



**Measurement
Solutions LLC**

TEMPERATURE MEASUREMENT & CONTROL



SERVICES

- Sensor design and manufacturing
- Contract manufacturing
- N.I.S.T. calibration and repair
- Control systems design
- Consulting, validation and installation
- Gas combustion



LARGE INVENTORY

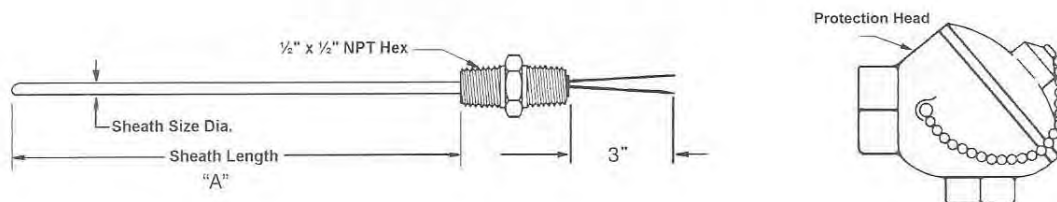
- Thermocouple, RTD and Thermistor Probes
- Wire, Connectors, Heads, Blocks, Panel Jacks
- Controllers, Indicators and Panel Meters
- Electric Heating Elements
- SCR and SSR



Measurement Solutions
480-897-0300
info@measol.com
www.MEASOL.com

Mineral Insulated Thermocouples

Industrial Process



IP- - - -

Calibration*

Iron Constantan **J**
 Chromel Alumel **K**
 Chromel Constantan **E**
 Copper Constantan **T**

*For additional calibrations call sales

Sheath Materials*

A 304SS **Q** .. Inconel 600
F 316SS **D** ... 310SS

*Consult sales for special sheath materials

Sheath O.D. (in)*

18125 **14**250
316188 **516**313

*Consult sales for other diameters

Junction*

	Grounded	Ungrounded	Exposed
Single	G	U	E
Dual	H	W	D

*Dual ungrounded & exposed junctions are isolated

Transmitter Option

Omit if none needed. See ordering information on next page.

Termination

ST Stripped Leads, 3" bare leads are standard. Specify lead length in inches and "GG" or "TT" after code for glass or teflon leads.

CA Cast Aluminum Head

CI Cast Iron Head

NY Nylon Head, Black

PW ... Polypropylene Head, White

EX Explosion Proof Head

See page 75 for head descriptions. Consult sales for additional options.

Fittings

See Table "B" on next page for ordering code. 1/2" x 1/2" NPT SS fitting (code "A") is standard.

Sheath Length "A"

Specify in inches

- Standard probe assemblies use 1/2"x1/2" NPT SS fitting brazed. Welded construction is available use fitting code "C".
- Spring loaded assembly is not sealed at process fitting.

See next page for pricing and discount schedule

Ordering example; **IP-KA-14U-12A-ST48GG** = Type "K" 304 stainless steel. 1/4" od, ungrounded junction. 12" A length with 1/2 x1/2" brazed fitting and 48" of fiberglass leads.

Mineral Insulated Thermocouples

Industrial Process (Cont'd)

Transmitter option; 1. I = Isolated or N = Non-isolated 2. & 3. **Temp. Range** (see table A below) 4. °C or °F

Example:

I	0	200	C
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 = Isolated 0-200 degrees C = 4-20mA

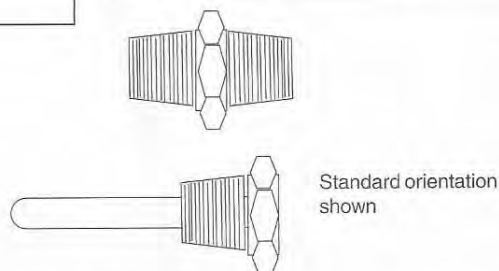
	Non-isolated	Isolated
T/C Input:	J, K, T, N	AE, B, E, J, K, N, R, S, T, U
Output:	4-20mA	4-20mA or 20-4mA
Ambient Temp.:	-40 to 185°F / -40 to 85°C	-40 to 185°F / -40 to 85°C
Power Supply:	6.5 to 32 VDC	6.5 to 36 VDC
Polarity Protection	Yes	Yes
Accuracy:	± 0.1% of span	± 0.1% of span
Calib. Accuracy:	± 0.1% of span	max. of 0.2°C or 0.1% of span
Long Term Stability	± 0.1% of span/year	± 0.1% of span/year
Connection:	up to 12 Awg. wire	up to 16 Awg. wire

Table A Standard Ranges		
J	K	T
0 - 200°C	0 - 250°C	-50 - 100°C
0 - 500°C	0 - 500°C	0 - 200°C
0 - 760°C	0 - 1000°C	0 - 400°C
0 - 350°F	0 - 500°F	-60 - 200°F
0 - 1000°F	0 - 1000°F	0 - 400°F
0 - 1400°F	0 - 2000°F	0 - 760°F

Consult factory for other ranges.

