

MicroCAT C-T Monitor (Serial Interface)

SBE 37-SI


The SBE 37-SI MicroCAT is a high-accuracy conductivity and temperature (pressure optional) Serial Interface sensor without batteries or memory. 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, and the MicroCAT provides data in ASCII engineering units. The output format 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 products; however, new acquisition techniques provide increased accuracy and resolution while reducing power consumption. 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 pressure sensor, developed by Druck, Inc., has a superior new 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. A high-stability reference crystal with a drift rate of less than 2 ppm/year is used to count the frequency from the oscillator.

COMMUNICATIONS AND INTERFACING

The MicroCAT communicates directly with a computer via a standard serial interface. Real-time data can be transmitted at distances of up to 800 meters (2600 feet) at 1200 baud (power considerations may limit the distance). 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** — At pre-programmed intervals, the MicroCAT samples. There are two types of autonomous sampling:
 - *Continuous sampling* at the fastest rate possible (0.66 second minimum), or
 - *Interval sampling* at intervals of 10 seconds to 9.1 hours.
- **Polled Sampling** — On command from a computer or satellite, radio, or wire telemetry equipment, the MicroCAT takes a sample and transmits the data.
- **Serial Line Sync** — In response to a pulse on the serial line, the MicroCAT wakes up, samples, transmits the data, and goes to sleep.

SOFTWARE

The MicroCAT is supplied with SEATERM®, a powerful Win 95/98/NT/2000/XP terminal program for easy communication and data retrieval. SEATERM can send commands to the MicroCAT to provide status display, data acquisition setup, data display and capture, and diagnostic tests.

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 (per month)

Conductivity: 0.0003 S/m (0.003 mS/cm)
 Temperature: 0.0002 °C
 Optional Pressure: 0.004% of full scale range

Resolution

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

Time Resolution

1 second

Clock Stability

13 seconds/month

Input Power

0.5 Amps at 7-24 VDC

Quiescent Current*

10 microamps

Communication Current*

35 milliamps

Acquisition Current*

35 milliamps

Acquisition Time

0.66 seconds/sample minimum
 (programmable)

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.

