

GW1001 WIFI WEATHER STATION

with 7-In-1 Solar Powered Outdoor Sensor Array

Operation Manual

Model: GW1001

Thank you for purchasing this GW1001 Wi-Fi Weather Station. Your sensor data will be available on your local Wi-Fi network and the Internet.

This manual will guide you, step-by-step, through setting up your weather station and gateway, and understanding the operation of your weather station. Use this manual to become familiar with your professional weather station and save it for future reference.



Note: The stainless steel pole is not included in the package.

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2 Unpacking

Open your weather station box and inspect that the contents are intact (nothing broken) and complete (nothing missing). Inside you should find the following:

QT	Item Description
1	USB Wi-Fi Gateway
1	Cable clip
1	USB extension cable for powering the gateway
1	Outdoor Sensor Body with built-in: Thermo-hygrometer / Rain Gauge / Wind Speed Sensor/ Wind Direction Sensor, Light and UV sensor, Solar panel
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 (M6 size)
1	Metal mounting plate to be used with U-Bolts
1	Wrench for M6 bolts
1	User manual (this manual)

Table 1: Package content

If components are missing from the package, or broken, or any problem during the operation, please contact customer service to resolve the issue.

Note: The gateway must be plugged into a USB (2.0 or later) port for its power supply. You may want to use a USB extension cable (USB type A - Male straight to female straight; included) to allow for better placement.

Note: Batteries for the outdoor sensor package are **not included**. You will need 2 AA size batteries, alkaline or Lithium batteries (Lithium recommended for colder climates).

3 Overview

3.1 USB Gateway

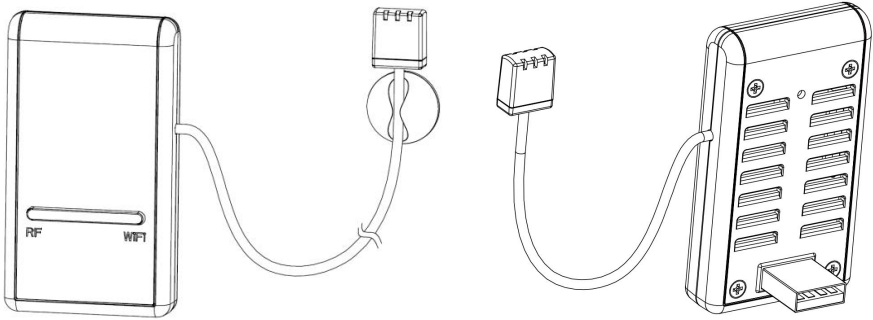


Figure 1: Wi-Fi Gateway

3.2 Features

USB Wi-Fi Gateway

- Attached temperature, humidity and atmospheric pressure 3-in-1 probe sensor.
- Collects sensor data from various supported wireless sensors.
 - Additional/optional sensors:
 - Up to 8 WH31 multi-channel temperature and humidity sensors
 - Up to 8 WH51 soil moisture sensors
 - Up to 4 WH41/WH43 PM2.5 air quality sensors
 - One WH45 PM2.5/PM10/CO2/temperature and humidity all-in-1 sensor
 - Up to 4 WH55 Water leak sensors
 - One WH57 Lightning sensor
 - Up to 8 WN34 Temp Sensors
 - Up to 8 WN30 multi-channel temp probe sensors
 - Up to 8 WN35 leaf wetness sensors
- Calculates dew point for outdoor sensor (cloud upload supported)
- Pushes sensor data to cloud weather services:

- <https://www.ecowitt.net>
- <https://www.wunderground.com>
- <https://www.weathercloud.com/>
- <https://www.wow.com>
- Custom sites using either Wunderground or Ecowitt protocol. Contact the Customer Support department for assistance.
- Mobile application (WS View)
 - View collected live data.
 - Manage sensor calibration setup.
 - Manage sensor selection.
- Data storage service on Ecowitt server: <https://ecowitt.net>
 - Stores data for past six months at 5-minute intervals
 - Stores data for past one year at 30-minute intervals

Note: All the optional sensors can all be found on our website: www.ecowitt.com. Make sure to select the model of the units with the same RF frequency as your gateway (the frequency is different for various countries because of regulations).

Note: Only sensor data supported by each specific service will be uploaded. For example, the Wunderground only accepts outdoor sensor data, therefore it will not display the following sensor data on their website:

- Indoor temperature and humidity (from the GW1000 built-in 3-in-1 sensor)
- Multi-channel temperature and humidity (from the WH31 sensor)
- Soil moisture (from the WH51 sensor)
- PM2.5 data (from the WH41 sensor).
- Lightning data (from the WH57 sensor)
- Water leakage condition (from the WH55 Sensor)
- Water/Soil temp sensor(from WN34 sensor)
- Multi-channel temp probe sensor(from WN30 sensor)
- Leaf wetness sensor(from WN35 sensor)

To view and record all the sensors data remotely, we recommend you to use the Ecowitt server.

Outdoor Sensor Package

- Outdoor temperature and humidity
- Wind speed, gust speed, and wind direction
- Rainfall rate and totals for day, week, month, and year
- Solar light intensity and UV index

4 Set up Guide

To complete assembly you will need a Philips screwdriver (size PH0) and a wrench (size M6; included in package).

Note: We suggest you assemble all components of the weather station, including gateway in one location so you can easily test functionality. After testing, place the outdoor sensor package in the desired location. Note, however, that movement during assembly, and movement after assembly can cause the rain sensor to “falsely” register rain. It is therefore best if you do not connect the gateway to any Internet services until you have reset these false readings using the gateway. The errant values may be hard to remove from Internet services if you do not reset first.

Attention:

- Ensure batteries are installed with correct polarity (+/-)
- Do not mix old and new batteries
- Do not use rechargeable batteries
- If outdoor temperature may go below 32F or 0C for prolonged periods, Lithium based batteries are suggested over alkaline type batteries for the outdoor sensor array

4.1 Sensor Package Assembly

See Figure 2 to locate and understand all the parts of the outdoor sensor package once fully assembled.

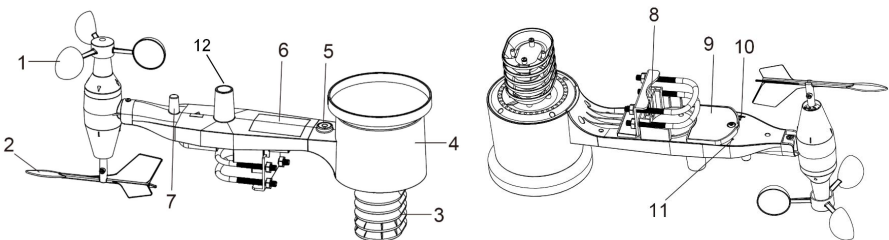


Figure 2: Sensor assembly components

1. Wind Speed cups	7. Antenna
2. Wind Vane	8. U-Bolts
3. Thermo- and hygro-meter sensors	9. Battery compartment door
4. Rain collector	10. Reset button
5. Bubble level	11. LED (red) to indicate data transmission
6. Solar panel	12. Light sensor and UV sensor

Table 2: Sensor assembly detailed items

4.1.1 Install U-bolts and metal plate

Installation of the U-bolts, which are in turn used to mount the sensor package on a pole, requires installation of an included metal plate to receive the U-bolt ends. The metal plate, visible in Figure 3 on the right side, has four holes through which the ends of the two U-Bolts will fit. The plate itself is inserted in a groove on the bottom of the unit (opposite side of solar panel). Note that one side of the plate has a straight edge (which goes into the groove), the other side is bent at a 90-degree angle and has a curved profile (which will end up “hugging” the mounting pole). Once the metal plate is inserted, remove nuts from the U-Bolts and insert both U-bolts through the respective holes of the metal plate as shown in Figure 3.

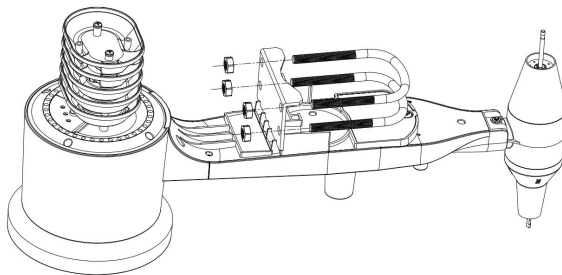


Figure 3: U-Bolt installation

Loosely screw on the nuts on the ends of the U-bolts. You will tighten these later during final mounting. Final assembly is shown in Figure 4.

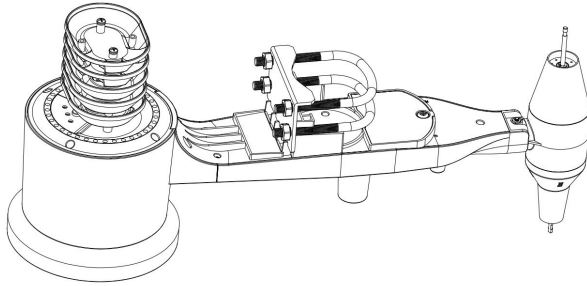


Figure 4: U-Bolts and nuts installed

The plate and U-Bolts are not yet needed at this stage but doing this now may help avoid damaging wind vane and wind speed cups later on. Handling of the sensor package with wind vane and speed cups installed to install these bolts is more difficult and more likely to lead to damage.

4.1.2 Install wind vane

Push the wind vane onto the shaft on the bottom side of the sensor package, until it goes no further, as shown on the left side in Figure 5. Next, tighten the set screw, with a Philips screwdriver (size PH0), as shown on the right side, until the wind vane cannot be removed from the axle. Make sure the wind vane can rotate freely. The wind vane's movement has a small amount of friction, which is helpful in providing steady wind direction measurements.