Thread	Material	Sheath OD	Order Code
1/2"x1/2"	316SS	.125" to .313"	A
1/2"x1/2"	316SS	.125" to .250"	*B
1/2"x1/2"	316SS	.125" to .313"	**C
1/2" Single	316SS	.125" to .313"	D
1/4"x1/4"	316SS	.188" to .250"	E
1/4" Single	304SS	.062" to .250"	F
1/8" Single	304SS	.062" to .250"	G

* *Spring Loaded Assembly*
 ** *316SS welded fitting*

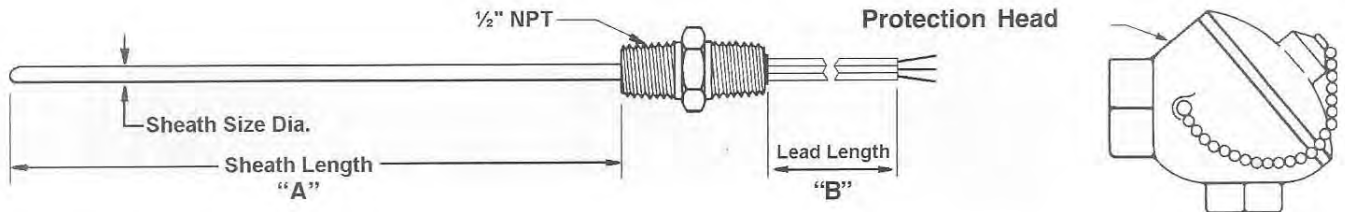


Standard orientation for single threaded fittings is threads facing process. Add "X" after fitting order code for backwards fitting (threads facing lead end).

Industrial process thermocouples feature connection heads which provide superior dust and moisture protection. A variety of head styles are available depending upon your application. Optional head-mounted transmitters are also available.

Discount Schedule	
1 - 9 units	Net
10 - 24 units	10%
25 and up	20%

P R I C I N G						
*Basic (includes 1st 12" of sheath) *For dual element add \$15 to basic		.062	.125	.188	.250	.313
		N/A	\$26	\$28	\$31	\$38
Add'l Sheath per inch Single Element	304SS	N/A	.15	.25	.45	.75
	Inc. 600	N/A	.20	.40	.55	1.05
Add'l Sheath Dual Element	304SS	N/A	.30	.40	.50	1.20
	Inc. 600	N/A	.35	.60	.80	1.30
Junction Adder	G,E,H	N/A	N/C	N/C	N/C	N/C
	U	N/A	\$2	\$2	\$2	\$2
	W,D	N/A	\$6	\$4	\$4	\$4
Protection Head Adder		CA	CI	NY	PW	EX
		\$26	\$26	\$22	\$25	\$50
Fitting Adder		A	B	C,F,G	D	E
		N/C	\$10	\$5	\$4	\$9
Transmitter option add \$99 for non-isolated or \$189 for isolated.						

RTDs**Industrial Process**

D - IP - - - - -

Probe Style
Industrial Process..... IP

Fittings
See Table "B" on next page for ordering code. 1/2" x 1/2" NPT SS fitting (code "A") is standard.

Element

Din 385 Class A 100 ohm	A
Din 385 Class B 100 ohm	B
Din 385 Class A 1000 ohm	C
Din 385 Class B 1000 ohm	D
JIS 391 Class A 100 ohm	E
JIS 391 Class B 100 ohm	F
JIS 391 Class A 1000 ohm	G
JIS 391 Class B 1000 ohm	H

Diameter (inches)

1/8"	18
3/16"	316
1/4"	14
5/16"	516

"A" Sheath Length
Specify in inches **XX**

Transmitter Option
Omit if none needed. See ordering information on next page.

