LISST-ABS

Submersible Acoustic Backscatter Sensor

• Sediment Concentration • Superior Response • Fouling Tolerant

Sequoia Scientific, Inc. is proud to offer the first low-cost acoustic backscatter sensor designed specifically for measuring suspended sediments. The 8MHz acoustic sensor has a superior response over optical turbidity sensors for coarse grains. The LISST-ABS is a fixed-point monitoring sensor. It uses a new and novel technique to internally compensate for geometric beam spreading and attenuation, yielding un-attenuated backscatter signal strength. It is held pointing into flow for low drag.

Why acoustics? Why single-point, and why 8 MHz? Acoustic sensors benefit from their much higher tolerance to fouling than optical sensors, which is an obvious advantage. Single-point use makes them suitable for monitoring wherever turbidity type sensors are in use. The choice of 8MHz frequency is made to ensure nearly flat response to particles in the size range 30-400 microns (See figure on back). For example, LISST-ABS maintains calibration over this size range within ~ ±30% from its mean value. In contrast, sensitivity of optical turbidity sensors changes by ~± 400% over the same size range. The LISST-ABS also covers a wide concentration range, up to 70g/L for 5 -10 micron sediments.

Analog voltage, SDI-12, and RS232 outputs are available on the underwater connector. The analog and digital values are available as soon as power is applied. SDI-12 is available on demand.

The LISST-ABS max depth is 100 m. Contact Sequoia for deeper versions.

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FEATURES

- Recorded quantity: Backscatter signal strength in decibel (software provided for conversion to concentration)
- Sample volume Location: 5.5 cm from sensor face.
- Operating Frequency: 8MHz
- Tolerant to fouling
- Calibration over 30-400 micron sizes: flat to within ±30%; [compare with ±400% for turbidity sensors]
- Calibration for fine particles below 30 microns: response follows $d^{1.5}$
- Analog, SDI-12 and Digital (RS232) outputs available on the underwater connector

SPECIFICATIONS (subject to change without notice)

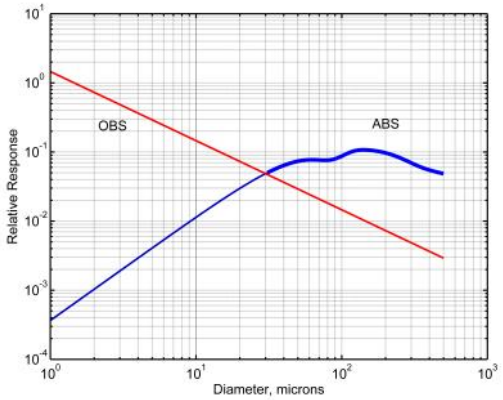
Sensor Type: Point sensor.
Sample volume size: 10 dia x 15 L (mm)
Operating Frequency: 8MHz
Sample volume: approx. 1.5cm long, 5.5 cm in front of sensor head.
Output: 0-5V for 0-100dB, continuously updated at 1 sec. intervals.
or SDI-12 or RS-232 continuous or polled
Conversion to physical units: Provided.
Working Range: 1mg/L to 70g/L (7-micron dust); or
<50 g/L (200 micron sand)
Calibration: Recommended with sediment samples.
Drift: Internally compensated for temperature, ageing.
Resolution: 0.025 dB (0.3% of current value).
Accuracy: 0.3% of current value

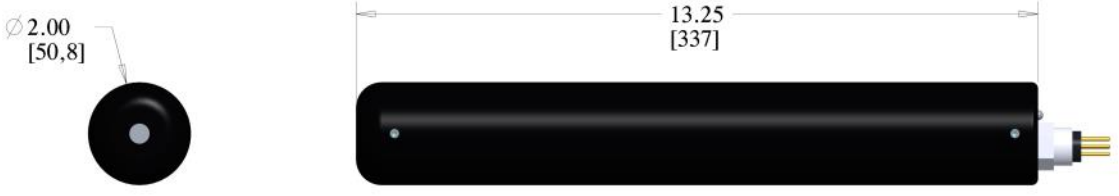
Mechanical and electrical

- Sensor Dia.: 2.00 in (5.08 cm)
- Length: 13.25 in (33.65 cm)
- Weight: 1 lb. (0.5 Kg) in air; 0.5 lb. (0.22Kg) buoyant in water.
- Transducer: 10mm dia, ceramic
- External supply : 11-18 Vdc
- Current drain: 80 mA
- Max. Depth: 100 m (check with factory for deeper rating)
- Material: ABS Plastic
- Connector type: Impulse MCBH-8-MP-SS
- Power on LED: Green, blink on update
- Sample update rate: 1Hz [average of 64 measurements]

Figure on right shows the relative responsivity of optical turbidity meters contrasted with the LISST-ABS acoustic backscatter sensor. Note that turbidity sensors (OBS) have very poor sensitivity as grain size increases to sand sizes and more. The ABS, in contrast, has a fairly constant response from 30-400 microns , varying only by ~30% from its mean value over this range. This is shown as a heavier weight line on the ABS curve.

[ABS curve shows case of single size particles; in a polydispersion, the relative response varies as square of shown response, and the net signal is square root of sums from all size classes.]





Sequoia Scientific, Inc.
2700 Richards Road, Suite 107, Bellevue, WA 98005 USA
Tel 425.641.0944 **Fax** 425.643.0595 **email** info@SequoiaSci.com
www.SequoiaSci.com

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