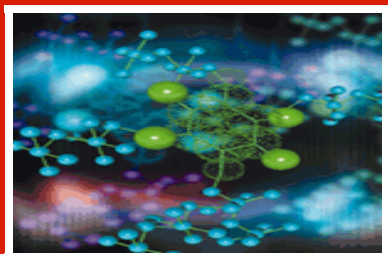
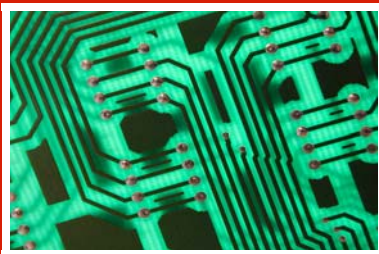


AccuTru Sensor Technologies



ExL Thermocouples

AccuTru Sensor Technologies

A DIVISION OF ACCUTRU INTERNATIONAL CORPORATION

NEW TECHNOLOGIES

(exclusively from AccuTru)

Mi-Dry®, ExL®, SVS®

AccuTru is becoming well known in the process control community as a leading edge sensor technology company. New technologies ranging from the first ever self-validating/self-diagnostic temperature sensor to extended life thermocouples constructed with AccuTru's proprietary mineral insulation, Mi-Dry, are making a major impact on the marketplace. Read more about these new technologies that are exceeding user expectations in increased accuracy, repeatability, and service life.

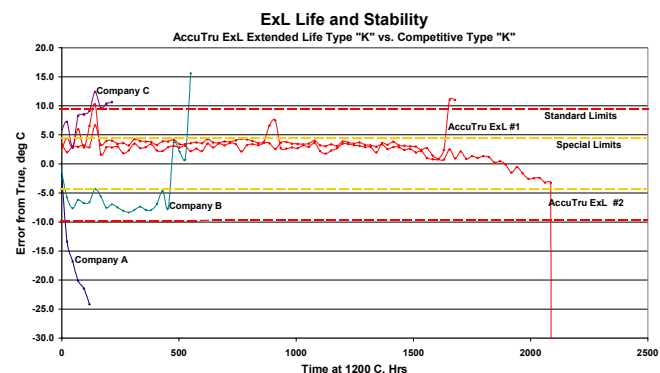
NEW TECHNOLOGIES

- ExL Extended Life Thermocouples with Mi-Dry
- Mi-Dry Resistance Temperature Detectors (RTD's)
- ExL Longer Life High Temperature Ceramic Sheathed Thermocouples
- SVS Self-validating/Self-diagnosing Temperature Sensors
- Flame Probes

ExL Extended Life Thermocouples made with Mi-Dry

Made with our exclusive Mi-Dry ceramics, these highly stable mineral insulated, metal sheathed thermocouples outlast thermocouples made with MgO by 2 to 4 times. High performance AccuTru ExL thermocouples, available only from AccuTru, are intended for use in temperature sensing applications where accuracy, repeatability, and long life are important. The chart below illustrates the result of a life test conducted with AccuTru's ExL thermocouples compared to standard thermocouples.

The unique Mi-Dry insulating material in this product slows



or prevents typical failure modes common to other mineral insulated thermocouples. The increased signal stability and life improves process control and reduces downtime. Better control allows for more precise process optimization, reduced operating costs and improved process safety.

Mi-Dry Resistance Temperature Detectors (RTD's)

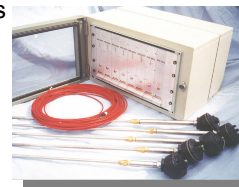
Mi-Dry RTD's are constructed with the same proprietary insulating material used in AccuTru's ExL extended life thermocouples. Taking advantage of this material's superior moisture resistance and higher electrical resistance vs. MgO, Mi-Dry RTD's have better shelf life and higher temperature range when compared to standard RTD's constructed with MgO cable.

ExL Longer Life High Temperature Ceramic Sheathed Thermocouples

AccuTru offers an extensive line of ceramic sheathed noble metal thermocouples. Designed for profile or spike (control) applications, AccuTru uses the highest quality ceramic materials treated with a proprietary process that extends the life and stability of the sensor.

