In 2010, the only US Standard regarding the strength of thermowells had its first significant revision in 35 years. New geometries, new requirements, new capabilities and more than 40 new pages of math and physics calculations to boot in the ASME PTC 19.3-TW (2010). Now, in 2016 that standard has been further updated in ASME PTC 19.3TW-2016.

Your objective? To ensure your thermowell designs meet the standard.

Your tool? **SwiftyCalc**. Now free from JMS Southeast, Inc. to registered users.

The JMS SwiftyCalc software quickly provides you with a thermowell design based upon your material requirements and process variables meeting the ASME PTC 19.3TW standard. Save your results to your own account and return later to modify on the fly. JMS SwiftyCalc also provides you with instant theoretical maximums for insertion length. SwiftyCalc is perfect for faster response time and increased reliability in your temperature measurement system. Push a button and generate fully developed data sheets.

Need to develop a quick budget for your temperature application project? Push a button and get pricing from a friendly and knowledgeable JMS sales engineer.

To sign up for SwiftyCalc, register at www.jms-se.com/SwiftyCalc or call 1.800.873.1835
<table>
<thead>
<tr>
<th>Miniature and Industrial Thermocouples</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics Sensors</td>
<td>2</td>
</tr>
<tr>
<td>Resistance Temperature Devices (RTDs)</td>
<td>3</td>
</tr>
<tr>
<td>Sanitary Sensors, Sanitary Thermowells and Specialty Sensors</td>
<td>4</td>
</tr>
<tr>
<td>Thermowells, Protection Tubes, and Coatings</td>
<td>5</td>
</tr>
<tr>
<td>Accessories</td>
<td>6</td>
</tr>
<tr>
<td>Thermocouple and RTD Wire</td>
<td>7</td>
</tr>
<tr>
<td>Transmitters</td>
<td>8</td>
</tr>
</tbody>
</table>

Swifty Sensor

Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
MINIATURE AND INDUSTRIAL THERMOCOUPLES

#1 DESCRIPTION [6, 7]
1 Thermocouple

#2 TYPE [8, 9, 10]
J, T, K, E, N, X (Other, specify)

LIMITS OF ERROR/ELEMENT CONSTRUCTION

<table>
<thead>
<tr>
<th>#3</th>
<th>DESCRIPTION</th>
<th>LIMITS OF ERROR/ELEMENT CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard</td>
<td>Single</td>
</tr>
<tr>
<td>2</td>
<td>Standard</td>
<td>Dual</td>
</tr>
<tr>
<td>3</td>
<td>Special</td>
<td>Single</td>
</tr>
<tr>
<td>4</td>
<td>Special</td>
<td>Dual</td>
</tr>
</tbody>
</table>

WELD PAD DESIGN

#6 (L, M)

OUTSIDE DIAMETER [11]

<table>
<thead>
<tr>
<th>#4</th>
<th>OD Single/Dual</th>
<th>OD Single/Dual</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>1/2” 10 12</td>
<td>R 6mm 16 18</td>
</tr>
<tr>
<td>A</td>
<td>3/8” 13 16</td>
<td>C 3/16” 19 20</td>
</tr>
<tr>
<td>Y</td>
<td>5/16” 14 16</td>
<td>D 1/8” 22 24</td>
</tr>
<tr>
<td>B</td>
<td>1/4” 16 18</td>
<td>E 1/16” 28 30</td>
</tr>
</tbody>
</table>

REDUCED TIP DESIGN 

#6 (P, Y)

MEASURING JUNCTION [12, 13, 14, 15]

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Stainless steel</td>
<td>1650</td>
<td>C</td>
</tr>
<tr>
<td>J</td>
<td>Stainless steel</td>
<td>2100</td>
<td>S</td>
</tr>
<tr>
<td>V</td>
<td>STABALOY</td>
<td>2220</td>
<td>C</td>
</tr>
<tr>
<td>K</td>
<td>Stainless steel</td>
<td>1650</td>
<td>P</td>
</tr>
<tr>
<td>M</td>
<td>Inconel 600</td>
<td>2100</td>
<td>X</td>
</tr>
</tbody>
</table>

Note: For hollow tube sensors or sensors requiring a factory bend, see pages 2-1 and 2-2.

Note: For options N, NF, O, & OF Fasttrax (aka removable weld pad) designs, refer to 4-15.

Note: Provide description when selecting these options.

#8 STANDARD INDUSTRIAL ATTACHING DEVICE [1-3, 6-13]

<table>
<thead>
<tr>
<th>#8</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A No Attaching device</td>
</tr>
</tbody>
</table>

Note: High nickel proprietary spring material is rated to 1000°F (for 1/4" O sensors)

Note: For double threaded use a 2 suffix along with your selection: Example: H2

Note: For options N, NF, O, & OF Fasttrax designs, refer to 4-15.

Note: Spring Loaded design

Note: L is the overall length of the sensor to the transition, wire, plug, head, or fixed attaching device. L excludes non-fixed attaching devices.
# MINIATURE AND INDUSTRIAL THERMOCOUPLES

## Options

### #9 PROCESS NPT [3]

<table>
<thead>
<tr>
<th>L</th>
<th>M</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot;</td>
<td>1/4&quot;</td>
<td>1/2&quot; (Standard) with symbols W, S, C, &amp; N from selection #8</td>
</tr>
</tbody>
</table>

### #10 LEAD WIRE TYPE & LENGTH IN INCHES [SEE SECTION 7]

<table>
<thead>
<tr>
<th>Z</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>No lead wires</td>
<td>Bare wire</td>
<td>PVC coil cord - 4&quot; standard length (relaxed)</td>
</tr>
<tr>
<td>Fiber glass braid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teflon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hi-temp fiberglass braid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kapton</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### #11 ARMOR OR HEAT SHRINK [7-7] [16]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/16&quot; ID SS flex armor</td>
<td>3/16&quot; ID SS flex armor Teflon coated white</td>
<td>3/16&quot; ID SS flex armor Teflon coated black</td>
<td>1/8&quot; ID SS flex armor</td>
<td>SS overbraid</td>
<td>Heat shrink/sleeving</td>
<td>Jacket to match primary insulation</td>
<td></td>
</tr>
</tbody>
</table>

### #12 TYPE OF TRANSITION [16]

<table>
<thead>
<tr>
<th>H</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat shrink</td>
<td>Size on size</td>
</tr>
</tbody>
</table>

### #13 COLD END TERMINATION (Visit our online catalog for additional terminations, www.JMS-SE.com/ends)

#### Connectors

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>F</th>
<th>WM</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>WF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniature plug</td>
<td>Standard plug</td>
<td>High temperature plug (&lt; 800˚F)</td>
<td>Microphone style plug (6DA)</td>
<td>Miniature jack</td>
<td>Standard jack</td>
<td>High temperature jack (&lt; 800˚F)</td>
<td>Microphone style jack (6DA)</td>
</tr>
</tbody>
</table>

#### Transmitters

<table>
<thead>
<tr>
<th>8H</th>
<th>8N</th>
<th>8I</th>
<th>8E</th>
<th>8D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated transmitter</td>
<td>Non-isolated transmitter</td>
<td>Hart Protocol</td>
<td>Intrinsically safe</td>
<td>Hart/Intrinsically safe</td>
</tr>
</tbody>
</table>

**Note:** L is the length of the sensor to the fixed attaching device.

**Note:** Add span range after transmitter selection. Example: 8H(0-200°C).

**Note:** Transmitter output = 4-20mA. (See section 8 for other options).

### #14 OPTIONS

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>5L</th>
<th>5M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel tag</td>
<td>Plastic tag</td>
<td>Paper tag</td>
<td>Laser etch on probe</td>
<td>Calibrate at specified point(s)</td>
<td>Standard lot calibration</td>
<td>Material calibration report</td>
</tr>
</tbody>
</table>

**Note:** Add an S prefix to your selection to designate stranded wire. Example: S312= 12" stranded Teflon lead wire. 24 AWG or smaller may be used to accommodate some smaller diameters and flex armor extensions.

**Note:** Bell Springs are used for most wire extensions at transition. A special armor adapter is used when flex armor is longer than 60".

**Note:** For high humidity/moisture environments (< 500˚F), put a 2 after your selection. For example, R2.

**Note:** For high temperatures at the transition area (500°F - 1200°F), put a 3 after your selection. For example, T3.

**Note:** Solid 20 AWG

**Note:** Add span range after transmitter selection. Example: 8H(0-200°C).

**Note:** Transmitter output = 4-20mA. (See section 8 for other options).

**Note:** Add span range after transmitter selection. Example: 8H(0-200°C).

**Note:** Transmitter output = 4-20mA. (See section 8 for other options).

**Note:** Add span range after transmitter selection. Example: 8H(0-200°C).

**Note:** Transmitter output = 4-20mA. (See section 8 for other options).

**Note:** Add span range after transmitter selection. Example: 8H(0-200°C).

### COMPLETE PART NUMBER EXAMPLES

- with nipple-union-spring-loaded extension assembly: 1J1BH12”SUN6H1JPZZZL1
- without extension assembly: 1J1BH12”SPZZZL1

**Note:** AMS 2750D and AMS 2750E compliant

**Must specify increments & range (Example: 0 to 300˚F, 10° increments)

**Premium calibration report. Corrections data will be provided for temperatures within the range.

**Premium lot calibration report. Corrections data will be provided for temperatures within the range.

**CE marking [page XV]

**Guide 17025 calibration

**Bar code

**MTR

**#10 LEAD WIRE TYPE & LENGTH IN INCHES [SEE SECTION 7]

**#11 ARMOR OR HEAT SHRINK [7-7] [16]

**#12 TYPE OF TRANSITION [16]

**#13 COLD END TERMINATION (Visit our online catalog for additional terminations, www.JMS-SE.com/ends)

**#14 OPTIONS

**COMPLETE PART NUMBER EXAMPLES

**with nipple-union-spring-loaded extension assembly: 1J1BH12”SUN6H1JPZZZL1

**without extension assembly: 1J1BH12”SPZZZL1

**1-2
CUSTOM NIPPLE/UNION EXTENSION CONFIGURATOR

An extension assembly provides extra length extending the sensor head past insulation and away from heat. Standard unions are 1/2" FNPT on both ends. The union joins two nipples in an extension assembly and has a standard pressure rating of 150 PSIG.

When a nipple-union-nipple assembly is selected and spring-loading of the thermocouple element is required, there are two different methods of spring-loading the sensor. JMS’s standard, recommended method is to use the machined 1/2" x 1/2" NPT spring-loaded stainless steel fitting as one of the nipples. With this design, the probe is secured within the fitting and mounted to the head in a rigid manner instead of spring-loading against a terminal block, as is the case with a standard nipple-union-nipple. Due to stress exerted by spring, selection #8, option N “nipple” should never be used with an in-head transmitter. Any of the other options within option #8 are compatible with in-head transmitters.

Notes:
- The standard JMS spring designed specifically for a 1/4” OD sensor is made of high nickel proprietary spring wire which allows users to successfully maintain 1/2” of spring-loading even up to 1000°F.
- Spring-loaded extension assemblies should not be used with ceramic protection tubes.

<table>
<thead>
<tr>
<th>#8</th>
<th>COLD SIDE STANDARD INDUSTRIAL ATTACHING DEVICE [1-3, 6-13]</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>G</td>
<td>Single thread (process)</td>
</tr>
<tr>
<td>W</td>
<td>Double threaded</td>
</tr>
<tr>
<td>H2</td>
<td>SS w/ SS ferrule</td>
</tr>
<tr>
<td>I2</td>
<td>SS w/ Teflon ferrule</td>
</tr>
<tr>
<td>J2</td>
<td>SS w/ Lava ferrule</td>
</tr>
<tr>
<td>K2</td>
<td>SS w/ Nylon ferrule</td>
</tr>
<tr>
<td>L2</td>
<td>Brass w/ Brass ferrule</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8.1 UNION</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
</tr>
<tr>
<td>O</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8.2 PROCESS FITTING (MALE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8.3 N LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>** Specify (inches)**</td>
</tr>
<tr>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8.4 UNION and/or NIPPLE MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
</tr>
<tr>
<td>K</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8.5 UNION PRESSURE RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

Note: High nickel proprietary spring material is rated to 1000°F. (For 1/4” OD sensors)

Notes:
- The standard JMS spring designed specifically for a 1/4” OD sensor is made of high nickel proprietary spring wire which allows users to successfully maintain 1/2” of spring-loading even up to 1000°F.
- Spring-loaded extension assemblies should not be used with ceramic protection tubes.

Continue on to the “PROCESS NPT” selection to finish creating your sensor part number. Selection #9 on page 1-2 (thermocouples) and 3-2 (RTDs).
BEADED THERMOCOUPLES

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1B</td>
<td>Beaded thermocouple</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>JUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Welded bead only</td>
</tr>
<tr>
<td>T</td>
<td>Twisted and welded bead</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>INSULATOR TYPE AND LENGTH (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 inch - Round</td>
</tr>
<tr>
<td>D</td>
<td>3 inch - Round</td>
</tr>
<tr>
<td>F</td>
<td>One piece construction - Round</td>
</tr>
<tr>
<td>G</td>
<td>1 inch - Oval</td>
</tr>
<tr>
<td>H</td>
<td>3 inch - Oval</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

Base metal 8-14 AWG leads are bent to fit JMS terminal block 6G with 3" leads. [Add'l options see Pg. 1-7]

**Oval Insulators will be used for any bent, beaded thermocouple.**

<table>
<thead>
<tr>
<th>#4</th>
<th>COLD END INSULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fiberglass sleeve (Standard)</td>
</tr>
<tr>
<td>2</td>
<td>Heat shrink</td>
</tr>
<tr>
<td>3</td>
<td>Mullite fish spine beads</td>
</tr>
<tr>
<td>Z</td>
<td>Bare ends</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

Base metal 15-30 AWG leads are straight

---

**Noble metal thermocouples are normally 24 gauge wires.**

To specify ceramic or metal protection tubes for beaded thermocouple assemblies, see the Thermowell and protection tube pages in section 5 of this catalog.

---

<table>
<thead>
<tr>
<th>#5</th>
<th>INSULATOR MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Alumina (Standard for Noble metals)</td>
</tr>
<tr>
<td>M</td>
<td>Mullite (Standard for Base metals)</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>#6</th>
<th>WIRE GAUGE</th>
<th>O.D. OF 1&quot; OR 3&quot; OVAL INSULATORS</th>
<th>O.D. OF 1&quot; OR 3&quot; ROUND INSULATORS</th>
<th>O.D. OF 1 PIECE ROUND INSULATORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>8 (Standard oval)</td>
<td>5/16&quot; x 7/16&quot;</td>
<td>7/16&quot;</td>
<td>7/16&quot;</td>
</tr>
<tr>
<td>14</td>
<td>14 (Standard oval)</td>
<td>3/16&quot; x 1/4&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>26</td>
<td>3/16&quot;</td>
<td>3/16&quot;</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>30</td>
<td>1/8&quot;</td>
<td>1/8&quot;</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
<td>Single Oval</td>
<td>Single Round</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Add °C for common junction. See illustrations below. (Example: CD24, CD26)

---

**Noble metal**

| D8  | 8 | 1/2" | 1/2" |
| D14 | 14 | 1/4" | 1/4" |
| D20 | 20 | 3/16" | 3/16" |
| D24 | 24 | 3/16" | 3/16" |
| D26 | 26 | 3/16" | 3/16" |
| D30 | 30 | 1/8" | 1/8" |
| DX  | Other, specify | Dual Round | Dual Round |

(Oval not available in dual element)

---

<table>
<thead>
<tr>
<th>#7</th>
<th>TYPE</th>
</tr>
</thead>
</table>

---

<table>
<thead>
<tr>
<th>#8</th>
<th>LEAD LENGTH IN INCHES</th>
</tr>
</thead>
</table>

Specify length of TC leads in inches. (See drawings)

**Note:** Standard length is 2" for Noble metal, 3" Base metal

---

<table>
<thead>
<tr>
<th>#9</th>
<th>OPTIONS</th>
<th>Use only if applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stainless steel tag</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Plastic tag</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Paper tag</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Calibrate at specified point(s). Corrections data provided for each point.</td>
<td></td>
</tr>
<tr>
<td>5L</td>
<td>Standard lot calibration</td>
<td></td>
</tr>
<tr>
<td>5M</td>
<td>Material calibration report.</td>
<td></td>
</tr>
<tr>
<td>6**</td>
<td>Premium lot calibration report. Corrections data will be provided for temperatures within the range.</td>
<td></td>
</tr>
<tr>
<td>6L*</td>
<td>Premium lot calibration report. Corrections data will be provided for temperatures within the range.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>CE marking [page XV]</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Guide 17025 calibration</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bar code</td>
<td></td>
</tr>
</tbody>
</table>

* AMS 2750D and AMS 2750E compliant

** Must specify increments & range

(Example: 0 to 300°F, 10° increments)
### WIRE THERMOCOUPLE

**BARE ENDS**

**LENGTH** (ft)

### GASKET THERMOCOUPLE

**BOLT Ø (#5)**

**STD PLUG & CABLE CLAMP**

**LENGTH** (ft)

### SHIM THERMOCOUPLE

**GROUNDED JUNCTION (SPOT WELDED TO CLAMP)**

**STD PLUG & CABLE CLAMP**

**LENGTH** (ft)

### RING TERMINAL THERMOCOUPLE

**BOLT Ø (#5)**

**GROUNDED JUNCTION CRIMP**

### SPADE LUG THERMOCOUPLE

**BOLT Ø (#5)**

**GROUNDED JUNCTION CRIMP**

### WIRE, GASKET, AND LUG THERMOCOUPLES

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1D</td>
<td>Wire gasket and lug thermocouples - Grounded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>STYLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Wire thermocouple</td>
</tr>
<tr>
<td>H</td>
<td>Gasket thermocouple</td>
</tr>
<tr>
<td>L</td>
<td>Ring terminal thermocouple</td>
</tr>
<tr>
<td>M</td>
<td>Spade lug thermocouple</td>
</tr>
<tr>
<td>S</td>
<td>Shim thermocouple</td>
</tr>
<tr>
<td>M*</td>
<td>Hose clamp thermocouple</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>TYPE</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>GASKET MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper (Standard)</td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td></td>
</tr>
<tr>
<td>Other, specify</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>BOLT DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>C</td>
<td>Other, specify</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>WIRE INSULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fiberglass braid</td>
</tr>
<tr>
<td>3</td>
<td>FEP Teflon</td>
</tr>
<tr>
<td>4</td>
<td>Hi-temp fiberglass braid</td>
</tr>
<tr>
<td>5</td>
<td>Kapton</td>
</tr>
<tr>
<td>8</td>
<td>Fiberglass braid/stainless steel overbraid</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#7</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length in inches</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8</th>
<th>COLD END TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare ends</td>
</tr>
<tr>
<td>B</td>
<td>Miniature plug</td>
</tr>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

### HOSE CLAMP DIMENSIONAL CHART

<table>
<thead>
<tr>
<th>STANDARD PIPE SIZE (in)</th>
<th>HOSE CLAMP ID (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 to 3/8</td>
<td>7/16</td>
</tr>
<tr>
<td>1/2 to 3/4</td>
<td>11/16</td>
</tr>
<tr>
<td>1 to 1-1/2</td>
<td>1-1/4</td>
</tr>
<tr>
<td>2 to 2-1/2</td>
<td>2</td>
</tr>
<tr>
<td>3 to 3-1/2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>4-1/4</td>
</tr>
<tr>
<td>5</td>
<td>3-9/16</td>
</tr>
<tr>
<td>6</td>
<td>5-1/8</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>X</td>
<td>Other Specify</td>
</tr>
</tbody>
</table>

* Must select option 8" from selection #6
** See hose clamp dimensional chart below to specify needed clamp size by adding the corresponding # as a suffix. Example: C2 = Hose clamp T/C to fit 1/2" - 3/4" pipe

* Standard material for ring/spade lugs is nickel-plated steel.

Note: If washer/gasket/ring dimensions are critical, use X and state requirements.

Note: For stranded wire, add an S prefix before symbol designation in this column. 24 AWG or smaller may be used to accommodate some smaller diameters.
#1 DESCRIPTION
1P Bearing sensor

#2 CASE STYLE
| A  | .188\(^\circ\) X .250\(^\circ\) L (spring-loaded) |
| B  | .275\(^\circ\) X .250\(^\circ\) L (fixed) |
| C  | .125\(^\circ\) X .300\(^\circ\) L (fixed) |
| D  | .080\(^\circ\) X .300\(^\circ\) L (fixed) |
| E  | .250\(^\circ\) X .250\(^\circ\) L (fixed) |
| F  | .188\(^\circ\) X .250\(^\circ\) L (fixed) |
| X  | Other, specify |

#3 THERMOCOUPLE TYPE
| T  | Copper/Constantan |
| K  | Chrome/Alumel |
| J  | Iron/Constantan |
| N  | Nicrosil/Nisil |
| X  | Other, specify |

#4 ELEMENT CONSTRUCTION
| S  | Single |
| D  | Dual |
| X  | Other, specify |

#5 MEASURING JUNCTION
| G  | Grounded (Standard) |
| U  | Ungrounded |
| I  | Isolated |

#6 A LENGTH
| A length (in inches) |

#7 SEALING SLEEVE/FEEDTHROUGH DIAMETER
| C  | 3/16\(^\circ\) |
| B  | 1/4\(^\circ\) |
| X  | Other, specify |
| Z  | N/A |

#8 LEAD WIRE TYPE & B LENGTH

| T  | Teflon |
| TS | Teflon with SSOB overall Max temp- 392\(^\circ\)F |
| K  | Kapton |
| KS | Kapton with SSOB overall Max temp- 500\(^\circ\)F |
| X  | Other, specify |

#9 COLD END TERMINATION

| A  | Bare ends |
| B  | Miniature plug |
| C  | Standard plug |
| X  | Other, specify |

#10 OPTIONS

1. Stainless steel tag
2. Plastic tag
3. Paper tag
4. Laser etch on sleeve/feedthrough

\[\text{Add'l options see Pg. 1-7}\]

Note: See pages 6-9 for ordering information.

