# Resistance Temperature Sensors

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Temperature</th>
<th>Accuracy</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RTDs</strong></td>
<td>Accurate, repeatable and interchangeable over a wide operating range.</td>
<td>-328 to 1200 °F, -200 to 650 °C</td>
<td>DIN Class A: ± 0.06% at 32°F (0°C), DIN Class B: ±0.12% at 32°F (0°C)</td>
<td>76</td>
</tr>
<tr>
<td><strong>Thermistors</strong></td>
<td>Highly sensitive to small changes in temperature, fairly accurate over a limited temperature range.</td>
<td>-75 to 500 °F, -60 to 260 °C</td>
<td>±1% at 77°F (25°C) to ±15% at 32°F (0°C)</td>
<td>88</td>
</tr>
<tr>
<td><strong>ENVIROSEAL™ HD</strong></td>
<td>Suited for heavy-duty applications including those in harsh environments.</td>
<td>-40 to 392 °F, -40 to 200 °C</td>
<td>Available with either RTD or thermistors. See information above.</td>
<td>95</td>
</tr>
</tbody>
</table>
# Resistance Temperature Sensors

## RTDs

### Bends

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td>0.125</td>
<td>3/8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>0.188</td>
<td>3/8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>0.250</td>
<td>1/2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

## Lead Terminations

<table>
<thead>
<tr>
<th>Termination</th>
<th>Code</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Male Plug</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td>Standard Female Jack</td>
<td>B</td>
<td>—</td>
</tr>
<tr>
<td>Standard Male Plug with Mating Connector</td>
<td>C</td>
<td>—</td>
</tr>
<tr>
<td>Miniature Male Plug</td>
<td>J</td>
<td>—</td>
</tr>
<tr>
<td>Miniature Female Jack</td>
<td>K</td>
<td>—</td>
</tr>
<tr>
<td>Miniature Male Plug with Mating Connector</td>
<td>L</td>
<td>—</td>
</tr>
<tr>
<td>Split Leads</td>
<td>T</td>
<td>1½&quot;</td>
</tr>
<tr>
<td>#8 Spade Lugs</td>
<td>U</td>
<td>1½&quot;</td>
</tr>
</tbody>
</table>

* When style contains jacketed wire.
# Resistance Temperature Sensors

## RTDs

### Fitting Options

#### Fixed Fittings

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Material</th>
<th>Sheath Size in.</th>
<th>NPT Thread Size in.</th>
<th>Hex Size in.</th>
<th>Length in.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Single Thread 1/8 NPT</td>
<td>303 SS</td>
<td>0.063 to 0.250</td>
<td>1/8</td>
<td>7/16</td>
<td>11/16</td>
<td>A</td>
</tr>
<tr>
<td>Fixed Single Thread 1/4 NPT</td>
<td>303 SS</td>
<td>0.125 to 0.250</td>
<td>1/4</td>
<td>9/16</td>
<td>7/8</td>
<td>B</td>
</tr>
<tr>
<td>Fixed Single Thread 1/2 NPT</td>
<td>303 SS</td>
<td>0.125 to 0.250</td>
<td>1/2</td>
<td>7/8</td>
<td>1</td>
<td>D</td>
</tr>
<tr>
<td>Fixed Double Thread 1/2 NPT</td>
<td>303 SS</td>
<td>0.125 to 0.250</td>
<td>1/2</td>
<td>7/8</td>
<td>13/4</td>
<td>F</td>
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</table>

#### Compression Fittings

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Material</th>
<th>Sheath Size in.</th>
<th>NPT Thread Size in.</th>
<th>Hex Size in.</th>
<th>Length in.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Adjustable Compression Brass</td>
<td>Brass</td>
<td>0.125</td>
<td>1/8</td>
<td>1/2</td>
<td>1</td>
<td>J</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>11/8</td>
<td>J</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/8</td>
<td>1/2</td>
<td>13/16</td>
<td>J</td>
</tr>
<tr>
<td>Non-Adjustable Compression SS</td>
<td>303 SS</td>
<td>0.063</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.125</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>15/16</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/8</td>
<td>1/2</td>
<td>15/16</td>
<td>L</td>
</tr>
<tr>
<td>Adjustable Compression TFE Gland</td>
<td>303 SS</td>
<td>0.063</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.125</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/4</td>
<td>7/8</td>
<td>27/16</td>
<td>X</td>
</tr>
<tr>
<td>Adjustable Compression Lava Gland</td>
<td>303 SS</td>
<td>0.063</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>Q</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.125</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>Q</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>11/4</td>
<td>Q</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/4</td>
<td>7/8</td>
<td>27/16</td>
<td>V</td>
</tr>
</tbody>
</table>

