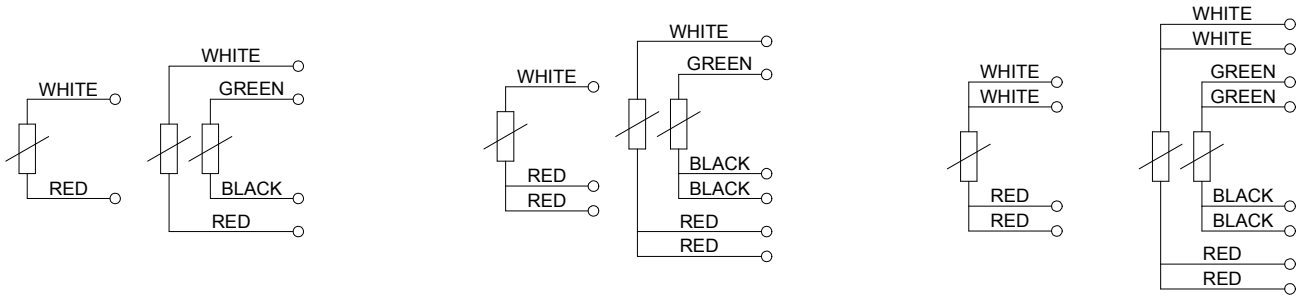
Element Connections

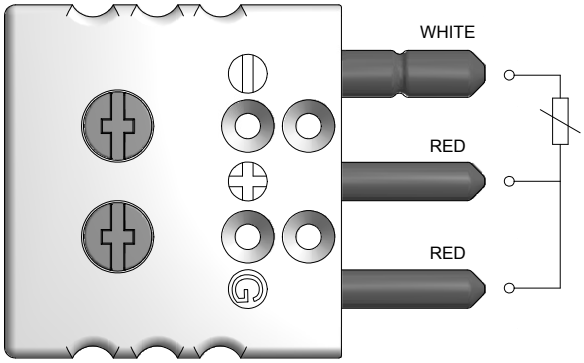
Two-Wire: Provides one connection to each end of the element. This construction is suitable where the resistance of the lead wire may be considered as an additive constant in the circuit, and particularly where the changes in lead resistance due to ambient temperature changes may be ignored.

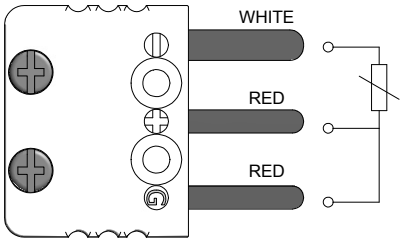
Three-Wire: Provides one connection to one end of the element and two to the other end of the element. Connected to an instrument designed to accept three wire input, sufficient compensation is usually achieved for leadwire resistance and temperature change in leadwire resistance. This is the most commonly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