"B" Lead Length
(Omit for probes with heads)
XX Specify in inches

Lead Option
(Omit for probes with heads)

3TT	Teflon Jacket 3 Wire
4TT	Teflon Jacket 4 Wire
2IT	Individual Teflon 2 Wire
3IT	Individual Teflon 3 Wire
4IT	Individual Teflon 4 Wire
3GG	Fiberglass Jacket 3 Wire
4GG	Fiberglass Jacket 4 Wire

Termination

ST	Stripped Leads, 36" teflon leads are standard
CA	Cast Aluminum Head
CI	Cast Iron Head
NY	Nylon Head Black
PW ...	Polypropylene Head White
EX	Explosion Proof Head

•Standard probe assemblies use 1/2"x1/2" NPT SS fitting brazed. Welded construction is available. Use order code "C"

•Spring loaded assembly is not sealed at process fitting.

• 3-wire teflon is standard for head termination.

RTDs

Industrial Process (Cont'd)

Transmitter option; 1. I = Isolated or N = Non-isolated 2. & 3. Temp. Range (see table A below) 4. °C or °F

Example;

I 0 100 C

= Isolated, 0-100 degrees C = 4-20mA

	Non-isolated	Isolated
Input:	PT100 .00385 3-wire RTD	PT100 .00385 3 or 4-wire RTD
Range:	Adjustable to specific ranges within -60 to 1120°F / -50 to 550°C	-328 to 1832°F / -200 to 1000°C Narrowest range = 18°F / 10°C
Output:	4-20mA	4-20mA or 20-4mA
Ambient Temp.:	-40 to 185°F / -40 to 85°C	-40 to 185°F / -40 to 85°C
Power Supply:	6.5 to 32 VDC	6.5 to 36 VDC
Polarity Protection	Yes	Yes
Accuracy:	± 0.1% of span	± 0.1% of span
Calib. Accuracy:	± 0.1% of span	max. of 0.2°C or 0.1% of span
Long Term Stability	± 0.1% of span/year	± 0.1% of span/year
Connection:	up to 12 Awg. wire	up to 16 Awg. wire

**Table A
Standard Ranges**

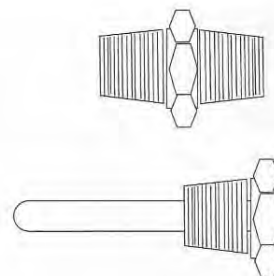
RTD
-50 - 50°C
0 - 100°C
0 - 150°C
0 - 100°F
0 - 300°F
0 - 400°F
Consult sales for other ranges

Table B FITTINGS

NPT Thread	Material	Sheath OD	Order Code
1/2"x1/2"	316SS	.125" to .313"	A
1/2"x1/2"	316SS	.125" to .250"	*B
1/2"x1/2"	316SS	.125" to .313"	**C
1/2" Single	316SS	.125" to .313"	D
1/4"x1/4"	316SS	.188" to .250"	E
1/4" Single	304SS	.062" to .250"	F
1/8" Single	304SS	.062" to .250"	G

* Spring Loaded Assembly

** 316SS welded fitting



Standard orientation for single threaded fittings is threads facing process. Add "X" after fitting order code for backwards fitting (threads facing lead end).

- Standard assemblies use Class B thinfilm elements and are rated from -50°C (-58°F) to +260°C (500°F). Higher temperature rated assemblies are available up to 400°C (752°F). Add "-HT" to p/n suffix.

Discount Schedule

1 - 9 units	Net
10 - 24 units	10%
25 - 49 units	20%
50 and up	Call

PRICING

*Basic (includes 1st 12" of sheath)		1/8"	3/16"	1/4"	5/16"
		\$65	\$63	\$60	\$68
Add'l Sheath Adder (per inch)		.15	.25	.45	.75
Element Adder		A	B	C,E,G,H	D,F
		\$5	N/C	\$6	\$2
Protection Head Adder		CA,CI	NY	PW	EX
		\$26	\$22	\$25	\$55
Fitting Adder	A	B	C,F,G	D	E
	N/C	\$20	\$5	\$4	\$9
Lead Option Adder (per foot) (first 36" included in basic)	2IT	2TT,3IT	3TT, 3GG	4IT	4TT, 4GG
	.30	.50	.65	.65	.70

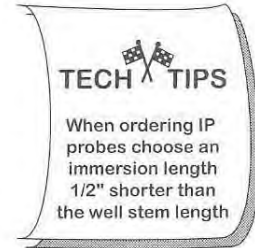
Transmitter option add \$99 for nonisolated or \$189 for isolated.