Compression Fittings: Compression fittings are shipped finger-tight on the sheath allowing field installation. Once non-adjustable fittings are deformed, they cannot be relocated. Adjustable fittings come with Tetrafluorethylene (TFE) sealant or lava sealant glands.
## RTDs

### Fitting Options (Continued)

#### Adjustable Spring Loaded

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Material</th>
<th>Sheath Size in.</th>
<th>NPT Thread Size in.</th>
<th>Hex Size in.</th>
<th>Length in.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>316 SS</td>
<td>0.250</td>
<td>1/2</td>
<td>7/8</td>
<td>2</td>
<td>H</td>
</tr>
</tbody>
</table>

#### Bayonet Lockcap and Spring

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Material</th>
<th>Sheath Size in.</th>
<th>Length in.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Plated Steel</td>
<td>0.125</td>
<td>1 1/8</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td>Plated Steel</td>
<td>0.188</td>
<td>1 1/8</td>
<td>W</td>
</tr>
</tbody>
</table>
Resistance Temperature Sensors

RTDs

Watlow manufactures a variety of RTD sensors that are specially designed to ensure precise and repeatable temperature measurement. Watlow sensors are built to meet the most demanding industrial applications while providing a lower total cost of ownership for our customers.

Performance Capabilities
- Precise and stable within the wide temperature range of -328 to 1200°F (-200 to 650°C)

Features and Benefits

Strain-free construction
- Provides dependable, accurate readings
- Allows elements from different lots to be substituted with no recalibration needed

High signal-to-noise output
- Increases accuracy of data transmission
- Permits greater distances between sensor and measuring equipment

Temperature coefficient (alpha) carefully controlled while insulation resistance values exceed DIN-IEC-751 standards
- Ensures sensor sensitivity
- Minimizes self heating
- Allows precise measurement
- Repeatable

Typical Applications
- Stoves, grills, fryers and other food equipment
- Textile production
- Plastics processing
- Petrochemical processing
- Air, gas and liquid temperature measurement
- Exhaust gas temperature measurement
- Semiconductor processing
- Bearing and gear boxes
Resistance Temperature Sensors

RTDs

Standard Industrial Insulated Leads

Style RB

Features and Benefits

High accuracy
- Dependable readings

Customized diameters
- From 0.125 to 0.250 inch

Epoxy sealed
- Resists moisture and pull out
- Standard 500°F (260°C) potting

Durable rigid sheath
- 316 stainless steel -58 to 500°F (-50 to 260°C)

Internal heat transfer paste
- Quick time response

Ordering Information

Part Number

<table>
<thead>
<tr>
<th>Sheath O.D. (in.)</th>
<th>Lead Wire Const.</th>
<th>Fittings</th>
<th>Lead Wire Term.</th>
<th>Sheath Const.</th>
<th>Sheath Length “L” (in.)</th>
<th>Sheath Length “L” (fract. in.)</th>
<th>Element</th>
<th>Initial Element Accuracy</th>
<th>Lead Wire Length (ft)</th>
<th>Sheath Length “L” (fractional in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sheath O.D. (in.)

G = 0.125
H = 0.188
J = 0.250

Note: 0.125 dia. supplied with 28 gauge wire. 0.188 and 0.250 dia. supplied with 24 gauge wire.

Lead Wire Construction*

- Standard Overbraid Flex Armor
- Fiberglass stranded
- PFA stranded
- Certain option combinations must be furnished with a transition between the sheath and lead wire. Contact the factory if a transition is unacceptable.
- May require a transition.

Fittings

If required, enter the order code from pages 76 to 77. If none enter “0”.

Lead Wire Termination

- Standard male plug 400°F (200°C)
- Standard female jack
- Standard plug with mating connector
- Male miniature plug
- Female miniature jack
- Male/female mini set
- Standard leads
- Leads with spade lugs
- Requires two-or three-wire, single element only.

