

## Immersion probe for pH measurements with antimony electrodes

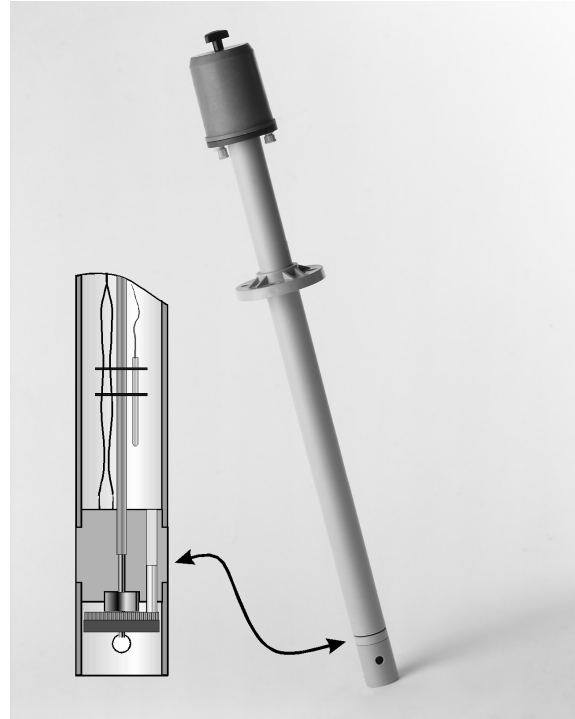
Immersion probes designed for the measure of pH in very difficult applications. The measuring electrode, that is kept clean and active by a brush, and the reference electrode, c/w electrolyte reservoir, assure long operating periods without maintenance requirements.

Sb0C immersion probe can be installed into basins, tanks and open channels, and they are designed for wall mounting by means of a flange sliding on all the probe body, DN50.

Mod.Sb0C 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.

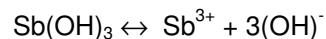
### Advantages

- **Sturdy execution, very easy to be installed**
- **Suitable for measurements in the range 1 to 13 pH**
- **either 24,110 or 220 VAC power supply or pneumatic actuator (for Ex zone installation)**
- **Water tight cable glands**
- **Electrodes self cleaning**
- **The probe body acts as the 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  $Sb(OH)_3$  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.

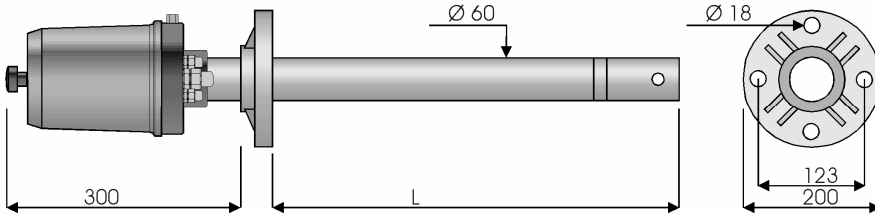
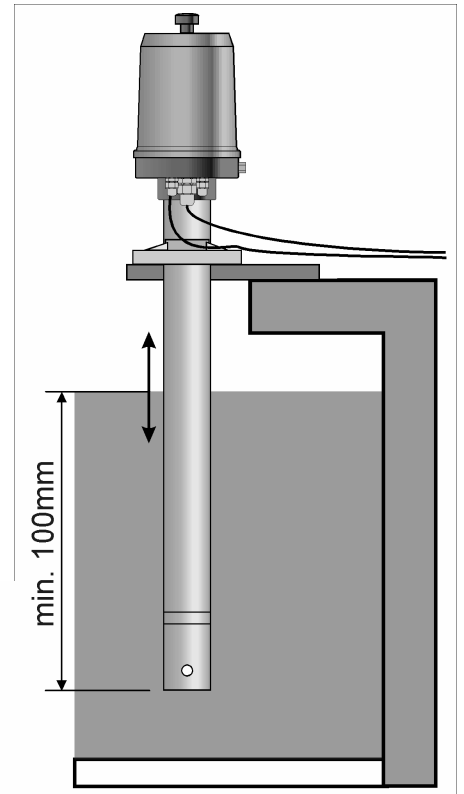
This probe includes separate electrodes: the antimony electrode is annular with flat surface and the reference is Ag/AgCl, with flat shaped diaphragm located near the annular Sb electrode. A corundum (or other material on request) brush keeps constantly clean the electrodes surfaces.

