



# IDRONAUT OCEAN SEVEN 304 CTD LOGGER

## LOW POWER MICRO CTD

The OCEAN SEVEN 304 CTD, completes the line of high quality and accuracy IDRONAUT OCEAN SEVEN CTDs, fulfilling the demand for a high performance CTD probe with very small diameter and extremely low power consumption. This CTD can be easily integrated/adapted to third-party systems like floating profilers and/or buoy-moored systems. The 304 CTD can, upon request, be equipped with a wide range of interfaces like: RS232C, Asynchronous TTL (0..5VDC), RS422.

IDRONAUT prides itself on the design of its pressure balanced full ocean depth, pump free, low maintenance sensors. Central to which, is their well known high accuracy seven-platinum-ring quartz conductivity cell, which can be cleaned in the field without need of re-calibration. This unique quartz cell employs a large diameter (8 mm) and a short length (46 mm) to guarantee self-flushing and no clogging after long-term deployment even in biologically active waters. Competitors' cells, which present few mm only of cell orifice and very long cell length, are prone to clog even if protected by poisonous antifouling devices. The OCEAN SEVEN 304 CTD does not require pumps or other external devices to flush the sensors, which could further limit its power consumption.

The 304 CTD offers a combination of 16-bit high resolution data accuracy, with long-term sensor stability, making this CTD an ideal choice for both on-line profiling and self-recording moored applications. The CTD uses state-of-the-art electronics and is equipped with a 64-Mbyte logging memory, acquiring and storing data in memory, according to customer defined measurement schedules (see below).

Moreover, the user can select the proper Conductivity range: for salt or fresh water, making this CTD a very advanced tool for sampling sites near shore influenced by fresh water inlets, or/and for borehole monitoring applications.

### **SAMPLING MODES**

User selectable sampling/operating modes include:

- Continuous:** Sampling at fixed rates starting from 0.1 Hz to 8 Hz. Sampling continues until interrupted. Multiple sessions are possible, switching the CTD ON and OFF.
- Pressure:** Data is sampled at regular pressure intervals. Multiple profiles can be obtained switching the CTD ON and OFF. Two different methods (conductivity/pressure) can be used to interrupt acquisitions when the CTD returns to the surface. This data acquisition method is ideal for profiling.
- Timed:** CTD collects a series of samples, then sleeps for the configured interval time before waking up again and repeating the acquisitions. Time interval can be configured from 2 s up to 1 day. Battery power is conserved while in sleep mode. This data acquisition method is ideal for long-term monitoring.
- Conditioned:** Data is sampled at fixed rates starting when the selected parameter overcomes the configured boundary. Sampling continues until the selected parameter falls below the configured boundary. Parameters used to condition the sampling can be: Pressure, Temperature and Conductivity. Whenever the acquisition cycle starts, the CTD uses the same rules of the "Continuous" data acquisition. Monitoring of the selected parameter occurs at the configured interval.

### **REAL-TIME COMMUNICATIONS**

The OCEAN SEVEN 304 CTD communicates with a computer via a standard RS232C interface. Real-time data can be acquired by means of the REDAS Windows software. An optional RS422 interface overcomes the limitation of the RS232C cable maximum length (100 m) and allows the probe to transmit data through distances up to 1000 m. The communication speed is user selectable among: 9600, 19200, 38400 and 57600 bps.

### **SOFTWARE**

A programme operating under Windows 98se/ME/2000/XP allows the operator to configure the OCEAN SEVEN 304 CTD data acquisition and logger functions and upload data from the 64-MByte internal memory. The software package comprises:

- ITRM:** terminal emulation programme to easily communicate with the OCEAN SEVEN 304 CTD using the probe integrated operator interface.
- REDAS:** data processing and retrieval programme which allows the display and plotting of conductivity, temperature, pressure and derived variables such as salinity, sound speed, density, according to UNESCO formulas and recommendations.



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## **DATA STORAGE AND BATTERY ENDURANCE**

The OCEAN SEVEN 304 CTD allows the storing of 2,006,048 data sets each one being composed of the reading of: conductivity, temperature and pressure sensors plus the acquisition date and time. The 304 CTD is powered by two PP3 9V alkaline batteries connected in parallel which provide 1 A/h sufficient to keep the CTD continuously ON for 36 hours in continuous sampling mode and at the maximum sampling rate.

Further battery endurance can be obtained by using three 6V lithium batteries (instead of the two 9V alkaline type) which increase the battery endurance up to 190 hours of continuous operation. Whenever the CTD operates in "Timed Mode", the battery endurance can be considerably extended because the CTD waits for the interval between acquisitions in "Sleep mode".

## **SENSOR SPECIFICATIONS**

The OCEAN SEVEN 304 CTD can be equipped with the following sensors to measure:

<b>Parameter</b>	<b>Range</b>	<b>Accuracy</b>	<b>Resolution</b>	<b>Time Constant</b>
Pressure	0..1000 dbar <sup>(2)</sup>	0.05 %F.S.	0.0015 %F.S.	50 ms
Temperature	-5..+35 °C	0.005 °C	0.0006 °C	50 ms
Conductivity				
Salt water	0..64 mS/cm	0.005 mS/cm	0.001 mS/cm	50 ms <sup>(1)</sup>
Fresh water	0..6400 µS/cm	1 µS/cm	0.1 µS/cm	50 ms <sup>(1)</sup>

(1) At 1 m/second flow rate.

(2) Other standard pressure transducers, immediately available, have : 10, 40, 100, 200, 500, 2000, 4000, 6000 dbar ranges.

## **ELECTRONIC SPECIFICATIONS**

<i>Real-time data output rate:</i>	8 Hz.
<i>Logging:</i>	up to 8 Hz (depending on the CTD sampling method).
<i>Interfaces</i>	RS232C, Asynchronous TTL (0..5VDC), RS422.
<i>Baud Rate</i>	up to 57600 bps (9600 bps default).
<i>Data memory</i>	64 Mbytes.
<i>A/D converter</i>	16-bit successive approximation.
<i>Analogue input</i>	4 multiplexed analogue inputs.
<i>Supply Voltage</i>	4.5..11V, nominal 9V.
<i>Supply Current</i>	
Running:	23 mA @ 9V.
Sleep:	0.045 mA @ 9V.
<i>Communication protocol</i>	proprietary byte oriented binary and plain message protocol.
<i>Operator interface</i>	friendly menu driven user interface
<i>Batteries</i>	two 9V, 0.5 A/h, PP3 alkaline batteries assembled in parallel, or three 6V lithium batteries.

## **PHYSICAL CHARACTERISTICS**

		<b>1000 dbar (AISI 316/black POM)</b>	<b>6000 dbar (AISI 316)</b>
<i>Housing:</i>			
<i>Dimensions:</i>	housing diameter	43 mm (*)	48 mm
	total length	515 mm	515 mm
<i>Weight:</i>	in air	1.3 kg	3.1 kg
	in water	0.7 kg	2.3 kg

(\*) The removable titanium sensor protection presents a diameter of 44 mm.

**OEM versions of the OCEAN SEVEN 304 CTD electronics and sensors are available upon request.**



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