

---

# Ambient Weather WS-100 Wi-Fi Smart Weather Station User Manual



## Table of Contents

### Contents

1. Introduction .....	3
2. Warnings .....	4
3. Quick Start Guide .....	4
4. Parts .....	4
4.1 Wi-Fi Module (included).....	4
4.2 Anemometer (optional) .....	5
4.3 Rain Gauge (optional) .....	6
4.4 Indoor / Outdoor Thermo-Hygrometer (optional).....	7
4.5 Floating Pool, Spa and Pond Thermometer (optional) .....	8
4.6 Temperature Probe (optional) .....	8
4.7 Indoor Thermo-Hygrometer (optional).....	8
5. Recommend Tools .....	8
6. Sensor Assembly and Installation .....	9
6.1 Anemometer .....	9
6.1.1 Anemometer Assembly .....	9
6.1.2 Anemometer Installation.....	10
6.2 Rain Gauge .....	12
6.2.1 Rain Gauge Assembly .....	12
6.2.2 Rain Gauge Installation .....	13
6.3 Thermo-Hygrometer (F007TH) .....	14
6.3.1 Thermo-Hygrometer Assembly.....	14
6.3.2 Thermo-Hygrometer Installation.....	16
6.4 Floating Pool, Spa and Pond Thermometer (F007PF).....	17
6.4.1 Floating Pool, Spa and Pond Thermometer Assembly .....	17
6.4.2 Sensor Placement .....	22
6.5 Probed Thermometer (F007TP) .....	23
6.5.1 Probed Thermometer Assembly .....	23
6.5.2 Probed Thermometer Installation .....	25
6.5.3 Refrigerator/Freezer Mounting.....	26
6.5.4 Wall Mounting .....	27

---

6.6	Indoor Thermo-Hygrometer (FT012TH) .....	28
6.6.1	Indoor Thermo-Hygrometer Assembly .....	28
6.6.2	Display Features .....	30
6.6.3	Indoor Thermo-Hygrometer Sensor Operation .....	31
6.6.4	Backlight Operation.....	32
6.6.5	Adjustment or Calibration.....	32
6.6.6	Indoor Sensor Installation .....	34
7.	Weather Station Installation Guide and Limitations .....	35
7.1	Pre-Installation Checkout .....	35
7.2	Site Survey.....	36
7.3	Best Practices for Wireless Communication .....	36
8.	Module Set Up and Operation .....	37
8.1	Module Buttons and LEDs .....	37
8.2	Module Power Up .....	38
8.3	Wi-Fi and Internet Services .....	39
8.4	Connect to the Module's WiFi Wireless Access Point (WAP).....	39
8.5	Accessing the Module's Web Interface.....	42
8.6	Time Synchronization .....	45
8.7	Module Factory Reset .....	45
9.	AmbientWeather.net .....	45
9.1	Registering with AmbientWeather.net .....	45
9.2	Ambient Weather Apps .....	47
10.	Third Party Public Websites.....	47
11.	AmbientWeather.net Works with and Community .....	48
12.	Advanced Settings.....	48
12.1	Live Data .....	48
12.1.1	Viewing Live Data.....	48
12.1.2	Adding or Reacquiring Sensors .....	50
12.1.3	Editing Rainfall Totals .....	50
12.2	Units .....	50
12.3	Calibration .....	51
12.3.1	Temperature Calibration.....	52
12.3.2	Humidity Calibration .....	52
12.3.3	Barometer Calibration.....	53
12.3.4	Rain Calibration.....	53
12.3.5	Wind Speed Calibration .....	54
12.3.6	Wind Direction Calibration .....	54
12.4	Upgrade .....	55
13.	Glossary of Terms .....	55
14.	Specifications .....	56
15.1	Wireless Specifications.....	56
15.2	Measurement Specifications .....	56
15.3	Power Consumption .....	57

15.4	Wi-Fi Specifications.....	57
15.	Maintenance.....	57
16.	Liability Disclaimer.....	57
17.	FCC Statement.....	58
18.	Warranty Information.....	59
19.	California Prop 65.....	59

## 1. Introduction

Thank you for your purchase of the WS-100 WiFi Smart Weather Module. The following user guide provides step by step instructions for installation, operation and troubleshooting. To download the latest full-sized manual and additional troubleshooting tips, please visit:

<https://help.ambientweather.net/product/ws-100>

The WS-100 is a WiFi connected module that receives sensor data from a variety of sensors, displays and configures this data, and sends it to your router and the Internet.

The module also includes an internal temperature, humidity and barometer.


The following items are may be packaged or sold separately with the WS-100:


Item	Measurements	Sensors Supported	Comments
WS-100	Internal temperature, humidity and barometer sensors	--	Included
WS-12-ANEMOMETER	Wind Speed and Wind Direction	1	Optional
WS-12-RAIN	Precipitation	1	Optional
F007TH	Indoor or Outdoor Temperature and Humidity	8	Optional 8 Channel Sensor. Mix and match with other 8 channel sensors.
F007PF	Floating Pool, Spa and Pond Thermometer	8	Optional 8 Channel Sensor. Mix and match with other 8 channel sensors.
F007TP	Indoor or Outdoor Temperature Probe	8	Optional 8 Channel Sensor. Mix and match with other 8 channel sensors.
FT012TH	Indoor Temperature and Humidity	8	Optional 8 Channel Sensor. Mix and match with other 8 channel sensors.

---

**Figure 1**

## 2. Warnings

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

 **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.


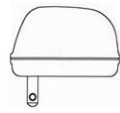

## 3. Quick Start Guide

Step	Description	Section
1	Assemble and power up the sensors	6
2	Power up the module and synchronize with wind sensor, rain sensor and other sensor(s)	8.2
3	Install the sensors	6
5	Calibrate the relative or sea-level pressure (barometer)	9.10.3
6	Clear any total rain that may have accumulated during the set up.	9.10.4
7	Connect the module to Wi-Fi	10
8	Register at AmbientWeather.net	11

**Figure 2**




## 4. Parts

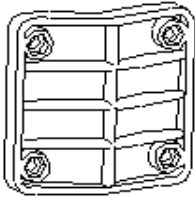

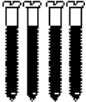

### 4.1 Wi-Fi Module (included)

QTY	Item	Image
1	<b>WS-100 WiFi Module</b> Frame Dimensions (LxHxW): 3 x 3 x 1 in	
1	Antenna	
1	Power Adapter	
1	User Manual	

**Figure 3**


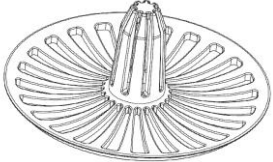

## 4.2 Anemometer (optional)

QTY	Item	Image
1	<b>WS-12-ANEMOMETER</b> Dimensions: 3 ¼ x 6 x 8 ½”	
1	Pole Dimensions: 12 x 1½ x 1”	
1	Pole Mounting Bracket (with pole insert) Dimensions: 3 x 4 x 1 ½”	

QTY	Item	Image
1	Anemometer Mounting Bracket Back Plate (pole mount) Dimensions: 3 x 3 x 1"	
4	Pole mounting nuts (M5) / bolts (Ø5)	
4	Tapping screws	
2	Pole mounting nuts (M3) / bolts (Ø3)	

**Figure 4**

### 4.3 Rain Gauge (optional)

QTY	Item	Image
1	<b>WS-12-RAIN</b> Rain Gauge Dimensions: 8 1/4" x 7 3/4" x 5" (5" diameter)	
1	Rain Gauge Filter Dimensions: 2.48 x 2.48 x 1.1in	
2	Pole mounting U-bolt / nuts (M5)	

**Figure 5**

If sold separate from the anemometer (only one pole assembly is required per system), the following parts are included:



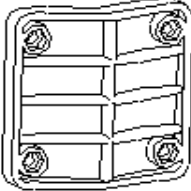

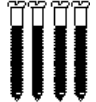
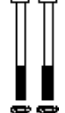
QTY	Item	Image
1	Pole Dimensions: 12 x 1½ x 1”	
1	Pole Mounting Bracket (with pole insert) Dimensions: 3 x 4 x 1 ½”	
1	Anemometer Mounting Bracket Back Plate (pole mount) Dimensions: 3 x 3 x 1”	
4	Pole mounting nuts (M5) / bolts (Ø5)	
4	Tapping screws	
2	Pole mounting nuts (M3) / bolts (Ø3)	

Figure 6

#### 4.4 Indoor / Outdoor Thermo-Hygrometer (optional)


Item	Image
<b>F007TH</b> Thermo-hygrometer transmitter Dimensions (LxHxW): 4.5 x 2.0 x 0.75in	

Figure 7

### 4.5 Floating Pool, Spa and Pond Thermometer (optional)


Item	Image
<b>F007PF</b> Floating Pool, Spa and Pond Thermometer Dimensions (LxWxH): 8.5" x 4.2" x 3.7"	

Figure 8

### 4.6 Temperature Probe (optional)


Item	Image
<b>F007TP</b> Temperature Probe Dimensions (LxHxW): 4.5 x 2.0 x 0.75in Probe Length: 6 feet	

Figure 9

### 4.7 Indoor Thermo-Hygrometer (optional)


Item	Image
<b>FT012TH</b> Indoor Thermo-hygrometer transmitter Dimensions (LxHxW): 4.3" x 2.5" x 0.65"	

Figure 10

## 5. Recommend Tools

- Phillips Precision screwdriver Size: PH0 and PH2



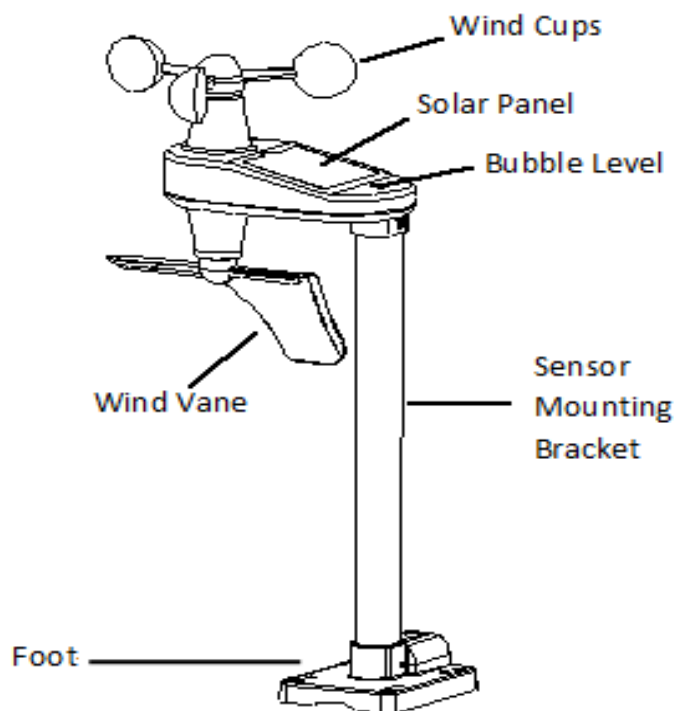
- Compass or GPS (for wind direction calibration)
- Adjustable Wrench
- Hammer and nail for hanging remote thermo-hygrometer transmitter.

## 6. Sensor Assembly and Installation

### 6.1 Anemometer

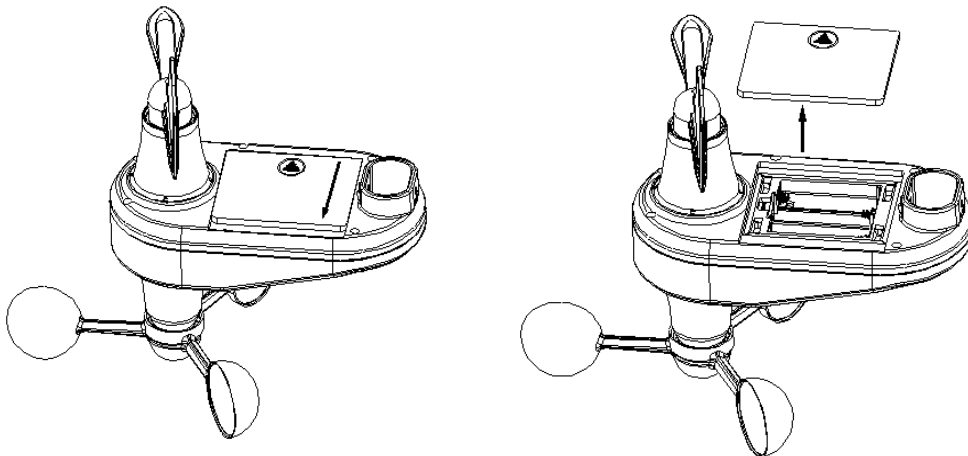
#### 6.1.1 Anemometer Assembly

The anemometer assembly consists of the wind cups, wind vane, solar panel, bubble level, sensor mounting bracket and mounting foot. The solar panel provides power to the anemometer when the sun is out, and the batteries provide power at night (the solar panel does not charge the batteries).




**Figure 11**

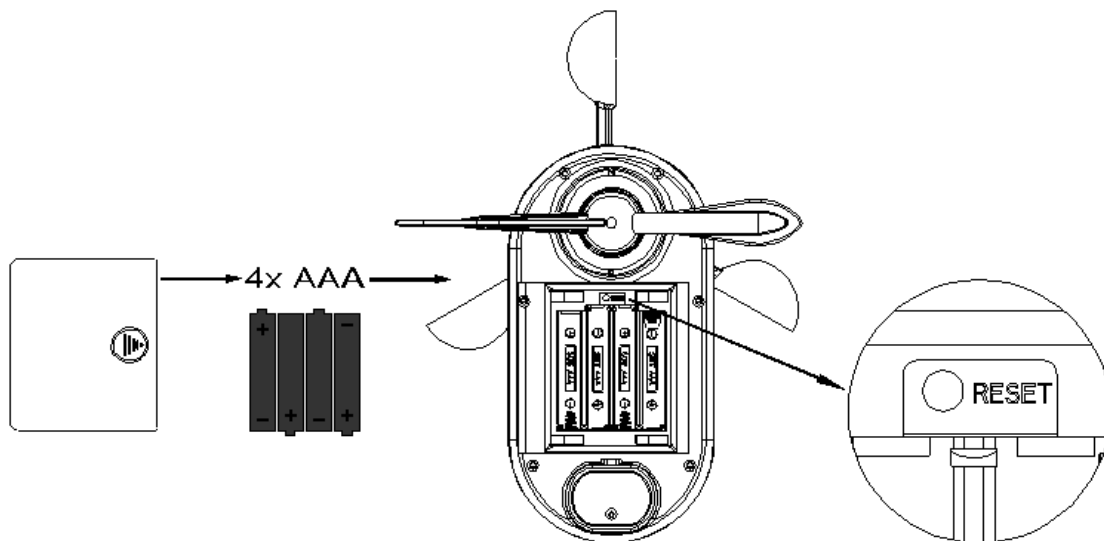
Locate the battery door on the anemometer transmitter, push and open the battery compartment, as shown in Figure 11.



**Figure 12**


Insert four batteries into the battery compartment, then press the reset button, as shown in Figure 12.

 **Note:** Use high quality alkaline batteries, which have an operational temperature range of -4 to 140 °F. Use Energizer e2 Lithium batteries for low temperature installation, which have an operational temperature range of -40 to 140 °F. Do not use rechargeable batteries. They have a lower operating voltage and discharge faster than non-rechargeable batteries and will result in short transmission ranges.

