BURNS® ENGINEERING

Temperature Measurement Experts

Series 100

Special Limits of Error Thermocouples

Temperature Measurement Experts®

Since 1960, Burns Engineering has been an industry leader in the design and manufacture of temperature sensors. Accuracy, reliability and consistency are hallmarks of the Burns brand. At Burns, we focus on the measurement. We understand the subtleties of temperature measurement, from selection through installation, and how they can impact your processes and ultimately your success. We worry about the details so you don't have to. When you select Burns you're getting more than a sensor, you're getting your own team of Temperature Measurement Experts.

Series 100 Thermocouples

These rugged sensors have proven performance and are designed for maximum service life. Our Series 100 Special Limits Thermocouples are available in Type E, J, K, N, or T and various styles, lead wire configurations, thermowells, connection heads, as well as custom designs, to meet the broad demands of industrial processes.

Get a Web Quote:

Visit BurnsEngineering.com to configure your sensor today.

Here's how:

1. Register or sign-in
2. Search for the model (100A, 100K, etc.) using the search box (upper right) or click on the Product/Quote tab and select the model of interest.
3. Click on 'Configure My Part'.
4. Select the parameters to support your application
5. Add to Quote Cart.
6. Submit Cart for Quote – We'll be in touch shortly.

Product Index

Series 100 Thermocouples

Series 100 Thermocouples

Overview and Specifications

Series 100 Overview

Series 100 thermocouples are highly configurable to meet your specific process needs. With styles including direct immersion for easy installation, spring loaded to ensure positive contact in the thermowell, and capsule for ultimate installation flexibility. These all purpose sensors provide exceptional performance with a proven track record of durability.

The Series 100 offers 5 thermocouple types; E, J, K, N, and T all with Special Limits tolerance class (typical tolerance is ½ the standard limits thermocouple). Designed with mineral insulated metal sheaths, in both grounded and ungrounded options, these thermocouples provide accurate measurements and long life expectancy.

Multiple configurations are approved through Factory Mutual (FM) for hazardous environments:

EXPLOSION PROOF: CLASS I, DIV. 1, GROUPS A, B, C, D
DUST IGNITION PROOF: CLASS II & III, DIV. 1, GROUPS E, F, G
NEMA 4X (CARBON STEEL THERMOWELLS ARE APPROVED FOR NEMA 4 ONLY)

Configurations available include:

Fast Response Design

Union for Ease of Removal

Classic Flanged Thermowell

Although numerous configurations are available from our catalog or website, if your process needs something a bit different, we will modify or customize to provide the best solution for your measurement need.

Series 100
Specifications

Thermocouple Types

ANSI Thermocouple Type	Single Element Wire Designations	Wire Material, Generic & Trade Names	Magnetic	Sheath Material	Lead Wire Color Code	
					Individual Wire Insulator	Cable
E	EP EN	Chromel™ Constantan	No No	316SS	Purple Red	Brown
J	JP JN	Iron Constantan	Yes No	316SS	White Red	Brown
K	KP KN	Chromel™ Alumel™	No Yes	Inconel® 600	Yellow Red	Brown
N	NP NN	Nicrosil Nisil	No No	Inconel® 600	Orange Red	Brown
T	TP TN	Copper Constantan	No No	316SS	Blue Red	Brown

Accuracy and thermocouple interchangeability: All materials are in accordance with ANSI MC 96.1, Special Limits of Error.

Temperature Range & Initial Calibration Tolerances

ANSI Thermocouple Type	Temperature Range	Special Limits (% applies to temperature measure in °C)
E	-200°C to -170°C (-328°F to -274°F) -170°C to 125°C (-274°F to 257°F) 125°C to 870°C (257°F to 1598°F)	±0.8% ±0.5°C (±0.9°F) ±0.4%
J	0°C to 275°C (32°F to 527°F) 275°C to 750°C (527°F to 1382°F)	±1.1°C (±2.0°F) ±0.4%
K	0°C to 275°C (32°F to 527°F) 275°C to 1180°C (527°F to 2156°F)	±1.1°C (±2.0°F) ±0.4%
N	-40°C to 375°C 375°C to 1000°C	±1.5°C ±0.4%
T	-200°C to -62.5°C (-328°F to -80.5°F) -62.5°C to 125°C (-80.5°F to 257°F) 125°C to 350°C (257°F to 662°F)	±0.8% ±0.5°C (±0.9°F) ±0.4%

	mV in degrees C				
Temp C	E	J	K	N	T
-50	-2.787	-2.431	-1.889	-1.269	-1.819
-45	-2.523	-2.197	-1.709	-1.146	-1.64
-40	-2.255	-1.961	-1.527	-1.023	
-35	-1.984	-1.722	-1.343	-0.898	
-30	-1.709	-1.482	-1.156	-0.772	
-25	-1.432	-1.239	-0.968	-0.646	
-20	-1.152	-0.995	-0.778	-0.518	
-15	-0.868	-0.749	-0.586	-0.390	
-10	-0.582	-0.501	-0.392		
-5	-0.292	-0.251	-0.197		
0	0	0	0		
5	0.294	0.253	0.198		
10	0.591	0.507	0.397		
15	0.89	0.762	0.5		
20	1.192	1.019			
25	1.495				

See page 21 and 22 for Millivolts vs Temperature data for each thermocouple type.

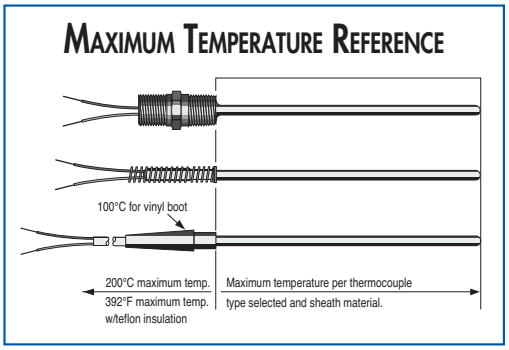
Sheath Diameter and Wire Gauge

Sheath Diameter	Single Element AWG	Dual Element AWG
1/4”	16	18
3/16”	19	21
1/8”	22	24

Bend Radius:

Sheath is bendable with a 3/4” minimum radius.

See complete bend criteria on pg 18, Sheath Options.

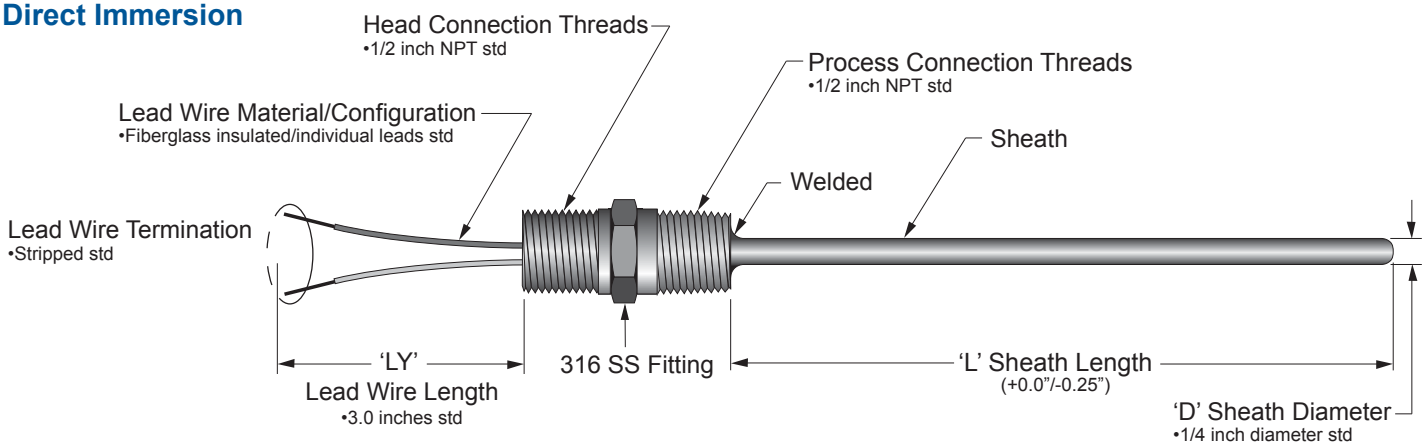


Note: maximum temperature of standard sealing material at cable/sheath transition is 200°C/392°F

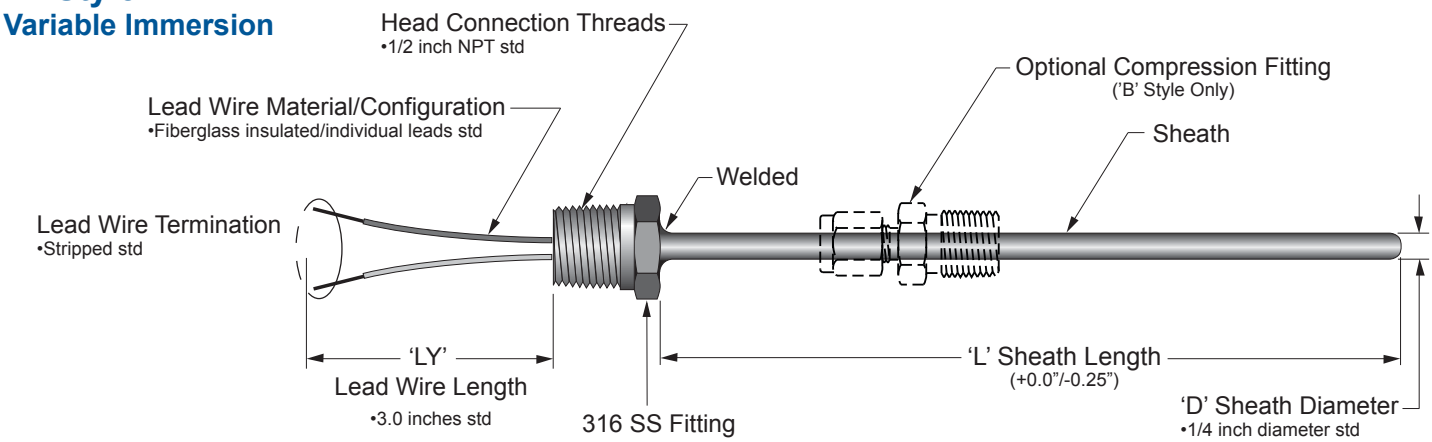
‘A’ and ‘B’ Style Direct Immersion Sensors

Specifications

‘A’ Style
Direct Immersion



‘B’ Style
Variable Immersion



‘A’ Style Application

Designed for direct immersion into the process where fast response is needed or in small diameter lines where a thermowell can’t be used. Pressure rated to 3000 psi.

‘B’ Style Application

Provides installation flexability with variable immersion feature. Brass or 316 SS compression fitting with PTFE or SS ferrules are available. PTFE allows for readjustment of the immersion length.

‘A’ and ‘B’ Style Direct Immersion Sensors

Ordering Information

Sensor Style

		Sheath Length Tolerance
A	General Purpose, Direct Immersion	+0/-0.25”
B	General Purpose, Variable Immersion	+0/-0.25”

Thermocouple Type

		Sheath Material
E	Chromel/Constantan (leadwire code = purple+, red-)	316 SS
J	Iron/Constantan (leadwire code = white+, red-)	316 SS
K	Chromel/Alumel (leadwire code = yellow+, red-)	Inconel® 600
N	Nicrosil/Nisil (leadwire code = orange+, red-)	Inconel® 600
T	Copper/Constantan (leadwire code = blue+, red-)	316 SS

Thermocouple Junction Configuration

D	Single, Ungrounded
E	Single, Grounded
F	Duplex, Ungrounded
G	Duplex, Grounded

Connection Head (See NOTE 1)

		Sensor/Head Connection
1C	Cast Iron Head	1/2" NPT
2A	Aluminum Head	1/2" NPT
2E	Aluminum Head, Epoxy Coated	1/2" NPT
3A	Aluminum Head with Water Proof Kit	1/2" NPT
3E	Aluminum Head, Epoxy Coated with Water Proof Kit	1/2" NPT
5A	Aluminum Head	1/2" NPT
5E	Aluminum Head, Epoxy Coated	1/2" NPT
9P	Polypropylene Head, White	1/2" NPT
14S	Stainless Steel Head	1/2" NPT
19A	Aluminum Head with LED Indicator	1/2" NPT
24S	Stainless Steel Head with Battery powered LCD Indicator	1/2" NPT
25A	Aluminum Head with Option for Remote Mount	3/4" NPT
N	No Connection Head	

‘L’ Sheath Length (See NOTE 2)

035	3.5 inch (minimum)
055	5.5 inch
085	8.5 inch
115	11.5 inch
175	17.5 inch
LLL	Specify ‘L’ Length in inches for ‘L’ ≤ 99.9”. For ‘L’ >99.9”, use LLLL (150”=1500)

