

SEACAT Profiler

SBE 19plus



The SBE 19plus is the next generation *Personal CTD*, bringing numerous improvements in accuracy, resolution (in fresh as well as salt water), reliability, and ease-of-use to the wide range of research, monitoring, and engineering applications pioneered by its legendary SEACAT predecessor. The 19plus samples faster (4 Hz vs 2), is more accurate (0.005 vs 0.01 in T, 0.0005 vs 0.001 in C, and 0.1% vs 0.25% — with *seven times* the resolution — in D), and has more memory (8 Mbyte vs 1). There is more power for auxiliary sensors (500 ma vs 50), and they are acquired at higher resolution (14 bit vs 12). Cabling is simpler and more reliable because there are four differential auxiliary inputs on two separate connectors, and a dedicated connector for the pump. All exposed metal parts are titanium, instead of aluminum, for long life and minimum maintenance.

The 19plus can be operated without a computer from even the smallest boat, with data recorded in non-volatile FLASH memory and processed later on your PC. Simultaneous with recording, real-time data can be transmitted over single-core, armored cable directly to your PC's serial port (maximum transmission distance dependent on number of auxiliary sensors, baud rate, and cable properties). The 19plus' faster sampling and pump-controlled TC-ducted flow configuration significantly reduces salinity spiking caused by ship heave, and allows slower descent rates for improved resolution of water column features. Auxiliary sensors for dissolved oxygen, pH, turbidity, fluorescence, and PAR can be added. For moored deployments, the 19plus can be set to *time-series* mode using software commands. External power and two-way real-time communication over 10,000 meters of cable can be provided with the SBE 36 CTD Deck Unit and Power and Data Interface Module (PDIM).

The 19plus uses the same temperature and conductivity sensors proven in 5000 SEACAT and MicroCAT instruments, and a superior new micro-machined silicon strain gauge pressure sensor developed by Druck, Inc. 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.).

Accuracy, convenience, portability, software, and support; compelling reasons why the 19plus is today's best low-cost CTD.

CONFIGURATION AND OPTIONS

A standard SBE 19plus is supplied with:

- Plastic housing for depths to 600 meters
- Strain-gauge pressure sensor
- 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)
- SBE 5M miniature pump and T-C Duct

Options include:

- Titanium housing for depths to 7000 meters
- SBE 5T pump in place of SBE 5M for use with dissolved oxygen and/or other pumped sensors
- Bulkhead connector for use with PAR sensor
- Sensors for oxygen, pH (for integration in Profiling mode only), fluorescence, light (PAR), light transmission, and turbidity
- Stainless steel cage
- MCBH *Micro* connectors in place of glass-reinforced epoxy connectors
- Ni-Cad batteries and charger
- Moored mode conversion kit with anti-foulant device fittings

SOFTWARE

The SBE 19plus is supplied with a powerful Windows 95/98/NT/2000/XP software package, SEASOFT®-Win32, which includes:

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



Shown with
optional cage,
SBE 5T pump,
& SBE 43
DO sensor



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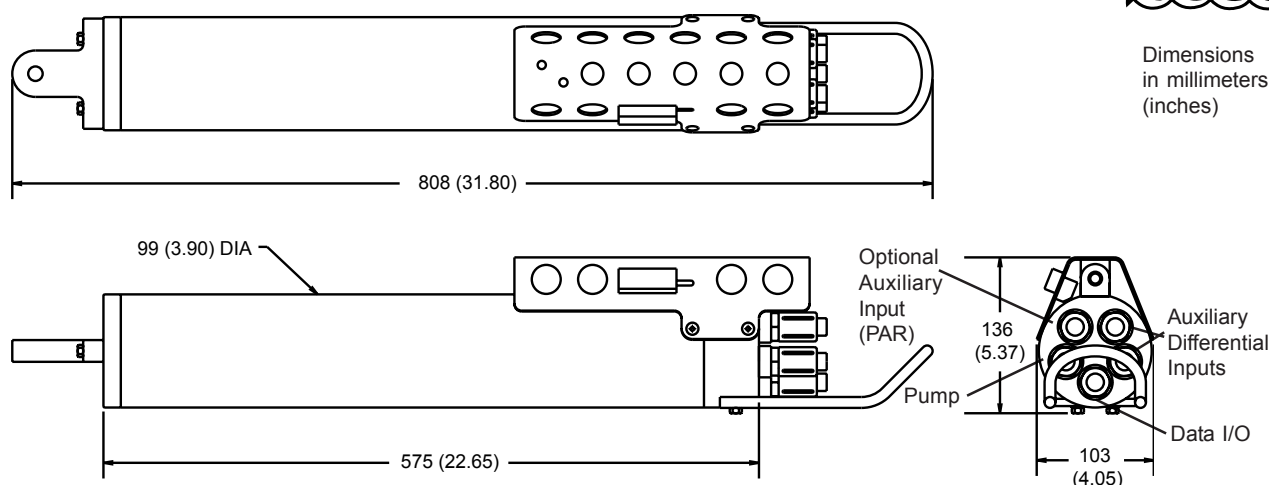
Fax: (425) 643-9954

SEACAT Profiler

SBE 19plus



Dimensions
in millimeters
(inches)



