SEA-BIRD SCIENTIFIC

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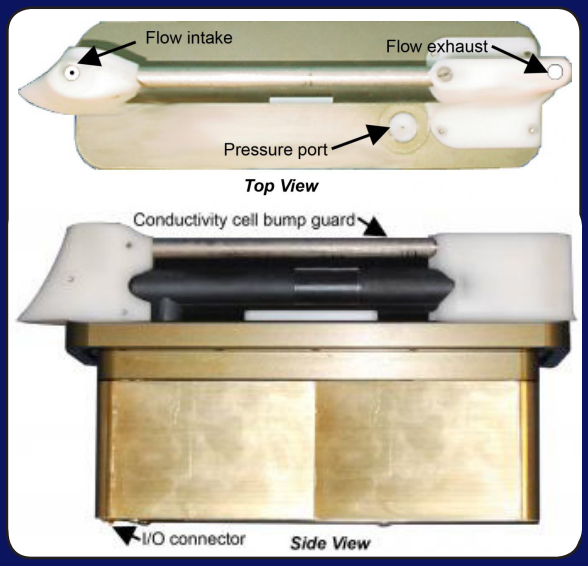
Slocum Glider Payload CTD

The Slocum Glider Payload CTD is a low-power profiling instrument designed specifically for installation in Slocum gliders. It has the high accuracy necessary for research, updating ocean models, assessing sensor stability on moored observatories, and leveraging data collection opportunities from operational vehicle missions. The externally powered, continuously pumped CTD consumes only 240 mW sampling continuously at 1/2 Hz. One Alkaline C cell could operate the CTD continuously for 37 hours (3 days at 50% duty cycle, profiling continuously at ½ Hz on every glider upcast); a 50% duty cycle for 30 days uses only 4.2% of a typical Slocum glider's alkaline energy capacity (7.8 MJ). Data are output in engineering units or raw decimal counts.



Features

- Conductivity, Temperature, and Pressure.
  - Assembly visible on glider exterior consists of intake sail (with integral T-C duct and anti-foulant device), internal field conductivity cell, and exhaust sail attached to a rectangular science bay hatch cover. Electronics, pump motor, and pressure transducer are attached to hatch cover underside and enclosed in waterproof calibration housing. Intake sail allows measurements to be made outside vehicle's boundary flow (where old water is thermally contaminated by vehicle). Pump pulls water into intake sail, past temperature sensor, through anti-foulant device and conductivity cell, and out exhaust sail (preventing exhaust re-circulation and Bernoulli pressure differences from changing flow rate). Outside of conductivity cell is free-flushed, minimizing salinity errors.
- RS-232 interface, real-time output, externally powered (for use on vehicles that can supply power and acquire data).
- Two sampling modes:
  - Continuous Sampling (autorun = yes) runs pump continuously and samples every 2 sec, producing time series suitable for corrections (e.g. response filtering, alignment, thermal mass correction) for dynamic errors in data.
  - Polled Sampling (autorun = no) acquires and transmits data on command. For valid salinity data, pump must be run prior to sampling.
- Unique flow path, pumping regimen, and expendable anti-foulant device, for maximum bio-fouling protection.
- Pump-controlled, T-C ducted flow to minimize salinity spiking.
- Field-proven design based on Argo float CTD, with more than 10,000 Argo float CTDs deployed.
- Seasoft© V2 Windows software package (setup, data processing).
- Five-year limited warranty.

Components

- Unique internal-field conductivity cell permits use of expendable anti-foulant device, for long-term bio-fouling protection.
- Aged and pressure-protected thermistor has a long history of exceptional accuracy and stability.
- Pressure sensor with temperature compensation is available in four strain-gauge ranges (to 2000 m).
- For Continuous sampling, pump runs continuously, providing bio-fouling protection and correlation of CTD measurements.

Options

- Strain-gauge pressure sensor in one of 4 ranges (to 2000 m).

Measurement Range

Conductivity	0 to 9 S/m (calibrated 0 to 6 S/m)
Temperature	-5 to +42 °C (calibrated +1 to +32 °C)
Pressure	0 to 100 / 350 / 1000 / 2000 m (calibrated to full scale)

Initial Accuracy

Conductivity	In calibration range: ± 0.0003 S/m; Outside calibration range: ±0.0010 S/m [1]
Temperature	In calibration range: ± 0.002 °C; Outside calibration range: ±0.004 °C [1]
Pressure	In calibration range: ± 0.1% of full scale range

[1] Due to fit extrapolation errors.

Resolution

Conductivity	0.00001 S/m
Temperature	0.001 °C
Pressure	0.002% of full scale range

External Power Requirements, Flushing, and Sample Timing

8 to 20 VDC nominal.
Quiescent current: 30 µA
Continuous (1/2 Hz) Sampling: 241 mW (2.9 Watt-hours/day @ 50% duty)

Example Spot Sampling, Flushing, and Sample Timing Comparison:

	PumpFast	*PumpSlow*
Flow rate	*14 ml/sec*	*9 ml/sec*
*Time to pump 110 ml**	*7.8 sec*	*12.2 sec*
Power to pump 110 ml	*2.56 Joules*	*1.93 Joules*
Time to end of sample after TakeSample	*2.65 sec*	*2.65 sec*
*Power during sampling**	*0.74 Joules*	*0.64 Joules*
Duration of spot sample operation	*7.8 - 1.2 + 2.65 = 9.25 sec*	*12.2 - 1.2 + 2.65 = 13.65 sec*
Total power per spot sample (time)	*3.3 Joules*	*2.57 Joules*

**Includes 1.2 sec pumping after TakeSample sent. Recommended interval between PumpFast and TakeSample is 6.6 (7) sec.*

Data Format

Real-time data in decimal S/m, °C , and decibars; or raw decimal counts.

Housing, Depth Rating, & Weight

CTD & integral pump: in air 1.1 kg, in water 0.4 kg.
Calibration housing immersion depth: 10 m maximum.

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