



## Sb0A0Axx0Ax

### Through flow cell for pH measurements with antimony electrodes

Through-flow cell designed for the measure of pH in presence of abrasive or fouling substances and in processes with high concentration of hydrofluoric or phosphoric acid. 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.

Sb0A through flow cells can be wall mounted or directly installed on the pipeline where the sample is drawn for measure. These cells are simple to install and can always be located in easy-to-access position.

Mod.Sb0A 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, or in solutions containing hydrofluoric acid or phosphoric acid where glass pH electrode would not be suitable.

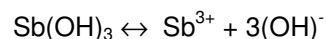


#### Advantages

- **Sturdy and compact execution**
- **Suitable for measurements in the range 1 to 13 pH**
- **24 VAC, 110 VAC or 220VAC power supply or pneumatic actuator (for Ex zone installation)**
- **Water tight cable glands**
- **Electrodes self cleaning**
- **Electrolyte reservoir**
- **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 an  $\text{Sb(OH)}_3$  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.

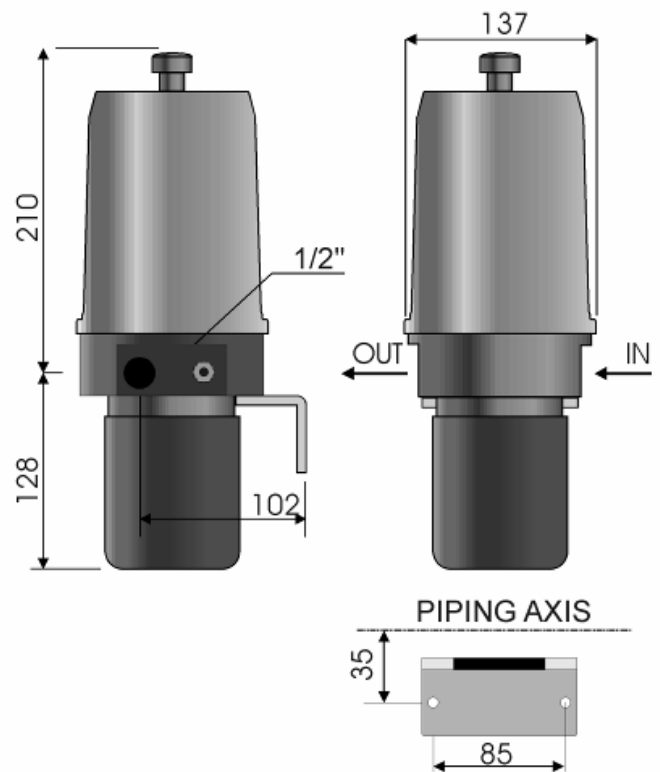
The probe body is made of PVDF and the probe includes, besides the ground pin (supplied upon request), a temperature sensor, a reference electrode, an antimony pH measuring electrode. A ratio motor is installed on the upper housing of the probe and moves the brush. In the same housing the electrolyte reservoir is mounted. The probe is supplied with brackets and accessories for wall mounting. Hydraulic connections are two, 1/2" F for sample inlet and drain.

The lower vessel, that is fixed to the probe through a threaded nut, can be used as calibration vessel.

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## Technical Specifications

Body material:..... PVDF  
 Electrodes:..... measure: antimony, annular;  
 ..... reference: semisolid Ag/AgCl-KCl, with salt bridge  
 Zero point:..... pH 1  
 Slope:..... 50 mV/pH  
 Measuring ranges:..... 1-13 pH  
 Operating temperature limits: ..... 5 to 100 °C  
 Storage temperature limits:..... 0 to +60 °C  
 Operating pressure:..... 2 bar at room temperature  
 Sample flow rate:..... <0,5 l/min  
 Vessel volume: ..... approx. 0,4 l  
 Response time:.. 3 minutes (depending upon flow rate)  
 Process connections: ..... 1/2" F  
 Brush velocity: ..... 1 RPM, alternating,  
 ..... for Sb0A0Axx0A(1,2 or 3)  
 ..... Adjustable through air pressure for Sb0A0Axx0A4  
 Power supply: ..... 24 Vac, 110 VAC, 220 VAC  
 ..... according to selected code  
 Consumption:..... 3 W  
 Pneumatic version requirements: ..... filtered air > 2 bar  
 Cable glands: ..... q.ty 2 Pg 9  
 Housing protection:..... IP65  
 Max.distance from instrument: ..... 50 m  
 Mounting: ..... supplied c/w wall mounting bracket;  
 ..... direct mounting on pipeline with rigid tubing's  
 Dimensions: ..... Ø 137 x 338 mm  
 Weight: ..... approx. 3 Kg. (PP)

