TEMPERATURE MEASUREMENT

JMS SOUTHEAST INCORPORATED

JMS-SE.COM

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Temperature Measurement
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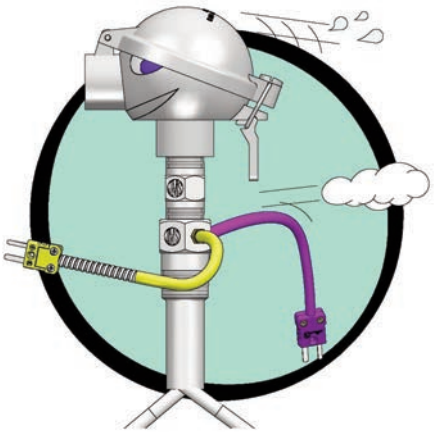
ISO 9001:2008 Registered
File No. 10001132 QM08

WELCOME TO JMS SOUTHEAST!

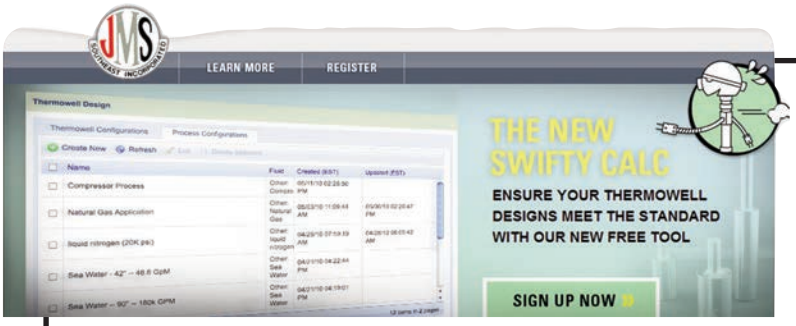
Swifty Sensor



Home of the next day *Swifty Sensor Service* and the New ***SwiftyCalc***!

What sets JMS apart from the average temperature sensor manufacturer?

It's all the "extras" we provide to ensure customer satisfaction. Such as our unique 24 hour delivery service of products called ***Swifty Sensor Service***. Have an emergency? Need it overnight? We will manufacture whatever your need may be to get you out of that "situation". This is at NO extra charge to you.



DESIGN THERMOWELLS THAT LAST AND EXTEND THE LIFE OF YOUR TEMPERATURE SENSORS WITH JMS SwiftyCalc!

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.

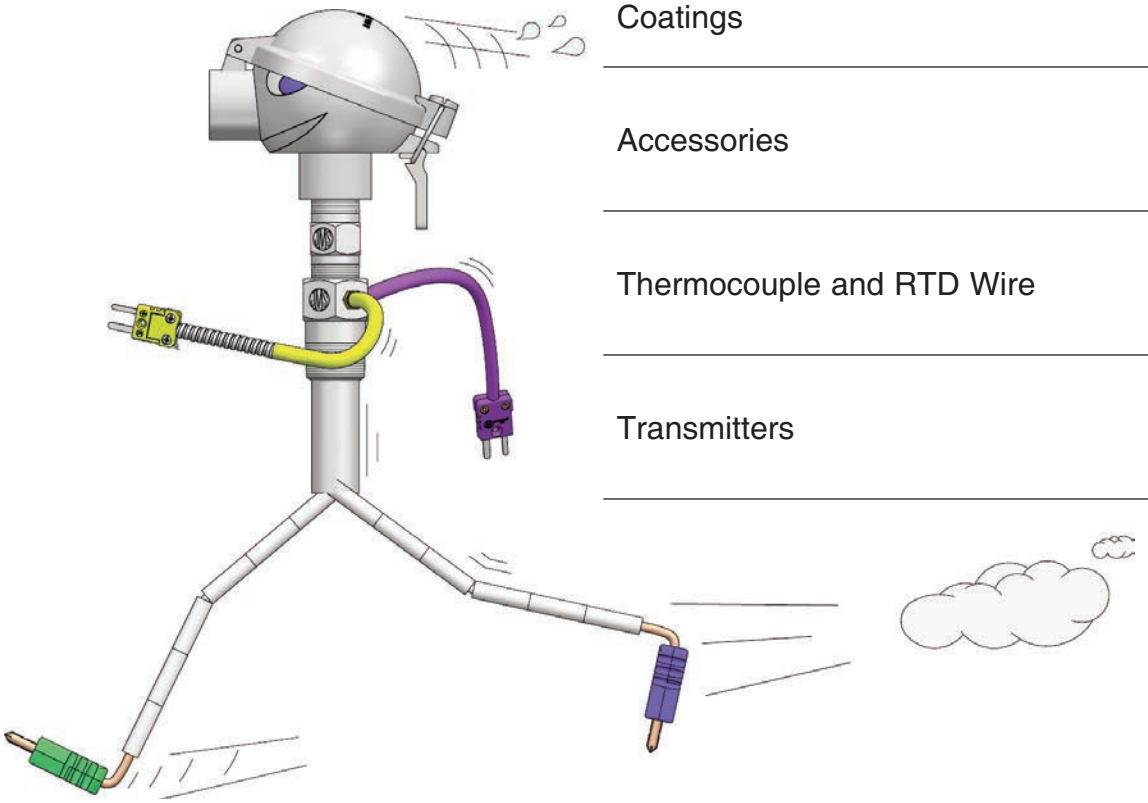
The JMS SwiftyCalc software quickly provides you with a thermowell design based upon your material requirements and process variables meeting the ASME PTC 19.3TW standard. Save your results to your own account and return later to modify on the fly. JMS SwiftyCalc also provides you with instant theoretical 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

MINIATURE AND INDUSTRIAL THERMOCOUPLES

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

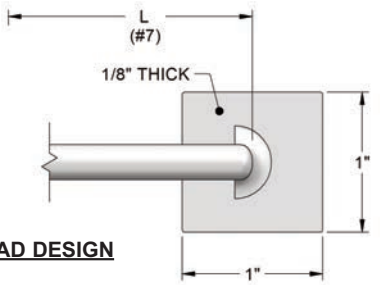
#2	TYPE [8, 9, 10]
____	J, T, K, E, N, X (Other, specify)

#3	LIMITS OF ERROR/ELEMENT CONSTRUCTION			
1	Standard	Single	6	Standard Triple
2	Standard	Dual	X	Other, specify
3	Special	Single		
4	Special	Dual		

Many more options available at JMS-SE.com

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

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



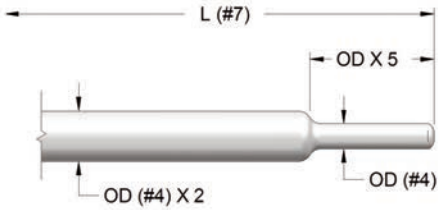
WELD PAD DESIGN
#6 (L, M)

#4	OUTSIDE DIAMETER [11]	CONDUCTOR SIZE (FOR BASE METALS ONLY) SINGLE (AWG)	DUAL (AWG)
	OD Single/Dual	OD Single/Dual	OD Single/Dual
P	1/2" 10 12	R 6mm 16 18	F 1/25" 32 34
A	3/8" 13 16	C 3/16" 19 20	X* Other, specify
Y	5/16" 14 16	D 1/8" 22 24	
B	1/4" 16 18	E 1/16" 28 30	

*JMS now offers sheath as small as 0.010" in diameter.

#5	SHEATH MATERIAL [11]	MAX °F	[2-8, 4-17]		MAX ºF
H	304 stainless steel	1650	C	Teflon coated stainless steel	400
J	310 stainless steel	2100	S	Titanium	400
V	STABALOY	2220	Q	Hastelloy C-276	800
K	316 stainless steel	1650	P	Pyrosil	2300
M	Inconel 600	2100	X	Other, specify	--

REDUCED TIP DESIGN
#6 (P,Y)

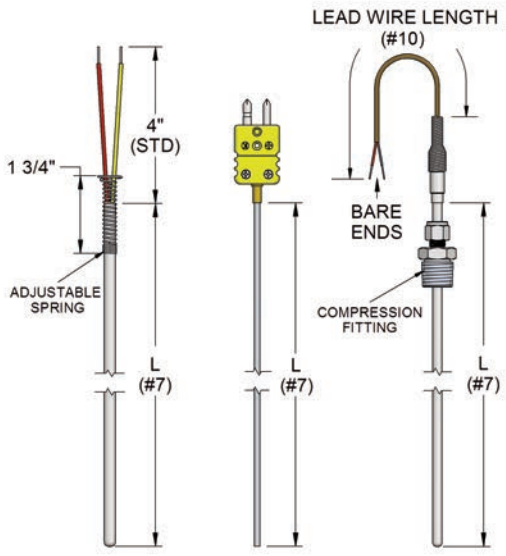


#6	MEASURING JUNCTION [12, 13, 14, 15]		
G	Grounded	P	Reduced tip, grounded
U	Ungrounded	Y	Reduced tip, ungrounded
E	Exposed (Isolated on dual/triple)	R	Gas/Air, exposed
I	Isolated	S	Gas/Air, grounded
J	Pointed tip, grounded, 45º ∠	T	Gas/Air, ungrounded
K	Pointed tip, ungrounded, 45º ∠	V*	Enlarged tip, grounded
L	Weld pad, grounded	W*	Enlarged tip, ungrounded
M	Weld pad, ungrounded	X*	Other, specify
N	Weld pad, removable grounded		
O	Weld pad, removable ungrounded		
NF	Removable "foot" only, grounded		
OF	Removable "foot" only, ungrounded		

*Provide description when selecting these options.

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

#7	LENGTH (See illustrations on page 1-1 through 1-3 for lengths)
____"	Length in inches (lengths greater than 90" may be coiled for shipment)



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.

NEW ***Skip to page 1-3 to complete selection #8 if your sensor requires a nipple and/or union extension.***

#8	STANDARD INDUSTRIAL ATTACHING DEVICE [1-3, 6-13]	
X	Other, specify	
Z	N/A	No Attaching device
G	Single thread (process)	Welded design
F	Single thread (reversed)	
W	Double threaded	
H*	SS w/ SS ferrule	Compression design
I*	SS w/ Teflon ferrule	
J*	SS w/ Lava ferrule	
K*	SS w/ Nylon ferrule	
L*	Brass w/ Brass ferrule	
D	Single threaded (process)	Spring-Loaded design
C	Double threaded w/ oil ring	
A	Double w/ threaded retainer	
E	Adjustable spring	
S	Double threaded (most common)	
B	Double threaded Bayonet	
BS	Double threaded Bayonet w/ oil seal	
BD	Single threaded Bayonet	
BDS	Single threaded Bayonet w/ oil seal	

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

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

OR → S U N 6" H 1

SEE PAGE 1-3

1	J	1	B	H	G	12"	S

MINIATURE AND INDUSTRIAL THERMOCOUPLES

#9 PROCESS NPT [3]

L	1/8”
M	1/4”
P	1/2” (Standard) with symbols W,S,C, & N from selection #8
O	3/4”
X	Other, specify
Z	N/A

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

Z	No lead wires
1__”	Fiberglass braid
2__”	PVC
3__”	Teflon
4__”	Hi-temp fiberglass braid
5__”	Kapton

} Solid 20 AWG

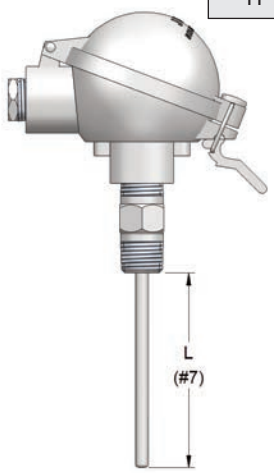
7__”	Bare wire
8__”	PVC coil cord - 4” standard length (relaxed)
X__”	Other, specify

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.

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

A	3/16” ID SS flex armor
B	3/16” ID SS flex armor Teflon coated white
C	3/16” ID SS flex armor Teflon coated black
D	1/8” ID SS flex armor
F	SS overbraid
G	Heat shrink/sleeving
H	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 flex armor is longer than 60”.



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

#12 TYPE OF TRANSITION [16]

H	Heat shrink
S	Size on size
T	3/8” OD (Standard)
R	1/4” OD
X	Other,specify
Z	No transition

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.

#13 COLD END TERMINATION

Choose as many as applicable [Add’l options see Pg. 1-7]

(Visit our online catalog for additional terminations, *www.JMS-SE.com/ends*)

Connectors

B	Miniature plug
C	Standard plug
F	High temperature plug (< 800˚F)
WM	Microphone style plug (6DA)
D	Miniature jack
E	Standard jack
G	High temperature jack (< 800˚F)
WF	Microphone style jack (6DA)

Transmitters

8H	Isolated transmitter
8N	Non-isolated transmitter
8I	Hart Protocol
8E	Intrinsically safe
8D	Hart/Intrinsically safe

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

Heads [6–1] visit *www.JMS-SE.com/headspecs*

Exp. Proof	I	Aluminum, NEMA 4X, FM, CSA, IP66 (6IA/6B4)
	J	316 SS, NEMA 4X, FM, CSA, IP66 (6ISS/6B4)
	P	Aluminum, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6IAIEC/6B4)
	GA	Aluminum, w/viewing window,NEMA 4X, FM, CSA, ATEX, IECEx (688A1/88DIG) (Transmitter required)
	GS	316SS w/viewing window,NEMA 4X, FM, CSA, ATEX, IECEx (688S1/88DIG) (Transmitter required)
Gen. Purpose	L	Aluminum w/ hinged cover (6L/6B4)
	M	Aluminum w/ screw cover & chain (6M/6B4)
	R	Aluminum w/ hinged high dome cover (6R/6B4)
	N	Cast Iron w/ screw cover (6N/6B4)
	Q	Black Noryl plastic (6Q/6B4)
	SS	316 SS w/ screw cover & chain (6SS/6B4)

Other

A	Bare ends
K	Spade lugs (6SL)
O	Open terminal block (6B4)
X	Other, specify

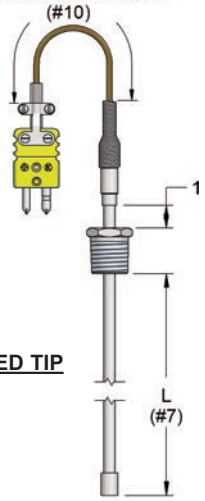
#14 OPTIONS

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 provided for each point.
5L*	Standard lot calibration
5M	Material calibration report.
6**	Premium calibration report. Corrections data will be provided for temperatures within the range.
6L*	Premium lot calibration report. Corrections data will be provided for temperatures within the range.
7	CE marking [page XV]
8	Guide 17025 calibration
9	Bar code
M	MTR

* AMS 2750D and AMS 2750E compliant
** Must specify increments & range (Example: 0 to 300°F, 10° increments)

LEAD WIRE LENGTH (#10)



ENLARGED TIP
#6 (V, W)

P	Z	Z	Z	L	1

COMPLETE PART NUMBER EXAMPLES

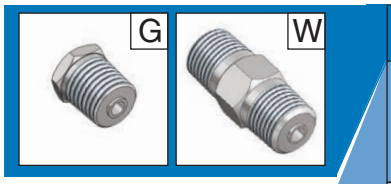
-with nipple-union-spring-loaded extension assembly:
1J1BHG12”S[UN6H1]PZZZL1
-without extension assembly:
1J1BHG12”SPZZZL1

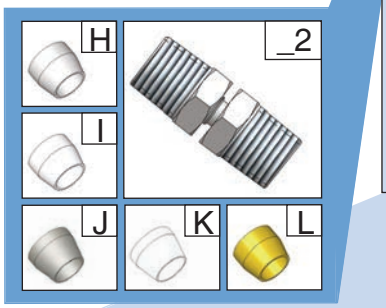
CUSTOM NIPPLE/UNION EXTENSION CONFIGURATOR

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.

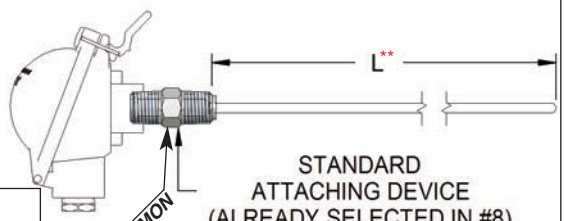
Notes:
-The standard JMS spring designed specifically for a 1/4" OD sensor is made of high nickel proprietary spring wire which allows users to successfully maintain 1/2" of spring-loading even up to 1000°F.
-Spring-loaded extension assemblies should not be used with ceramic protection tubes.





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

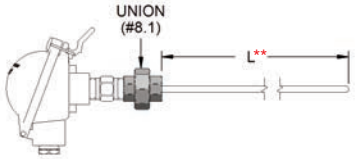
#8	COLD SIDE STANDARD INDUSTRIAL ATTACHING DEVICE [1-3, 6-13]
X	Other, specify
Welded design	
G	Single thread (process)
W	Double threaded
Compression design	
H2	SS w/ SS ferrule
I2	SS w/ Teflon ferrule
J2	SS w/ Lava ferrule
K2	SS w/ Nylon ferrule
L2	Brass w/ Brass ferrule
Spring-Loaded design	
D	Single threaded
C	Double threaded w/ oil ring
A	Double w/ threaded retainer
N	Nipple (spring-loaded against terminal block)
S	Double threaded
B	Double threaded Bayonet
BS	Double threaded Bayonet w/ oil seal
BD	Single threaded Bayonet
BDS	Single threaded Bayonet w/ oil seal



** L is the overall length of the sensor to the fixed attaching device. Page 1-1, selection #7 for T/Cs or 3-1, selection #6 for RTDs.

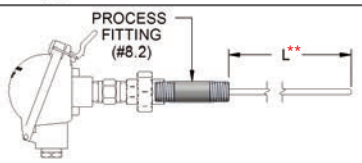
#8.1	UNION
U	Union
O	Coupling
X	Other, specify
Z	N/A

Note: Thread adapters may be used when symbol #9 is not 1/2" NPT.

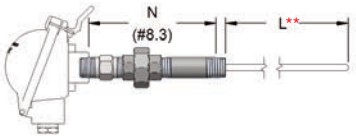


#8.2	PROCESS FITTING (MALE)
N	Nipple
X	Other, specify
Z	N/A (Female thread)

Note: Thread adapters may be used when symbol #9 is not 1/2" NPT.



#8.3	N LENGTH
___"	Specify (inches)*
Z	N/A



* ONLY for configurations with nipples (option N for selection #8 or #8.2.)
ALL other configurations have fixed lengths and this selection is not applicable.

#8.4	UNION and/or NIPPLE MATERIAL		
H	304 stainless steel	X	Other, specify
K	316 stainless steel		
C	Black steel		
G	Galvanized steel		

#8.5	UNION PRESSURE RATING	
1	#150 - A351 spec (Standard)	ASTM
2	#3000 - A182 spec	
3	#6000 - A182 spec	
X	Other, specify	

S	U	N	6"	H	1

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

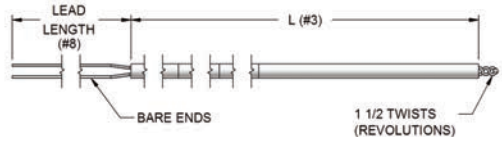
#1	DESCRIPTION
1B	Beaded thermocouple

#2	JUNCTION
B	Welded bead only
T	Twisted and welded bead

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

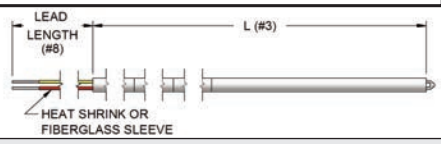
#3	INSULATOR TYPE AND LENGTH (L)
A __"	1 inch - Round
D __"	3 inch - Round
F __"	One piece construction - Round
G __"	1 inch - Oval
H __"	3 inch - Oval
X __"	Other, specify

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



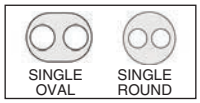
#4	COLD END INSULATION
1	Fiberglass sleeve (Standard)
2	Heat shrink
3	Mullite fish spine beads
Z	Bare ends
X	Other, specify

Base metal 15-30 AWG leads are straight

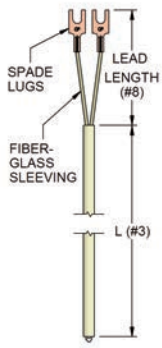


#5	INSULATOR MATERIAL
A	Alumina (Standard for Noble metals)
M	Mullite (Standard for Base metals)

#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	8 (Standard oval)	5/16" x 7/16"	7/16"	7/16"
14	14 (Standard oval)	3/16" x 1/4"	1/4"	1/4"
20	20		3/16"	3/16"
24	24		3/16"	3/16"
26	26		3/16"	3/16"
30	30		1/8"	1/8"
X	Other, specify			



NOBLE METAL



DUAL ELEMENT	Note: Add "C" for common junction. See illustrations below. (Example: CD24, CD26)			
D08	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			

(Oval not available in dual element)

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.

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

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

* AMS 2750D and AMS 2750E compliant
** Must specify increments & range (Example: 0 to 300°F, 10° increments)

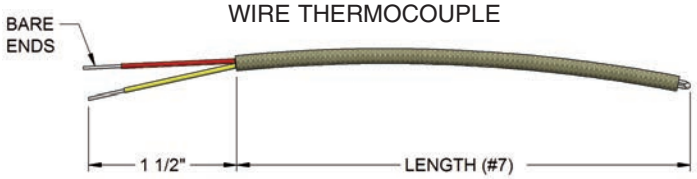
DUAL COMMON JUNCTION
(CD, Option #6)

DUAL ISOLATED JUNCTION
(D, Option #6)

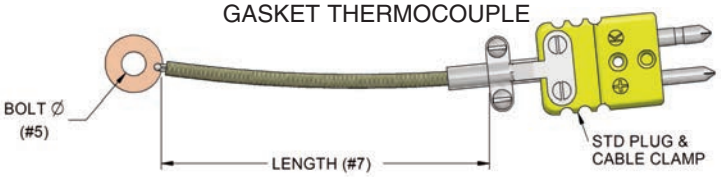
1B	B	F(6)	1	A	24	R	2"	3

WIRE, GASKET, AND LUG THERMOCOUPLES

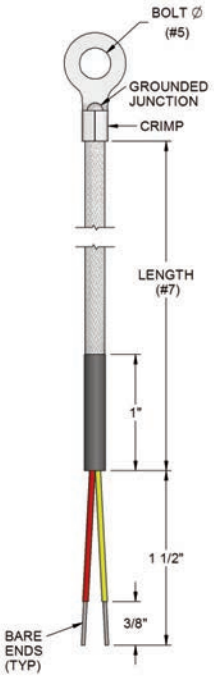
WIRE THERMOCOUPLE



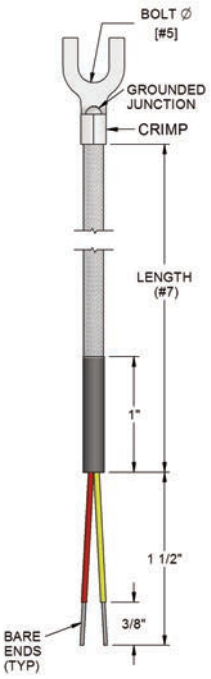
GASKET THERMOCOUPLE



RING TERMINAL THERMOCOUPLE



SPADE LUG THERMOCOUPLE



#1	DESCRIPTION
1D	Wire gasket and lug thermocouples - Grounded

#2	STYLE
G	Wire thermocouple
H	Gasket thermocouple
L	Ring terminal thermocouple
S	Spade lug thermocouple
M*	Shim thermocouple
C_**	Hose clamp thermocouple

* 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

#3	TYPE
____	J, K, N, T, E, R, S, B, C, L, A, X (Other, specify)

#4	GASKET MATERIAL
C	Copper (Standard)
S*	Steel
X	Other, specify
Z	N/A

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

#5	BOLT DIAMETER **Note:** If washer/gasket/ring dimensions are critical, use X and state requirements.
A	#10
C	1/4"
X	Other, specify bolt size, ø, and any tolerances as necessary.
Z	N/A

#6	WIRE INSULATION
1	Fiberglass braid
3	FEP Teflon
4	Hi-temp fiberglass braid
5	Kapton
8	Fiberglass braid/stainless steel overbraid
X	Other, specify

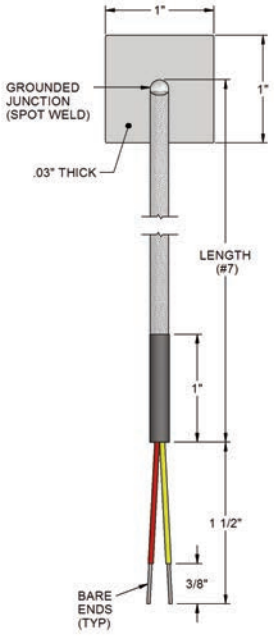
Note: For stranded wire, add an S prefix before symbol designation in this column. 24 AWG or smaller may be used to accommodate some smaller diameters.

#7	LENGTH
____"	Length in inches

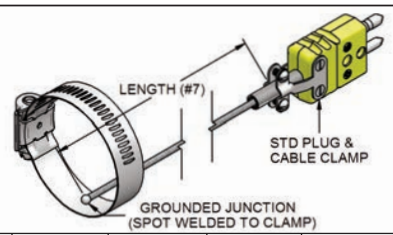
#8	COLD END TERMINATION
A	Bare ends
B	Miniature plug
C	Standard plug
X	Other, specify

[Add'l options see Pg. 1-7]

SHIM THERMOCOUPLE



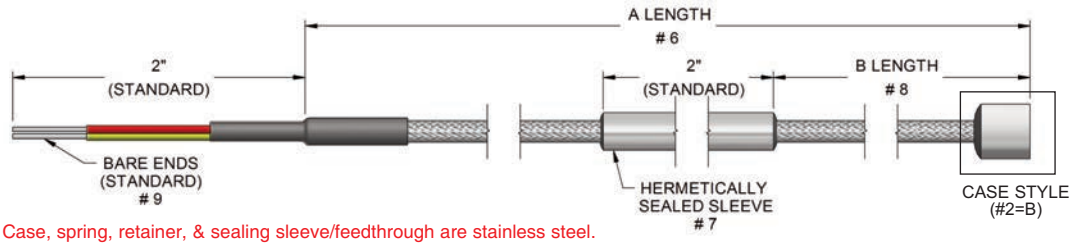
HOSE CLAMP DIMENSIONAL CHART



	STANDARD PIPE SIZE (In)	HOSE CLAMP ID (In) MIN.	HOSE CLAMP ID (In) MAX.
1	1/4 to 3/8	7/16	25/32
2	1/2 to 3/4	11/16	1-1/4
3	1 to 1-1/2	1-1/16	2
4	2 to 2-1/2	2-1/16	3
5	3 to 3-1/2	3-5/16	4-1/4
6	4	3-9/16	4-1/2
7	5	5-1/8	6
8	6	6 -1/8	7
X	Other Specify		

1D	G	K	Z	Z	1	36"	C

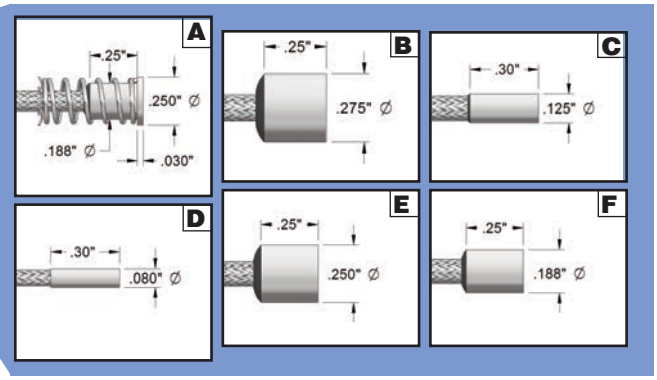
WIRE STYLE BEARING SENSOR



Note: Case, spring, retainer, & sealing sleeve/feedthrough are stainless steel.

