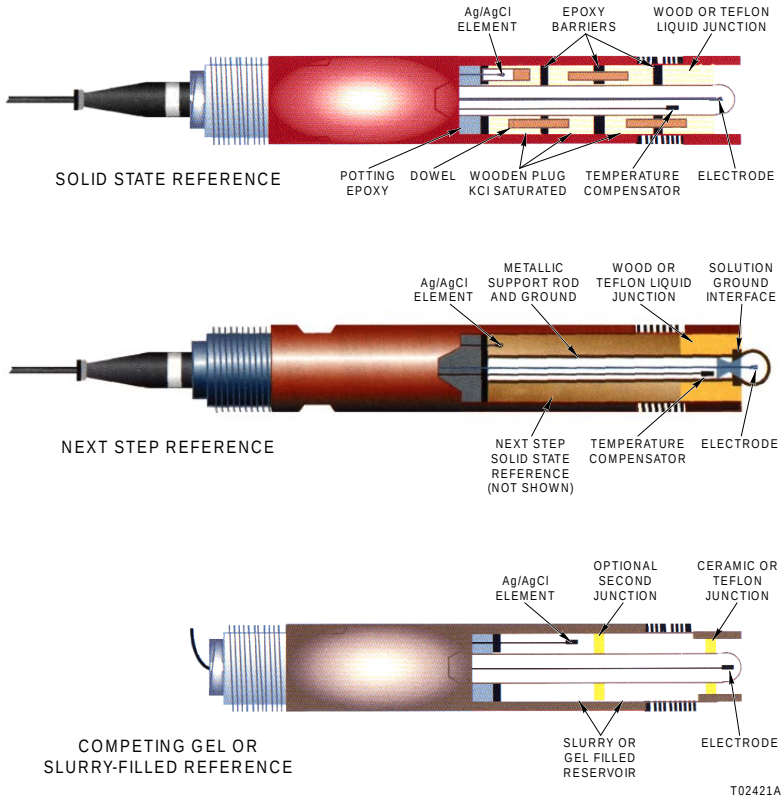
pH/ORP Sensors for Process Monitoring

Specification

pH/ORP Sensors

Features

- ***Standard Solid State Reference, Next Step™ Reference, and Next Step Advantage™ :*** Eliminate poisoning, pumping, and plugging.
- ***Next Step Reference:*** Patented advancement of Solid State Reference design.
- ***Next Step Advantage with solution ground:*** Provides complete sensor diagnostics.
- ***Superior electrodes:*** Seven different choices.
- ***Integral and external temperature compensation.***
- ***Combination style sensors.***
- ***Multiple sensor designs:*** Increase installation flexibility.
- ***Integral cable.***
- ***Choice of materials.***
- ***Rugged designs.***
- ***Operating temperature to 140°C (284°F).***
- ***Operating pressures to 1,725 kPa (250 psi) and higher (consult factory).***
- ***Sealed, compact assembly.***
- ***Simple, flexible installation.***
- ***Extended sensor life.***
- ***Resistant to fouling, strong acids, and caustics.***



A well-deserved reputation for ruggedness, longevity, and accuracy hallmark TBI-Bailey pH/ORP sensors. TBI-Bailey sensors are easily applied to most industrial measurement needs. They are renowned for their ability to outperform conventional sensors in the toughest applications throughout the process industry.

The performance and durability of TBI-Bailey sensors are attributable to the patented ***Solid State Reference*** half cell. Recent patented advancements to the original Solid State Reference include the new ***Next Step Reference*** half cell and ***Next Step Advantage*** sensor with solution ground rod. The Next Step Reference has drastically increased sensor life and performance in many applications. The Next Step Advantage sensor provides the added feature of sensor diagnostics. These new advances, combined with superior electrode technology, result in a sensor unequalled in the industry.

The availability of many styles, shapes, and materials assures compatibility with design, budgetary, and process requirements.

TBI-Bailey

BAILEY FISCHER & PORTER

The Most Durable pH/ORP Sensors in the World

Solid state reference and Next Step Reference half cells, along with recent advancements to these technologies, are the foundations on which all TBI-Bailey sensors are built. The silver/silver chloride (Ag/AgCl) based reference is permanently charged with potassium chloride (KCl). This delivers a nonfluid reference that all but eliminates poisoning, plugging, and pumping problems plaguing liquid, slurry, and gel-filled sensor designs.

TBI-Bailey sensors use a large, annular liquid junction (Fig. 1). It is continuous throughout the reference, resisting fouling and ensuring a low resistance interface to the process. This interface is free of junction potentials that cause erratic measurements.

It is possible to combine all measurement functions into one compact body. These functions are: reference, electrode, temperature compensation, and solution ground rod. An integral cable, potted inside the sensor, provides a completely sealed assembly without in-process high impedance connections.

TS00910A

Figure 1. Sensor Cross Sections Showing Wood and Teflon® Liquid Junctions

Choosing the Correct pH/ORP Sensor

1. Use the descriptions of each sensor model to determine the mounting scheme, body style, and material that fits the installation requirements.

2. Choose an electrode that suits the process temperature, chemistry, and physical parameters of the installation (refer to ***Electrodes***).

3. Select the automatic temperature compensator type. It can be an external element or integral to the sensor (refer to ***Temperature Compensation***).

4. Choose the liquid junction material, wood or Teflon, best suited to the process, and the type of electrode protection desired (refer to ***Liquid Junctions***).

5. Select either a standard Solid State Reference or new Next Step Reference half cell.

6. Use the appropriate sensor nomenclature tables to select the solution ground rod and o-ring material if selecting a Next Step Advantage sensor.

7. Use the nomenclature for the selected sensor to choose accessory hardware.

8. Select the cable length to connect the sensor to the analyzer or transmitter. Choose a continuous integral cable, or an integral cable and extension cable (refer to ***Cables***).

9. Build a model number using information in Steps 1 through 8 and nomenclature tables.

Sensor Options

TBI-Bailey offers a wide variety of standard sensors for most applications. Options include: body style, electrode, temperature compensation, liquid junction, sensor design, and cable. Next Step Advantage sensors also allow a choice between solution ground rod and o-ring materials.

Body Style

Sensor bodies are constructed of Kynar® and Ryton®. Table 1 lists the sensor model numbers and their applications. Model numbers beginning with TB5 are Solid State Reference and Next Step Reference sensors. Model numbers beginning with TBX5 are Next Step Advantage sensors.

Table 1. Sensor Models and Applications

Model Number	Application
TB551, TBX551	Inline, twist lock, submersible
TB556, TBX556	Inline, threaded, submersible
TB557, TBX557	Ball valve insertion, hot tap
TB561, TBX561	Inline, sterilizable
TB562, TBX562	Sanitary/sterilizable
TB564, TBX564	High pressure, hot tap
TB566, TBX566	High purity, flow cell
TB567, TBX567	Inline, high pressure

Electrodes

The design of TBI-Bailey measurement electrodes eliminates failure due to thermal stress caused by rapid temperature excursions. Unlike other sensors that use an air bubble for expansion absorption, TBI-Bailey uses a plunger style electrode. Plunger electrodes allow for expansion and contraction of the fill solution volume in response to temperature changes without large, internal air bubbles.

The manufacturing process for the pH glass uses nonoffensive chemicals. The glass contains no barium, cobalt, or uranium oxides. The impedance is low enough to maintain signal integrity, yet high enough to remain chemically durable with little or no sodium ion (Na^+) error.

Electrodes come in seven types to allow for optimization of electrode properties to process characteristics. Table 2 lists each electrode type with descriptions and ratings. Figure 2 shows the physical configuration of each electrode.

Table 2. Electrode Types and Ratings

Type	Description	Ratings			
		Range	Operating Temperature		Impedance
			°C	°F	
1	Flat glass - suitable for high density applications or processes where heavy fouling is expected. Electrode flush with liquid junction. Low Na^+ error.	0 to 14 pH	0 to 100[1]	32 to 212[1]	650 MΩ at 25°C (77°F)
2	Ruggedized glass - thicker glass in bulb area for rough handling and immersion in streams carrying abrasives. Not recommended for high pH applications.	0 to 12 pH	0 to 100	32 to 212	200 MΩ at 25°C (77°F)
3	High temperature glass - very versatile. Suitable for both high and low pH measurements, strong chemicals, and high purity water. Low Na^+ error.	0 to 14 pH	10 to 140	50 to 284	300 MΩ at 25°C (77°F)
5	ORP - Platinum (Pt) electrode as active element.	0 to ±2000 mV	0 to 140	32 to 284	<1 kΩ
6	Antimony (Sb) - metal electrode for pH measurement in abrasive or HF processes.	3 to 11 pH	-20 to 80	-4 to 176	<1 kΩ
F	Fluoride/acid resistant glass - resistant to etching effects of HF and strong acids up to several percent concentration.	0 to 12 pH	10 to 80[2]	50 to 176[2]	300 MΩ at 25°C (77°F)
J	Coating resistant glass - very versatile and suitable for both high and low pH measurements, strong chemicals, and high purity water. Resists coating better than Type 3 in some applications.	0 to 14 pH	10 to 140	50 to 284	300 MΩ at 25°C (77°F)

NOTES:
1. 0°C to 121°C (32°F to 250°F) for sterilization cycles.
2. 50°C (122°F) max. recommended for high HF concentration.

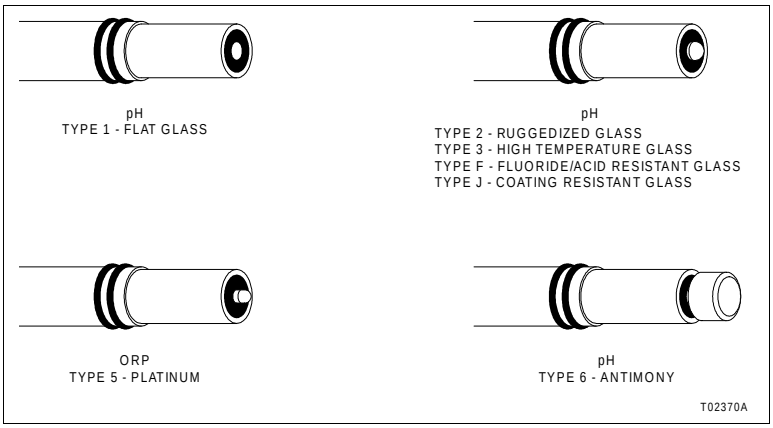


Figure 2. Electrode Types

Temperature Compensation

Temperature compensators adjust for process stream temperature effects on the glass pH electrode output (Nernstian effects) when connected to any TBI-Bailey pH analyzer or transmitter (Fig. 3). Select analyzers and transmitters allow the temperature compensator to adjust for solution pH changes due to temperature effects. Order temperature compensation as an integral component of the pH sensor or as an external unit. This is valid for both inline and submersible applications.

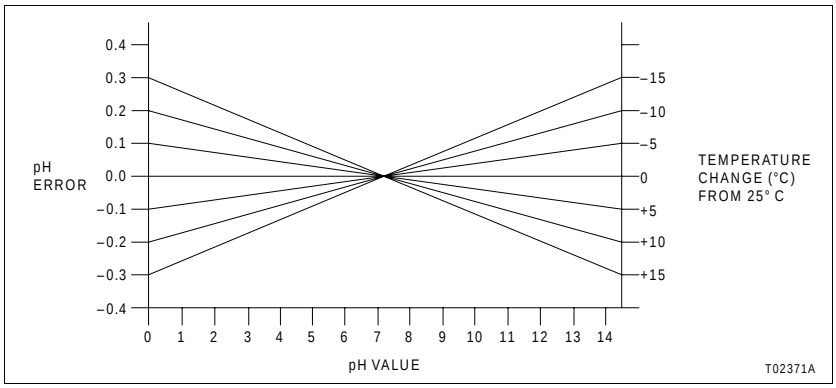


Figure 3. Temperature Compensation

The integral temperature compensator is located inside the electrode (Fig. 4). Two 22-AWG wires carry the signal.

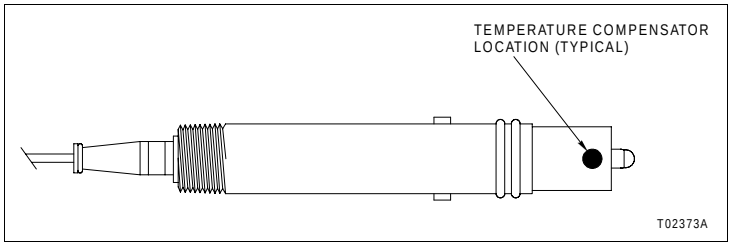


Figure 4. Integral Temperature Compensator

Model TB590 External Temperature Compensators come in either inline or submersible versions. A shielded two-wire cable carries the signal (Fig. 5). Order the external temperature compensators using the nomenclature shown in Table 3.

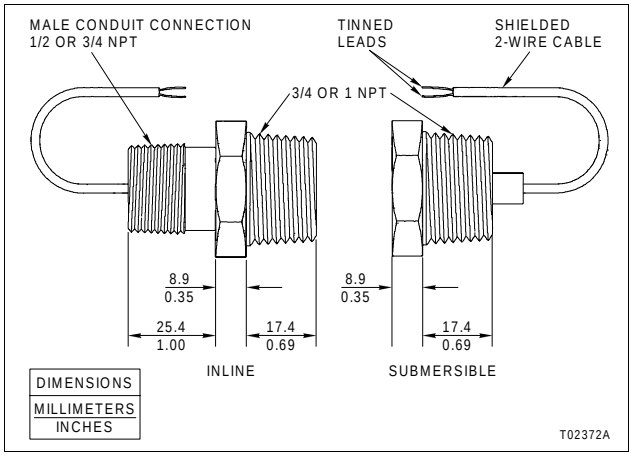


Figure 5. Model TB590 External Temperature Compensators

Wand temperature compensators are external units that come with all wetted parts made of either Teflon or 316 stainless steel (Fig. 6). They have 9.1-meter (30-foot), Teflon jacketed, twisted pair leads. Table 4 summarizes the types of wand temperature compensators.