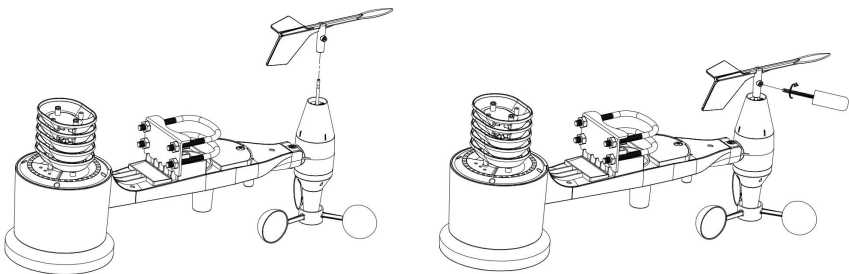


Figure 5: Wind vane installation diagram

4.1.3 Install wind speed cups

Push the wind speed cup assembly onto the shaft on the opposite side of the wind vane, as shown in Figure 6 on the left side. Tighten the set screw, with a Philips screwdriver (size PH0), as shown on the right side. Make sure the cup assembly can rotate freely. There should be no noticeable friction when it is turning.

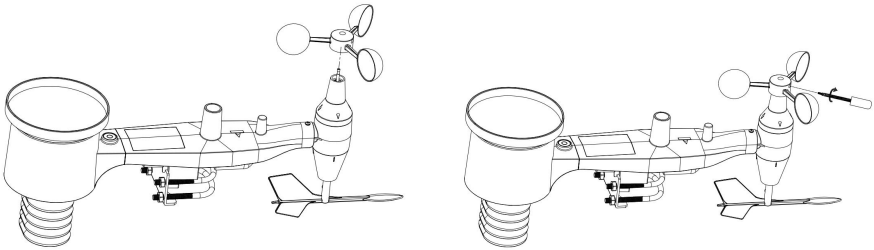


Figure 6: Wind speed cup installation diagram

4.1.4 Install Batteries in sensor package

Open the battery compartment with a screwdriver and insert 2 AA batteries in the battery compartment. The LED indicator on the back of the sensor package (item 9) will turn on for four seconds and then flash once every 16 seconds indicating sensor data transmission. If you did not pay attention, you may have missed the initial indication. You can always remove the batteries and start over, but if you see the flash once every 16 seconds, everything should be OK.

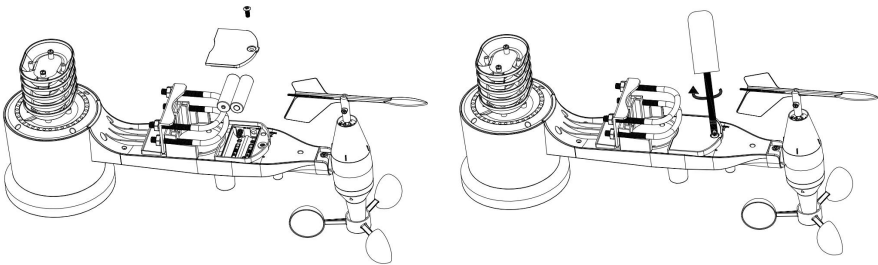


Figure 7: Battery installation diagram

Note: If LED does not light up or is on permanently, make sure the battery is inserted the correct way and inserted fully, starting over if necessary. Do not install the batteries backwards as it may permanently damage the outdoor sensor.

Note: We recommend Lithium batteries for cold weather climates, but alkaline batteries are sufficient for most climates. Rechargeable batteries have lower voltages and should never be used.

4.1.5 Mount assembled outdoor sensor package

4.1.5.1 Before you mount

Before proceeding with the outdoor mounting detailed in this section, you may want to skip to setup instructions in section 4.3 and onwards first, while you keep the assembled outdoor sensor package nearby (although preferably not closer than 5 ft. from the gateway). This will make any troubleshooting and adjustments easier and avoids any distance or interference related issues from the setup.

After setup is complete and everything is working, return here for outdoor mounting. If issues show up after outdoor mounting they are almost certainly related to distance, obstacles etc.

4.1.5.2 Mounting

Your package includes two U-Bolts, 4 nuts, and a metal mounting plate for the U-Bolts. You can attach a pipe(not included) to a permanent structure in the desired location. The U-Bolts will accommodate a pipe diameter of 1-2 inches.

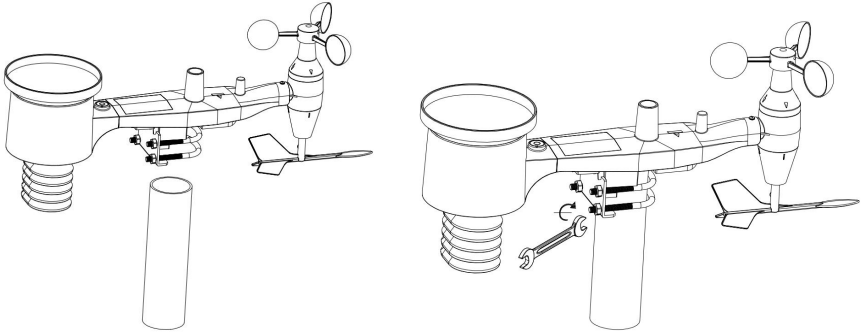


Figure 8: Sensor package mounting diagram

The mounting plate will slide into a slot on the bottom of the sensor package and then you can provisionally insert the U-Bolts from the other side through the holes provided holes. Next place a nut on each of the four ends of the U-Bolts and tighten by hand several turns so they will not fall off.

Next prepare the mounting pipe in the desired location and make sure it is vertical, or very close to it. Use a level if needed.

Finally, place the sensor package on top of the prepared mounting pipe. The U-Bolts should be loose enough to allow this but loosen the nuts as necessary. Once placed, hand tightens all four nuts, taking care to do so evenly. Do not use a wrench yet!

Now you will need to align the whole package in the proper direction by rotating it on top of the mounting pipe as needed. Locate the arrow labeled “WEST” that you will find on top of the sensor package right next to the light sensor, on the opposite side of the solar panel. You must rotate the whole sensor package until this arrow points due west. To achieve proper alignment, it is helpful to use a compass (many cell phones have a compass application). Once rotated in the correct orientation, lightly tighten the bolts a little more (use a wrench) to prevent further rotation.

Note: The orientation to WEST is necessary for two reasons. The most important one is to position the solar panel and light sensor in the most advantageous position for recording solar radiation and

charging internal capacitors. Secondly it causes a zero reading for wind direction to correspond to due NORTH, as is customary. This orientation is correct for installations in the northern hemisphere. If you are installing in the southern hemisphere, the correct orientation to achieve the same optimal positioning is to have the “WEST” arrow actually point due EAST! This has the side effect, however, of lining up the 0 reading of the wind direction with SOUTH. This needs to be corrected using a 180-degree offset in the calibration settings.

Now look at the bubble level. The bubble should be fully inside the red circle. If it is not, wind direction, speed, and rain readings may not operate correctly or accurately. Adjust the mounting pipe as necessary. If the bubble is close, but not quite inside the circle, and you cannot adjust the mounting pipe, you may have to experiment with small wooden or heavy cardboard shims between the sensor package and the top of the mounting pole to achieve the desired result (this will require loosening the bolts and some experimentation).

Make sure you check, and correct if necessary, the westerly orientation as the final installation step, and now tighten the bolts with a wrench. Do not over tighten, but make sure strong wind and/or rain cannot move the sensor package.

4.1.6 Reset Button and Transmitter LED

In the event the sensor array is not transmitting, reset the sensor array.

Using a bent-open paperclip, press and hold the **RESET BUTTON** (see Figure 9) to affect a reset: the LED turns on while the RESET button is depressed, and you can now let go. The LED should then resume as normal, flashing approximately once every 16 seconds.

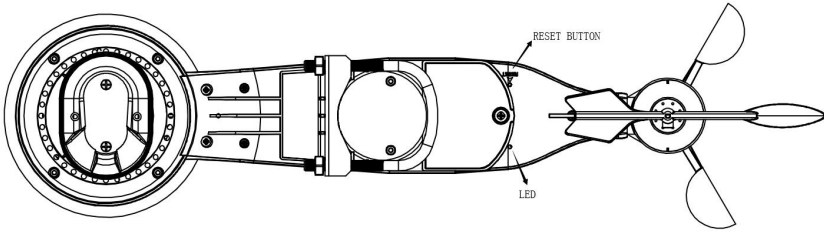


Figure 9: Reset button and Transmitter LED location

4.2 Best Practices for Wireless Communication

Wireless (RF) communication is susceptible to interference, distance, walls and metal barriers. We recommend the following best practices for trouble free wireless communication between both sensor packages and the gateway:

- **Indoor sensor placement:** The sensor will have the longest reach for its signal when mounted or hung vertically. Avoid laying it down on a flat surface.
- **Electro-Magnetic Interference (EMI).** Keep the gateway several feet away from computer monitors and TVs.
- **Radio Frequency Interference (RFI).** If you have other devices operating on the same frequency band as your indoor and/or outdoor sensors and experience intermittent communication between sensor package and gateway, try turning off these other devices for troubleshooting purposes. You may need to relocate the transmitters or receivers to avoid the interference and establish reliable communication. The frequencies used by the sensors are one of (depending on your location): 433, 868, or 915 MHz (915 MHz for United States).
- **Line of Sight Rating.** This device is rated at 300 feet line of sight (under ideal circumstances; no interference, barriers or walls), but in most real-world scenarios, including a wall or two, you will be able to go about 100 feet.