The probe is composed of a PVDF body ( $\varnothing$  60 mm, standard length 1000 mm) and a waterproof connection head, containing the brush actuator system, electrical or pneumatic, and the terminal board for electrical connections. The main body that acts as electrolyte reservoir and is totally filled with KCl, in which a small reference electrode (sealed, with semisolid electrolyte) is immersed. The lower part of the probe includes the ring shaped Antimony sensor, the brush and the synthetic diaphragm. The probe is fixed, on wall or to the basin wall, by means of a flange sliding on all the probe body, DN50.

# Sb0CxAxx0Ax

## Technical Specifications

Body material:.....PVDF  
 Electrodes:..... measuring electrode: Antimony, ring shaped  
 ..... reference electrode: Ag/AgCl and KCl semisolid and salt bridge  
 Zero point:.....pH 1  
 Slope: ..... 50 mV/pH at 25°C  
 Measurement range: ..... from 1 to 13 pH  
 Working temperature: ..... from 5° to 95°C  
 Storing temperature:..... from 0° to +60°C  
 Power supply: ..... 24,110 or 220 VAC according to selected code  
 Pneumatic supply: ..... with air, filtered, > 2 bar  
 Max consumption: ..... 3 W  
 Output: ..... Pg 13.5 (supply cable) and Pg 9 (electrode shielded cable)  
 Max probe / instrument distance: ..... 50 m  
 Response time: ..... 3 min.  
 Dimensions: (Ø 60 mm, length 1000mm, 1500mm -others on request-)  
 Fixing flange: ..... ISO/IN DN 50  
 Weight: ..... about 3 Kg (L = 1000 mm)



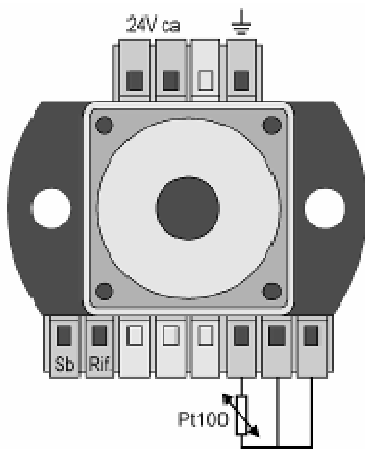
## Calibration & Maintenance

To perform a calibration, lift the probe out of the process, unscrew the electrodes protection, wash the probe end, fill the calibration vessel (optionally available) 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, wash the probe with water and reinstall the electrodes protection.

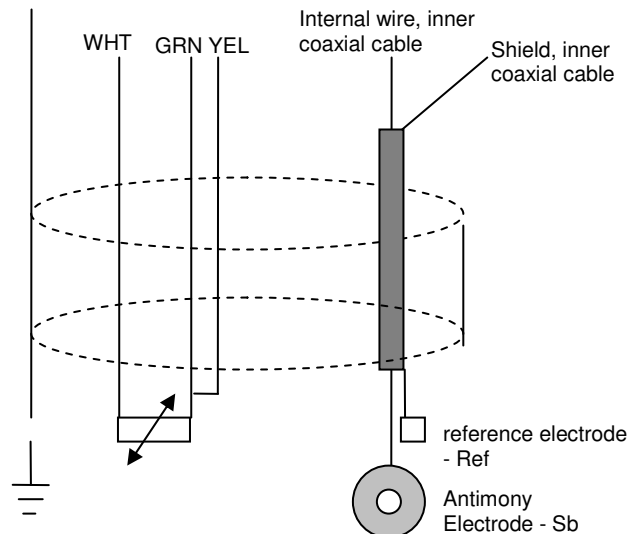
**ATTENTION:** the use of inorganic standard solution is recommended since the organic ones react with Antimony oxide causing voltage shift.

### Cable instrument side

## Wirings



### External shield



## Terminal board inside the probe head

### Wiring inside the probe

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## Order code breakdown

	Sb0	x	x	x	x	x	x	x	x
<b>pH probes with antimony electrodes</b>	Sb0								
<b>Type of probe</b> Immersion probe Ø 60 SI/60-Sb		C							
<b>Probe length</b> 1000 mm (under the flange) 1500 mm (under the flange) Special execution			3 4 9						
<b>Fixed code</b>				A					
<b>Construction material (body)</b> PVDF Special execution					1 9				
<b>Shaft and pin material</b> Reserved Stainless steel Hastelloy C 275 (probes with max.length 1500 mm) Hastelloy C 275 (probes with length higher than 1500 mm) Special execution						A B C D Z			
<b>Fixed code</b>							0		
<b>Fixed code</b>								A	
<b>Mechanical cleaning system actuator</b> Reserved Electric, 24 Vac Electric, 110 Vac Electric, 220 Vac Pneumatic Special execution									0 1 2 3 4 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.