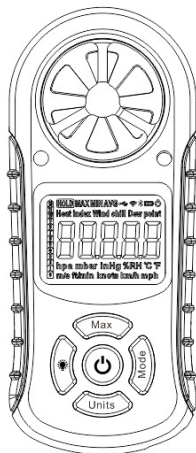


eA990R Digital Anemometer

User Manual



1. Overview

Thank you for purchasing the ennoLogic eA990R anemometer, a high quality instrument which measures 8 parameters:

- Wind Speed (mph, m/s, ft/min, knots, km/h)
- Wind Chill (°C / °F)
- Air Temperature (°C / °F)
- Humidity (%)
- Heat Index (°C / °F)
- Dew Point ((°C / °F)
- Barometric Pressure (hPa, mbar, inHg)
- Pressure & Relative Altitude (m, ft)

The eA990R anemometer comes with many powerful features including the following:

- LCD with White Backlight
- Beaufort Scale
- Maximum, Minimum, and Average Reading Display
- Hold Function
- Rechargeable Li-Ion battery
- Low Battery Indicator
- Auto Power Off (with override option)
- Calibration Function
- CE Certified & RoHS Compliant

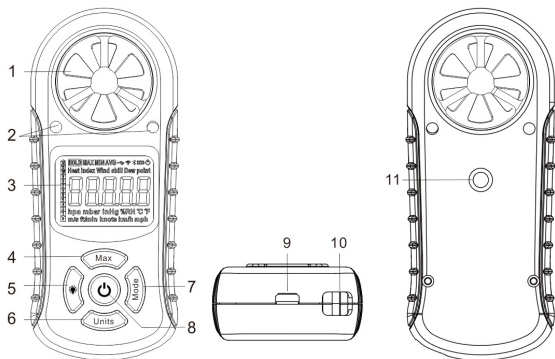
Important: This meter is accurate at low and mid-range air speeds. Consistent use at very high speeds, e.g. from the window of a fast moving car will damage the impeller's bearing and reduce accuracy.

Specifications:

Parameter	Units	Range	Resolution	Accuracy
Wind Speed	mph	0 to 65	0.2	±5%
	m/s	0 to 30	0.1	
	ft/min	0 to 5860	19	
	knots	0 to 55	0.2	
	km/h	0 to 90	0.3	
Wind Chill	°C	0 to 30m/s, -45 to 10	0.1	±1
	°F	0 to 65 mph, -49 to 50	0.1	±1.8
Temperature	°C	-29 to 70	0.1	±1
	°F	-20 to 158	0.1	±1.8
Relative Humidity	%RH	0 to 100	0.1	±2%
Heat Index	°C	0 to 100%RH, 21.1 to 54.4	0.1	±2
	°F	0 to 100%RH, 70 to 130	0.1	±3.6
Dew Point	°C	-29 to 70	0.1	±2
	°F	-20 to 158	0.1	±3.6
Barometric Pressure	hPa	10 to 1100	0.1	±1.5
	mbar	10 to 1100	0.1	±1.5
	inHg	0.29 to 32.48	0.01	±0.05
Altitude	m	-700 to 9000	1	±12
	ft	-6000 to 30000	3	±50

Operating Temperature	32°F to 122°F (0°C to 50°C)
Operating Humidity	10% to 90% RH
Storage Temperature	14°F to 140°F (-10°C to 60°C)
Storage Humidity	10 to 75% RH
Battery	Lithium Polymer, 300mAh, rechargeable
Current Consumption	11 mA (14 mA with backlight on)
Size	4.5" x 1.8" x 1" (115*45*25 mm)
Weight	2.5oz. (70g)

Product Description:



1. Vane Impeller
2. Temperature & Humidity Sensors
3. LCD with Backlight
4. Max Button

5. **Backlight** Button
6. **Units** Button
7. **Mode** Button
8. **Power** Button
9. Battery Charge Port
10. Lanyard Attachment Point
11. Tripod Mount

How to Use Your Anemometer

Turning the Anemometer On and Off

Press the **Power button** briefly to turn the anemometer on.

Press the **Power button** for more than one second to turn the anemometer off.

After 5 minutes without any operation the anemometer will power off automatically.

To disable Auto Power Off hold the **Backlight button** down while turning the unit on. You will see the Power Symbol appear on the LCD (top right). **Warning**, if you disable Auto Power Off, the meter will stay on until the battery runs out unless you turn it off manually by holding down the Power Button.

Backlight

Press the **Backlight button** briefly to turn the backlight on or off.

Cycling Through Measurement Parameters

Press the **Mode button** briefly to change the displayed parameter. The instrument will cycle through the parameters in the following order:

Wind Speed » Wind Chill » Temperature » Relative Humidity » Heat Index » Dew Point » Barometric Pressure » Pressure Altitude.

