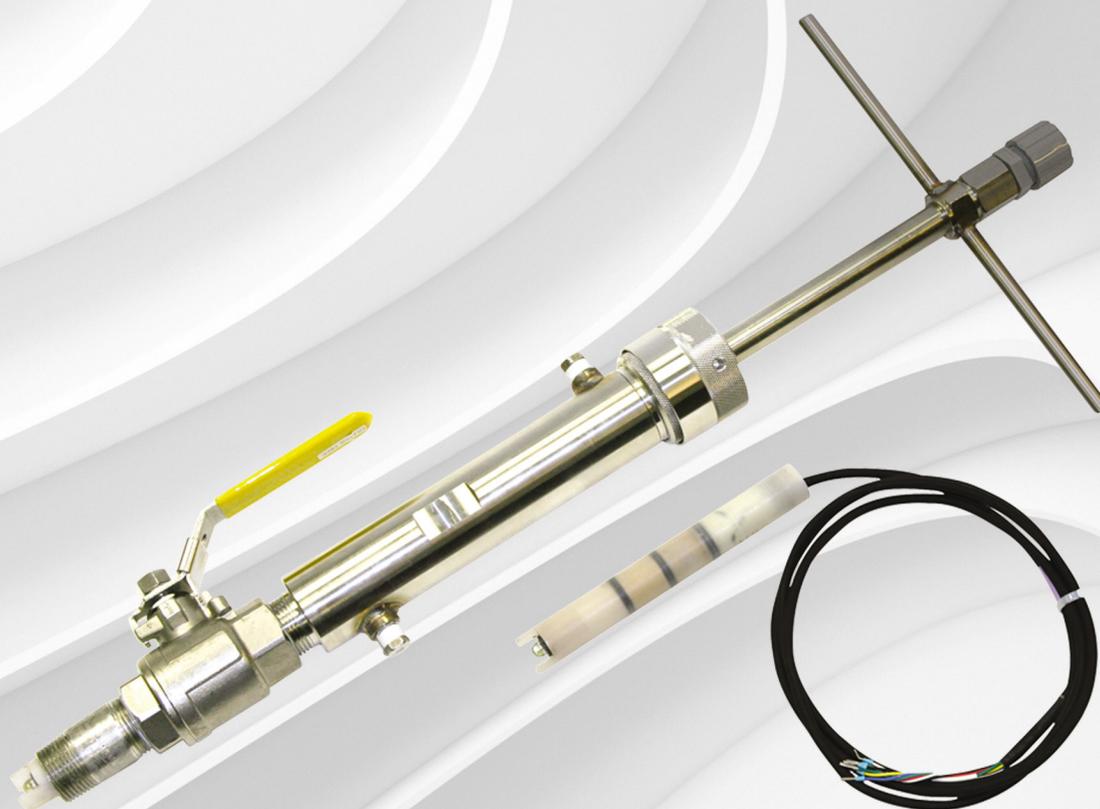


ABB MEASUREMENT & ANALYTICS | DATA SHEET

TBX587

pH / Redox (ORP) sensor



Measurement made easy

Retractable sensor assembly for industrial applications

1 inch retractable sensor

- specifically designed for smaller sample line installations

Quick response thermal compensator

- provides accurate pH measurement even with changing process temperature

150 psig maximum pressure rating

- easy 'T' handle for insertion into pressurized process

Next Step™ solid state reference

- eliminates poisoning, pumping and plugging

Solution ground rod

- permits continuous sensor diagnostics

Variety of sensor wiring options

- VarioPin™ and pinned leads wiring options

Operating temperature up to 140 °C (284 °F)

- the highest glass temperature limit on the market

Combination electrode style construction

- measuring, reference and temperature elements contained in one compact sensor body

TBI heritage

- based on the most successful harsh application pH sensor design on the market

A new addition to the most durable pH / Redox (ORP) sensors product line in the world

The Endura TBX587 is the latest addition to ABB's successful line of industrial pH sensors. A well deserved reputation for ruggedness, longevity and accuracy hallmark the TBX5 series pH sensors. The sensors are easily applied to most industrial measurement needs. They are renowned for their ability to outperform conventional gel filled sensors in the toughest process applications.