100					
Basic Order Codes					

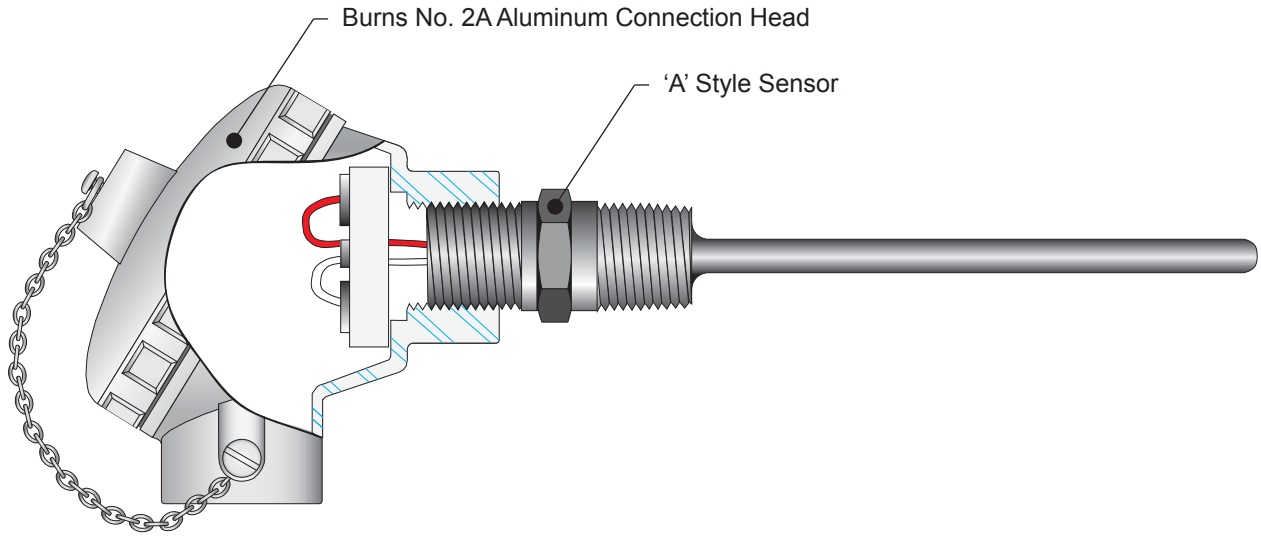
(Leave Options blank if not required)

Explosion Proof (NOTE 3)	Options	Transmitter

See pages 17–19

FOR REFERENCE:
Thermocouple Specifications, page 4
Common Options, pages 17 – 19
Connection Head Descriptions, page 20

Example Configuration



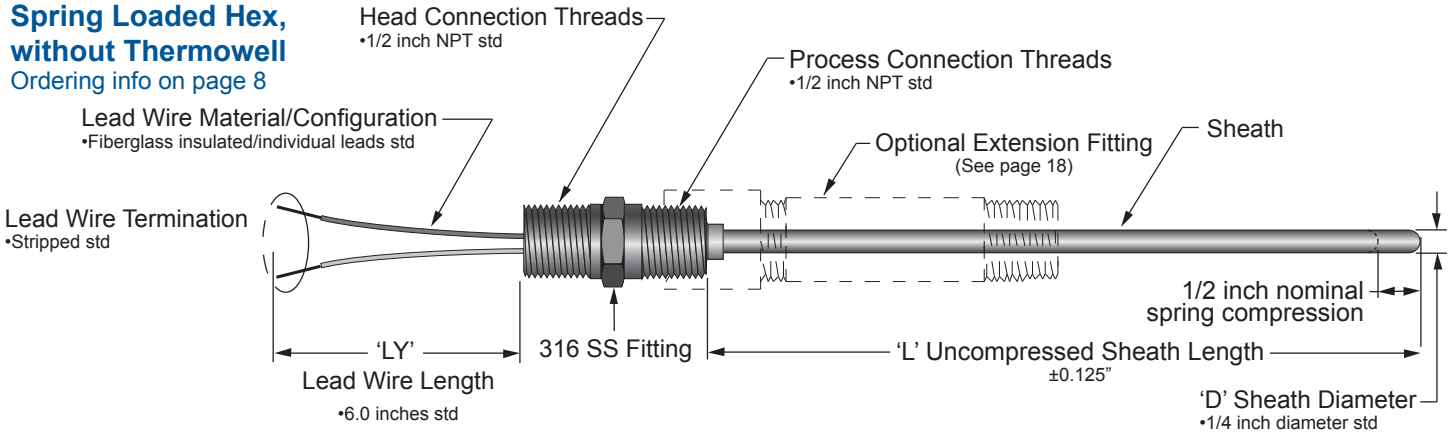
NOTE 1: See our Connection Head Supplement for all available connection heads and full details.
NOTE 2: For sensor sheath lengths ‘L’ greater than 200 inches, contact Burns Customer Service.
NOTE 3: For FM explosion proof approved assembly, enter ‘/AFM’ code. See page 3 for ratings and drawing # 18938 for approved product structure details.

‘L’ Style Spring Loaded Hex Fitting Sensors

Specifications

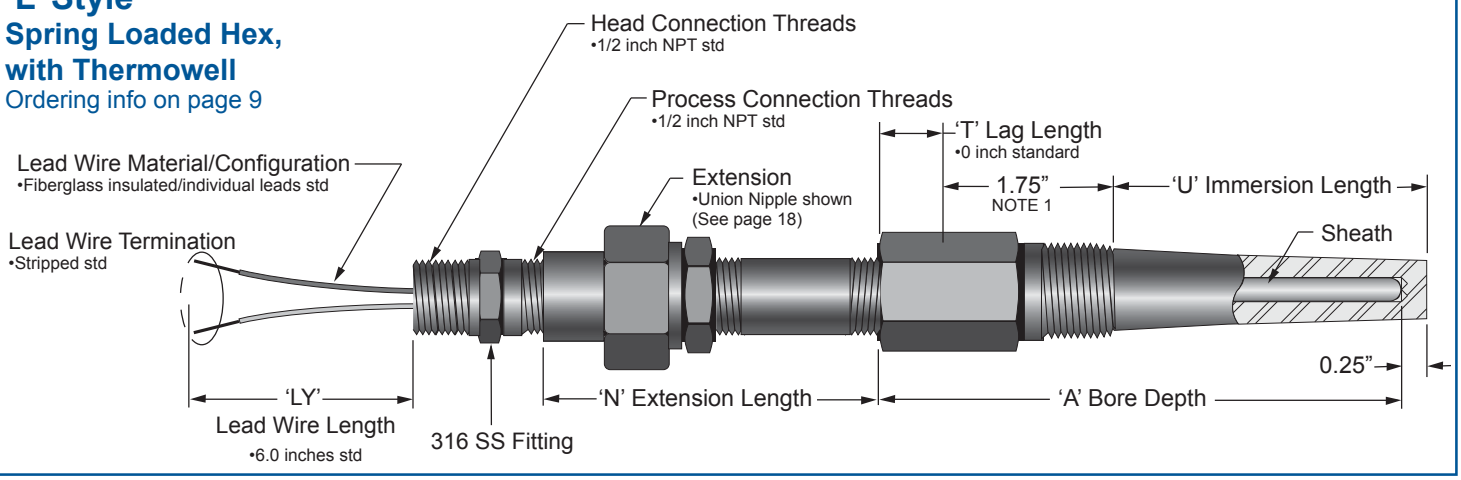
‘L’ Style
Spring Loaded Hex, without Thermowell

Ordering info on page 8



‘L’ Style
Spring Loaded Hex, with Thermowell

Ordering info on page 9



‘L’ Style Application

Adaptable to a variety of connection heads or direct to conduit. Union connection allows for easy removal for calibration without disconnecting the leads.

Length Code Definitions and Equations for ‘L’ Style Assemblies

Length Codes	For Threaded & Socket Wells	For Flanged Wells
‘L’ Uncompressed Sheath Length ‘U’ Immersion Length ‘N’ Extension Length ‘A’ Well Bore Depth ‘T’ Well Lag Length	L = N + A L = N + U + T + 1.5 A = U + T + 1.5	L = N + A L = N + U + T + 2 A = U + T + 2

NOTE 1: 1.75 inch length is used on threaded and socket weld thermowells. A 2.25 inch length is used with flanged wells.

‘L’ Style Spring Loaded Hex Fitting Sensors without Thermowell

Ordering Information

Sensor Style

L	Spring Loaded, Hex Fitting

Thermocouple Type

		Sheath Material
E	Chromel/Constantan (leadwire code = purple+, red-)	316 SS
J	Iron/Constantan (leadwire code = white+, red-)	316 SS
K	Chromel/Alumel (leadwire code = yellow+, red-)	Inconel® 600
N	Nicrosil/Nisil (leadwire code = orange+, red-)	Inconel® 600
T	Copper/Constantan (leadwire code = blue+, red-)	316 SS

Thermocouple Junction Configuration

D	Single, Ungrounded
E	Single, Grounded
F	Duplex, Ungrounded
G	Duplex, Grounded

Connection Head (See NOTE 1)

		Sensor/Head Connection
1C	Cast Iron Head	1/2" NPT
2A	Aluminum Head	1/2" NPT
2E	Aluminum Head, Epoxy Coated	1/2" NPT
3A	Aluminum Head with Water Proof Kit	1/2" NPT
3E	Aluminum Head, Epoxy Coated with Water Proof Kit	1/2" NPT
5A	Aluminum Head	1/2" NPT
5E	Aluminum Head, Epoxy Coated	1/2" NPT
9P	Polypropylene Head, White	1/2" NPT
14S	Stainless Steel Head	1/2" NPT
19A	Aluminum Head with LED Indicator	1/2" NPT
20P	Plastic Head with LED Indicator	1/2" NPT
N	No Connection Head	

Extension Type (See Illustrations - page 18)

		Standard ‘N’ Extension Length
1C	Galvanized Coupling Nipple	3 inches
2C	304 SS Coupling Nipple	3 inches
3C	316 SS Coupling Nipple	3 inches
1D	Galvanized Union Nipple	3 inches
2D	304 SS Union Nipple	3 inches
3D	316 SS Union Nipple	3 inches
N	No Extension	0 inches

‘L’ Uncompressed Sheath Length (See NOTE 2)

035	3.5 inch (minimum)
055	5.5 inch
085	8.5 inch
115	11.5 inch
175	17.5 inch
LLL	Specify ‘L’ Length in inches for ‘L’ ≤ 99.9”. For ‘L’ >99.9”, use LLLL (150”=1500)

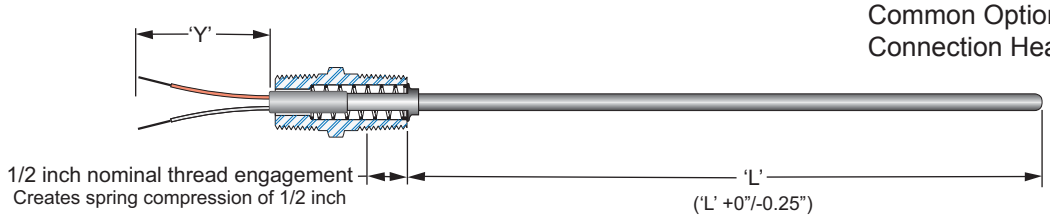
100						
Basic Order Codes						

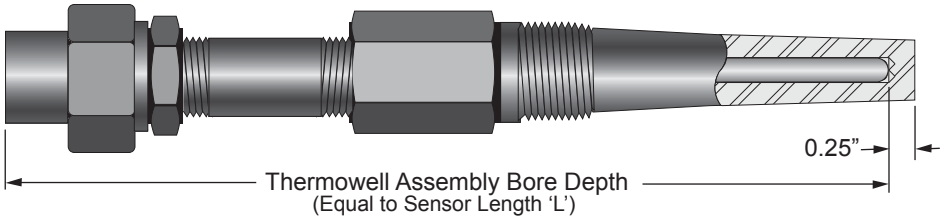
(Leave blank if not required)

Options | Transmitter

See pages 17–19

Example Configuration





FOR REFERENCE:
Thermocouple Specifications, page 4
Common Options, pages 17 – 19
Connection Head Descriptions, page 20

NOTE 1: See our Connection Head Supplement for all available connection heads and full details.
NOTE 2: For sensor sheath lengths ‘L’ greater than 200 inches, contact Burns Customer Service.