#1	DESCRIPTION
1P	Bearing sensor

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



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

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

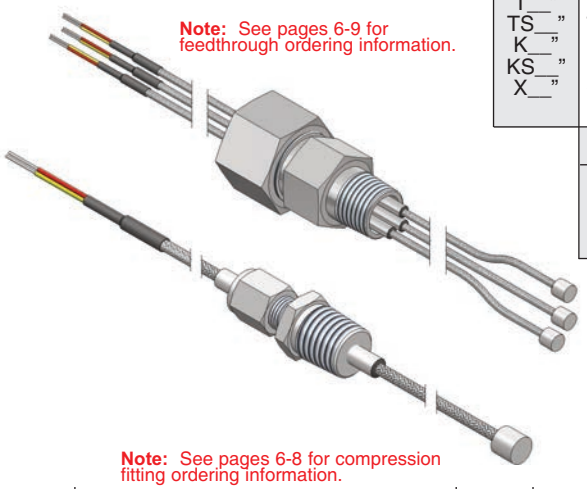
#5	MEASURING JUNCTION
G	Grounded (Standard)
U	Ungrounded
I	Isolated

#6	A LENGTH
___"	A length (in inches)

#7	SEALING SLEEVE/FEEDTHROUGH DIAMETER
C	3/16" Ø
B	1/4" Ø
X	Other, specify
Z	N/A

#8	LEAD WIRE TYPE & B LENGTH	
T__"	Teflon	Max temp- 392°F
TS__"	Teflon with SSOB overall	
K__"	Kapton	Max temp- 500°F
KS__"	Kapton with SSOB overall	
X__"	Other, specify	

Note: See pages 6-9 for feedthrough ordering information.



#9	COLD END TERMINATION	[Add'l options see Pg. 1-7]
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
X	Other, specify

Note: See pages 6-8 for compression fitting ordering information.

1P	B	T	S	G	36"	B	TS60"	A	4

ADDITIONAL TERMINATIONS

	COLD END TERMINATION [SEE SECTION 6] Choose as many as applicable (JMS part number prefixes are shown in parenthesis)		
Connectors			
	Plugs		**Jacks**
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/hermetic plug (6DC)	VF	Molded/hermetic jack (6DC)
Y	M12 Male connector (6DY)	YF	M12 Female connector (6DY)

Heads [6–1] Visit *www.JMS-SE.com/headspecs*

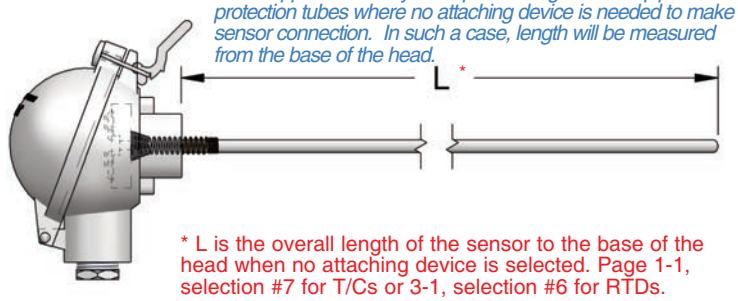
Explosion Proof

I	Aluminum, NEMA 4X, FM, CSA, IP66 (6IA/6B4)
J	316 stainless steel, NEMA 4X, FM, CSA, IP66 (6ISS/6B4)
P	Aluminum, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6IAIEC/6B4)
U	316 stainless steel, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6ISSATEX/6B4)
SI	Cast Iron, NEMA 3, 4, UL, CSA (6I/6PT)
GA	Aluminum, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP66 (688A1)
GS	316SS, screw cover w/ indicating window, NEMA 4X, ATEX, IECEx, FM, CSA, IP66 (688S1)

General Purpose

L	Aluminum w/ hinged cover (6L/6B4)
M	Aluminum w/ screw cover & chain (6M/6B4)
R	Aluminum w/ hinged high dome cover (6R/6B4)
N	Cast Iron w/ screw cover (6N/6B4)
Q	Black Noryl plastic (6Q/6B4)
SS	316 stainless steel w/ screw cover & chain (6SS/6B4)
WP	White plastic, screw cover, Sanitary (6WP, 6B4)
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.

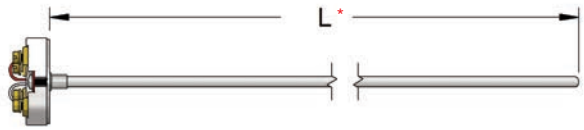
Transmitters

8H	Isolated transmitter
8N	Non-isolated transmitter
8I	Hart Protocol
8E	Intrinsically safe
8D	Hart/Intrinsically safe
8M	Integral transmitter (see page 3-5) RTDs ONLY

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

Other

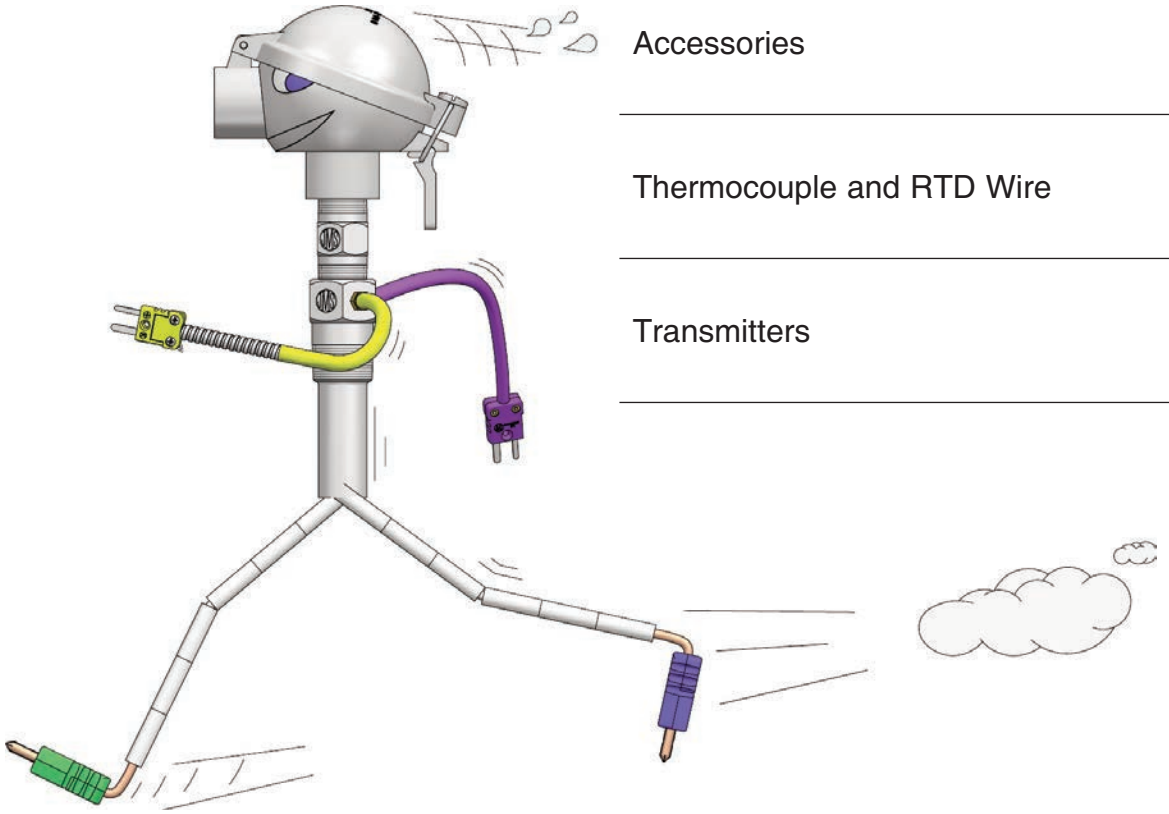
A	Bare ends
K	Spade lugs (6SL)
RL	Ring lugs (6RL)
O	Open ceramic terminal block, Brass screw terminal (6B)
OA	Open Bakelite terminal block, Nickel plated screw terminal (6BB)
OB	Open ceramic terminal block for sensors with bayonet style connection, Brass screw terminal (6B or 6C/6DMD)
OG	Ceramic terminal block, Brass screw terminal (6G)
OP	Pluggable Polymide 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)
PS	Ship straight
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.

PLASTICS SENSORS

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.

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.

#1	DESCRIPTION
2	Plastics sensors

#2	DESIGN [8]
M	MgO insulated (swaged sheath)
H	Hollow tube

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

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

#4	OUTSIDE DIAMETER
C	3/16" (.188")
D	1/8" (.125")
B	1/4" (.250")
R	6mm (.236")
X	Other, specify
Z	N/A

Note: 316 SS standard sheath and tube material.

#5	LIMITS OF ERROR	ELEMENT CONSTRUCTION
1	Standard	Single
2	Standard	Dual
3	Special	Single
4	Special	Dual
X	Other, specify	

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

#6	CONSTRUCTION
S	Straight
4	45° bend
9	90° bend
X	Specify angle of bend and "A" length (see illustrations above)

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

#7	MAXIMUM 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	<482°C (900°F)	=1 Fiberglass*
E	<705°C (1300°F)	
F	>705°C (1300°F)	

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

#8	MEASURING JUNCTION [9]
G	Grounded
U	Ungrounded common (RTD's are always ungrounded)
I	Isolated
E	Exposed
X	Other, specify

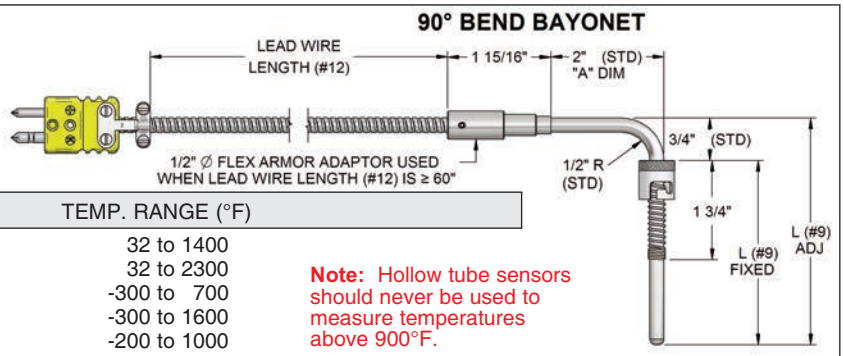
#9	LENGTH (L)
___"	Length in inches

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

2	M	K	C	1	9	D	G	3"

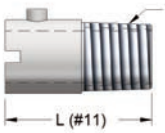


PLASTICS SENSORS

#10	ATTACHING DEVICES (see illustrations below)		
J*	Adjustable bayonet (Standard)	X	Other, specify
F	Fixed bayonet		
P*	Brass compression fitting *(1/8" NPT)*		
N	Non-Immersion nozzle *(1/4-28 x 3/8" long, **fixed** thread)*		
M*	Nozzle melt *(3/8-24 x 5/16" long, **rotating** thread)*		
Z	N/A		

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

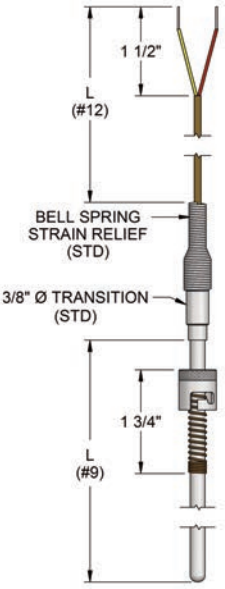
#11	ADAPTER TYPE *1/8" NPT adapters are used with .125" Ø and .188" Ø sensors.		
1/8"* NPT	3/8" x 24	NICKEL PLATED STEEL SLOT HEAD MOUNTING ADAPTER (FOR BAYONET ONLY)	
Z	Z	No adapter required	
A	E	7/8" overall length	
B	F	1 1/2" overall length	
C	G	2 1/2" overall length	
D	J	3 1/2" overall length	
X	X	Other, specify	
		Note: More adapter options on page 2-5.	
K		1/4" NPT X 1 1/4" long for 1/4" bayonet	



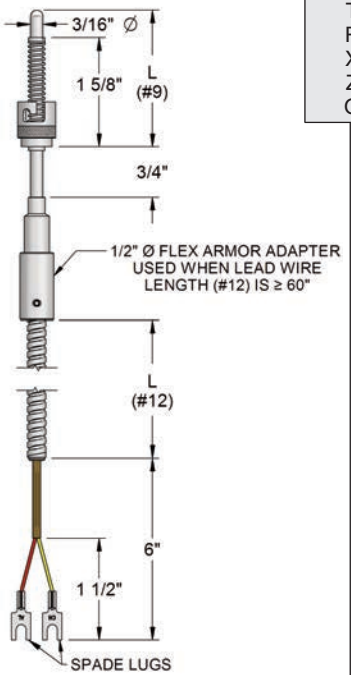
#12	LEAD WIRE TYPE & LENGTH IN INCHES
Z	No lead wires
1 __"	Fiberglass braid
3 __"	FEP Teflon
5 __"	Kapton
6 __"	Fiberglass braid/flex armor overall
7 __"	Teflon/flex armor overall
8 __"	Fiberglass braid/stainless steel overbraid
X __"	Other, specify

Note: 20 AWG solid wire is standard for thermocouples and 24 AWG stranded wire is standard for RTDs.
Note: 24 AWG wire or smaller may be used if necessary.

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



FIXED BAYONET

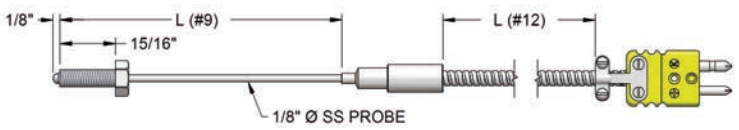


#13	TYPE OF TRANSITION [1-16]
H	Heat shrink
S	Size on size
T	3/8" OD (Standard)
R	1/4" OD
X	Other,specify
Z	No transition
Q	Cuttable design (No crimp at end of tube/Nylon insert)

Note: For high humidity/moisture environments (≤500˚ F), put a 2 after your selection.
Note: For high temperature at the transition area (>500˚ F), put a 3 after your selection. (May not comply with ASTM Insulation Resistance (IR) test)
Note: When Z (no transition) is specified for a hollow tube sensor, the extension lead is crimped to the tube.

#14	COLD END TERMINATION [Add'l options see Pg 1-7] CHOOSE AS MANY AS APPLICABLE		
Connectors		Heads	
B	Miniature plug (6A1B2)	I	Explosion proof Aluminum, NEMA 4X, FM, CSA, IP66 (6IA/6B4)
C	Standard plug (6A1C2)	L	Aluminum w/ hinged cover (6L/6B4)
F	High temperature plug (< 800˚ F)	M	Aluminum w/ screw cover & chain(6M/6B4)
WM	Microphone style plug (6DA)	N	Cast ron w/ screw cover (6N/6B4)
V	Hermetic connector plug (6DC)	Q	Black Noryl plastic (6Q/6B4)
D	Miniature jack	R	Aluminum high dome, hinged cover (6R/6B4)
E	Standard jack	Other	
G	High temperature jack (< 800˚ F)	A	Bare ends
WF	Microphone style jack (6DA)	K	Spade lugs (6SL)
		O	Open terminal block (6B4)
		X	Other, specify

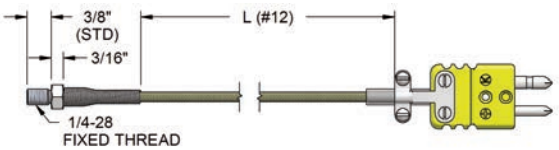
#15	TAGGING AND CALIBRATION OPTIONS (USE ONLY IF APPLICABLE)
____	See page 1-2 #14 for ordering selections.



NOZZLE MELT

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

J	A	6 (72")	T	C	1



NON-IMMERSION NOZZLE

Example part number: 2HKZ1SDU0"NZ1(60")ZC

PLASTIC MELT EXTRUSION SENSORS

#1	DESCRIPTION
2P	Plastic melt sensors

#2	STYLE [2-6]
4*	Bolt with 1 1/2" bendable metal extension and plug
5	Bolt with direct mount plug
6**	Bolt with 24" of Kapton insulated wire w/flexible armor and plug
X	Other, specify

* Tubular extension between bolt and plug can be formed by hand at application site to desired angle. If longer metal extension from hex to plug connection is required, use X and specify length desired. (Example: 2PXJ13BGP; X=4-6")

**If a length other than 24" of flex armor is required, use X and specify length desired. (Example: 2PXJ13BCP; X=6-36")

#3	SENSOR TYPE [1-1, 3-3] (Hollow tube design)
J	Iron/Constantan
A	100Ω Platinum RTD .00385 alpha (3 wire) (Standard)
X	Other, specify

#4	LIMITS OF ERROR/ELEMENT CONSTRUCTION		
1	Standard/Single	4	Special/Dual
2	Standard/Dual	X	Other, specify
3	Special/Single		

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

#5	BOLT LENGTH (B) [6]				
3	3"	6	6"	X	Other, specify

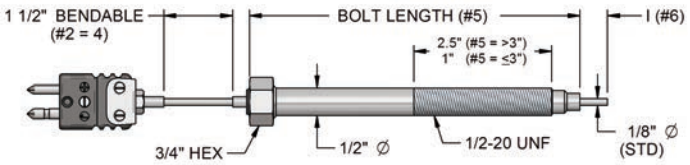
#6	IMMERSION (I) [6]		
A	Flush	C	1"
B	1/2"	X	Other, specify

#7	MEASURING JUNCTION [9]
G	Grounded
U	Ungrounded common (RTD's are always ungrounded)
E	Exposed
I	Isolated
X	Other, specify

For special wetted parts facing, use X + description. (Example: X=Grounded + Hastelloy C-276 facing)

#8	MAXIMUM SERVICE TEMPERATURE
P	<500°F (Standard)
Q	500°F - 900°F

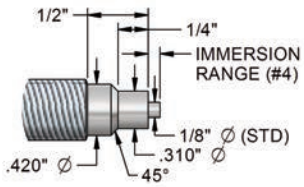
#9	TAGGING/CALIBRATION OPTIONS (Use only if applicable)
____	See page 1-2 #14 for ordering selections.



PLASTIC MELT EXTRUSION ADJUSTABLE SENSORS

#1	DESCRIPTION	#2	SENSOR TYPE [3-3] (Hollow Tube Design)
27	Adjustable plastic melt sensor	J	Iron/Constantan
		3	100Ω Platinum RTD, .00385 alpha (3 wire) Class B
		X	Other, specify

TIP DETAIL

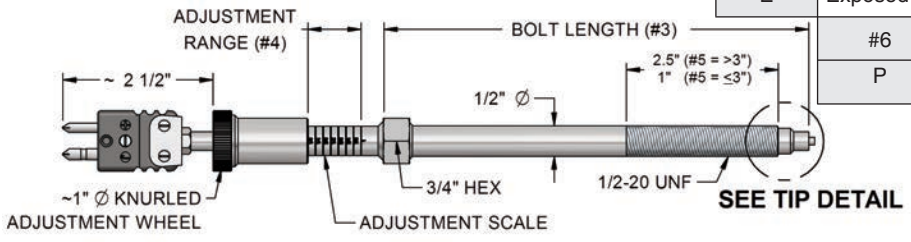


#3	BOLT LENGTH	#4	IMMERSION RANGE [9]
3	3" Bolt	A	1/8" - 1"
5	5" Bolt	B	1/8" - 2 1/2"
7	7" Bolt	X	Other, specify
X	Other, specify		

#5	MEASURING JUNCTION		
G	Grounded (Standard)	I	Isolated
U	Ungrounded (RTD's always ungrounded)	X	Other, specify
E	Exposed (Recommended for profiling)		

#6	MAX SERVICE TEMPERATURE		
P	<500°F (Standard)	Q	500°F - 900°F

#7	TAGGING/CALIBRATION OPTIONS (use only if applicable)
___	See page 1-2 #14 for ordering selections

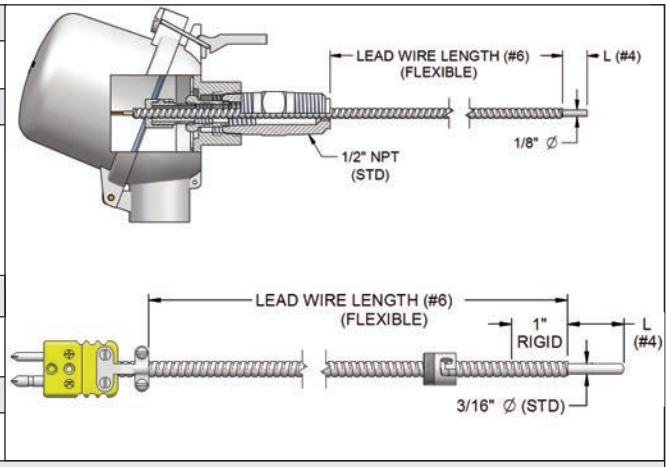


FLEX ARMOR ADJUSTABLE DEPTH SENSORS

#1	DESCRIPTION
2K	Flexible armor adjustable depth sensor

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

Note: Add a 2 for dual element. (Example: 2J)



#3	DIMENSIONS OF FLEX
1	.125" ID X .210" OD
2	.188" ID X .270" OD (Standard)

#4	TUBE LENGTH
__"	Length in inches
Z	Flush - no tube (Standard)

#5	JUNCTION
G	Grounded (Standard)
U	Ungrounded - (RTDs are always ungrounded)

#6	LEAD WIRE LENGTH (Standard Insulation Fiberglass)
__"	Length in inches

#7	COLD END TERMINATION [Add'l options see Pg 1-7]
C	Standard plug
E	Standard jack
K	Spade lugs
I*	Explosion proof head, 1/2" x 3/4" connection with fitting
R*	High dome, general purpose head w/ hinged cover, 1/2" x 1/2" fitting
T	Junction box connector
A	Bare ends (Standard)
X	Other, specify

Note: If bayonet adapter is needed for mounting, see page 2-5.

* 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.

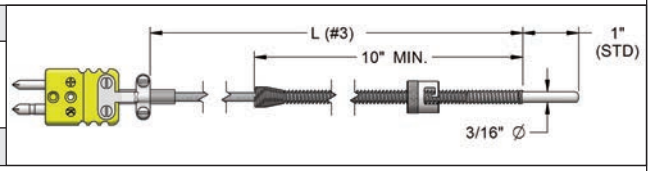
#8	TAGGING AND CALIBRATION OPTIONS (Use only if applicable)
____	See page 1-2 #14 for ordering selections.

SPRING ADJUSTABLE DEPTH SENSORS

#1	DESCRIPTION
2Q	Spring adjustable depth bayonet sensor

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

#3	LEAD WIRE LENGTH	
48"	Length in inches	**Note:** Length measured from front of spring to back of cable clamp.
60"	Length in inches	
X	Other, specify	



#4	JUNCTION
G	Grounded (Standard)
U	Ungrounded common (RTDs are always ungrounded)

#5	COLD END TERMINATION [Add'l options see Pg 1-7]			
A	Bare ends (Standard)	K	Spade lugs (compensated)	**Note:** If bayonet adapter is required, see page 2-5.
C	Standard plug	T	Junction box connector	
E	Standard jack	X	Other, specify	

#6	TAGGING AND CALIBRATION OPTIONS (use only if applicable)
____	See page 1-2 #14 for ordering selections.

MGO VS HOLLOW TUBE

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.

INSULATOR	PURITY %	MELTING POINT °C	MELTING POINT °F	USABLE TEMP. °C	USABLE TEMP. °F
Magnesium Oxide(MgO)	96.4% (STD) 99.4% (must specify) 99.8% (must specify)	2790	5050	1650	3000

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.

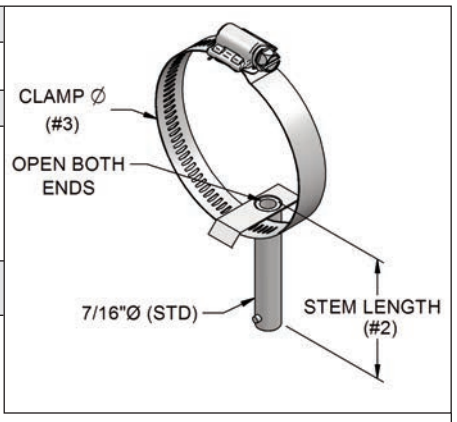
BAYONET ACCESSORIES

STAINLESS STEEL PIPE CLAMP ADAPTERS

#1	DESCRIPTION
2C	Pipe clamp bayonet adapter (For .125" Ø and .188" Ø sensors)

#2	"L" LENGTH OF STEM IN INCHES
R	1-3/4"
S	3-3/4"
T	8-3/4"
X	Other, specify
Z	N/A, hose clamp only

#3	STANDARD PIPE SIZE (INCHES)	BAND CLAMP DIAMETER (INCHES) MIN.	MAX.
1	1/4 to 3/8	7/16	25/32
2	1/2 to 3/4	11/16	1-1/4
3	1 to 1-1/2	1-1/16	2
4	2 to 2-1/2	2-1/16	3
5	3 to 3-1/2	3-5/16	4-1/4
6	4	3-9/16	4-1/2
7	5	5-1/8	6
8	6	6-1/8	7
X	Other Specify		

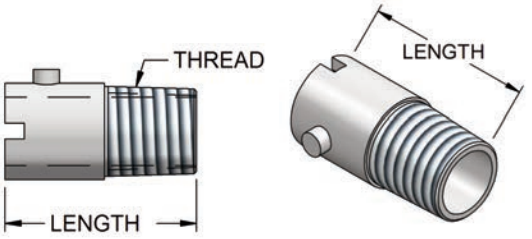


Note: L = Length of stem. Should be equal to the maximum insulation thickness + 3/4". The bayonet sensor length for adjustable should be L + 1-1/4". For fixed, it should be L + 1/2".

2C	S	3

NICKEL PLATED SLOT HEAD ADAPTERS

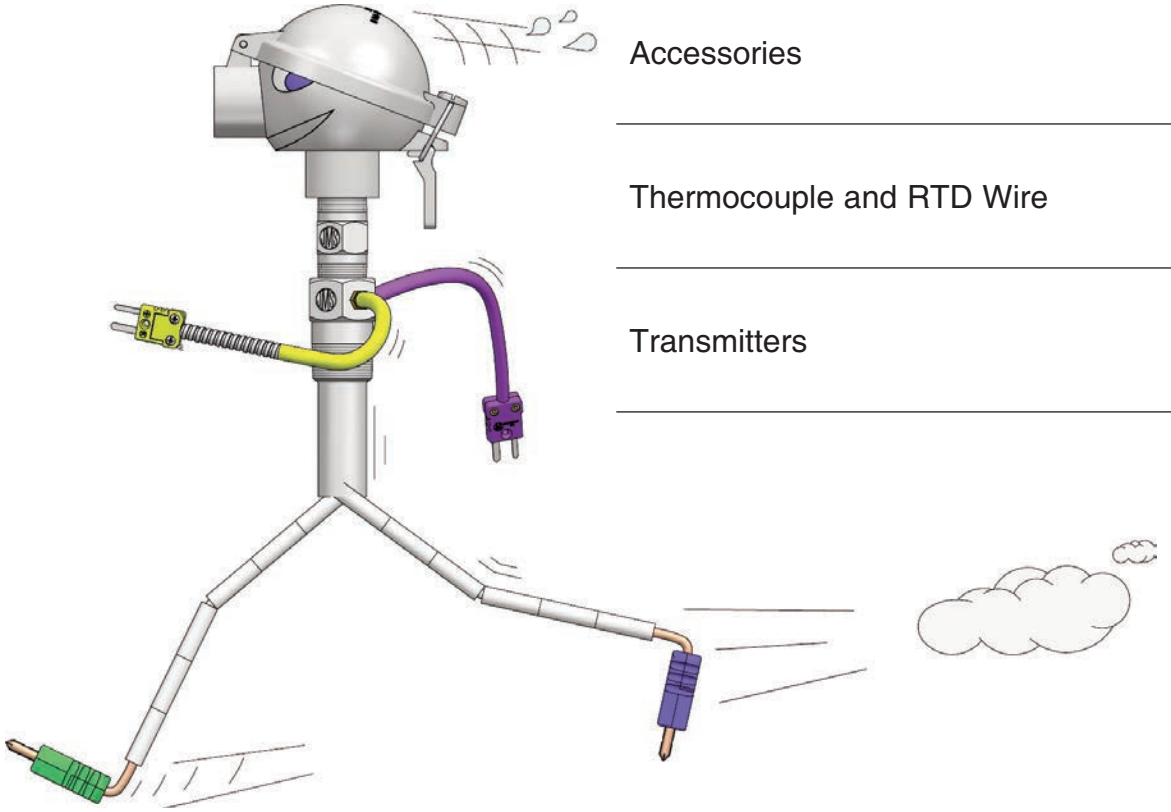
THREAD			LENGTH
1/8" NPT	3/8"-24	1/4"NPT	
2A	2E	6BA78	7/8" overall length
2A1	—	6BA	1-1/4" overall length
2B	2F	—	1-1/2" overall length
2C	2G	—	2-1/2" overall length
2D	2J	—	3-1/2" overall length



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.