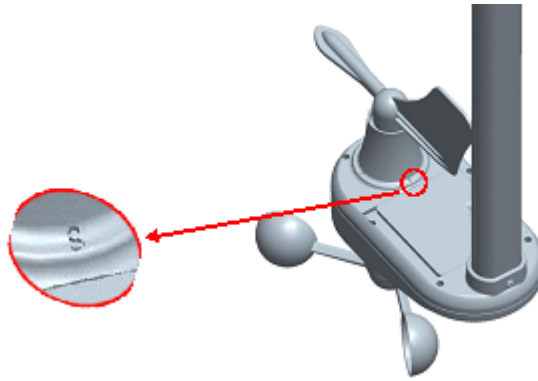


**Figure 13**

### 6.1.2 Anemometer Installation

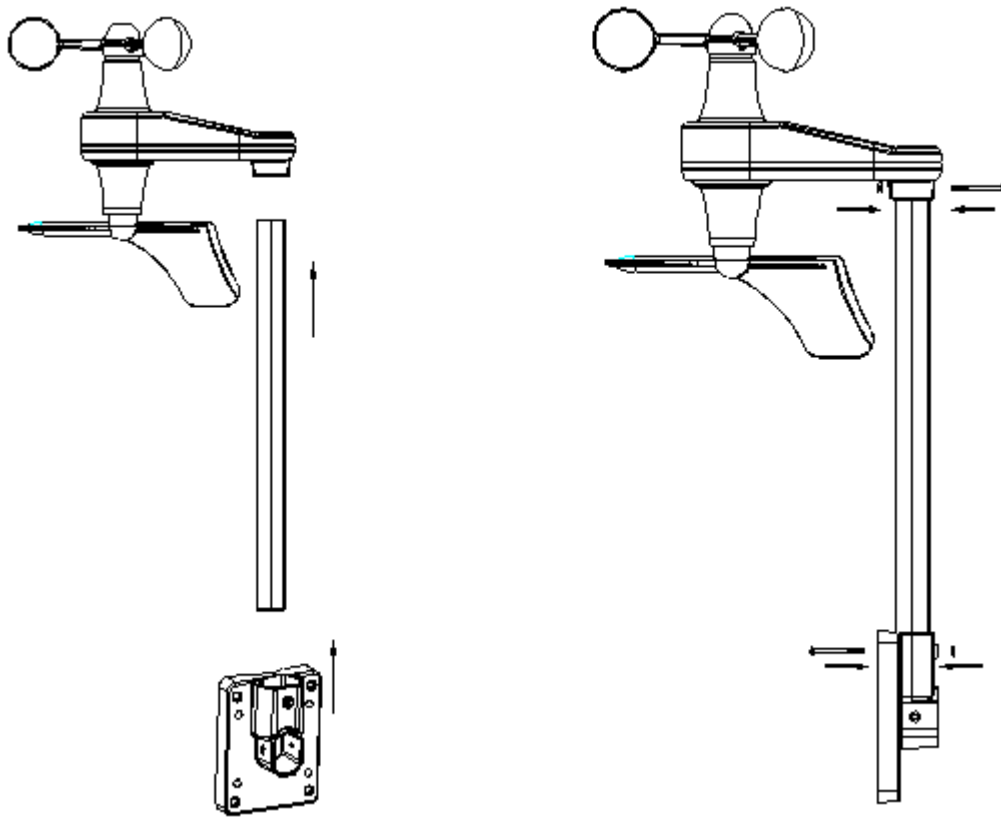
 **Note:** Do not install the anemometer until it is paired and operationally confirmed with the display module.

Prior to installation, you will need to calibrate the wind direction. There is a “S” indicator on the wind vane that indicates South, as shown in Figure 13. Align this “S” marker in the direction of South.



**Figure 14**

Fasten the wind transmitter to mounting pole brackets with foot-mounting, two Ø3 bolts and M3 nuts, as shown in Figure 14.



**Figure 15**

Tighten the included mounting pole to your mounting pole (purchased separately) with the four Ø5 Bolts and M5 Nuts assembly, or fix on the wall with four tapping screws, as shown in Figure 15.

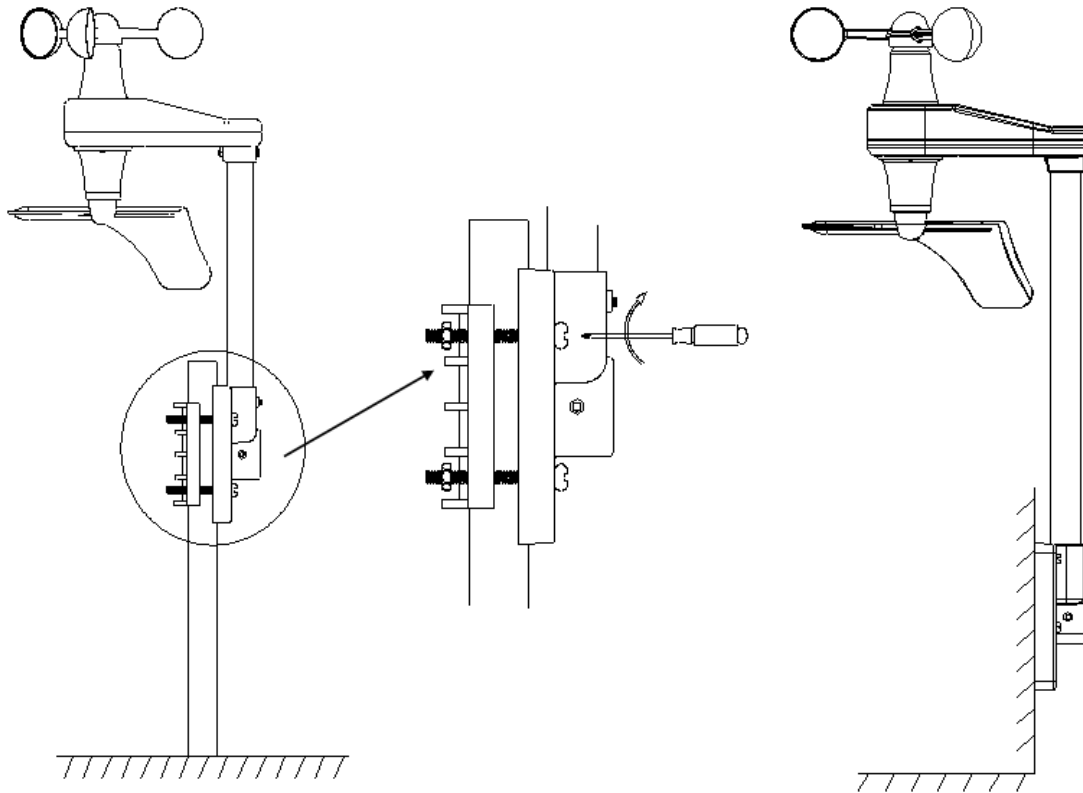


Figure 16

## 6.2 Rain Gauge

### 6.2.1 Rain Gauge Assembly

The rain gauge consists of the rain gauge funnel, base, and drawer filter, as shown in Figure 16.

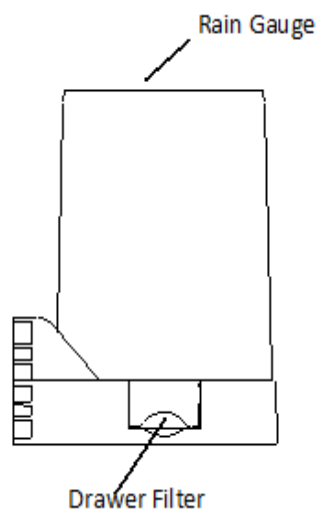
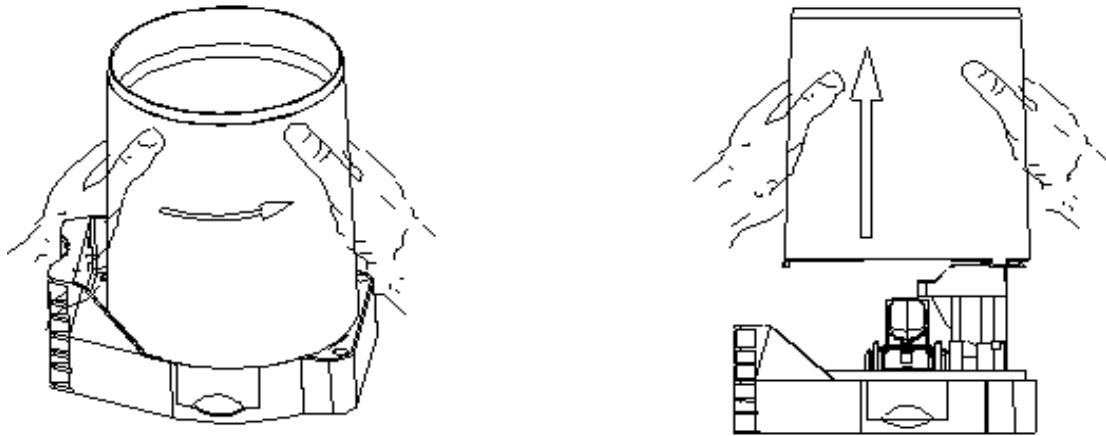


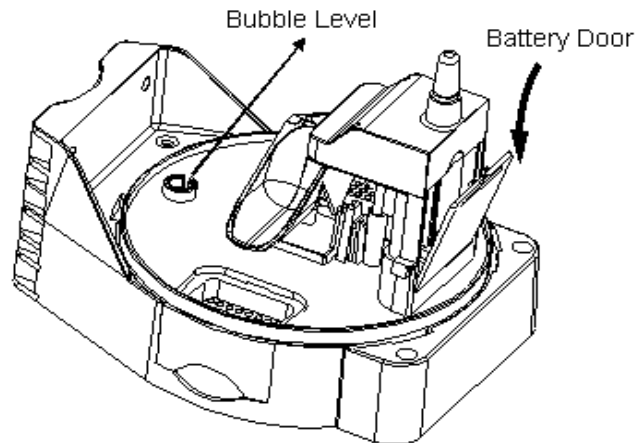
Figure 17

Rotate and detach the rain gauge funnel, as shown in Figure 17.



**Figure 18**

Locate the battery door on the rain gauge transmitter, pull out the battery compartment, as shown in Figure 18.



**Figure 19**

## 6.2.2 Rain Gauge Installation

Remove the rain gauge funnel from the base prior to installation by rotating the counterclockwise until the tabs on the base and the funnel align, then pulling upwards.

Fasten the rain gauge to the mounting pole. Tighten the rain gauge to your mounting pole or bracket with two U-bolts and four M5 nuts or fix on a horizontal surface with the four tapping screws.

Reattach the funnel by aligning the tabs on the funnel and base and rotate clockwise.

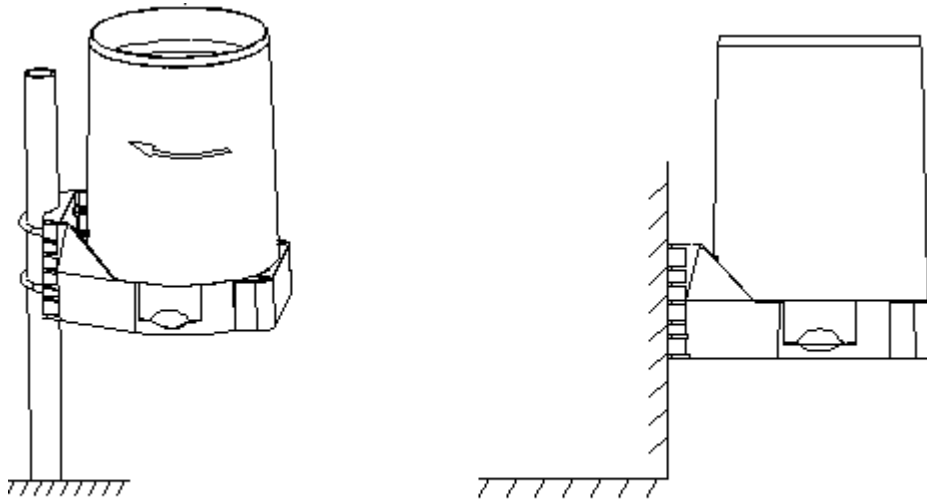


Figure 20

### 6.3 Thermo-Hygrometer (F007TH)

#### 6.3.1 Thermo-Hygrometer Assembly

Remove the battery door on the back of the sensor by removing the set screw, as shown in Figure 21.

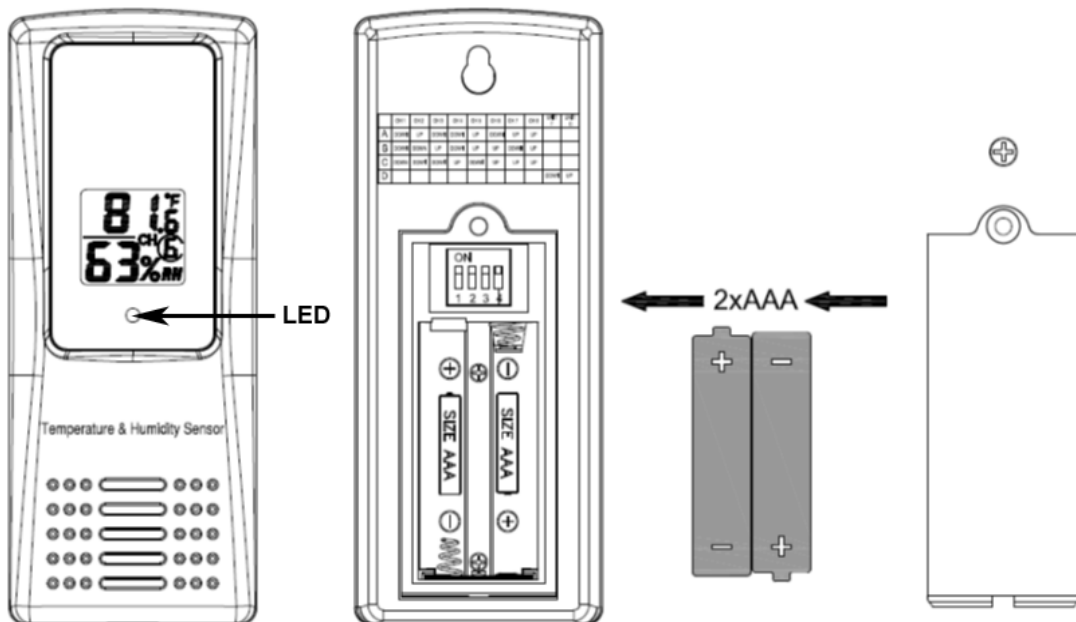


Figure 21

**BEFORE** inserting the batteries, locate the dip switches on the inside cover of the lid of the transmitter.

Figure 22 displays all four switches in the OFF position (factory default setting).



**Figure 22**

**Channel Number:** The WS-50 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 Table 1.

**Temperature Units of Measure:** To change the transmitter display units of measure (°F vs. °C), change Dip Switch 4, as referenced in Table 1.

