



IDRONAUT OCEAN SEVEN 304Plus CTD LOGGER

VERY LOW POWER, SELF-RECORDING, UV-ANTIFOULING, DISSOLVED OXYGEN
ARCTIC, ANTARCTICA, - BRINE – ROVs and AUVs -

The OCEAN SEVEN 304Plus CTD completes the line of high quality and accuracy IDRONAUT OCEAN SEVEN CTDs, fulfilling the demand of a high performance CTD probe with very small diameter and very low power consumption. This CTD can be easily integrated/adapted to third-party systems like floating profilers and/or oceanographic moorings, ROVs and AUVs. IDRONAUT prides itself on the design of its full ocean depth, pump-free, low-maintenance sensors. Central to which is the high accuracy seven-platinum-ring quartz conductivity cell (patented) which can be cleaned in the field without the need for re-calibration. This unique quartz cell employs a large diameter (8 mm) and a short length (46mm) to guarantee self-flushing. The OS304Plus does not require pumps or any other external device to flush the sensors, which minimizes its power consumption and allows the use in **Arctic** and **Antarctica**. The OS304Plus CTD standard interface is RS232C; other optional interfaces are: TTL, RS485 and **wireless Bluetooth®**.

The RS485 interface overcomes the RS232C limitation (200m cable). The OS304Plus communicates at a speed up to 115k2 bps, thus reducing data uploading time to a minimum. The OS304Plus can be manufactured with a 316 grade L stainless steel housing or a white POM housing or a titanium housing allowing deployment to depths of 1000 dbar or 2000 dbar or 7000 dbar respectively.

Features:

- ◇ Up to 8Hz CTD simultaneous sampling.
- ◇ Very low power consumption
- ◇ Expandable: pH, oxygen, turbidity and other sensor interfaces, available upon request.
- ◇ Large memory (2Gbytes) 60.000.000 data sets.
- ◇ High-speed data uploading.

UV ANTIFOULING

A UV-LED (Ultraviolet, 250..300 nm @500μW, Light-Emitting Diode) is integrated into the conductivity sensor quartz cell (patent pending). The UV-LED sterilizes the early growth of biofouling, thus eliminating environmental drift in the conductivity sensor.

TOP-COVER BULK-HEAD CONNECTOR

The OCEAN SEVEN 304Plus is equipped with the MCBH series of wet-pluggable connector

SAMPLING MODES

- Continuous:** Sampling at configurable rate: 0.1 Hz to 6 Hz.
Multiple cycles can be obtained by switching the CTD on/off.
- Pressure:** Data is sampled at pressure intervals.
Multiple profiles are obtained by switching the CTD on/off.
- Timed:** CTD collects a series of samples and then sleeps for the configured time interval.
Time intervals are: between 5s up to 1 day.
- Conditional:** Data acquisition is started and continues while the reading from a selected sensor is above a threshold value. Monitoring of the selected sensor threshold value can be configured to occur at intervals: between 5s up to 1 day.
- Burst:** Burst sampling carried out at configured time intervals: between 5s up to 1 day.

DATA STORAGE AND BATTERY ENDURANCE

The OS304Plus CTD is equipped with a 2-Gbyte internal non-volatile SD FLASH memory which allows the storing of about 60,000,000 data sets each one being composed of the reading of: CTD sensors plus the acquisition date and time. Different types of battery can be installed in the CTD housing.

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|-----------------|--|-------------|
| ➤ 2 x size "AA" | Alkaline 1.5V battery assembled in a single pack. | 3.0V |
| ➤ 1 x size "AA" | Lithium non-rechargeable battery | 3.6V, 2.4Ah |
| ➤ 1 x size "C" | Lithium non-rechargeable battery | 3.6V, 8.4Ah |
| ➤ 1 x NiMH | rechargeable IDRONAUT custom battery pack (3x1.2 AA) | 3.6V, 2.6Ah |
| ➤ 1 x size "C" | Lithium Ion rechargeable battery | 3.6V, 4.2Ah |

The NiMH rechargeable battery pack allows up to 50 hours of continuous operation, while the "C" size Lithium non-rechargeable battery allows up to 168 hours of continuous operation. Whenever the OS304Plus operates in Timed, Burst and Conditional modes, the battery endurance is considerably extended because the OS304Plus enters a deep sleep mode between acquisitions and drains only 8μAh from the battery.

