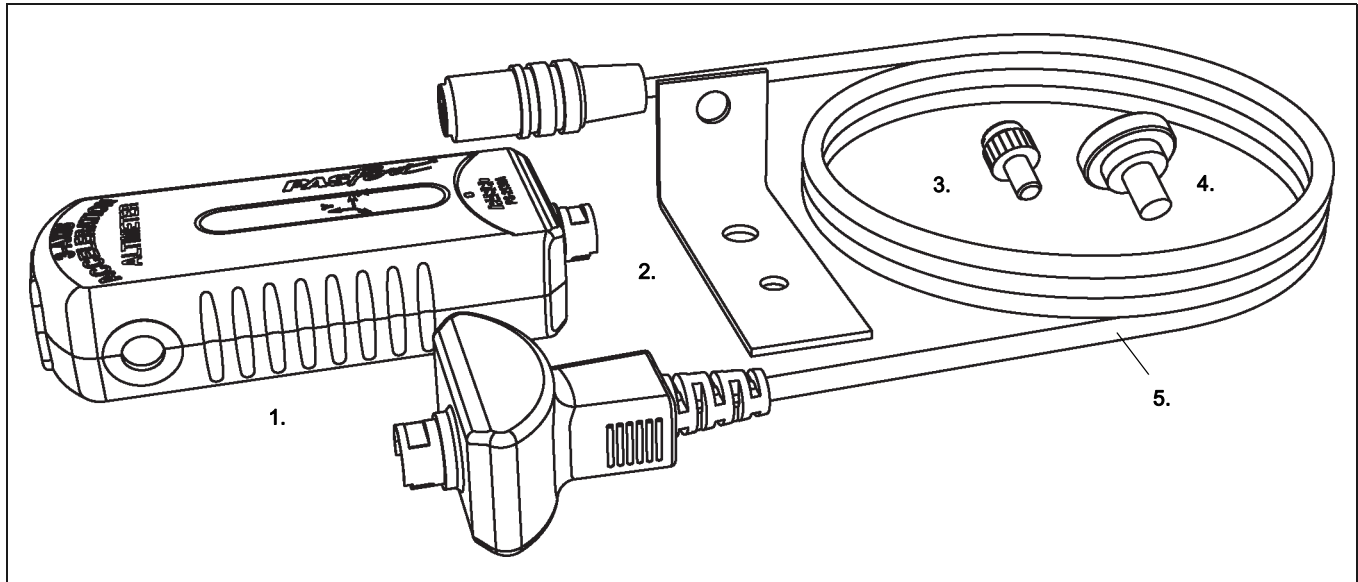


3-Axis Acceleration/Altimeter Sensor

PS-2136A



Included Items	
1.	3-Axis Acceleration/Altimeter Sensor
2.	Mounting Bracket
3.	Smaller Thumbscrew
4.	Larger Thumbscrew
5.	Sensor Extension Cable (PS-2500)

Recommended Items*
PASCO Cart
PASCO Dynamics Track
Angle Indicator
PASCO Xplorer GLX Vest

Required Items*
PASCO Interface
PASCO Data Collection Software

*See the PASCO catalog or the PASCO web site at www.pasco.com for more information.

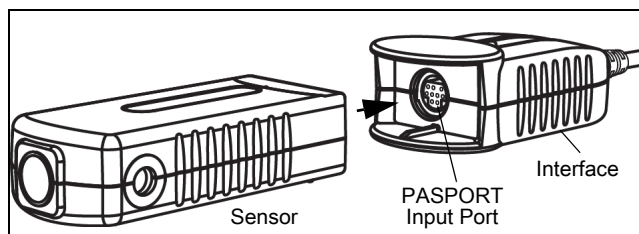
Introduction

The PS-2136A 3-Axis Acceleration/Altimeter Sensor is capable of five simultaneous measurements: acceleration (change of velocity with respect to time) in three axes: X, Y, and Z, resultant acceleration, and altitude. The units of measure for acceleration include m/s^2 (meters per second squared) and g (acceleration due to Earth gravity), and the units for altitude include meters (m) and feet (ft).

The sensor is designed to work with a PASPORT-compatible interface and PASCO data collection software.

Setup the 3-Axis Acceleration Sensor

- Plug the sensor into a PASPORT input port of a compatible interface.



NOTE: If more distance is needed between the sensor and the interface or datalogger, you can plug the sensor into a PASPORT Sensor Extension Cable (included), and then plug the cable into the computing device.

- Start the PASCO data collection software.

Data Collection Software Help

See the SPARKvue Help or PASCO Capstone Help for information about collecting, displaying, and analyzing data.

