

MicroCAT C-T (P optional) Recorder (Serial interface & Memory) **SBE 37-SM**



SUMMARY

- Conductivity, Temperature, and (optional) Pressure, at user-programmable intervals (6 seconds to 6 hours).
- RS-232 serial interface (RS-485 optional), internal memory, and internal batteries.
- Expendable anti-foulant devices for bio-fouling protection.
- Depths to 350 meters (*ShallowCAT* plastic housing) or 7000 meters (titanium housing).
- Sea-Bird's field-proven MicroCAT family, with more than 8000 instruments deployed since 1997.

DESCRIPTION

The SBE 37-SM MicroCAT is a high-accuracy conductivity and temperature (pressure optional) recorder with **S**erial interface, internal battery, and non-volatile **F**LASH **M**emory. The MicroCAT is designed for moorings or other long duration, fixed-site deployments. Constructed of titanium and other non-corroding materials to ensure long life with minimum maintenance, the MicroCAT's depth capability is 7000 meters; it is also available with an optional 350-meter plastic *ShallowCAT* housing.

Calibration coefficients are stored in EEPROM, allowing the MicroCAT to output data in ASCII engineering units (decimal or XML format); raw output is also available. The data always includes Conductivity, Temperature, (optional) Pressure, and time. If desired, the MicroCAT can calculate and output salinity and sound velocity (Chen-Millero).

SENSORS AND SENSOR INTERFACE ELECTRONICS

The MicroCAT retains the temperature and conductivity sensors used in our time-proven SeaCAT and SeaCAT *plus* products. Electrical isolation of the conductivity electronics eliminates any possibility of ground-loop noise. The MicroCAT's unique internal-field conductivity cell permits the use of expendable anti-foulant devices. The aged and pressure-protected thermistor has a long history of exceptional accuracy and stability.

The optional strain-gauge pressure sensor is available in eight ranges, from 0 - 20 meters to 0 - 7000 meters. Compensation of the temperature influence on pressure offset and scale is performed by the MicroCAT's CPU.

Temperature is acquired by applying an AC excitation to a hermetically-sealed VISHAY reference resistor and an ultra-stable aged thermistor (drift rate typically less than 0.002 °C per year). The ratio of thermistor resistance to reference resistance is determined by a 24-bit A/D converter; this A/D also processes the pressure sensor signal. Conductivity is acquired using an ultra-precision Wien-Bridge oscillator.

COMMUNICATIONS AND INTERFACING

The MicroCAT communicates via standard RS-232 interface. Data can be uploaded at up to 115.2K baud. Real-time data can be transmitted up to 1600 meters (5200 feet) at 600 baud, simultaneous with recording. Firmware upgrades can be downloaded through the communications port, without opening the instrument. An optional RS-485 interface allows multiple MicroCATs to share a common 2-wire cable, minimizing cable complexity for C-T chains.

User-selectable operating modes include:

- **Autonomous Sampling** – At pre-programmed intervals of 6 seconds to 6 hours, the MicroCAT wakes up, samples, stores data in FLASH memory, and goes to sleep.
- **Polled Sampling** – On command from a computer or satellite, radio, or wire telemetry equipment, the MicroCAT wakes up, samples, and transmits data.
- **Serial Line Sync** – In response to a pulse on the serial line, the MicroCAT wakes up, samples, stores data in FLASH memory, and goes to sleep.

SOFTWARE

The MicroCAT is supplied with a powerful Windows 2000/XP software package, Seasoft® V2, which includes:

- SeatermV2® – terminal program for easy communication and data retrieval.
- SBE Data Processing® – programs for calculation, display, and plotting of conductivity, temperature, pressure (optional), and derived variables such as salinity and sound velocity.



DATA STORAGE AND BATTERY ENDURANCE

Temperature and conductivity are stored 6 bytes/sample, time 4 bytes/sample, and optional pressure 5 bytes/sample; memory capacity is in excess of 530,000 samples. The MicroCAT is powered by a 10.6 Amp-hour (nominal) battery pack consisting of twelve AA lithium batteries (Saft LS14500) which, when removed from the MicroCAT, can be shipped via commercial aircraft. The pack provides sufficient internal battery capacity for more than 630,000 samples for a typical sampling scheme. *

SPECIFICATIONS

Measurement Range

Conductivity: 0 - 7 S/m (0 - 70 mS/cm)
Temperature: -5 to 35 °C
Optional Pressure: 20/100/350/600/1000/2000/3500/7000 (meters of deployment depth capability)

Initial Accuracy

Conductivity: ± 0.0003 S/m (0.003 mS/cm)
Temperature: ± 0.002 °C
Optional Pressure: ± 0.1% of full scale range

