

MicroCAT C-T Sensor (Serial Interface)

SBE 37-SI


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 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 250-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, and Pressure (if optional sensor installed); users can choose to add any combination of time, sound velocity (Chen-Millero), salinity, depth, and density.

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. Its aged and pressure-protected thermistor has a long history of exceptional accuracy and stability.

The optional Druck pressure sensor has a superior design that is entirely different from conventional 'silicon' types in which the deflection of a metallic diaphragm is detected by epoxy-bonded silicon strain gauges. The Druck sensor employs a micro-machined *silicon diaphragm* into which the strain elements are implanted using semiconductor fabrication techniques. Unlike metal diaphragms, silicon's crystal structure is perfectly elastic, so the sensor is essentially free of pressure hysteresis. Compensation of the temperature influence on pressure offset and scale is performed by the MicroCAT's CPU.



SENSOR INTERFACE ELECTRONICS

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 directly with a computer via a standard RS-232 serial interface. Real-time data can be transmitted up to 1600 meters (5200 feet) at 600 baud (power considerations may limit the distance), simultaneous with recording. Data can be uploaded at up to 115.2K baud. Firmware upgrades can be downloaded through the communications port by the user, without opening the instrument. An optional RS-485 interface allows multiple MicroCATs to share a common 4-wire cable (power, common, data +, data -), minimizing cable complexity for C-T chains.

User-selectable operating modes include:

- **Autonomous Sampling** — The MicroCAT is pre-programmed to sample, store data in FLASH memory, and transmit data. There are two types of autonomous sampling:
 - *Continuous sampling* at the fastest rate possible (1.0 second minimum without pressure)
 - *Interval sampling* at intervals of 6 seconds to 6 hours.
- **Polled Sampling** — On command from a computer or satellite, radio, or wire telemetry equipment, the MicroCAT takes a sample 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, transmits data, 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.

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

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 seconds/sample,
 dependent on sampling mode
 and inclusion of pressure sensor

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

Standard
 Titanium, 7000 m (23,000 ft)
 Weight in air: 2.9 kg (6.5 lbs)
 Weight in water: 1.9 kg (4.3 lbs)
Optional ShallowCAT
 Plastic, 250 m (820 ft)
 Weight in air: 2.2 kg (4.9 lbs)
 Weight in water: 1.2 kg (2.7 lbs)

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