Initial Element Accuracy @ 0°C

- DIN Class A (±0.06%)
- DIN Class B (±0.12%)
- Available in 0.250 inch diameter only.

Lead Wire Length (ft)

Whole feet: 01 to 99

Note: Applies to low temperature RTD’s only.
Resistance Temperature Sensors

RTDs

Plug or Jack Termination
Style RC

Features and Benefits

Durable rigid sheath
- 316 SS -58 to 500°F (-50 to 260°C)

Durable connectors with copper pins
- 400°F (200°C) temperature rating
- Provides simple connection to extension leads

Brazed adapter
- Provides superior connector attachment

High accuracy
- Ensures dependable readings

Ordering Information

Part Number

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>RC</td>
<td>Sheath O.D. (in.)</td>
<td>Cold End Term.</td>
<td>Fittings</td>
<td>0</td>
<td>Sheath Const.</td>
<td>Sheath Length “L” (in.)</td>
<td>Sheath Length “L” (frac. in.)</td>
<td>Element</td>
<td>Initial Element Accuracy</td>
<td>00</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G = 0.125</td>
<td>H = 0.188</td>
<td>J = 0.250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: 0.125 dia. supplied with 28 gauge wire, 0.188 and 0.250 dia. supplied with 24 gauge wire.


Cold End Termination

A = Standard plug
C = Standard plug with mating connector
Note: Standard plugs and jacks 400°F (200°C).

Fittings

If required, enter the order code from pages 76 to 77. If none enter “0”.

Sheath Construction

A = 316/316L SS

Sheath O.D. (in.)

Sheath O.D. (in.)

Sheath Const.

Sheath Const.

Element

Element

Initial Element Accuracy @ 0°C

Initial Element Accuracy @ 0°C

2-Wire 3-Wire

2-Wire 3-Wire

100Ω single A B
1000Ω single J K

A = DIN Class A (±0.06%)
B = DIN Class B (±0.12%)
# Resistance Temperature Sensors

## RTDs

### Metal Transitions

**Style RF**

## Features and Benefits

- **Stainless steel transitions filled with 500°F (260°C) epoxy**
  - Protects sensor from moisture
  - Encapsulates connection between wire and cable

- **Coiled spring strain relief**
  - Protects lead wire against sharp bends in the transition area

- **Flexible mineral insulated construction**
  - Provides a bendable and highly durable sensor

- **Temperature rating**
  - -328 to 1200°F (-200 to 650°C)

- **High accuracy**
  - Ensures dependable readings

- **Diameters available**
  - 0.125 to 0.250 inch O.D.

## Ordering Information

### Part Number

- **RF**
- **Sheath O.D. (in.)**
  - G = 0.125
  - H = 0.188
  - J = 0.250

- **Lead Wire Const.**
  - Fiber glass stranded: A
  - PFA stranded: B

- **Fittings**

- **Lead Wire Termination**
  - A* = Standard male plug
  - B* = Standard female jack
  - C* = Standard plug with mating connector
  - J* = Male miniature plug
  - K* = Female miniature jack
  - L* = Male/female mini set
  - T = Standard leads
  - U = Leads with spade lugs

### Sheath Construction

- **K** = 316/316L SS mineral insulated

### Sheath Length “L” (fractional in.)

- 0 = No fraction, whole inches
- 4 = 1/2 in.

### Element

- **Initial Element Accuracy @ 0°C**
  - A = DIN Class A (+0.06%)
  - B = DIN Class B (+0.12%)

### Lead Wire Length (ft)

- **Initial Element Accuracy @ 0°C**
  - Whole feet: 01 to 99

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*Requires two-or three-wire, single element only.*
**Resistance Temperature Sensors**

**RTDs**

*Connection Head/Optional Transmitter*

**Style RR**

---

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Sheath O.D. (in.)</th>
<th>Con. Head</th>
<th>Mtg. Fittings</th>
<th>Sheath Const.</th>
<th>Sheath Length “L” (in.)</th>
<th>Sheath Length “L” (fract. in.)</th>
<th>Element</th>
<th>Initial Element Accuracy</th>
<th>Tag Style</th>
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</thead>
<tbody>
<tr>
<td>RR</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
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<td></td>
<td></td>
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<td>0.125</td>
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<tr>
<td>H</td>
<td>0.188</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>0.250</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** 0.125 dia. supplied with 28 gauge wire. 0.188 and 0.250 dia. supplied with 24 gauge wire.