‘L’ Style Spring Loaded Hex Fitting Sensors with Thermowell

Ordering Information (1 of 2)

Sensor Style

L	Spring Loaded, Hex Fitting

Thermocouple Type

		Sheath Material
E	Chromel/Constantan (leadwire code = purple+, red-)	316 SS
J	Iron/Constantan (leadwire code = white+, red-)	316 SS
K	Chromel/Alumel (leadwire code = yellow+, red-)	Inconel® 600
N	Nicrosil/Nisil (leadwire code = orange+, red-)	Inconel® 600
T	Copper/Constantan (leadwire code = blue+, red-)	316 SS

Thermocouple Junction Configuration

D	Single, Ungrounded
E	Single, Grounded
F	Duplex, Ungrounded
G	Duplex, Grounded

Connection Head (See NOTE 1)

		Sensor/Head Connection
1C	Cast Iron Head	1/2" NPT
2A	Aluminum Head	1/2" NPT
2E	Aluminum Head, Epoxy Coated	1/2" NPT
3A	Aluminum Head with Water Proof Kit	1/2" NPT
3E	Aluminum Head, Epoxy Coated with Water Proof Kit	1/2" NPT
5A	Aluminum Head	1/2" NPT
5E	Aluminum Head, Epoxy Coated	1/2" NPT
9P	Polypropylene Head, White	1/2" NPT
14S	Stainless Steel Head	1/2" NPT
19A	Aluminum Head with LED Indicator	1/2" NPT
24S	Stainless Steel Head with Battery powered LCD Indicator	1/2" NPT
25A	Aluminum Head with Option for Remote Mount	3/4" NPT
N	No Connection Head	

Extension Type (See Illustrations - page 18)

		Standard ‘N’ Extension Length
1C	Galvanized Coupling Nipple	3 inches
2C	304 SS Coupling Nipple	3 inches
3C	316 SS Coupling Nipple	3 inches
1D	Galvanized Union Nipple	3 inches
2D	304 SS Union Nipple	3 inches
3D	316 SS Union Nipple	3 inches
N	No Extension	0 inches

‘U’ Immersion Length (See NOTE 2)

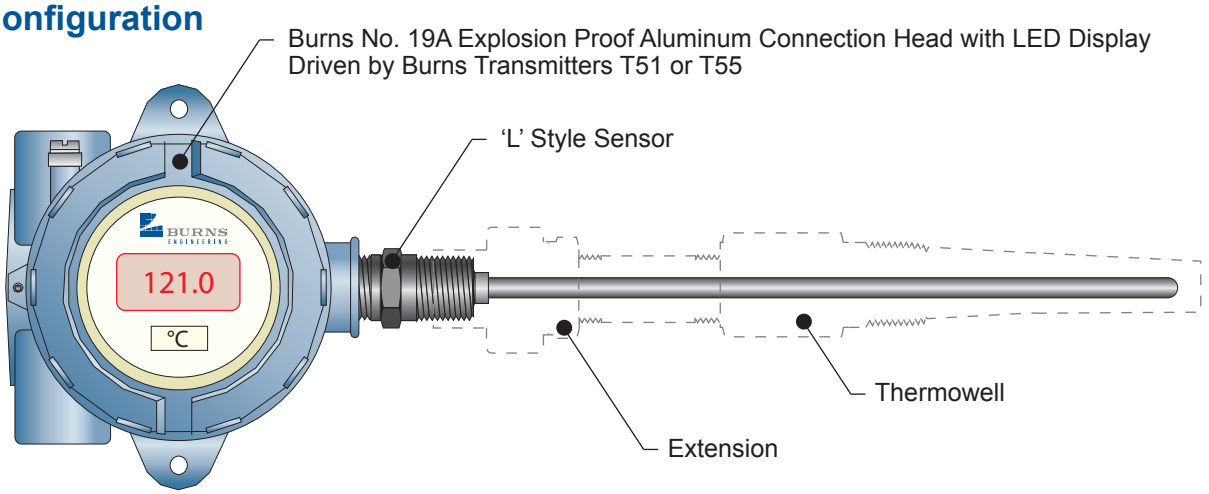
025	2.5 inch (minimum length)
040	4.0 inch
045	4.5 inch
070	7.0 inch
075	7.5 inch
100	10.0 inch
105	10.5 inch
135	13.5 inch
160	16.0 inch
UUU	Specify ‘U’ Immersion Length in inches.

100						

Basic Order Codes

Required basic order codes continued on next page

Example Configuration



NOTE 1: See our Connection Head Supplement for all available connection heads and full details.
NOTE 2: For Thermowells with Bore Depths (‘A’) greater that 42 inches contact Burns Customer Service. Long length wells can be constructed from welded bar stock segments or from pipe. Specifics of the application must be verified to ensure the thermowell design meets your process needs.

‘L’ Style Spring Loaded Hex Fitting Sensors with Thermowell

Ordering Information (2 of 2)

Thermowell Type (See NOTE 3)

	Threaded Thermowells
TT2	Tapered Threaded, 1/2” NPT process threads
TT3	Tapered Threaded, 3/4” NPT process threads
TT4	Tapered Threaded, 1” NPT process threads
RT2	Reduced Tip Threaded, 1/2” NPT process threads
RT3	Reduced Tip Threaded, 3/4” NPT process threads
RT4	Reduced Tip Threaded, 1” NPT process threads
ST2	Straight Threaded, 1/2” NPT process threads
ST3	Straight Threaded, 3/4” NPT process threads
ST4	Straight Threaded, 1” NPT process threads
	Socket Weld Thermowells
TW3	Tapered Welded, 3/4” pipe size
TW4	Tapered Welded, 1” pipe size
TW5	Tapered Welded, 1 1/4” pipe size
RW3	Reduced Tip Welded, 3/4” pipe size
RW4	Reduced Tip Welded, 1” pipe size
RW5	Reduced Tip Welded, 1 1/4” pipe size
SW3	Straight Welded, 3/4” pipe size
SW4	Straight Welded, 1” pipe size
SW5	Straight Welded, 1 1/4” pipe size
	Flanged Thermowells
TF4A	Tapered Flanged, 1.0” flange, 150 LB
TF6A	Tapered Flanged, 1.5” flange, 150 LB
TF8A	Tapered Flanged, 2.0” flange, 150 LB
TF4B	Tapered Flanged, 1.0” flange, 300 LB
TF6B	Tapered Flanged, 1.5” flange, 300 LB
TF8B	Tapered Flanged, 2.0” flange, 300 LB
RF4A	Reduced Tip Flanged, 1.0” flange, 150 LB
RF6A	Reduced Tip Flanged, 1.5” flange, 150 LB
RF8A	Reduced Tip Flanged, 2.0” flange, 150 LB
RF4B	Reduced Tip Flanged, 1.0” flange, 300 LB
RF6B	Reduced Tip Flanged, 1.5” flange, 300 LB
RF8B	Reduced Tip Flanged, 2.0” flange, 300 LB
SF4A	Straight Flanged, 1.0” flange, 150 LB
SF6A	Straight Flanged, 1.5” flange, 150 LB
SF8A	Straight Flanged, 2.0” flange, 150 LB
SF4B	Straight Flanged, 1.0” flange, 300 LB
SF6B	Straight Flanged, 1.5” flange, 300 LB
SF8B	Straight Flanged, 2.0” flange, 300 LB
	Sanitary Thermowells (1/2” NPT, 16 AMP Cap)
TS15	Tapered Sanitary, 1 1/2” Sanitary Cap
TS20	Tapered Sanitary, 2” Sanitary Cap
TS25	Tapered Sanitary, 2 1/2” Sanitary Cap
RS15	Reduced Tip Sanitary, 1 1/2” Sanitary Cap
RS20	Reduced Tip Sanitary, 2” Sanitary Cap
RS25	Reduced Tip Sanitary, 2 1/2” Sanitary Cap
SS15	Straight Sanitary, 1 1/2” Sanitary Cap
SS20	Straight Sanitary, 2” Sanitary Cap
SS25	Straight Sanitary, 2 1/2” Sanitary Cap

Thermowell Material

02	304 Stainless Steel
03	316 Stainless Steel
04	Carbon Steel
05	304L Stainless Steel
06	316L Stainless Steel
07	Hastelloy® C276
08	Chrome-Moly
09	Aluminum 6061 T6
10	Monel™
11	PTFE
12	Inconel® 600
13	Brass
14	Titanium

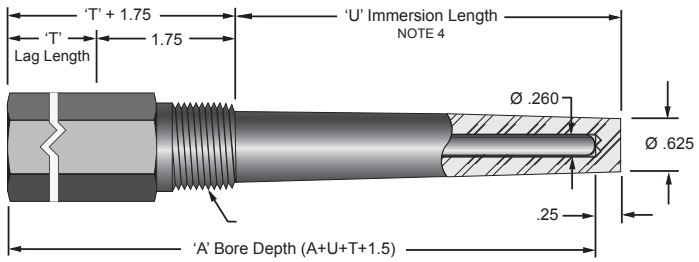
Basic Order Codes

(Leave Options blank if not required)

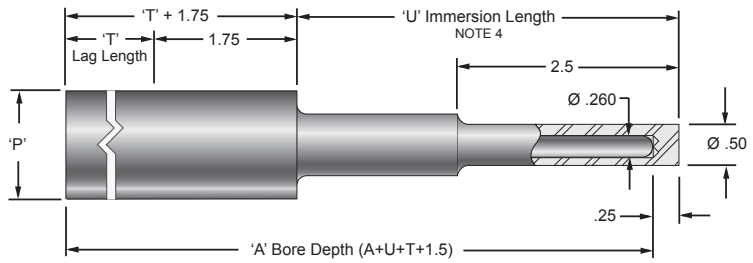
Explosion Proof (NOTE 5) | Options | Transmitter

See pages 17–19

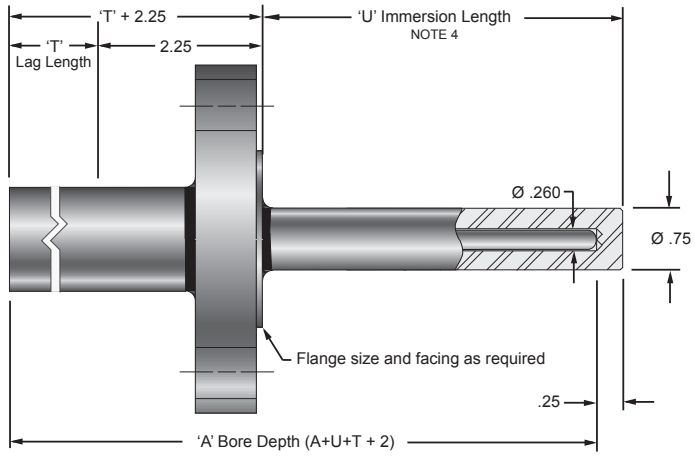
(TT) Threaded Thermowell shown with Tapered Stem



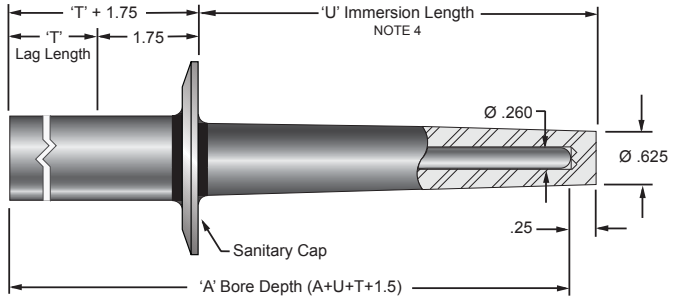
(RW) Socket Weld Thermowell shown with Reduced Tip Stem



(SF) Flanged Thermowell shown with Straight Stem



(TS) Sanitary Thermowell shown with Tapered Stem

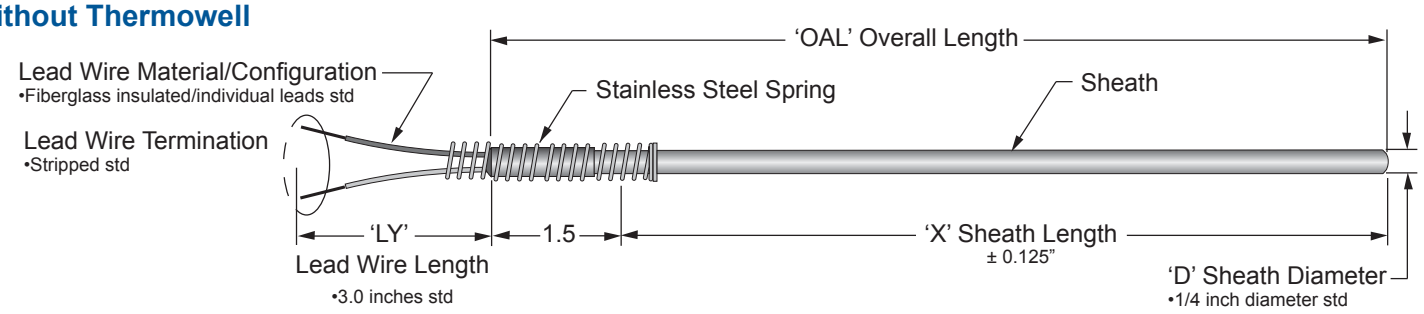


NOTE 3: See our Thermowell catalog or visit us on-line at burnsengineering.com for a full line of standard thermowell styles along with information on custom thermowells.
NOTE 4: For Thermowells with Bore Depths (‘A’) greater that 42 inches contact Burns Customer Service. Long length wells can be constructed from welded bar stock segments or from pipe. Specifics of the application must be verified to ensure the thermowell design meets your process needs.
NOTE 5: For FM explosion proof approved assembly, enter ‘/AFM’ code. See page 3 for ratings and drawing # 18938 for approved product structure details.