Hold Function

To freeze the current reading, press the **Backlight button** for more than 2 seconds. Press it again for more than 2 seconds to exit this mode.

Changing the Measurement Units

In any measurement parameter mode briefly press the **Units button** to change the measurement unit displayed. For example, in wind speed mode choose between mph, m/s, ft/min, knots, and km/h.

Max/Min/Avg Value Measurement Function

This function allows you to track the maximum, minimum and average of your readings for any parameter each time you power on the unit.

In any measurement parameter mode briefly press the **Max button** to display the Maximum Reading. A second press will display the Minimum, a third press will display the Average and a fourth press will return the meter to the real-time current readings.

Max: In this mode the meter will display the maximum value registered since it was powered on.

Min: When in this mode the meter will display the minimum value.

AVG: When in this mode the meter will display the average of all values since it was powered on.

NOTE: The Max, Min and Avg values will be reset when the meter is turned off.

Beaufort Scale

The Beaufort scale categorizes wind speed according to observed conditions at sea or on land:

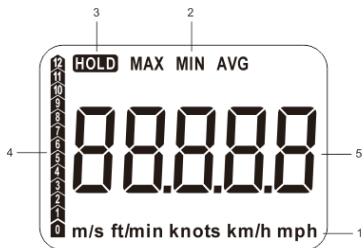
- 0 - Calm (<1mph)
- 1 - Light air (1-3mph)
- 2 - Light breeze (4-7mph)
- 3 - Gentle breeze (8-12mph)
- 4 - Moderate breeze (13-18mph)
- 5 - Fresh breeze (19-24mph)
- 6 - Strong breeze (25-31mph)
- 7 - Near gale (32-38mph)
- 8 - Gale (39-46)
- 9 - Strong gale (47-54mph)
- 10 - Storm (55-63mph)
- 11 - Violent storm (64-72mph)
- 12 - Hurricane (>73mph)

The Beaufort scale is displayed in all parameter modes according to current wind speed (see display legend).

Parameter 1: Wind Speed

To measure wind speed, hold the anemometer into the wind or air flow you want to measure, and the device instantly begins displaying wind speed in miles per hour (mph). To change the unit, press the **Units button**. To capture and hold a reading **press and hold the Backlight button for more than 2 seconds**. This is handy for measuring air flow in difficult situations.

To track maximum, minimum, and average readings simply press the **Max button** briefly to cycle through them. For average readings, keep in mind that periods of zero wind speed may skew your average. In this case you may want to restart the unit to reset the Max/Min/Avg data.

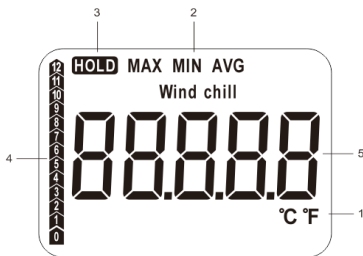


1. Wind Speed Units: mph, m/s, ft/min, knots, km/h
2. Max/Min/Avg Indicator
3. Hold Current Wind Speed Reading
4. Beaufort Scale
5. Wind Speed Value

Parameter 2: Wind Chill

Wind chill is the perceived lowering of air temperature experienced on exposed skin due to wind. The faster the wind blows, the more readily it cools your skin as it replaces the ambient warm air surrounding your skin. In other words, the air “feels” colder than it is because of the chilling effect of the wind.

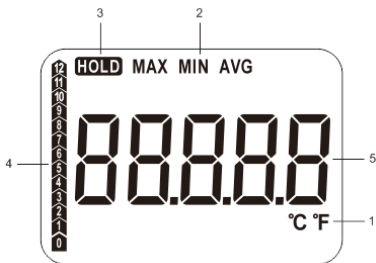
Wind Chill is expressed as a temperature which is typically lower than the air temperature. Wind chill temperature is valid only for temperatures at or below 50 °F with wind speeds above 3.0 mph. To measure wind chill, **press the Mode button once** after turning on the unit.



1. Wind Chill Units: °F or °C
2. Max/Min/Avg Indicator
3. Hold Current Wind Chill Reading
4. Beaufort Scale
5. Wind Chill Value

Parameter 3: Temperature

After turning the unit on, **press the Mode button twice** to display temperature. To take a measurement, hold the anemometer so air passes through it. Temperature response depends upon air flow through the unit due to the location of the temperature sensor inside the unit. Response may be slow at zero air flow (5 to 10 minutes), but typically only takes 30-60 seconds in steady air flow.



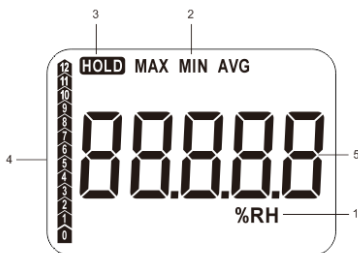
1. Temperature Units: °F or °C
2. Max/Min/Avg Indicator
3. Hold Current Temperature Reading
4. Beaufort Scale
5. Temperature Value

Parameter 4: Relative Humidity

Relative humidity is the amount of moisture in the air compared to the maximum amount of moisture the air can "hold" at that temperature.