- **Metal Barriers.** Radio frequency will not pass through metal barriers such as aluminum siding or metal wall framing. If you have such metal barriers and experience communication problems, you must change the placement of sensor package and or gateway.

The following table shows different transmission media and expected signal strength reductions. 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%

Table 3: RF Signal Strength reduction

4.3 Wi-Fi Gateway Introduction

See Figure 10 to help you identify elements of the gateway.

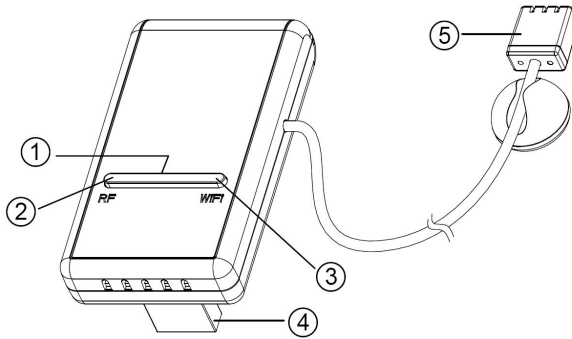


Figure 10: Gateway Introduction

1	Wi-Fi Configure/Reset Button
2.	RF Status Indicator Light (Blue)
3.	Wi-Fi Status Indicator Light (Red)
4.	USB Connector for system power supply
5.	Temperature, humidity and barometric 3-in-1 sensor

Table 4: gateway parts identification

Before configuring the gateway with your mobile application, please read the description of the LED indicators (2 and 3), and button function for better understanding.

4.3.1 LED Indicators

RF (Blue): Indicates RF data receiving status

- **Flash** (each): indicates one packet of RF data from a sensor was received.
- **Off** (steady): indicates no RF data received.

Wi-Fi (Red): Indicates Wi-Fi connection status

- **On** (steady): indicates connected to Wi-Fi network; network communication normal and data uploaded to configured weather service(s) successfully.
- **Off** (steady): Wi-Fi connection failed.
- **Flash** (slowly), indicates connected to Wi-Fi network; network communication normal, but upload to one or more configured weather services failed. First confirm Internet access through your router is functioning, and then check whether the upload server account and password are correct (use WS View application).
- **Flash** (rapidly), indicates that Wi-Fi configuration mode is active. Use the WS View mobile application to complete the configuration.

4.3.2 Button functions

The black button is used for the following two modes:

Wi-Fi Configure Mode: Press and hold the button for about 5 seconds until the Wi-Fi status LED is fast flashing indicating the gateway is ready for Wi-Fi configuration.

Reset Mode: Hold the black button for about 10 seconds till the red light and blue light flash simultaneously for three times will reset the gateway to factory settings. The history data, Wi-Fi settings, calibration etc. are all lost and need to be setup again via WS View app.

Note:

1. When powered up, and when there is no valid Wi-Fi configuration (including very first time), the Wi-Fi status LED will be fast flashing. It means that the gateway is in the Wi-Fi configuration mode. Use the mobile application to complete the configuration process.
2. If you purchased optional sensor(s), you may power up the new sensor at any time and use mobile application's live data view to confirm whether the sensor has been added successfully. If this does not appear the case, also check the **Sensor ID** page to see if the sensor's ID has been registered.

5 Publish to Internet Weather Services

Your gateway can send your sensor data to WS View APP via local network or selected internet-based weather services. The supported services are shown in the table below:

Service	Description
Weather Underground	Site: https://wunderground.com provides local & long-range weather forecasts, weather reports, maps & tropical weather conditions for locations worldwide.
WOW	Site: https://wow.metoffice.gov.uk A UK based weather observation website.
Weather Cloud	Site: https://weathercloud.net A large network of weather stations reporting data in real time from all over the world.
Ecowitt Weather	Site: https://www.ecowitt.net Ecowitt' s new weather server that can host a bunch of sensors that other services don't support at this time.

Table 5: Supported weather services

5.1 Gateway Wi-Fi Configuration

The gateway can function as an independent Wi-Fi access point during Wi-Fi configuration. This will be used to allow your mobile application to connect to it directly during configuration (temporarily), passing configuration information about your normal Wi-Fi network to the Gateway so that it can later connect to your preferred Wi-Fi network.

Please follow the following procedure:

1. Download the mobile application **WS View** from the iOS App Store or Google Play store, as appropriate for your device.

2. Connect your gateway with the included USB extension cable and then plug your gateway into an available USB port that supplies power and ensure it is in Wi-Fi configuration mode (red LED flashing fast). If it is not, follow the procedure to put it in that mode (hold down button for about 5 seconds).
3. Start the application and make sure the location permission function is granted (on) when you are running the app for the first time. In case you disabled the location access function for this application, please go to your mobile device settings page and configure it as “on”. The application needs your location to configure weather services.
4. Press “Configure New Device”. This may be automatic on the very first use of the application.
5. Tap on the appropriate device type and select “Next”. Follow the prompts.

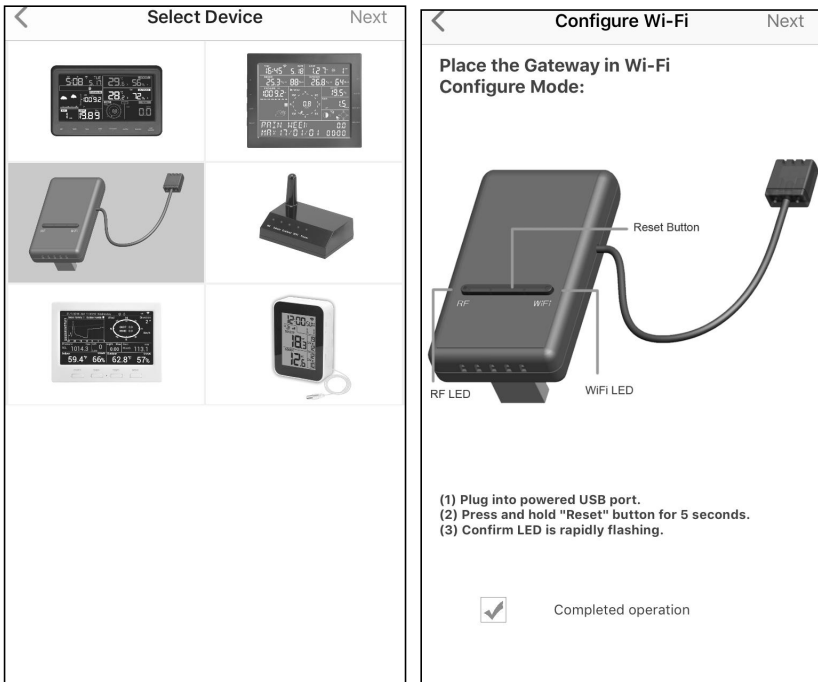


Figure 11: Configure screen

6. Confirm Wi-Fi configuration mode is active, as prompted. Correct if necessary (see above). Press “Next”.

7. **For Android version:**

Enter your preferred Wi-Fi SSID (network name) and security password. You can set the uploading to weather servers (Ecowitt Weather / Weather Underground / Weather Cloud / WOW / Customized Website) on this page or do that after the Wi-Fi configuration done.

Scroll to the bottom of the screen and press “Save”. This will be communicated to the console in a later step.

For iOS version:

Switch your mobile device to the ad-hoc Wi-Fi network created by your console. It will be named something like “EasyWeather-WIFI” followed by some numbers. Wait until connected. You may see a message such as “Unsecured Network” and “No Internet connection”: this is normal and can be ignored.

Return to the mobile application. Enter your preferred Wi-Fi SSID (network name) and security password. You can set the uploading to weather servers (Ecowitt Weather / Weather Underground / Weather Cloud / WOW / Customized Website) on this page or do that after the Wi-Fi configuration done.

Press “Next”. This will be communicated to the console in a later step.

8. The connection should be recognized, and you should see a few messages about connecting to the gateway and configuring it. The RED LED on the gateway should now no longer be flashing red.

9. Your mobile device should have been returned to your normal Wi-Fi network setting and the “Live Data” screen should be providing a read-out of your sensors.


← Device List Live Data More	
GW1000A-WIFI24AD	
Indoor Temperature 26.7 °C	Indoor Humidity 54 %
Outdoor Temperature 25.6 °C	Outdoor Humidity 61 %
Absolute Pressure 1007.6 hPa	Relative Pressure 1007.6 hPa
Solar Radiation 0.0 fc	UV-Index 0
Wind Speed 0.0 km/h	
Wind Gust Speed 0.0 km/h	
Day Wind Max	0.0 km/h
RainRate	0.0 mm
RainDay	0.0 mm
RainWeek	0.0 mm
RainMonth	0.0 mm
RainYear	0.0 mm
GW1000A_V1.5.7	

Figure 12: Live Data screen

Note: If it displays a blank screen on the Device List instead of the “Live Data” screen, please check the following:

- Wait for 1-2 minutes and check whether the device will appear and go to the “Live Data” screen.
- If the Device List still shows blank, check whether your mobile device has been returned to your normal Wi-Fi network setting. If not, change it manually.

- Check whether you have used the 2.4GHz band Wi-Fi network only (dual band is not supported)
- Try to turn off your mobile data/cellular data.
- Exit the app and close all the applications in process, then reopen the WS View app and back to the Device List
- If still not work, contact the customer service for support

Note: the above and after figures are all from the iOS version application. The operations are almost the same on both Android version and iOS version.

10. Check the data quality and make sure sensor(s) are properly detected by the gateway.
11. With your obtained sensor ID or MAC address, register your device on the dedicated weather service you submitted.
12. If you register with WU, the current day history data can be viewed on WS View app.