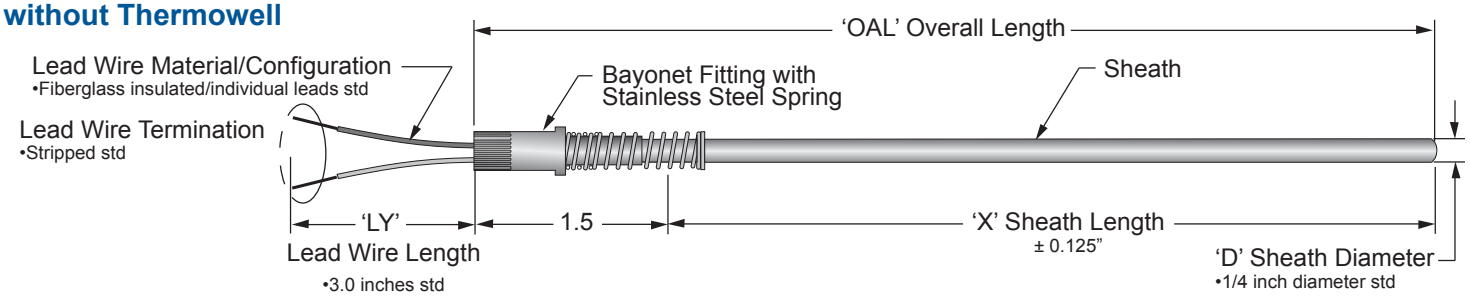
‘C’ and ‘K’ Style Spring Loaded Sensors

Specifications

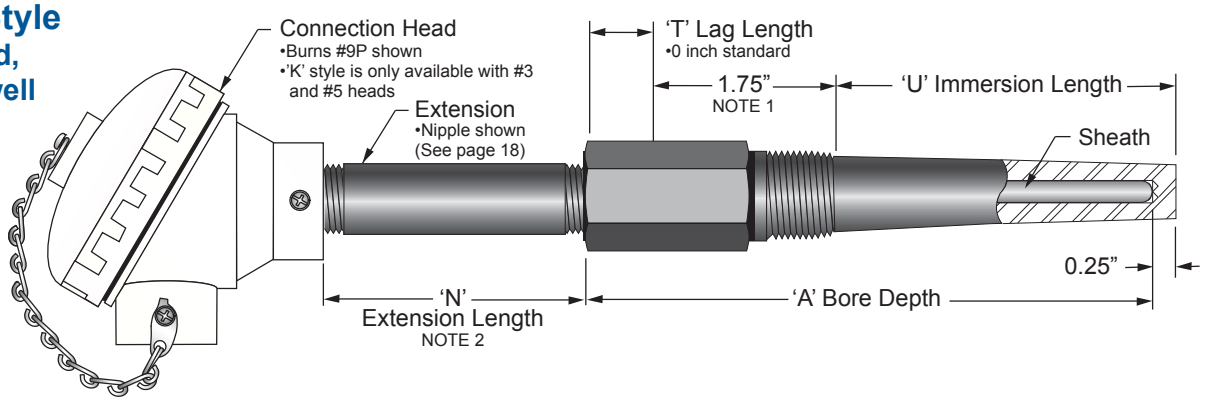
‘C’ Style
Spring Loaded, without Thermowell



‘K’ Style
Spring Loaded, without Thermowell



‘C’ and ‘K’ Style
Spring Loaded, with Thermowell



NOTE: All Dimensions in inches.

‘C’ Style Application
Assembly allows easy removal of the sensor through the connection head. No wrenches required.

‘K’ Style Application
Similar to the ‘C’ Style but with the addition of a 1/4 turn twist lock fitting for even easier removal of the sensor. Add longer leads and it makes calibration checks possible with no tools required. Works with #3 and #5 connection heads only.

NOTE 1: 1.75 inch length is used on threaded and socket weld thermowells; a 2.25 inch length is used with flanged wells
NOTE 2: When a ‘C’ style assembly is ordered with a transmitter the actual ‘N’, nominal extension length, will be 1/2” long than specified.

Spring Loaded Sensors without Thermowell

Ordering Information

Sensor Style

C	Spring Loaded Sensor for Thermowell Applications
K	Spring Loaded Sensor with Bayonet Fitting for Thermowell Applications, mates with #3 or #5 head only

Thermocouple Type

		Sheath Material
E	Chromel/Constantan (leadwire code = purple+, red-)	316 SS
J	Iron/Constantan (leadwire code = white+, red-)	316 SS
K	Chromel/Alumel (leadwire code = yellow+, red-)	Inconel® 600
N	Nicrosil/Nisil (leadwire code = orange+, red-)	Inconel® 600
T	Copper/Constantan (leadwire code = blue+, red-)	316 SS

Thermocouple Junction Configuration

D	Single, Ungrounded
E	Single, Grounded
F	Duplex, Ungrounded
G	Duplex, Grounded

Connection Head (See NOTE 1)

		Sensor/Head Connection
1C	Cast Iron Head, 'C' style only	1/2" NPT
2A	Aluminum Head, 'C' style only	1/2" NPT
2E	Aluminum Head, Epoxy Coated, 'C' style only	1/2" NPT
3A	Aluminum Head with Water Proof Kit, 'K' style only	1/2" NPT
3E	Aluminum Head, Epoxy Coated with Water Proof Kit, 'K' style only	1/2" NPT
5A	Aluminum Head, 'K' style only	1/2" NPT
5E	Aluminum Head, Epoxy Coated, 'K' style only	1/2" NPT
9P	Polypropylene Head, White, 'C' style only	1/2" NPT
14S	Stainless Steel Head, 'C' style only	1/2" NPT
N	No Connection Head	

Extension Type (See Illustrations - page 18)

		Standard 'N' Extension Length
1A	Galvanized Nipple	3 inches
2A	304 SS Nipple	3 inches
3A	316 SS Nipple	3 inches
1B	Galvanized Nipple Union Nipple	3 inches
2B	304 SS Nipple Union Nipple	3 inches
3B	316 SS Nipple Union Nipple	3 inches
N	No Extension	0 inches

'X' Sheath Length (See NOTE 2)

035	3.5 inch (minimum length)
060	6.0 inch
090	9.0 inch
120	12.0 inch
150	15.0 inch
180	18.0 inch
XXX	Specify 'X' Length in inches for X ≤ 99.9". XXXX for > 99.9" (150"=1500)

100						
Basic Order Codes						

(Leave blank if not required)

Options	Transmitter

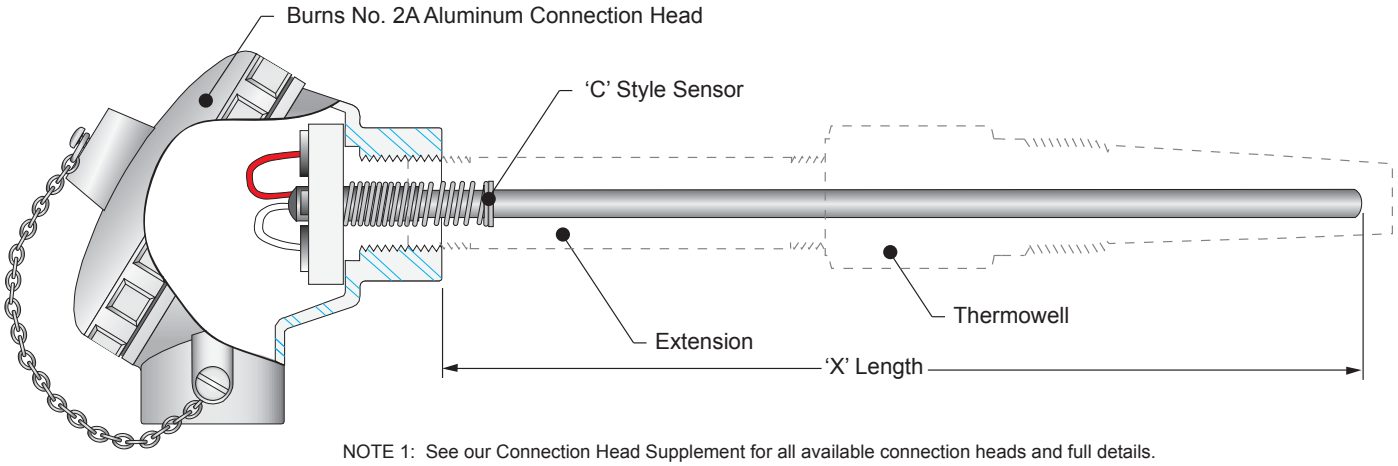
See pages 17–19

FOR REFERENCE:
Thermocouple Specifications, page 4
Common Options, pages 17 – 19
Connection Head Descriptions, page 20

Length Code Definitions and Equations for 'C' and 'K' Style Assemblies

Length Codes	For Threaded & Socket Wells	For Flanged Wells
'X' Sheath Length 'U' Immersion Length 'OAL' Overall Length 'N' Extension Length 'A' Well Bore Depth 'T' Well Lag Length	X = OAL - 1.5 X = N + A X = N + U + T + 1.5 A = U + T + 1.5	X + OAL - 1.5 X + N + A X + N + U + T + 2 A = U + T + 2

Example Configuration



NOTE 1: See our Connection Head Supplement for all available connection heads and full details.
NOTE 2: For sensor sheath lengths 'X' greater than 200 inches contact Burns Customer Service.

‘C’ and ‘K’ Style Spring Loaded Sensors with Thermowell

Ordering Information (1 of 2)

Sensor Style

C	Spring Loaded Sensor for Thermowell Applications
K	Spring Loaded Sensor with Bayonet Fitting for Thermowell Applications, mates with #3 and #5 heads only

Thermocouple Type

		Sheath Material
E	Chromel/Constantan (leadwire code = purple+, red-)	316 SS
J	Iron/Constantan (leadwire code = white+, red-)	316 SS
K	Chromel/Alumel (leadwire code = yellow+, red-)	Inconel® 600
N	Nicrosil/Nisil (leadwire code = orange+, red-)	Inconel® 600
T	Copper/Constantan (leadwire code = blue+, red-)	316 SS

Thermocouple Junction Configuration

D	Single, Ungrounded
E	Single, Grounded
F	Duplex, Ungrounded
G	Duplex, Grounded

Connection Head (See NOTE 1)

		Sensor/Head Connection
1C	Cast Iron Head, ‘C’ style only	1/2" NPT
2A	Aluminum Head, ‘C’ style only	1/2" NPT
2E	Aluminum Head, Epoxy Coated, ‘C’ style only	1/2" NPT
3A	Aluminum Head with Water Proof Kit, ‘K’ style only	1/2" NPT
3E	Aluminum Head, Epoxy Coated with Water Proof Kit, ‘K’ style only	1/2" NPT
5A	Aluminum Head, ‘K’ style only	1/2" NPT
5E	Aluminum Head, Epoxy Coated, ‘K’ style only	1/2" NPT
9P	Polypropylene Head, White, ‘C’ style only	1/2" NPT
14S	Stainless Steel Head, ‘C’ style only	1/2" NPT
N	No Connection Head	

Extension Type (See Illustrations - page 18)

		Standard ‘N’ Extension Length
1A	Galvanized Nipple	3 inches
2A	304 SS Nipple	3 inches
3A	316 SS Nipple	3 inches
1B	Galvanized Nipple Union Nipple	3 inches
2B	304 SS Nipple Union Nipple	3 inches
3B	316 SS Nipple Union Nipple	3 inches
N	No Extension	0 inches

‘U’ Immersion Length (See NOTE 2)

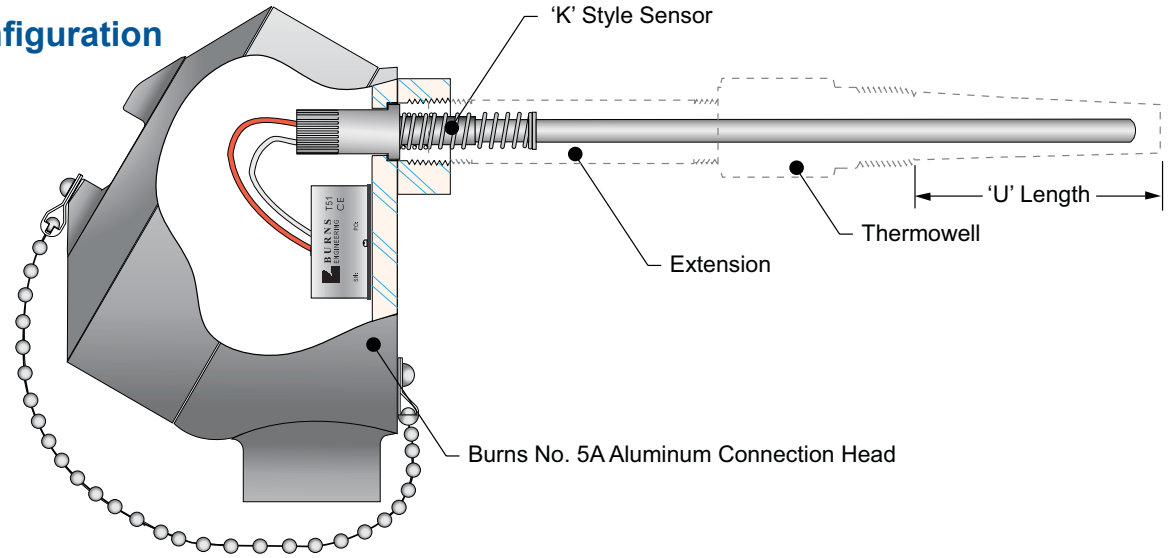
025	2.5 inch (minimum)
040	4.0 inch
045	4.5 inch
070	7.0 inch
075	7.5 inch
100	10.0 inch
105	10.5 inch
135	13.5 inch
160	16.0 inch
UUU	Specify “U” Immersion Length in inches.

100						

Basic Order Codes

Required basic order codes continued on next page

Example Configuration



NOTE 1: See our Connection Head Supplement for all available connection heads and full details.
NOTE 2: For Thermowells with Bore Depths (‘A’) greater that 42 inches contact Burns Customer Service. Long length wells can be constructed from welded bar stock segments or from pipe. Specifics of the application must be verified to ensure the thermowell design meets your process needs.

