For more detailed assembly and installation instructions, scan the QR code below to view our step-by-step installation video.

Package Contents:

- All-In-One Outdoor
 Weather Sensor Array
- Display Console with Desk Stand
- Wind Vane
- Wind Cups
- Rain Gauge Funnel
- Rain Gauge Coil
- Mounting Hardware

Required Tools:

- Precision Screwdriver
- Adjustable Wrench or 10mm Wrench
- (2) AA batteries



gauge coil and U-bolts (not mounting). **Note:** We recommend assembling the station indoors and moving it outside once the setup process is complete.

Step 3:

Power up the console using the AC adapter.





WS-2000 Quick Setup Guide



Step 2:

Insert the 2 - AA batteries into the bottom of the array and close the battery door completely.

Step 4a:

WiFi Scan: Press the button corresponding to the gear icon.



Then select **WiFi Scan—Setup** using the buttons corresponding to 1 and 2 (which is like Enter on a computer).



Navigate to your Wireless Network Name / SSID using $\frown \Psi$, press the select button \swarrow .

Version 2.20





Enter the password for your network.

Within 3-5 minutes the WiFi Signal Strength and Ambient Weather Network Icons will appear.



Hidden SSID

Setup

Step 5 (cont'<u>d</u>):

Press the to Account and Press . Then, enter the email you would like to use for this weather station on the Ambient Weather Network (if you already have an AWN account and want this station on the same account

	Oustomized Setup										
A	Ambier	ntWea	ather.	net:							
Account											
		Ente	er your	email ad	dress a	nd we'll	walk yo	ou throu	ugh creat	ling an	
		aco	ount for	this de	vice on	ambient	weathe	rnet.			
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										Backspace	
					i					Caps Lock	
										Cancel	
					w				#+-	Ok	
	X		\leftarrow		\rightarrow		\uparrow		Ļ	Υ	Ċ

the same account

enter that email address here). When done press Ok.

Step 7:

Install your array on a pole and tighten the U-bolts with a 10mm wrench. Please scan the QR code for mounting best practices. **Note:** Supports

poles 1.25-2" OD.



Step 5:

Press the button corresponding to the gear icon.



Then select Weather Server—Setup using the buttons corresponding to 1 and (which is like Enter on a computer).



Step 6:

Check your email to confirm your dashboard setup on AmbientWeather.net. Your email will look something like this, depending on if this is your first account or if you already have an account with us.



Welcome to the community!

Download the free Ambient Weather app for on-the-go access to your data, hyperlocal forecasts, interactive maps, and more! And join our facebook group and share a picture of your new station! www.facebook.com/groups/ambientweathernetwork



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Enhanced by a powerful network of weather stations, the Ambient Weather Network provides the most accurate hyperlocal conditions for your neighborhood, activity, or business. Connect your compatible Ambient Weather Station to access your data remotely and join one of the fastest-growing weather communities. Personalize your data tiles, set alerts, and share your weather updates with other weather enthusiasts on our platform, which is always ad-free and free of charge!



Multiple Map Layers

Select the radar, wind, or temperature layers or drill down to view your neighborhood's weather stations.





Customizable Forecast

Add your personal weather station to the map and create your own forecast for the community.



Local Weather Cameras

Watch timelapse videos of weather conditions from local weather cameras or add your own.





Scan the QR Code below to download the Ambient Weather Network App for free on the iOS App Store or Android Google Play Store.





Ambient Weather WS-2000 Wi-Fi OSPREY Solar Powered Wireless Weather Station User Manual



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ambient weather

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1. Introduction

Thank you for your purchase of the Ambient Weather WS-2000 Wi-Fi OSPREY Solar Powered Wireless Weather Station. The following user guide provides step by step instructions for installation, operation and troubleshooting. To download the latest manual and additional troubleshooting tips, please visit:

https://ambientweather.com/amws2000.html#faq.tab

2. Warnings and Cautions

Warning: Any metal object may attract a lightning strike, including your weather station mounting pole. Never install the weather station in a storm.

Warning: If you are mounting the weather station to a house or structure, consult a licensed electrician for proper grounding. A direct lightning strike to a metal pole can damage or destroy your home.

Warning: Installing your weather station in a high location may result in injury or death. Perform as much of the initial check out and operation on the ground and inside a building or home. Only install the weather station on a clear, dry, day.

3. Quick Start Guide

Although the manual is comprehensive, much of the information contained may be intuitive. In addition, the manual does not flow properly because the sections are organized by components.

The following Quick Start Guide provides the necessary steps to install and operate the weather station, and upload to the internet, along with references to the pertinent sections.

	Set Up				
Step	Description	Section			
1	Assemble and power up the sensor array	5.4			
2	Power up the display tablet and synchronize with sensor array	5.2			
3	Mount the sensor array	5.4.7			
4	Set date and time on tablet	6.14.1			
5	Calibrate the relative pressure to sea-level conditions (local airport) on tablet	6.16			
6	Reset the rain to zero on tablet	6.16			
Wi-Fi and Internet					
7	Configure Wi-Fi	6.9.15			
8	Register and upload to Weather Servers	6.9.14			

4. Pre-Installation Checkout and Site Survey

4.1 Pre-Installation Checkout

Before installing your weather station in the permanent location, we recommend operating the weather station for one week in a temporary location with easy access. This will allow you to check out all the functions, ensure proper operation and familiarize you with the weather station and calibration procedures.



4.2 Site Survey



Perform a site survey before installing the weather station. Consider the following:

- 1. You must clean the rain gauge every few months and change the batteries every 2-3 years. Provide easy access to the weather station.
- 2. Avoid radiant heat transfer from buildings and structures. In general, install the sensor array at least 5' from any building, structure, ground, or roof top.
- 3. Avoid wind and rain obstructions. The rule-of-thumb is to install the sensor array at least four times the difference in the height of the sensor array and that of the tallest obstruction. For example, if the building is 20' tall and the mounting pole is 6' tall, install the sensor array 4 x (20 6)' = 56' away.
- 4. Mount the sensor array in direct sunlight for accurate temperature readings.
- 5. Installing the weather station over sprinkler systems or other unnatural vegetation may affect temperature and humidity readings. We suggest mounting the sensor array over natural vegetation.
- 6. Wireless Range. Radio communication between receiver and transmitter in an open field can reach up to 330 feet, providing there are no interfering obstacles such as buildings, trees, vehicles and high voltage lines. Wireless signals will not penetrate metal buildings. Under most conditions, the maximum wireless range is



100'.

- 7. Radio Interference. Computers, radios, televisions, and other sources can interfere with radio communications between the sensor array and tablet. Please take this into consideration when choosing tablet or mounting locations. Make sure your display tablet is at least five feet away from any electronic device to avoid interference.
- 8. Visit Ambient Weather Mounting Solutions for assistance and ideas for mounting your weather station:

https://ambientweather.com/faqs/question/view/id/1788/

5. Getting Started

The Ambient Weather WS-2000 OSPREY Wi-Fi Personal Weather Station consists of an indoor display tablet (receiver + Wi-Fi transmitter) and an all-in-one outdoor weather sensor array.

5.1 Parts List

QTY	Item
1	Display Tablet
1	Outdoor Sensor Body with built-in: Thermo-hygrometer / Rain Gauge / Wind Speed Sensor/ Wind Direction Sensor, Light and UV sensor, Solar panel
1	Thermo-hygrometer-barometer transmitter
1	Wind speed cups (to be attached to outdoor sensor body)
1	Wind vane (to be attached to outdoor sensor body)
2	U-Bolts for mounting on a pole
4	Threaded nuts for U-Bolts (M5 size)
1	Metal mounting plate to be used with U-Bolts
1	Wrench for M5 bolts
1	Funnel coil filter
1	AC adapter
1	User manual

Note: Batteries are not included. You will need 4 AA size batteries, Alkaline or Lithium batteries (for colder climates).

Note: AC adapter is included. The adapter is a switching-type adapter and can generate a small amount of electrical interference with the RF reception in the tablet, when placed too close to the tablet. Please keep the tablet display at least 2 ft. or 0.5 m away from the power adapter to ensure best RF reception from the outdoor sensor package.

5.2 Included tools

Quantity	Picture	Item
1		Precision Screwdriver #1 (for small Phillips screws on wind vane and wind cups



5.3 Recommend Tools

- Adjustable wrench (for mounting pole)
- Compass or GPS (for wind direction calibration)

5.4 Sensor Array Set Up





Figure 1

No	Description	No	Description
1	Wind Vane (measures wind direction)	7	Solar panel
2	Wind Speed Sensor (measures wind speed)	8	U-Bolt
3	UV sensor/ Light sensor	9	Battery compartment
4	Thermometer-hygrometer sensor (measures temperature and humidity)	10	Reset button
5	Rain collector	11	LED transmitter Indicator
6	Bubble level		



5.4.1 Install Wind Vane

Reference Figure 2. (a) Locate and align the flat key on the wind vane shaft to the flat key on the wind vane and push the vane on to the shaft. (b) tighten the set screw with a precision screwdriver and make sure the wind vane spins freely.

Note: You may need to back out the set screw first before sliding the vane onto the shaft.

Note: The wind vane shaft does not spin as freely as the wind cups. This is by design. The dampening prevents the wind vane from spinning with the slightest breeze, which will result in variable wind all the time. The added resistance allows the wind vane to change direction with 2 - 3 mph, providing a much better wind direction tracking.



5.4.2 Install Wind Cups

Reference Figure 3. (a) push the wind cups on to the shaft. (b) tighten the set screw with a precision screwdriver and make sure the wind cups spin freely.



