Professional Wireless Wi-Fi Weather Station Operation Manual

Model: WS2320

Thank you for purchasing this Professional Wi-Fi Weather Station! This device provides accurate weather readings and is Wi-Fi capable to stream data from the weather station to Internet based weather services.

This manual will guide you, step-by-step, through setting up your weather station and console, 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.

1 Table of Contents

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	Display Console
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 (M5 size)
1	Metal mounting plate to be used with U-Bolts
1	Wrench for M5 bolts
1	AC adapter
1	User manual (this manual)

Table 1: Package content

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

Note: Batteries are **not included**. You will need 5 AA size batteries, alkaline or Lithium batteries (only 2 of these needed for colder climates).

Note: While the console can operate on batteries only, an AC adapter is included and is required for Wi-Fi functionality. The adapter is a switching-type adapter and can generate a small amount of electrical interference with the RF reception in the console, when placed too close to the console. Please keep the console display at least 2 ft. or 0.5 m away from the power adapter to ensure best RF reception from the outdoor sensor package.

3 OVERVIEW

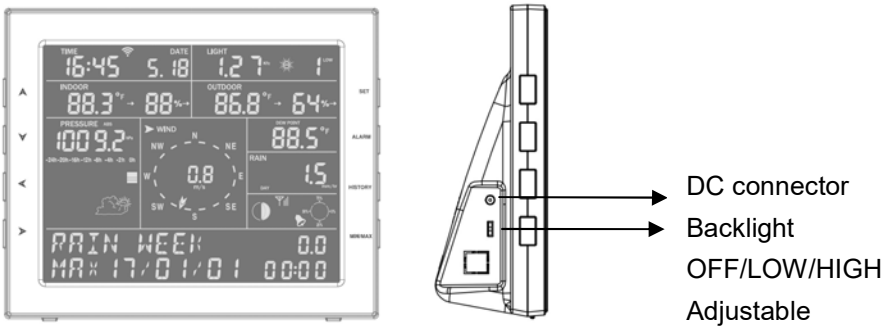


Figure 1: Display Console

Note: Backlight function is only available when connected to power adapter

3.1 Features

- Time and date, Moon phase
- Indoor/Outdoor temperature and humidity
- Wind speed, gust speed, and wind direction (compass)
- Absolute and Relative barometric pressure
- Rainfall rate and totals for day, week, month, year and life-time total
- Calculated wind chill, dew point and heat index display
- Solar light intensity and UV index
- Selectable display units for each sensor: C or F (temperature); mph, km/h, m/s, knots or Beaufort (wind speed); inHg, hPa or mmHg (pressure); in or mm (rainfall); lux, fc or w/m^2 (solar lighting)
- Weather forecast based on barometer reading
- Barometric history chart (12, or 24 hr.)
- Maximum and minimum values for sensor with time stamp
- High/low alarm options for sensors
- Message panel showing alarm conditions, min and max data, etc.
- Data preserved during battery change

- PC software (requires Wi-Fi connection; downloaded)
- Backlight high/low adjustable when connected to power adapter
- 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.
- Data storage service on Ecowitt server: https://ecowitt.net
  - Stores data for past six months at 5-minute intervals
  - Stores data for past year at 30-minute intervals

4 Setup Guide

To complete assembly you will need a Philips screwdriver (size PH0) and a wrench (size M5; included in package).

Note: We suggest you assemble all components of the weather station, including console 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 console to any Internet services until you have reset these false readings using the console. The errant values may be hard to remove from Internet services if you do not reset first.

Attention:

- Follow suggested order for battery installation (outdoor sensor first, console second)
- 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.

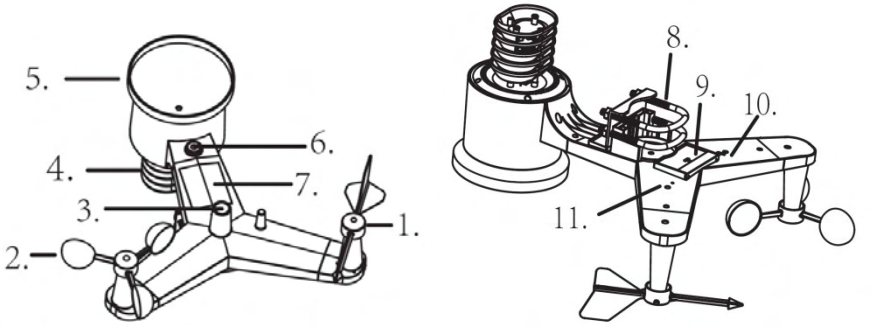


Figure 2: Sensor assembly components

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

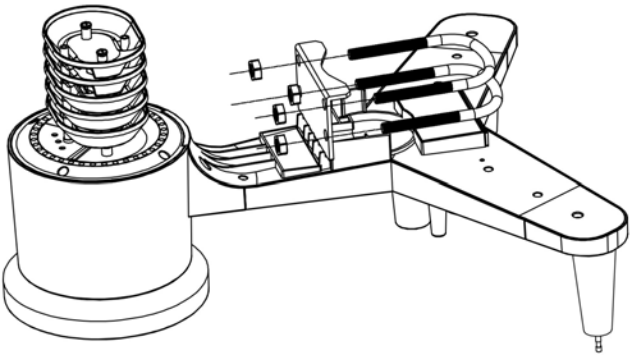


Figure 3: U-Bolt installation

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.