SPECIFICATIONS

	Measurement Range	Initial Accuracy	Typical Stability (per month)	Resolution
Conductivity (S/m)	0 to 9	0.0005	0.0003	0.00005 (most oceanic waters; resolves 0.4 ppm in salinity) 0.00007 S/m (high salinity waters; resolves 0.4 ppm in salinity) 0.00001 S/m (fresh waters; resolves 0.1 ppm in salinity)
Temperature (°C)	-5 to +35	0.005	0.0002	0.0001
Pressure	0 to 20/100/350/ 1000/2000/3500/ 7000 meters	0.1% of full scale range	0.004% of full scale range	0.002% of full scale range

Memory 8 Mbyte non-volatile FLASH memory

Data Storage

Recorded Parameter	Bytes/Sample
T + C	6
pressure	5
each external voltage	2

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

Internal Batteries 9 alkaline D-cells provide 60 hours profiling CTD operation; optional 9-cell rechargeable nickel-cadmium battery pack provides approximately 24 hours operation per charge

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

Power Requirements

Sampling	65 mA
SBE 5M pump	100 mA
Optional SBE 5T pump	150 mA
Communications	60 mA
Quiescent	30 μ A

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 in air*, Weight in water*

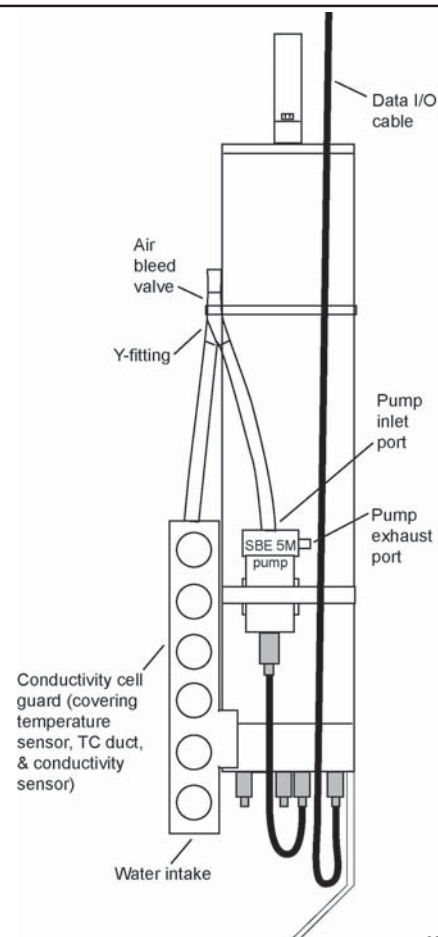
Acetal Copolymer Plastic housing, 600 meter (1950 feet), 7.3 kg (16 lbs), 2.3 kg (5 lbs)

3AL-2.5V Titanium housing, 7000 meter (22,900 feet), 13.7 kg (30 lbs), 8.6 kg (19 lbs)

*without pump

Optional Cage

1016 mm x 241 mm x 279 mm (40 in. x 9.5 in. x 11 in.), 6.3 kg (14 lbs)



08/04



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Submersible Pump

SBE 5T

The SBE 5T pump module is a compact unit consisting of a centrifugal pump head and a long-life, brushless, DC ball bearing motor contained in a titanium pressure housing useable to 10,500 meters. The pump impeller and electric drive motor are coupled magnetically through the housing, providing high reliability by eliminating moving seals.

APPLICATIONS

The SBE 5T is a primary component in Sea-Bird's SBE 9*plus* CTD Underwater Unit and SBE 25 Sealogger CTD. It is also used as optional equipment on the Seacat product line. The pump flushes water through the conductivity cell at a constant rate, independent of the CTD's motion, improving dynamic performance. The pump may also be suitable for custom applications, where pressure heads are less than 300 cm of water and flow rates are less than 100 ml/sec.

CONFIGURATION

The SBE 5T is configured for various applications by selecting either standard or low voltage options, and one of several motor speed options. Speed options of 1300, 2000, 3000 or 4500 rpm have been established to meet flow rate requirements for Sea-Bird applications. Other speeds can be set by adjusting a potentiometer.

OPERATION

Motor speed and pumping rate remain nearly constant over the entire input voltage range (less than 1% change in speed for a 1 volt change in supply voltage). The unrestricted flow rate with no head is approximately 100 ml/second at 2000 rpm. Flow changes are nearly linear with changes in speed. With unlimited power supply current, turn-on surge is about 1.8 amperes (maximum), which drops to steady state in about 0.25 seconds. If power supply current is limited to approximately 200 milliamps, the motor will come up to speed in about 0.30 seconds. A series diode is installed in the input power line to prevent damage if the wires are accidentally reversed. Pumping rates and motor current for Sea-Bird's various applications are given on the next page.

