

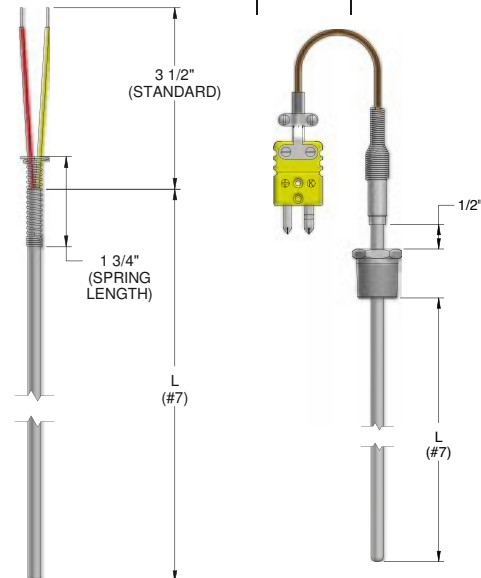
# MINIATURE AND INDUSTRIAL THERMOCOUPLES



#1	DESCRIPTION [6, 7]					
1	Thermocouple					
	#2	TYPE [8, 9, 10]				
	-	J, T, K, E, N, X (Other, specify)				
	#3	LIMITS OF ERROR [9]	ELEMENT CONSTRUCTION			
	1	Standard	Single			
	2	Standard	Dual			
	3	Special	Single			<b>Note:</b> For hollow tube sensors see pages 2-1 and 2-2.
	4	Special	Dual			
	X	Other, specify				
	#4	OUTSIDE DIAMETER [11]	CONDUCTOR SIZE (FOR BASE METALS ONLY)			
			SINGLE (AWG)		DUAL (AWG)	
	A*	3/8" 13			16	
	B	1/4" 16			18	
	C	3/16" 19			20	
	D	1/8" 22			24	
	E	1/16" 28			30	
	F*	1/25" 32			34	
	X	Other, specify				
	Z	N/A				
	#5	SHEATH MATERIAL [11]	MAX °F [2-8, 4-17]			MAX °F
	H	304 Stainless Steel	1650	M	Inconel 600	2100
	J	310 Stainless Steel	2100	C	Teflon coated SS	400
	V	STABALOY 2220		Q	Hastelloy C-276	2000
	K	316 Stainless Steel	1650	X	Other, specify	
	#6	MEASURING JUNCTION [12, 13, 14, 15]				
	G	Grounded		P*	Reduced tip, grounded	
	U	Ungrounded		Y*	Reduced tip, ungrounded	
	E	Exposed (Isolated on dual)		R*	Gas/Air, exposed	
	I	Isolated		S*	Gas/Air, grounded	
	J*	Pointed tip, grounded		T*	Gas/Air, ungrounded	
	K*	Pointed tip, ungrounded		V*	Enlarged tip, grounded	
	L*	Weld pad, grounded		W*	Enlarged tip, ungrounded	
	M*	Weld pad, ungrounded		X*	Other, specify	
	N*	Weld pad, removable grounded			* <b>Note:</b> Provide description when selecting these options.	
	O*	Weld pad, removable ungrounded				
	#7	LENGTH (See sketches on Pg. 1-1, 2, & 3 for lengths)				
	-	Length in inches <b>Note:</b> If sensor requires factory bend order from pg 2-1.				
	#8	STANDARD INDUSTRIAL ATTACHING DEVICE [1-3, 6-13]				
	W	Fixed NPT ss fitting - double threaded				
	S	Spring loaded NPT ss fitting -double threaded				
	C	Spring loaded NPT ss w/ oil ring - double threaded				
	D	Spring loaded ss fitting - single threaded				
	M**	CSA explosion proof spring loaded fitting				
	A	Spring loaded w/threaded retainer				
	B	Bayonet spring loaded assembly for thermowells and heads				
	E*	Adjustable spring over .250", .188", .125" sheath				
	F	Reverse mounted steel plug fixed for attaching head				
	G	Fixed stainless steel to sheath (See drawing to left)				
	H*	Compression fitting ss w/ ss ferrule				
	I*	Compression fitting ss w/ teflon ferrule				
	J*	Compression fitting ss w/ lava ferrule				
	K*	Compression fitting ss w/ nylon ferrule				
	L*	Compression fitting brass w/ brass ferrule				
	H4	4" SS nipple-union-nipple (NUN4H1)				
	H6	6" SS nipple-union-nipple (NUN6H1)				
	N4	4" nipple-union-nipple (NUN4G1)				
	N6	6" nipple-union-nipple (NUN6G1)				
	S4	4" spring-loaded-union-nipple (NU4G1)				
	S6	6" spring-loaded-union-nipple (NU6G1)				
	C4**	4" CSA certified flame path spring-loaded-union-nipple				
	C6**	6" CSA certified flame path spring-loaded-union-nipple				
	X	Other, specify or if more than 1 is needed				
	Z	Not applicable (no fitting required)				

