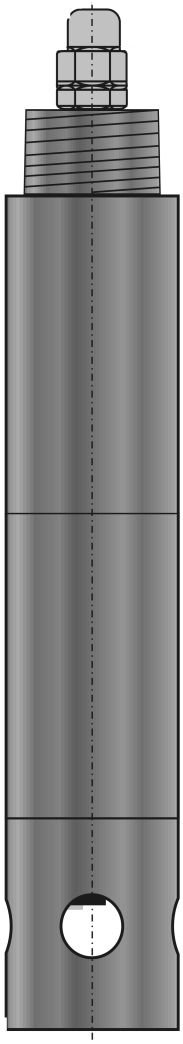
125Axxx

Differential pH electrode



Differential pH electrodes Mod.125 are designed for pH measurements in very difficult applications where standard pH electrodes cannot work because the reference electrode life would be too short. Mod.125 sensor is made of a PP or PVDF body which includes the glass pH measuring electrode, the reference electrode and the salt bridge, the temperature sensor, the solution ground contact and the electronic circuit for signal standardization.
These sensors are fully interchangeable with any other pH electrode and are suitable to be used with any pH meter.
An economically interesting solution is the use of these sensors in conjunction with our standard pH meter Mod.uP01.
Typical applications for differential pH electrodes are all those processes including fouling or fatty substances that would deposit on the reference electrode making the measurement impossible. Another typical application is on processes containing substances that react with traditional reference electrodes destroying them, such as Hg^{++}, Pb^{++}, Cu^{++}, ClO_4^-, Ag^+, Br^-, I^-, CN^-, $S^=$ ions. The reference electrodes used in differential pH electrodes are not subject to the negative effect that stray currents have on inner metal electrodes of traditional reference electrodes. In all these applications, where traditional pH electrodes would have a short life, the differential pH electrodes assure long term reliability with almost no maintenance requirements.
Examples of processes where the differential pH electrodes are the best choice: wastewater treatment plants, process including fouling suspended solids, processes including poisoning substances, processes with high amounts of sulphides, flocculation and coagulation , scrubbers, galvanic processes, surface treatments, processes for heavy metal treatment.

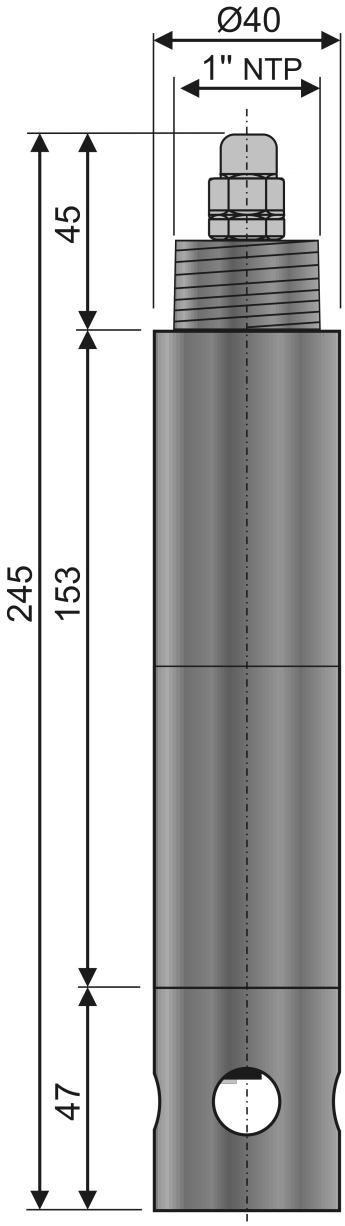
Advantages

- **This sensor is insensitive to interfering chemical substances**
- **Long operating life even in presence of fouling or fatty substances**
- **This sensor can replace any other pH sensor**
- **Suitable for the connection to any type of pH meter**
- **This sensor can be directly connected to a PLC or to a voltmeter**
- **PP or PVDF body (Stainless Steel on demand)**
- **PVDF porous diaphragm**
- **Suitable for direct immersion installation**
- **Temperature sensor included**
- **Solution ground contact included**

