

# Sound Level Sensor

(Order Code SLS-BTA)

The Sound Level Sensor measures sound level in decibels. It can be used for activities such as

- Environmental noise studies
- Sound level comparisons
- Investigating room acoustics
- Investigating sound insulation



**Note:** Vernier products are designed for educational use. Our products are not designed nor are they recommended for any industrial, medical, or commercial process such as life support, patient diagnosis, control of a manufacturing process, or industrial testing of any kind.

## What's Included

- Sound Level Sensor

## Compatible Software and Interfaces

See [www.vernier.com/manuals/sls-bta](http://www.vernier.com/manuals/sls-bta) for a list of interfaces and software compatible with the Sound Level Sensor.

## Getting Started

1. Connect the sensor to the interface (LabQuest Mini, LabQuest 2, etc.).
2. Start the appropriate data-collection software (Logger Pro, Logger Lite, LabQuest App) if not already running, and choose New from File menu.

The software will identify the sensor and load a default data-collection setup. You are now ready to continue your experiment.

If you are collecting data using a Chromebook™, mobile device such as iPad® or Android™ tablet, or a Vernier wireless sensor or interface, please see the following link for up-to-date connection information:

[www.vernier.com/start/sls-bta](http://www.vernier.com/start/sls-bta)

## Using the Product

Connect the sensor following the steps in the Getting Started section of this user manual.

The sensing microphone on the Sound Level Sensor is located inside the hole in the top of the case. Because the microphone is located inside the sensor, it is helpful to point the microphone hole toward the source of the sounds you are measuring.

When using the Sound Level Sensor, be mindful of the environment around the sensor. Wind blowing across the opening or vibrations from the surface on which it is resting can cause the sensor to read much higher than it should. When collecting data, place the sensor on its foam feet or hold the sensor in your hand to separate the microphone from extraneous vibrations.

## Calibration

The Sound Level Sensor will never need to be calibrated. Each sensor is carefully calibrated before it ships, and this unique calibration is stored on a smart chip in the sensor. **Note:** There is no method to perform a calibration of this sensor in most of our software programs; however, there is no need to do so. Logger Pro does allow for an approximate calibration, but the results would likely be less accurate than the custom factory calibration.

## Specifications

Sensor	3/8" electret (prepolarized) condenser microphone
Measurement range	55 to 110 dB
Frequency range	30 to 10,000 Hz
Resolution	0.1 dB
Accuracy	3 dB (ref 90 dB @ 1 kHz)
Stored calibration	Sensor Reading = $K_0 + K_1 * \text{voltage} + K_2 * \text{voltage}^2$ $K_0$ : 30.3014 dB $K_1$ : 13.858 dB/V $K_2$ : 2.173 dB/V <sup>2</sup>

## How the Sensor Works

The Sound Level Sensor uses an electret condenser microphone mounted inside the sensor case. The output of this microphone is amplified, filtered, and averaged over 50 ms to produce a single sound pressure level measurement.

The Sound Level Sensor is A-weighted, meaning it discriminates against low frequencies, in a manner similar to the response of the ear. With this setting, the meter primarily measures in the 500 to 10,000 Hz range.

## Suggested Sound Level Studies

You can collect sound level data in many real-world situations; for example, you can

- Collect sound levels before, during, and after a concert or dance.
- Collect sound levels throughout the day in a school hallway or shopping mall.
- Use the Sound Level Sensor to judge cheering contests at pep rallies.
- Collect data outside and inside a car equipped with a stereo system.
- Make a model of an ear and ear canal. Measure sound levels at the “ear drum” when a headset is placed over the ear. Repeat the experiment, but place an earplug between the headset and the meter.

### Example Sound Levels

Source	Sound Pressure Level (dBA)
Threshold of pain	130
Construction noise	110
Subway train	100
Noisy restaurant	80
Busy traffic, normal radio	70
Normal conversation, dishwasher	60
Quiet office	50
Soft whisper	30
Threshold of hearing	0

### Additional Experiments

For more information about experiments related to this product, see [www.vernier.com/sls-bta](http://www.vernier.com/sls-bta)

### Troubleshooting

Connect the Sound Level Sensor to an interface. The data-collection software will identify the sensor and begin a live readout of the sound level. Normal classroom sound levels should be 60–70 dB; a quiet office should read around 55 dB.

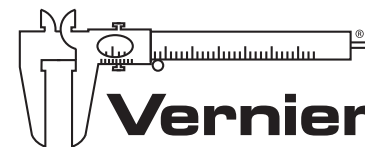
For additional troubleshooting, see [www.vernier.com/til/3485](http://www.vernier.com/til/3485)

### Repair Information

If you have followed the troubleshooting steps and are still having trouble with your Sound Level Sensor, contact Vernier Technical Support at [support@vernier.com](mailto:support@vernier.com) or call 888-837-6437. Support specialists will work with you to determine if the unit needs to be sent in for repair. At that time, a Return Merchandise Authorization (RMA) number will be issued and instructions will be communicated on how to return the unit for repair.

### Warranty

Vernier warrants this product to be free from defects in materials and workmanship for a period of five years from the date of shipment to the customer. This warranty does not cover damage to the product caused by abuse or improper use. This warranty covers educational institutions only.



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