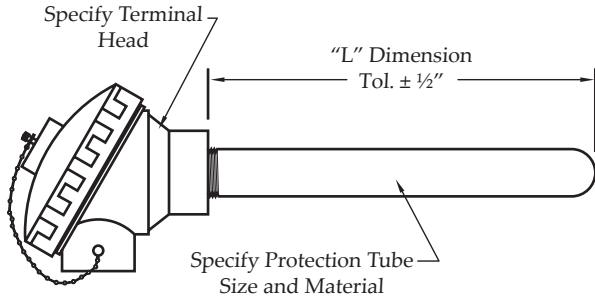


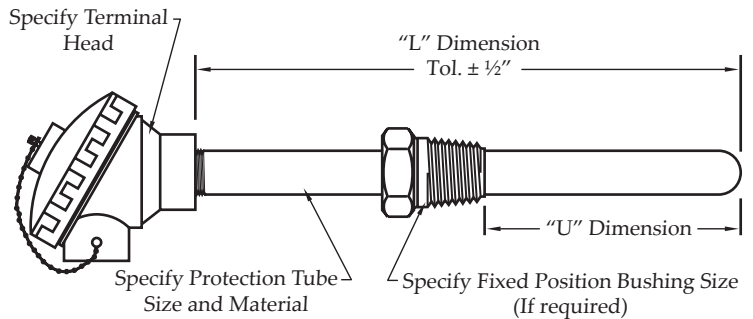
Industrial Process Thermocouples

BASE METAL PROTECTION TUBE ASSEMBLY

The TPT Style Thermocouple assemblies feature a base metal thermocouple and metal protection tube for use in corrosive or hostile environments. Optional mounting bushings and flanges are available.



STYLE TPT - Metal Protection Tube



STYLE TPB - Metal Protection Tube with Process Bushing

Table 1: Thermocouple Type

Thermocouple Type Codes				Limits of Error
E	J	K	T	Standard Limits
2	3	4	8	Special Limits

Table 2: Element Type

Code	Metal Type
L	Beaded, 8 Gauge, Single, Specify Junction
M	Beaded, 14 Gauge, Single, Specify Junction
N	Beaded, 14 Gauge, Dual, Specify Junction
O	MI Cable, 18 Gauge, Single, Specify Junction GND/UNG
P	MI Cable, 18 Gauge, Dual, Specify Junction GND/UNG

Table 3: Protection Tube Size

Code	IPS (Nominal)
H	3/8" (.675)
L	1/2" (.840)
M	3/4" (1.050)
N	1" (1.315)
O	1 1/4" (1.660)
P	1 1/2" (1.900)

Table 4: Wall Thickness

Code	Nominal Wall
W	Schedule 40
Y	Schedule 80
Z	Schedule 160

Table 5: "U" Dimension

Specify in inches. See table on page 27 for codes.

Table 6: Protection Tube Materials

Code	Metal Materials
4	304 Stainless Steel
6	316 Stainless Steel
8	Inconel® 600
A	Inconel® 601
R	Carbon Steel

Table 7: "L" Dimension

Specify in inches. See table on page 27 for codes.

Table 8: Fitting Options

Code	Description
0	No fitting option
E	1/2" NPT Hex Bushing
F	3/4" NPT Hex Bushing
X	Special

Table 9: Fitting Material

Code	Description
4	304 Stainless Steel
6	316 Stainless Steel
B	Brass
R	Steel

Table 10: Screw Cover Terminal Heads

Code	Screw Cover Head Materials
A	1/2" NPT Conduit, Aluminum Head
B	3/4" NPT Conduit, Aluminum Head
C	1/2" NPT Conduit, Cast Iron Head
D	3/4" NPT Conduit, Cast Iron Head
M	1/4" NPT Conduit Connection, Miniature Plastic Head
P	1/2" NPT Conduit, Grey Delrin Head
W	1/2" NPT Conduit, White Polypropylene Head
Z	1/2" NPT Conduit, Explosion Proof Aluminum Head
Y	3/4" NPT Conduit, Explosion Proof Aluminum Head

