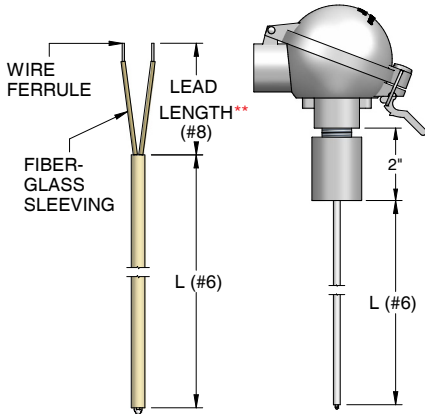


# BEADED THERMOCOUPLES

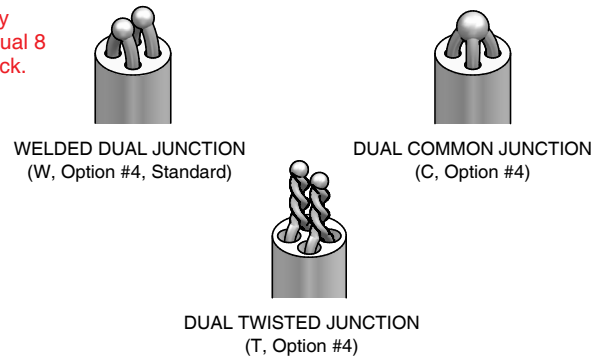
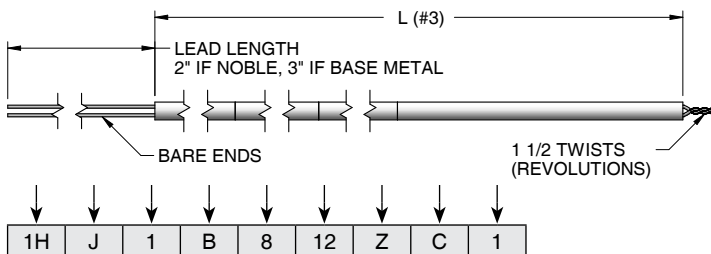
Beaded thermocouples are most common in furnace, heat treating and other high temperature applications. Noble Metal Thermocouples (Types R, S, B) and Refractory Thermocouples (Types C & A) incorporate an alumina bead to avoid contamination of the wire. Base Metal Thermocouples (Types J, K, N, E, T and L) are constructed with mullite beads or alumina where the upgrade is more readily available. Smaller AWG thermocouples (20 AWG, 24, AWG, 26 AWG and 30 AWG) are usually built with a single piece insulator. Larger AWG base metal thermocouples (8 AWG, 14 AWG, 20 AWG) are constructed with 1" to 3" long mullite beads that are either oval or rounded. **Heads and attaching devices will be shipped unassembled to the thermocouple unless assembled to a protection tube to avoid breakage in shipment. Must have attaching device and process connection to ship assembled to heads and protection tubes.** See Section 5 for typical protection tube designs. Special designs available by drawing.

