

Antimony probe for pH measurements in closed pipelines, with retractable electrodes, suitable for high temperature applications, extraction device supplied with dual interlock safety system

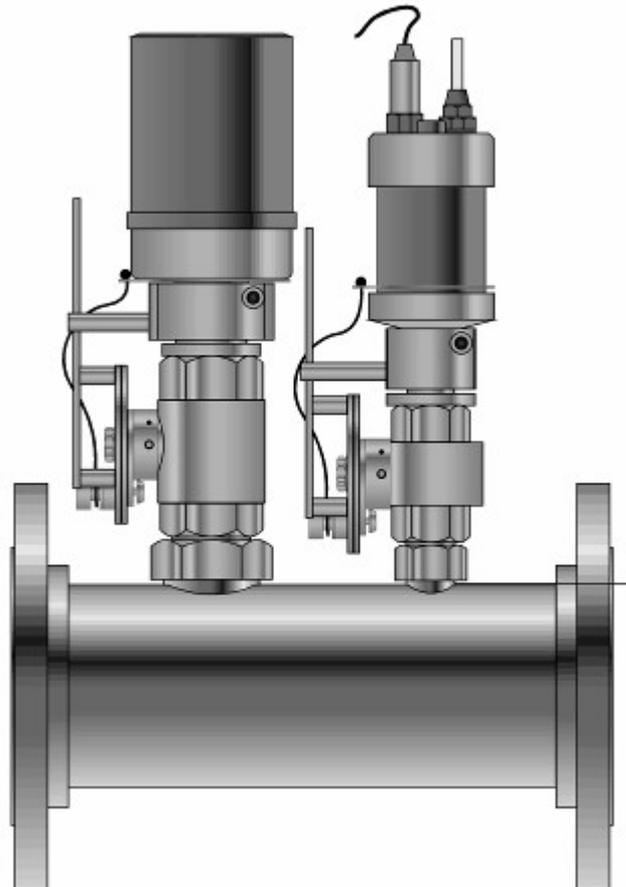
Designed for the measure of pH in closed pipelines in presence of abrasive or fouling substances, even in presence of high temperatures. The measuring electrode, that is kept clean and active by a brush, and the reference electrode, c/w semisolid electrolyte reservoir, assure long operating periods without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

Mod.Sb0I probes are designed to be directly installed into closed pipelines of various diameter through many types of flanged connections; the electrodes can be extracted from the probe without emptying the pipe.

Mod.Sb0I 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

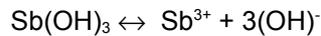
- **Sturdy and compact execution, SS, AISI 316, PSU parts**
- **In line retractable electrodes**
- **Suitable for measurements in the range 1 to 13 pH**
- **Suitable for temperature up to 140 °C**
- **Suitable for pressure up to 3 bar**
- **24,110 or 220 VAC power supply or pneumatic actuator (for Ex zone installation)**
- **Water tight cable glands**
- **Electrodes self cleaning**
- **Electrolyte reservoir need no refilling**
- **No maintenance requirement**



Sb0I0xxxxCx

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 $Sb(OH)_3$ 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 = 0 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 salt bridge electrolyte is semisolid and never requires refilling.

The probe is a stainless steel AISI 316 pipe, standard length 337 mm, \varnothing 5 inches, including flanges on both sides. Other pipe lengths and diameters and many types of flanges are available upon request (specify at order). 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.

Two fittings c/w manual valves and dual safety interlock are installed on the stainless steel pipe. These fittings allow extracting and inserting the electrodes even when the line is filled with process liquid.

Technical Specifications

Body material:	stainless steel AISI 316
Electrodes support material:	PSU and PVDF
Electrodes:	measure: antimony, annular; reference: semisolid Ag/AgCl-KCl
Salt bridge:	semisolid KCl, does not require any refilling
Zero point:	pH 1.0
Slope:	50 mV/pH
Measuring ranges:	1-13 pH
Operating temperature limits:	5 to 140 °C (up to 150°C for short periods)
Storage temperature limits:	-10 to +60 °C
Operating pressure:	3 bar
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 connections
Dimensions:	length 337 mm, \varnothing 3" to 6", other upon request
Weight:	apprx. 12 kg. (3"), 16 kg. (4"), 20 kg. (5"), 23 kg. (6"),

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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.