Combating reference electrode failure

Solid-state Next Step reference technology is the foundation for all TBX5 series pH electrodes. The totally solid inner reference chamber is charged with potassium chloride (KCl). This non-liquid reference chamber all but eliminates the poisoning, pumping and plugging problems that plague conventional liquid, slurry and gel designs.

The standard solution ground rod allows for continuous monitoring of glass breakage, shorts, and reference coating and contamination. ABB offers a wide variety of solution ground materials and O-ring options suitable for most industrial processes.

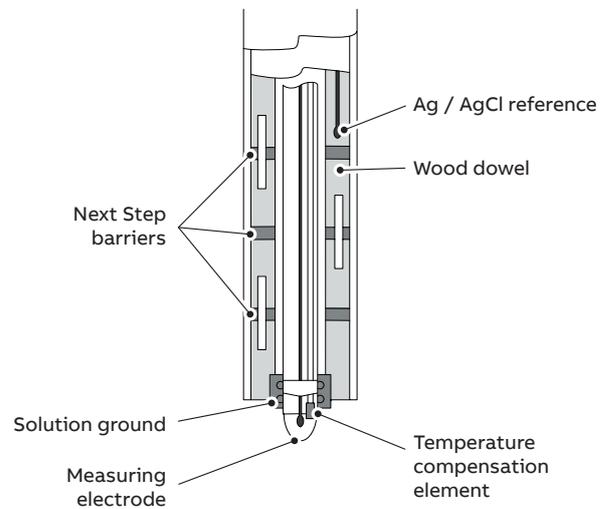


Figure 1 TBX5 sensor solid state reference

...Combating reference electrode failure

Durable electrodes

The TBX587 electrode design eliminates failures due to thermal stress caused by rapid temperature excursions. Unlike other pH sensors that use a large inner air bubble for expansion absorption, the TBX587 electrodes use a unique inner plunger; providing more effective protection against temperature fluctuations.

The glass manufacturing process uses inoffensive components. 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 error.

TBX587 temperature electrode performance

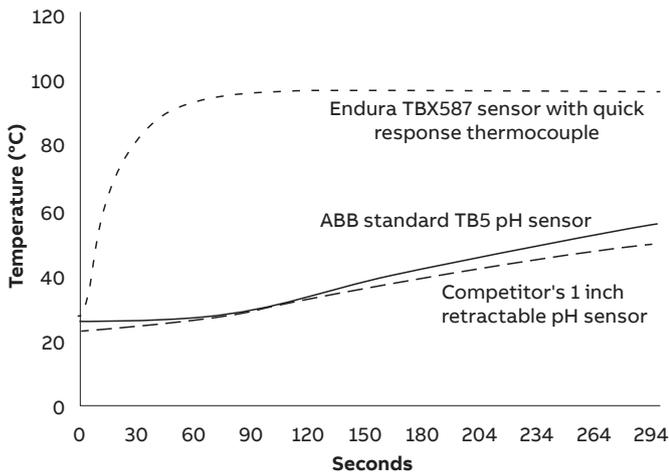


Figure 2 TBX587 thermocouple response time

Reference junction styles

To promote TBX587 electrode process efficiency, reference junctions are available as either wood or PTFE. A standard notched tip is offered to protect the measurement electrode from breakage.

The hardwood reference junction is highly recommended for all general purpose duties, particularly those requiring high resistance to coating. PTFE junctions are promoted for continuous processes over 11.0 pH or those containing known wood delignifiers such as strong caustics, bleaches and other oxidizers.

Temperature compensation

Temperature compensators enable pH analyzers to adjust for temperature effects on the glass pH electrode output (Nernst). Selected analyzers can also use this measurement to compensate for solution pH temperature effects.

The quick response temperature option offered on certain styles of ABB glass electrodes greatly improves the TBX587 temperature response over the competition.

The integral temperature compensator is available in two forms: 3 kΩ Balco and Pt100.

