IDRONAUT OCEAN SEVEN 306 OEM
pH & Redox

The measurement of pH in seawater demands high accuracy since seawater has a high ionic strength and is weakly buffered. The pH range in the oceans is particularly restricted and, only in very special cases, the observed values are outside the range of 7.8 and 8.4 pH and, in some seas, the range extends from 6.5 to 9.0 pH.

The OCEAN SEVEN 306 OEM pH and redox sensor probe is provided with an analogue output 0..5V and allows the *in situ* determination of pH and redox (oxidation reduction potential) in natural waters as oceans, lakes, rivers and estuaries. The OCEAN SEVEN 306 pH and redox combined sensor, is specifically designed to simplify the integration in CTD probes.

SENSOR specification

Parameter	*Range*	*Initial Accuracy*	*Resolution*	*Response Time*
pH	1..14 pH	0.01 pH	0.001 pH	t63% < 3s
Redox	+/- 1000 mV	+/- 1 mV	+/- 0.1mV	t63% < 3s

Specification

Measuring principle:		potentiometric
pH sensor:		glass membrane
Redox sensor:		platinum electrode
Reference sensor:		Ag/AgCl double bridge
Working temperature:		-2.. +40°C
Output:	pH:	0..5 VDC (*)
	Redox:	0..5 VDC (**)
Power supply:		11..15 VDC
Power consumption:		30 mA@12 VDC
Board dimension:		80 x 35 mm

(*) The pH measuring range can be customized to: 1..14 pH, 2..12 or 3..11 (default).

(**) An offset of +2500mV shift the redox sensor output. Therefore the redox sensor output is from +1500 mV to +3500 mV.

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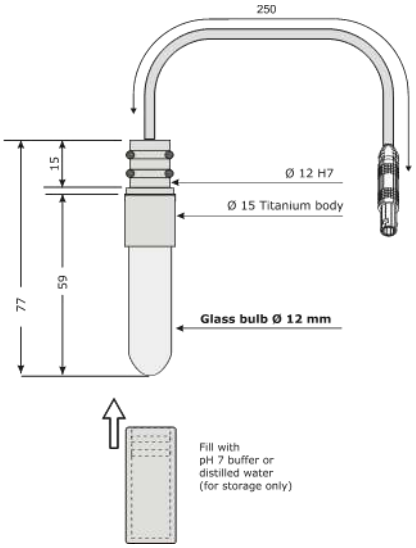
pH sensor

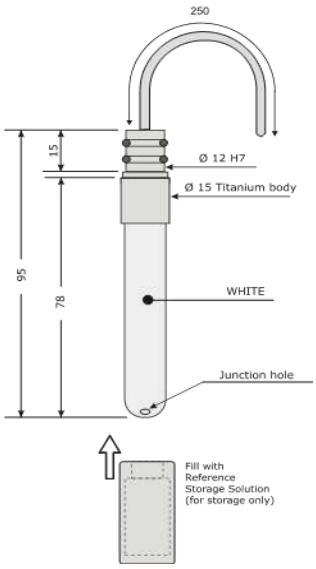
The pH sensor has a titanium head, a glass body and a pH sensitive glass tip, which can withstand pressures up to 700 bar. During all periods of inactivity, the glass tip must be fitted with a white plastic hydrating cap filled with the pH 7 Buffer Solution, or simply with clean water. This is to prevent the pH-sensitive glass from dehydration, which slows down the sensor response.



Type:	blue glass membrane (100 MOhm @ 20°C).
Measurement range:	1..14 pH.
Initial Accuracy:	0.01 pH.
Resolution:	0.001 pH.
Drift:	0.05 pH/month.
Response time:	3 s.
Max pressure:	700 bar.
Sensor body:	titanium.
Life:	2 years if intensively used to for monitoring, up to 4 years if used weekly for

Reference sensor

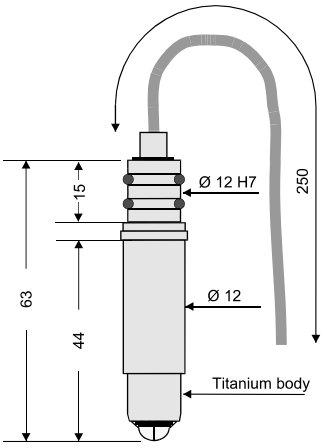
The reference sensor is in contact with the unknown solution by means of a small hole in the glass tip. This minimizes and stabilizes the junction potential between the inner gel electrolyte and the liquid to be measured. The reference sensor is a Silver/Silver Chloride cell in a saturated potassium chloride solid gel and the sensor head is made of titanium. It is also available a reference sensor specifically developed for long-term monitoring of seawater where the internal cell is 0.7 mol NaCl. The glass body of the sensor is fitted with a plastic hydrating cap filled with the REFERENCE SENSOR STORAGE SOLUTION based on 3-mol KCl (or NaCl) or, if not available, even with KCl saturated solution to avoid drying of the gel when not in use.



Internal cell:	Ag/AgCl filled with solid gel.
Max pressure:	700 bar.
Sensor body:	titanium.
Life:	1 year if intensively used for monitoring, up to 2 years If used weekly for daily profiling or monitoring.

Redox sensor

The REDOX sensor measures the oxidation-reduction potential of the REDOX couples present in the medium; it makes use of the same reference sensor of pH as a reference. The sensor itself consists of a platinum wire, which ends at the tip of the glass body (in which it is embedded), where the glass body is rounded. The REDOX state of any natural environment is the result of a combined effect of chemical and biological processes of reversible and/or irreversible nature and, therefore, difficult to define. Because of the number of unknown reactions and lack of reversibility, the measured potential is not representative of a true Eh value but is only the e.m.f. of an electrochemical cell (e.g. Pt + reference electrode). Such cell difference potentials measured in natural environments are still very often referred to the hydrogen scale and expressed as REDOX potentials or Eh. The potential of our reference electrode (Ag / AgCl; KCl sat.) is +202 mV at 20° C which is to be added to the measured value. Therefore, if for example we measure a value of 100 mV, the true Eh value is +302 mV, whereas, if we measure a value of -100 mV, the true Eh value is +102 mV, and so on. In other words, the positive potential of the reference electrode with respect to hydrogen must be always added to the value measured by our probe. When using reference electrodes different from the hydrogen ones, it is usual practice to present data as Eh by obviously taking into account the potential of the reference electrode with respect to the hydrogen electrode. For this reason, we present REDOX data as Eh.



Type:	platinum electrode.
Measurement range:	-1000 to +1000 mV.
Initial Accuracy:	1 mV.
Resolution:	0.1 mV.
Max Pressure:	700 bar.
Response time	3s.
Sensor Body:	titanium.
Life:	unlimited.