Anemometer

(Order Code ANM-BTA)

The Anemometer is a device for measuring wind speed.

How the Anemometer Works

The Vernier Anemometer is an impeller-type anemometer with the axis of rotation parallel to the direction of the wind. It uses a magnet located in the impeller and an inductor. The wind causes rotation of the impeller, the magnet, and the shaft. The rotation of the magnet produces an electrical signal proportional to the wind speed.

Using the Anemometer

To use the Anemometer, hold it so that the wind blows directly into the Anemometer. This will cause the impeller to spin. You can also attach the accessory rod to the standard camera mount found on the back of the Anemometer and mount it on a ring stand.

Potential Uses for this Sensor

The following is a partial list of activities and experiment that can be performed using this sensor.

- Measure the wind speed of air generated by a variable speed fan.
- Use an Anemometer, a Current Sensor, and a Differential Voltage Probe to investigate the effect of design, number and size of rotors and blades of a windmill's electrical energy output.
- Use an Anemometer and an Infrared Thermometer to determine how wind speed affects the rate of cooling of an object.
- Investigate why wind speed is slower over land than it is over the ocean.
- Use an Anemometer and a compass to determine wind direction.

Collecting Data with the Anemometer

This sensor can be used with the following interfaces to collect data:

- Vernier LabQuest® as a standalone device or with a computer
- Vernier LabQuest® Mini with a computer
- Vernier LabPro® with a computer, TI graphing calculator, or Palm® handheld
- Vernier Go!®Link
- Vernier EasyLink®
- Vernier SensorDAQ®
- CBL 2™

Here is the general procedure to follow when using the Anemometer:

1. Connect the Anemometer to the interface.
2. Start the data-collection software.
3. The software will identify the Anemometer and load a default data-collection setup. You are now ready to collect data.

Data-Collection Software

This sensor can be used with an interface and the following data-collection software.

- **Logger *Pro*** This computer program is used with LabQuest, LabQuest Mini, LabPro, or Go!Link. The Anemometer requires Logger *Pro* 3.8.3 or newer.
- **Logger Lite** This computer program is used with LabQuest, LabQuest Mini, LabPro, or Go!Link.
- **LabQuest App** This program is used when LabQuest is used as a standalone device. The Anemometer requires LabQuest App 1.5 or newer.
- **EasyData App** This calculator application for the TI-83 Plus and TI-84 Plus can be used with CBL 2, LabPro, and Vernier EasyLink. We recommend version 2.0 or newer, which can be downloaded from the Vernier web site, www.vernier.com/easy/easydata.html, and then transferred to the calculator. See the Vernier web site, www.vernier.com/calc/software/index.html for more information on the App and Program Transfer Guidebook.
- **DataMate program** Use DataMate with LabPro or CBL 2 and TI-73, TI-83, TI-84, TI-86, TI-89, and Voyage 200 calculators. See the LabPro and CBL 2 Guidebooks for instructions on transferring DataMate to the calculator.
- **Data Pro** This program is used with LabPro and a Palm handheld.
- **LabVIEW** National Instruments LabVIEW™ software is a graphical programming language sold by National Instruments. It is used with SensorDAQ and can be used with a number of other Vernier interfaces. See www.vernier.com/labview for more information.

Note: This product is to be used for educational purposes only. It is not appropriate for industrial, medical, research, or commercial applications.

Do I Need to Calibrate the Anemometer? No.

You should not have to perform a new calibration when using the Anemometer. We have set the sensor to match our stored calibration before shipping it. You can simply use the appropriate calibration value that is stored in the data-collection program.

This sensor is equipped with circuitry that supports auto-ID. When used with LabQuest, LabQuest Mini, LabPro, Go! Link, SensorDAQ, EasyLink, or CBL 2, the data-collection software identifies the sensor and uses pre-defined parameters to configure an experiment appropriate to the recognized sensor.

Specifications

Operational Range		0.5–30 m/s
Stored calibration (m/s)	slope	10 m/s/V
	intercept	–10 m/s
Stored calibration (km/h)	slope	22.37 mph/V
	intercept	–22.37 mph
Stored calibration (ft/s)	slope	36 km/h/V
	intercept	–36 km/h
Accuracy:		
less than or equal to 5 m/s		±0.15 m/s
greater than 5 m/s		±3% of reading
10 Bit Resolution (using CBL 2)		4.80×10^{-2} m/s
12 Bit Resolution (using LabQuest, LabQuest Mini, LabPro, Go!Link, or EasyLink)		1.20×10^{-2} m/s
13 Bit Resolution (using SensorDAQ)		6.00×10^{-3} m/s
Power		7 mA @ 5VDC

Available Supporting Curricula

Kid Wind Project® has worked closely with Vernier to produce a series of experiments to quantify the power and energy output of Kid Wind's wind turbines, solar cells, and fuel cell products. We have found this hardware and software easy to use, and it provides a large amount of data for a variety of simple or complex experiments that students commonly perform. Available experiments include:

Experiment 1 - Quantifying Power/Energy from classroom sized Wind Turbines, Solar Panels, and Fuel Cells

Experiment #2 - Creating a Power Curve for a Small Wind Turbine

Experiment #3 - Solar Thermal System Efficiency

Experiment #4 - Analyzing AC Generators & Wind Turbines

Experiment #5 - Determining Solar PV Panel Efficiency

All of these experiments can be found at
http://learn.kidwind.org/teach/other_resources/vernier

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.

Measure. Analyze. Learn.™
Vernier Software & Technology
13979 S.W. Millikan Way • Beaverton, OR 97005-2886
Toll Free (888) 837-6437 • (503) 277-2299 • FAX (503) 277-2440
info@vernier.com • www.vernier.com

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