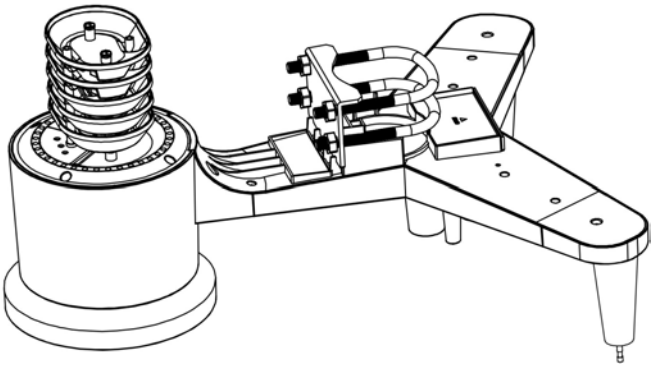


Figure 4: U-Bolts and nuts installed

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

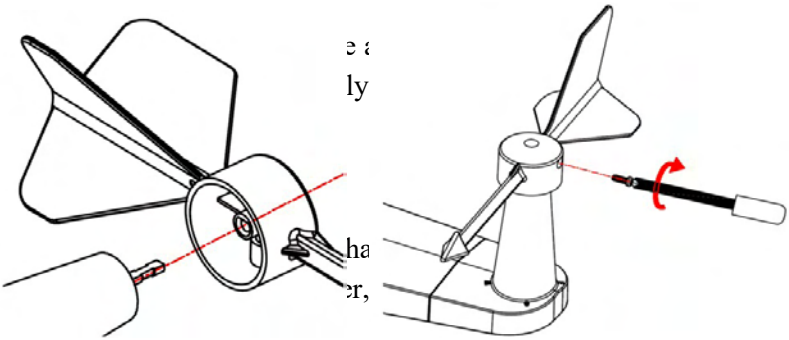


Figure 5. Next, tighten the set screw, with a Philips screwdriver (size PH0), as shown on the right side, until the wind vane cannot be removed from the axle. Make sure the wind vane can rotate freely. The wind vane's movement has a small amount of friction, which is helpful in providing steady wind direction measurements.

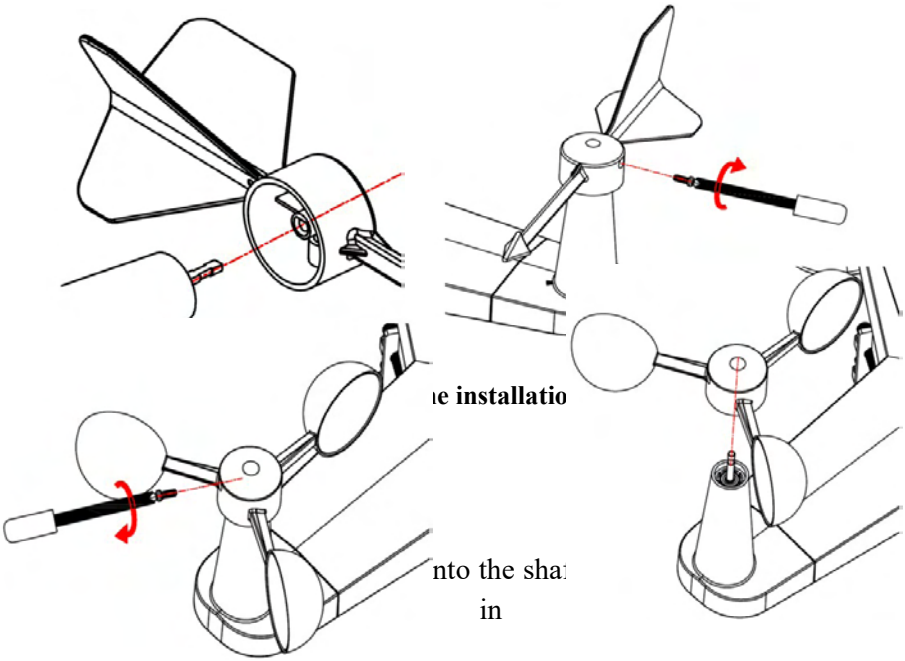


Figure 6 on the left side. Tighten the set screw, with a Philips screwdriver (size PH0), as shown on the right side. Make sure the cup assembly can rotate freely. There should be no noticeable friction when it is turning.