DIP SWITCH				FUNCTION
1	2	3	4	
DOWN	DOWN	DOWN	---	Channel 1(outdoor)
DOWN	DOWN	UP	---	Channel 2
DOWN	UP	DOWN	---	Channel 3
DOWN	UP	UP	---	Channel 4
UP	DOWN	DOWN	---	Channel 5
UP	DOWN	UP	---	Channel 6
UP	UP	DOWN	---	Channel 7
UP	UP	UP	---	Channel 8
---	---	---	DOWN	°F
---	---	---	UP	°C

**Table 1**

Insert two AAA batteries.

After inserting the batteries, the remote sensor LED indicator will light for 4 seconds, and then flash once per 60 seconds thereafter. Each time it flashes, the sensor is transmitting data.

Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the display, as shown in Figure 23.

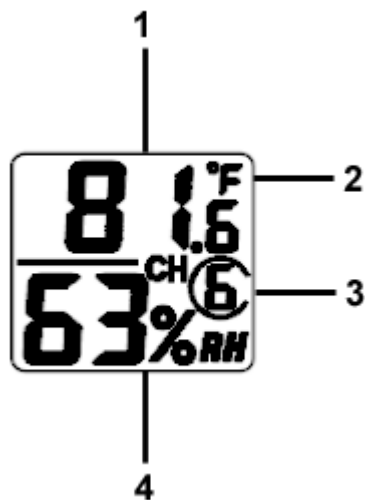



Figure 23

- (1) temperature
- (2) temperature units (°F vs. °C)
- (3) channel number
- (4) relative humidity

Close the battery door. Make sure the gasket (around the battery compartment) is properly seated in its trace prior to closing the door. Tighten the set screw.

### 6.3.2 Thermo-Hygrometer Installation

 **Note:** If you place the sensor outside, it is recommended you mount it in a shaded area. A north facing wall is preferred because it is in the shade most of the day. Direct sunlight and radiant heat sources will result in inaccurate temperature readings. Although the sensor is water resistant, it is best to mount in a well-protected area, such as under an eave. Use a screw or nail (not included) to affix the remote sensor to the wall, as shown in Figure 24.

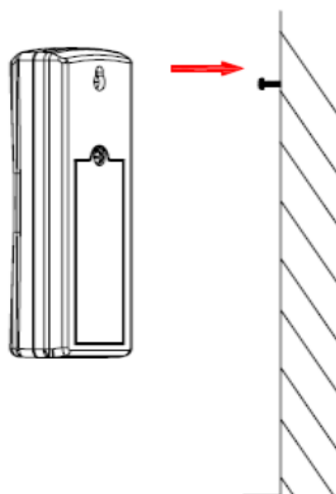


Figure 24



Sensors placed in shade on the north side of the house will experience lower daily highs and higher daily lows because of the radiant heat (and cooling) of the walls and structure around it. This is known as thermal mass and has a time averaging affect (just like the temperature of your pool will respond faster than a lake).


Optional Sensor Radiation Shields (Item SRS100LX) are available from Ambient Weather for mounting the sensor in an open area.



Figure 25

## 6.4 Floating Pool, Spa and Pond Thermometer (F007PF)

### 6.4.1 Floating Pool, Spa and Pond Thermometer Assembly

 **Note:** We recommend fresh alkaline batteries for temperature ranges between -4 °F and 140 °F and fresh lithium batteries for temperature ranges between -40 °F and 140 °F. The solar panel does not charge the batteries, so rechargeable batteries are not needed or recommended.

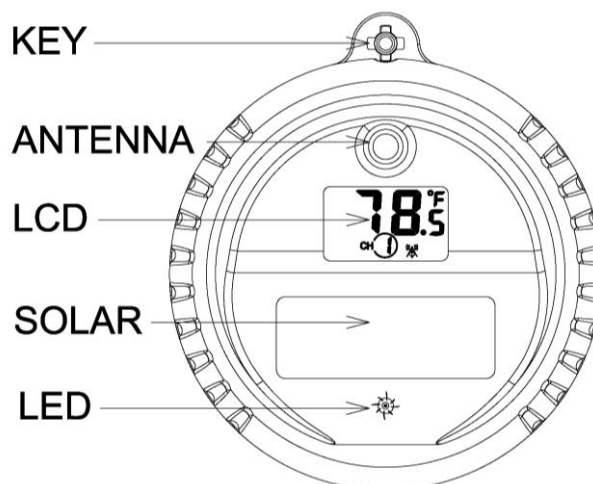

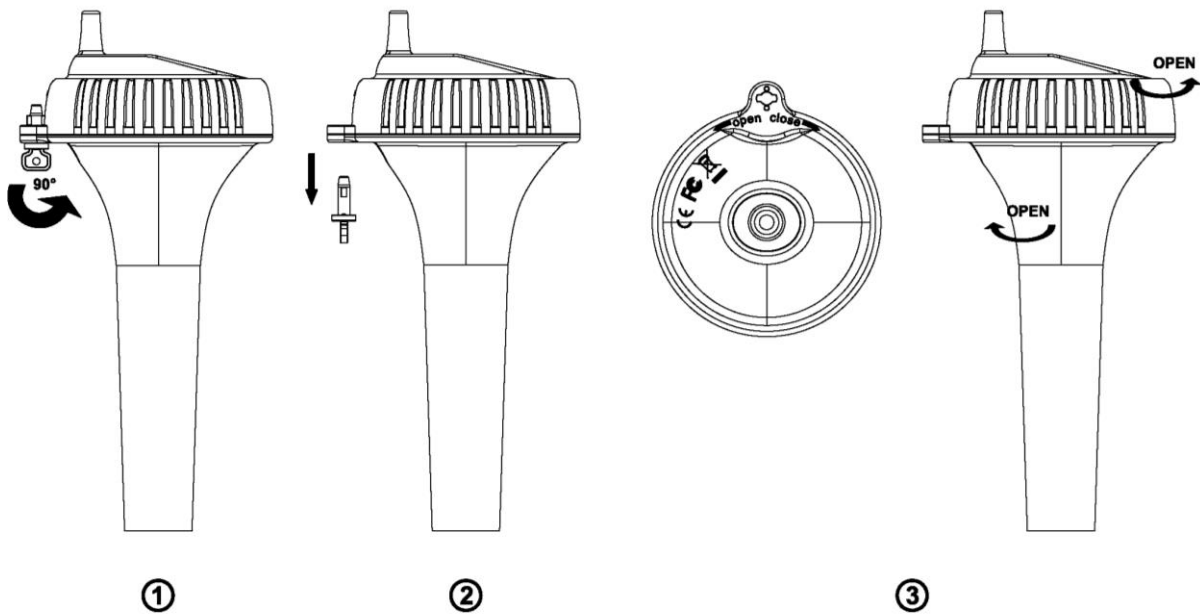


Figure 26

To insert the batteries,, (1) Twist the **BUTTON** lid to unlock, (2) remove the button, and (3) twist the main body of the sensor by removing the lid, as shown in Figure 27 .

 **IMPORTANT NOTE:** Turn the lid counter clockwise to **open**, like the lid of a jar. Turning the lid clockwise may overtighten the lid.



**Figure 27**

 **IMPORTANT NOTE:** Turn the lid counterclockwise to **open**, like the lid of a jar (Figure 28). Turning the lid clockwise may overtighten the lid.



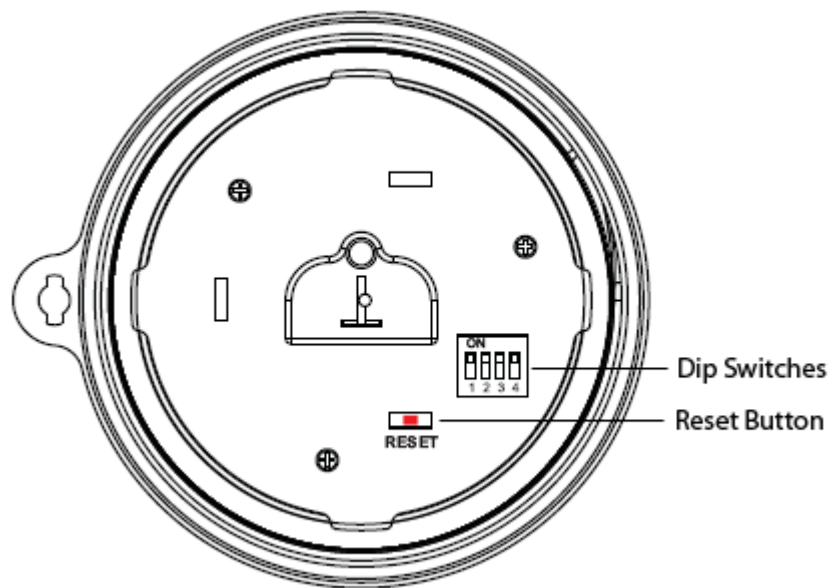
**Figure 28**

The floating thermometer includes dip switches for assigning channel numbers. **BEFORE** inserting the batteries, locate the dip switches on the inside cover of the lid of the transmitter. Figure 29 displays all four switches in the OFF position (factory default setting).

**NOTE:** The second-generation pool float includes a reset button.

If the display does not power up after inserting the batteries, press the reset button shown in Figure 29.

If your pool float does not include a reset button, cover the solar panel with one hand, remove the batteries, wait 60 seconds, reinsert the batteries, and uncover the solar panel.



**Figure 29**



**Figure 30**

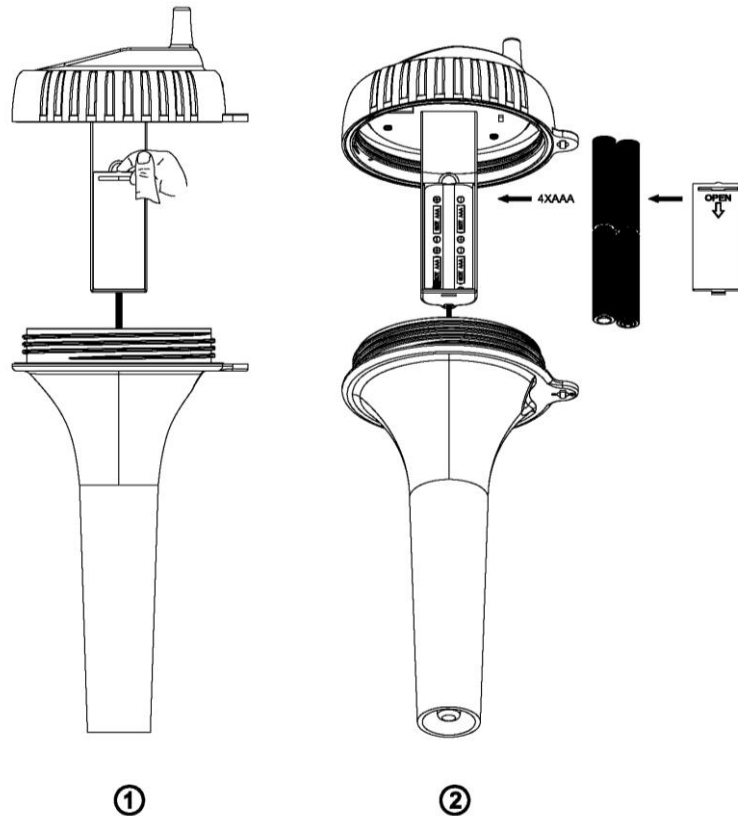
**Channel Number:** The F007PF supports up to eight transmitters. To set each channel number (the default is Channel 1), change Dip Switches 1, 2 and 3, as referenced in Table 1.

**Temperature Units of Measure:** To change the transmitter display units of measure ( $^{\circ}\text{F}$  vs.  $^{\circ}\text{C}$ ), change Dip Switch 4, as referenced in Table 1.

DIP SWITCH				FUNCTION
1	2	3	4	
DOWN	DOWN	DOWN	---	Channel 1 (pool)
DOWN	DOWN	UP	---	Channel 2 (SPA)
DOWN	UP	DOWN	---	Channel 3 (optional)
DOWN	UP	UP	---	Channel 4 (optional)
UP	DOWN	DOWN	---	Channel 5 (optional)
UP	DOWN	UP	---	Channel 6 (optional)
UP	UP	DOWN	---	Channel 7 (optional)
UP	UP	UP	---	Channel 8 (optional)
---	---	---	DOWN	°F
---	---	---	UP	°C

**Table 2**

Reference Figure 31. Install 4 x AAA batteries.



**Figure 31**

Open the battery compartment and (2) insert 4 x AAA batteries into the battery compartment, observing the correct battery polarity.

After inserting the batteries, the remote sensor LED indicator will light for 4 seconds, and then flash once per 60 seconds thereafter. Each time it flashes, the sensor is transmitting data.

Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the

display, as shown in Figure 23.

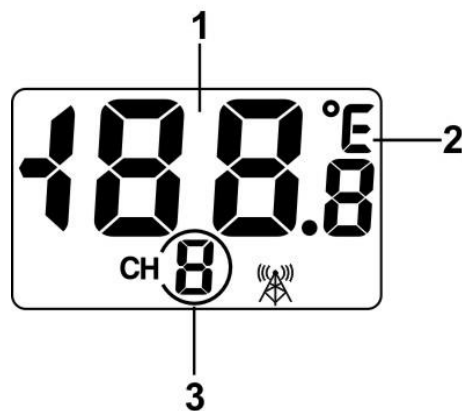


Figure 32

- (1) temperature
- (2) temperature units (°F vs. °C)
- (3) channel number

Close the battery door. Make sure both red colored gaskets are properly seated in their traces prior to closing the battery door, as shown in Figure 33. Failure to properly seal the floating thermometer will result in water leakage and damage.

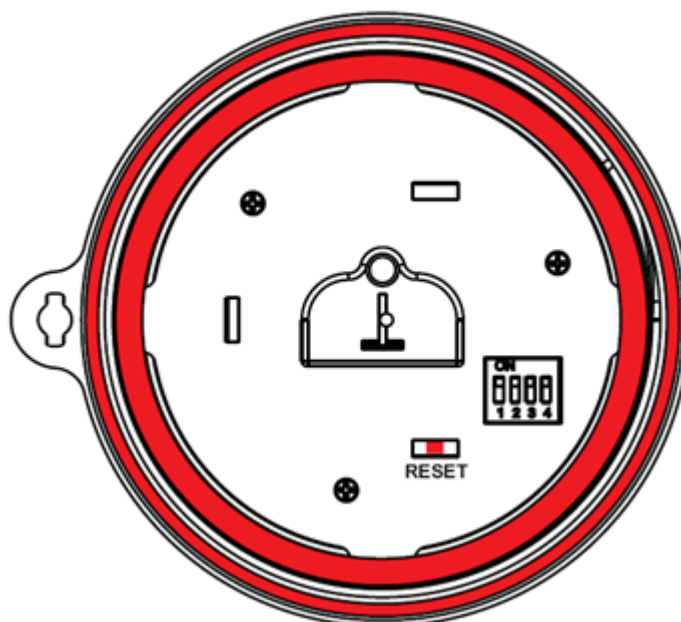
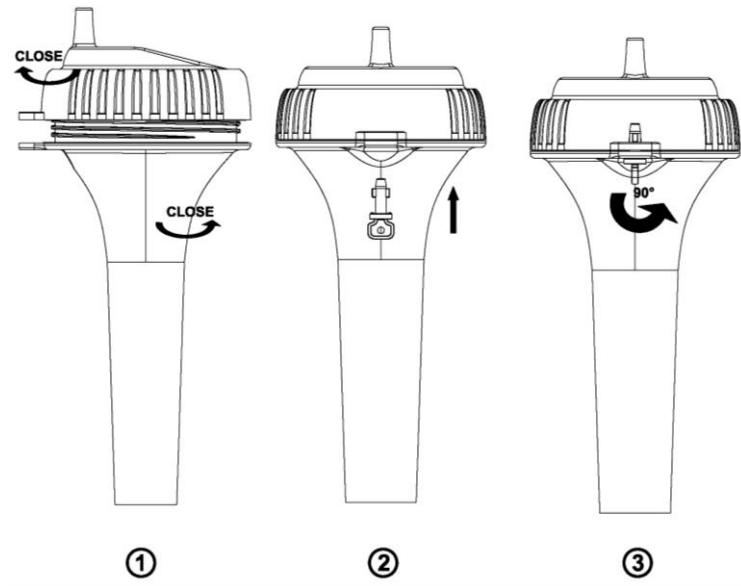


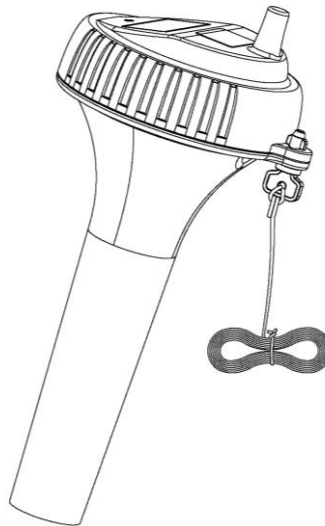
Figure 33

To close the lid, (1) Twist the lid until it is firmly locked, and the button is aligned. (2) Insert the button and turn 90 degrees to lock the lid, as shown in Figure 34.



