copper leadwire.

Leadwire Resistance

LEADWIRE-WIRE GAUGE	RESISTANCE-OHMS PER FOOT	UNCOMPENSATED 2-WIRE CIRCUITS	
		MAX. LENGTH FOR 1 °F ERROR @ 20 °C [68 °F]	ERROR IN °F PER DOUBLE FT.
30	0.133	0.81 ft	1.24 °F
28	0.0851	1.26 ft	0.79 °F
24	0.0333	3.2 ft	0.31 °F
22	0.0213	5.1 ft	0.198 °F
20	0.0148	7.27 ft	0.14 °F
18	0.0083	13.0 ft	0.077 °F
16	0.0052	20.7 ft	0.048 °F

STANDARD PLATINUM RTD ASSEMBLIES - Pyromation standard RTD assemblies are constructed using platinum elements with a reference resistance of 100 ohms at 0 °C, a temperature coefficient 0.003 85 °C⁻¹ and which are in accordance with the following standards:

1. International Standard, IEC 60751 2. American Standard, ASTM E1137

TEMPERATURE		IEC CLASS B ^[1] (RBF) ± (0.12% × R ₀) Ω		ASTM GRADE B ^[1] (RIT) ± (0.1% × R ₀) Ω		IEC CLASS A ^[1] (RAT) ± (0.06% × R ₀) Ω		IEC CLASS A ^[1] (RAF) ± (0.06% × R ₀) Ω		IEC CLASS AA ^[1] (R3T) ± (0.04% × R ₀) Ω		(1/5) IEC CLASS B ^[2] (R5T) ± (0.02% × R ₀) Ω	
		± (0.3 + 0.005 t) °C		± (0.25 + 0.0042 t) °C		± (0.15 + 0.002 t) °C		± (0.15 + 0.002 t) °C		± (0.1 + 0.0017 t) °C		± (0.06 + 0.001 t) °C	
°C	[°F]	°C	[°F]	°C	[°F]	°C	[°F]	°C	[°F]	°C	[°F]	°C	[°F]
-200	[-328]			1.09	[1.96]								
-100	[-148]			0.67	[1.21]	0.35	[0.63]						
-50	[-58]	0.55	[0.99]	0.46	[0.83]	0.25	[0.45]			0.19	[0.34]		
-30	[-22]	0.45	[0.77]	0.38	[0.64]	0.21	[0.36]	0.21	[0.36]	0.15	[0.26]	0.09	[0.16]
0	[32]	0.30	[0.54]	0.25	[0.45]	0.15	[0.27]	0.15	[0.27]	0.10	[0.18]	0.06	[0.11]
100	[212]	0.80	[1.44]	0.67	[1.21]	0.35	[0.63]	0.35	[0.63]	0.27	[0.49]	0.16	[0.29]
150	[302]	1.05	[1.89]	0.88	[1.58]	0.45	[0.81]	0.45	[0.81]	0.36	[0.65]	0.21	[0.38]
200	[392]	1.30	[2.34]	1.09	[1.96]	0.55	[0.99]	0.55	[0.99]	0.44	[0.79]		
250	[482]	1.55	[2.79]	1.30	[2.34]	0.65	[1.17]	0.65	[1.17]	0.53	[0.95]		
300	[572]	1.80	[3.24]	1.51	[2.72]	0.75	[1.35]	0.75	[1.35]				
400	[752]	2.30	[4.14]	1.93	[3.47]	0.95	[1.71]						
450	[842]	2.55	[4.59]	2.14	[3.85]	1.05	[1.89]						
500	[932]	2.80	[5.04]	2.35	[4.23]								
600	[1112]			2.77	[4.99]								

Where: |t| = value of temperature without regard to sign, °C

[1] The equations represent values for 3- and 4-wire PRTs. Caution must be exercised with 2-wire PRTs due to lead resistance.

[2] This tolerance can only be met with a 4-wire PRT. If a 3-wire construction is specified, the guaranteed tolerance will be downgraded to the highest possible accuracy based on the temperature range as listed in the above table.

