REOTEMP Multipoint Sensors strategically place multiple sensors inside one tube or sheath, providing a more complete temperature profile of the process. Multipoints are highly customizable. You can choose from a wide selection of terminals, connections, and stem styles. Depending on the size of the outer tube, you can have an almost unlimited number of sensors to capture detailed data. This allows for optimization of the process and identification of thermal gradients.

** FEATURES / BENEFITS  

- Optimize Efficiency  
- Lower Energy Costs  
- Identify Temperature Gradients and Hot Spots  
- Map or Average Temperatures Over a Large Area  
- Multiple Measurements with One Process Connection  
- Improve Safety  
- Replaceable Elements

** Common Applications  

- Reactor Vessels  
- Scrubbers  
- Chemical Silos  
- Grain Silos  
- Ducts  
- Storage Tanks  
- Exhaust Stacks  
- Beverage Processing  
- Ovens  
- Catalytic Crackers  
- Water Towers  
- Distillation Columns

** Provides a detailed view of the process**

Heat Map Example

Multi-Point Sensor vs 2 Sensors
Thermocouples

MULTIPOINT THERMOCOUPLE SENSORS

Terminal Options

Junction Box
Lead Wire
Male Plugs

Connection Options

Flanged
Threaded
Union

Stem Styles

Exposed
Protection Tube
Flexible

Additional Options

- Wide Variety of Stem Materials
- Anchor/Weight
- Transmitters (4-20mA, HART)
- Media Transfer Windows
- Free Hanging Stems
- Staggered Stems
- Replaceable Stems

Inner Guide Tubes with Heat Transfer Blocks (Cutaway for Illustration Purposes)

Cooling Fins
## Specification Worksheet

### Customer Info
- **Company Name:**
- **Phone:**
- **Email:**

### Sensor Type
- **Thermocouple:**
  - Type J Single
  - Type J Single
  - Type K Single
  - Type E Single
  - Type N Single
  - Type S Single
- **Junction:**
  - Grounded
  - Ungrounded
- **RTD:**
  - Consult Factory
  - Other (Specify in Notes)
  - 3-wire
  - 4-wire
  - 100Ω
  - 1000Ω
- **Std Temp (-328/400°F),**
  - Ext. Temp (-328/1112°F)**

### # of Temperature Sensors
- **Total Length of stem (in inches):**
- **Location of each sensor (from tip up):**
  - Evenly distributed:
  - Custom location (Describe distance from tip for each sensor):

### Pipe
- **Nominal Pipe Size:**
- **OD:**
- **Schedule:**

### Ambient Temperature Range:
### Maximum Process Temperature:
### Process Material/Conditions/Pressure:
### Accuracy required:
- **Electrical Connection: Transmitter, Terminal block, plug/jack,**
  - Transmitter:
    - 4-20mA
    - HART
    - Profibus
  - **Plug/Jack:**
    - Std. Male Plug
    - Std. Female Jack
    - Mini Male Plug
    - Mini Female Jack
  - **Other:**
    - Stripped Leads

### Enclosure Type:
- **Std. NEMA4X/IP65 Aluminum**
- **Explosion Proof (consult factory)**

### Enclosure Electrical Connection:
- **Blank Case**
- **3/4" Female Conduit Connection**
- **Cable Gland**
- **Other:**
## MULTIPLE THERMOCOUPLE SENSORS

### Process Connection (Threaded or Flanged)

<table>
<thead>
<tr>
<th>Flanged:</th>
<th>1&quot;</th>
<th>150# RF</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5&quot;</td>
<td>300# RF</td>
</tr>
<tr>
<td></td>
<td>2&quot;</td>
<td>600# RF</td>
</tr>
</tbody>
</table>

| Threaded: | 1/2"NPT | Male |
|           | 3/4" NPT | Female |
|           | 1" NPT | Union |
|           | 2" NPT | Other |

### Stem Style:

- Rigid
- Exposed
- Flexible

### Options:

- Heat Transfer Blocks
- Cooling Fins
- Anchor Weight: lbs
- Media Transfer Windows
- Replaceable Stems
- PMI (Positive Material Identification)
- Helium Leak Test
- Tag - Stainless Steel

### Additional Notes:

If you have a preliminary drawing or sketch, please include it with this form. Reotemp can provide a representative drawing of the assembly for your approval, upon request.
## THERMOCOUPLE & RTD ACCURACIES

