



Sb0D0xxxxAx

Antimony probe for pH measurements in closed pipelines

Designed for the measure of pH in closed pipelines in presence of abrasive or fouling substances. The measuring electrode, that is kept clean and active by a brush, and the reference electrode, c/w electrolyte reservoir, assure long operating periods without maintenance requirements.

Mod.Sb0D probes are designed to be directly installed into closed pipelines of various diameter through many types of flanged connections.

Mod.Sb0D probes are designed for industrial "heavy/duty" applications, in dirty and fouling processes, in water with abrasive suspended solids, as where calcium hydroxide is dosed, where glass pH electrode would not be suitable.

Advantages

- Sturdy execution, SS AISI 316 or PVDF
- Suitable for measurements in the range 1 to 13 pH
- Suitable for pressure up to 5 bar (@20 °C)
- Suitable for temperature up to 100 °C
- Water tight cable glands
- 24, 110 or 220 VAC power supply or pneumatic actuator (for Ex zone installation)
- Electrodes self cleaning
- Electrolyte reservoir may be pressurized
- Extremely low maintenance requirements

Operating principle and realization

The Antimony electrode measure is based on an oxidation-reduction phenomenon. On the surface of this electrode the metallic Sb naturally forms a $\text{Sb}(\text{OH})_3$ oxide layer, so that an electrochemical equilibrium is produced as per the equation:



A too thick oxide layer on the electrode surface would compromise the functioning, so the measuring surface of the antimony electrode is continuously gritted by a brush that keeps the oxide layer to a constant thickness value; the brush also avoids any fouling of the electrode surface.

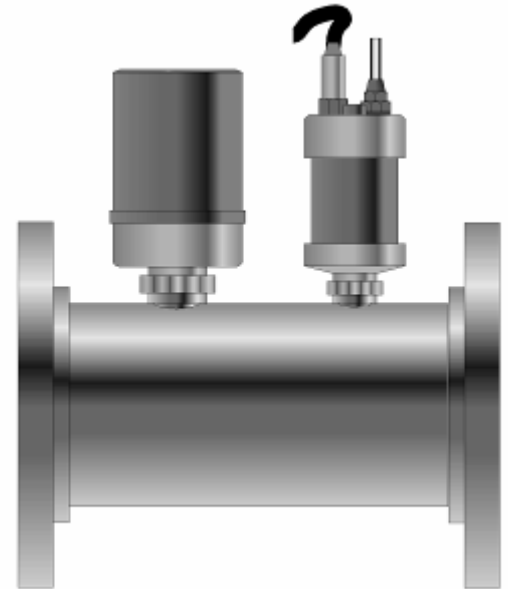
The potential generated by the Antimony electrode is 50 mV/pH with a response time of about 3 minutes respect to 57 mV/pH with 10 seconds of response time for the glass electrode. The zero point (0 mV) is at pH = 1 for antimony electrode, while it is at pH = 7 for the glass electrode. For this reason a pH meter that can introduce a zero correction of at least 400 mV must be used.

This probe includes separate electrodes: the antimony electrode is annular with flat surface and the reference is Ag/AgCl, with flat shaped diaphragm. A corundum (or other material on request) brush keeps constantly clean the electrodes surfaces. The reference electrode is solid gel filled and is immersed into the external electrolyte reservoir also acting as salt bridge.

The probe is a stainless steel AISI 316 (Mod.Sb0D0x2xxAx) (or PVDF, Mod.Sb0Dx4xxAx) pipe, standard length 337 mm, \varnothing 5", including flanges on both sides. Other pipe lengths and diameters and many types of flanges are available upon request (select on order code).

The system includes a KCl reservoir, the measuring group made of antimony measuring electrode and cleaning system, both installed on the upper side of the pipe.

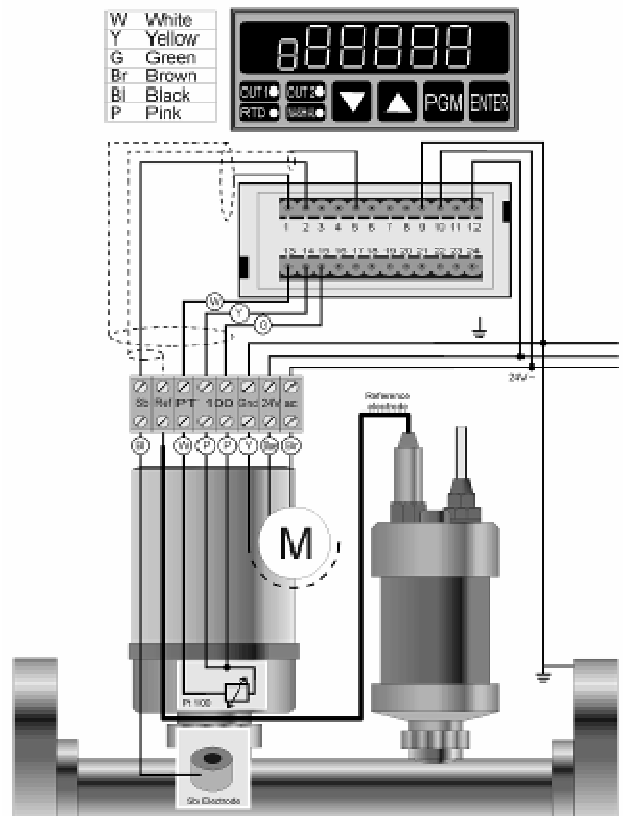
The KCl reservoir can be pressurized and includes the liquid junction with synthetic diaphragm, the reference electrode, the connection for optional pressure gauge and pressurizing valve. The measuring group includes the annular antimony electrode, the brush and the motor for brush (pneumatic or electric) and the terminal board for the connection of the system to the electronic unit, all included in a splash proof housing.



