

# Ambient Weather WS-228TBH 9" Brushed Aluminum Traditional Barometer with Temperature and Humidity, Radiant Blue User Manual



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## 1. Introduction

Thank you for your purchase of the Ambient Weather WS-228TBH 9" Brushed Aluminum Traditional Barometer with Temperature and Humidity, Radiant Blue. The following is a guide for preparation, care and operation of your traditional weather station.

## 2. Preparation

Your weather instrument includes a protective pad to prevent damage to the barometer mineral glass case during shipment. Remove this protective pad and circular instruction sheet. The barometer is ready to use.

## 3. Care and Cleaning

Avoid use of harsh household cleaners and coarse paper towels, which can damage the lacquer coating or scratch the bezel or lens. Fingerprints and dirt may be removed the lenses and bezels with a soft cloth lightly dampened with a mixture of water and mild dishwashing liquid. Be sure to dry the lens and bezel with a soft cloth after cleaning.

Do not install the weather station outside. The weather station is intended for indoor use only.

## 4. Hygrometer (Humidity Meter)

### 4.1 How the hygrometer works

The hygrometer measures the indoor relative humidity. The sensor measures the air moisture by a sensitive mechanical coil spring that is bonded with a moisture absorbent material.

Hygrometers register the percentage of water vapor present in the air, compared to the maximum amount that can be present at a given temperature.

The coils in hygrometers respond slowly and while humidity levels change abruptly, it can take an hour or more for the meter to reach an accurate reading. Remember that the hygrometer is reading indoor humidity, and is vastly different than outdoor humidity, as reported by the National Weather Service.

It is not uncommon to have low humidity reading during cold weather when indoor air is heater. Air conditioning also removes moisture from the air. The optimum levels are 45% to 50% during heating and cooling seasons. Low humidity can cause health problems and can be hard on wood furnishings. High humidity can cause mold or mildew to grow.

### 4.2 Hygrometer Accuracy

Humidity measurement is among the more difficult problems in basic meteorology. Accuracy is difficult to achieve and are subject to drift, so need regular recalibration.

A further difficulty is that most hygrometers sense relative humidity rather than the absolute amount of water present, but relative humidity is a function of both temperature and absolute moisture content, so small temperature variations within the air in a test chamber will translate into relative humidity

variations.

## 5. Aneroid Barometer

### 5.1 How the aneroid barometer works

An aneroid barometer uses a small, flexible metal box called an aneroid cell. This aneroid capsule (cell) is made from an alloy of beryllium and copper. The evacuated capsule (or usually more capsules) is prevented from collapsing by a strong spring. Small changes in external air pressure cause the cell to expand or contract. This expansion and contraction drives mechanical levers such that the tiny movements of the capsule are amplified and displayed on the face of the aneroid barometer. Many models include a manually set needle which is used to mark the current measurement so a change can be seen. It was invented by Blaise Pascal.

### 5.2 Reading the barometer

It is highly advisable to lightly tap the glass near the center brass knob with your fingers before taking a barometer reading. The light tap will overcome any friction that may affect accurate hand readings, especially during periods of slow atmospheric changes. The Coast Guard has informed us that tapping the barometer is even required on the most expensive aneroid barometers, because the mechanism is made deliberately “stiff”.

The ability of the barometer to indicate changes in barometric pressure makes it a useful instrument in weather forecasting.

The weather forecast or pressure tendency is based on the rate of change of barometric pressure. In general, when the pressure increases, the weather improves (sunny to partly cloudy) and when the pressure decreases, the weather degrades (cloudy to rain).

The weather forecast is an estimation or generalization of weather changes in the next 24 to 48 hours, and varies from location to location. The tendency is simply a tool for projecting weather conditions and is never to be relied upon as an accurate method to predict the weather.

The barometer includes a manually set needle, which is used to mark the current measurement so a change can be seen. Barometric readings should be taken daily. Remember that the rate of change of barometric pressure is important in determining weather changes. You may want to take multiple readings each day during periods of unstable weather conditions.

The following basic rule of thumb will hold true in using the barometer to predict weather conditions.

- A fast rise in barometric pressure means good weather of short duration.
- A rapid drop in barometric pressure means disturbances nearby, showers of short duration.
- Regular elevation in barometric pressure usually will indicate a clear, dry weather conditions (cold and dry in the winter).
- A slow but continuous drop in barometric pressure will indicate persistent, bad weather.
- Slow drops of 2-3 tenths mbar per 24 hours a depression of some distance away.
- Drops of 1-2 tenths mbar per hour means disturbances nearby of short duration.
- Steep drops of 6-10 tenths mbar within 4-5 hours period indicates coming rain and/or storm with strong winds.

