

S70 Tube Skin Thermocouples

TYPICAL USES

- Wall temperature measurements for reactor vessels in chemical and petrochemical processes.
- Surface temperature measurements for steam lines in power generation processes.
- Process tube wall measurement fixed furnace heading. Special designs for intrinsically safe, non-incendive and explosion proof application.

DESCRIPTION

The Ashcroft S70 temperature sensor assemblies provide accurate temperature measurements for applications that are located in hazardous environments. Each temperature sensor assembly consists of a temperature sensor, magnesium oxide, MgO, insulated insert, connection head and lag extension. The assembly may also include an optional terminal block for wiring and/or transmitters.

Thermocouple assemblies are manufactured to either to IEC 60584-2 or ANSI MC 96.1.



SPECIFICATIONS

Ashcroft Series:	S70
Sheath Diameter:	¼", ⅜", ½", 6 mm, 8 mm
Stem Length:	Minimum: 200 mm/8 in Maximum: 45 m/150 ft
Sensor Type & Measuring Range	Thermocouples Type J -40 to +750°C Type K -200 to +1000°C Type N -200 to +1000°C
Wiring Configuration:	Thermocouples 2 Wire
Accuracy Class	ANSI MC 96 1 Standard Special IEC 60584 Class 1 Class 2 Class 3

KEY BENEFITS

- Flexible designs to work in most applications.
- Available with head mounted transmitters.

Thermocouples (ANSI MC 96.1)

	Type J	Type K	Type N
Standard	±2.2°C or ±0.0075*tl ⁽¹⁾	±2.2°C or ±0.0075*tl ⁽¹⁾	±2.2°C or ±0.0040*tl ⁽¹⁾
Special	±1.1°C or ±0.0040*tl ⁽¹⁾	±1.1°C or ±0.0040*tl ⁽¹⁾	±1.1°C or ±0.0040*tl ⁽¹⁾

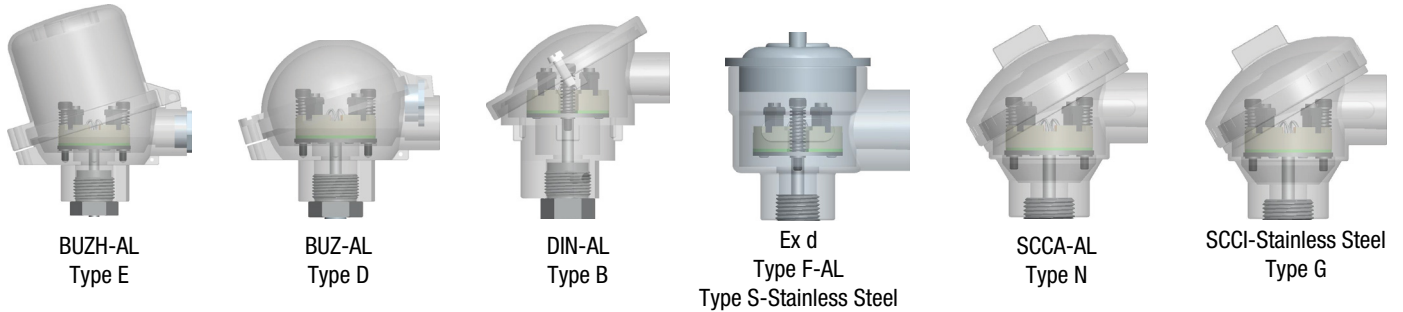
Thermocouples (IEC 60584-2)

	Type J	Type K	Type N
Class 1	±1.5°C or ±0.0040*tl ⁽¹⁾	±1.5°C or ±0.0040*tl ⁽¹⁾	±1.5°C or ±0.0040*tl ⁽¹⁾
Class 2	±2.5°C or ±0.0075*tl ⁽¹⁾	±2.5°C or ±0.0075*tl ⁽¹⁾	±2.5°C or ±0.0040*tl ⁽¹⁾
Class 3	N/A	±2.5°C or ±0.0040*tl ⁽¹⁾	±2.5°C or ±0.0150*tl ⁽¹⁾

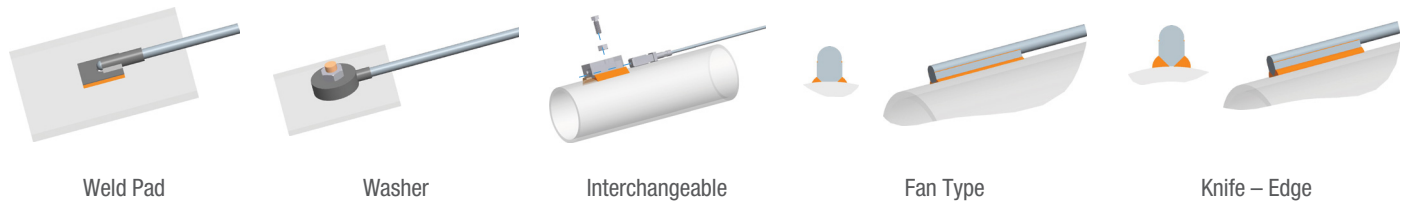
(1) Absolute temperature in °C

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Optional S70 Heads



Sensing Elements



OPTIONAL APPROVALS

FM Explosion Proof: Class I, Division 1, Groups A, B, C, D
 T4 for $-40^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$
 T6 for $-40^{\circ}\text{C} \leq \text{Ta} \leq +60^{\circ}\text{C}$

