Data Sheet

SS/AP300 Issue 2

Combination pH/Redox (ORP) Sensors

AP300 Series

- **User-customizable for Insertion, Flow-through, Immersion and Hot-tap Retractor**
  - ideal for OEMs (Original Equipment Manufacturers) and general applications
- **Economical investment, powerful performance**
  - suitable for general purpose and light industrial applications
- **Combination Sensor complete with measuring, reference and temperature elements**
  - all-in-one sensor; needs no additional electrodes
- **Bulb and Flat Glass Options**
  - provides rugged performance and exceptional resistance to in-line coatings
- **High stability PTFE reference junction**
  - superior performance in water treatment duties
  - anti-fouling capability in contaminated media
- **Gel-filled disposable sensor**
  - non-maintenance sensor
- **Process-resistant gel electrolyte**
  - operates up to 105°C (221°F) and 6 bar (90 PSI)

Excellent all-round performance in a wide range of applications

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Positive Solutions

ABB provides an unrivalled range of dedicated pH/Redox (ORP) sensors for laboratory and process industrial duties.

Trouble-free Selection: Ideal for OEMs

The AP300 series is the perfect starting point for pH or Redox (ORP) measurements. Economical in outlay, yet powerful enough for the majority of standard applications, these PPS (Ryton) bodied sensors are best placed for OEMs and users with general purpose applications.

The range provides uncomplicated, effective technology enabling on-site customization. Simple conversion is possible from an insertion probe into a dip-type immersion or in-line, flow-through sensor; enabling the user to provide maximum application coverage with the minimum number of variants.

A 'Hot-tap' insertion sensor variant allows fitting and retraction through a standard, full-port ball-valve keeping installation costs to a minimum.

Rugged Design, Maximum Protection

The inner electrolyte is a highly media-resistant gel with integral protection against process contaminants, faced with a dirt-repellent PTFE junction.

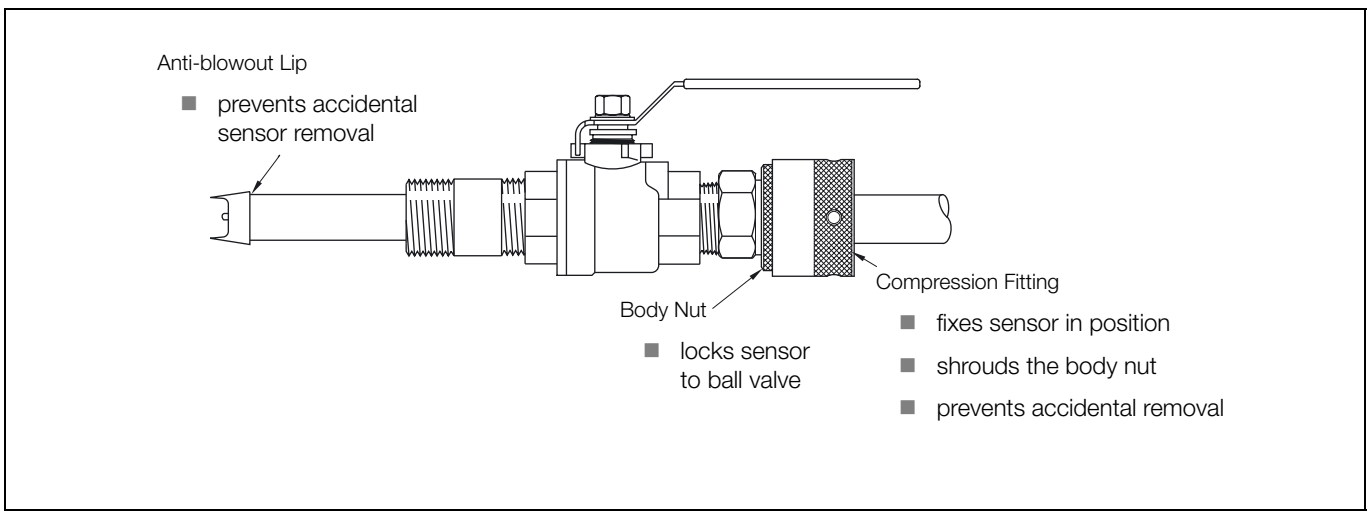
These are encapsulated in a rugged body, providing maximum resistance to chemical attack. The sensor can withstand operation up to 105°C (221°F) and 6 bar (90 PSI).

Site Customizable: Insertion, Flow, Immersion and Hot-tap Retractable

The AP301 is a PPS Ryton sensor for general applications that can be adapted to 1in. NPT fittings by threaded locknut process adapters. Dip-type immersion is achieved by using an immersion guard and connection of the 3/4 in. NPT back-thread to a customer-supplied dip-tube.