125Axxx

Operating principle and realization

Mod.125 is a differential pH electrode, PP or PVDF body (Stainless Steel upon request), suitable for immersion installation (immersion depth up to 250 mm) for higher immersion depths the electrode is supplied c/w pipe for immersion installation. The measuring electrode has hemispheric glass membrane, the reference electrode is included inside the body and is immersed into the salt bridge, separated from it by a glass membrane. The large area porous diaphragm is made of PVDF. The sensor includes the solution ground contact and the temperature sensor, Pt100, for temperature indication and for measure thermo compensation. A self-powered electronic circuit included in the sensor transforms the signal from the electrodes into a standard, low impedance signal ±500 mV or 0 ÷ 1 V (signal from Pt100 is a resistance in Ohm): this makes the Mod.125 sensor perfectly interchangeable with any other pH electrode; it also can be connected to any pH meter and also directly to a PLC or to a voltmeter. The electrode is supplied c/w integral cable, standard length 5 m, 6 mm diameter, shielded for a better signal protection.
The cable shield is connected to the metal sheath of the Pt100 temperature sensor so that connecting it to the ground of the instrument the solution in measure results grounded also (this is essential for the good operation of each analyser).
For immersion installations require the immersion probe Mod.SI0V, available in various materials and different lengths.



Technical Specifications

Type of electrode:..... combined for pH
Electrode body:.....PP or PVDF (stainless Steel on demand)
Materials at contact:..... PP, PVDF, glass, stainless steel
Measuring electrode:.....hemispheric glass membrane
Electrolyte: .....KCl gel, 3,3 M
Salt bridge:.....KCl gel , 3,3 M
Porous diaphragm:..... PVDF, 6 mm diameter
Membrane resistance:.....250 MΩ @ 25°C
Zero point:.....7 pH ±0.5 pH
Measuring range:.....0÷14 pH
Response time:..... 5 sec. to reach 90% of the measure
Temperature sensor:.....Pt100
Solution ground contact:.....included
Signal generated:.....pH: either ± 500 mV or 0 ÷ 1 V low impedance
.....Temperature: signal in ohm from Pt100
Power supply: .....2 alkaline batteries (inclusded) type N, 1,5 V, 800 mA/h, replaceable
Battery operative life: .....approximately 10 years (electrode consumption is 10 uA).
.....Batteries can be replaced by the user when depleted
Immersion installation: .....immerison depth 250 mm;
.....for higher immersion depths an immersion fitting is separately supplied (request Mod.SI0V)
Operating temperature limits:.....0÷50 °C (PVC); 0÷80 °C (PP); 0÷100°C (PTFE)
Operating pressure limits:..... 5 bar @ ambient temperature
Cable:.....integral, standard 5 m
Dimensions : .....∅ 40 mm, l.245 mm

N.B. Differential electrodes are also available in the version for the measure of ORP: Contact Your supplier for technical information.

CLR Srl viaPapa Giovanni XXIII, 49 20090 Rodano Millepini, Milan, ITALY Ph.+39 (0)2 95328005 FAX +39 (0)2 95320020 - clrnet@tin.it - www.clritalia.com

125Axxx

Calibration & Maintenance

When the electrode is not in use for long periods it has to be stored into its protective cap filled with some ml of pH 4 buffer solution; take care to avoid electrolyte loss.
Should the glass electrode remain dry for a short time, it can be reconditioned by immersing it 1 hour into a pH 7 buffer solution (this allows to rehydrate the membrane).
Calibration of pH measuring chain is performed as follows: prepare two beaker, one with pH 7.0 buffer solution and one with pH 4.0 buffer solution (label them to distinguish). Wash the electrode with distilled water, dry with a cloth or soft paper without wiping it. Immerse the electrode in pH 7.0 solution wait some minutes until the reading is stabilized, then calibrate zero point. Rinse the electrode with distilled water, dry with a cloth or soft paper without wiping it. Immerse the electrode in pH 4.0 solution wait some minutes until the reading is stabilized, then calibrate the slope.
Now the pH measuring chain is ready for normal operation.
Storing the electrode into its protective cap filled with pH 4 buffer solution, will increase life expectancy of the electrode.

Order code breakdown

	125	**x**	**x**	**x**	**x**
Differential pH electrodes	125				
Fixed Code		A			
Body construction material					
Reserved			0		
Polypropylene			1		
PVDF			2		
Special Execution			9		
Type of output signal					
Reserved				A	
± 2000 mV				B	
0÷1 V				C	
Cable and connector					
Integral cable, 5 m					1
Integral cable, 10 m					2
Integral cable, 15 m					3
Special execution					9

WIRING DIAGRAM DIFFERENTIAL pH ELECTRODES

Color	***uP Terminal***	***Function***
white	2	*Signal, pH*
black (or grey)	5	*Common, pH*
yellow	13	*Signal Pt100*
blue	14	*Return Pt100*
red (or pink)	15	*Return Pt100*