SVS—Self-Validating/Self-Diagnostic Temperature Sensors

AccuTru's patented Self-Validating/Self-Diagnostic sensors are producing a sea-change in the process control industry. These sensors demonstrate measurement accuracies up to three times better than special limits of error for the service life of the sensor, and up to twice the life of conventional thermocouples.



The SVS sensors are available in three different temperature ranges, covering measurements from -200°C to 1750°C (-325°F to 3200°F). The SVS series of temperature sensors are intended for use in critical temperature measurement and control applications found in almost every industrial process. Examples of existing applications include heat treating, chemicals, petrochemicals, pharmaceuticals, gas turbines, glass melters, pilot plants, and research laboratories.

The patented SVS technology detects and corrects sensor drift and warns of sensor deterioration before failure. These features provide high value by providing highly reliable measurements and predictive maintenance. This enables improved process control, and increases yields while reducing operating risks and costs.

AccuTru Flame Rods

AccuTru produces a series of ionization probes for use in pilot furnaces or other applications where moisture adsorption is a problem. The probes are charged with an electric potential and if a flame is present, the charge is transferred to the flame probe sheath. The detection of a flame is critical in processes where fuel is introduced to a combustion process.

AccuTru Sensor Technologies

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AccuTru's Full Line of Quality Temperature Measurement Products

In addition to being a recognized leader in the development and marketing of new temperature measurement technology, AccuTru is a full service, quality manufacturer of a wide array of temperature measurement devices and accessories. AccuTru stands ready to address your temperature measurement needs. Fast response, quality products, and superb engineering support are our hallmarks.

FEATURING:

- *Multi-Point Thermocouples*
- *Thermocouples*
- *Resistance Temperature Detectors (RTD's)*
- *Thermowells*
- *Transmitters—Digital and Analog Thermocouple and RTD*
- *Calibration Services*

Multi-Point Thermocouples

Our design engineers and technicians have extensive experience in the design and manufacture of multi-point thermocouples. We offer multi-points in both ExL and conventional MgO insulating materials. AccuTru maintains a stock of multi-point materials in order to provide quick response in critical need situations.

Thermocouples

If you want economically priced MgO insulated thermocouples but want to be assured of the highest possible quality, AccuTru offers a complete line of industrial thermocouples, including Types E,J,T,K,N,R,S,and B. You can select from a wide range of designs from quick connect type to transition style. We also manufacture thermocouples for use in thermowells, as well as a variety of other specialty items, including weld-pad thermocouples. These sensors cover the entire range from -200°C to 1750°C.

These sensors are made to AccuTru's exacting quality standards using MgO mineral insulated cable.

Resistance Temperature Detectors (RTD's)

If initial cost is of paramount importance, contact AccuTru for a quote on our RTD's. We manufacture a variety of styles, including thin film and bulb RTD's, in multiple configurations in an extensive variety of sheath materials to meet your specific requirements.

Thermowells

Let AccuTru's team of experts help you select the proper materials for your applications. All of our thermowells are manufactured to exacting specifications and we are able to provide quick response to your needs. Our engineering team specializes in the design of special thermowells for demanding applications.

Transmitters—Digital and Analog Thermocouple and RTD

AccuTru carries a complete line of both digital and analog thermocouple and RTD transmitters, in both hockey puck, and DIN rail mounted styles.



Whether you require fully isolated and linearized transmitters or low budget transmitters, AccuTru can provide them. Intrinsically safe and/or plug-in loop powered read-out transmitters are also available.

Most of these products incorporate microprocessor technology and are quickly and easily programmed using any PC and the software included with the transmitter.

HART protocol transmitters also available.

Calibration Services

Contact AccuTru for a price quote on calibration services. We provide quick, reliable service. All of our sensor products can be ordered with calibration at single or multiple points, traceable to NIST.

Why AccuTru?

What sets AccuTru apart from other manufacturers is our advanced temperature technologies.

There is more to selecting temperature measurement devices than just price. When you have at risk significant capital investments, product quality, yield costs, energy expenses, and environmental issues, you need to look to AccuTru's advanced technologies.

