

SEACAT C-T Recorder

SBE 16*plus*



The SBE 16*plus* SEACAT is a Temperature and Conductivity recorder (pressure optional) intended for moorings and other long-duration, fixed-site deployments. Compared to the original SBE 16 SEACAT, the 16*plus* offers the improved C, T, and pressure specifications of MicroCATs, and also includes larger memory (8 Mbyte vs 1) and four differentially-amplified A/D input channels (14-bit resolution vs 12). The 16*plus* is more power-efficient than old SEACATs: 9 alkaline D-cells will record 380,000 samples of C and T. Conditioned power (500 ma) is available for auxiliary sensors (dissolved oxygen, turbidity, fluorescence, PAR, etc); their cabling is simpler and more reliable because there are two auxiliary input bulkhead connectors.



Standard plastic and optional titanium housing shown

The SBE 16*plus* uses the same temperature and conductivity sensors proven in 5000 SEACATs and MicroCATs, and (optionally) a silicon strain gauge or quartz pressure sensor. Improvements in design, materials, and signal acquisition techniques yield a low-cost instrument with superior performance that is also easy to use. Calibration coefficients, obtained in our computer-controlled high accuracy calibration baths, are stored in EEPROM memory. They permit data output in ASCII engineering units (degrees C, Siemens/m, decibars, salinity [PSU], sound velocity [m/sec.], etc.).

The SBE 16*plus* sample interval is soft-programmable in 1-second increments ranging from 10 to 14,400 seconds. Between samples, the 16*plus* powers down, drawing only 30 microamps of current. Data is recorded in non-volatile FLASH memory for 38.4K baud upload after recovery.

Real-time monitoring is practical using the SBE 16*plus* 3-wire RS-232C data output. The 16*plus* is well suited to networked sensor arrays where its operation can be triggered by satellite, radio, or hardwire telemetry equipment. Optional RS-485 (2-wire) and inductive modem (1-wire loop) interfaces allow multiple SEACATs to share a simple and robust telemetry cable.

CONFIGURATION AND OPTIONS

A standard SBE 16*plus* is supplied with:

- Plastic housing for depths to 600 meters
- 8 Mbyte FLASH RAM memory
- 9 D-size alkaline batteries
- Impulse glass-reinforced epoxy bulkhead connectors: 4-pin I/O, 2-pin pump, and two 6-pin (two differential auxiliary A/D inputs each)
- Anti-foul attachments and expendable anti-foulant devices

Options include:

- Titanium housing for depths to 7000 or 10,500 meters
- Druck strain gauge pressure sensor or Quartz pressure sensor
- RS-485 interface in place of RS-232
- Inductive modem interface in place of RS-232 (see SBE 16*plus*-IM datasheet for details)
- Additional bulkhead connector: 4-pin for RS-232 sensor (SBE 38 secondary temperature sensor) or 3-pin for PAR sensor
- Sensors for oxygen, fluorescence, light (PAR), light transmission, and turbidity
- SBE 5M or 5T pump for use with pumped sensors
- MCBH *Micro* connectors in place of glass-reinforced epoxy connectors
- Battery pack kit for lithium batteries (lithium batteries **not** supplied by Sea-Bird)

SOFTWARE

The SBE 16*plus* is supplied with a powerful Windows 95/98/NT/2000/XP software package, SEASOFT®-Win32, which includes:

- SEATERM® — communication and data retrieval
- SBE Data Processing® — filtering, aligning, averaging, and plotting of CTD and auxiliary sensor data and derived variables



Sea-Bird Electronics, Inc.

1808 136th Place NE, Bellevue, Washington 98005 USA

Website: <http://www.seabird.com>

E-mail: seabird@seabird.com

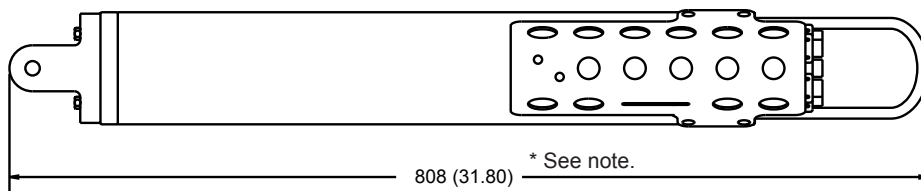
Telephone: (425) 643-9866

Fax: (425) 643-9954

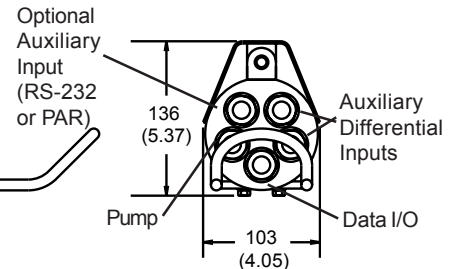
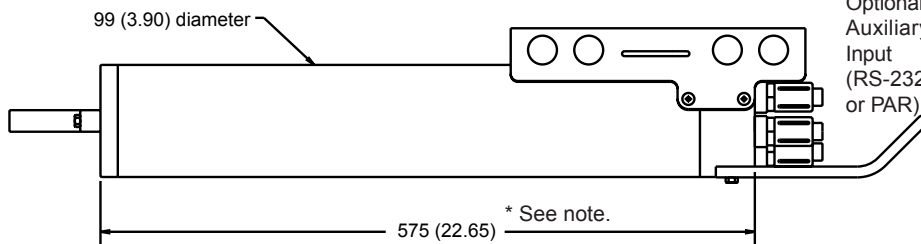
SEACAT C-T Recorder

SBE 16plus

Dimensions
in millimeters
(inches)



Note: 16plus with optional **Quartz** pressure sensor is 190 mm (7.5 inches) longer than shown in drawing.