To measure relative humidity, turn on the anemometer, and **press the Mode button 3 times**. The display will show "%RH" below the value of relative humidity.

Relative humidity and temperature are measured by the same sensor. This sensor is located behind the small hole left of the impeller above the display.



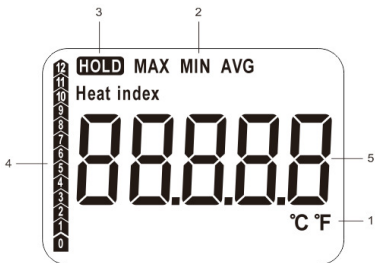
1. Relative Humidity Units: %RH
2. Max/Min/Avg Indicator
3. Hold Current Relative Humidity Reading
4. Beaufort Scale
5. Relative Humidity Value

Parameter 5: Heat Index

The heat index is what the temperature feels like to the human body when relative humidity is combined with air temperature. Heat index is only valid at temperatures at or above 80 °F.

The human body cools itself by perspiration, which removes heat from the body by evaporation. High relative humidity slows evaporation, which slows down heat removal from the body. This causes the feeling of being overheated. Heat index is attempt to measure this apparent temperature.

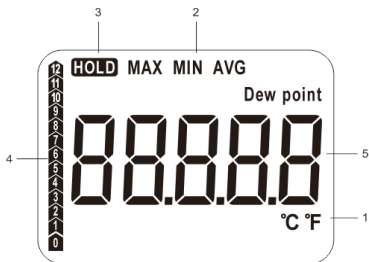
To measure it, **press the Mode button 4 times** after turning on the unit.



1. Heat Index Units: °F or °C
2. Max/Min/Avg Indicator
3. Hold Current Heat Index Reading
4. Beaufort Scale
5. Heat Index Value

Parameter 6: Dew Point Temperature

The dew point is the temperature at which air is saturated with water vapor. When air has reached the dew-point temperature the water vapor is condensing at the same rate at which liquid water is evaporating. Below the dew point, water will begin to condense on surfaces forming dew, or particles in the air forming clouds and fog. To measure dew point, power on the anemometer and **press the Mode button 5 times** until “Dew Point” is displayed in the upper left corner.



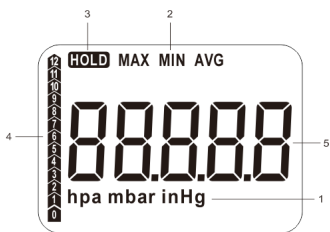
1. Dew Point Temperature Units: °F or °C
2. Max/Min/Avg Indicator
3. Hold Current Dew Point Temperature Reading
4. Beaufort Scale
5. Dew Point Temperature Value

Parameter 7: Barometric Pressure

Barometric pressure is the force per unit area exerted by the entire column of air above that area. Barometric pressure measurements are displayed by the anemometer in inches of mercury (inHg), hectopascal (hPa), or millibar (mbar).

Standard sea-level pressure, by definition, equals 29.92 inches of mercury. Variations in sea-level pressure are quite small: the highest and lowest sea-level pressures ever recorded are 32.01 inHg in Siberia and 25.9 inHg during a typhoon in the South Pacific.

To measure barometric pressure, turn on the anemometer and **press the Mode button 6 times** until inHg is displayed. Press the **Units button** to change the units to hectopascal or millibar.



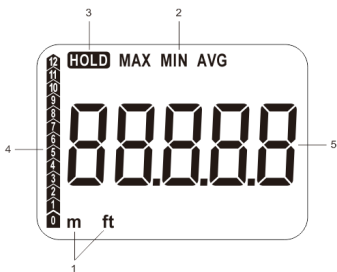
1. Barometric Pressure Units: inHg, hPa, mbar
2. Max/Min/Avg Barometric Pressure Reading Display
3. Hold Current Barometric Pressure Reading
4. Beaufort Scale
5. Barometric Pressure Value

Parameter 8: Pressure Altitude & Relative Altitude

The eA990R measures pressure altitude and not absolute altitude (unlike a GPS). Pressure altitude is a relative altitude measurement based on barometric pressure. Pressure altitude is the altitude indicated by an altimeter that is adjusted to measure height above the Standard Datum Plane. The Standard Datum Plane is a theoretical level where the weight of the atmosphere is 29.92 inches of mercury. As atmospheric pressure changes, the Standard Datum Plane may be below, at, or above sea level.

Pressure altitude is most commonly used for aviation planning.

To measure pressure altitude, **press the Mode button 7 times** after turning on the anemometer. Press the **Units button** to switch from feet to meters.