- *Self-Validating, Self-Diagnostic temperature measurement systems.*
- *ExL Extended Life Thermocouples*
- *MI-Dry Resistance Temperature Detectors (RTD's)*
- *All Thermocouples manufactured using special limits of error cable and special limits thermocouple wire for extension wire*
- *All Thermocouple and RTD connectors use solid metal pins.*

The AccuTru team looks forward to discussing your temperature measurement needs and sharing with you, the benefits of AccuTru technology.

AccuTru Sensor Technologies

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Ex-L Thermocouples with AccuTru's Mi-Dry[®] Inside

**Higher Stability and Longer Life than
Conventional Metal Sheathed
Thermocouples**

AccuTru's research into electrical insulating ceramics led to the development of this highly stable, extended life, mineral insulated, metal sheathed sensor. High performance ExL Extended Life thermocouples are intended for use in temperature sensing applications where accuracy, repeatability, and long life are important. The unique insulating material in this product slows or prevents typical failure modes common to other mineral insulated sensors. The increased stability and life improves process control and reduces downtime. Better control allows for more precise process optimization, reducing operating costs and improving quality.

Specifications:

Expected Life:

Up to 4X conventional metal sheathed sensors

Accuracy (Limits of Error, ANSI MC 96.1)

+/- 1.1°C (+/- 2 °F) or +/- 0.4% of reading, whichever is greater

Insulation Resistance:

Up to 100X greater than conventional metal sheathed sensors @ 1200°C

QUICK ORDER GUIDE:

Step One: Select Sensor Calibration

Step Two: Select Junction

Step Three: Select Sheath Material

Step Four: Select Sheath Diameter

Step Five: Determine Sheath Length
(Length from tip of sensor to
start of lead wire or transition)

Step Six: Select Termination

Step Seven: Select Length of Leads
(Measured from back end of
sensor or transition)