Part Number Sequence

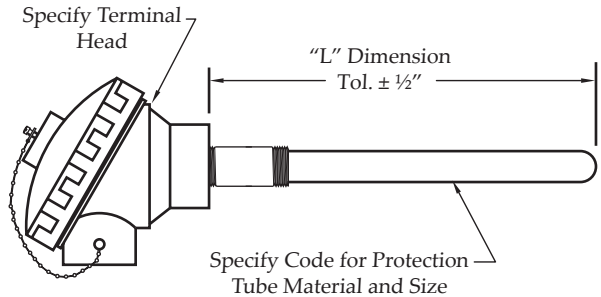
TPT-EN-LW07H4-10F6A

TPT	-	E	N	-	L	W	07H	4	-	10H	F	6	A
TPT		Table 1	Table 2	Table 3	Table 4	Table 5	Table 6	Table 7	Table 8 & 9	Table 10			
Sensor Type & Style No.		Thermocouple Type	Element Type	Tube Size	Wall Thickness	"U" Dimension	Tube Material	"L" Dimension	Process Fitting	Terminal Heads			

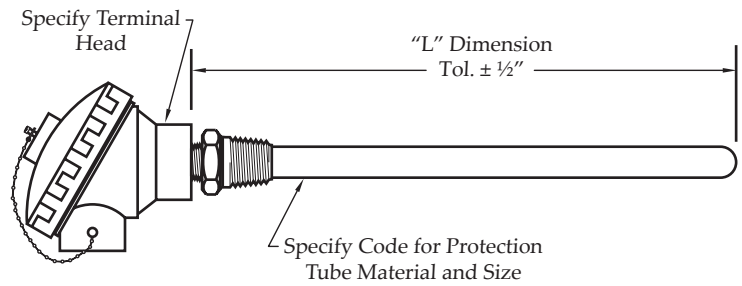
Industrial Process Thermocouples

BASE METAL CERAMIC PROTECTION TUBE ASSEMBLY

The TPTC Style Thermocouple assemblies feature a base metal thermocouple element and ceramic protection tube for high temperature service. Ceramic mounting bushings are available.



STYLE TPTC - Ceramic Protection Tube with Pipe Nipple



STYLE TPTC - Ceramic Protection Tube with Hex Fitting

Table 1: Thermocouple Type

Thermocouple Type Codes				Limits of Error
E	J	K	T	Standard Limits
2	3	4	8	Special Limits

Table 2: Element Type

Code	Metal Type
L	Beaded, 8 Gauge, Single, Specify Junction
M	Beaded, 14 Gauge, Single, Specify Junction
N	Beaded, 14 Gauge, Dual, Specify Junction
O	MI Cable, 18 Gauge, Single, Specify Junction GND/UNG
P	MI Cable, 18 Gauge, Dual, Specify Junction GND/UNG

Table 3: Ceramic Tube Size

Code	IPS (Nominal)
F	3/8" (.375)
L	11/16" (.688)
M	3/4" (.750)
P	7/8" (.875)
S	1" (1.00)

Table 4: Ceramic Material

Code	Materials
L	Alumina
W	Mullite

Table 5: "L" Dimension

Specify in inches. See table on page 27 for codes.

Table 6: Ceramic Process Connection

Code	Description
1	1/2" NPT Nipple
2	3/4" NPT Nipple
3	1/2" NPT Hex Nipple
4	3/4" NPT Hex Nipple
5	1/2" NPT N-U-N
6	3/4" NPT N-U-N

Table 7: Extension Material

Code	Metal Materials
4	304 Stainless Steel
6	316 Stainless Steel
B	Brass
K	Black Pipe
R	Steel

Table 8: Screw Cover Terminal Heads

Code	Screw Cover Head Materials
A	1/2" NPT Conduit, Aluminum Head
B	3/4" NPT Conduit, Aluminum Head
C	1/2" NPT Conduit, Cast Iron Head
D	3/4" NPT Conduit, Cast Iron Head
M	1/4" NPT Conduit Connection, Miniature Plastic Head
P	1/2" NPT Conduit, Grey Delrin Head
W	1/2" NPT Conduit, White Polypropylene Head
Z	1/2" NPT Conduit, Explosion Proof Aluminum Head
Y	3/4" NPT Conduit, Explosion Proof Aluminum Head