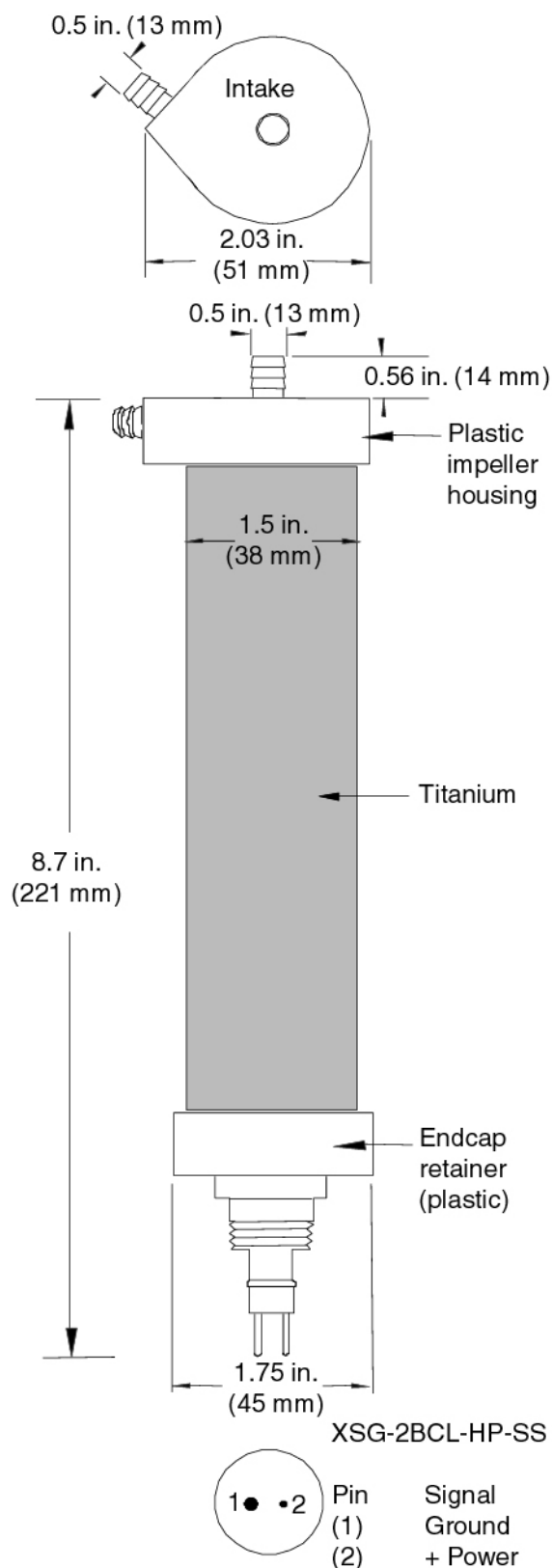
SPECIFICATIONS

Standard input range (#3 winding, 1300 - 3000 RPM): 10 - 18 VDC

Standard input range (#3 winding, 4500 RPM): 13 - 18 VDC

Low input range (#5 winding - 1300, 2000 RPM only): 6 - 16 VDC

Weight: 0.7 kilos (1.5 lbs.) in air, 0.3 kilos (.65 lbs.) in water



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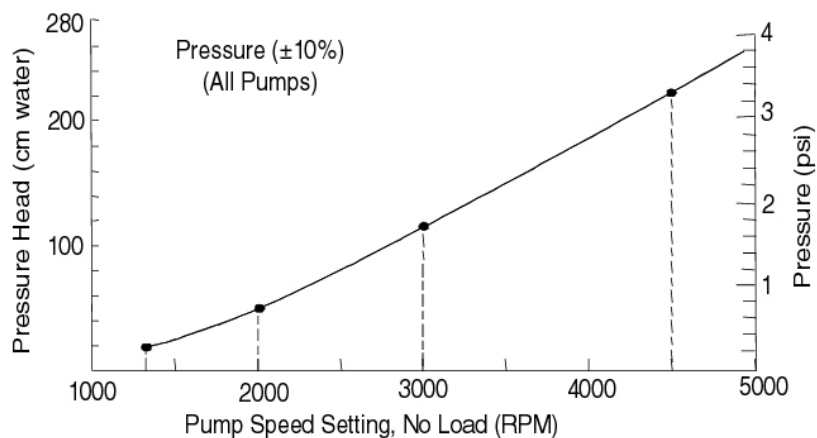
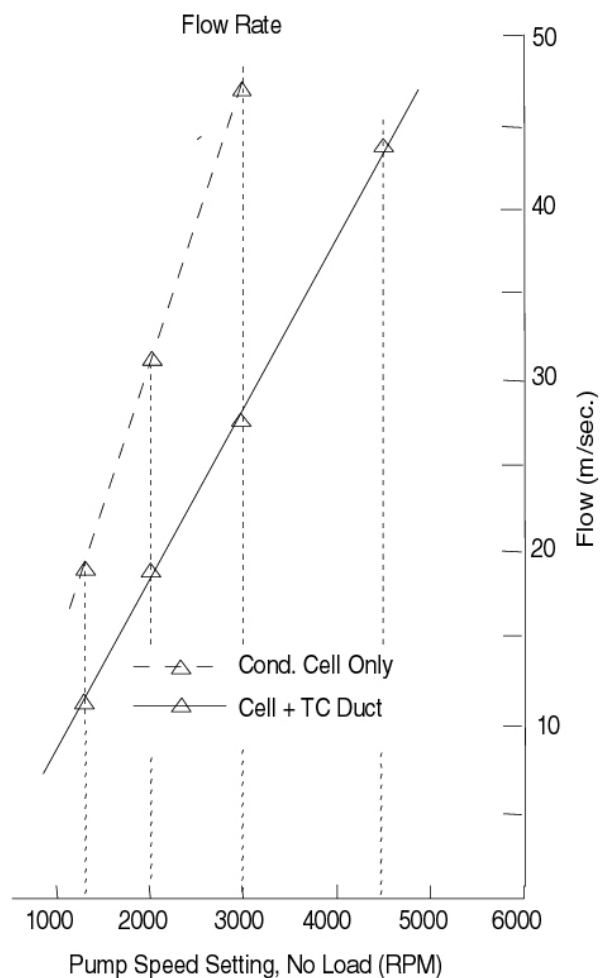
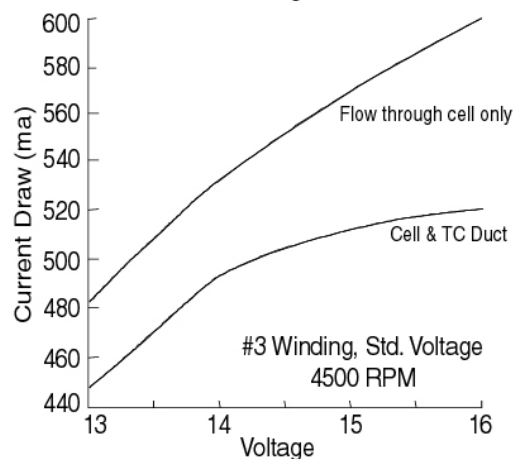
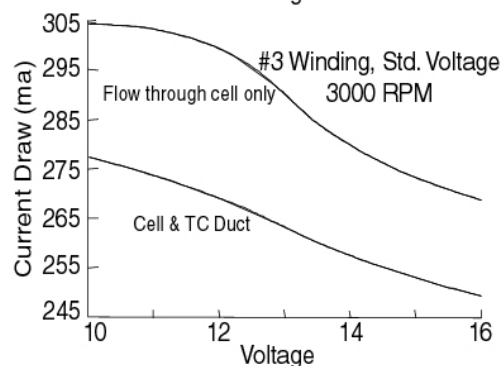
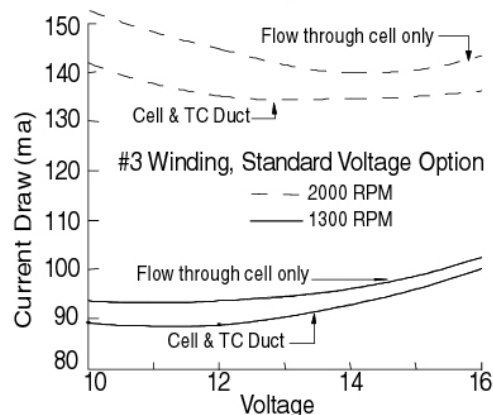
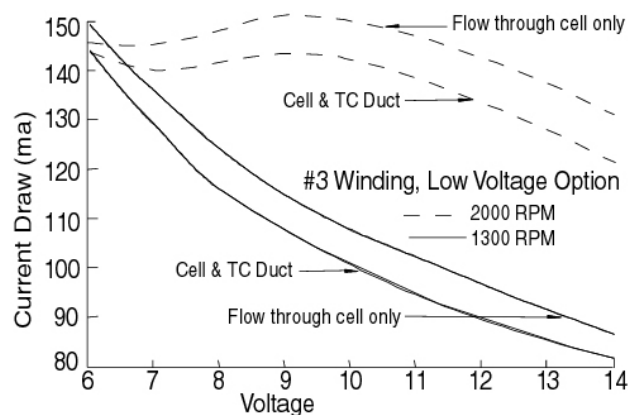
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Submersible Pump

SBE 5T



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pH Sensor

SBE 18


The SBE 18 pH Sensor uses a pressure-balanced glass-electrode / Ag/AgCl-reference pH probe to provide *in-situ* measurements at depths up to 1200 meters (3900 ft). The replaceable pH probe is permanently sealed and is supplied with a soaker bottle attachment that prevents the reference electrode from drying out during storage. The sensor and associated interface electronics is a modular, self-contained package that is easy to install, service, and calibrate.

The SBE 18 is intended for use as an add-on auxiliary sensor for profiling CTDs (SBE 9*plus* CTD; SBE 19 and 19*plus* SEACAT; and SBE 25 SEALOGGER CTD). Power / signal interface cables and mounting hardware are available separately.

The SBE 18's interface circuits buffer and offset the differential glass-electrode/reference potential to produce a high-level, pH-dependant, output voltage. Computation of pH in engineering units is typically done using our SEASOFT[®] software.

Sea-Bird calibrates the pH sensor against precision buffer solutions (4, 7, 10 pH $\pm$ 0.02 pH). These calibration results are tabulated on a certificate furnished with each sensor.