**Connection Head**

- **C** = Polypropylene
- **D** = Cast iron
- **E** = Cast aluminum
- **H** = Explosion proof
- **U** = E head with 5750 transmitter
- **V** = C head with 5750 transmitter
- **W** = H head with 5750 transmitter

* For units with transmitter, the order must specify a range and degree F or C, as well as a temperature span.

**Head Mounting Fittings**

- **O** = Single threaded, 303 SS
- **F** = Double threaded, 303 SS ½ in. NPT
- **H** = Spring loaded, double threaded, 316 SS ½ in. NPT

* Available in 0.250 inch diameter only.

**Sheath Construction**

- **-58 to 500°F (-50 to 260°C)**
  - Standard industrial (0.125 - 0.250 in. O.D.)
  - Mineral insulated (0.125 - 0.250 in. O.D.)

- **-328 to 1200°F (-200 to 650°C)**
  - 316 SS

**Element**

- 2-Wire
- 3-Wire
- 4-Wire

- **1000 single**
  - A = DIN Class A (±0.06%)
  - B = DIN Class B (±0.12%)

- **1000 dual**, **
  - D = DIN Class A (±0.06%)
  - E = DIN Class B (±0.12%)

- **10000 single**, **
  - J = DIN Class A (±0.06%)
  - K = DIN Class B (±0.12%)

* Available in 0.250 inch diameter only.
** Available with standard industrial construction only.

**Initial Element Accuracy @ 0°C**

- **A** = Polymeric
- **1** = 300 SERIES SST

---

### Features and Benefits

**Connection heads**

- Provides superior dust and moisture resistance.

**Weatherproof plastic heads**

- Resists weak acids, organic solvents, alkalies, sunlight and dust.

**Complete assembly available**

- Head-mounted 4-20mA transmitter, three- or four-wire input and non-isolated.
**Resistance Temperature Sensors**

**RTDs**

*For Use With Thermowells*

**Style RT**

**Type 1**

6 inch N-U-N Typical (2 each ½ x 3 inch steel pipe nipples and 1 each malleable union)

**Type 3**

½ x 3 inch long steel pipe nipple typical

**Type 4**

¾ in. (19 mm) NPT

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### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Sheath O.D. (in.)</th>
<th>Conn. Head</th>
<th>Cold End Config.</th>
<th>Sheath Const.</th>
<th>Sheath Length “L” (in.)</th>
<th>Element</th>
<th>Initial Element Accuracy</th>
<th>Spring-Loading</th>
<th>Tag Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>J = 0.250</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Supplied with 24 gauge wire.

#### Connection Head

- **C** = Polypropylene
- **D** = Cast iron
- **E** = Cast aluminum
- **H** = Explosion proof
- **U** = E head with 5750 transmitter
- **V** = C head with 5750 transmitter
- **W** = H head with 5750 transmitter
- **Y** = Yes
- **N** = No

#### Cold End Configuration

1 = Type 1
2 = Type 2
3 = Type 3
4 = Type 4

#### Sheath Construction

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>Sheath O.D. (in.)</th>
<th>Sheath Length “L” (in.)</th>
<th>Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>-58 to 500°F (-50 to 260°C)</td>
<td>0.250</td>
<td>A</td>
<td>2-Wire (A)</td>
</tr>
<tr>
<td>-328 to 1200°F (-200 to 650°C)</td>
<td>0.250</td>
<td>B</td>
<td>3-Wire (B)</td>
</tr>
</tbody>
</table>

**Initial Element Accuracy @ 0°C**

<table>
<thead>
<tr>
<th>Element</th>
<th>100Ω single</th>
<th>100Ω dual*</th>
<th>1000Ω single*</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td></td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>K</td>
<td></td>
</tr>
</tbody>
</table>

**Spring-Loading**

- **Y** = Yes
- **N** = No

**Tag Style**

- **0** = Polymeric
- **1** = 300 SERIES SST

### Features and Benefits

**High quality thermowells and pipe wells**
- Protects sensor

**Mineral insulated construction**
- Available in 0.125 to 0.250 inch O.D.
- Available with spring-loading
- Ensures positive contact

**Complete assembly available**
- Head-mounted 4-20mA transmitter, three- or four-wire input and non-isolated

**Variety of connection head options**
- Meets your application requirements

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*When ordering a complete assembly with thermowell, specify “AR” as required and reference pages 103 to 107 for “U” dimension; otherwise, specify the “L” dimension in whole inches.