Typical Stability

Conductivity: 0.0003 S/m (0.003 mS/cm) per month
Temperature: 0.0002 °C per month
Optional Pressure: 0.05% of full scale range per year

Resolution

Conductivity: 0.00001 S/m (0.0001 mS/cm)
Temperature: 0.0001 °C
Optional Pressure: 0.002% of full scale range

Clock Stability

5 seconds/month

Quiescent Current * 30 microAmps

Sampling and Communication Current *

Communication 4.3 milliAmps
Sampling 15 milliAmps if transmitting real-time;
 13 milliAmps if not transmitting

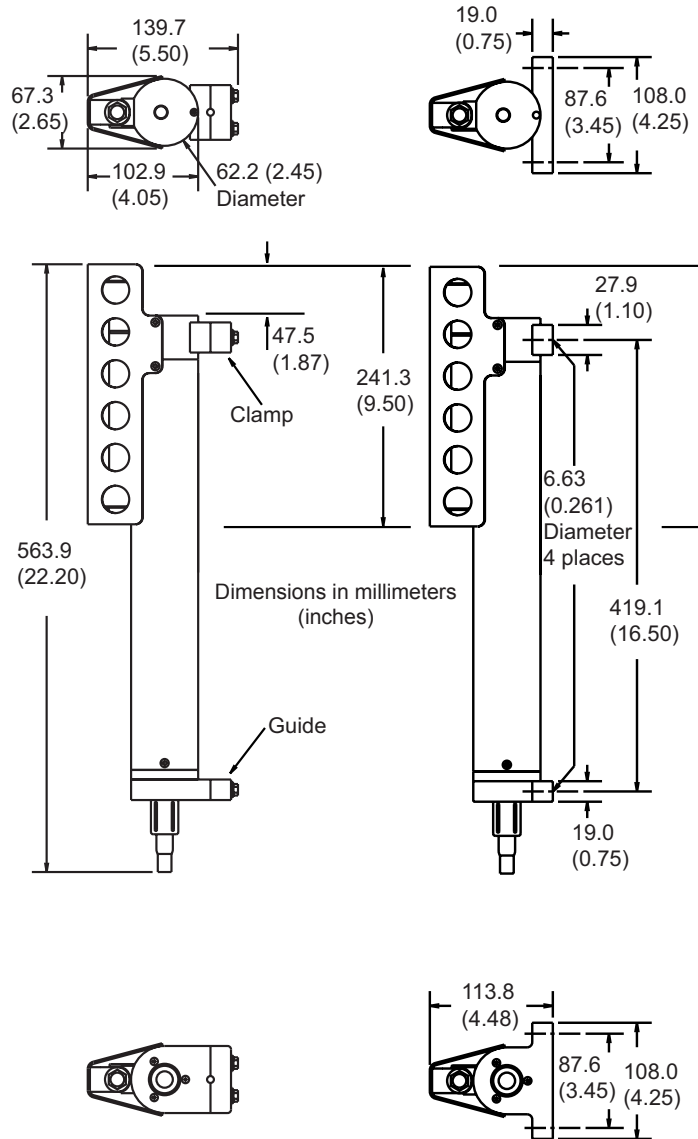
Acquisition Time 1.8 - 2.6 seconds/sample, dependent on sampling mode and inclusion of pressure sensor

Power Supply 10.6 Amp-hour (nominal) battery pack

Optional External Power 0.5 Amps at 9 - 24 VDC

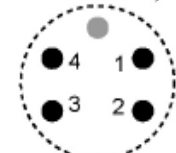
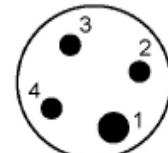
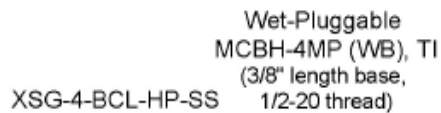
Housing, Depth Rating, and Weight (without pressure sensor)
Standard Titanium, 7000 m (23,000 ft)
 Weight in air: 3.8 kg (8.3 lbs)
 Weight in water: 2.3 kg (5.1 lbs)

Optional ShallowCAT Plastic, 350 m (1150 ft)
 Weight in air: 2.7 kg (6.0 lbs)
 Weight in water: 1.2 kg (2.7 lbs)



Standard Wire Mounting Clamp and Guide

Alternate Flat Surface Mounting Brackets



Pin	Signal
1	Common
2	RS-232 data receive
3	RS-232 data transmit
4	9-24 VDC (optional external power)

* Power consumption / battery endurance values are for standard RS-232 interface; for optional RS-485 interface, see RS-485 manual