Note: See pages 6-9 for compression fitting ordering information.
# ADDITIONAL TERMINATIONS

## Plugs

<table>
<thead>
<tr>
<th>Connector</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Miniature plug (6A1B)</td>
<td></td>
</tr>
<tr>
<td>BH</td>
<td>Miniature high temperature plug (6A2B) &lt;800°F</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Standard plug (6A1C)</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>Standard high temperature plug (6A2C) &lt;800°F</td>
<td></td>
</tr>
<tr>
<td>WM</td>
<td>Microphone style plug (6DA)</td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>Solid pin plug, heavy duty (6A3C)</td>
<td></td>
</tr>
<tr>
<td>WE</td>
<td>Ultra high temperature plug, glazed (6A5C) &lt;1200°F</td>
<td></td>
</tr>
<tr>
<td>WH</td>
<td>Ultra high temperature plug, unglazed (6A7C) &lt;1200°F</td>
<td></td>
</tr>
<tr>
<td>WJ</td>
<td>Low noise plug (6A6C) &lt;425°F</td>
<td></td>
</tr>
<tr>
<td>WL</td>
<td>DIN-IEC microphone plug (6DB)</td>
<td></td>
</tr>
</tbody>
</table>

## Jacks

<table>
<thead>
<tr>
<th>Connector</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Miniature jack (6A1D)</td>
<td></td>
</tr>
<tr>
<td>DH</td>
<td>Miniature high temperature jack (6A2D) &lt;800°F</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Standard jack (6A1E)</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Standard high temperature jack (6A2E) &lt;800°F</td>
<td></td>
</tr>
<tr>
<td>WF</td>
<td>Microphone style jack (6DA)</td>
<td></td>
</tr>
<tr>
<td>WB</td>
<td>Solid pin jack, heavy duty (6A3E)</td>
<td></td>
</tr>
<tr>
<td>WD</td>
<td>Jab in jack (6A4E)</td>
<td></td>
</tr>
<tr>
<td>WG</td>
<td>Ultra high temperature jack, glazed (6A5E) &lt;1200°F</td>
<td></td>
</tr>
<tr>
<td>WI</td>
<td>Ultra high temperature jack, unglazed (6A7E) &lt;1200°F</td>
<td></td>
</tr>
<tr>
<td>WK</td>
<td>Low noise jack (6A6E) &lt;425°F</td>
<td></td>
</tr>
<tr>
<td>WN</td>
<td>DIN-IEC microphone style jack (6DB)</td>
<td></td>
</tr>
<tr>
<td>VF</td>
<td>Molded/hermetic jack (6DC)</td>
<td></td>
</tr>
<tr>
<td>YF</td>
<td>M12 Female connector (6DY)</td>
<td></td>
</tr>
</tbody>
</table>

## Heads

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Aluminum, NEMA 4X, FM, CSA, IP66 (6IA/6B4)</td>
</tr>
<tr>
<td>J</td>
<td>316 stainless steel, NEMA 4X, FM, CSA, IP66 (6ISS/6B4)</td>
</tr>
<tr>
<td>P</td>
<td>Aluminum, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6IAIEC/6B4)</td>
</tr>
<tr>
<td>U</td>
<td>Cast Iron, NEMA 3, 4, UL, CSA (6I/6PT)</td>
</tr>
<tr>
<td>GA</td>
<td>Aluminum, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP66 (688A1)</td>
</tr>
<tr>
<td>GS</td>
<td>316SS, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP66 (688S1)</td>
</tr>
</tbody>
</table>

## Expansion Proof

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIAIEC</td>
<td>Aluminum, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP66 (6IAIEC/6B4)</td>
</tr>
<tr>
<td>ISSATEX</td>
<td>316 stainless steel, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6ISSATEX/6B4)</td>
</tr>
</tbody>
</table>

## General Purpose

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Aluminum w/ hinged cover (6L/6B4)</td>
</tr>
<tr>
<td>M</td>
<td>Aluminum w/ screw cover &amp; chain (6M/6B4)</td>
</tr>
<tr>
<td>R</td>
<td>Aluminum w/ hinged dome cover (6R/6B4)</td>
</tr>
<tr>
<td>N</td>
<td>Cast Iron w/ screw cover (6N/6B4)</td>
</tr>
<tr>
<td>Q</td>
<td>Black Noryl plastic (6Q/6B4)</td>
</tr>
<tr>
<td>SS</td>
<td>316 stainless steel w/ screw cover &amp; chain (6SS/6B4)</td>
</tr>
<tr>
<td>WP</td>
<td>White plastic, screw cover, Sanitary (6WP, 6B4)</td>
</tr>
<tr>
<td>SB</td>
<td>Nickel plated, cylinder style, 1/4&quot; NPT (6S250)</td>
</tr>
<tr>
<td>SD</td>
<td>Nickel plated, cylinder style, 1/8&quot; NPT (6S125)</td>
</tr>
<tr>
<td>SC</td>
<td>Stainless steel, socket cap style</td>
</tr>
<tr>
<td>ST</td>
<td>Molded plastic, mini head, 1/4&quot; NPT, &lt; 350°F (6T)</td>
</tr>
<tr>
<td>SU</td>
<td>Molded plastic, mini head, 1/4&quot; NPT, &lt; 800°F (6U)</td>
</tr>
</tbody>
</table>

## Transmitters

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8H</td>
<td>Isolated transmitter</td>
</tr>
<tr>
<td>8N</td>
<td>Non-isolated transmitter</td>
</tr>
<tr>
<td>8I</td>
<td>Hart Protocol</td>
</tr>
<tr>
<td>8E</td>
<td>Intrinsically safe</td>
</tr>
<tr>
<td>8D</td>
<td>Hart/Intrinsically safe</td>
</tr>
<tr>
<td>8M</td>
<td>Integral transmitter (see page 3-5) RTDs ONLY</td>
</tr>
</tbody>
</table>

## Other

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare ends</td>
</tr>
<tr>
<td>K</td>
<td>Spade lugs (6SL)</td>
</tr>
<tr>
<td>RL</td>
<td>Ring lugs (6RL)</td>
</tr>
<tr>
<td>OA</td>
<td>Open Bakelite terminal block, Nickel plated screw terminal (6BB)</td>
</tr>
<tr>
<td>OB</td>
<td>Open ceramic terminal block for sensors with bayonet style connection, Brass screw terminal (6B or 6C/6MDM)</td>
</tr>
<tr>
<td>OG</td>
<td>Ceramic terminal block, Brass screw terminal (6G)</td>
</tr>
<tr>
<td>OP</td>
<td>Pluggable Polyamide terminal block, Nickel plated screw terminal (6P)</td>
</tr>
<tr>
<td>OS</td>
<td>Open ceramic terminal block, Nickel plated solder terminal (6C)</td>
</tr>
<tr>
<td>CG</td>
<td>Cord connector/grip, Aluminum 1/2&quot; NPT (6CC)</td>
</tr>
<tr>
<td>PS</td>
<td>Ship straight</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

### Notes:

- Add span range after transmitter selection. Example: 8H(0-200C).
- Transmitter output = 4 - 20 mA. (See section 8 for other options).

---

* L is the overall length of the sensor to the base of the head when no attaching device is selected. Page 1-1, selection #7 for T/Cs or 3-1, selection #6 for RTDs.

---

* L is the overall length of the sensor to the base of the terminal block mounting plate when open terminal block cold end termination is selected without a fixed attaching device. Page 1-1, selection #7 for T/Cs or 3-1, selection #6 for RTDs.
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniature and Industrial Thermocouples</td>
<td>1</td>
</tr>
<tr>
<td>Plastics Sensors</td>
<td>2</td>
</tr>
<tr>
<td>Resistance Temperature Devices (RTDs)</td>
<td>3</td>
</tr>
<tr>
<td>Sanitary Sensors, Sanitary Thermowells and Specialty Sensors</td>
<td>4</td>
</tr>
<tr>
<td>Thermowells, Protection Tubes, and Coatings</td>
<td>5</td>
</tr>
<tr>
<td>Accessories</td>
<td>6</td>
</tr>
<tr>
<td>Thermocouple and RTD Wire</td>
<td>7</td>
</tr>
<tr>
<td>Transmitters</td>
<td>8</td>
</tr>
</tbody>
</table>

Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
# PLASTICS SENSORS

## BAYONET TEMPERATURE SENSORS

Bayonet style thermocouples are the most common in plastics processing. JMS has adapted this useful and safe design to other industrial sensors to utilize the best features of both.

Our standard design and most commonly used is the Adjustable Bayonet attachment device developed by JMS in 1982. This design incorporates a Chrome-plated Brass cap with a stainless steel spring. The spring fits around the appropriately sized sensor and remains in position until such a time as the user adjusts it. This enables the same sensor to be used for many different applications in the same facility. It also makes for lower inventory levels which your accountant will love.

The other attachment devices we make for your sensors are standard in the industry. For those “Old Dogs” who refuse to try something innovative, we still offer the fixed bayonet design. The length of this sensor cannot be changed and will only go in the hole it was specifically built to fit.

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Plastics sensors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>DESIGN [8]</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>MgO insulated (swaged sheath)</td>
</tr>
<tr>
<td>H</td>
<td>Hollow tube</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>TYPE</th>
<th>TEMPERATURE RANGE (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan</td>
<td>32 to 1400</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
<td>32 to 2300</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
<td>-300 to 700</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
<td>-300 to 1600</td>
</tr>
<tr>
<td>3</td>
<td>100Ω Platinum RTD (.00385 alpha, 3 wire)</td>
<td>-200 to 1000</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Hollow tube sensors should never be used to measure temperatures above 900°F.

<table>
<thead>
<tr>
<th>#4</th>
<th>OUTSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3/16” (.188”)</td>
</tr>
<tr>
<td>D</td>
<td>1/8” (.125”)</td>
</tr>
<tr>
<td>B</td>
<td>1/4” (.250”)</td>
</tr>
<tr>
<td>R</td>
<td>6mm (.236”)</td>
</tr>
</tbody>
</table>

**Note:** Special limits RTDs are JMS Class A tolerance (page 3-1)

<table>
<thead>
<tr>
<th>#5</th>
<th>LIMITS OF ERROR ELEMENT CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard</td>
</tr>
<tr>
<td>2</td>
<td>Standard</td>
</tr>
<tr>
<td>3</td>
<td>Special</td>
</tr>
<tr>
<td>4</td>
<td>Special</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Straight</td>
</tr>
<tr>
<td>4</td>
<td>45° bend</td>
</tr>
<tr>
<td>9</td>
<td>90° bend</td>
</tr>
<tr>
<td>X</td>
<td>Specify angle of bend and “A” length (see illustrations above)</td>
</tr>
</tbody>
</table>

**Note:** 1/2” radius bends are standard. Other radii may be specified but they may deform the diameter of the tube at the bend.

<table>
<thead>
<tr>
<th>#7</th>
<th>MAXIMUM TEMPERATURE AT WHICH TIP WILL BE EXPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt;0°C (32°F) Cryogenic =5 Kapton*</td>
</tr>
<tr>
<td>B</td>
<td>&lt;200°C (392°F) =3 Teflon*</td>
</tr>
<tr>
<td>C</td>
<td>&lt;285°C (550°F) =5 Kapton*</td>
</tr>
<tr>
<td>D</td>
<td>&lt;482°C (900°F) =1 Fiberglass*</td>
</tr>
<tr>
<td>E</td>
<td>&lt;705°C (1300°F)</td>
</tr>
<tr>
<td>F</td>
<td>&gt;705°C (1300°F)</td>
</tr>
</tbody>
</table>

**Note:** If no transition (Z) is in symbol 13, we recommend these corresponding selections for primary wire insulation on hollow tube sensors.

<table>
<thead>
<tr>
<th>#8</th>
<th>MEASURING JUNCTION [9]</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Grounded</td>
</tr>
<tr>
<td>U</td>
<td>Ungrounded common (RTD’s are always ungrounded)</td>
</tr>
<tr>
<td>I</td>
<td>Isolated</td>
</tr>
<tr>
<td>E</td>
<td>Exposed</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#9</th>
<th>LENGTH (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length in inches</td>
</tr>
</tbody>
</table>

**Note:** See appropriate drawing on page 2-1 & 2-2 before you specify the immersion length. Use 0” for non-immersion nozzle design.

---

Note: When LENGTH (Option #9) exceeds 90°, the probe may be coiled for shipment.

[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at www.JMS-SE.com/TechnicalCatalog
### ATTACHING DEVICES
(see illustrations below)

<table>
<thead>
<tr>
<th>J</th>
<th>F</th>
<th>P*</th>
<th>N</th>
<th>M*</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjustable bayonet</td>
<td>Fixed bayonet</td>
<td>Brass compression fitting (1/8&quot; NPT)</td>
<td>Non-Immersion nozzle (1/4-28 x 3/8&quot; long, fixed thread)</td>
<td>Nozzle melt (3/8-24 x 5/16&quot; long, rotating thread)</td>
<td>N/A</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Non-fixed fittings do not affect the immersion length (#9).

### ADJUSTABLE BAYONET
(Top of cap is usually positioned 3/4" from transition at factory)

### ADJUSTABLE BAYONET TYPE
1/8" NPT adapters are used with .125" Ø and .188" Ø sensors.

<table>
<thead>
<tr>
<th>1/8&quot; NPT</th>
<th>3/8&quot; x 24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>Z</td>
</tr>
<tr>
<td>A</td>
<td>E</td>
</tr>
<tr>
<td>B</td>
<td>F</td>
</tr>
<tr>
<td>C</td>
<td>G</td>
</tr>
<tr>
<td>D</td>
<td>J</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

No adapter required if the overall length is 7/8" or less. K 1/4" NPT X 1 1/4" long for 1/4" bayonet. For more adapter options, see page 2-5.

### LEAD WIRE TYPE & LENGTH IN INCHES

<table>
<thead>
<tr>
<th>Z</th>
<th>1</th>
<th>3</th>
<th>5</th>
<th>7</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiberglass braid</td>
<td>FEP Teflon</td>
<td>Kapton</td>
<td>Fiberglass braid/flex armor overall</td>
<td>Teflon/flex armor overall</td>
<td>Fiberglass braid/stainless steel overbraid</td>
</tr>
<tr>
<td>Note: 20 AWG solid wire is standard for thermocouples and 24 AWG stranded wire is standard for RTDs.</td>
<td>Note: 24 AWG wire or smaller may be used if necessary.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other, specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TYPE OF TRANSITION [1-16]

<table>
<thead>
<tr>
<th>H</th>
<th>S</th>
<th>T</th>
<th>R</th>
<th>X</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat shrink</td>
<td>Size on size</td>
<td>3/8&quot; OD (Standard)</td>
<td>1/4&quot; OD</td>
<td>Other, specify</td>
<td></td>
</tr>
<tr>
<td>Note: For high humidity/moisture environments (≤500˚ F), put a 2 after your selection.</td>
<td>Note: For high temperature at the transition area (&gt;500˚ F), put a 3 after your selection. (May not comply with ASTM Insulation Resistance (IR) test)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: When Z (no transition) is specified for a hollow tube sensor, the extension lead is crimped to the tube.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### COLD END TERMINATION [Add'l options see Pg 1-7] CHOOSE AS MANY AS APPLICABLE

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>F</th>
<th>WM</th>
<th>V</th>
<th>D</th>
<th>E</th>
<th>G</th>
<th>WF</th>
</tr>
</thead>
</table>

### EXPLOSION PROOF ADJUSTABLE BAYONET

- Example part number: 2MKD1SDG12"MZ6(60")TC

### NON-IMMERSION NOZZLE

- Example part number: 2MKZ1SDU0"NZ1(60")2C

---

Note:
- More adapter options on page 2-5.
- 24 AWG wire or smaller may be used if necessary.
- Explosion proof Aluminum, NEMA 4X, FM, CSA, IP66 (6A/6B4)
- Aluminum w/ hinged cover (6L/6B4)
- Aluminum w/ screw cover & chain (6M/6B4)
- Cast iron w/ screw cover (6N/6B4)
- Black Noryl plastic (6O/6B4)
- Aluminum high dome, hinged cover (6R/6B4)
- Bare ends
- Spade lugs (6SL)
- Open terminal block (6B4)
- Other, specify

---

See page 1-2 #14 for ordering selections.
PLASTIC MELT EXTRUSION SENSORS

**PLASTIC MELT EXTRUSION ADJUSTABLE SENSORS**

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
<th>#2</th>
<th>SENSOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Adjustable plastic melt sensor</td>
<td>J</td>
<td>Iron/Constantan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>100Ω Platinum RTD .00385 alpha (3 wire) Class B</td>
</tr>
</tbody>
</table>

**#3 BOLT LENGTH**

<table>
<thead>
<tr>
<th>3</th>
<th>3&quot; Bolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5&quot; Bolt</td>
</tr>
<tr>
<td>7</td>
<td>7&quot; Bolt</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**#4 IMMERSION RANGE**

<table>
<thead>
<tr>
<th>A</th>
<th>1/8&quot; - 1&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>1/8&quot; - 2 1/2&quot;</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**#5 MEASURING JUNCTION**

<table>
<thead>
<tr>
<th>Grounded (Standard)</th>
<th>Ungrounded (RTD's always ungrounded)</th>
<th>Exposed (Recommended for profiling)</th>
<th>Isolated Other, specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>U</td>
<td>E</td>
<td>I</td>
</tr>
</tbody>
</table>

**#6 MAX SERVICE TEMPERATURE**

<table>
<thead>
<tr>
<th>P</th>
<th>&lt;500°F (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>500°F - 900°F</td>
</tr>
</tbody>
</table>

**#7 TAGGING/CALIBRATION OPTIONS**

See page 1-2 #14 for ordering selections.

---

**PLASTIC MELT EXTRUSION SENSORS**

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
<th>#2</th>
<th>SENSOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2P</td>
<td>Plastic melt sensors</td>
<td></td>
<td>Standard/Single</td>
</tr>
</tbody>
</table>

**#3 SENSOR TYPE**

<table>
<thead>
<tr>
<th>1-1</th>
<th>(Hollow tube design)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan</td>
</tr>
<tr>
<td>A</td>
<td>100Ω Platinum RTD .00385 alpha (3 wire) (Standard)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**#4 LIMITS OF ERROR/ELEMENT CONSTRUCTION**

<table>
<thead>
<tr>
<th>1</th>
<th>Standard/Single</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Standard/Dual</td>
</tr>
<tr>
<td>3</td>
<td>Special/Single</td>
</tr>
</tbody>
</table>

**#6 IMMERSION**

<table>
<thead>
<tr>
<th>A</th>
<th>Flush 1/2&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**#7 MEASURING JUNCTION**

<table>
<thead>
<tr>
<th>G</th>
<th>Grounded</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>Ungrounded (RTD's always ungrounded)</td>
</tr>
<tr>
<td>E</td>
<td>Exposed</td>
</tr>
<tr>
<td>I</td>
<td>Isolated</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**#8 MAXIMUM SERVICE TEMPERATURE**

<table>
<thead>
<tr>
<th>P</th>
<th>&lt;500°F (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>500°F - 900°F</td>
</tr>
</tbody>
</table>

**#9 TAGGING/CALIBRATION OPTIONS**

See page 1-2 #14 for ordering selections.
# FLEX ARMOR ADJUSTABLE DEPTH SENSORS

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2K</td>
<td>Flexible armor adjustable depth sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>SENSOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan (Standard)</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
</tr>
<tr>
<td>3</td>
<td>100Ω Platinum RTD .00385 alpha (3 wire) Class B</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>DIMENSIONS OF FLEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.125&quot; ID X .210&quot; OD (Standard)</td>
</tr>
<tr>
<td>2</td>
<td>.188&quot; ID X .270&quot; OD</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>TUBE LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>Length in inches</td>
</tr>
<tr>
<td>X</td>
<td>Flush - no tube (Standard)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>JUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Grounded (Standard)</td>
</tr>
<tr>
<td>U</td>
<td>Ungrounded (RTDs are always ungrounded)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>LEAD WIRE LENGTH (Standard Insulation Fiberglass)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Length in inches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#7</th>
<th>COLD END TERMINATION [Add'l options see Pg 1-7]</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>E</td>
<td>Standard jack</td>
</tr>
<tr>
<td>K</td>
<td>Spade lugs</td>
</tr>
<tr>
<td>l</td>
<td>Explosion proof head, 1/2&quot; x 3/4&quot; connection with fitting</td>
</tr>
<tr>
<td>R</td>
<td>High dome, general purpose head w/ hinged cover, 1/2&quot; x 1/2&quot; fitting</td>
</tr>
<tr>
<td>T</td>
<td>Junction box connector</td>
</tr>
<tr>
<td>X</td>
<td>Bare ends (Standard)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

* Symbols I & R are not usually used in plastics manufacturing. These options are designed to provide a spring-loaded industrial sensor that can be used through elbows and around corners. Also an excellent solution when spring-loading is needed for a protection tube or thermowell that has become warped or bent.

<table>
<thead>
<tr>
<th>#8</th>
<th>TAGGING AND CALIBRATION OPTIONS (Use only if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>See page 1-2 #14 for ordering selections.</td>
</tr>
</tbody>
</table>

---

# SPRING ADJUSTABLE DEPTH SENSORS

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2Q</td>
<td>Spring adjustable depth bayonet sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>SENSOR TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan (Standard)</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
</tr>
<tr>
<td>3</td>
<td>100Ω Platinum RTD .00385 alpha (3 wire) Class B</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>LEAD WIRE LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Length in inches</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>JUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Grounded (Standard)</td>
</tr>
<tr>
<td>U</td>
<td>Ungrounded common (RTDs are always ungrounded)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>COLD END TERMINATION [Add'l options see Pg 1-7]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare ends (Standard)</td>
</tr>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>E</td>
<td>Standard jack</td>
</tr>
<tr>
<td>K</td>
<td>Spade lugs (compensated)</td>
</tr>
<tr>
<td>T</td>
<td>Junction box connector</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

* Symbols I & R are not usually used in plastics manufacturing. These options are designed to provide a spring-loaded industrial sensor that can be used through elbows and around corners. Also an excellent solution when spring-loading is needed for a protection tube or thermowell that has become warped or bent.

<table>
<thead>
<tr>
<th>#6</th>
<th>TAGGING AND CALIBRATION OPTIONS (use only if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>See page 1-2 #14 for ordering selections.</td>
</tr>
</tbody>
</table>

---

Note: If bayonet adapter is needed for mounting, see page 2-5.
Bayonet thermocouples can be constructed with Magnesium Oxide sheath material or hollow tube units made with lead wires inserted in tubing. Magnesium Oxide (MgO) insulation is a dry, uncontaminated, compacted ceramic powder. MgO gives the thermocouple high insulation resistance and dielectric strength. Also, it allows excellent insulation of the positive and negative wire conductors in relation to each other and to the outer sheath. Among the outstanding features of sheath material are: (A) flexibility to bend or form to twice the radius of the sheath diameter, (B) its rigidity to maintain size and shape after bending or straightening, (C) vibration or shock has no effect on the material, (D) sheath material withstands pressures upward to 50,000 psi, and (E) sheath material may be used in applications where temperatures may range from -400° to 3000°F depending on requirements and selection of materials.

<table>
<thead>
<tr>
<th>INSULATOR</th>
<th>PURITY %</th>
<th>MELTING POINT °C</th>
<th>USABLE TEMP. °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>MgO</td>
<td>99.4% (must specify)</td>
<td>2790</td>
<td>1650</td>
</tr>
<tr>
<td>MgO</td>
<td>99.8% (must specify)</td>
<td>5050</td>
<td>3000</td>
</tr>
</tbody>
</table>

New insulation materials are being developed. Use an X and describe to specify.

The hollow-tube design is used for disposable thermocouples that can be replaced easily. Their life is about half of that of a Magnesium Oxide insulated thermocouple. The advantage of a hollow-tube design is the cost. It is the least expensive design for the short run.