**Figure 34**

A tether can be added into the button as shown in Figure 35.



**Figure 35**

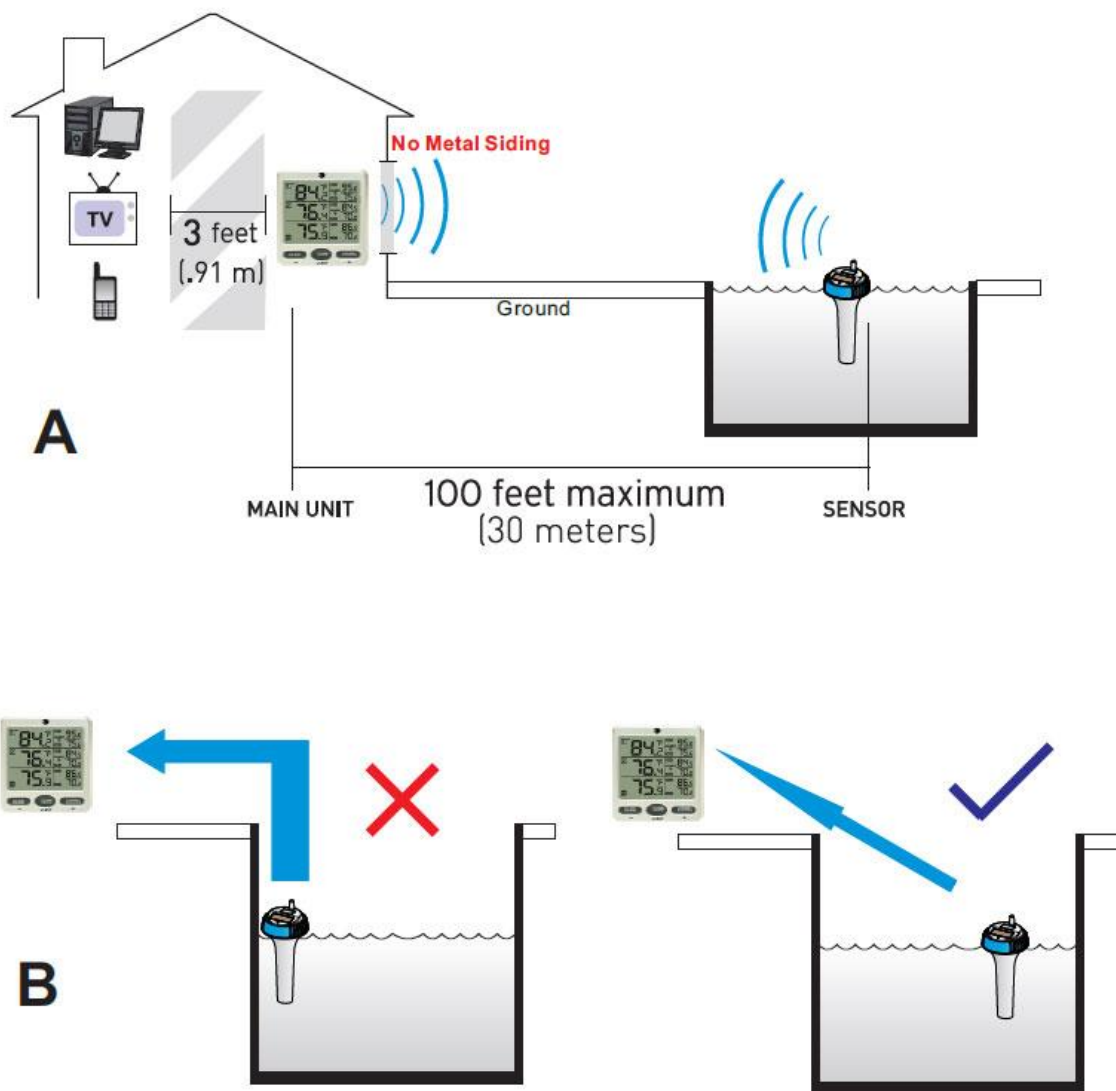
Place the sensor in the water and make sure that it is within the effective transmission range from the display module.

### **6.4.2 Sensor Placement**

Place the sensor in the pool or spa within 100 feet of the display module (Figure 36, reference A). Avoid transmitting through solid earth or ground (Figure 36, reference B). Use a tether (string) to fix the sensor in the pool or spa.

Place the module at least three feet away from computers, TVs, and wireless phones.

Avoid transmitting through solid metal barriers.




**Figure 36**

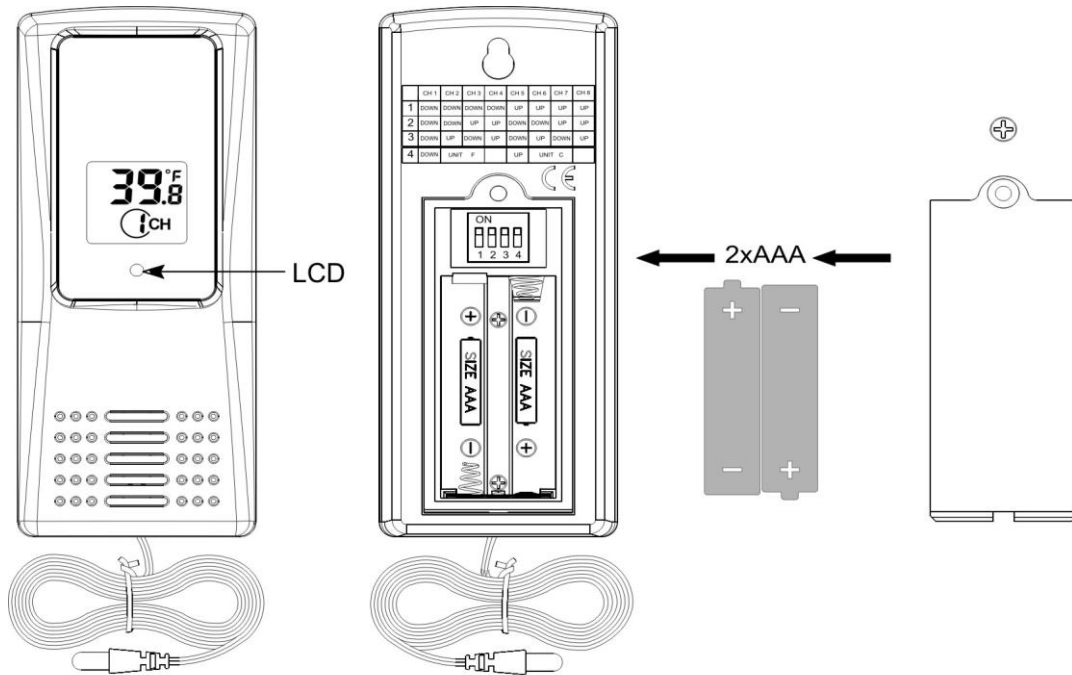
**NOTE:** The F007PF is designed to float. If the F007PF is used under a cover and the sensor is constantly submerged, the additional pressure will lead to premature gasket failure. Moisture will enter the sensor compartment and cause sensor failure.

## 6.5 Probed Thermometer (F007TP)

### 6.5.1 Probed Thermometer Assembly

 **Note:** Do not use rechargeable batteries. They have a lower operating voltage and discharge faster than non-rechargeable batteries and will result in short transmission ranges. We recommend fresh alkaline batteries for temperature ranges between -4 °F and 140 °F and fresh lithium batteries for temperature ranges between -40 °F and 140 °F.

Remove the battery door on the back of the sensor by removing the set screw, as shown in Figure 27.



**Figure 37**

**BEFORE** inserting the batteries, locate the dip switches on the inside cover of the lid of the transmitter.

Figure 38 displays all four switches in the OFF position (factory default setting).



**Figure 38**

**Channel Number:** The sensor 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 Table 1.

**Temperature Units of Measure:** To change the transmitter display units of measure (°F vs. °C), change Dip Switch 4, as referenced in Table 1.



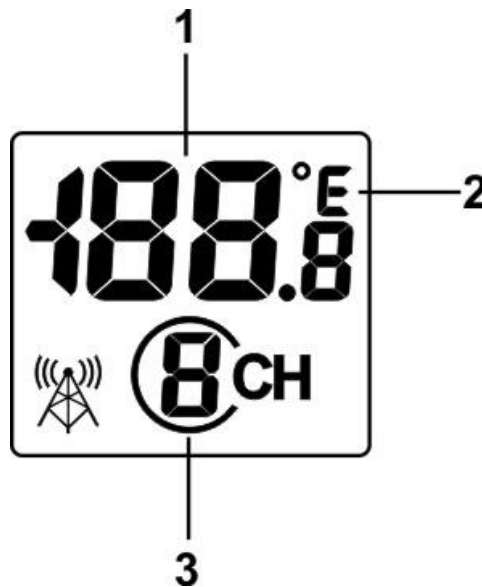
DIP SWITCH				FUNCTION
1	2	3	4	
DOWN	DOWN	DOWN	---	Channel 1
DOWN	DOWN	UP	---	Channel 2
DOWN	UP	DOWN	---	Channel 3
DOWN	UP	UP	---	Channel 4
UP	DOWN	DOWN	---	Channel 5
UP	DOWN	UP	---	Channel 6
UP	UP	DOWN	---	Channel 7
UP	UP	UP	---	Channel 8
---	---	---	DOWN	°F
---	---	---	UP	°C

**Table 3**

Insert two AAA batteries.

After inserting the batteries, the remote sensor LED indicator will light for 4 seconds, and then flash once per 60 seconds thereafter. Each time it flashes, the sensor is transmitting data.

Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the display, as shown in Figure 39.



**Figure 39**

- (1) temperature
- (2) temperature units (°F vs. °C)
- (3) channel number

Close the battery door. Make sure the gasket (around the battery compartment) is properly seated in its trace prior to closing the door. Tighten the set screw.

### 6.5.2 Probed Thermometer Installation

The remote probe sensors have many applications, including measuring inside/outside air temperature, water temperature, soil or ground temperature and refrigerator / freezer temperatures.

### 6.5.3 Refrigerator/Freezer Mounting

The sensor includes a detachable suction cup that may be used to secure the remote sensor to the interior or exterior surface of the refrigerator/freezer, as shown in Figure 40.

For better reception, we recommended installing the sensor to the outside of the refrigerator/freezer. If the refrigerator/freezer is a metal box, the wireless signal cannot escape, and the sensors must be placed on the outside.



**Figure 40**

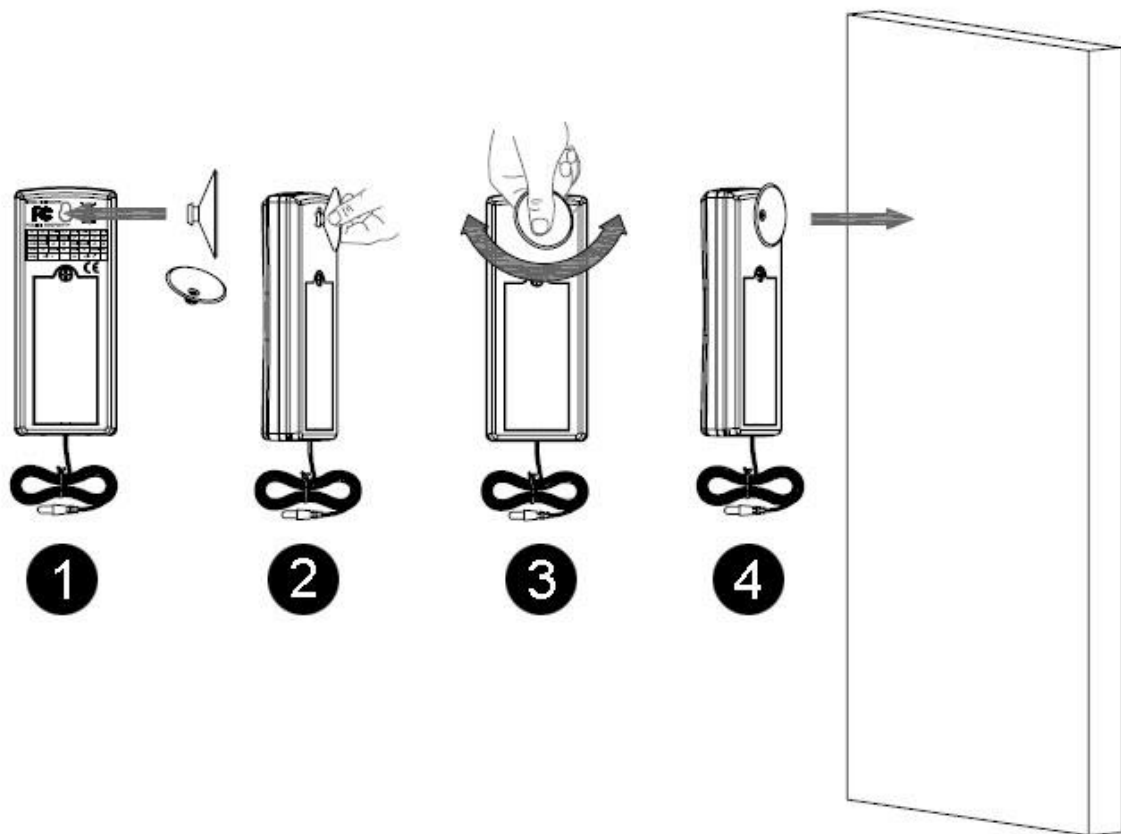
To attach the suction cup to the remote sensor, reference Figure 41.

Locate the mounting hole on the back of the unit.


Press the suction cup into the mounting hole.


While applying pressure with your thumb, twist the suction cup until fully inserted.

Wet the back of the suction cup and apply to clean, smooth, flat surface.



**Figure 41**


 **Note:** The sensors have the capability of being placed inside or outside the refrigerator/freezer, but it is recommended you install it outside. This will extend the battery life, the sensor life, and improve wireless communication range.

