# **IDRONAUT OCEAN SEVEN 310** 28Hz VERY-LOW-POWER, SELF-RECORDING and PROFILING MULTIPARAMETER CTD

The **OCEAN SEVEN 310** multiparameter CTD represents a real breakthrough in the concept of miniaturization, integration and performance. Thanks to the adoption of a new generation of electronic devices, the OS310 can interface with up to 14 analogue sensors and up to 2 digital sensors (see list) and can guarantee sampling rates up to 28Hz.

The operator can easily select the OS310 sampling rate from 1Hz to 28 Hz (samples per second), according to the required monitoring or profiling activity.

The OS310 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. The OS310 does not require pumps or any other external device to flush the sensors, which minimizes its power consumption. The OS310 is characterized by a drift free sensor preamplifiers.

#### DATA STORAGE

The OS310 CTD is equipped with a 4-Gbyte SD memory card, which allows the storing of about 60,000,000 data sets each one being composed of the reading of all the installed sensors plus the acquisition date and time. The OS310 communicates at a speed up to 230k4 bps, thus keeping data uploading time to a minimum.

### **CONDUCTIVITY CELL**

The high accuracy seven-platinum-ring quartz conductivity cell (patented) can be cleaned in the field without the need for re-calibration. This unique quartz cell employs a large diameter (8mm) and a short length (46mm) to guarantee self-flushing and no clogging after long-term deployment even in biologically active waters. Furthermore, **an optional UV LED (280 nm), integrated into the conductivity cell**, sterilizes the sample under measurement, thus avoiding the early growth of biofouling inside the quartz measuring cell.

## **BATTERY-OPERATED SELF-RECORDING MODES**

<u>Continuous:</u>	Sampling at configurable rates: up to 28 Hz. Multiple cycles can be obtained by switching the CTD ON/OFF.
<u>Pressure:</u>	Data is sampled at pressure intervals. Multiple profiles can be obtained by switching the CTD ON/OFF.
<u>Timed:</u>	CTD collects a series of samples and then sleeps for the configured time interval.
	Time intervals: 5s up to 1 day.
<u>Conditional</u> :	Data acquisition is started and continues while the reading from a selected sensor is above
	the threshold value. Monitoring of the selected sensor threshold value can be configured to
	occur at intervals: between 5s and 1 day.
<u>Burst:</u>	Burst sampling carried out at configured time intervals: 5s up to 1 day.

#### **BATTERY**

The OS310 CTD can be equipped with different types of battery that can be installed in the CTD housing:

$\triangleright$	1x Size "A" Li-SOCI2 Lithium-thionyl chloride non rechargeable battery	3.6V, 2.4 Ah
≻	3x Size "AA" 1.5V Alkaline non rechargeable battery assembled in a single pack	4.5V
$\succ$	1x Size "C" Li-SOCI2 Lithium-thionyl chloride non rechargeable battery	3.6V, 8.4 Ah
≻	1x Size "D" Li-SOCI2 Lithium-thionyl chloride non rechargeable battery	3.6V, 19.0 Ah
≻	1x NiMh rechargeable IDRONAUT custom battery pack(3x1.2 AAA)	3.6V, 2.4 Ah
≻	1x Li-ION rechargeable custom battery	3.7V, 4.5 Ah

Whenever the OS310 operates in *Timed, Burst* and *Conditional* modes, the battery endurance is considerably extended because the CTD enters a deep sleep mode between acquisitions.

#### DATA TELEMETRY

The telemetry interface allows interfacing the OS310 through standard oceanographic coaxial cables up to 10Km long. When communicating through data telemetry, the IDRONAUT deck units are mandatory. The OS310 can use both the low-voltage (30/60 VDC) **Portable deck unit** and the high-voltage (220 VDC) on-board **MkPlus deck unit**.



#### SENSOR SPECIFICATIONS

The OS310 multiparameter CTD can be equipped with the following sensors to measure:

Parameter	Range	Accuracy	Resolution	Time Constant
Pressure	07000 dbar <sup>(3)</sup>	0.05 % FS	0.0015 % FS	50 ms
Temperature	-5+50 °C	0.0015 °C	0.0001 °C	50 ms
Conductivity salt water	090 mS/cm	0.0015 mS/cm	0.0001 mS/cm	50 ms (1)
fresh water	07000 μS/cm	5 μS/cm	0.1 µS/cm	50 ms (1)
brine	0350 mS/cm <sup>(5)</sup>	0.010 mS/cm	0.0001 mS/cm	50 ms
Oxygen (polarographic)	050 ppm	0.1 ppm	0.01 ppm	3 s <sup>2)</sup>
	0500 %sat.	1 %sat.	0.1 %sat.	3 s <sup>2)</sup>
Oxygen (optical)	045 mg/l	0.1 mg/l	0.025 mg/l	5 s
	0250 %sat.	±0.2 %sat.	0.05 %sat.	5 s
рН	014 pH	0.01 pH	0.1 mpH	3 s <sup>4)</sup>
Redox	-1000+1000 mV	1 mV	0.1 mV	3 s