FM Intrinsically safe: Class I, Division 1, Groups A, B, C, D
 T4 for $-55^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$
 T5 for $-55^{\circ}\text{C} \leq \text{Ta} \leq +55^{\circ}\text{C}$
 T6 for $-55^{\circ}\text{C} \leq \text{Ta} \leq +40^{\circ}\text{C}$

FM Nonincendive: Class I, Division 2, Groups A, B, C, D
 T4 for $-55^{\circ}\text{C} \leq \text{Ta} \leq +80^{\circ}\text{C}$
 T5 for $-55^{\circ}\text{C} \leq \text{Ta} \leq +55^{\circ}\text{C}$
 T6 for $-55^{\circ}\text{C} \leq \text{Ta} \leq +40^{\circ}\text{C}$

ATEX or IECEx: ATEX or IECEx
 II 1 G Ex ia IIC T6 Ga -50°C to $+60^{\circ}\text{C}$
 II 2 G Ex ib IIC T6 Gb -50°C to $+60^{\circ}\text{C}$
 II 2 G Ex e IIC T6 Gb -55°C to $+60^{\circ}\text{C}$
 II 2 G Ex d IIC T6 Gb -55°C to $+60^{\circ}\text{C}$

Data Sheet

S70 Tube Skin Thermocouples

S70 TC ORDERING CODE	Example:	S70	S	V	K	N	U	1	3	N	2	-
Area Classification												
S - Standard			S									
D - Explosion Proof												
J - Intrinsic Safety - ia												
B - Intrinsic Safety - ib												
E - Increased safety												
N - Non-Incendive												
Sheath Diameter												
T - ¼" ø6.35 mm												
U - ⅜" ø9.53 mm												
V - ½" ø12.7 mm												
6 - 6 mm												
8 - 8 mm												
Thermocouple Type												
J - Temperature range: -200...+ 750°C												
K - Temperature range: -200...+ 1000°C					K							
N - Temperature range: -200...+ 1000°C												
Accuracy or Class (IEC 60751)												
N - ANSI MC 96.1: Standard Limits												
S - ANSI MC 96.1: Special Limits												
1 - IEC 60584-2: class 1												
2 - IEC 60584-2: class 2												
3 - IEC 60584-2: class 3												
Element												
U - Insulated, with weld pad 1" x 1" AISI 316L							U					
S - Insulated, with weld pad 1" x 1" Inconel 600												
T - Insulated, with weld pad 1" x 1" AISI 446												
R - Insulated, with washer AISI 316 ø44/19 x16												
Y - Grounded, with flat knife edge												
Electrical Circuit												
1 - Single								1				
2 - Dual												
5 - Single, with 3 turn expansion loop ø100												
6 - Double, with 3 turn expansion loop ø100												
Sheath Material												
1 - AISI 316/ 1.4401												
3 - Inconel 600/ 2.4816									3			
4 - AISI 446/ 1.4762												
Head Type												
F - Ex d Aluminum												
S - Exd Stainless steel												
G - SCCI Stainless steel												
B - DIN B Aluminum												
D - BUZ Aluminum												
E - BUZH Aluminum												
N - SCCA Aluminum												
Instrument Connection												
2 - ½ NPT, Conduit connection ½ NPT											2	
N - ¾ NPT, Conduit connection ½ NPT												
M - M20x1.5, Conduit connection ½ NPT												
3 - ½ NPT, Conduit connection ¾ NPT												
4 - ¾ NPT, Conduit connection ¾ NPT												
5 - M20x1.5, Conduit connection ¾ NPT												
Head Conduit Gland												
- - Without												-
P - Polyamide PA, for unarmored cable												
L - Nickel plated brass, for unarmored cable												
M - Nickel plated brass, single seal for armoured cable												
N - Nickel plated brass, double seal for armoured cable												
S - Stainless steel, for unarmored cable												
T - Stainless steel, single seal for armoured cable												
U - Stainless steel, double seal for armoured cable												

