

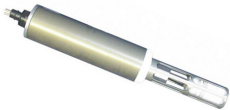


CSA Ciências Oceânicas, Ltda

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Rental Instrument	Description	Characteristics
Meteoceanographic		
	Workhorse Sentinel ADCP Teledyne RD Instruments' Workhorse Sentinel ADCP offers unparalleled shallow-water accuracy, a 175-meter profiling range, and unmatched low power consumption, making it ideal for year-round deployments. It's lightweight and easy to deploy on buoys, boats, or the bottom. Shore connection is via cable or modem, and the Sentinel can be easily upgraded to measure pressure, perform bottom tracking tasks, or be used as a directional wave gauge.	• Self-Contained 1200, 600 or 300 kHz • DC input: 20-60V DC. Internal battery pack, external battery pack or external power supply • Standard depth rating: 200m. • Optional to 6000m
	ACR 866-A Teledyne Benthos manufactures a wide range of acoustic releases for shallow, medium, and deepwater operations. The ACR 866-A is an acoustic release sensor ideal for mooring recovery applications requiring a robust stainless steel package and 2,200 kg load handling.	• Depth rating 2,000 m • Release load rating 2,200 kg • Stainless steel construction • Transponder feature - 5-10 km slant range
Water Quality		
	Sea-Bird SBE-19+V2 CTD The Seabird SBE 19plus V2 CTD measures conductivity, temperature, and pressure at a rate of 4 scans/sec (4 Hz) and offers high accuracy and resolution, reliability, and ease of use for a wide range of research, monitoring, and engineering applications. The CT's channeled, pump-controlled flow minimizes salinity spikes caused by ship roll and allows for slow descent rates without reducing sensor responses, improving dynamic accuracy and identifying small-scale structures in the water column. The equipment can be operated in real time, connected to the communication cable, or offline, and can be programmed to collect and store data without a communication cable.	• Conductivity, Temperature, Pressure, and up to seven auxiliary sensors • User-programmable mode: profiling at 4 Hz, or moored sampling at user-programmable intervals • RS-232 interface, internal memory, and internal alkaline batteries (can be powered externally) • Pump-controlled, T-C ducted flow to minimize salinity spiking • Depths to 600, 7,000 or 10,500 meters • Seasoft V2 Windows software package (setup, data upload, real-time data acquisition, and data processing)
	Sea-Bird SBE 18 pH Sensors The Sea-bird Electronics SBE 18 pH sensor integrates with the SBE 19 plus V2 CTD to measure pH at depths of 1,200 meters. Simple to install, maintain, and calibrate, this sensor measures pH with 0.1 pH accuracy and a fast response.	• 1,200 meter depth rating • Fast equilibration times • 0-5v signal output



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Rental Instrument

Description

Characteristics



**Sea-Bird SBE 43
Dissolved Oxygen
Sensor**

The SBE 43 is a high-precision, individually calibrated oxygen sensor designed to aid in critical hypoxia and stoichiometric ocean oxygen chemistry research on a variety of profiling and moored platforms. The SBE 43 is designed for use in the pumped flow path of a CTD, providing optimal correlation with CTD measurements. The elapsed time between the CTD and the associated oxygen measurement is easily quantified and corrected in post-processing.

The SBE 43's voltage output sensor can be integrated with any Sea-Bird CTD that accepts a 0- to 5-volt auxiliary sensor input.

Dramatically improved oxygen measurement due to enhanced temperature response. Signal resolution is increased by onboard temperature compensation. Continuous bias eliminates stabilization wait time after initialization. Hysteresis is largely eliminated in the upper ocean (1,000 m) due to the improved temperature response. Hysteresis at greater depths is predictable and correctable in post-processing. There is no signal or calibration degradation when used for logging in hydrogen sulfide environments.

