MicroCAT C-T Recorder (**I**nductive **M**odem & integral **P**ump)

SBE 37-IMP

SUMMARY

- Conductivity, Temperature, and (optional) Pressure, at user-programmable intervals (6 seconds to 6 hours).
- Inductive Modem (IM) interface, internal memory, and internal batteries.
- Expendable anti-foulant devices, unique flow path, and pumping regimen for maximum bio-fouling protection.
- New, high-efficiency pump for longer deployments or shorter sampling intervals
- Depths to 250 meters (*ShallowCAT* plastic housing) or 7000 meters (titanium housing).
- Sea-Bird's field-proven MicroCAT family, with more than 8000 instruments deployed since 1997.

DESCRIPTION

The SBE 37-IMP MicroCAT is a high-accuracy conductivity and temperature (pressure optional) recorder with internal battery, non-volatile memory, built-in **I**nductive **M**odem, and integral **P**ump.

The Inductive Modem (IM) system provides reliable, low-cost, real-time data transmission for up to 100 IM-enabled instruments using plastic-coated wire rope (typically 3x19 galvanized steel) as both the transmission line and mooring tension member. IM instruments clamp anywhere along the rugged mooring wire. Expensive and potentially unreliable multi-conductor electrical cables with fixed-position underwater connectors are not required. IM moorings are easily reconfigured for changing deployments (positions changed or instruments added or removed), by sliding and re-clamping instruments on the cable. IM systems are much less expensive and more power-efficient than acoustic modems, and offer reliable communication over greater distances.

In a typical mooring, an **I**nductive **M**odem **M**odule (IMM) or **S**urface **I**nductive **M**odem (SIM) housed in the buoy communicates with underwater IM instruments and is interfaced to a computer or data logger via an RS-232 serial port. The computer or data logger (not supplied by Sea-Bird) is programmed to poll each IM instrument on the mooring for its data, and send the data to a telemetry transmitter (satellite link, cell phone, RF modem, etc.). The MicroCAT saves data in memory for upload after recovery, providing a data backup if real-time telemetry is interrupted.

SENSORS AND INTERFACE ELECTRONICS

The MicroCAT retains the temperature and conductivity sensors used in our time-proven SEACAT and SEACAT*plus* products. Calibration coefficients are stored in EEPROM, allowing the MicroCAT to transmit data in engineering units. Sea-Bird's 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.

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 per year). The thermistor resistance to reference resistance ratio is determined by a 24-bit A/D converter, which also processes the pressure sensor signal. Conductivity is acquired with an ultra-precision Wien-Bridge oscillator.

The optional strain-gauge pressure sensor is available in eight ranges, from 0 - 20 meters to 0 - 7000 meters. Compensation of the temperature influence on pressure offset and scale is performed by the MicroCAT's CPU.

PUMP

The integral pump runs for 1 second 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.

OPERATING MODES

User-selectable operating modes include:

- Polled Sampling — On command, the MicroCAT runs the pump, takes a sample, and transmits data.
- Autonomous Sampling — At pre-programmed intervals, the MicroCAT runs the pump, takes a sample, and stores data in memory.
- Combo or Averaging Sampling — The MicroCAT samples autonomously, and the IMM/SIM can request the last stored data or the average of the samples acquired since its last request.

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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.

DATA STORAGE AND BATTERY ENDURANCE

Temperature and conductivity are stored 6 bytes/sample, time 4 bytes/sample, and optional pressure 5 bytes/sample; memory capacity is in excess of 530,000 samples. The MicroCAT is powered by a 7.8 Amp-hour (nominal) battery pack consisting of twelve AA lithium batteries (Saft LS14500) which, when removed from the MicroCAT, can be shipped via commercial aircraft. The pack provides sufficient internal battery capacity for more than 340,000 samples for a typical sampling scheme.

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 m (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

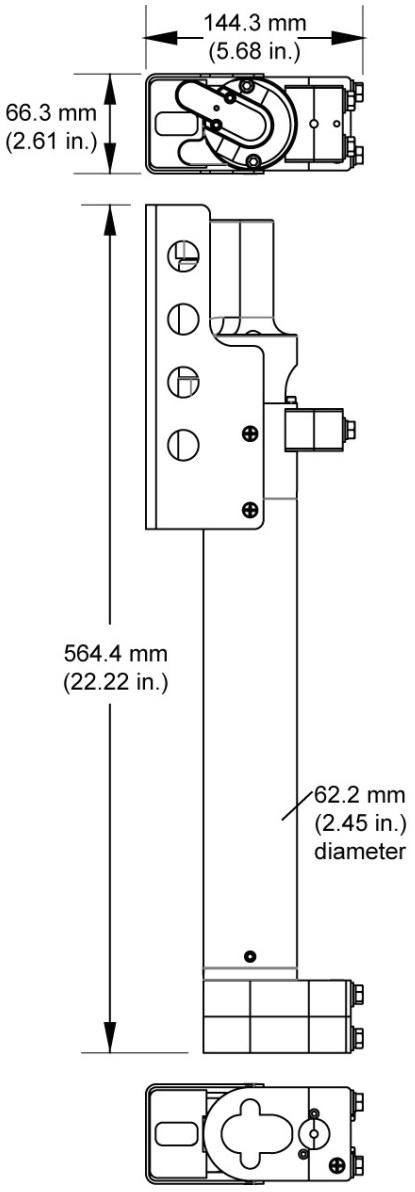
Clock Accuracy	5 seconds/month
Power Supply	7.8 Amp-hour (nominal) battery pack
Quiescent Current	55 microAmps
Communications Current	0.6 milliAmps listening, 10 millAmps transmitting
Communications Time	0.5 seconds/sample
Sampling Current	8 milliAmps
Sampling Time	1.9 - 2.6 seconds/sample, *dependent on sampling mode and inclusion of pressure sensor*
Pump Current	0.025 Amp-seconds/sample

Housing and Depth Rating

Standard	Titanium, 7000 m (23,000 ft)
Optional ShallowCAT	Plastic, 250 m (820 ft)

Weight (with standard mounting clamp and guide)

Optional ShallowCAT	In air: 3.6 kg (8.0 lbs)
	In water: 1.7 kg (3.7 lbs)



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