

BTB2 Sealed Boiler Tube Block

Overview

The Sealed Boiler Tube Block (BTB2) is a uniquely designed, patent-pending temperature sensor. It is specifically engineered to measure the metal temperature of tubes within boilers, furnaces and other various industrial process equipment.

Features:

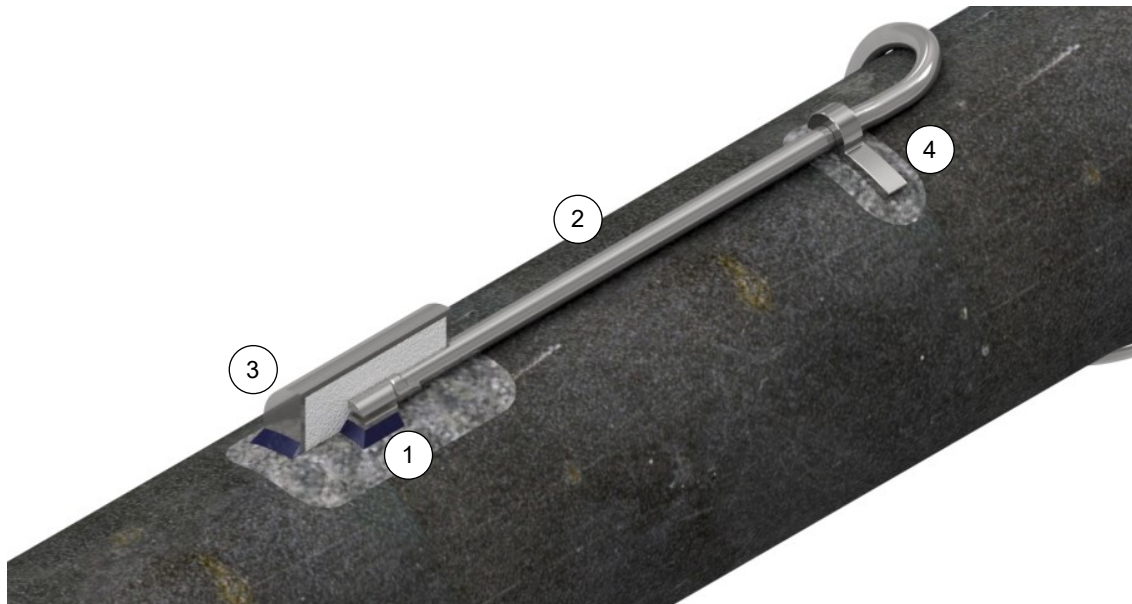
- Completely sealed block
- Robust design that is very simple to install
- Unmatched reliability
- Third party proven - the most accurate tube metal temperature sensor when compared to traditional surface mount sensors

Application:

BTB2's are commonly used inside: Once-Through Steam Generators (OSTG), Heat-Recovery Steam Generators (HRSG), Coker Furnaces, Industrial Boilers and Furnaces, Hot Oilers, and Fire-Tubes.

BTB2

1. The Block is where the thermocouple junction is welded to the boiler tube metal surface. The block is attached with one tack weld, and a fillet weld around the front groove.
2. The Mineral Insulated (MI) Cable extends from the block to the outside of the boiler where it will transition to soft lead wires for termination into the electrical control equipment.
3. The Heat Shield (Shroud) will isolate and insulate for accurate tube metal wall temperature. The heat shield is insulated with a high temperature fibrous material. It can be attached to the boiler tube with 1 continuous fillet weld around the outside, or multiple intermittent fillet welds; depending on end user preference.
4. The MI Cable Support-Guides (Clips) are weldable attachments used to secure the BTB2 in place. Various options are available.



BTB2 Sealed Boiler Tube Block Model Code

BTB2 - T1 - T2 - T3 - T4 - T5 - T6 - T7 - T8 - T9 - T10 - T11 - T12

BTB2 Sealed Boiler Tube Block Sensor

T1	Connection Head
2AL	Aluminum, 3/4" conduit, Bakelite terminal block
2ALT	Aluminum epoxy, 3/4" conduit, Bakelite terminal block
2SS	Stainless steel, 3/4" conduit, Bakelite terminal block
Other	Refer to page 6 for details, styles and options
X	Not Required ⁷

T2	Connection Extension "A" Length (inches) ⁴
"inches"	Specify Extension Length
1.5	1.5" Extension (available for TH only)
4.5	4.5" Extension (most common for GS, GF)
6.5	6.5" Extension
8.5	8.5" Extension