1. Altitude Units: ft, m
2. Max/Min/Avg Indicator
3. Hold Current Altitude Reading
4. Beaufort Scale
5. Altitude Value

Relative Altitude Measurement:

The ennoLogic anemometer is able to display relative altitude (also referred to as climb or ascent/descent). Relative altitude allows you to measure changes in altitude from the point where you enter “Relative Altitude” mode. To enter this mode, press the **Mode button** until you get to altitude, then **press and hold the Units button for five seconds**. The LCD will first display **REL** and then set the altitude to zero. From then on, the altitude reading will display the difference between your newly set zero reference altitude and your current position. To change back to Pressure Altitude, **press and hold the Units button again for five seconds**.



Calibrating Your Anemometer:

NOTE: DO NOT ATTEMPT TO CALIBRATE WIND SPEED UNLESS YOU HAVE ACCESS TO A CALIBRATION SOURCE FOR AIR FLOW!

Your anemometer was calibrated at the factory. But you can recalibrate it if you want by following these steps:

Step 1: To enter calibration mode, **hold the Mode button down while turning on the anemometer**.

Step 2: Use the table below to find the parameter to calibrate. Use the **Max** and **Units buttons** to select the number for the parameter you wish to calibrate. Press the **Power button** to begin calibration.

Number	Calibration Function Mode
1	Wind Speed
2	Temperature
3	Relative Humidity
4	Barometric Pressure
5	Pressure Altitude
6	Display Battery Voltage

Step 3: Press the **Backlight** and **Mode** buttons to choose the digit you wish to change (the selected digit will flash). Use the **Max** and **Units** button to change the value.

Step 4: Press the **Power** button for more than 2 seconds to store the new value and to exit calibration mode.

(Note: To restore factory default calibration settings, **hold the Units button down while turning on the anemometer.**)

Calibrating Barometric Pressure

To calibrate barometric pressure use a reliable instrument or trusted source for barometric and altitude readings for your local area.

Calibrating Altitude

Calibrating altitude is not as simple as entering the desired altitude value in feet. The altitude displayed by the anemometer is pressure altitude, and for every atmospheric pressure there is a corresponding default pressure altitude:

<http://www.csgnetwork.com/pressurealtcalc.html>. That's why the altitude displayed by your anemometer typically does not match the true altitude at your location. The anemometer works like an altimeter.

If you want to calibrate the altitude to your current true local altitude, you must subtract a pressure dependent offset from the altitude value you want to calibrate for. This offset depends on the current atmospheric pressure at the time of calibration. To determine the offset, you calibrate the anemometer to an altitude of "00000". Then turn it back on (into normal operating mode) and read the altitude. This is your offset. Subtract the offset from your true local altitude, and calibrate the anemometer to the resulting value.

Example: Your anemometer displays a pressure reading of 29.95 inHg. Turn it off and **hold the Mode button down** and turn it back on again to enter calibration mode. Press the **Max button** several times until the number on the display shows "5", the code for altitude. Press the **Power button**. The display will now show a value that is actually the default pressure altitude at the current atmospheric pressure, in this case -0026 feet. Ignore this value and set all digits to 0 so the display shows "00". Then turn the anemometer off.

Now turn the anemometer back on and press the **Mode button** 7 times until the display shows altitude. The value displayed is the pressure-dependent offset that you have to subtract from your true local altitude. In our example the offset is "-371". We want to calibrate for an altitude of 500ft, our true local altitude. So we subtract -371 from 500 feet: $500 - (-371) = 871$. This is the altitude value we have to calibrate for so the anemometer will display an altitude of 500 feet.

Turn the unit off, and enter altitude calibration mode again. This time, change the digits to "00871" and press the **Power button** until the unit turns off to store this value.

Turn the anemometer back on and check the altitude. Its displayed value will now be very close to 500 feet (499 feet in this example, resolution is limited by barometric pressure resolution.) Keep in mind that your new altitude reading is still pressure dependent. So any changes in atmospheric pressure will change the altitude reading. But calibrating to a true known local altitude can still be very useful if the atmospheric pressure stays roughly the same, and you want to use the anemometer to determine altitude while hiking or climbing, for instance.

Battery Replacement:

This anemometer uses a rechargeable 3.7V Lithium-Polymer battery that is built-in and is not intended to be replaced by the user. This battery can be recharged through a Micro USB charge port at the bottom of the unit. This port functions as a charge port only, and cannot be used for data transfer or communication with a computer. The battery should be recharged if the anemometer fails to power on or if the battery icon indicates low power (see below). To charge the battery use the included USB charging cable to connect the anemometer to a standard 5V USB charger or a computer's USB port.



Low Power, charge battery soon



Battery charging



Battery fully charged

Digital Anemometer ennoLogic eA990R

Made in China

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