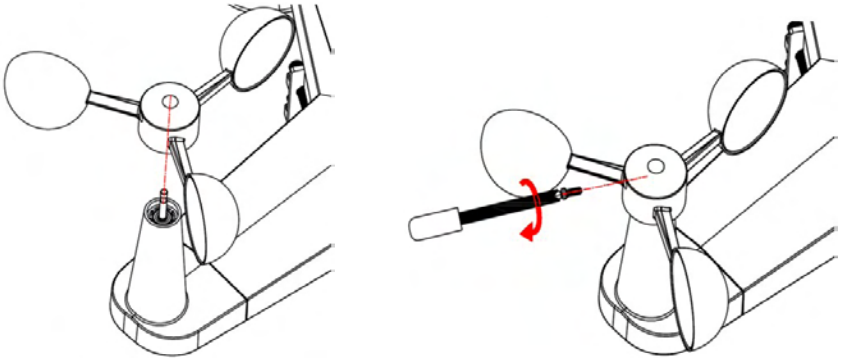
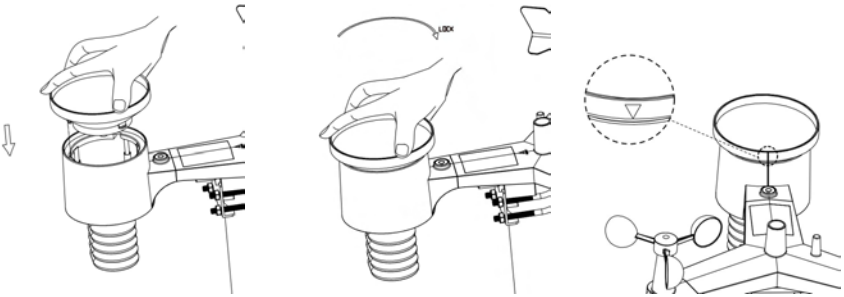


Figure 6: Wind speed cup installation diagram

4.1.4 Install Rain Gauge

Keep the Indication mark in straight line. As show below photo.



4.1.5 Install Batteries in sensor package

Open the battery compartment 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.

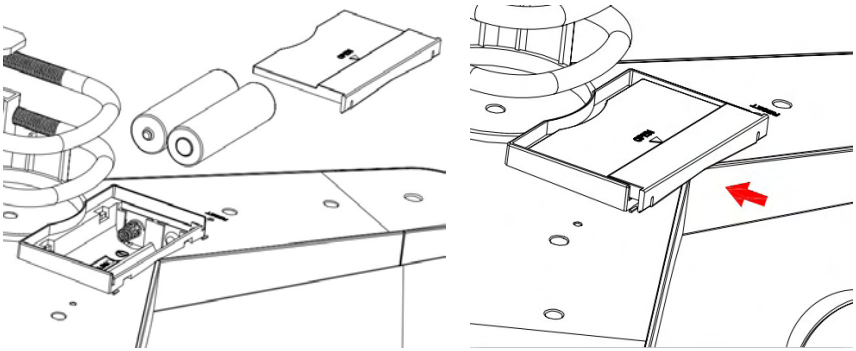


Figure 7: Battery installation diagram

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.

4.1.6 Mount assembled outdoor sensor package

4.1.6.1 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 console). 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.

4.1.6.2 Mounting

Your package includes two U-Bolts, 4 nuts, and a metal mounting plate for the U-Bolts. You can attach a pipe to a permanent structure and then attach the sensor package to it (see Figure 8). The U-Bolts will accommodate a pipe diameter of 1-2 inches.

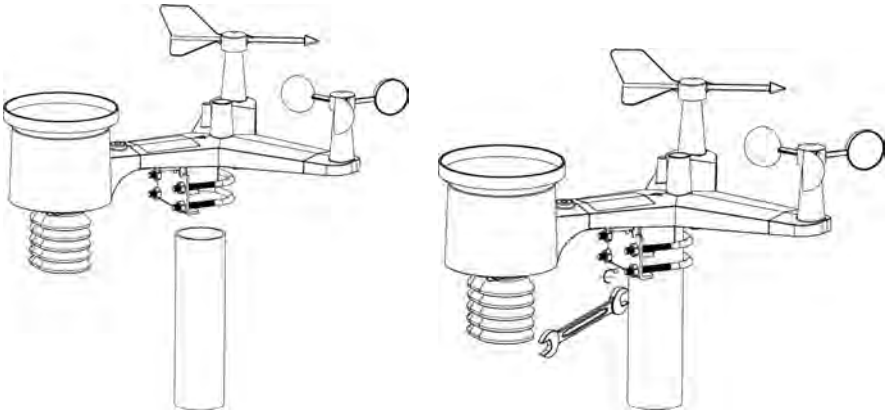


Figure 8: Sensor package mounting diagram

Make sure the mounting pipe 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 “North” that you will find on top of the sensor package right next to the light sensorl. 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 North 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 "North" arrow actually point due South! 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 (see section 5.2.7).

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.

Note: If you tested the full assembly indoors and then came back here for instructions and mounted to sensor package outdoor you may want to make some further adjustments on the console. The transportation from indoor to outdoor and handling of the sensor is likely to have "tripped" the rainfall sensing bucket one or more times and

consequently the console may have registered rainfall that did not really exist. You can use console functions to clear this from history. Doing so is also important to avoid false registration of these readings with weather services.