[ ] BRACKETS INDICATE PAGE NUMBERS IN TECHNICAL CATALOG AVAILABLE ONLINE AT [WWW.JMS-SE.COM/PDF/JMS\\_TECHNICAL\\_CATALOG.PDF](http://WWW.JMS-SE.COM/PDF/JMS_TECHNICAL_CATALOG.PDF)

**Note:** For options N & O Fasttrax designs refer to 4-15.



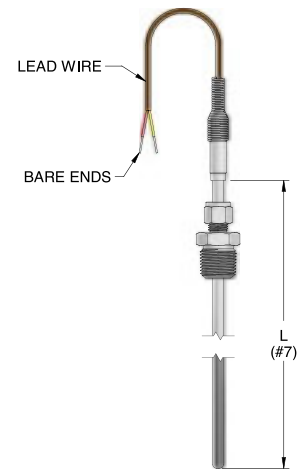
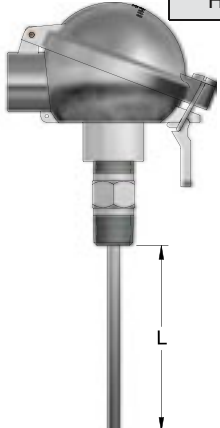
Immersion for Symbol #8-E Spring  
Immersion for Symbol #8-G&D Fitting

1	J	1	B	H	G	12"	S
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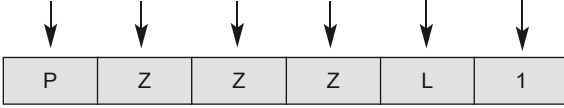
\* Length calc. w/out attaching device.(See dwg on pg. 1-2)  
\*\*For CSA certified assbly. sensor must be assembled w/thermowell having appropriate Canadian Registration Number (CRN)