The AP302 & AP303 are composite combination sensors made from PVDF and can be converted from insertion to flow or dip immersion using its front and rear 3/4 in. NPT threads.

Completing the series, the AP304 & AP305 are fully retractable PVDF-bodied sensors enabling installation, commissioning and maintenance without the need for a costly by-pass system or long immersion sensor. This can significantly reduce new project costs. The additional benefit of the retractable method is that it permits maintenance without process shut-down.



Schematic of AP304 and AP305 anti-blowout lip and hand-compression fitting safety features

Retractable Sensor with Safety-by-Design

The safety of operators is paramount. This is maintained by incorporating an anti-blowout lip in the design of the AP304 & AP305, preventing accidental sensor removal. Unlike chain restraints, this safety-by-design is an integral part of the sensor's construction.

Ball-valve connection is achieved with either wrench-tight or hand-tight fittings. The hand-operated compression fitting provides additional safety through two separate locking rings. A body nut union ring locks the sensor to the ball valve and enables sensor dismounting without complete disassembly. In addition, a compression ring fixes the sensor into position at the required insertion depth and seals the body from the process. This compression ring has an integral shroud that prevents access to the smaller body nut when the compression ring is being loosened for sensor maintenance.

All-in-one and Low Maintenance

The AP300 Series is a composite, combination electrode with all the sensor elements in one compact body; measuring element, reference and temperature sensor. This reduces outlay and maximizes performance.

The gel-filled reference section means that the sensor requires little maintenance other than periodic cleaning and calibration.

Flat-Glass Self-Cleaning Efficiency

To promote self-cleaning, the junction design uses fouling-resistant PTFE. When used with ABB Flat-Glass technology the AP300 provides maximum resistance to in-line coatings; particularly fibrous media.

Flat & Bulb Glass Variants

Cable Options

Two cable connection methods are possible; integral cable in 3m (10ft), 6m (20ft) and 9m (30ft) lengths, or terminated via a fitted junction box.

Each version allows for tagged sensor terminations enabling connection to a wide variety of process pH/Redox (ORP) instruments with terminal blocks. Alternatively the sensor can be supplied with detachable BNC/TC connections.

Model AP301

General-purpose in-line/immersion, locknut style sensors.

Models AP302 and AP303

General-purpose in-line/immersion, 3/4 in. NPT threaded sensors.

Models AP304 and AP305

General-purpose, Hot-tap retractable sensors.

Sensor Cables and Junction Box Wiring

Male BNC

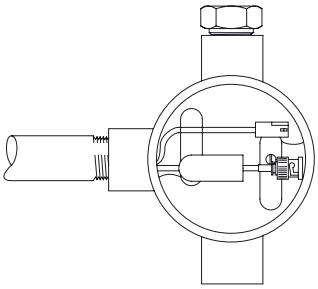
Pin Leads

Female BNC (to Sensor or Junction Box)

Pin Leads (to TB82, TB84 and 4630)

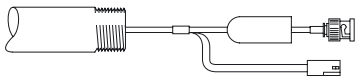
Tagged Pin Extension Cable
(Cable 4TB 3011-3XXX or 9170/300)

Without Temperature Compensator

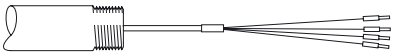


Junction Box
(4TB5023-0162)

Junction Box

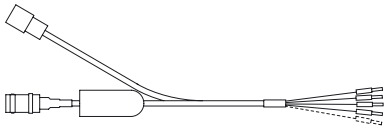


Male BNC and Temperature Compensator Connector



Tagged Pin Leads

To Sensor or Junction Box



Pin Leads

Tagged Pin Extension Cable
(5-Core 1015/16x to TB8XPH & 4630*
or
4-Core 4TB3011-4XXX to TB8XPH)

With Temperature Compensator

* Automatic Pt100 lead resistance compensation with Model 4630 instruments or similar.