Note: You may need to back out the set screw first before sliding the cups onto the shaft.





5.4.3 Install U-Bolts

Note: Your U-bolts may have come preassembled at the factory.

(a) Insert the U-Bolts into the sensor array mounting bracket and hand tighten the nuts.



- (b) Tighten the nuts to fit the size of your mounting pole (between 1.25" and 2" diameter).
- (c) Insert the sensor array and U-Bolt assembly onto the mounting pole.
- (d) Tighten the U-Bolts around the pole with an adjustable wrench. Make sure the sensor array is level.





5.4.4 Install the Rain Gauge Funnel

Reference Figure 5. Install the rain gauge funnel. Rotate clockwise to attach the funnel to the sensor array.







5.4.5 Install the Funnel Coil Filter

To install the funnel coil filter, press the coil until the hook is inside the hole at the bottom of the funnel, and locked in place. The spring tension will keep the filter tight on the funnel.



5.4.6 Install Batteries

Reference Figure 7. Insert 2 x AA non-rechargeable batteries (not included) into the battery compartment. The LED indicator on the back of the transmitter will turn on for four seconds, and then flash once every 16 seconds (the sensor transmission update period).



Figure 7



Note: If the LED does not light up, or stays on permanently, make sure the battery polarity is correct, or the batteries are fresh. Do not install the batteries backwards. You can permanently damage the thermo-hygrometer.

Note: We recommend lithium batteries for cold weather climates, but alkaline batteries are sufficient for most climates. We do not recommend rechargeable batteries. They have lower voltages, do not operate well at wide temperature ranges, and do not last as long, resulting in poorer reception.

5.4.7 Install Mounting Pole

Reference Figure 8. The mounting assembly includes two U-Bolts and a bracket that tightens around a 1.25 to 2" diameter pole (not included) using the four U-Bolt nuts.



Use the bubble level next to the rain sensor to make sure the sensor array is completely level. If the sensor array is not level, the rain gauge, UV and solar radiation sensors will not measure properly.

Note: If you cannot read the bubble level due to mounting constraints, place straddle a line or ruler level across the top of the rain gauge for easier viewing.

5.4.7.1 Aligning the Wind Direction

Locate the four-wind vane compass rose indicators of N, E, S, W (representing North, East, South and West) at the base of the wind vane. Align the compass rose direction upon final installation with a compass or GPS.

5.5 Best Practices for Wireless Communication

Wireless communication is susceptible to interference, distance, walls and metal barriers. We recommend the following best practices for trouble free wireless communication.

- 1. Electro-Magnetic Interference (EMI). Keep the tablet several feet away from computer monitors and TVs.
- 2. Radio Frequency Interference (RFI). If you have other 915 MHz devices and communication is intermittent, try turning off these other devices for troubleshooting purposes. You may need to relocate the transmitters or receivers to avoid intermittent communication.
- 3. Line of Sight Rating. This device is rated at 300 feet line of sight (no interference, barriers or walls) but typically you will get 100 feet maximum under most real-world installations, which include passing through barriers or walls.



4. **Metal Barriers.** Radio frequency will not pass through metal barriers such as aluminum siding. If you have metal siding, align the remote and tablet through a window to get a clear line of sight.

The following is a table of reception loss vs. the transmission medium. Each "wall" or obstruction decreases the transmission range by the factor shown below.

Medium	RF Signal Strength Reduction
Glass (untreated)	5-15%
Plastics	10-15%
Wood	10-40%
Brick	10-40%
Concrete	40-80%
Metal	90-100%

5.2 WH32B Indoor Thermo-Hygrometer-Barometer Transmitter

Remove the battery door on the back of the sensor, as shown in Figure 9.





- 1. Insert two AA batteries.
- 2. After inserting the batteries, the remote sensor will display temperature, humidity and barometric pressure on the display, as shown in Figure 10.



Figure 10

3. This sensor is also capable of displaying in Celsius or Fahrenheit by using the switch under the battery door. As shown in Figure 10a.



Figure 10a



5.3 Optional Sensors

The WS-2000 supports the following optional sensors:

Item Number	Number of Channels	Description	Image
AQIN	1	Indoor Air Quality Monitor	
PM25	1	PM2.5 Wireless Outdoor Particulate Monitor	
PM25IN	1	PM2.5 Wireless Indoor Particulate Monitor	
WH31E	8*	Thermo-Hygrometer Sensor	THE SECOND
WH31SM	16	Soil Moisture Sensor	
WH31L	1	Lightning Detector	James Harris
WH31LA	4	Leak Detector	
WH31P	8*	Probed Thermometer	



WH31PF	8*	Floating Pool Thermometer	
			182
			1.1
			a address a
			e lind e

(*) The WH31E, WH31PF, and WH31P share the same 8-channels.

Figure 11

5.4 8-Channel Thermo-Hygrometer (optional)

The WS-2000 supports up to 8 additional thermo-hygrometer sensors (WH31E), which can be viewed on the display tablet and Internet.

Note: Do not use rechargeable batteries. We recommend fresh alkaline batteries for outdoor temperature ranges between -4 °F and 140 °F and fresh lithium batteries for outdoor temperature ranges between -40 °F and 140 °F.

1. Remove the battery door on the back of the transmitter(s) by sliding down the battery door, as shown in Figure 12.



- 2. **BEFORE** inserting the batteries, locate the dip switches on the inside cover of the lid of the transmitter.
- 3. **Channel Number:** The WS-2000 supports up to eight transmitters. To set each channel number (the default is Channel 1), change Dip Switches 1, 2 and 3, as referenced in Figure 13.
- 4. **Temperature Units of Measure:** To change the transmitter display units of measure (°F vs. °C), change Dip Switch 4, as referenced in Figure 13.

Switch in down position. \Box Switch in up position.







- 5. Insert two AA batteries.
- 6. Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the display, as shown in Figure 14.



- (1) temperature
- (2) temperature units (°F vs. °C)
- (3) channel number
- (4) relative humidity
- 7. Close the battery door.

Repeat for the additional remote transmitters, verifying each remote is on a different channel.

5.5 WH31P Probed Thermometer (optional)

The WH31P probed thermometer requires 2 x AA batteries (not included). We recommend Energizer Lithium batteries for longer life and a wider operating temperature range.



Remove the battery door on the back of the transmitter(s) by sliding down the battery door, as shown in Figure 12



- 2. BEFORE inserting the batteries, locate the dip switches on the inside cover of the lid of the transmitter.
- 3. **Channel Number:** The WS-2000 and WS-5000 supports up to eight transmitters. To set each channel number (the default is Channel 1), change Dip Switches 1, 2 and 3, as referenced in Figure 13.
- 4. **Temperature Units of Measure:** To change the transmitter display units of measure (°F vs. °C), change Dip Switch 4, as referenced in Figure 13.

Switch in down position. \Box Switch in up position.





Figure 16

- 5. Insert two AA batteries.
- 6. Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the display, as shown in Figure 14.



Figure 17

- (1) temperature units (°F vs. °C)
- (2) temperature
- $(3) \ \ channel \ number$
- 7. Close the battery door.
- 8. Repeat for the additional remote transmitters, verifying each remote is on a different channel.

5.6 Sensor Placement

It is recommended you mount the remote sensor outside on a north facing wall, in a shaded area, at a height at or above the receiver. If a north facing wall is not possible, choose a shaded area, under an eave.

Direct sunlight and radiant heat sources will result in inaccurate temperature readings. Although the sensor is weatherproof, it is best to mount in a well-protected area, such as an eve.

- 1. Use a screw or nail to affix the remote sensor to the wall, as shown in Figure 18.
- 2. Hang the remote sensor up on string, as shown in Figure 19.

Note: Make sure the sensor is mounted vertically and not lying down on a flat surface. This will ensure optimum reception. Wireless signals are impacted by distance, interference (other weather stations, wireless phones, wireless routers, TVs and computer monitors), and transmission barriers, such as walls. In general, wireless signals will not penetrate solid metal and earth (down a hill, for example).





5.7 Best Practices for Wireless Communication

Wireless communication is susceptible to interference, distance, walls and metal barriers. We recommend the following best practices for trouble free wireless communication.

1. Electro-Magnetic Interference (EMI). Keep the tablet several feet away from computer monitors and TVs.

2. **Radio Frequency Interference (RFI).** If you have other 433 MHz devices and communication is intermittent, try turning off these other devices for troubleshooting purposes. You may need to relocate the transmitters or receivers to avoid intermittent communication.

Line of Sight Rating. This device is rated at 300feet line of sight (no interference, barriers or walls) but typically you will get 100feet maximum under most real-world installations, which include passing through barriers or walls.
 Metal Barriers. Radio frequency will not pass-through metal barriers such as aluminum siding. If you have metal siding, align the remote and tablet through a window to get a clear line of sight.

The following is a table of reception loss vs. the transmission medium. Each "wall" or obstruction decreases the transmission range by the factor shown below.

Medium	RF Signal Strength Reduction
Glass (untreated)	5-15%
Plastics	10-15%
Wood	10-40%
Brick	10-40%
Concrete	40-80%
Metal	90-100%

5.8 Display Tablet



Figure 20

Connect the display tablet power jack to AC power with the power adapter (included), as shown in Figure 21.

Place the sensor array and indoor thermo-hygrometer transmitter about 5 to 10 feet from the display tablet and wait several minutes for the remote sensors to synchronize with the display tablet.





Figure 21

6. Display Tablet Operation

Note: About This Section. The display tablet includes buttons at the bottom with icons signifying the menu functions. This manual includes "quick menu boxes" as shown below, signifying how to access a setting from home screen. For example, to access calibration panel, from the home screen, press the Set Key three times to view the calibration panel.