RESISTANCE TEMPERATURE DEVICES (RTDS)

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
3	RTD

#2 ELEMENT TYPE [4, 9, 10, 11, 15, 18, 22, 24] — 100 Ω Platinum 0.00385 alpha (Ω/Ω/°C) unless otherwise stated

	Resistor Accuracy at 0°C	Thermometer Class [pg. 3-18]	Resistor Class [pg. 3-18]
B	± 0.30°C (Competitor's Std)	B	≥ F 0.30
E	± 0.15°C (Standard)	A	≥ F 0.15
P*	± 0.06°C	AA	≥ 1/2 F 0.10
S*	± 0.03°C (Best Accuracy)	1/4 AA	≥ 1/10 F 0.10
N	± 0.74°C (120 Ω Nickel α=.00672)	Non-Standard	Non-Standard
M	± 0.30°C (1000 Ω)	B	≥ F 0.30
X	Other, specify [3-22]	--	--

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")	D	1/8" (.125")
A	3/8" (.375")	X	Other, specify
Y	5/16" (.312")	Z	N/A
B	1/4" (.250")		
R	6mm (.236")		
C	3/16" (.188")		

TIP CONSTRUCTION [5-30] [1-13] MUST CHOOSE 1

N	Normal, closed tip (Standard)
K	Pointed tip, 45°
M*	Weld pad
O*	Weld pad, removable
R2*	Gas/Air, exposed
W*	Enlarged tip
Y2*	Reduced tip

* Provide description when selecting these options.

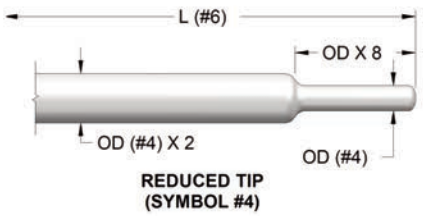
[ ] Brackets indicate page numbers where additional helpful information can be found in technical catalog. Now available online at www.JMS-SE.com/TechnicalCatalog

#5 TUBE MATERIAL [11, 12]

K	316 stainless steel	C	Teflon coated, stainless steel
L	316L stainless steel	S	Titanium
M	I-600 (Use if symbol #7 >500°F)	X	Other, specify

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

__" Immersion length in inches (lengths greater than 90" may be coiled for shipment)

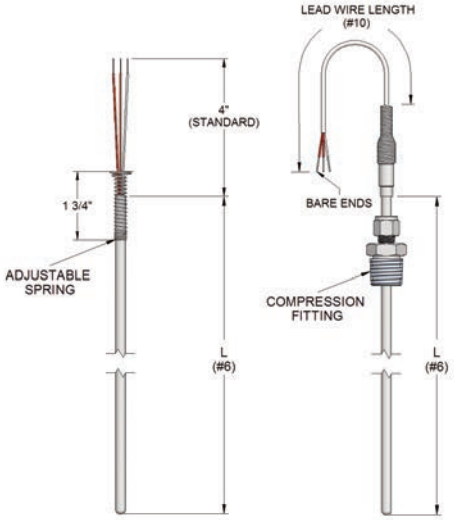


REDUCED TIP (SYMBOL #4)

#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*

* If no transition (Z) is in symbol 13, we recommend these corresponding selections for primary wire insulation in symbol 10.



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.

NEW ***Skip to page 1-3 to complete selection #8 if your sensor requires a nipple and/or union extension.***

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

X	Other, specify	
Z	N/A	No Attaching device
G	Single thread (process)	Welded design
F	Single thread (reversed)	
W	Double threaded	
H*	SS w/ SS ferrule	Compression design
I*	SS w/ Teflon ferrule	
J*	SS w/ Lava ferrule	
K*	SS w/ Nylon ferrule	
L*	Brass w/ Brass ferrule	
D	Single threaded (process)	Spring-Loaded design
C	Double threaded w/ oil ring	
A	Double w/ threaded retainer	
E	Adjustable spring	
S	Double threaded (most common)	
B	Double threaded Bayonet	
BS	Double threaded Bayonet w/ oil seal	
BD	Single threaded Bayonet	
BDS	Single threaded Bayonet w/ oil seal	

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

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

OR → S { U N 6" H 1 }

SEE PAGE 1-3

3	E	S	BN	K	12"	B	S

RESISTANCE TEMPERATURE DEVICES (RTDS)

#9	PROCESS NPT		
L	1/8”	O	3/4”
M	1/4”	X	Other, specify
P	1/2” (Standard)	Z	N/A

#10	LEAD WIRE TYPE & LENGTH IN INCHES [see section 7]			
1__”	Fiberglass braid	X__”	Other, specify	**Note**: All wire in tubes > 1/8” OD will be 24 AWG. Smaller tubes will have a max. of 28 AWG. If no transition or armor is specified, wire may be fragile. JMS standard lead wire for RTDs is stranded plated copper.
3__”	Teflon (Standard)	Z	N/A	
4__”	High temperature fiberglass braid			
5__”	Kapton (Standard for Cryogenic)			

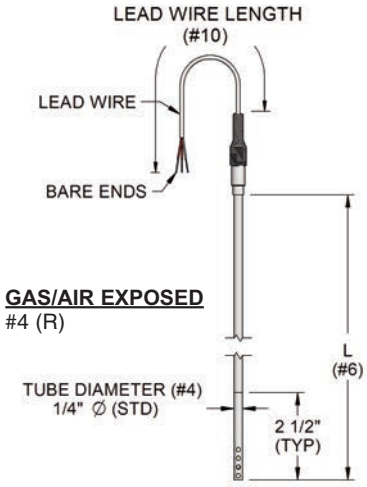
#11	ARMOR OR HEAT SHRINK/JACKET [7-7]		
A	3/16” ID SS flex armor (Standard)	G	Heat shrink/sleeving
B	3/16” ID SS flex armor Teflon coated white	H	Jacket to match primary insulation
C	3/16” ID SS flex armor Teflon coated black	J	Aluminum Mylar shielded and jacketed to match primary insulation
D	1/8” ID SS flex armor	Z	N/A
F	SS overbraid	X	Other, specify

#12	WIRE CONFIGURATION [17, 18]
T	2 Wire
Y	3 Wire
W	4 Wire

Note: Use a double symbol for 2 separate multiconductor lead wires, if dual elements. For example, TT.

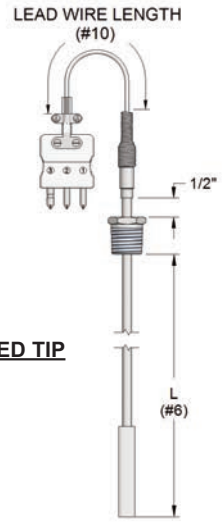
#13	TYPE OF TRANSITION [14]
H	Heat shrink
S	Size on size
T	3/8” OD
R	1/4” OD
Q	Cuttable (Std construction only) [3-12]
X	Other,specify
Z	No transition

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 to 1200°F), put a 3 after your selection. For example, T3.



GAS/AIR EXPOSED
#4 (R)

Note: Immersion shown (#6) is overall length of tube for gas air sensors.



ENLARGED TIP
#4 (W)

#14	COLD END TERMINATION [Add'l options see Pg 1-7] Choose all that apply (Visit our online catalog for additional terminations, www.JMS-SE.com/ends)			
Connectors		**Heads [6-1] Visit www.JMS-SE.com/headspecs**		
B	Miniature plug	Exp. Proof	I	Aluminum, NEMA 4X, FM, CSA, IP66 (6IA/6B4)
C	Standard plug		J	316 SS, NEMA 4X, FM, CSA, IP66 (6ISS/6B4)
F	High temp plug (< 800°F)		P	Aluminum, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6IAIEC/6B4)
WM	Microphone style plug		U	316 SS, NEMA 4X, FM, CSA, ATEX, IECEx, IP66 (6ISSATEX/6B4)
D	Miniature jack	Gen. Purpose	L	Aluminum w/ hinged cover (6L/6B4)
E	Standard jack		M	Aluminum w/ screw cover & chain (6M/6B4)
G	High temp jack (< 800°F)		N	Cast Iron w/ screw cover (6N/6B4)
WF	Microphone style jack		Q	Black Noryl plastic (6Q/6B4)
V	Hermetic plug		R	Aluminum high dome w/hinged cover (6R/6B4)
Y	M12 watertight plug		SS	316 SS w/ screw cover & chain (6SS/6B4)
Transmitters		**Other**		
8H	Isolated transmitter	A		Bare ends
8N	Non-isolated transmitter	K		Spade lugs (6SL)
8I	Hart Protocol	O		Open terminal block (6B4)
8E	Intrinsically safe	X		Other, specify
8D	Hart/Intrinsically safe			
8M	Integral transmitter (see page 3-5)			

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

#15	OPTIONS (Use only if applicable)		
1	Stainless steel tag	6*	Premium calibration report. Corrections data will be provided for all.
2	Plastic tag		
3	Paper tag		
4	Laser etch on probe	7	CE marking [page XV]
5	Calibrate at specified point(s). Corrections data provided for each point.	8	Guide 17025 calibration
		9	Bar code
		M	MTR

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

P	3-36”	A	Y	T	A	1

COMPLETE PART NUMBER EXAMPLES

-with nipple-union-spring-loaded fitting extension assembly:
3ESBNK12”BS[UN6K1]PZZYZL1
-without extension assembly:
3ESBNK12”BSPZZYZL1

AVERAGING RTDS

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).

#1	DESCRIPTION
3A	Averaging RTD

#2	ELEMENT TYPE 0.00385, 100Ω @ 0°C, Class B		
E*	Continuous, -148° to 382°F (-100° to 200°C)	X	Other, specify
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"

#3	PROBE DIAMETER		
B	1/4" (.250")	C	3/16" (.188")

#4	SENSING LENGTH
__"	Sensing length in inches **Note:** Sensing length must be at least 4" shorter than the total probe length.

#5	TUBE MATERIAL		
K	316 Stainless steel	U	Copper

#6	TOTAL PROBE LENGTH
__"	Total probe length In inches

#7	STANDARD INDUSTRIAL ATTACHING DEVICE
W	Fixed 1/2" NPT double threaded SS fitting
B	Bayonet spring-loaded assembly for thermowells & heads
F	Reverse mounted single thread SS fitting fixed to sheath for attaching head
G	Fixed single threaded SS fitting
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
X	Other, specify
Z	N/A

For all compression fittings except fixed, immersion is overall length of the tube.

#8	PROCESS NPT		
L	1/8"	X	Other, specify
M	1/4"	Z	N/A
P	1/2"		

#9	LEAD WIRE TYPE & LENGTH IN INCHES
1 __"	Fiberglass braid
3 __"	Teflon
6 __"	Fiberglass braid/flex armor overall
7 __"	Teflon/flexible armor overall
8 __"	3 conductor fiberglass braid/SS overbraid
9 __"	3 conductor Teflon with Teflon jacket overall
10 __"	3 conductor Teflon/SS overbraid with Teflon jacket overall
X __"	Other, specify
Z	N/A

#10	WIRE CONFIGURATION
T	2 Wire
Y	3 Wire
W	4 Wire

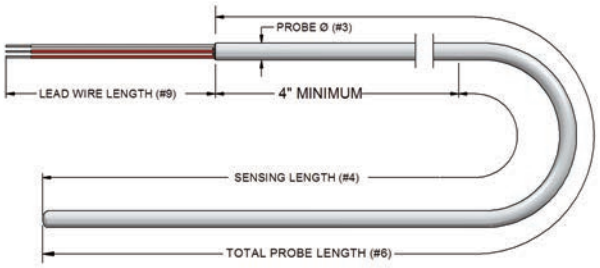
#11	MAX TRANSITION TEMP
P	< 500°F
Q*	> 500°F

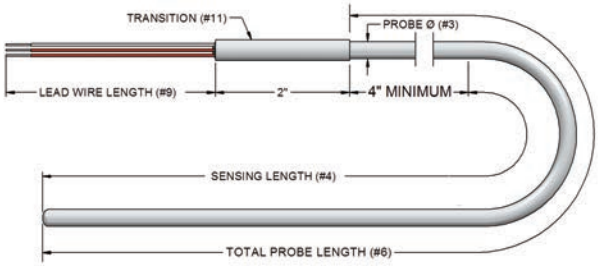
* Not valid for continuous element type.

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





3A	E	B	12"	K	18"	I	M	3-36"	Y	P

AVERAGING RTDS

#12	COLD END TERMINATION [Add'l options see Pg 1-7] (Choose as many as applicable)
A	Bare ends
B	Miniature plug
C	Standard plug
D	Miniature jack
E	Standard jack
F	High temperature plug (< 800°F)
G	High temperature jack (< 800°F)
I	Explosion proof head, NEMA 4X, FM, CSA, IP66 (6IA/6B4)
K	Spade lugs (6SL)
L	Aluminum head w/ hinged cover (6L/6B4)
M	Aluminum head w/ screw cover & chain (6M/6B4)
N	Cast Iron head w/ screw cover (6N/6B4)
O	Open terminal block (6B4)
Q	Black Noryl plastic head (6Q/6B4)
R	High dome head (6R)
V	Hermetic connector (6DC) - Male
WM	Microphone style connector (6DA) - Male
WF	Microphone style connector (6DA) - Female
X	Other, specify

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

#13	TAGGING AND CALIBRATION OPTIONS (use only if applicable)		
1	Stainless steel tag	5	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.
2	Plastic tag		
3	Paper tag		
4	Laser etch on probe	7	CE marking [Page XV of online technical catalog]
		9	Bar code
		M	MTR

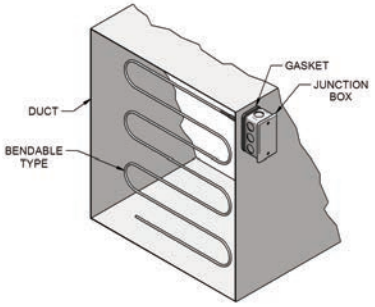
C	1

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
3L	Platinum, 100Ω @ 0°C, a=.00385

#2	SENSOR TYPE
56	Rigid
57	Bendable

#3	WIRE CONFIGURATION
T	2 Wire
Y	3 Wire

#4	INSERTION LENGTH
_____"	(Standard Lengths for Rigid type (inches): 12", 18", 24", 48", 60", 72" Standard Lengths for Bendable type (inches): 72", 144", 288")

#5	OPTIONS
A	Weatherproof connection box (2.12" W X 4.0" H X1.75" D)
B	Sensor only, no box
C	Stainless steel tag
X	Other

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

3L	56	T	60"	A

RTD WITH INTEGRAL PC PROGRAMMABLE TRANSMITTER

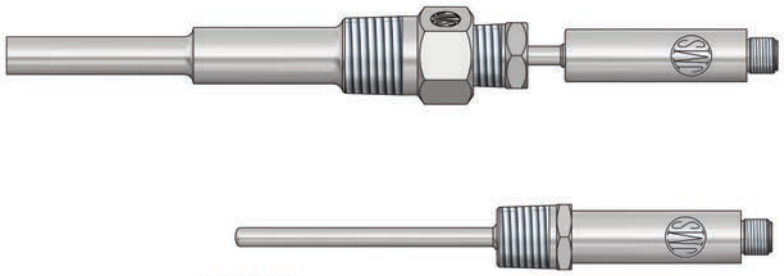
RTD with 4-20 mA INTEGRAL OUTPUT (RTD *in*, 4-20 mA *out*)

INDUSTRIAL STYLE INTEGRAL TRANSMITTER (Transmitter option see page 3-2, #14, 8M)

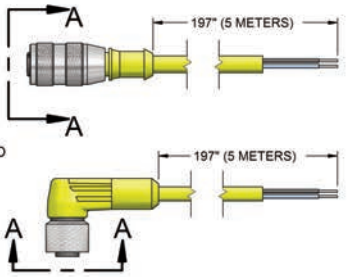
FEATURES:

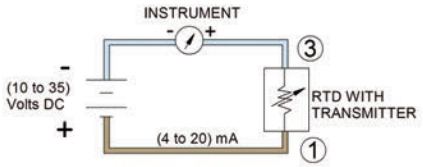
- PC programmable
- Carry a 4-20 mA to your PLC directly from the RTD with no special equipment.
- Available in fixed immersion and spring loaded for thermowells!!
- Quick-n-Clean M12 connection for easy replacement.
- NEMA 6P (IP67) rated with M12 connector.
- Ideal for most applications from -60 to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

Ideal for high moisture environments!



DETAIL VIEW A-A
(M12 CONNECTOR)





4 WIRE RTD WITH TRANSMITTER

JMS PART #	DESCRIPTION
6SKWT*	M12 CORDSET, 4 POLE, FEMALE, STRAIGHT, IP67, 197" (5 METER) LENGTH
6RKWT*	M12 CORDSET, 4 POLE, FEMALE, RIGHT ANGLE, IP67, 197" (5 METER) LENGTH

*Add an X to the end of the part # to specify a custom cord length.

ECONOMY HAND HELD INFRARED SENSOR

To order, use JMS part number: IR20L

Only! *$35.00*

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.

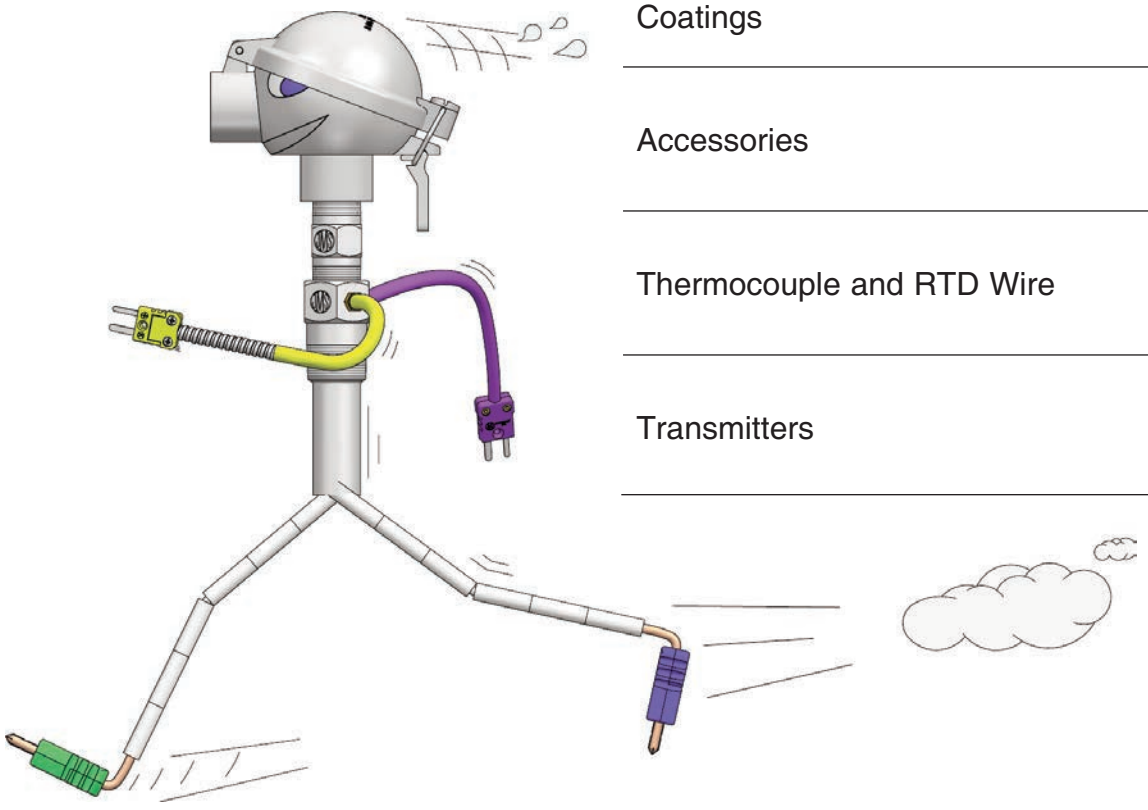
BATTERY REPLACEMENT:
When an empty battery icon flashes in the LCD, this indicates that the battery is low and should be replaced. Confirm that the power is OFF, open the battery door in the handle and replace the 9 volt battery. Please remember to dispose of the batteries properly and to keep away from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

SANITARY AND SPECIALTY SENSORS

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.

3-A APPROVED SANITARY SENSORS

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).

www.3-A.org

#1	DESCRIPTION
4S	Sanitary sensors

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

Resistor accuracies at 0˚C. Add 3 before selection for 3 wire RTD

#3	ELEMENT CONSTRUCTION
1	Single
2	Dual
X	Other, specify

#4	OUTSIDE DIAMETER (OD)		
A	3/8”	E	1/16”
B	1/4”	X	Other, specify
C	3/16”	Z	NA
D	1/8”		

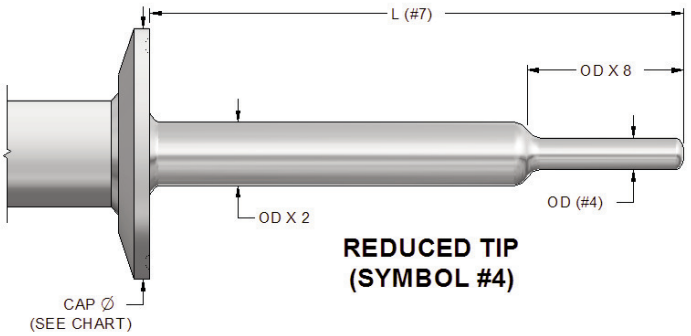
Note: For a reduced tip, add R before selection. The shank OD will equal twice the tip OD. See illustration below. (Example RB steps down from 1/2" to 1/4" at the tip)

#5	TUBING MATERIAL
K	316 stainless steel
L	316 low carbon stainless steel (Standard)
H	304 stainless steel
I	304 low carbon stainless steel
X	Other, specify

#6	MEASURING JUNCTION
G	Grounded
U	Ungrounded (Standard)
	Note: RTD’s are always ungrounded.

#7	IMMERSION LENGTH (L)
___”	Length in inches

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



REDUCED TIP (SYMBOL #4)

4S	S	1	B	K	U	12”

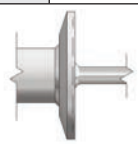
TRI-CLOVER (16 AMP) CAP SIZE CHART

CAP SIZE (#9)	CAP Ø
1/2 X 3/4	1"
1	2"
1 1/2	2"
2	2 17/32"
2 1/2	3 1/16"
3	3 9/16"
4	4 11/16"
6	6 9/16"
8	8 9/16"
10	10 9/16"
12	12 9/16"

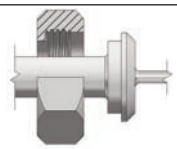
3-A APPROVED SANITARY SENSORS

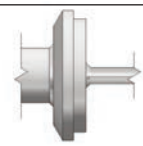
#8	SANITARY CAP OPTIONS [SEE BELOW] **Note:** Standard sanitary thermowells can be found on page 4-4 and 4-5.		
T	Tri-Clover (16 AMP)	P	PV Gasket (16APV) without 13-H nut
B***	Bevel seat (16 A) without 13-H nut	PH	PV Gasket with 13-H nut
BH***	Bevel seat with 13-H nut	A***	3A4 Adapter
I**	I Clamp (16AI-14I)	X*	Other, specify
S**	1/2" x 1/2" Spring-loaded fitting for assembly with sanitary thermowell.		

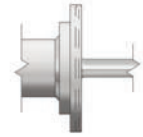
* When specifying X, ensure that it meets 3-A standard.
** Not 3-A authorized.
*** Must be cleaned manually.

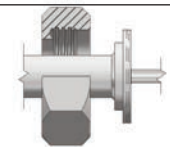

T Tri-Clover (16 AMP)


B Bevel Seat (16A) without 13-H Nut


BH Bevel Seat(16A) with 13-H Nut


I I Clamp (16IA-14I)


P PV Gasket (16APV) without 13-H Nut


PH PV Gasket (16APV) with 13-H Nut

#9	CAP SIZE			See Triclover Size Chart on page 4-1
05	1/2 or 3/4	60	6	**Note:** 05 Cap sizes (1/2 x 3/4) will use 1/4" NPT nipple. Not available for Bevel seat or I-Clamp
15	1 or 1 1/2	80	8	
20	2	100	10	
25	2 1/2	120	12	
30	3	Z	N/A	
40	4	X	Other, specify	


A 3A4 Adapter

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

#11	LEAD WIRE TYPE AND LENGTH IN INCHES	MAX. TEMP. °F		
Z	No lead wire (Teflon will insulate the wires in the head)	392°F	X	Other, specify
1__"	Fiberglass braid	662°F		
3__"	Teflon	392°F		
7__"	Teflon wire with white Teflon covered flex armor	392°F		

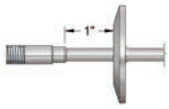
#12	TRANSITION TYPE		
H	Heat shrink	X	Other, specify
S	Size on size	Z	No transition
R	1/4" OD		
T	3/8" OD (Standard w/out head)		
N	Nipple (Standard w/ head)		
B	7/16" OD (Standard for high humidity)		

Note: For extra high humidity/moisture/ washdown environments ≤ 500ºF, please add a 2 suffix to your selection. Example: T2

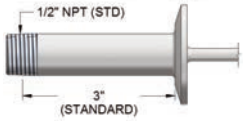
Note: For high temperature at the transition area (>500°F) please add a 3 suffix to your selection. Example: T3

"Z" No Transition

"T" or "R" Transition, or M12 Direct Connect Transition



"N" Threaded Nipple



#13	COLD END TERMINATION [Add'l options see Pg 1-7] Choose as many as applicable		
WP	White plastic head (3-A Standard)	AW	Bare ends, Teflon with nipple
A	Bare ends	SC	Capped socket connection [4-3]
P	Epoxy coated explosion proof rated cast Iron head w/ gasket	8H	Isolated transmitter
		8M	Integral transmitter (see page 4-3 for details)
IA	Epoxy coated explosion proof rated aluminum head w/ chain	8N	Non-isolated transmitter
ISS	Explosion proof stainless steel head	HD	Indicating transmitter housing
SS	General purpose stainless steel head w/ screw cover	Y*	M12 watertight male connector
		X	Other, specify

* See page 4-16 for wiring diagram.

NOTE: For detailed specifications and ratings see JMS-SE.com/headspecs

#14	OPTIONS—USE ONLY IF APPLICABLE [INTRODUCTION]		
1*	Stainless steel tag	6**	Premium calibration report Corrections data will be provided for all temperatures within the range.
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.	7	CE marking [page XV]
		8	Guide 17025 calibration
		9*	Bar code
		M	MTR (wetted parts)

* Must specify information required on tag/probe
** Must specify increments & range. (Example: 0 to 300°F, 10° increments)

Note: 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.