Hardware

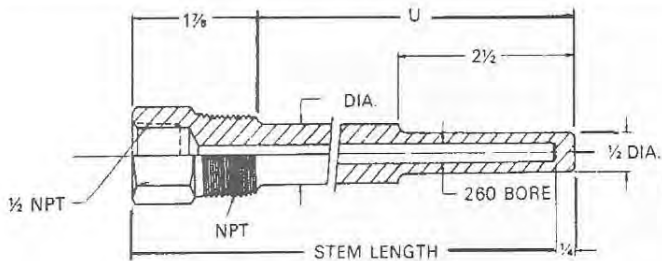
Thermowells

Standard Thermowells

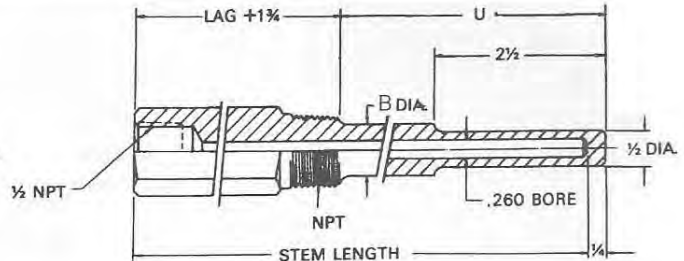
External Thread	Part Number	U Length	Stem Length	B Diameter	304SS	316SS	Brass	Carbon Steel
1/2"	1/2U250-*	2-1/2	4	5/8"	22.00	29.70	16.00	16.00
	1/2U450-*	4-1/2	6		26.10	35.50	19.80	19.80
	1/2U750-*	7-1/2	9		39.20	52.80	31.00	31.00
	1/2U1050-*	10-1/2	12		47.20	64.20	40.50	40.50
	1/2U1350-*	13-1/2	15		68.40	91.90	52.50	52.50
	1/2U1650-*	16-1/2	18		80.80	109.50	62.80	62.80
	1/2U2250-*	22-1/2	24		104.90	141.00	73.20	73.20
3/4"	3/4U250-*	2-1/2	4	3/4"	22.10	29.80	16.40	16.40
	3/4U450-*	4-1/2	6		26.10	34.90	19.80	19.80
	3/4U750-*	7-1/2	9		39.00	52.40	30.70	30.70
	3/4U1050-*	10-1/2	12		47.80	64.20	40.00	40.00
	3/4U1350-*	13-1/2	15		68.50	92.80	52.40	52.40
	3/4U1650-*	16-1/2	18		81.70	109.80	61.80	61.80
	3/4U2250-*	22-1/2	24		104.80	141.50	72.50	72.50
1"	1U250-*	2-1/2	4	7/8"	28.50	35.20	21.80	21.80
	1U450-*	4-1/2	6		36.20	48.60	25.90	25.90
	1U750-*	7-1/2	9		46.90	64.20	33.90	33.90
	1U1050-*	10-1/2	12		58.70	78.90	45.10	45.10
	1U1350-*	13-1/2	15		81.90	110.30	60.00	60.00
	1U1650-*	16-1/2	18		96.50	128.90	70.50	70.50
	1U2250-*	22-1/2	24		131.80	162.50	81.80	81.80