Table 3. Model TB590 External Temperature Compensator Nomenclature

1 2 3 4 5 6 7 8 9 10 T B 5 9 0 _ _ _ _ _	External Temperature Compensator (3 kΩ)
	Style
0 _ _ _ _	Inline
1 _ _ _ _	Submersible
	Body Style
0 _ _ _	¾ NPT
1 _ _ _	1 NPT
	Units of Measure, Cable Length
F _ _	Ft
	Cable Length
_ _	01 to 30 ft (enter length in whole ft)

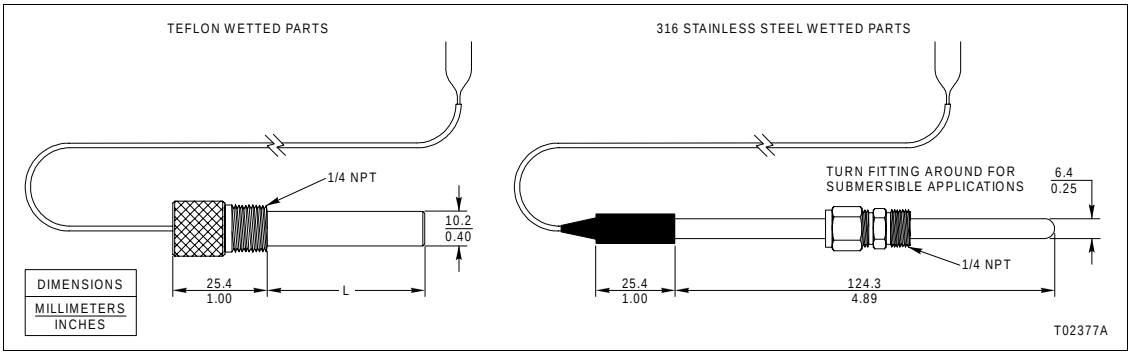


Figure 6. Wand Temperature Compensator Dimensions

Table 4. Wand Temperature Compensators

Part Number	Wetted Parts	L Dimension (Fig. 6)		Max. Pressure		Max. Temperature	
		mm	in.	kPa	psi	°C	°F
4TB6006-0008	316 stainless steel	—	—	690	100	125	257
4TB6006-0009	Teflon	50.8	2.0	690	100	100	212
4TB6006-0021	Teflon	25.4	1.0	690	100	100	212

Liquid Junctions

Liquid junctions come in two materials and three styles. The two materials are wood and porous Teflon. The three styles are flush, notched, and recessed.

The hardwood junction is recommended for all processes except known wood delignifiers. Wood delignifiers such as strong caustics and oxidizers, or substances with a continuous pH above 11.5, cause wood to lose its texture. Porous Teflon is recommended for processes known to delignify wood or with a continuous pH of 11.5 or above.

Table 5 lists the three styles and provides a description of each. Table 6 lists the junction materials, styles, and electrode types for each sensor. Figure 7 shows the normal and flat glass versions of the three styles.

Table 5. Liquid Junction Styles

Style	Description
Flush	Liquid junction flush with end of sensor body. Recommended for processes where fouling is expected.
Notched	Sensor body material extends beyond liquid junction surface to provide electrode protection. Recommended for all hot tap and submersible sensors.
Recessed	Liquid junction is countersunk and hoods electrode. Recommended for processes with very high velocity or high density solids. Not recommended for submersible sensors or flat glass choices.

Table 6. Valid Liquid Junctions[1]

Sensor (TB/TBX)	Flush			Notched			Recessed		
	Wood	Teflon	Electrodes	Wood	Teflon	Electrodes	Wood	Teflon	Electrodes
551	•	•	1,2,3,5,6,F,J	—	—	—	—	•	1[2],2,3,F,J
556	•	•	1,6	•	•	1,2,3,5,F,J	—	•	1[2],2,3,F,J
557	•	•	1,6	•	•	1,2,3,5,F,J	—	•	1[2],2,3,F,J
561	•	•	1,3,5,F,J	•	•	1,3,5,F,J	—	—	—
562	•	•	1,2,3,5,F,J	—	—	—	—	—	—
564	•	•	6	•	•	2,3,5,F,J	—	•	2,3,F,J
566	•	•	1,3,5,J	—	—	—	—	—	—
567	•	•	2,3,5,6,F,J	—	—	—	—	[2]	2,3,F,J

NOTES:
1. • = valid selection. — = invalid selection.
2. Not recommended.

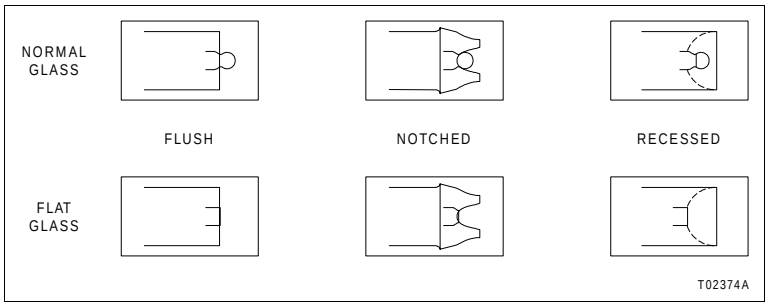


Figure 7. Liquid Junction Styles

Cables

TBI-Bailey offers a number of cabling options for all its pH/ORP sensors. All cables are potted inside the sensor to provide environmental protection. Cable lengths, specified in the sensor nomenclature, can be any continuous length up to 9.1 meters (30 feet). The standard length for most sensors is 1.5 meters (five feet). Standard nomenclature items include junction boxes and submersion couplers, typically used with extension cables for direct connection to TBI-Bailey analyzers and transmitters. Extension cables can also be used with sensors that require more than 9.1 meters (30 feet) of cable. Recommended maximum cable length is 30.5 meters (100 feet). A BNC/TC to pin terminal adapter is available for connecting sensors with coaxial cable to Type TB82 and TB84 transmitters, and competitive electronics using terminal blocks. Sensors with pin terminals already connected are available by selecting the T nomenclature option. Figure 8 shows the cable styles and junction box wiring for solid state and Next Step Reference sensors and Figure 9 shows the cable styles and junction box wiring for Next Step Advantage sensors.

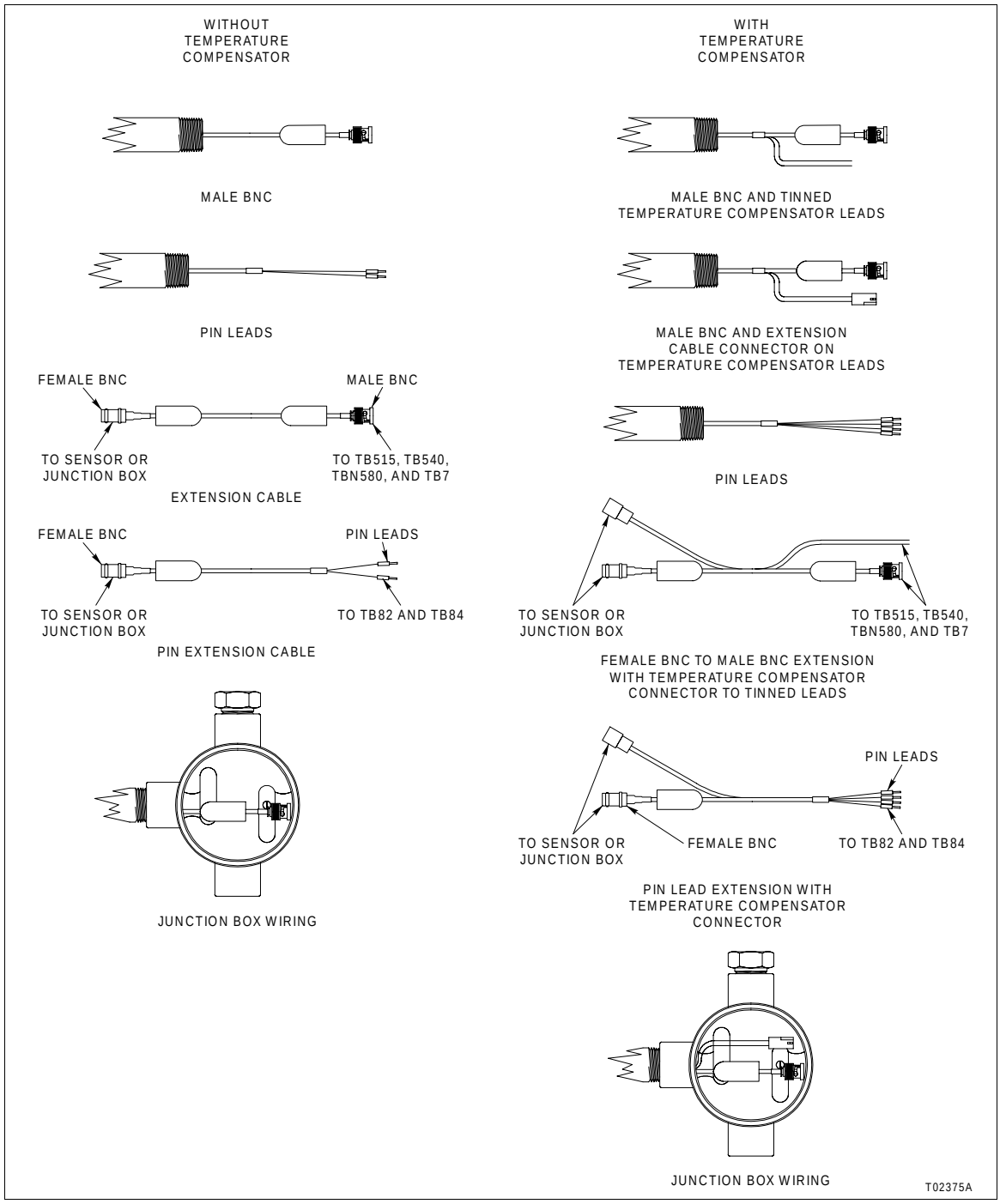


Figure 8. Solid State and Next Step Reference Sensor Cables and Junction Box Wiring

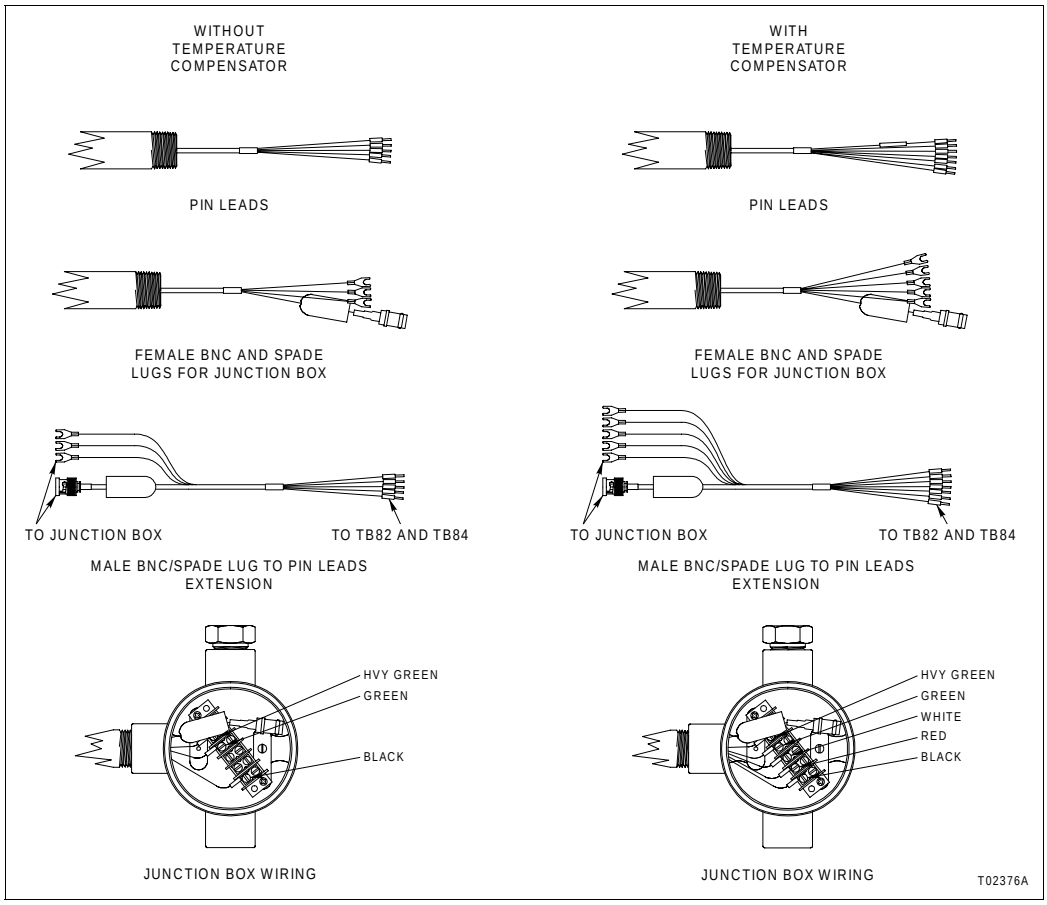


Figure 9. Next Step Advantage Sensor Cables and Junction Box Wiring

Specifications, Dimensions, and Nomenclature

TBI-Bailey offers several sensors in the Solid State Reference, Next Step Reference, and Next Step Advantage series. The following sections contain detailed specifications, dimensions, and nomenclature for each available sensor.

Model TB551 and TBX551 Sensors

Model TB551 and TBX551 sensors (Fig. 10) are inline (flow) or submersible, general purpose, twist lock style sensors. The sensor body is molded from chemically resistant Ryton. A twist lock receptacle, available in epoxy, Kynar, or 316 stainless steel, or a Ryton threaded receptacle adapt the sensor to one-inch fittings. Optional electrode guards protect the electrode in submersible applications.

Figure 10. Model TB551 Sensor

The Model TB551 and TBX551 sensor specifications are listed in Table 7 and their dimensions are shown in Figure 11. Table 8 is the Model TB551 sensor nomenclature and Table 9 is the Model TBX551 sensor nomenclature.