### BAYONET ACCESSORIES

#### STAINLESS STEEL PIPE CLAMP ADAPTERS

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2</td>
<td>&quot;L&quot; LENGTH OF STEM IN INCHES</td>
</tr>
<tr>
<td>R</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>S</td>
<td>3-3/4&quot;</td>
</tr>
<tr>
<td>T</td>
<td>5-3/4&quot;</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A, hose clamp only</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>STANDARD PIPE SIZE (INCHES)</th>
<th>BAND CLAMP DIAMETER (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/4 to 3/8</td>
<td>7/16</td>
</tr>
<tr>
<td>2</td>
<td>1/2 to 3/4</td>
<td>11/16</td>
</tr>
<tr>
<td>3</td>
<td>1 to 1-1/2</td>
<td>1-1/16</td>
</tr>
<tr>
<td>4</td>
<td>2 to 2-1/2</td>
<td>2-1/16</td>
</tr>
<tr>
<td>5</td>
<td>3 to 3-1/2</td>
<td>3-5/16</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3-9/16</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>5-1/8</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>6-1/8</td>
</tr>
<tr>
<td>X</td>
<td>Other Specify</td>
<td></td>
</tr>
</tbody>
</table>

### NICKEL PLATED SLOT HEAD ADAPTERS

<table>
<thead>
<tr>
<th>THREAD</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8&quot; NPT</td>
<td>1/4&quot;NPT</td>
</tr>
<tr>
<td>2A</td>
<td>2E</td>
</tr>
<tr>
<td>2A1</td>
<td>—</td>
</tr>
<tr>
<td>2B</td>
<td>2F</td>
</tr>
<tr>
<td>2C</td>
<td>2G</td>
</tr>
<tr>
<td>2D</td>
<td>2J</td>
</tr>
</tbody>
</table>

**Note:** To order adapters of different lengths, use 2A + X for 1/8" NPT and 2E + X for 3/8"-24 threads. You must specify length. Standard slot head adapters are nickel plated brass. Other materials are available upon request.
<table>
<thead>
<tr>
<th>RESISTANCE TEMPERATURE DEVICES (RTDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniature and Industrial Thermocouples</td>
</tr>
<tr>
<td>Plastics Sensors</td>
</tr>
<tr>
<td>Resistance Temperature Devices (RTDs)</td>
</tr>
<tr>
<td>Sanitary Sensors, Sanitary Thermowells and Specialty Sensors</td>
</tr>
<tr>
<td>Thermowells, Protection Tubes, and Coatings</td>
</tr>
<tr>
<td>Accessories</td>
</tr>
<tr>
<td>Thermocouple and RTD Wire</td>
</tr>
<tr>
<td>Transmitters</td>
</tr>
</tbody>
</table>

Swifty Sensor

Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
**RESISTANCE TEMPERATURE DEVICES (RTDS)**

### #1 DESCRIPTION

<table>
<thead>
<tr>
<th>Element Type</th>
<th>RTD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>#2</strong></td>
<td><strong>ELEMENT TYPE [4, 9, 10, 11, 15, 18, 22, 24]</strong></td>
</tr>
<tr>
<td></td>
<td>100 Ω Platinum 0.00385 alpha (Ω/°C) unless otherwise stated</td>
</tr>
<tr>
<td><strong>Resistor Accuracy at 0°C</strong></td>
<td><strong>Thermometer Class [pg. 3-18]</strong></td>
</tr>
<tr>
<td>B</td>
<td>± 0.30°C (Competitor's Std)</td>
</tr>
<tr>
<td>E</td>
<td>± 0.15°C (Standard)</td>
</tr>
<tr>
<td>P</td>
<td>± 0.06°C</td>
</tr>
<tr>
<td>S</td>
<td>± 0.03°C (Best Accuracy)</td>
</tr>
<tr>
<td>N</td>
<td>± 0.74°C (120 Ω Nickel α = 0.00672)</td>
</tr>
<tr>
<td>M</td>
<td>± 0.30°C (1000 Ω)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify [3-22]</td>
</tr>
</tbody>
</table>

**Note:** Wound or film resistors may be used.

* For compliant results, use 4 wire RTD for high accuracy (types P & S).

### #3 ELEMENT CONSTRUCTION [4] [pg. 3-11]

| S | Single Standard construction |
| D | Dual Standard construction |
| J | Single Swaged construction |
| K | Dual Swaged construction |
| X | Other, specify |

**Note:** Use swaged for high temperature, bendability, high vibration and/or longer than 90°.

### #4 TUBE DIAMETER

**MUST CHOOSE 1**

| P | 1/2” (.500”) |
| A | 3/8” (.375”) |
| Y | 5/16” (.312”) |
| B | 1/4” (.250”) |
| R | 6mm (.236”) |
| C | 3/16” (.188”) |

**MUST CHOOSE 1**

| D | 1/8” (.125”) |
| X | Other, specify |
| Z | N/A |

### #5 TUBE MATERIAL [11, 12]

<table>
<thead>
<tr>
<th>K</th>
<th>L</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>316 stainless steel</td>
<td>316L stainless steel</td>
<td>1-000 (Use if symbol #7 &gt; 500°F)</td>
</tr>
</tbody>
</table>

### #6 LENGTH (L) (See illustrations on pages 3–1 and 3–2 for “L” dimension)

**“**

### #7 MAX. TEMPERATURE AT WHICH TIP WILL BE EXPOSED

| A | <0°C (32°F) / Cryogenic = 5 Kapton |
| B | <200°C (392°F) = 3 Teflon* |
| C | <285°C (550°F) = 5 Kapton* |
| D | <350°C (662°F) = 1 Fiberglass* |
| E | <660°C (1220°F) = 4 High temperature fiberglass* |

* For double threaded use a 2 suffix along with your selection. Example: H2

### #8 STANDARD INDUSTRIAL ATTACHING DEVICE [1-3, 6-13]

| X | Other, specify |
| Z | N/A No Attaching device |

**W**

Single thread (reversed) Double threaded

### Compression design

**D**

Single threaded (process) Double threaded w/ oil ring

**Spring-Loaded design**

**OR**

**{**

S | U | N | 6” | H | 1 **}**

**SEE PAGE 1-3**

### Note:

- L is the overall length of the sensor to the transition, wire, plug, head, or fixed attaching device. L excludes non-fixed attaching devices.
- \[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at www.JMS-SE.com/TechnicalCatalog
#9 PROCESS NPT

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>M</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>1/4&quot;</td>
<td>1/2&quot; (Standard)</td>
<td></td>
</tr>
</tbody>
</table>

#10 LEAD WIRE TYPE & LENGTH IN INCHES

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Fiberglass braid</td>
<td>Teflon (Standard)</td>
<td>High temperature fiberglass braid</td>
<td>Kapton (Standard for Cryogenic)</td>
</tr>
<tr>
<td>X</td>
<td>Z</td>
<td>Other, specify</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#11 ARMOR OR HEAT SHRINK/JACKET [7-7]

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>3/16&quot; ID SS flex armor (Standard)</td>
<td>3/16&quot; ID SS flex armor Teflon coated white</td>
<td>3/16&quot; ID SS flex armor Teflon coated black</td>
<td>1/8&quot; ID SS flex armor</td>
</tr>
<tr>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
</tr>
<tr>
<td>SS overbraid</td>
<td>Heat shrink/sleeving</td>
<td>Aluminum Mylar shielded and jacketed to match primary insulation</td>
<td>Jacket to match primary insulation</td>
</tr>
<tr>
<td>J</td>
<td>Z</td>
<td>N/A</td>
<td>X</td>
</tr>
</tbody>
</table>

#12 WIRE CONFIGURATION [17, 18]

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Y</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>2 Wire</td>
<td>3 Wire</td>
<td>4 Wire</td>
<td>Note: Use a double symbol for 2 separate multiconductor lead wires, if dual elements. For example, TT.</td>
</tr>
</tbody>
</table>

#13 TYPE OF TRANSITION [14]

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>S</td>
<td>R</td>
<td>Q</td>
</tr>
<tr>
<td>Heat shrink</td>
<td>Size on size</td>
<td>1/4&quot; OD</td>
<td>Cuttable (Std construction only) [3-12]</td>
</tr>
<tr>
<td>T</td>
<td>U</td>
<td>X</td>
<td>Z</td>
</tr>
<tr>
<td>Other, specify</td>
<td>Other, specify</td>
<td>No transition</td>
<td></td>
</tr>
</tbody>
</table>

#14 COLD END TERMINATION

(Add'l options see Pg 1-7) Choose all that apply

<table>
<thead>
<tr>
<th>Connectors</th>
<th>Heads [6-1]</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>Miniature plug</td>
<td>Standard plug</td>
<td>High temp plug (&lt; 800°F)</td>
<td>Microphone style plug</td>
</tr>
<tr>
<td>F</td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
<tr>
<td>WM</td>
<td>D</td>
<td>E</td>
<td>J</td>
</tr>
<tr>
<td>Microphone style plug</td>
<td>Miniature jack</td>
<td>Standard jack</td>
<td>Aluminum Mylar shielded and jacketed to match primary insulation</td>
</tr>
<tr>
<td>J</td>
<td>K</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Z</td>
<td>Y</td>
<td>X</td>
<td>SS</td>
</tr>
<tr>
<td>Other, specify</td>
<td>Other, specify</td>
<td>Aluminum w/ hinged cover (6L/6B4)</td>
<td>Aluminum w/ screw cover &amp; chain (6M/6B4)</td>
</tr>
<tr>
<td>N</td>
<td>O</td>
<td>P</td>
<td>Q</td>
</tr>
<tr>
<td>Q</td>
<td>N</td>
<td>O</td>
<td>P</td>
</tr>
<tr>
<td>Cast iron w/ screw cover (6N/6B4)</td>
<td>Black Noryl plastic (6Q/6B4)</td>
<td>Aluminum high dome w/hinged cover (6R/6B4)</td>
<td>Aluminum high dome w/screw cover &amp; chain (6S/6B4)</td>
</tr>
</tbody>
</table>

Transmitters

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8H</td>
<td>8N</td>
<td>8I</td>
<td>8E</td>
</tr>
<tr>
<td>Isolated transmitter</td>
<td>Non-isolated transmitter</td>
<td>Hart Protocol</td>
<td>Intrinsically safe</td>
</tr>
<tr>
<td>8D</td>
<td>8M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hart/Intrinsically safe</td>
<td>Integral transmitter (see page 3-5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Add span range after transmitter selection. Example: 8H(0-200C).

#15 OPTIONS (Use only if applicable)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Stainless steel tag</td>
<td>Plastic tag</td>
<td>Paper tag</td>
<td>Laser etch on probe</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calibrate at specified point(s).</td>
<td>Corrections data provided for each point.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Must specify increments & range (Example: 0 to 300°F, 10° increments)

COMPLETE PART NUMBER EXAMPLES

- with nipple-union-spring-loaded fitting extension assembly: 3ESBNK12"BS[UN6K1]PZZYSL1
- without extension assembly: 3ESBNK12"BSPZZYSL1
Continuous averaging resistance temperature detectors are most frequently used in air washing and air handling systems where turbulent and stratified air flow may effect the temperature measurement in a tip sensitive probe. The average temperature of the air in the duct can be measured with this type of sensor.

Any application which requires an averaging of temperature across an area would be suited for this sensor type. The operating temperature range for a continuous averaging RTD is from -148 to 382°F. Lower temperatures and temperatures up to 900°F are handled with a multipoint design (4, 8, or 16 points).

**ELEMENT TYPE** 0.00385, 100Ω @ 0°C, Class B

- E*: Continuous, -148° to 382° F (-100° to 200°C)
- P4**: Platinum 4 point, <900°F (<482°C)
- P8**: Platinum 8 point, <900°F (<482°C)
- P16**: Platinum 16 point, <900°F (<482°C)

* Only available in 1/4” diameter up to 1200” long.
** Maximum probe length is 240”

**LEAD WIRE TYPE & LENGTH IN INCHES**

- 3-36” Y

**TOTAL PROBE LENGTH**

- N/A

**STANDARD INDUSTRIAL ATTACHING DEVICE**

- X: Other, specify

**MAX TRANSITION TEMP**

- X: Other, specify

**PROCESS NPT**

- B: 1/4” (.250”)

**TUBE MATERIAL**

- K: 316 Stainless steel
- U: Copper

**TOTAL PROBE LENGTH**

- N/A

**Note:** Call JMS for information about averaging thermocouples, swamp boxes and special proprietary multipoint designs.

**Note:** When LENGTH (Option #6) exceeds 90”, the probe may be coiled for shipment.

**Note:** 9” minimum bend radius
### LOW COST AVERAGING RTDS

Low cost averaging RTDs sense the temperature of air streams in ducts and plenums. This sensor includes a junction box with gasket to prevent leakage and vibration noise.

These thermometers have a continuous element to sense true average temperature along their entire length. They provide accurate composite readings in locations where air may be stratified into hot and cold layers.

Rigid averaging sensors have a brass case. Bendable models have aluminum sheaths (Copper on special order) formable to a radius of 4". Bendable sensors can criss-cross ducts to average temperatures in two dimensions.

**Specifications:**
- Temperature range: -45.5 to 135°C (-50 to 275°F);
- Gasket: 100°C (212°F);
- Leadwire: 22AWG, Teflon insulated, 8” long;
- Sheath diameter: .188” OD.

#### #1 DESCRIPTION

<table>
<thead>
<tr>
<th>#3</th>
<th>SENSOR TYPE</th>
<th>#5</th>
<th>OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>Rigid</td>
<td>A</td>
<td>Weatherproof connection box (2.12” W X 4.0” H X 1.75” D)</td>
</tr>
<tr>
<td>57</td>
<td>Bendable</td>
<td>B</td>
<td>Sensor only, no box</td>
</tr>
</tbody>
</table>

#### #12 COLD END TERMINATION

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare ends</td>
</tr>
<tr>
<td>B</td>
<td>Miniature plug</td>
</tr>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>D</td>
<td>Miniature jack</td>
</tr>
<tr>
<td>E</td>
<td>Standard jack</td>
</tr>
<tr>
<td>F</td>
<td>High temperature plug (&lt; 800°F)</td>
</tr>
<tr>
<td>G</td>
<td>High temperature jack (&lt; 800°F)</td>
</tr>
<tr>
<td>H</td>
<td>Explosion proof head, NEMA 4X, FM, CSA, IP66 (6IA/6B4)</td>
</tr>
<tr>
<td>I</td>
<td>Spade lugs (6SL)</td>
</tr>
<tr>
<td>J</td>
<td>Aluminum head w/ hinged cover (6L/6B4)</td>
</tr>
<tr>
<td>K</td>
<td>Aluminum head w/ screw cover &amp; chain (6M/6B4)</td>
</tr>
<tr>
<td>L</td>
<td>Open terminal block (6B4)</td>
</tr>
<tr>
<td>M</td>
<td>Cast iron head w/ screw cover (6N/6B4)</td>
</tr>
<tr>
<td>N</td>
<td>Black Noryl plastic head (6Q/6B4)</td>
</tr>
<tr>
<td>O</td>
<td>Stainless steel head w/ hinged cover (6R)</td>
</tr>
<tr>
<td>P</td>
<td>High dome head (6R)</td>
</tr>
<tr>
<td>Q</td>
<td>Microphone style connector (6DA) - Male</td>
</tr>
<tr>
<td>R</td>
<td>Microphone style connector (6DA) - Female</td>
</tr>
<tr>
<td>S</td>
<td>Microphone style connector (6DA) - Female</td>
</tr>
<tr>
<td>T</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**Note:** For any other cold end termination, use appropriate part numbers from section 6 in place of symbol #12.

#### #13 TAGGING AND CALIBRATION OPTIONS

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stainless steel tag</td>
</tr>
<tr>
<td>2</td>
<td>Plastic tag</td>
</tr>
<tr>
<td>3</td>
<td>Paper tag</td>
</tr>
<tr>
<td>4</td>
<td>Laser etch on probe</td>
</tr>
<tr>
<td>5</td>
<td>Standard room temp calibration. Due to the limited size of calibration chambers and the potential sensing length of these sensors, we recommend one point at room temperature. Please contact factory for any other calibration options.</td>
</tr>
<tr>
<td>6</td>
<td>CE marking [Page XV of online technical catalog]</td>
</tr>
<tr>
<td>7</td>
<td>Bar code</td>
</tr>
<tr>
<td>8</td>
<td>MTR</td>
</tr>
</tbody>
</table>

**Note:** When INSERTION LENGTH (Option #4) exceeds 90”, the probe may be coiled for shipment.

#### #4 INSERTION LENGTH

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>Lengths for Rigid type (inches): 12”, 18”, 24”, 48”, 60”, 72”</td>
</tr>
<tr>
<td>Standard</td>
<td>Lengths for Bendable type (inches): 72”, 144”, 288”</td>
</tr>
<tr>
<td>A</td>
<td>Weatherproof connection box (2.12” W X 4.0” H X 1.75” D)</td>
</tr>
<tr>
<td>B</td>
<td>Sensor only, no box</td>
</tr>
<tr>
<td>C</td>
<td>Stainless steel tag</td>
</tr>
<tr>
<td>X</td>
<td>Other</td>
</tr>
</tbody>
</table>
RTD with 4-20 mA INTEGRAL OUTPUT (RTD in, 4-20 mA out)
INDUSTRIAL STYLE INTEGRAL TRANSMITTER (Transmitter option see page 3-2, #14, 8M)

FEATURES:
- PC programmable
- Carry a 4-20 mA to your PLC directly from the RTD with no special equipment.
- Available in fixed immersion and spring loaded for thermowells!!
- Quick-n-Clean M12 connection for easy replacement.
- NEMA 6P (IP67) rated with M12 connector.
- Ideal for most applications from -60 to 320°F.
- Ambient temperature limits -40 to 185°F.

ECONOMY HAND HELD INFRARED SENSOR

To order, use JMS part number: IR20L

OPERATING INSTRUCTIONS
This thermometer is a non-contact, infrared thermometer. Simply aim the thermometer at the target with the probe and press the measuring button to display the surface temperature. The distance to target diameter ratio (Distance:Spot) is 12:1, therefore the device should be positioned as close to the target as possible.

°C/°F:
The units of temperature indicated on the probe can be changed from °C to °F by pressing °C/°F toggle button.

BATTERY REPLACEMENT:
When an empty battery icon flashes in the LCD, this indicates that the battery is low and should be replaced. Confirm that the power is OFF, open the battery door in the handle and replace the 9 volt battery. Please remember to dispose of the batteries properly and to keep away from children.

SPECIFICATIONS
Measurement Range: -50 to 380°C (-58 to 716°F).
Operating & Storage Temperature: 0 to 50°C (32 to 122°F)
Accuracy: ±2% of reading or 2°C (4°F) (whichever is greater)
Resolution: 0.1°C/0.1°F
Response Time: ≤ 0.8 second.
Emissivity Range: 0.95 fixed.
Spectral Response: 5-14 µM
Distance to Spot Ratio: 12:1
Auto shut off feature: Yes

Only! $35.00
**SANITARY AND SPECIALTY SENSORS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miniature and Industrial Thermocouples</td>
<td>1</td>
</tr>
<tr>
<td>Plastics Sensors</td>
<td>2</td>
</tr>
<tr>
<td>Resistance Temperature Devices (RTDs)</td>
<td>3</td>
</tr>
<tr>
<td>Sanitary Sensors, Sanitary Thermowells and Specialty Sensors</td>
<td>4</td>
</tr>
<tr>
<td>Thermowells, Protection Tubes, and Coatings</td>
<td>5</td>
</tr>
<tr>
<td>Accessories</td>
<td>6</td>
</tr>
<tr>
<td>Thermocouple and RTD Wire</td>
<td>7</td>
</tr>
<tr>
<td>Transmitters</td>
<td>8</td>
</tr>
</tbody>
</table>

Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
CIP (Clean-In-Place) line of 3-A certified sanitary thermocouples and RTDs from JMS are specially designed to meet the needs of the food, dairy, beverage, pharmaceutical, chemical and cosmetic industries. They are ideally suited for a number of applications where corrosion and contamination are factors. They are fabricated from stainless steel or other 3-A approved material using a method assuring imperfection-free surfaces. All sanitary grade thermocouples are provided to special limits of error. All sanitary RTDs are available in 4 wire construction.

Units may be supplied utilizing sanitary caps from Alloy Products, Cherry-Burrell or Lapish Tri-Clover, or spring loaded fittings in sanitary thermowells. Each design is polished to a #4 finish to assure that there are no pits, folds or crevices. The exterior nipple, also stainless steel, can be joined to a connection head, designed to withstand caustic washdown. A typical RTD or Thermocouple (see pages 1-1 and 3-1) may be used with a sanitary thermowell (see page 4-5).