### 5.3 Absolute vs. Relative Pressure

To compare pressure conditions from one location to another, meteorologists correct pressure to sea-level conditions. Because the air pressure decreases as you rise in altitude, the sea-level corrected

pressure (the pressure your location would be at if located at sea-level) is generally higher than your measured pressure.

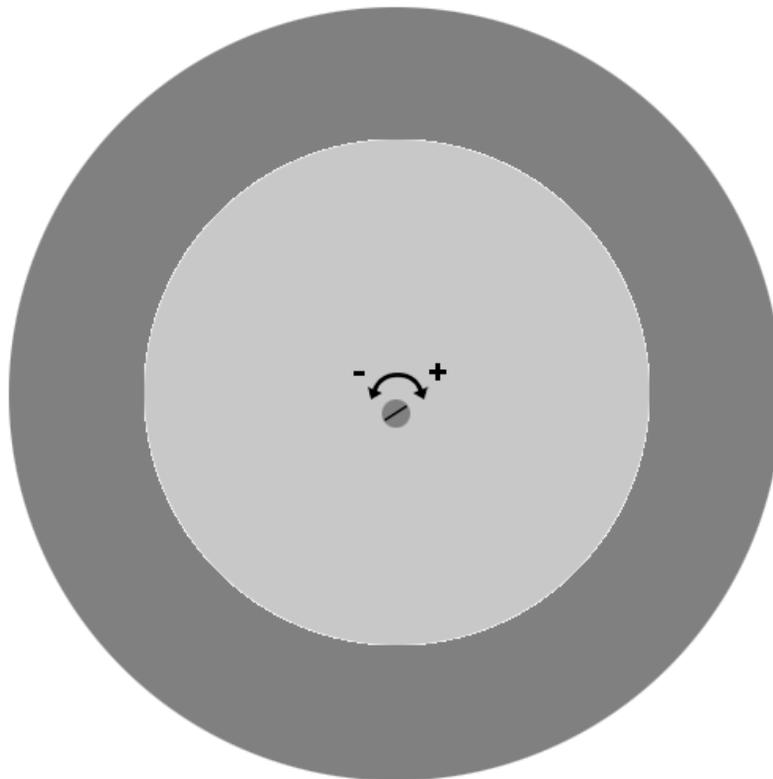
Thus, your absolute pressure (measured at your location) may read 28.62 inHg (969 mb) at an altitude of 1000 feet (305 m), but the relative pressure (sea-level) is 30.00 inHg (1016 mb).

The standard sea-level pressure is 29.92 in Hg (1013 mb). This is the average sea-level pressure around the world. Relative pressure measurements greater than 29.92 inHg (1013 mb) are considered high pressure and relative pressure measurements less than 29.92 inHg are considered low pressure.

To determine the relative pressure for your location, locate an official reporting station near you (the internet is the best source for real time barometer conditions, such as Weather.com or Wunderground.com), and set your weather station to match the official reporting station.

## 5.4 Barometer Calibration

Your barometer will operate from -100 to 3,000 feet with reliable accuracy. Aneroid barometers have a small screw on the back for sea-level calibration. With a flat blade screwdriver, turn this screw in either direction slightly while looking at the indicator needle. It should move in one direction or the other. Tap the barometer to see where the needle settles. Continue this procedure until the proper pressure reading is obtained. Do not turn the screw counter-clockwise (to the left) too far, since the screw can fall out. After the initial calibration, no further adjustment will be required unless the barometer is moved to a new geographic location.



**Figure 1**  
Barometer Back Plate

## 6. Dial Thermometer

The dial thermometer uses a bimetallic strip wrapped into a coil. One end of the coil is fixed to the housing of the device and the other drives an indicating needle. The principle behind a bimetallic strip thermometer relies on the fact that different metals expand at different rates as they warm up. By bonding two different metals together, the coil bends, causing the needle to move. Bimetallic thermometers are not as accurate as bulb (mercury or red spirit) thermometers. The dial thermometer should require no calibration.

## 7. Installation

To install the traditional weather station, hang the case on a wall with the hole built into the case. Only install indoors, in a clean area.

## 8. Measurement Specifications

The following table provides specifications for the measured parameters.

Measurement	Range	Accuracy	Resolution
Indoor Temperature	-40 to 140 °F	± 3.6 °F	2 °F
Indoor Humidity	0 to 100 %	20% – 45%: ± 9% 45% – 75%: ± 6% 75% – 98%: ± 9%	1 %
Barometric Pressure	940 hPa to 1070 hPa (about -100 to 7,000')	1060hPa – 1030hPa: ± 10hPa 1030hPa – 990hPa: ± 5hPa 990hPa – 960hPa: ± 10hPa	1 hPa

## 9. Warranty Information

Ambient, LLC provides a 1-year limited warranty on this product against manufacturing defects in materials and workmanship.