- In SPARKvue, select the **HELP** button in any screen.
- In PASCO Capstone, select **Help** from the **Help** menu, or press **F1**.

Software Setup

- Set up a display.
- Select a measurement.
- Begin recording data.

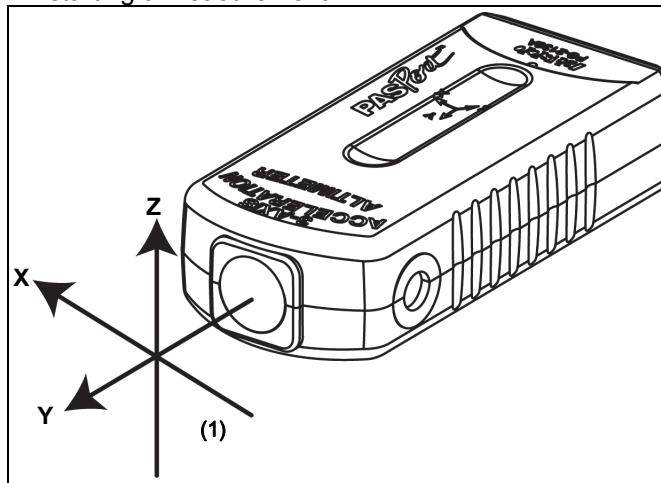
Direction of Sensitivity

The acceleration sensing units inside the sensor are oriented so that the lines of greatest sensitivity follow the three arrows indicating the direction of acceleration.

Zero the Sensor

The sensor can be set up so that it will automatically zero itself when you start to record data. Or, the sensor could be mounted in the specific orientation needed for an experiment, and then set to zero from within the data collection software,

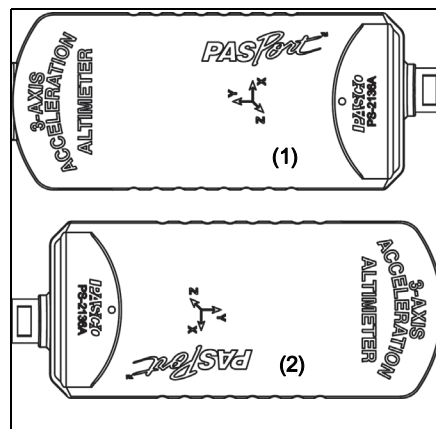
Search in the software Online Help for directions about how to set the sensor output to zero before starting a measurement.



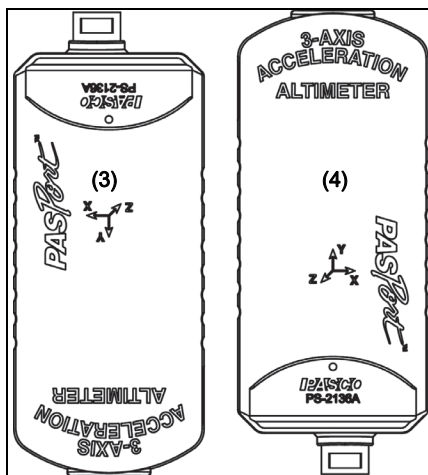
Arrows indicate direction of acceleration. See (1). In this orientation, the X-axis direction is 'positive' to the left, the Y-axis direction is 'positive' toward the end plate, and the Z-axis direction is 'positive' perpendicular to the label on top.

Test the Sensor's Output Using Earth's Gravity

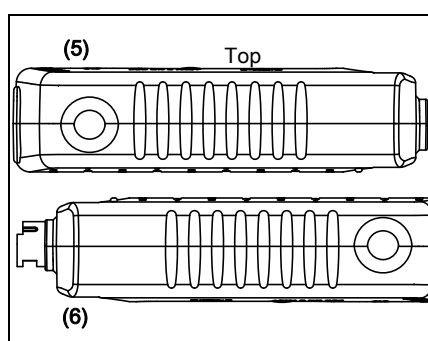
For example, if the sensor is on its side and oriented with its long axis horizontal as shown, the Acceleration X-axis reading is 1.0 g in X. See (1). If the sensor is oriented with the X-axis arrow pointing down, the Acceleration X-axis reading is -1.0 g in X. See (2).



If the sensor is oriented with the Y-axis pointing down, the Acceleration Y-Axis reading is -1.0 g in Y. See (3). If the sensor is oriented with its the Y-axis arrow pointing up, the Acceleration Y-axis reading is 1.0 g in Y. See (4)



If the sensor is oriented with the label facing up, the Acceleration Z-axis reading will read 1.0 g in Z. See (5). If the label is facing down, the reading is -1.0 g in Z. See (6).