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4S</td>
<td>Sanitary sensors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>RTD/THERMOCOUPLE TYPE (RTD–Platinum 0.00385 alpha (Ω/°C). Resistor accuracies at 0°C below &amp; [3-1,17,18]</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>RTD Options</td>
</tr>
<tr>
<td>E</td>
<td>4 wire ± 0.3°C</td>
</tr>
<tr>
<td>P</td>
<td>4 wire ± 0.15°C</td>
</tr>
<tr>
<td>S</td>
<td>4 wire ± 0.06°C</td>
</tr>
<tr>
<td>X</td>
<td>4 wire ± 0.03°C (JMS Standard)</td>
</tr>
<tr>
<td></td>
<td>Other, specify</td>
</tr>
<tr>
<td>T</td>
<td>Thermocouple Options</td>
</tr>
<tr>
<td>K</td>
<td>Copper/Constantan</td>
</tr>
<tr>
<td>J</td>
<td>Chromel/Alumel</td>
</tr>
<tr>
<td>X</td>
<td>Iron/Constantan</td>
</tr>
<tr>
<td></td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>ELEMENT CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single</td>
</tr>
<tr>
<td>2</td>
<td>Dual</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>OUTSIDE DIAMETER (OD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3/8&quot;</td>
</tr>
<tr>
<td>B</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>C</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>D</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>E</td>
<td>1/16&quot;</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>NA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>TUBING MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>L</td>
<td>316 low carbon stainless steel (Standard)</td>
</tr>
<tr>
<td>H</td>
<td>304 stainless steel</td>
</tr>
<tr>
<td>I</td>
<td>304 low carbon stainless steel</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>MEASURING JUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Grounded</td>
</tr>
<tr>
<td>U</td>
<td>Ungrounded (Standard)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#7</th>
<th>IMMERSION LENGTH (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Length in inches</td>
</tr>
</tbody>
</table>

[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at [www.JMS-SE.com/TechnicalCatalog](http://www.JMS-SE.com/TechnicalCatalog)
### 3-A APPROVED SANITARY SENSORS

#### #8 SANITARY CAP OPTIONS [SEE BELOW]

<table>
<thead>
<tr>
<th>#</th>
<th>CAP SIZE</th>
<th>Note: Standard sanitary thermowells can be found on page 4-4 and 4-5.</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Tri-Clover (16 AMP)</td>
<td>Bevel seat (16 A) without 13-H nut</td>
</tr>
<tr>
<td>B**</td>
<td>Bevel seat (16 A) with 13-H nut</td>
<td></td>
</tr>
<tr>
<td>BH***</td>
<td>I Clamp (16AI-14I)</td>
<td>1/2&quot; x 1/2&quot; Spring-loaded fitting for assembly with sanitary thermowell.</td>
</tr>
</tbody>
</table>

#### #9 CAP SIZE

<table>
<thead>
<tr>
<th>#</th>
<th>05 1/2 or 3/4</th>
<th>15 1 or 1 1/2</th>
<th>20 2</th>
<th>25 2 1/2</th>
<th>30 3</th>
<th>40 4</th>
<th>Note: 05 Cap sizes (1/2 x 3/4) will use 1/4&quot; NPT nipple, Not available for Bevel seat or I-Clamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>PV Gasket (16APV) without 13-H nut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH</td>
<td>PV Gasket with 13-H nut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A***</td>
<td>3A4 Adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X**</td>
<td>Other, specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### #10 FINISH

<table>
<thead>
<tr>
<th>H</th>
<th>High polish #4 finish (&lt;32 Microinches (µin)) (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Electropolish after #4 finish (&lt;32 Microinches (µin))</td>
</tr>
<tr>
<td>P</td>
<td>Passivate after #4 finish (&lt;32 Microinches (µin))</td>
</tr>
<tr>
<td>F</td>
<td>Fine polish (&lt;20 Microinches (µin)) (Standard)</td>
</tr>
<tr>
<td>V</td>
<td>Ultra polish 8G finish (&lt;8 Microinches (µin))</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #11 LEAD WIRE TYPE AND LENGTH IN INCHES

<table>
<thead>
<tr>
<th>Z</th>
<th>No lead wire (Teflon will insulate the wires in the head)</th>
<th>392°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fiberglass braid</td>
<td>662°F</td>
</tr>
<tr>
<td>3</td>
<td>Teflon</td>
<td>392°F</td>
</tr>
<tr>
<td>7</td>
<td>Teflon wire with white Teflon covered flex armor</td>
<td>392°F</td>
</tr>
</tbody>
</table>

#### #12 TRANSITION TYPE

<table>
<thead>
<tr>
<th>H</th>
<th>Heat shrink</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Size on size</td>
</tr>
<tr>
<td>R</td>
<td>1/4&quot; OD</td>
</tr>
<tr>
<td>T</td>
<td>3/8&quot; OD (Standard w/out head)</td>
</tr>
<tr>
<td>N</td>
<td>Nipple (Standard w/ head)</td>
</tr>
<tr>
<td>B</td>
<td>7/16&quot; OD (Standard for high humidity)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #13 COLD END TERMINATION

| WP | White plastic head (3-A Standard)                       |
|    | Bare ends                                              |
|    | Epoxy coated explosion proof rated cast iron head w/gasket |
|    | Explosion proof proof rated aluminum head w/ chain      |
| IA | General purpose stainless steel head w/ screw cover     |

#### #14 OPTIONS—USE ONLY IF APPLICABLE [INTRODUCTION]

| 1* | Stainless steel tag                                     |
| 2* | Plastic tag                                             |
| 3* | Paper tag                                               |
| 4* | Laser etch on probe                                     |
| 5  | Calibrate at specified point(s). Corrections data will be provided for each point. |

#### NOTE:

- For detailed specifications and ratings see JMS-SE.com/headspecs
- See Triclover Size Chart on page 4-1
- For extra high humidity/moisture/washdown environments ≤ 500°F, please add a 2 suffix to your selection. Example: T3
- For high temperature at the transition area (>500°F). please add a 3 suffix to your selection. Example: T3
- Must specify information required on tag/probe
- Must specify increments & range. (Example: 0 to 300°F, 10° increments)
- When specifying X, be sure to observe requirements and restrictions as imposed by the 3-A Sanitary standards for sensors and sensor fittings and connections, Number 74-03.

---

* When specifying X, ensure that it meets 3-A standard.
** Not 3-A authorized.
*** Must be cleaned manually.
#1 DESCRIPTION
5F Sanitary thermowells - Add “W” here for a plug with a chain attached to well. (Example. 5FW)

#2 STYLE [25-27]
A Step shank  F Fast response straight shank (1/2” Q)  S Straight shank (3/4” Q)  T Tapered shank

#3 BORE SIZE & SENSOR CONNECTION Standard is NPSM. See drawing below.

<table>
<thead>
<tr>
<th>2</th>
<th>.260” ID</th>
<th>3</th>
<th>.385” ID</th>
<th>X</th>
<th>Other, specify</th>
</tr>
</thead>
</table>
Note: See illustration and sensor length equations below to calculate your mating sensor's immersion length.

#4 U (INSERTION) DEPTH [15]
B 2-1/2”
C 4-1/2”
D 6”
E 7-1/2”
U Other, specify

Note: Standard (sensor) connections are 1/2” FNPSM (female straight) to match 1/2” MNPT (male tapered)

Note: Ingold socket and threaded fittings are readily available. Because of the diversity of sizes, materials and other options, please consult JMS directly.

www.3-A.org

#6 CAP SIZE See Triclover Size Chart on page 4-1

<table>
<thead>
<tr>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
<th>40</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>X*</th>
<th>Z</th>
<th>N/A</th>
</tr>
</thead>
</table>

#7 CAP STYLE [see 4-9, Row 9 for illustrations]

T Tri-Clover (16 AMP)  P PV Gasket (16APV)  A Tri-Clover (16 AMP)  X 3A4 Adapter
B Bevel seat w/o 13H nut  PH PV Gasket (16APV) w/ 13-H nut
BH Bevel seat w/ 13H nut  I Clamp (16AI-14I)  I**  A**  X***
H** 3A4 Adapter

#8 MATERIAL

<table>
<thead>
<tr>
<th>H</th>
<th>I</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SS</td>
<td>304L SS</td>
<td>316 SS</td>
</tr>
</tbody>
</table>

#9 POLISH

H High polish #4 finish (≤ 32 Microinches(µin)) (Standard)
E Electropolish after #4 finish (≤ 32 Microinches(µin))
P Passivate after #4 finish (≤ 32 Microinches(µin))
F Fine polish (≤ 20 Microinches(µin))
V Ultra polish 8G finish (≤ 8 Microinches(µin))
X Other, specify

#10 TAGGING OPTIONS

<table>
<thead>
<tr>
<th>1</th>
<th>Laser etched or stamped on well (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Other</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
</tr>
</tbody>
</table>

#11 DOCUMENTATION / CERTIFICATION

M Material Test Report (MTR)  D Dye penetrant testing
P Internal hydrostatic pressure test  U X-Ray examination
W Premium SwiftyCalc  A ASME 19.3TW-2010 calculation
S Surface finish certificate  E Certificate of electropolish
A Certificate of no Animal Derived Material (ADM)  N Certificate of no polishing compounds
O Certificate of cleaned for oxygen service

* When specifying X, ensure that it meets 3-A standard.
** Not 3-A authorized.
*** Must be cleaned manually.
3-A SANITARY “SLIM-WELL” PROTECTION TUBES

<table>
<thead>
<tr>
<th>#1 DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5SL</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2 WELL DIAMETER &amp; SENSOR CONNECTION</th>
<th>Standard is NPSM. See drawing below.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3/16&quot; Ø (fits 1/8&quot; Ø sensor)</td>
</tr>
<tr>
<td>B</td>
<td>1/4&quot; Ø (fits 3/16&quot; Ø sensor)</td>
</tr>
<tr>
<td>Y</td>
<td>5/16&quot; Ø (fits 1/4&quot; Ø sensor)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**Note:** Standard (sensor) connections are 1/4" FNPSM (female straight) to match 1/4" MNPT (male tapered)

Add “N” for FNPT (Example: BN=FNPT)

<table>
<thead>
<tr>
<th>#3 U (INSERTION) DEPTH</th>
<th>[15]</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>&quot;U&quot; length in inches</td>
</tr>
</tbody>
</table>

**Note:** See illustration and sensor length equations below to calculate your mating sensor's Immersion length.

<table>
<thead>
<tr>
<th>#4 T (LAG) EXTENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
</tr>
</tbody>
</table>

See Triclover Size Chart on page 4-1

<table>
<thead>
<tr>
<th>#5 CAP SIZE</th>
<th>See Triclover Size Chart on page 4-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 x 3/4</td>
<td>2</td>
</tr>
<tr>
<td>1 x 1-1/2</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6 CAP STYLE</th>
<th>[see 4-2, selection #8 for illustrations]</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Tri-Clover (16 AMP)</td>
</tr>
<tr>
<td>B***</td>
<td>Bevel seat w/o 13H nut</td>
</tr>
<tr>
<td>BH***</td>
<td>Bevel seat w/ 13H nut</td>
</tr>
<tr>
<td>I**</td>
<td>I Clamp (16Al-14I)</td>
</tr>
<tr>
<td>P</td>
<td>PV Gasket (16APV) w/o 13-H nut</td>
</tr>
<tr>
<td>PH</td>
<td>PV Gasket (16APV) w/ 13-H nut</td>
</tr>
<tr>
<td>X***</td>
<td>3A4 Adapter</td>
</tr>
</tbody>
</table>

**Note:** When specifying X, ensure that it meets 3-A standard.

**** Not 3-A authorized.

*** Must be cleaned manually.

| #7 MATERIAL |
|---|---|
| H | 304 SS |
| I | 304L SS |
| K | 316 SS |
| L | Other, specify |
| X | 316L SS |

<table>
<thead>
<tr>
<th>#8 POLISH</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>P</td>
</tr>
<tr>
<td>F</td>
</tr>
<tr>
<td>V</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

**Note:**
- Matching sensor length for sensors with a spring-loaded fitting = U length(#3) + 1 5/8" + T length(#4)
- Matching sensor length for sensors with a welded fitting = U length(#3) + 1 1/8" + T length(#4)

<table>
<thead>
<tr>
<th>#9 TAGGING OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#10 DOCUMENTATION / CERTIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
</tr>
<tr>
<td>D</td>
</tr>
<tr>
<td>P</td>
</tr>
<tr>
<td>U</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>S</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>A</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>O</td>
</tr>
</tbody>
</table>

* When specifying X, ensure that it meets 3-A standard.

** Not 3-A authorized.

*** Must be cleaned manually.

www.3-A.org
3-A CERTIFIED SANITARY WELD-IN THERMOWELLS

JMS Southeast, Inc. is proud to be a US manufacturer of a full line of sanitary RTDs, thermocouples and thermowells (3-A Authorization #1482).

JMS Southeast’s 3-A certified weld-in thermowells are designed to be used with either sanitary 3-A certified probes* or non-certified probes.** Sanitary thermowells should be welded to a tank or a vat with a full crevice-free fillet weld to avoid cracks and crevices. Standard sanitary weld-in wells are fabricated from stainless steel and then polished to a #4 finish.***

In addition to weld-in thermowells, JMS also offers a full line of 3-A certified sanitary cap thermowells. Illustrations of the most commonly selected cap styles can be found on page 4-4, row 7 of this catalog.
* For ordering and additional information, see pages 4-1 through 4-3 of this catalog.
** For thermocouples, please refer to section 1 of this catalog. For RTDs, please refer to section 3.
*** Other finishes available upon request to meet customer requirements.

### #1 DESCRIPTION

5C 3-A Certified sanitary thermowells - Add “W” here for a plug with a chain attached to well. (Example. 5CW)

### #2 U (INSERTION) DEPTH [15]

<table>
<thead>
<tr>
<th>#2</th>
<th>Specify length in inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Note: When specifying spring-loaded replacement sensor, customer should specify immersion length 1/4” shorter than the overall weld-in thermowell length</td>
</tr>
</tbody>
</table>

### #3 MATERIAL

<table>
<thead>
<tr>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
<th>N</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>304 SS</td>
<td>304L SS</td>
<td>316 SS</td>
<td>316L SS</td>
<td>X</td>
<td>Other, specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** When specifying an X, material selected must comply with 3-A standard, 74-03

### #4 BORE SIZE & SENSOR CONNECTION Standard is NPSM.

<table>
<thead>
<tr>
<th>#4</th>
<th>BORE SIZE &amp; SENSOR CONNECTION Standard is NPSM.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Add “N” for FNPT  (Example: 2N=FNPT)</td>
</tr>
</tbody>
</table>

### #5 T (LAG) EXTENSION [5-15]

<table>
<thead>
<tr>
<th>#5</th>
<th>T (LAG) EXTENSION [5-15]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Specify length in inches</td>
</tr>
</tbody>
</table>

### #6 TAGGING OPTIONS

<table>
<thead>
<tr>
<th>#6</th>
<th>Stamped on well (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Other</td>
</tr>
<tr>
<td>Z</td>
<td>N/A (No Lag)</td>
</tr>
</tbody>
</table>

### #7 DOCUMENTATION & CERTIFICATIONS -- use all that apply (Example: “DU” requests dye penetrant test & X-Ray examination)

<table>
<thead>
<tr>
<th>M</th>
<th>D</th>
<th>P</th>
<th>U</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Test Reports (MTRs)</td>
<td>Dye penetrant testing</td>
<td>Internal hydrostatic pressure test</td>
<td>X-Ray examination</td>
<td>Premium SwiftyCalc ASME 19.3TW-2010 calculation</td>
</tr>
</tbody>
</table>

### MATERIAL TEST REPORTS

S | E | A | N | O
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface finish certificate</td>
<td>Certificate of electropolish</td>
<td>Certificate of No Animal</td>
<td>Certificate of no polishing compounds</td>
<td>Certificate of cleaned for Oxygen service</td>
</tr>
</tbody>
</table>

FREE Wake Frequency Calculations to ASME PTC 19.3 TW, *SwiftyCalc!* Visit JMS-SE.com to sign up today! www.JMS-SE.com/SwiftyCalc

Note: Standard (sensor) connections are 1/2” FNPSM (female straight) to match 1/2” MNPT (male tapered)

Note: Does not include head and nipple. These parts may be ordered separately.

Note: see page 5-11 for more options.

Note: See page 4-4, row 7 for illustrations of the most commonly selected cap styles.
**3-A APPROVED COMPLETE SENSORS**

**SANITARY CAP TYPICAL DESIGNS**

- TRI-CLOVER (16 AMP) (CAP OPTION "T")
- BEVEL SEAT WITH 13-H NUT (16 AMP) (CAP OPTION "BH")

**SPECIAL DESIGNS**

- SOCKET CAP COLD END TERMINATION (OPTION "SC")
- ULTRA HIGH ACCURACY TYPE T WIRE THERMOCOUPLE

**FEATURES:**

- PC programmable,
- NEMA 6P (IP67) rated with M12 connector.
- Ideal for most applications from -60 to 320°F
- Ambient temperature limits -40 to 185°F
- Quick-n-Clean M12 connection for easy replacement.
- Available in 3-A certified and standard industrial designs (see page 3-5)

**Ideal for high moisture environments!**

**JMS presents its rugged, fast response, multi-strand Type T sensor.**

**3-A RTD with 4-20 mA INTEGRAL OUTPUT (RTD in, 4-20 mA OUT!!)**

**TOOL FREE RTD TEMPERATURE MEASUREMENT**

**People who purchased this also purchased the bennomether.**
(See page 4-15 for details.)
HAND HELD SENSORS

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>4H</td>
<td>Hand held sensor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan, standard limits of error</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel, standard limits of error</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan, standard limits of error</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan, standard limits of error</td>
</tr>
<tr>
<td>3</td>
<td>RTD 100Ω Platinum ,00385 alpha, 3 wire, Class B</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>OUTSIDE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3/8” (.375”)</td>
</tr>
<tr>
<td>B</td>
<td>1/4” (.250”)</td>
</tr>
<tr>
<td>C</td>
<td>3/16” (.188”)</td>
</tr>
<tr>
<td>D</td>
<td>1/8” (.125”)</td>
</tr>
<tr>
<td>E</td>
<td>1/16” (.063”)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>LENGTH (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>___</td>
<td>Immersion length in inches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>MEASURING JUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Grounded</td>
</tr>
<tr>
<td>U</td>
<td>Ungrounded (RTDs are always ungrounded)</td>
</tr>
<tr>
<td>J</td>
<td>Pointed tip, grounded</td>
</tr>
<tr>
<td>K*</td>
<td>Pointed tip, ungrounded</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>HANDLE STYLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Handle for replaceable probe</td>
</tr>
<tr>
<td>R</td>
<td>Permanent handle for non-replaceable probe</td>
</tr>
<tr>
<td>S</td>
<td>Rugged, stainless steel handle for non-replaceable probe</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#7</th>
<th>LEAD WIRE INSULATION AND LENGTH IN INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Coil-cord. Length will stretch from 12” to 36” (Standard)</td>
</tr>
<tr>
<td>2</td>
<td>20 AWG PVC</td>
</tr>
<tr>
<td>3</td>
<td>20 AWG Teflon</td>
</tr>
<tr>
<td>5</td>
<td>20 AWG Kapton</td>
</tr>
<tr>
<td>6</td>
<td>20 AWG fiberglass braid/flexible armor overall</td>
</tr>
<tr>
<td>7</td>
<td>20 AWG Teflon/flexible armor overall</td>
</tr>
<tr>
<td>8</td>
<td>20 AWG fiberglass braid/stainless steel overbraid</td>
</tr>
<tr>
<td>9</td>
<td>3 conductor Teflon with overall jacket of Teflon (RTD only)</td>
</tr>
<tr>
<td>10</td>
<td>3 conductor Teflon/stainless steel overbraid w/ overall jacket of Teflon (RTD only)</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#8</th>
<th>COLD END TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare ends</td>
</tr>
<tr>
<td>B</td>
<td>Miniature plug (Standard)</td>
</tr>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>D</td>
<td>Replacement sensor</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

Other styles of hand-held sensors are available. See page 4-13 or contact JMS Southeast, Inc. for your custom design.
**SINTERING, FURNACE & GLASS THERMOCOUPLES**

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
<th>4G</th>
<th>Sintering, furnace &amp; glass thermocouple</th>
</tr>
</thead>
<tbody>
<tr>
<td>#2</td>
<td>TYPE [Add a “2” before the letter to indicate dual element construction (Example: Dual type S would be coded “2S”)]</td>
<td>S</td>
<td>Platinum/Platinum 10% Rhodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R</td>
<td>Platinum/Platinum 13% Rhodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Platinum 6% Rhodium/Platinum 30% Rhodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Tungsten 5% Rhodium/Tungsten 26% Rhodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>Tungsten 5% Rhodium/Tungsten 20% Rhodium</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>*</td>
<td>Rated 1000°C to 2500°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td>OUTSIDE DIAMETER</td>
<td>B</td>
<td>1/4” (Standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>3/16”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>1/8”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>1/16”</td>
</tr>
<tr>
<td>F</td>
<td>1/25”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#5</td>
<td>THERMOCOUPLE JUNCTION</td>
<td>G</td>
<td>Grounded</td>
</tr>
<tr>
<td></td>
<td></td>
<td>U</td>
<td>Ungrounded (Standard) Required for Type C</td>
</tr>
<tr>
<td>#6</td>
<td>IMMERSION LENGTH</td>
<td>___</td>
<td>Length in inches</td>
</tr>
<tr>
<td>#7</td>
<td>INSULATION</td>
<td>M</td>
<td>MgO (Magnesium Oxide)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>Al₂O₃ (Standard - Aluminum Oxide)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>HfO₂ (Hafnia)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>#8</td>
<td>FITTINGS</td>
<td>Z</td>
<td>No Fitting (Standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>Reverse mounted SS plug fixed for attaching head</td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>Fixed SS to sheath</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>Compression fitting SS w/ SS ferrule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>#9</td>
<td>PROCESS NPT</td>
<td>A</td>
<td>1/2”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>1/4”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>1/8”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A (Standard)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#10</td>
<td>COLD END TERMINATION</td>
<td>C</td>
<td>Standard temp plug</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>High temp std plug (Standard)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>Explosion proof NEMA 4X head</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>Aluminum head w/ hinged cover</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>Aluminum head w/ screw cover &amp; chain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>Cast Iron head w/ screw cover</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>NOTE:</td>
<td>For detailed specifications and ratings, see JMS-SE.com/headspecs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#11</td>
<td>TAGGING AND CALIBRATION</td>
<td>USE ONLY IF APPLICABLE</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>See page 1-2 #14 for ordering selections.</td>
<td></td>
</tr>
</tbody>
</table>
DESIgn

- CenterPoint MI cables are 0.070” thick, double-wall design with a 5/16” sheath O.D.
- First wall is 0.035” overlapping second wall of 0.035”
- Second wall acts as a flexible protective thermowell wrapped around a flexible, heavy-walled thermocouple
- Single CenterPoint MI cable can house 19 points of temperature indication, greatest in the industry
- CenterPoint sheath materials are available in any metallurgy
- Thermocouples are available in any calibration
- A single CenterPoint assembly can be designed for complete coverage of a single catalyst bed

Each CenterPoint assembly is custom designed to meet the specification of the Process Licensor, Engineering Company and End User

COlD ENd DESIgn

- Pressure gauge directly tied to flange penetration creating secondary safety system
- Eliminates the need for additional welded or flanged safety chamber
- Reduced flange face penetrations maintains flange integrity
- Double block and bleed valve designed to bleed off trapped hydrogen or process fluids
- Each junction is equipped with a 10,000 psi pressure fitting,
- All welds are full penetration welds

CenterPoint provides optional secondary containment chambers available to meet the design needs and specifications of the customer

SAFETy BENEFITS

- Rapid speed of response time: Real time temperature measurements
- 96% of a 100 degree step change in 3 to 8 seconds
- Eliminate temperature excursions on high temperature, high pressure
- Radial spread determines “hotspot” locations near reactor walls
- Reduce/replace many reactor skin thermocouples
- Can be tied into the EMS system

CONSTRUCTION

- Double wall construction allows the MI cable to be welded to the flange face without damage to the cable caused by localized heat buildup during the welding procedure
- Drawing and Annealing sheath material provides a flexible housing for the thermocouples
- Restricting process flow (should the sheath integrity become breached) is tightly packed Magnesium Oxide insulation
- No special tools necessary for making long bends
- Tubing benders required for tight radius bends
MULTIPOINT

PERMANENT & REPLACEABLE MULTIPOINT SENSOR DESIGNS AVAILABLE

Note: For flexible high temperature reactor design, see next two pages.

A multipoint sensor allows the measurement of a temperature profile across a large area. Thermocouples or RTDs are arranged with measuring junctions at various points along a pipe, allowing the measurement of various points from a complete assembly. Many elements can be spaced along a probe.

This opens up possibilities for improved profiling in reactors, for example, where flow interference prevents inserting large numbers of individual probes. Multipoint probes can also be used to give a temperature profile where stratification of a tanks contents may be of concern. JMS will custom design your assembly to give you the most accurate temperature measurement for your process.

The following information and/or drawing is needed to properly design your assembly:

- Thermocouple calibration or RTD element type
- Outside diameter of pipe and pipe material
- Junction style of thermocouple
- Sensor material (bare wire, 316 SS tubing, or sheath material)
- Overall length of the entire assembly
- Process connection
- Accuracy required
- Cold-end termination
- Maximum operating temperature

Averaging or discrete point measurement available upon request.