# MINIATURE AND INDUSTRIAL THERMOCOUPLES

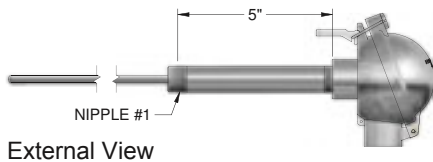
<b>#9</b>	PROCESS NPT [3]		
L M P O X Z	1/8" 1/4" 1/2" (Standard w/ symbols W, S, C, and N in symbol #8) 3/4" Other, specify N/A		
<b>#10</b>	LEAD WIRE TYPE & LENGTH IN INCHES [SEE SECTION 7]		
Z 1__" 2__" 3__" 4__" 5__"	No lead wires Glass braid PVC Teflon Hi-temp glass braid Kapton	}	Solid 20 AWG 7__" Bare wire 8__" PVC coil cord - Standard when using symbol #8-B and #13-R X__" Other, specify
Note: For stranded wire, add "S" before symbol designation in this column. 24 awg or smaller may be used to accommodate some smaller diameters and flex armor extensions.			
<b>#11</b>	ARMOR OR HEAT SHRINK [7-7] [16]		
A B C D F G H	3/16" ID SS flex armor 3/16" ID SS flex armor teflon coated white 3/16" ID SS flex armor teflon coated black 1/8" ID SS flex armor SS overbraid Heat shrink / sleeving Jacket to match primary insulation		J Aluminum mylar shielded and jacketed to match primary insulation X Other, specify Z N/A
Note: Bell Springs are used for most wire extensions at transition. A special armor adapter is used when armor is longer than 60".			
<b>#12</b>	TYPE OF TRANSITION [16]		
H S T R Q X Z	Heat shrink Size on size 3/8" OD (Standard) 1/4" OD Cuttable (see full catalog) Other, specify No transition		Note: For high humidity / moisture environments, ≤ 500°F put a "2" after your selection.  Note: For high temperature at the transition area use an X + type of transition and maximum temperature. >500°F
<b>#13</b>	COLD END TERMINATION [SEE SECTION 6] PICK AS MANY AS APPLICABLE		
A B C D E F G I J K L M N O P U	Bare ends Miniature plug Standard plug Miniature jack Standard jack High temperature plug (< 800° F) High temperature jack (< 800° F) Explosion proof NEMA 4X head, FM, CSA (6IA/6B4) Explosion proof stainless steel NEMA 4X head, FM, CSA (6ISS/6B4) Spade lugs (6SL) Aluminum head w/ hinged cover (6L / 6B4) Aluminum head w/ screw cover & chain (6M / 6B4) Cast iron head w/ screw cover (6N / 6B4) Open terminal block (6M) Explosion proof AL head ATEX certified Explosion proof stainless steel head ATEX certified		Note: For any other cold end termination, use symbol X and describe using appropriate part numbers from section 6 in place of symbol #13.  Q Blk nylon Nema 4 head (6Q/6B4) R High dome head (6R) WM Microphone style connector (6DA) -Male WF Microphone style connector (6DA) -Female 8H Isolated transmitter 8N Non isolated transmitter 8S AI-1500 8I TempIR with Hart Protocol 8E Intrinsically Safe TempIR 8D TempIR/ Hart/ Intrinsically Safe X Other, specify
<b>#14</b>	OPTIONS USE ONLY IF APPLICABLE [INTRODUCTION]		
1* 2* 3* 4*	Stainless steel tag Plastic tag Paper tag Laser etch on probe		5 Calibrate at specified point(s). Corrections data will be provided for each point. 6** Premium calibration report Corrections data will be provided for all temperatures within the range. 7 CE Marking [Page XV] 8 Guide 17025 calibration 9 BAR CODE Z N/A
* Must specify information required on tag / to be etched			** You must specify increments & range (Ex. 0 to 300°F, 10° increments)



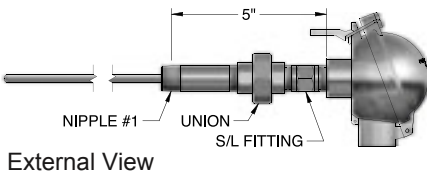
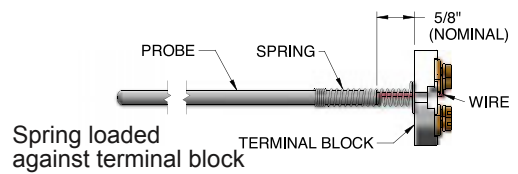
Immersion is overall length of tube for non-fixed attaching devices



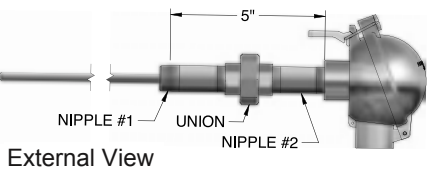
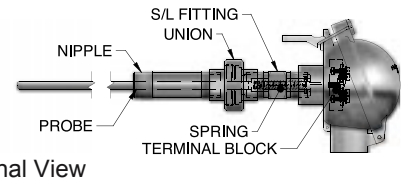
# NIPPLE-UNION-NIPPLE EXTENSION ASSEMBLIES



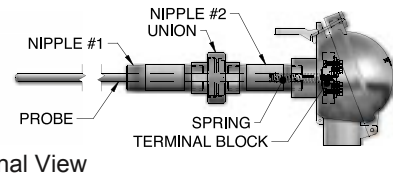
**Drawing 1**  
Nipple + Adjustable Spring  
Minimum Nipple L = 1"  
Ex. Part#: 1J1BHG12"EXZZZL  
X = N5"G1



**Drawing 2**  
Nipple-Union with Machined  
1/2" x 1/2" Spring Loaded Fitting  
Minimum NU L = 3 1/2"  
(includes S/L fitting)  
Ex. Part#: 1J1BHG12" SXZZZL  
X = NU5"G1



**Drawing 3**  
Nipple-Union-Nipple with  
Spring Against Terminal Block  
Minimum NUN L = 2 1/2"  
EX. Part#: 1J1BHG12"EXZZZL  
X = NUN5"G1



An extension assembly may be needed to provide extra length for your sensor in order to extend your sensor head through insulation, or away from the heat of the process. This extension can include a pipe nipple only or a nipple-union-nipple or a nipple-union with a spring-loaded fitting.

