



Inspeed Anemometer and Wind Vane

March 2009

Thank you for your interest in Hobby Boards' Inspeed Anemometer and Wind Vane. We are confident that this device will form an integral part of your weather station for years to come.

Description

Hobby Boards' Inspeed Anemometer is our premium solution for monitoring wind speed and direction.

Contents of kit

- Anemometer (wind speed sensor) with mounting arm
- Wind vane (wind direction sensor) with mounting arm
- Controller board
- Controller board case

Required but NOT included

- 1-Wire master
- CAT5 cable
- 7-24v DC power supply
- Software to interpret data

Technical Specs

Anemometer and Wind Vane

- Anemometer with 3 cup rotor
 - Measures wind speeds of 3 to 125+ MPH.
 - Rugged Delrin body with bronze and Rulon bushings.
 - Sapphire bearing to minimize wear.
- Wind vane uses Hall effects
 - Wind direction resolution higher than one degree.
 - Zero dead band. Many potentiometer wind vanes have a dead spot of several degrees. This device has no dead band at all.
 - Near-zero friction. Since the magnet is not in contact with the Hall sensor, there is no friction from the sensor.
 - Virtually infinite life. Unlike potentiometers that wear out, the magnetic Hall sensor is non-contacting and should theoretically last forever.
- Weather-resistant casing protect bearings and electronics.
- 25 feet of exterior grade wire.
- 1-Wire controller board with screw terminals for easy connection of the device.

Controller

- The Hobby Boards' Anemometer board uses the Dallas DS2423 and DS2438 1-Wire chips.

Connections

- 1-Wire connections are made through a dual RJ45 jack with pass-through capability or the available screw terminals for easy connectivity to your 1-Wire network.
- Power is supplied through CAT5 cable connected to the RJ45 jack or through the screw terminal.
- The Inspeed Anemometer and Wind Vane are connected through the screw terminals.

Power Requirements

- The maximum power draw is 17mA at +7v DC.

Installation

1. Unpack all parts and verify against the contents of kit listed above.

Connecting Controller Board

1. Open the controller board case.
2. Apply dielectric compound to the RJ12 jack and two RJ45 jacks on the controller board (optional; dielectric compound not included).
3. Connect the red wire from the anemometer to the screw terminal on the controller board labeled Counter A.
4. Connect the red wire from wind vane and the black wire from the anemometer to the screw terminal on the controller board labeled +5V Out.
5. Connect the black wire from the wind vane to the screw terminal labeled GND.
6. Connect the white wire from the wind vane to the screw terminal labeled A/D In.
7. Connect your 1-Wire cable (see Connecting 1-Wire and Power below).
8. Re-install the case cover, making sure all wires fit in the slot in the case cover. By default, the case comes with a slit on one end, to accommodate wires connected to screw terminals. If you choose to use the RJ45 connectors, Hobby Boards can provide an additional slot for these wires. Because of the additional slots needed, the case will be less water-resistant when RJ45 connectors are used. Please let us know when you place your order.
9. Seal the slot in the case, where wires protrude, with caulk or other sealant (caulk not provided).

Mounting

1. Anemometer should be mounted on a mast in a high location as far from trees and other obstructions as possible.
2. Align mounting brackets of wind vane and anemometer so that the screw holes match. Mount the aligned mounting brackets to your mast using one of the following methods:
 - a. If your mast is made of a suitable material, screw through the screw holes directly into the mast.
 - b. Alternatively, bolt the two mounting brackets together and clamp the assembly to your mast.

- c. Regardless of mounting method, the axis of rotation should be as close to vertical as possible.
- NOTE: see Operation section (below) to align wind vane to North.
3. Attach controller case to the mast using tie wraps.
4. Use tie wraps to neaten any wires, if desired.

Operation

Aligning Wind Vane to North

The wind vane allows you to select your own “north” without having to mount the bracket in any particular way. There is a set screw on the side of the wind vane body. When screwed in about ½ turn, the tip of the screw will press against the magnet holder inside the vane to prevent it from turning. This allows you to then twist the vane pointer until aligned with north.

1. Determine the orientation of the bracket once mounted.
2. Rotate the vane pointer until your software reads north.
3. Hold the vane pointer in that position, and tighten the set screw about ½ turn to lock the magnet.
4. Twist the vane pointer until it points to magnetic north.
5. Release the set screw by loosening it approximately ½ turn.

Connecting 1-Wire and Power

To connect the controller board to your 1-Wire network, simply use a standard network cable and connect it to either RJ45 jack. The second jack is provided to allow pass-through connections. The two jacks can be connected interchangeably. Optionally, the controller board can be connected to your 1-Wire network using the screw terminals labeled GND, DQ, and +14v.

The controller board requires at least 7 VDC. This will be supplied in one of two ways. Power can be supplied locally, using the screw terminals labeled GND and +14v. Alternatively, power can be supplied through the 1-Wire network if your controller board is connected through a Hub, Master Hub, or Power Injector.

Software Requirements

The Inspeed Anemometer and Wind Vane requires 1-Wire software to read, interpret and display the data provided by the device. Many software providers support Hobby Boards devices shortly after they are released. Device support changes frequently, so please check with your software provider to see whether this device is supported or not.

Programming Notes

If you are a software developer, and would like to write your own software to support the Inspeed Anemometer and Wind Vane, the following calculations will be necessary.

Wind Speed:

Wind speed will be calculated from the counters on page 15 and 16 of the DS2423. To obtain wind speed from the counter, use the following formula:

$$WS = \frac{2.5C}{T}$$

Where:

WS=wind speed in miles per hour

C=counts

T=time interval over which counts are measured

Wind Direction:

Wind direction will be calculated from the VDD and VAD register of the DS2438.

To obtain wind direction, use the following formula:

$$D = \frac{400(VAD - 0.05VDD)}{VDD}$$

Where:

D=wind direction in degrees

VAD=wind vane output voltage

VDD=supply voltage