

MicroCAT C-T Monitor (Serial Interface)



The SBE 37-SI MicroCAT is a high-accuracy conductivity and temperature (pressure optional) Serial Interface sensor without batteries or memory. The SI MicroCAT is useful as a stand-alone monitoring device, and is easily integrated with current meters, ROVs, AUVs, towed sonars, and other instrumentation platforms. Construction is of titanium and other non-corroding materials to ensure long life with minimum maintenance, and depth capability is 7000 meter (23,000 feet).

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 is installed), and 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 is completely unaffected by external fouling, permitting the use of expendable anti-fouling devices to inhibit internal fouling and ensure stability. Its aged and pressure-protected thermistor has a long history of exceptional accuracy and stability.

The MicroCAT's 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 100 meters (330 feet) at 1200 baud. 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** — allows sampling at pre-programmed intervals:
 - Continuous sampling at the fastest rate possible (0.66 to 10 second intervals), or
 - Interval sampling at intervals of 10 seconds to 9.1 hours, with the MicroCAT going to sleep between samples.
- **Polled Sampling** — allows sampling and data transmission to be triggered by a command from a computer or satellite, radio, or wire telemetry equipment.
- **Serial Line Sync** — allows sampling and data transmission to be triggered by a pulse on the serial line, which causes a sleeping MicroCAT to wake up, sample, transmit the data, and power off automatically.

SOFTWARE

The MicroCAT is supplied with SEATERM®, a powerful Win 95/98/NT 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.

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SPECIFICATIONS

Measurement Range

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

*Expressed in 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

7-24 VDC

Quiescent Current

10 microamps

Acquisition Current

40 milliamps maximum

Acquisition Time

0.66-10 seconds/sample (programmable)

Housing

Titanium

Depth Capability

7000 m (23,000 feet)

Weight (no clamp)

in air: 2.9 kg (6.5 lbs)
 in water: 1.9 kg (4.3 lbs)

Dimensions in millimeters (inches)