T	15	H	3-36"	T	WP

3-A CERTIFIED SANITARY THERMOWELLS

#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.						
2	.260” ID	3	.385” ID	X	Other, specify	Add “N” for FNPT (Example: 2N=FNPT)

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

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

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

#5	T (LAG) EXTENSION
T__”	Lag length in inches

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

#6	CAP SIZE							See Triclover Size Chart on page 4-1
15	1 x 1-1/2	30	3	80	8	X*	Other, specify
20	2	40	4	100	10	Z	N/A
25	2-1/2	60	6	120	12		

#7	CAP STYLE [see 4-9, Row 9 for illustrations]				
T	Tri-Clover (16 AMP)	P	PV Gasket (16APV) w/o 13-H nut	A***	3A4 Adapter
B***	Bevel seat w/o 13Hnut	PH	PV Gasket (16APV) w/ 13-H nut	X*	Other,specify
BH***	Bevel seat w/ 13H nut				
I**	I Clamp (16AI-14I)				

#8	MATERIAL		
H	304 SS	L	316L SS
I	304L SS	X	Other, specify
K	316 SS		

#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
1	Laser etched or stamped on well (Standard)
X	Other
Z	N/A

#11	DOCUMENTATION / CERTIFICATION Choose as many as applicable (Example: “DU” requests dye penetrant test and X-Ray examination)
M	Material Test Report (MTR)
D	Dye penetrant testing
P	Internal hydrostatic pressure test
U	X-Ray examination
W	Premium SwiftyCalc, 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

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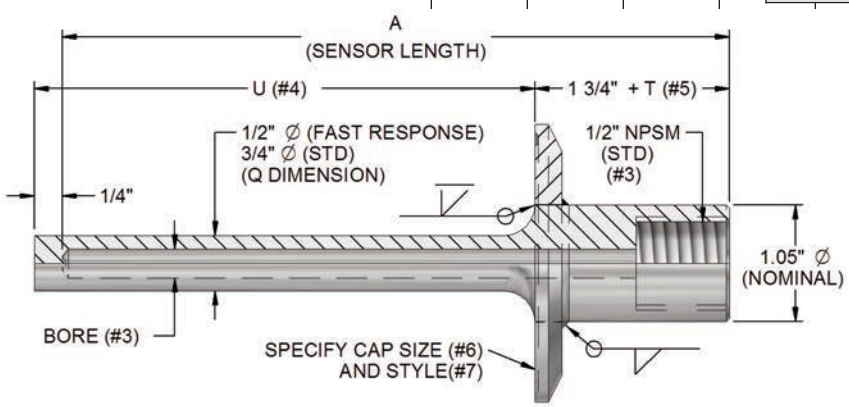


Note:
-Matching sensor length for sensors with a spring-loaded fitting
A = U length(#4) + 1 1/2” + T length(#5)

-Matching sensor length for sensors with a welded fitting
A = U length(#4) + 3/4” + T length(#5)

* When specifying X, ensure that it meets 3-A standard.
** Not 3-A authorized.
*** Must be cleaned manually.

5F	A	2	D	2”	15	T	K	H	1	M

3-A SANITARY “SLIM-WELL” PROTECTION TUBES

#1	DESCRIPTION
5SL	Sanitary Slim-well - Add “W” here for a plug with a chain attached to well. (Example. 5SLW)

#2	WELL DIAMETER & SENSOR CONNECTION Standard is NPSM. See drawing below.
C	3/16” Ø (fits 1/8” Ø sensor)
B	1/4” Ø (fits 3/16” Ø sensor)
Y	5/16” Ø (fits 1/4” Ø sensor)
X	Other, specify Add “N” for FNPT (Example: BN=FNPT)

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

#3	U (INSERTION) DEPTH [15]
U__”	“U” length in inches

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

#4	T (LAG) EXTENSION
T__”	Lag length in inches

#5	CAP SIZE							
05	1/2 x 3/4	25	2-1/2	60	6	120	12
15	1 x 1-1/2	30	3	80	8	X*	Other, specify
20	2	40	4	100	10	Z	N/A

See Triclover Size Chart on page 4-1

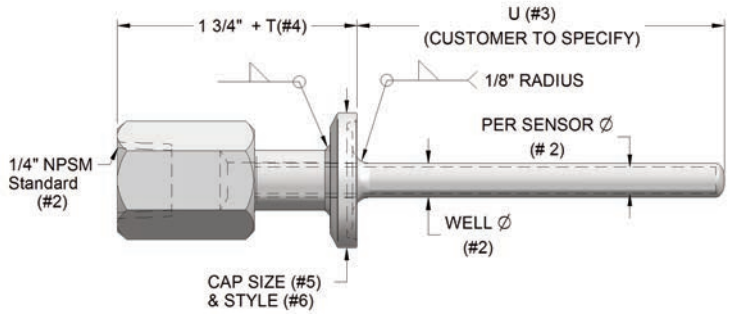
#6	CAP STYLE [see 4-2, selection #8 for illustrations]				
T	Tri-Clover (16 AMP)	P	PV Gasket (16APV) w/o 13-H nut	A***	3A4 Adapter
B***	Bevel seat w/o 13Hnut	PH	PV Gasket (16APV) w/ 13-H nut	X*	Other,specify
BH***	Bevel seat w/ 13H nut				
I**	I Clamp (16AI-14I)				

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

#8	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

#9	TAGGING OPTIONS
1	Laser etched or stamped on well (Standard)
X	Other
Z	N/A

#10	DOCUMENTATION / CERTIFICATION Choose as many as applicable (Example: “DU” requests dye penetrant test and X-Ray examination)
M	Material Test Report (MTR)
D	Dye penetrant testing
P	Internal hydrostatic pressure test
U	X-Ray examination
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



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)

* When specifying X, ensure that it meets 3-A standard.
** Not 3-A authorized.
*** Must be cleaned manually.

5SL	B	10”	2”	05	T	K	H	1	M

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.

www.3-A.org

#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]	
U__"	Specify length in inches.	**Note:** When specifying spring-loaded replacement sensor, customer should specify immersion length 1/4" shorter than the overall weld-in thermowell length

#3	MATERIAL						**Note:** see page 5-11 for more options.
H I	304 SS 304L SS	K L	316 SS 316L SS	X	Other, specify		**NOTE:** When specifying an X, material selected must comply with 3-A standard, 74-03

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

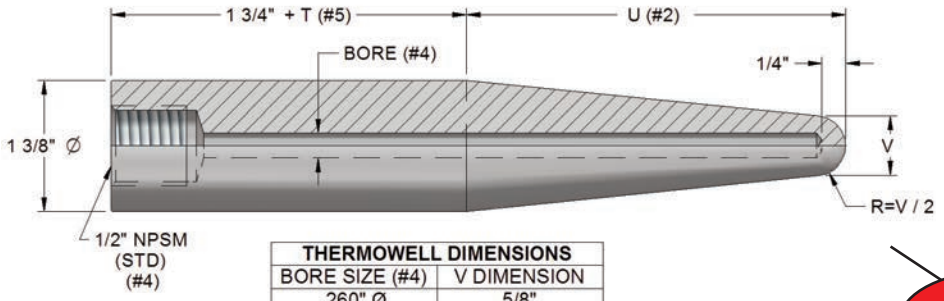
#4	BORE SIZE & SENSOR CONNECTION Standard is NPSM.					
2	.260" ID	3	.385" ID	X	Other, specify	Add "N" for FNPT (Example: 2N=FNPT)

#5	T (LAG) EXTENSION [5-15]		
Z	N/A (No Lag)	T__"	Specify length in inches

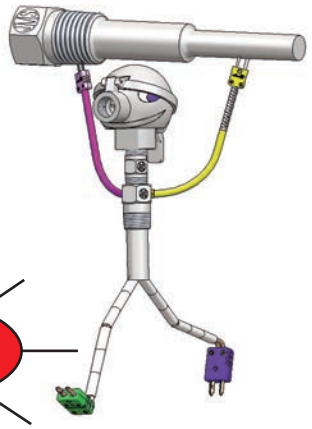
#6	TAGGING OPTIONS
1	Stamped on well (Standard)
X	Other
Z	N/A

#7	DOCUMENTATION & CERTIFICATIONS -- use all that apply (Example: "DU" requests dye penetrant test & X-Ray examination)		
M	Material Test Reports (MTRs)	S	Surface finish certificate
D	Dye penetrant testing	E	Certificate of electropolish
P	Internal hydrostatic pressure test	A	Certificate of No Animal Derived Material (ADM)
U	X-Ray examination	N	Certificate of no polishing compounds
W	Premium SwiftyCalc ASME 19.3TW-2010 calculation	O	Certificate of cleaned for Oxygen service

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



THERMOWELL DIMENSIONS	
BORE SIZE (#4)	V DIMENSION
.260" Ø	5/8"
.385" Ø	49/64"



NEW!

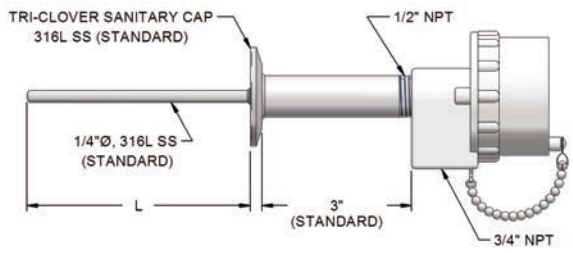
FREE Wake Frequency Calculations to ASME PTC 19.3 TW, ***SwiftyCalc!*** Visit JMS-SE.com to sign up today!
www.JMS-SE.com/SwiftyCalc

5C	10	H	2	Z	1	M

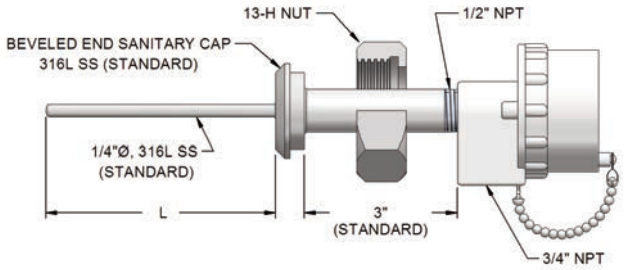
3-A APPROVED COMPLETE SENSORS

SANITARY CAP TYPICAL DESIGNS

TRI-CLOVER (16 AMP) (CAP OPTION "T")

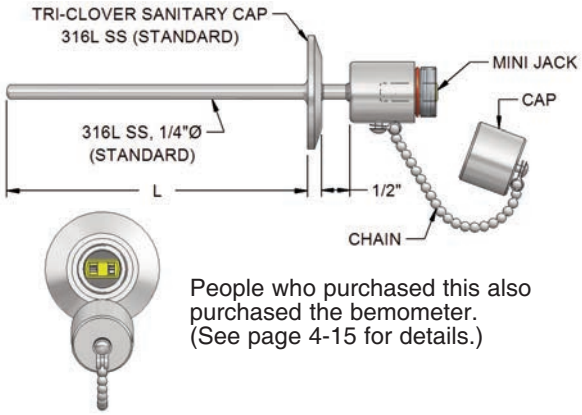


BEVEL SEAT WITH 13-H NUT (16 AMP) (CAP OPTION "BH")



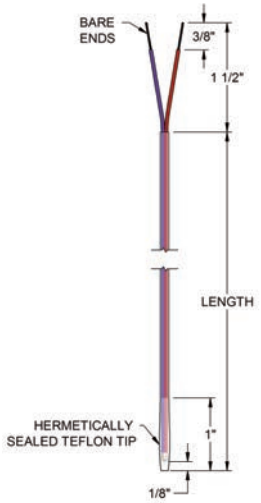
SPECIAL DESIGNS

SOCKET CAP COLD END TERMINATION (OPTION "SC")



People who purchased this also purchased the bemometer. (See page 4-15 for details.)

ULTRA HIGH ACCURACY TYPE T WIRE THERMOCOUPLE



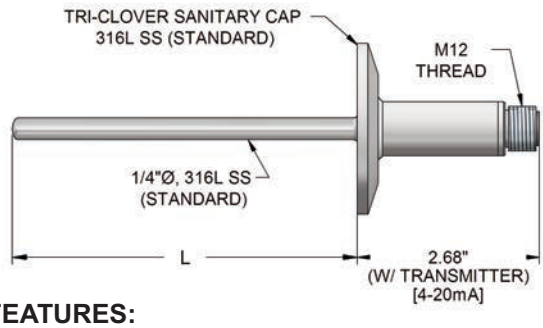
Moisture, rough handling and severe conditions all pose grave threats to the functionality of Type T thermocouple measurements - measurements which are a critical component of many high accuracy laboratory and pharmaceutical applications.

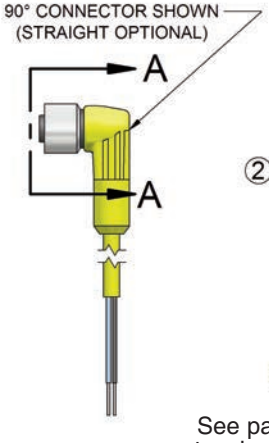
JMS presents its rugged, fast response, multi-strand Type T sensor. These sensors are manufactured from premium Type T thermocouple wire, which is accurate to ± 0.22˚C at 121˚C, and with hermetically sealed tips perfect for environments with high humidity. These sensors represent the cutting edge in thermocouple technology.

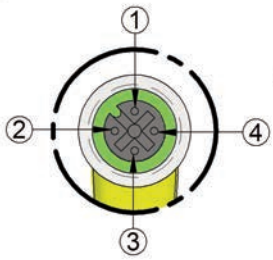
To order, simply specify JMS part #: DWG16238- followed by the length. Example: DWG16238-120 for an Ultra High Accuracy Type T sensor 120 inches in length.

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

TOOL FREE RTD TEMPERATURE MEASUREMENT

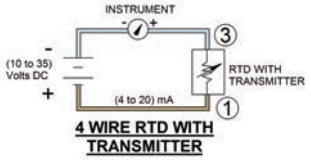


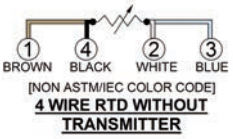


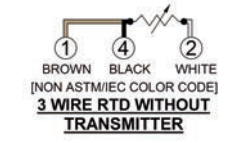


VIEW A-A
(M12 CONNECTOR)

See page 3-5 for extension assemblies.







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!

HAND HELD SENSORS

#1	DESCRIPTION
4H	Hand held sensor

#2	TYPE
J	Iron/Constantan, standard limits of error
K	Chromel/Alumel, standard limits of error
T	Copper/Constantan, standard limits of error
E	Chromel/Constantan, standard limits of error
3	RTD 100Ω Platinum .00385 alpha, 3 wire, Class B
X	Other, specify

#3	OUTSIDE DIAMETER
A	3/8" (.375")
B	1/4" (.250")
C	3/16" (.188")
D	1/8" (.125")
E	1/16" (.063")
X	Other, specify

#4	LENGTH (L)
__"	Immersion length in inches

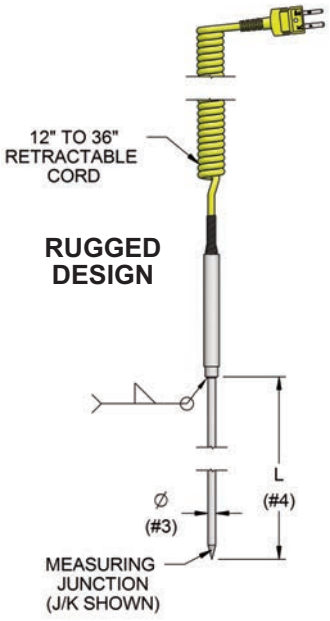
NOTE: Standard material is 316 stainless steel.

#5	MEASURING JUNCTION
G	Grounded
U	Ungrounded (RTDs are always ungrounded)
J*	Pointed tip, grounded
K*	Pointed tip, ungrounded
X*	Other, specify

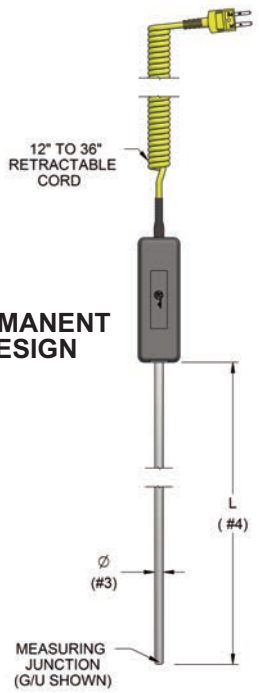
Note: See ordering symbols on page 1-1, row 6 for special junctions such as pointed tip and gas/air.

* Provide dimensions when selecting these options.

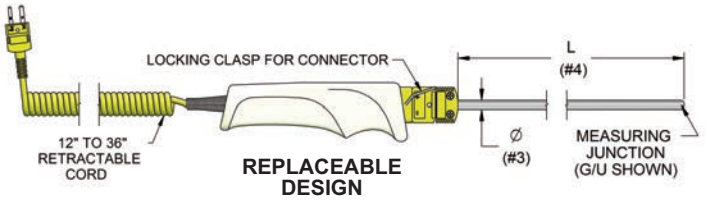
#6	HANDLE STYLE (See illustrations below and to the left)
H	Handle for replaceable probe
R	Permanent handle for non-replaceable probe
S	Rugged, stainless steel handle for non-replaceable probe
X	Other, specify
Z	N/A



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



#8	COLD END TERMINATION [Additional options see Pg 1-7]
A	Bare ends
B	Miniature plug (Standard)
C	Standard plug
D	Replacement sensor
X	Other, specify



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

4H	K	B	6"	G	H	S	B

SINTERING, FURNACE & GLASS THERMOCOUPLES

#1	DESCRIPTION
4G	Sintering, furnace & glass thermocouple

#2 TYPE [Add a "2" before the letter to indicate dual element construction (Example: Dual type S would be coded "2S")]

S	Platinum/Platinum 10% Rhodium	C	Tungsten 5% Rhenium/Tungsten 26% Rhenium
R	Platinum/Platinum 13% Rhodium	A*	Tungsten 5% Rhenium/Tungsten 20% Rhenium
B	Platinum 6% Rhodium/Platinum 30% Rhodium	X	Other, specify

*Rated 1000°C to 2500°C

#3 OUTSIDE DIAMETER

B	1/4" (Standard)	F	1/25"
C	3/16"	X	Other, specify
D	1/8"	Z	N/A
E	1/16"		

#4 TUBE MATERIAL

A	Platinum - 10% Rhodium	R*	Molybdenum
B	Platinum - 20% Rhodium	S*	Tantalum
M	Inconel 600	T*	Titanium
X	Other, specify	RL*	Molybdenum-LX

*Purged and filled with high temperature inert gas

NEW **ASK ABOUT OUR SMALL DIAMETER(.01" to .063") SWAGED TANTALUM AND PLATINUM OPTIONS!**
Call Now (800)-873-1835

#5 THERMOCOUPLE JUNCTION

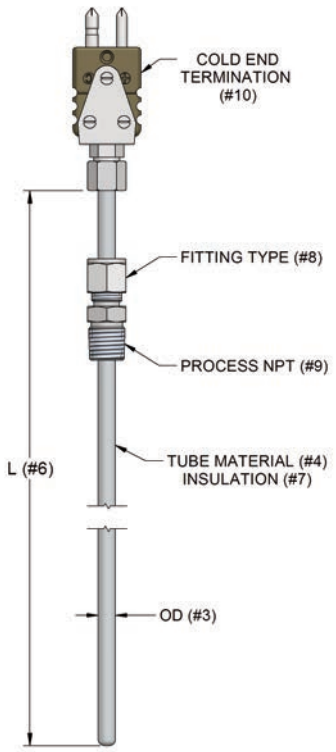
G	Grounded
U	Ungrounded (Standard) Required for Type C

#6 IMMERSION LENGTH

__"	Length in inches

#7 INSULATION

M	MgO (Magnesium Oxide)
A	Al_2O_3 (Standard - Aluminum Oxide)
H	HfO_2 (Hafnia)
X	Other, specify



#8 FITTINGS

Z	No Fitting (Standard)
F	Reverse mounted SS plug fixed for attaching head
G	Fixed SS to sheath
H	Compression fitting SS w/ SS ferrule
X	Other, specify

#9 PROCESS NPT

A	1/2"
B	1/4"
C	1/8"
X	Other, specify
Z	N/A (Standard)

#10 COLD END TERMINATION [Additional options see Pg 1-7]

C	Standard temp plug
F	Hi temp std plug (Standard)
I	Explosion proof NEMA 4X head
L	Aluminum head w/ hinged cover
M	Aluminum head w/ screw cover & chain
N	Cast Iron head w/ screw cover
X	Other, specify

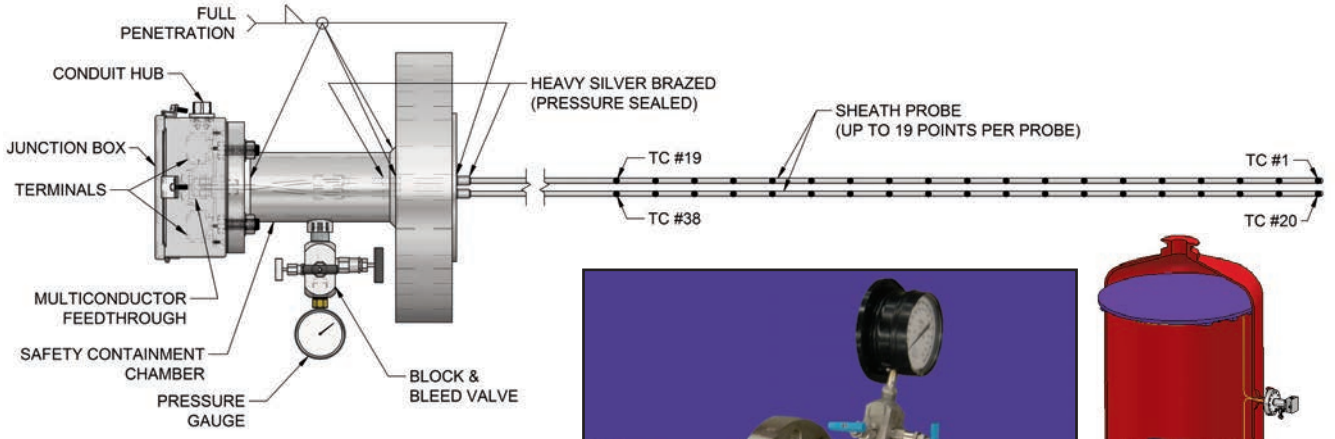
NOTE: For detailed specifications and ratings, see JMS-SE.com/headspecs

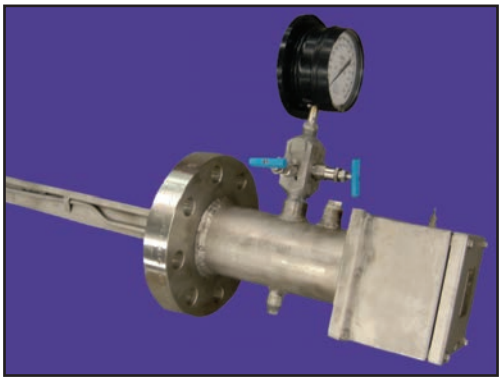
#11 TAGGING AND CALIBRATION USE ONLY IF APPLICABLE

___	See page 1-2 #14 for ordering selections.

4G	S	B	R	U	14"	A	Z	A	F	

CENTERPOINT





MI CABLE DESIGN AND CONSTRUCTION

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

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*

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

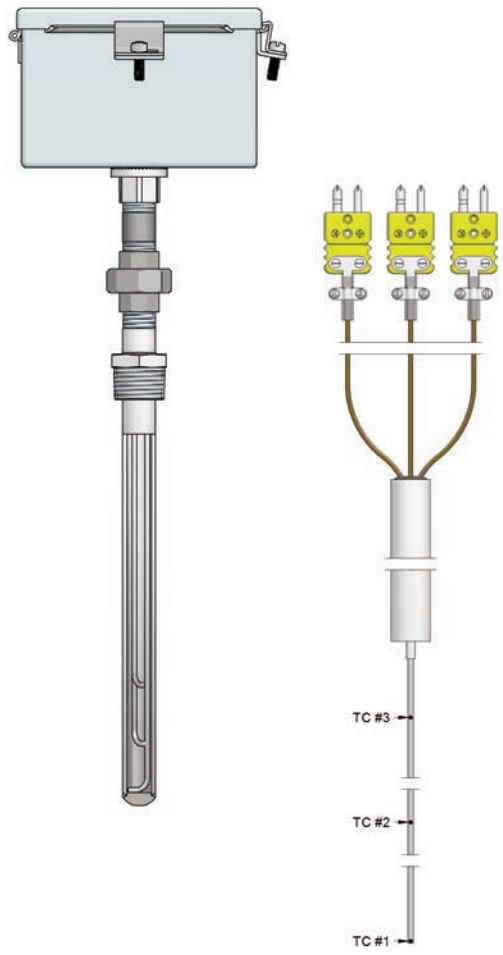
SAFETY BENEFITS

- *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*

MULTIPOINT

PERMANENT & REPLACEABLE MULTIPOINT SENSOR DESIGNS AVAILABLE

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

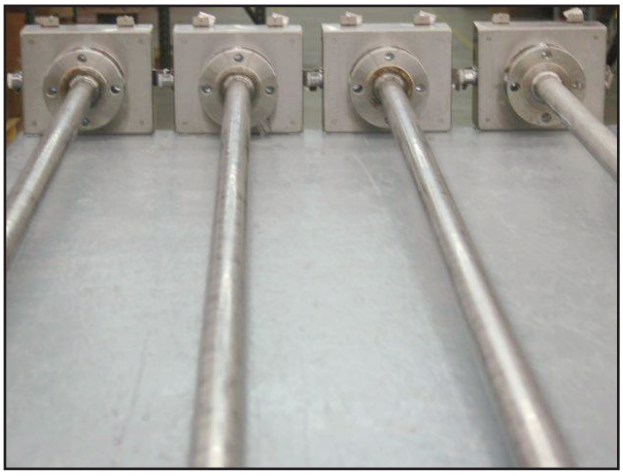


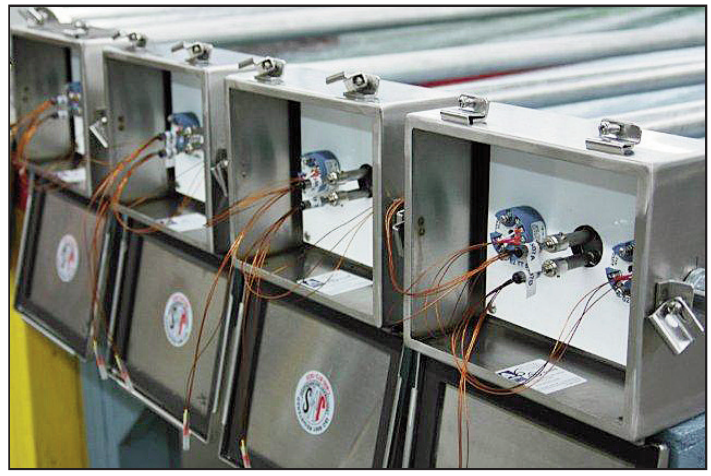
A multipoint sensor allows the measurement of a temperature profile across a large area. Thermocouples or RTDs are arranged with measuring junctions at various points along a pipe, allowing the measurement of various points from a complete assembly. Many elements can be spaced along a probe.

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



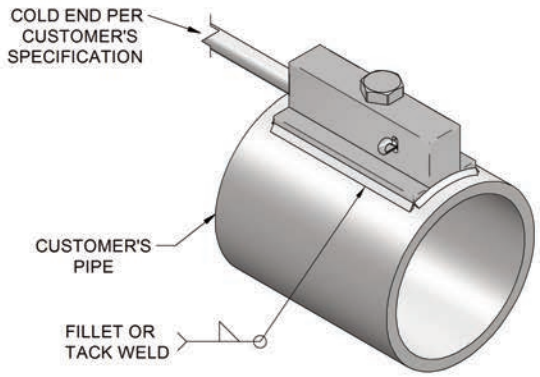


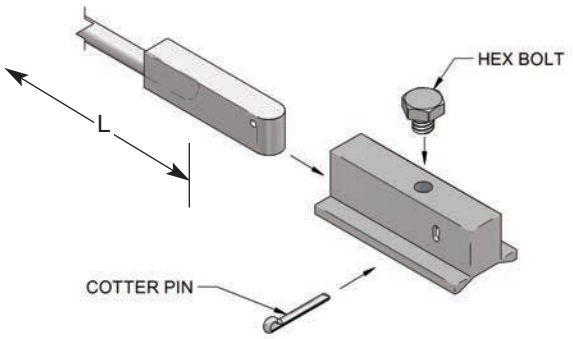
Averaging or discrete point measurement available upon request.

JMS will generate a drawing for your assembly.

FASTTRAX

(Also referred to as the Removable Weld Pad design)





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.

