

# SEACAT C-T Recorder

SBE 16*plus* V2  


The SBE 16*plus* V2 (Version 2) SEACAT Recorder measures temperature and conductivity (pressure optional) and provides high accuracy and resolution, reliability, and ease-of-use on moorings and other long-duration, fixed-site deployments. The V2 is the most versatile successor in the line of SEACAT Recorders begun with the original SBE 16 SEACAT in 1987.



Compared to the previous 16*plus*, the 16*plus* V2 incorporates an electronics upgrade and additional features. The V2 has two additional (six total) differentially-amplified A/D input channels, FLASH memory is increased from 8 to 64 MB, and one RS-232 data input channel is added. Data can be output in XML as well as ASCII and HEX formats. Firmware upgrades can be downloaded through the communications port by the user, without opening the instrument.

The SBE 16*plus* V2 uses the same temperature and conductivity sensors proven in 10,000 SEACATs and MicroCATs, and (optionally) a silicon strain gauge or Digiquartz® 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* V2 sample interval is soft-programmable in 1-second increments ranging from 10 to 14,400 seconds. Between samples, the 16*plus* V2 powers down, drawing only 20 microamps of current. Nine alkaline D-cells provide power for 355,000 samples of C and T (operation time is shorter if powering auxiliary sensors). Conditioned power (500 ma) is available for auxiliary sensors (dissolved oxygen, turbidity, fluorescence, PAR, etc.). 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* V2 3-wire RS-232C data output. The 16*plus* V2 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, OPTIONS, AND ACCESSORIES

A standard SBE 16*plus* V2 is supplied with:

- Plastic housing for depths to 600 meters
- 64 Mbyte FLASH RAM memory
- 9 D-size alkaline batteries
- Glass-reinforced epoxy bulkhead connectors
- Anti-foul attachments and expendable anti-foulant devices

Options and accessories include:

- Titanium housing for depths to 7000 or 10,500 meters
- Semi-conductor strain gauge pressure sensor or Digiquartz® pressure sensor
- RS-485 half-duplex interface in place of RS-232
- Inductive modem interface in place of RS-232 / RS-485 (see SBE 16*plus*-IM V2 datasheet for details)
- Auxiliary sensors for dissolved oxygen, fluorescence, radiance (PAR), light transmission, and optical backscatter (turbidity)
- SBE 5M miniature pump for pumped conductivity; SBE 5P or 5T pump for pumped conductivity and pumped auxiliary sensor(s)
- Wet-pluggable MCBH series connectors
- Battery pack kit for lithium batteries (lithium batteries **not** supplied by Sea-Bird)

## SOFTWARE

The SBE 16*plus* V2 is supplied with a powerful Windows 2000/XP software package, SEASOFT® V2, which includes programs for communication and data retrieval, real-time data acquisition and display, and data processing (filtering, aligning, averaging) and plotting of CTD and auxiliary sensor data and derived variables.



**Sea-Bird Electronics, Inc.**

13431 NE 20th Street, Bellevue, Washington 98005 USA

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

E-mail: [seabird@seabird.com](mailto:seabird@seabird.com)