*Note*, maximum sheath length is 36 inches for sheath construction A.

*When ordering a complete assembly with thermowell, specify “AR” as required and reference pages 103 to 107 for “U” dimension; otherwise, specify the “L” dimension in whole inches.

*Note*, maximum sheath length is 36 inches for sheath construction A.
Resistance Temperature Sensors

RTDs
For Use With Thermowells
Style RW

Ordering Information

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<tr>
<td>RW</td>
<td>G</td>
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<td>0</td>
<td>000</td>
<td>0</td>
<td>A</td>
<td>0</td>
<td>0</td>
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</table>

3 Sheath O.D. (in.)
G = 0.125

4 Leadwire Construction
A = 900°F (500°C) Fiberglass stranded
B = 400°F (200°C) Teflon stranded

6 Leadwire Termination
A = Standard male plug
B = Standard female plug
C = Standard plug with mating connector
T = Standard leads
U = Leads with spade lugs

7 Stud Size - Hole Diameter (inch)
A = No. 6 - 0.144
B = No. 8 - 0.169
C = No. 10 - 0.196
D = 1/4 - 0.266
E = 1/8 - 0.390

11 Element
2-Wire 3-Wire
A 100Ω single
B

12 Temperature Coefficient
DIN 0.00385
A Class A
B Class B

13 - 14 Leadwire Length “E” (foot)
Whole feet: 01-99

15 Special Requirements
If none, enter “0”. If required, contact factory.

Features and Benefits

Sensor temperature rating
- -50° to 200°C

High accuracy
- Ensures dependable readings

Washer terminals
- Brazed to a 316 SS tube, 0.125 in. diameter, 1 1/2 in. long.

Sensors placed beneath existing screws or bolts
- Permits surface temperature measurement
Resistance Temperature Sensors

RTDs

Specialty Construction Styles

Adjustable Spring Style
Part Number 10 = 6 in.
Part Number 11 = 12 in.

Adjustable Armor Style
Part Number 12

Cartridge with Flange
Part Number 25

Open Air
Part Number 50

Open Air with Flange
Part Number 55

Surface Mount
Part Number 80
Resistance Temperature Sensors

RTDs

Specialty RTDs

Specifications

- Two- or three-wire
- Resistance: 1000 Ω at 0°C
- Alpha curve: 0.00385Ω/Ω/°C
- Tolerance at 0°C: ±0.12%
- Range: -58 to 500°F (-50 to 260°C)

Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Const. Styles</th>
<th>Diameter (in.)</th>
<th>Element Type</th>
<th>Lead Type</th>
<th>Sheath Length “L” (in.)</th>
<th>Lead Wire Length “E” (ft)</th>
<th>Term.</th>
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<tbody>
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</table>

<table>
<thead>
<tr>
<th>Construction Styles</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 = 6 inch adjustable spring style</td>
</tr>
<tr>
<td>11 = 12 inch adjustable spring style</td>
</tr>
<tr>
<td>12 = Adjustable armor style</td>
</tr>
<tr>
<td>25 = Cartridge with flange</td>
</tr>
<tr>
<td>50 = Open air</td>
</tr>
<tr>
<td>55 = Open air with flange</td>
</tr>
<tr>
<td>80 = Surface mount</td>
</tr>
</tbody>
</table>

Note: See previous page for construction style drawings.

- Diameter (in.)
  - D = 0.188
  - A = Not applicable: surface mount

- Element Type
  - C = RTD 2-wire, 100Ω DIN 0.00385
  - D = RTD 3-wire, 100Ω DIN 0.00385

- Lead Type
  - L4 = Fiberglass and SS armor
  - M4 = Fiberglass
  - N4 = Fiberglass and SS overbraid
  - T2 = PFA

- Sheath Length “L” (in.)

- Lead Wire Length “E” (ft)

- Terminations
  - A = 1.5 inch stripped split leads, no terminals
  - B = No. 8 spade terminals
  - H = 0.25 in. female quick connect terminals

Note: 1.5 required for VAT construction: No. 10, 11, 12)
Resistance Temperature Sensors

Thermistors

Watlow thermistors are designed to ensure fast, accurate and repeatable temperature measurement. Thermistors are highly sensitive to small changes in temperature and maintain accurate temperatures over a limited range. These sensors are made with either epoxy-coated or glass-coated constructions and can be used in the most demanding environmental conditions.