Standard nipples and unions are 1/2" NPT and are available in galvanized or stainless steel. The union joins two nipples in an extension assembly and has a standard pressure rating of 150 pounds.

When a nipple-union-nipple or nipple only assembly is used and spring loading of the thermocouple element is required, there are two different methods of spring loading the sensor. The preferred method is to use the machined 1/2" by 1/2" NPT spring-loaded stainless steel fitting as one of the nipples. With this design, the probe is secured within the fitting and is mounted to the head in a rigid manner (see drawing #2 above). The appropriate part number for this assembly would be selected from symbols #8 and #9 from page 1-1 and 1-2, in addition to the symbols on this page. A cheaper method is a spring, mounted over the probe and loaded against the bottom of the terminal block in the head. With this method the probe is not supported within the nipple-union-nipple. It is secured only by the wires into the terminal block. (See drawings 1 & 3 above). We do not recommend that you use this method of spring loading.

When specifying this sensor extension, the nipple-union-nipple length tolerance is  $\pm 1/2"$ .

#1	EXTENSION ASSEMBLY		
N	Nipple Only (Dwg #1)		
NU	Nipple-Union (Dwg #2)		
NUN	Nipple-Union-Nipple (Dwg #3)		
#2	LENGTH		
--"	Specify length in inches		
#3	MATERIAL		
G	Galvanized Steel		
H	304 Stainless Steel		
C	Black Steel		
#4	PRESSURE RATING		
1	#150	- A351 spec (Standard)	} ASTM
2	#3000	- A182 spec	
3	#6000	- A182 spec	
X	Other, specify		
NUN	5"	G	1

# BEADED THERMOCOUPLES

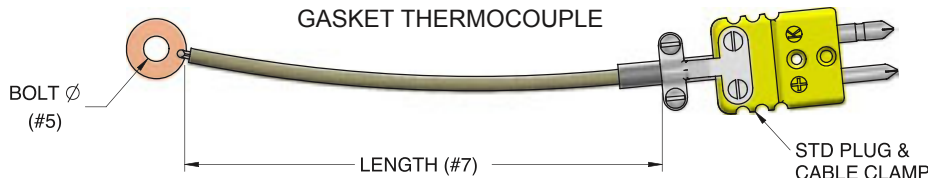
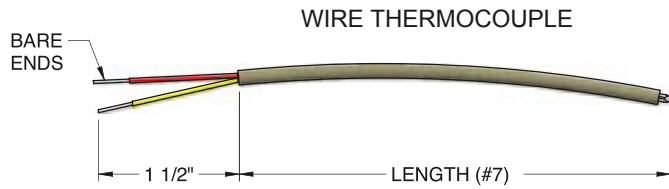
#1	DESCRIPTION								
1B	Beaded Thermocouple								
	#2	JUNCTION							
	B T	Welded bead only Twisted and welded bead						Base metal 8-14 AWG is bent to fit JMS terminal block 6G with 3" leads. (see section 6 for additional terminations)	
	#3	INSULATOR TYPE AND LENGTH (L)							
	A D F G H X	1 inch - Round 3 inch - Round One piece construction - Round 1 inch - Oval 3 inch - Oval Other, specify in description							
	#4	COLD END INSULATION						Base metal 15-30 AWG leads are straight	
	1 2 3 Z X	Fiberglass sleeve (Standard) Heat shrink Mullite fish spine beads Bare ends Other, specify							
	#5	INSULATOR MATERIAL							
	A M	Alumina (Standard for noble metals) Mullite (Standard for base metals)							
	#6	SINGLE ELEMENT	WIRE GAUGE	O.D. OF 1" OR 3" OVAL INSULATORS	O.D. OF 1" OR 3" ROUND INSULATORS	O.D. OF 1 PIECE ROUND INSULATORS			
		08 14 20 24 26 30 X	8 (Standard oval) 14 (Standard oval) 20 24 26 30 Other, specify	5/16" x 7/16" 3/16" x 1/4"   OVAL SINGLE	7/16" 1/4" 3/16" 3/16" 3/16" 1/8"   SINGLE ROUND	7/16" 1/4" 3/16" 3/16" 3/16" 1/8"   FISH SPINE BEADS			
	DUAL ELEMENT	D08 D14 D20 D24 D26 D30 DX	8 14 20 24 26 30 Other, specify	OVAL NOT AVAILABLE IN DUAL	1/2" 5/16" 3/16" 3/16" 3/16" 1/8"	 DUAL ROUND	1/2" 1/4" 3/16" 3/16" 3/16" 1/8"		
	#7	TYPE							
	-	J, K, N, T, E, R, S, B, C, L, A, X (Other, specify)							
	#8	LEAD LENGTH IN INCHES							
	-	Specify length of TC leads in inches. (See drawings) <b>Note: Standard length is 2" for noble metal, 3" base metal</b>							
	#9	OPTIONS USE ONLY IF APPLICABLE [INTRODUCTION]							
	1* 2* 3* 4* 5 6** 7 8 9 Z	Stainless steel tag Plastic tag Paper tag Laser etch on probe Calibrate at specified point(s). Corrections data will be provided for each point. Premium calibration report. Corrections data will be provided for all temperatures within the range. CE Marking [Page XV] Guide 17025 calibration BAR CODE N/A							
		<p style="color: red; font-size: small;">* Must always specify information required on tag / to be etched. **Must specify increments &amp; range. Ex. 0 to 300°F, 10° increments.</p>							
1B	B	F(6)	1	A	24	R	2"	3	