 **Note:** Make sure that the refrigerator surface is smooth and clean, so that suction cups will not fall off. It is recommended to wet the surface of the suction cup first to improve the seal.

### 6.5.4 Wall Mounting

The remote sensor can be mounted to a wall or horizontal surface to measure any temperature medium, including air, water, and soil.

Use a screw or nail (not included) to affix the remote sensor to the wall, as shown in Figure 42.

 **Note:** If measuring outside air temperature, we recommend mounting the sensor in the shade, on the north side of the house or structure to avoid radiant heat transfer.

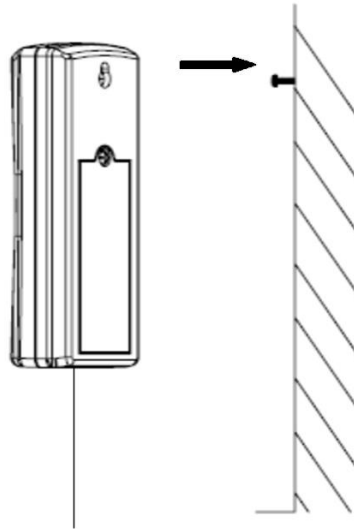


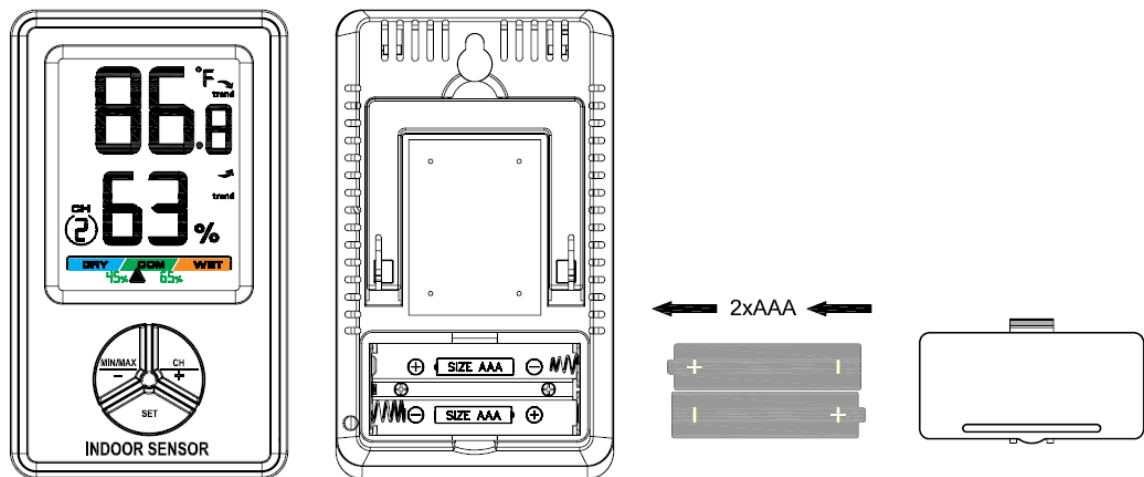
Figure 42

## 6.6 Indoor Thermo-Hygrometer (FT012TH)


### 6.6.1 Indoor Thermo-Hygrometer Assembly

Remove the battery door on the back of the sensor, as shown in Figure 1. Insert two AAA (alkaline or lithium, avoid rechargeable) batteries in the back of the indoor sensor.

We do not recommend rechargeable batteries because they start at a lower voltage and do not last as long, resulting in wireless transmission issues.



**Figure 43**

Insert two AAA batteries. After inserting the batteries, all the LCD segments will light up for a few seconds to verify all segments are operating properly, and the transmission icon  will flash once per 60 seconds thereafter. Each time it flashes, the sensor is transmitting data.

Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the display, as shown in Figure 44 (#12).

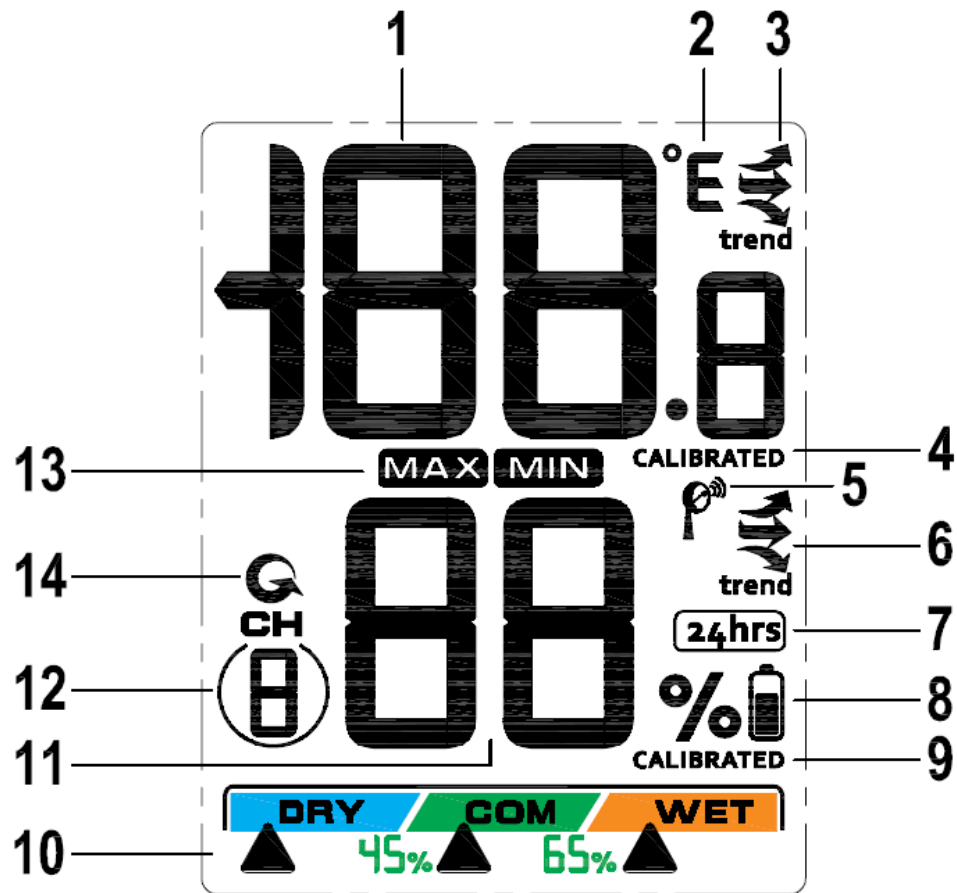


Figure 44

- |  |   |
|--|---|
| 1. Temperature   | 8. Low power indicator  |
| 2. Temperature units (°F or °C)                                    | 9. Humidity Calibrated Icon (when the calibration is displayed) |
| 3. Temperature, Rate of Change indicator                           | 10. Humidity Comfort Colorful Icon                              |
| 4. Temperature Calibrated Icon (when the calibration is displayed) | 11. Relative Humidity (%)                                       |
| 5. Transmission Icon (flashes when updating)                       | 12. Channel 1,2,3,4,5,6,7,8 indicator                           |
| 6. Humidity, Rate of Change indicator                              | 13. Min/Max Record mode   |
| 7. Min/Max Clears daily mode                                       | 14. Scroll Icon indicator setting Channel mode                  |

Close the battery door. Place on a table using the desk stand or hang on the wall using the suspension eye.

## 6.6.2 Display Features

### 6.6.2.1 Comfort Icon

The comfort icon is based on humidity ranges specified in Figure 45.

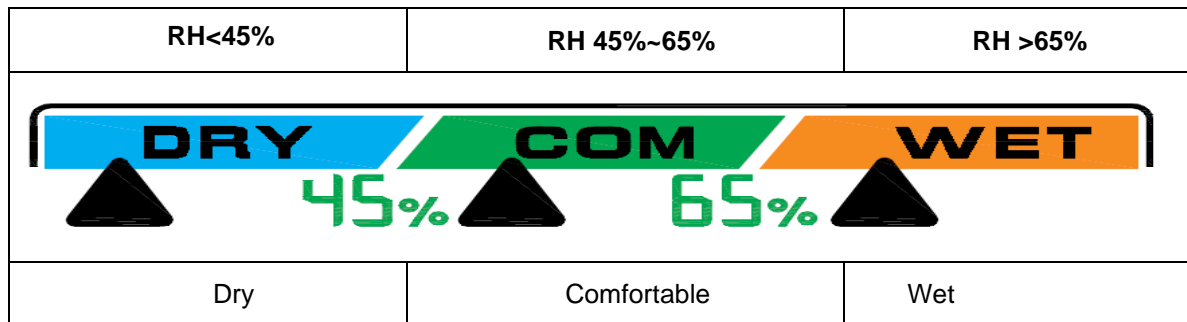




Figure 45

### 6.6.2.2 Rate of Change Icon

The rate of change icon  detects rapid changes in temperature and humidity. If the arrow points upward, the temperature is increasing at a rate of +2°F per 30 minutes (or greater), or humidity is increasing at a rate of +5% per 30 minutes (or greater). If the arrow points downward, the temperature is decreasing at a rate of -2°F per 30 minutes (or less), or humidity is decreasing at a rate of -5% per 30 minutes (or less).



## 6.6.3 Indoor Thermo-Hygrometer Sensor Operation


 **Note:** The indoor sensor has three buttons for easy operation: **MIN/MAX/-** button, **SET** button, and **CH/+** button.

### 6.6.3.1 Changing the Sensor Channel Number

If you are using the transmitter to send data to a wireless receiver, and own more than one sensor, they must transmit on separate channels.

To set a different channel, you must enter the channel scroll mode.

Press and hold the **CH/+** button 3 seconds to enter the scroll mode . In scroll mode, press the **CH/+** button to set channels 1 through 8. Press and hold the **CH/+** button 3 seconds to exit the setting, and the scroll icon  disappears.

 **Note:** **BEFORE** inserting the receiver batteries, set each indoor sensor channel number **FIRST** (the default is Channel 2, the outdoor sensor is usually defined as Channel 1).

### 6.6.3.2 Min/Max Mode

The Min/Max mode displays the minimum and maximum temperature and humidity (since reset of the unit) for the indoor sensor.

- **Display Maximum.** Press the **MIN/MAX** button once to display the maximum. The **MAX** icon will be displayed.
- **Clear Maximum.** To reset the maximum values to the current values, *press and hold* the **MIN/MAX** button for 3 seconds.
- **Display Minimum.** Press the **MIN/MAX** button again to display the minimum. The **MIN** icon will be displayed.
- **Clear Minimum.** To reset the minimum values to the current values, *press and hold* the **MIN/MAX** button for 3 seconds.

To return to normal mode, press the **MIN/MAX** button again.

#### 6.6.3.3 Clearing Min/Max Daily

The minimum and maximum can be set to clear daily (every 24 hours automatically) or manually. Press and hold the **SET** button for 3 seconds to switch between **24hrs** and Clears Manually.

When you manually clear the minimum and maximum, the Clears Daily function will clear every 24 hours from the time you clear it.

For example, if you clear the min and max at 4:00pm, it will continue to clear every day at 4:00pm.


#### 6.6.3.4 Temperature Units of Measure

The default temperature units of measure are degrees Fahrenheit. To toggle between degrees Celsius and degrees Fahrenheit, press and hold the **MIN/MAX** button for 3 seconds in normal mode.

### 6.6.4 Backlight Operation

To temporarily turn on the back light for five seconds, press the **any** button on the indoor sensor.

### 6.6.5 Adjustment or Calibration

 **Note:** The measured humidity range is between 10 and 99%. Humidity cannot be accurately measured outside of this range without an expensive hygrometer. Thus, the humidity cannot be calibrated below 10% or above 99%.

The purpose of calibration is to fine tune or correct for any sensor error associated with the devices margin of error. The measurement can be adjusted from the module to calibrate to a known source.

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. They are in a different location and typically update once per hour.

The purpose of your weather station is to measure conditions of your surroundings, which vary significantly from location to location.

#### 6.6.5.1 Humidity Calibration

To enter the humidity calibration mode, press and hold the **SET and MIN/MAX** buttons at the same time for 3 seconds, and the humidity value will begin flashing. Press the **CH/+** button to increase the humidity and the **MIN/MAX/-** button to decrease the humidity reading in 1% increments. To rapidly increase (or decrease) the humidity reading, press and hold the **CH/+** or **MIN/MAX/-** button.

To return the humidity to the actual or uncalibrated measurement, press the **SET** button.

**CALIBRATED** will be displayed when the humidity calibrated measurement.

Once the displayed humidity equals the calibrated source, press, and hold the **SET** button for three seconds, or wait 15 seconds for timeout, and the humidity value will stop flashing.



**Discussion:** Due to manufacturing tolerances, the humidity is accurate to  $\pm 5\%$ . In addition, capacitive hygrometers are susceptible to drift due to contamination. To improve this accuracy, the indoor and outdoor humidity can be calibrated using an accurate source, such as a sling psychrometer or one step humidpak calibration kits available at [AmbientWeather.com](http://AmbientWeather.com).

#### 6.6.5.2 Temperature Calibration

To enter the temperature calibration mode, press and hold the **SET and CH/+** buttons for 3 seconds and the temperature value will begin flashing. Press the **CH/+** button to increase the temperature and the **MIN/MAX/-** button to decrease the temperature reading in  $0.1^\circ$  increments. To rapidly increase (or decrease) the temperature reading, press and hold the **CH/+** or **MIN/MAX/-** button.

To return the temperature to the actual or uncalibrated measurement, press the **SET** button.

**CALIBRATED** will be displayed when the temperature calibrated measurement.

Once the displayed temperature equals the calibrated source, press, and hold the **SET** button for three seconds, or wait 15 seconds for timeout, and the temperature value will stop flashing.



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

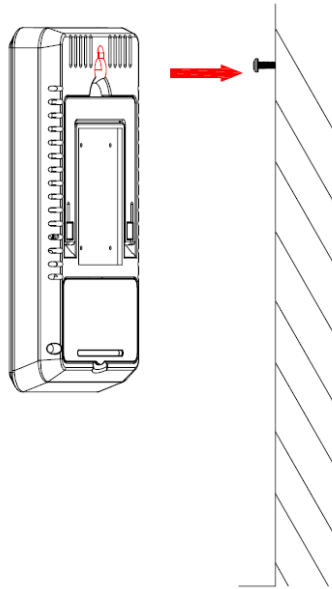
To calibrate temperature, we recommend a mercury or red spirit (fluid) thermometer. Bi-metal (dial) and other

digital thermometers are not a good source and have their own margin of error.

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 module to match the fluid thermometer.