Performance Capabilities

- Epoxy thermistors are suitable for use from -75 to 302°F (-60 to 150°C). Glass-coated thermistors are available for use from -75 to 500°F (-60 to 260°C). Please contact the factory for availability. Thermistors have an accuracy of ±1% at 77°F (25°C).

Features and Benefits

- Designed to maintain accuracy over the life of the sensor
  - Improved process control
- High resistance
  - Large signal change compared to RTDs minimizing the impact of lead wire resistance errors
- Interchangeable
  - Maintains good system repeatability
- Small mass and internal heat transfer paste
  - Quick time response
- Point sensitive
  - Able to sense temperature in a very specific location

Typical Applications

- Heating, ventilation and air conditioning (HVAC)
  - Air conditioning
  - Refrigeration and freezer temperature control
- Food preparation
  - Deep fryers
  - Food storage systems
- Medical
  - Blood analysis and dialysis equipment
  - Infant incubators
- Industrial electronics
  - Fluid temperature measurement
  - Liquid level indicators
Resistance Temperature Sensors

Thermistors

Bends

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<thead>
<tr>
<th></th>
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<tbody>
<tr>
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<tr>
<td>0.188</td>
<td>3/8</td>
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</tr>
<tr>
<td>0.250</td>
<td>1/2</td>
<td>2</td>
<td>2</td>
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</table>

Lead Terminations

<table>
<thead>
<tr>
<th>Termination</th>
<th>Code</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
<td>Standard Male Plug</td>
<td>A</td>
<td>—</td>
</tr>
<tr>
<td>Standard Female Jack</td>
<td>B</td>
<td>—</td>
</tr>
<tr>
<td>Standard Male Plug with Mating Connector</td>
<td>C</td>
<td>—</td>
</tr>
<tr>
<td>Miniature Male Plug</td>
<td>J</td>
<td>—</td>
</tr>
<tr>
<td>Miniature Female Jack</td>
<td>K</td>
<td>—</td>
</tr>
<tr>
<td>Miniature Male Plug with Mating Connector</td>
<td>K</td>
<td>—</td>
</tr>
<tr>
<td>Split Leads</td>
<td>T</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>#8 Spade Lugs</td>
<td>U</td>
<td>1 1/2&quot;</td>
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</tbody>
</table>

* When style contains jacketed wire.
# Resistance Temperature Sensors

## Thermistors

### Fitting Options

#### Fixed Fittings

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Material</th>
<th>Sheath Size in.</th>
<th>NPT Thread Size in.</th>
<th>Hex Size in.</th>
<th>Length in.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Single Thread 1/8 NPT</td>
<td>303 SS</td>
<td>0.063 to 0.250</td>
<td>1/8</td>
<td>7/16</td>
<td>11/16</td>
<td>A</td>
</tr>
<tr>
<td>Fixed Single Thread 1/4 NPT</td>
<td>303 SS</td>
<td>0.125 to 0.250</td>
<td>1/4</td>
<td>9/16</td>
<td>7/8</td>
<td>B</td>
</tr>
<tr>
<td>Fixed Single Thread 1/2 NPT</td>
<td>303 SS</td>
<td>0.125 to 0.250</td>
<td>1/2</td>
<td>7/8</td>
<td>1</td>
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<tr>
<td>Fixed Double Thread 1/2 NPT</td>
<td>303 SS</td>
<td>0.125 to 0.250</td>
<td>1/2</td>
<td>7/8</td>
<td>13/4</td>
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</table>