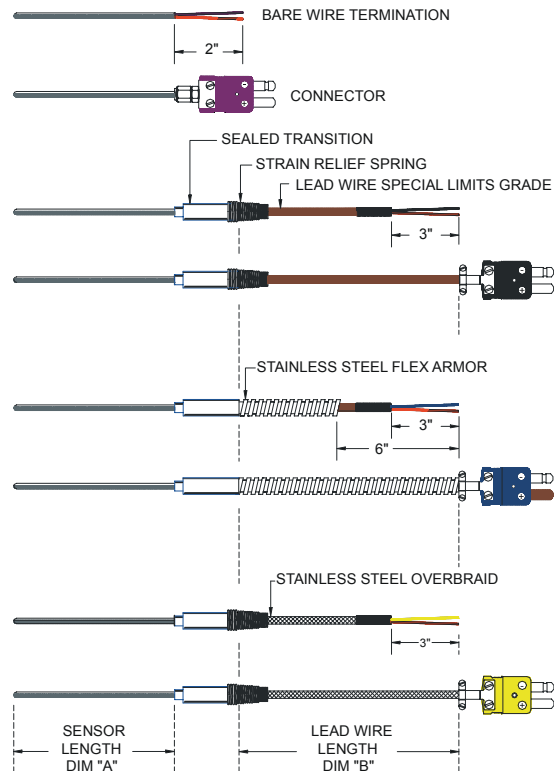
Step Eight: Select Connector

Step Nine: Select Type of Lead Wire if Used

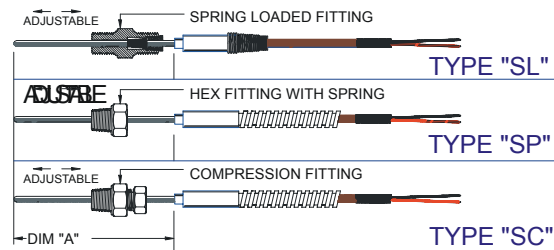
Step Ten: Select Process Fittings

Step Eleven: Select Any Options if Required

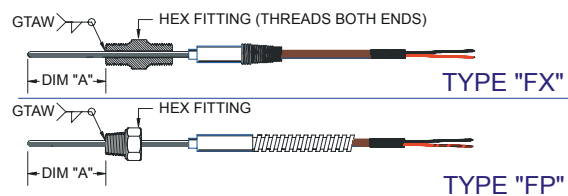
THERMOCOUPLE STYLES



CONNECTION FITTING OPTIONS

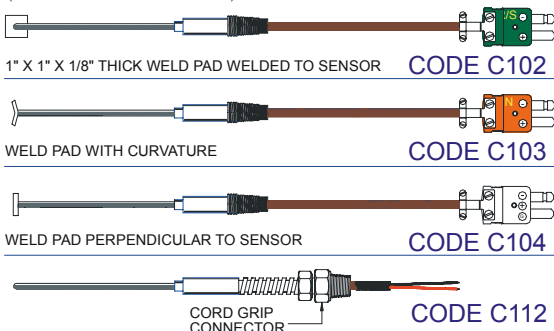


WELDED FITTING OPTIONS



WELDED PAD OPTIONS

(ADD CODE TO END OF PART NUMBER)



AccuTru Sensor Technologies

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ACCUTRU QUICK ORDER Part Number Guide for ExL Extended Life Metal Sheathed Thermocouples:

1. CALIBRATION

K = Type K
J = Type J
N = Type N

2. JUNCTION

U = Ungrounded
G = Grounded
E = Exposed

6. TERMINATION

B = Bare ends
M = Standard Male Plug-Solid Pin (350°F)
F = Standard Female Jack (350°F)
N = Mini Male Plug
G = Mini Female Jack
H = Std High Temp Male Plug-Solid Pin (550°F, Brown Case)
K = Std High Temp Female Jack (550°F, Brown Case)
L = Ultra High Temp Ceramic Male Plug-Solid Pin (1200°F)
P = Ultra High Temp Ceramic Female Jack (1200°F)
S = Compensating Spade Lugs

8. LEAD WIRE

X = None
T = Teflon
G = Fiberglass
AT = Stainless Steel Flex Armor
AG = Stainless Steel Flex Armor
TAT = Teflon Coated SS Flex Armor over Teflon
TAG = Teflon Coated SS Flex Armor over Glass
PAT = PVC Coated SS Flex Armor over Teflon
PAG = PVC Coated SS Flex Armor over Glass
BT = Stainless Steel Overbraid over Teflon
BG = Stainless Steel Overbraid over Glass

3. SHEATH MATERIAL

600A = Alloy 600
316S = 316 SS
*See Note

4. SHEATH DIAMETER

020D = 0.020
040D = 0.040
062D = 0.062
125D = 0.125
236D = 0.236 (6mm)
250D = 0.250
*See Note