SPECIFICATIONS

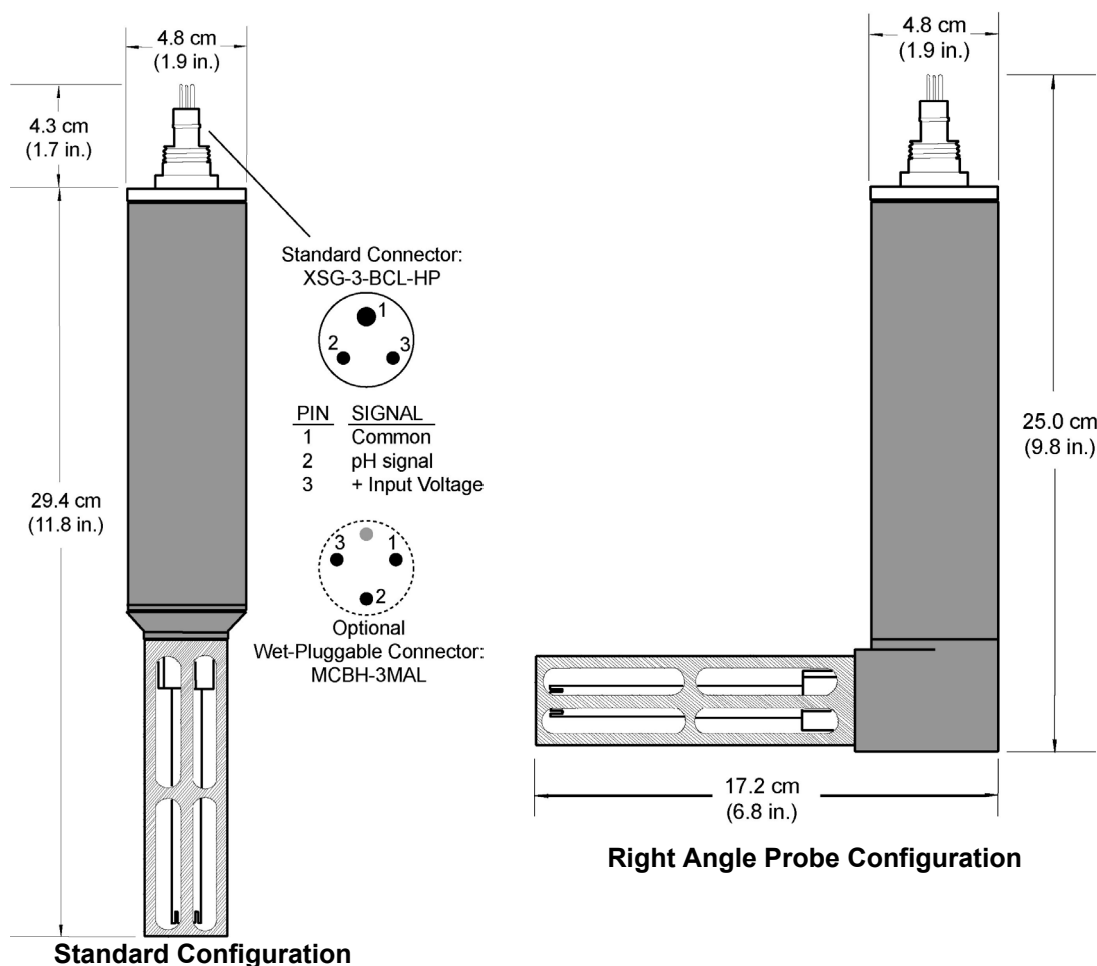
Measurement range 0 – 14 pH
Accuracy¹ 0.1 pH
Time response² 1 second

ELECTRICAL / MECHANICAL

Power required 6 - 24 VDC, 7 mA
Signal output 0 to +5 V
Materials Anodized aluminum (6061-T6), stainless steel
Operating depth 1200 meters (3900 ft)
Weight 0.7 kg (1.5 lbs) in air, 0.4 kg (0.8 lbs) in water

¹ Stated accuracy achievable with frequent field calibrations.

² Time to reach 63% of final value following step change in pH.



10/04



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Sea-Bird Dissolved Oxygen Sensor

SBE 43



Developed during five years of intensive research and development — and following almost four years of field trials — the SBE 43 sets a new oxygen measurement standard for oceanographic research.

The new sensor is a Clark polarographic membrane type in which careful choices of materials, geometry, and sensor chemistry are combined with superior electronics interfacing and calibration methodology to yield major gains in performance.

Calibration stability is improved by an order of magnitude; the new sensor holds calibration in shipment and requires less frequent calibration.