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 hydroprocessing units (example: hydrocracking, hydrotreating reactor)*

INSTALLATION

- *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*

PIPE STAND SKIN SENSORS

#1	SUPPORT STRUCTURE
4W	Weld pad support structure

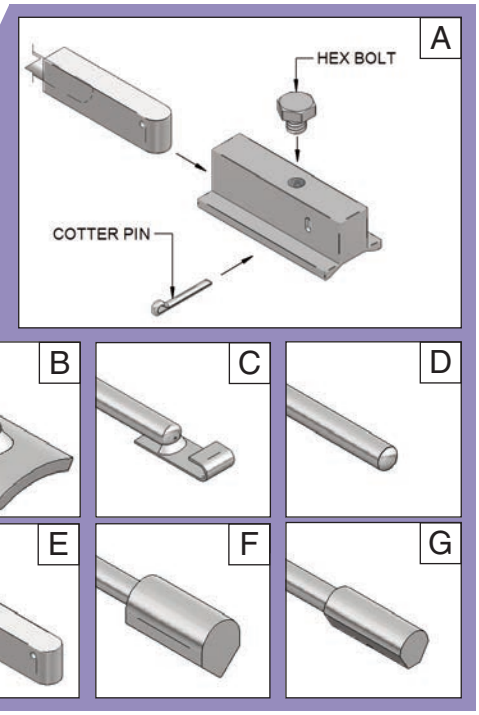
#2	SENSOR TYPE				
	THERMOCOUPLE		*RTD (class A, Pt100)*		
E	Type E	N	Type N	2	2-wire
J	Type J	T	Type T	3	3-wire
K	Type K			4	4-wire
X	Other, specify				

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

#4	PAD / SHEATH MATERIAL		
K	316 SS	M	Inconel 600
H	304 SS	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 *SEE ILLUSTRATION*
__"	Specify (in inches)



#7	JUNCTION STYLE	GROUNDED	UNGROUNDED	ISOLATED
G	Grounded			
U	Ungrounded (RTDs always ungrounded)			
I	Isolated			

#8	CUSTOMER PIPE DIAMETER				
	Standard Pipe size	Actual Ø		Pipe size	Actual Ø
075	3/4" (MIN)	1.05"	50	5"	5.56"
10	1"	1.32"	60	6"	6.63"
15	1 1/2"	1.90"	80	8"	8.63"
20	2"	2.38"	100	10"	10.75"
25	2 1/2"	2.88"	120*	12"	12.75"
30	3"	3.50"			
40	4"	4.50"			
X*	Other, specify	___"			

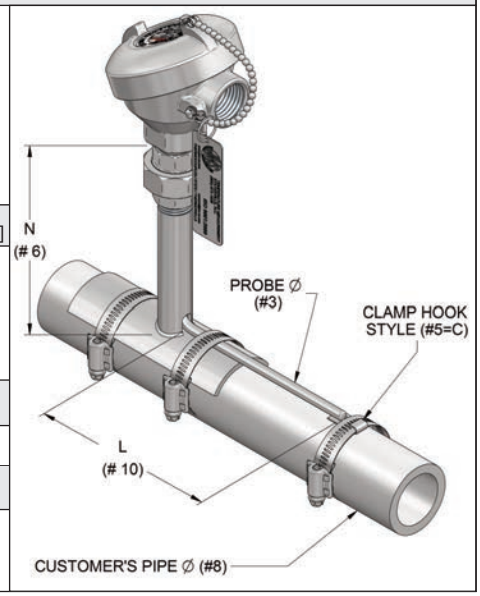
*Weld pads are not curved to fit customer's pipe for diameters 12" and larger due to the minimal tangency gap.

#9	COLD END TERMINATION [Additional options see Pg 1-7]		
GS*	SS w/ viewing port, Nema 4X, FM, CSA, ATEX, IECEx	A	Bare ends
M	Aluminum w/ screw cover & chain	X	Other, specify
I	Aluminum, Nema 4X, FM, CSA, IP66		
SS	316 SS w/ screw cover & chain		

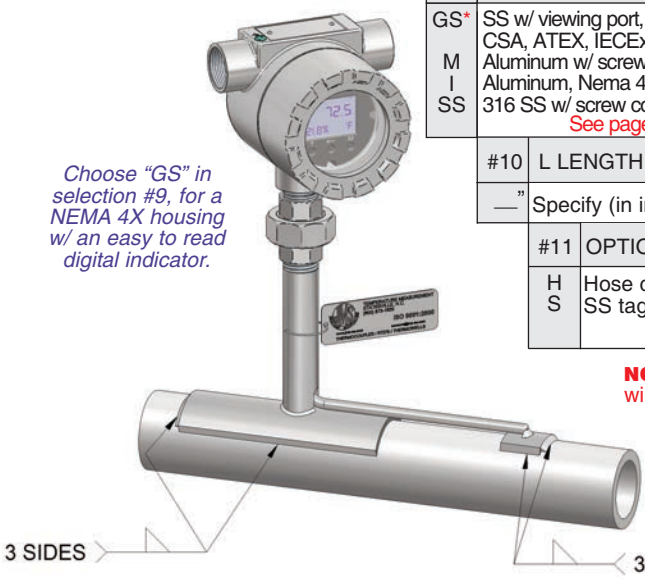
*Must be paired with a transmitter.
See page 8-1 for transmitter ordering information.

#10	L LENGTH
__"	Specify (in inches)

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



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



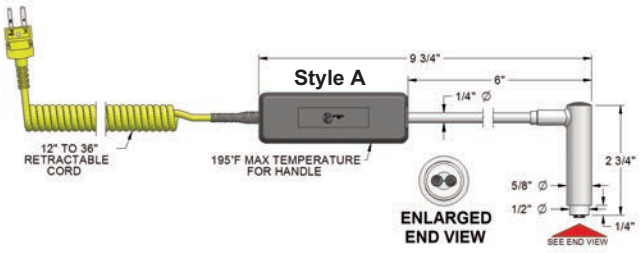
NOTE: Sensor weld pad styles A & D (#5) along with nipple stand weld pads will be curved to fit customer's pipe diameter (#8).

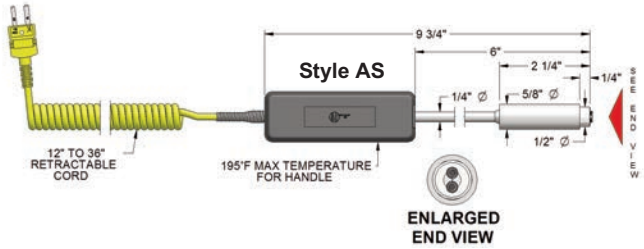
SURFACE SENSORS

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.





TEMPERATURE RATING IS BASED ON T/C TYPE

#1	STYLE *Not available as RTD		(See illustrations above & to the right)
4AS*	Hand held (straight design)	4PADT	Large pad
4A*	Hand held (90° design)	4PADL	Small pad surface
4BK*	Specialty brush sensor		
4B*	Permanent mount		

#2	COLD END TERMINATION [Additional options see Pg 1-7]
A	Bare ends
B	Miniature plug
C	Standard plug
X	Other, specify
Z	N/A

#3	SURFACE SENSOR		
J*	J thermocouple	X	Other, specify
K	K thermocouple		
2*	2 wire RTD		
3*	3 wire RTD		
4*	4 wire RTD		

*Not available as brush

#4	LEADWIRE TYPE & LENGTH		
S	Coil-cord (Standard)	Z	N/A
3__"	Teflon		
5__"	Kapton w/ SS overbraid		
X	Other, specify		

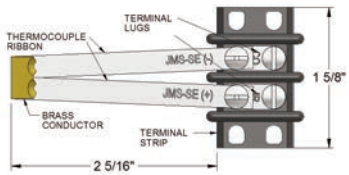
#5	# OF REPLACEMENT TIPS		
0	No sets	Z*	N/A
1 +	Number of sets		

*Standard for styles B, L, T.

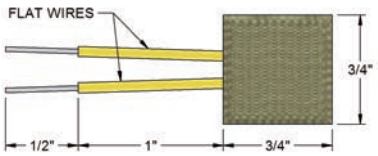
Note: Thermocouple wire is 24 AWG solid conductors. RTD wire is 24 AWG stranded conductors.

Style BK

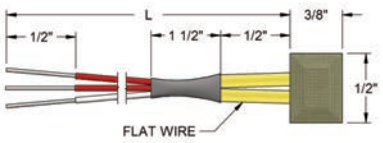
Style B



Style T



Style L



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 .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.

MAGNETIC SURFACE PROBES

#2	STYLE
4M	Magnet surface probe

#2	STYLE	lb pull @ 70°F
C	Crown (1-1/4"Ø) (Standard)	25
R	Round (1"Ø)	24
U	Horseshoe (1-1/8" depth)	19
H	Heavy-load (3"Ø)	100

#3	SENSOR TYPE				
	THERMOCOUPLE			RTD (class B, Pt100)	
E	Type E	N	Type N	2	2-wire
J	Type J	T	Type T	3	3-wire
K	Type K			4	4-wire
X	Other, specify				

#4	JUNCTION TYPE
G	Grounded (Standard for T/Cs)
U	Ungrounded (RTDs are always ungrounded)

#5	LEADWIRE TYPE & LENGTH
C__"	Coil-cord
T__"	Teflon
TS__"	Teflon w/ SS overbraid (Standard)
K__"	Kapton
KS__"	Kapton w/ SS overbraid
F__"	Fiberglass
FS__"	Fiberglass w/ SS overbraid
X__"	Other, specify

#6	COLD END TERMINATION
A	Bare ends
B	Miniature plug
C	Standard plug
X	Other, specify
Z	N/A

[Additional options see Pg 1-7]

4M	C	K	G	TS36"	A

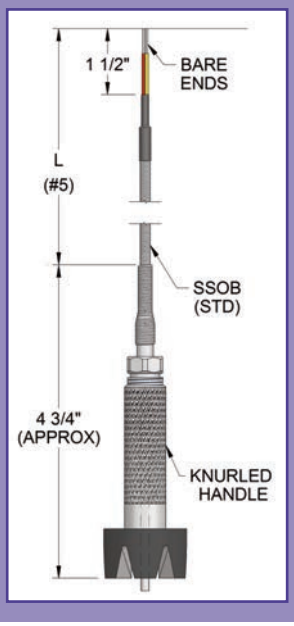
Maximum temperature rating shown in red.

Style C

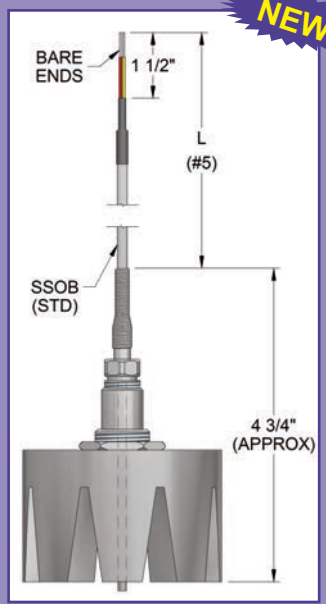
Style R

Style U

Style H



NEW

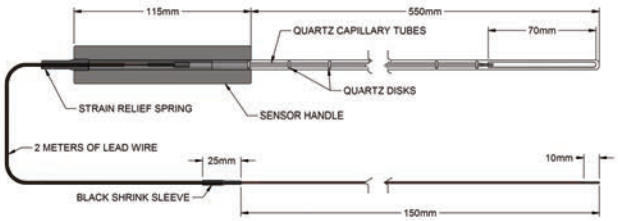


Note: Thermocouple wire is 24 AWG solid conductors. RTD wire is 24 AWG stranded conductors.

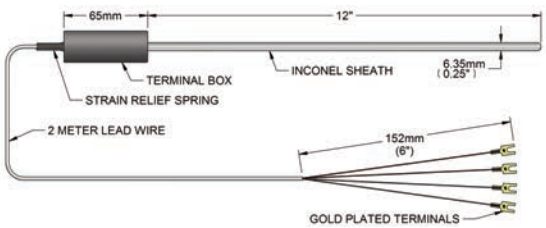
LABORATORY THERMOMETERS

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

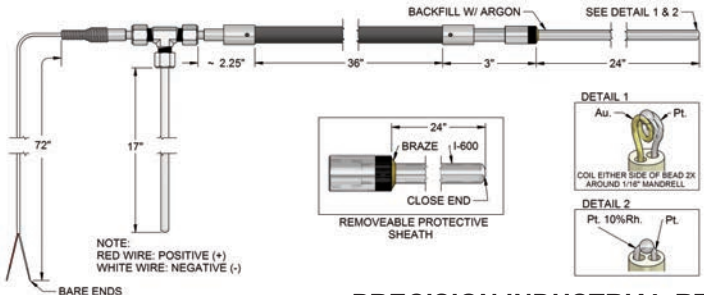
STANDARD PLATINUM RESISTANCE THERMOMETERS



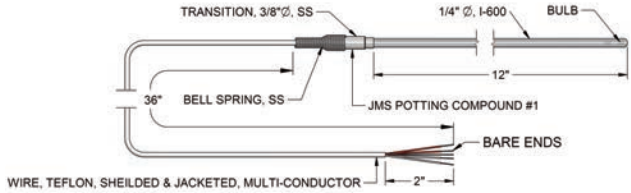
SECONDARY STANDARD RTDS



JMS STANDARDS THERMOCOUPLE



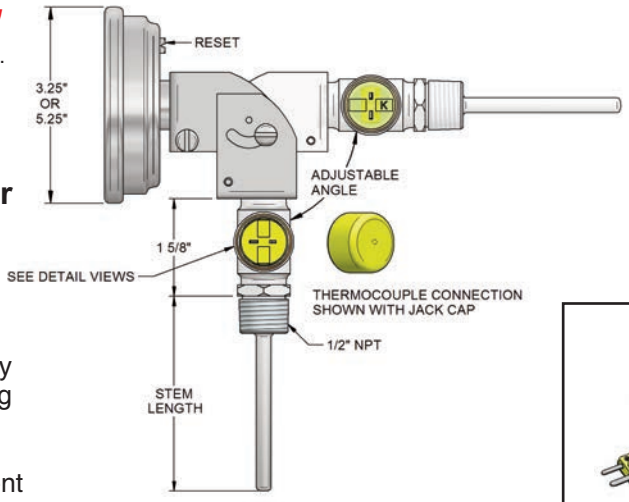
PRECISION INDUSTRIAL RTD

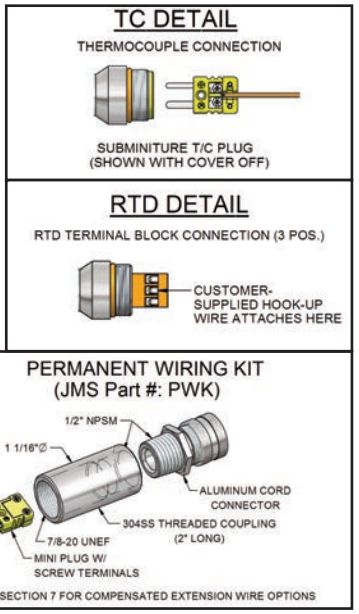


ANALOG BEMOMETER

BE•MORE•METER!!

Originally developed by JMS Southeast, Inc.



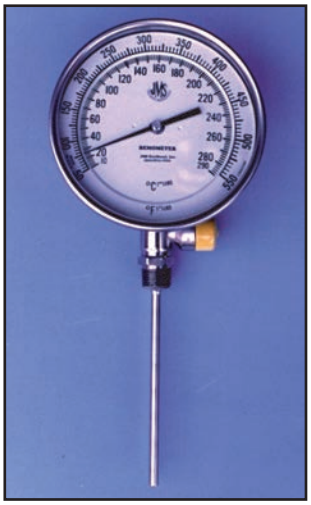


Unites Bimetal with either Thermocouple or RTD Technology!

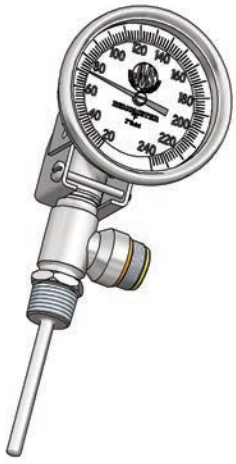
- Bimetal Dependability
- Thermocouple / RTD Accuracy
- Direct AND Electronic Reading
- Easy To Use
- Easy To Calibrate
- Two Sensors in One Instrument

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.



People who purchased this also purchased socket cap sensors.
(See page 4-3 for details.)



How To Order Your Adjustable Angle Bemometer:

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

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

Permanent Wiring Kit

Table 1 - Model	
KEY	DESCRIPTION
30	3" Back connection
32	3" Adjustable angle
50	5" Back connection
52	5" Adjustable angle

Table 2 - Stem Length	
KEY	DESCRIPTION
040	4 inches
060	6 inches
090	9 inches
120	12 inches
X	Other, specify

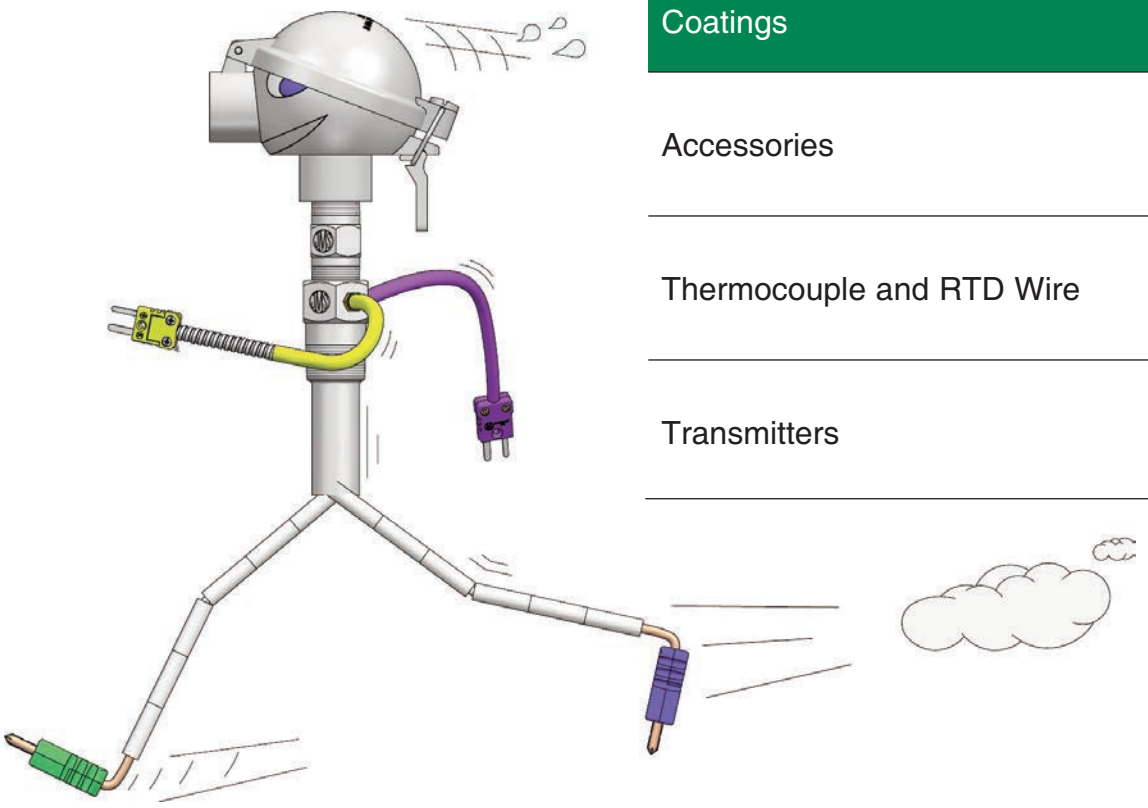
Table 3 - Scale Type	
KEY	DESCRIPTION
0	Dual scale °F / °C
1	Celsius only
2	Fahrenheit only

Table 4 - Standard Ranges			
KEY	DESCRIPTION		
	Dual scale F/C	Celsius only	Fahrenheit only
01	-100/150°F & -70/70°C	-70/70°C	-100/150°F
02	-40/120°F & -40/50°C	-50/50°C	-40/120°F
03	25/125°F & -5/50°C	0/50°C	25/125°F
04	0/140°F & -20/60°C		0/140°F
05	0/200°F & -15/90°C	0/100°C	0/200°F
06	0/250°F & -20/120°C	-20/120°C	0/250°F
07	20/240°F & -5/115°C		20/240°F
08	50/300°F & 10/150°C	0/150°C	50/300°F
09	50/400°F & 10/200°C	0/200°C	50/400°F
10	50/500°F & 10/260°C	0/250°C	50/500°F

Table 5 - Sensor Type	
KEY	DESCRIPTION
J	Thermocouple output, Type J
K	Thermocouple output, Type K
E	Thermocouple output, Type E
T	Thermocouple output, Type T
3	100Ω RTD output, 3 wire

THERMOWELLS

Swifty Sensor

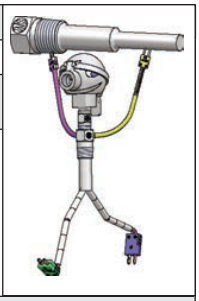


Due to space limitations we have excluded some part number selections from publication. Additional selections are available via JMS catalog cut sheets posted at www.JMS-SE.com. It is the final reference for JMS part numbers. Custom products are also available with drawings to suit your application. Call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

THREADED, SOCKET WELD, & WELD-IN THERMOWELLS

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

#1	DESCRIPTION [See pages 5-20 through 5-24 for detailed information on dimensions, velocity ratings, and pressure ratings]
5	Thermowells - Add a W here for a Brass plug and stainless steel chain attached to well. (Example: 5W)



#2	SIZE	THREADED WELL External thread	SOCKET WELL Pipe size	SOCKET WELL Actual external Ø	WELD IN Actual external Ø
1	1/2"	1/2" NPT	N/A	N/A	N/A
2	3/4"	3/4" NPT (Standard)	3/4" pipe	1.050"Ø (Standard)	N/A
3	1"	1" NPT	1" pipe	1.315"Ø	1.00"Ø
4	1-1/2"	1-1/2" NPT	1-1/2" pipe	1.900"Ø	1.50"Ø (Standard)
5	1-1/4"	1-1/4" NPT	1-1/4" pipe	1.660"Ø	1.25"Ø
X	Other, specify				

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

#3	SHANK STYLE [15]	**NOTE:** Standard shank geometry fits 3000# rated sockolet/threadolet fittings. Use X to specify alternate geometry if needed.
A	Step (Standard)	
S	Straight	
T	Tapered	
B*	Built-up (see page 5-2)	
X	Other, specify	*Recommended if overall length of thermowell is 40" or greater

#4	PROCESS ENGAGMENT		
T	Threaded well design	W*	Weld In design
S	Socket weld well design	X	Other, specify
			*Tapered shank standard

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

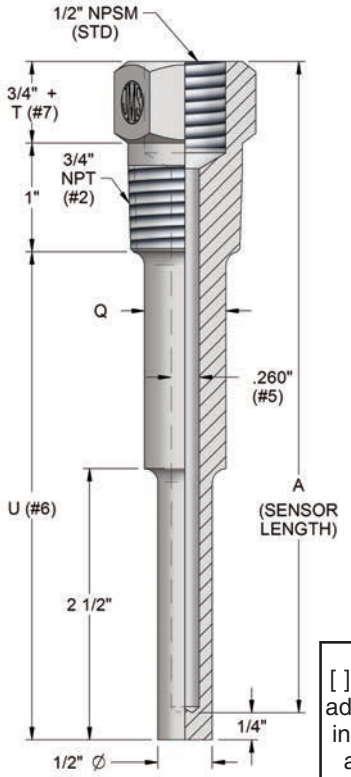
#5	BORE SIZE & SENSOR CONNECTION
2	.260" ID used for .250" OD sensors (Standard)
3	.385" ID used for .375" OD sensors (straight or tapered shank style only)
X	Other, specify **NOTE:** Add a N suffix for FNPT.(Example: 2N = .260" ID with 1/2" FNPT sensor connection)

#6	U (INSERTION) DEPTH [15]	STANDARD T DIMENSION	S/L SENSOR LENGTH NO LAG	S/L SENSOR LENGTH WITH LAG
B	2-1/2"	2	4	6
C	4-1/2"	3	6	9
D	6"	3	7-1/2	10-1/2
E	7-1/2"	3	9	12
F	10-1/2"	3	12	15
G	13-1/2"	3	15	18
H	16-1/2"	3	18	21
I	22-1/2"	3	24	27
U__"*	Other, specify			

*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)

NOTE: Use U_ selection in place of X in legacy part numbers. (example: legacy part # 52AT2XTK1 X=5", is equivalent to 52AT2U5TK1)

THREADED STEP SHANK THERMOWELL DESIGN



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

Matching sensor lengths:

-All Spring-loaded designs and all Compression designs with a nipple/union extension
A = U length(#6) + 1 1/2" + T length(#7)

-All Welded designs
A = U length(#6) + 3/4" + T length(#7)

-All Compression designs without a nipple/union extension
A = U length(#6) + 3 3/4" + T length(#7)

#8	WELL MATERIAL [31-34]		
A	Alloy 800H/HT	M	Inconel 600
B	F5	N	Monel 400
C	F9	Q	Hastelloy C-276
D	F91	S	Titanium
E	F22	X*	Other, specify
F	F11		
G	Carbon steel		
H	304 stainless steel		
I	Low Carbon 304 stainless steel		
J	310 stainless steel		
K	316 stainless steel (Standard)		
L	Low Carbon 316 stainless steel		

*For more options, like special jackets and coatings or unique material requirements, consult your sales representative directly.

#9	TAGGING OPTIONS
1	Stamped on well (Standard)
X*	Other, specify
M	MTR
W	Premium SwiftyCalc ASME 19.3TW calculation
	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

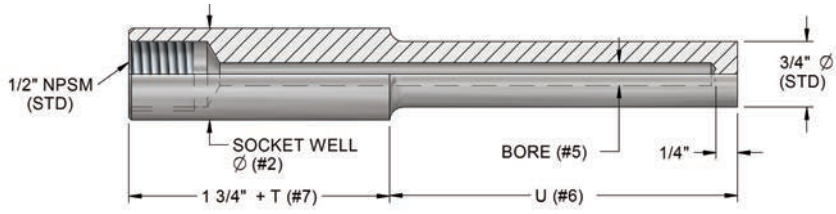
5	2	A	T	2	E	T	H	1

THREADED, SOCKET WELD & WELD-IN THERMOWELLS

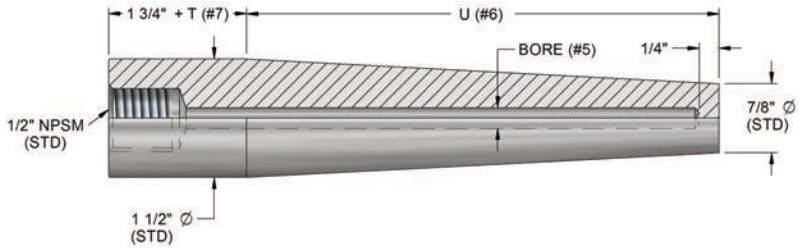
NEW ***FREE*** Wake Frequency Calculations to ASME PTC 19.3 TW, ***SwiftyCalc!***
Visit JMS-SE.com to sign up today! www.JMS-SE.com/SwiftyCalc

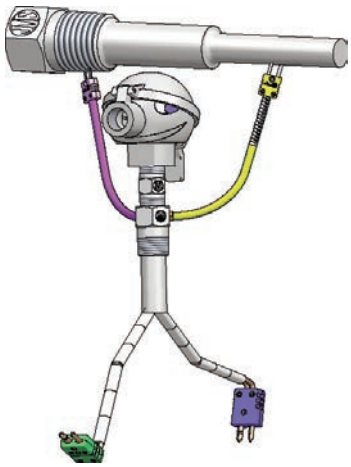
(JMS Southeast, Inc. participated in the ASME 19.3 TW committee performing the first major revision since 1974 to the only US thermowell strength standard. The new ASME PTC 19.3 TW standard addresses wake frequency calculations.)