(1) At 1 m/second flow rate. (2) From nitrogen to air. (3) Other standard pressure transducers: 10, 40, 100, 200, 500, 1000, 2000, 4000, 7000, 10000 dbar.
(4) Differential pH preamplifier, 10<sup>13</sup>÷ 10<sup>14</sup> ohm input impedance. (5) Optional extended range, available upon request

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

#### **OPTIONAL ANALOGUE AND DIGITAL INTERFACE**

The OS310 can be optionally equipped with up to 14 analogue sensors and 2 digital devices. The measuring range, resolution, accuracy and time constant if not indicated, belong to the interfaced sensor.

Parameter	Range	Accuracy	Resolution	<b>Time Constant</b>
Pressure (highly accurate)	07000 dbar <sup>(1)</sup>	0.01 % FS	0.002 % FS	50 ms
Turbidity meter	0>2500 FTU	0.1 FTU	0.025 FTU	3s <sup>(2)</sup>
Fluorometer	0150 μg/l	0.02 μg/l	0.01 μg/l	3s <sup>(2)</sup>
PAR	010 μΑ	0.05 μΑ	0.01 μΑ	
UNILUX (single-channel)	0100 μg/l <sup>(3)</sup>			
TRILUX (three-channel)	0100µg/l <sup>(3)</sup>			
CYCLOPS fluorometers	0100 μg/l <sup>(3)</sup>			
ECO fluorometers	0100 μg/l <sup>(3)</sup>			
Water sampling system	General Oceanics 10	18 Rosette, IDRONAUT 1	MISS miniaturized 6 Bottle w	vater sampling system

(1) Other standard pressure transducers: 100, 1000,2000, 4000, 7000 dbar. (2) Provided with auto-range ,25,125,500, >2500 FTU; 5,15,50,150 μg/l.
(3) Chlorophyll *a*, Phycocyanin, Phycoerythrin for algae monitoring; Rhodamine WT or Fluorescein for dye tracing applications; Nephelometer for turbidity monitoring.

#### **SPECIFICATIONS**

Real-time and l	ogging:	up to 28 Hz
Interfaces		RS232C, RS485, TTL, Data telemetry (QAM) up to 10Km; Wireless: WiFi/Bluetooth
Software:		REDAS-5 and ITERM
Power supply:	Battery:	2.95.0 VDC; running: 90 mA @ 3.6VDC; standby 10 μA @ 3.6VDC;
	External power:	932 VDC
	Data telemetry:	Low voltage: 1860 VDC; High voltage: 90220 VDC

# PHYSICAL CHARACTERISTICS

	1000 dbar	1500 dbar	2000 dbar	6000 dbar	7000 dbar	7000 dbar
	(AISI316)	(POM)	(POM)	(Titanium)	(Titanium)	(Titanium)
diameter	48 mm	100 mm	75 mm	48 mm	75 mm	89 mm
length	630740mm	730 mm	660 mm	630740mm	630 mm	800 mm
in air	1.3 Kg	4.2 kg	2.6 Kg	2.1 Kg	5.5 Kg	8.0 Kg
in water	0.7 kg	0.2 Kg	0.4 kg	1.3 Kg	3.3 Kg	4.3 Kg
	diameter length in air in water	1000 dbar(AISI316)diameterlength630740mmin air1.3 Kgin water0.7 kg	1000 dbar     1500 dbar       (AISI316)     (POM)       diameter     48 mm     100 mm       length     630740mm     730 mm       in air     1.3 Kg     4.2 kg       in water     0.7 kg     0.2 Kg	1000 dbar (AISI316)     1500 dbar (POM)     2000 dbar (POM)       diameter     48 mm     100 mm     75 mm       length     630740mm     730 mm     660 mm       in air     1.3 Kg     4.2 kg     2.6 Kg       in water     0.7 kg     0.2 Kg     0.4 kg	1000 dbar (AISI316)     1500 dbar (POM)     2000 dbar (POM)     6000 dbar (Titanium)       diameter     48 mm     100 mm     75 mm     48 mm       length     630740mm     730 mm     660 mm     630740mm       in air     1.3 Kg     4.2 kg     2.6 Kg     2.1 Kg       in water     0.7 kg     0.2 Kg     0.4 kg     1.3 Kg	1000 dbar (AISI316)     1500 dbar (POM)     2000 dbar (POM)     6000 dbar (Titanium)     7000 dbar (Titanium)       diameter     48 mm     100 mm     75 mm     48 mm     75 mm       length     630740mm     730 mm     660 mm     630740mm     630 mm       in air     1.3 Kg     4.2 kg     2.6 Kg     2.1 Kg     5.5 Kg       in water     0.7 kg     0.2 Kg     0.4 kg     1.3 Kg     3.3 Kg



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