"Menu box" example. From the home screen, press the Set Key 3 times to view the calibration panel.

6.1 Initial Display Tablet Operation

Connect the display tablet power jack to AC power with the power adapter. The tablet starts to receive from the indoor and outdoor transmitters, as shown in Figure 22.



6.2 Home Screen Display

The display tablet home screen layout is shown in Figure 23.





No	Description	No	Description
1	WeatherUnderground.com connection icon	16	Channel indicator
2	AmbientWeather.net connection icon	17	Rain rate, daily, hourly, weekly, monthly, and
			yearly rain
3	Wi-Fi signal strength icon.	18	Forecast icon based on rate of change of pressure
	An exclamation point ! indicates the display is		
	connected to Wi-Fi but not the Internet.		
4	Outdoor Sensor Array Low Battery Indicator	19	Barometric pressure (REL or ABS), rate of change
			and rate of change arrow
5	Outdoor Sensor Array Signal Quality	20	Max daily wind gust
6	Current, high and low outdoor temperature	21	Moon Phase
7	Humidity	22	10-minute average wind speed and direction
8	Wind speed, wind gust, current wind direction	23	UV Index
	(blue arrow), 10-minute average wind direction		
	(larger gray arrow).		
9	Leak detector status (channels 1-4)	24	Sunrise, sunset, sun arc
10	Soil moisture (channels 1-8)	25	Solar Radiation
11	Current date and time	26	Indoor PM2.5 sensor
12	Lighting detector last strike, last strike time and	27	Outdoor PM2.5 sensor
	strikes per hour		
13	Indoor, Channel 1-8 humidity	28	Dew Point
14	Indoor, Channel 1-8 temperature	29	Feels Like Temperature
15	Channel scroll mode indicator	30	Lightning icon appears when then Dew Point
			exceeds 70 °F, which signifies conditions may be
			possible for lightning storms to form in the area.
		31	Hourly Rain Icon



6.3 Display Buttons



lcon	Description
	Brightness control key
\bigcirc	Press this key to enhance the brightness
)	
\frown	Brightness control key
(\bot)	Press this key to decrease the brightness
$\mathbf{)}$	
(Backlight on/off key
	Press this key to turn on/off the display
	Background key
	Press this key to choose between dark background display and light background display
-	
•	Pressure display key
()	Press this key to choose the display between Absolute pressure and Relative pressure.
63	
-	
- ~	Channel key
(CH)	Press this key to change the display between indoor temperature & humidity, multiple channel
	temperature & humidity and scroll mode, where the channels scroll every 5 seconds.
	History key
	Press this key to enter History Mode
· •	
	Set key
200	Press this key to enter Set Mode
203	
13	

6.4 Multi-Channel and Scroll Mode for Optional Sensors

You can add up to 8 additional thermo-hygrometer sensors (optional, item number WH31).

Press the Channel Button to switch between indoor and Channels 1-8. After the last channel is selected, press

the Channel button one more time to scroll all the sensors every 5 seconds.

Note: For multi-channel sensor data, it will only be fed to ambientweather.net server, and no history data will be saved in the display tablet.

6.5 Temperature and Humidity Color Gradients

Outdoor/Indoor Temperature Color Ring

* Note, you can view the actual colors in the web manual.

Temperature Range (degF)	Color Ring	Temperature Range (degF)	Color Ring
< -10		50-60	
-10 to 0	\bigcirc	60-70	\bigcirc
0 to 10	\bigcirc	70-80	\bigcirc
10-20	\bigcirc	80-90	\bigcirc
20-30	\bigcirc	90-100	\bigcirc
30-40	\bigcirc	100-110	\bigcirc
40-50		> 110	\bigcirc

Humidity Range (%)	Color Ring	Humidity Range (%)	Color Ring
0%, No signal or dashes	\bigcirc	50 to 60	\mathbf{O}
1 to 10	\bigcirc	60 to 70	0
10 to 20	\bigcirc	70 to 80	0
20 to 30	0	80 to 90	0
30 to 40	\bigcirc	90 to 99	0
40 to 50	\bigcirc	100%	0
50 to 60	\bigcirc		

Outdoor/Indoor Humidity Color Ring

6.6 Hourly Rain Icon

The Hourly Rainfall Icon shows the accumulated rainfall for the last hour (60 mins). For the purpose of this icon,



the console stores the rainfall every 5 minutes and displays the sum of the last 12 measurements (trailing 60minute summary).

Hourly Rain (in)	Icon	Hourly Rain (in)	Icon
0.0	\bigcirc	0.6 to 0.8	
0 to 0.2		0.8 to 1	
0.2 to 0.4		1 to 1.2	
0.4 to 0.6	\bigcirc	1.2 to 1.4	

6.7 Other Console Features

6.7.1 Weather Forecasting

The five weather icons are Sunny, Partly Cloudy, Cloudy, Rainy and Stormy.

The forecast icon is based on the rate of change of barometric pressure. Please allow at least one month for the weather station to learn the barometric pressure over time.

Sunny	Partly Cloudy	Cloudy	Rainy	Stormy
Pressure increses for	Pressure increases	Pressure decreases	Pressure decreases	Pressure rapidly
a sustained period of	slightly, or initial power	slightly	for a sustained	decreases
time	up		period of time	

Figure 24

6.7.2 Wireless Signal Quality Icon

The wireless signal strength displays reception quality. If no signal is lost, the signal strength indicator will display 5 bars. If the signal is lost once, four bars will be displayed, as shown in Figure 25. A bar is removed for each consecutive loss of signal.

Five Bars	Four Bars
-----------	-----------



Figure 25

6.7.3 Weather Forecasting Description and Limitations

In general, if the rate of change of pressure increases, the weather is generally improving (sunny to partly cloudy). If the rate of change of pressure decreases, the weather is generally degrading (cloudy, rainy or stormy). If the rate of change is relatively steady, it will read partly cloudy.

The reason the current conditions do not match the forecast icon is because the forecast is a prediction 24-48 hours in advance. In most locations, this prediction is only 70% accurate and it is a good idea to consult the National Weather Service for more accurate weather forecasts. In some locations, this prediction may be less or more accurate. However, it is still an interesting educational tool for learning why the weather changes.

The National Weather Service (and other weather services such as The Weather Channel) have many tools at their disposal to predict weather conditions, including weather radar, weather models, and detailed mapping of ground conditions.

6.7.4 Lightning Icon

The lightning icon *V* appears when then Dew Point exceeds 70 °F, which signifies temperature and humidity conditions may be possible for lightning storms to form in the area.

6.7.5 PM2.5 Sensor (optional)

An optional PM2.5 sensor is available for the WS-2000. The display shows the current PM2.5 measurement, and the 24-hour running average, which is a better indication of the accumulative effect of particulates on overall health.

The display features a color-coded icon with the following breakpoints:

AQI Category	Color	Breakpoints (µg/m ³)
Good	Green	0.0 - 12.0
Moderate	Yellow	12.1 - 35.4
Unhealthy for	Orange	35.5 - 55.4
Sensitive Groups		
Unhealthy	Red	55.5 - 150.4
Very Unhealthy	Purple	150.5 - 250.4
Hazardous	Maroon	250.5 - 500

Figure 26

6.8 History Mode

6.8.1 Min/Max

View high and low records, and clear specific records in the history mode.



View and reset minimum and maximums.

Version 2.20





Press the Return Key **I** to return to the main screen.

Refer to Factory 6.12 to clear all of the highs and lows at Midnight, or manually clearing all of the highs and lows at once.

6.8.2 Archive Memory Mode

You can view and clear archived memory from the Archive Memory Mode.





No	Time	Indoor Temperature (°F)	Indoor Humidity (%)	Outdoor Temperature (°F)	Outdoor Humidity (%)	Dew Point (°F)	Feels Like (°F)	Wind (mph)
2689	12/5/2018 AM 6:40	77.7	65	68.9	47	47.8	68.9	2.5
2690	12/5/2018 AM 6:45	77.7	65	68.9	47	47.8	68.9	2.5
2691	12/5/2018 AM 6:50	77.7	65	68.9	47	47.8	68.9	2.2
2692	12/5/2018 AM 2:40	77.9	65	68.9	47	47.8	68.9	2.5
2693	12/5/2018 AM 2:45	77.9	65	68.9	47	47.8	68.9	2.2
2694	12/5/2018 AM 2:50	77.9	65	68.9	47	47.8	68.9	2.2
2695	12/5/2018 AM 2:55	77.9	65	68.9	46	47.3	68.9	2.2
2696	12/5/2018 AM 3:00	77.9	65	68.9	46	47.3	68.9	2.2
2697	12/5/2018 AM 3:05	77.9	65	68.9	46	47.3	68.9	2.2
2698	12/5/2018 AM 3:10	77.9	65	68.9	46	47.3	68.9	2.2
2699	12/5/2018 AM 3:15	77.9	65	68.9	46	47.3	68.9	2.7
2700	12/5/2018 AM 3:20	77.9	64	68.9	46	47.3	68.9	2.5
2701	12/5/2018 AM 3:25	77.9	65	68.9	46	47.3	68.9	2.2
2702	12/5/2018 AM 3:30	78.1	65	68.9	46	47.3	68.9	2.2
2703	12/5/2018 AM 3:35	78.6	65	68.9	46	47.3	68.9	2.2
2704	12/5/2018 AM 3:40	78.6	65	68.9	46	47.3	68.9	2.2
		\leftarrow –	>	\uparrow \downarrow	\uparrow	\downarrow	Ś	

Figure 28

		\leftarrow	\rightarrow	\uparrow	\downarrow	$\uparrow \downarrow$	Ĵ
Clear All History	Recall page	scroll left	scroll right	scroll up	scroll down	Switch to graph	return home
						screen	

To clear all the records, press the <u>Clear All History button</u> and you will be prompted to clear the data. Press



. The Yes button will be highlighted in Green. Press the Plus button to \checkmark the down arrow once to confirm clear all archived records.