5. SHEATH LENGTH (Dim A in inches)

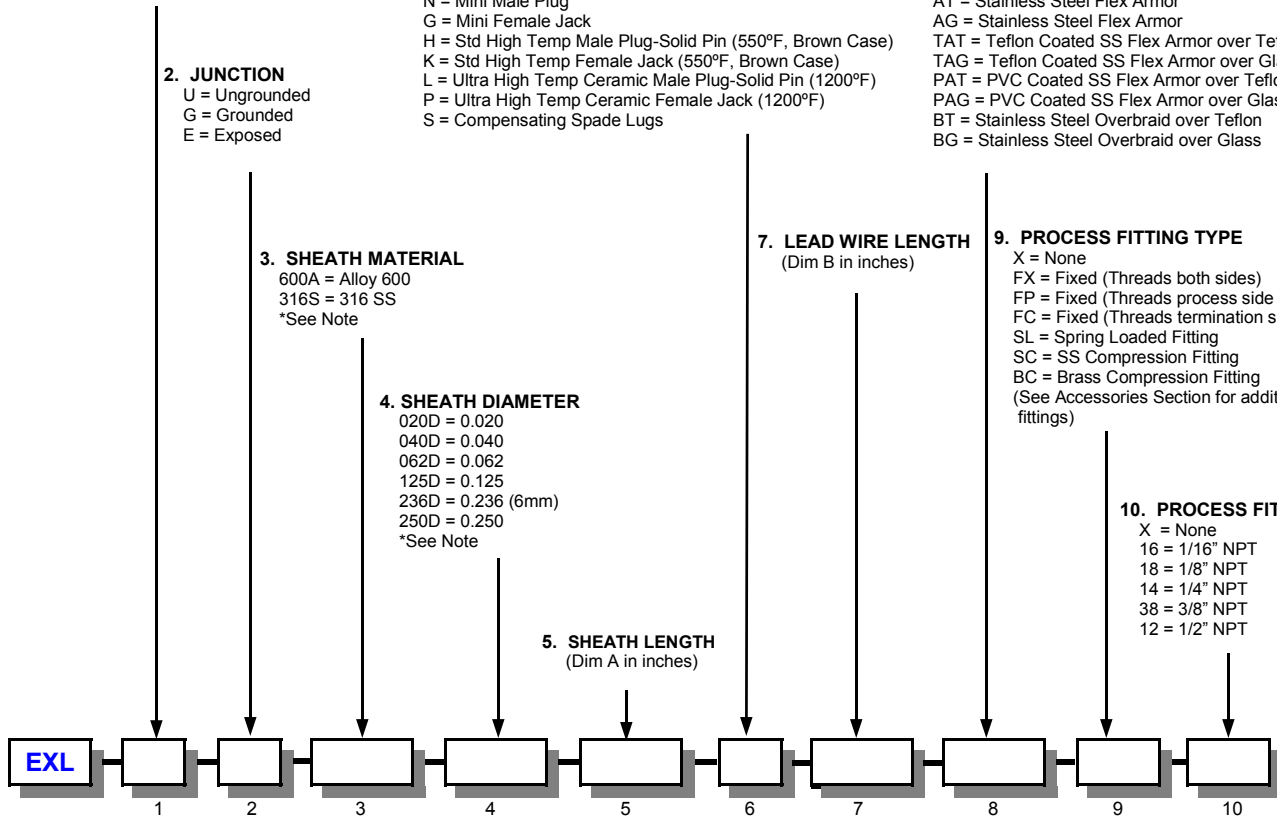
7. LEAD WIRE LENGTH (Dim B in inches)

9. PROCESS FITTING TYPE

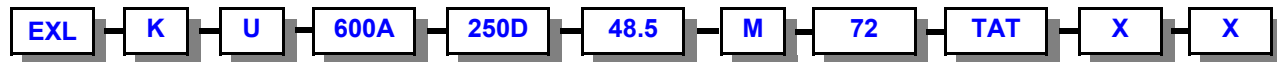
X = None
FX = Fixed (Threads both sides)
FP = Fixed (Threads process side only)
FC = Fixed (Threads termination side only)
SL = Spring Loaded Fitting
SC = SS Compression Fitting
BC = Brass Compression Fitting
(See Accessories Section for additional fittings)

10. PROCESS FITTING (NPT)

X = None
16 = 1/16" NPT
18 = 1/8" NPT
14 = 1/4" NPT
38 = 3/8" NPT
12 = 1/2" NPT

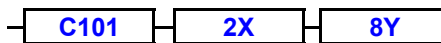


EXAMPLE: EXL-K-U-600A-250D-48.5-M-72-TAT-X-X



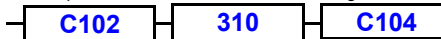
OPTIONS (Add to End of Part Number)

1. 90° Degree Bend:



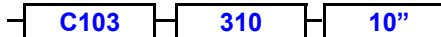
Example: 90° Bend with bend at 2" straight and 8" from tip