‘C’ and ‘K’ Style Spring Loaded Sensors with Thermowell

Ordering Information (2 of 2)

Thermowell Type (See NOTE 3)

	Threaded Thermowells
TT2	Tapered Threaded, 1/2” NPT process threads
TT3	Tapered Threaded, 3/4” NPT process threads
TT4	Tapered Threaded, 1” NPT process threads
RT2	Reduced Tip Threaded, 1/2” NPT process threads
RT3	Reduced Tip Threaded, 3/4” NPT process threads
RT4	Reduced Tip Threaded, 1” NPT process threads
ST2	Straight Threaded, 1/2” NPT process threads
ST3	Straight Threaded, 3/4” NPT process threads
ST4	Straight Threaded, 1” NPT process threads
	Socket Weld Thermowells
TW3	Tapered Welded, 3/4” pipe size
TW4	Tapered Welded, 1” pipe size
TW5	Tapered Welded, 1 1/4” pipe size
RW3	Reduced Tip Welded, 3/4” pipe size
RW4	Reduced Tip Welded, 1” pipe size
RW5	Reduced Tip Welded, 1 1/4” pipe size
SW3	Straight Welded, 3/4” pipe size
SW4	Straight Welded, 1” pipe size
SW5	Straight Welded, 1 1/4” pipe size
	Flanged Thermowells
TF4A	Tapered Flanged, 1.0” flange, 150 LB
TF6A	Tapered Flanged, 1.5” flange, 150 LB
TF8A	Tapered Flanged, 2.0” flange, 150 LB
TF4B	Tapered Flanged, 1.0” flange, 300 LB
TF6B	Tapered Flanged, 1.5” flange, 300 LB
TF8B	Tapered Flanged, 2.0” flange, 300 LB
RF4A	Reduced Tip Flanged, 1.0” flange, 150 LB
RF6A	Reduced Tip Flanged, 1.5” flange, 150 LB
RF8A	Reduced Tip Flanged, 2.0” flange, 150 LB
RF4B	Reduced Tip Flanged, 1.0” flange, 300 LB
RF6B	Reduced Tip Flanged, 1.5” flange, 300 LB
RF8B	Reduced Tip Flanged, 2.0” flange, 300 LB
SF4A	Straight Flanged, 1.0” flange, 150 LB
SF6A	Straight Flanged, 1.5” flange, 150 LB
SF8A	Straight Flanged, 2.0” flange, 150 LB
SF4B	Straight Flanged, 1.0” flange, 300 LB
SF6B	Straight Flanged, 1.5” flange, 300 LB
SF8B	Straight Flanged, 2.0” flange, 300 LB
	Sanitary Thermowells (1/2” NPT, 16 AMP Cap)
TS15	Tapered Sanitary, 1 1/2” Sanitary Cap
TS20	Tapered Sanitary, 2” Sanitary Cap
TS25	Tapered Sanitary, 2 1/2” Sanitary Cap
RS15	Reduced Tip Sanitary, 1 1/2” Sanitary Cap
RS20	Reduced Tip Sanitary, 2” Sanitary Cap
RS25	Reduced Tip Sanitary, 2 1/2” Sanitary Cap
SS15	Straight Sanitary, 1 1/2” Sanitary Cap
SS20	Straight Sanitary, 2” Sanitary Cap
SS25	Straight Sanitary, 2 1/2” Sanitary Cap

Thermowell Material

02	304 Stainless Steel
03	316 Stainless Steel
04	Carbon Steel
05	304L Stainless Steel
06	316L Stainless Steel
07	Hastelloy® C276
08	Chrome-Moly
09	Aluminum 6061 T6
10	Monel™
11	PTFE
12	Inconel® 600
13	Brass
14	Titanium

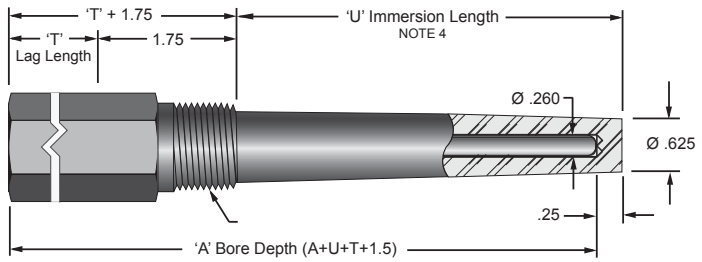
Basic Order Codes

(Leave Options blank if not required)

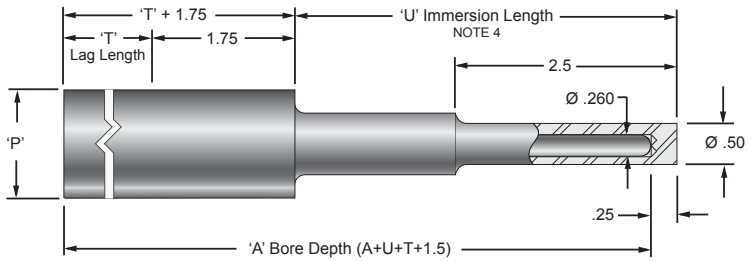
Explosion Proof (NOTE 5) | Options | Transmitter

See pages 17–19

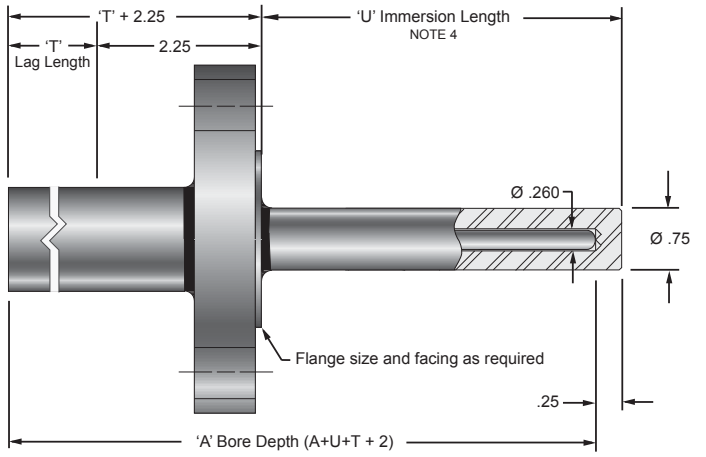
(TT) Threaded Thermowell shown with Tapered Stem



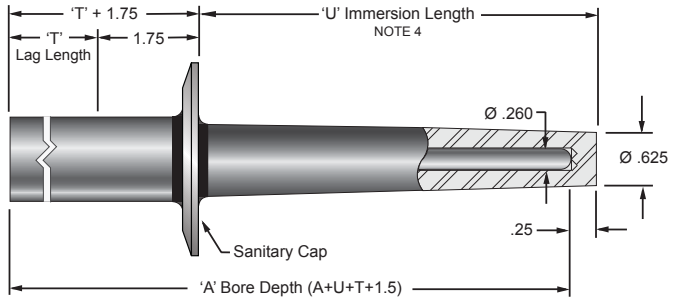
(RW) Socket Weld Thermowell shown with Reduced Tip Stem



(SF) Flanged Thermowell shown with Straight Stem



(TS) Sanitary Thermowell shown with Tapered Stem

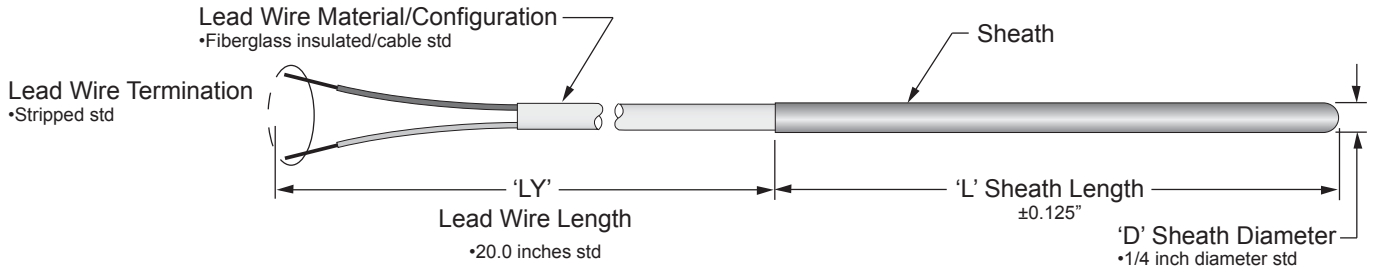


NOTE 3: See our Thermowell catalog or visit us on-line at burnsengineering.com for a full line of standard thermowell styles along with information on custom thermowells.
NOTE 4: For Thermowells with Bore Depths (‘A’) greater that 42 inches contact Burns Customer Service. Long length wells can be constructed from welded bar stock segments or from pipe. Specifics of the application must be verified to ensure the thermowell design meets your process needs.
NOTE 5: For FM explosion proof approved assembly, enter ‘/AFM’ code. See page 3 for ratings and drawing # 18938 for approved product structure details.

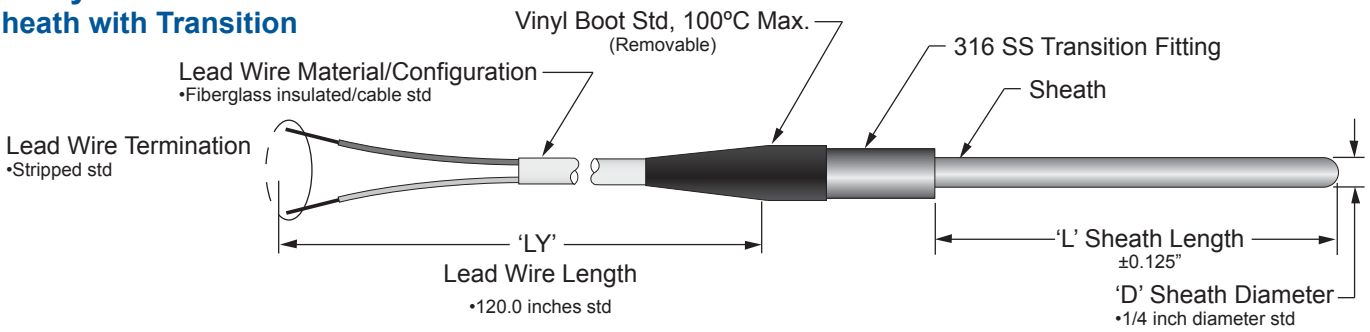
‘D’, ‘G’, and ‘P’ Style Capsule Sensors

Specifications

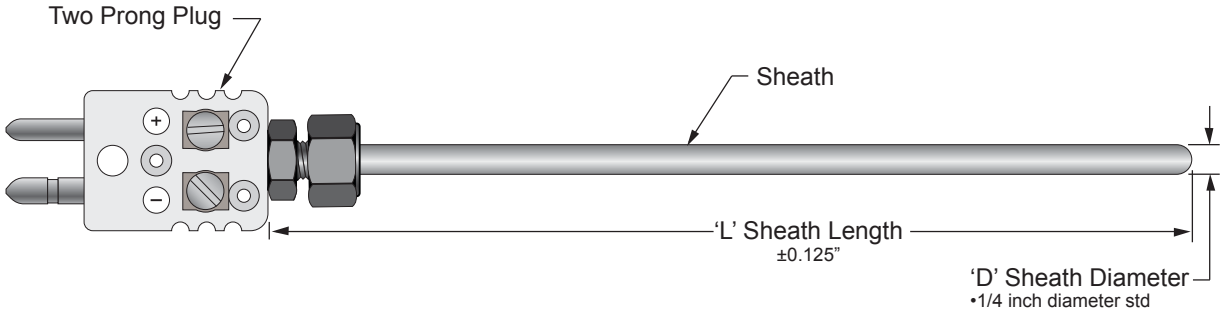
‘D’ Style
Plain Sheath



‘G’ Style
Sheath with Transition



‘P’ Style
Plug Style



‘D’ Style Application
Straight sheath allows pass through in tight locations.

‘G’ Style Application
Addition of the transition fitting improves moisture resistance. Recommended where humidity is high.

‘P’ Style Application
Standard or mini two pin thermocouple plug allows use with multiple readouts and portable equipment.