Table 7. Model TB551 and TBX551 Sensor Specifications

Property	Characteristic/Value
Applications	Inline, submersible
Max. pressure/temp.	690 kPa (100 psi) at 140°C (284°F)
Features	Low cost, universal type, equipped with adaptor for twist lock or threaded cap insertion
Material Body Liquid junction	 Ryton Wood or Teflon
Liquid junction types	Flush, recessed

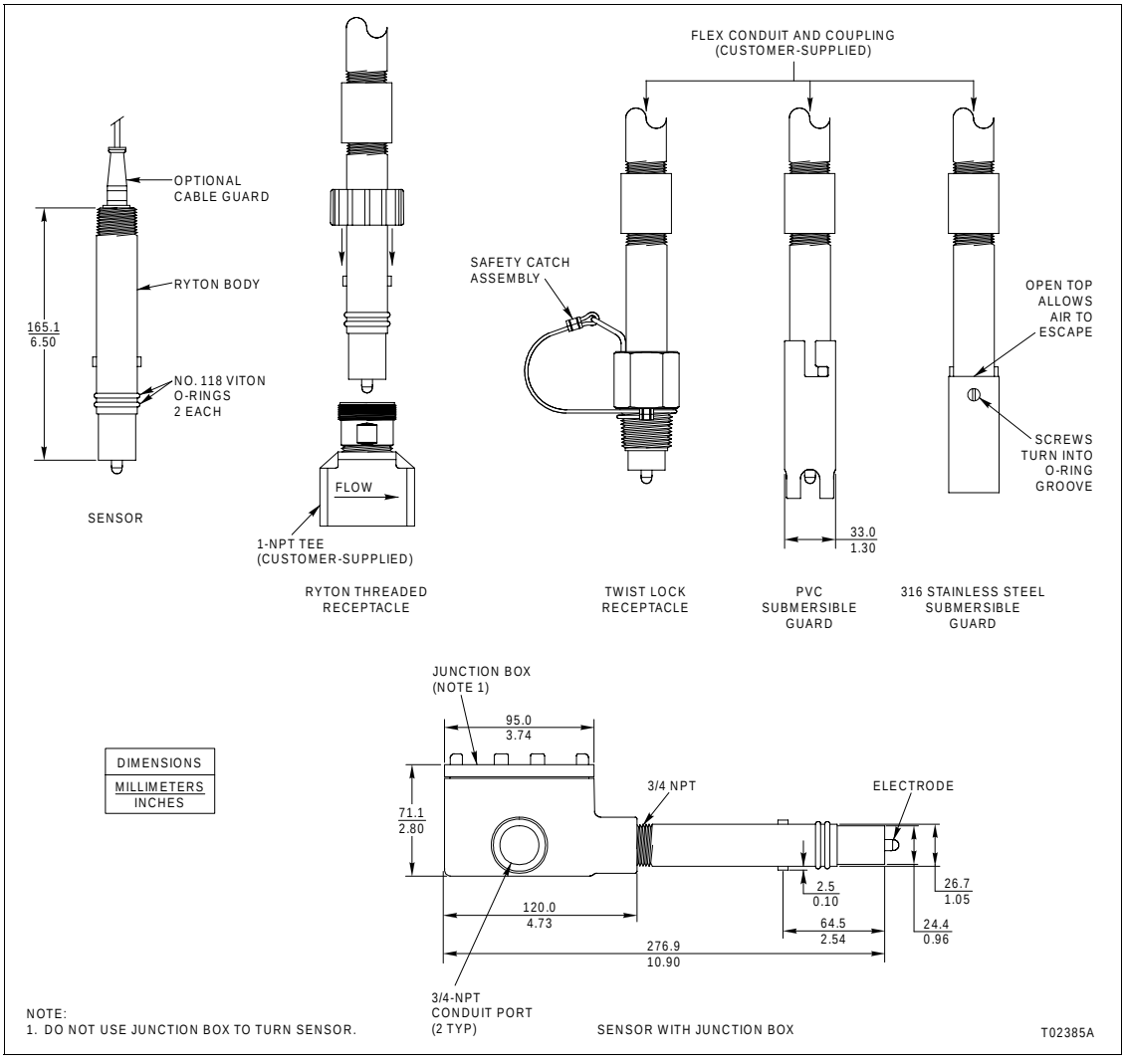


Figure 11. Model TB551 and TBX551 Sensor Dimensions

Table 8. Model TB551 Solid State and Next Step Sensor Nomenclature

1	2	3	4	5	6	7	8	9	10	11	12	13	Inline, Twist Lock, Submersible pH/ORP Sensor Assembly[1]
T	**B**	**5**	**5**	**1**	_	_	_	_	_	_	_	_	
													Electrode
					1	_	_	_	_	_	_	_	Flat glass, pH
					2	_	_	_	_	_	_	_	Ruggedized glass, pH
					3	_	_	_	_	_	_	_	High temperature glass, pH
					5	_	_	_	_	_	_	_	Platinum, ORP
					6	_	_	_	_	_	_	_	Antimony, pH[2]
					F	_	_	_	_	_	_	_	Fluoride/acid resistant glass, pH
					J	_	_	_	_	_	_	_	Coating resistant glass, pH
													Integral Temperature Compensator
						0	_	_	_	_	_	_	None
						1	_	_	_	_	_	_	3 kΩ, tinned leads[3]
						2	_	_	_	_	_	_	3 kΩ, extension cable connector[3]
						3	_	_	_	_	_	_	Pt 100, tinned leads[4]
						4	_	_	_	_	_	_	Pt 100, extension cable connector[4]
													Liquid Junction
							1	_	_	_	_	_	Wood, flush, Solid State Reference
							3	_	_	_	_	_	Teflon, flush, Solid State Reference
							4	_	_	_	_	_	Teflon, recessed, Solid State Reference[3]
							A	_	_	_	_	_	Wood, flush, Next Step Reference
							B	_	_	_	_	_	Teflon, flush, Next Step Reference
							C	_	_	_	_	_	Teflon, recessed, Next Step Reference[3]
													Body Style
								0	_	_	_	_	Ryton
													Accessory Hardware
									0	_	_	_	None
									1	_	_	_	Epoxy twist lock receptacle
									2	_	_	_	316 stainless steel twist lock receptacle
									3	_	_	_	Kynar twist lock receptacle
									4	_	_	_	PVC submersible guard
									5	_	_	_	316 stainless steel submersible guard
									6	_	_	_	Ryton threaded receptacle
													Integral Sensor Cable, Units of Measure[5]
										F	_	_	BNC connector, ft
										T	_	_	Tinned and pin leads, ft[6]
										0	_	_	Use when Positions 12 and 13 contain JB, SP, SK, or JS[7]
													Length, Integral Sensor Cable
											_	_	01 to 30 ft (enter length in whole ft)
											J	B	With junction box[7]
											S	P	With PVC submersible coupler[7]
											S	K	With Kynar submersible coupler[7]
											J	S	Less junction box or submersible coupler[7]

NOTES:
1. Tagging must be ordered separately.
2. Model TB551601,3,A,B sensors only.
3. Model TB5511,2,3,F,J sensors only.
4. Model TB5511,2,3,J sensors only. TBI-Bailey instrument compatibility limited to Type TB82 and TB84 transmitters.
5. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: Use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, Nomenclature position 7 must be 2 or 4. Option 2: Select T in Nomenclature position 11, which is not designed for use with extension cables or junction box.
6. Designed for direct connection to Type TB82 or TB84 transmitters, or competitive electronics using terminal blocks.
7. Junction box or submersible connector mounted on sensor. Cable length approximately 102 mm (4 in.). Requires extension cable. Nomenclature position 7 must be 0, 2, or 4.

Table 9. Model TBX551Next Step Advantage Sensor Nomenclature

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Next Step Advantage Inline, Twist Lock, Submersible pH/ORP Sensor Assembly[1]
T	**B**	**X**	**5**	**5**	**1**	_	_	_	_	_	_	_	_	_	_	_	
																	Electrode
						1	_	_	_	_	_	_	_	_	_	_	Flat glass, pH
						2	_	_	_	_	_	_	_	_	_	_	Ruggedized glass, pH
						3	_	_	_	_	_	_	_	_	_	_	High temperature glass, pH
						5	_	_	_	_	_	_	_	_	_	_	Platinum, ORP
						6	_	_	_	_	_	_	_	_	_	_	Antimony, pH[2]
						F	_	_	_	_	_	_	_	_	_	_	Fluoride/acid resistant glass, pH
						J	_	_	_	_	_	_	_	_	_	_	Coating resistant glass, pH
																	Integral Temperature Compensator
							0	_	_	_	_	_	_	_	_	_	None
							1	_	_	_	_	_	_	_	_	_	3 kΩ[3]
							3	_	_	_	_	_	_	_	_	_	Pt 100[4]
																	Liquid Junction
								A	_	_	_	_	_	_	_	_	Wood, flush, Next Step Reference
								B	_	_	_	_	_	_	_	_	Teflon, flush, Next Step Reference
								C	_	_	_	_	_	_	_	_	Teflon, recessed, Next Step Reference[3]
																	Solution Ground Rod Material
									1	_	_	_	_	_	_	_	316 stainless steel
									2	_	_	_	_	_	_	_	Titanium
									3	_	_	_	_	_	_	_	Hastelloy® B2
																	O-Ring Material
										1	_	_	_	_	_	_	Viton®
										2	_	_	_	_	_	_	EPDM
										3	_	_	_	_	_	_	Silicone
										4	_	_	_	_	_	_	Kalrez®,[5]
																	Body Style
											0	_	_	_	_	_	Ryton
																	Accessory Hardware
												0	_	_	_	_	None
												1	_	_	_	_	Epoxy twist lock receptacle
												2	_	_	_	_	316 stainless steel twist lock receptacle
												3	_	_	_	_	Kynar twist lock receptacle
												4	_	_	_	_	PVC submersible guard
												5	_	_	_	_	316 stainless steel submersible guard
												6	_	_	_	_	Ryton threaded receptacle
																	Integral Sensor Cable, Units of Measure
													T	_	_	_	Tinned and pin leads, ft
													0	_	_	_	Use when positions 15 and 16 contain JB, JS, or when extension cable termination is required[6]
																	Length, Integral Sensor Cable
														_	_	_	01 to 30 ft (enter length in whole ft)
														J	B	_	With junction box[6]
														J	S	_	Less junction box[6]
																	Tagging
																0	None
																1	Mylar
																2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Model TBX55160A,B sensors only.
3. Model TBX5511,2,3,F,J sensors only.
4. Model TBX5511,2,3,J sensors only.
5. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
6. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If junction box is ordered separately and longer cable lengths are desired, enter cable length in nomenclature positions 15 and 16.

Model TB556 and TBX556 Sensors

Model TB556 and TBX556 sensors (Fig. 12) are threaded style sensors suitable for both submersion and insertion into process piping. The threads used for mounting the sensor are ¾ NPT with the front thread being used for insertion applications. Distance from this thread to the tip of the sensor is specified by the complete sensor nomenclature. Maximum insertion depth is 127 millimeters (five inches).

TC00946A

Figure 12. Model TB556 Sensor

The Model TB556 and TBX556 sensor specifications are listed in Table 10 and their dimensions are shown in Figure 13. Table 11 is the Model TB556 sensor nomenclature and Table 12 is the Model TBX556 sensor nomenclature.

Table 10. Model TB556 and TBX556 Sensor Specifications

Property	Characteristic/Value
Applications	¾-in. process connection, submersible
Max. pressure/temp.	690 kPa (100 psi) at 80°C (176°F); 276 kPa (40 psi) at 140°C (284°F)
Material Body Liquid junction	 Kynar Wood, Teflon
Liquid junction types	Flush (antimony and flat glass electrodes only), notched (recommended), optional recessed Teflon
Flow	Specify electrode insertion depth in nomenclature
Submersible	With notched liquid junction

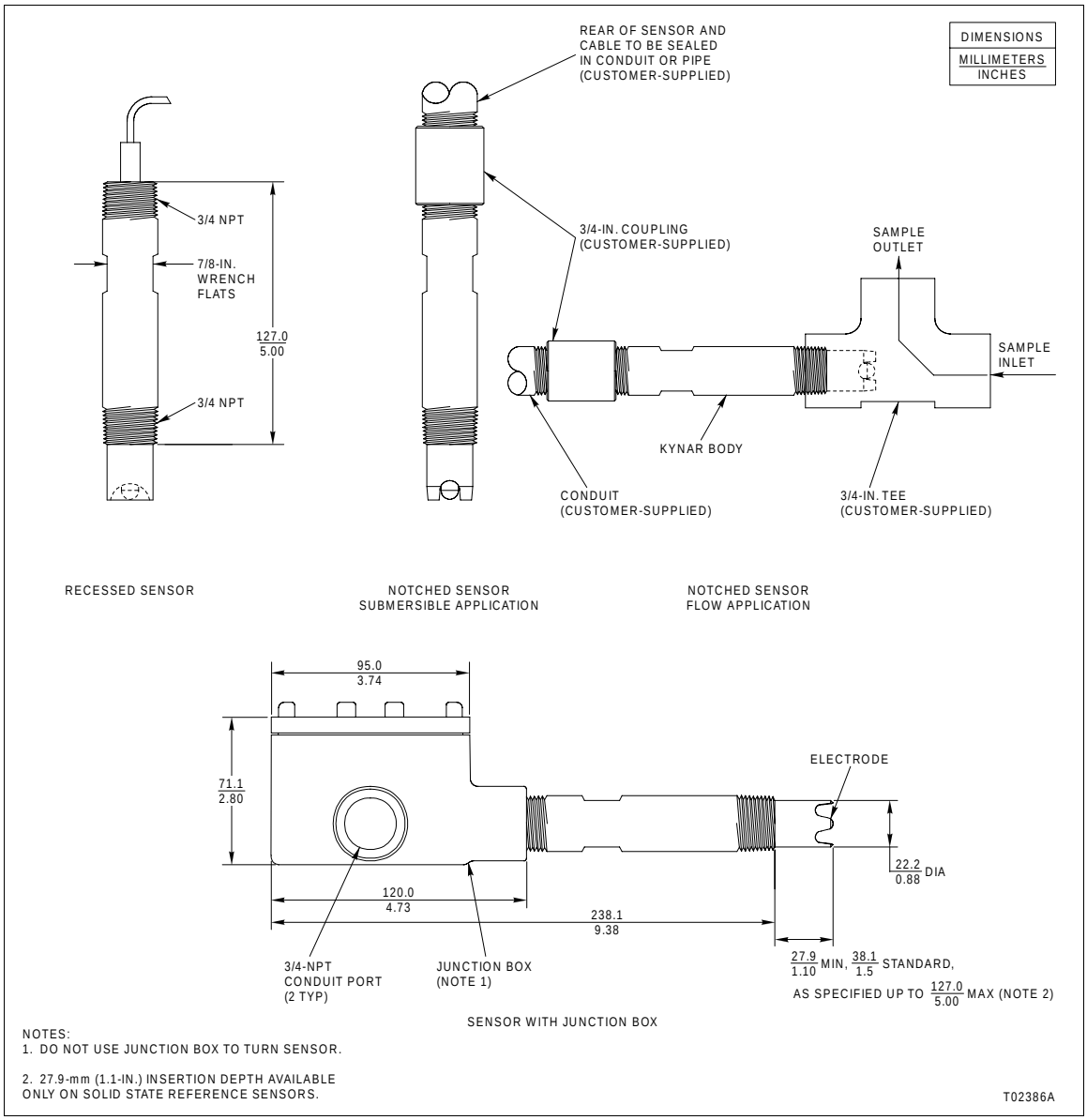


Figure 13. Model TB556 and TBX556 Sensor Dimensions

Table 11. Model TB556 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 **T B 5 5 6** _ _ _ _ _ _ _ _	**Inline, Threaded, Submersible pH/ORP Sensor Assembly**[1,2]
	Electrode
1 _ _ _ _ _ _ _	Flat glass, pH
2 _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _	Antimony, pH[3]
F _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH[4]
J _ _ _ _ _ _ _	Coating resistant glass, pH

Table 11. Model TB556 Solid State and Next Step Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 **T B 5 5 6** _ _ _ _ _ _ _ _	**Inline, Threaded, Submersible pH/ORP Sensor Assembly**[1,2]
	Integral Temperature Compensator
0 _ _ _ _ _ _	None
1 _ _ _ _ _ _	3 kΩ, tinned leads[5]
2 _ _ _ _ _ _	3 kΩ, extension cable connector[5]
3 _ _ _ _ _ _	Pt 100, tinned leads[6]
4 _ _ _ _ _ _	Pt 100, extension cable connector[6]
	Liquid Junction
1 _ _ _ _ _	Wood, flush, Solid State Reference[7,8]
3 _ _ _ _ _	Teflon, flush, Solid State Reference[7,8]
4 _ _ _ _ _	Teflon, recessed, Solid State Reference[5,7]
5 _ _ _ _ _	Wood, notched, Solid State Reference[9]
6 _ _ _ _ _	Teflon, notched, Solid State Reference[9]
A _ _ _ _ _	Wood, flush, Next Step Reference[7,8]
B _ _ _ _ _	Teflon, flush, Next Step Reference[7,8]
C _ _ _ _ _	Teflon, recessed, Next Step Reference[7,9]
D _ _ _ _ _	Wood, notched, Next Step Reference[9]
E _ _ _ _ _	Teflon, notched, Next Step Reference[9]
	Body Style[10]
0 0 _ _ _	Submersible [11]
1 1 _ _ _	1.1-in. insertion depth
1 5 _ _ _	1.5-in. insertion depth
5 0 _ _ _	5.0-in. insertion depth
	Integral Sensor Cable, Units of Measure[12]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[13]
0 _ _	Use when positions 12 and 13 contain JB, SP, SK, or JS[14]
	Length, Integral Sensor Cable
_ _	01 to 30 ft (enter length in whole ft)
J B	With junction box
S P	With PVC submersible coupler[14]
S K	With Kynar submersible coupler[14]
J S	Less junction box or submersible coupler[14]

NOTES:
1. Tagging must be ordered separately.
2. Standard body material is Kynar. Consult factory for Halar® body.
3. Model TB556601,3,A,B sensors only.
4. Minimum insertion depth is 1.5 in. Maximum insertion depth is 5.0 in.
5. Model TB5561,2,3,F,J sensors only.
6. Model TB5561,2,3,J sensors only. TBI-Bailey instrument compatibility limited to Type TB82 and TB84 transmitters.
7. Insertion depth = 4.5-in. maximum.
8. Model TB5561,6 sensors only.
9. Model TB5561,2,3,5,F,J sensors only.
10. Minimum insertion depth for Next Step Reference is 1.5 in.
11. Built as 1.5-in. insertion depth. Can be any length between 0.8 and 5.0 in. Includes cable strain relief on sensors without temp. comp.
12. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 11, which is not designed for use with extension cables or junction box.
13. Designed for direct connection to Type TB82 or TB84 transmitters, or competitive electronics using terminal blocks.
14. Junction box or submersible connector mounted on sensor. Cable length approximately 102 mm (4 in.). Requires extension cable. Nomenclature position 7 must be 0, 2, or 4.