No	Time	Indoor Temperature (°F)	Indoor Humidity (%)	Outdoor Temperature (°F)	Outdoor Humidity (%)	Dew Point (°F)	Feels Like (°F)	Wind (mph)
2721	12/5/2018 AM 5:13	78.4	65	24.8	54	10.4	24.8	0.0
2722	12/5/2018 AM 5:18	78.4	65	59.0	73	50.4	59.0	0.0
2723	12/5/2018 AM 5:23	78.4	65	87.8	89	84.2	111.7	0.0
2724	12/5/2018 AM 5:28				19	69.8	123.8	0.0
2725	12/5/2018 AM 5:33				39	-39.3	-22.0	0.0
2726	12/5/2018 AM 5:38		- 46 - 6'-4-		58	0.1	12.2	0.0
2727	12/5/2018 AM 5:43	Ciea	r the histo	74	33.4	41.0	0.0	
2728	12/5/2018 AM 5:48				95	77.2	78.8	0.0
2729	12/5/2018 AM 5:52	Ye		No	24	67.6	113.0	0.0
2730	12/5/2018 AM 5:57		<u> </u>		42		-36.4	0.0
Ð	R Q			$\uparrow \qquad \downarrow$				

Figure 29



Figure 30

6.8.3 Graph

Graph memory for all parameters, based on the date and time.





Q	\downarrow	$\uparrow \downarrow$	C
Change x-axis time between 12, 24, 48 and 72 hours.	Change graph parameters	Switch to Min/Max display	return home



6.8.4 Sensors Name & Data



AC	QIN		T&ł	H CH1	Т&	H CH2	57	₄ H CH3	Τł	&H CH4	T&H CH5	T&H CH6
T&H		02	77.	2°F	74	1.3 °F	7	6.3 °F		76.5 °F	73.0 °F	76.8 °F
79.0 °F 40 %	727	ppm	40	0 %				56 %		43 %	48 %	43 %
PM2.5	٩٩		T&H	I CH7	Т&	H CH8		ndoor	WH:	31SM CH	1 WH31SM CH2	WH31SM CH3
7 ug/m³ Good	7 uç Go	g/m³ ood	75.	9°F	74	1.3 °F	7	5.6 °F		0 %	0%	0 %
AQI 24H থা থা	AQI	24H	44	4 %			4	43 %				
WH31SM CH4	Na	me	AQIN	AQIN							WH51LW CH1	
0 %	0	1	2	a	b	с	d	е	f	_	Backspace	0%
	3	4	5	g	h	i	j	k	I		Caps Lock	
0 %	6	7	8	m	n	ο	p	q	ſ		Cancel	
	9	s	t	u	v	w	×	У	z	#+=	Ok	
		\times		\leftarrow		\rightarrow		\uparrow	,	\downarrow	Υ	Ś



Q	Q	\uparrow	\downarrow	Ĵ
Select field		Scroll field up	Scroll field down	return to Setup



6.9 Set Mode

The Set Mode allows you to customize your display, manage archive data, and connect your display tablet to the Internet.



Ø	Ø	\downarrow	\rightarrow	\uparrow	\rightarrow	Ś	Ĵ
Select units	Select units of	Select	Select	Scroll field	Scroll field	Select next	return to
of measure	measure or scroll	value	value	up	down	Set Page	home
or scroll	value down			_			
value up							

6.9.1 Set Date and Time



1. Set Time. (hour:minute:second) Press



to increase or decrease the value.

 \rightarrow or \leftarrow

to select hour, minute or second. Press

or



2.	Set Date. (month:day:year) Press to set the date. The month field will turn red. Press or
	to select month, day or year. Press or let to increase or decrease the value.
3.	Set Time Zone. Press to set the time zone. Press to increase the time zone and to
	decrease the time zone. With time zone highlighted, press to set Daylight Savings Time (DST). Press to toggle ON or OFF. Note: the DST should be always checked to automatically update the time when
4.	Set Time Server. The default time server is time.nist.gov. Press to set the time server. Press again
	to turn ON. Press to toggle ON or OFF. Press to immediately to highlight Update and to immediately update.
	Note: The time server will not work until the Wi-Fi connection has been set up.

		Setup					
	Time			Date			
	AN	4 06:43:03		12/0	05/2018		
	Time Zo	one					
	(UTC-0	5:00)Eastern Tin	ne (US & Cana	nda)			
	🗹 Auto	matically adjust	t clock for day	ylight saving c	hanges		
	Server					Update	
			tin	ne.nist.gov			
	🗹 Auto	matically synch	ronize with In	ternet time se	rver		
	Next sy	nchronization 2	:00				
	Success	synchronizing	with time.nist.	gov			
Ð	ξ	ର ←	- →	\uparrow	\downarrow	Ċ	
				Figure 33			
Q		Q	\leftarrow	\rightarrow	\uparrow	\downarrow	Ĵ
scroll value	up sci	roll value down	Select value	Select value	Scroll field up	Scroll field down	return to Setup


6.9.2 Set Time Format



6.9.3 Set Date Format



6.9.4 Temperature Units of Measure



6.9.5 Barometer Units of Measure



6.9.6 Wind Speed Units of Measure

Press to change the wind speed units of measure between mph, bft (beufort scale), ft/s, m/s, km/h and knot.

6.9.7 Rainfall Units of Measure





Press

to change the rainfall units of measure between in and mm.

6.9.8 Solar Radiation Units of Measure



6.9.9 Backlight Display



	Set	up						
Automatic co	ontrol back	liaht		Auto	matic brigh	itness adi	ustment	
Turn on the	backlight			Ma>	kimum brigt	ntness	_	
AM Turn off th	06:30 e backlight			Mini	mum bright			
PM	10:00							
<u> </u>	<u> </u>	, _	、		I		4	
Ð	a	\leftarrow	→ F	igure 34	\checkmark		Ċ	
0		\frown	1		`	•		

Ŭ	Ŭ	Ţ	\rightarrow		\checkmark	C.
adjust up or check	adjust down or uncheck	scroll left	scroll right	scroll up	scroll down	return home





(+)

Θ

Figure 35

Note: Our consoles use the decimal degrees format of Longitude/Latitude.

To determine your longitude and latitude, we recommend the following website:

www.bing.com/maps

Reference Figure 36 below:

- 1. Enter your address and select the search button
- 2. The latitude (first number) and longitude (second number) are returned. In this example:

Latitude = 33.2981181889772 Longitude = -111.960209459066

Below we will define how the longitude and latitude are shown based on your location

If you are in the Northern Hemisphere your Latitude will be positive. If you are in the Southern Hemisphere your Latitude will be negative. If you are in the Eastern Hemisphere your longitude will be positive. If you are in the Western Hemisphere your longitude will be negative.

In this example, the Longitude and Latitude will be entered into the display as follows:

Latitude = NORTH ----- 33.2981 Longitude = WEST ----- 111.9602 after rounding to four significant digits.

Record your longitude and latitude below for future reference:

Longitude:

Latitude:







6.9.11 Reset Weekly Rain at



6.9.12 Rainfall Season



6.9.13 Archive Interval



6.9.14 Weather Server





Registration for AmbientWeather.net is accomplished through console

	Setup									
Customized	Set	qL								
AmbientW	/eather.net:									
Account										
I	Enter your email address and we'	ll walk you t	through creating an							
6	account for this device on ambier	ntweather.ne	et.							
	MAC: 98:CD:AC:22:F2:B4									
()	Q	\uparrow	\downarrow	Ú						

On the weather server screen, you can enter you email address which is connected to your account on AmbientWeather.net.

		S	etup)								
Cust												
Amb	ient V	Veat	her.r	et:		Ś	Setup					
A	Err	nail										
	0	1	2	a	b	с	d	е	f	_	Backspace	
	3	4	5	a	h	i		k	1		Caps Lock	
	6	- 7	• •					~ 			Capcol	
	0	ſ	•				μ	Ч		•	Cancer	
	9	S	t	<u>u</u>	V	W	×	у ~	Ż	#+=	Ok	
		X		\leftarrow		\rightarrow		, L	1	\checkmark	Ý	



Note that this is an example only and your MAC address will be different.

You will receive an email like the example below to complete the process.



Once registered, select the dashboard to view your data.





	Setup				
Customized		Setup			
AmbientV	Veather.net:				
Account					
	Enter your email addres	ss and we'll wa	lk you ti	rough creating an	
	account for this device	on ambientwe	ather.net		
	MAG	C: 98:CD:AC:22:F	2:B4		
_	-				
Ð	Q	1		\downarrow	C C

Figure 37

Q	Q	\uparrow	\downarrow	Ĵ
Select Keyboard		Scroll field up	Scroll field down	return to Setup

1. Set Setup. Press to highlight the customized panel. Enter Setup to customize your own server. You can choose the Wunderground.com or AmbientWeather.net protocol, which is defined on the Weather Underground website (search Weather Underground upload protocol) and the AmbientWeather.net help guide:

https://ambientweather.com/faqs/question/view/id/1857/



Figure to Figure outline the personal web server set up using the Weather Underground protocol.













Figure 42



Figure 43















Figure 46

Figure 45 to Figure outline the personal web server set up using the AmbientWeather.net protocol.



