MI Cable Thermocouple Assemblies

**Style MTA9 Handheld Probe**

**Design Features**
- Coil cord lengths are available only in 1 ft. (5 ft. extended) and 2 ft. (10 ft. extended).
- Coil cord construction is good to 221°F (105°C).
- Fiberglass lead construction is good to 900°F (482°C).
- Teflon® insulated lead construction is good to 392°F (200°C).

**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:**

```
MTA9  1  2  3  4  5  6  7  8  9  10  11  12  13  14
```

- **Calibration Code** BOX 1
  - ANSI Standard Tolerances
    - J = 0.5% K = 0.25% E = 0.2% T = 0.1% N = 0.05%
  - Special Tolerances
    - 3 = ±0.2% 4 = ±0.1% 5 = ±0.05% 6 = ±0.025% 7 = ±0.012%

- **Sheath Length “L”** BOX 6
  - Whole inches 01 to 99
  - For lengths over 99 in. consult TEMPCO.

- **Sheath Length “L”** BOX 7
  - Fractional inches
    - 0 = 0” 3 = 3/8” 6 = 3/4”
    - 1 = 1/8” 4 = 1/2” 7 = 7/8”
    - 2 = 1/4” 5 = 5/8”

- **Junction** BOX 8
  - Single Grounded Ungrounded Exposed
    - G = 0 U = 1 E = 2
  - Dual, common
    - 4 = 3 5 = 4 6 = 5
  - Dual, isolated
    - 7 = 6 8 = 7

- **Tip** BOX 9
  - R = Round Tip
  - D = Drill Point
  - F = Flat Tip
  - O = Exposed Junction

- **Lead Wire Length** BOX 10
  - In inches 012 to 999
  - For Coil Cords Enter 060 or 120

- **Lead Wire Construction** BOX 11
  - Overbraid Flex Armor
    - C = Coilet Cord
    - S = Fiberglass
    - B = Teflon®
    - D = Overbraid Flex Armor
  - Note: Coil cord insulation is PVC/Polyurethane with a temperature rating of 221°F (105°C).

- **Lead Wire Termination** BOX 12
  - P = Standard Male Plug
  - J = Standard Female Jack
  - K = Std. Plug with Mating Jack
  - D = Mini Male Plug
  - E = Mini Female Jack
  - F = Mini Plug with Mating Jack
  - B = Std.— 2-1/2” Split Leads
  - S = Leads with Spade Lugs
  - C = 2-1/2” Split with BX connector and Spade Lugs

- **Handle Type** BOX 13
  - 1 = Stainless Steel
  - 2 = Teflon® 500°F (260°C)
  - 3 = Bakelite 400°F (204°C)

- **Special Requirements** BOX 14
  - X = Specify
  - 0 = None

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

View Product Inventory @ www.tempco.com
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

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

View Product Inventory @ www.tempco.com
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.

**Calibrations**

The table shows the standard temperature ranges for the various ANSI thermocouple calibrations:

| ANSI Letter | Thermocouple Type       | Temperature Range °F | °C |
|-------------|-------------------------|-----------------------|
| J           | Iron-Constantan         | 32-1400               | (0-760) |
| K           | CHROMEL P®-ALUMEL®      | 32-2300               | (0-1260) |
| N           | Nicrosil-Nisil          | 32-2300               | (0-1260) |
| T           | Copper-Constantan       | 32-660                | (0-350)  |
| E           | CHROMEL P®-Constantan   | 32-1600               | (0-871)  |
| R           | Pt 13% Rhodium-Platinum| 32-2700               | (0-1482) |
| S           | Pt 10% Rhodium-Platinum| 32-2700               | (0-1482) |
| B           | Pt 30% Rh-Pt 6% Rh     | 1600-3100             | (871-1704) |

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 0.038”</td>
<td>±1/2”</td>
<td>±2%</td>
</tr>
<tr>
<td>0.038” to 0.065”</td>
<td>±3/8”</td>
<td>±11/2%</td>
</tr>
<tr>
<td>Larger than 0.065”</td>
<td>±1/4”</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>

Refer to the Mineral Insulated Thermocouples and Cable section regarding sheath, insulation and calibration (pages 14-114 through 14-118).

**TEMPCO’s engineering staff will be happy to assist you with the design and selection of your thermocouple requirements.**

**Formability**

Because Tempco-Pak is fully annealed it can normally be formed around a mandrel 4 times the sheath diameter. Consult TEMPCO if special forming is required.

**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.