|                  |   |                    |    |                  |  |   |  |              |   |                |  |
|------------------|---|--------------------|----|------------------|--|---|--|--------------|---|----------------|--|
| #1               | DESCRIPTION   |                    |    |                  |  |   |  |              |   |                |  |
| 1H               | Beaded Thermocouple   |                    |    |                  |  |   |  |              |   |                |  |
| #2               | TYPE  |                    |    |                  |  |   |  |              |   |                |  |
|                  | J, K, N, R, S, B, C, T, E, A, X (Other, specify)  |                    |    |                  |  |   |  |              |   |                |  |
| #3               | LIMITS OF ERROR / ELEMENT CONSTRUCTION  |                    |    |                  |  |   |  |              |   |                |  |
| 1                | Standard  | Single             | 3  | Special          | Single   | X                                       | Other, specify                         |              |   |                |  |
| 2                | Standard  | Dual               | 4  | Special          | Dual   |   |  |              |   |                |  |
| #4               | MEASURING JUNCTION  |                    |    |                  |  |   |  |              |   |                |  |
| B                | Welded (Std)  | (Isolated if Dual) | C  | Common weld bead |  |   |  |              |   | (Dual Only)    |  |
| T                | Twisted   | (Isolated if Dual) | X  | Other, specify   |  |   |  |              |   |                |  |
| #5               | WIRE GAUGE  |                    |    |                  |  |   |  |              |   |                |  |
|                  | AWG   | INSULATOR OD       |    | AWG              | INSULATOR OD   |   | AWG                                    | INSULATOR OD |   |                |  |
| 8                | 8   | 7/16" (1/2" DUAL)  | 20 | 20               | 3/16"  | 26                                      | 26                                     | 3/16"        | X | Other, specify |  |
| 14               | 14  | 1/4"               | 24 | 24               | 3/16"  | 30                                      | 30                                     | 1/8"         |   |                |  |
| #6               | LENGTH ("L" Dimension -- See illustrations on this page for length)*  |                    |    |                  |  |   |  |              |   |                |  |
| L"               | Length in inches  |                    |    |                  |  |   |  |              |   |                |  |
| #7               | ATTACHING DEVICES USED TO CONNECT TO CERAMIC OR METAL PROTECTION TUBE [5-5 TO 5-8]  |                    |    |                  |  |   |  |              |   |                |  |
| Z                | N/A   |                    |    |                  | C34  | Nipple-Coupling SS 1/2"x3/4" NPTF       |  |              |   |                |  |
| U                | Short Nipple with 1/2" NPTF 304 SS Union  |                    |    |                  | C10  | Nipple-Coupling SS 1/2"x1" NPTF         |  |              |   |                |  |
| C18              | Nipple-Coupling SS 1/2"x1/8" NPTF   |                    |    |                  | C114   | Nipple-Coupling SS 1/2"x1-1/4" NPTF     |  |              |   |                |  |
| C14              | Nipple-Coupling SS 1/2"x1/4" NPTF   |                    |    |                  | C112   | Nipple-Coupling SS 1/2"x1-1/2" NPTF     |  |              |   |                |  |
| C                | Nipple-Coupling SS 1/2"x1/2" NPTF   |                    |    |                  | X  | Other, specify                          |  |              |   |                |  |
| #8               | COLD END TERMINATION (Additional Options see Page 1-7) <a href="http://www.JMS-SE.com/headspecs">www.JMS-SE.com/headspecs</a> |                    |    |                  |  |   |  |              |   |                |  |
| Quick Connectors |   |                    |    |                  | HEADS [6-1] std 1/2"x3/4" add prefix of 1 for 3/4"x3/4" head |   |  |              |   |                |  |
| C                | Standard Plug   |                    |    |                  | General Purpose  | L                                       | Aluminum w/ hinged cover (6L)          |              |   |                |  |
| F                | High Temp Plug  |                    |    |                  |  | M                                       | Aluminum w/ screw cover & chain (6M)   |              |   |                |  |
| E                | Standard Jack   |                    |    |                  |  | N                                       | Cast Iron w/ screw cover & chain (6N)  |              |   |                |  |
| G                | High Temp Jack  |                    |    |                  |  | SS                                      | 316 SS w/ screw cover & chain (6SS)    |              |   |                |  |
| Other            |   |                    |    |                  | Exp. Proof   | I                                       | Aluminum, NEMA 4X, FM, CSA, IP66 (6IA) |              |   |                |  |
| A                | Fiberglass sleeve to bare ends**  |                    |    |                  |  | J                                       | 316 SS NEMA 4X, FM, CSA, IP66 (6ISS)   |              |   |                |  |
| K                | Fiberglass sleeve to spade lugs**   |                    |    |                  |  |   |  |              |   |                |  |
| O                | Open terminal block   |                    |    |                  |  |   |  |              |   |                |  |
| X                | Other, specify  |                    |    |                  | AH   | Heat shrink to bare ends**              |  |              |   |                |  |
| AF               |   |                    |    |                  | AF   | Mullite fish spine beads to bare ends** |  |              |   |                |  |
| #9               | OPTIONS   |                    |    |                  |  |   |  |              |   |                |  |
| 1                | Stainless Steel Tag   |                    |    |                  | 5M   | Material Calibration Report             |  |              |   |                |  |
| 2                | Plastic Tag   |                    |    |                  | 5L   | Standard Lot Calibration                |  |              |   |                |  |
| 3                | Paper Tag   |                    |    |                  | 5  | Calibrate at specific points            |  |              |   |                |  |
| T                | Calibration Tag   |                    |    |                  | 6  | Premium Calibration Report              |  |              |   |                |  |
| 7                | CE Marking  |                    |    |                  | 6L   | Premium Lot Calibration Report          |  |              |   |                |  |
| X                | Other, specify.   |                    |    |                  | 8  | Guide 17025 Calibration                 |  |              |   |                |  |