4.1.7 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.

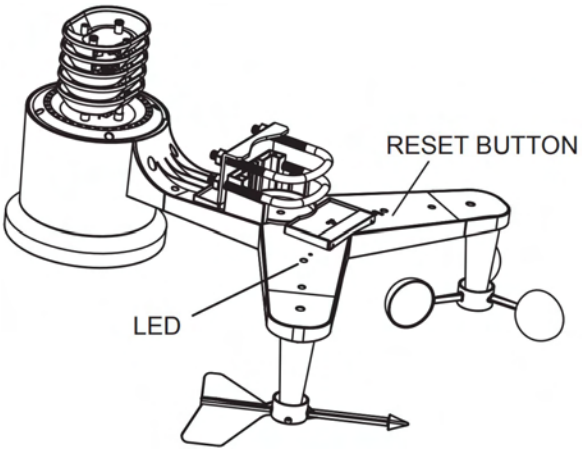


Figure 9: Reset button and Transmitter LED location

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 the sensor package and the console:

- **Electro-Magnetic Interference (EMI)**. Keep the console 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 console, 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 console.

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 Console Display

See Figure 10 to help you identify elements of the console's display screen.

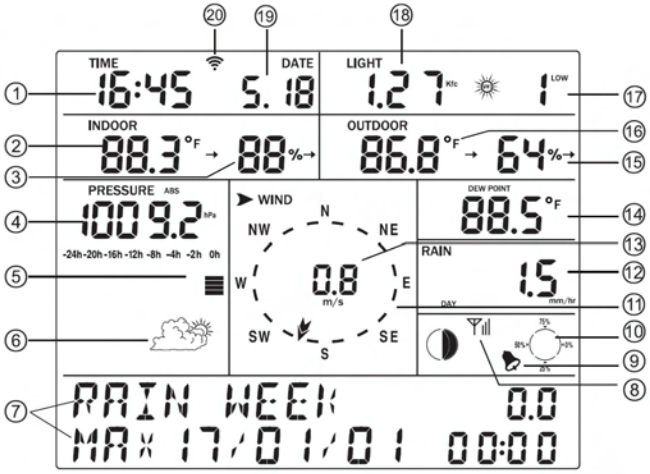


Figure 10: Display Console Screen Layout

1 Time	11 Wind direction
2 Indoor Temperature	12 Rainfall
3 Indoor Humidity	13 Wind speed/Gust speed
4 Barometric Pressure	14 Wind chill/Dew point/Heat index
5 Barometric Pressure graph	15 Outdoor Humidity
6 Weather Forecast icon	16 Outdoor Temperature
7 Dynamic information display area	17 UV index
8 RF signal reception icon	18 Light
9 Alarm icon	19 Date
10 Memory status	20 Wi-Fi Signal icon

Table 4: Display console detailed items

4.3.1 Initial Display Console Set Up

Immediately after power up (inserting batteries and/or power adapter), the unit will turn on all segments of the LCD for 3 seconds and will then display

one or more messages on the bottom: firmware version, RF frequency and sensor identifier. Then the unit will start to look for reception of the outdoor sensor data which may take up to 3 minutes. Once the signal has been found and registered, the unit will enter the receive and display mode.

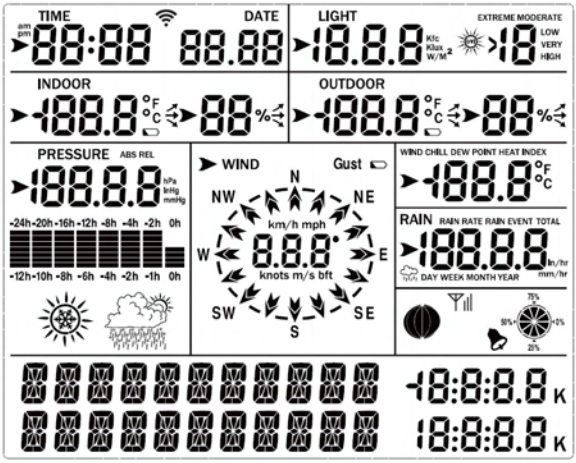


Figure 11: Console display LCD segments

4.3.2 Key functions

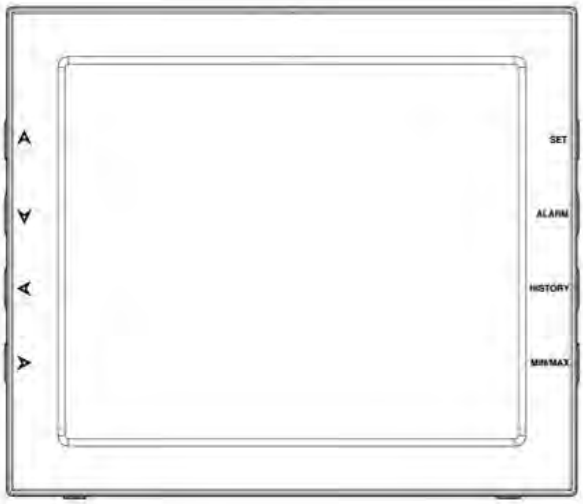


Figure 12: Buttons around the display

You'll find four keys on each side of the console. The following tables briefly explains the function of these keys.