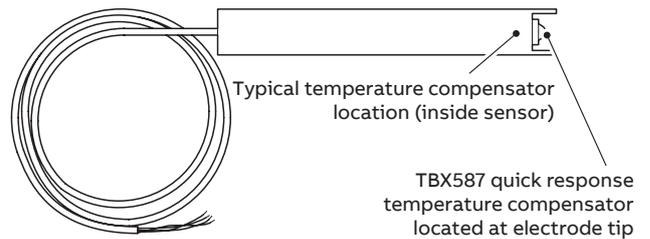


Figure 3 TBX587 temperature compensator location

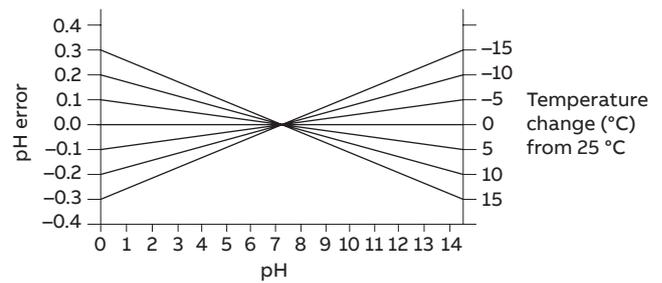


Figure 4 pH errors caused by temperature changes

Cable connection options

TBX587 sensors offer two different cabling options to connect to a wide variety of pH electronics.

Pinned leads – code option 'T':

enable the sensor to be wired directly to the pH electronics. This is ideal for cost savings and for short cable length applications where a quick disconnection method is not needed.

VarioPin – code option 'V':

provides a watertight (IP 68) quick disconnect option for difficult applications where the sensors will be removed frequently for cleaning, calibration or replacement.

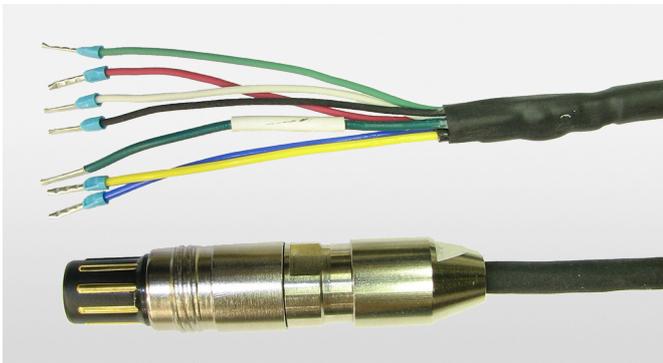
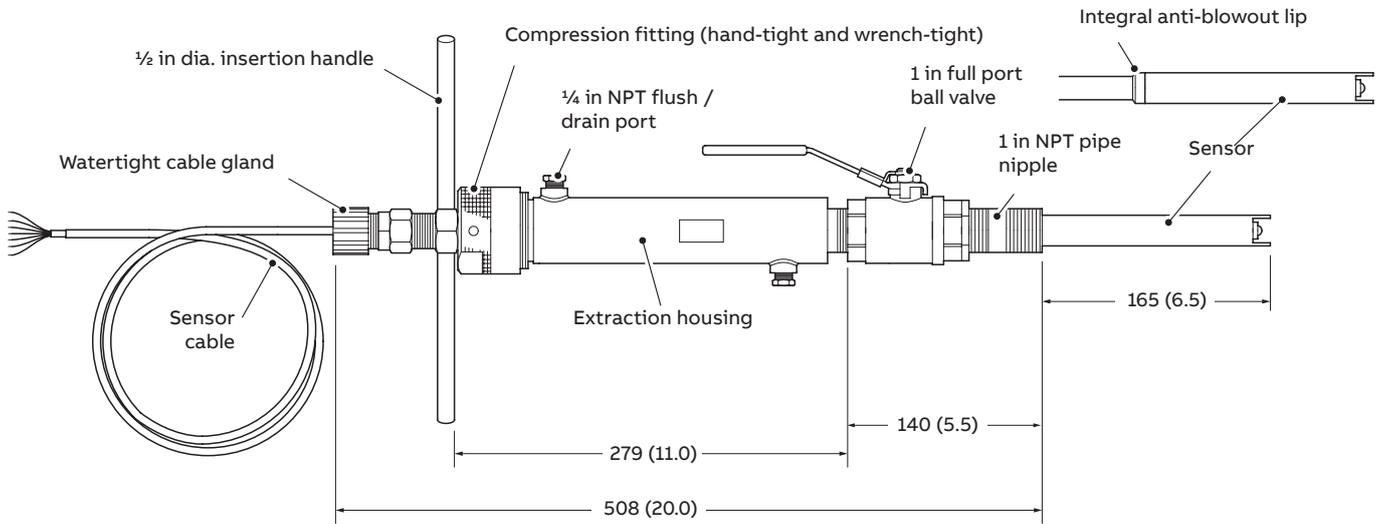