5.2 Adding weather services

You may have configured weather services during the initial configuration, or you may do so later. To do so, open the mobile application and select your gateway from the device list. This will bring you to the “Live Data” screen for the gateway.

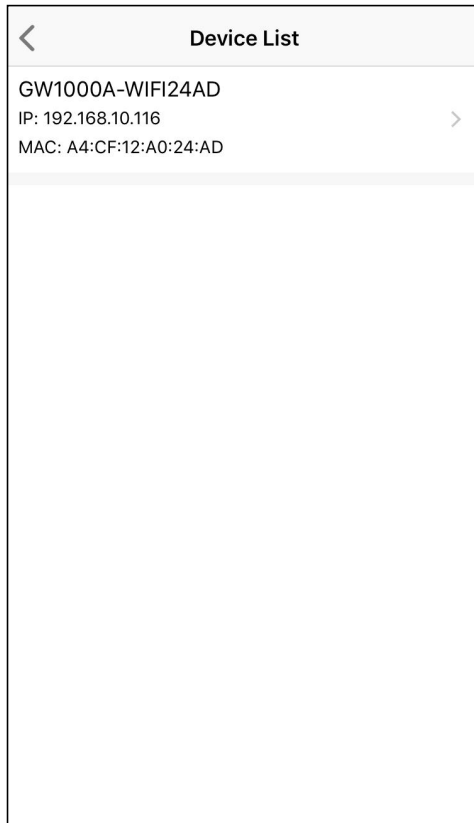


Figure 13: Device List screen

On the “Live Data” screen, press the “More” button in the upper right and select “Weather Services” from the menu.

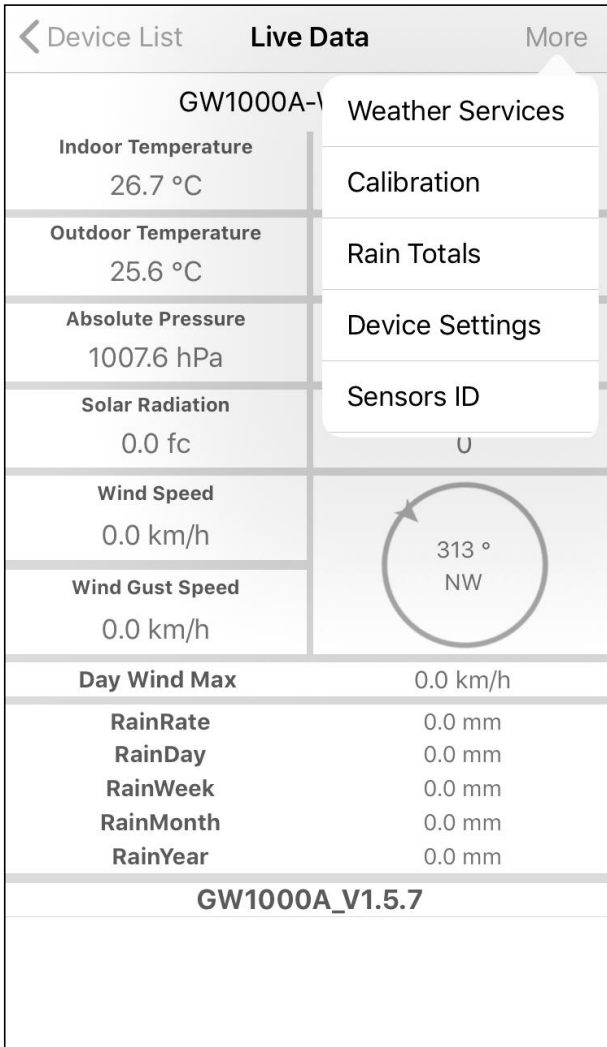


Figure 14: Live Data screen with settings menu

Navigate to the weather service you wish to configure by pressing “Next” and enter the appropriate data.

Upload Next

Server

ecowitt.net

Upload Interval (minutes)

1 2 3 4 5 ON OFF

MAC: A0:20:A6:36:C9:6B

Save

Register at ecowitt.net

Response time

EasyWeatherV1.4.5

Open your Web Browser, go to ecowitt.net or click on the link above. Enter the MAC address above to register your device. Return to this application, select an update interval and save.

Upload Next

Server

Wunderground

Station ID
IU5E7FU430

Station Key
Isrling198

Save

Register at Wunderground

Wunderground PWS

EasyWeatherV1.4.5

If you don't have Wunderground Station ID, you can select 'Register at Wunderground.com' to register your weather station. Enter the Station ID and Station Key and select Save.

Upload Next

Server

Weathercloud

Weathercloud ID

Weathercloud Key

Save

Register at Weathercloud

EasyWeatherV1.4.5

Open your Web Browser, go to weathercloud.net or click on the link above, and register your weather station. Return to this application, enter the weather cloud ID and Key and select save.

Upload Next

Server

WeatherObservationsWebsite

Station ID

Station Key

Save

Register at WeatherObservationsWebsite

EasyWeatherV1.4.5

Open your Web Browser, go to WeatherObservationsWebsite or click on the link above, and register your weather station. Return to this application, enter the WeatherObservationsWebsite ID and Key and select save.

Upload

Server

Customized

Disable Enable

Protocol Type Same As
Ecowitt Wunderground

Server IP / Hostname

Path
/weatherstation/updateweatherstation.php?

Station ID

Station Key

Port
80

Upload Interval
60 Seconds

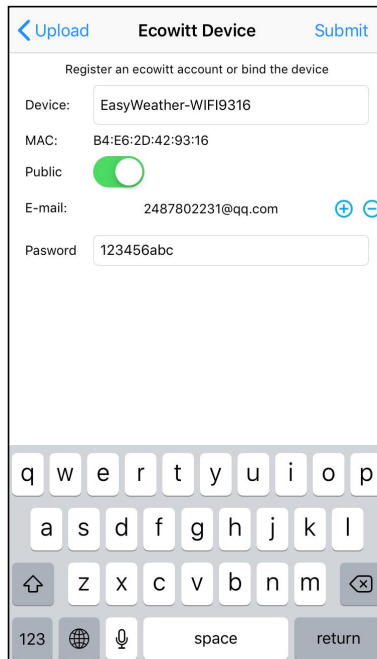
You can upload the data to a custom server.

Figure 14: Weather Services uploading setting screen

5.3 Ecowitt Weather

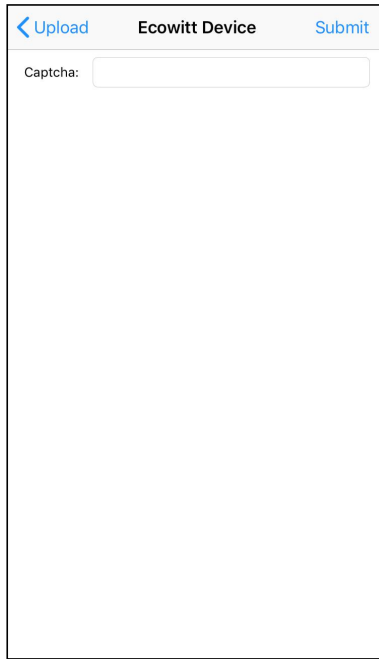
It's recommended to use the Ecowitt Weather server to monitor and record your sensors data. You may do so as the following tips:

- On the ecowitt.net uploading page, enable the ON button (displayed blue) and set the uploading interval time.
- Copy the MAC address (will be used to add the device on the server later)
- Press Save on the page.
- Press “Register at ecowitt.net” and finish the registration on the page.



The screenshot shows a mobile application interface for registering an Ecowitt device. At the top, there are navigation links for 'Upload', 'Ecowitt Device', and 'Submit'. Below this is a heading: 'Register an ecowitt account or bind the device'. The form contains several fields: 'Device:' with the value 'EasyWeather-WIFI9316'; 'MAC:' with the value 'B4:E6:2D:42:93:16'; 'Public:' with a green toggle switch turned on; 'E-mail:' with the value '2487802231@qq.com' and '+' and '-' icons; and 'Pasword' (sic) with the value '123456abc'. A virtual keyboard is visible at the bottom of the screen.

- Press the “+” button and select enter your email address.
- Set a password for your ecowitt account
- Press Submit.
- Enter the captcha you received from your email box and press submit.



- It will jump to the ecowitt.net dashboard and display the sensor data within several minutes.

Note:

If you could not receive the captcha from your email box, please check the spam.

It only supports setting the units and language on the WS View app. To use the full settings, please visit the ecowitt website on your browser or on a computer.

If you could not register on the WS View app, please go to the website to register and add the device.

Any question, please contact us at support@ecowitt.com.

5.3.1 Viewing data on ecowitt.net

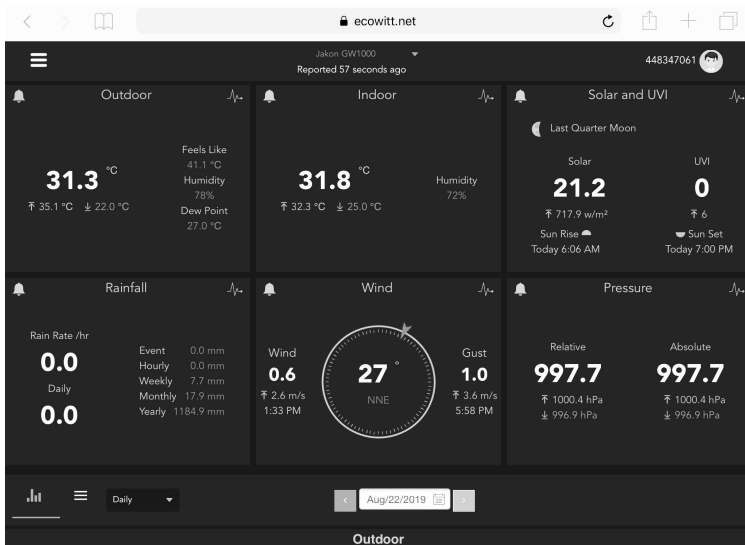
You can observe your sensor’s data by using the ecowitt.net web site. You will use a URL like this one, where your station ID replaces the text “STATIONID”.

