MI Cable Thermocouple Assemblies

Temperature Sensing

Thermocouples with Transmitter and Connection Head

Design Features
- 4-20mA Programmable Linear Output Transmitter
- Available with Spring-Loaded Sheath
- For field programming of the temperature transmitter see Part Number EMT90006 on page 12-45
- Transmitter Accuracy of +/-0.2% of temperature span
- 1/2" NPT Process Connection

Transmitter Ambient Temperature Range:
-40° to +185°F (-40° to +85°C)
Refer to page 12-44 for complete details.

Ordering Information
Thermocouples are offered with the options listed in the worksheet below. Create an ordering code by filling in the boxes with the appropriate number and/or letter designation for your requirements, and a part number will be assigned.

Ordering Code:

<table>
<thead>
<tr>
<th>Calibration Code</th>
<th>Insulation</th>
<th>Sheath Material</th>
<th>Sheath O.D.</th>
<th>Sheath Length “L”</th>
<th>Transmitter Type</th>
<th>Junction Type</th>
<th>Connection Head</th>
<th>Spring-Loaded Probe</th>
<th>Special Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>box 1</td>
<td>box 2</td>
<td>box 3</td>
<td>box 4</td>
<td>box 5</td>
<td>box 8</td>
<td>box 7</td>
<td>box 9</td>
<td>box 10</td>
<td>box 11</td>
</tr>
<tr>
<td>ANSI Standard Tolerances</td>
<td>M = 96% min. MgO (Standard)</td>
<td>A = Alloy 600 C = 316 SS</td>
<td>F = .125&quot; H = .250&quot;</td>
<td>Whole inches 01 to 99</td>
<td>Temperature low range</td>
<td>Grounded G</td>
<td>S = Stainless Steel</td>
<td>Y = Spring-Loaded</td>
<td>X = Specify</td>
</tr>
<tr>
<td>Special Tolerances</td>
<td>H = 99.4% min. MgO</td>
<td>B = 304 SS</td>
<td>G = .188&quot;</td>
<td>For lengths over 99 in. consult TEMPCO.</td>
<td>Temperature high range</td>
<td>Ungrounded U</td>
<td>L = Aluminum Head with LCD Indicator (EMT10001)</td>
<td>0 = Not Required</td>
<td>0 = None</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unit °F °C</td>
<td>Exposed E</td>
<td>(FDA Approved)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Conduit connection for A, H & S is 1/2", for B is 3/8" NPT, for P is 3/4" NPT. For overall dimensions see pages 14-98 through 14-100.

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

(800) 323-6859 • Email: sales@tempco.com

Rev 2 (2-20)
MI Cable Thermocouple Assemblies

Mineral Insulated Metal-Sheathed Cable

Thermocouple Assemblies are made from TEMPCO’s high quality Tempco-Pak and will incorporate all the same outstanding features.

Important Features:

* Accurate
* High Temperature Rating
* Fast Response
* Moisture Proof
* Thermal Shock Resistant
* Can Be Formed
* Weldable
* High Pressure Rated
* Compact
* Durable

Typical Applications

Bearings
* Diesel Engines
* Food Processing
* Furnaces
* Glass Manufacturing
* Heat Treating
* Kilns
* Metal Processing
* Oil Processing
* Ovens
* Petrochemicals
* Power Stations
* Refineries
* Research Laboratories
* Steam Generators
* Turbines

Exposed Junction (E)

Thermocouple wires are butt-welded. Insulation is sealed against liquid or gas penetration prior to use. This junction style provides the fastest possible response time but leaves the thermocouple wires unprotected against corrosive or mechanical damage.

Grounded Junction (G)

The sheath and thermocouple wires are welded together, forming a completely sealed integral junction. Recommended in presence of liquids, moisture, gas or high pressure. The wire is protected from corrosive or erosive conditions. In the Grounded Junction, response time approaches that of the Exposed Junction.

Ungrounded Junction (U)

Thermocouple junction is fully insulated from welded sheath end. Excellent for applications where stray emf’s would affect the reading and for frequent or rapid temperature cycling. With the Ungrounded Junction, response time is slightly longer than for the Grounded Junction.

View Product Inventory @ www.tempco.com
Temperature Sensing
MI Cable Thermocouple Assemblies

Selecting the Correct Tempco-Pak Thermocouple Assembly

Thermocouples must be selected to meet the conditions of each particular application. The environment, operating temperature and atmosphere, response time and length of service must be considered when selecting the sheath, insulation, calibration, junction and termination of the thermocouple assembly.

Sheath Materials
The most commonly used sheath materials and their maximum continuous operating temperatures in an oxidizing atmosphere are as follows:

<table>
<thead>
<tr>
<th>Sheath Material</th>
<th>Max. Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alloy 600</td>
<td>2150°F (1177°C)</td>
</tr>
<tr>
<td>304 Stainless Steel</td>
<td>1650°F (899°C)</td>
</tr>
<tr>
<td>316 Stainless Steel</td>
<td>1650°F (899°C)</td>
</tr>
<tr>
<td>310 Stainless Steel</td>
<td>2100°F (1150°C)</td>
</tr>
</tbody>
</table>

*Note:* For temperatures exceeding 2200°F (1204°C), Noble or Refractory metal sheaths are normally used.

Weldability
The thermocouple sheath can be brazed, soldered or welded. Welding the thermocouple sheath in the field is not recommended on diameters less than .093 in. All welding should be done in an inert atmosphere.

Assembly Tolerances:
Sheath Length Dimensions

<table>
<thead>
<tr>
<th>Sheath O.D.</th>
<th>“L” Tolerance Up to 24”</th>
<th>“L” Tolerance Over 24”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to .038”</td>
<td>±1/2”</td>
<td>±1%</td>
</tr>
<tr>
<td>.038” to .065”</td>
<td>±5/8”</td>
<td>±1 1/2%</td>
</tr>
<tr>
<td>Larger than .065”</td>
<td>±3/4”</td>
<td>±1%</td>
</tr>
</tbody>
</table>

Flexible Lead Dimensions

<table>
<thead>
<tr>
<th>Lead Length (ft.)</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 5</td>
<td>+6”, −1”</td>
</tr>
<tr>
<td>5 to 10</td>
<td>+6”, −2”</td>
</tr>
<tr>
<td>over 10</td>
<td>+5%, −2%</td>
</tr>
</tbody>
</table>