Table 12. Model TBX556 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	Next Step Advantage Inline, Threaded, Submersible pH/ORP Sensor Assembly[1,2]
T B X 5 5 6 _ _ _ _ _ _ _ _ _ _ _	
	Electrode
1 _ _ _ _ _ _ _ _ _ _	Flat glass, pH
2 _ _ _ _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH[3]
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _ _ _ _	Antimony, pH
F _ _ _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _ _ _	3 kΩ[4]
3 _ _ _ _ _ _ _ _ _	Pt 100[5]
	Liquid Junction[6]
A _ _ _ _ _ _ _ _ _	Wood, flush, Next Step Reference[7]
B _ _ _ _ _ _ _ _ _	Teflon, flush, Next Step Reference[7]
C _ _ _ _ _ _ _ _ _	Teflon, recessed, Next Step Reference[4]
D _ _ _ _ _ _ _ _ _	Wood, notched, Next Step Reference[8]
E _ _ _ _ _ _ _ _ _	Teflon, notched, Next Step Reference[8]
	Solution Ground Rod Material
1 _ _ _ _ _ _ _ _ _	316 stainless steel
2 _ _ _ _ _ _ _ _ _	Titanium
3 _ _ _ _ _ _ _ _ _	Hastelloy B2
	O-Ring Material
1 _ _ _ _ _ _ _ _ _	Viton
2 _ _ _ _ _ _ _ _ _	EPDM
3 _ _ _ _ _ _ _ _ _	Silicone
4 _ _ _ _ _ _ _ _ _	Kalrez[9]
	Body Style
0 0 _ _ _ _ _ _ _	Submersible[10]
1 5 _ _ _ _ _ _ _	1.5-in. insertion depth[11]
5 0 _ _ _ _ _ _ _	5.0-in. insertion depth[11]
	Integral Sensor Cable, Units of Measure
T _ _ _ _ _ _ _ _	Tinned and pin leads, ft
0 _ _ _ _ _ _ _ _	Use when positions 15 and 16 contain JB, JS, or when extension cable termination is required.[12]
	Length, Integral Sensor Cable
_ _ _ _ _ _ _ _	01 to 30 ft (enter length in whole ft)
J B _ _ _ _ _ _ _	With junction box[12]
J S _ _ _ _ _ _ _	Less junction box[12]
	Tagging
0	None
1	Mylar
2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Standard body material is Kynar. Consult factory for Halar body.
3. Model TBX55660,A,B sensors only.
4. Model TBX5561,2,3,F,J sensors only.
5. Model TBX5561,2,3,J sensors only. TBI-Bailey instrument compatibility limited to Type TB82 and TB84 transmitters.
6. Flush and recessed liquid junctions limited to 4.5-in. insertion depths.
7. Model TBX5561,6 sensors only.
8. Model TBX5561,2,3,F,J sensors only.
9. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
10. Manufactured as 1.5-in. insertion depth. Includes cable strain relief.
11. Includes cable strain relief.
12. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If junction box is ordered separately and longer cable lengths are desired, enter cable length in nomenclature positions 15 and 16.

Model TB557 and TBX557 Sensors

Model TB557 and TBX557 sensors are hot tap, ball valve insertion sensors (Fig. 14). They are removable from the process line, tank, or vessel, without interrupting flow or requiring draining of the container. The sensor is inserted through a standard 1-½ inch or 1-¼ inch full port ball valve (Fig. 15). An antiblowout lip, far superior to lanyard restraints found on competitive sensors, is standard. Ease of disassembly facilitates sensor replacement. Two types of compression fittings, a hand-tight with 1-¼ NPT threads and a wrench-tight with 1.0-NPT threads are available (Fig. 16). The flush and drain style (bottom row in Fig. 14), available with both hand-tight and wrench-tight compression fittings, has 1-½ inch threads.

Figure 14. Model TB557 and TBX557 Sensors

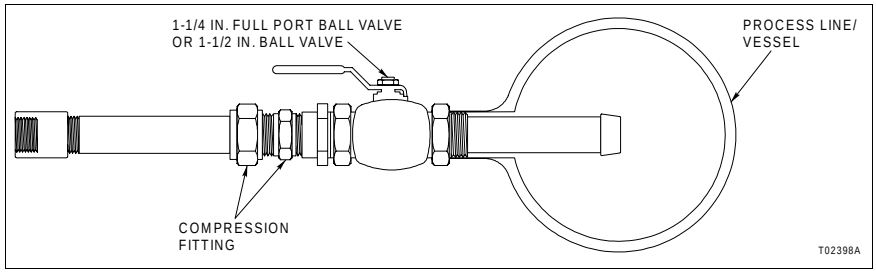


Figure 15. Ball Valve

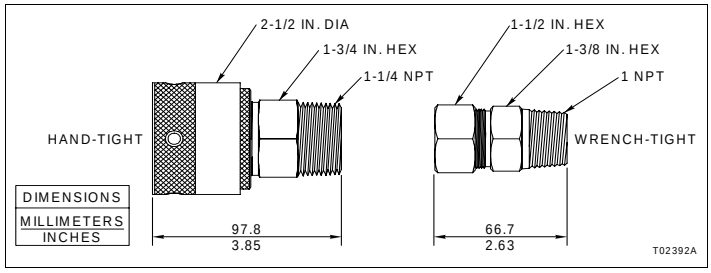


Figure 16. Compression Fittings

The Model TB557 and TBX557 sensor specifications are listed in Table 13 and their dimensions are shown in Figure 17. Table 14 is the Model TB557 sensor nomenclature and Table 15 is the Model TBX557 sensor nomenclature.

Table 13. Model TB557 and TBX557 Sensor Specifications

Property	Characteristic/Value
Applications	Inline, tanks
Max pressure/temp.	690 kPa (100 psi) at 80°C (176°F); 276 kPa (40 psi) at 140°C (284°F)
Features	Insert or retract without disturbing line flow, replaceable pH sensor, antiblowout lip, no internal high impedance connectors
Material Body Compression fitting External o-rings Liquid junction	 Kynar with titanium sheath (316 stainless steel and Hastelloy sheaths available) 316 stainless steel (titanium and Hastelloy available) Viton Wood, Teflon
Liquid junction types	Flush (Antimony and flat glass electrodes only), notched, recessed
Length	16-in. standard, 30-in. max.

Table 14. Model TB557 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 5 7 _ _ _ _ _ _ _ _	Ball Valve Insertion Hot Tap pH/ORP Sensor Assembly[1,2]
	Electrode
1 _ _ _ _ _ _ _	Flat glass, pH
2 _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _	Antimony, pH[3]
F _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _	None
1 _ _ _ _ _ _	3 kΩ, tinned leads[4]
2 _ _ _ _ _ _	3 kΩ, extension cable connector[4]
3 _ _ _ _ _ _	Pt 100, tinned leads[5]
4 _ _ _ _ _ _	Pt 100, extension cable connector[5]
	Liquid Junction
1 _ _ _ _ _	Wood, flush, Solid State Reference[3,6]
3 _ _ _ _ _	Teflon, flush, Solid State Reference[3,6]
4 _ _ _ _ _	Teflon, recessed, Solid State Reference[4]
5 _ _ _ _ _	Wood, notched, Solid State Reference[7]
6 _ _ _ _ _	Teflon, notched, Solid State Reference[7]
A _ _ _ _ _	Wood, flush, Next Step Reference[3,6]
B _ _ _ _ _	Teflon, flush, Next Step Reference[3,6]
C _ _ _ _ _	Teflon, recessed, Next Step Reference[4]
D _ _ _ _ _	Wood, notched, Next Step Reference[7]
E _ _ _ _ _	Teflon, notched, Next Step Reference[7]
	Body Style (other lengths and materials available)
0 _ _ _ _	Replacement Model TB557 sensor only
7 _ _ _ _	16-in. titanium sheath
A _ _ _ _	16-in. Hastelloy C sheath
B _ _ _ _	16-in. 316 stainless steel sheath
F _ _ _ _	20-in. titanium sheath
G _ _ _ _	24-in. titanium sheath
H _ _ _ _	30-in. titanium sheath
	Accessory Hardware
0 _ _ _	None[8]
1 _ _ _	316 stainless steel compression fitting, wrench-tight
2 _ _ _	Hastelloy C compression fitting, wrench-tight
3 _ _ _	316 stainless steel compression fitting, hand-tight
4 _ _ _	Titanium compression fitting, hand-tight

Table 14. Model TB557 Solid State and Next Step Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 5 7 _ _ _ _ _ _ _ _	Ball Valve Insertion Hot Tap pH/ORP Sensor Assembly[1,2]
	Integral Sensor Cable, Units of Measure[9]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[10]
0 _ _	Use when positions 12 and 13 contain JB, or J1-J5[11]
	Length, Integral Sensor Cable
_ _	01 to 29 ft (enter length in whole ft)[12]
J B	With junction box[11]
J 1	Replacement sensor for 16-in. sheath[13]
J 2	Replacement sensor for 20-in. sheath[13]
J 3	Replacement sensor for 24-in. sheath[13]
J 4	Replacement sensor for 30-in. sheath[13]
J 5	Replacement sensor for 36-in. sheath[13]

NOTES:
1. Tagging must be ordered separately.
2. Standard body material is Kynar. Ryton available on special order.
3. Consult factory for use of flush liquid junctions with glass pH and ORP electrodes. Antimony electrode must have flush liquid junction.
4. Model TB5571,2,3,F,J sensors only.
5. Model TB5571,2,3,J sensors only. TBI-Bailey instrument compatibility limited to Type TB82 and TB84 transmitters.
6. Model TB5571,6 sensors only.
7. Model TB5571,2,3,5,F,J sensors only.
8. Applicable for all body styles. Mandatory for replacement sensor (0 in nomenclature position 9).
9. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 11, which is not designed for use with extension cables or junction box.
10. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
11. Junction box mounted on sensor. Cable length varies to match body style length selection. Nomenclature positions 9 and 10 can be anything except 0. Requires extension cable to transmitter. Nomenclature position 7 must be 0, 2, or 4.
12. Standard cable length of 4 ft as measured from rear of sensor assembly with 16-in. sheath only. Maximum 29-ft cable available with 16-in. sheath only. Longer sheathes decrease cable length proportionally.
13. Applicable only to sensors with junction boxes.

Table 15. Model TBX557 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 5 7 _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage Ball Valve Insertion Hot Tap pH/ORP Sensor Assembly[1,2]
	Electrode
1 _ _ _ _ _ _ _ _ _ _	Flat glass, pH
2 _ _ _ _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _ _ _ _	Antimony, pH[3]
F _ _ _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _ _ _ _	3 kΩ[4]
3 _ _ _ _ _ _ _ _ _ _	Pt 100[5]
	Liquid Junction
A _ _ _ _ _ _ _ _ _ _	Wood, flush, Next Step Reference[3,6]
B _ _ _ _ _ _ _ _ _ _	Teflon, flush, Next Step Reference[3,6]
C _ _ _ _ _ _ _ _ _ _	Teflon, recessed, Next Step Reference[4]
D _ _ _ _ _ _ _ _ _ _	Wood, notched, Next Step Reference[7]
E _ _ _ _ _ _ _ _ _ _	Teflon, notched, Next Step Reference[7]
	Solution Ground Rod Material
1 _ _ _ _ _ _ _ _ _ _	316 stainless steel
2 _ _ _ _ _ _ _ _ _ _	Titanium
3 _ _ _ _ _ _ _ _ _ _	Hastelloy B2

Table 15. Model TBX557 Next Step Advantage Sensor Nomenclature *(continued)*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Next Step Advantage Ball Valve Insertion Hot Tap pH/ORP Sensor Assembly[1,2]
T	**B**	**X**	**5**	**5**	**7**	_	_	_	_	_	_	_	_	_	_	_	
																	O-Ring Material
										1	_	_	_	_	_	_	Viton
										2	_	_	_	_	_	_	EPDM
										3	_	_	_	_	_	_	Silicone
										4	_	_	_	_	_	_	Kalrez[8]
																	Body Style
											0	_	_	_	_	_	Replacement Model TBX557 sensor only
											7	_	_	_	_	_	16-in. titanium sheath
											A	_	_	_	_	_	16-in. Hastelloy C sheath
											B	_	_	_	_	_	16-in. 316 stainless steel sheath
											F	_	_	_	_	_	20-in. titanium sheath
											G	_	_	_	_	_	24-in. titanium sheath
											H	_	_	_	_	_	30-in. titanium sheath
											J	_	_	_	_	_	20-in. Hastelloy C sheath
											K	_	_	_	_	_	24-in. Hastelloy C sheath
											L	_	_	_	_	_	30-in. Hastelloy C sheath
											M	_	_	_	_	_	20-in. 316 stainless steel sheath
											N	_	_	_	_	_	24-in. 316 stainless steel sheath
											P	_	_	_	_	_	30-in. 316 stainless steel sheath
											R	_	_	_	_	_	36-in. titanium sheath
											S	_	_	_	_	_	60-in. stainless steel sheath
																	Accessory Hardware[9]
												0	_	_	_	_	None[10]
												1	_	_	_	_	316 ss compression fitting, wrench-tight
												2	_	_	_	_	Hastelloy C compression fitting, wrench-tight
												3	_	_	_	_	316 ss compression fitting, hand-tight
												4	_	_	_	_	Titanium compression fitting, hand-tight
																	Integral Sensor Cable, Units of Measure
													T	_	_	_	Tinned and pin leads, ft
													0	_	_	_	Use when positions 15 and 16 contain JB, or J1-J6[11]
																	Length, Integral Sensor Cable
														_	_	_	01 to 29 ft (enter length in whole ft)[12]
														J	B	_	With junction box[11]
														J	1	_	Replacement sensor for 16-in. sheath[13]
														J	2	_	Replacement sensor for 20-in. sheath[13]
														J	3	_	Replacement sensor for 24-in. sheath[13]
														J	4	_	Replacement sensor for 30-in. sheath[13]
														J	5	_	Replacement sensor for 36-in. sheath[13]
														J	6	_	Replacement sensor for 60-in. sheath[13]
																	Tagging
																0	None
																1	Mylar
																2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Standard body material is Kynar. Ryton available on special order.
3. Antimony electrode must have flush liquid junction.
4. Model TBX5571,2,3,F,J sensors only.
5. Model TBX5571,2,3,J sensors only. TBI-Bailey instrument compatibility limited to Type TB82 and TB84 transmitters.
6. Model TBX5571,6 sensors only.
7. Model TB5571,2,3,5,F,J sensors only.
8. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
9. Standard hardware kits have Viton o-rings.
10. Applicable for all body styles. Mandatory for replacement sensor (0 in nomenclature position 12).
11. Junction box mounted on sensor. Cable length approximately 4 in. Nomenclature positions 12 and 13 can be anything except 0. Selection of OJB in nomenclature positions 14, 15, and 16 requires extension cable. If junction box is ordered separately, and longer cable length is desired, enter cable length in nomenclature positions 15 and 16.
12. Standard cable length of 4 ft as measured from rear of sensor assembly with 16-in. sheath only. Maximum 29-ft cable available with 16-in. sheath only. Longer sheathes decrease cable length proportionally.
13. Applicable only to sensors using junction boxes.