2. Weld Pad



Example: Weld Pad with 310 SS material and perpendicular weld pad

3. Weld Pad with Curvature:



Example: Weld Pad with 310 SS material and curvature Pipe Diameter

4. NIST Calibration



Example: NIST Calibration at 3 Temperature Points

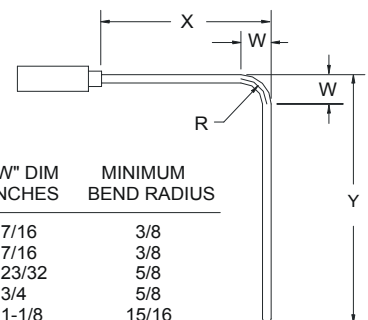
OPTION CODES

- C101 = 90 Degree Bend Specify "X" and "Y" dimensions after code number
- C102 = Weld Pad (Specify Pad Material 310SS, 316SS, or other after code number)
- C103 = Weld Pad with Curvature (Specify Pipe Diameter)
- C104 = Weld Pad Perpendicular
- C105 = NIST Calibration (Specify Temperature Points)
- C106 = Silver Braze Transition to Sensor
- C107 = In Line/Smooth Transition (Transition OD same as sensor OD)
- C108 = SS Tag attached via SS Wire
- C109 = Other Tag Specify
- C110 = Certified Drawings
- C111 = Self Gripping Spring on Sensor
- C112 = CGB Cord Grip Connector at end of Armor

See Options Page for additional options.

*Contact AccuTru for special orders of items not listed

90 DEGREE BEND



SHEATH DIAMETER	"W" DIM INCHES	MINIMUM BEND RADIUS
1/16	7/16	3/8
1/8	7/16	3/8
3/16	23/32	5/8
1/4	3/4	5/8
3/8	1-1/8	15/16

AccuTru Sensor Technologies

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Connection Head Style ExL Thermocouples with Mi-Dry

These ExL thermocouples constructed with Mi-Dry and feature connection heads that prevent the ingress of moisture and dust, improving the life of the sensor in industrial applications. AccuTru offers a wide variety of styles and materials, including stainless steel heads for applications where aluminum suffers from pitting and corrosion. See our catalog section on transmitters for a wide variety of high performance digital and analog head mounted transmitters.

SENSOR HEAD CODES					
Order Code	Head Style	Material	Rating	Conduit Fitting	Process Fitting
1	1	Aluminum	1	34	12
4	1	Aluminum	3	34	12
8	2	316 Stainless	3	34	12
12	3	Aluminum	2	34	12
14	3	Cast Iron	2	34	12
16	3	Poly—White	2	34	12
17	3	Cast Iron-HD	2	34	34
18	3	Aluminum	4	34	12
19	4	Aluminum/Epoxy	2	34	12
20	5	Aluminum/Epoxy	5	34	12
21	6	Aluminum/Epoxy	1	34	12
24	7	Nylon Din	7	12	12
25	8	Aluminum	8	12	12

RATINGS

- 1 = General Purpose NEMA 4X
- 2 = General Purpose NEMA 4
- 3 = Explosion Proof FM/CSA, NEMA 4X
- 4 = FDA Polypropylene White FDA Compliant
- 5 = Explosion Proof NEMA 7 and 9
- 6 = Explosion Proof
- 7 = UL Rated
- 8 = Hinged Standard Din

CONDUIT CONNECTIONS

- 12 = 1/2" NPT
- 34 = 3/4" NPT

PROCESS CONNECTIONS

- 12 = 1/2" NPT
- 34 = 3/4" NPT

SEE ACCESSORIES SECTION FOR ADDITIONAL FITTINGS AND HEAD STYLES

THERMOCOUPLE STYLES

HEAD STYLES



STYLE 1



STYLE 2



STYLE 3



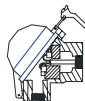
STYLE 4



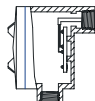
STYLE 5



STYLE 6



STYLE 7



STYLE 8

CONNECTION FITTING OPTIONS

NIPPLE-UNION-NIPPLE WITH SPRING ADJUSTABLE FITTING CODES
TYPE "NU"

FITTING-UNION-NIPPLE WITH SPRING
TYPE "SN"

NIPPLE W/ SPRING
TYPE "NP"

HEX FITTING W/ SPRING TRANSITION
TYPE "SL"

HEX FITTING W/ SPRING
TYPE "SP"

COMPRESSION FITTING
TYPE "SC"

COMPRESSION FITTINGS
TYPE "SS"

HEX FITTING GTAW COMPRESSION FITTING
TYPE "SF"

NIPPLE-UNION-FITTING GTAW
WELDED FITTING CODES
TYPE "UF"