<table>
<thead>
<tr>
<th>Type K</th>
<th>Type J</th>
<th>Type T</th>
<th>Type E</th>
<th>Type N</th>
<th>Type S</th>
<th>Type R</th>
<th>Type B</th>
<th>RTD Class B</th>
<th>RTD Class A</th>
</tr>
</thead>
<tbody>
<tr>
<td>-328°F</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>± 2.34°F</td>
<td>± 2.34°F</td>
</tr>
<tr>
<td>-148°F</td>
<td>± 3.96°F</td>
<td>± 3.96°F</td>
<td>± 1.8°F</td>
<td>± 3.96°F</td>
<td>± 3.96°F</td>
<td>± 2.7°F</td>
<td>± 2.7°F</td>
<td>± 1.44°F</td>
<td>± 1.44°F</td>
</tr>
<tr>
<td>32°F</td>
<td>± 3.96°F</td>
<td>± 3.96°F</td>
<td>± 1.8°F</td>
<td>± 3.96°F</td>
<td>± 3.96°F</td>
<td>± 2.7°F</td>
<td>± 2.7°F</td>
<td>± 0.54°F</td>
<td>± 0.27°F</td>
</tr>
<tr>
<td>392°F</td>
<td>± 3.96°F</td>
<td>± 3.96°F</td>
<td>± 1.8°F</td>
<td>± 3.96°F</td>
<td>± 3.96°F</td>
<td>± 2.7°F</td>
<td>± 2.7°F</td>
<td>± 2.34°F</td>
<td>± 0.99°F</td>
</tr>
<tr>
<td>752°F</td>
<td>± 5.4°F</td>
<td>± 5.4°F</td>
<td>± 3.6°F</td>
<td>± 5.4°F</td>
<td>± 5.4°F</td>
<td>± 2.7°F</td>
<td>± 2.7°F</td>
<td>± 4.14°F</td>
<td>± 4.14°F</td>
</tr>
<tr>
<td>1112°F</td>
<td>± 8.1°F</td>
<td>± 8.1°F</td>
<td>± 5.4°F</td>
<td>± 8.1°F</td>
<td>± 8.1°F</td>
<td>± 2.7°F</td>
<td>± 2.7°F</td>
<td>± 5.94°F</td>
<td>± 5.94°F</td>
</tr>
<tr>
<td>1472°F</td>
<td>± 10.8°F</td>
<td>–</td>
<td>± 7.2°F</td>
<td>± 10.8°F</td>
<td>± 3.6°F</td>
<td>± 3.6°F</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>1832°F</td>
<td>± 13.5°F</td>
<td>–</td>
<td>–</td>
<td>± 13.5°F</td>
<td>± 4.5°F</td>
<td>± 4.5°F</td>
<td>± 9°F</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2192°F</td>
<td>± 16.2°F</td>
<td>–</td>
<td>–</td>
<td>± 16.2°F</td>
<td>± 5.4°F</td>
<td>± 5.4°F</td>
<td>± 10.8°F</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2552°F</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>± 6.3°F</td>
<td>± 6.3°F</td>
<td>± 12.6°F</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2912°F</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>± 14.4°F</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Note: The accuracies in the above table are estimates given at fixed points, they do not apply to temperature ranges and are intended only as examples to give a general idea of what can be expected. Consult Reotemp if a specific accuracy is required or to confirm accuracies at any points not listed in the above table.

*Thermocouples are normally supplied to meet the tolerances specified in the table for temperatures above 32°F. The same materials, however, may not fall within the tolerances for temperatures below 32°F. If materials are required to meet the tolerances stated for temperatures below 32°F, contact Reotemp sales.

---

**Looking for better accuracy?**

Reotemp offers RTDs up to 5x more accurate than Class B RTDs with the Hi-Accuracy™ option.

**Thermocouples** up to 2x more accurate with the Special Limits of Error option.
**Thermocouples**

**REFERENCE INFORMATION**

**THERMOCOUPLE TEMPERATURE OPERATING RANGES**

<table>
<thead>
<tr>
<th>Type</th>
<th>Minimum Temp. °F</th>
<th>Maximum Temp. °F</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>-328</td>
<td>2300</td>
</tr>
<tr>
<td>J</td>
<td>32</td>
<td>1400</td>
</tr>
<tr>
<td>T</td>
<td>-328</td>
<td>700</td>
</tr>
<tr>
<td>E</td>
<td>-328</td>
<td>1600</td>
</tr>
<tr>
<td>N</td>
<td>32</td>
<td>2300</td>
</tr>
<tr>
<td>S</td>
<td>32</td>
<td>2700</td>
</tr>
<tr>
<td>R</td>
<td>32</td>
<td>2700</td>
</tr>
<tr>
<td>B</td>
<td>1600</td>
<td>3100</td>
</tr>
</tbody>
</table>

**THERMOCOUPLE TYPICAL RESPONSE TIMES**

63.2% Temperature Change in an Agitated Water Bath

<table>
<thead>
<tr>
<th>Probe Sheath Diameter (in.)</th>
<th>Time (Seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.062 G</td>
<td>1</td>
</tr>
<tr>
<td>0.062 U</td>
<td>2</td>
</tr>
<tr>
<td>0.125 G</td>
<td>3</td>
</tr>
<tr>
<td>0.125 U</td>
<td>4</td>
</tr>
<tr>
<td>0.187 G</td>
<td>5</td>
</tr>
<tr>
<td>0.187 U</td>
<td>6</td>
</tr>
<tr>
<td>0.250 G</td>
<td>7</td>
</tr>
<tr>
<td>0.250 U</td>
<td>8</td>
</tr>
<tr>
<td>0.375 G</td>
<td>9</td>
</tr>
<tr>
<td>0.375 U</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

G = Grounded
U = Ungrounded

**TEMP. LIMITS OF WIRE JACKETS**

<table>
<thead>
<tr>
<th>Jacket</th>
<th>Temp. Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC</td>
<td>221°F</td>
</tr>
<tr>
<td>Teflon</td>
<td>400°F</td>
</tr>
<tr>
<td>Fiberglass</td>
<td>900°F</td>
</tr>
</tbody>
</table>