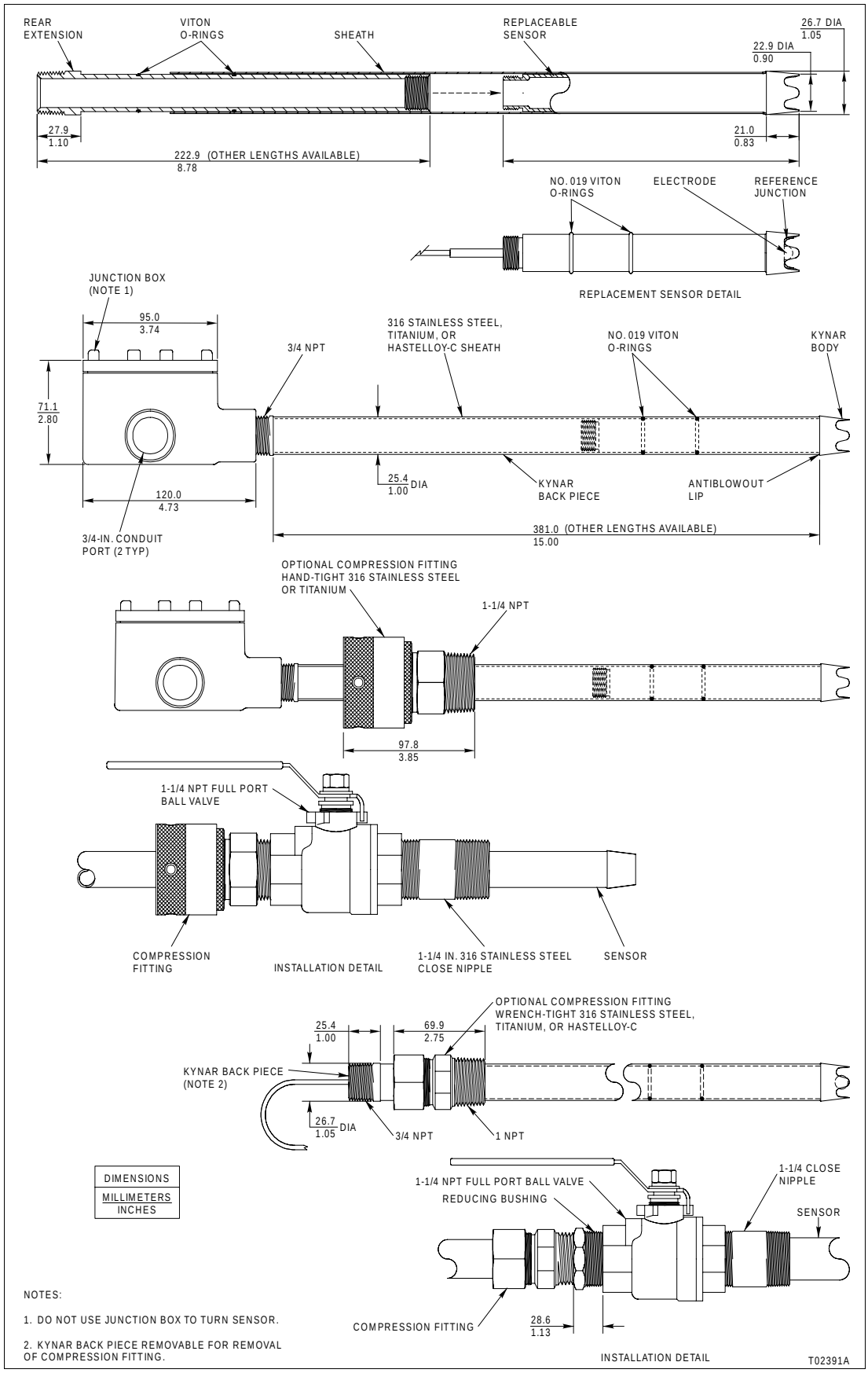


Figure 17. Model TB557 and TBX557 Sensor Dimensions

Model TB561 and TBX561 Sensors

Model TB561 and TBX561 sensors are sterilizable, inline sensors (Fig. 18). They are designed for measurements in process vessels requiring periodic sterilization, such as fermentors, etc. The sensors are available with a bushing and union type holder nut, but can also be retrofit into standard bushings with 0.983-inch to 0.995-inch inner diameters. A one-inch holder is available for installing the sensor into an existing one-inch threaded line or tee.

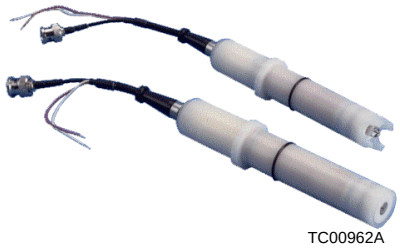


Figure 18. Model TB561 and TBX561 Sensors

The Model TB561 and TBX561 sensor specifications are listed in Table 16 and their dimensions are shown in Figure 19. Table 17 is the Model TB561 sensor nomenclature and Table 18 is the Model TBX561 sensor nomenclature.

Table 16. Model TB561 and TBX561 Sensor Specifications

Property	Characteristic/Value
Applications	Batch processing with steam or chemical sterilization, fermentors, glass-lined reactors, pharmaceutical, food and beverage, biogenetics
Features	No pressurization required, 2 standard insertion depths (deeper insertion available)
Max. pressure/temp.	276 kPa (40 psi) at 140°C (284°F); 448 kPa (65 psi) at 121°C (250°F); 690 kPa (100 psi) at 90°C (194°F)
Material Body Liquid junction	 Kynar Wood, Teflon
Liquid junction types	Flush, notched

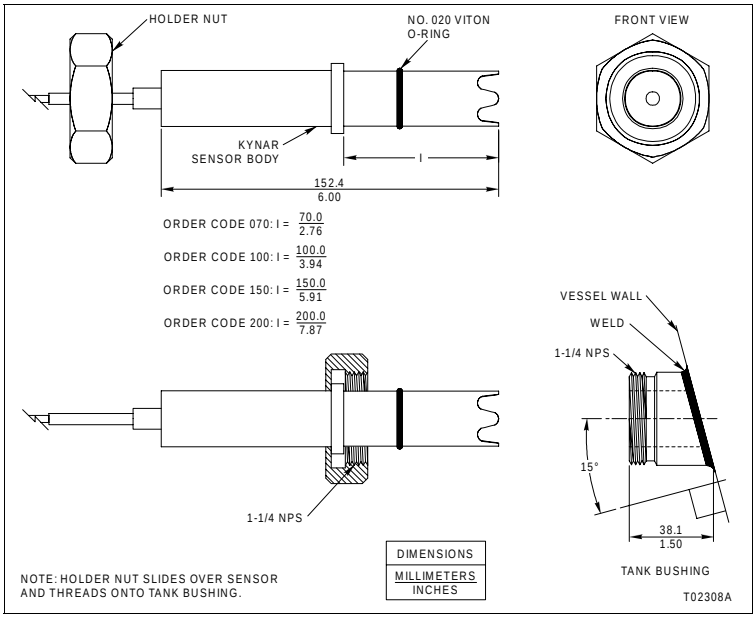


Figure 19. Model TB561 and TBX561 Sensor Dimensions

Table 17. Model TB561 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 T B 5 6 1 _ _ _ _ _ _ _ _ _	Inline Sterilizable pH/ORP Sensor Assembly[1]
	Electrode
1 _ _ _ _ _ _ _ _	Flat glass, pH
3 _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _	Platinum, ORP
F _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _	3 kΩ, tinned leads[2]
2 _ _ _ _ _ _ _	3 kΩ, extension cable connector[2]
3 _ _ _ _ _ _ _	Pt 100, tinned leads[3]
4 _ _ _ _ _ _ _	Pt 100, extension cable connector[3]
	Liquid Junction
1 _ _ _ _ _ _	Wood, flush, Solid State Reference
3 _ _ _ _ _ _	Teflon, flush, Solid State Reference
5 _ _ _ _ _ _	Wood, notched, Solid State Reference
6 _ _ _ _ _ _	Teflon, notched, Solid State Reference
A _ _ _ _ _ _	Wood, flush, Next Step Reference
B _ _ _ _ _ _	Teflon, flush, Next Step Reference
D _ _ _ _ _ _	Wood, notched, Next Step Reference
E _ _ _ _ _ _	Teflon, notched, Next Step Reference
	Body Style[4]
0 7 0 _ _ _	70-mm insertion depth
1 0 0 _ _ _	100-mm insertion depth
1 5 0 _ _ _	150-mm insertion depth
2 0 0 _ _ _	200-mm insertion depth
	Integral Sensor Cable, Units of Measure[5]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[6]
0 _ _	Use when positions 13 and 14 contain JB or JS[7]
	Length, Integral Sensor Cable
_ _	01 to 30 ft (enter length in whole ft)
J B	With junction box[7]
J S	Less junction box[7]

NOTES:
1. Tagging must be ordered separately.
2. Model TB5611,3,F,J sensors only.
3. Model TB5611,3,J sensors only. TBI-Bailey instrument compatibility limited to Type TB82 and TB84 transmitters.
4. Insertion depth measured from wetted face of sensor flange to tip of notched guard.
5. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 11, which is not designed for use with extension cables or junction box.
6. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
7. Junction box mounted on sensor. Cable length approximately 102 mm (4 in.). Requires extension cable. Nomenclature position 7 must be 0, 2, or 4.

Table 18. Model TBX561 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 6 1 _ _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage Inline Sterilizable pH/ORP Sensor Assembly[1]
	Electrode
1 _ _ _ _ _ _ _ _ _ _	Flat glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
F _ _ _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH

Table 18. Model TBX561 Next Step Advantage Sensor Nomenclature *(continued)*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Next Step Advantage Inline Sterilizable pH/ORP Sensor Assembly[1]
T	**B**	**X**	**5**	**6**	**1**	_	_	_	_	_	_	_	_	_	_	_	
																	Integral Temperature Compensator
							0	_	_	_	_	_	_	_	_	_	None
							1	_	_	_	_	_	_	_	_	_	3 kΩ[2]
							3	_	_	_	_	_	_	_	_	_	Pt 100[3]
																	Liquid Junction
								A	_	_	_	_	_	_	_	_	Wood, flush, Next Step Reference
								B	_	_	_	_	_	_	_	_	Teflon, flush, Next Step Reference
								D	_	_	_	_	_	_	_	_	Wood, notched, Next Step Reference
								E	_	_	_	_	_	_	_	_	Teflon, notched, Next Step Reference
																	Solution Ground Rod Material
									1	_	_	_	_	_	_	_	316 stainless steel
									2	_	_	_	_	_	_	_	Titanium
									3	_	_	_	_	_	_	_	Hastelloy B2
																	O-Ring Material
										1	_	_	_	_	_	_	Viton
										2	_	_	_	_	_	_	EPDM
										3	_	_	_	_	_	_	Silicone
										4	_	_	_	_	_	_	Kalrez[4]
																	Body Style[5]
											0	7	_	_	_	_	70-mm insertion depth
											1	0	_	_	_	_	100-mm insertion depth
											1	5	_	_	_	_	150-mm insertion depth
											2	0	_	_	_	_	200-mm insertion depth
																	Integral Sensor Cable, Units of Measure
													T	_	_	_	Tinned and pin leads, ft
													0	_	_	_	Use when positions 15 and 16 contain JB, JS, or when extension cable termination is required[6]
																	Length, Integral Sensor Cable
														_	_	_	01 to 30 ft (enter length in whole ft)
														J	B	_	With junction box[6]
														J	S	_	Less junction box[6]
																	Tagging
																0	None
																1	Mylar
																2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Model TB5611,3,F,J sensors only.
3. Model TB5611,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
4. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
5. Insertion depth measured from wetted face of sensor flange to tip of notched guard.
6. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If junction box is ordered separately and longer cable lengths are desired, enter cable length in nomenclature positions 15 and 16.

Model TB562 and TBX562 Sensors

Model TB562 and TBX562 sensors are designed for processes requiring the use of sanitary fittings (Fig. 20). These sensors have an integrated 1.5-inch sanitary tri-clamp flange fitting. They are suitable for processes using either steam or chemical cleaning.

The Model TB562 and TBX562 sensor specifications are listed in Table 19 and their dimensions are shown in Figure 21. Table 20 is the Model TB562 sensor nomenclature and Table 21 is the Model TBX562 sensor nomenclature.