Specification

General

pH Measuring range
0 to 14pH

Redox (ORP) Measuring Range
–2000 to 2000mV

Temperature range

Body	0 to 105°C (32 to 221°F)
Bulb glass	0 to 105°C (32 to 221°F)
Flat glass	0 to 100°C (32 to 212°F)
Redox (ORP)	0 to 105°C (32 to 221°F)

Pressure maximum
6 bar (90 PSI)

Temperature compensator (pH sensors only)
Integral Pt100 or Balco 3kΩ

Wetted materials

Glass	pH electrode
Platinum	Redox (ORP)
PTFE	Junction
PPS (Ryton)	Body AP301
PVDF (Kynar)	Body AP302/3 and AP304/5
Stainless steel	AP304 & AP305 shaft

pH glass types

Bulb	general duties
Flat	in-line, self-cleaning

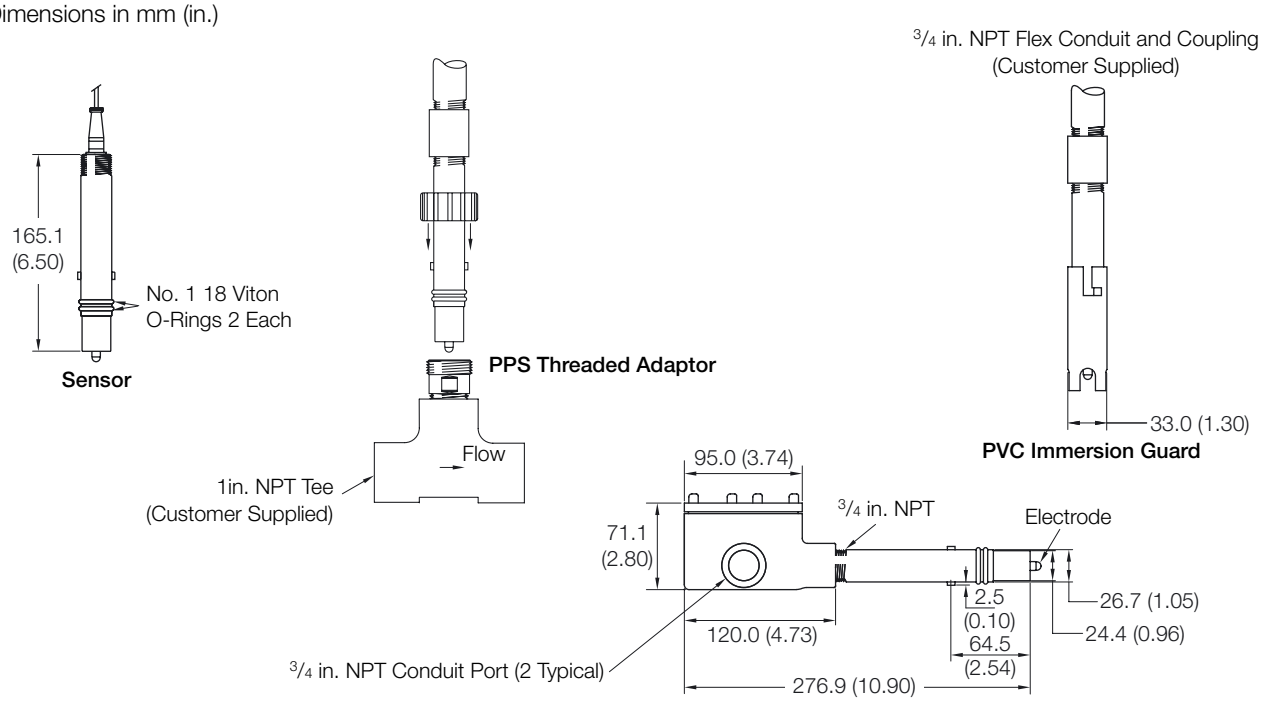
Reference System
Ag/AgCl-3.5M KCl in gel matrix