JMS will generate a drawing for your assembly.
FASTTRAX

(Also referred to as the Removable Weld Pad design)

APPLICATIONS

- Single or dual fired furnace tubes
- Top, side, or bottom fired furnace tubes
- Boiler tubes in power plants
- Catalyst tubes/tube sheath reactors (example: steam methane reformers, polygas units, acrylic acid units)
- Steam tracing lines
- Coker units
- External skin temperature for hydproprocessing units (example: hydrocracking, hydrotreating reactor)

INSTALATION

- Installation or supervision available
- Supervision recommended
- E&I Tech can replace Fasttrax probe using only a ladder and a pair of pliers

LOW-COST REPLACEMENT

- Install hardware ONE TIME
- No need to scaffold furnace
- No grinding off existing TSTC
- No grinding down to base metal for welding (causes additional tube thinning)
- No welders necessary
- No moving Tubeskin TC out of the initial zone you want to measure because you cannot weld near last Tubeskin TC
- Re-order ONLY the replaceable probe

DESIGN

- Anti-slip cotter pin design
- Low profile heat shield
- Heavy-walled sheath
- Available in wrap-around design & parallel designs
- Available with S-Loops or expansion coils

HIGH RELIABILITY

- Fully protected probe
- S-Loops keep thermocouple sheath hidden and out of flame
- Clips placed on tube help hold thermocouple in place while process acts as a heat sink
- Wire contact WON’T slip from contact point due to JMS cotter pin design
- Safety
- Measure tube temperature, not process temperature
- Recognize tube wear and tube thinning
- Error set to high side of tube temperature-added safety
- Small offset allows you to push process furnace without sacrificing safety
- Highly accurate for safety
- Ceramic-filled heat shields may lead to low tube skin reading and compromise safety
- Large metal heat shields can absorb large amounts of radiant heat

HIGH ACCURACY

- High accuracy bare wire contact with tube surface
- Bare wire is the standard by which all tube skin thermocouples are tested for accuracy
- Low heat transfer from heat shield/lowest profile heat shield in the industry
- Reduces effects of radiant heat on thermocouple

Note: To order this style as a thermocouple, see page 1-1, selection #6, options N and O in the JMS Ordering Catalog. For an RTD, see page 3-1, selection #4, option O.
### PIPE STAND SKIN SENSORS

#### #1 SUPPORT STRUCTURE
- 4W: Weld pad support structure

#### #2 SENSOR TYPE
**THERMOCOUPLE**
- Type E
- Type J
- Type K
- Other, specify

**RTD (class A, Pt100)**
- 2-wire
- 3-wire
- 4-wire

#### #3 PROBE DIAMETER
- B: 1/4" Ø
- C: 3/16" Ø
- D: 1/8" Ø
- Other, specify

#### #4 PAD / SHEATH MATERIAL
- K: 316 SS
- H: 304 SS
- M: Inconel 600
- X: Other, specify

#### #5 TIP / WELD PAD DESIGN
- A: JMS Fastrax weld pad assembly, replaceable
- B: Weld pad, standard 1" x 1"
- C: Clamp hook pad
- D: Standard round tip
- E: Fastrax replacement “foot” only
- F: Universal weld pad
- G: Contoured weld pad
- X: Other, specify

#### #6 N LENGTH
- Specify (in inches)

#### #7 JUNCTION STYLE
- G: Grounded
- U: Ungrounded (RTDs always ungrounded)
- I: Isolated

#### #8 CUSTOMER PIPE DIAMETER
**GROUNDED** | **UNGROUNDED** | **ISOLATED**
---|---|---
**Pipe size** | **Actual Ø** | **Pipe size** | **Actual Ø** | **Pipe size** | **Actual Ø**
075 | 3/4" (MIN) | 1.05" | 50 | 5" | 5.56" | 110 | 1 1/2" | 2.38" | 10 | 6" | 6.63" | 120 | 2" | 1.90" | 11 | 6" | 6.63" | 125 | 2 1/2" | 2.88" | 12 | 6" | 6.63" | 130 | 3" | 3.50" | 13 | 6" | 6.63" | 135 | 4" | 4.50" | 14 | 6" | 6.63" | 140 | 5" | 5.56" | 15 | 6" | 6.63" | 150 | 5 1/2" | 5.56" | 16 | 6" | 6.63" | 160 | 6" | 6.63" | 17 | 6" | 6.63" | 170 | 6 1/2" | 5.56" | 18 | 6" | 6.63" | 180 | 7" | 5.56" | 19 | 6" | 6.63" | 190 | 7 1/2" | 5.56" | 20 | 6" | 6.63" | 200 | 8" | 5.56" | 21 | 6 1/2" | 5.56" | 210 | 8" | 5.56" | 22 | 7" | 5.56" | 220 | 8 1/2" | 5.56" | 23 | 7" | 5.56" | 230 | 9" | 5.56" | 24 | 7" | 5.56" | 240 | 9 1/2" | 5.56" | 25 | 7" | 5.56" | 250 | 1" | 5.56" | 26 | 7" | 5.56" | 260 | 1 1/2" | 5.56" | 27 | 7" | 5.56" | 270 | 1 3/4" | 5.56" | 28 | 7 1/2" | 5.56" | 280 | 2" | 5.56" | 29 | 8" | 5.56" | 290 | 2 1/2" | 5.56" | 30 | 8" | 5.56" | 300 | 3" | 5.56" | 31 | 8 1/2" | 5.56" | 310 | 3 1/2" | 5.56" | 32 | 9" | 5.56" | 320 | 4" | 5.56" | 33 | 9 1/2" | 5.56" | 330 | 4 1/2" | 5.56" | 34 | 10" | 5.56" | 340 | 5" | 5.56" | 35 | 10 1/2" | 5.56" | 350 | 5 1/2" | 5.56" | 36 | 11" | 5.56" | 360 | 6" | 5.56" | 37 | 11 1/2" | 5.56" | 370 | 6 1/2" | 5.56" | 38 | 12" | 5.56" | 380 | 7" | 5.56" | 39 | 12 1/2" | 5.56" | 390 | 7 1/2" | 5.56" | 40 | 13" | 5.56" | 400 | 8" | 5.56" | 41 | 13 1/2" | 5.56" | 410 | 8 1/2" | 5.56" | 42 | 14" | 5.56" | 420 | 9" | 5.56" | 43 | 14 1/2" | 5.56" | 430 | 9 1/2" | 5.56" | 44 | 15" | 5.56" | 440 | 10" | 5.56" | 45 | 15 1/2" | 5.56" | 450 | 10 1/2" | 5.56" | 46 | 16" | 5.56" | 460 | 11" | 5.56" | 47 | 16 1/2" | 5.56" | 470 | 11 1/2" | 5.56" | 48 | 17" | 5.56" | 480 | 12" | 5.56" | 49 | 17 1/2" | 5.56" | 490 | 12 1/2" | 5.56"

#### #9 COLD END TERMINATION
"Weld pads are not curved to fit customer’s pipe for diameters 12" and larger due to the minimal tangency gap.

#### #10 L LENGTH
- Specify (in inches)

#### #11 OPTIONS
- H: Hose clamps (QTY3)
- S: SS tag
- M: MTR
- X: Other, specify

---

Choose "GS" in selection #9, for a NEMA 4X housing w/ an easy to read digital indicator.

---

**NOTE:** Sensor weld pad styles A & D (#5) along with nipple stand weld pads will be curved to fit customer’s pipe diameter (#8).
The JMS pad RTD is a specialty sensor which provides a fast response surface measurement. It is a 100Ω platinum RTD with an alpha of 0.00385 Ω/Ω/°C. Pad material is PTFE (Teflon) impregnated glass fibre. The pad RTD has an effective operating range from -80°C to 200°C and its tolerance is 0.1Ω (± 0.26°C at 0°C). Additional Teflon leadwire is configured as a 3 wire RTD. High temperature configurations can be designed.

**TEMPERATURE RATING IS BASED ON T/C TYPE**

<table>
<thead>
<tr>
<th>#</th>
<th>STYLE</th>
<th>(See illustrations above &amp; to the right)</th>
<th>#2 COLD END TERMINATION</th>
<th>(Additional options see Pg 1-7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>STYLE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4A</td>
<td>Hand held (straight design)</td>
<td>Hand held (90° design)</td>
<td>Specialty brush sensor</td>
<td>Permanent mount</td>
</tr>
<tr>
<td>4P</td>
<td>Large pad</td>
<td>4PADT</td>
<td>4PADL</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Small pad surface</td>
<td></td>
<td>B</td>
<td>Bare ends</td>
</tr>
<tr>
<td>4B*</td>
<td></td>
<td></td>
<td>C</td>
<td>Miniature plug</td>
</tr>
<tr>
<td>4K*</td>
<td></td>
<td></td>
<td>X</td>
<td>Standard plug</td>
</tr>
<tr>
<td>4*</td>
<td></td>
<td></td>
<td>Z</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**Note:** Thermocouple wire is 24 AWG solid conductors. RTD wire is 24 AWG stranded conductors.

The JMS Brush Thermocouple can be used in applications in which a surface temperature of a stationary or moving electrically conducting surface is needed.

True temperature measurement of a surface is very hard to obtain. Previous designs called for the probe to fully contact with as small a junction as possible, spring load with as even pressure as possible, insulate around the surface to be measured, or combinations of all these methods.

All of the above methods have proven to have their own particular faults. When compared to an infrared sensor, which does accurately measure surface temperature (unit must have correct emissivity adjustment), most of the above mentioned sensors either read much hotter or colder than the infrared. However, even the infrared style exhibits problems when emissivity levels fall beneath 0.4 or less (most metallic surfaces). JMS has applied for a patent on this brush sensor because of its unique design and widespread application. The JMS brush probe eliminates emissivity, surface contact and heat wicking considerations.

**SURFACE SENSORS**
MAGNETIC SURFACE PROBES

<table>
<thead>
<tr>
<th>#2 STYLE</th>
<th>STYLE</th>
<th>lb Pull @ 70°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>4M Magnetsurface probe</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>C Crown (1-1/4&quot;) (Standard)</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>R Round (1&quot;)</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>U Horseshoe (1-1/8&quot; depth)</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>H Heavy-load (3&quot;)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3 SENSOR TYPE</th>
<th>THERMOCOUPLE</th>
<th>RTD (class B, Pt100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E Type E</td>
<td>N Type N</td>
<td>2 2-wire</td>
</tr>
<tr>
<td>J Type J</td>
<td>T Type T</td>
<td>3 4-wire</td>
</tr>
<tr>
<td>K Type K</td>
<td>X Other, specify</td>
<td></td>
</tr>
<tr>
<td>U Grounded (Standard for T/Cs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U Ungrounded (RTDs are always ungrounded)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4 JUNCTION TYPE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G Grounded</td>
<td></td>
</tr>
<tr>
<td>U Ungrounded</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5 LEADWIRE TYPE &amp; LENGTH</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C Coil-cord</td>
<td></td>
</tr>
<tr>
<td>T Teflon</td>
<td></td>
</tr>
<tr>
<td>TS Teflon w/ SS overbraid (Standard)</td>
<td></td>
</tr>
<tr>
<td>K Kapton</td>
<td></td>
</tr>
<tr>
<td>KS Kapton w/ SS overbraid</td>
<td></td>
</tr>
<tr>
<td>F Fiberglass</td>
<td></td>
</tr>
<tr>
<td>FS Fiberglass w/ SS overbraid</td>
<td></td>
</tr>
<tr>
<td>X Other, specify</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6 COLD END TERMINATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A Bare ends</td>
<td></td>
</tr>
<tr>
<td>B Miniature plug</td>
<td></td>
</tr>
<tr>
<td>C Standard plug</td>
<td></td>
</tr>
<tr>
<td>X Other, specify</td>
<td></td>
</tr>
<tr>
<td>Z N/A</td>
<td></td>
</tr>
</tbody>
</table>

Note: Thermocouple wire is 24 AWG solid conductors. RTD wire is 24 AWG stranded conductors.

LABORATORY THERMOMETERS

For detailed descriptions and ordering information, visit www.JMS-SE.com

STANDARD PLATINUM RESISTANCE THERMOMETERS

SECONDARY STANDARD RTDS

JMS STANDARDS THERMOCOUPLE

PRECISION INDUSTRIAL RTD
Unites Bimetal with either Thermocouple or RTD Technology!

- Bimetal Dependability
- Thermocouple / RTD Accuracy
- Direct AND Electronic Reading
- Easy To Use
- Easy To Calibrate
- Two Sensors in One Instrument

This thermometer combines the convenience, simplicity, and self-powered actuation of a bimetal thermometer with the digital accuracy and data acquisition capabilities of a thermocouple or RTD. With standards traceable to the NIST, this new instrument offers simplified calibration for ISO 9000 compliance and other statistical process control requirements. It is also ideal in applications requiring easy and quick readability while still affording a means of electronic data acquisition. There is no need to add additional access points or thermowells to your existing process in order to gain different types or readings.

This is available with a 3” or 5” dial, in a Back Connected or Adjustable angle case, 1/4” stem diameter in lengths to 12", 1/2" NPT connection, in ranges from -100°F (-70°C) to 500°F (260°C), with Fahrenheit, Celsius and Dual Scale Dials available. Thermocouple output may be accessed via a plug-in connector; RTD output is accessed by a terminal block. Both have 1/2" conduit threaded mounting (PWK option) and a plastic cap standard. Optional weatherproof housing is available. Construction is of type 304 series stainless steel with a glass crystal. It is hermetically sealed per ASME B40.3 standard. It also comes with a one-year warranty.

How To Order Your Adjustable Angle Bemometer:

JMS PART NUMBER: ANA 30 060 0 01 K - PWK (Optional)

Table 1: Model
Table 2: Stem Length
Table 3: Scale Type (F, C or F&C)
Table 4: Range
Table 5: Sensor Type

<table>
<thead>
<tr>
<th>Table 1 - Model</th>
<th>Table 2 - Stem Length</th>
<th>Table 3 - Scale Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY DESCRIPTION</td>
<td>KEY DESCRIPTION</td>
<td>KEY DESCRIPTION</td>
</tr>
<tr>
<td>30 3” Back connection</td>
<td>040 4 inches</td>
<td>0 Dual scale °F / °C</td>
</tr>
<tr>
<td>32 3” Adjustable angle</td>
<td>060 6 inches</td>
<td>1 Celsius only</td>
</tr>
<tr>
<td>50 5” Back connection</td>
<td>090 9 inches</td>
<td>2 Fahrenheit only</td>
</tr>
<tr>
<td>52 5” Adjustable angle</td>
<td>120 12 inches</td>
<td>X Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4 - Standard Ranges</th>
<th>Table 5 - Sensor Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY DESCRIPTION</td>
<td>KEY DESCRIPTION</td>
</tr>
<tr>
<td>Dual scale F/C</td>
<td>J Thermocouple output, Type J</td>
</tr>
<tr>
<td>Celsius only</td>
<td>K Thermocouple output, Type K</td>
</tr>
<tr>
<td>Fahrenheit only</td>
<td>E Thermocouple output, Type E</td>
</tr>
<tr>
<td>-100/150°F &amp; -70/70°C</td>
<td>T Thermocouple output, Type T</td>
</tr>
<tr>
<td>-70/70°C</td>
<td>3 100Ω RTD output, 3 wire</td>
</tr>
<tr>
<td>-50/50°C</td>
<td></td>
</tr>
<tr>
<td>-40/120°F</td>
<td></td>
</tr>
<tr>
<td>-40/120°F</td>
<td></td>
</tr>
<tr>
<td>0/50°C</td>
<td></td>
</tr>
<tr>
<td>0/25°F</td>
<td></td>
</tr>
<tr>
<td>0/140°F &amp; -20/60°C</td>
<td></td>
</tr>
<tr>
<td>0/140°F</td>
<td></td>
</tr>
<tr>
<td>0/200°F &amp; -15/90°C</td>
<td></td>
</tr>
<tr>
<td>0/200°F</td>
<td></td>
</tr>
<tr>
<td>0/250°F &amp; -20/120°C</td>
<td></td>
</tr>
<tr>
<td>0/250°F</td>
<td></td>
</tr>
<tr>
<td>20/240°F &amp; -5/115°C</td>
<td></td>
</tr>
<tr>
<td>20/240°F</td>
<td></td>
</tr>
<tr>
<td>50/300°F &amp; 10/150°C</td>
<td></td>
</tr>
<tr>
<td>50/300°F</td>
<td></td>
</tr>
<tr>
<td>50/400°F &amp; 10/200°C</td>
<td></td>
</tr>
<tr>
<td>50/400°F</td>
<td></td>
</tr>
<tr>
<td>50/500°F &amp; 10/280°C</td>
<td></td>
</tr>
<tr>
<td>50/500°F</td>
<td></td>
</tr>
</tbody>
</table>

People who purchased this also purchased socket cap sensors. (See page 4-3 for details.)
Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
#1 DESCRIPTION  [See pages 5-20 through 5-24 for detailed information on dimensions, velocity ratings, and pressure ratings]  Thermowells - Add a W here for a Brass plug and stainless steel chain attached to well. (Example: 5W)

<table>
<thead>
<tr>
<th>SIZE</th>
<th>THREADED WELL</th>
<th>SOCKET WELL</th>
<th>WELD IN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>External thread</td>
<td>Pipe size</td>
<td>Actual external Ø</td>
</tr>
<tr>
<td>1</td>
<td>1/2&quot; NPT</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>2</td>
<td>3/4&quot; NPT (Standard)</td>
<td>3/4&quot; pipe</td>
<td>1.050&quot; (Standard)</td>
</tr>
<tr>
<td>3</td>
<td>1&quot; NPT</td>
<td>1&quot; pipe</td>
<td>1.315&quot; (Standard)</td>
</tr>
<tr>
<td>4</td>
<td>1-1/2&quot; NPT</td>
<td>1-1/2&quot; pipe</td>
<td>1.900&quot; (Standard)</td>
</tr>
<tr>
<td>5</td>
<td>1-1/4&quot; NPT</td>
<td>1-1/4&quot; pipe</td>
<td>1.660&quot; (Standard)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
<td>Other, specify</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#3 SHANK STYLE [15]
- A Step (Standard)
- S Straight
- T Tapered
- B Built-up (see page 5-2)
- X Other, specify

#4 PROCESS ENGAGEMENT
- T Threaded well design
- S Socket weld well design
- W* Weld In design
- X Other, specify

#5 BORE SIZE & SENSOR CONNECTION
- 260° ID used for .250 OD sensors (Standard)
- .385° ID used for .375 OD sensors (straight or tapered Shank style only)
- Other, specify

#6 U (INSERTION) DEPTH [15]
- B 2-1/2"  "If overall length of thermowell is 40" or greater, JMS recommends the use of our "Built-up" shank style (option #3)
- C 4-1/2"
- D 6"  "Recommended if overall length of thermowell is 40" or greater"
- E 7-1/2"
- F 10-1/2"
- G 13-1/2" (see illustration on page 5-2)
- H 16-1/2"  "Standard lag (For lengths see chart in option #6)
- U Other, specify

#7 T (LAG) EXTENSION [15]
- T Standard lag (For lengths see chart in option #6)
- Z N/A (No lag)
- X Other, specify

#8 WELL MATERIAL [31-34]
- Alloy 800H/HT
- Inconel 600
- F5
- Monel 400
- F9
- Hastelloy C-276
- P91
- Titanium
- F11
- X
- H Hastelloy X
- J F4

#9 TAGGING OPTIONS
- Stamped on well (Standard)
- Other, specify
- MTR
- Premium SwiftyCalc ASME 19.3TW calculation

Note: Standard sensor connections are 1/2" FNPSM (female straight) to match 1/2" MNPT (male tapered) per ASME B40.200-2008 (B40.9)

Note: See illustrations below and on page 5-2 for specifications.

*NEW* FREE Wake Frequency Calculations to ASME PTC 19.3 TW, SwiftyCalc! Visit JMS-SE.com to sign up today! www.JMS-SE.com/SwiftyCalc

Visit JMS-SE.com to sign up today! www.JMS-SE.com/SwiftyCalc

[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at www.JMS-SE.com/TechnicalCatalog
**NEW**  **FREE** Wake Frequency Calculations to ASME PTC 19.3 TW, SwiftyCalc!
Visit JMS-SE.com to sign up today!  www.JMS-SE.com/SwiftyCalc

(JMS Southeast, Inc. participated in the ASME 19.3 TW committee performing the first major revision since 1974 to the only US thermowell strength standard. The new ASME PTC 19.3 TW standard addresses wake frequency calculations.)

**LIMITED SPACE THERMOWELLS**

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5L</td>
<td>Limited space thermowells - Add a W here for a Brass plug and stainless steel chain attached to well (Example: 5LW)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>WELL MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>304 stainless steel</td>
</tr>
<tr>
<td>K</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>M</td>
<td>Inconel 600</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>TAGGING OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stamped on well (Standard)</td>
</tr>
<tr>
<td>X*</td>
<td>Other</td>
</tr>
<tr>
<td>M</td>
<td>MTR</td>
</tr>
</tbody>
</table>

Note: Immersion length of a spring-loaded sensor to fit this well is 2-1/2".
#1 DESCRIPTION [See pages 5-25 through 5-27 for detailed information on dimensions, velocity ratings, and pressure ratings]  

5T Thermowells - Add a W here for a Brass plug and stainless steel chain attached to well (Example: 5TW)

#2 SHANK STYLE [15]

<table>
<thead>
<tr>
<th>A</th>
<th>Step (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Straight</td>
</tr>
<tr>
<td>T</td>
<td>Tapered</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B*</th>
<th>Built-up (see page 5-2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

*Recommended if overall length of thermowell is 40” or greater

#3 BORE SIZE & SENSOR CONNECTION Standard is NPSM.

<table>
<thead>
<tr>
<th>2</th>
<th>.260” ID used for .250” OD sensors (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>.385” ID used for .375” OD sensors (straight or tapered shank style only)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#4 U (INSERTION) DEPTH [15]  

<table>
<thead>
<tr>
<th>U DIMENSION</th>
<th>SENSOR LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2”</td>
<td>4”</td>
</tr>
<tr>
<td>4”</td>
<td>6”</td>
</tr>
<tr>
<td>7”</td>
<td>9”</td>
</tr>
<tr>
<td>10”</td>
<td>12”</td>
</tr>
<tr>
<td>13”</td>
<td>15”</td>
</tr>
<tr>
<td>16”</td>
<td>18”</td>
</tr>
<tr>
<td>22”</td>
<td>24”</td>
</tr>
</tbody>
</table>

*If overall length of thermowell is 40” or greater, JMS recommends the use of our “Built-up” shank style (option # 3) (see illustration on page 5-2)

#5 T (LAG) EXTENSION [15]  

<table>
<thead>
<tr>
<th>T…”</th>
<th>Length in inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>N/A (Standard)</td>
</tr>
</tbody>
</table>

*NOTE: Lag extension is needed if flange thickness exceeds 1 3/4”.

#6 WELL MATERIAL [31-34]  

<table>
<thead>
<tr>
<th>G</th>
<th>Carbon steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>304 stainless steel</td>
</tr>
<tr>
<td>I</td>
<td>Low Carbon 304 stainless steel</td>
</tr>
<tr>
<td>J</td>
<td>310 stainless steel</td>
</tr>
<tr>
<td>K</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>L</td>
<td>Low Carbon 316 stainless steel</td>
</tr>
<tr>
<td>M</td>
<td>Inconel 600</td>
</tr>
<tr>
<td>N</td>
<td>Monel 400</td>
</tr>
</tbody>
</table>

Special jackets & coatings are available for thermowells. Call JMS for more information or www.JMS-SE.com.