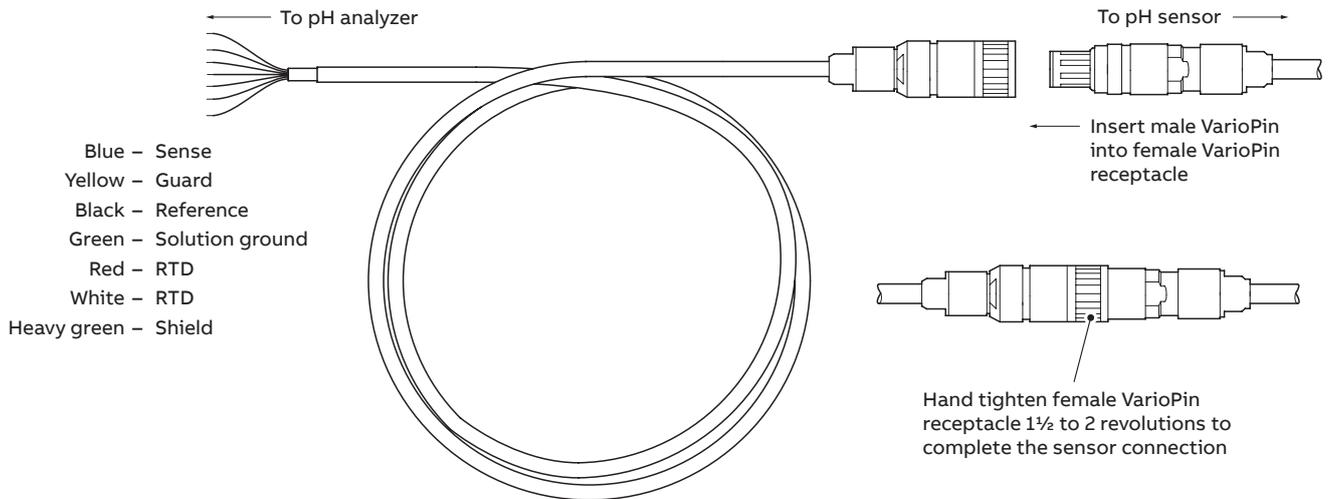
Figure 5 Pinned leads and VarioPin connections

Dimensions

Dimensions in mm (in)



Electrical connections



Specification

Pressure (max.)

10.3 bar (150 psi)

Temperature compensator (pH sensors only)

Quick response integral Pt100 or 3 k Ω Balco

Wetted material options

pH electrode

Glass

Redox (ORP)

Platinum

Reference junction

- PTFE
- Wood

Sensor body

PVDF

Solution ground + hardware

- Stainless steel
- Titanium
- Hastelloy

O-rings

- EPDM
- Viton
- Kalrez

Measurement electrode type and rating

Code	Type	Description	Range	Ratings		Quick TC standard
				Operating temperatures °C	°F	
1	Flat glass	Flush glass for slurries and high particulate applications.	0 to 14 pH	10 to 100	60 to 212 ¹	Yes
2	General-purpose glass	Low temperature and light duty applications. Not for high pH.	0 to 12 pH	0 to 100	32 to 212	Yes
3	High temperature glass	High temperature glass electrode and special high temperature cable.	0 to 14 pH	10 to 140	50 to 284	Yes
8	Flat Redox (ORP)	Flush platinum element. Well suited for slurry applications.	0 to 2000 mV	0 to 140	32 to 284	No
6	Antimony (Sb)	Metal pH electrode for hydrofluoric acid or high abrasion applications.	3 to 11 pH	-20 to 80	-4 to 176	No
F	Fluoride resistant glass	Etch resistant pH glass up to several % hydrofluoric acid concentration as well as other strong acids.	0 to 12 pH	10 to 80 ²	50 to 176 ²	Yes
J	Coat resistant glass	Most common industrial glass electrode for applications with coating and build-up.	0 to 14 pH	10 to 140	50 to 284 ³	Yes