Button	Function(s)
⮝	Move to previous information message (normal mode), or increase (program mode). We will call this key "UP" in the remainder of this manual
⮟	Move to next information message (normal mode), or decrease (program mode). We will call this key "DOWN" in the remainder of this manual.
⮜	Move the previous display segment (normal mode), or back to main menu (settings mode). We will call this key "LEFT" in the remainder of this manual
⮞	Move the next display segment (normal mode), or into sub menu (settings mode). We will call this key "RIGHT" in the remainder of this manual

Figure 13: Left side buttons

Button	Function(s)
SET	Hold to enter settings mode
ALARM	Display high- or low-alarm (normal mode), or turn alarm on/off
HISTORY	Display historical sensor data records (normal mode), or return to normal mode (all other modes)
MIN/MAX	Display recorded minimum and maximum sensor values

Figure 14: Right side buttons

Note: A low battery indicator icon will appear on the right corner of the outdoor temperature display of the console, when the batteries power of the outdoor sensor is not enough.

5 Operating the console

The console display contains 10 distinct information segments as well as a message panel on the bottom left side.

The console operates in several different modes: normal, settings, history, alarm, max/min, and calibration settings. Each mode is explained in the following sections.

Any mode other than normal, can always be exited to return to normal mode by depressing the “HISTORY” button briefly. Thirty seconds of inactivity in any mode will also cause a return to normal mode.

5.1 Normal mode

Normal mode is the most often used mode. It is used to display most current sensor information for quick inspection.

There are information segments for each separate sensor (10 totals), such as temperature, pressure etc. Press LEFT, or RIGHT keys to switch among different segments. The currently selected segment will be marked with the arrow symbol ►.

The selected segment also determines the message(s) shown in the message panel on the bottom left. These messages rotate every 5 seconds.

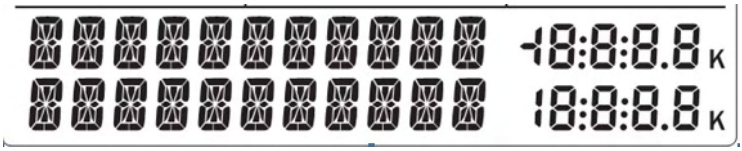


Figure 15: Message panel

There are two rows of 11-character segments on the left where message text will be displayed, and there are two rows of number displays on the right. If there are multiple messages, they will change every 5 seconds, or you can push the UP or DOWN buttons to force a change to another message at any time. When alarm conditions are active, corresponding messages will display here.

Some of the segments can display different variations. For example, you can display RAIN, RAIN RATE, RAIN EVENT, DAY TOTAL, WEEK TOTAL, MONTH TOTAL, YEAR TOTAL, and TOTAL. After such a segment has been selected with the LEFT/RIGHT keys, you can select between these variations by pressing the SET key (repeatedly as necessary).

Now we discuss the various information segments in the display while in normal mode.

5.1.1 TIME Segment

Figure 16: Time and Date segment

This segment (Figure 16) displays the current time and date. When connected to Wi-Fi, the time will be synchronized with a NIST atomic clock once a day, otherwise you must set (or correct) it manually using console functions. The time will be displayed in Universal Coordinated Time until you set the correct time zone offset on Ecowitt Weather server.

When the arrow indicator is in this segment the following messages will appear in the message panel:

1. Current year, and day of the week
2. Time of alarm and status of alarm (on/off)
3. Time of Sunrise/Sunset (see “Other Console Functions” for detail)
4. Current moon phase (see “Other Console Functions” for detail)

5.1.2 LIGHT Segment

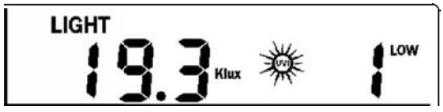


Figure 17: Light and UV-index segment

This segment (Figure 17) displays the current solar radiation (light) and ultra-violet index (UV-index). The light is the overall intensity of sunlight and its theoretical maximum varies with location and time of year. The actual value also depends on atmospheric conditions (clouds, vapor, etc.) and varies throughout the day. The UV-index is a value that gives an indication of the strength of harmful UV radiation and can be helpful to know when protection from the sun is advised. A qualitative indication of the strength of UV radiation is also included (LOW etc.)