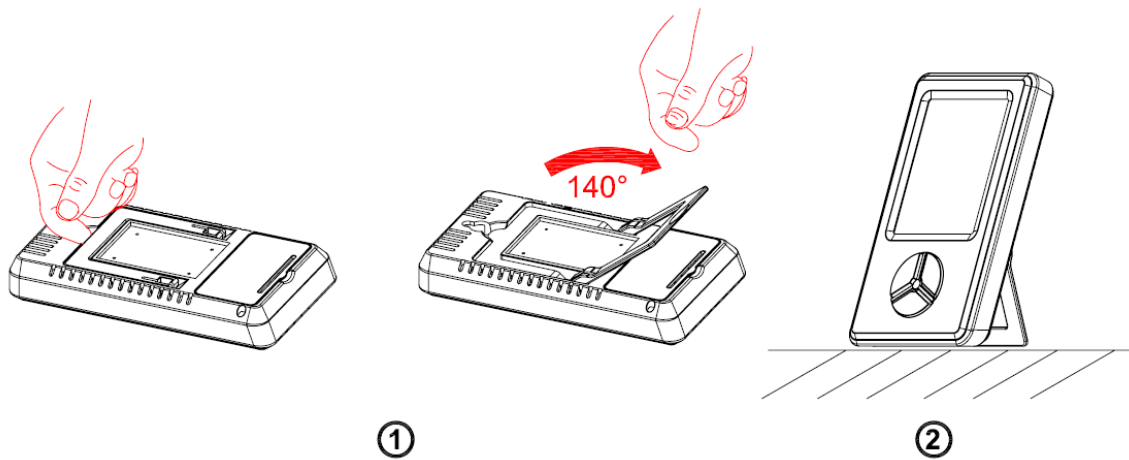
### 6.6.6 Indoor Sensor Installation

**Indoor use only.** It is recommended you mount the Indoor sensor in a shaded area. Avoid indirect sunlight and radiant heat sources that will result in inaccurate temperature readings. Use a screw or nail (not included) to affix the indoor sensor to the wall, as shown in Figure 46.



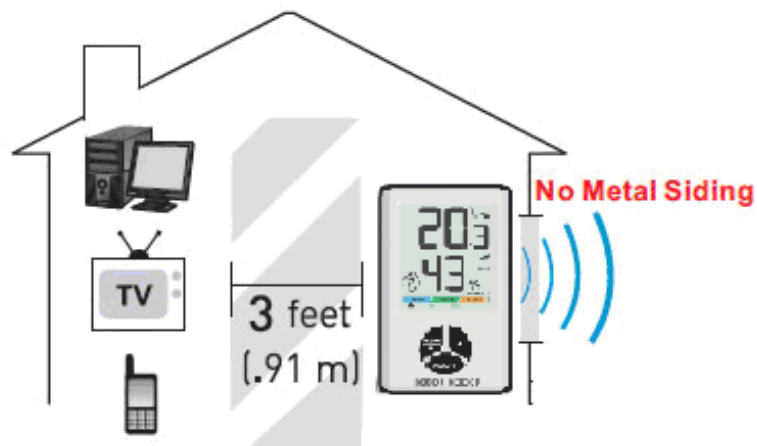
**Figure 46**

To place on a table or horizontal surface, fold out the desk stand, as shown in Figure 47.



**Figure 47**

Place the module at least three feet away from computers, TVs, and wireless phones. Avoid transmitting through solid metal barriers, as shown in Figure 48.



**Figure 48**

## 7. Weather Station Installation Guide and Limitations

### 7.1 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. This will also allow you to test the wireless range of the weather station.

## 7.2 Site Survey

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

You must clean the rain gauge every few months and change the rechargeable batteries every 2-3 years. Provide easy access to the rain gauge.

Avoid radiant heat transfer from buildings and structures. In general, install the thermos-hygrometer in a shaded area on the north side of a structure.

Avoid wind obstructions. The rule of thumb is to install the anemometer at least four times the distance of the height of the tallest obstruction. For example, if the building is 20' tall, and the mounting pole is 6' tall, install  $4 \times (20 - 6) = 56'$  away.

Wireless Range. The radio communication between receiver and transmitter in an open field can reach up to 300 feet, providing there are no interfering obstacles such as buildings, trees, vehicles, high voltage lines. Wireless signals will not penetrate metal buildings. Under most conditions, the maximum wireless range is 100'.

Radio interference such as PCs, radios or TV sets can, in the worst case, entirely cut off radio communication. Please take this into consideration when choosing module or mounting locations. Make sure your display module is at least five feet away from any electronic device to avoid interference.

Visit Ambient Weather Mounting Solutions for assistance and ideas for mounting your weather station:

<http://www.ambientweather.com/amwemoso.html>

## 7.3 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 module 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.
3. **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.

4. **Metal Barriers.** Radio frequency will not pass through metal barriers such as aluminum siding. If you have metal siding, align the remote and module 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.

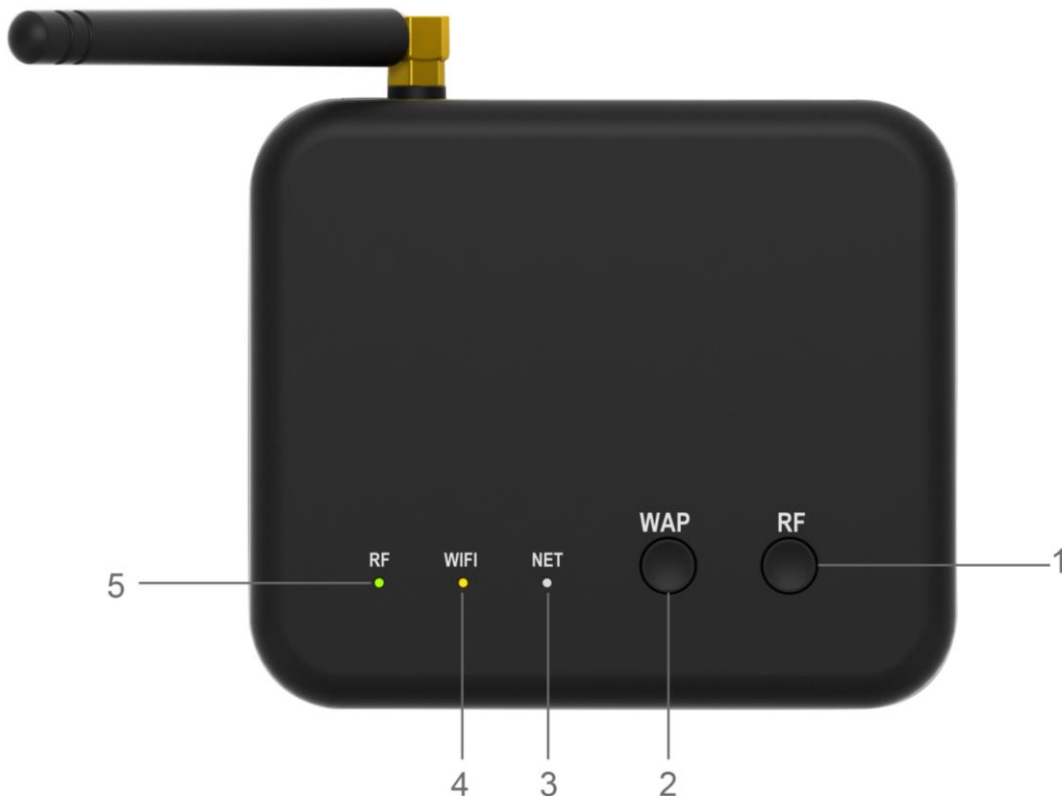
Medium	RF Signal Strength Reduction
Glass (untreated)	5-15%
Plastics	10-15%
Wood	10-40%
Brick	10-40%
Concrete	40-80%
Metal	90-100%

**Figure 49**

## 8. Module Set Up and Operation

### 8.1 Module Buttons and LEDs

The WS-100 module includes two buttons and three LED status lights.



No	Function
1	RF button. Press to search for sensors.


2	WAP key. Press to connect to WiFi and change settings.
3	NET Light
4	WiFi Light
5	RF Light

**Figure 50**

<b>Indicator LED Color</b>	<b>Status</b>	<b>Frequency</b>	<b>Description</b>
<b>RF Light Green</b>	ON		Sensor search complete after 3 minutes.
	Flash	once per second	Sensor search mode (3 minutes), or sensor signal lost.
		4 times per second	One of the sensors has a low battery.
	OFF		No external sensors received.
<b>WiFi White</b>	ON		WiFi connected.
	Flash	once per second	WAP (wireless access point) mode.
	OFF		WiFi not connected.
<b>Network Red</b>	ON		Data has not been transferred for 30 minutes.
	Flash	once per second	Transmitting data to the Internet.
	OFF		Transfer of data to the Internet successful.

**Figure 51**

## 8.2 Module Power Up

 Note: Power up the rain gauge, anemometer, and the 8-channel sensors first before powering up the module. If you power up the module first, you will need to resynchronize the sensors.

Make certain the weather station sensors are at least 10' away from the module and within 100' of the module. If the weather station is too close or too far away, it may not receive a proper signal. If you have more than one thermo-hygrometer transmitter, make sure they are all powered up and transmitting on different channels.

Plug the AC adapter into the module, as shown in Figure 52. Extending the AC adapter cable so the module is not right next to the wall wart will reduce interference, and improve RF reception.



Figure 52

While in the sensor search mode, the green **RF LED**  will flash. Once search mode is complete, the green RD LED light will remain on.

### 8.3 Wi-Fi and Internet Services

The WS-100 includes a Wi-Fi chip that connects to the 2.4 GHz band on your router and sends data automatically once per minute to our cloud services, AmbientWeather.net.

AmbientWeather.net captures, stores, and sends data to other services, such as WeatherUnderground.com, PWSWeather.com, IFTTT, Amazon Alexa, Google Home and more. Application Programming Interface (API) is available for programmers and third-party programmers.

### 8.4 Connect to the Module's WiFi Wireless Access Point (WAP)

Make sure your module is plugged into AC power. It will not connect to Wi-Fi otherwise.

When you first power up the module, or press and hold the **WAP** button for three seconds, the yellow **WiFi**

**WIFI**

**LED** will flash to signify that it has entered wireless access point (WAP) mode, and is ready to connect to the module's WiFi.

You can use your desktop, laptop, tablet, or smart phone to connect to the module's WiFi. The module's network name begins with WeatherHome, followed by a unique code.

Once completed, you will return your device to the normal WiFi settings.

**Example 1. Connect to the module Wi-Fi server with a PC.**

Choose Wi-Fi network settings from Windows (or search “Change Wi-Fi Settings” from Windows), and Connect to the WeatherHome, as shown in Figure 52 (your Wi-Fi network name may be slightly different but will always begin with WeatherHome).

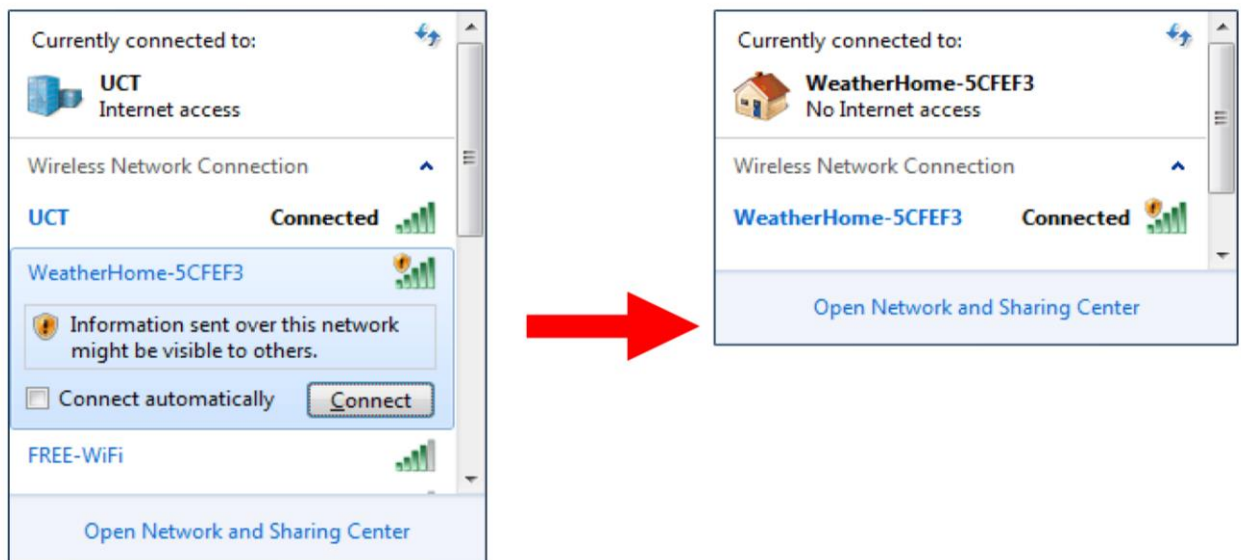




Figure 52

**Example 2. Connect to the module Wi-Fi server with a Mac.**

Select the Settings icon  and  Network. Connect to the WeatherHome Wi-Fi network, as shown in Figure 53 (your Wi-Fi network name may be slightly different but will always begin with WeatherHome).



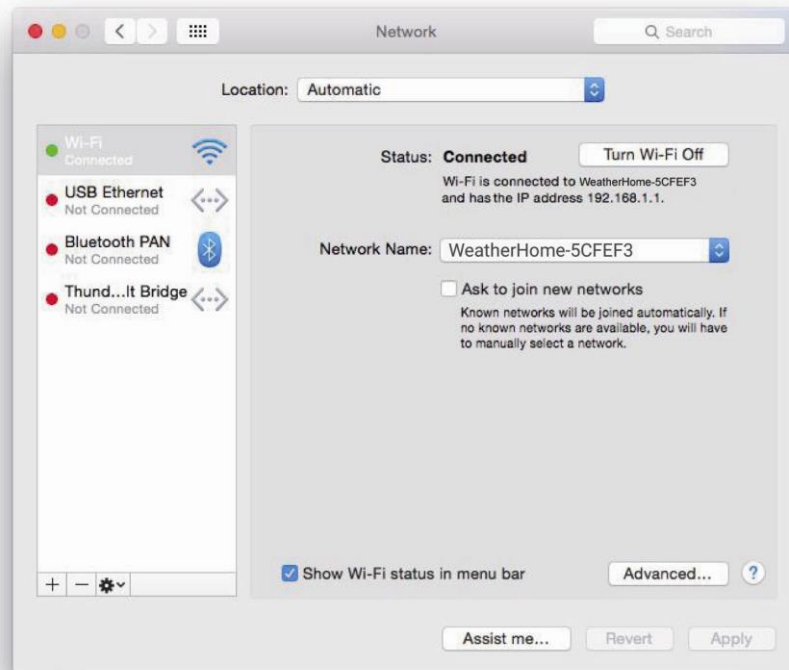



Figure 53

**Example 3. Connect to the module Wi-Fi server with an iPhone or iPad.**

Tap the Settings icon  and Wi-Fi. Connect to the WeatherHome Wi-Fi network, as shown in Figure 54 (your Wi-Fi network name may be slightly different but will always begin with WeatherHome).