T3	Sensor Leads Style	T4 Compatible ⁵
TE	Teflon (260°C)	ALL
ST	Teflon With SS Over-braid (260°C)	ALL
AT	Flex Armour Over Teflon (260°C)	X, CF, WI
AF	Flex Armour Over Fiberglass (482°C)	X, CF, WI

T4	Fitting Options
CF	Compression Fitting (threads towards process)¹⁰
GS	Gas Seal Union (CF welded inside union)⁷
CH	Compression Fitting (threads towards head) ⁷
GF	Gas Seal Fitting (CF threaded inside union) ⁷
TH	Threaded Bulkhead (threaded outside & inside) ^{6,7}
WI	Welded Bulkhead (threaded outside, welded inside) ^{6,10}
X	Not Required
Other	Consult Factory

T5	Fitting Size
12	1/2" NPT
34	3/4" NPT
10	1" NPT (most common for TH, WI)
15	1.5" NPT
X	Not Applicable
Other	Consult Factory

T6	Sensor Type
K	Type K Thermocouple⁹
Other	Consult Factory

T7	Sensor Sheath & Block Material
316	316 stainless steel
310	310 stainless steel
600	Inconel 600
HAC	Hastelloy C-276
Other	Consult Factory

T8	Probe Diameter
14	1/4"
38	3/8"

T9	Sensor "L" Length (inches) ⁴
"inches"	Specify Length

T10	Block Mounting Style
L	Longitudinal (parallel to pipe)
R#	Radial (perpendicular to pipe) / # = Pipe OD

T11	Heat Shield (Shroud)
HS	Full Weld-On Heat Shield
X	No Heat Shield (e.g. hot oilers)
Other	Consult Factory

T12	MI Support Guides & Quantity ⁸
F3	Full Support-Guides / Qty 3
F#	Full Support-Guides / # = Qty
H#	Half Support-Guides / # = Qty
Other#	Consult Factory / # = Qty

NOTES:

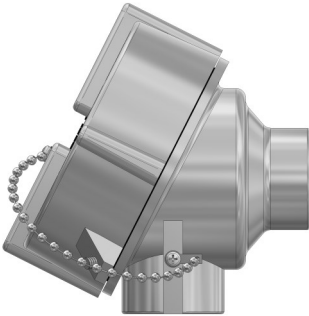
1. Part number examples: BTB2-X-12-TE-CF-12-K-316-14-120-L-HS-F3 or BTB2-2SS-4.5-TE-GS-34-K-600-14-160-R2-X-H3
2. Bold text indicates most common part selections
3. BTB2's are supplied with MTR's and welding/install instructions
4. Reference page 3 for part outline and page 4 to 5 for dimensions
5. Sensor lead style compatible with specific fitting options
6. Bulkhead fitting assembly as per page 5. Most commonly used with option 10 (1"NPT fitting size)
7. GS, GF, CH, TH designed to be used with a connection head
8. Select any # of clips required. Most common supply is 3 pcs
9. Type K thermocouple temperature measurement range is 0°C to +1,260°C
10. CF and WI fitting options cannot be removed due to transition OD when AT, AF are selected



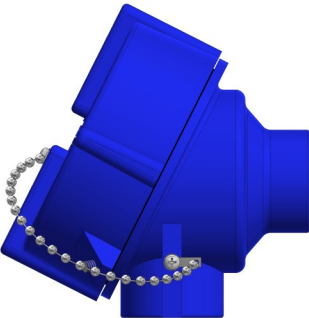
BTB2 Sealed Boiler Tube Block Outline

Connection Head

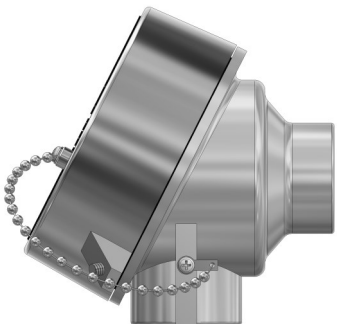
2AL



2ALT



2SS



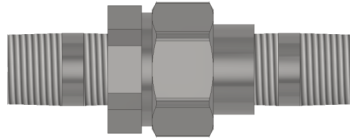
Refer to page 6 for further connection head styles, options and details