SOCKET WELD WELL DESIGN (SERIES 52SS2)

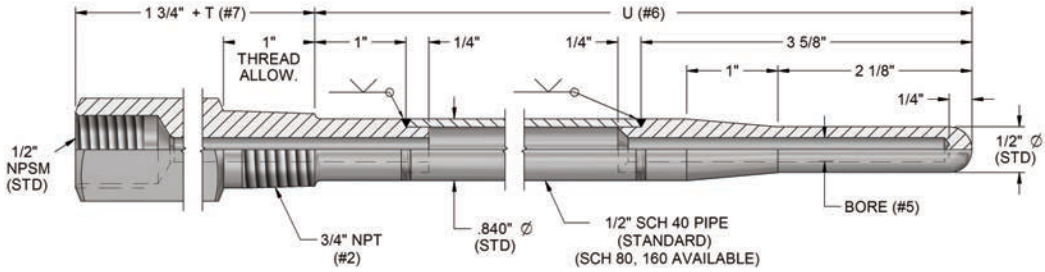


WELD IN THERMOWELL (SERIES 54TW2)





BUILT UP THERMOWELL* (SERIES 52BT2)



*Design does not meet ASME PTC 19.3 TW specifications.

LIMITED SPACE THERMOWELLS

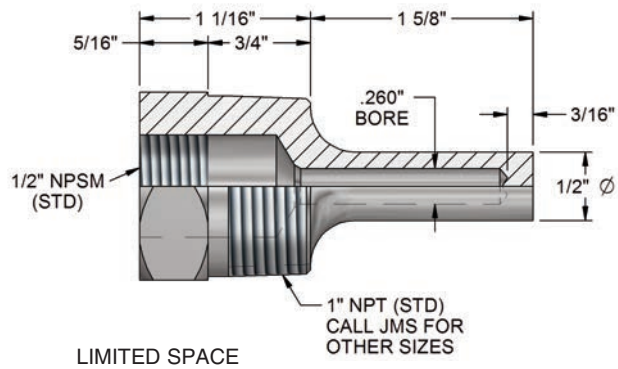
#1	DESCRIPTION
5L	Limited space thermowells - Add a W here for a Brass plug and stainless steel chain attached to well (Example: 5LW)

#2	WELL MATERIAL
H	304 stainless steel
K	316 stainless steel
M	Inconel 600
X	Other, specify

#3	TAGGING OPTIONS
1	Stamped on well (Standard)
X*	Other
M	MTR

5L	M	1

Note: Immersion length of a spring-loaded sensor to fit this well is 2-1/2".



LIMITED SPACE THERMOWELL

FLANGED THERMOWELLS

#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]

A	Step (Standard)	B*	Built-up (see page 5-2)
S	Straight	X	Other, specify
T	Tapered		

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

#3 BORE SIZE & SENSOR CONNECTION Standard is NPSM.

2	.260" ID used for .250" OD sensors (Standard)
3	.385" ID used for .375" OD sensors (straight or tapered shank style only)
X	Other, specify

NOTE: Add N suffix for FNPT.(Example: 2N = .260" ID with 1/2" FNPT sensor connection)

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

#4 U (INSERTION) DEPTH [15]

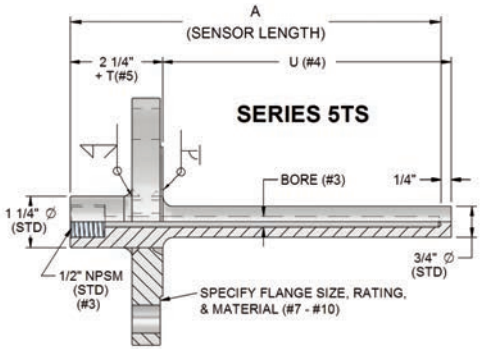
A	2"	*If overall length of thermowell is 40" or greater, JMS recommends the use of our "Built-up" shank style (option # 3) (see illustration on page 5-2)
B	4"	
C	7"	
D	10"	
E	13"	**NOTE:** Use U_ selection in place of X in legacy part numbers. (example: legacy part # 5TA2XZK3A1K1 X=5", is equivalent to 5TA2U5ZK3A1K1)
F	16"	
G	22"	
U__"*	Other, specify	

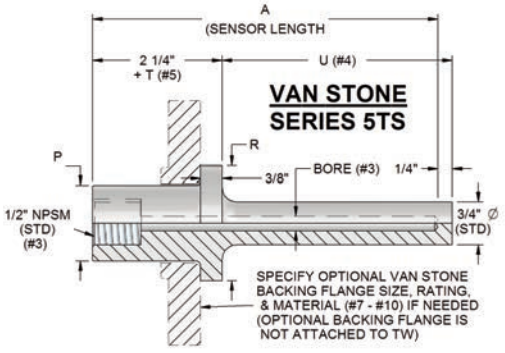
U DIMENSION	SENSOR LENGTH
2"	4"
4"	6"
7"	9"
10"	12"
13"	15"
16"	18"
22"	24"

#5 T (LAG) EXTENSION [15]

T__"	Length in inches
Z	N/A (Standard)

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





Van Stone Dimensions Chart

Flange Size	P (Stem Ø)	R (Sealing FaceØ)	Flange Bore
1"	1.315"	2.000"	1.375"
1 1/2"	1.900"	2.875"	1.970"
2"	2.375"	3.625"	2.460"

#6 WELL MATERIAL [31-34] Special jackets & coatings are available for thermowells. *Call JMS for more information or www.JMS-SE.com.*

G	Carbon steel	A	Alloy 800H/HT
H	304 stainless steel	P	Hastelloy B-3
I	Low Carbon 304 stainless steel	Q	Hastelloy C-276
J	310 stainless steel	S	Titanium
K	316 stainless steel	X*	Other, specify
L	Low Carbon 316 stainless steel		
M	Inconel 600		
N	Monel 400		

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

#7 WELD AND SIZE OF FLANGE [27]

3	1"	6	3"
4	1 1/2"	X	Other, specify
5	2"		

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

A	150	E	900
B	300	F	1500
C	400	G	2500
D	600	X	Other, specify

#9 FACING

1	Raised (Standard)	4	Van Stone no flange
2	Flat	5	Van Stone w/flange
3	Ring Joint Type	X	Other, specifiy

#10 FLANGE MATERIAL [31-34]

G	Carbon steel	N	Monel 400
H	304 stainless steel	A	Alloy 800H/HT
I	Low Carbon 304 stainless steel	P	Hastelloy B-3
J	310 stainless steel	Q	Hastelloy C-276
K	316 stainless steel	S	Titanium
L	Low Carbon 316 stainless steel	X*	Other, specify
M	Inconel 600		

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

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

#11 TAGGING OPTIONS

1	Tag # stamped on well (Standard)
X*	Other
M	MTR
W	Premium SwiftyCalc ASME 19.3TW Calculation

Matching sensor lengths:

-All Spring-loaded designs and all Compression designs with a nipple/union extension
A = U length(#6) + 2" + T length(#7)

-All Welded designs
A = U length(#6) + 1 1/4" + T length(#7)

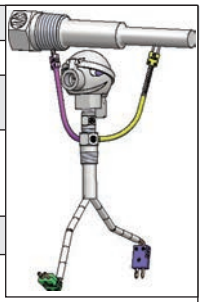
-All Compression designs without a nipple/union extension
A = U length(#6) + 4 1/4" + T length(#7)

5T	A	2	C	Z	H	4	A	1	H	1

Note: You must always specify information required on tag.

THREADED SAMPLE PROBE

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



#2	PROCESS CONNECTION		
1	1/2" NPT	4	1-1/2" NPT
2	3/4" NPT (Standard)	5	1-1/4" NPT
3	1" NPT	X	Other, specify (Example: 2" 150# raised face flange.)

#3	SHANK STYLE [15]
A	Step
S	Straight (Standard)
T	Tapered
X	Other, specify

#4	SAMPLING DEVICE CONNECTION
M	1/4" NPT
P	1/2" NPT
O	3/4" NPT
N	1" NPT
X	Other, specify

#5	BORE SIZE
2	.260" ID (Standard)
3	.385" ID
X	Other, specify

#6	U (INSERTION) DEPTH [15]
U__"*	Specify insertion length

#7	T (LAG) EXTENSION [15]
T__"	Specify lag length

#8	WELL MATERIAL [31-34]
G	Carbon steel
H	304 stainless steel
K	316 stainless steel (Standard)
M	Inconel 600
X*	Other, specify

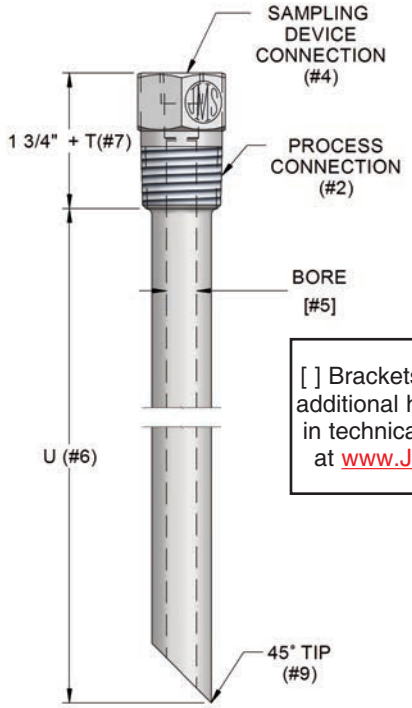
*For more options and unique material requirements, consult your sales representative directly.

#9	OPEN TIP STYLE
A	45°
F	Flat tip
X	Other, specify

#10	TAGGING OPTIONS
1	Stamped on well (Standard)
X*	Other, specify
M	MTR

Note: You must always specify information required on tag.

THREADED STRAIGHT SHANK SAMPLE PROBE DESIGN



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

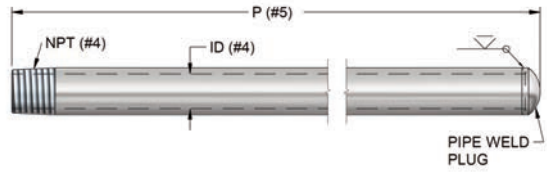
5S	2	A	1	2	U10"	T3"	H	A	1

METAL PROTECTION TUBES

#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 (see illustrations below)
1	Fast response tip
2	Standard response tip

#3	ATTACHING DEVICES
B	Carbon steel bushing
K	Stainless steel bushing
J	Adjustable cast iron floor flange
Z	N/A
X	Other, specify (Example: 3" 150 lb raised face flange.)



ATTACHING DEVICE STYLE "Z"

#4	NOMINAL SIZE [30]	*ID	OD	NPT	STANDARD BUSHING PROCESS CONNECTION	STANDARD FLOOR FLANGE SIZE
18	1/8"	.269	.405	1/8"	1/4" NPT	3"
14	1/4"	.364	.540	1/4"	1/2" NPT	3"
12	1/2" (Standard)	.622	.840	1/2"	3/4" NPT	3"
34	3/4"	.824	1.050	3/4"	1" NPT	4"
10	1"	1.049	1.315	1"	1-1/4" NPT	4"
X	Other, specify					

*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.

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

#5	OVERALL LENGTH (P)		
A	12"	E	36"
B	18"	F	48"
C	24"	G	60"
D	30"	X	Other, specify

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.

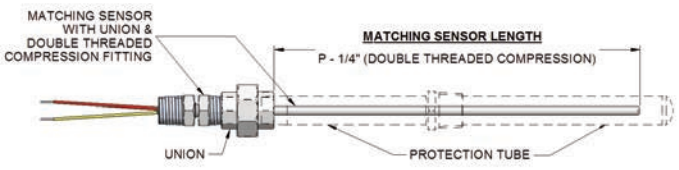
#6	MOUNTING METHOD (see illustrations below)
__" Z	Insert U dimension. (Only if using a permanently fixed attaching device) N/A (Bushing if specified will be adjustable)

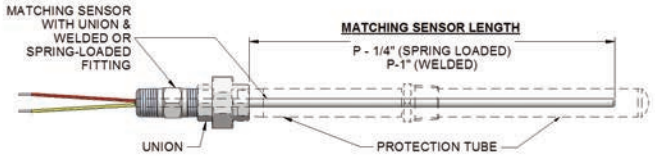
#7	PROTECTION TUBE MATERIAL [31-34]		
G	Carbon steel	M	Inconel 600
H	304 Stainless steel	Q	Hastelloy C-276
J	310 Stainless steel	T	446 Stainless Steel
K	316 Stainless steel (Standard)	X*	Other, specify

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

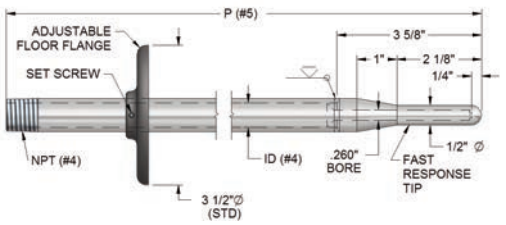
#8	TAGGING OPTIONS
1	Tag # stamped on well (Standard)
M	MTR
X*	Other, specify

Note: You must always specify information required on tag.

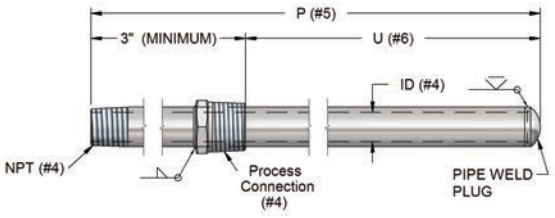




STYLE 5P1



STYLE 5P2



5P	2	B	12	A	9"	K	1

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% Al_2O_3). “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.

#1	DESCRIPTION
5D	Ceramic protection tubes - Add a W here for a Brass cap and stainless steel chain attached to threaded protection tubes only (Example: 5DW)

#2	MATERIAL
A	Alumina
M	Mullite
H	Hexoloy SE Silicon Carbide
G	Alumina/Mullite 60/40
X	Other, specify

#3	ATTACHING DEVICE (see illustrations to the right and below)
O	No fitting
P	Open both ends, no fitting
C	Collar (see dimensions below in option #4)
B*	Hex bushing (Std for option #4 selections: 14,38,76,12)
S**	Carbon steel sleeve (Std for option #4 selections: 34 & 10)
X	Other, specify

NOTES:

*Standard hex bushings are 1/2” NPT head connection, and 3/4” NPT process connection.

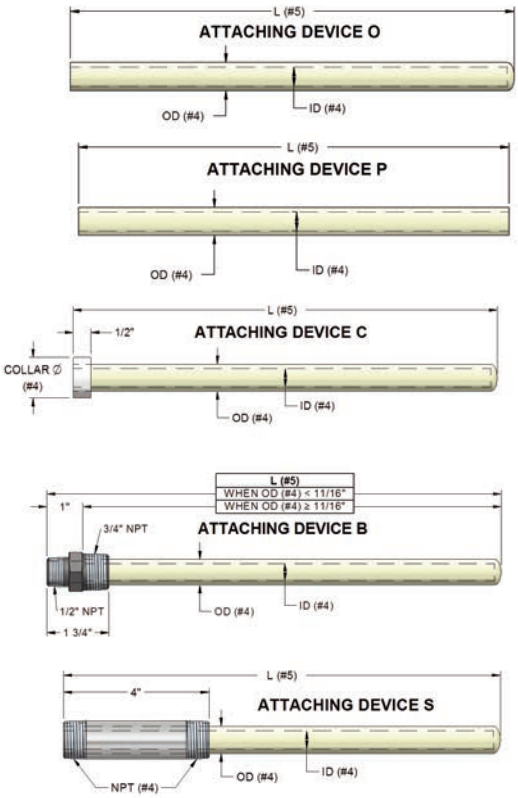
**CS sleeve for tube NPT will equal tube OD (Example: 1” OD will use 1” NPT threads). It can be used to attach adjustable flanges and bushings. Use X in symbol number 3 and describe.

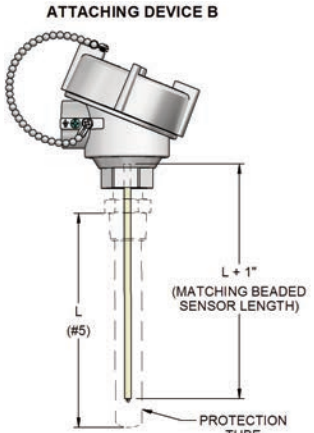
***For tubes smaller than 11/16” OD(selection #4), the L length will equal the total length including the entire hex bushing.

#4	TUBE SIZE			
	Tube ID x OD		Collar OD	
	Alumina Mullite	Hexoloy	Alumina Mullite	Hexoloy
14	1/4” x 3/8”	1/4” x 3/8”	5/8”	5/8”
38	3/8” x 1/2”	3/8” x 5/8”	3/4”	1”
76	7/16” x 11/16”	N/A	1”	N/A
12	1/2” x 3/4”	1/2” x 3/4”	1-1/8”	1-1/8”
34*	3/4” x 1”	3/4” x 1-1/4”	1-3/8”	1-3/4”
10*	1” x 1-1/4”	1” x 1-1/2”	1-3/4”	2”
X	Other, specify			

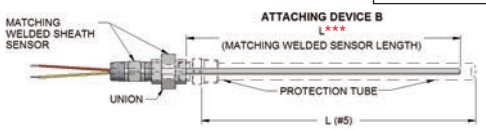
#5	LENGTH (L)***
A	6”
B	12” (Standard)
C	18”
D	24” (Standard)
E	30”
F	36”
X	Other, specify

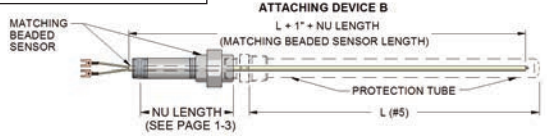
#6	TAGGING OPTIONS
1	Tag # is indelibly marked on well or attaching device (Standard)
X	Other
M	MTR

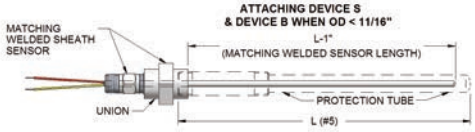


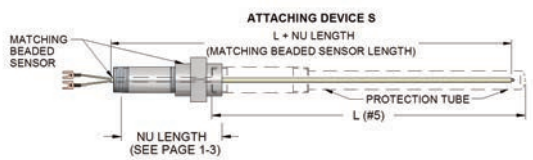


MATCHING SENSOR LENGTHS







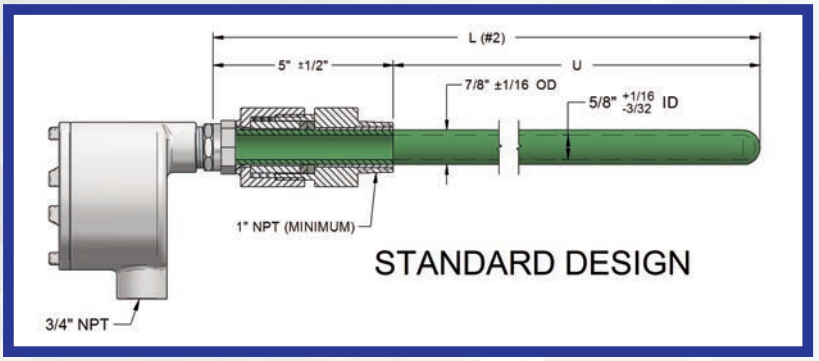


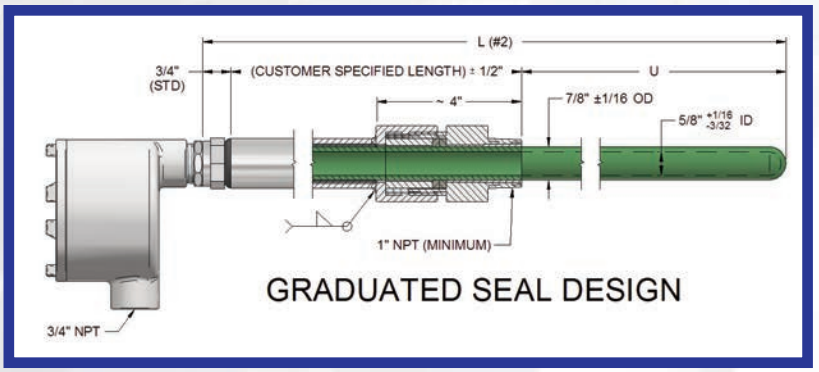
5D	A	B	12	B	1

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

SULFUR PROTECTION TUBE

DESIGN ASPECTS





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

- 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.**

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APPLICATIONS

Sulfuric acid plants

H_2SO_4

Corrosive SO_2 and SO_3 gas to 2500°F at tip

Corrosive SO_3 and HF gas to 2000°F

Boiling H_2SO_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.

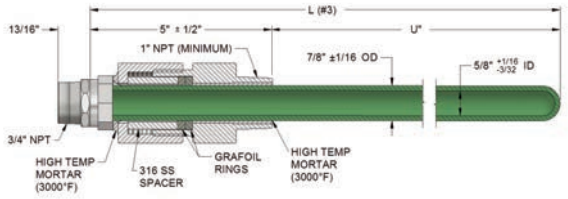
The MCPT exhibits good wear resistance and abrasion resistance. It has a hardness of Rockwell C37, which indicates the crushing strength of the material rather than the true hardness of the entire body.

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".

#1	DESCRIPTION
5G	Metal Ceramic Protection Tube (MCPT) 5/8" ID x 7/8" OD, 3/4" NPT conduit connector - Add a W here for a Brass cap and stainless steel chain attached to protection tube (Example: 5GW)

#2	FITTING SELECTION (See pages 5-7 through 5-9 for details)
Z	N/A
J	Standard design
G	Graduated seal design
X	Other, specify

#3	LENGTH (L)	Standard Design (U Length)	Graduated Seal (U Length)
1	9"	4"	N/A
2	12"	7"	N/A
3	18" (Standard)	13"	N/A
4	30" (Standard)	25"	5-1/4"
5	36"	31"	11-1/4"
6	48" (Standard)	43"	23-1/4"
X	Other, specify		



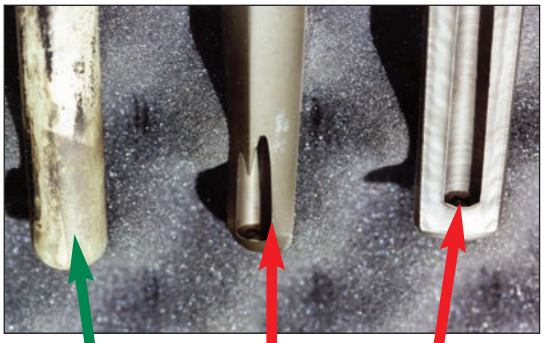
Standard Design

5G	J	3

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.



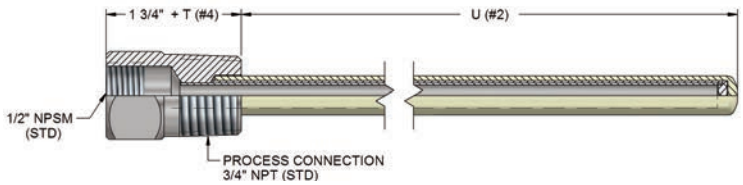
#1	DESCRIPTION
5V	Coal pulverizing thermowell - Add a W here for a Brass plug and stainless steel chain attached to well (Example: 5VW)

#2	U (INSERTION) DEPTH
__"	Length in inches (see illustration below)

#3	PROCESS CONNECTION
A	3/4" NPT (Standard)
B	1" NPT
C	1-1/4" NPT
X	Other, specify

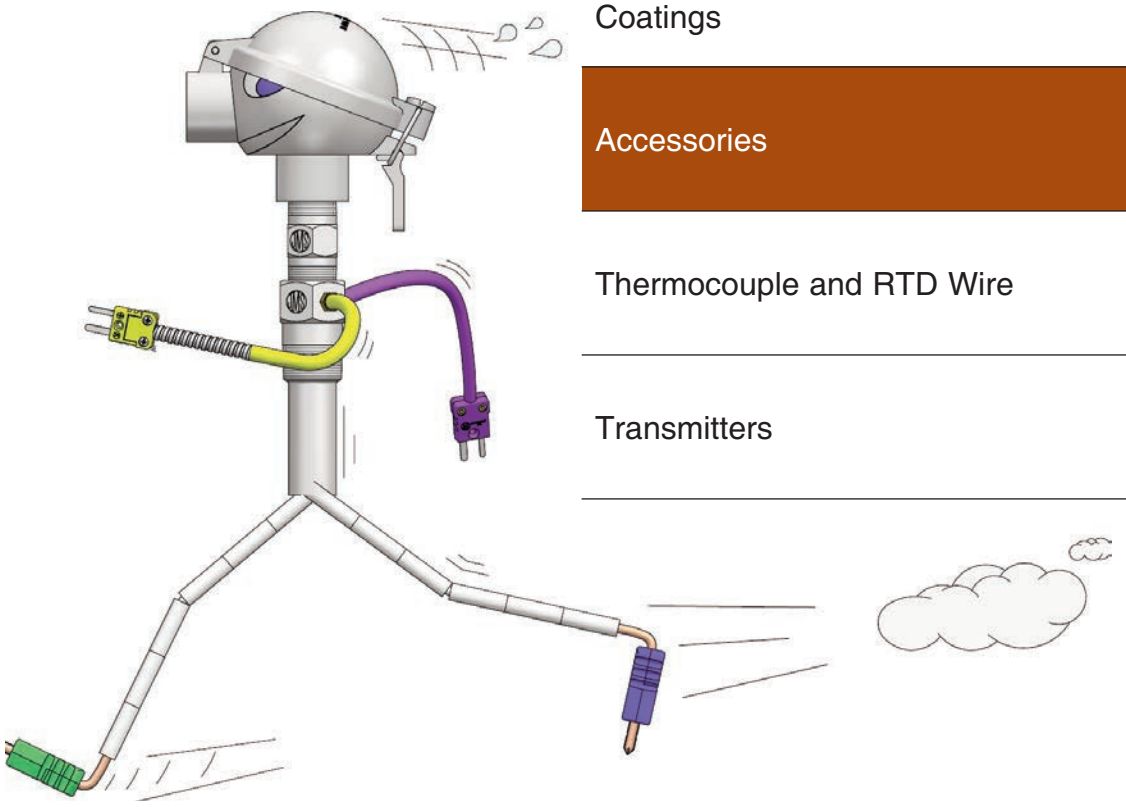
#4	LAG LENGTH (T)
T	Standard (See chart on page 5-1, option #6)
Z	N/A
X	Other, specify

5V	3	A	Z



ACCESSORIES

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.

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)

6L (L)
General purpose aluminum head with hinged cover 1/2" x 1/2" connection (Standard)

Features:
*Corrosion resistant *Moisture resistant
*Dust resistant *Durable
*NEMA 4

150°C

6M (M)
General purpose aluminum head with cap and chain, 1/2" x 3/4" connection

Features:
*Corrosion resistant *Moisture resistant
*Dust resistant *Durable
*NEMA 4

150°C

6N (N)
General purpose cast iron head with cap and chain, 1/2" x 3/4" connection

Features:
*Corrosion resistant *Moisture resistant
*Dust resistant *Durable
*NEMA 4

150°C

6SS (SS)
General purpose 316 stainless steel head with cap and chain, 1/2" x 3/4" connection

Features:
*Corrosion resistant *Moisture resistant
*Dust resistant *Durable
*NEMA 4X

150°C

6I (SI)
Explosion proof cast iron head 3/4" x 3/4" connection

Features:
*UL, CSA explosion proof rated for Class I, Div. I, Groups B, C, D, Class II, III Div. I, Groups E, F, G, *NEMA 3 & 4 rated. *Moisture resistant, *Dust resistant. *Cast iron with aluminum cover.

85°C

6ISS (J)
Explosion proof stainless steel head 1/2" x 3/4" connection

Features:
FM, CSA explosion proof rated for Class I, Div. I, Groups B, C, D, Class II, Div. I, Groups E, F, G, Class III. *NEMA 4X rated. IP66.

85°C

6ISSATEX (U)
Explosion proof stainless steel head 1/2" x 3/4". IP66

Features:
ATEX explosion proof rated for II 2G Ex d IIC

85°C

6IAIEC (P)
Explosion proof aluminum head 1/2" x 3/4" connection

Features:
FM, CSA ATEX & IEC Ex explosion proof rated for Class I, Div. I, Groups, B, C, D, Class II, III, Div. I, Groups E, F, G. ATEX II 2GD Ex d IIC Gb Ex tb IIIC Db IP68, IEC Ex SIR 09.0006U, NEMA 4X, IP66.