When the arrow indicator is in this segment the following messages will appear in the message panel, each with a corresponding time stamp:

1.Maximum light strength for the current day
2.Maximum light strength since last reset
3.Maximum UV-index for the current day
4.Maximum UV-index since the last reset

5.1.3 INDOOR Segment

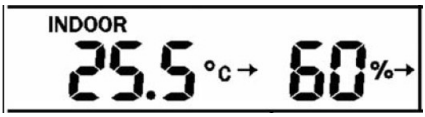


Figure 18: Indoor conditions segment

This segment (Figure 18) displays the current indoor temperature and humidity, as measured at the location of console. When the arrow indicator is in this segment the following messages will appear in the message panel, each with a corresponding time stamp:

1.Maximum (indoor) temperature for the current day
2.Minimum (indoor) temperature for the current day
3.Maximum (indoor) temperature since last reset
4.Minimum (indoor) temperature since the last reset
5.Maximum (indoor) humidity for the current day
6.Minimum (indoor) humidity for the current day
7.Maximum (indoor) humidity since last reset
8.Minimum (indoor) humidity since the last reset

5.1.4 OUTDOOR Segment

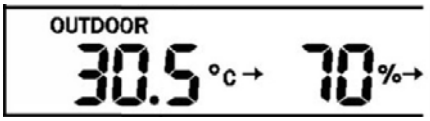


Figure 19: Outdoor conditions segment

This segment (Figure 19) displays the current outdoor temperature and humidity, as measured at the location of the outdoor sensor package. When the arrow indicator is in this segment, the messages that appear on the message board are the same as for the indoor conditions, except they reflect outdoor conditions.

5.1.5 PRESSURE Segment

Figure 20: Barometric pressure segment

This segment (Figure 20) displays the current barometric pressure, a historical graph of pressures, and a pictorial weather forecast. Pressure is measured at the location of the console, but of course reflects both indoor and outdoor pressure as these are identical.

The pressure indicated may be absolute (ABS) or relative (REL), depending on the variation you have selected using the SET key. The absolute pressure is the pressure measured at your console's location (altitude). Relative pressure refers to the pressure measured by your console (absolute), corrected to the

value that would exist if your station was located at sea level. The relative pressure is what is normally published by official weather stations.

Below the pressure values there is a historical graph. This graph can be configured to display 12 or 24 hours of history and will give you some insight into how pressure has been changing. Falling pressures typically indicate worsening weather (to come), and rising pressures indicate good/better weather is to come. Rapid rise or fall indicates the passage of a “front.”

Below the graph you will see a pictorial forecast for the next 12 hours.

When the arrow indicator is in this segment the following messages will appear in the message panel, each with a corresponding time stamp:

1.Maximum relative barometric pressure of the current day
2.Minimum relative barometric pressure of the current day
3.Maximum relative barometric pressure since the last reset
4.Minimum relative barometric pressure since the last reset
5.Maximum absolute barometric pressure of the current day
6.Minimum absolute barometric pressure of the current day
7.Maximum absolute barometric pressure since the last reset
8.Minimum absolute barometric pressure since the last reset

5.1.6 WIND Segment

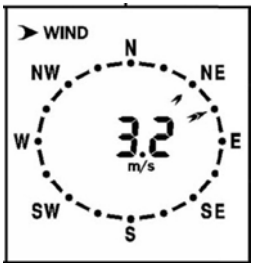


Figure 21: Wind speed and direction segment

This segment (Figure 21) displays wind related information. Inside the circular “compass rose” you will find two arrows (if they overlap only one will be visible). The “thicker” arrow indicates the most recently measured wind direction 16 seconds or less ago). The “thinner” arrow represents the

average wind direction in the prior interval of 16 seconds. This allows insight into the change of direction of the wind.

Both arrows can take 16 specific values: N, NNE, NE, ENE, E, ESE, SE, SSE, S, SSW, SW, WSW, W, WNW, NW, and NNW. Therefore, these indications are only accurate within 22.5 degrees.

When the arrow indicator is in this segment you can use the “SET” button to show variations. The variation shown above displays last measured wind speed in the center of the compass rose. The other variations display “wind gust” speed, or wind direction in degrees (thus allowing more precision than just the arrows).

When the arrow indicator is in this segment the following messages will appear in the message panel, each with a corresponding time stamp:

1.Maximum wind speed of the current day
2.Maximum wind speed since the last reset
3.Maximum wind gust speed of the current day
4.Maximum wind gust speed since the last reset

5.1.7 FEELS LIKE Segment

Figure 22: Dew point, wind chill, heat index segment

This segment (Figure 22) displays calculated values related to temperature and pressure. The values that can be displayed are “wind chill”, “heat index”, and “dew point.”

Wind chill and heat index are perceptual values that indicate the air temperature as experienced by humans, as opposed to the measured ambient air temperature. The passing flow of lower temperature air makes it feel “colder” and this is reflected in the wind chill temperature. Conversely, if it feels warmer than the measured air temperature due to the effects of humidity, we use a heat-index temperature to indicate how warm it feels.

The “dew point” is not a perceptual value, but it is calculated from the sensor values (temperature and humidity). The dew point is the temperature to which air has to be cooled to become saturated, and beyond which airborne water vapor would become liquid (dew).