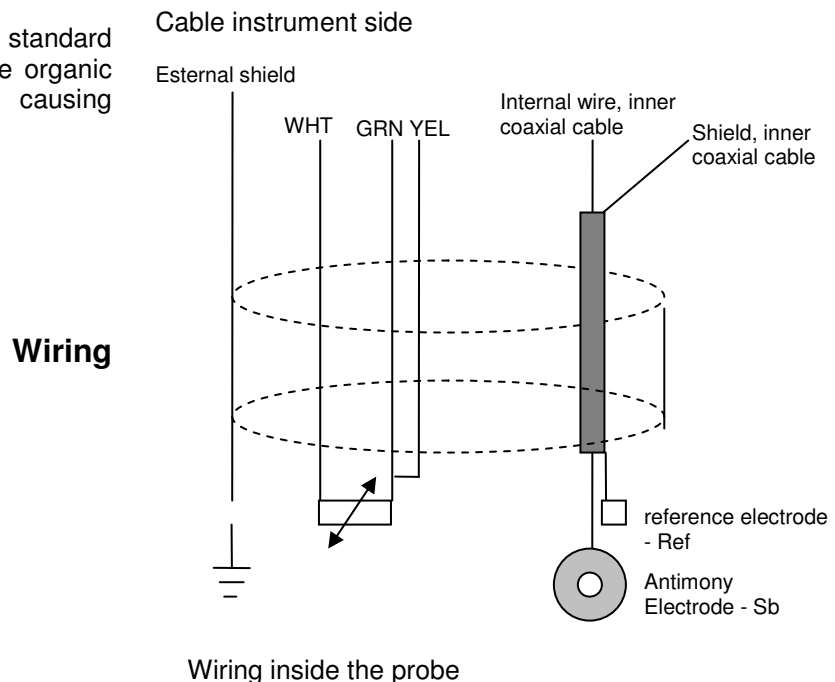


## Calibration & Maintenance

To perform a calibration, stop the sample flow to the probe, unscrew the lower vessel, wash it and fill it with the proper calibration solution (e.g. pH 4 buffer solution).

The zero point of these sensors is extremely stable and never needs to be recalibrated. The slope can be calibrated as follows: pour into the vessel the desired pH buffer solution and screw the vessel on the probe. Wait for stabilization and calibrate. Unscrew the vessel, discard the solution, wash the vessel with water and reinstall it.

**ATTENTION:** the use of inorganic standard solution is recommended since the organic ones react with Antimony oxide causing voltage shift.



# Sb0A0Axx0Axx

## Order code breakdown

|  | Sb0 | x | x | x | x      | x                | x | x | x                          |
|--|-----|---|---|---|--------|------------------|---|---|----------------------------|
| <b>pH probe with antimony electrodes</b>   | Sb0 |   |   |   |        |                  |   |   |                            |
| <b>Type of probe</b><br>Through flow cell, <b>D100-Sb</b>  |     | A |   |   |        |                  |   |   |                            |
| <b>Fixed code</b>  |     |   | 0 |   |        |                  |   |   |                            |
| <b>Fixed code</b>  |     |   |   | A |        |                  |   |   |                            |
| <b>Construction material (body)</b><br>PVDF<br>Special execution   |     |   |   |   | 1<br>9 |                  |   |   |                            |
| <b>Shaft and pin material</b><br>Reserved<br>Stainless steel<br>Hastelloy C 275<br>Special execution   |     |   |   |   |        | A<br>B<br>C<br>Z |   |   |                            |
| <b>Fixed code</b>  |     |   |   |   |        |                  | 0 |   |                            |
| <b>Fixed code</b>  |     |   |   |   |        |                  |   | A |                            |
| <b>Mechanical cleaning system actuator</b><br>Reserved<br>Electric, 24 Vac<br>Electric, 110 Vac<br>Electric, 220 Vac<br>Pneumatic<br>Special execution |     |   |   |   |        |                  |   |   | 0<br>1<br>2<br>3<br>4<br>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 solution ..... E/123-2x

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

**A = Measuring group**  
**B = Porous diaphragm group**  
**C = Brush actuator (ratio motor)**  
**D = Reference electrode c/w salt bridge and electrolyte reservoir**