- Voltage or frequency output.
- Fully and individually calibrated; calibration drift rates of less than 0.5% over 1000 hours of operation (on time)
- For use in CTD pumped flow path, optimizing correlation with CTD measurements
- Oxygen measurement dramatically improved because of improved temperature response.
- Signal resolution is increased by on-board temperature compensation
- Continuous polarization eliminates stabilization wait-time after power-up
- Hysteresis is largely eliminated in the upper ocean (1000 m) due to improved temperature response. Hysteresis at greater depths is predictable and correctable in post-processing
- No degradation of signal or calibration when used for profiling in hydrogen sulfide environments



**SBE 5T
Submersible Pump**

The SBE 5T / 5P pump is a modular component on several Sea-Bird CTD packages. The 5T / 5P is standard equipment on the SBE 9plus CTD and 25 / 25plus Sealogger CTD, and optional equipment on the SBE 16plus V2, 16plus-IM V2, and 19plus V2 SeaCAT CT(D) Recorders. The highly reliable pump flushes water through the conductivity cell at a constant rate, independent of the CTD's motion, improving dynamic performance. Operational characteristics of the 5T and 5P are identical, but the housings and depth ratings differ (5T titanium housing to 10,500 m; 5P plastic housing to 600 m). The pump may also be suitable for custom applications, where pressure heads are less than 300 cm of water and flow rates are less than 100 mL/sec.

- Centrifugal pump head
- Long-life, brushless, DC, ball-bearing motor
- Pump impeller and electric drive motor coupled magnetically through housing, providing high reliability by eliminating moving seals
- Pumping rates and motor current for various applications



**WETlabs Eco-
FLCDRTD CDOM
Sensor**

The Environmental Characterization Optics (ECO) is a single-channel fluorometer that offers high resolution and wide measurement ranges, utilizing 14-bit digital processing. The ECO series excels in biological monitoring and dye trace studies.

The encapsulated optical block ensures long-term instrument stability, and optional anti-biofouling technology provides truly durable field measurements.

- Analog and Digital Output
- Temperature range 0 to 30 degrees Celsius
- Depth rating 600 meters (standard)
- Depth rating 6000 meters (deep)
- Data memory 108,000 samples



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Rental Instrument	Description	Characteristics
 Campbell Scientific OBS-3+ Turbidity Sensor	The Campbell Scientific OBS-3+ turbidity sensor can be integrated with the Sea-Bird SBE 19plus V2 CTD or other analog data logger for water logging applications or mooring for dredging monitoring in rivers and canals. The dual-channel output measures suspended solids and turbidity with ranges of 0 to 250 mg/L and 0 to 1000 NTU, respectively.	• 1,500 meter depth rating • Dual channel output with 0-250 & 0-1000 NTU
 WETlabs Eco-FLNTURTD Chlorophyll / Turbidity Sensor	The WET Labs' Environmental Characterization Optical (ECO) meter incorporates a common set of options with a single basic design, ideal for a wide variety of implementations. The FLNTU combines the unparalleled sensitivity of the ECO fluorometer with optical scattering measurement at 700 nm for simultaneous turbidity determination and environmentally tailored output ranges. It allows for the assessment of fluorescence and turbidity variability and interactions.	• Digital and analog output • Temperature range 0 to 30 degrees Celsius • Depth rating 600 meters (standard) • Depth rating 6,000 meters (deep) • Data memory 90,000 samples
Water Sampling		
 Go-Flo Water Bottle Teflon Coated - 10L	The General Oceanics Go-flo water bottles are designed for a closed-open-closed operation; the bottle is closed upon entering the water to avoid any surface contamination and opens for water collection when approximately one atmosphere of pressure is reached. These bottles can be fitted to the SBE-32 water sampling rosette for autonomous or real-time closure or can be clamped to a cable and closed via messenger when a rosette is unavailable.	• 5L or 10L capacity • Teflon-coated for easy cleaning and lowered likelihood of contamination
 Sea-Bird SBE 32 Carousel	The SBE 32 Carousel is a bottled water sampling system widely used in the world's oceans, where it has built a reputation for reliability and ease of use. With an accessory Deck Unit, the Carousel provides water sampling and real-time CTD data acquisition with any Sea-Bird logging CTD (requires electromechanical cable and a winch equipped with slip rings). With an accessory Subsea Unit, the Carousel can operate autonomously with a Sea-Bird logging CTD and can be programmed to close bottles at selected depths, allowing deployment using wires or non-powered lines.	• 6,800 meter depth rating • Autonomous or real-time bottle closure when fitted with AFM or SBE 33 deck unit, respectively
 Sea-Bird SBE 33 Carousel Deck Unit	The Sea-Bird SBE 33 Carousel is a real-time deck unit used in conjunction with the Rosset SBE 32 for water sampling at various depths. It is integrated with a CTD to record data and controls bottle opening location in real time, giving the operator full control over when and at what depth water samples are collected. The Deck Unit provides instant quality control of CTD data to ensure the equipment is functioning properly.	• Manual fire bottle controls • Provides link for real-time CTD data collection