Reference Junction
Porous PTFE

Overall Dimensions

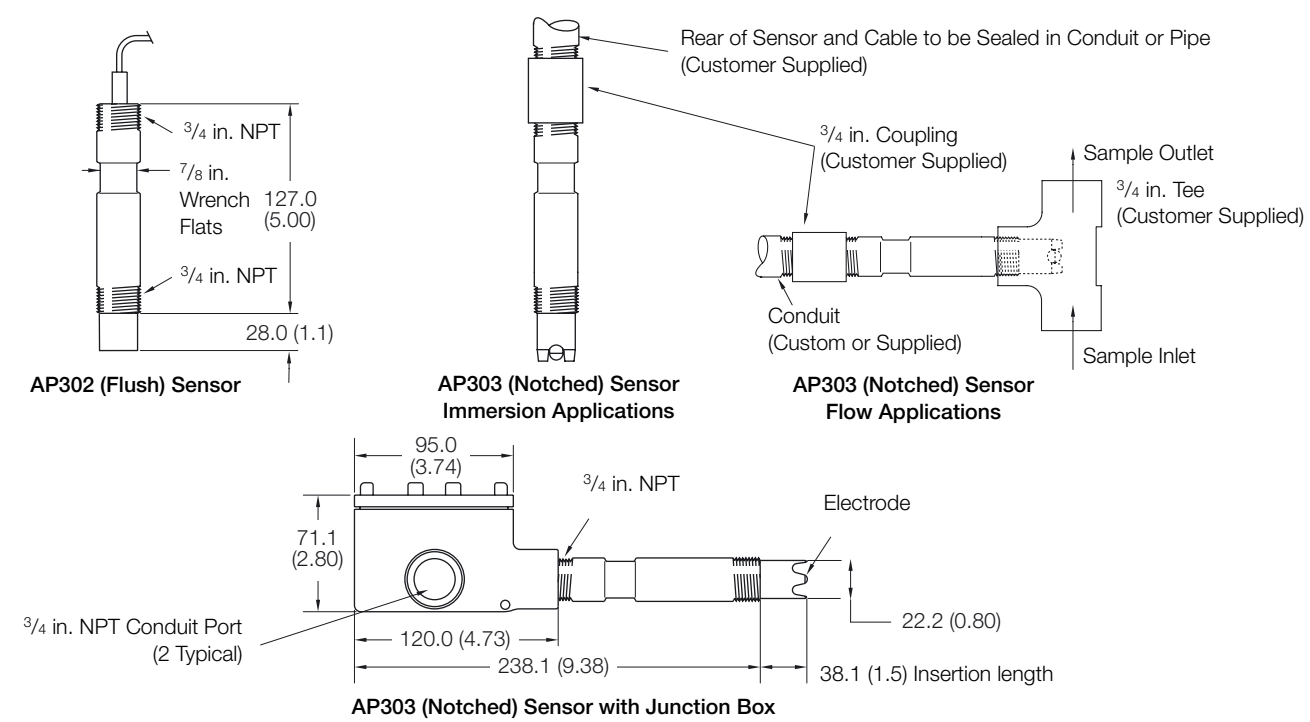
Model AP301

Dimensions in mm (in.)



Models AP302 and AP303

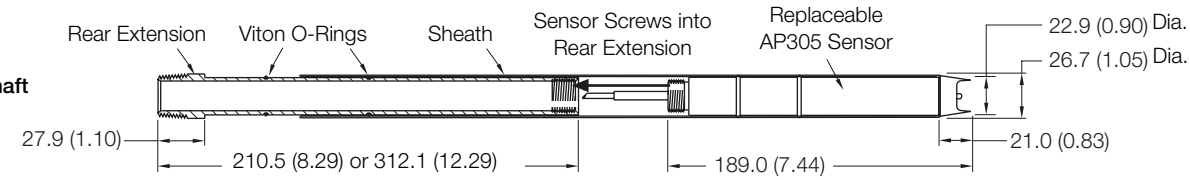
Dimensions in mm (in.)



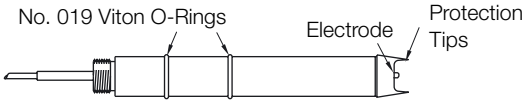
Models AP304 and AP305

Dimensions in mm (in.)