<https://www.ecowitt.net/home/index?id=STATIONID>

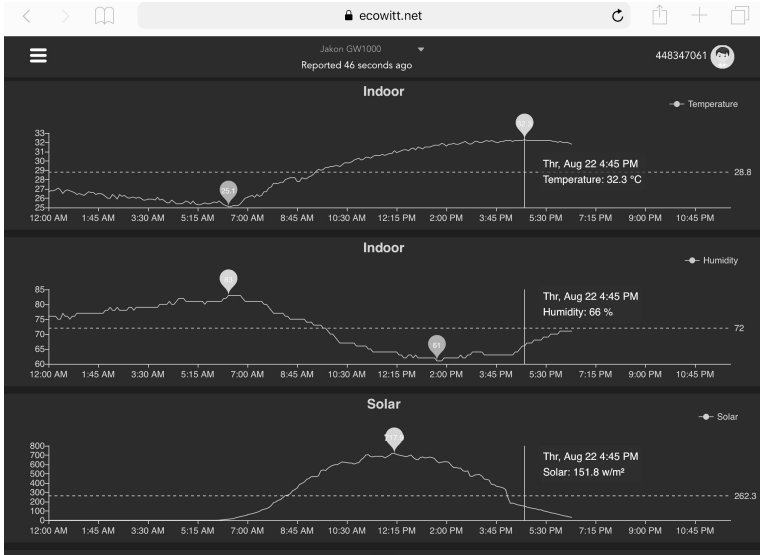
Note: If you want to share your station data with other users, you may use the Share option under the Menu to create a share link.

It will show a page such as this, where you can look at today's data and historical data as well.

Dashboard



Graph display



List display

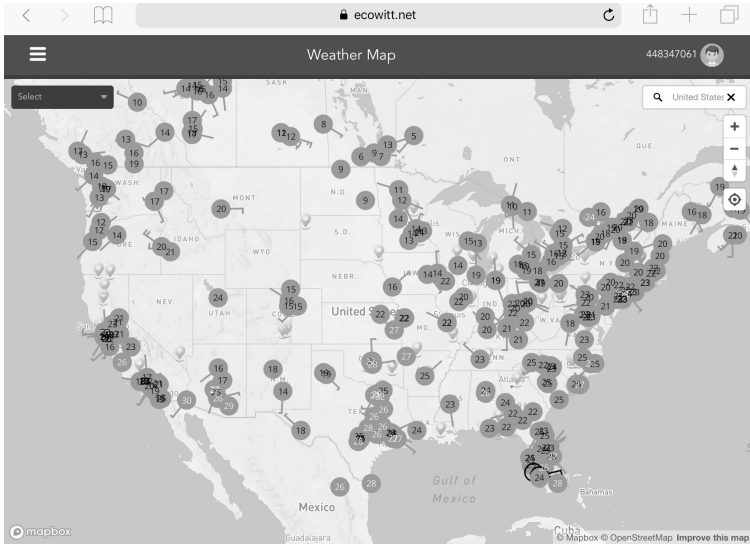
6:37 PM Thu Aug 22 ecowitt.net 448347061

Reported 13 seconds ago

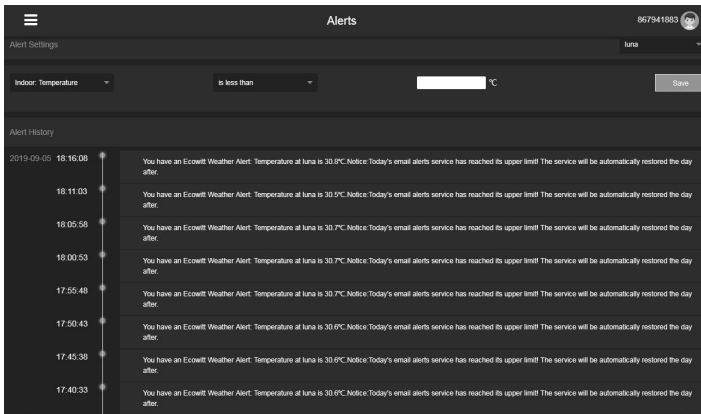
Daily Aug/22/2019

Time	Temperature (°C)	Humidity(%)	Dew Point(°C)	Feels Like(°C)	Temperature (°C)	Humidity(%)	Absolute(hPa)	Relative(hPa)	Wind Speed(m/s)	Wind Gust(m/s)	Wi Da
2019-08-22 18:30	31.3	77	26.8	40.9	31.8	72	997.8	997.8	1.0	2.0	4
2019-08-22 18:25	31.5	77	26.9	41.3	31.8	71	997.7	997.7	1.1	1.5	2
2019-08-22 18:20	31.5	76	26.8	41.2	31.9	71	997.8	997.8	0.8	1.5	3
2019-08-22 18:15	31.6	76	26.9	41.4	32.0	71	997.7	997.7	0.9	2.0	2
2019-08-22 18:10	31.7	75	26.8	41.5	32.0	71	997.6	997.6	0.7	2.0	3
2019-08-22 18:05	31.8	75	26.8	41.6	32.0	71	997.6	997.6	0.8	2.6	2
2019-08-22 18:00	31.9	74	26.7	41.6	32.1	71	997.5	997.5	1.1	3.1	8
2019-08-22 17:55	31.9	75	26.9	41.9	32.0	70	997.5	997.5	1.1	3.6	7
2019-08-22 17:50	32.1	74	26.9	42.4	32.1	70	997.4	997.4	1.0	2.0	5
2019-08-22 17:45	32.2	74	27.0	42.6	32.1	70	997.4	997.4	1.7	2.6	1
2019-08-22 17:40	32.3	74	27.1	42.9	32.2	70	997.1	997.1	0.6	2.0	2
2019-08-22 17:35	32.5	73	27.0	43.1	32.2	69	997.3	997.3	0.9	2.6	6
2019-08-22 17:30	32.7	72	27.1	43.6	32.2	69	997.4	997.4	0.5	1.5	5

Weather Map



Email Alerts



5.4 Weather Underground

If you are planning to use wunderground.com you must have an account and register a (new) personal weather station. You may do so on the Wunderground uploading page in the WS View application:

- Press Register at Wunderground.com and finish the registration on the page (you may choose “other” when selecting device hardware).
- Take note of the PWS identifier (ID) and the password that will be generated for you.
- Back to the app and input the Station ID and Key.
- Press Save.
- Back to the Menu page and select WU Dashboard. You’ll see the current WU data, including graphs on the “WU Dashboard” screen within hours.

To add additional WU stations, please follow this procedure:

- Press “Menu” icon (upper left) and choose Manage Wunderground.
- Press “Add WU Station ID” to add a new station, The next screen will let you enter the appropriate information.
- You may also press the “Delete” button next to a specific station to remove it.

5.4.1 WU Dashboard vs Live Data

You should be aware that the sensor information presented here represents the latest as seen by WU (from the last successful upload), and may not be identical what is on your live data screen!

Here is a short explanation showing data difference:

Live Data is obtained by the mobile app by connecting directly to the gateway. This can only happen when your mobile device and gateway are connected to the same Wi-Fi network. It will then show up after you select “Device List” from the main settings menu. If your mobile device is in another network, no device(s) will show up in this list and you will not be able to select a device for displaying the “Live Data” screen.

WU Dashboard shows the data obtained from WU server. This requires that your mobile device can reach the Internet and therefore this is possible even when you are not on your home Wi-Fi network, such as when using cellular data.

5.5 Calibration or Rain totals

When on the “Live Data” screen, you can press the “More” button (upper right) to enter the calibration screen or the rain totals screen.

When you select “Calibration” you can change sensor calibration values on the next screen.

If you tap on “Rain Totals” instead, you can edit the rain total for the current day, week, month, or year. This is useful when you start using this system instead of another one that has accumulated data, or simply if you know the values to be incorrect.

5.5.1 Calibration of barometric pressure settings.

Calibration of barometric pressure requires some additional understanding, which we will provide here. Also provided is a step by step procedure for calibrating correctly.

Absolute barometric pressure, can be calibrated at manufacturing time by comparing with a precise instrument that measures pressure at the same location. In practice, sometimes small adjustments of a few hPa may be needed. The relative pressure represents what the air pressure would indicate if your station was at sea level and depends on the altitude of your gateway and cannot be known in advance. This is why it needs an adjustment.

There are different manners in which to handle this adjustment. We will outline a reliable procedure below, which requires adjusting both pressures. The method assumes that you have an official airport sufficiently nearby to act as a reliable reference. Usually distances of up to 25 miles work reliably, but this is not always true and depends on geography. We start by assuming that your station’s absolute pressure reading is correct and needs no offset correction.

The procedure below assumes you are starting from the gateway’s factory setting. With those settings, ABS and REL should, at this time, be displaying the same value. We also assume, for the moment, that ABS pressure is 100% correct.