Connection Extension

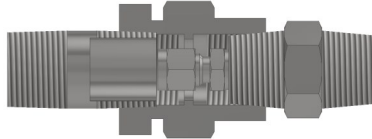
CF / CH



GS



GF



TE



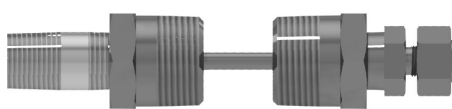
ST



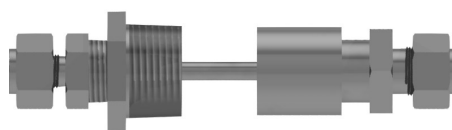
AT



TH

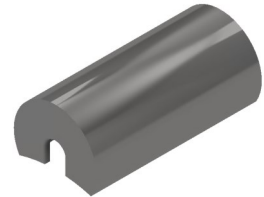


WI



Sensor

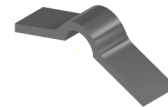
Heat Shield (Shroud)



Sensor



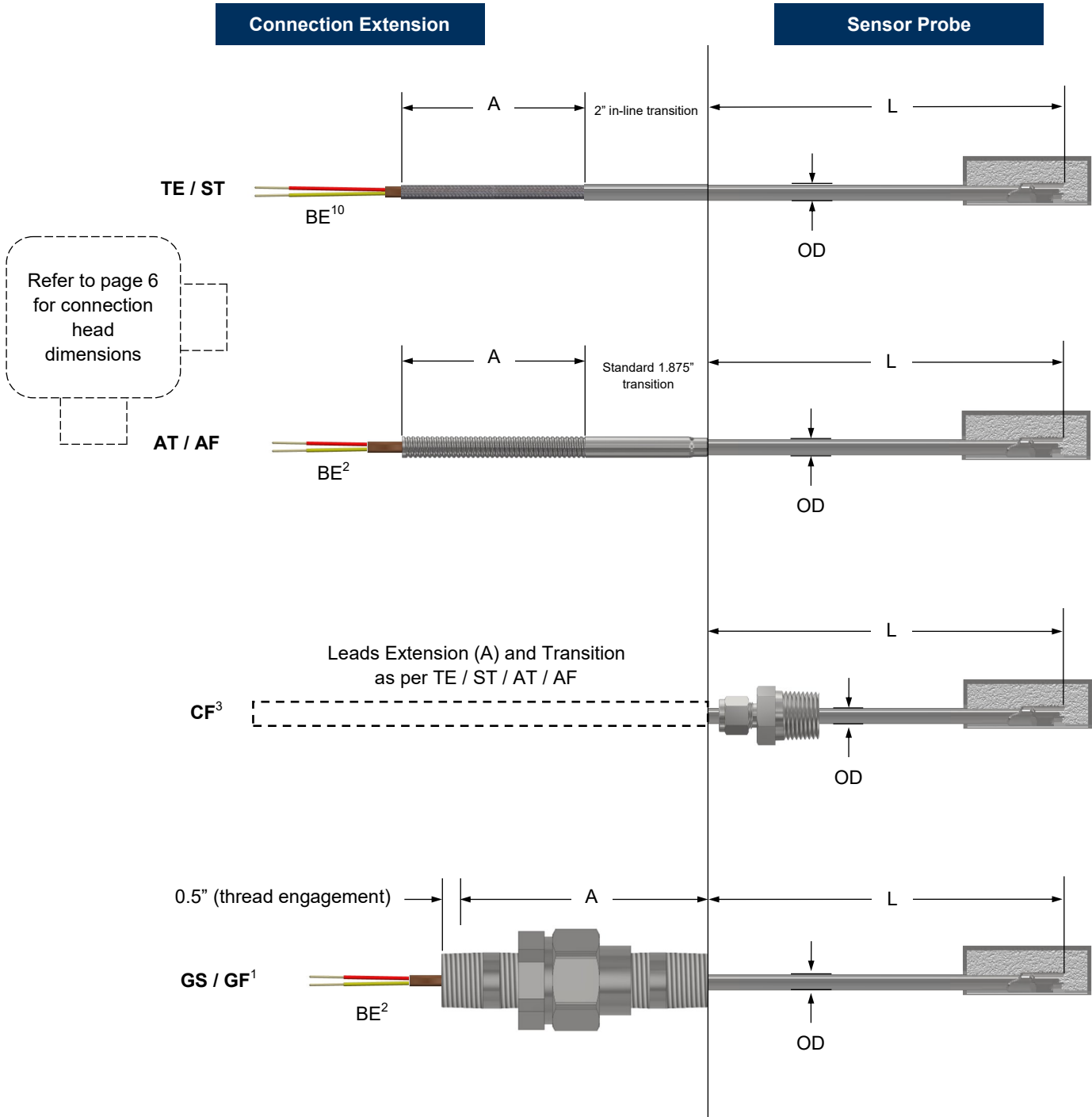
Full Support-Guide



Half Support-Guide



BTB2 Sealed Boiler Tube Block Dimensions



NOTES:

1. GS, GF, CH, TH designed to be used with a connection head
2. Standard BE leads are supplied 8" long
3. CF and WI fitting options cannot be removed due to transition OD when AT, AF are selected

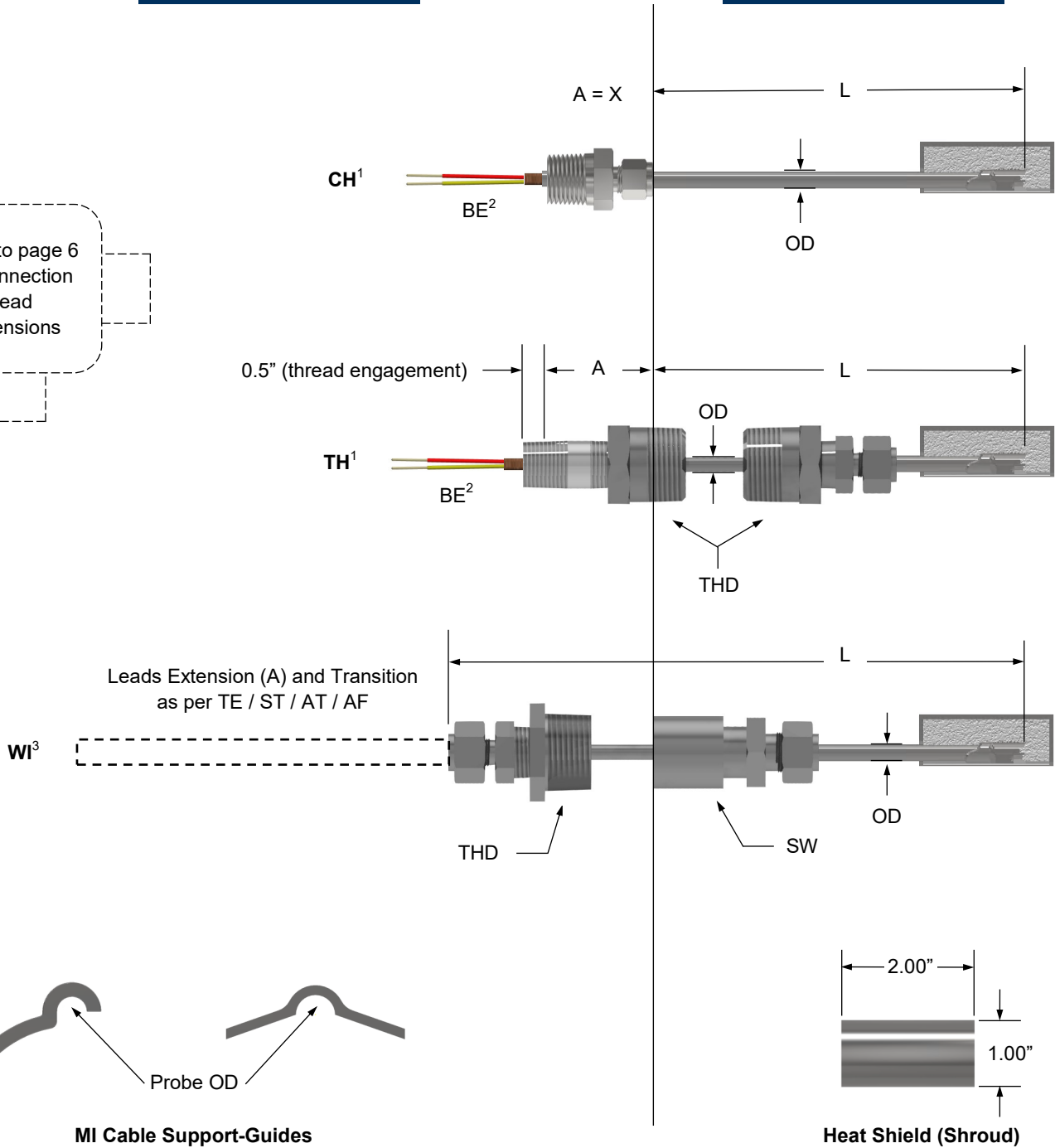


BTB2 Sealed Boiler Tube Block Dimensions

Connection Extension

Sensor Probe

Refer to page 6 for connection head dimensions



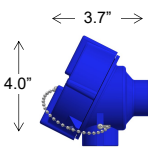
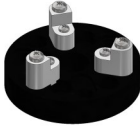
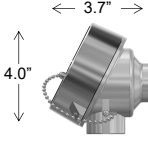