#7 WELD AND SIZE OF FLANGE [27]  

<table>
<thead>
<tr>
<th>3</th>
<th>1 1/2”</th>
<th>6</th>
<th>3”</th>
<th>Other, specify</th>
</tr>
</thead>
</table>

*NOTE: Add F prefix to selection to specify a Full Penetration weld is required. (example: F4 = 1 1/2” flange Full penetration weld)

#8 FLANGE PRESSURE RATING (PSI) per ASME B-16.5

<table>
<thead>
<tr>
<th>A</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>300</td>
</tr>
<tr>
<td>C</td>
<td>400</td>
</tr>
<tr>
<td>D</td>
<td>600</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1500</td>
</tr>
<tr>
<td>G</td>
<td>2500</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#9 FACING

<table>
<thead>
<tr>
<th>1</th>
<th>Raised (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Flat</td>
</tr>
<tr>
<td>3</td>
<td>Ring Joint Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>Van Stone no flange</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Van Stone w/flange</td>
</tr>
</tbody>
</table>

#10 FLANGE MATERIAL [31-34]

<table>
<thead>
<tr>
<th>G</th>
<th>Carbon steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>304 stainless steel</td>
</tr>
<tr>
<td>I</td>
<td>Low Carbon 304 stainless steel</td>
</tr>
<tr>
<td>J</td>
<td>310 stainless steel</td>
</tr>
<tr>
<td>K</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>L</td>
<td>Low Carbon 316 stainless steel</td>
</tr>
<tr>
<td>M</td>
<td>Inconel 600</td>
</tr>
<tr>
<td>N</td>
<td>Monel 400</td>
</tr>
<tr>
<td>A</td>
<td>Alloy 800/HHT</td>
</tr>
<tr>
<td>P</td>
<td>Hastelloy B-3</td>
</tr>
<tr>
<td>Q</td>
<td>Hastelloy C-276</td>
</tr>
<tr>
<td>S</td>
<td>Titanium</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

*For more options and unique material requirements, consult your sales representative directly.

#11 TAGGING OPTIONS

<table>
<thead>
<tr>
<th>1</th>
<th>Tag # stamped on well (Standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X*</td>
<td>Other</td>
</tr>
<tr>
<td>M</td>
<td>MTR</td>
</tr>
<tr>
<td>W</td>
<td>Premium SwiftyCalc ASME 19.3TW Calculation</td>
</tr>
</tbody>
</table>

*Recommended if overall length of thermowell is 40” or greater

NOTE: Standard sensor connections are 1/2” FNPSM (female straight) to match 1/2” MNPT (male tapered)

**Note:** Refer to the Van Stone Dimensions Chart for detailed information on dimensions.

*For more options and unique material requirements, consult your sales representative directly.*
### Threaded Straight Shank Sample Probe Design

#### #1 Description
Sample probe - Add a W here for a Brass plug and stainless steel chain attached to probe. (Example: 5SW)

#### #2 Process Connection

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>2</td>
<td>3/4&quot; NPT (Standard)</td>
</tr>
<tr>
<td>3</td>
<td>1&quot; NPT</td>
</tr>
<tr>
<td>4</td>
<td>1-1/2&quot; NPT</td>
</tr>
<tr>
<td>5</td>
<td>1-1/4&quot; NPT</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify (Example: 2&quot; 150# raised face flange.)</td>
</tr>
</tbody>
</table>

#### #3 Shank Style [15]

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Step</td>
</tr>
<tr>
<td>S</td>
<td>Straight (Standard)</td>
</tr>
<tr>
<td>T</td>
<td>Tapered</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #4 Sampling Device Connection

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1/4&quot; NPT</td>
</tr>
<tr>
<td>P</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>O</td>
<td>3/4&quot; NPT</td>
</tr>
<tr>
<td>N</td>
<td>1&quot; NPT</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #5 Bore Size

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>.260&quot; ID (Standard)</td>
</tr>
<tr>
<td>3</td>
<td>.385&quot; ID</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #6 U (Insertion) Depth [15]

U__ Specify insertion length

#### #7 T (Lag) Extension [15]

T__ Specify lag length

#### #8 Well Material [31-34]

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Carbon steel</td>
</tr>
<tr>
<td>H</td>
<td>304 stainless steel (Standard)</td>
</tr>
<tr>
<td>K</td>
<td>316 stainless steel</td>
</tr>
<tr>
<td>M</td>
<td>Inconel 600</td>
</tr>
<tr>
<td>X*</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #9 Open Tip Style

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>45°</td>
</tr>
<tr>
<td>F</td>
<td>Flat tip</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

#### #10 Tagging Options

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stamped on well (Standard)</td>
</tr>
<tr>
<td>X*</td>
<td>Other, specify</td>
</tr>
<tr>
<td>M</td>
<td>MTR</td>
</tr>
</tbody>
</table>

**Note:** You must always specify information required on tag.

[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at [www.JMS-SE.com/TechnicalCatalog](http://www.JMS-SE.com/TechnicalCatalog)
#1 DESCRIPTION

5P Metal protection tube - Add a W here for a Brass cap and stainless steel chain attached to well (Example: 5PW)

#2 RESPONSE TYPE

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fast response tip</td>
</tr>
<tr>
<td>2</td>
<td>Standard response tip</td>
</tr>
</tbody>
</table>

#3 ATTACHING DEVICES

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Carbon steel bushing</td>
</tr>
<tr>
<td>K</td>
<td>Stainless steel bushing</td>
</tr>
<tr>
<td>J</td>
<td>Adjustable cast iron floor flange</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

(Example: 3" 150 lb raised face flange.)

**Note:** Bends and elbows are available. Call your salesperson for drawing(s).

**ATTACHING DEVICE STYLE “Z”**

**Note:** Matching spring-loaded sensor length will be the overall length of the protection tube minus 1/4". Welded sensors will be 1" less than the overall length of the protection tube. See illustrations below.

#5 OVERALL LENGTH (P)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>1/8&quot;</td>
<td>.269 .405 1/8&quot;</td>
</tr>
<tr>
<td>14</td>
<td>1/4&quot;</td>
<td>.364 .540 1/4&quot;</td>
</tr>
<tr>
<td>12</td>
<td>1/2&quot; (Standard)</td>
<td>.622 .840 1/2&quot;</td>
</tr>
<tr>
<td>34</td>
<td>3/4&quot;</td>
<td>.824 1.050 3/4&quot;</td>
</tr>
<tr>
<td>10</td>
<td>1&quot;</td>
<td>1.049 1.315 1&quot;</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
<td></td>
</tr>
</tbody>
</table>

*Refers to schedule 40 pipe. For other pipe schedules, use X in the above symbol and specify the pipe schedule in description. Example: 5P1BXA10G X=1/2" Schedule 80 pipe.

#6 MOUNTING METHOD

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12&quot;</td>
<td>E</td>
<td>36&quot;</td>
</tr>
<tr>
<td>B</td>
<td>18&quot;</td>
<td>F</td>
<td>48&quot;</td>
</tr>
<tr>
<td>C</td>
<td>24&quot;</td>
<td>G</td>
<td>60&quot;</td>
</tr>
<tr>
<td>D</td>
<td>30&quot;</td>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**Note:** You must always specify information required on tag.

#7 PROTECTION TUBE MATERIAL

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Carbon steel</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>304 Stainless steel</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>310 Stainless steel</td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>316 Stainless steel (Standard)</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Inconel 600</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Hastelloy C-276</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>446 Stainless Steel</td>
<td></td>
</tr>
<tr>
<td>X*</td>
<td>Other, specify</td>
<td></td>
</tr>
</tbody>
</table>

**Economical sleeve alternatives available. Call JMS for details.**

#8 TAGGING OPTIONS

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tag # stamped on well (Standard)</td>
</tr>
<tr>
<td>M</td>
<td>MTR</td>
</tr>
<tr>
<td>X*</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**Note:** Matching spring-loaded sensor length will be the overall length of the protection tube minus 1/4".

Welded sensors will be 1" less than the overall length of the protection tube. See illustrations below.

**Note:** Matching spring-loaded sensor length will be the overall length of the protection tube minus 1/4".

Welded sensors will be 1" less than the overall length of the protection tube. See illustrations below.
CERAMIC PROTECTION TUBES

Alumina, Mullite and Hexoloy SE protection tubes are used at high temperatures that have a small slope of temperature change. Any thermocouple type can be used in these ceramic tubes; however, Platinum-Rhodium and Chromel-Alumel are used most often due to their high operating temperature range. “Alumina” is an Aluminum Oxide ceramic (99.7% Al₂O₃). “Mullite” is a compound of Alumina and Silica (Silicon Carbide). “Hexoloy” is a sintered alpha Silicon Carbide. Alumina tubes can be used at 3400°F (1870°C), Mullite tubes can be used at 3100°F (1700°C) and Hexoloy will not slump at 3000°F (1648°C) even under load. These tubes are somewhat gas tight, sensitive to thermal shock, and can crack if one end of the tube is heated at a different rate than the other. If the tubes are exposed to a significant sharp decline or rise in temperature, they may crack. Hexoloy has excellent thermal shock resistance, universal corrosion resistance and exceptional wear with high strength and extreme hardness for severe environment applications.

Platinum-Rhodium thermocouples should always be protected in ceramic protection tubes. Alumina should be used rather than Mullite for all atmospheres, except oxidizing, where Mullite can be used. The Silicon from the Mullite can contaminate the Platinum-Rhodium thermocouple.

We recommend that the user preheat the entire tube to ≈ 900°F before installing it into a hot process environment.

### Tube Size

<table>
<thead>
<tr>
<th>Tube ID x OD</th>
<th>Collar OD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; x 3/8&quot;</td>
<td>1/4&quot; x 3/8&quot;</td>
</tr>
<tr>
<td>3/8&quot; x 1/2&quot;</td>
<td>3/8&quot; x 5/8&quot;</td>
</tr>
<tr>
<td>5/8&quot; x 1&quot;</td>
<td>5/8&quot; x 1&quot;</td>
</tr>
<tr>
<td>1-1/8&quot; x 1-3/4&quot;</td>
<td>1-1/8&quot; x 1-3/4&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**
- Standard hex bushings are 1/2" NPT head connection, and 3/4" NPT process connection.
- CS sleeve for tube NPT will equal tube OD (Example: 1" OD will use 1" NPT threads). It can be used to attach adjustable flanges and bushings. Use X in symbol number 3 and describe.
- For tubes smaller than 11/16" OD, the L length will equal the total length including the entire hex bushing.

### Attaching Device

<table>
<thead>
<tr>
<th>Attaching Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>No fitting</td>
</tr>
<tr>
<td>Open both ends, no fitting</td>
</tr>
<tr>
<td>Collar</td>
</tr>
<tr>
<td>Hex bushing (Std for option #4 selections: 14, 38, 76, 12)</td>
</tr>
<tr>
<td>Carbon steel sleeve (Std for option #4 selections: 34 &amp; 10)</td>
</tr>
<tr>
<td>Other, specify</td>
</tr>
</tbody>
</table>

### Tagging Options

<table>
<thead>
<tr>
<th>Tagging Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tag # is indelibly marked on well or attaching device (Standard)</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>MTR</td>
</tr>
</tbody>
</table>

**Match Sensor Lengths**

Note: Do NOT use spring-loaded sensors in ceramic protection tubes.
SULFUR PROTECTION TUBE

DESIGN ASPECTS

- Excellent corrosion resistance capable of resisting even the punishing temperatures and corrosion of a sulfur burner.
- Dual graduated seals allow the end user to access and monitor the sensor, while preventing leakage of sulfur burner contents.
- Maximized lifespan of wells and sensors.
- Tightly bonded layer of Chromium Oxide which, together with the naturally inert nature of Alumina, provides protection tubing with a remarkable resistance to oxidizing and corrosive atmospheres over 2200°F.
- High thermal conductivity and sensitivity to temperature changes makes it an excellent choice for thermocouples used to monitor or control high temperature environments.
- Great strength at temperatures where many high temperature metals melt. Above 2800°F it begins to soften and becomes plastic.
- Less porous than most compacts. No significant passage of gas through the body at high temperatures, except under high vacuum. Sufficiently impermeable for most industrial applications.
- Superior to “straight ceramics” in resisting thermal and mechanical shock.
- Sturdy UL, FM and CSA approved explosion proof head.
- Not recommended in boiling sulfuric acid -- 10%. For more information regarding its suitability to your application, Call JMS Today!!!
SULFUR PROTECTION TUBE

See page 5-9 (5G) series for ordering.

PROCESS BENEFITS

- JMS provides experienced engineering capable of designing to suit your specification needs.
- Maximized lifespan of wells and sensors.
- Increases reliable temperature measurements in Sulfur burners on an ongoing basis.
- Reduces risk of Sulfuric acid leaking into uncontained areas.
- Reduces shut downs due to sensor replacement.
- Avoids the high cost of repetitive replacements.

APPLICATIONS

Sulfuric acid plants

\[ \text{H}_2\text{SO}_4 \]

Corrosive \( \text{SO}_2 \) and \( \text{SO}_3 \) gas to 2500°F at tip

Corrosive \( \text{SO}_3 \) and \( \text{HF} \) gas to 2000°F

Boiling \( \text{H}_2\text{SO}_4 \) – 97%

Many additional applications.

Call JMS today for prompt and friendly assistance with your specification needs.
MCPT - METAL CERAMIC PROTECTION TUBES

The MCPT consists of a hard abrasion-resistant Chromium and Aluminum Oxide material. It has good strength at temperatures where many high-temperature metals melt. This “hybrid” composition is slightly less resistant to thermal and mechanical shock than metal protection tubes, but much greater than that of ceramic protection tubes.

The MCPT exhibits good wear resistance and abrasion resistance. It has a hardness of Rockwell C37, which indicates the crushing strength of the material rather than the true hardness of the entire body.

JMS Southeast, Inc. offers the special optional fitting pictured below for mounting the metal ceramic protection tube in high temperature sealed environments. The minimum “U” length available is 2.35”.

<table>
<thead>
<tr>
<th>#1 DESCRIPTION</th>
<th>#2 FITTING SELECTION</th>
<th>#3 LENGTH (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5G Metal Ceramic Protection Tube (MCPT) 5/8” ID x 7/8” OD, 3/4” NPT conduit connector</td>
<td>- Add a W here for a Brass cap and stainless steel chain attached to protection tube (Example: 5GW)</td>
<td>Standard Design Graduated Seal</td>
</tr>
<tr>
<td>5G</td>
<td>J</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LENGTH (U Length)</th>
<th>Graduated Seal (U Length)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9”</td>
<td>4”</td>
</tr>
<tr>
<td>12”</td>
<td>7”</td>
</tr>
<tr>
<td>18” (Standard)</td>
<td>13”</td>
</tr>
<tr>
<td>30” (Standard)</td>
<td>25”</td>
</tr>
<tr>
<td>36”</td>
<td>31”</td>
</tr>
<tr>
<td>48” (Standard)</td>
<td>43”</td>
</tr>
<tr>
<td>Other, specify</td>
<td>23-1/4”</td>
</tr>
</tbody>
</table>

COAL PULVERIZING THERMOWELL

This well is ideal for coal pulverizers, fluidized beds and any place where contact instrumentation might be subjected to Small Particle Erosion (SPE). JMS found that in many SPE applications customers were using OEM supplied hard faced thermowells with a variety of coatings. These thermowells were expensive to replace and could not withstand the harsh erosive environment of pulverized coal. The wear to these OEM supplied wells resulted in loss of reliability, change in response time and significant energy costs.

In response to these concerns, JMS developed a pressure sealed dependable alternative and has had some wells in place for more than 6 years without appreciable wear. A side by side comparison of durability is pictured on the right.

<table>
<thead>
<tr>
<th>#1 DESCRIPTION</th>
<th>#2 U (INSERTION) DEPTH</th>
<th>#3 PROCESS CONNECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5V Coal pulverizing thermowell - Add a W here for a Brass plug and stainless steel chain attached to well (Example: 5VW)</td>
<td>__” Length in inches (see illustration below)</td>
<td>A 3/4” NPT (Standard)</td>
</tr>
<tr>
<td>5V</td>
<td>3</td>
<td>A</td>
</tr>
</tbody>
</table>

JMS Coal Pulverizing Design Typical Design w/ Stellite Coating Typical Design Uncoated Steel
Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
### CONNECTION HEADS

**JMS part numbers are shown in black. (Ordering codes are shown in parenthesis) (Max temp ratings shown in red text on the right)**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>6L</td>
<td>General purpose aluminum head with hinged cover 1/2&quot; x 1/2&quot; connection (Standard)</td>
<td><em>Corrosion resistant</em> <em>Moisture resistant</em> <em>Durable</em> <em>NEMA 4</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>150°C</td>
</tr>
<tr>
<td>6Q</td>
<td>Black plastic (polyamid 6) head 1/2&quot; x 1/2&quot; connection</td>
<td><em>Moisture resistant</em> <em>Dust resistant</em> <em>Very light weight</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Q)</td>
</tr>
<tr>
<td>6S250</td>
<td>Cylinder style head, 1/4&quot; NPT Small &amp; light weight</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100°C</td>
</tr>
<tr>
<td>6S125</td>
<td>Cylinder style head, 1/8&quot; NPT Small &amp; light weight</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>100°C</td>
</tr>
<tr>
<td>6N</td>
<td>General purpose cast iron head with cap and chain, 1/2&quot; x 3/4&quot; connection</td>
<td><em>Corrosion resistant</em> <em>Dust resistant</em> <em>Moisture resistant</em> <em>Durable</em> <em>NEMA 4</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>150°C</td>
</tr>
<tr>
<td>6T</td>
<td>Miniature molded head, 1/4&quot; x 1/4&quot; connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>175°C</td>
</tr>
<tr>
<td>6U</td>
<td>Hi temp miniature head, 1/4&quot; x 1/4&quot; connection</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>425°C</td>
</tr>
<tr>
<td>6S</td>
<td>General purpose 316 stainless steel head with cap and chain, 1/2&quot; x 3/4&quot; connection</td>
<td><em>Corrosion resistant</em> <em>Dust resistant</em> <em>Moisture resistant</em> <em>NEMA 4X</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>150°C</td>
</tr>
<tr>
<td>6B</td>
<td>90° Pulling Elbow Malleable Iron/Zinc plated 1/2&quot; x 1/2&quot; connection. Wire nuts not included</td>
<td><em>Rain tight</em> <em>Small and light weight</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(SA)</td>
</tr>
<tr>
<td>6S81</td>
<td>Explosion proof head, 316SS 1/2&quot; x 3/4&quot; x 3/4&quot; connection, threaded cap with glass viewing window.</td>
<td>ATEX/IECEx, FM/CSA, NEMA 4X rated.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>85°C</td>
</tr>
<tr>
<td>6S8A1</td>
<td>Explosion proof head, coated Aluminum 1/2&quot; x 3/4&quot; x 3/4&quot; connection, threaded cap with glass viewing window.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>85°C</td>
</tr>
<tr>
<td>6G2</td>
<td>Ceramic block with brass terminals for type 6M and 6N connection heads. For use with 8 to 14 AWG wires. (See pg. 1-4).</td>
<td><em>UN Listed: E-11853</em> <em>CSA Certified: 9795</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>200°C</td>
</tr>
<tr>
<td>6B4</td>
<td>Ceramic block with brass terminal plates for type 6L, 6M, 6N, 6Q, and 6R connection heads. For use with maximum 16 AWG wire. (See pg. 1-4).</td>
<td>Diameter = 1.62&quot;, Depth = .6&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200°C</td>
</tr>
<tr>
<td>6AIEC</td>
<td>Explosion proof aluminum head 1/2&quot; x 3/4&quot; connection</td>
<td><em>ATEx explosion proof rated for II 2G Ex d IIC</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>85°C</td>
</tr>
<tr>
<td>6B6</td>
<td>Ceramic block with brass terminal plates for type 6L, 6M, 6N, 6Q, and 6R connection heads. For use with maximum 16 AWG wire. (See pg. 1-4).</td>
<td>Temperature rating of 200°C.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200°C</td>
</tr>
<tr>
<td>6IA</td>
<td>Explosion proof aluminum head 1/2&quot; x 3/4&quot; connection</td>
<td><em>UN Listed: E-11853</em> <em>CSA Certified: 9795</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>85°C</td>
</tr>
<tr>
<td>6C4</td>
<td>Ceramic block with 304SS terminal posts for type 6L and 6Q connection heads. Terminal posts provide easy access to the wires. For use with max.18 AWG wire.</td>
<td>Diameter = 1.62&quot;, Depth = .995&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200°C</td>
</tr>
<tr>
<td>6R</td>
<td>High dome, general purpose head with hinged cover, 1/2&quot; x 1/2&quot; connection</td>
<td><em>Corrosion resistant</em> <em>Moisture resistant</em> <em>Durable</em> <em>NEMA 4</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>150°C</td>
</tr>
<tr>
<td>6WP</td>
<td>White plastic screw-top head (polypropylene) 1/2&quot; x 3/4&quot; connection</td>
<td><em>Moisture resistant</em> <em>Dust resistance</em> <em>Very light weight</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>90°C</td>
</tr>
<tr>
<td>6PT2</td>
<td>Unpluggable terminal blocks for easy calibration and removal of sensors. Terminal body is made of 6.6 Polyamide material, with corrosion proof screw clamp parts. For use with 18 AWG to 24 AWG wires. It is standard with 6R and 6L connection heads.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>130°C</td>
</tr>
</tbody>
</table>

For more information and details on connection heads and accessories, visit [www.JMS-SE.com/headspecs](http://www.JMS-SE.com/headspecs)
PLUGS AND JACKS

Connector bodies are molded of glass-filled thermoset compounds (will not melt) for high strength and dependability. The standard connectors will withstand ambient temperatures to 400°F continuous and 500°F intermittent. High temperature connectors will withstand ambient temperatures to 800°F continuous and 1000°F intermittent. Standard plugs are color coded per ANSI standards. High temperature plugs are color coded rust. High temperature connectors have nickel plated prongs; and therefore, are good for use in corrosive environments. Other high temperature plugs and jacks are made of ceramic material and can be color coded.

Alloys of prongs match ANSI calibrations to maintain sensing accuracy. Alloys and polarity are identified by symbols molded into the body.

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION [6-18, 6-19]</th>
</tr>
</thead>
<tbody>
<tr>
<td>6A</td>
<td>Accessories plugs and jacks</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>CONNECTOR DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1*</td>
<td>Standard &lt;425°F</td>
</tr>
<tr>
<td>2</td>
<td>High temperature &lt;800°F</td>
</tr>
<tr>
<td>3*</td>
<td>Heavy duty (solid pin) &lt;425°F</td>
</tr>
<tr>
<td>4*</td>
<td>Heavy duty (jab-in &amp; solid pin) &lt;425°F (Std size only)</td>
</tr>
<tr>
<td>5</td>
<td>Ultra high temperature (glazed) &lt;1200°F</td>
</tr>
<tr>
<td>6*</td>
<td>Low noise &lt;425°F</td>
</tr>
<tr>
<td>7</td>
<td>Ultra high temperature (unglazed) &lt;1200°F</td>
</tr>
</tbody>
</table>

*Add a W suffix to symbol #2 for a write-on window connector. (Example: 1W=Standard connector with write-on window.)