Specifications

Item	Value
Range for Each Axis:	Acceleration: ± 16 g
Unit Choices (examples):	Acceleration: m/s^2 and g Altitude: m and ft
Resolution:	Acceleration: 0.002 g Altitude: 0.10 m (10 cm)
Maximum Sample Rate:	Acceleration: 500 Hz Acceleration with simultaneous Altitude: 100 Hz*

(*NOTE: Altitude reads zero for sample rate greater than 100 Hz)

Altitude

The Altimeter relies upon barometric pressure to calculate altitude. As barometric pressure changes with weather conditions, the altitude reading will appear to change. During a period of high pressure, for example, the altitude reading may be lower than expected. However, the Altimeter will correctly measure the change in altitude or height. If possible, zero the sensor when it is located at the starting position. If more than altitude change is required, use the data collection software to create a calculation of true altitude using a correction factor based on the known altitude at the starting position.

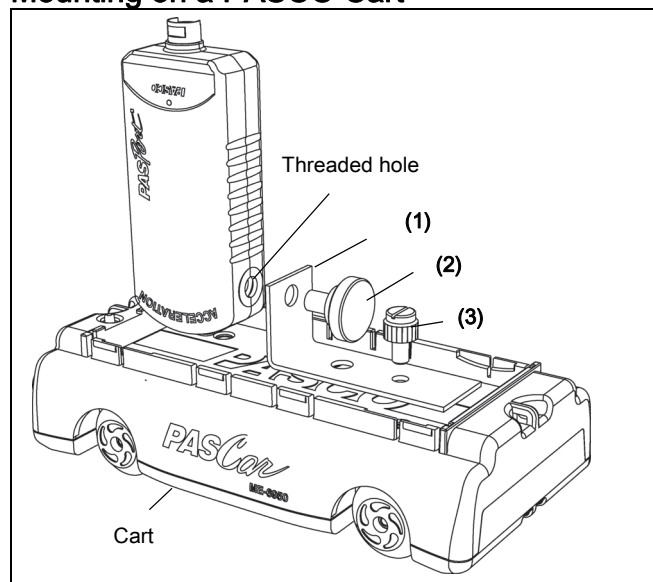
About the Measurement

This sensor has the over-sampling command capability that can be used by the data collection software

Over-sampling

Over-sampling reduces noise, produces smoother data, and improves the measurement resolution. This effect is especially noticeable when very small changes are measured. The degree of over-sampling depends on the sample rate. Maximum over-sampling occurs at slower sample rates. To increase the degree of over-sampling, lower the sample rate in the software.

Mounting on a PASCO Cart



Item

1. Mounting Bracket
2. Larger Thumbscrew
3. Smaller Thumbscrew

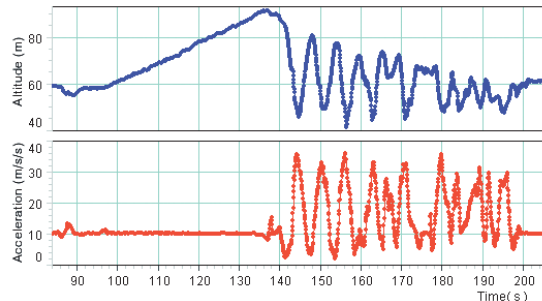
Use the smaller thumbscrew to attach the mounting bracket to the accessory tray of a PASCO Cart. Use the larger thumbscrew to attach the sensor to the mounting bracket.

Suggested Activities

- Acceleration on an inclined plane.
- Roller coaster amusement park physics.
- Hiking, mountain biking, skiing.
- Starting, stopping, turning a vehicle.

Sample Data

Acceleration and altitude data from a roller coaster.



Acceleration-Altitude

Technical Support

For assistance with any PASCO product, contact PASCO at:

Address: PASCO scientific
10101 Foothills Blvd.
Roseville, CA 95747-7100

Phone: 916-786-3800 (worldwide)
800-772-8700 (U.S.)

Web: www.pasco.com

Email: support@pasco.com

More Information

For the latest information about the sensor, visit the PASCO web site at www.pasco.com and enter the product number or the product name in the Search window.

Limited Warranty

For a description of the product warranty, see the PASCO catalog or the PASCO web site at: www.pasco.com/legal.

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This electronic product is subject to disposal and recycling regulations that vary by country and region. It is your responsibility to recycle your electronic equipment per your local environmental laws and regulations to ensure that it will be recycled in a manner that protects human health and the environment. To find out where you can drop off your waste equipment for recycling, please contact your local waste recycle/disposal service, or the place where you purchased the product.

The European Union WEEE (Waste Electronic and Electrical Equipment) symbol (to the right) and on the product or its packaging indicates that this product must not be disposed of in a standard waste container.