Figure 47





Figure 48



Figure 49





Figure 50



6.9.14.1 Ambient Weather Dashboard App

Android and iOS Ambient Weather Dashboard apps are available in addition to AmbientWeather.net. Search "Ambient Weather Dashboard" in the Google Play or iOS app store, or visit:

- Ambient Weather Dashboard for Android: https://play.google.com/store/apps/details?id=net.ambientweather.dashboard
- Ambient Weather Dashboard for iOS: https://apps.apple.com/us/app/ambient-weather-dashboard/id1426025887



6.9.14.1 IFTTT

The AmbientWeather.net service connects to IFTTT, the platform that allows devices and services to work together seamlessly.

Here are a few things you can do with IFTTT:

- Turn off your Rachio sprinklers when it rains, there is too much wind, or below freezing.
- Close your Hunter blinds when the sun is too intense.
- Close your garage door when it is too windy.
- Blink your hue lights when it starts raining.
- Connect to other web services, such as Gmail, Facebook, Instagram, or Pinterest.

For more information on IFTTT and how it can work for you, visit:

https://ambientweather.com/faqs/question/view/id/1796/

6.9.14.2 Compatible with Alexa

The Ambient Weather skill provides Ambient Weather personal weather station owners with the ability to get real-time, and past weather information generated by the devices they have set up at AmbientWeather.net.

Enable the skill and get started: say "Alexa, ask Ambient Weather for a weather report.". This will provide you with your outdoor weather report, but you can ask for your indoor weather report as well by saying, "Alexa, ask Ambient Weather about the indoor conditions." You can also ask for a report about a specific day, month or year! Just say "Alexa, ask Ambient Weather about the weather yesterday." or "Alexa, ask Ambient Weather about the weather in May".

For more information and to enable this skill, visit:

https://www.amazon.com/dp/B074PGCM1D/

6.9.14.3 Works with Google Assistant

The Ambient Weather Google Assistant app provides Ambient Weather personal weather station owners with the ability to get real-time, and past weather information generated by the devices they have set up at AmbientWeather.net

Link your account to get started: say 'hey google, Ambient Weather... weather report.' This will provide you with your outdoor weather report. You can ask for your indoor weather report as well by saying, ' indoor conditions'.



You can also link the Ambient Weather app by downloading the Google Assistant.

Here are some sample commands:

- Weather Report
- Outdoor conditions
- Indoor conditions
- Yesterday's weather
- Conditions for October 15, 2017
- Conditions for September 2017
- Conditions for 2016

For more information and to enable this app, visit:

https://assistant.google.com/services/a/id/668e6f3369f27209/

6.9.15 Wi-Fi Scan

Press to perform a Wi-Fi Scan. Your wireless rou Press to select your wireless network. Press	ter will appear. \downarrow to enter the password. Press
to scroll to the character and press to select the c the Wi-Fi Network setup page. Leave the password blan	haracter. Press OK when complete. Press to return to c of the Wi-Fi network is not encrypted.

Note: The Wi-Fi signal strength icon is displayed on the home page. If wireless connectivity is successful and you are reporting to Wunderground.com, the Wi-Fi icon on the top left-hand side of the display tablet.

If you do not see your wireless network, press the Return button and perform another Wi-Fi scan. If the problem persists, power down and up your display tablet and perform another Wi-Fil scan.

If you are uploading to AmbientWeather.net successfully, the icon will show on the left top of the display tablet.



Select V	Wi-Fi Net	work						н	idden S	SSID	Setup	
My Rou	uter Na	ne							Co	nnect	ted	.11
	,											1 I
	Pas	sword										j i
	0	1	2	a	b	с	d	е	f		Backspace	1
	3	4	5	g	h	i	j	k	I		Caps Lock	
	6	7	8	m	n	o	p	q	r		Cancel	j i
	9	s	t	u	v	w	×	У	z	#+=	Ok	
		X		\leftarrow	-	\rightarrow		\uparrow	\downarrow	,	، ب	5
]	Figure	55			
<	\leftarrow		\rightarrow		\uparrow						${\leftarrow}$	Ĵ
Select	t value	Select	t value	Sc	roll fie	eld up	Sci	roll fie	ld dov	vn	Select	return to Setup

6.9.15.1 Hidden SSID

If the Wi-Fi network you are connecting to is hidden, please follow below steps to connect:



After connecting successfully, the status will display Connected.



	Hidd	len S	SID								
	्रद्धता ।										
D	SSIU [
Passv	vord										
Con	nect	O	k								1
Ss	sid										
0	1	2	a	b	с	d	е	f	_	Backspace	
3	4	5	g	h	i	j	k	1		Caps Lock	
6	7	8	m	n	о	р	q	r		Cancel	
9	s	t	u	v	w	×	У	z	#+=	Ok	
	\times		+		•	-					5
						Fi	igure 5	56			
	Hidd	len S	SID								
	Hidd	len S	SID							_	
	Hidd Ssid [len S	SID		Т900	-ost]	
Passv	Hidd Ssid (word (len S	SID		T900 19903	-OST 25710]	
Passv Con	Hidd Ssid (word (nect (len S	SID k]	T900 19903	-OST 25710]	
Passv Con St	Hidd Ssid (word (nect (atus)	len S	k Conn] ected	T900 19903	-OST 25710]	
Passv Con St	Hidd Ssid (word (nect (atus (len S	k Conn] ected	T900 19903	-ost 25710]	
Passv Con St	Hidd Ssid (word (nect (atus (len S	k Conn] lected	T900 19903	-OST 25710]	
Passv Con St	Hidd Ssid (word (nect (atus (len S	k Conn] lected	T900 19903	-OST 25710]	
Passv Con St	Hidd Ssid (word (nect (atus (len S	k Conn] lected	T900 19903	-OST 25710]	
Passv Con St	Hidd Ssid (word (nect (atus (len S	k Conn] lected	T900 19903	-OST 25710					
Passv Con St	Hidd Ssid (word (nect (atus (len S	k Conn] lected	T900 19903	-OST 25710					

Figure 57

6.9.16 Reset Daily Rain at





6.9.17 More



More			
Soil Moisture Calibration	Calibration	Sensors ID	Setup
Multi CH T&H Calibration	Calibration	Sensors Name&Data	Setup
PM2.5 Calibration	Calibration	AQIN Calibration	Calibration
\odot \bigcirc		$\uparrow \qquad \downarrow$	Ú Ú

Ø	Ø	\uparrow	\downarrow	Ĵ,
Select field		Scroll field up	Scroll field down	return to Setup
		Figure 58		

6.9.18 Soil Moisture Calibration

The soil moisture sensor provides for optional two-point linear calibration. This is important due to different soil types and density.

The calibration equation is defined as:

% Soil Moisture (calibrated) = (Now AD - 0%AD) *100 / (100%AD - 0%AD)

Where AD stands for "analog to digital" and is the unscaled digital value, Now AD is the currently measured AD and the other parameters are described below.



6.9.18.1 0% Soil Moisture Set Point

To determine the 0% soil moisture, collect a soil sample in a cup from where the sensor will be installed, and allow the soil to completely dry out. Next, place the soil sensor in the medium and allow the sensor to stabilize for one hour.

Next, set the **0%AD** calibration set point to the **Now AD** value.

6.9.18.2 100% Soil Moisture Set Point

To determine the 100% soil moisture, collect a soil sample in a cup from where the sensor will be installed, and add water and mix until the soil is saturated, and there is no standing water. Next, place the soil sensor in the medium and allow the sensor to stabilize for one hour.

Next, set the **100%AD** calibration set point to the **Now AD** value.

6.9.18.3 Customize and Reset

Once the 0%AD and 100%AD are entered, set **Customize** to **ON**. To return to the non-calibrated settings, set **Customize** to OFF. Select **Reset** to restore to factory default.

	Calit	oration									
Channel	Soil Moisture	Now AD	0%AD	100%AD)	Customize	Reset				
1	3%	83	70	500		OFF	Reset				
2	62%	320	70	500		OFF	Reset				
3	0%	26	70	500		OFF	Reset				
4	51%	268	70	500		OFF	Reset				
5	29%	188	70	500		OFF	Reset				
6	0%	26	70	500		OFF	Reset				
7	66%	335	70	500		OFF	Reset				
8	63%	323	70	500		OFF	Reset				
÷		\leftarrow	\rightarrow	\uparrow	\downarrow		5				
Θ		Q	\leftarrow	\rightarrow		\uparrow	\downarrow	Ĵ			
Increase	value Decrea	ise value	Select value	Select value	Scr	oll field up	Scroll field down	return to home			
	Figure 59										
To adjust 1	To adjust the parameter, press to scroll to the parameter you wish to change. Press to highlight the sign										
(positive v	vs. negative, if a	pplicable) ar	nd significant o	digit. Press	Q	or Q to	change the calibra	ted value.			

6.9.19 Multi-Channel Temperature and Humidity Calibration

For general information on temperature and humidity calibration, reference Section 6.11, Calibration.



	Calibr	a tion					
Channel	Temperature	Humidity	Temp. (Offset	Humi. Offset	Reset	
1			0.0		0	Reset	
2	82.2°F	45%	0.0		0	Reset	
3	80.8°F	46%	0.0		0	Reset	
4	81.0°F	47%	0.0		0	Reset	
5	81.0°F	46%	0.0		0	Reset	
6	81.3°F	47%	0.0		0	Reset	
7	14.7°F	49%	0.0		0	Reset	
8	81.3°F	45%	0.0		0	Reset	
				•			
÷		\leftarrow	\rightarrow		\checkmark	Ŋ	
G		2	\leftarrow	\rightarrow	\uparrow	\checkmark	
Increase	value Decreas	se value Sele	ect value Se	elect value	Scroll field up	Scroll field down	re

Figure 60

The calibrated temperature and humidity equations are as follows:

Calibrated Temperature = Measured Temperature + Temp. Offset Calibrated Humidity = Measured Humidity + Humidity. Offset

To adjust the parameter, press

to scroll to the parameter you wish to change. Press

to highlight the sign

to home

(positive vs. negative, if applicable) and significant digit. Press or to change the calibrated value.