<table>
<thead>
<tr>
<th>#3</th>
<th>STYLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Mini plug</td>
</tr>
<tr>
<td>D</td>
<td>Mini jack</td>
</tr>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>E</td>
<td>Standard jack</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th># OF CIRCUITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 pole</td>
</tr>
<tr>
<td>3*</td>
<td>3 pole</td>
</tr>
</tbody>
</table>

*For thermocouples, 3 pole design will include a copper ground pin. (see illustration below)

<table>
<thead>
<tr>
<th>#5</th>
<th>TYPE</th>
<th>COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan</td>
<td>Black</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
<td>Blue</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
<td>Yellow</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
<td>Purple</td>
</tr>
<tr>
<td>S</td>
<td>Copper/#11 Alloy</td>
<td>Green</td>
</tr>
<tr>
<td>R</td>
<td>Copper/#11 Alloy</td>
<td>Green</td>
</tr>
<tr>
<td>N</td>
<td>Nicrosil/Nisil</td>
<td>Orange</td>
</tr>
<tr>
<td>C</td>
<td>405/A426</td>
<td>Brown</td>
</tr>
<tr>
<td>A*</td>
<td>Copper/Copper (for type B and RTD's)</td>
<td>White</td>
</tr>
</tbody>
</table>

*Note: 2 pole will be Copper/Copper for TCs. 3 pole will be plated Copper for RTDs.

---

**Note:** See page 6-18 and 6-19 on the web for plug wiring standards.

---

**Note:** Call JMS for high temp. vacuum applications and multi-pin connectors. Thermocouple plugs are normally two pin and RTD plugs are three pin. See page 6-4 for preferred RTD quick connectors.

---

**Note:** Call JMS for high temp. vacuum applications and multi-pin connectors. Thermocouple plugs are normally two pin and RTD plugs are three pin. See page 6-4 for preferred RTD quick connectors.
SUPPORT ACCESSORIES FOR PLUGS AND JACKS

TUBE ADAPTER FOR USE WITH PLUG OR JACK ON SHEATH
Nickel plated steel construction compression fitting. Always used with high temp. connectors and dual connectors mounted to sheath, may be specified on standard plugs and jacks.

<table>
<thead>
<tr>
<th>SINGLE</th>
<th>DUAL</th>
<th>OUTSIDE TUBE DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>6V063S</td>
<td>6V063D</td>
<td>1/16&quot;</td>
</tr>
<tr>
<td>6V125S</td>
<td>6V125D</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>6V188S</td>
<td>6V188D</td>
<td>3/16&quot;</td>
</tr>
<tr>
<td>6V250S</td>
<td>6V250D</td>
<td>1/4&quot;</td>
</tr>
</tbody>
</table>

ROUND SINGLE CIRCUIT PANEL JACK
Designed for mounting into an instrument case or control panel from the front. Fits in a standard 3/4" knockout (1 1/8" diameter). Polarity and color coded for identification.

CABLE CLAMP FOR USE W/ PLUG & JACK WITH LEAD WIRE
Nickel plated steel. For cable up to 3/8" diameter. Always used to support plug mounted on wire lead.

SUPPORT ACCESSORIES

CABLE CLAMP FOR USE W/ PLUG & JACK WITH LEAD WIRE
Nickel plated steel. For cable up to 3/8" diameter. Always used to support plug mounted on wire lead.

Note: Standard cord connectors are aluminum. Other sizes and materials are available.

THERMOCOUPLE DIN RAIL CONNECTOR

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6DR</td>
<td>Din rail mountable thermocouple connections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE OF EXTENSION WIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>QUANTITY OF SENSOR INPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Desired number of plugs (total per individual rail)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>INCLUDES MINI T/C RECEPTACLE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Note: If yes, leave blank (Example: 6DRK2)</td>
</tr>
</tbody>
</table>

6DR J 4 4
QUICK CONNECTORS

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6D</td>
<td>Quick connectors</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE OF CONNECTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US microphone style connector (Standard)</td>
</tr>
<tr>
<td>B</td>
<td>DIN-IEC microphone style connector</td>
</tr>
<tr>
<td>C</td>
<td>Molded/Hermetic connector</td>
</tr>
<tr>
<td>Y</td>
<td>M12 watertight connector</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>DESCRIPTION [6-17] Visit JMS-SE.com/CONNECTORS for pin connections details.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 wire RTD or thermocouple</td>
</tr>
<tr>
<td>3</td>
<td>3 wire RTD</td>
</tr>
<tr>
<td>4</td>
<td>4 wire RTD</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>TERMINATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Plug</td>
</tr>
<tr>
<td>E</td>
<td>Jack</td>
</tr>
<tr>
<td>P</td>
<td>Panel mounted jack</td>
</tr>
<tr>
<td>M</td>
<td>Panel mounted plug</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th># OF CIRCUICTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Single</td>
</tr>
<tr>
<td>D</td>
<td>Dual</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>INSERT ALLOY</th>
</tr>
</thead>
<tbody>
<tr>
<td>J*</td>
<td>Iron/Constantan</td>
</tr>
<tr>
<td>T*</td>
<td>Copper/Constantan</td>
</tr>
<tr>
<td>K*</td>
<td>Chrome/Alumel</td>
</tr>
<tr>
<td>E*</td>
<td>Chrome/Constantan</td>
</tr>
<tr>
<td>S</td>
<td>Gold Plated - Standard for Type C</td>
</tr>
<tr>
<td>C</td>
<td>Chrome Plated - Standard for Type A</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

* Not available in Type A or C Connectors.

See [6-17] JMS Technical Catalog for plug wiring standards.

EXTENSION ASSEMBLIES

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6E</td>
<td>Extension assembly (Extension grade wire is used per ASTM E230)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J, T, K, E, N, R*, S*, 2, 3, 4 wire RTD, X (Other, Specify)</td>
<td></td>
</tr>
</tbody>
</table>

*Available in fiberglass braid, Teflon, and PVC only.

<table>
<thead>
<tr>
<th>#3</th>
<th>ELEMENT CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single</td>
</tr>
<tr>
<td>2</td>
<td>Dual</td>
</tr>
<tr>
<td>3</td>
<td>Triple</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>LEAD WIRE TYPE &amp; LENGTH IN INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20/24 AWG fiberglass braid</td>
</tr>
<tr>
<td>2</td>
<td>20/24 AWG PVC</td>
</tr>
<tr>
<td>3</td>
<td>20/24 AWG FEP Teflon</td>
</tr>
<tr>
<td>4</td>
<td>20/24 AWG high temp fiberglass braid</td>
</tr>
<tr>
<td>5</td>
<td>20/24 AWG Kapton</td>
</tr>
</tbody>
</table>

| 6  | 20/24 AWG fiberglass braid/flex armor overall (Standard) |
| 7  | 20/24 AWG Teflon w/ flex armor |
| X  | Other, specify |

Notes: -20 AWG standard for T/C ext. & 24 AWG for RTD ext. -Dual & triple element will be bundled via flex armor.

<table>
<thead>
<tr>
<th>#5</th>
<th>FIRST END TERMINATIONS [Additional options see pg.1-7]</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Bare ends</td>
</tr>
<tr>
<td>B</td>
<td>Miniature plug</td>
</tr>
<tr>
<td>D</td>
<td>Miniature jack</td>
</tr>
<tr>
<td>C</td>
<td>Standard plug</td>
</tr>
<tr>
<td>E</td>
<td>Standard jack</td>
</tr>
<tr>
<td>F</td>
<td>High temp std plug</td>
</tr>
<tr>
<td>G</td>
<td>High temp std jack</td>
</tr>
<tr>
<td>L</td>
<td>Dual molded plug</td>
</tr>
<tr>
<td>M</td>
<td>Dual molded jack</td>
</tr>
<tr>
<td>W</td>
<td>Type A plug (6DA) [See pg.6-17]</td>
</tr>
<tr>
<td>V</td>
<td>Type A jack</td>
</tr>
<tr>
<td>T</td>
<td>Junction box connector</td>
</tr>
</tbody>
</table>

Note: All plugs and jacks will be mounted with a cable clamp for mechanical strength unless otherwise specified.

<table>
<thead>
<tr>
<th>#6</th>
<th>SECOND END TERMINATIONS [Additional options see Pg 1-7]</th>
</tr>
</thead>
<tbody>
<tr>
<td>6E</td>
<td>J</td>
</tr>
<tr>
<td>1</td>
<td>6-36&quot;</td>
</tr>
<tr>
<td>C</td>
<td>TA</td>
</tr>
</tbody>
</table>

Notes: - Other, specify M12 watertight connector (plug) - Other, specify Spade lugs
Multicircuit panels are molded of glass-filled thermoset compounds for high strength and dependability. Panels will withstand continuous exposure to temperatures of 425°F and intermittent exposure to 500°F. One-piece mounting frame is made of 3/32” thick rigid steel with flat black finish. Horizontal mounting style is standard.

### #1 DESCRIPTION

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6PM</td>
<td>Multicircuit panel</td>
</tr>
</tbody>
</table>

### #2 FRAME STYLE

<table>
<thead>
<tr>
<th>#2</th>
<th>FRAME STYLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Standard Frame (Maximum number of jacks per row is 24)</td>
</tr>
<tr>
<td>2</td>
<td>19” Rack (Maximum number of jacks per row is 22)</td>
</tr>
</tbody>
</table>

### #3 TYPE

<table>
<thead>
<tr>
<th>#3</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Standard</td>
</tr>
<tr>
<td>M</td>
<td>Mini</td>
</tr>
<tr>
<td>U</td>
<td>Universal</td>
</tr>
</tbody>
</table>

### #4 NUMBER OF ROWS REQUIRED

<table>
<thead>
<tr>
<th>#4</th>
<th>NUMBER OF ROWS REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 3 1/2”</td>
</tr>
<tr>
<td>2</td>
<td>3 1 1/2”</td>
</tr>
<tr>
<td>3</td>
<td>5 1/4”</td>
</tr>
<tr>
<td>4</td>
<td>7”</td>
</tr>
</tbody>
</table>

### #5 DESCRIPTION

<table>
<thead>
<tr>
<th>#5</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>Total number of sensor inputs</td>
</tr>
</tbody>
</table>

### #6 TYPE

<table>
<thead>
<tr>
<th>#6</th>
<th>TYPE</th>
<th>COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan</td>
<td>Black</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
<td>Blue</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
<td>Yellow</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
<td>Purple</td>
</tr>
<tr>
<td>R</td>
<td>Platinum/Platinum 13% Rhodium</td>
<td>Green</td>
</tr>
<tr>
<td>S</td>
<td>Platinum/Platinum 10% Rhodium</td>
<td>Green</td>
</tr>
<tr>
<td>A</td>
<td>Copper/Copper</td>
<td>White</td>
</tr>
<tr>
<td>N</td>
<td>Nicrosil/Nisil</td>
<td>Orange</td>
</tr>
</tbody>
</table>

### #7 # OF POLES

<table>
<thead>
<tr>
<th>#7</th>
<th># OF POLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2 poles</td>
</tr>
<tr>
<td>3</td>
<td>3 poles</td>
</tr>
</tbody>
</table>

**Note:** We assume an even number of circuits per row.

Typical arrangement layout for standard or universal. Contact our engineering department for specific drawings.

---

**CIRCUITS PER ROW**

<table>
<thead>
<tr>
<th>NUMBER OF ROWS</th>
<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>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
<th>21</th>
<th>22</th>
<th>23</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fh 2 3/8&quot; Ch 1 1/2&quot;</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>2 Fh 4 3/8&quot; Ch 3 1/4&quot;</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
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<td>17</td>
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<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Fh 6 1/8&quot; Ch 5&quot;</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
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<td>18</td>
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<td>20</td>
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<td>22</td>
<td>23</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Fh 8 3/8&quot; Ch 7 1/4&quot;</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
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<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Fh 10 1/8&quot; Ch 9 1/2&quot;</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
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<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Fh 12 1/8&quot; Ch 12&quot;</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Fh 14 7/8&quot; Ch 13 3/4&quot;</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
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<td>24</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Fh 16 5/8&quot; Ch 15 1/2&quot;</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Fh 18 3/8&quot; Ch 17 1/4&quot;</td>
<td>18</td>
<td>19</td>
<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

---

| X 6PM | | S | | 3 | | 12 | | K | | 2 | |
**JACK PANEL OR PLUG PANEL CONDUIT BOXES**

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6PB</td>
<td>Jack panel or plug panel conduit boxes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE</th>
<th>COLOR CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan</td>
<td>Black</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan</td>
<td>Blue</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel</td>
<td>Yellow</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan</td>
<td>Purple</td>
</tr>
<tr>
<td>R</td>
<td>Platinum/Platinum 13% Rhodium</td>
<td>Green</td>
</tr>
<tr>
<td>S</td>
<td>Platinum/Platinum 10% Rhodium</td>
<td>Green</td>
</tr>
<tr>
<td>2</td>
<td>2 Pole Copper/Copper (for type B thermocouples)</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>3 Pole Copper/Copper (for RTDs)</td>
<td>White</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>DESCRIPTION</th>
<th>Note: Wire hubs are opposing when mates are connected. Male is left handed and the Female is ALWAYS right!</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number of circuits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>BOX STYLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Conduit box cast Aluminum - locking handle is standard on male box. (1-5 circuits)</td>
</tr>
<tr>
<td>D</td>
<td>Junction box fiberglass impregnated Nylon (1-6 circuits)</td>
</tr>
<tr>
<td>E</td>
<td>Junction box cast Aluminum (1-6 circuits)</td>
</tr>
<tr>
<td>J</td>
<td>Junction box - standard mini flat pin connectors (1-6 circuits)</td>
</tr>
<tr>
<td>L</td>
<td>Molded panel (1 piece)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>No Box</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>CONNECTION TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Plug (male)</td>
</tr>
<tr>
<td>F</td>
<td>Jack (female)</td>
</tr>
</tbody>
</table>

**STYLE D, E**
**ROTARY SELECTOR SWITCHES**

The JMS Deluxe Switch has an integral face plate and screw/solder terminals. Terminals are silver plated, brass numbered circuits w/ polarity identification. Blades and contacts are silver plated w/ self-cleaning wiper action. The “OFF” position has terminals available for shorting input circuit when using the switch w/ a digital meter. Order numbers 63-2 through 63-10 are break before make. Order numbers 63-12 through 65-40 and 6R-6 through 6R-36 are make before break.

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>NO. POS. 2 POLE</th>
<th>SYMBOL</th>
<th>NO. POS. 2 POLE</th>
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</thead>
<tbody>
<tr>
<td>63-2</td>
<td>2</td>
<td>65-24</td>
<td>24</td>
</tr>
<tr>
<td>63-3</td>
<td>3</td>
<td>65-28</td>
<td>28</td>
</tr>
<tr>
<td>63-4</td>
<td>4</td>
<td>65-32</td>
<td>32</td>
</tr>
<tr>
<td>63-5</td>
<td>5</td>
<td>65-36</td>
<td>36</td>
</tr>
<tr>
<td>63-6</td>
<td>6</td>
<td>65-40</td>
<td>40</td>
</tr>
<tr>
<td>63-8</td>
<td>8</td>
<td>6R-6</td>
<td>6</td>
</tr>
<tr>
<td>63-10</td>
<td>10</td>
<td>6R-12</td>
<td>12</td>
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<tr>
<td>63-14</td>
<td>14</td>
<td>6R-24</td>
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<tr>
<td>63-16</td>
<td>16</td>
<td>6R-28</td>
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<tr>
<td>63-18</td>
<td>18</td>
<td>6R-32</td>
<td>32</td>
</tr>
<tr>
<td>63-20</td>
<td>20</td>
<td>6R-36</td>
<td>36</td>
</tr>
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</table>

**SPADE LUGS**

Spade lugs are offered in compensating alloys. Spade lugs accept 18 gauge wire or smaller for crimp connections. Each lug has stamped-in designation of thermocouple alloy type.

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
<th>#2</th>
<th>THERMOCOUPLE ALLOY</th>
</tr>
</thead>
<tbody>
<tr>
<td>6SL</td>
<td>Spade lug</td>
<td>AL</td>
<td>Alumel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH</td>
<td>Chromel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO</td>
<td>Constantan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CP</td>
<td>Copper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IR</td>
<td>Iron</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>NN</th>
<th>NP</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nisil</td>
<td>Nicrosil</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

**TERMINAL STRIPS**

JMS terminal strips are manufactured of general purpose glass-filled Nylon and will withstand temperatures from 40°F to 400°F. Terminals are Nickel-plated Brass. JMS recommends that thermocouple terminal lugs be ordered with this item.

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>6TS</td>
<td>Terminal strip</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>#2</th>
<th># OF CIRCUITS</th>
<th>#3</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>Number of circuits (4 screws = 1 circuit)</td>
<td></td>
<td>J,T,K,E,N,R</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(R will be RTD or Pt T/Cs)</td>
</tr>
</tbody>
</table>

Note: There is a maximum of 10 circuits per strip.

**TERMINAL LUGS**

Terminal lugs are available in thermocouple compensating alloys. They are intended for use with JMS Southeast terminal strips. Each lug is marked with thermocouple alloy.

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION</th>
<th>#2</th>
<th>THERMOCOUPLE ALLOY</th>
</tr>
</thead>
<tbody>
<tr>
<td>6TL</td>
<td>Terminal lug</td>
<td>AL</td>
<td>Alumel</td>
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<tr>
<td></td>
<td></td>
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<td>Chromel</td>
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<td>CO</td>
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<td></td>
<td></td>
<td>CP</td>
<td>Copper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IR</td>
<td>Iron</td>
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</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>NN</th>
<th>NP</th>
<th>X</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Nisil</td>
<td>Nicrosil</td>
<td>Other, specify</td>
</tr>
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</table>
## ATTACHING DEVICES

### #1 DESCRIPTION

<table>
<thead>
<tr>
<th>#</th>
<th>DESCRIPTION</th>
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</thead>
<tbody>
<tr>
<td>6F</td>
<td>Attaching device (fittings)</td>
</tr>
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### #2 TYPE

<table>
<thead>
<tr>
<th>#</th>
<th>TYPE</th>
<th>COMPRESSION</th>
<th>WELDED</th>
<th>SPRING-LOADED</th>
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<tbody>
<tr>
<td>H</td>
<td>Stainless steel ferrule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>Teflon ferrule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>Lava ferrule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>Nylon ferrule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>Brass ferrule</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Double threaded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Double threaded w/ plug</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Double threaded stainless steel w/ oil ring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Double threaded Bayonet assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Double threaded Bayonet oil sealed assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Double threaded Bayonet oil sealed assembly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Adjustable stainless steel spring</td>
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### #3 OUTSIDE DIAMETER OF TUBE

<table>
<thead>
<tr>
<th>#</th>
<th>OUTSIDE DIAMETER OF TUBE</th>
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<tbody>
<tr>
<td>P</td>
<td>1/2&quot; (.500&quot;)</td>
</tr>
<tr>
<td>A</td>
<td>3/8&quot; (.375&quot;)</td>
</tr>
<tr>
<td>Y</td>
<td>5/16&quot; (.313&quot;)</td>
</tr>
<tr>
<td>B</td>
<td>1/4&quot; (.250&quot;)</td>
</tr>
<tr>
<td>R</td>
<td>6mm (.236&quot;)</td>
</tr>
<tr>
<td>C</td>
<td>3/16&quot; (.188&quot;)</td>
</tr>
<tr>
<td>D</td>
<td>1/8&quot; (.125&quot;)</td>
</tr>
<tr>
<td>E</td>
<td>1/16&quot; (.063&quot;)</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
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</table>

### #4 PROCESS CONNECTION

<table>
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<tr>
<th>#</th>
<th>PROCESS CONNECTION</th>
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</thead>
<tbody>
<tr>
<td>L</td>
<td>1/8&quot; NPT</td>
</tr>
<tr>
<td>M</td>
<td>1/4&quot; NPT</td>
</tr>
<tr>
<td>P</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
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### #5 FITTING MATERIAL

<table>
<thead>
<tr>
<th>#</th>
<th>FITTING MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>Stainless steel (Standard)</td>
</tr>
<tr>
<td>B</td>
<td>Brass</td>
</tr>
<tr>
<td>T</td>
<td>Teflon</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

---

* JMS springs for .250" O.D. sensors are made from a special material and undergo unique heat treating processes to maintain a loaded compression of at least 1 pound up to 1000° F. Standard stainless steel springs lose 100% of their compression at elevated temperatures.