HEX FITTING GTAW
TYPE "FX"

HEX FITTING GTAW
TYPE "FP"

HEX FITTING GTAW
TYPE "FC"

HEX FITTING GTAW HEX FITTING GTAW
TYPE "FF"

COMPRESSION FITTING HEX FITTING GTAW
TYPE "FS"

CORD GRIP CONNECTOR
CODE C112
(ADD CODE C112 TO END OF P/N)

* THREAD ENGAGEMENT

TNG 1/2" NPT = 0.5"

TNG 3/4" NPT = 0.56"

AccuTru Sensor Technologies

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ACCUTRU QUICK ORDER Part Number Guide for ExL Long Life Connection Head Metal Sheath Thermocouples:

1. CALIBRATION

K = Type K
J = Type J
N = Type N

6. SENSOR CONNECTION HEAD

Enter head style choice from table at left.

8. LEAD WIRE

X = None
T = Teflon
G = Fiberglass
AT = Stainless Steel Flex Armor Teflon
AG = Stainless Steel Flex Armor Fiberglass
TAT = Teflon Coated SS Flex Armor over Teflon
TAG = Teflon Coated SS Flex Armor over Glass
PAT = PVC Coated SS Flex Armor over Teflon
PAG = PVC SS Flex Coated Armor over Glass
BT = Overbraid over Teflon
BG = Overbraid over Glass

2. JUNCTION

U = Ungrounded
G = Grounded
E = Exposed

3. SHEATH MATERIAL

600 = Alloy 600
316 = 316 SS
Contact AccuTru for other sheath options

4. SHEATH DIAMETER

020D = 0.020
040D = 0.040
062D = 0.062
125D = 0.125
188D = 0.188
250D = 0.250

5. SHEATH LENGTH (Dim A in inches)

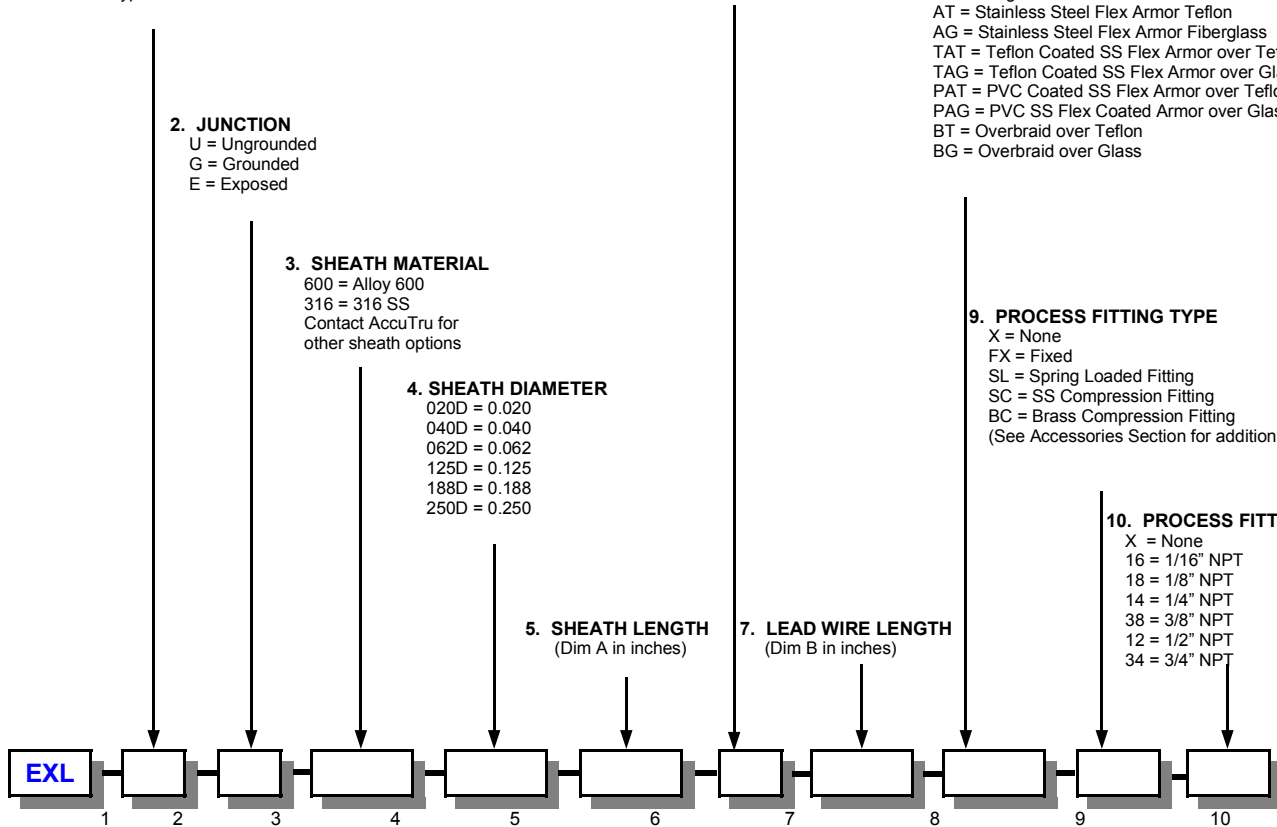
7. LEAD WIRE LENGTH (Dim B in inches)