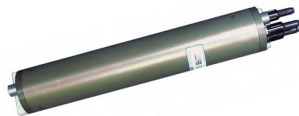


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Rental Instrument	Description	Characteristics
 Sea-Bird Carousel Auto Fire Module (AFM)	The Sea-Bird Electronics Carousel Auto Fire Module (AFM) is used when an electromechanical cable is unavailable, allowing the user to pre-program the SBE 32 water sampling rosette to fire bottles autonomously based on time or depth. The AFM can be used with or without a CTD.	• Depth rating of 6,800 meters; • Operates on 9 D-size batteries that provide approximately 60 hours of operation. • RS-232 interface
 SBE 36 Deck Unit and PDIM	The Power and Data Interface Module (PDIM) provides power and real-time data acquisition for an SBE 19, 19plus, 19plus V2, 25, 25plus, or 49 CTD, or SBE 50 Pressure Sensor when connected to an SBE 33 deck unit. The system allows for two-way communication for the CTD over a single- or multi-conductor sea cable, and provides ample power for auxiliary sensors that may not otherwise be supportable by a battery-powered CTD.	• Depths of 1 – 6800 m (aluminum)
Sediment Sampling		
 Box Corer - Ekman type - 140 L	The USNEL type box corer has become the standard sampling tool for surveys in soft or deep sediments. The enlarged surface area of the box (0.25m ²) allows for relatively large sample sizes to be recovered in deep water where the time required to deploy and recover the instrument is significant. The standard box corer is built within a gimballed hexagonal frame. The instrument is triggered by a trip as the main coring stem passes through its frame. The depth of penetration (maximum 65 cm) can be controlled to prevent over-penetration in softer sediments.	• 0.25 m² sample area • Constructed for minimal disturbance • Stainless steel housing for reduced contamination • Variable weighting around the enclosure to aid penetration • Used for detailed environmental, geochemical, and surface sedimentological studies • Two different design options for improved penetration depending on the sediment type
 WildCo Van Veen Dredger - 18L	The Van Veen Grab is a sampling device that can be used to manually collect sediment samples from deep water bodies with soft or sandy substrates. It is a relatively lightweight sampler, useful for collecting benthic macroinvertebrates that inhabit the sediment. The top of the sampler has neoprene rubber flaps covering 500-micron mesh screens. The flaps open during penetration into the bed to be sampled, thus reducing the wave front that could disturb the substrate. The flaps close over the screens when the sampler is retrieved to the surface, preventing loss of material.	• Materials: 304 stainless steel • Fasteners: 18-8 stainless steel • Chains: 304 stainless steel • Bottom opening: 359 x 279mm (14-1/8 x 11in) • Weight empty: 18.5 kg (41 lb) • Weight with sample: 68-90 kg (150-200 lb) • Volume: 24 L (1465 cubic inches) • Sample area: 0.1 square m (154 square in) • Mesh on screens: 500 microns