SPECIFICATIONS

Measurement Range

Temperature	-5 to +35 °C
Conductivity	0 to 9 S/m
Pressure (optional)	Strain-gauge 0 to 20/100/350/600/1000/2000/3500/7000 meters Quartz 0 to 20/60/130/200/270/680/1400/2000/4200/7000/10,500 meters

Initial Accuracy

Temperature	0.005 °C
Conductivity	0.0005 S/m
Pressure (optional)	Strain-gauge 0.1% of full scale range Quartz 0.02% of full scale range

Typical Stability (per month)

Temperature	0.0002 °C
Conductivity	0.0003 S/m
Pressure (optional)	Strain-gauge 0.004% of full scale range Quartz 0.002% of full scale range

Resolution

Temperature	0.0001 °C
Conductivity	0.00005 S/m typical
Pressure (optional)	Strain-gauge 0.002% of full scale range Quartz — depends on sample integration time; consult factory

Memory

8 Mbyte non-volatile FLASH memory	
Data Storage	
Recorded Parameter	Bytes/Sample
T + C	6
strain-gauge pressure	5
Quartz pressure	6
each external voltage	2
SBE 38 secondary temperature	3
date and time	4

Real-Time Clock 32,768 Hz TCXO accurate to ±1 minute/year

Internal Batteries 9 alkaline D-cells

External Power Supply 9 - 28 VDC; consult factory for required current

Battery Endurance ¹

CT only	380,000 samples
CTD only	260,000 samples
CTD & 5M pump	145,000 samples

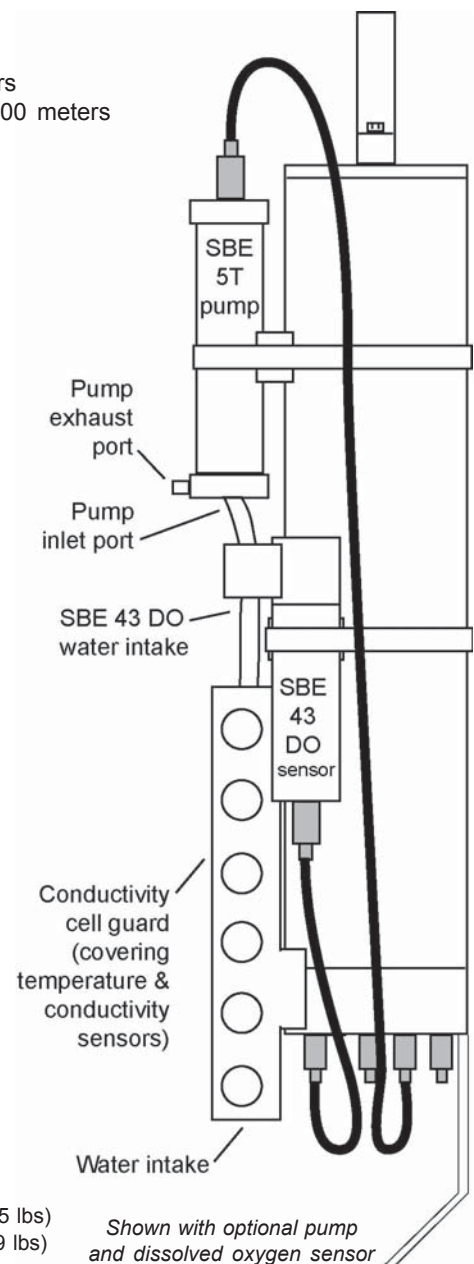
¹ With Duracell MN1300 cells. Dependent on sampling scheme.

Auxiliary Voltage Sensors

Auxiliary power out	up to 500 mA at 10.5 - 11 VDC
A/D resolution	14 bits
Input range	0 - 5 VDC

Housing Materials — Depth Rating — Weight

Acetal Copolymer Plastic housing — 600 meter (1950 feet) — in air 7.3 kg (16 lbs); in water 2.3 kg (5 lbs)
3AL-2.5V Titanium housing — 7000 meter (22,900 feet) — in air 13.7 kg (30 lbs); in water 8.6 kg (19 lbs)
6AL-4V Titanium housing — 10500 meter (34,400 feet)



Sea-Bird Electronics, Inc.

1808 136th Place NE, Bellevue, Washington 98005 USA
Website: <http://www.seabird.com>

E-mail: seabird@seabird.com

Telephone: (425) 643-9866

Fax: (425) 643-9954