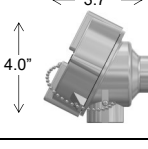
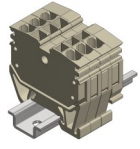
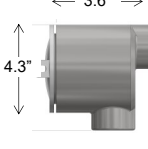
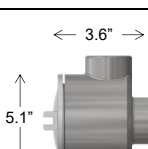
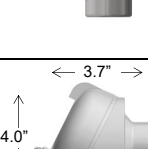
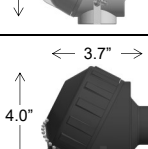
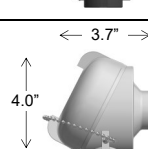
NOTES:

1. GS, GF, CH, TH designed to be used with a connection head
2. Standard BE leads are supplied 8" long
3. CF and WI fitting options cannot be removed due to transition OD when AT, AF are selected



BTB2 Connection Heads

Model, Outline, and Dimensions

Outline & Dimensions	Model	Connection (NPT)		Terminal Block Options	Material	Connection Head Electrical Approval ¹
		Instrument	Conduit			
 <p>← 3.7" → 4.0"</p>	1ALT	1/2"	1x 1/2" ²	 Bakelite - <u>standard</u> Screw terminals to suit sensor configuration	Cast aluminum epoxy coated Buna O-ring	Class I Groups B,C,D Class II Groups E,F,G Class III Enclosure Type 4X
	2ALT	1/2"	1x 3/4"			
	3ALT	3/4"	1x 3/4"			
 <p>← 3.7" → 4.0"</p>	1SS	1/2"	1x 1/2" ²	 Ceramic - optional Screw terminals to suit sensor configuration	316 stainless steel Buna O-ring	Class I Groups B,C,D Class II Groups E,F,G Class III Enclosure Type 4X
	2SS	1/2"	1x 3/4"			
	3SS	3/4"	1x 3/4"			
 <p>← 3.7" → 4.0"</p>	1AL	1/2"	1x 1/2" ²	Add: "C" to connection head model number Example: 2ALTC 	Cast aluminum Buna O-ring	Class I Groups B,C,D Class II Groups E,F,G Class III Enclosure Type 4
	2AL	1/2"	1x 3/4"			
	3AL	3/4"	1x 3/4"			
 <p>← 3.6" → 4.3"</p>	1CAL ¹	1/2" ²	1x 1/2" ²	Clamp technology - optional DIN mounted clamp technology terminals to suit sensor configuration	Iron alloy Buna O-ring	Class I Groups A,B,C,D Class II Groups E,F,G Class III
	2CAL ¹	3/4"	1x 3/4"			
	1CCI ¹	1/2" ²	1x 1/2" ²			
	2CCI ¹	3/4"	1x 3/4"			
 <p>← 3.6" → 5.1"</p>	4CAL ¹	1/2"	2x 1/2"	Add: "D" to connection head model number. Example: 2ALTD	Cast aluminum Buna O-ring	Class I Groups A,B,C,D Class II Groups E,F,G Class III
	3CAL ¹	3/4"	2x 3/4"			
	4CCI ¹	1/2" ²	2x 1/2" ²			
	3CCI ¹	3/4"	2x 3/4"			
 <p>← 3.7" → 4.0"</p>	4AL	1/2"	1x 1/2" ²	Ceramic - oval terminal block Screw terminals to suit sensor configuration	Iron alloy Buna O-ring	General purpose
	0AL	1/2"	1x 3/4"			
 <p>← 3.7" → 4.0"</p>	1CI	1/2"	1x 1/2" ²	Terminal block integral to connection head Screw terminals to suit sensor configuration	Polypropylene	General purpose
	2CI	1/2"	1x 3/4"			
	3CI	3/4"	1x 3/4"			
 <p>← 3.7" → 4.0"</p>	0PY	1/2"	1x 3/4"			

NOTES:

1. Connection head approval rating is that of the enclosure ONLY and not the BTB2 sensor assembly
2. May be supplied with an approved reducer bushing