

Hull Temperature Sensor



The SBE 48 is a high-accuracy temperature recorder with non-volatile memory, designed for shipboard determination of sea surface temperature. Mounted with magnets just below the water line, the SBE 48's temperature sensor is in contact with the **inside** of the ship's hull. The SBE 48's internal battery runs the real-time clock and can be used to power the instrument for very short deployments; external power is recommended for typical deployments.

The SBE 48's thermistor, the same sensor used in the SBE 37 MicroCAT and SBE 39 Temperature Recorder, has a long history of exceptional accuracy and stability. Demonstrated drift is typically less than 0.002 °C per year.

COMMUNICATIONS AND INTERFACING

The SBE 48 communicates directly with a computer via a standard RS-232 interface, at a user-selectable baud rate of 1200 to 38,400. Setup and extraction of data is done via an I/O data cable plugged into an external connector. Calibration coefficients are stored in EEPROM, allowing the SBE 48 to transmit data in ASCII engineering units (°C).

User-selectable operating modes include:

- **Polled Sampling** allows sampling and data transmission to be triggered by a command from a computer, or satellite, radio, or wire telemetry equipment.
- **Autonomous Sampling** allows sampling at pre-programmed intervals, and can be set up to start at a future date and time. There are two types of Autonomous Sampling —
 - *Interval*: At pre-programmed (3-second to 9-hour) intervals, SBE 48 wakes up, samples, and powers off.
 - *Continuous*: SBE 48 continuously samples at approximately 1-second intervals, and does not power off between samples.

The SBE 48 also calculates a running average for up to 120 samples, which can be transmitted while logging data.

- **Serial Line Sync** allows sampling and data transmission to be triggered by a pulse on the serial line, which causes a sleeping SBE 48 to wake up, sample, and power-off automatically.

DATA STORAGE AND BATTERY ENDURANCE

The SBE 48 has two megabytes of non-volatile FLASH memory and can store over 275,000 samples of temperature (3 bytes per sample) and time (4 bytes per sample).

The SBE 48's internal, 9-volt, lithium battery powers the real-time clock. Running the clock alone, the battery will last for five to ten years. If external power is not provided, the battery can provide power for logging up to 150,000 samples.

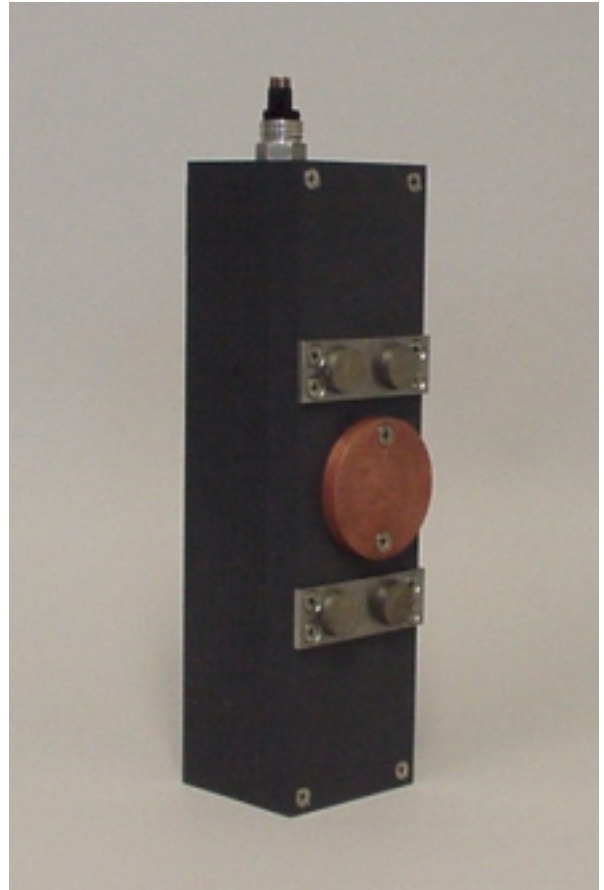
SENSOR INTERFACE ELECTRONICS

Temperature is acquired by applying an AC excitation to a hermetically sealed VISHAY reference resistor and an ultra-stable aged thermistor. A 24-bit A/D converter digitizes the outputs of the reference resistor and thermistor. AC excitation and ratiometric comparison using a common processing channel avoids errors caused by parasitic thermocouples, offset voltages, leakage currents, and reference errors.

SOFTWARE

The SBE 48 is supplied with a powerful software package that includes:

- SEATERM® — Win 95/98/NT terminal program for easy communication and data retrieval.
- PLOT39® — Win 95/98/NT program for plotting data from an SBE 48
- SEASOFT® — DOS programs for analysis, display, and plotting of temperature.



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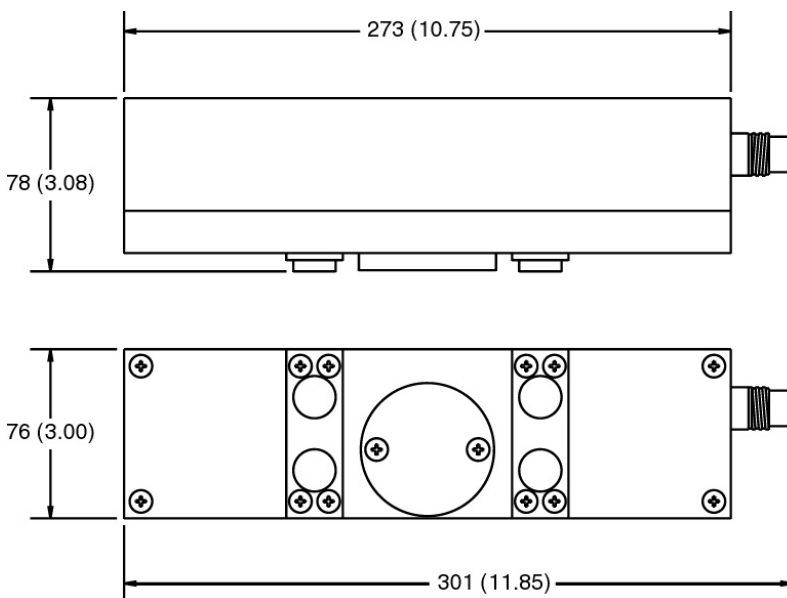
Email: seabird@seabird.com

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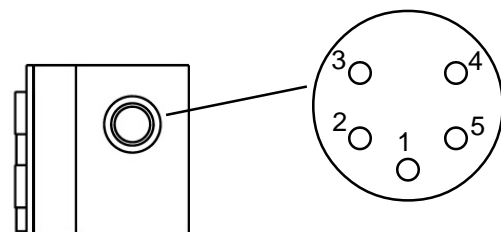


SPECIFICATIONS

Measurement Range	-5 to +35°C
Initial Accuracy	± 0.002°C
Typical Stability (per month)	0.0002°C
Resolution	0.0001°C
Clock Accuracy	15 seconds/month
Internal Power	9V non-hazardous lithium battery: Runs real-time clock (5 to 10 year battery endurance). Can power SBE 48 (up to 150,000 samples) if external power not supplied.
External Power	8 - 16 VDC
Quiescent Current	10 microamps
Operating Current	0.015 amp-seconds per sample
Memory Capacity	276,000 samples (temperature and time) (temperature=3 bytes/sample; time=4 bytes/sample)
Materials	PVC housing
Weight	2.3 kg (5 lbs)



Pin	Description
1	Ground
2	Transmit: RS-232C transmit data from SBE 48 to computer
3	Power: 8 - 16 VDC external power
4	Receive: RS-232C receive data transmitted from computer
5	Shield



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