



Sound Level Sensor

PS-2109



Sensor Specifications:

Sound Level (dBA/dBC):

Range:	Voice: 30 to 70 dBA/dBC Horn: 50 to 90 dBA/dBC Plane: 70 to 110 dBA/dBC
Accuracy:	± 2 dB at 94 dBA (or dBC) at 1000 Hz
Resolution:	0.1 dB
Repeatability:	0.1 dB

Sound intensity ($\mu\text{W}/\text{m}^2$):

Range:	Voice: 1×10^{-3} to $10 \mu\text{W}/\text{m}^2$ Horn: 1×10^{-1} to $1,000 \mu\text{W}/\text{m}^2$ Plane: 10 to $100,000 \mu\text{W}/\text{m}^2$
---------------	---

Sound Sensor Quick Start

The PS-2109 Sound Level Sensor measures sound level in decibels (both dBA and dBC weighting scales) and sound intensity in $\mu\text{W}/\text{m}^2$.

Additional Equipment Needed

- USB Link (PS-2100) with USB-compatible computer or Xplorer (PS-2000)
- EZscreen or DataStudio® software (version 1.7 or later)

Equipment Setup

1. Connect the USB Link to a USB port on your computer or to a USB hub.
2. Connect the sensor to the USB Link or Xplorer.
3. The software launches when it detects a PASPORT™ sensor. Select a choice from the PASPORTAL window.



800-772-8700 • 916-786-3800 • techsupp@pasco.com • www.pasco.com

012-08204A

Sound Scales and Ranges

The PS-2109 Sound Level Sensor is designed to measure the sound level (intensity level) of sound sources within 10 feet. The sensor measures the following:

- **Sound Level (dBC)** - The dBC weighting scale corresponds to the total *sound level* generated by a diffracted sound emission, such as from machinery, a motor, or a plane at take off. The dBC displays a wider frequency spectrum than the dBA weighting scale because unlike the dBA weighting scale, the noise is unfiltered.
- **Sound Level (dBA)** - The dBA weighting scale filters out some of the sound frequencies from a sound source to more closely match the frequency response of the human ear. The dBA scale is commonly used in the workplace to establish the *sound level* an employee will experience in typical working conditions.
- **Sound Intensity ($\mu\text{W}/\text{m}^2$)** - The *sound intensity* ($\mu\text{W}/\text{m}^2$) measurement is calculated from the dBC measurement of sound level.

Selecting a Measurement Range

Choose a sound measurement range by depressing one of the range buttons on the front of the sensor.



Plane: 70 dB to 110 dB



Horn: 50 dB to 90 dB



Voice: 30 dB to 70 dB

Note: When you plug in the Sound Level Sensor, the middle range is automatically selected.

DataStudio Activity - Recording Sound Level and Intensity from a Speaker

Equipment Required: Sound Level Sensor, USB link or Xplorer, USB-compatible computer, speaker (WA-9303), function generator (PI-9587C)

1. Plug the Sound Level Sensor into a USB link or Xplorer. (If using the USB link, connect it to the computer.)
2. Connect a speaker to a function generator.
3. Turn on the speaker and create a relatively low volume sine wave at 440 Hz (Concert A).
4. Place the sensor about 0.2 meters from the speaker and press the **Start** button to record data. After a few seconds, click the **Stop** button.
5. Increase the volume (amplitude) of the sound wave and repeat step 4. Collect data for five different sound wave volumes.
6. Using DataStudio, create a graph with sound level on the vertical axis and sound intensity on the horizontal axis.
7. (Analysis): What relationship do you notice between sound level and sound intensity? How would the sound intensity change with an increase of 20 dB?

Common Sound Levels and Relative Sound Intensities

Sound Source	Sound Level (dB)	Sound Intensity ($\mu\text{W}/\text{m}^2$)
Rustling leaves	20	10^{-4}
Library	40	10^{-2}
Normal conversation	60	1
Noisy office	80	10^2
Subway train	100	10^4
Rock concert	120	10^6



800-772-8700 • 916-786-3800 • techsupp@pasco.com • www.pasco.com