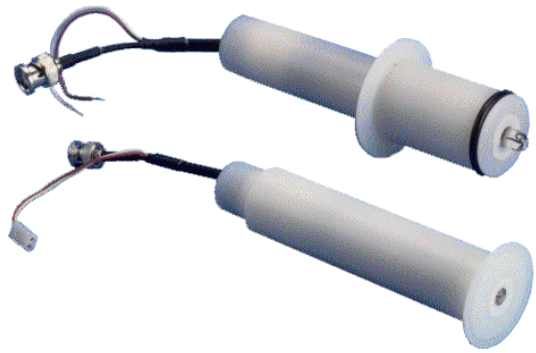


Figure 20. Model TB562 and TBX562 Sensors

Table 19. Model TB562 and TBX562 Sensor Specifications

Property	Characteristic/Value
Applications	Food and beverage, dairy, pharmaceutical, biogenetics
Features	Integral tri-clamp fitting
Max. pressure/temp.	276 kPa (40 psi) at 140°C (284°F); 448 kPa (65 psi) at 121°C (250°F); 690 kPa (100 psi) at 90°C (194°F)
Material Body External o-rings Liquid junction	 Kynar Viton Wood, Teflon
Liquid junction types	Flush
Mounting	1-½ in. polished sanitary tube flange; 1.0 and 1-½ in. tri-clamp for flush style

Table 20. Model TB562 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 **T B 5 6 2** _ _ _ _ _ _ _	**Sanitary/Sterilizable pH/ORP Sensor Assembly**[1]
	Electrode
1 _ _ _ _ _ _	Flat glass, pH
2 _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _	Platinum, ORP
F _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _	None
1 _ _ _ _ _	3 kΩ, tinned leads[2]
2 _ _ _ _ _	3 kΩ, extension cable connector[2]
3 _ _ _ _ _	Pt 100, tinned leads[3]
4 _ _ _ _ _	Pt 100, extension cable connector[3]
	Liquid Junction
1 _ _ _ _	Wood, flush, Solid State Reference
3 _ _ _ _	Teflon, flush, Solid State Reference
A _ _ _ _	Wood, flush, Next Step Reference
B _ _ _ _	Teflon, flush, Next Step Reference
	Body Style
0 _ _ _	Standard, 1.5-in. sanitary tri-clamp flange[4]
1 _ _ _	Flush, 1.0/1.5-in. sanitary tri-clamp flange[5]
	Integral Sensor Cable, Units of Measure[6]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[7]
0 _ _	Use when positions 11 and 12 contain JB or JS[8]

Table 20. Model TB562 Solid State and Next Step Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 T B 5 6 2 _ _ _ _ _ _ _	Sanitary/Sterilizable pH/ORP Sensor Assembly[1]
	Length, Integral Sensor Cable
_ _	01 to 30 ft (enter length in whole ft)
J B	With junction box[8]
J S	Less junction box[8]

NOTES:
1. Tagging must be ordered separately.
2. Model TB5621,2,3,F,J sensors only.
3. Model TB5621,2,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
4. For 1.5-in. tube. Location of flange on sensor body provides approximate insertion depth of 2.5 in. measured from flange wetted surface to tip of reference liquid junction.
5. For 1.0 or 1.5-in. tube. Flange wetted surface flush with surface of reference liquid junction.
6. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 10, which is not designed for use with extension cables or junction box.
7. Designed for direct connection to Type TB82 or TB84 transmitters, or competitive electronics using terminal blocks.
8. Junction box mounted on sensor. Cable length approximately 102 mm (4 in.). Requires extension cable. Nomenclature position 7 must be 0, 2, or 4.

Table 21. Model TBX562 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 6 2 _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage Sanitary/Sterilizable pH/ORP Sensor Assembly[1]
	Electrode
1 _ _ _ _ _ _ _ _ _ _	Flat glass, pH
2 _ _ _ _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
F _ _ _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _ _ _ _	3 kΩ[2]
3 _ _ _ _ _ _ _ _ _ _	Pt 100[3]
	Liquid Junction
A _ _ _ _ _ _ _ _ _ _	Wood, flush, Next Step Reference
B _ _ _ _ _ _ _ _ _ _	Teflon, flush, Next Step Reference
	Solution Ground Rod Material
1 _ _ _ _ _ _ _ _ _ _	316 stainless steel
2 _ _ _ _ _ _ _ _ _ _	Titanium
3 _ _ _ _ _ _ _ _ _ _	Hastelloy B2
	O-Ring Material
1 _ _ _ _ _ _ _ _ _ _	Viton
2 _ _ _ _ _ _ _ _ _ _	EPDM
3 _ _ _ _ _ _ _ _ _ _	Silicone
4 _ _ _ _ _ _ _ _ _ _	Kalrez[4]
	Body Material
0 _ _ _ _ _ _ _ _ _ _	Kynar
	Body Style
0 _ _ _ _ _ _ _ _ _ _	Standard, 1.5-in. sanitary tri-clamp flange[5]
1 _ _ _ _ _ _ _ _ _ _	Flush, 1.0/1.5-in. sanitary tri-clamp flange[6]
	Integral Sensor Cable, Units of Measure
T _ _ _	Tinned and pin leads, ft
0 _ _ _	Use when positions 15 and 16 contain JB, JS, or when extension cable termination is required[7]
	Length, Integral Sensor Cable
_ _ _	01 to 30 ft (enter length in whole ft)
J B _	With junction box[7]
J S _	Less junction box[7]

Table 21. Model TBX562 Next Step Advantage Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	
T B X 5 6 2 _ _ _ _ _ _ _ _ _ _ _	**Next Step Advantage Sanitary/Sterilizable pH/ORP Sensor Assembly**[1]
	Tagging
	0 None
	1 Mylar
	2 Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2 Model TBX5621,2,3,F,J sensors only.
3. Model TBX5621,2,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
4. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
5. For 1.5-in. tube. Location of flange on sensor body provides approximate insertion depth of 2.5 in. measured from flange wetted surface to tip of reference liquid junction.
6. For 1.0 or 1.5-in. tube. Flange wetted surface flush with surface of reference liquid junction.
7. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If junction box is ordered separately and longer cable lengths are desired, enter cable length in nomenclature positions 15 and 16.

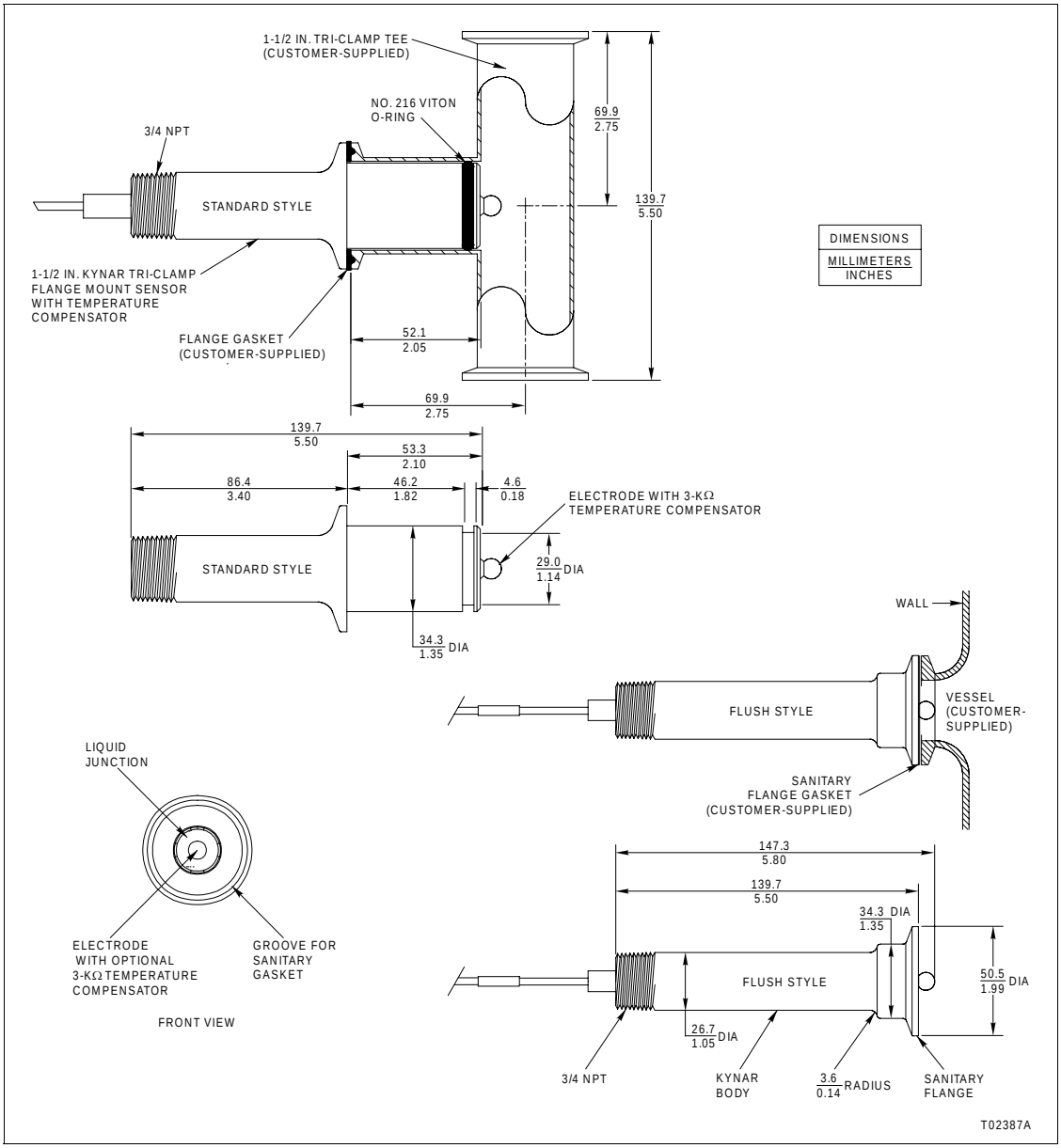


Figure 21. Model TB562 and TBX562 Sensor Dimensions

Model TB564 and TBX564 Sensors

Model TB564 and TBX564 sensors are high pressure, hot tap, ball valve insertion sensors (Fig. 22). A retraction housing is provided for isolating the sensor body from the operator. The ¼-inch taps are provided for flushing the housing during retraction or pressurization before insertion. The sensor cable and temperature compensation connector (if separate from sensor cable) are shipped unattached. Field connection information is provided.

Figure 22. Model TB564 and TBX564 Sensors

The Model TB564 and TBX564 sensor specifications are listed in Table 22 and their dimensions are shown in Figure 23. Table 23 is the Model TB564 sensor nomenclature and Table 24 is the Model TBX564 sensor nomenclature.

Table 22. Model TB564 and TBX564 Sensor Specifications

Property	Characteristic/Value
Applications	High pressure, hazardous materials
Features	Insert and retract without disturbing process, retraction housing for safety, taps for flushing and pressurizing housing
Max. pressure/temp.	2,065 kPa (300 psi) at 140°C (284°F)
Material Body Ball valve/hardware External o-rings Liquid junction	 Kynar 316 stainless steel (consult factory for other available materials) Viton Wood, Teflon
Liquid junction types	Flush (antimony electrode only), notched, recessed

Table 23. Model TB564 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 6 4 _ _ _ _ _ _ _ _	High Pressure Hot Tap pH/ORP Sensor Assembly[1]
	Electrode
2 _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _	Antimony, pH[2]
F _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _	None
1 _ _ _ _ _ _	3 kΩ, tinned leads[3]
2 _ _ _ _ _ _	3 kΩ, extension cable connector[3]
3 _ _ _ _ _ _	Pt 100, tinned leads[4]
4 _ _ _ _ _ _	Pt 100, extension cable connector[4]

Table 23. Model TB564 Solid State and Next Step Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 6 4 _ _ _ _ _ _ _ _	High Pressure Hot Tap pH/ORP Sensor Assembly[1]
	Liquid Junction
1 _ _ _ _ _	Wood, flush, Solid State Reference[2,5]
3 _ _ _ _ _	Teflon, flush, Solid State Reference[2,5]
4 _ _ _ _ _	Teflon, recessed, Solid State Reference[3]
5 _ _ _ _ _	Wood, notched, Solid State Reference[6]
6 _ _ _ _ _	Teflon, notched, Solid State Reference[6]
A _ _ _ _ _	Wood, flush, Next Step Reference[2,5]
B _ _ _ _ _	Teflon, flush, Next Step Reference[2,5]
C _ _ _ _ _	Teflon, recessed, Next Step Reference[3]
D _ _ _ _ _	Wood, notched, Next Step Reference[6]
E _ _ _ _ _	Teflon, notched, Next Step Reference[6]
	Body Style
0 _ _ _ _	Replacement Model TB564 sensor only
	Accessory Hardware
0 _ _ _	None[7]
9 _ _ _	Complete Model TB564 assembly
A _ _ _	Model TB564 hardware, less ball valve
	Integral Sensor Cable, Units of Measure[8]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[9]
0 _ _	Use when positions 12 and 13 contain JB or JS[10]
	Length, Integral Sensor Cable
_ _	01 to 29 ft (enter length in whole ft)
J B	With junction box[10]
J S	Less junction box[10]

NOTES:
1. Tagging ordered separately.
2. Consult factory for use of flush liquid junctions with glass pH and ORP electrodes. Antimony electrode must have flush liquid junction.
3. Model TB5642,3,F,J sensors only.
4. Model TB5642,3,J sensors only.
5. Model TB5646 sensor only.
6. Model TB5642,3,5,F,J sensors only.
7. Requires installation of BNC connector kit.
8. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: Use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 11, which is not designed for use with extension cables or junction box.
9. Designed for direct connection to Type TB82 or TB84 transmitters, or competitive electronics using terminal blocks.
10. Junction box mounted on insertion rod. Cable length approximately 254 mm (10 in.). Requires extension cable for connection to transmitter. Nomenclature position 7 must be 0, 2, or 4. If sensor is ordered without accessory hardware (0 in nomenclature position 10), junction box must be ordered separately.

Table 24. Model TBX564 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 6 4 _ _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage High Pressure Hot Tap pH/ORP Sensor Assembly[1]
	Electrode
2 _ _ _ _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _ _ _ _	Antimony, pH[2]
F _ _ _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _ _ _	3 kΩ[3]
3 _ _ _ _ _ _ _ _ _	Pt 100[4]

Table 24. Model TBX564 Next Step Advantage Sensor Nomenclature *(continued)*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Next Step Advantage High Pressure Hot Tap pH/ORP Sensor Assembly[1]
T	**B**	**X**	**5**	**6**	**4**	_	_	_	_	_	_	_	_	_	_	_	
																	Liquid Junction
								A	_	_	_	_	_	_	_	_	Wood, flush, Next Step Reference[2,5]
								B	_	_	_	_	_	_	_	_	Teflon, flush, Next Step Reference[2,5]
								C	_	_	_	_	_	_	_	_	Teflon, recessed, Next Step Reference[3]
								D	_	_	_	_	_	_	_	_	Wood, notched, Next Step Reference[6]
								E	_	_	_	_	_	_	_	_	Teflon, notched, Next Step Reference[6]
																	Solution Ground Rod Material
									1	_	_	_	_	_	_	_	316 stainless steel
									2	_	_	_	_	_	_	_	Titanium
									3	_	_	_	_	_	_	_	Hastelloy B2
																	O-Ring Material
										1	_	_	_	_	_	_	Viton
										2	_	_	_	_	_	_	EPDM
										3	_	_	_	_	_	_	Silicone
										4	_	_	_	_	_	_	Kalrez[7]
																	Body Style
											0	_	_	_	_	_	Replacement Model TBX564 sensor only
																	Accessory Hardware[8]
												0	_	_	_	_	None[9]
												9	_	_	_	_	Complete Model TBX564 sensor assembly
												A	_	_	_	_	Model TBX564 sensor hardware, less ball valve
																	Integral Sensor Cable, Units of Measure
													T	_	_	_	Tinned and pin leads, ft
													0	_	_	_	Use when positions 15 and 16 contain JB, JS, or when extension termination cable is required[10]
																	Length, Integral Sensor Cable
														_	_	_	01 to 29 ft (enter length in whole ft)
														J	B	_	With junction box[10]
														J	S	_	Less junction box[10]
																	Tagging
																0	None
																1	Mylar
																2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Consult factory for use of flush liquid junctions with glass pH electrodes, and ORP electrodes. Antimony electrode must have flush liquid junction.
3. Model TBX5642,3,F,J sensors only.
4. Model TBX5642,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
5. Model TBX5646 sensor only.
6. Model TBX5642,3,5,F,J sensors only.
7. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
8. Viton o-rings standard in hardware kits.
9. Requires field installation of BNC connector kit.
10. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If sensor is ordered without accessory hardware (0 in nomenclature position 13), junction box must be ordered separately. If longer cable lengths are required to attach to extension cable, specify length in nomenclature positions 15 and 16.