1. For this procedure we will get the most precise results if our display for pressure is in hPa units. Even if you do not want to use those units eventually, set the app to use them for now.
2. Determine the altitude, or elevation above sea level, of your station's gateway. This measurement is necessary to account for the difference in air pressure caused by the elevation of your gateway. Elevation above sea level reduces the absolute pressure measured by your sensor. Determine this altitude using a GPS, or look it up using a tool such as this web site: <https://www.freemaptools.com/elevation-finder.htm>. You can input your location's GPS coordinates, or manipulate the map to your location. Click on "Estimate Elevation" and observe the result. For an example we will use a gateway location at 42 ft. above sea level.
3. This tool will provide the ground level elevation at your location, so you will need to add the right amount for how high above ground level your gateway is. If you are on a ground floor and have the gateway on a desk, you'll have to add something like 3-4 ft. If you are using a GPS system that tells you elevation, make sure it is right next to the gateway and you'll be able to read the correct elevation right from the GPS results without further adjustment.
4. With the correct altitude/elevation in hand you will need to determine the correct offset. To be added to the absolute pressure reading in order to compute relative pressure (sea level equivalent). Correction tables can be found on-line in many places. One example is the table found at the web site at <https://novalynx.com/manuals/bp-elevation-correction-tables.pdf>. Locate your elevation in the first column and read the correction in the third column. This table, however is rather coarse, making it hard to be precise. An alternative is an on-line calculator such as the one found here: <http://www.csgnetwork.com/barcorrecthcalc.html>
For our example of 42 ft. above sea level we input 42 ft. of elevation and a standard pressure of 1013.25 hPa/mb and press calculate. We find an "absolute barometer value" that should be -1.5626061222588443 hPa lower than at sea level. The inverse (because relative pressure is

higher than absolute pressure) of this number will be our “REL PRESS OFFSET” value. Use the settings procedure to increase REL by +1.6 (nearest rounded value we can input).

5. Now we need a reliable reference for pressure at sea level. Locate the official identifier for the nearest airport. Refer to “[World Airport Codes](https://www.world-airport-codes.com)” at <https://www.world-airport-codes.com> or a similar reference. Enter your location or nearby airport name, and press “Search.” Select the correct airport from your search results and click on it. For example, search for “Mountain View” and click on “Moffet Field.”
6. From the resulting page find the ICAO code, if listed. Otherwise use the IATA code. For the example above, you would find IATA code “NUQ.”
7. Now go to a web site like [AVIATION WEATHER CENTER](https://www.aviationweather.gov/metar?gis=off) (for US locations) at <https://www.aviationweather.gov/metar?gis=off> and enter the code you found in step 2, and click “Decoded” (to make the next step easier) before requesting the METAR information. For the example we would enter “KNUQ” and find a result output like: “30.09 inches Hg (1019.0 mb) [Sea level pressure: 1019.1 mb]”
8. Go to the calibration settings page and observe the “REL Barometer value (this is the value we just adjusted in step 4 above). Compare the REL value with the value from the airport. IN our example, the REL display was 1022.9 where we expected 1019.1. This then tells us that our displayed REL pressure is $1022.9 - 1019.1 = 3.8$ hPa different from the reference source.
9. Since we assumed the absolute pressure measured was correct, and we presumably calculated the elevation related offset correctly, we must conclude that the absolute pressure was not correct after all. It appears to be 3.8 too high, so we’ll now enter a correction of -3.8 in the settings for “ABS Barometer” until it reads a value 3.8 hPa lower than before. This kind of correction is entirely normal as during manufacturing small shifts in the pressure sensor readings can be introduced.
10. For a more precise procedure, locate a very precise barometer that you can place right next to the gateway, you would adjust “ABS Barometer”

until the ABS pressure reads identical. You would then still adjust “REL barometer” until it displays the value from the reference airport. This procedure would also produce the correct relative pressure, but due to a precise calibration of the absolute pressure, it too is correct.

The first procedure above generally works quite well, but for stations at fairly high altitudes (e.g. 5,000 ft. or higher) it may be more incorrect than at lower altitudes. In such cases comparisons with other known correct, and nearby at similar altitude, stations may help.

Now that calibration is complete, feel free to change the pressure units to whatever you like.

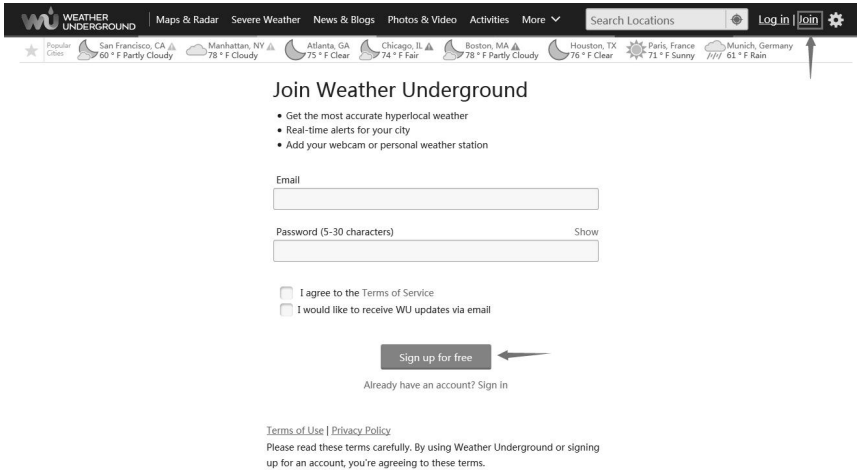
Note: Airport METAR data is often only updated every 10, 15 or even 30 minutes. If you use the information in the procedure above, you may be looking at pressure data that is out of date by as much as the update interval. To get best results observe several times and figure out the update interval and then use two values for the procedure: one taken immediately after an update, another taken about halfway through the interval.

Note: It is also a good idea to observe some more after the calibration procedure is complete to make sure the numbers are correct.

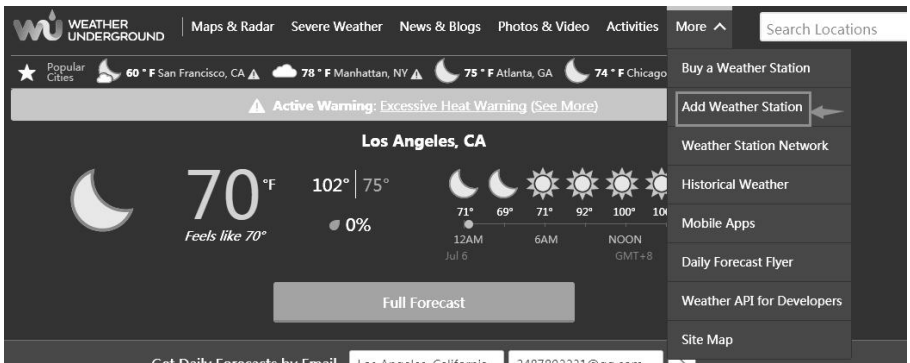
5.6 Registering with and using wunderground.com

If you have not already done setup for wunderground.com during the Wi-Fi setup, you can do so later. Perform the following steps:

1. Visit Wunderground.com and click **Join** as the right top arrow indicates and select the **Sign up for free** option.



2. Click **More** and select **Add Weather Station** to register your station



Personal Weather Station Network

Overview **Buying Guide** **Register with WU**

Step 1: Register Your Station

1. Type in the **city, state, country** where your weather station will be located.
2. Drag the **red marker** to your specific location.

1032 West 8th Street, Los Angel...

Latitude: 34.0494
Longitude: -118.264099

Elevation (ft):

Height Above Ground (ft):

[Verify Location →](#)

3. Click **verify location** and fill out the form.

After submitting the form, you will see the following:

Step 3: Add Your WU Info to Your Weather Station Software

Congratulations. Your station is now registered with Wunderground!

You are almost done. Now go to your weather station software and add the following:

Your Station ID:
KCALOSAN764

Your Station Key/Password:
v8cp612c

[My Weather Stations](#)

It may take a few minutes or several hours for your station to start sending data to Weather Underground.

ID and Password are case-sensitive. Process may require you to register with a 3rd party site (eg. *rainwise.net*).

Not seeing your station data yet? Check out our [PWS Help Center](#).

5.7 Device Settings

On Live Data page, press More and select Device Settings to set the following:

Select sensor type

Set time zone

Reboot Device

Reset to Factory Settings

5.8 Sensor ID

On Live Data page, press More and select Sensor ID to set the following:

View sensor ID, signal bar and battery power condition

Register the sensor when offline

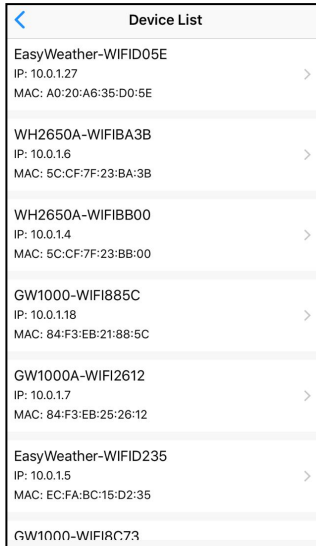
Enable or disable the sensor

Input the Sensor ID when offline

5.9 Device list

When on WU Dashboard screen, you can press the “Menu” button (upper right) and select Device List to view all your devices.

You can press your device to view or modify the settings.