6.9.20 PM2.5 Air Quality Sensor Calibration

	Calibration			
Channel	PM2.5	PM.25 Offset	Reset	
Outdoor		0	Reset	
	67 / *			
Indoor	3/ug/m³	0	Reset	
\odot	$\Theta \leftarrow$	\rightarrow \uparrow	\rightarrow	¢



Figure 61

The calibrated PM2.5 equations are as follows:

Calibrated PM2.5 = Measured PM2.5 + PM2.5 Offset



6.9.21 Sensors ID

The console supports multiple sensors and sensor arrays. You can disable or enable specific sensors.

To view a complete list of sensor IDs, visit:

https://ambientweather.com/faqs/question/view/id/1502/

For the WS-2000 weather station, the following sensor IDs are assigned:

WS2000: Sensor array WH32B: Indoor thermo-hygrometer-barometer

Sensor	Signal ID	CH	Sensor	Signal ID	CH	Sensor	Signal	ID
WS2000		OUT	PM2.5		3	WH31SM		
WH32B		IN	PM2.5		4	WH31SM		
WH32E	Disable	1	T&H		5	WH31SM		
WS5000		2	T&H		6	WH31SM		
5kRAIN		3	T&H		7	WH31SM		
WH31L		4	T&H		8	WH31SM		
AQIN		5	T&H		1	Leak		
		6	T&H		2	Leak		
		7	T&H		3	Leak		
		8	T&H		4	Leak		
		1	WH31SM		1	WH51LW		
		2	WH31SM		2	WH51LW		
(+		\leftarrow	\rightarrow	\uparrow	\downarrow		Ś	

Θ	Ø	\uparrow	\downarrow	Ĵ
Select field		Scroll field up	Scroll field down	return to Setup

Figure 62

To register, disable or select a specific sensor, press the

Q button to edit and save settings.



Sensor S	ignal ID	CH Sensor	Signal ID	CH	Sensor	Signal ID
WS2000		OUT PM2.5		3	WH31SM	
WH32B		IN PM2.5		4	WH31SM	
WH32E	Disable	1 T&H		5	WH31SM	
WS5000		Please enter the	e correct hexadecim	al ID.	WH31SM	
5kRAIN					WH31SM	
WH31L		Register	Disable		WH31SM	
AQIN					Leak	
		Save	Cancel		Leak	
					Leak	
		8 T&H		4	Leak	
		1 WH31SM		1	WH51LW	
		2 WH31SM		2	WH51LW	
Ð	Q		\uparrow	\downarrow		Ċ

Figure 63



Figure 64



6.9.22 Sensors Name & Data

This screen will allow you to name you sensors and view current live data.

AC	QIN	<i></i>	T&ł	H CH1	T&I	H CH2	T8	H CH3	Τį	&H CH4	T&H CH5	T&H CH6
T&H	C	02	77	.2 °F	74	1.3 °F	7	6.3 °F		76.5 °F	73.0 °F	76.8 °F
79.0 ℉ 40 %	727	ppm	41	40 %				56 %		43 %	48 %	43 %
PM2.5	P۲		T&H	I CH7	T&H CH8			Indoor		31SM CH	1 WH31SM CH2	WH31SM CH3
7 ug/m³ Good	7 uç Go	7 ug/m³ Good		75.9 °F		74.3 °F		75.6 °F		0 %	0%	0%
AQI 24H ସ ସ	AQI	24H	4,	4 %			4	43 %				1
WH31SM CH4	Na	me	AQIN									WH51LW CH1
0 %	0	1	2	а	b	с	d	е	f	-	Backspace	0%
	3	4	5	g	h	i	j	k	I		Caps Lock	
0 %	6	7	8	m	n	0	р	q	٢		Cancel	
	9	s	t	u	۷	w	×	У	Z	#+=	Ok	
		X		\leftarrow		\rightarrow		\uparrow		\downarrow	Ļ	Ś

Figure 65

\odot	Q	\uparrow	\downarrow	C
Select field		Scroll field up	Scroll field down	return to Setup



6.9.23 AQIN Calibration



 Increase value
 Decrease value
 Select value
 Scroll field up
 Scroll field down
 return to home

 The calibrated AQIN equations are as follows:
 Select value
 Scroll field up
 Scroll field down
 return to home

Calibrated C02 = Measured C02 + C02 Offset

Calibrated PM2.5 = Measured PM2.5 + PM2.5 Offset

Calibrated PM10 = Measured PM10 + PM10 Offset



6.10 Alarm Mode



The upper alarm is displayed on the right and the lower alarm is displayed on the left. If the measured value is greater



than the maximum alarm setting, the alarm will sound. If the measured value is less than the minimum alarm setting, the alarm will sound.



You can also set a time-of-day alarm using the same method





Θ	Q	\leftarrow	\rightarrow	\uparrow	\rightarrow	Ğ	Ĵ
Increase alarm	Decrease alarm	Select value	Select value	Scroll field	Scroll field	Enter sub-	return to
limit values	limit values			up	down	setup	home
						mode	

6.11 Calibration Mode

For multi-channel soil moisture, temperature, and humidity, and PM2.5 sensor calibration, refer to Section 6.9.17.





								-
Increase	Decrease	Select value	Select value	Scroll	Scroll field	Enter sub-	return	to
calibrated value	calibrated value			field up	down	setup	home	
						mode		



To adjust the parameter, press

to scroll to the parameter you wish to change. Press



to highlight the sign

(positive vs. negative, if applicable) and significant digit. Press

or

to change the calibrated value.

Parameter	Type of	Default	Typical Calibration Source
	Calibration		
Temperature	Offset	Current Value	Red Spirit or Mercury Thermometer (1)
Humidity	Offset	Current Value	Sling Psychrometer (2)
ABS	Offset	Current Value	Calibrated laboratory grade barometer
Barometer			
REL Barometer	Offset	Current Value	Local airport (3)
Wind Direction	Offset	Current Value	GPS, Compass (4)
Solar Radiation	Gain	1.00	Calibrated laboratory grade solar radiation sensor
1 w/m^2	Gain	126.7 lux	Solar radiation conversion from lux to w/m ² for wavelength
			correction (5)
Wind	Gain	1.00	Calibrated laboratory grade wind meter (6)
Rain	Gain	1.00	Sight glass rain gauge with an aperture of at least 4" (7)
Daily Rain	Offset	Current Value	Apply an offset if the weather station was not operating for the
			entire day.
Weekly Rain	Offset	Current Value	Apply an offset if the weather station was not operating for the
			entire week.
Monthly Rain	Offset	Current Value	Apply an offset if the weather station was not operating for the
			entire month.
Yearly Rain	Offset	Current Value	Apply an offset if the weather station was not operating for the
			entire year.

(1) Temperature errors can occur when a sensor is placed too close to a heat source (such as a building structure, the ground or trees).

To calibrate temperature, we recommend a mercury or red spirit (fluid) thermometer. Bi-metal (dial) and digital thermometers (from other weather stations) are not a good source and have their own margin of error. Using a local weather station in your area is also a poor source due to changes in location, timing (airport weather stations are only updated once per hour) and possible calibration errors (many official weather stations are not properly installed and calibrated).

Place the sensor in a shaded, controlled environment next to the fluid thermometer, and allow the sensor to stabilize for 48 hours. Compare this temperature to the fluid thermometer and adjust the tablet to match the fluid thermometer.

(2) Humidity is a difficult parameter to measure electronically and drifts over time due to contamination. In addition, location has an adverse effect on humidity readings (installation over dirt vs. lawn for example).

Official stations recalibrate or replace humidity sensors on a yearly basis. Due to manufacturing tolerances, the humidity is accurate to \pm 5%. To improve this accuracy, the indoor and outdoor humidity can be calibrated using an accurate source, such as a sling psychrometer.

(3) The display tablet displays two different pressures: absolute (measured) and relative (corrected to sea-level).

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 may read 28.62 inHg (969 mb) at an altitude of 1000 feet (305 m), but the relative pressure 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 your local "official" barometric pressure reading on <u>www.AmbientWeather.net/baro</u> or scan QR code below. To access the pressure relative pressure calibration screen of your console, see Section 7.5 / Figure 65 to enter the value.



Note: Calibration setting is saved until console is factory reset. If the console location elevation changes it will need to be recalibrated.

- (4) Only use this if you improperly installed the weather station sensor array and did not point the direction reference to true north.
- (5) The default conversion factor based on the wavelength for bright sunlight is 126.7 lux / w/m². This variable can be adjusted by photovoltaic experts based on the light wavelength of interest, but for most weather station owners, is accurate for typical applications, such as calculating evapotranspiration and solar panel efficiency.
- (6) Wind speed is the most sensitive to installation constraints. The rule of thumb for properly installing a wind speed sensor is 4 x the distance of the tallest obstruction. For example, if your house is 20' tall and you mount the sensor on a 5' pole:

Distance = $4 \times (20 - 5)' = 60'$.

Many installations are not perfect and installing the weather station on a roof can be difficult. Thus, you can calibrate for this error with a wind speed multiplier.