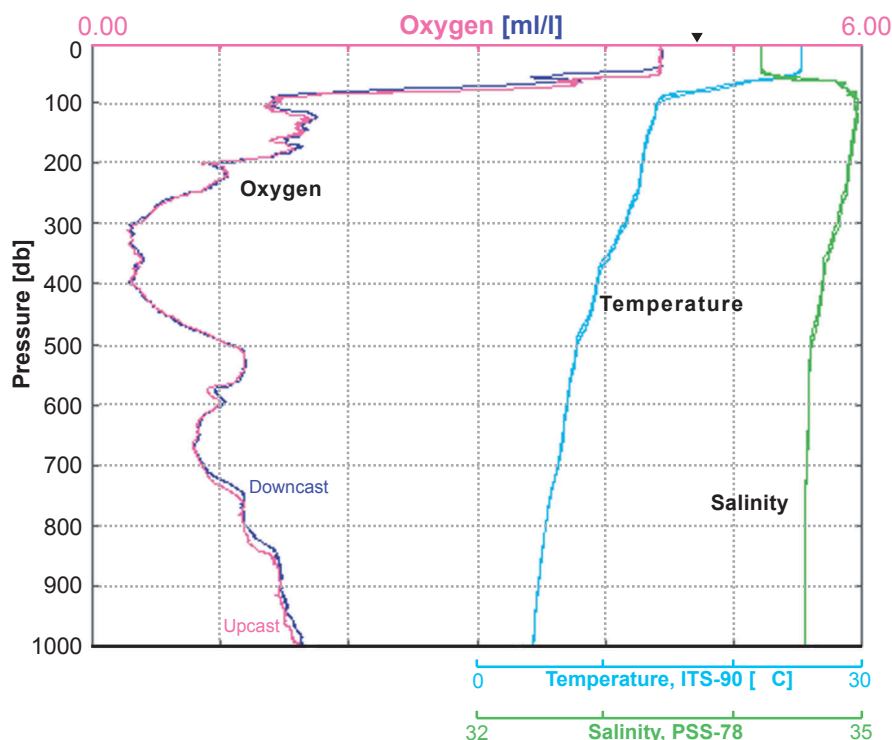
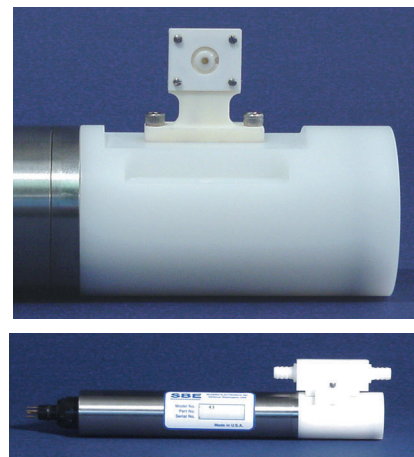
Calibration drift is caused primarily by chemical processes inside the sensor and by membrane fouling from ocean contaminants. If the membrane is kept clean, the steps taken to improve the new sensor's chemical stability yield demonstrated calibration drift rates of less than 2% over 1000 hours.

Temperature response and corrections are dramatically improved. The largest source of error in profiling applications is nearly eliminated, and the equilibration 'wait time' at the beginning of a profile is reduced to seconds. Profiling accuracy in gradients is dramatically improved.

The chemical and physical processes that underlay the oxygen measurement are very sensitive to temperature. Accurate characterization of the internal sensor temperatures that control these processes, especially when water temperature is changing rapidly, is a key accomplishment of this new design. Not only does the new sensor measure temperature in the right place: the temperature equilibration time of the entire sensor head has been reduced to a few seconds so that it tracks the changing water temperature much more faithfully.

Pressure hysteresis is largely eliminated in the upper ocean (1000 meters). Oxygen features are more precisely resolved, and the agreement in down-and-up profiles reduces the ambiguity about which should be locked to bottle Winklers.

Hysteresis in oxygen measurements is caused by delays in a sensor's response to changing temperature, pressure — and oxygen. Slow temperature response and time-mismatch of temperature corrections are responsible for most of the hysteresis in the upper 1000 meters. These faults have been largely overcome in the new design. Hysteresis from pressure cycling remains a factor below 1000 meters.



Equatorial Pacific
2° 0.9' N, 110° 2.2' W
25 Oct 2000

24 Hz SBE 911*plus* data; oxygen measurements were time shifted 6 seconds relative to pressure to account for water transit time through TC Duct and plumbing. No other processing was performed.

▼ surface oxsat = 4.7 ml/l



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Sea-Bird Dissolved Oxygen Sensor



Continuous polarization eliminates the wait-time for stabilization after power-up. The new sensor is always ready for immediate use.

Previous sensors required several minutes to 'polarize' following power-up. During that time, sensor readings were inaccurate. In the SBE 43, micropower electronics and an internal, five-year, board-mounted battery eliminate the power-up delay.

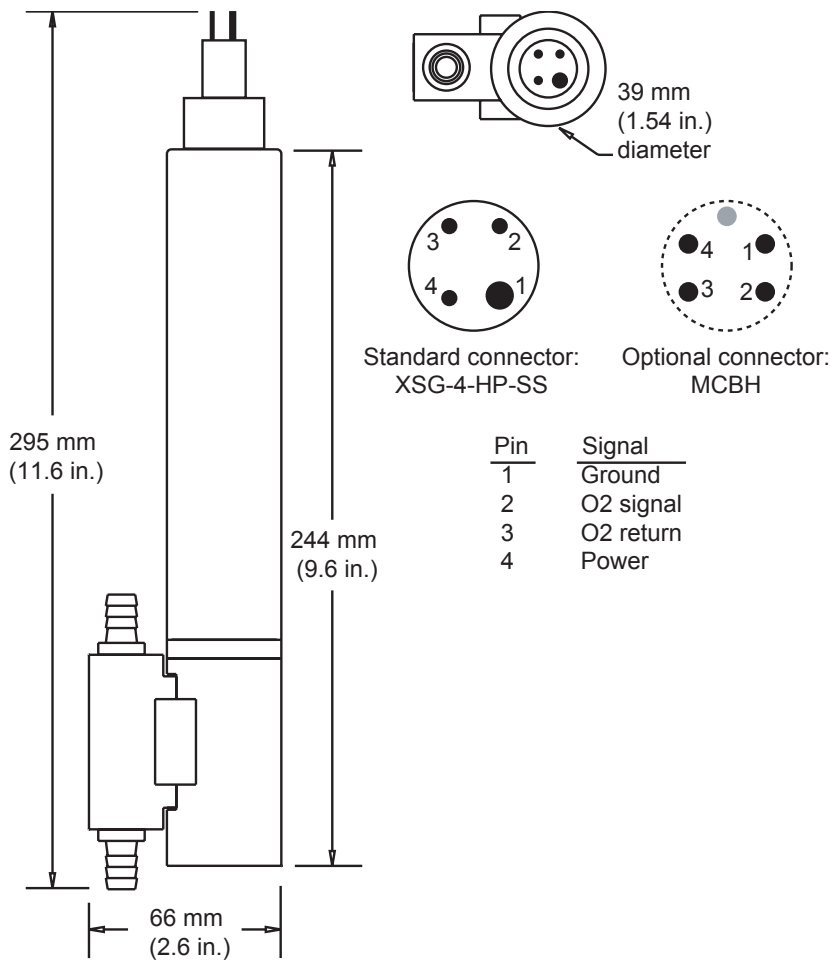
Signal resolution is increased by on-board temperature compensation. And because there is no 'temperature' output signal, a CTD channel is made available for other purposes.