Part Number Sequence

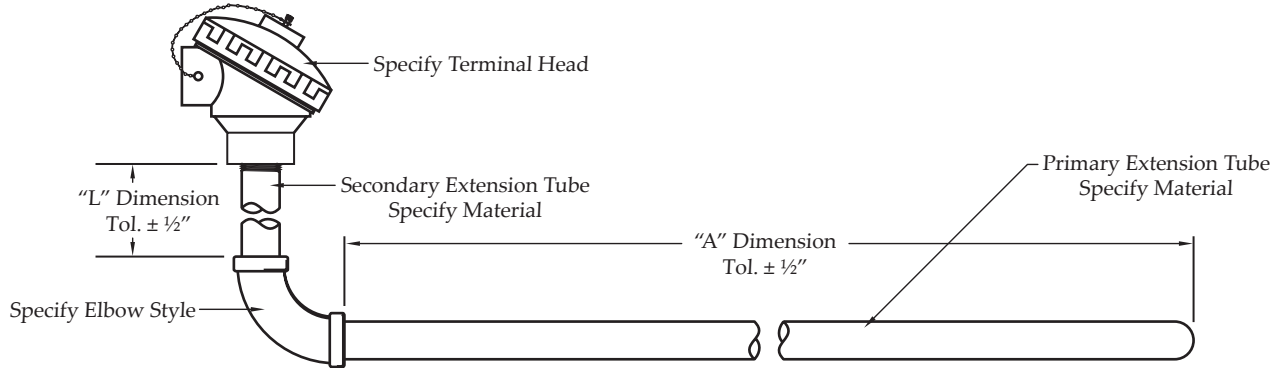
TPTC-KM-LL140-2KD

TPTC	-	K	M	-	L	L	140	-	2	K	D
TPTC		Table 1	Table 2		Table 3	Table 4	Table 5		Table 6	Table 7	Table 8
Sensor Type & Style No.		Thermocouple Type	Element Type		Ceramic Tube Size	Ceramic Material	"L" Dim.		Ceramic Process Conn.	Extension Material	Terminal Heads

Industrial Process Thermocouples

BASE METAL 90° PROTECTION TUBE ASSEMBLY

The TPA Style Thermocouple assembly features a base metal thermocouple element and metal protection tube with a 90° angle design for over-the-side application.



STYLE TPA - 90° Protection Tube

Table 1: Thermocouple Type

Thermocouple Type Codes				Limits of Error
E	J	K	T	Standard Limits
2	3	4	8	Special Limits

Table 2: Element Type

Code	Metal Type
L	Beaded, 8 Gauge, Single, Specify Junction
M	Beaded, 14 Gauge, Single, Specify Junction
N	Beaded, 14 Gauge, Dual, Specify Junction
O	MI Cable, 18 Gauge, Single, Specify Junction GND/UNG
P	MI Cable, 18 Gauge, Dual, Specify Junction GND/UNG

Table 3: Protection Tube Size

Code	IPS (Nominal)
L	½" (.840)
M	¾" (1.050)
N	1" (1.315)
O	1 ¼" (1.660)
P	1 ½" (1.900)

Table 4: Wall Thickness

Code	Nominal Wall
W	Schedule 40
Y	Schedule 80
Z	Schedule 160

Table 6: "L" Dimension

Specify in inches. See table on page 27 for codes.

Table 7: "A" Dimension

Specify in inches. See table on page 27 for codes.

Table 5: Protection Tube Materials

Code	Metal Materials
4	304 Stainless Steel
6	316 Stainless Steel
5	446 Stainless Steel
8	Inconel® 600
A	Inconel® 601
R	Carbon Steel

Table 9: Screw Cover Terminal Heads

Code	Screw Cover Head Materials
A	½" NPT Conduit, Aluminum Head
B	¾" NPT Conduit, Aluminum Head
C	½" NPT Conduit, Cast Iron Head
D	¾" NPT Conduit, Cast Iron Head
M	¼" NPT Conduit Connection, Miniature Plastic Head
P	½" NPT Conduit, Grey Delrin Head
W	½" NPT Conduit, White Polypropylene Head
Z	½" NPT Conduit, Explosion Proof Aluminum Head
Y	¾" NPT Conduit, Explosion Proof Aluminum Head

Table 8: Elbow Style

Code	Elbow Type
F	Fixed Elbow

Part Number Sequence TPA-JL-LW406H-410HFB

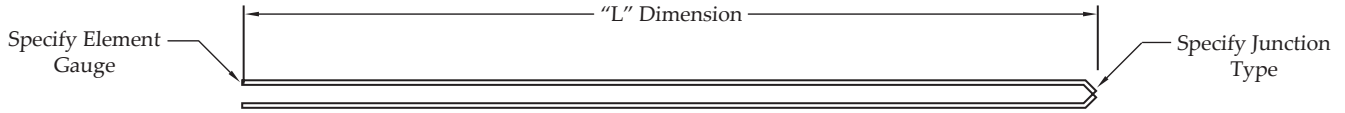
TPA	-	J	L	-	L	W	4	06H	-	4	10H	F	B
TPA		Table 1	Table 2	Table 3	Table 4	Table 5	Table 6	Table 5	Table 7	Table 8	Table 9		

Sensor Type Thermocouple Element Tube Wall Primary Tube "L" Secondary "A" Elbow Terminal & Style No. Type Type Size Thickness Material Dim. Tube Material Dim. Style Head

Industrial Process Thermocouples

BASE METAL THERMOCOUPLE ELEMENTS

The TEBA and TEBD Style Thermocouples are base metal replacement elements for all ceramic or metal protection tube assemblies.