#### Compression Fittings

<table>
<thead>
<tr>
<th>Fitting Type</th>
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<th>Sheath Size in.</th>
<th>NPT Thread Size in.</th>
<th>Hex Size in.</th>
<th>Length in.</th>
<th>Code</th>
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</thead>
<tbody>
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<td>Non-Adjustable Compression Brass</td>
<td>Brass</td>
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<td>1/8</td>
<td>1/2</td>
<td>1</td>
<td>J</td>
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<tr>
<td></td>
<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>1 1/8</td>
<td>J</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/8</td>
<td>1/2</td>
<td>1 3/16</td>
<td>J</td>
</tr>
<tr>
<td>Non-Adjustable Compression SS</td>
<td>303 SS</td>
<td>0.063</td>
<td>1/8</td>
<td>1/2</td>
<td>1 1/4</td>
<td>L</td>
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<td></td>
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<td>0.125</td>
<td>1/8</td>
<td>1/2</td>
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<td>L</td>
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<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>1 3/16</td>
<td>L</td>
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<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/8</td>
<td>1/2</td>
<td>1 3/16</td>
<td>L</td>
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<tr>
<td>Adjustable Compression TFE Gland</td>
<td>303 SS</td>
<td>0.063</td>
<td>1/8</td>
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<td>1/8</td>
<td>1/2</td>
<td>1 1/4</td>
<td>G</td>
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<td></td>
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<td>0.188</td>
<td>1/8</td>
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<td></td>
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<td>0.250</td>
<td>1/4</td>
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<td>2 7/16</td>
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<tr>
<td>Adjustable Compression Lava Gland</td>
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<td>1/8</td>
<td>1/2</td>
<td>1 1/4</td>
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<td></td>
<td>0.188</td>
<td>1/8</td>
<td>1/2</td>
<td>1 1/4</td>
<td>Q</td>
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<tr>
<td></td>
<td></td>
<td>0.250</td>
<td>1/4</td>
<td>7/8</td>
<td>2 7/16</td>
<td>V</td>
</tr>
</tbody>
</table>

**Compression Fittings:** Compression fittings are shipped finger-tight on the sheath allowing field installation. Once non-adjustable fittings are deformed, they cannot be relocated. Adjustable fittings come with TFE or lava sealant glands.
## Thermistors

### Fitting Options (Continued)

#### Adjustable Spring Loaded

<table>
<thead>
<tr>
<th>Fitting Type</th>
<th>Material</th>
<th>Sheath Size in.</th>
<th>NPT Thread Size in.</th>
<th>Hex Size in.</th>
<th>Length in.</th>
<th>Code</th>
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</thead>
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<tr>
<td></td>
<td>316 SS</td>
<td>0.250</td>
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<td>7/8</td>
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<td>H</td>
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#### Bayonet Lockcap and Spring

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<th>Length in.</th>
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<tbody>
<tr>
<td></td>
<td>Plated Steel</td>
<td>0.125</td>
<td>1 5/8</td>
<td>W</td>
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<tr>
<td></td>
<td>Plated Steel</td>
<td>0.188</td>
<td>1 5/8</td>
<td>W</td>
</tr>
</tbody>
</table>
Resistance Temperature Sensors

**Thermistors**

*Standard Industrial Thermistor with Insulated Leads*

**Style TB**

---

**Features and Benefits**

- **Rigid 316 stainless steel sheath**
  - Ideal for industrial applications
- **Cold end epoxy seal**
  - Rated to 260°C (500°F)
- **Internal heat transfer paste**
  - Quick time response

---

**Ordering Information**

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<tbody>
<tr>
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<td>B</td>
<td>3</td>
<td>B</td>
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<td>H = 0.188</td>
<td>J = 0.250</td>
<td>B = Standard - PFA</td>
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<tr>
<td>T = Standard leads</td>
<td>U = Leads with spade lugs</td>
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</tbody>
</table>

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**Temperature Rating and Accuracy**

- A* = -75 to 302°F (-60 to 150°C) ±1% accuracy @ 25°C
- B** = -75 to 500°F (-60 to 260°C) ±15% accuracy @ 25°C
  - * Only available with 1,000, 2,200, 3,000 or 10,000Ω
  - ** Only available with 100,000Ω

---

**Temperature Rating & Accuracy**

- A* = -75 to 302°F (-60 to 150°C) ±1% accuracy @ 25°C
- B** = -75 to 500°F (-60 to 260°C) ±15% accuracy @ 25°C
  - * Only available with 1,000, 2,200, 3,000 or 10,000Ω
  - ** Only available with 100,000Ω