Even when oxygen concentration is constant, the normal range of ocean temperatures causes the output of earlier sensors to vary by a factor of two. The SBE 43's internal temperature compensation eliminates this variation, allowing the new sensor to pre-amplify the signal proportionately; resolution with existing CTD systems is correspondingly doubled.

A 5-year warranty backs the sensor's integrity. During the warranty period, one sensor re-charge (electrolyte refill, membrane replacement, and recalibration — as mandated by chemical depletion of electrolyte) will be performed at our facility free of charge.

Specifications:

Measurement range:	120% of surface saturation in all natural waters, fresh and salt
Initial accuracy:	2% of saturation
Typical stability:	2% per 1000 hours (clean membrane)
Input voltage:	6.5 - 24 VDC
Input power:	60 milliwatts
Output signal:	0 - 5 VDC
Depth rating:	7000 meters
Materials:	titanium and plastic
Weight:	0.7 kg (1.5 lbs)



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CYCLOPS-7 Submersible Sensors

User's Manual



Version 1.6
April 25, 2007
P/N 998-2100

TURNER DESIGNS
845 W. Maude Ave.
Sunnyvale, CA 94085
Phone: (408) 749-0994
FAX: (408) 749-0

Appendix A

CYCLOPS-7 Specifications

Parameter	Specification
Minimum Detection Limit	0.03 µg/L Chlorophyll <i>a</i> 0.04 ppb Rhodamine WT 150 cells/mL Cyanobacteria 0.04 NTU Turbidity
Dynamic Range (Depends on gain setting)	X1: 0 – 500 µg/L, Chl <i>a</i> X10: 0 – 50 µg/L, Chl <i>a</i> X100: 0 – 5 µg/L, Chl <i>a</i> X1: 0 – 1,000 ppb, RWT X10: 0 – 100 ppb, RWT X100: 0 – 10 ppb, RWT X1: 0 – 2,000,000 cells/mL PC or PE X10: 0 – 200,000 cells/mL PC or PE X100: 0 – 20,000 cells/mL PC or PE X1: 0 – 3000 NTU, Turbidity X10: 0 – 1000 NTU, Turbidity X100: 0 – 100 NTU, Turbidity
Linearity, (over dynamic range for lab environment)	0.99R ²
Power Draw	@3V: Max 360 mW =5V: Max 265 mW
Input Voltage	3 – 15 VDC
Signal Output	0 – 5 VDC
Temperature Range	Ambient: 0 to 50 °C Water Temp: -2 to +50 °C
Light Source	Light Emitting Diode
Excitation Wavelength	Chl 460 nm, RWT 550 nm, PC 595 nm, PE 528 nm, Turbidity 850 nm
Emission Wavelength	Chl 620 - 715 nm, RWT 590 - 715nm PC 670 nm, PE 573 nm, Turbidity 850 nm
Detector	Photodiode
Detection Wavelength	300 – 1,100 nm
Warm up time	5 seconds
Dimensions, (length excludes connector)	Length: 4.3", 10.9cm Diameter: 0.875", 2.22cm
Weight	5.0 ozs, 160 gm
Depth Rating	600 meters
Housing Material	316 Stainless Steel



OBS-3+ Turbidity Sensor



Accurate, Rugged

Compact, low-power probe is field-proven

Overview

The OBS-3+ is a submersible turbidity probe that has sideways-facing optics. It uses OBS technology to measure suspended solids and turbidity for applications ranging from water quality

in freshwater rivers and streams to sediment transport and dredge monitoring. Campbell Scientific data loggers measure the OBS-3+ probe's output and calculate turbidity.