Device List	
EasyWeather-WIFID05E IP: 10.0.1.27 MAC: A0:20:A6:35:D0:5E	>
WH2650A-WIFIBA3B IP: 10.0.1.6 MAC: 5C:CF:7F:23:BA:3B	>
WH2650A-WIFIBB00 IP: 10.0.1.4 MAC: 5C:CF:7F:23:BB:00	>
GW1000-WIFI885C IP: 10.0.1.18 MAC: 84:F3:EB:21:88:5C	>
GW1000A-WIFI2612 IP: 10.0.1.7 MAC: 84:F3:EB:25:26:12	>
EasyWeather-WIFID235 IP: 10.0.1.5 MAC: EC:FA:BC:15:D2:35	>
GW1000-WIFIRC73	

Note: This function requires that your phone and the console is using the same network.

5.10 Manage Wunderground

You can add or delete WU Station ID by selecting “Manage Wunderground” on the submenu:

WU Stations		Add
I44JIUXI35		Delete
I44JIUXI28		Delete
I44JIUXI60		Delete
I44JIUXI74		Delete
IFJELL37		Delete
I44JIUXI65		Delete
I44JIUXI71		Delete
IU5E7FU414		Delete
KCAMOUNT191		Delete
I44JIUXI36		Delete
IU5E7FU429		Delete

5.11 Unit Settings

You can set your desired display units by selecting “Unit Settings” on the submenu:

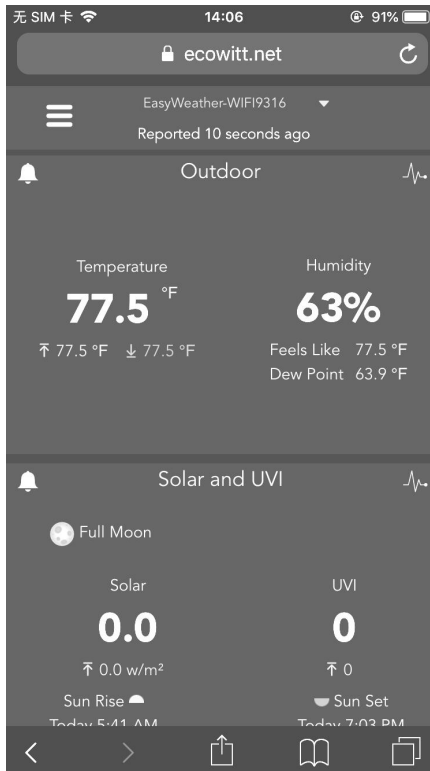
Display Settings	
Temperature	<input checked="" type="radio"/> °C <input type="radio"/> °F
Pressure	<input checked="" type="radio"/> hPa <input type="radio"/> inHg <input type="radio"/> mmHg
Wind	<input type="radio"/> km/h <input type="radio"/> mph <input checked="" type="radio"/> m/s
Rain	<input checked="" type="radio"/> mm <input type="radio"/> in
Light	<input checked="" type="radio"/> w/m ² <input type="radio"/> lux <input type="radio"/> fc

5.12 Manage Ecowitt

Once you created your ecowitt account successful on the WS View app, you may select “Manage Ecowitt” on the submenu to manage your device.

Ecowitt Device	
WS1900B-WIFI65E7 2C:F4:32:4E:65:E7	Delete
GW1000B-WIFI378B B4:E6:2D:73:37:8B	Delete
EasyWeather-WIFI8AE5 BC:DD:C2:AF:8A:E5	Delete

You may view your weather station data by pressing your device on this screen:



5.13 Viewing data on wunderground.com

You can also observe your weather station's data by using the wunderground.com web site. You will use a URL like this one, where your station ID replaces the text "STATIONID":

<http://www.wunderground.com/personal-weather-station/dashboard?ID=STATIONID>

It will show a page such as this, where you can look at today's data and historical data as well:

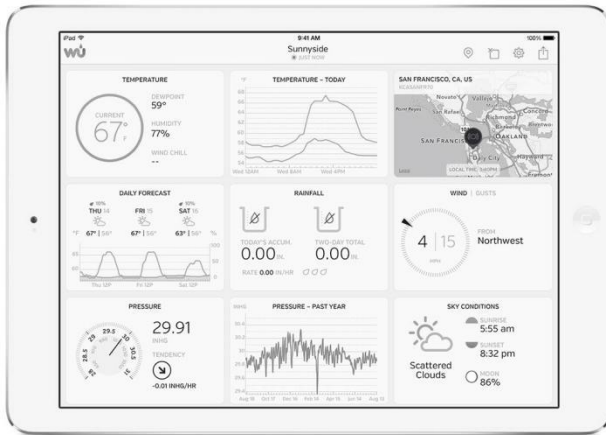
The screenshot shows the Wunderground dashboard for Darwin, Australia. The main display features a large temperature of 78.4°F and a wind speed of 12.1 mph. Below this, there are various weather metrics such as dew point, humidity, and precipitation. A satellite map of Darwin is visible on the left. At the bottom, there is a weather history summary table for July 6, 2018.

	High	Low	Average		High	Low	Average
Temperature	82.4 °F	77.4 °F	79.9 °F	Wind Speed	13 mph	--	12 mph
Dew Point	73.8 °F	64.6 °F	70.1 °F	Wind Gust	14 mph	--	--
Humidity	79%	63%	70%	Wind Direction	--	--	West
Precipitation	0 in	--	--	Pressure	29.67 in	29.59 in	--

There are also some very useful mobile apps. The URLs provided here go to the Web version of the application pages. You can also find them directly from the iOS or Google Play stores:

- **WunderStation:** iPad application for viewing your station's data and graphs

<https://itunes.apple.com/us/app/wunderstation-weather-from-your-neighborhood/id906099986>



- **WU Storm:** iPad and iPhone application for viewing radar images, animated wind, cloud coverage and detailed forecast, and PWS station data

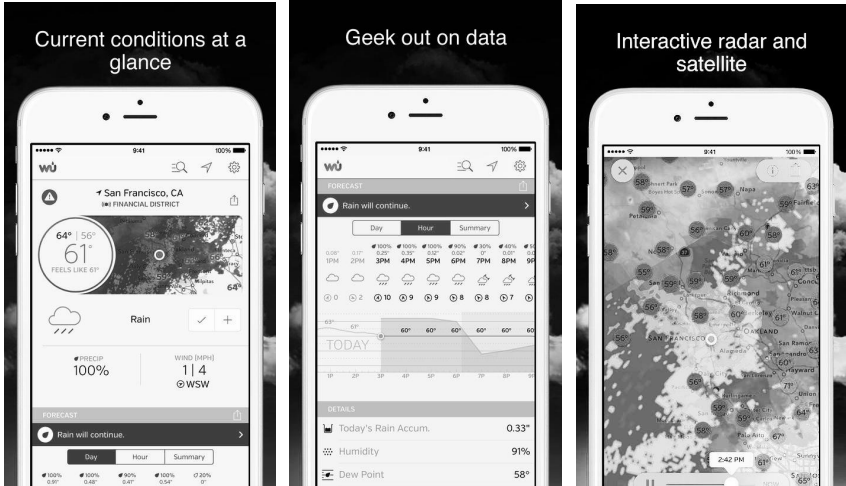
<https://itunes.apple.com/us/app/wu-storm/id955957721>



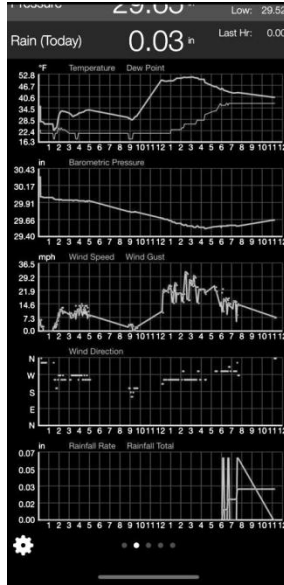
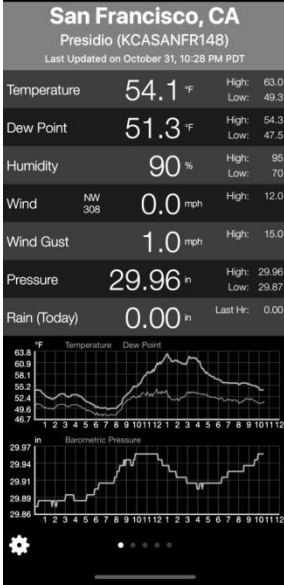
- **Weather Underground: Forecast:** iOS and Android application for forecasts

<https://itunes.apple.com/us/app/weather-underground-forecast/id486154808>

<https://play.google.com/store/apps/details?id=com.wunderground.android.weather&hl=en>



PWS Weather Station Monitor: View weather conditions in your neighborhood, or even right in your own backyard. Connects to wunderground.com



6 Maintenance

The following steps should be taken for proper maintenance of your station

Clean Rain Gauge

Check the rain gauge every 3 months. Rotate the funnel counter-clockwise and lift it up. Clean the funnel and bucket with a damp cloth to remove any dirt, debris and insects. Spray the array lightly with insecticide, if there's a bug infestation.

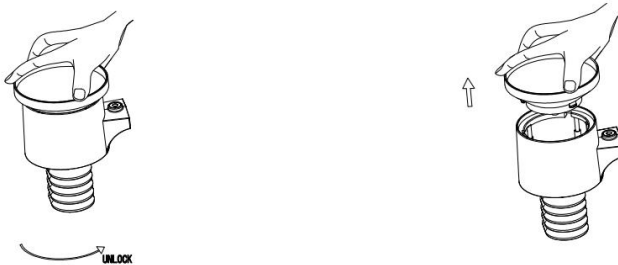


Figure: Rain gauge installation & maintenance

Clean Solar Radiation Sensor and Solar Panel

The solar radiation sensor and solar panel of the outdoor sensor array need to be cleaned with a non-abrasive slightly damp cloth every 3 months.