This limited warranty begins on the original date of purchase, is valid only on products purchased and only to the original purchaser of this product. To receive warranty service, the purchaser must contact Ambient, LLC for problem determination and service procedures.

Warranty service can only be performed by a Ambient, LLC. The original dated bill of sale must be presented upon request as proof of purchase to Ambient, LLC.

Your Ambient, LLC warranty covers all defects in material and workmanship with the following specified exceptions: (1) damage caused by accident, unreasonable use or neglect (lack of reasonable and necessary maintenance); (2) damage resulting from failure to follow instructions contained in your owner's manual; (3) damage resulting from the performance of repairs or alterations by someone other than an authorized Ambient, LLC authorized service center; (4) units used for other than home use (5) applications and uses that this product was not intended, such as outdoor use.

This warranty covers only actual defects within the product itself, and does not cover the cost of installation or removal from a fixed installation, normal set-up or adjustments, claims based on misrepresentation by the seller or performance variations resulting from installation-related circumstances.

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## 10. California Proposition 65

**WARNING:** Use of the Ambient Weather Products can expose you to chemicals, including lead and lead compounds, which are known to the State of California to cause cancer and bisphenol A (BPA), and phthalates DINP and/or DEHP, which are known to the State of California to cause birth defects or other reproductive harm.

### **Can I Trust that Ambient Weather Products are Safe Despite this Warning?**

In 1986, California voters approved the Safe Drinking Water and Toxic Enforcement Act known as Proposition 65 or Prop 65. The purpose of Proposition 65 is to ensure that people are informed about exposure to chemicals known by the State of California to cause cancer, birth defects and/or other reproductive harm. A company with ten or more employees that operates within the State of California (or sells products in California) must comply with the requirements of Proposition 65. To comply, businesses are: (1) prohibited from knowingly discharging listed chemicals into sources of drinking water; and (2) required to provide a "clear and reasonable" warning before knowingly and intentionally exposing anyone to a listed chemical. Proposition 65 mandates that the Governor of California maintain and publish a list of chemicals that are known to cause cancer, birth defects and/or other reproductive harm. The [Prop 65 list](#), which must be updated annually, includes over 1,000 chemicals, including many that are commonly used in the electronics industry.

Although our manufacturing process is "lead-free" and RoHS compliant, it remains possible that trace amounts of lead could be found in components or subassemblies of Ambient Weather Products. Bisphenol A (BPSA) could conceivably be present in minute amounts in our plastic housings, lenses, labels or adhesives, and DEHP & DINP (phthalates) could possibly be found in PVC wire coatings of our cables, housings, and power cords. Unlike RoHS, Prop 65 does not establish a specific threshold for reporting on the substances of concern and instead sets forth a much less definitive standard requiring that the business demonstrate with certainty that there is "no significant risk" resulting from exposure. With respect to carcinogens, the "no significant risk" level is defined as the level which is calculated to result in not more than one excess case of cancer in 100,000 individuals exposed over a 70-year lifetime. In other words, if you are exposed to the chemical in question at this level every day for 70 years, theoretically, it will increase your chances of getting cancer by no more than 1 case in 100,000 individuals so exposed. With respect to reproductive toxicants, the "no significant risk" level is defined as the level of exposure which, even if multiplied by 1,000, will not produce birth defects or other reproductive harm. In other words, the level of exposure is below the "no observable effect level," divided by 1,000. (The "no observable effect level" is the highest dose level which has not been associated with observable reproductive harm in humans or test animals.) Proposition 65 does not clarify whether exposure is to be measured only in normal operation, or in the event of misuse such as intentionally damaging, incinerating or consuming an Ambient Weather Product or component and Ambient Weather has not attempted to evaluate the level of exposure.

A Proposition 65 warning means one of two things: (1) the business has evaluated the exposure and has concluded that it exceeds the "no significant risk level"; or (2) the business has chosen to provide a warning simply based on its knowledge about the presence of a listed chemical without attempting to evaluate the exposure. The California government has itself clarified that "The fact that a product bears a Proposition 65 warning does not mean by itself that the product is unsafe." The government has also explained, "You could think of Proposition 65 more as a 'right to know' law than a pure product safety law."

**While using Ambient Weather Products as intended, we believe any potential exposure would be negligible or well within the "no significant risk" range. However, to ensure compliance with California law and our customers' right to know, we have elected to place the Proposition 65**

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**warning signs on Ambient Weather Products.**

For further information about California's Proposition 65, please visit <https://oehha.ca.gov/prop65/background/p65plain.html>