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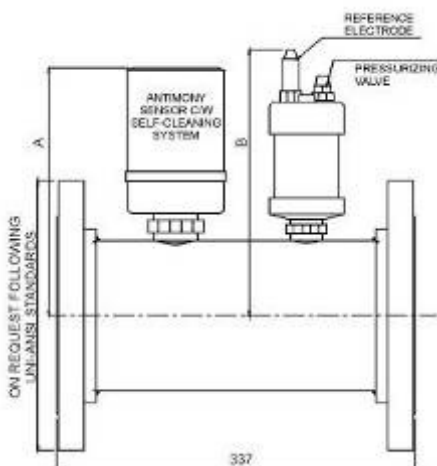
Technical Specifications

Body material: stainless steel AISI 316 or PVDF
 Electrode support material:..... PVDF
 Electrodes:.....measure: antimony, annular;
reference: semisolid Ag/AgCl-KCl, with salt bridge
 Zero point:.....0 mV at pH 0
 Slope:.....50 mV/pH
 Measuring ranges: 1-13 pH
 Operating temperature limits: 5 to 100 °C
 (up to 130°C for short periods)
 Storage temperature limits:..... -10 to +60 °C
 Operating pressure:.....5 to 2 bar according to
 operating temperature
 Response time:..... 3 minutes
 Process connections: UNI or ANSI flanges,
 type and dimensions upon request
 Power supply: 24, 110 or 220 Vac
 Consumption:..... 3 W
 Pneumatic version requirements: filtered air > 2 bar
 Cable glands: q.ty 1 Pg 9 (power supply)
 q.ty 2 PG 7 (cables to electronic unit)
 Housing protection:..... IP65
 Max.distance from instrument: 50 m
 Mounting: .directly into the pipelines through flanged conn.
 Dimensions:length 337 mm, Ø 3" to 6" , other upon request
 Weight: approx 9 kg. (3"), 13 kg. (4"), 17 kg. (5"), 20 kg. (6")



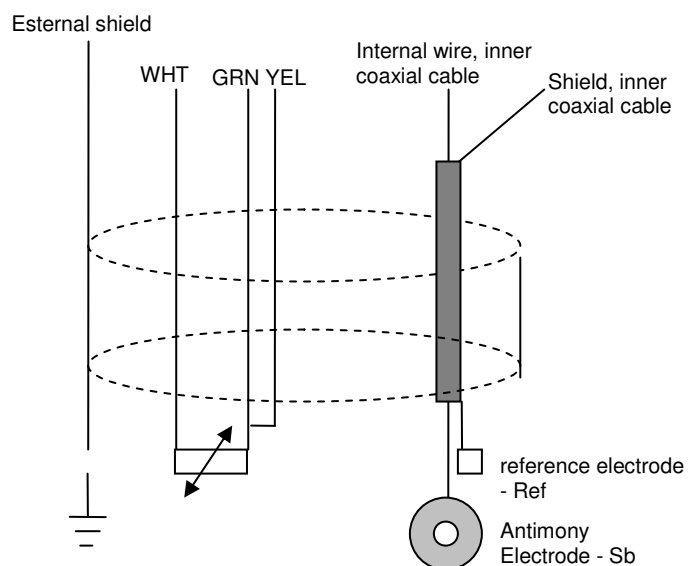
Calibration & Maintenance

The calibration of the measuring chain may be operated through standard pH 7.0 and pH 4.0 buffer solutions. However, in order to make easy the calibration procedure with this probe, the calibration can be directly operated on the liquid under measure, without interrupting the process. The zero point can be calibrated by shorting terminals Sb and rif on the terminal board inside the probe. The instrument reading with terminal shorten must be 0 pH. The zero point of measuring chains including antimony electrodes is usually very stable and does not require recalibrations: it is therefore allowed to bypass the calibration of the zero point and directly calibrate the slope. Measure the pH of the liquid under measure with a portable pH meter or with the desired laboratory method (with proper accuracy level) and then calibrate the slope of the instrument with the measured pH value.



Wiring

Cable instrument side



Wiring inside the probe

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Order code breakdown

	Sb0	x	x	x	x	x	x	x	x
pH probe with antimony electrodes	Sb0								
Type of probe For direct installation in pipeline T-Sb		D							
Fixed Code			0						
Flanges for process connection									
Reserved				A					
ANSI 150 3"				B					
ANSI 150 4"				C					
ANSI 150 5"				D					
ANSI 150 6"				E					
DN 80				F					
DN100				G					
DN125				H					
DN150				I					
Special execution				Z					
Construction Material (probe body)									
AISI 316 body, PVDF electrodes support					2				
PVDF body, PVDF electrodes support					4				
Special execution					9				
Shaft and pin material									
Reserved						A			
Stainless steel						B			
Hastelloy C 275						C			
Special execution						Z			
Sample withdrawal connection									
Reserved							0		
Not included							1		
DN20 flange for sample withdrawal							2		
Special execution							9		
Fixed code									A
Mechanical cleaning system actuation									
Reserved									0
Electric, 24 Vac									1
Electric, 110 Vac									2
Electric, 220 Vac									3
Pneumatic									4
Special execution									9

Accessories

Cable for the connection n to the electronic unit, 7 cores + inner coaxial cable, shielded, **Mod.CV/2SCH-7-x** where x = length in meters, to be specified at order

Optional Accessories

pH 7,00 buffer solution..... T/101-7x

pH 4,00 buffer solution..... T/101-4x

pH 9 buffer solution..... T/101-9x

Refilling electrolyte, saturated KCl solutionE/123-2x

where x= A : 250 ml bottle; x = B : 500 ml bottle; x = C: 1000 ml bottle.