Benefits and Features

- › Sideways facing optics avoid obstructions above and below the probe
- › Measures suspended solids and turbidity for up to 4000 NTUs
- › Provides a compact, low-power probe that is field proven
- › Compatible with most Campbell Scientific data loggers
- › Accurate and rugged
- › Stainless-steel body allows use down to 500 m in fresh water
- › Titanium body allows use down to 1500 m in fresh or salt water
- › Fitted with MCBH-5-FS, wet-pluggable connector—multiple mating cable length options available
- › Offers an optional five-point sedimentation calibration for better measurements (see Ordering Info on the web page)

Detailed Description

The OBS-3+ uses its sideways-facing optics to emit a near-infrared light into the water. It then measures the light that bounces back from the water's suspended particles.

If an obstruction is in the emitted light's range, the light will scatter back and the turbidity reading will be too high. This probe's sideways-facing optics avoids obstructions above and

below the probe. The OBS300 is available for locations that have obstructions around the sides of the probe.

OBS® is a registered trademark of Campbell Scientific.



Specifications

Range	» 0 to 500 NTU » 0 to 250 NTU » 0 to 4000 NTU » 0 to 3000 NTU » 0 to 1000 NTU
Maximum Submersion Depth	» 1500 m (4921.5 ft) for titanium body » 500 m (1640.5 ft) for stainless-steel body
Concentration Accuracy	» 2% of reading or 1 mg/l (whichever is larger) for mud » 4% of reading or 10 mg/l (whichever is larger) for sand
Maximum Concentration Range	» 50,000 to 100,000 mg/l (for sand) » 5,000 to 10,000 mg/l (for mud) » <i>Maximum concentration depends on sediment size, particle shape, and reflectivity.</i>
Operating Temperature Range	0° to 40°C
Drift over Time	< 2% per year
Maximum Data Rate	10 Hz
Minimum Warm-up Time	2 s
Infrared Wavelength	850 nm $\pm$ 5 nm
Daylight Rejection	-28 dB (re: 48 mW/cm ⁻²)
Optical Power	2000 μ W

Turbidity Accuracy	2% of reading or 0.5 NTU (whichever is larger)
Housing Material	316 stainless steel or titanium
Connector	MCBH-5-FS, wet-pluggable
Diameter	2.5 cm (0.98 in.)
Height	14.7 cm (5.79 in.)
Weight	181.4 g (0.4 lb)

-2.5 Output Option

Output Voltage	0 to 2.5 V (over selected NTU range)
Supply Voltage	5 to 15 Vdc
Current Drain	15 mA

-5 Output Option

Output Voltage	0 to 5 V (over selected NTU range)
Supply Voltage	5 to 15 Vdc
Current Drain	15 mA

-20 Output Option

Output Voltage	4 to 20 mA (over selected NTU range)
Supply Voltage	9 to 15 Vdc
Current Drain	45 mA

For comprehensive details, visit: www.campbellsci.com/obs-3plus



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EQUIPMENT CODE

ETS_106A

EQUIPMENT

GRAB 25 L

Technical Specifications

Material	Stainless Steel
Dimensions	H 110 cm; L 64 cm; D 27 cm
Sampling Area	0.1 m ²
Sampling Volume	25 L
Weight	34 Kg
Additional weights	No. 4 weights, 4 kg each
Total weight	38Kg



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registro delle imprese di Ancona; r.e.a. Ancona 165285;

capitale sociale euro 15.000,00 i.v



Setacci Certificati Certified Sieves



Setacci Certificati Giuliani

I Setacci Certificati GIULIANI sono accompagnati da un Certificato di Conformità che attesta che le reti, i materiali, le dimensioni, e le metodologie di costruzione sono conformi e riconosciute degli istituti di normalizzazione di riferimento. I Setacci Giuliani sono tarati secondo procedura Giuliani Sieve Lab Test 001 in conformità alle normative internazionali ISO 3310 e del documento -UKAS Traceability Test Sieve LAB22 edition1- e tutte le procedure indicate sono parte integrante del nostro sistema di qualità certificato ISO 9001. Il sistema di qualità del lab test opera, inoltre, in piena conformità alla ISO IEC 17025. Nel Certificato vengono indicati:

Diametri disponibili

I Setacci sono prodotti nelle seguenti misure normalizzate:
diam 50 mm
diam 75 mm
diam 100 mm
diam 120 mm
diam 150 mm
diam 200 mm
diam 250 mm
diam 300 mm
diam 400 mm
diam 500 mm

Accessori

- Coperchio
- Coperchio con diffusore per setacciatura ad umido
- Fondo
- Fondo con scarico
- Guarnizioni per setacciatura ad umido
- Scarico su Setaccio
- Sfere in gomma con anima in acciaio

- Il numero di Serie
- La serie di riferimento
- Il numero progressivo
- I mesh
- La luce netta
- I materiali

Le Serie di riferimento

I Setacci certificati GIULIANI

vengono prodotti ed allestiti secondo le norme riportate dalle seguenti tabelle che riportano i dati relativi alle aperture delle maglie richiesti dalle principali normative italiane ed estere.

Naturalmente siamo in grado di sopperire anche ad eventuali richieste specifiche relative a Setacci calibrati con aperture delle maglie speciali e dimensioni ed allestimenti customizzati.

Sono realizzati in Acciaio Inox e lucidati a mano con superficie antiatrito

CHIAMACI

Tel: 011.27.30.666 | Fax: 011.27.30.668

SCRIVICI

info@giuliani.it

VIENI A TROVARCI

Lun - Ven: 8:30-12:30 13:00-17:00

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