Oval Insulators will be used for any bent beaded thermocouple.

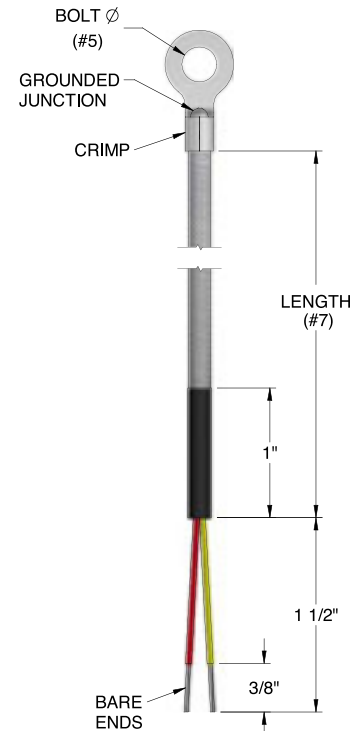
Insulator Tolerances  $\varnothing$ :  $\pm 6\%$  or  $.005"$  whichever is greater.  
Length:  $\pm .063"$ .

Noble metal thermocouples are normally 24 gauge wires. To specify ceramic or metal protection tubes for beaded thermocouple assemblies, see the "Thermowells, Protection Tubes and Coatings" pages in Section 5 of this catalog.

# WIRE, GASKET, AND LUG THERMOCOUPLES



RING TERMINAL THERMOCOUPLE



#1	DESCRIPTION
1D	Wire Gasket and Lug Thermocouples
#2	G Wire thermocouple H Gasket thermocouple L Ring Terminal thermocouple S Spade Lug thermocouple
#3	TYPE (Ex: J, T, K, N, E, etc.)
—	J, K, N, T, E, R, S, B, C, L, A, X (Other, specify)
#4	GASKET MATERIAL
C	Copper (Standard)
P	Spark plug washer (4 cycle automotive)
S	Stainless steel
X	Other, specify
Z	N/A
#5	BOLT DIAMETER
A	#10
C	1/4"
X	Other, specify bolt size and O.D. of washer as necessary.
Z	N/A
#6	WIRE INSULATION
1	Glass braid
3	FEP teflon
4	Hi-temp glass braid
5	Kapton
8	Glass braid / stainless steel overbraid
X	Other, specify
#7	DESCRIPTION
--"	Length in inches
#8	COLD END TERMINATION
A	Bare ends
B	Miniature plug
C	Standard plug
X	Other, specify (See page 1-2, Row#13 for more options)

**Note:** If washer / ring O.D. is critical, use X and state requirements.

1D	G	K	Z	Z	1	36"	C
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