STYLE TEBA - Bare Element Thermocouple

Table 1: Thermocouple Type

Thermocouple Type Codes				Limits of Error
E	J	K	T	Standard Limits
2	3	4	8	Special Limits

Table 2: Junction Type

Code	Single Junction
B	Buttwelded
D	Twisted & Welded

Table 3: Bare Element Gauge

Code	Thermocouple Wire Gauge Size
08	8 Gauge
14	14 Gauge
20	20 Gauge
24	24 Gauge

Table 5: Termination

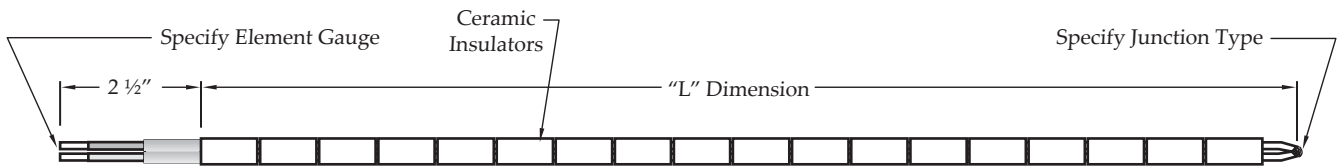
Code	Termination
0	2" Split Ends
1	#6 Spade Lug
3	Standard Plug
M	Mini Plug

Table 4: "L" Dimension

Specify in inches. See table on page 27 for codes.

Part Number Sequence TEBA-JB-080022H0

TEBA	-	J	B	-	08	00	22H	0
TEBA		Table 1	Table 2		Table 3		Table 4	Table 5
Sensor Type & Style No.		Thermocouple Type	Junction Type		Bare Element Gauge		"L" Dimension	Termination



STYLE TEBD - Insulated Thermocouple

Table 1: Thermocouple Type

Thermocouple Type Codes				Limits of Error
E	J	K	T	Standard Limits
2	3	4	8	Special Limits

Table 2: Junction Type

Code	Single Junction
B	Buttwelded
D	Twisted & Welded
Code	Dual Junction
F	Buttwelded, 14 GA & 20 GA only
M	Twisted & Welded, 14 GA & 20 GA only

Table 3: Element Gauge

Code	Thermocouple Wire Gauge Size
08	8 Gauge
14	14 Gauge
20	20 Gauge
24	24 Gauge

Table 4: Insulator Type

Code	Description
1	Single Round Insulator
2	1" Long Oval Insulator
3	1" Long Round Insulator
4	3" Long Round Insulator
5	3" Long Oval Insulator

Table 5: Insulator Material

Code	Description
A	Alumina
M	Mullite
C	Ceramic

Table 6: "L" Dimension

Specify in inches. See table on page 27 for codes.