85°C

6IA (I)
Explosion proof aluminum head 1/2" x 3/4" connection

Features:
FM, CSA. Explosion proof rated for Class I, Div. I, Groups B, C, D. Class II, III, Div. I, Groups E, F, G. NEMA 4X, IP66

85°C

6R (R)
High dome, general purpose head with hinged cover, 1/2" x 1/2" connection

Features:
*Corrosion resistant *Moisture resistant
*Dust resistant *Durable
*NEMA 4

150°C

6WP (WP)
White plastic screw-top head (polypropylene) 1/2" x 3/4" connection

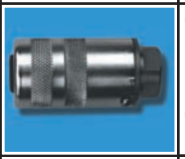
Features:
*Moisture resistant *Dust resistance
*Corrosion resistance *Very light weight
*NEMA 4X

90°C

6Q (Q)
Black plastic (polyamid 6) head 1/2" x 1/2" connection

Features:
*Moisture resistant *Dust resistant
*Corrosion resistance *Very light weight

130°C



6S250 (SB)
Cylinder style head, 1/4" NPT Small & light weight

100°C

6S125 (SD)
Cylinder style head, 1/8" NPT Small & light weight

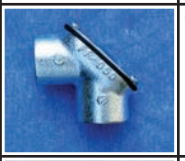
100°C

6T (ST)
Miniature molded head, 1/4" x 1/4" connection

175°C

6U (SU)
Hi temp miniature head, 1/4" x 1/4" connection

425°C



69B (SA)
90˚ Pulling Elbow Malleable Iron/ Zinc plated 1/2" x 1/2" connection. Wire nuts not included

Features:
*Rain tight *Small and light weight
*UL Listed: E-11853 *CSA Certified: 9795

150°C

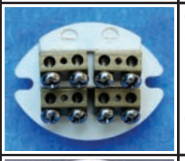
688S1 (GS)
Explosion proof head, 316SS 1/2" x 3/4" x 3/4" connection, threaded cap with glass viewing window.

Features:
ATEX/IECEx, FM/CSA, NEMA 4X rated.

85°C

688A1 (GA)
Explosion proof head, coated Aluminum 1/2" x 3/4" x 3/4" connection, threaded cap with glass viewing window.

85°C

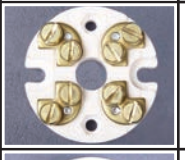


6G2 (OG)
Ceramic block with brass terminals for type 6M and 6N connection heads.
For use with 8 to 14 AWG wires. (See pg. 1-4).

Dimensions:
6G2: H = .790", W = 2.00", D = 1.544"
6G4: H = 1.146", W = 2.00", D = 1.544"

6G4 (OG)

200°C



6B4 (O)
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)

Dimensions:
Diameter = 1.62", Depth = .6"

200°C

6B6 (O)
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)
Temperature rating of 200°C.

Dimensions:
Diameter = 1.62", Depth = .6"

200°C

6C4 (OS)
Ceramic block with 304SS terminal posts for type 6L and 6Q connection heads. The terminal posts provide easy access to the wires. For use with max.18 AWG wire.

6C8 (OS)

Dimensions:
Diameter =1.662", Depth = .995"

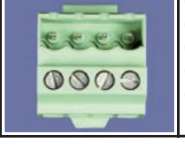
200°C

6BB4 (OA)
Bakelite terminal block with nickel plated brass terminal posts for type 6IA and 6ISS connection heads. For use with max. 20 AWG wire.
Temperature rating of 130°C.

6BB6 (OA)

Dimensions:
Diameter = 1.96", Depth = .905"

130°C



6PT2
6PT3
6PT4
6PT6
6PT8 (OP)
Unpluggable terminal blocks for easy calibration and removal of sensors. Terminal body is made of 6.6 Polyimide material, with corrosion proof screw clamp parts. For use with 18 AWG to 24 AWG wires. It is standard with 6R and 6I connection heads.

100°C

For more information and details on connection heads and accessories,
visit 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.

#1	DESCRIPTION [6-18, 6-19]
6A	Accessories plugs and jacks

#2	CONNECTOR DESIGN	
1*	Standard	<425°F
2	High temperature	<800°F
3*	Heavy duty (solid pin)	<425°F
4*	Heavy duty (jab-in & solid pin)	<425°F (Std size only)
5	Ultra high temperature (glazed)	<1200°F
6*	Low noise	<425°F
7	Ultra high temperature (unglazed)	<1200°F

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

#3	STYLE
B	Mini plug
D	Mini jack
C	Standard plug
E	Standard jack

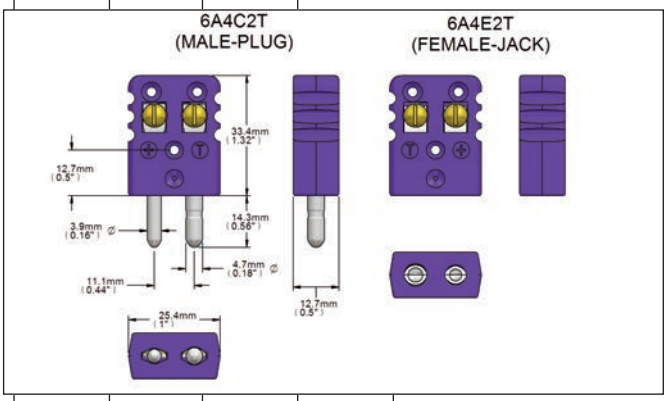
#4	# OF CIRCUITS
2	2 pole
3*	3 pole

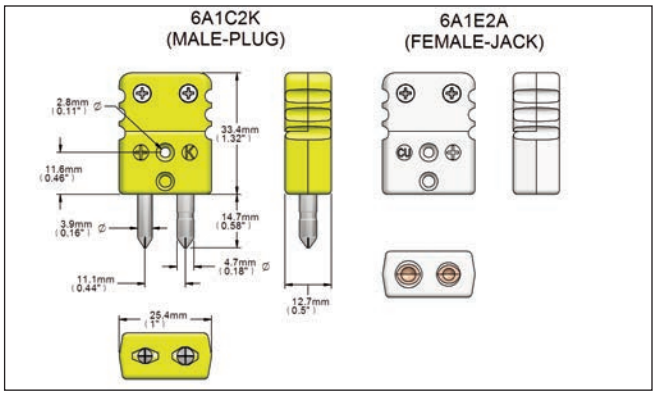
*For thermocouples, 3 pole design will include a copper ground pin. (see illustration below)

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

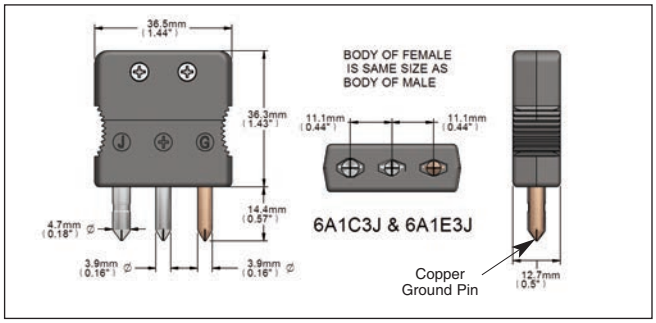
***Note:** 2 pole will be Copper/Copper for TCs. 3 pole will be plated Copper for RTDs.

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.



6A	1W	C	2	J

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.

SINGLE	DUAL
6V063S	6V063D
6V125S	6V125D
6V188S	6V188D
6V250S	6V250D

OUTSIDE TUBE DIAMETER
1/16”
1/8”
3/16”
1/4”

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.

6RSC (Standard)
6RMCR (Mini)
Round Single Circuit Panel Jack

MAX. TEMP. 400°F
JACK NOT INCLUDED

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.

6H Cable Clamp

PANEL ADAPTOR

6ACL Panel adaptor
JACK NOT INCLUDED

WATER RESISTANT NEOPRENE BOOT FOR USE WITH PLUG AND JACK

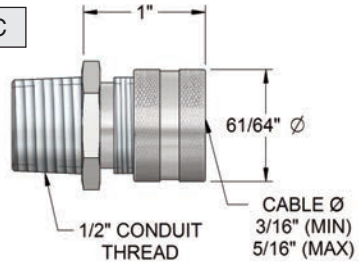
6WPBM Mini plugs & jacks

6WPB Standard sized plugs & jack
Flexible moisture proof boot for connector and wire connection.
MAX. TEMP. 212°F

SUPPORT ACCESSORIES

CORD CONNECTOR FOR USE W/ ATTACHING HEAD ASSEMBLIES & FLEX ARMOR

6CC

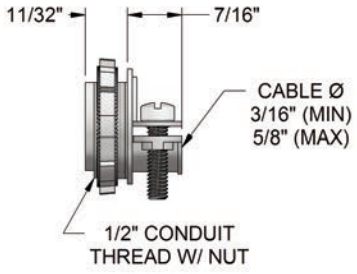


PLUG LOCK

6FCL

JUNCTION BOX CONNECTOR

6JBC

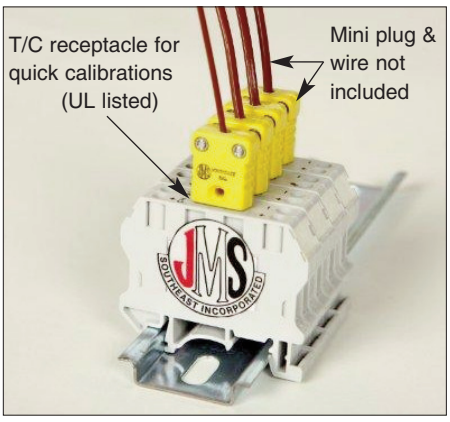


Note: Standard cord connectors are aluminum. Other sizes and materials are available.

THERMOCOUPLE DIN RAIL CONNECTOR

#1	DESCRIPTION		
6DR	Din rail mountable thermocouple connections		
#2	TYPE OF EXTENSION WIRE		
J T K	Iron/Constantan Copper/Constantan Chromel/Alumel	E	Chromel/Constantan
#3	QUANTITY OF SENSOR INPUTS		
____	Desired number of plugs (total per individual rail)		
#4	INCLUDES MINI T/C RECEPTACLE?		
N	No **Note:** If yes, leave blank (Example: 6DRK2)		

6DR	J	4	4



QUICK CONNECTORS

#1	DESCRIPTION
6D	Quick connectors

#2	TYPE OF CONNECTOR		
A	US microphone style connector (Standard)	C	Molded/Hermetic connector
B	DIN-IEC microphone style connector	Y	M12 watertight connector

#3	DESCRIPTION [6-17] Visit JMS-SE.com/CONNECTORS for pin connections details.		
2	2 wire RTD or thermocouple	4	4 wire RTD
3	3 wire RTD	X	Other, specify

#4	TERMINATION Note: If you can see the pins it is a male (plug)				
C	Plug	P	Panel mounted jack	X	Other, specify
E	Jack	M	Panel mounted plug		

#5	# OF CIRCUITS
S	Single
D	Dual
X	Other, specify

#6	INSERT ALLOY
J*	Iron/Constantan
T*	Copper/Constantan
K*	Chromel/Alumel
E*	Chromel/Constantan
S	Gold Plated - Standard for Type C
C	Chrome Plated - Standard for Type A
X	Other, specify

* Not availiable in Type A or C connectors.

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

6D	B	2	C	S	J


TYPE A PLUG


TYPE A JACK


TYPE B PLUG


TYPE B JACK


TYPE C PLUG


TYPE C JACK

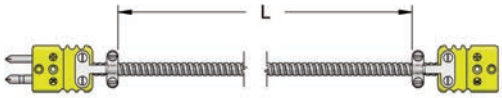

TYPE Y PLUG


TYPE Y JACK

EXTENSION ASSEMBLIES

#1	DESCRIPTION
6E	Extension assembly (Extension grade wire is used per ASTM E230)

Single Extension with Plug & Jack



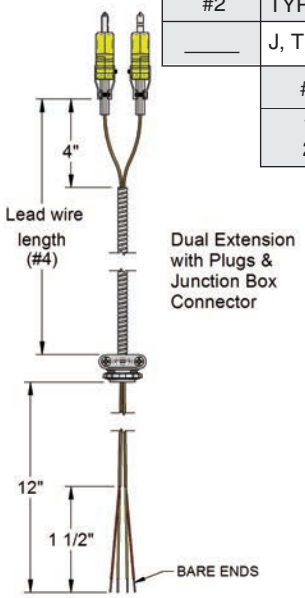
#2	TYPE
____	J, T, K, E, N, R*, S*, 2, 3, 4 wire RTD, X (Other, Specify)

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

#3	ELEMENT CONSTRUCTION		
1	Single	3	Triple
2	Dual	X	Other, specify

#4	LEAD WIRE TYPE & LENGTH IN INCHES		
1 __"	20/24 AWG fiberglass braid	6 __"	20/24 AWG fiberglass braid/flex armor overall (Standard)
2 __"	20/24 AWG PVC	7 __"	20/24 AWG Teflon w/ flex armor
3 __"	20/24 AWG FEP Teflon	X__"	Other, specify
4 __"	20/24 AWG high temp fiberglass braid		
5 __"	20/24 AWG Kapton		

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



#5	FIRST END TERMINATIONS [Additional options see pg.1-7]				
A	Bare ends	G	High temp std jack	K	Spade lugs
B	Miniature plug	L	Dual molded plug	Y	M12 watertight connector (plug)
D	Miniature jack	M	Dual molded jack		
C	Standard plug	W	Type A plug (6DA) [See pg 6-17]	X	Other, specify
E	Standard jack	V	Type A jack		
F	High temp std plug	T	Junction box connector		

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

#6	SECOND END TERMINATIONS [Additional options see Pg 1-7]

6E	J	1	6-36"	C	TA

MULTICIRCUIT PANEL WITH MOUNTING FRAME

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.

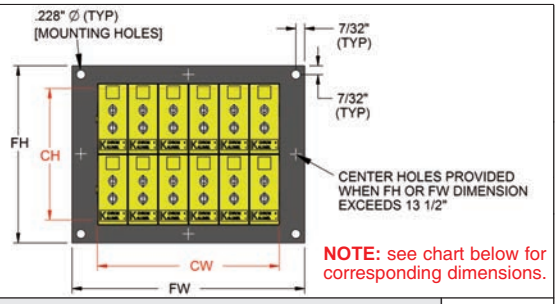
#1	DESCRIPTION
6PM	Multicircuit panel

#2	FRAME STYLE
1	Standard Frame (Maximum number of jacks per row is 24)
2	19" Rack (Maximum number of jacks per row is 22)

#3	TYPE
S	Standard
M	Mini
U	Universal

#4	NUMBER OF ROWS REQUIRED
1	
2	
3	
4	
X	Other, specify

19" RACK NUMBER OF ROWS	STANDARD HEIGHT
1	3 1/2"
2	3 1/2"
3	5 1/4"
4	7"



NOTE: see chart below for corresponding dimensions.

#5	DESCRIPTION
____	Total number of sensor inputs
X	Other, specify

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

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

#7	# OF POLES
2	2 poles
3	3 poles

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

NUMBER OF ROWS / TOTAL CIRCUITS	CIRCUITS PER ROW																								
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	FW= 2 3/4" CW= 1 1/2"	FW= 3 1/2" CW= 2 1/4"	FW= 4 1/4" CW= 3"	FW= 5" CW= 3 3/4"	FW= 5 3/4" CW= 4 1/2"	FW= 6 1/2" CW= 5 1/4"	FW= 7 1/4" CW= 6"	FW= 8" CW= 6 3/4"	FW= 8 3/4" CW= 7 1/2"	FW= 9 1/2" CW= 8 1/4"	FW= 10 1/4" CW= 9"	FW= 11" CW= 9 3/4"	FW= 11 3/4" CW= 10 1/2"	FW= 12 1/2" CW= 11 1/4"	FW= 13 1/4" CW= 12"	FW= 14" CW= 12 3/4"	FW= 14 3/4" CW= 13 1/2"	FW= 15 1/2" CW= 14 1/4"	FW= 16 1/4" CW= 15"	FW= 17" CW= 15 3/4"	FW= 17 3/4" CW= 16 1/2"	FW= 18 1/2" CW= 17 1/4"	FW= 19 1/4" CW= 18"
1 FH= 2 5/8" CH= 1 1/2"	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2 FH= 4 3/8" CH= 3 1/4"	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
3 FH= 6 1/8" CH= 5"	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72
4 FH= 7 7/8" CH= 6 3/4"	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96
5 FH= 9 5/8" CH= 8 1/2"	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120
6 FH= 11 3/8" CH= 10 1/4"	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144
7 FH= 13 1/8" CH= 12"	14	21	28	35	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147	154	161	168
8 FH= 14 7/8" CH= 13 3/4"	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192
9 FH= 16 5/8" CH= 15 1/2"	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216
10 FH= 18 3/8" CH= 17 1/4"	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240

6PM	1	S	3	12	K	2

JACK PANEL OR PLUG PANEL CONDUIT BOXES

#1	DESCRIPTION
6PB	Jack panel or plug panel conduit boxes

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

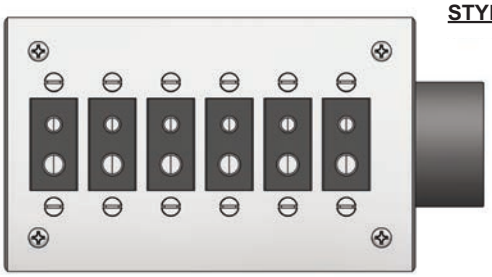
#3	DESCRIPTION
1 2 3 4 5 6	} Number of circuits

Note: Wire hubs are opposing when mates are connected.
Male is left handed and the Female is ALWAYS right!

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

#5	CONNECTION TYPE
M	Plug (male)
F	Jack (female)

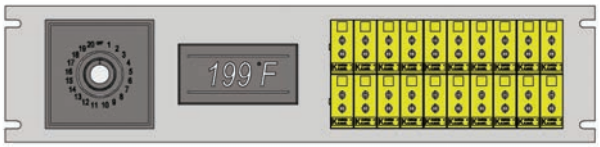
STYLE D, E



6PB	K	6	J	M

ROTARY SELECTOR SWITCHES

19" JACK PANEL WITH DELUXE SWITCH
Call our engineering department for specific drawings.



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.

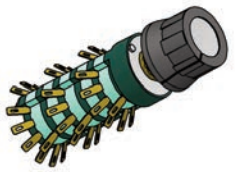
SYMBOL	NO. POS. 2 POLE
63-2	2
63-3	3
63-4	4
63-5	5
63-6	6
63-8	8
63-10	10
63-12	12
63-14	14
63-16	16
63-18	18
63-20	20

SYMBOL	NO. POS. 2 POLE
65-24	24
65-28	28
65-32	32
65-36	36
65-40	40
	3 POLE
6R-6	6
6R-12	12
6R-24	24
6R-28	28
6R-32	32
6R-36	36

The JMS economy switch has an adhesive backed face plate for the panel. Terminals are gold plated, brass numbered circuits. Contacts are the self-cleaning wiper action type. Standard switch is "break before make." JMS Southeast stocks both two pole and three pole 12 point economy switches.

#1	DESCRIPTION
6ET12	2 pole 12 point JMS economy switch
6ER12	3 pole 12 point JMS economy switch

ECONOMY SWITCH

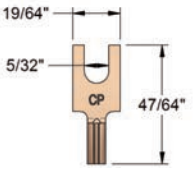


SPADE LUGS

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.

#1	DESCRIPTION
6SL	Spade lug

#2	THERMOCOUPLE ALLOY		
AL	Alumel	NN	Nisil
CH	Chromel	NP	Nicrosil
CO	Constantan	X	Other, specify
CP	Copper		
IR	Iron		



TERMINAL STRIPS

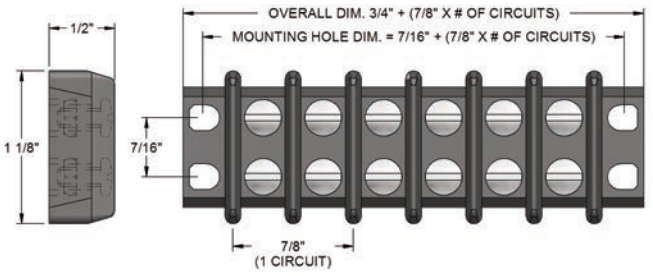
JMS terminal strips are manufactured of general purpose glass-filled Nylon and will withstand temperatures from 40°F to 400°F. Terminals are Nickel-plated Brass. JMS recommends that thermocouple terminal lugs be ordered with this item.

#1	DESCRIPTION
6TS	Terminal strip

#2	# OF CIRCUITS
#	Number of circuits (4screws = 1 circuit)

#3	TYPE
_"	J,T,K,E,N,R (R will be RTD or Pt T/Cs)

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

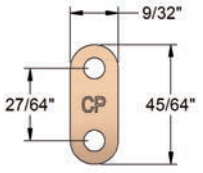


TERMINAL LUGS

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.

#1	DESCRIPTION
6TL	Terminal lug

#2	THERMOCOUPLE ALLOY		
AL	Alumel	NN	Nisil
CH	Chromel	NP	Nicrosil
CO	Constantan	X	Other, specify
CP	Copper		
IR	Iron		



ATTACHING DEVICES

#1	DESCRIPTION
6F	Attaching device (fittings)

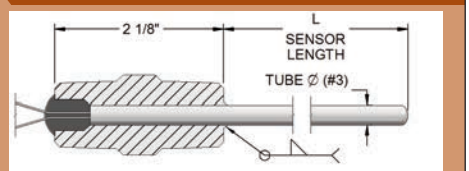
#2	TYPE	
H	Stainless steel ferrule	COMPRESSION
I	Teflon ferrule	
J	Lava ferrule	
K	Nylon ferrule	
L	Brass ferrule	
W	Double threaded	WELDED
S	Double threaded	SPRING-LOADED
C	Double threaded w/ plug	
A	Double threaded stainless steel w/ oil ring	
B	Double threaded Bayonet assembly	
D	Double threaded Bayonet oil sealed assembly	
E	Adjustable stainless steel spring	

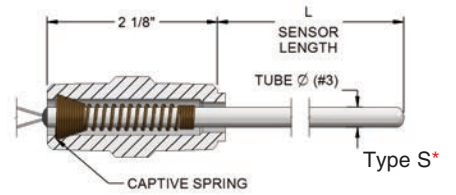
#3	OUTSIDE DIAMETER OF TUBE				
P	1/2" (.500")	R	6mm (.236")	E	1/16" (.063")
A	3/8" (.375")	C	3/16" (.188")	X	Other, specify
Y	5/16" (.313")	D	1/8" (.125")		
B	1/4" (.250")				

#4	PROCESS CONNECTION
L	1/8" NPT
M	1/4" NPT
P	1/2" NPT
X	Other, specify
Z	N/A

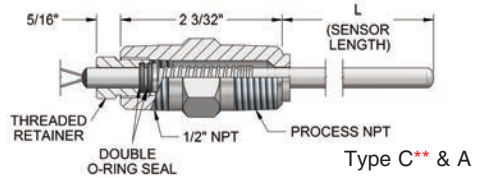
#5	FITTING MATERIAL
K	Stainless steel (Standard)
B	Brass
T	Teflon
X	Other, specify

NEW! Double threaded compression fitting (Just add a "2" suffix)



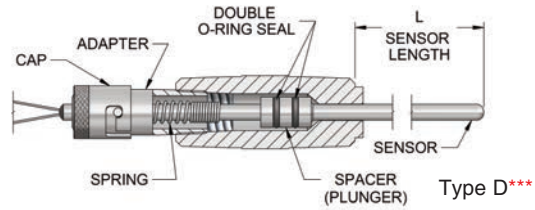


Type S*



Type C** & A

Type B***



Type D***

Type E

6F	H	B	M	K

*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.

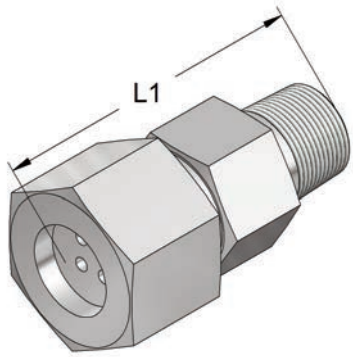
**Type C does not include oil-ring seal.

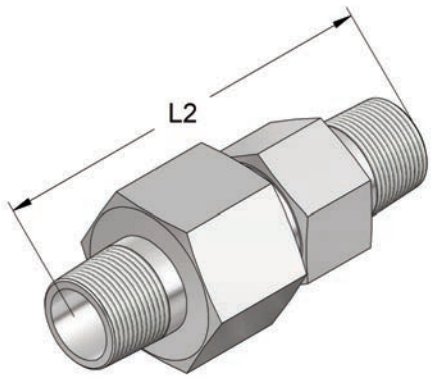
***Typically used with type 6R & 6P heads. (See page 6-1)

MULTICONDUCTOR FEEDTHROUGHS

Model number includes:

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





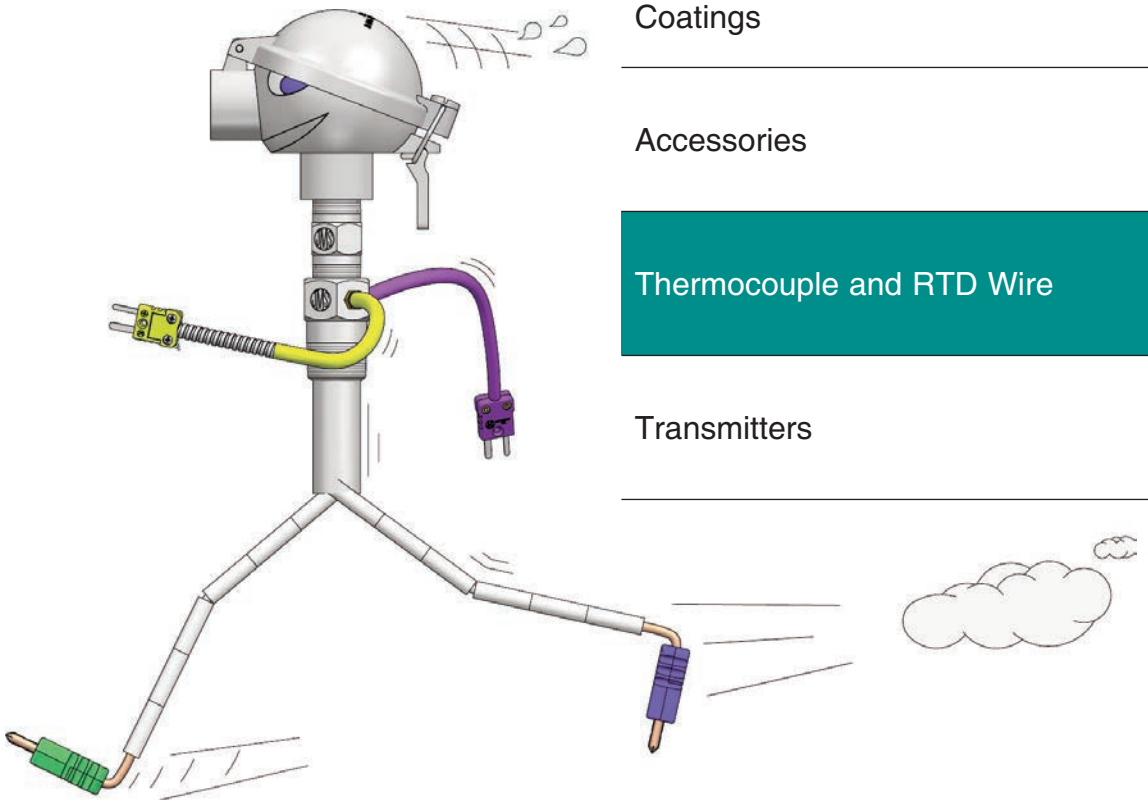
TO ORDER (Specify model number) Example: 6FT144L1T

SHEATH DIAMETER	MODEL NUMBER	DIAMETER OF PROBE	NUMBER OF PROBES	THREAD NPT	LENGTH		ACROSS FLATS	
					L1	L2	HOUSING	CAP
1/25”	6FT0403 (L1 OR L2) (T OR S)	.040”	3	1/4”	2”	2 1/2”	3/4”	7/8”
	6FT0405 (L1 OR L2) (T OR S)	.040”	5	1/4”	2”	2 1/2”	3/4”	7/8”
	6FT0406 (L1 OR L2) (T OR S)	.040”	6	1/2”	2 5/8”	3 3/8”	1 1/8”	1 3/8”
	6FT0408 (L1 OR L2) (T OR S)	.040”	8	1/2”	2 5/8”	3 3/8”	1 1/8”	1 3/8”
	6FT04010 (L1 OR L2) (T OR S)	.040”	10	3/4”	2 13/16”	3 1/2”	1 1/4”	1 1/2”
	6FT04012 (L1 OR L2) (T OR S)	.040”	12	3/4”	2 13/16”	3 1/2”	1 1/4”	1 1/2”
	6FT04016 (L1 OR L2) (T OR S)	.040”	16	3/4”	2 13/16”	3 1/2”	1 1/4”	1 1/2”
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!