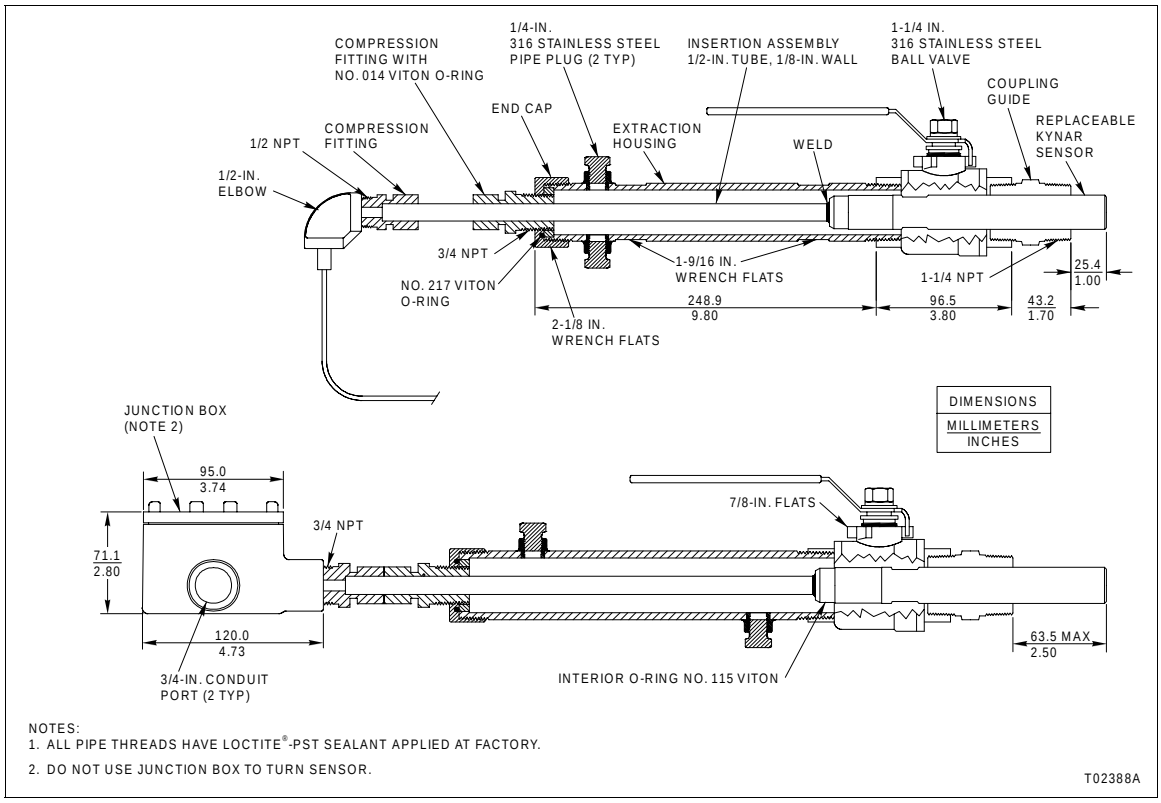


Figure 23. Model TB564 and TBX564 Sensor Dimensions

Model TB566 and TBX566 Sensors

Model TB566 and TBX566 sensors are high purity flow cell sensors (Fig. 24). They are designed for measurement in water with a conductivity below 20 microsiemens per centimeter. They can also be used for pH measurements in pilot plants and applications having low flows. The assembly consists of a 316 stainless steel flow cell and sensor housing, and an epoxy body pH sensor. The 316 stainless steel acts as a shield for the sensor and process. An upflow design assures that the sample is not contaminated by potassium chloride (KCl) salt from the reference before it is measured by the glass electrode. This design also minimizes the possibility of air entrapment.

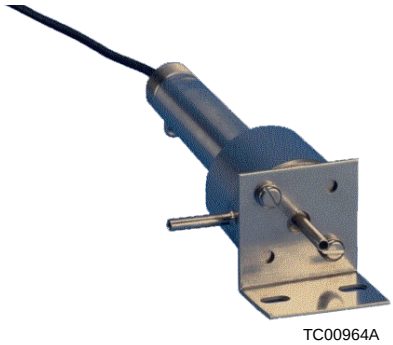


Figure 24. Model TB566 and TBX566 Sensors

The Model TB566 and TBX566 sensor specifications are listed in Table 25 and their dimensions are shown in Figure 25. Table 26 is the Model TB566 sensor nomenclature and Table 27 is the Model TBX566 sensor nomenclature.

Table 25. Model TB566 and TBX566 Sensor Specifications

Property	Characteristic/Value
Applications	Pure water measurement[1], pilot plants, low flow applications
Features	316 stainless steel flow cell with ¼-in. tube connections, complete sensor and process shielding
Max. pressure/temp.	690 kPa (100 psi) at 140°C (284°F)
Material	
Body	Molded epoxy
Housing	316 stainless steel
Flow cell	316 stainless steel
Flow cell o-rings	Buna
External o-rings	Viton
Liquid junction	Wood, Teflon
Liquid junction types	Flush

NOTE:
1. Constant flow between 50 and 150 ml/min. recommended for pure water installations.

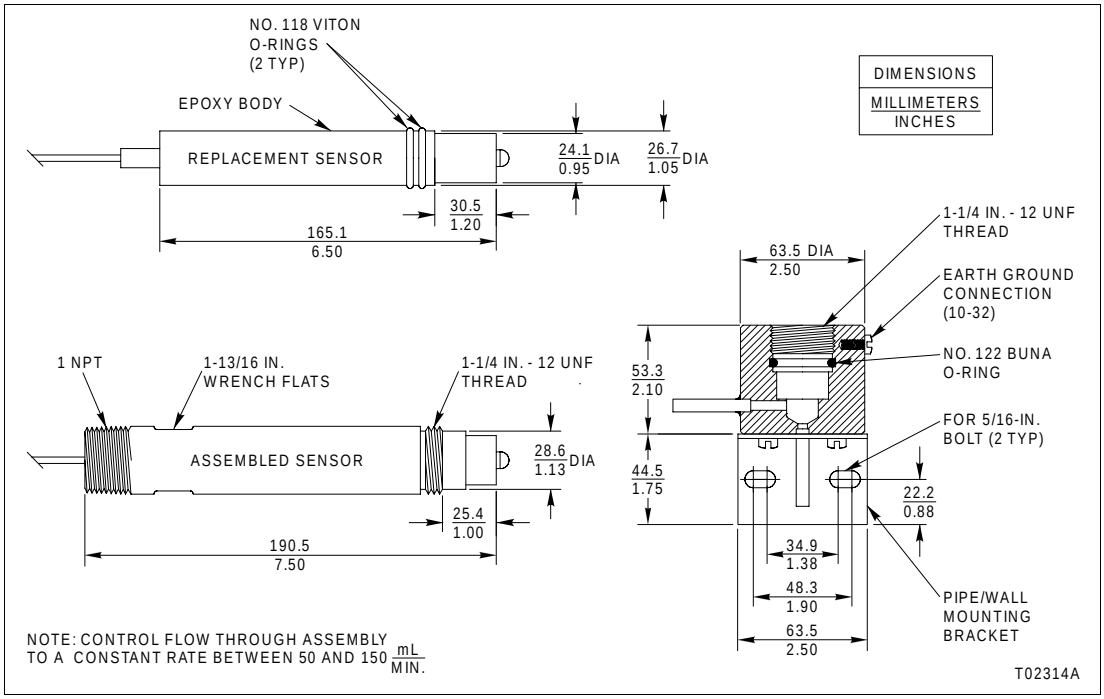


Figure 25. Model TB566 and TBX566 Sensor Dimensions

Table 26. Model TB566 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 6 6 _ _ _ _ _ _ _ _ _	High Purity Flow Cell pH/ORP Sensor Assembly[1]
	Electrode
1 _ _ _ _ _ _ _	Flat glass, pH
3 _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _	Platinum, ORP
J _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _	3 kΩ, tinned leads[2]
2 _ _ _ _ _ _ _	3 kΩ, extension cable connector[2]
3 _ _ _ _ _ _ _	Pt 100, tinned leads[3]
4 _ _ _ _ _ _ _	Pt 100, extension cable connector[3]

Table 26. Model TB566 Solid State and Next Step Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 6 6 _ _ _ _ _ _ _ _	High Purity Flow Cell pH/ORP Sensor Assembly[1]
	Liquid Junction
1 _ _ _ _ _	Wood, flush, Solid State Reference
3 _ _ _ _ _	Teflon, flush, Solid State Reference
A _ _ _ _ _	Wood, flush, Next Step Reference
B _ _ _ _ _	Teflon, flush, Next Step Reference
	Body Style
0 _ _ _ _	Model TB566 sensor body
	Accessory Hardware
0 _ _ _	None
D _ _ _	Model TB566 sensor flow cell/housing assembly
	Integral Sensor Cable, Units of Measure[4]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[5]
0 _ _	Use when Positions 12 and 13 contain JB or JS[6]
	Length, Integral Sensor Cable
_ _	01 to 30 ft (enter length in whole ft)
J B	With junction box[6]
J S	Less junction box[6]

NOTES:
1. Tagging ordered separately.
2. Model TB5661,3,J sensors only.
3. Model TB5661,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
4. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 11, which is not designed for use with extension cables or junction box.
5. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
6. Junction box mounted on sensor. Cable length approximately 102 mm (4 in.). Requires extension cable for connection to transmitter. Nomenclature position 7 must be 0, 2, or 4. If sensor is ordered without accessory hardware (0 in nomenclature position 10), junction box must be ordered separately.

Table 27. Model TBX566 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 6 6 _ _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage High Purity Flow Cell pH/ORP Sensor Assembly[1]
	Electrode
1 _ _ _ _ _ _ _ _ _ _	Flat glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _ _ _ _	3 kΩ[2]
3 _ _ _ _ _ _ _ _ _ _	Pt 100[3]
	Liquid Junction
A _ _ _ _ _ _ _ _ _ _	Wood, flush, Next Step Reference
B _ _ _ _ _ _ _ _ _ _	Teflon, flush, Next Step Reference
	Solution Ground Rod Material
1 _ _ _ _ _ _ _ _ _ _	316 stainless steel
2 _ _ _ _ _ _ _ _ _ _	Titanium
3 _ _ _ _ _ _ _ _ _ _	Hastelloy B2
	O-Ring Material
1 _ _ _ _ _ _ _ _ _ _	Viton
2 _ _ _ _ _ _ _ _ _ _	EPDM
3 _ _ _ _ _ _ _ _ _ _	Silicone
4 _ _ _ _ _ _ _ _ _ _	Kalrez[4]
	Body Style
0 _ _ _ _ _ _ _ _ _ _	Model TBX566 sensor body

Table 27. Model TBX566 Next Step Advantage Sensor Nomenclature *(continued)*

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Next Step Advantage High Purity Flow Cell pH/ORP Sensor Assembly[1]
T	**B**	**X**	**5**	**6**	**6**	_	_	_	_	_	_	_	_	_	_	_	
																	Accessory Hardware[5]
												0	_	_	_	_	None
												D	_	_	_	_	Model TB566 sensor flow cell/housing assembly
																	Integral Sensor Cable, Units of Measure
													T	_	_	_	Tinned and pin leads, ft
													0	_	_	_	Use when positions 15 and 16 contain JB, JS, or when extension termination cable is required[6]
																	Length, Integral Sensor Cable
														_	_	_	01 to 30 ft (enter length in whole ft)
														J	B	_	With junction box[6]
														J	S	_	Less junction box[6]
																	Tagging
																0	None
																1	Mylar
																2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Model TB5661,3,J sensors only.
3. Model TB5661,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
4. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
5. Viton o-rings standard in hardware kits.
6. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If sensor is ordered without accessory hardware (0 in nomenclature position 13), junction box must be ordered separately. If longer cable lengths are required to attach to extension cable, specify length in nomenclature positions 15 and 16.

Model TB567 and TBX567 Sensors

Model TB567 and TBX567 sensors are high pressure, inline sensors (Fig. 26). The pressure and temperature ratings associated with this sensor are unique in the industry. After consultation with TBI-Bailey, customers have exceeded the standard ratings of 1,724 kilopascals (250 pounds per square inch gage) at 100-degrees Celsius (212-degrees Fahrenheit). Many installations are operating at over 6,895 kilopascals (1,000 pounds per square inch gage). The assembly comes in two pieces, a 316 stainless steel housing and a molded epoxy sensor body.

TC00965A

Figure 26. Model TB567 and TBX567 Sensors

The Model TB567 and TBX567 sensor specifications are listed in Table 28 and their dimensions are shown in Figure 27. Table 29 is the Model TB567 sensor nomenclature and Table 30 is the Model TBX567 sensor nomenclature.