Table 7: Termination

Code	Termination
0	2" Split Ends
1	#6 Spade Lug
3	Standard Plug
M	Mini Plug

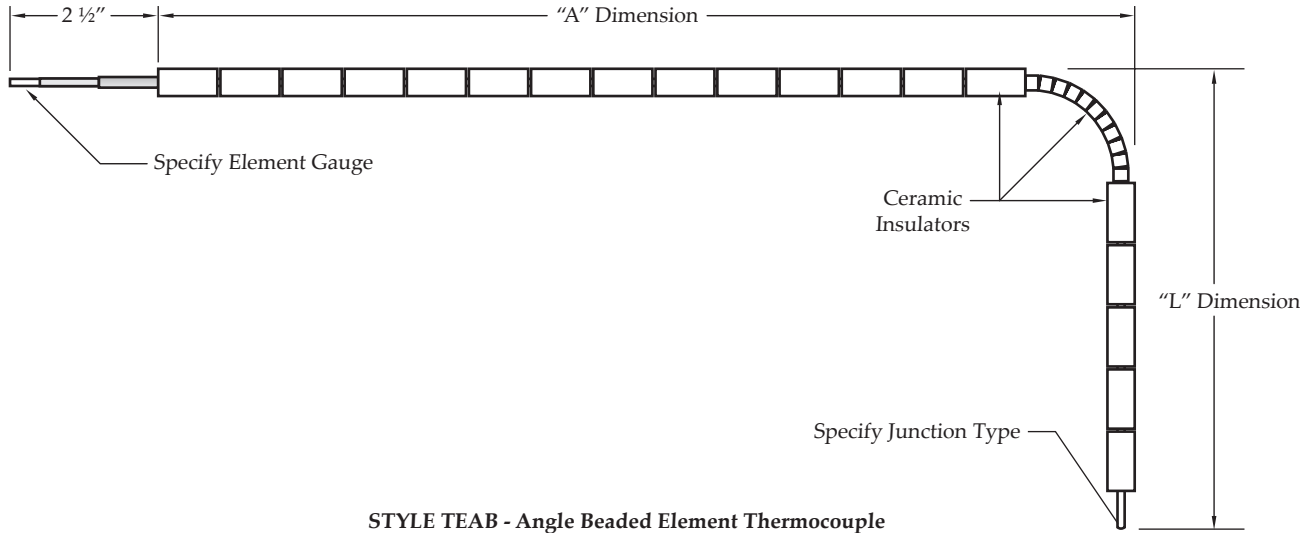
Part Number Sequence TEBD-JB-081M22H0

TEBD	-	J	B	-	08	1	M	22H	0
TEBD		Table 1	Table 2		Table 3	Table 4	Table 5	Table 6	Table 7
Sensor Type & Style No.		Thermocouple Type	Junction Type		Bare Element Gauge	Insulator Type	Insulator Material	"L" Dimension	Termination

Industrial Process Thermocouples

BASE METAL THERMOCOUPLE ELEMENTS

The TEAB Style Thermocouple is a replacement element for the TPA 90° angle protection tube thermocouple assembly.



STYLE TEAB - Angle Beaded Element Thermocouple

Table 1: Thermocouple Type

Thermocouple Type Codes				Limits of Error
E	J	K	T	Standard Limits
2	3	4	8	Special Limits

Table 2: Junction Type

Code	Single Junction
B	Buttwelded
D	Twisted & Welded

Table 3: Bare Element Gauge

Code	Thermocouple Wire Gauge Size
08	8 Gauge
14	14 Gauge
20	20 Gauge

Table 4: "L" Dimension

Specify in inches. See table on page 27 for codes.

Table 5: "A" Dimension

Specify in inches. See table on page 27 for codes.

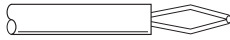
Part Number Sequence

TEAB-JB-1412D-32M

TEAB	-	J	B	-	14	12D	-	32M
TEAB		Table 1	Table 2		Table 3	Table 4		Table 5
Sensor Type & Style No.		Thermocouple Type	Junction Type		Bare Element Gauge	"L" Dimension		"A" Dimension

Industrial Process Thermocouples

JUNCTION TYPES



EXPOSED (E)
Joined and welded wires.
Specified where fast response is required.



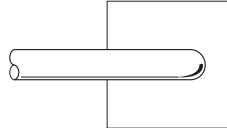
GROUNDED (G)
Junction is seal welded integrally to the sheath.
Protects wire from corrosive conditions.



UNGROUNDED (U)
Junction is electrically insulated from seal welded sheath. Design helps prevent stray EMF's.



NECKDOWN (N)
Neckdown provides faster response.
Junction can be single or dual circuit and grounded or ungrounded.



PAD (P)
Pad is designed for welding directly to boiler or process tubes for sensing skin temperatures.

SHEATH DIAMETERS

Sheath Code	T	Y	W	A	B	V	C	D	E	F	H
Sheath Diameter	.020"	.032"	.040"	.062"	.125"	.156"	.188"	.250"	.313"	.375"	.500"
Wire Gauge	38	34	33	30	24	22	20	18	16	15	11
Max. Length	100'	150'	200'	400'	250'	200'	175'	100'	55'	40'	30'

PART NUMBER CODE DEFINITIONS

"L" Dimensions & "U" Dimensions				"A" Dimensions		Fractional Dimension Letter Code			
"L" and "U" dimensions are specified in whole inches and use a letter Code for the fraction. (Enter 0 when there is no fraction) Enter the three digit code per examples below:				"A" dimensions are specified in whole inches only. Enter the three digit code as follows:		1/16"	A	11/16"	L
						1/8"	B	3/4"	M
						3/16"	C	13/16"	N
						1/4"	D	7/8"	P
						5/16"	E	15/16"	R
						3/8"	F	1"	S
3"	030	10 5/8"	10K	9"	009	7/16"	G	0	No
4 1/2"	04H	12"	120	12"	012	1/2"	H	Fraction	
6 1/4"	06D	15 3/8"	15F	36"	036	9/16"	J		
7 7/8"	07P	17 3/4"	17M	144"	144	5/8"	K		
9 5/8"	09K	22 1/8"	22B						