In addition to the installation challenges, wind cup bearings (moving parts) wear over time.

Without a calibrated source, wind speed can be difficult to measure. We recommend using a calibrated wind meter (available from Ambient Weather) and a constant speed, high speed fan.

(7) The rain collector is calibrated at the factory based on the funnel diameter. The bucket tips every 0.01" of rain (referred to as resolution). The accumulated rainfall can be compared to a sight glass rain gauge with an aperture



of at least 4". The following is a link to an accurate sight glass rain gauge:

http://www.ambientweather.com/stprraga.html

Make sure you periodically clean the rain gauge funnel.

Note: The purpose of calibration is to fine tune or correct for any sensor error associated with the devices margin of error. Errors can occur due to electronic variation (example, the temperature sensor is a resistive thermal device or RTD, the humidity sensor is a capacitance device), mechanical variation, or degradation (wearing of moving parts, contamination of sensors).

Calibration is only useful if you have a known calibrated source, you can compare it against and is optional. This section discusses practices, procedures, and sources for sensor calibration to reduce manufacturing and degradation errors. Do not compare your readings obtained from sources such as the internet, radio, television, or newspapers. The purpose of your weather station is to measure conditions of your surroundings, which vary significantly from location to location.

6.12 Factory and Data Export



		Factory								
	Automatic Clear	Ma×/Min	OFF		Clear Ma	ı×∕Min	CI	ear		
	Reset to	Factory	Reset		Backu	o data	Bac	ckup		
	Clea	r History	Clear			About	Dis	play		
	\oplus (Q		\uparrow	\downarrow	٤	Ğ;	Ĵ		
			Figu	re 68						
\odot	Q	\leftarrow	\rightarrow	1	•	\rightarrow	~	ğ	۲ ۲	Ĵ
Select Setting	Select Setting	Scroll left	Scroll right	Scroll	field	Scroll down	field	Enter setup n	sub-	return to

1. Automatic Clear Max/Min. Clears all the minimum and maximum values in stored memory at Midnight



- 4. Clear Max/Min. Clears all Maximum and Minimum data from the console
- 5. Backup data. Backup data to micro SD / TF card (see the Accessories section of this manual for more information on micro SD / TF cards). Insert the micro SD / TF Card into the slot, as shown in Figure 21.



The data is stored in comma separated value (csv) file format, which can be opened in Microsoft Excel. The TF card can be read by a computer with an SD card adaptor.

It may take several minutes to write the data to the SD Card. The popup message Successful completion of the

backup. will be displayed. Press to return.

6.12.1 Exporting Data File Format (Data Logging)

Plug the Micro SD Card into your computer and view the SD Card Drive. There are two files listed.

History_YYYDD.csv: The history data file as shown in Figure .

YYYYDD.csv: The remaining data during the download. For example, if it takes three minutes to download, it the last three minutes of data.





Figure 69

The format of the data is csv (comma separated value) and can be opened in a spreadsheet program such as Microsoft Excel for advanced data analysis, with the following headers:

Column	Parameter
1	No (data point number)
2	Time
3	Indoor Temperature (°F)
4	Indoor Humidity (%)
5	Outdoor Temperature (°F)
6	Outdoor Humidity (%)
7	Dew Point (°F)
8	Feels Like (°F)
9	Wind (mph)
10	Gust (mph)
11	Wind Direction (°)
12	ABS Barometer (inHg)
13	REL Barometer (inHg)
14	Solar Rad. (lux)
15	UV Index
16	Rain Rate (in/h)
17	Event Rain (in)
18	Daily Rain (in)
19	Weekly Rain (in)
20	Monthly Rain (in)
21	Yearly Rain (in)

Figure 70

6.12.2 Exporting Channel 1-8 Data

The SD Card must be inserted into the console and remain inserted to record channel 1-8 sensor data. Whenever there is a new data set recorded, it will be added to this file.

The sensor data is not saved to on-board flash due to memory constraints; it is only saved to the SD card.

YYYYCH1A.csv is the channel sensor data and is only generated when the SD Card is inserted into the tablet.

6.12.3 About

Provides detailed information for troubleshooting purposes.



Figure 71

7. Updating Firmware

7.1 What is firmware?

Firmware is software that is embedded on chip inside the weather station hardware. Firmware is the software for the hardware. The firmware tells the hardware what to do with the data and when and how to send it to the internet.

The WS-5000 has two types of firmware: console firmware and Wi-Fi firmware. The console firmware is updated using a microSD card (Section 7.2). The Wi-Fi firmware is updated using the awnet app (Section 7.3).

Note: when Ambient releases a new sensor model the Console Firmware (Section 7.2) and Wi-Fi Firmware (Section 7.3) often need to be updated to ensure proper communication

7.2 Updating Console Firmware

Download the latest Console Firmware file using the below link (under Ambient Weather Software) to your computer. Make a note of where you saved this file.

https://ambientweather.com/amws2000.html#download.tab

File may download as User.bin rename to Factory.bin and then copy the Factory.bin file to your Micro SD Card (the SD card must be empty and format FAT32 and only up to 32gb in storage space.)



Power down your display console by removing AC power.

Insert the SD Card into the display console. (SD card port located near ac adaptor port.)



Power up the display console and follow the instructions.

The console will verify the firmware was updated.





Power down the console after complete. Remove the SD Card when the console is powered down.

For Console Firmware update history please see the link below:

https://ambientweather.com/faqs/question/view/id/1415/

 Firmware Update Downloads And History:

 July 21, 2021 [Version.1.7.4]

 Changes:

 • Can now rename indoor sensor to custom name.

 November 17, 2020 [Version 1.6.9]

 Changes:

 • Add path for custom server setup. Wfli firmware will need to be upgraded to 4.2.8 or later.

 • Revise PM2.5, AQI, PM10, CO2 average buffer to be reset when newly registered again.

 June 12, 2020 [Version 1.6.4]

 Changes:

 • Fixes issue with PM2.5 IN not displaying on the console, introduced in Version 1.6.3.

 • Leak detector icon turns orange on the display console if the sensor loses communication for 10 minutes.

7.3 Updating Wi-Fi Firmware

To update the Wi-Fi firmware on your WS-2000/WS-5000 display console, your console must already be connected to Wi-Fi. You will access the about screen and select Upgrade Wi-Fi Version you will receive a notification if it is successful.

	About				
Model: WS-2000					
Total storage: 10	MB	Au	Automatically upgrade wifi firmware		
Available storag	e: 9.806MB	Up	grade Wifi Version		
Hardware revision number: V2.0			New version:AMBWeatherProV5.1.0.1		
Firmware revisio	n number: Pro_V1.8.8				
Frequency: 915M					
MAC: 98:CD:AC:2	2:F2:B4	WiFi	WiFi operation : WiFi upgrade Succeeded!		
IP: 10.255.172.139					
Wi-Fi Firmware: /	AMBWeatherPro_V5.	1.0			
Ð	Q	,	$\uparrow \downarrow$	Ú	
\odot	Q	\uparrow	\checkmark	Ĵ	
Select field	1	Scroll field up	Scroll field down	return to Setup	


8. Glossary of Terms

Term	Definition		
Absolute	Absolute pressure is the measured atmospheric pressure and is a function of altitude, and to a lesser		
Barometric	extent, changes in weather conditions.		
Pressure			
	Absolute pressure is not corrected to sea-level conditions. <i>Refer to Relative Barometric Pressure</i> .		
Accuracy	Accuracy is defined as the ability of a measurement to match the actual value of the quantity being		
	measured.		
Barometer	A barometer is an instrument used to measure atmospheric pressure.		
Calibration	Calibration is a comparison between measurements - one of known magnitude or correctness of one		
	device (standard) and another measurement made in as similar a way as possible with a second		
	device (instrument).		
Dew Point	The dew point is the temperature at which a given parcel of humid air must be cooled, at constant		
	barometric pressure, for water vapor to condense into water. The condensed water is called dew.		
	The dew point is a saturation temperature.		
	The derive point is approxisted with relative hyperidity. A high relative hyperidity indicates that the deriv		
	noint is closer to the current air temperature. Relative humidity of 100% indicates the dew point is		
	equal to the current temperature and the air is maximally saturated with water. When the dew point is		
	remains constant and temperature increases, relative humidity will decrease.		
D 1 1 1			
Feels Like	The Feels Like temperature is a combination of Heat Index when it is hot outside, and Wind Chill when it is could outside.		
	when it is cold outside.		
	Wind Chill temperature is defined by the National Weather Service for temperatures at or below		
	40 °F and wind speeds above 5.0 mph.		
	Heat Index is not valid or calculated below 80 degF.		
	Thus, when the outdoor temperature is between 40 degF and 80 degF, the feels like temperature is		
	the same as the outdoor temperature.		
	If the temperature is below 40 degF, the feels like temperature is the same as the outdoor		
	temperature when the wind speed is less than 5 mph.		
Hecto-Pascals	Pressure units in SI (international system) units of measurement. Same as millibars (1 hPa = 1		
(hPa)	mbar)		
Hygrometer	A hygrometer is a device that measures relative humidity. Relative humidity is a term used to		
	describe the amount or percentage of water vapor that exists in air.		
Inches of	Pressure in Imperial units of measure.		
Mercury	1 inch of mercury = 33.86 millibars		
(inHg)			
Kain Gauge	A rain gauge is a device that measures inquid precipitation (rain), as opposed to solid precipitation (snow gauge) over a set period		
	(show gauge) over a set period.		
	All digital rain gauges are self-emptying or self-dumping (also referred to as tipping rain gauge).		
	The precision of the rain gauge is based on the volume of rain per emptying cycle.		
Range	Range is defined as the amount or extent a value can be measured.		
Relative	Measured barometric pressure relative to your location or ambient conditions		
Barometric	inclusive succharte pressure relative to your relation of another conditions.		
Pressure			
Resolution	Resolution is defined as the number of significant digits (decimal places) to which a value is being		
	reliably measured.		