---

**Lead Wire Length “E” (ft)**

- Whole feet: 01 to 99
Resistance Temperature Sensors

**Thermistors**

*Specialty Construction Styles*

**Adjustable Spring Style**
Part Number 10 = 6 in.
Part Number 11 = 12 in.

**Open Air**
Part Number 50

**Adjustable Armor Style**
Part Number 12

**Open Air with Flange**
Part Number 55

**Cartridge with Flange**
Part Number 25

**Surface Mount**
Part Number 80
**Resistance Temperature Sensors**

**Thermistors**

**Specialty Thermistors**

### Ordering Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Const. Styles</th>
<th>Diameter (in.)</th>
<th>Element Type</th>
<th>Lead Length “L” (in.)</th>
<th>Lead Wire Length “E” (ft)</th>
<th>Term.</th>
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</thead>
<tbody>
<tr>
<td>S</td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Construction Styles

- 10 = 6 inch adjustable spring style
- 11 = 12 inch adjustable spring style
- 12 = Adjustable armor style
- 25 = Cartridge with flange
- 50 = Open air
- 55 = Open air with flange
- 80 = Surface mount

**Note:** See previous page for construction style drawings.

#### Diameter (in.)

- D = 0.188
- A = Not applicable: surface mount

#### Element Type

- M = Thermistor No. 11, 1,000Ω
- N = Thermistor No. 12, 3,000Ω
- P = Thermistor No. 16, 100,000Ω

**Note:** Contact the factory for other thermistors which are available on request. See Style TB thermistor.

#### Lead Type

- L4 = Fiberglass and SS armor
- M4 = Fiberglass
- N4 = Fiberglass and SS overbraid
- T2 = PFA

#### Sheath Length “L” (in.)

- A = Not applicable
- C = 1.5 in.
- D = 2.0 in.
- E = 2.5 in.
- F = 3.0 in.
- G = 3.5 in.
- H = 4.0 in.
- J = 4.5 in.
- K = 5.0 in.
- L = 5.5 in.
- M = 6.0 in.
- N = 6.5 in.
- P = 7.0 in.
- Q = 7.5 in.
- R = 8.0 in.
- S = 8.5 in.

* 1.5 required for VAT construction: No. 10, 11, 12

#### Lead Wire Length “E” (ft)

- 012 = 1 ft
- 024 = 2 ft
- 036 = 3 ft
- 048 = 4 ft
- 060 = 5 ft
- 072 = 6 ft
- 084 = 7 ft
- 096 = 8 ft
- 108 = 9 ft
- 120 = 10 ft
- 180 = 15 ft

#### Terminations

- A = 1.5 inch stripped split leads, no terminals
- B = No. 8 spade terminals
- H = 0.25 in. female quick connect terminals

### Specifications

- Metal oxide, sintered and encapsulated
- Negative temperature coefficient
- Non-linear temperature/resistance curve
- Resistance at 77°F (25°C) and ranges:

#### Epoxy Bead Tolerance

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Resistance</th>
<th>Accuracy @ 25°C</th>
<th>Max. Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>#11</td>
<td>1K</td>
<td>±1%</td>
<td>150°C</td>
</tr>
<tr>
<td>#12</td>
<td>3K</td>
<td>±1%</td>
<td>150°C</td>
</tr>
</tbody>
</table>

#### Glass Bead Tolerance

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Resistance</th>
<th>Accuracy @ 25°C</th>
<th>Max. Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>#16</td>
<td>100K</td>
<td>±20%</td>
<td>300°C</td>
</tr>
</tbody>
</table>
Features and Benefits

Submersible and 1200psi pressure wash rated seal (not including connector area)
• Protects the sensor from washdown or other extreme moisture environments

Oil resistant materials
• Sensors maintain a long life even when exposed to oil, gasoline or diesel fuel

Vibration resistant design, 25 lb pull out force rating
• Tough, rugged design to hold up to the roughest applications

-40 to 392°F (-40 to 200°C) sensor temperature rating
• Offers superior application flexibility

Time response of two seconds
• Fast response measures 63.2 percent (first order) of the temperature change in two seconds or less

250psi threaded fitting pressure rating
• Suitable for most rugged applications
Resistance Temperature Sensors

ENVIROSEAL HD Sensors

Sensor Types:
- RTD or thermistor
- Sheath length: 0.75 to 3 inches
- Fitting: 1/4 inch NPT or 1/8 inch NPT male thread either brass or 316 stainless steel
- Lead length: up to 24 inches
- Lead wire: 18 gauge stranded with Tefzel® insulation
- Lead wire terminations: stripped leads or Deutsch 2 pin connector or similar automotive style connector