‘D’, ‘G’, and ‘P’ Style Capsule Sensors

Ordering Information

Sensor Style

D	Plain Sheath with One Diameter for Entire Sheath Length
G	Capsule Style with Transition Fitting
P	Plug Style

Thermocouple Type

		Sheath Material
E	Chromel/Constantan (leadwire code = purple+, red-)	316 SS
J	Iron/Constantan (leadwire code = white+, red-)	316 SS
K	Chromel/Alumel (leadwire code = yellow+, red-)	Inconel® 600
N	Nicrosil/Nisil (leadwire code = orange+, red-)	Inconel® 600
T	Copper/Constantan (leadwire code = blue+, red-)	316 SS

Thermocouple Junction Configuration

D	Single, Ungrounded
E	Single, Grounded
F	Duplex, Ungrounded
G	Duplex, Grounded

‘L’ Sheath Length (See NOTE 1)

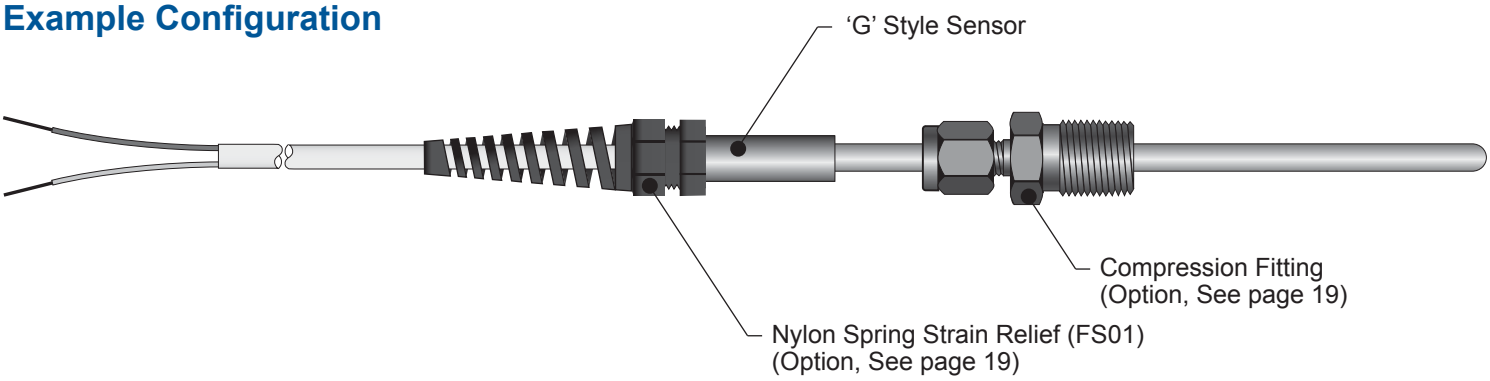
035	3.5 inch (minimum length)
055	5.5 inch
085	8.5 inch
115	11.5 inch
175	17.5 inch
LLL	Specify ‘L’ Length in inches for ‘L’ ≤ 99.9”. LLLL for ‘L’ > 99.9” (150”=1500)

100					
Basic Order Codes				(Leave blank if not required) Options	Transmitter

See pages 17–19

FOR REFERENCE:
Thermocouple Specifications, page 4
Common Options, pages 17 – 19

Example Configuration

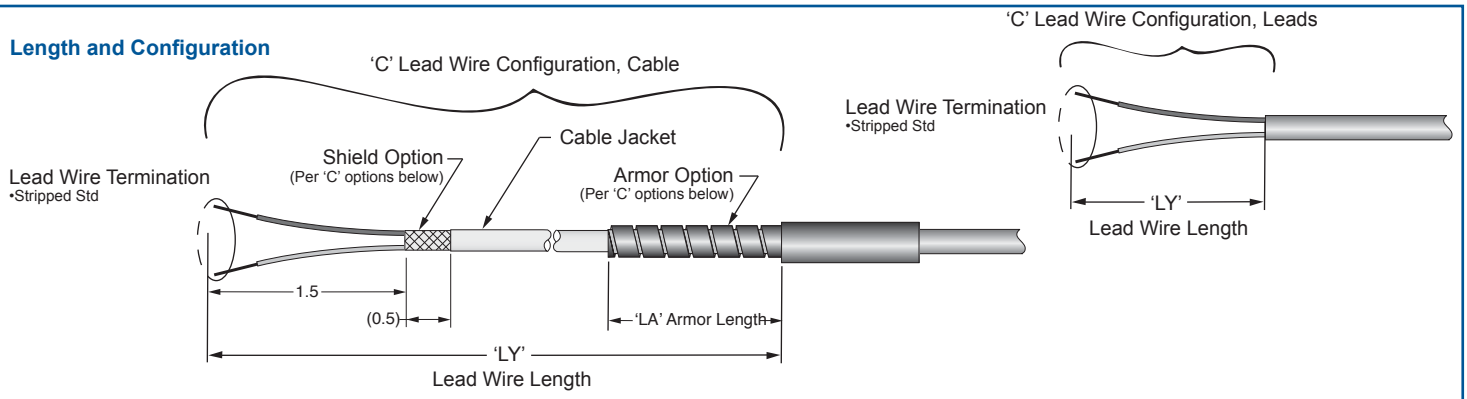


NOTE 1: For sensor sheath lengths ‘L’ greater than 200 inches contact Burns Customer Service.

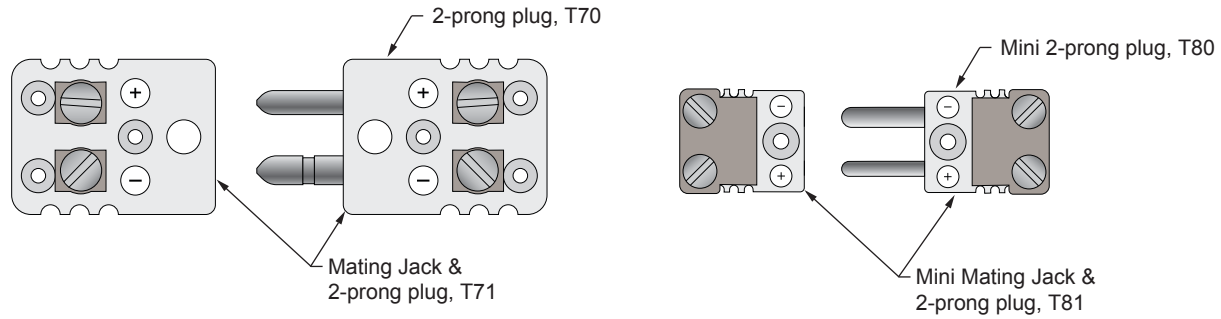
Common Option Codes

Leadwire Options

Length and Configuration



Termination



L Lead Wire Options (Note: Only fill in the codes applicable to your specifications)

Lead Wire Length ('Y' option)

Y _ _ _	Specify lead wire length in one inch increments Example: For a 6 inches 'Y' length specify 006, For a 15 foot 'Y' length specify 180 Cable Designs: Minimum 12.0 inches (Y012), Maximum 999.0 inches (Y999) Leadwire Designs: Minimum 3.0 inches (Y003), Maximum 36.0 inches (Y036)

Lead Wire Insulation Material ('M' option)

M01	PTFE, PFA or FEP insulation depending on configuration. (Contact Customer Service if questions)
M03	Kapton® insulation with epoxy seal. (Leads rated to 250°C, seal rated to 200ºC) (Kapton® insulated conductors and Kapton® jacket)
M98	Fiberglass insulation with ceramic seal. (Lead wires and seal rated to 450°C) (Fiberglass insulated conductors and fiberglass jacket)

Lead Wire Configuration ('C' option)

C01	Individual insulated leads, standard for A, B, L, C and K style sensors
C10	Cable, standard for D and G style sensors
C24	Shielded cable (aluminized polyester foil shield with drain wire)
C30	Cable with stainless steel overbraid
C40	Cable with stainless steel armor, specify armor length below
C41	Shielded cable with stainless steel armor, specify armor length below
C54	Shielded cable with stainless steel overbraid

Armor Length ('A' option)

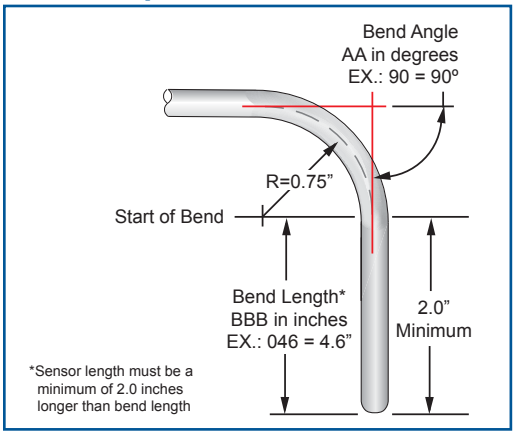
A _ _ _	Specify armor length in one inch increments 'A' Armor Length must be at least 6 inches less than lead wire length example: For a 15 foot 'A' Armor Length specify 180

Lead Wire Termination ('T' option)

T70	Two prong plug
T71	Two prong plug with mating jack
T80	Miniature two prong plug
T81	Miniature two prong plug with mating jack

Common Option Codes

Sheath Options



S Sheath Options (Note: Only fill in the codes applicable to your specifications)

Sheath Diameter ('D' option)

D01	1/8 inch diameter
D02	3/16 inch diameter

Sheath Coating ('C' option)

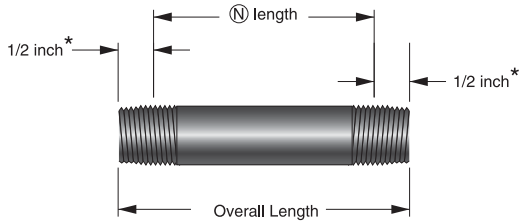
C02	Teflon Coating

Sheath Bending ('B' option)

B _ _ _ _ _	Specify bend angle (AA) and location (BBB)
	Bending angles should be specified to the nearest degree.
	Bend locations should be specified in 0.1 inch increments and are defined as the distance from the tip of the sensor.
	Minimum Bend Length = 2.0 inches
	Example: for a 45º bend, starting 4.0 inches from the tip of the sensor, specify B45040

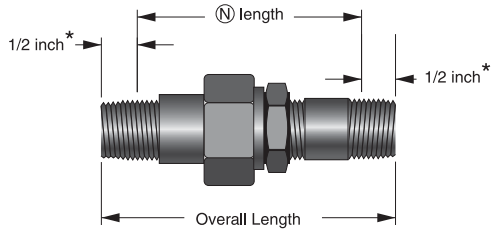
Extension Options (*1/2” is normal thread engagement for 1/2” NPT fittings)

Style “A”, Nipple Extension



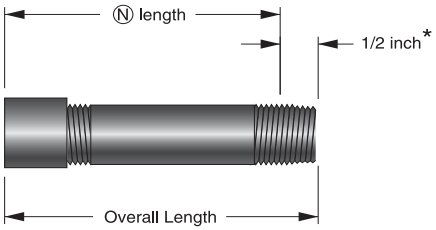
Use with C, K, L style assemblies.

Style “B”, Nipple-Union-Nipple Extension



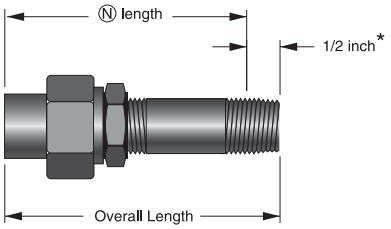
Use with C or K style assemblies.

Style “C”, Coupling-Nipple Extension



Use with L style assemblies.

Style “D”, Union-Nipple Extension



Use with L style assemblies.

E Extension Options

Extension Length ('N' option)

N _ _	Specify extension length in 0.5 inch increments Minimum Length is 1.0 inch (N10), Maximum Length is 9.5 inches (N95) Example: N60 = ‘N’ length of 6.0 inches

Thermowell Options

W Thermowell Options (Note: Only fill in the codes applicable to your specifications)

Lag Extension ('T' option)

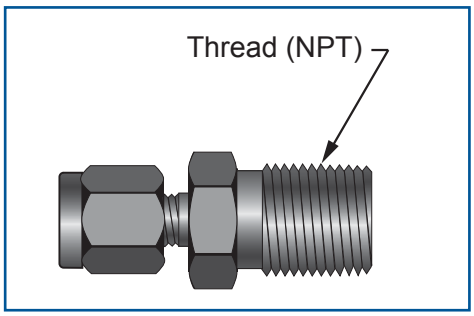
T30	3.0 inches
T _ _	Specify lag length in 0.1 inch increments Minimum Length is 0.5 inch (T05), Maximum Length is 9.9 inches (T99) Example: T45 = ‘T’ length of 4.5 inches

Testing and Documentation Options ('E' option)

E01	Hydrostatic internal pressure testing per ASTM specifications
E02	Dye penetrant testing per ASTM specifications
E03	X-ray examination per ASTM specifications
E04	Material certification of thermowell, not available with brass
E05	Murdock stength calculations
E06	Surface Finish certification of thermowell
E07	Canadian Registration Number (CNR) provided with thermowell
E15	Hydrostatic external pressure testing
E16	Positive material identification (PMI)
E17	Inspection Certificate (ISO 10474, EN 10204, DIN 50049)

Common Option Codes

Compression Fitting Options



FC Fitting Options, Compression ('C' option)

Fitting Material

03	316 Stainless Steel
13	Brass

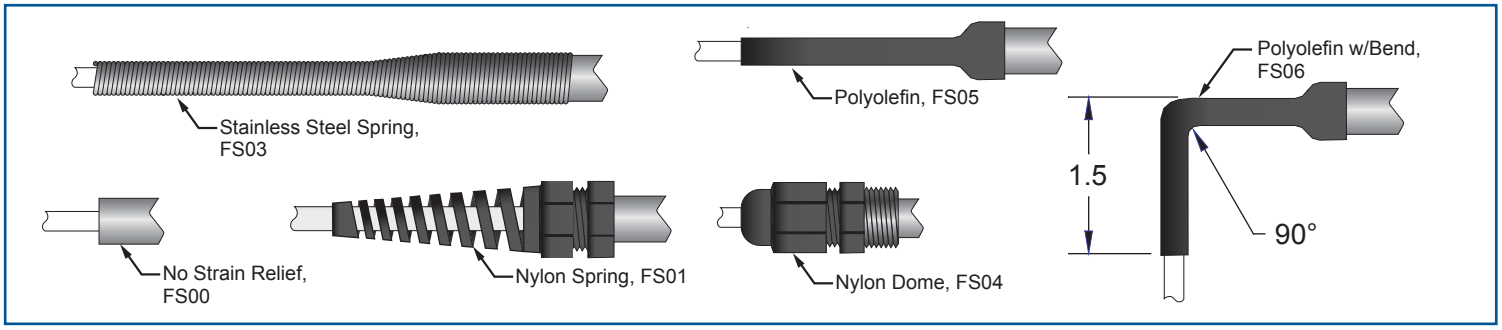
Ferrule Type

1	PTFE, re-adjustable
2	Stainless Steel

Threads

1	1/8" NPT
3	1/4" NPT
4	3/8" NPT
5	1/2" NPT

Strain Relief Options



F Fitting Options

Strain Relief Options ('S' option) available only with 'G' Style sensor

S01	Nylon Spring, Maximum temperature 100°C
S03	Stainless Steel Spring
S04	Nylon Dome, Maximum temperature 100°C
S05	Polyolefin, Adhesive lined, Maximum temperature 100°C
S06	Polyolefin, Adhesive lined with 90 degree bend, Maximum temperature 100°C

Tagging Options

M Miscellaneous Options

Sensor Tagging Options ('T' Options)

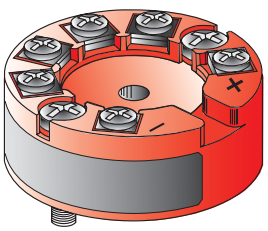
T01	Paper Tag with Tag Number (sensor assembly)
T02	Stainless Steel Tag with Tag Number (sensor assembly)
T26	Tag Number Electro-etched on Sensor Sheath

Transmitters

We offer a full range of transmitters to meet your requirements. Our transmitters provide fast response and accurate measurements over the entire temperature range. They are designed for monitoring and control applications. For more information on our complete transmitter offering see our transmitter catalog or contact our factory.