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Data Sheet

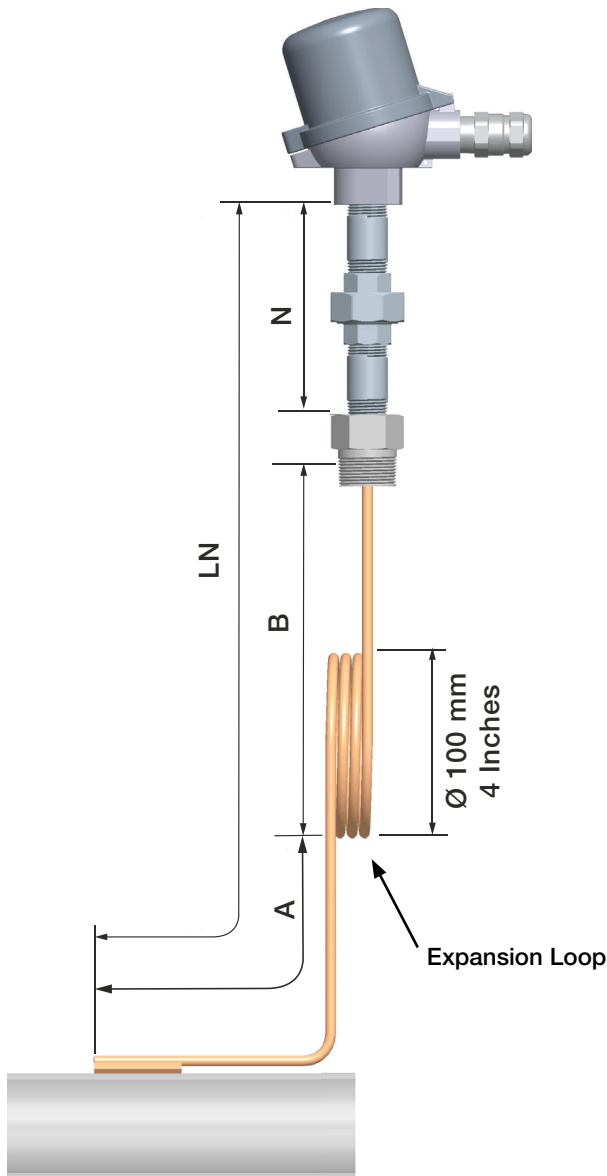
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S70 TC ORDERING CODE Example: (Cont'd)	X	B	-	H7	R3	-	-	3P	T	B=200 Length in mm	LN=400 Nominal length in mm
Nominal Length											
X - LN=... (add actual length LN=?? at the end of code)	X										
Distance B											
-- Distance B (add actual B length B=?? at the end of ordering code)											
B - To the 3 turns ø100 B= ... (min=200, max=45000)		B									
- - Straight, without turns											
Fixing Clamp											
- - No Clamp											
K - 1 clamp											
L - 2 clamps											
M - 3 clamps											
Lag Extension											
4- - Without, with plug ATX											
H6 - Nipple AISI 316, N=40											
H7 - Nipple AISI 316, N=100											
J7 - Nipple-Union-Nipple AISI 316, N=120											
Process Connection											
R3 - Thread ½ NPT											
R4 - Thread ¾ NPT											
VZ - Thread 1½ NPT											
H1 - Flange ANSI 1" 150 lbs #RF											
H2 - Flange ANSI 1" 300 lbs #RF											
H3 - Flange ANSI 1" 600 lbs #RF											
J1 - Flange ANSI 1½" 150 lbs #RF											
J2 - Flange ANSI 1½" 300 lbs #RF											
J3 - Flange ANSI 1½" 600 lbs #RF											
L1 - Flange ANSI 2" 150 lbs #RF											
L3 - Flange ANSI 2" 300 lbs #RF											
L6 - Flange ANSI 2" 600 lbs #RF											
-- - Without connection											
Electrical Connections											
- - With terminal block											
1 - With transmitter Not available with FM IS or NI approvals											
3 - Without terminal block, with flying leads											
Certifications											
- - None required											
F - FM											
A - ATEX											
X - IECEX											
S - SIL 2 + ATEX											
I - INMETRO											
D - ATEX + IECEX											
2 - SIL 2											
P - EAC (Gost R) + Metrological Russia											
Calibration Report											
-- - None											
3P - 3 points											
5P - 5 points											
3D - 3 points											
5D - 5 points											
Tagging											
- Without											
T - Label in stainless steel with tag											
Consult factory for other configurations											

S70 Tube Skin Thermocouples

DIMENSIONS in [] are millimeters

For reference only, consult Ashcroft for specific dimensional drawings



HOW TO ORDER S70 TEMPERATURE PROBES:

- The ordering code is built by selecting the appropriate configuration for the various sections of the ordering code.
- The Insert nominal length LN is measured from base of the head to the tip of the probe.
- The lag extension length N is measured for the base of the head to the center of the threads on the lag extension.
- The B dimension is from the center of the connection fitting to the end of the expansion loop.
- The A dimension is from the end of the expansion loop to the tip of the probe.
- $LN = A + B + N + \text{length of connection fitting}$
- The B length and the LN length are added to the end of the ordering code in millimeters.
- To convert inches to millimeters multiply by 25.4.
mm = inches x 25.4

- e = Stem Diameter
- T = Lag Extension Length
- LN = Nominal Length
- B = Length to Expansion Loop
- A = Length to Weld Pad