¹ 0 to 121 °C (32 to 250 °F) for sterilization cycles

² 50 °C (122 °F) maximum recommended for high hydrofluoric acid concentration

³ 90 °C (194 °F) maximum cable temperature

Ordering information

Endura 1 in retractable pH / Redox (ORP) sensor assembly	TBX587	X	X	X	X	O	X	XX	X
Measurement electrode									
Flat glass, 10 to 100 °C (50 to 212 °F), 0 to 14 pH. For high particulates with flow at 90 degrees to the sensor.	1								
General purpose glass, 0 to 100 °C (32 to 212 °F), 0 to 12 pH. For low temperature applications.	2								
High temperature glass, 10 to 140 °C (50 to 284 °F), 0 to 14 pH. Sensor cable rated to 140 °C (284 °F).	3								
Platinum (flat ORP), 0 to 140 °C (32 to 284 °F), ±2000 mV	8								
Antimony, -20 to 80 °C (-4 to 176 °F), 3 to 11 pH	6								
Glass, pH, fluoride-resistant, 10 to 80 °C (50 to 176 °F), 0 to 14 pH	F								
Coat-resistant glass, 10 to 140 °C (50 to 284 °F), 0 to 14 pH. Sensor cable rated to 90 °C (194 °F)	J								
Integral thermocompensator									
None, replacement sensor	0								
3 kΩ ¹	1								
Pt 100 ¹	3								
Reference junction									
Wood, Notched, Next Step ²							D		
PTFE, Notched, Next Step ²							E		
Solution ground wetted material									
316 stainless steel with Viton O-rings								1	
316 stainless steel with EPDM O-rings								2	
316 stainless steel with Kalrez O-rings								3	
Titanium with Viton O-rings								4	
Titanium with EPDM O-rings								5	
Titanium with Kalrez O-rings								6	
Hastelloy B-2 with Viton O-rings								7	
Hastelloy B-2 with EPDM O-rings								8	
Hastelloy B-2 with Kalrez O-rings								9	
Accessory hardware									
None, replacement sensor									O
Complete hardware assembly, stainless steel with Viton O-rings									A
Complete hardware assembly, stainless steel with EPDM O-rings									B
Complete hardware assembly, stainless steel with Kalrez O-rings									C
Complete hardware assembly, titanium with Viton O-rings									D
Complete hardware assembly, titanium with EPDM O-rings									E
Complete hardware assembly, titanium with Kalrez O-rings									F
Complete hardware assembly, Hastelloy C with Viton O-rings									G
Complete hardware assembly, Hastelloy C with EPDM O-rings									H
Complete hardware assembly, Hastelloy C with Kalrez O-rings									J
Sensor cable connection options									
Tinned / Pinned leads									T
Quick disconnect VarioPin connector									V
Sensor cable length in m (ft)									
1.5 (5) ³									05
3 (10) ³									10
6 (20) ³									20
9 (30) ³									30
Quick disconnect VarioPin connector (select extension cable separately – see VarioPin extension cable on page 9)									00
Tag									
None									0
Mylar®									1
Stainless steel									2

¹ No integral thermocompensator when Redox (ORP) or antimony electrode selected for **Measurement electrode**.

² Flush reference junction supplied when antimony electrode selected for **Measurement electrode** (all other electrodes have notched tip).

³ Cable length applies only to tinned / pinned leads (see **Sensor cable connection options**). VarioPin option requires extension cable.

Accessories

1 in ball valve kit

Material	Part no.
Stainless steel (4TB4951-0118 + 4TB4955-0118):	4TB5205-0302
Titanium (4TB4951-0119 + 4TB4955-0013)	4TB5205-0303
Hastelloy C (4TB4951-0120 + 4TB4955-0014)	4TB5205-0304

VarioPin extension cable

Length in m (ft)	Part no.
2 (5)	4TB3011-9005
3 (10)	4TB3011-9010
6 (20)	4TB3011-9020
10 (30)	4TB3011-9030
15 (50)	4TB3011-9050
23 (75)	4TB3011-9075
30 (100)	4TB3011-9100

Acknowledgements

- Next Step is a trademark of ABB Automation Inc.
- VarioPin is a trademark of Interconnex AG
- Hastelloy is the registered trademark name of Haynes International, Inc.
- Mylar is a registered trademark of Dupont Teijin Films.
- Viton is a registered trademark of the Chemours Company.
- Kalrez is a registered trademark of DuPont

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