

COMPARISON OF THERMISTORS AND RTD's

THERMISTORS

Advantages:

- Fast response
- Small size
- High resistances eliminate most lead resistance problems
- Rugged, not affected by shock or vibration

Disadvantages:

- Nonlinear
- Narrow span for any single unit
- Interchangeability is limited unless matched pairs are used

RTD's

Advantages:

- Linear over wide operating range
- Wide temperature operating range
- High temperature operating range
- Interchangeable over wide range
- Better stability at high temperature

Disadvantages:

- Low sensitivity
- Higher cost
- No point sensing
- Affected by shock and vibration
- Requires 3 or 4 wire operation
- Can be affected by contact resistance

ADVANTAGE / DISADVANTAGES OF THERMISTOR TYPES:

JMS offers ruggedized bead-type thermistors as standards, other types are available upon request.

As a group, the hermetically sealed bead type thermistors are more stable than the metalized surface contact types. Of the bead types, those with a thin glass coating would be the least stable and the large glass probes would be the most stable. The hermetic glass seal strain relieves the leadwire-to-ceramic interface and prevents changes in the oxidation state of the thermistor thus providing improved stability. Among the metalized surface contact thermistors, flakes and uncoated chips are the least stable. Moderate to good stability may be obtained with epoxy coated chips although such devices exhibit significantly poorer stability than ruggedized hermetically sealed beads and probes. This is particularly true when the thermistors are exposed to strongly oxidizing or reducing environments.

The bead type thermistors with lead wires sintered into the ceramic body permit operation at higher temperatures. Bead in glass probe thermistors are available with temperature ratings to 55°C and are very stable with continuous operating temperatures at or below 300°C.

The bead type thermistors are generally smaller in size than the metalized surface contact type thermistors, have faster thermal time constant value and lower dissipation constant values. The small size and fast response of the beads is an advantage in many temperature measurement applications; however, the lower dissipation constant will result in greater self-heating effects in most applications.

BEAD TYPE THERMISTORS:

*Glass coated beads * Beads in glass probe * Bare beads * Ruggedized beads * Beads in glass rod

Advantages:

- Good to excellent stability. Lead wires are strain relieved in glass hermetic seal.
- Smaller sizes available.
- Fast response times.

Disadvantages:

- Medium to low dissipation constants.
- Matched pairs or resistive padding are required for interchangeability.