Sensor Shaft

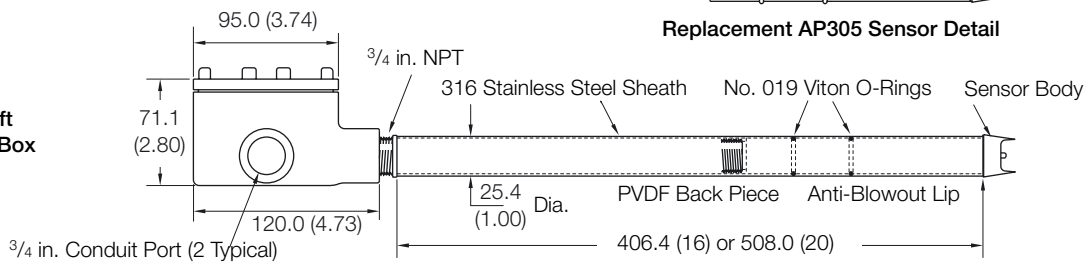


Replacement Sensor

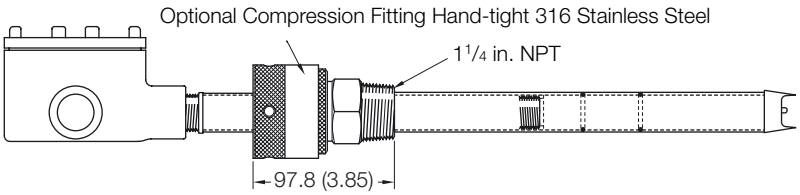


Replacement AP305 Sensor Detail

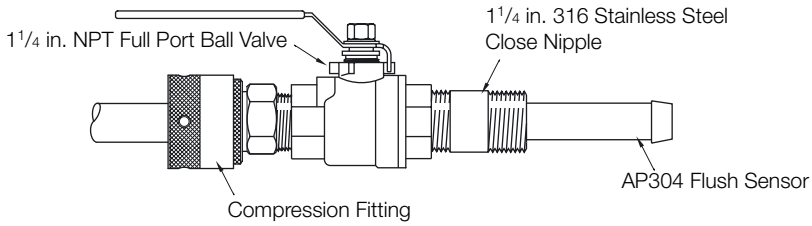
Sensor Shaft & Junction Box



Sensor Shaft & Hand-tight Fitting

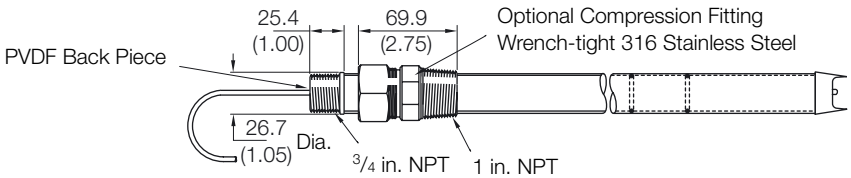


Ball Valve Insertion & Hand-tight Fitting

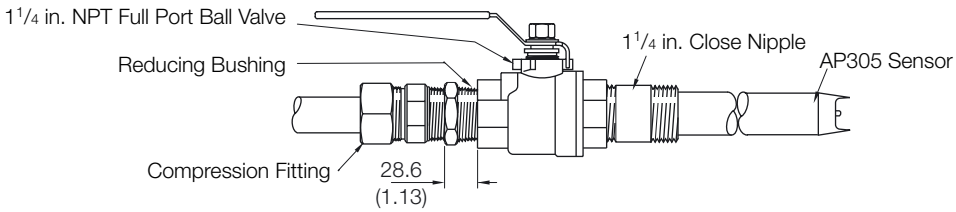


Installation Detail

Sensor Shaft & Wrench-tight Fitting



Ball Valve Insertion & Wrench-tight Fitting



Installation Detail

Ordering Information

pH/Redox (ORP) Sensor/Assembly	**AP30**	**X**	**/**	**X**	**X**	**0**	**X**	**X**	**XX**	**X**
Gel-filled, disposable sensor with dirt-repellent PTFE junction										
Body style										
Twist-lock insertion/immersion (TB551 style)										
Standard insertion – no sensor guard (flush)		1								
3/4 in.threaded insertion/immersion (TB556 style)										
Insertion depth 1.1 in. – no sensor guard (flush)		2								
Insertion depth 1.5 in. – notched sensor guard		3								
Hot-tap ball valve insertion (TB557 style)										
No sensor guard (flush)		4								
Notched sensor guard		5								
Measuring Electrode										
Flat glass pH for in-line, fouling applications (5 to 100°C, 0 to 14pH)				1						
Standard glass, pH (0 to 105°C, 0 to 14pH)				2						
Platinum, Redox (ORP)				5						
Integral Temperature Sensor										
None – only for Redox (ORP) sensors					0					
Pt100 – only for pH sensors					1					
3kΩ – only for pH sensors					2					
Reserved										
Junction Box or Integral Cable Length										
Short length cable – supplied **without** junction box							0			
3m (10 ft)							1			
6m (20 ft)							2			
9m (30 ft)							3			
Integral junction box supplied with short length cable							8			
Sensor Connectors										
Tagged Pin Leads – all tagged terminations								0		
Connectors – BNC on pH/Redox (ORP) + TC connector (if used)								1		
Also select for electrodes used with junction box										
Accessory Hardware										
No accessory supplied									00	
For AP301										
1 in. NPT, locknut adapter – Ryton (PPS)									12	
PVC immersion (dip) guard									13	
For AP304 & AP305										
16 in. stainless steel sheath									20	
16 in. stainless steel sheath & 316 stainless steel wrench-tight fitting									21	
16 in. stainless steel sheath & 316 stainless steel hand-tight fitting									22	
20 in. stainless steel sheath									23	
20 in. stainless steel sheath & 316 stainless steel wrench-tight fitting									24	
20 in. stainless steel sheath & 316 stainless steel hand-tight fitting									25	
Instruction Manual										
No manual supplied – for replacement sensors only										0
English										1
French										2
German										3
Spanish										4

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