\* Note: Manufacturing tolerance of one piece construction is ±0.5", one inch and three inch bead construction is +0"/-1".



\*\* Note: Bare ends will be 2" with wire ferrule if noble (Type R, S, B) 2" if refractory (Type C, A) thermocouples and 3" if base metal (J, K, N, T, E, L) thermocouples. Dual 8 AWG & 14 AWG thermocouples will have the leads shaped to fit a 6G4 terminal block.



# ADDITIONAL TERMINATIONS

**COLD END TERMINATION** [SEE SECTION 6] Choose as many as applicable (**JMS part number prefixes are shown in parenthesis**)

**Connectors**

| <b>Plugs</b> |  | <b>Jacks</b> |  |
|--------------|--|--------------|--|
| B            | Miniature plug (6A1B)                                | D            | Miniature jack (6A1D)                                |
| BH           | Miniature high temperature plug (6A2B) <800°F        | DH           | Miniature high temperature jack (6A2D) <800°F        |
| C            | Standard plug (6A1C)                                 | E            | Standard jack (6A1E)                                 |
| F            | Standard high temperature plug (6A2C) <800°F         | G            | Standard high temperature jack (6A2E) <800°F         |
| WM           | Microphone style plug (6DA)                          | WF           | Microphone style jack (6DA)                          |
| WA           | Solid pin plug, heavy duty (6A3C)                    | WB           | Solid pin jack, heavy duty (6A3E)                    |
| WC           | Jab in plug (6A4C)                                   | WD           | Jab in jack (6A4E)                                   |
| WE           | Ultra high temperature plug, glazed (6A5C) <1200°F   | WG           | Ultra high temperature jack, glazed (6A5E) <1200°F   |
| WH           | Ultra high temperature plug, unglazed (6A7C) <1200°F | WI           | Ultra high temperature jack, unglazed (6A7E) <1200°F |
| WJ           | Low noise plug (6A6C) <425°F                         | WK           | Low noise jack (6A6E) <425°F                         |
| WL           | DIN-IEC microphone plug (6DB)                        | WN           | DIN-IEC microphone style jack (6DB)                  |
| V            | Molded/water resistant plug (6DC)                    | VF           | Molded/water resistant jack (6DC)                    |
| Y            | M12 Male connector (6DY)                             | YF           | M12 Female connector (6DY)                           |
| WQ           | Miniature locking plug (6A8B2)                       | WR           | Miniature locking jack (6A1DL2)                      |
| WS           | Standard plug, locking (6A8C2)                       | WT           | Standard jack, locking (6A8E2)                       |

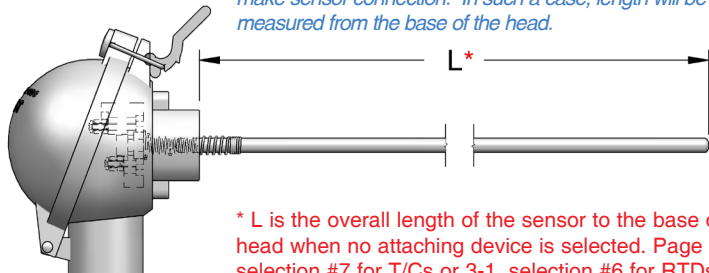
**Heads** [6-1] Visit [www.JMS-SE.com/headspecs](http://www.JMS-SE.com/headspecs)