THERMOCOUPLE AND RTD WIRE

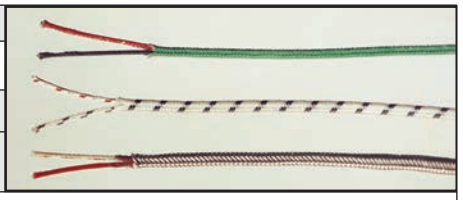
Swifty Sensor



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

#1	DESCRIPTION [7-5 through 7-17]
7	Thermocouple wire (measured in feet)



#2	TYPE		
EXTENSION GRADE [10]	THERMOCOUPLE GRADE [9]	TYPE	
JX	J	Iron/Constantan	
KX	K	Chromel/Alumel	
TX	T	Copper/Constantan	
EX	E	Chromel/Constantan	
NX	N	Nicrosil/Nisil	
RX	--	Copper/#11 Alloy	
SX	--	Copper/#11 Alloy	
BX	–	PCLW 630/Copper (special order only)	It is common practice to use plain Copper wire for type "B" extension. Use 2X from this selection or 2 conductor RTD wire. (Ex. 7RTT2242N)
2X	–	Copper/Copper	
CX	–	A405/A426	

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.

Extension Grade Only

#3	INSULATION [7-5] [7-6]	Temperature Range (°C)			Temperature Range (°C)
PP*	Polyvinyl Chloride(PVC)	-29 - 105	GG*	Fiberglass braid	25 - 482
PC	Polyvinyl Chloride(PVC) rip cord	-29 - 105	GS*	Fiberglass braid with SS overbraid	25 - 482
PA*	Polyvinyl Chloride(PVC) w/ twisted conductors Aluminum Mylar shield & drain wire	-29 - 80	HG*	High temperature fiberglass braid	25 - 705
			HS*	High temperature fiberglass braid with SS overbraid	25 - 705
KK*	Kapton	-200 - 285	RR	Refrasil	25 - 871
NN	Nylon	-200 - 177	SI	Siloflex	25 - 982
TF*	Fused Teflon	-200 - 260	NE*	Nextel - Heavy weave (for light weave, use X and specify lower weave #)	25 - 1200
TT*	Extruded Teflon	-200 - 200			
			X	Other, specify	

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

#4	WIRE SIZE		
16	16 AWG	28	28 AWG
20	20 AWG (Standard)	30	30 AWG
24	24 AWG	X	Other, specify

#5	WIRE CONSTRUCTION
1	Solid (Standard)
2	Stranded

7	J	TT	20	1

[ ] 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				
JP	Iron	NN	Nisil	BP*	Platinum 30% Rhodium
JN	Constantan	TP	Copper	BN*	Platinum 6% Rhodium
KP	Chromel	TN	Constantan	CP*	Tungsten 5% Rhenium
KN	Alumel	SP*	Platinum 10% Rhodium	CN*	Tungsten 26% Rhenium
EP	Chromel	SN*	Platinum	AP*	Tungsten 5% Rhenium
EN	Constantan	RP*	Platinum 13% Rhodium	AN*	Tungsten 20% Rhenium
NP	Nicrosil	RN*	Platinum		

*Unit of Measure = inches

#3	WIRE SIZE			
8	8 AWG	24	24 AWG	(JMS standard for SP, SN, RP, RN, BP, & BN)
14	14 AWG	28	28 AWG	
16	16 AWG	30	30 AWG	
20	20 AWG	X	Other, specify	

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.

#1	DESCRIPTION [7-5 through 7-17]
7M	Multi-conductor extension cable

#2	TYPE	Unit of Measure = Feet
J	Iron/Constantan	
K	Chromel/Alumel	
T	Copper/Constantan	
E	Chromel/Constantan	
R	Copper/#11 Alloy	
S	Copper/#11 Alloy	
B	PCLW 630/Copper	
2	2 wire RTD (commonly used for type B thermocouples)	
3	3 wire RTD	
4	4 wire RTD	
X	Other, specify	

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

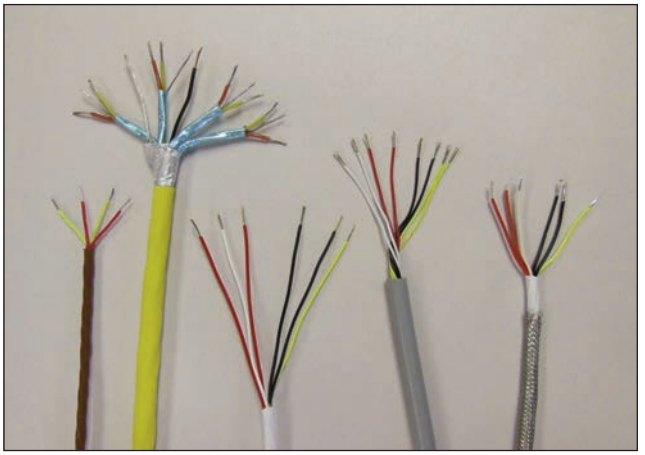
#3	# OF PAIRS	NOMINAL OD	EST. SHIPPING WT. LBS. PER 1000 FEET
2	2	.370	53
4	4	.390	80
8	8	.480	131
12	12	.580	198
16	16	.650	245
20	20	.680	285
24	24	.770	338
X	Other, specify		

Note: Add an "S" suffix for stranded conductors

#4	INSULATION
P	Polyvinyl Chloride(PVC) (Standard)
T	Extruded Teflon
X	Other, specify

#5	ALUMINUM MYLAR SHIELD
I	Individual pair and overall
O	Overall only
Z	No shield/not applicable

7M	J	4	P	I



RTD WIRE

#1	DESCRIPTION
7R	RTD wire

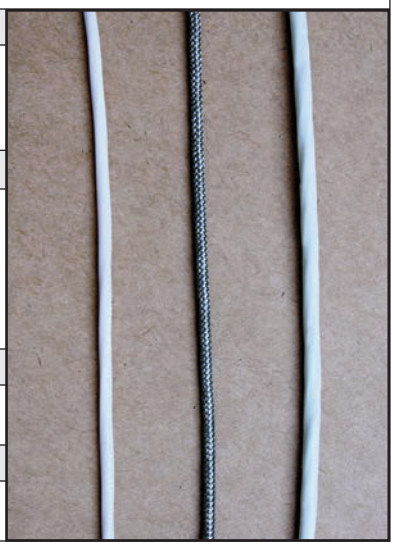
#2	INSULATION *Conductors are color coded per ASTM E1137 & IEC 60751
PP	Polyvinyl Chloride(PVC)
GG	Fiberglass braid (Standard)
GS	Fiberglass braid with stainless steel overbraid (available in 3, 4 or 6 conductor, 24 AWG)
KK	Kapton insulated
TT*	Extruded Teflon singles, Teflon wrap overall (Standard)
TS*	Extruded Teflon singles, Teflon wrap overall, SSOB
X	Other, specify

#3	NUMBER OF CONDUCTORS
2	Two conductors
3	Three conductors
4	Four conductors
X	Other, specify

#4	WIRE SIZE
16	16 AWG
20	20 AWG
24	24 AWG (Standard)
28	28 AWG
30	30 AWG
X	Other, specify

#5	WIRE CONSTRUCTION
1	Solid
2	Stranded (Standard)

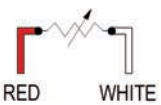
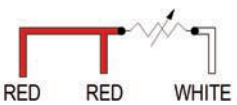
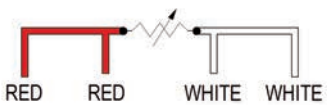
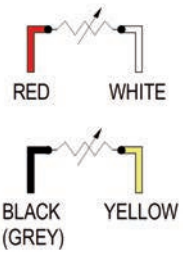
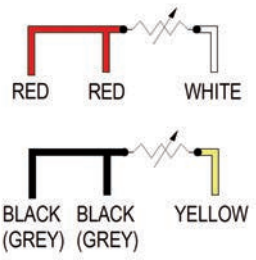
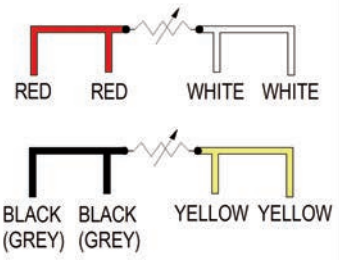
#6	SHIELD
N	No shield/not applicable
A	Aluminum Mylar shield



7R	TT	3	24	2	N

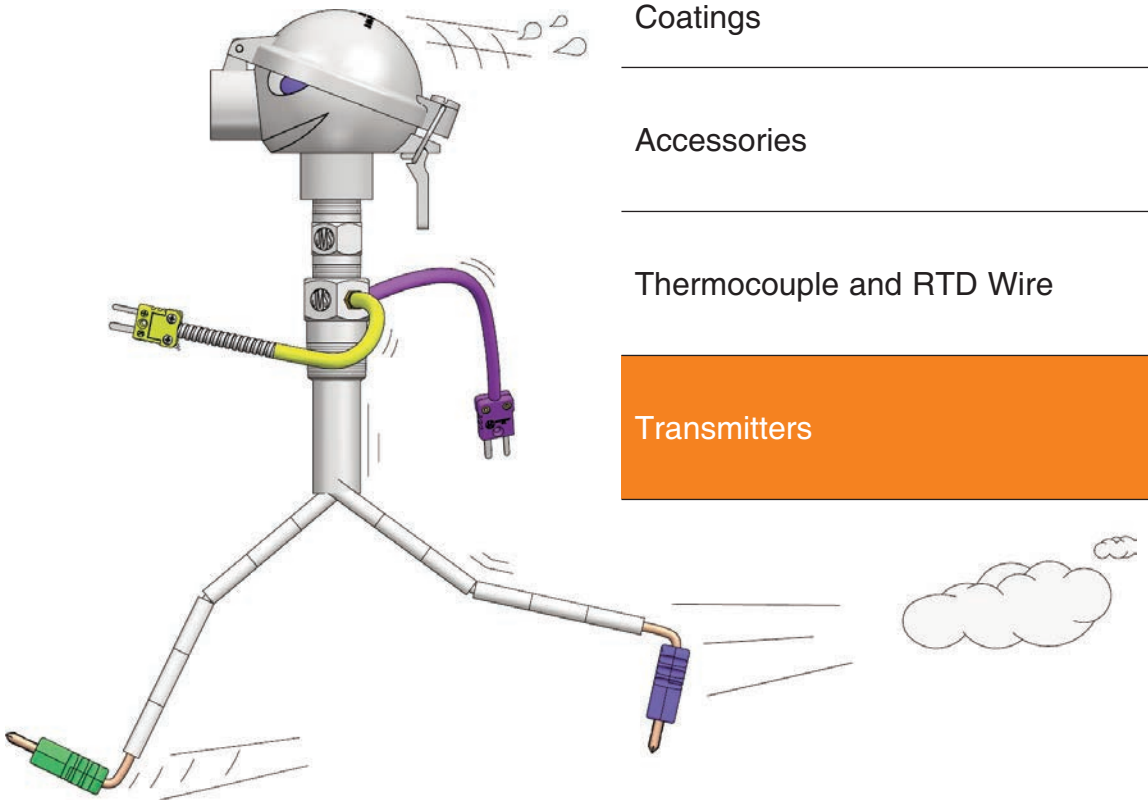
RTD WIRING CONFIGURATION AND COLOR CODE

(Reference ASTM 1137 and IEC 60751)

	2-wire-configuration	3-wire-configuration	4-wire-configuration
One resistor			
Two resistor			

TRANSMITTERS

Swifty Sensor



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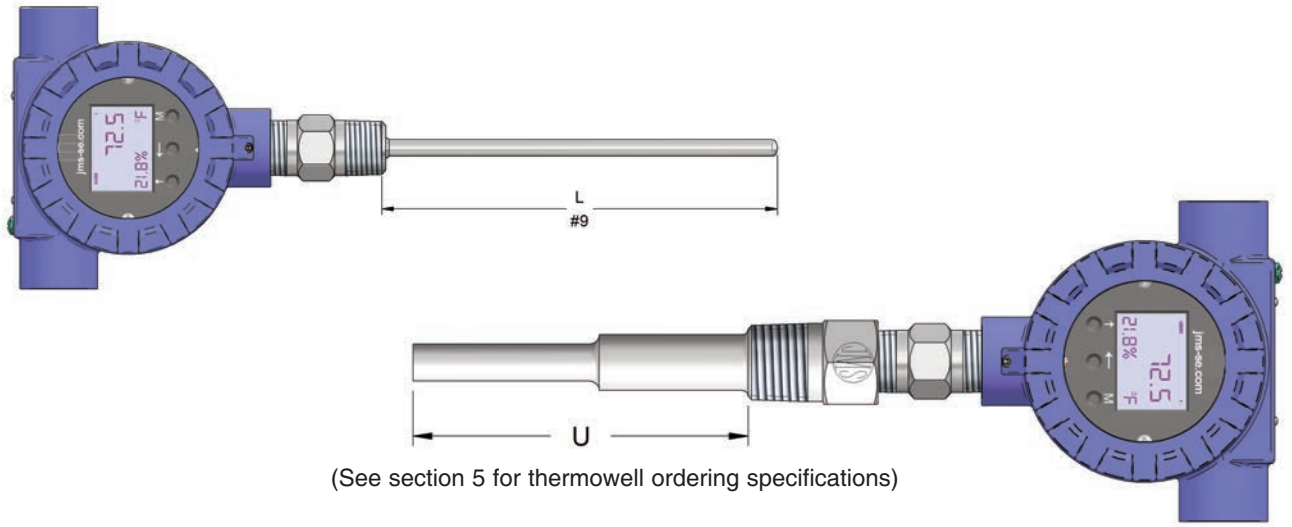
INTEGRAL TRANSMITTERS WITH HOUSING AND INDICATOR



(See section 5 for thermowell ordering specifications)

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.

#1	DESCRIPTION [18]	
888	Transmitter (Includes housing and digital indicator).	(Specifications for GS & GV housing styles see illustrations on page 8-2)

#2	TYPE OF TRANSMITTER [8-18]	
H	Isolated (Standard)	*FM intrinsically safe class I, Div. 1&2, Groups A,B,C,D, class I, zone 0, AExia IIC T6
N	Non-isolated	
I	Hart Protocol	
E	Intrinsically safe*	
D	Intrinsically safe/Hart Protocol*	
X	Other, specify	

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

#4	TEMPERATURE RANGE		
_ to _°C	List desired temperature span	X	Other, specify
_ to _°F	List desired temperature span		
Z	N/A		

#5	SIGNAL OUTPUT		
F	Fieldbus	X	Other, specify
P	Profibus		
4	4 to 20 mA		

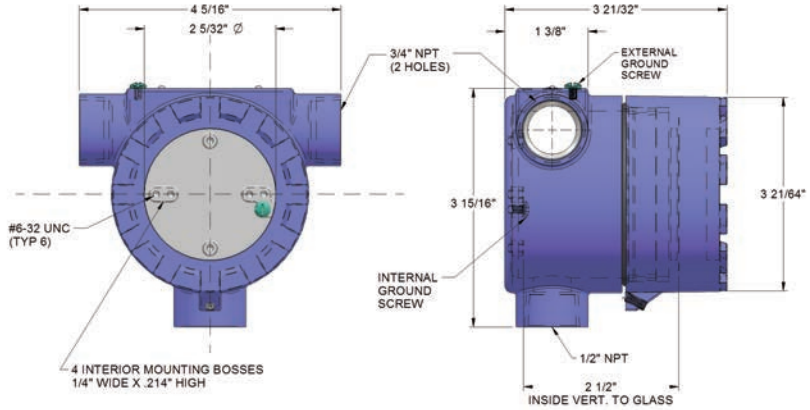
#6	INDICATION
D	Digital, 4-20 mA (Standard)
Z	No indication

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

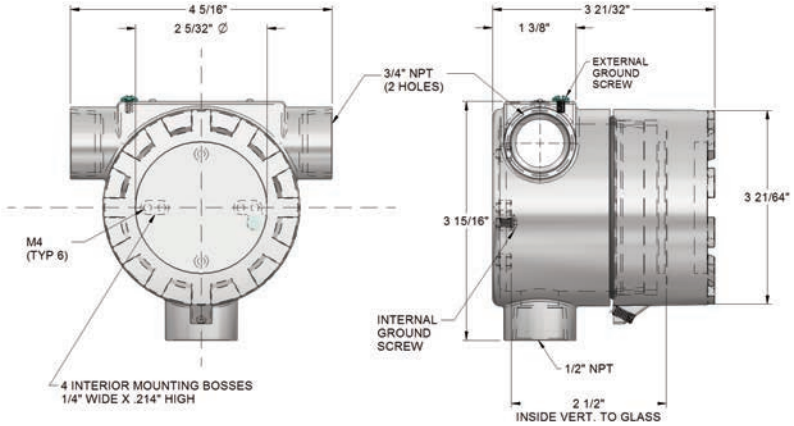
Note: Many other transmitter options are available.
(see pages 1-1 & 1-2 for TC)
(see pages 3-1 & 3-2 for RTD)
(see page 8-3 for stand alone transmitters)

INTEGRAL TRANSMITTERS WITH HOUSING AND INDICATOR

GA Housing Style (#7)
Detailed View



GS Housing Style (#7)
Detailed View



#7	HOUSING
GS	Explosion proof, NEMA 4X, ATEX/IECEx, FM/CSA, 316SS, threaded cap with glass viewing window
GA	Explosion proof, NEMA 4X, ATEX/IECEx, FM/CSA, Aluminium, threaded cap with glass viewing window
X	Other, specify

NOTE: Different housing options available. (see section 6)

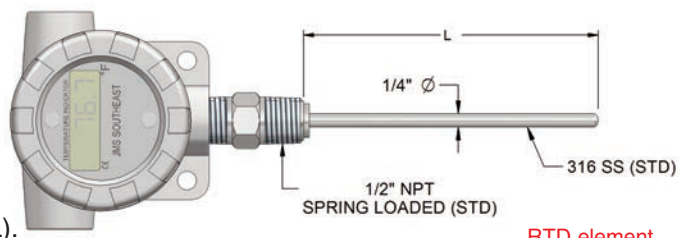
#8	FITTING TYPE [6-13]
S	Spring-loaded 1/2”x1/2” (NPT)
W	Welded 1/2”x1/2” (NPT)
N*	Nipple-Union-Nipple 1/2”x1/2” (NPT)
X*	Other, specify
Z	N/A

*See page 1-3 for extension assembly configurations

#9	IMMERSION LENGTH IN INCHES (L)
4	4”
6	6”
9	9”
12	12”
X	Other, specify
Z	Not applicable/probe not included (example: field mounted transmitter)

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)

RTD element
(Local indication only)

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]
8N	Transmitter, Non-Isolated

#2 INPUT

J*	Iron/Constantan thermocouple	N*	Nicrosil/Nisil thermocouple
T*	Copper/Constantan thermocouple	C*	Tungsten 5% Rhenium/Tungsten 26% Rhenium thermocouple
K*	Chromel/Alumel thermocouple	2	100Ω, Platinum, a=.00385, RTD, 2 Wire
E*	Chromel/Constantan thermocouple	3	100Ω, Platinum, a=.00385, RTD, 3 Wire
S*	Platinum 10% Rhodium/Pure Platinum thermocouple	4	100Ω, Platinum, a=.00385, RTD, 4 Wire
R*	Platinum 13% Rhodium/Pure Platinum thermocouple	X	Other, specify
B*	Platinum 6% Rhodium/Platinum 30% Rhodium thermocouple		

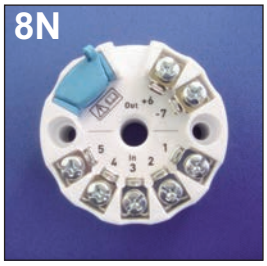
*All non-isolated thermocouple transmitters should be used with ungrounded junctions to prevent ground loops and noise interference.

#3 TEMPERATURE RANGE

_ to _°C	List desired temperature span	X	Other, specify
_ to _°F	List desired temperature span	Z	N/A (customer to span)

#4 OUTPUT

1	1 to 5 VDC	X	Other, specify
4	4 to 20 mA		



#5 MOUNTING

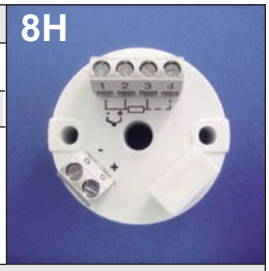
A	Dual mounting bracket	For panel mounting
B	Dual mounting bracket with 12" cuttable mounting track	For panel mounting
X	Other, specify	
Z	N/A	

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

A	Yes	Z	No

ISOLATED TRANSMITTERS

#1	DESCRIPTION [8-14 through 8-17]
8	Transmitter (Add "R" for DIN rail style for transmitter)



#2 TYPE OF TRANSMITTER

		I/O ISOLATION	SUPPLY VOLTAGE
H	Standard	1000 VAC	12 to 35 VDC
I	Hart Protocol	2500 VAC	11 to 30 VDC
E	Intrinsically safe	2500 VAC	11 to 30 VDC
D	Intrinsically safe/Hart Protocol	2500 VAC	11 to 30 VDC
X	Other, specify		

#3 INPUT

J	Iron/Constantan thermocouple	N	Nicrosil/Nisil thermocouple
T	Copper/Constantan thermocouple	C	Tungsten 5% Rhenium/Tungsten 26% Rhenium T/C
K	Chromel/Alumel thermocouple	2	100Ω, Platinum, a=.00385, RTD, 2 Wire
E	Chromel/Constantan thermocouple	3	100Ω, Platinum, a=.00385, RTD, 3 Wire
S	Platinum 10% Rhodium/Pure Platinum thermocouple	4	100Ω, Platinum, a=.00385, RTD, 4 Wire
R	Platinum 13% Rhodium/Pure Platinum thermocouple	X	Other, specify
B	Platinum 6% Rhodium/Platinum 30% Rhodium T/C	Z	N/A

#4 TEMPERATURE RANGE

_ to _°C	List desired temperature span	X	Other, specify
_ to _°F	List desired temperature span	Z	N/A (customer to span)

#5 OUTPUT

1	1 to 5 VDC	F	Fieldbus
4	4 to 20 mA	X	Other, specify
P	Profibus		

#6 SOFTWARE & CABLES INCLUDED?

A	Yes	
Z*	No	*Standard for I, E, & D type transmitters.

#7 PLUG IN INDICATION

P*	Yes	Z	No

* Only available with "puck" styled models I, E, or D in selection #2.

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

For more information and details on transmitters, Visit www.JMS-SE.com/Transmitters

JMS Now Offering Turnaround Services

You pull them. We Check, Spec and Req(uisition) them.

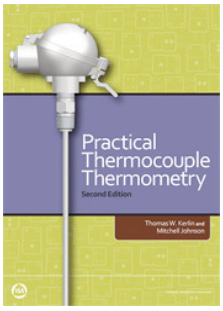
Many plants go into a turnaround and have to pull temperature sensors that may not have been replaced in years. What is in the field may or may not meet the latest standards. The data sheet may offer little more information than "type K thermocouple with steel thermowell". Wire colors may have long ago faded or been covered with gunk and gathering the details necessary to order a matching sensor in a timely manner that is going to have you up and running before the deadline arrives can be challenging to a crew that is already pressed for time.

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.

Could **JMS Turnaround Services** be the perfect cure for a common turnaround headache?

Call JMS today at **800-873-1835** to learn more.

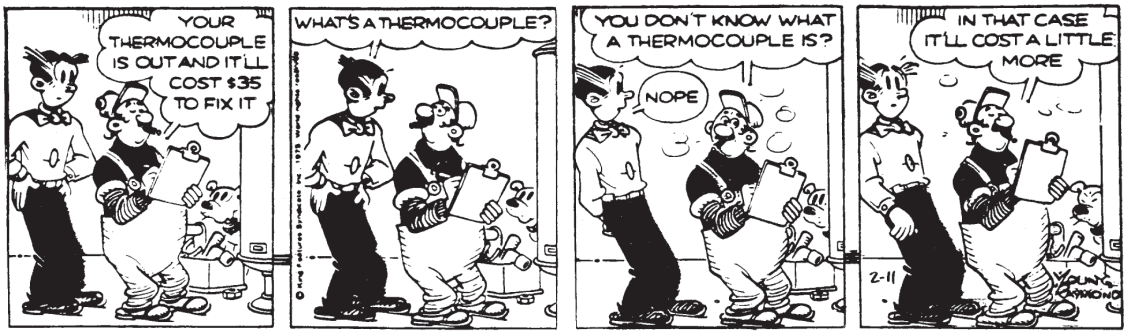
COME TO STATESVILLE AND BECOME THE CREDENTIALED TEMPERATURE EXPERT AT YOUR FACILITY.



JMS Southeast Inc. is producing its 30th annual course on industrial Temperature Measurement. Hundreds of Technicians, Engineers, Designers, Salesmen, and Integrators have attended and complimented this one day course. It is designed to familiarize the attendee with the basics and details of temperature measurement as practiced in industry today. It covers calibrations, accuracy, tolerances, standards, specifications, and response times. Through a proper circuit and application analysis, you will be able to troubleshoot any problem with either contact and/or non-contact sensors. The course is based on the books "Industrial Temperature Measuremen written by T.W. Kerlin, Ph.D. and R. L. Shepard who were the original instructors of this course and "Practical Thermocouple Thermometry (2nd Ed.)" by T.W. Kerlin, Ph.D. and Mitchell Johnson.

You will receive a free laser infrared thermometer with advance registration. Call **(800) 873-1835** or go to **www.jms-se.com** or Course Registration for details

We have all the info you need, just give us a buzz.



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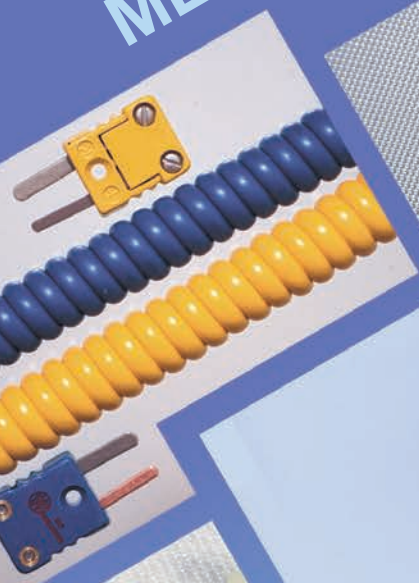
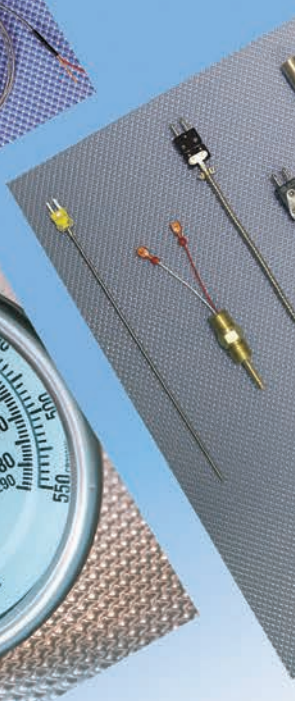
TEMPERATURE MEASUREMENT





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