*Specify material after part number.
Example: 1/2U450-316ss
Price: \$35.50



Standard Well



Lagging Well

Lagging Thermowells

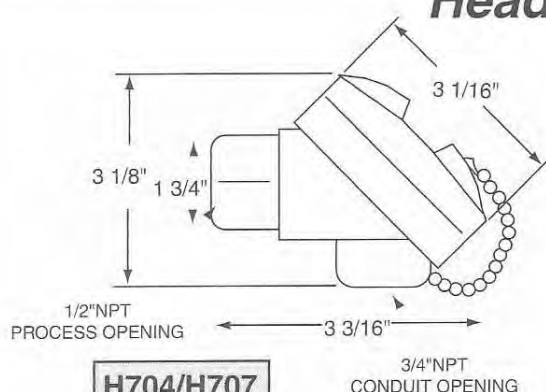
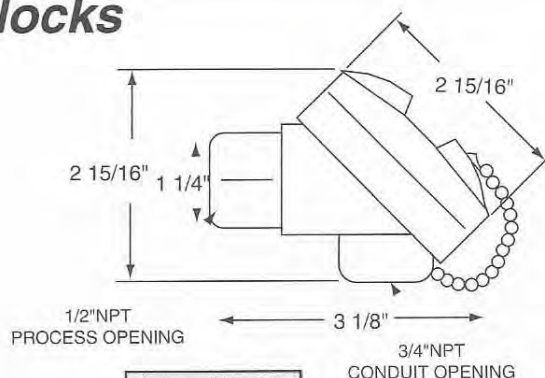
External Thread	Part Number	Lag Length	U Length	Stem Length	B Diameter	304SS	316SS	Brass	Carbon Steel
1/2"	1/2LU250-*	2	2-1/2	6	5/8"	25.50	35.30	19.00	19.00
	1/2LU450-*	3	4-1/2	9		38.20	52.75	30.80	30.80
	1/2LU750-*	3	7-1/2	12		46.10	63.90	40.20	40.20
	1/2LU1050-*	3	10-1/2	15		66.80	92.10	51.90	51.90
	1/2LU1350-*	3	13-1/2	18		79.70	108.70	62.50	62.50
	1/2LU1950-*	3	19-1/2	24		102.00	142.40	72.80	72.80
3/4"	3/4LU250-*	2	2-1/2	6	3/4"	25.70	35.60	19.00	19.00
	3/4LU450-*	3	4-1/2	9		38.40	52.90	30.80	30.80
	3/4LU750-*	3	7-1/2	12		46.40	64.20	40.20	40.20
	3/4LU1050-*	3	10-1/2	15		66.90	92.30	51.90	51.90
	3/4LU1350-*	3	13-1/2	18		79.90	109.00	62.50	62.50
	3/4LU1950-*	3	19-1/2	24		102.20	142.70	72.80	72.80
1"	1LU250-*	2	2-1/2	6	7/8"	36.40	47.90	26.40	26.40
	1LU450-*	3	4-1/2	9		47.30	64.20	34.10	34.10
	1LU750-*	3	7-1/2	12		58.90	78.80	45.30	45.30
	1LU1050-*	3	10-1/2	15		81.80	110.10	59.90	59.90
	1LU1350-*	3	13-1/2	18		95.50	128.70	68.90	68.90
	1LU1950-*	3	19-1/2	24		129.80	163.50	81.60	81.60

*Specify material after part number

Example: 1/2LU450-316SS Price: \$52.75

Hardware

Heads and Blocks

**H704/H707****H781-3**

Cast Aluminum/Cast Iron Heads

For Heads With No Transmitter or Non-isolated Transmitter:

H704 Die Cast Aluminum ... \$19.95
H707 Cast Iron Head \$19.80

Terminal Block (order seperately):

H741 2-term. \$5.00
H742 4-term. \$7.40

For Heads With Isolated Transmitter

***XL4000** Aluminum Head ... \$29.75
***XL3000** Iron Head \$27.85

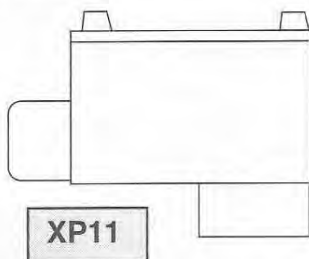
Terminal Block (order seperately):

TH2730D (dual) \$7.25

Transmitter Mounting Kit:

81500601 \$3.45

** not pictured*

**XP11**

*Explosion Proof Head

XP11 \$51.15
 3/4" NPT process x 3/4" NPT conduit
 Approx. dimensions: 4"H x 2-1/4"L x 3"W

Terminal Block (order seperately):

TH615 (6 terminals) \$5.60

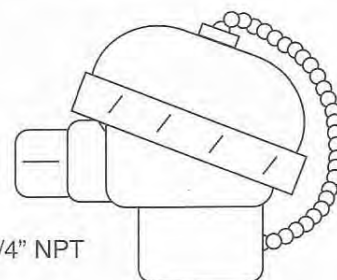
Transmitter Mounting Kit:

81500101 \$14.60

Polypropylene Heads

For Heads With No Transmitter or Non-isolated Transmitter:

White FDA approved polypropylene.
 Continuous temperature rating of 198°F.
 Supplied with 3 self-contained terminals.
H781-3 \$19.95

**RT30-WHT**

For Heads With Isolated Transmitter:

RT30-WHT White poly head \$30.00

Terminal Block (order seperately):

50500701 (single block) \$5.55
50500801 (dual block) \$6.95

Transmitter Mounting Kit:

81500101 \$3.45

**For hazardous locations. UL listed Class 1, Groups C, D; Class 2, Groups E,F; Class 3, all groups. Also CSA Class I, Group C,D; Class II, Groups E, F; and Class III*

Miniture heads and other styles available. Consult sales for details