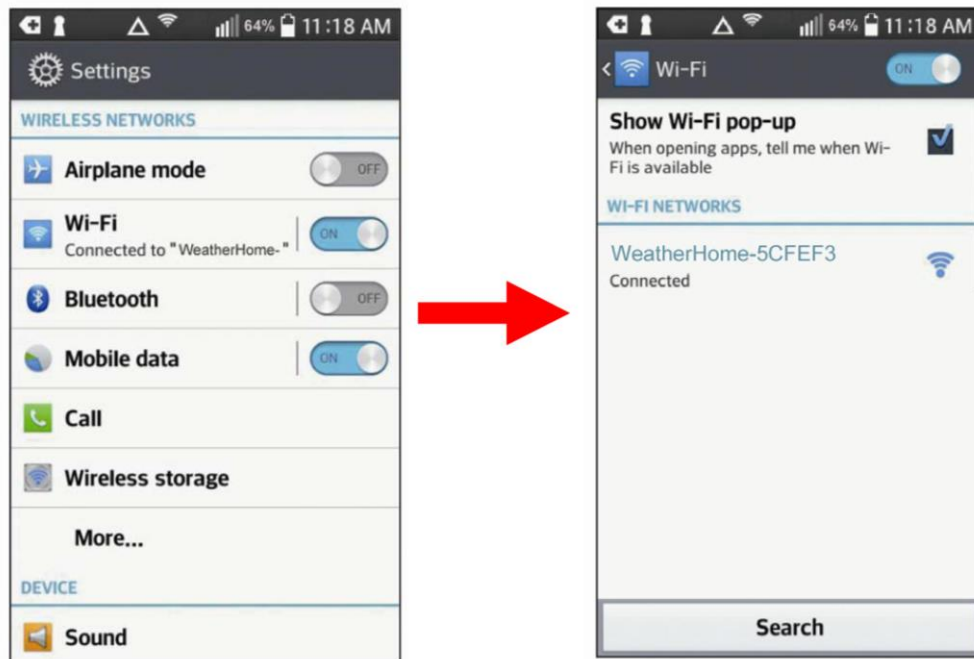



Figure 54

**Example 4. Connect to the module Wi-Fi server with an Android.**

From the Apps icon, tap the Settings icon  and Wi-Fi. Connect to the WeatherHome Wi-Fi network, as shown in Figure 55 (your Wi-Fi network name may be slightly different but will always begin with WeatherHome).

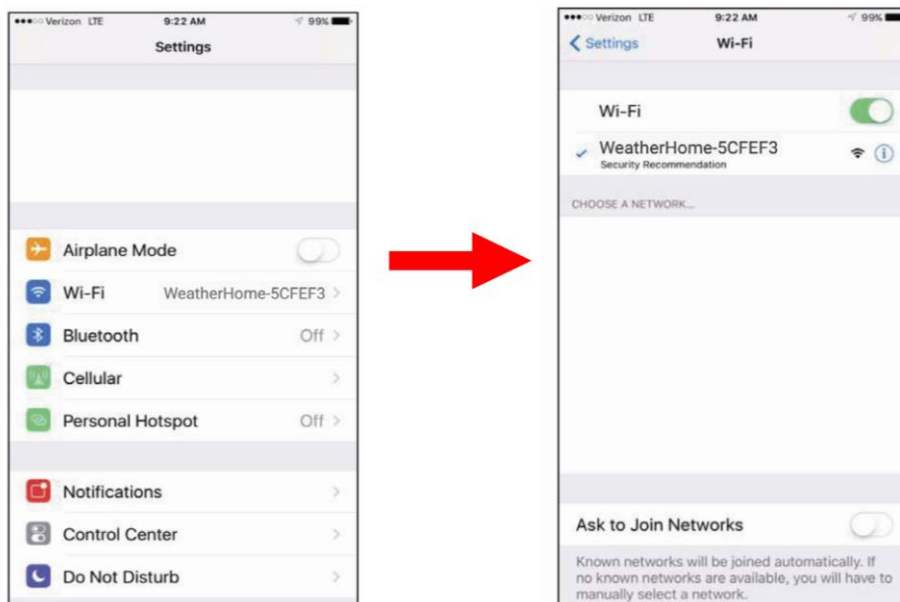


Figure 55


## 8.5 Accessing the Module's Web Interface

Once connected to the module Wi-Fi, open any web browser, and enter the following IP address into the


address bar:

<http://192.168.5.1>

to access the module's web browser.

 **Note:** Some browsers will treat 192.168.5.1 as a search, so make sure you include the header http://, or: <http://192.168.5.1> not 192.168.5.1.

Enter your 2.4 GHz router name or SSID, password, time zone and Daylight-Saving Time into the web interface (Figure 56), and tap **Save**.



**Figure 56**

 **Notes:**

Make a note of your Mac address. You will need this to register at AmbientWeather.net.

If you have a hidden SSID, enter the SSID manually.

**Time Zone Settings (default: 0h).** based on the number of hours from Coordinated Universal Time, or Greenwich Mean Time (GMT).

The following table provides times zones throughout the world. Locations in the eastern hemisphere are positive, and locations in the western hemisphere are negative.

Hours from GMT	Time Zone	Cities
-12	IDLW: International Date Line West	---
-11	NT: Nome	Nome, AK
-10	AHST: Alaska-Hawaii Standard CAT: Central Alaska HST: Hawaii Standard	Honolulu, HI
-9	YST: Yukon Standard	Yukon Territory
-8	PST: Pacific Standard	Los Angeles, CA, USA
-7	MST: Mountain Standard	Denver, CO, USA
-6	CST: Central Standard	Chicago, IL, USA
-5	EST: Eastern Standard	New York, NY, USA
-4	AST: Atlantic Standard	Caracas
-3	---	São Paulo, Brazil
-2	AT: Azores	Azores, Cape Verde Islands
-1	WAT: West Africa	---
0	GMT: Greenwich Mean WET: Western European	London, England
1	CET: Central European	Paris, France
2	EET: Eastern European	Athens, Greece
3	BT: Baghdad	Moscow, Russia
4	---	Abu Dhabi, UAE
5	---	Tashkent
6	---	Astana
7	---	Bangkok
8	CCT: China Coast	Beijing
9	JST: Japan Standard	Tokyo
10	GST: Guam Standard	Sydney
11	---	Magadan
12	IDLE: International Date Line East NZST: New Zealand Standard	Wellington, New Zealand

Once the setup is complete, disconnect your device from the module Wi-Fi. Otherwise, the module will automatically exit WAP mode.

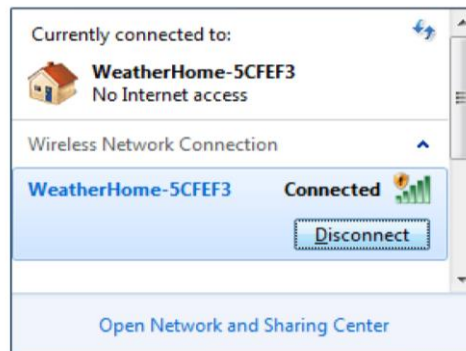




Figure 57

If the connection is successful, the Wi-Fi module's yellow **WiFi LED**  will stop flashing and remain on.

When the module successfully connects and uploads to AmbientWeather.net, the white Network LED  will turn off. If the network LED flashes once per 60 seconds, the module is currently uploading to the server.

If the network LED light remains on, the module has disconnected from the weather server for more than 30 minutes.

## 8.6 Time Synchronization

After the module has connected to the internet, it will attempt to connect to the USA's NIST internet time server to obtain the time. The time will automatically synchronize to the internet per an hour.

## 8.7 Module Factory Reset

To restore the console to factory default:

- Remove AC power.
- Press and hold the **RF** button and plug the AC power adapter back in.
- Wait three seconds, and let go of the **RF** button.

## 9. AmbientWeather.net

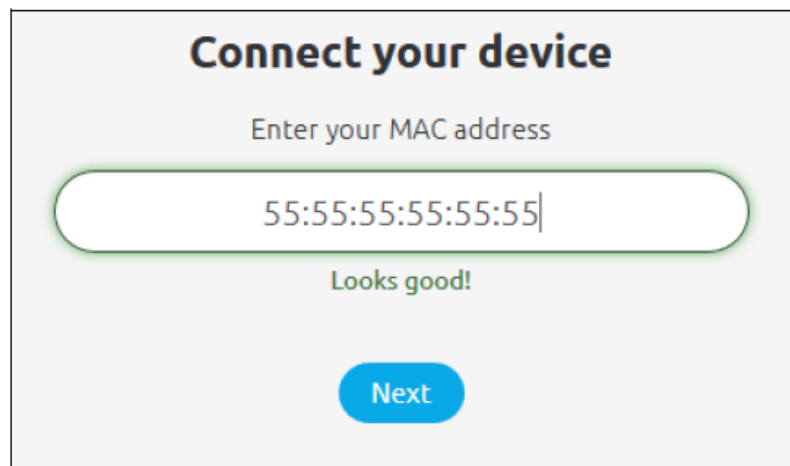
### 9.1 Registering with AmbientWeather.net

Visit: [www.AmbientWeather.net](http://www.AmbientWeather.net) to create an account and select Add Device, as shown in Figure 58.



**Figure 58**

Next, enter the MAC address found on your Weather Station Web Interface (Figure 59). Note that 55:55:55:55:55:55 is an example only and your MAC address will be different.



**Figure 59**

Register an account on AmbientWeather.net (email address and password).  
Once registered, select the dashboard to view your data, as shown in Figure 59.

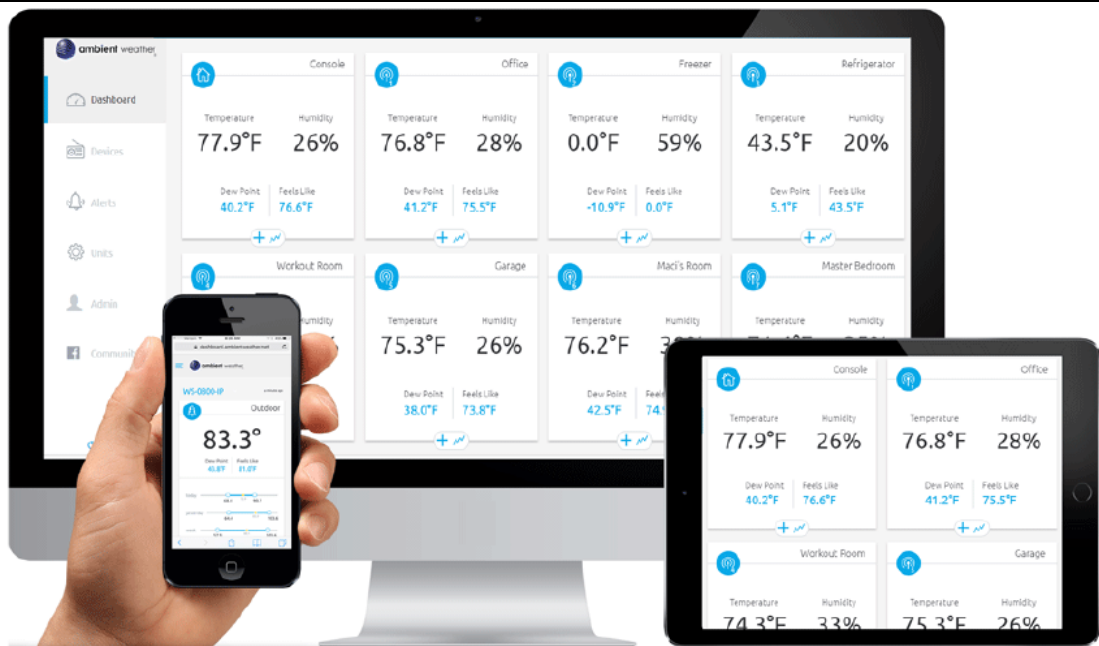


Figure 60

## 9.2 Ambient Weather Apps

You can view your device online either through a web browser, or apps for Android and iOS devices.

[AmbientWeather.net](https://www.ambientweather.net) is a responsive design and mobile friendly, so there is no need for an app on your desktop, laptop, tablet, or mobile device. Simply open your web browser, browse to [AmbientWeather.net](https://www.ambientweather.net), and bookmark your dashboard.

The **Ambient Weather Dashboard** app is available on both Android and iOS. Search the Google or Apple Store for **Ambient Weather Dashboard**.




## 10. Third Party Public Websites

WeatherUnderground.com and PWSWeather.com are third party public websites.

You can also report to these websites through the AmbientWeather.net hosting service. To register and send data to the websites, go to the Devices panel on your AmbientWeather.net dashboard:

<https://dashboard.ambientweather.net/devices>

 **Note:** The current temperature and humidity data is the transmitter of CH1 (so it must be on the outside).

## 11. AmbientWeather.net Works with and Community

AmbientWeather.net works with IFTTT, Amazon Alexa, Google Home, Home Assistant, SmartThings, and a variety of other third-party apps. There is also an API for developers.

Learn more at:

<https://www.ambientweather.com/community.html>

## 12. Advanced Settings

To access advanced settings from the module, connect to the web interface, as outlined in Section 8.5

Accessing the Module's Web Interface and select the menu .

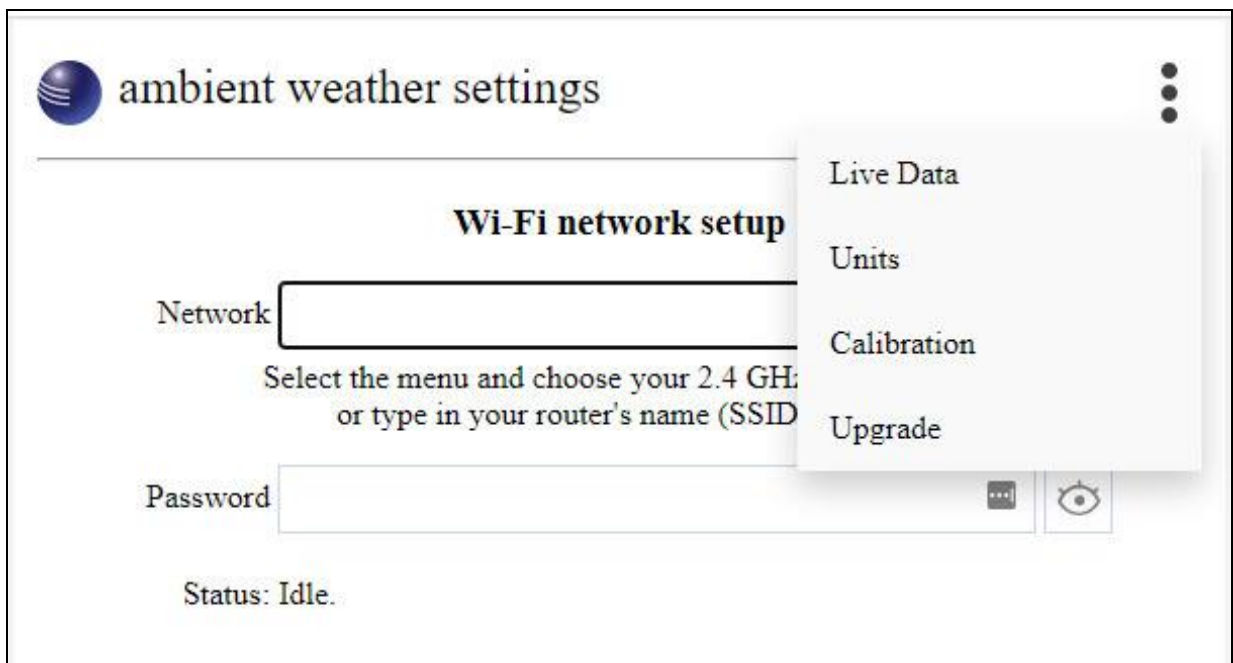



Figure 61

### 12.1 Live Data

#### 12.1.1 Viewing Live Data

To view live data directly from the weather station, and register new sensors, select Live Data from the menu . The live data panel does not replace the data available at AmbientWeather.net and is used for troubleshooting and local access.







ambient weather live data		Updated 0 seconds ago
<b>Outdoor</b>		
Temperature	76.8 °F	
Humidity	22 %	
<b>Sensor 2</b>		
Temperature	77.0 °F	
Humidity	30 %	
<b>Sensor 3</b>		
Temperature	76.6 °F	
Humidity	28 %	
<b>Sensor 5</b>		
Temperature	76.7 °F	
<b>Pressure</b>		
Absolute	28.62 inHg	
Relative	29.93 inHg	
<b>Wind Speed</b>		
Max Daily Gust	0.0 mph	
Wind	0.0 mph	
Gust	0.0 mph	
Direction	180 °	
Wind Average 2 Minute	0.0 mph	
Direction Average 2 Minute	180 °	
Wind Average 10 Minute	0.0 mph	
Direction Average 10 Minute	180 °	
<b>Rainfall</b>		
Rate	0.0 inch/hr	
Hour	0.0 inch	
Day	5.0 inch	
Week	5.0 inch	
Month	5.0 inch	
Year	5.0 inch	
Total	5.0 inch	
<a href="#">Edit</a>		
<b>Battery</b>		
Sensor 2 battery is low		
Sensor 3 battery is low		
Sensor 5 battery is low		
Outdoor battery is low		
<b>Register Transmitters</b>		
Sensor 2	<a href="#">Register</a>	
Sensor 3	<a href="#">Register</a>	
Sensor 5	<a href="#">Register</a>	
Outdoor	<a href="#">Register</a>	
Wind Speed	<a href="#">Register</a>	
Rainfall	<a href="#">Register</a>	
All	<a href="#">Register</a>	

Figure 62

### 12.1.2 Adding or Reacquiring Sensors


If sensor communication is lost, dashes (--) will be displayed on the live data panel. To reacquire the signal:

1. Tap  to enter the lost sensor search mode.
2.  will be displayed for 3 minutes. Once the signal is reacquired, the button will change to , and the current values will be displayed. Tap  to exit the search mode at any time.