| <b>Explosion Proof</b> |   |
|------------------------|---|
| I                      | Aluminum, NEMA 4X, FM, CSA, IP68 (6IA)  |
| J                      | 316 stainless steel, NEMA 4X, FM, CSA, IP68 (6ISS)                                      |
| P                      | Aluminum, NEMA 4X, FM, CSA, ATEX, IECEx, IP68 (6IAIEC)                                  |
| U                      | 316 stainless steel, NEMA 4X, ATEX, IP68 (6ISSATEX)                                     |
| SI                     | Cast Iron, NEMA 3, 4, UL, CSA (6I)  |
| GA                     | Aluminum, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP68 (688A1) |
| GS                     | 316SS, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP68 (688S1)    |

| <b>General Purpose</b> |  |
|------------------------|--|
| L                      | Aluminum w/ hinged cover (6L)                    |
| M                      | Aluminum w/ screw cover & chain (6M)             |
| R                      | Aluminum w/ hinged high dome cover (6R)          |
| N                      | Cast Iron w/ screw cover (6N)                    |
| Q                      | Black plastic (6Q)                               |
| SS                     | 316 stainless steel w/ screw cover & chain (6SS) |
| WP                     | White plastic, screw cover, Sanitary (6WP)       |
| SB                     | Nickel plated, cylinder style, 1/4" NPT (6S250)  |
| SD                     | Nickel plated, cylinder style, 1/8" NPT (6S125)  |
| SC                     | Stainless steel, socket cap style                |
| ST                     | Molded plastic, mini head, 1/4" NPT, < 350F (6T) |
| SU                     | Molded plastic, mini head, 1/4" NPT, < 800F (6U) |

*Some applications may have pre-existing threaded pipes or protection tubes where no attaching device is needed to make sensor connection. In such a case, length will be measured from the base of the head.*



**\* 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.**

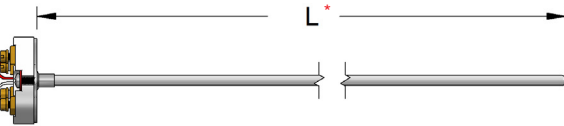
**Transmitters** [ 8-1 to 8-3 ]

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

|    |                                     |     |   |
|----|-------------------------------------|-----|---|
| 8H | Isolated transmitter                | 8PA | Explosion proof, IP66/IP68, NEMA 4X, ATEX/IECEx, FM/CSA, Aluminum, threaded cap with glass viewing window, touch programmable [ 8-2 ] |
| 8N | Non-isolated transmitter            |     |   |
| 8I | Hart Protocol                       | 8PS | Explosion proof, IP66/IP68, NEMA 4X, ATEX/IECEx, FM/CSA, 316 SS, threaded cap with glass viewing window, touch programmable [ 8-2 ]   |
| 8E | Intrinsically safe                  |     |   |
| 8D | Hart/Intrinsically safe             |     |   |
| 8M | Integral transmitter (see page 3-5) |     | <b>RTDs ONLY</b>  |

**Other**

|    |  |  |  |
|----|--|--|--|
| A  | Bare ends  |  |  |
| K  | Spade lugs (6SL)   |  |  |
| RL | Ring lugs (6RL)  |  |  |
| O  | Open ceramic terminal block, brass screw terminal (6B)   |  |  |
| OA | Open Bakelite terminal block, nickel plated screw terminal (6BB)                                       |  |  |
| OB | Open ceramic terminal block for sensors with bayonet style connection, brass screw terminal (6B or 6C) |  |  |
| OG | Ceramic terminal block, brass screw terminal (6G)  |  |  |
| OP | Pluggable polyimide terminal block, nickel plated screw terminal (6PT)                                 |  |  |
| OS | Open ceramic terminal block, nickel plated solder terminal (6C)  |  |  |
| CG | Cord connector/grip, aluminum 1/2" NPT (6CC)   |  |  |
| TB | Conduit bushing, 3/4" NPT male X 1/2" NPT female, plated steel (6IRB)                                  |  |  |
| X  | Other, specify   |  |  |



**\* 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.**