When the arrow indicator is in this segment the following messages will appear in the message panel, each with a corresponding time stamp:

1.Minimum wind chill temperature of the current day
2.Minimum wind chill temperature since the last reset
3.Maximum dew point temperature of the current day
4.Minimum dew point temperature of the current day
5.Maximum dew point temperature since the last reset
6.Minimum dew point temperature since the last reset
7.Maximum heat index of the current day.
8.Maximum heat index since the last reset

5.1.8 RAIN Segment

Figure 23: Rain segment

This segment (Figure 23) displays rainfall related values. The values that can be displayed (use the “SET” button when the arrow is in the segment) are: RAIN RATE (amount of rain accumulated in past 60 minutes), RAIN EVENT, RAIN TODAY, RAIN THIS WEEK, RAIN THIS MONTH, RAIN THIS YEAR or TOTAL RAIN. “RAIN EVENT” means a single period of rainfall not interrupted by a rain rate of 0. Thus, if it rains for 10 minutes, RAIN EVENT will display values for that 10-minute period. Likewise, if it rains continuously for 4.5 hours, the values will pertain to the whole 4.5-hour period.

When the arrow indicator is in this segment the following messages will appear in the message panel, each with a corresponding time stamp:

1.Maximum rain rate of the current day

2.Maximum rain rate since the last reset
3.Total rainfall of current day
4.Total rainfall of the current week. The week starts at midnight when Sunday begins and ends exactly 7 days later
5.Total rainfall of the current month
6.Total rainfall of the current year

5.2 Settings Mode

Settings mode can be activated from “normal mode” by pressing the SET button and holding it for 2 seconds. Once activated you can use the LEFT button to select a particular settings category, or cycle through available categories. The settings categories available are:

- TIME SETTING
- UNIT SETTING
- RECORD SAVE INTERVAL
- RESET RAIN SETTING
- BAROMETRIC SETTING
- KEY BEEP SETTING
- CALIBRATION SETTING
- TRANSMITTER ID

Once you have selected the desired category, you can change modes to where you can actually see and modify the related settings for the category by pressing the RIGHT key. For each setting displayed you can change the value or choices by using the UP/DOWN keys, repeatedly if necessary. Holding these keys down for two seconds or more will cause rapid increase or decrease of the selected value. Continue with the RIGHT key to move on to other settings within the category or leave settings mode and return to normal mode by pressing the HISTORY key, or simply waiting 30 seconds or more without pressing any button.

5.2.1 TIME SETTING

The following sub-settings are available in the “TIME SETTING” category:

1.TIME FORMAT: A choice between 12H or 24H time display is available

2.DATE FORMAT: The following date format choices are available: MM-DD-YYYY, DD-MM-YYYY, or YYYY-MM-DD

3.TIME: Use this to manually set the current time and date. Use up or down buttons to change the blinking digits, use the RIGHT key to advance from hours to minutes, to month, to day, to year.

4.NORTH/SOUTH: Set which hemisphere you are located in so that moon phases can be displayed correctly.

5.2.2 UNIT SETTING

The following sub-settings are available in the “UNIT SETTING” category:

1.LIGHT UNIT: A choice of lux, fc, or w/m^2

2.TEMPERATE UNIT: A choice of Celsius (C) or Fahrenheit (F)

3.BAROMETRIC UNIT: A choice of hectopascal (hPa), inches mercury (inHg), or millimeters mercury (mmHg)

4.WIND SPEED UNIT: A choice of km/h, mph, knots, m/s, or Beaufort (bft)

5.RAINFALL UNIT: A choice of mm, or inch

5.2.3 RECORD SAVE INTERVAL

This category has only one setting and it affects the interval (in minutes) after which sensor data is recorded. If set to “5 minutes” for example, the current settings are recorded to permanent storage every 5 minutes. Use the RIGHT key to activate the setting and then UP/DOWN to change the interval as desired.

5.2.4 RESET RAIN SETTING

The following sub-settings are available in the “RESET RAIN SETTING” category:

1.RESET DAY RAIN AT 0:00~23:00

2.RESET WEEK RAIN AT SUN~MON

3.RESET YEAR RAIN AT JUN~DEC

If you chose OCT, for example, annual rain totals, maximum and minimum will reset to 0 on October 1 each year. Which month to use depends on your location's official definition of the rain season. Consult online sources to find this information.

5.2.5 BAROMETRIC SETTING

This category offers only one setting, called BAROMETRIC HISTORY. It allows you to choose between a 12 hr. or 24 hr. historical interval for graphing past barometric pressure information. Use the UP/DOWN buttons to select as desired. The graph will display a 12 hr. or 24 hr. scale above or below the graphing area.

5.2.6 KEY BEEP SETTING

This category offers one setting to have keys beep, or not, when pressed. Use the UP/DOWN buttons to select as desired.

5.2.7 CALIBRATION SETTING

This category offers settings through which you can alter values obtained from the sensors before display or recording. This functionality is generally used to make sure that the displayed and recorded values match those of a reference measurement or instrument. The most often used example of this concerns absolute and relative pressure measurements. More on that in a moment.