For instance, by monitoring every hour, the OS304Plus can run for about 12 years on a single Lithium size "C" cell.



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SENSOR SPECIFICATIONS

The OS304Plus CTD can be equipped with the following sensors to measure:

Parameter	Range	Accuracy	Resolution	Time Constant
Pressure	0..1000 dbar(1)	0.05 %full scale	0.0015 % full scale	50 ms
Temperature	-5..+35 °C	0.002 °C	0.0001 °C	50 ms
Conductivity	0..90 mS/cm(*)	0.003 mS/cm	0.0003 mS/cm	50 ms ⁽²⁾

(*) By reducing the range to 0..70 mS/cm, the resolution becomes 0.0002 mS/cm.

If properly calibrated the range can be extended up to 250 mS/cm to measure in the Brine.

(1) Other standard pressure transducers, immediately available, have: 10, 40, 100, 200, 500, 2000, 4000, 6000, 7000 dbar ranges.

(2) At 1 m/second flow rate.

The fundamental properties of seawater, like: **Salinity, Sound Speed, Water Density, Oxygen ppm** are obtained using the algorithms described in the UNESCO technical papers in marine science no. 44 "Algorithms for computation of fundamental properties of sea water".

The freshwater properties like: **TDS (Total Dissolved Solids), Fresh Water Conductivity** corrected at 20°C and 25°C are automatically calculated.

OPTIONAL SENSOR SPECIFICATIONS

The OS304Plus CTD can be optionally equipped with the IDRONAUT Highly Accurate Precise (0.01%FS) pressure transducer, the IDRONAUT OEM Turbidity Meter, the IDRONAUT polarographic dissolved oxygen sensor and the IDRONAUT pH sensor.

Parameter	Range	Accuracy	Resolution	Time Constant
Pressure	0..7000 dbar	0.01 %full scale	0.002 %full scale	50 ms
Oxygen	0..50 ppm	0.1 ppm	0.01 ppm	3 s (from nitrogen to air)
	0..500 % sat.	1 % sat.	0.1 %sat.	3 s (from nitrogen to air)
pH ⁽¹⁾	0..14 pH	0.01 pH	0.001 pH	3 s
Turbidity	0.03..>750 FTU	5 FTU*	0.5* FTU	0.1 s

* Accuracy and resolution are referred to 750 FTU scale.

(1) **pH GLASS SENSOR (7000 m operation):** High-pressure glass membrane pH electrode in conjunction with a ceramic junction-less reference electrode and a differential pH preamplifier, 10¹³ 10¹⁴ ohm input impedance.

ELECTRONIC SPECIFICATIONS

Real-time and logging:	8Hz.
Interfaces:	RS232C, TTL (0..3.3VDC), RS485, wireless Bluetooth®.
Real time clock accuracy:	3 ppm/year.
Communication speed:	38K4 bps (up to 115k2 bps).
Data memory:	2 Gbyte
Supply voltage:	Battery: 2 x size "AA" Alkaline 1.5V battery assembled in a single pack, 3.0V. or 1 x size "AA" Lithium non rechargeable battery, 3.6V, 2.4Ah.
Supply current:	External: 5.0..18VDC. Running: 45 mA @ 3.6VDC; Sleep: 8 µA @ 3.6VDC.

SOFTWARE

Idronaut programmes operating under all Windows versions allow the operator to configure the OS304Plus data acquisition and logger functions and upload data from the memory. They are:

ITERM: Terminal emulation programme to easily communicate with the OS304Plus using the built-in operator interface and communication protocol.

REDAS-5: Data processing and retrieval programme, which allows the display and plotting of conductivity, temperature, pressure and derived variables such as salinity, sound speed and water density, according to UNESCO formulas and recommendations.

µREDAS: REDAS-5 customized for Windows mobiles running on PDA devices.

PHYSICAL CHARACTERISTICS

Housing:	1000 dbar (AISI 316/black POM)	2000 dbar (white POM)	7000 dbar (Titanium GR 2)
Dimensions:			
housing diameter	43 mm (upper cap:48mm)	75 mm	48 mm
total length (with hanging rod)	540 mm	580 mm	545 mm
Weight: in air	1.1 kg	2.2 kg	1.8 kg
in water	0.65 kg	0,5 kg	1.1 kg



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