

MicroCAT C-T Monitor (Serial Interface & integral Pump)

SBE 37-SIP



The SBE 37-SIP MicroCAT is a high-accuracy conductivity and temperature (pressure optional) Serial Interface sensor with integral Pump, without batteries or memory. The SIP MicroCAT is intended 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 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 pressure 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 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.

PUMP

The integral pump typically runs for 0.5 seconds each time the MicroCAT samples, providing the following advantages:

- **Improved conductivity response** – The pump flushes the previously sampled water from the conductivity cell and brings a new water sample quickly into the cell.
- **Improved anti-foul protection** – Water does not freely flow through the conductivity cell between samples, allowing the anti-foul concentration inside the cell to build up.

COMMUNICATIONS AND INTERFACING

The MicroCAT communicates directly with a computer via a standard RS-232 serial interface. Real-time data can be transmitted at distances of up to 800 meters (2600 feet) at 1200 baud (power considerations may limit 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), with the pump running continuously, or
 - *Interval sampling* at intervals of 10 seconds to 9.1 hours, with the pump running before each sample.
- **Polled Sampling** — On command from a computer or satellite, radio, or wire telemetry equipment, the MicroCAT runs the pump, takes a sample, and transmits the data.
- **Serial Line Sync** — In response to a pulse on the serial line, the MicroCAT wakes up, runs the pump, 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.



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SPECIFICATIONS

Measurement Range

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

Acquisition Time

0.66 seconds/sample minimum
 (programmable)

Pump Current

260 milliamps (0.13 amp-sec per
 0.5 sec pulse)

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

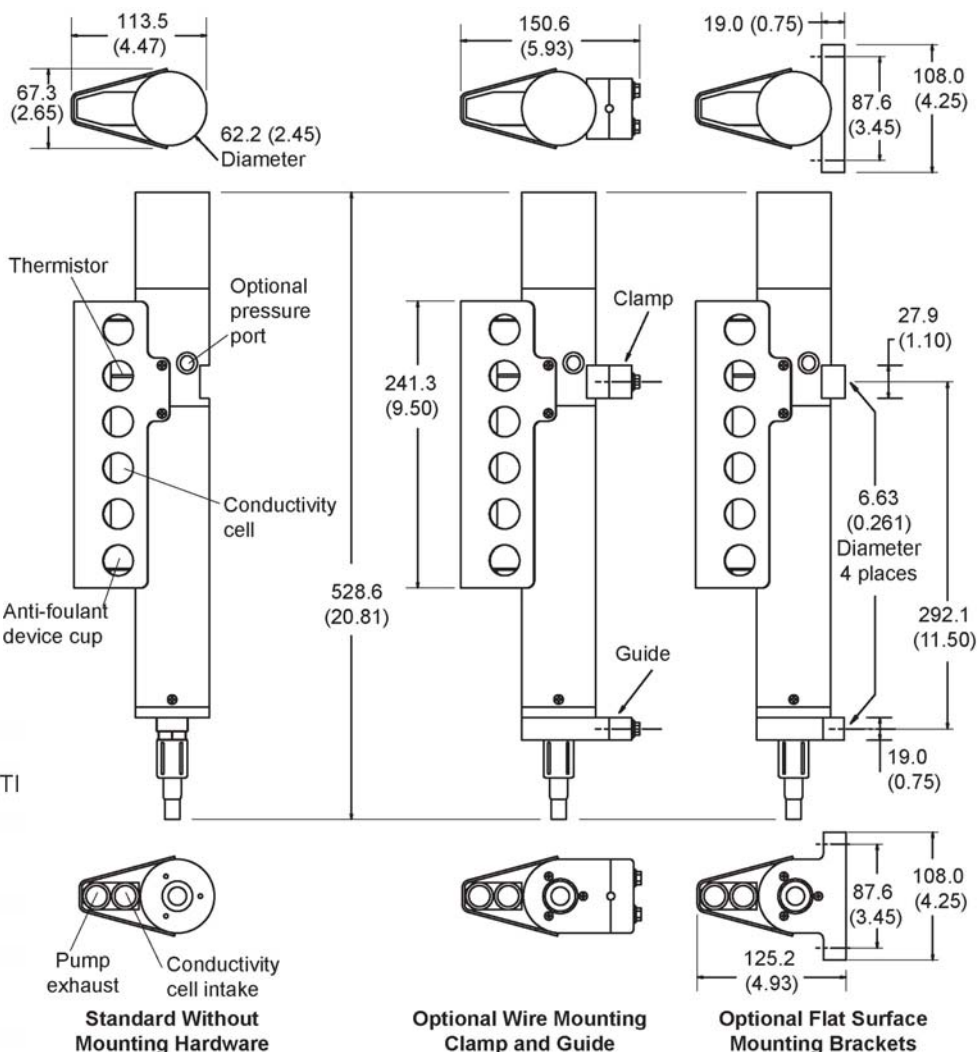
Standard

Titanium, 7000 m (23,000 ft)
 Weight in air: 4.2 kg (9.2 lbs)
 Weight in water: 2.8 kg (6.2 lbs)
 Plastic, 250 m (820 ft)
 Weight in air: 3.1 kg (6.9 lbs)
 Weight in water: 1.7 kg (3.8 lbs)

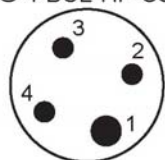
Optional ShallowCAT

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

Dimensions in
 millimeters
 (inches)

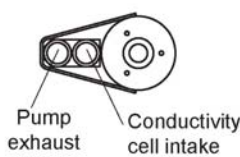
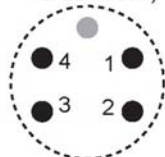


Standard
 SG-4-BCL-HP-SS



Pin	Signal
1	Common
2	RS-232 data receive
3	RS-232 data transmit
4	7-24 VDC external power

Optional
 Wet-Pluggable
 MCBH-4MP (WB), TI
 (3/8" length base,
 1/2-20 thread)



Standard Without
 Mounting Hardware

Optional Wire Mounting
 Clamp and Guide

Optional Flat Surface
 Mounting Brackets