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With compliments from the team at KD INSTRUMENTS

The most common methods of measuring temperature by electrical means make use of one of the following:

**Thermocouples**
**Resistance Temperature Detectors ie RTD**
**Radiation (Infrared) Pyrometers**

Each of these sensors is described in detail in this section. Thermocouples and R.T.D.'s are considered to be CONTACT SENSORS. Radiation pyrometers are distinguished as NON CONTACT.
The following table will aid you in selection between the two contact types.

## table 1

| CONSIDERATION | R.T.D. | THERMOCOUPLE |
|---|---|---|
| **Accuracy** | More accurate | Less accurate |
| **Temperature Range** | 0.1 to 1.0ºC Narrower -200 to 850ºC | 0.5 to 5ºC Wider -200 to 2000ºC |
| **Cost** | More expensive (two or three times) | Less expensive |
| **Sensitivity** | Stem Sensitive | Tip Sensitive |
| **Speed Response** | Slower | Faster |
| **Size** | Larger | Very small possible |
| **Thermocouple Reference** | Not Applicable | Required |
| **Surface Temperature** | Generally unsuitable | Suitable |
| **Measurement Vibration Effects** | Less suitable | Suitable (mineral insulated type) |
| **Power supply** | Required | Not Required |
| **Self-Heating** | Applicable | Not Applicable |
| **Long-Term stability** | Excellent | Less Satisfactory |
| **Robustness** | Less Suitable | More suitable |
| **Connecting Leads** | Ordinary Copper | Thermocouple Material to reference junction |
| **Output** | Resistance bridge approx. 0.4 ohms change per ºC | E.M.F Generation base metal: approx 40 microvolts per ºC<br>Nobal metal: above 1000ºC approx 10 microvolts per ºC non linear |
| **Electrical "pick up"** | Less susceptible | More susceptible |

The above table should be interpreted with caution. The information given shows average application experience, but some of the considerations can be modified by special design or selection.