9. PROCESS FITTING TYPE

X = None
FX = Fixed
SL = Spring Loaded Fitting
SC = SS Compression Fitting
BC = Brass Compression Fitting
(See Accessories Section for additional fittings)

10. PROCESS FITTING (NPT)

X = None
16 = 1/16" NPT
18 = 1/8" NPT
14 = 1/4" NPT
38 = 3/8" NPT
12 = 1/2" NPT
34 = 3/4" NPT

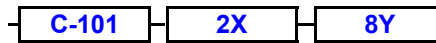


EXAMPLE: EXL-J-U-A600-125D-39-12-X-X-SC-14



OPTIONS (Add to End of Part Number)

1. 90° Degree Bend:



Example: 90° Bend with bend at 8" from tip and 2" straight

2. Weld Pad



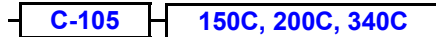
Example: Weld Pad with 310 SS material

3. Weld Pad with Curvature:



Example: Weld Pad with curvature and Pipe Diameter

4. NIST Calibration

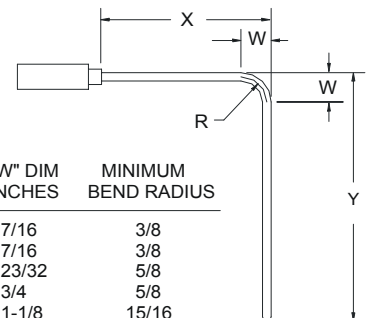


Example: NIST Calibration at 3 Temperature Points

OPTION CODES

- 101 = 90 Degree Bend Specify "X" and "Y" dimensions after code number
- 102 = Weld Pad (Specify Pad Material 310SS, 316SS, or other after code number)
- 103 = Weld Pad with Curvature (Specify Pipe Diameter)
- 105 = NIST Calibration (Specify Temperature Points)
- 106 = Silver Braze Transition to Sensor
- 107 = In Line/Smooth Transition (Transition OD same as sensor OD)
- 108 = SS Tag attached via SS Wire
- 109 = Other Tag Specify
- 110 = Certified Drawings
- 111 = Self Gripping Spring on Sensor
- 112 = CGB Cord Grip Connector at end of Armor

90 DEGREE BEND



SHEATH DIAMETER	"W" DIM INCHES	MINIMUM BEND RADIUS
1/16	7/16	3/8
1/8	7/16	3/8
3/16	23/32	5/8
1/4	3/4	5/8
3/8	1-1/8	15/16

AccuTru Sensor Technologies

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Accessories

HEAD STYLES



STYLE 1



STYLE 2



STYLE 3



STYLE 4



STYLE 5



STYLE 6



STYLE 7



STYLE 8

* THREAD ENGAGEMENT

TNG 1/2" NPT = 0.5"

TNG 3/4" NPT = 0.56"

CONNECTION FITTING OPTIONS