Replacing Batteries Regularly

Batteries of the outdoor sensor array need to be replaced every 1-2 years for environmental friendly. In serious environments, check the batteries every 3 months and apply a corrosion preventing compound(not included) on the battery terminals for protection.

To Prevent Snow build up

In snowy days, use anti-icing silicon spray on the top of the weather station to prevent snow build up.

7 Troubleshooting Guide

Look through the following table and locate an issue or problem you are experiencing in the left column and read possible solutions in the right column.

Problem	Solution
<p>Outdoor sensor not reporting to gateway</p> <p>Dashes (--) on the Live Data interface</p>	<ul style="list-style-type: none"> • Check that the outdoor transmission LED on the bottom is flashing approximately every 16 seconds.. • If the batteries were recently (re)placed, check correct polarity was used and/or reseal the batteries. If the batteries are old, replace them. • If the LED is now flashing every 16 seconds, proceed to the next step. If it is not flashing and you have repeated battery checks and placement, you may have a defective unit. • Make sure the gateway has been powered with 5V 1A power supply or above. • If the batteries/power supply may have been changed in the remote and/or the gateway, and the gateway has not been reset, the solution may be as simple as powering cycling the gateway: plug off the gateway for about 10 seconds and reconnect. • If you still have problems, bring the outdoor sensor to a location about 10 ft. away from the gateway for testing. Power cycle the gateway as described above. • Do not touch any buttons for several minutes to allow the gateway to “discover” the outdoor sensor. During this process the remote sensor ID will be at the status of “Learning” on the Sensor ID interface. Wait several minutes for the sensor ID to display. • If the sensor properly syncs up, proceed to the next step “Intermittent problems with outdoor sensor reception

Problem	Solution
Intermittent problems with outdoor sensor reception on gateway	<p data-bbox="401 151 543 178">on gateway.”</p> <ul data-bbox="353 197 1002 802" style="list-style-type: none"> <li data-bbox="353 197 1002 347">• There may be a temporary loss of communication due to signal quality issues caused by electrical interference or other location related factors (obstacles along line of sight). <li data-bbox="353 363 1002 472">• To troubleshoot, install a fresh set of batteries in the remote sensor array. For cold weather environments, install lithium batteries. <li data-bbox="353 488 1002 724">• If you still have intermittent problems move sensor and gateway closer together, but not closer than 5 ft. Also check that there are no metal barriers like aluminum siding, or metal wall framing, along the line of sight between sensor and gateway. Relocate sensor and gateway as necessary to avoid obstacles. <li data-bbox="353 740 1002 802">• Depending on natural barriers you may also have to move the outdoor sensor higher and/or closer.
Relative pressure does not agree with official reporting station	<ul data-bbox="353 826 958 1102" style="list-style-type: none"> <li data-bbox="353 826 958 1102">• Relative pressure refers to sea-level equivalent temperature and should generally agree closely with the official station. If there is a disagreement, make sure you are not looking at absolute pressure, in particular if your station is not near sea level. Also check at different times due to occasional delays in updates to the official station. <p data-bbox="353 1118 784 1145">Redo the pressure calibration procedure.</p> <ul data-bbox="353 1161 1002 1473" style="list-style-type: none"> <li data-bbox="353 1161 1002 1473">• The barometer is only accurate to ± 0.09 inHg (3 hPa) within the following relative pressure range: 8.86 to 32.48 inHg (300 – 1,100 hPa), which corresponds to an altitude of 29,527 ft. (9,000 m) down to 2,500 ft. (750 m) below sea level. At higher altitudes, you should expect a possible lesser accuracy and non-linearity effects in the error (the calibration offset only allows for a partially linear correction).

Problem	Solution
Time is incorrect	Make sure your time zone and daylight savings time setting is correct (even when connected to the Internet via Wi-Fi this is needed).
Data not reporting to Wunderground.com	<ul style="list-style-type: none"> • Confirm your station ID is correct. The station ID is all caps, and the most common issue is substituting a capital letter O for a 0 (zero) or vice versa. Please note the digit 0 can only occur in the last part of the station ID (which is a station number in a city). Example, KAZPHOEN11, not KAZPH0EN11 • Confirm that your password (also called: key) is correct. It is the password wunderground.com generated for your station ID. You can also verify it by logging in to wunderground.com and looking it up under “My PWS.” • If there's a number "1" on the station key, try to input the lower case of letter "l" to replace it on the app. • Make sure the date, time and time zone is correct on the WS View app. If it is not incorrect, you may be reporting data for a point in the past or future and you may not see it where you expect it. • Check your router firewall settings. The gateway sends data via port 80. If you can access other web sites using “http” (not to be confused with “https”) this setting will be OK.
No Wi-Fi connection, or gateway configuration failed	<ul style="list-style-type: none"> • Check for Wi-Fi light on the gateway. If wireless connectivity is operational, the Wi-Fi light will be steady. Make sure you configured the correct SSID and password. Repeat the procedure as necessary to verify. • The gateway does not support so-called “captive Wi-Fi” networks. These are typically “guest” type networks where users have to agree to terms and

Problem	Solution
	<p>conditions before being connected.</p> <ul style="list-style-type: none"> • Make sure your Wi-Fi supports 2.4 GHz signals (801 type B or G, or N) because Wi-Fi that uses the 5 GHz spectrum is not supported. For router with dual band, please disable the 5GHz band. • Turn off your mobile data/cellular data. • Ensure the DHCP mode is open • Enable the location access function for the WS View app on your mobile device settings page <p>Try alternative methods.</p> <p>Method 1:</p> <ol style="list-style-type: none"> 4. Power off the gateway and wait for several minutes. 5. Power on the gateway and hold the black button for 5s till the red LED flash fast. 6. Open the Wi-Fi network on your phone and connect to the hotspot of GW1000-WIFIXXXX. 7. Open the WS View app and click Configure New Device - select GW1000 - click Next 8. Follow the instructions on the app. <p>Method 2:</p> <ol style="list-style-type: none"> 9. On a PC, go to our website 10. go to “Support” and click “MANUAL & SOFTWARE” 11. search for “GW1000” 12. download and install the “GW1000 Wi-Fi Configuration with PC Software” 13. Connect PC to the gateway’s Wi-Fi hotspot and use the software to configure the gateway. 14. Now use the mobile app and wait for the gateway to appear in the “Device List”

Problem	Solution
	<p data-bbox="352 193 470 220">Method 3:</p> <p data-bbox="352 234 978 304">Reset your router or reset the gateway to factory mode and then try the configuration again</p> <p data-bbox="352 360 470 387">Method 4:</p> <p data-bbox="352 402 943 512">Try to set your router password to none and then do the configuration again. If successfully, you may set your router password back and configure the gateway again.</p> <p data-bbox="352 568 470 595">Method 5:</p> <p data-bbox="352 609 926 639">Try the configuration using a different mobile device.</p> <p data-bbox="352 695 983 805">If still unsuccessfully, please contact our Customer Service Department via email: support@ecowitt.com or ecowittweather@outlook.com.</p>

8 Specifications

Note: Out of range values will be displayed using “---”:

Outdoor sensor	Specification
Transmission distance in open field	100 m (330 ft.)
RF Frequency	433/868/915 MHz depending on location
Temperature range	-40°C – 60°C (-40°F - 140°F)
Temperature accuracy	± 1°C, or ± 2°F
Temperature resolution	0.1°C, or 0.1°F
Humidity range	10% ~ 99%
Humidity accuracy	± 5%
Humidity resolution	1%
Rain volume display range	0 – 9999 mm, or 0 – 199.99 in
Rain volume accuracy	± 10%
Rain volume resolution	0.3 mm (for volume < 1,000 mm) 1 mm (for volume ≥ 1,000 mm), or 0.01 in (for volume < 100 in) 1 mm (for volume ≥ 100 in)
Wind speed range	0 – 50 m/s (0 ~ 100 mph)
Wind speed accuracy	± 1 m/s (speed < 5 m/s) ± 10% (speed ≥ 5 m/s), or ± 0.1 mph (speed < 11 mph) ± 10% (speed ≥ 11 mph)
UV-Index range	0 - 15
Light range	0 – 120 kLux
Light accuracy	± 15%
Sensor reporting interval	16 seconds

Table 6: Outdoor sensor specification

USB gateway built-in sensor	Specification
Temperature range	-10°C – 60°C (14°F - 140°F)
Temperature resolution	0.1°C, or 0.1°F
Humidity range	1% ~ 99%
Humidity resolution	1%
Barometric pressure range	300 – 1,100 hPa (8.85 – 32.5 inHg)
Barometric pressure accuracy	± 3 hPa in 700 – 1,100 hPa range
Barometric pressure resolution	0.1 hPa (0.01 inHg)

Table 7: USB gateway built-in sensor specification

Power	Specification
USB gateway	5V DC
Outdoor sensor	Solar panel (built-in)
Outdoor sensor (backup)	2 x AA 1.5V LR6 Alkaline (not included), or 2 x AA 1.5V Lithium battery (not included)

Table 8: Power specification

The primary power source for the outdoor sensor is the solar panel. When available solar power (light over recent period) is insufficient, the batteries will be used. In outdoor climates that frequently have sustained temperatures below 0°C (or 32°F) the use of Lithium batteries is strongly suggested as these are performing better than Alkaline batteries under such circumstances.

9 Warranty Information

We disclaim any responsibility for any technical error or printing error, or the consequences thereof.

All trademarks and patents are recognized.

We provide a 1-year limited warranty on this product against manufacturing defects, or 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 us for problem determination and service procedures.

This limited 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, or claims based on misrepresentation by the seller, or performance variations resulting from installation-related circumstances.