Model T51 & T55

PC Programmable
Custom Input/Linearization
FM, CSA, CE Approval
0.05% Accuracy



T51 Transmitter
T55 Transmitter, HART Communication

Temperature Range

{Tmin to Tmax}	Tmin = Temperature for 4mA output Tmax = Temperature for 20mA output

Temperature Units

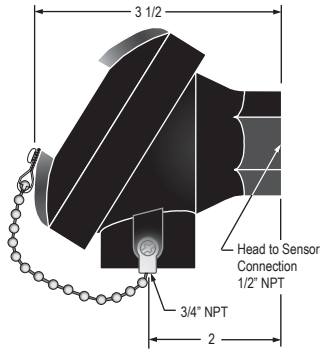
C	Degrees Celsius
F	Degrees Fahrenheit

Connection Head Descriptions

Standard Enclosures

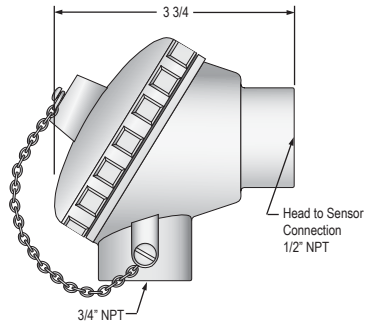
Burns Engineering offers a variety of connection heads to complement the sensor (RTD or Thermocouple) and its operational environment. Choose from the following materials, sizes and ratings. See Burns Connection Head Supplement for all available heads and additional details.

Cast iron weather proof connection head NEMA type 4 enclosure. For use with single or dual element sensors and DIN B sized transmitters.



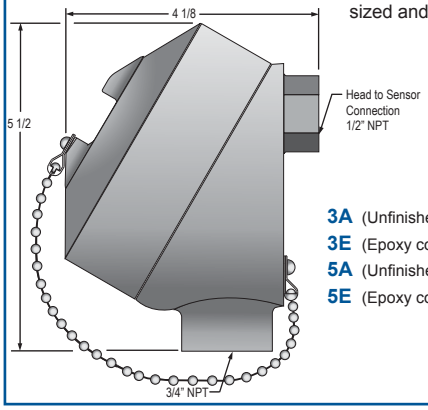
1C (Cast iron, black baked enamel)

Cast aluminum weather proof connection head NEMA type 4X enclosure. For use with single or dual element sensors and DIN B sized transmitters.



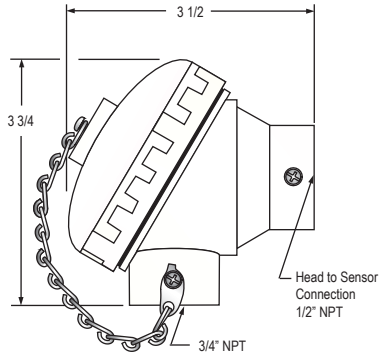
2A (Aluminum, polyester metalic finish)
2E (Epoxy coated)

Explosion proof cast aluminum connection head FM rated as explosion proof Class I, Div 1, Group A, B, C, D: Class II, Div 1, Group E, F, G: Class III, Div 1, NEMA 4X. For use with single and dual element sensors, DIN B sized and model TL transmitters.



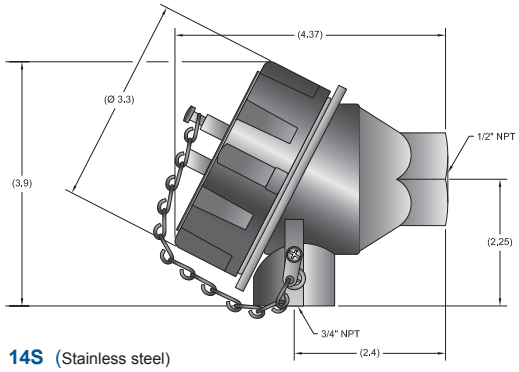
3A (Unfinished w/waterproof kit)
3E (Epoxy coated, w/waterproof kit)
5A (Unfinished)
5E (Epoxy coated)

Polypropylene weather proof NEMA type 4X connection head. For use with single or dual sensor and DIN B sized transmitters.



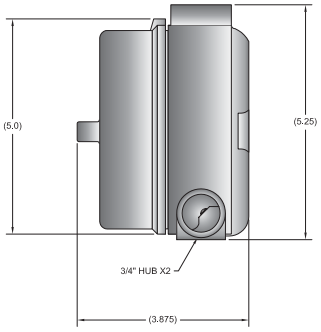
9P (Polypropylene, white)

Explosion proof 316 stainless steel connection head. FM rated as explosion proof Class I, Div. 1, group A, B, C, D: Class II, Div. 1, Group E, F, G: Class III, Div. 1, NEMA 4A. For use with single and dual sensors and DIN B sized transmitters.



14S (Stainless steel)

Remote mountable, explosion proof aluminum head. FM rated: Class I, Div 1, Group B, C, D: Class II, Div 1, Group E, F, G: Class III, Div1. For use with single or dual sensors and DIN B sized transmitters.

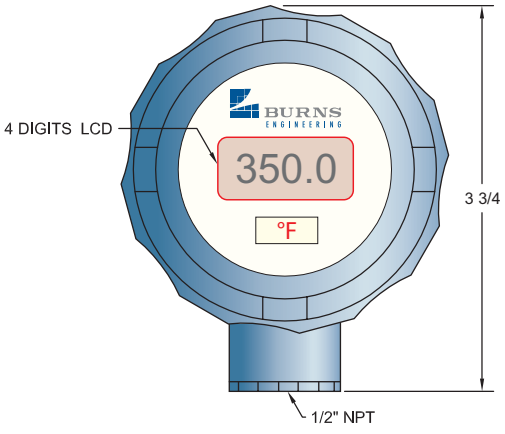


25A (Remote mount)

Enclosures with Indicators

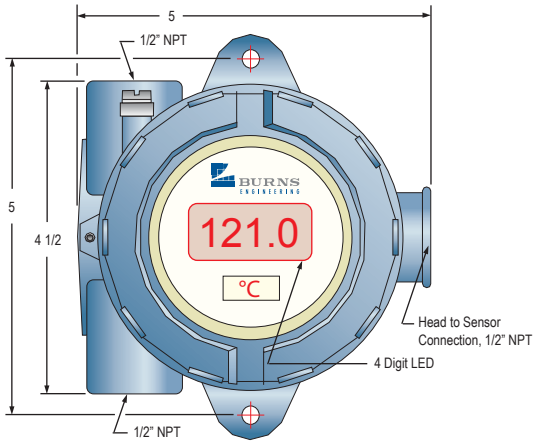
Burns offers loop powered (LED) and battery powered (LCD) indicators, available in three enclosure options. See the Burns Connection Head Supplement for all available Heads and Indicators.

The 24S, LCD indicator is a stainless steel head with battery powered indictor. NEMA 4X, IP67 rated.



24S (4 Digit LCD, battery powered)

The 19A LED indicator in an aluminum head can be driven by the Burns T51 or T55 transmitter housed in the same head. Hazardous location approved. See the Connection Head Supplement for rating.



19A (4 Digit LED, loop power)

Millivolts vs Temperature

Thermocouple Reference Table

mV vs T °C

Temp C	mV in degrees C				
	E	J	K	N	T
-50	-2.787	-2.431	-1.889	-1.269	-1.819
-45	-2.523	-2.197	-1.709	-1.146	-1.648
-40	-2.255	-1.961	-1.527	-1.023	-1.475
-35	-1.984	-1.722	-1.343	-0.898	-1.299
-30	-1.709	-1.482	-1.156	-0.772	-1.121
-25	-1.432	-1.239	-0.968	-0.646	-0.94
-20	-1.152	-0.995	-0.778	-0.518	-0.757
-15	-0.868	-0.749	-0.586	-0.390	-0.571
-10	-0.582	-0.501	-0.392	-0.260	-0.383
-5	-0.292	-0.251	-0.197	-0.131	-0.193
0	0	0	0	0.000	0
5	0.294	0.253	0.198	0.130	0.195
10	0.591	0.507	0.397	0.261	0.391
15	0.89	0.762	0.597	0.393	0.589
20	1.192	1.019	0.798	0.525	0.79
25	1.495	1.277	1	0.659	0.992
30	1.801	1.537	1.203	0.793	1.196
35	2.109	1.797	1.407	0.928	1.403
40	2.42	2.059	1.612	1.065	1.612
45	2.733	2.322	1.817	1.202	1.823
50	3.048	2.585	2.023	1.340	2.036
55	3.365	2.85	2.23	1.479	2.251
60	3.685	3.116	2.436	1.619	2.468
65	4.006	3.382	2.644	1.760	2.687
70	4.33	3.65	2.851	1.902	2.909
75	4.656	3.918	3.059	2.045	3.132
80	4.985	4.187	3.267	2.189	3.358
85	5.315	4.456	3.474	2.334	3.585
90	5.648	4.726	3.682	2.480	3.814
95	5.982	4.997	3.889	2.626	4.046
100	6.319	5.269	4.096	2.774	4.279
105	6.658	5.541	4.303	2.923	4.513
110	6.998	5.814	4.509	3.072	4.75
115	7.341	6.087	4.715	3.223	4.988
120	7.685	6.36	4.92	3.374	5.228
125	8.031	6.634	5.124	3.527	5.47
130	8.379	6.909	5.328	3.680	5.714
135	8.729	7.184	5.532	3.834	5.959
140	9.081	7.459	5.735	3.989	6.206
145	9.434	7.734	5.937	4.145	6.454
150	9.789	8.01	6.138	4.302	6.704
155	10.145	8.286	6.339	4.459	6.956
160	10.503	8.562	6.54	4.618	7.209
165	10.863	8.839	6.741	4.777	7.463
170	11.224	9.115	6.941	4.937	7.72
175	11.587	9.392	7.14	5.098	7.977
180	11.951	9.669	7.34	5.259	8.237
185	12.317	9.947	7.54	5.422	8.497
190	12.684	10.224	7.739	5.585	8.759
195	13.052	10.501	7.939	5.749	9.023
200	13.421	10.779	8.138	5.913	9.288
205	13.792	11.056	8.338	6.079	9.555
210	14.164	11.334	8.539	6.245	9.822
215	14.537	11.612	8.739	6.411	10.092
220	14.912	11.889	8.940	6.579	10.362
225	15.287	12.167	9.141	6.747	10.634
230	15.664	12.445	9.343	6.916	10.907
235	16.041	12.722	9.545	7.085	11.182
240	16.420	13.000	9.747	7.255	11.458
245	16.800	13.278	9.950	7.426	11.735
250	17.181	13.555	10.153	7.597	12.013

Temp C	mV in degrees C				
	E	J	K	N	T
255	17.562	13.833	10.357	7.769	12.293
260	17.945	14.110	10.561	7.941	12.574
265	18.328	14.388	10.766	8.114	12.856
270	18.713	14.665	10.971	8.288	13.139
275	19.098	14.942	11.176	8.462	13.423
280	19.484	15.219	11.382	8.637	13.709
285	19.871	15.496	11.588	8.812	13.995
290	20.259	15.773	11.795	8.988	14.283
295	20.647	16.050	12.001	9.164	14.572
300	21.036	16.327	12.209	9.341	14.862
305	21.426	16.604	12.416	9.519	15.153
310	21.817	16.881	12.624	9.696	15.445
315	22.208	17.157	12.831	9.875	15.738
320	22.600	17.434	13.040	10.054	16.032
325	22.993	17.710	13.248	10.233	16.327
330	23.386	17.986	13.457	10.413	16.624
335	23.780	18.262	13.665	10.593	16.921
340	24.174	18.538	13.874	10.774	17.219
345	24.569	18.814	14.084	10.955	17.518
350	24.964	19.090	14.293	11.136	17.819
355	25.360	19.366	14.503	11.318	18.120
360	25.757	19.642	14.713	11.501	18.422
365	26.154	19.918	14.923	11.683	18.725
370	26.552	20.194	15.133	11.867	19.030
375	26.950	20.469	15.343	12.050	19.335
380	27.348	20.745	15.554	12.234	19.641
385	27.747	21.021	15.764	12.418	19.947
390	28.146	21.297	15.975	12.603	20.255
395	28.546	21.572	16.186	12.788	20.563
400	28.946	21.848	16.397	12.974	20.872
405	29.346	22.124	16.608	13.159	
410	29.747	22.400	16.820	13.346	
415	30.148	22.676	17.031	13.532	
420	30.550	22.952	17.243	13.719	
425	30.952	23.228	17.455	13.906	
430	31.354	23.504	17.667	14.094	
435	31.756	23.780	17.879	14.281	
440	32.159	24.057	18.091	14.469	
445	32.562	24.333	18.303	14.658	
450	32.965	24.610	18.516	14.846	
455	33.368	24.887	18.728	15.035	
460	33.772	25.164	18.941	15.225	
465	34.175	25.442	19.154	15.414	
470	34.579	25.720	19.366	15.604	
475	34.983	25.998	19.579	15.794	
480	35.387	26.276	19.792	15.984	
485	35.792	26.555	20.005	16.175	
490	36.196	26.834	20.218	16.366	
495	36.601	27.113	20.431	16.557	
500	37.005	27.393	20.644	16.748	