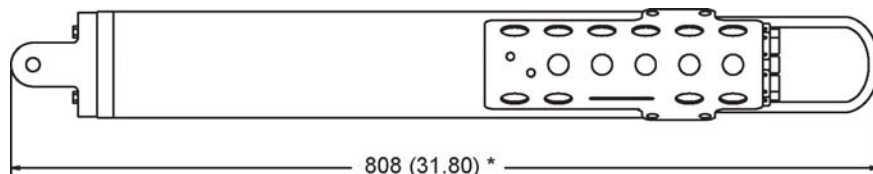
Telephone: (425) 643-9866

Fax: (425) 643-9954

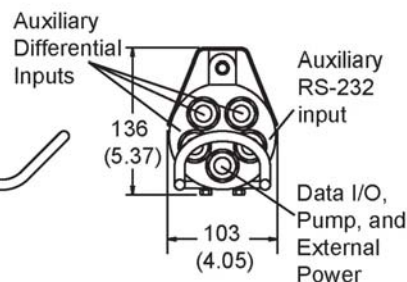
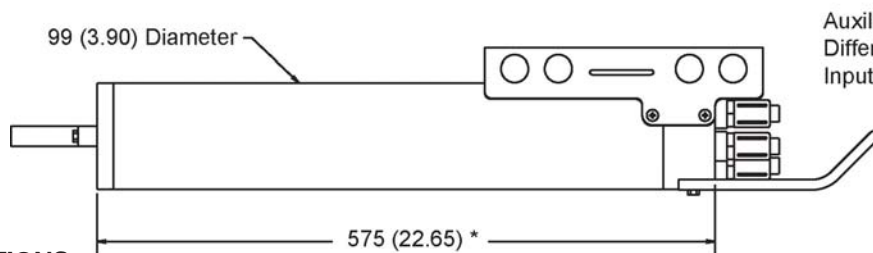
# SEACAT C-T Recorder

# SBE 16plus V2

Dimensions  
in millimeters  
(inches)



\* Note: 16plus V2 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

Temperature 0.0002 °C/month  
 Conductivity 0.0003 S/m/month  
 Pressure (optional) Strain-gauge 0.1% of full scale range/year  
 Quartz 0.025% of full scale range/year

### 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;  
 0.0006% of full scale range for 1-second integration

### Memory

64 Mbyte non-volatile FLASH memory

### Data Storage

Recorded Parameter	Bytes/Sample
T + C	6
pressure - strain gauge or Quartz	5
each external voltage	2
auxiliary RS-232 sensor	sensor dependent
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 <sup>1</sup>

CT only 355,000 samples  
 CTD only 240,000 samples  
 CTD & 5M pump 140,000 samples

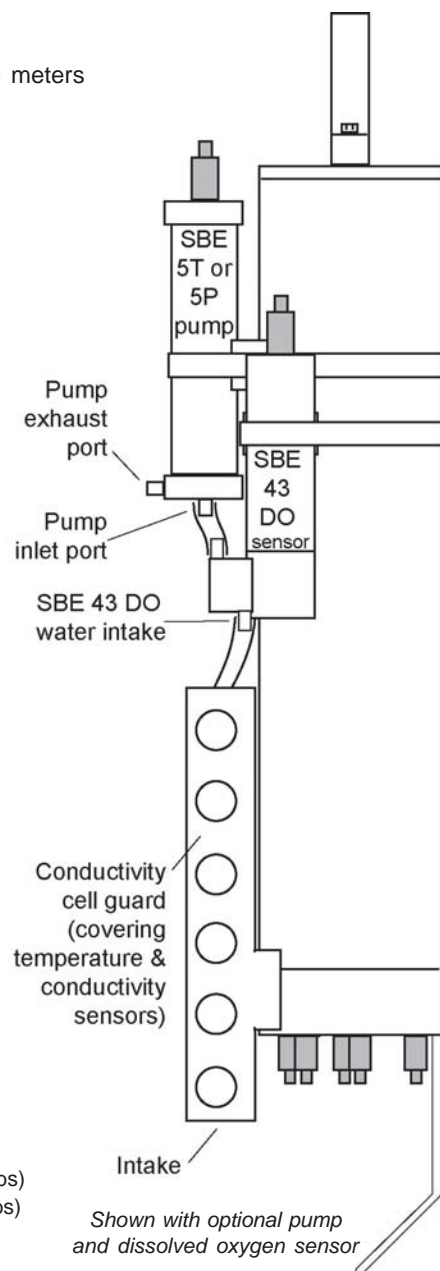
<sup>1</sup> With Duracell MN1300 cells. Dependent on sampling scheme.

### Auxiliary Sensors

Auxiliary power out up to 500 mA at 10.5 - 11 VDC  
 Voltage Sensor A/D resolution 14 bits  
 Voltage sensor 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)



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 Fax: (425) 643-9954