

MicroCAT C-T (P optional) Sensor (Serial Interface)



SUMMARY

- Conductivity, Temperature, and (optional) Pressure, at user-programmable 1-sec to 6-hour intervals.
- RS-232 or RS-485 serial interface, internal memory, and external power.
- 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 10,000 instruments deployed since 1997.
- Five-year limited warranty.

DESCRIPTION

The SBE 37-SI MicroCAT is a high-accuracy conductivity and temperature (pressure optional) sensor with **Serial Interface**, which includes a non-volatile FLASH memory. Externally powered, it is useful as a stand-alone monitoring device, and is easily integrated with current meters, ROVs, AUVs, towed sonars, and other instrumentation platforms. Constructed of non-corroding materials to ensure long life with minimum maintenance, the MicroCAT is rated for operation to 350 meters (plastic *ShallowCAT* housing) or 7000 meters (titanium housing), or pressure sensor full-scale range.

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. Data always includes Conductivity, Temperature, and (optional) Pressure; time, sound velocity (Chen-Millero), salinity, depth, and density can also be output.

SENSORS AND SENSOR INTERFACE ELECTRONICS

The MicroCAT retains the temperature and conductivity sensors used in our time-proven SeaCAT and SeaCAT*plus*. Electrical isolation of the conductivity electronics eliminates any possibility of ground-loop noise. The 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, to a maximum depth of 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 < 0.002 °C/year). The ratio of thermistor resistance to reference resistance is determined by a 24-bit A/D converter, which also processes the pressure sensor signal. Conductivity is acquired using an ultra-precision Wien-Bridge oscillator.

COMMUNICATIONS AND INTERFACING

The MicroCAT communicates via RS-232 or RS-485 serial interface:

- **RS-232** — Real-time data can be transmitted up to 1600 meters at 600 baud (power considerations may limit distance), simultaneous with recording. Data can be uploaded at up to 115.2K baud. The user can upgrade firmware through the external connector, without opening the housing.
- **RS-485** — Multiple MicroCATs can share a common 4-wire cable (power, common, data +, data -), minimizing cable complexity for C-T chains.

User-selectable operating modes include:

- **Autonomous** — The MicroCAT is pre-programmed to sample, store data in memory, and transmit data. There are two types of autonomous sampling: *Continuous sampling* at the fastest rate possible (1.0 sec minimum without pressure), or *Interval sampling* at 6-sec to 6-hour intervals.
- **Polled** — 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, takes 1 sample, stores data in memory, transmits data, and goes to sleep.

SOFTWARE

The MicroCAT is supplied with a powerful Windows 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.



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SPECIFICATIONS

Measurement Range

Conductivity: 0 - 7 S/m (0 - 70 mS/cm)
 Temperature: -5 to 45 °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 (-5 to 35 °C);
 ± 0.01 (35 °C to 45 °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 sec/month

Memory

8 Mbyte; capacity in excess of 530,000 samples

Input Power

0.5 Amps at 8.5 - 24 VDC

Quiescent Current*

30 microAmps

Communication Current*

4.3 milliAmps

Acquisition Current*

15 milliAmps

Acquisition Time

1.0 - 2.6 sec/sample,
 dependent on sampling mode
 and inclusion of pressure sensor

Housing, Depth Rating, & Weight (without pressure or clamps)

Plastic
 350 m (1150 ft)
 In air: 2.2 kg (4.9 lbs)
 In water: 1.2 kg (2.7 lbs)
Titanium
 7000 m (23,000 ft)
 In air: 2.9 kg (6.5 lbs)
 In water: 1.9 kg (4.3 lbs)

* Power consumption values are for RS-232 interface; for RS-485 interface, see RS-485 manual.