If new sensors are added, subtracted, or multiple sensor channels are lost, register **ALL** sensors, or press and

hold for three seconds  button on receiver.

### 12.1.3 Editing Rainfall Totals

Tap  to enter the Edit Rainfall Totals mode.

Rainfall		
Rate	0.0 inch/hr	
Hour	<input type="text" value="0.0"/>	inch
Day	<input type="text" value="5.0"/>	inch
Week	<input type="text" value="5.0"/>	inch
Month	<input type="text" value="5.0"/>	inch
Year	<input type="text" value="5.0"/>	inch
Total	<input type="text" value="5.0"/>	inch
<div style="display: flex; justify-content: space-around; margin-top: 10px;"> <span>Reset</span> <span>Apply</span> <span>Cancel</span> </div> <p style="text-align: center; margin-top: 5px;">Range: 0inch to 393.7inch.</p>		

Figure 63

## 12.2 Units

To change the units of measure displayed on the weather station's web interface, select **Units** from the menu



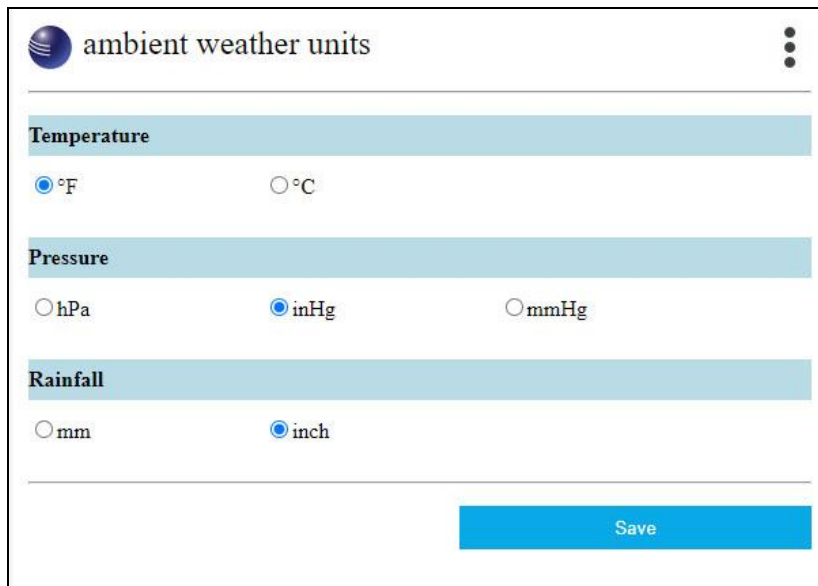


Figure 64


## 12.3 Calibration

To calibrate or adjust sensor measurements, select **Calibration** from the menu .

Relative pressure calibration is recommended, since pressure is affected by altitude, and the module does not know what altitude it is installed at. All other measurements are optional.

The purpose of calibration is to fine tune or correct for any sensor error associated with the devices margin of error. The measurement can be adjusted from the console to calibrate to a known source.

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. They are in a different location and typically update once per hour.


ambient weather calibration
⋮

---

**Temperature and humidity offset**

Outdoor	Temperature	<input type="text" value="0.0"/>	°F	Humidity	<input type="text" value="0"/>	%
Sensor 2	Temperature	<input type="text" value="0.0"/>	°F	Humidity	<input type="text" value="0"/>	%
Sensor 3	Temperature	<input type="text" value="0.0"/>	°F	Humidity	<input type="text" value="0"/>	%
Sensor 5	Temperature	<input type="text" value="0.0"/>	°F			

Range: -9.0°F to 9.0°F, default: 0°F. -9% to 9%, default: 0%

**Pressure offset**

Absolute pressure	<input type="text" value="0.0"/>	inHg
Relatively pressure	<input type="text" value="0.0"/>	inHg

Range: -0.27inHg to 0.27inHg, default: 0inHg.

**Wind gain and direction offset**

Wind speed	<input type="text" value="100"/>	%
Wind direction	<input type="text" value="0"/>	°

Range: 75% to 125%, default: 100%. 0° to 359°, default: 0°.

**Rainfall gain**

Rainfall	<input type="text" value="100"/>	%
----------	----------------------------------	---

Range: 75% to 125%, default: 100%.

Save

**Figure 65**

### 12.3.1 Temperature Calibration

Enter a temperature offset value in the field.

$$\text{Calibrated temperature} = \text{Measured temperature} + \text{Offset}$$

**Example:** Measured temperature = 79.8. Calibrated (source) temperature = 80.0.

$$\text{Offset} = \text{Calibrated temperature} - \text{Measured temperature} = 80.0 - 79.8 = 0.2.$$

Enter 0.2 into the offset field.

### 12.3.2 Humidity Calibration

Enter a humidity offset value in the field.

$$\text{Calibrated humidity} = \text{Measured humidity} + \text{Offset}$$

---

Example: Measured humidity = 30%. Calibrated (source) humidity = 28%.

Offset = Calibrated humidity - Measured humidity = 28 – 30 = -2%.

Enter -2 into the offset field.

### 12.3.3 Barometer Calibration

Enter a barometer offset into the field.

Calibrated barometer = Measured barometer + Offset

**Example:** Measured relative barometer = 29.92 inHg.

Calibrated (source) barometer from local airport = 30.00 inHg.

Offset = Calibrated barometer - Measured barometer = 30.00 – 29.92 = 0.08 inHg.

Enter 0.08 into the offset field.

**Discussion:** The module 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 (1013.2hpa). This is the average sea-level pressure around the world. Relative pressure measurements greater than 29.92 inHg (1013.2hpa) 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](http://Weather.com) or [Wunderground.com](http://Wunderground.com)), and set your weather station to match the official reporting station.

### 12.3.4 Rain Calibration

Enter a percentage calibration gain into the field.

Calibrated Rain = % Rainfall Gain / 100 x Measured Rain

Example: Measured rain = 4.00 inches

Calibrated (source) rain from sight glass = 3.92 inches.

Gain =  $100 \times (3.92 / 4.00) = 98\%$ .

Enter 98 into the percent gain field.

**Discussion:** 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”.



**Note:** that debris and insects can collect inside the tipping mechanism (they make a good spider’s nest).

Carefully remove the funnel and inspect the tipping mechanism for debris prior to calibration.

### 12.3.5 Wind Speed Calibration

Enter a percentage calibration gain into the field.

Calibrated Wind =  $\% \text{ Wind Gain} / 100 \times \text{Measured Wind}$

Example: Measured wind = 10 mph

Calibrated (source) wind = 12 mph

Gain =  $100 \times (12 / 10) = 120\%$ .

Enter 120 into the percent gain field.



**Note:** The wind gust is also affected by the wind speed calibration factor.

**Discussion:** Wind speed and wind gust are adversely affected by installation constraints. The rule of thumb is to install the weather station four times the distance of the height of the tallest obstruction (for example, a 6 m house would require an installation 24 m away).

In many instances, due to trees and other obstructions, this is not possible. The wind speed calibration allows you to correct for these obstructions.

In addition to installation challenges, wind speed bearings (any moving part) wears over time. To correct for wear, the correction value can be increased until the wind cups must be replaced.

Without a calibrated source, wind speed is a difficult parameter to measure. We recommend using a calibrated wind meter and constant, high speed fan.

### 12.3.6 Wind Direction Calibration

Enter a wind direction offset value in the field.

Calibrated wind direction = Measured wind direction + Offset

**Discussion:** If the anemometer is installed with the proper orientation, there is no need for calibration. In the event you live in the Southern Hemisphere, reverse the anemometer direction to point the solar collector to the North, and then adjust the calibration value to 180.

## 12.4 Upgrade

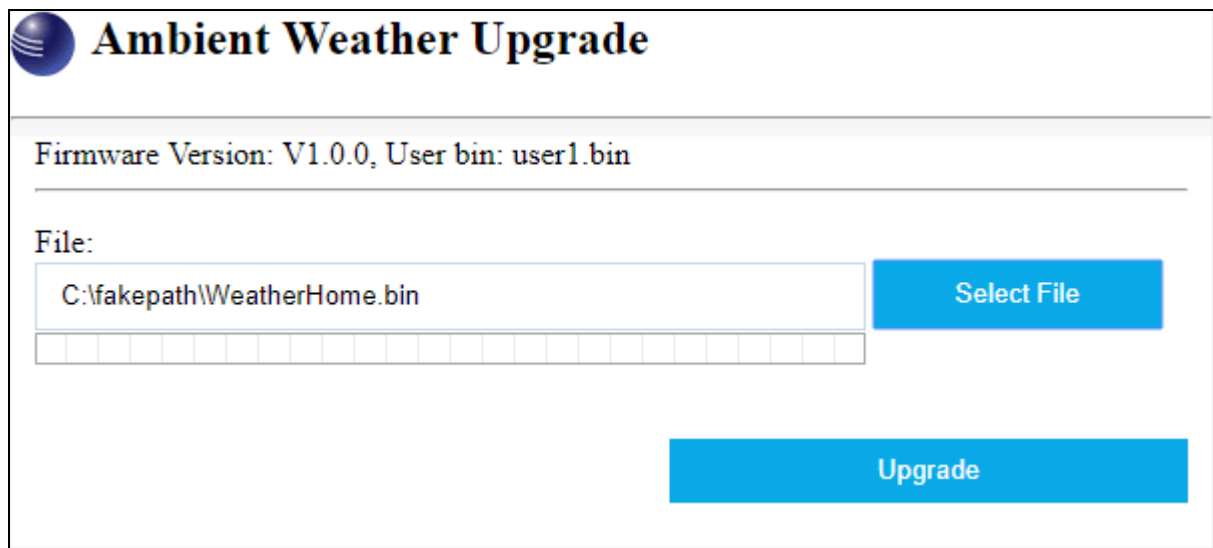
To upgrade firmware, select **Upgrade** from the menu .

To find the latest firmware updates, please visit:

<https://help.ambientweather.net/product/ws-100>

Note that you must download the firmware update file to your PC or Mac. You cannot download a file to your tablet or mobile phone.

Tap **Select File** and browse to the binary (bin) file you downloaded to your PC or Mac.



**Figure 66**

Once complete, your computer will automatically reconnect to your default WiFi connection.

## 13. Glossary of Terms

<b>Term</b>	<b>Definition</b>
Accuracy	Accuracy is defined as the ability of a measurement to match the actual value of the quantity being measured.
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.
Range	Range is defined as the amount or extent a value can be measured.
Resolution	Resolution is defined as the number of significant digits (decimal places) to which a value is being reliably measured.
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.
Absolute Barometric Pressure	Relative barometric pressure 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.
Relative Barometric Pressure	Measured barometric pressure relative to your location or ambient conditions.
HectoPascals (hPa)	Pressure units in SI (international system) units of measurement. Same as millibars (1 hPa = 1 mbar)
Inches of Mercury (inHg)	Pressure in Imperial units of measure. 1 inch of mercury = 33.86 millibars

## 14. Specifications

### 15.1 Wireless Specifications

Line of sight wireless transmission (in open air): 300 feet, 100 feet under most conditions

Frequency: 433 MHz

Update Rate: 60 seconds for rain sensor and thermo-hygrometer sensor, 16 seconds for wind sensor.

### 15.2 Measurement Specifications



The following table provides specifications for the measured parameters.

Measurement	Range	Accuracy	Resolution
Outdoor Temperature	-40 to 140 °F	± 1 °F	0.1 °F
Outdoor Humidity	10 to 99%	± 5% (only guaranteed between 20 to 90%)	1 %
Rain	0 to 396in	<0.6in: ±0.04in, 0.6in to 396in: ±7%	<39.4in (0.012in) >39.4in (0.04in)
Wind Direction	0 - 360 °	45° (8 point compass)	45° (8 point compass)
Wind Speed	0 to 112mph	4.5 mph ~22.4mph: ±6.7mph, 22.4mph ~112mph: ±10% (whichever is greater)	0.1mph

### 15.3 Power Consumption

- Adaptor: 6V to 500mA
- Thermo-Hygro Sensor : 2 x AAA alkaline batteries or Lithium batteries (not included)
- Rain sensor: 4 x AAA alkaline batteries or Lithium batteries (not included)
- Wind sensor: 4 x AAA alkaline batteries or Lithium batteries (not included)
- Battery life: Minimum 12 months for base station with excellent reception. Intermittent reception and multiple sensors may reduce the battery life.  
Minimum 12 months for sensors (use lithium batteries in cold weather climates less than -4 °F)

### 15.4 Wi-Fi Specifications

- WIFI Standard: 802.11 b/g/n
- WiFi Module WiFi Frequency: 2.4 GHz
- Setup User Interface (UI) support setup device: Build-in WiFi with WAP mode smart device, including desktops, laptops, tablets or mobile devices
- Recommend web browser for setup UI: Web browser support of HTML 5, such as the latest versions of Chrome, Safari, IE, Edge, Firefox, Mozilla or Opera.
- Line of sight WiFi RF transmission (in open air): 80 feet

## 15. Maintenance

- Clean the rain gauge once every 3 months. Pull out the Rain Gauge Filter drawer, as shown in Section 6.2.1.
- Replace the wind, rain, and thermo-hygrometer transmitter batteries once every 1-2 years
- Clean the anemometer solar panel once every 3 months.

## 16. 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 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.

## 17. 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:

This device may not cause harmful interference.

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.

## 18. 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 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 (6) the products inability to receive a signal due to any source of interference or metal obstructions and (7) 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.

## 19. 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 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 <https://oehha.ca.gov/prop65/background/p65plain.html>