Millivolts vs Temperature

Thermocouple Reference Table

mV vs T °F

	mV in degrees F				
Temp F	E	J	K	N	T
-60	-2.846	-2.483	-1.929	-1.296	-1.857
-55	-2.699	-2.353	-1.830	-1.228	-1.762
-50	-2.552	-2.223	-1.729	-1.160	-1.667
-45	-2.404	-2.092	-1.628	-1.092	-1.572
-40	-2.255	-1.961	-1.527	-1.023	-1.475
-35	-2.105	-1.828	-1.425	-0.954	-1.378
-30	-1.953	-1.695	-1.322	-0.884	-1.279
-25	-1.801	-1.562	-1.218	-0.814	-1.181
-20	-1.648	-1.428	-1.114	-0.744	-1.081
-15	-1.494	-1.293	-1.010	-0.674	-0.980
-10	-1.339	-1.158	-0.905	-0.603	-0.879
-5	-1.183	-1.022	-0.799	-0.532	-0.777
0	-0.868	-0.886	-0.586	-0.461	-0.675
5	-1.026	-0.749	-0.692	-0.390	-0.571
10	-0.550	-0.611	-0.370	-0.318	-0.467
15	-0.709	-0.473	-0.478	-0.246	-0.362
20	-0.227	-0.334	-0.153	-0.174	-0.256
25	-0.389	-0.195	-0.262	-0.102	-0.150
30	0.098	-0.056	0.066	-0.029	-0.043
35	-0.065	0.084	-0.044	0.928	0.065
40	0.426	0.225	0.286	1.065	0.173
45	0.262	0.365	0.176	1.202	0.282
50	0.591	0.507	0.397	1.340	0.391
55	0.757	0.649	0.508	1.479	0.501
60	0.924	0.791	0.619	1.619	0.611
65	1.091	0.933	0.731	1.760	0.723
70	1.259	1.076	0.843	1.902	0.834
75	1.427	1.220	0.955	2.045	0.947
80	1.597	1.364	1.068	2.189	1.060
85	1.767	1.508	1.181	2.334	1.174
90	1.938	1.652	1.294	2.480	1.288
95	2.109	1.797	1.407	2.626	1.403
100	2.281	1.942	1.521	2.774	1.519
105	2.454	2.088	1.635	2.923	1.635
110	2.628	2.234	1.749	3.072	1.752
115	2.802	2.380	1.863	3.223	1.870
120	2.977	2.527	1.977	3.374	1.988
125	3.153	2.673	2.092	3.527	2.107
130	3.330	2.821	2.207	3.680	2.227
135	3.507	2.968	2.321	3.834	2.347
140	3.685	3.116	2.436	3.989	2.468
145	3.863	3.264	2.552	4.145	2.590
150	4.042	3.412	2.667	4.302	2.712
155	4.222	3.560	2.782	4.459	2.835
160	4.403	3.709	2.897	4.618	2.958
165	4.584	3.858	3.013	4.777	3.082
170	4.766	4.007	3.128	4.937	3.207
175	4.948	4.157	3.244	5.098	3.333
180	5.131	4.306	3.359	5.259	3.459
185	5.315	4.456	3.474	5.422	3.585
190	5.500	4.606	3.590	5.585	3.712
195	5.685	4.757	3.705	5.749	3.840
200	5.871	4.907	3.820	5.913	3.968
205	6.057	5.058	3.935	6.079	4.097
210	6.244	5.209	4.050	6.245	4.227
215	6.432	5.360	4.165	6.411	4.357
220	6.620	5.511	4.280	6.579	4.487
225	6.809	5.662	4.395	6.747	4.618
230	6.998	5.814	4.509	6.916	4.750
235	7.188	5.965	4.623	7.085	4.882
240	7.379	6.117	4.738	7.255	5.015
245	7.570	6.269	4.852	7.426	5.148
250	7.762	6.421	4.965	7.597	5.282
255	7.954	6.573	5.079	7.769	5.416
260	8.147	6.726	5.192	7.941	5.551
265	8.340	6.878	5.306	8.114	5.687
270	8.535	7.031	5.419	8.288	5.823
275	8.729	7.184	5.532	8.462	5.959
280	8.924	7.336	5.644	8.637	6.096
285	9.120	7.489	5.757	8.812	6.233
290	9.316	7.642	5.869	8.988	6.371
295	9.513	7.795	5.982	9.164	6.510
300	9.710	7.949	6.094	9.341	6.648
305	9.907	8.102	6.205	9.519	6.788
310	10.106	8.255	6.317	9.696	6.928
315	10.304	8.409	6.429	9.875	7.068
320	10.503	8.562	6.540	10.054	7.209
325	10.703	8.716	6.652	10.233	7.350
330	10.903	8.869	6.763	10.413	7.492
335	11.104	9.023	6.874	10.593	7.634
340	11.305	9.177	6.985	10.774	7.777
345	11.506	9.331	7.096	10.955	7.920
350	11.708	9.485	7.207	11.136	8.064
355	11.911	9.639	7.318	11.318	8.208
360	12.113	9.793	7.429	11.501	8.352
365	12.317	9.947	7.540	11.683	8.497
370	12.520	10.101	7.650	11.867	8.643
375	12.724	10.255	7.761	12.050	8.789
380	12.929	10.409	7.872	12.234	8.935
385	13.134	10.563	7.983	12.418	9.082
390	13.339	10.717	8.094	12.603	9.229
395	13.545	10.871	8.205	12.788	9.377
400	13.751	11.025	8.316	12.974	9.525

	mV in degrees F				
Temp F	E	J	K	N	T
405	13.957	11.180	8.372	6.152	9.673
410	14.164	11.334	8.486	6.245	9.822
415	14.371	11.488	8.600	6.337	9.972
420	14.579	11.642	8.715	6.430	10.122
425	14.787	11.797	8.829	6.523	10.272
430	14.995	11.951	8.943	6.616	10.423
435	15.204	12.105	9.057	6.710	10.574
440	15.413	12.260	9.172	6.803	10.725
445	15.622	12.414	9.286	6.897	10.877
450	15.831	12.568	9.400	6.991	11.029
455	16.041	12.722	9.515	7.085	11.182
460	16.252	12.877	9.629	7.179	11.335
465	16.462	13.031	9.744	7.274	11.489
470	16.673	13.185	9.858	7.369	11.643
475	16.884	13.339	9.973	7.464	11.797
480	17.096	13.494	10.088	7.559	11.951
485	17.308	13.648	10.202	7.654	12.106
490	17.520	13.802	10.317	7.750	12.262
495	17.732	13.956	10.432	7.845	12.418
500	17.945	14.110	10.547	7.941	12.574
505	18.158	14.264	10.662	8.037	12.730
510	18.371	14.418	10.776	8.134	12.887
515	18.585	14.573	10.891	8.230	13.045
520	18.798	14.727	11.006	8.327	13.202
525	19.012	14.881	11.121	8.423	13.360
530	19.227	15.035	11.237	8.520	13.518
535	19.441	15.189	11.352	8.617	13.677
540	19.656	15.343	11.467	8.715	13.836
545	19.871	15.496	11.582	8.812	13.995
550	20.086	15.650	11.697	8.910	14.155
555	20.302	15.804	11.813	9.008	14.315
560	20.517	15.958	11.928	9.105	14.476
565	20.733	16.112	12.043	9.204	14.636
570	20.950	16.266	12.159	9.302	14.797
575	21.166	16.419	12.274	9.400	14.959
580	21.383	16.573	12.390	9.499	15.121
585	21.600	16.727	12.506	9.598	15.283
590	21.817	16.881	12.621	9.696	15.445
595	22.034	17.034	12.737	9.795	15.608
600	22.252	17.188	12.853	9.895	15.771
605	22.469	17.341	12.969	9.994	15.934
610	22.687	17.495	13.085	10.093	16.098
615	22.905	17.649	13.200	10.193	16.262
620	23.124	17.802	13.316	10.293	16.426
625	23.342	17.955	13.433	10.393	16.591
630	23.561	18.109	13.549	10.493	16.756
635	23.780	18.262	13.665	10.593	16.921
640	23.999	18.416	13.781	10.693	17.086
645	24.218	18.569	13.897	10.794	17.252
650	24.437	18.722	14.013	10.894	17.418
655	24.657	18.876	14.130	10.995	17.585
660	24.876	19.029	14.246	11.096	17.752
665	25.096	19.182	14.363	11.197	17.919
670	25.316	19.336	14.479	11.298	18.086
675	25.537	19.489	14.596	11.399	18.254
680	25.757	19.642	14.712	11.501	18.422
685	25.977	19.795	14.829	11.602	18.591
690	26.198	19.949	14.946	11.704	18.759
695	26.419	20.102	15.063	11.805	18.928
700	26.640	20.255	15.179	11.907	19.097
705	26.861	20.408	15.296	12.009	19.267
710	27.082	20.561	15.413	12.111	19.437
715	27.304	20.715	15.530	12.214	19.607
720	27.525	20.868	15.647	12.316	19.777
725	27.747	21.021	15.764	12.418	19.947
730	27.969	21.174	15.881	12.521	20.118
735	28.191	21.327	15.998	12.624	20.289
740	28.413	21.480	16.116	12.726	20.460
745	28.635	21.634	16.233	12.829	20.632
750	28.857	21.787	16.350	12.932	20.803

	mV in degrees F			
Temp F	E	J	K	N
755	29.079	21.940	16.468	13.036
760	29.302	22.093	16.585	13.139
765	29.525	22.246	16.702	13.242
770	29.747	22.400	16.820	13.346
775	29.970	22.553	16.937	13.449
780	30.193	22.706	17.055	13.553
785	30.416	22.860	17.173	13.657
790	30.639	23.013	17.290	13.760
795	30.862	23.166	17.408	13.864
800	31.086	23.320	17.526	13.969
805	31.309	23.473	17.643	14.073
810	31.533	23.627	17.761	14.177
815	31.756	23.780	17.879	14.281
820	31.980	23.934	17.997	14.386
825	32.204	24.087	18.115	14.490
830	32.427	24.241	18.233	14.595
835	32.651	24.395	18.351	14.700
840	32.875	24.549	18.469	14.804
845	33.099	24.702	18.587	14.909
850	33.323	24.856	18.705	15.014
855	33.547	25.010	18.823	15.119
860	33.772	25.164	18.941	15.225
865	33.996	25.318	19.059	15.330
870	34.220	25.473	19.177	15.435
875	34.445	25.627	19.295	15.541
880	34.669	25.781	19.414	15.646
885	34.893	25.936	19.532	15.752
890	35.118	26.090	19.650	15.857
895	35.343	26.245	19.768	15.963
900	35.567	26.400	19.887	16.069
905	35.792	26.555	20.005	16.175
910	36.016	26.710	20.123	16.281
915	36.241	26.865	20.242	16.387
920	36.466	27.020	20.360	16.493
925	36.691	27.175	20.479	16.599
930	36.915	27.330	20.597	16.705
935	37.140	27.486	20.715	16.812
940	37.365	27.642	20.834	16.918
945	37.590	27.797	20.952	17.025
950	37.815	27.953	21.071	17.131
955	38.040	28.109	21.189	17.238
960	38.265	28.266	21.308	17.344
965	38.489	28.422	21.426	17.451
970	38.714	28.579	21.544	17.558
975	38.939	28.735	21.663	17.665
980	39.164	28.892	21.781	17.772
985	39.389	29.049	21.900	17.879
990	39.614	29.206	22.018	17.986
995	39.839	29.363	22.137	18.093
1000	40.064	29.521	22.255	18.200

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Burns Engineering has a long history of designing and building temperature sensors to meet the measurement needs of unique and varied applications. The products in this catalog were specifically developed to meet field requirements and allow for configured-to-order flexibility. Not sure what product is right for your application? Our application engineering group is here to help you select, configure, and/or custom design the right product for your specific needs.

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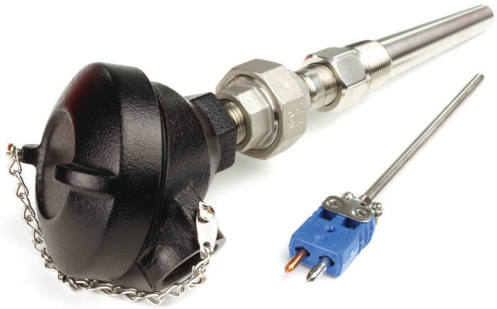

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