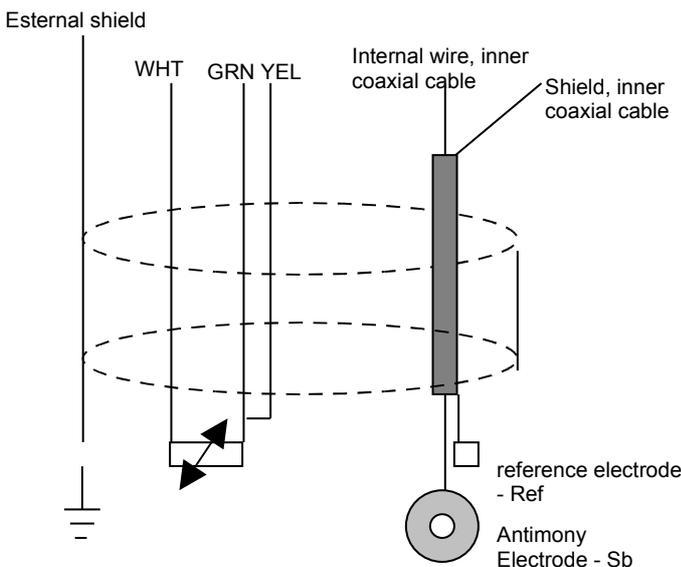
The zero point can be calibrated by shorting terminals Sb and rif on the terminal board inside the probe. The instrument reading with terminal shorten must be 0 pH.

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.

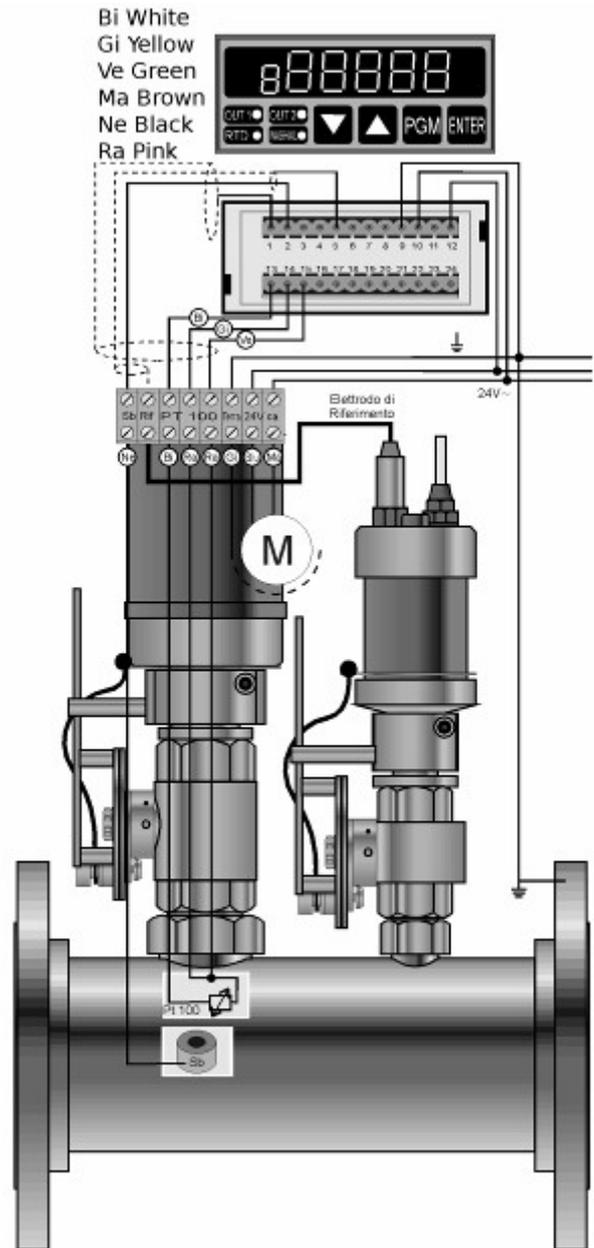
Measure the pH of the liquid under measure with a portable pHmeter or with the desired laboratory method (with proper accuracy level) and then calibrate the slope of the instrument with the measured pH value.

Wiring

Cable instrument side



Wirings inside the probe



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Order code breakdown

	Sb0	x	x	x	x	x	x	x	x
pH probes with antimony electrodes	Sb0								
Type of probe For pipeline, in line retract.electr.high T and P T-Sb-EST-HT		I							
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 (body)									
AISI 316 body, PSU / PVDF electrodes support						3			
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	
Safety interlock system for retractable electrodes									
Dual safety interlock system									C
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

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