Table 28. Model TB567 and TBX567 Sensor Specifications

Property	Characteristic/Value
Applications	High pressure insertion
Features	2-piece sensor has double o-ringed, sealed body with stainless steel outer sleeve
Max. pressure/temp.	1,380 kPa (200 psi) at 140°C (284°F); 1,725 kPa (250 psi) at 100°C (212°F) Greater pressure available. Consult factory.
Material Body Outer sleeve External o-rings Liquid junction	 Molded epoxy 316 stainless steel (consult factory for other available materials) Viton Wood, Teflon
Liquid junction types	Flush, recessed

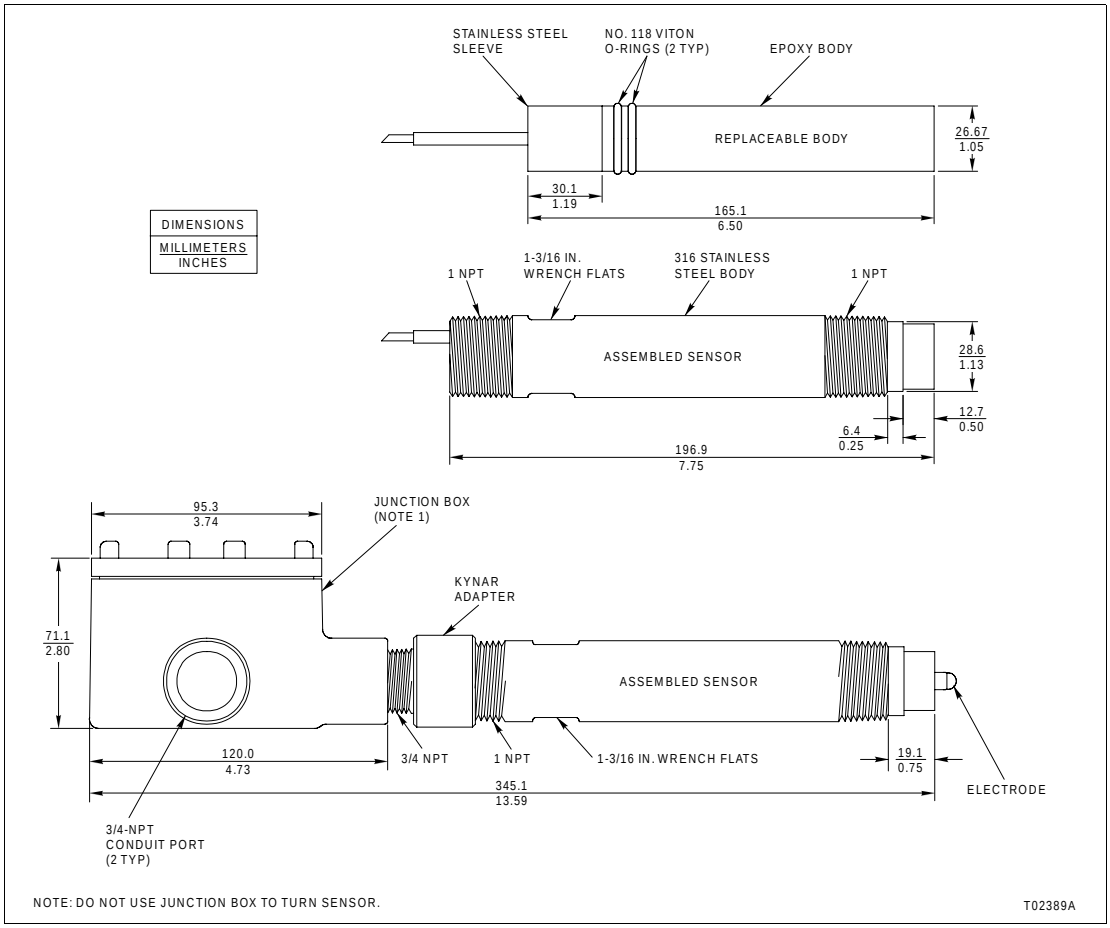


Figure 27. Model TB567 and TBX567 Sensor Dimensions

Table 29. Model TB567 Solid State and Next Step Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 6 7 _ _ _ _ _ _ _ _	Inline High Pressure pH/ORP Sensor Assembly[1]
	Electrode
2 _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _	Antimony, pH[2]
F _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _	Coating resistant glass, pH

Table 29. Model TB567 Solid State and Next Step Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 T B 5 6 7 _ _ _ _ _ _ _ _	Inline High Pressure pH/ORP Sensor Assembly[1]
	Integral Temperature Compensator
0 _ _ _ _ _ _	None
1 _ _ _ _ _ _	3 kΩ, tinned leads[3]
2 _ _ _ _ _ _	3 kΩ, extension cable connector[3]
3 _ _ _ _ _ _	Pt 100, tinned leads[4]
4 _ _ _ _ _ _	Pt 100, extension cable connector[4]
	Liquid Junction
1 _ _ _ _ _	Wood, flush, Solid State Reference
3 _ _ _ _ _	Teflon, flush, Solid State Reference
4 _ _ _ _ _	Teflon, recessed, Solid State Reference[3]
A _ _ _ _ _	Wood, flush, Next Step Reference
B _ _ _ _ _	Teflon, flush, Next Step Reference
C _ _ _ _ _	Teflon, recessed, Next Step Reference[3]
	Body Style
0 _ _ _ _	Model TB567 sensor body
	Accessory Hardware
0 _ _ _	None
8 _ _ _	Model TB567 316 stainless steel sensor housing[5]
	Integral Sensor Cable, Units of Measure[6]
F _ _	BNC connector, ft
T _ _	Tinned and pin leads, ft[7]
0 _ _	Use when positions 12 and 13 contain JB or JS[8]
	Length, Integral Sensor Cable
_ _	01 to 30 ft (enter length in whole ft)
J B	With junction box[8]
J S	Less junction box[8]

NOTES:
1. Tagging ordered separately.
2. Antimony electrode must have flush liquid junction.
3. Model TB5672,3,F,J sensors only.
4. Model TB5672,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
5. Consult factory for other materials.
6. There are two options for connection to Type TB82 and TB84 transmitters. Option 1: use BNC/TC to PIN adapter with conduit fitting or BNC/TC to PIN adapter. In either case, nomenclature position 7 must be 2 or 4. Option 2: select T in nomenclature position 11, which is not designed for use with extension cables or junction box.
7. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
8. Junction box mounted on sensor. Cable length approximately 102 mm (4 in.). Requires extension cable for connection to transmitter. Nomenclature position 7 must be 0, 2, or 4. If sensor is ordered without accessory hardware (0 in nomenclature position 10), junction box must be ordered separately.

Table 30. Model TBX567 Next Step Advantage Sensor Nomenclature

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 6 7 _ _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage Inline High Pressure pH/ORP Sensor Assembly[1]
	Electrode
2 _ _ _ _ _ _ _ _ _ _	Ruggedized glass, pH
3 _ _ _ _ _ _ _ _ _ _	High temperature glass, pH
5 _ _ _ _ _ _ _ _ _ _	Platinum, ORP
6 _ _ _ _ _ _ _ _ _ _	Antimony, pH[2]
F _ _ _ _ _ _ _ _ _ _	Fluoride/acid resistant glass, pH
J _ _ _ _ _ _ _ _ _ _	Coating resistant glass, pH
	Integral Temperature Compensator
0 _ _ _ _ _ _ _ _ _	None
1 _ _ _ _ _ _ _ _ _	3 kΩ[3]
3 _ _ _ _ _ _ _ _ _	Pt 100[4]

Table 30. Model TBX567 Next Step Advantage Sensor Nomenclature *(continued)*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 T B X 5 6 7 _ _ _ _ _ _ _ _ _ _ _	Next Step Advantage Inline High Pressure pH/ORP Sensor Assembly[1]
	Liquid Junction
A	Wood, flush, Next Step Reference
B	Teflon, flush, Next Step Reference
C	Teflon, recessed, Next Step Reference[3]
	Solution Ground Rod Material
1	316 stainless steel
2	Titanium
3	Hastelloy B2
	O-Ring Material
1	Viton
2	EPDM
3	Silicone
4	Kalrez[5]
	Body Style
0	Model TBX567 sensor body
	Accessory Hardware
0	None
8	316 stainless steel sensor housing
	Integral Sensor Cable, Units of Measure
T	Tinned and pin leads, ft
0	Use when positions 15 and 16 contain JB, JS, or when extension termination cable is required[6]
	Length, Integral Sensor Cable
_ _	01 to 30 ft (enter length in whole ft)
J B	With junction box[6]
J S	Less junction box[6]
	Tagging
0	None
1	Mylar
2	Stainless steel

NOTES:
1. Designed for direct connection to Type TB82 and TB84 transmitters, or competitive electronics using terminal blocks.
2. Antimony electrode must have flush liquid junction.
3. Model TBX5672,3,F,J sensors only.
4. Model TBX5672,3,J sensors only. Compatibility limited to Type TB82 and TB84 transmitters.
5. Kalrez o-rings for solution ground sleeve only. External o-rings are Viton. Kalrez o-ring kits for external o-rings sold separately.
6. When selecting JB or JS in nomenclature positions 15 and 16, cable length is approximately 102 mm (4 in.) and requires extension cable for connection to transmitter. If sensor is ordered without accessory hardware (0 in nomenclature position 13), junction box must be ordered separately. If longer cable lengths are required to attach to extension cable, specify length in nomenclature positions 15 and 16.

Accessories

TBI-Bailey offers many accessories to aid in pH/ORP measurements. This specification addresses ball valves for Model TB557 and TBX557 sensors, and automatic cleaners. Many other accessories are addressed in the pH, Conductivity, and DO Accessories Specification (WBPEEUS530001A0).

Automatic Cleaners

TBI-Bailey sensors by design resist fouling and plugging, especially when placed in sufficient velocity. Sometimes a lack of velocity or the precipitative properties of the stream require the use of automatic cleaners with the sensors. TBI-Bailey offers automatic cleaners for problem processes, but recommends potential users discuss the application with

TBI-Bailey before ordering. The hydraulic cleaner requires the use of a Model TB556 sensor with 1.5-inch insertion depth (Fig. 28).

NOTE: Solution lines to and from the pump and liquid source require heat tracing if freezing is possible.

Figure 28. Hydraulic Cleaner with Model TB556 Sensor

Programmable features of the hydraulic cleaner with Type TB7 and TB84 transmitters are:

- Cycle time: 0 to 99.99 hours.
- On time: 0 to 999 seconds.
- Recovery time: 0 to 999 seconds.
- Hold inputs: yes or no.

Table 31 lists specifications for hydraulic cleaners available. Figure 29 shows an application example using the hydraulic cleaner and the Type TB7 or Type TB84 transmitter.

Table 31. Hydraulic Cleaner Specifications

Property	Characteristic/Value
4TB5205-0232	
Materials	PVC, polypropylene, 316 stainless steel
Ratings	690 kPa (100 psi) at 40°C (104°F); 276 kPa (40 psi) at 60°C (140°F)
4TB5205-0233	
Materials	Kynar, Hastelloy B2
Ratings	690 kPa (100 psi) at 40°C (104°F); 276 kPa (40 psi) at 100°C (212°F)

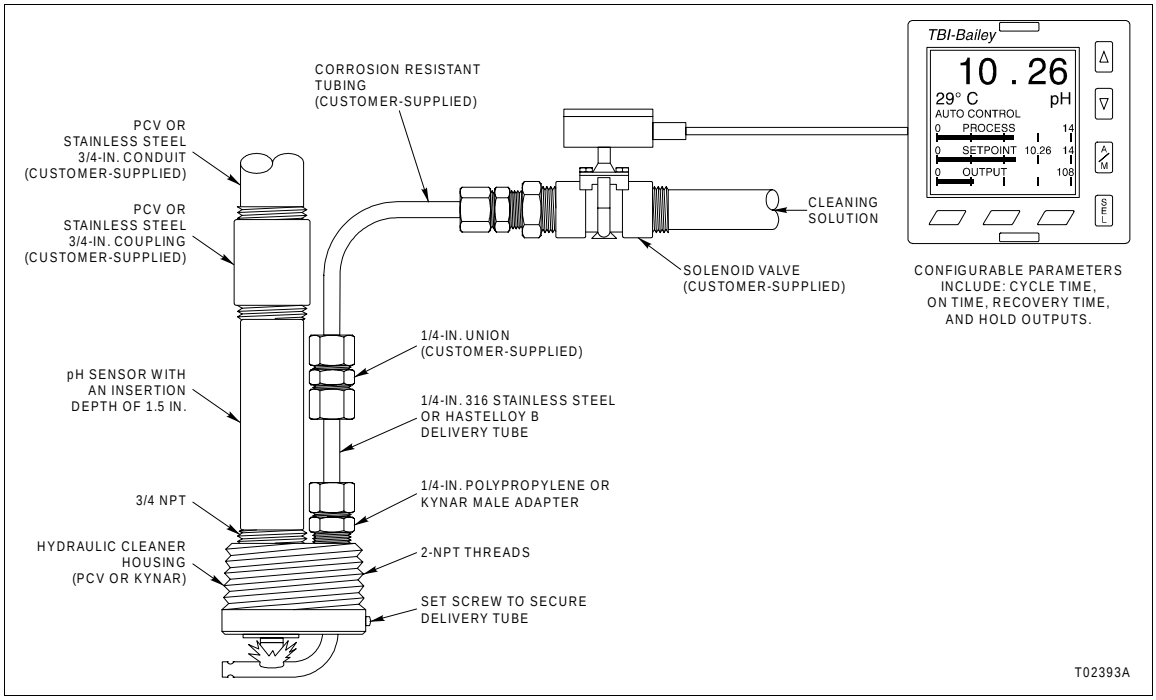


Figure 29. Hydraulic Cleaner Application Example

Ball Valves for Model TB557 and TBX557 Sensors

Table 32 lists the ball valves available for use with Model TB557 and TBX557 sensors.

Table 32. Ball Valves for Model TB557 and TBX557 Sensors

Part Number	Description
4TB5205-0174	1-¼ in. 316 stainless steel - includes 1-¼ in. to 1-in. reducing bushing with 1-¼ in. nipple. For use with wrench-tight compression hardware 4TB4953-0024 only.
4TB5205-0175	1-½ in. Kynar - includes 1-½ in. to 1-¼ in. reducing bushing with 1-½ in. nipple. For use with hand-tight compression hardware 4TB4953-0019 only.
4TB5205-0217	1-¼ in. 316 stainless steel - includes 1-¼ in. nipple. For use with hand-tight compression hardware 4TB4953-0006 only.
4TB5205-0218	1-½ in. Kynar - includes 1-½ in. to 1-¼ in. reducing bushing with 1-½ in. nipple. For use with hand-tight compression hardware 4TB4953-0060 or 4TB4953-0065 only.
4TB5205-0254	1-½ in. 316 stainless steel - includes 1-½ in. to 1-¼ in. reducing bushing with 1-½ in. nipple. For use with hand-tight compression hardware 4TB4953-0060 only.
4TB5205-0255	1-½ in. 316 stainless steel - includes 1-½ in. to 1-in. reducing bushing with 1-½ in. nipple. For use with wrench-tight compression hardware 4TB4953-0024 only.

pH/ORP Transmitters

TBI-Bailey offers a complete line of pH/ORP transmitters for use in pH/ORP measurement applications. Table 33 lists these instruments and their features.

Table 33. pH/ORP Transmitters

Type	Features
TB82 Advantage Series pH/ORP/pION Transmitter	Easy menu programming, online continuous sensor diagnostics, programmable isolated output, 3 standard modes of auto temperature compensation, Pt 100 and 3-kΩ Balco RTD compatibility, local/remote diagnostic alarming, adjustable damping, hold output function, programmable security codes and configuration lockout, HART communications, NEMA 4X/IP65 housing, CE Mark, intrinsically safe/nonincendive design.
TB84 Advantage Series pH/ORP/pION Transmitter	AC powered version of Type TB82 transmitter. Includes 3 relay outputs, 2 analog outputs, back lighting, complete sensor and instrument diagnostics, 5 conduit ports.
TB515 Two-Wire pH Transmitter	Intrinsically safe, 2-wire design, isolated transmitter output, NEMA 4X housing, LCD read-out, DC powered.
TB701 pH Analytical Controlling Transmitter	Configurable as basic analyzing transmitter, PID controller, or bidirectional controller with easy menu programming, up to 3 isolated and 4 relay outputs, AC powered.
TBN580 Smart pH/ORP Transmitter	Multiple applications, wide rangeability, easy calibration, sensor diagnostics, intrinsically safe, NEMA 4X housing, digital field bus compatibility, self-diagnostics, easy setup via Type STT, DC powered, isolated analog output.

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