Term	Definition
Solar	A solar radiation sensor measures solar energy from the sun.
Radiation	
	Solar radiation is radiant energy emitted by the sun from a nuclear fusion reaction that creates electromagnetic energy. The spectrum of solar radiation is close to that of a black object with a temperature of about 5800 K. About half of the radiation is in the visible short-wave part of the electromagnetic spectrum. The other half is mostly in the near-infrared part, with some in the ultraviolet part of the spectrum.
Thermometer	A thermometer is a device that measures temperature. Most digital thermometers are resistive thermal devices (RTD). RTDs measure changes in temperature as a function of electrical resistance.
Wind Vane	A wind vane is a device that measures the direction of the wind. The wind vane is usually combined with the anemometer. Wind direction is the direction from which the wind is blowing.

Figure 38

9. Specifications

9.3 Wireless Specifications

- Line of sight wireless sensor array RF transmission (in open air): 330 feet, 100 feet under most conditions
- Line of sight Wi-Fi RF transmission (in open air): 80 feet
- Update Rate: Outdoor Sensor: 16 seconds, Indoor Sensor: 64 seconds
- Sensor Array RF Frequency: 915 MHz
- Wi-Fi Tablet RF Frequency: 2.4 GHz

9.4 Measurement Specifications

The following table provides the specifications for the measured parameters.

Measurement	Range	Accuracy	Resolution
Indoor Temperature	14 to 140 °F	± 2 °F	0.1 °F
Outdoor Temperature	-40 to 149 °F (lithium batteries)	± 2 °F	0.1 °F
	-23 to 140 °F (alkaline batteries)		
Indoor Humidity	10 to 99%	± 5%	1 %
Outdoor Humidity	10 to 99%	± 5%	1 %
Barometric Pressure	8.85 to 32.50 inHg	± 0.08 inHg (within range of 27.13 to	0.01 inHg
		32.50 inHg)	
Light/Solar Radiation	0 to 300,000 Lux	± 15%	1 Lux
Light/Solar Radiation	0 to 27870.91FC	± 15%	0.01FC
Solar Irradiance	0 to 2367.798W/M2	± 15%	0.001W/M2
Rain	0 to 236 in.	± 5%	0.01 in
Wind Direction	0 - 360 °	± 10°	1°
Wind Speed	0 to 100 mph (operational)	± 2.2 mph or 10% (whichever is	1.4 mph
		greater)	

Figure 72

9.5 **Power Consumption**

- Display Tablet: 5V DC Adaptor (included), Power Consumption: 0.5 Watts (1.25 Watts during Wi-Fi configuration mode)
- Outdoor sensor array: 2xAA batteries (not included). The primary power source is the solar panel. The batteries provide backup power when there is limited solar energy.
- Indoor sensor: 2xAA batteries (not included).



10. Maintenance

1. Clean the rain gauge once every 3 months. Rotate the funnel counterclockwise and lift to expose the rain gauge mechanism, and clean with a damp cloth. Remove any dirt, debris and insects. If bug infestation is an issue, spray the array lightly with insecticide.



Figure 73

- 2. Clean the solar radiation sensor and solar panel every 3 months with damp cloth.
- 3. Replace batteries every 1-2 years. If left in too long, the batteries may leak due to environmental challenges. In harsh environments, inspect the batteries every 3 months (when cleaning the solar panel).
- 4. When replacing the batteries, apply a corrosion preventive compound on the battery terminals, available at Amazon and most hardware stores.
- 5. In snowy environments, spray the top of the weather station with anti-icing silicon spray to prevent snow build up.

11. Troubleshooting Guide

If your question is not answered here, you can contact us as follows:

- 1. Online Support: https://ambientweather.com/faqs/question/tags/tag/WS-2000/
- 2. Email Support: <u>support@ambientweather.com</u>
- 3. Technical Support: 480-346-3380 (M-F 8am to 3pm Arizona Time)



ambient weather

Problem	Solution	
Outdoor sensor array does not communicate to the display tablet	Reset the sensor array. Press the reset button as described in Error! Reference source not found., #10.	
	With an open-ended paperclip, press the reset button for 3 seconds to completely discharge the voltage.	
	Take out the batteries and wait one minute, while covering the solar panel to drain the voltage.	
	Put batteries back in and resync the tablet with the sensor array about 10 feet away.	
	The LED next to the battery compartment will flash every 16 seconds. If the LED is not flashing every 16 seconds	
	Replace the batteries in the outside sensor array.	
	If the batteries were recently replaced, check the polarity. If the sensor is flashing every 16 seconds, proceed to the next step.	
	There may be a temporary loss of communication due to reception loss related to interference or other location factors,	
	or the batteries may have been changed in the sensor array and the tablet has not been reset. The solution may be as simple as powering down and up the tablet (remove AC power, wait 10 seconds, and reinsert AC power).	
Temperature sensor reads too high in the davtime.	Make certain that the sensor array is not too close to heat generating sources or strictures, such as buildings, pavement, walls or air conditioning units.	
	Use the calibration feature to offset installation issues related to radiant heat sources. Reference Section 6.11.	
Relative pressure does	You may be viewing the absolute pressure, not the relative pressure.	
reporting station	Select the relative pressure. Make sure you properly calibrate the sensor to an official local weather station. Reference Section 6.11	
Rain gauge reports rain when it is not raining	An unstable mounting solution (sway in the mounting pole) may result in the tipping bucket incorrectly incrementing rainfall. Make sure you have a stable, level mounting solution.	
Data not reporting to Wunderground.com	1. Confirm your station ID and station Key is correct.	
	2. Make sure the date and time is correct on the tablet. If incorrect, you may be reporting old data, not real time data.	
	3. Make sure your time zone is set properly. If incorrect, you may be reporting old data, not real time data.	
	4. Check your router firewall settings. The tablet sends data via Port 80.	
No Wi-Fi connection	1. Check for Wi-Fi symbol on the display. If wireless connectivity is successful, the	
	Wi-Fi icon will be displayed in the time field.	
	2. Make sure your modem Wi-Fi settings are correct (network name, and password).	



Problem	Solution		
	3. Make sure the tablet is plugged into AC power. The tablet will not connect to Wi-Fi when powered by batteries only.		
	4. The tablet only supports and connects to 2.4 GHz routers. If you own a 5 GHz router, and it is a dual band router, you will need to disable the 5 GHz band, and enable the 2.4 GHz band.		
	5. The tablet does not support guest networks.		
Exclamation point ! next to the Wi-Fi icon	If there is an exclamation point ! next to the Wi-Fi icon on the WS-2000 display, it means the display is connected to Wi-Fi but the Wi-Fi is not connected to the Internet Make sure the 2.4 GHz band on your router is connected to the Internet. If the problem persists, try rebooting your router.		
Wind Vane does not spin as freely as the wind cups.	This is by design. The dampening prevents the wind vane from spinning with the slightest breeze, which will result in variable wind all the time. The added resistance allows the wind vane to change direction with $2 - 3$ mph, providing a much better wind direction tracking.		
Time off by	The time zone is entered incorrectly. Reference Section 6.9.1.		
increments of an hour,			
or date is off by one			
day.			
Figure 74			

12. Accessories

The following software and hardware accessories are available for this weather station at <u>www.AmbientWeather.com</u> .

Accessory	Description
Ambient Weather Mounting	Ambient Weather provides the most comprehensive mounting solutions for weather
<u>Solutions</u>	stations, including tripods, pole extensions, pole mounting kits, ground stakes and more.
WS-2000-CONSOLE-AC	Add as many display tablets as you like to your weather station.

Figure 75

13. Liability Disclaimer

Please help in the preservation of the environment and return used batteries to an authorized depot. The electrical and electronic wastes contain hazardous substances. Disposal of electronic waste in wild country and/or in unauthorized grounds strongly damages the environment.

Reading the "User manual" is highly recommended. The manufacturer and supplier cannot accept any responsibility for any incorrect readings and any consequences that occur should an inaccurate reading take place.

This product is designed for use in the home only as indication of weather conditions. This product is not to be used for medical purposes or for public safety information.

The specifications of this product may change without prior notice.

This product is not a toy. Keep out of the reach of children.

No part of this manual may be reproduced without written authorization of the manufacturer. Ambient, LLC WILL NOT ASSUME LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, PUNITIVE, OR OTHER SIMILAR DAMAGES ASSOCIATED WITH THE OPERATION OR MALFUNCTION OF THIS PRODUCT.



14.FCC Statement

Statement according to FCC part 15.19:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

- 1. This device may not cause harmful interference.
- 2. This device must accept any interference received, including interference that may cause undesired operation.

Statement according to FCC part 15.21:

Modifications not expressly approved by this company could void the user's authority to operate the equipment. **Statement according to FCC part 15.105:**

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in an installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

15. 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 an 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); (3) damage resulting from failure to follow instructions contained in your owner's manual; (4) damage resulting from the performance of repairs or alterations by someone other than an authorized Ambient, LLC authorized service center; (5) units used for other than personal use (6) applications and uses that this product was not intended (7) the products inability to receive a signal due to any source of interference or metal obstructions and (8) extreme acts of nature, such as lightning strikes or floods.

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.

16. California Prop 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



ambient weather

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 warning signs on Ambient Weather Products.

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