** Type C does not include oil-ring seal.

*** Typically used with type 6R & 6P heads. (See page 6-1)
# Multiconductor Feedthroughs

Model number includes:

L1 (CAP) OR L2 (CAP) +
TEFLON FERRULE (T) OR
STAINLESS STEEL FERRULE (S)

---

**To Order (Specify model number)**  
Example: 6FT144L1T

<table>
<thead>
<tr>
<th>Sheath Diameter</th>
<th>Model Number</th>
<th>Diameter of Probe</th>
<th>Number of Probes</th>
<th>Thread NPT</th>
<th>Length</th>
<th>Across Flats</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1/25”</strong></td>
<td>6FT0403 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>3</td>
<td>1/4”</td>
<td>2”</td>
<td>2 1/2”</td>
</tr>
<tr>
<td></td>
<td>6FT0405 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>5</td>
<td>1/4”</td>
<td>2”</td>
<td>2 1/2”</td>
</tr>
<tr>
<td></td>
<td>6FT0406 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>6</td>
<td>1/2”</td>
<td>2 5/8”</td>
<td>3 3/8”</td>
</tr>
<tr>
<td></td>
<td>6FT0408 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>8</td>
<td>1/2”</td>
<td>2 5/8”</td>
<td>3 3/8”</td>
</tr>
<tr>
<td></td>
<td>6FT04010 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>10</td>
<td>3/4”</td>
<td>2 13/16”</td>
<td>3 1/2”</td>
</tr>
<tr>
<td></td>
<td>6FT04012 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>12</td>
<td>3/4”</td>
<td>2 13/16”</td>
<td>3 1/2”</td>
</tr>
<tr>
<td></td>
<td>6FT04016 (L1 OR L2) (T OR S)</td>
<td>.040”</td>
<td>16</td>
<td>3/4”</td>
<td>2 13/16”</td>
<td>3 1/2”</td>
</tr>
</tbody>
</table>

| **1/16”**       | 6FT1163 (L1 OR L2) (T OR S) | .062” | 3 | 1/4” | 2” | 2 1/2” | 3/4” | 7/8” |
|                 | 6FT1165 (L1 OR L2) (T OR S) | .062” | 5 | 1/4” | 2” | 2 1/2” | 3/4” | 7/8” |
|                 | 6FT1166 (L1 OR L2) (T OR S) | .062” | 6 | 1/2” | 2 5/8” | 3 3/8” | 1 1/8” | 1 3/8” |
|                 | 6FT1168 (L1 OR L2) (T OR S) | .062” | 8 | 1/2” | 2 5/8” | 3 3/8” | 1 1/8” | 1 3/8” |
|                 | 6FT11610 (L1 OR L2) (T OR S) | .062” | 10 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |
|                 | 6FT11612 (L1 OR L2) (T OR S) | .062” | 12 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |
|                 | 6FT11616 (L1 OR L2) (T OR S) | .062” | 16 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |

| **1/8”**        | 6FT183 (L1 OR L2) (T OR S) | .125” | 3 | 1/2” | 2 5/8” | 3 3/8” | 1 1/8” | 1 3/8” |
|                 | 6FT184 (L1 OR L2) (T OR S) | .125” | 4 | 1/2” | 2 5/8” | 3 3/8” | 1 1/8” | 1 3/8” |
|                 | 6FT186 (L1 OR L2) (T OR S) | .125” | 6 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |
|                 | 6FT188 (L1 OR L2) (T OR S) | .125” | 8 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |

| **3/16”**       | 6FT3163 (L1 OR L2) (T OR S) | .188” | 3 | 1/2” | 2 5/8” | 3 3/8” | 1 1/8” | 1 3/8” |
|                 | 6FT3165 (L1 OR L2) (T OR S) | .188” | 5 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |

| **1/4”**        | 6FT143 (L1 OR L2) (T OR S) | .250” | 3 | 3/4” | 2 13/16” | 3 1/2” | 1 1/4” | 1 1/2” |

Many other options available!
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>THERMOCOUPLE AND RTD WIRE</td>
<td></td>
</tr>
<tr>
<td>Miniature and Industrial Thermocouples</td>
<td>1</td>
</tr>
<tr>
<td>Plastics Sensors</td>
<td>2</td>
</tr>
<tr>
<td>Resistance Temperature Devices (RTDs)</td>
<td>3</td>
</tr>
<tr>
<td>Sanitary Sensors, Sanitary Thermowells and Specialty Sensors</td>
<td>4</td>
</tr>
<tr>
<td>Thermowells, Protection Tubes, and Coatings</td>
<td>5</td>
</tr>
<tr>
<td>Accessories</td>
<td>6</td>
</tr>
<tr>
<td>Thermocouple and RTD Wire</td>
<td>7</td>
</tr>
<tr>
<td>Transmitters</td>
<td>8</td>
</tr>
</tbody>
</table>

Swifty Sensor

Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
### THERMOCOUPLE WIRE

#### #2 TYPE

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>JX</td>
<td>J</td>
<td>Iron/Constantan</td>
</tr>
<tr>
<td>KX</td>
<td>K</td>
<td>Chromel/Alumel</td>
</tr>
<tr>
<td>TX</td>
<td>T</td>
<td>Copper/Constantan</td>
</tr>
<tr>
<td>EX</td>
<td>E</td>
<td>Chromel/Constantan</td>
</tr>
<tr>
<td>NX</td>
<td>N</td>
<td>Nicrosil/Nisil</td>
</tr>
<tr>
<td>RX</td>
<td>--</td>
<td>Copper/#11 Alloy</td>
</tr>
<tr>
<td>SX</td>
<td>--</td>
<td>Copper/#11 Alloy</td>
</tr>
<tr>
<td>BX</td>
<td>--</td>
<td>PCLW 630/Copper (special order only)</td>
</tr>
<tr>
<td>2X</td>
<td>--</td>
<td>Copper/Copper</td>
</tr>
<tr>
<td>CX</td>
<td>--</td>
<td>A405/A426</td>
</tr>
</tbody>
</table>

*Note: For special limits of error thermocouple wire, use a double calibration symbol. (Example: JJ for Type J special limits). Polyvinyl Chloride (PVC) wire and type R,S, B, and C fiberglass wire are ordinarily manufactured in extension grade. Kapton, Nylon, Teflon, fiberglass braid, Refrasil, and Nextel are ordinarily manufactured in thermocouple grade.*

#### #3 INSULATION [7-5] [7-6]

<table>
<thead>
<tr>
<th>Type</th>
<th>Temperature Range (°C)</th>
<th>Temperature Range (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP**</td>
<td>-29 - 105</td>
<td>25 - 482</td>
</tr>
<tr>
<td>PC</td>
<td>-29 - 105</td>
<td>25 - 482</td>
</tr>
<tr>
<td>PA*</td>
<td>-29 - 80</td>
<td>25 - 705</td>
</tr>
<tr>
<td>Kapton</td>
<td>-200 - 285</td>
<td>25 - 871</td>
</tr>
<tr>
<td>NN</td>
<td>-200 - 177</td>
<td>25 - 982</td>
</tr>
<tr>
<td>TF</td>
<td>-200 - 350</td>
<td>NE*</td>
</tr>
<tr>
<td>TT*</td>
<td>-200 - 300</td>
<td>Nextel - Heavy weave (for light weave, use X and specify lower weave #)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

*Standard stock items in 20 AWG. Other insulations and sizes available.*

#### #4 WIRE SIZE

<table>
<thead>
<tr>
<th>Wire</th>
<th>Size (AWG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
</tr>
</tbody>
</table>

#### #5 WIRE CONSTRUCTION

<table>
<thead>
<tr>
<th>Wire</th>
<th>Construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Solid (Standard)</td>
</tr>
<tr>
<td>7</td>
<td>Stranded</td>
</tr>
</tbody>
</table>

[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at www.JMS-SE.com/TechnicalCatalog

### NON-INSULATED SINGLE CONDUCTOR THERMOCOUPLE WIRE

#### #1 DESCRIPTION [7-11]

**7N** Non-Insulated thermocouple wire

#### #2 TYPE

<table>
<thead>
<tr>
<th>Type</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>JP</td>
<td>Iron</td>
</tr>
<tr>
<td>JN</td>
<td>Constantan</td>
</tr>
<tr>
<td>KP</td>
<td>Chromel</td>
</tr>
<tr>
<td>KN</td>
<td>Alumel</td>
</tr>
<tr>
<td>EP</td>
<td>Chromel</td>
</tr>
<tr>
<td>EN</td>
<td>Constantan</td>
</tr>
<tr>
<td>NP</td>
<td>Nicrosil</td>
</tr>
<tr>
<td>NN</td>
<td>Nisil</td>
</tr>
<tr>
<td>TP</td>
<td>Copper</td>
</tr>
<tr>
<td>TN</td>
<td>Constantan</td>
</tr>
<tr>
<td>SP*</td>
<td>Platinum 10% Rhodium</td>
</tr>
<tr>
<td>SN*</td>
<td>Platinum</td>
</tr>
<tr>
<td>RP*</td>
<td>Platinum 13% Rhodium</td>
</tr>
<tr>
<td>RN*</td>
<td>Platinum</td>
</tr>
<tr>
<td>BP*</td>
<td>Platinum 30% Rhodium</td>
</tr>
<tr>
<td>BN*</td>
<td>Platinum 6% Rhodium</td>
</tr>
<tr>
<td>CP*</td>
<td>Tungsten 5% Rhenium</td>
</tr>
<tr>
<td>CN*</td>
<td>Tungsten 26% Rhenium</td>
</tr>
<tr>
<td>AP*</td>
<td>Tungsten 5% Rhenium</td>
</tr>
<tr>
<td>AN*</td>
<td>Tungsten 20% Rhenium</td>
</tr>
</tbody>
</table>

*Unit of Measure = inches

#### #3 WIRE SIZE

<table>
<thead>
<tr>
<th>Wire</th>
<th>Size (AWG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>8 AWG</td>
</tr>
<tr>
<td>14</td>
<td>14 AWG</td>
</tr>
<tr>
<td>16</td>
<td>16 AWG</td>
</tr>
<tr>
<td>20</td>
<td>20 AWG</td>
</tr>
<tr>
<td>24</td>
<td>24 AWG</td>
</tr>
<tr>
<td>28</td>
<td>28 AWG</td>
</tr>
<tr>
<td>30</td>
<td>30 AWG</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

*(JMS standard for SP, SN, RP, RN, BP, & BN)*

*Note: See www.JMS-SE.com for weight per unit of measure*
MULTI-CONDUCTOR EXTENSION CABLE

Each conductor is insulated with Polyvinyl Chloride (PVC) or Teflon. An aluminum backed Mylar™ tape serves as an electrostatic shield. A solid 20 gauge tinned-copper drain wire is over the bundle in direct contact with the aluminum/mylar shield, thus minimizing any stray EMFs. Conductors are color coded and numbered for identification. All conductors are insulated with an outer jacket of polyvinyl chloride or Teflon insulation approximately .0245” thick. Multipair extension cable can be manufactured with various quantities of pairs and insulation types. Contact JMS Southeast sales office for any requirements you may have.

<table>
<thead>
<tr>
<th>#1 DESCRIPTION [7-5 through 7-17]</th>
<th>7M Multi-conductor extension cable</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>#2 TYPE</th>
<th>Unit of Measure = Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>J Iron/Constantan</td>
<td></td>
</tr>
<tr>
<td>K Chromel/Alumel</td>
<td></td>
</tr>
<tr>
<td>T Copper/Constantan</td>
<td></td>
</tr>
<tr>
<td>E Chromel/Constantan</td>
<td></td>
</tr>
<tr>
<td>R Copper/#11 Alloy</td>
<td></td>
</tr>
<tr>
<td>S Copper/#11 Alloy</td>
<td></td>
</tr>
<tr>
<td>B PCLW 630/Copper</td>
<td></td>
</tr>
<tr>
<td>2 2 wire RTD</td>
<td></td>
</tr>
<tr>
<td>3 3 wire RTD</td>
<td></td>
</tr>
<tr>
<td>4 4 wire RTD</td>
<td></td>
</tr>
<tr>
<td>X Other, specify</td>
<td></td>
</tr>
</tbody>
</table>

Note: Standard thermocouple conductors are solid 20 AWG, standard RTD conductors are stranded 24 AWG.

<table>
<thead>
<tr>
<th>#3 # OF PAIRS</th>
<th>NOMINAL OD</th>
<th>EST. SHIPPING WT., LBS. PER 1000 FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>.370</td>
<td>53</td>
</tr>
<tr>
<td>4</td>
<td>.390</td>
<td>80</td>
</tr>
<tr>
<td>8</td>
<td>.480</td>
<td>131</td>
</tr>
<tr>
<td>12</td>
<td>.580</td>
<td>198</td>
</tr>
<tr>
<td>16</td>
<td>.650</td>
<td>245</td>
</tr>
<tr>
<td>20</td>
<td>.680</td>
<td>285</td>
</tr>
<tr>
<td>24</td>
<td>.770</td>
<td>338</td>
</tr>
<tr>
<td>X Other, specify</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Add an “S” suffix for stranded conductors.

<table>
<thead>
<tr>
<th>#4 INSULATION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>P Polyvinyl Chloride(PVC) (Standard)</td>
<td></td>
</tr>
<tr>
<td>T Extruded Teflon</td>
<td></td>
</tr>
<tr>
<td>X Other, specify</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5 ALUMINUM MYLAR SHIELD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I Individual pair and overall</td>
<td></td>
</tr>
<tr>
<td>O Overall only</td>
<td></td>
</tr>
<tr>
<td>Z No shield/not applicable</td>
<td></td>
</tr>
</tbody>
</table>
## RTD Wire

### 1. Description

- **7R**: RTD wire

### 2. Insulation

- PP: Polyvinyl Chloride (PVC)
- GG: Fiberglass braid (Standard)
- GS: Fiberglass braid with stainless steel overbraid (available in 3, 4 or 6 conductor, 24 AWG)
- KK: Kapton insulated
- TT*: Extruded Teflon singles, Teflon wrap overall (Standard)
- TS*: Extruded Teflon singles, Teflon wrap overall, SSOB
- X: Other, specify

*Conductors are color coded per ASTM E1137 & IEC 60751*

### 3. Number of Conductors

- 2: Two conductors
- 3: Three conductors
- 4: Four conductors
- X: Other, specify

### 4. Wire Size

- 16 AWG
- 20 AWG
- 24 AWG (Standard)
- 28 AWG
- 30 AWG
- X: Other, specify

### 5. Wire Construction

- 1: Solid (Standard)
- 2: Stranded (Standard)

### 6. Shield

- N: No shield/not applicable
- A: Aluminum Mylar shield

---

### RTD Wiring Configuration and Color Code

(Reference ASTM 1137 and IEC 60751)

<table>
<thead>
<tr>
<th>One Resistor</th>
<th>2-wire-configuration</th>
<th>3-wire-configuration</th>
<th>4-wire-configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RED</td>
<td>RED, WHITE</td>
<td>RED, RED, WHITE</td>
</tr>
<tr>
<td></td>
<td>BLACK (GREY)</td>
<td>BLACK (GREY), YELLOW</td>
<td>BLACK (GREY), YELLOW</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Two Resistor</th>
<th>2-wire-configuration</th>
<th>3-wire-configuration</th>
<th>4-wire-configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RED</td>
<td>RED, WHITE</td>
<td>RED, RED, WHITE</td>
</tr>
<tr>
<td></td>
<td>BLACK (GREY)</td>
<td>BLACK, BLACK (GREY), YELLOW</td>
<td>BLACK, BLACK (GREY), YELLOW</td>
</tr>
</tbody>
</table>
## TRANSMITTERS

<table>
<thead>
<tr>
<th>Swifty Sensor</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Miniature and Industrial Thermocouples</td>
</tr>
<tr>
<td>2</td>
<td>Plastics Sensors</td>
</tr>
<tr>
<td>3</td>
<td>Resistance Temperature Devices (RTDs)</td>
</tr>
<tr>
<td>4</td>
<td>Sanitary Sensors, Sanitary Thermowells and Specialty Sensors</td>
</tr>
<tr>
<td>5</td>
<td>Thermowells, Protection Tubes, and Coatings</td>
</tr>
<tr>
<td>6</td>
<td>Accessories</td>
</tr>
<tr>
<td>7</td>
<td>Thermocouple and RTD Wire</td>
</tr>
<tr>
<td>8</td>
<td>Transmitters</td>
</tr>
</tbody>
</table>

Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call 1-800-873-1835 or email Sensors@JMS-SE.com for more information.
The 888 series specified with these ordering symbols include a temperature sensor assembly with an integral transmitter and indicator. The sensors are 316 stainless steel and 1/4” outside diameter. Thermocouples have ungrounded junctions. RTD’s have a 3 wire configuration and a 0.00385 alpha. The most popular assembly features a spring-loaded fitting with a thermowell.

<table>
<thead>
<tr>
<th>#1</th>
<th>DESCRIPTION [18]</th>
</tr>
</thead>
<tbody>
<tr>
<td>888</td>
<td>Transmitter (Includes housing and digital indicator).          (Specifications for GS &amp; GV housing styles see illustrations on page 8-2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE OF TRANSMITTER [8-18]</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Isolated (Standard)</td>
</tr>
<tr>
<td>N</td>
<td>Non-isolated</td>
</tr>
<tr>
<td>I</td>
<td>Hart Protocol</td>
</tr>
<tr>
<td>E</td>
<td>Intrinsically safe*</td>
</tr>
<tr>
<td>D</td>
<td>Intrinsically safe/Hart Protocol*</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#3</th>
<th>SINGLE INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan thermocouple</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan thermocouple</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel thermocouple</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan thermocouple</td>
</tr>
<tr>
<td>S</td>
<td>Platinum 10% Rhodium/Pure Platinum thermocouple</td>
</tr>
<tr>
<td>R</td>
<td>Platinum 13% Rhodium/Pure Platinum thermocouple</td>
</tr>
<tr>
<td>B</td>
<td>Platinum 6% Rhodium/Platinum 30% Rhodium thermocouple</td>
</tr>
<tr>
<td>N</td>
<td>Nicrosil/Nisil thermocouple</td>
</tr>
<tr>
<td>C</td>
<td>Tungsten 5% Rhenium/Tungsten 26% Rhenium thermocouple</td>
</tr>
<tr>
<td>3</td>
<td>3 wire, 100Ω, Platinum, a=.00385, RTD</td>
</tr>
<tr>
<td>4</td>
<td>4 wire, 100Ω, Platinum, a=.00385, RTD</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#4</th>
<th>TEMPERATURE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>_ to _°C</td>
<td>List desired temperature span</td>
</tr>
<tr>
<td>_ to _°F</td>
<td>List desired temperature span</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#5</th>
<th>SIGNAL OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Fieldbus</td>
</tr>
<tr>
<td>P</td>
<td>Profbus</td>
</tr>
<tr>
<td>4</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>#6</th>
<th>INDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Digital, 4-20 mA (Standard)</td>
</tr>
<tr>
<td>Z</td>
<td>No indication</td>
</tr>
</tbody>
</table>

**Note:** Many other transmitter options are available. (see pages 1-1 & 1-2 for TC) (see pages 3-1 & 3-2 for RTD) (see page 8-3 for stand alone transmitters)
### INTEGRAL TRANSMITTERS WITH HOUSING AND INDICATOR

**GA Housing Style (#7)**
**Detailed View**

**GS Housing Style (#7)**
**Detailed View**

### Table: Housing Options

<table>
<thead>
<tr>
<th>#7</th>
<th>HOUSING</th>
</tr>
</thead>
<tbody>
<tr>
<td>GS</td>
<td>Explosion proof, NEMA 4X, ATEX/IECEX, FM/CSA, 316SS, threaded cap with glass viewing window</td>
</tr>
<tr>
<td>GA</td>
<td>Explosion proof, NEMA 4X, ATEX/IECEX, FM/CSA, Aluminium, threaded cap with glass viewing window</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

### Table: Fitting Type

<table>
<thead>
<tr>
<th>#8</th>
<th>FITTING TYPE</th>
<th>[6-13]</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Spring-loaded 1/2&quot;x1/2&quot; (NPT)</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>Welded 1/2&quot;x1/2&quot; (NPT)</td>
<td></td>
</tr>
<tr>
<td>N*</td>
<td>Nipple-Union-Nipple 1/2&quot;x1/2&quot; (NPT)</td>
<td></td>
</tr>
<tr>
<td>X*</td>
<td>Other, specify</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

### Table: Immersion Length

<table>
<thead>
<tr>
<th>#9</th>
<th>IMMERSION LENGTH IN INCHES (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>4&quot;</td>
</tr>
<tr>
<td>6</td>
<td>6&quot;</td>
</tr>
<tr>
<td>9</td>
<td>9&quot;</td>
</tr>
<tr>
<td>12</td>
<td>12&quot;</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>Not applicable/probe not included (example: field mounted transmitter)</td>
</tr>
</tbody>
</table>

### NEW
Polycarbonate General Purpose Enclosure with Battery Powered Digital Display

To order, simply specify JMS part #: DWG21551- followed by the length(L). (Example: DWG21551-12 for a 12" immersion)
## NON-ISOLATED TRANSMITTERS

Although non-isolated transmitters are available for thermocouples, JMS always recommends the customer use isolated transmitters for their application. See below for isolation values to 2500 volts

### #1 DESCRIPTION [8-13]

<table>
<thead>
<tr>
<th>#2</th>
<th>INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>J*</td>
<td>Iron/Constantan thermocouple</td>
</tr>
<tr>
<td>T*</td>
<td>Copper/Constantan thermocouple</td>
</tr>
<tr>
<td>K*</td>
<td>Chromel/Alumel thermocouple</td>
</tr>
<tr>
<td>E*</td>
<td>Chromel/Constantan thermocouple</td>
</tr>
<tr>
<td>S*</td>
<td>Platinum 10% Rhodium/Pure Platinum thermocouple</td>
</tr>
<tr>
<td>R*</td>
<td>Platinum 13% Rhodium/Pure Platinum thermocouple</td>
</tr>
<tr>
<td>B*</td>
<td>Platinum 6% Rhodium/Platinum 30% Rhodium thermocouple</td>
</tr>
</tbody>
</table>

*All non-isolated thermocouple transmitters should be used with ungrounded junctions to prevent ground loops and noise interference.

### #3 TEMPERATURE RANGE

<table>
<thead>
<tr>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>List desired temperature span</td>
<td>X</td>
</tr>
<tr>
<td>List desired temperature span</td>
<td>Z</td>
</tr>
<tr>
<td>Other, specify</td>
<td>N/A (customer to span)</td>
</tr>
</tbody>
</table>

### #4 OUTPUT

<table>
<thead>
<tr>
<th>#4</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 to 5 VDC</td>
</tr>
<tr>
<td>4</td>
<td>4 to 20 mA</td>
</tr>
</tbody>
</table>

### #5 MOUNTING

<table>
<thead>
<tr>
<th>A</th>
<th>Dual mounting bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Dual mounting bracket with 12” cuttable mounting track</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
<tr>
<td>Z</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### #6 SOFTWARE & CABLES INCLUDED? [8-19]

<table>
<thead>
<tr>
<th>A</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>No</td>
</tr>
</tbody>
</table>

---

## ISOLATED TRANSMITTERS

### #1 DESCRIPTION [8-14 through 8-17]

<table>
<thead>
<tr>
<th>#2</th>
<th>TYPE OF TRANSMITTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>Standard</td>
</tr>
<tr>
<td>I</td>
<td>Hart Protocol</td>
</tr>
<tr>
<td>E</td>
<td>Intrinsically safe</td>
</tr>
<tr>
<td>D</td>
<td>Intrinsically safe/Hart Protocol</td>
</tr>
<tr>
<td>X</td>
<td>Other, specify</td>
</tr>
</tbody>
</table>

### #3 INPUT

<table>
<thead>
<tr>
<th>#3</th>
<th>TYPE OF TRANSMITTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>Iron/Constantan thermocouple</td>
</tr>
<tr>
<td>T</td>
<td>Copper/Constantan thermocouple</td>
</tr>
<tr>
<td>K</td>
<td>Chromel/Alumel thermocouple</td>
</tr>
<tr>
<td>E</td>
<td>Chromel/Constantan thermocouple</td>
</tr>
<tr>
<td>S</td>
<td>Platinum 10% Rhodium/Pure Platinum thermocouple</td>
</tr>
<tr>
<td>R</td>
<td>Platinum 13% Rhodium/Pure Platinum thermocouple</td>
</tr>
<tr>
<td>B</td>
<td>Platinum 6% Rhodium/Platinum 30% Rhodium thermocouple</td>
</tr>
</tbody>
</table>

### #4 TEMPERATURE RANGE

<table>
<thead>
<tr>
<th>°C</th>
<th>°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>List desired temperature span</td>
<td>X</td>
</tr>
<tr>
<td>List desired temperature span</td>
<td>Z</td>
</tr>
<tr>
<td>Other, specify</td>
<td>N/A (customer to span)</td>
</tr>
</tbody>
</table>

### #5 OUTPUT

<table>
<thead>
<tr>
<th>#5</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 to 5 VDC</td>
</tr>
<tr>
<td>4</td>
<td>4 to 20 mA</td>
</tr>
<tr>
<td>P</td>
<td>Profibus</td>
</tr>
</tbody>
</table>

### #6 SOFTWARE & CABLES INCLUDED?

<table>
<thead>
<tr>
<th>A</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>No</td>
</tr>
</tbody>
</table>

---

**Note:** DIN rail style (8R) available for all isolated transmitter types.

### #7 PLUG IN INDICATION

<table>
<thead>
<tr>
<th>P*</th>
<th>Yes</th>
</tr>
</thead>
</table>

*Only available with “puck” styled models I, E, or D in selection #2.
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In such cases JMS has sent personnel on site to "check, spec and req" the temperature sensors and thermowells pulled from the field. This means that a JMS temperature expert examines the sensor and thermowell you pull out, takes pictures, compares it to the latest ASME and ASTM requirements, can perform on site PMI testing and wake frequency calculations and creates a part number so that the perfect part can be shipped to your site on an expedited basis. A drawing is then generated for your records so that the next time you turn around that item you have no question as to what has been installed -- you can order by drawing number and have every possible detail you need to make working with that sensor as easy as pie.

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