There are also a few sub-settings that are not true settings, but rather total values. These relate to rainfall totals an can be set to desired starting values. This may be useful when installing the weather station in the middle of a rainfall season. Totals can be set (from the initial value of 0) to known values

for the current year, month etc. so that, going forward the console will display correct values (as if you had the weather station all along).

All calibration settings generally offer an OFFSET, or FACTOR (COEFFICIENT). A recorded and displayed value is computed from the sensor value by multiplying the sensor value by the FACTOR and then adding the OFFSET. Where factors are not offered as a setting, the factor will be 1. This will also be the default factor. The default offset will be 0. Frequently only barometric settings will need adjustment!

While changing a setting, the console displays what the current sensor value is with this offset or factor applied so you can either determine desired offset beforehand, know what you reference value is and manipulate offset until the reference value is matched. Offset values should be specified in the selected units for that sensor!

This category offers the following sub-settings to change:

1. IN TEMP OFFSET: The value you select will be added to the indoor temperature sensor value before display and recording.
2. IN HUMI OFFSET: The value you select will be added to the indoor humidity sensor value before display and recording. When using a value other than 0 is it possible to compute humidity values below 0% or above 100%. Such values will be "clipped" to 0%, respectively 100% if that is the case.
3. OUT TEMP OFFSET: Similar to IN TEMP OFFSET, but for outdoor temperature sensor.
4. OUT HUMI OFFSET: Similar to IN HUMI OFFSET, but for outdoor humidity sensor.
5. ABS PRESS OFFSET: The value you select will be added to the absolute barometric pressure reading (actual sensor value). See note below.
6. REL PRESS OFFSET: The value you select will be added to the calibrated absolute barometric pressure reading (sensor value plus ABS PRESS OFFSET). See note below.
7. WIND DIR OFFSET: The value you select (in degrees) will be added to the wind direction sensor value. If resulting values exceed 359, 360 will first be subtracted (so that 370 becomes 10), and if values less than 0 would result, 360 is first added. This setting is useful if, after permanent

installation your reference indicates that your wind direction is systematically different from the reference and can be used to prevent having to re-orientate the outdoor sensor package. IMPORTANT: If you are installing in the southern hemisphere and followed earlier directions, you must use an initial offset of 180 here and subsequently adjust for small differences relative to a reference.

8. WIND SPEED FACTOR: The value you select will be multiplied with the sensor value. If your wind speed consistently differs from a known good reference (these are very hard to obtain), by a constant factor, you can make an adjustment here. The allowable range is 0.1 minimum to 2.5 maximum in 0.1 increments.
9. RAINFALL FACTOR: The value you enter here is multiplied with the rain rate sensor value. If your rain rate consistently differs from a known good reference (these are very hard to obtain), by a constant factor, you can make an adjustment here. The allowable range is 0.1 minimum to 2.5 maximum in 0.1 increments.
10. RAIN DAY TOTAL: The value you enter here is not an offset or a factor, but rather represents the total amount of rain seen so far for the current day. It should rarely need an adjustment after initial installation and setting. Allowable values are 0 – 9,999 mm or equivalent in other units.
11. RAIN WEEK TOTAL: The value you enter here is not an offset or a factor, but rather represents the total amount of rain seen so far for the current week (remember the week starts with Sunday). It should rarely need an adjustment after initial installation and setting. Allowable values are 0 – 9,999 mm or equivalent in other units.
12. RAIN MONTH TOTAL: The value you enter here is not an offset or a factor, but rather represents the total amount of rain seen so far for the current month. It should rarely need an adjustment after initial installation and setting. Allowable values are 0 – 9,999 mm or equivalents in other units.
13. RAIN YEAR TOTAL: The value you enter here is not an offset or a factor, but rather represents the total amount of rain seen so far for the current statistical rain year (may not start in January, see section 5.2.4). It should

rarely need an adjustment after initial installation and setting. Allowable values are 0 – 9,999 mm or equivalents in other units.

14. RAIN TOTAL: The value you enter here is not an offset or a factor, but rather represents the total amount of rain seen since the last reset of the unit or since this value was last changed. It should rarely need an adjustment after initial installation and setting. Allowable values are 0 – 9,999 mm or equivalents in other units.
15. TRANSMITTER ID: This is not a setting you can change. Rather it tells you a number that identifies the type of outdoor sensor from which sensor data was received. This is mostly useful for troubleshooting scenarios.

Note: Before making adjustments to WIND SPEED FACTOR or RAINFALL FACTOR please make sure your outdoor sensor package is mounted level and that the wind vane can move unobstructed and that there is no "slippage" on the axis (make sure set-screw is tight).

5.2.7.1 Calibration of barometric pressure settings.

Unlike all other calibration settings where factory installation ensures that, within the specified instrument precision, factors of 1.0 and offsets of 0 are appropriate and correct, this generally cannot be done for relative barometric pressure readings. To understand consider the following.

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 console and cannot be known in advance. This is why it needs an offset adjustment.

There are different manners in which to handle this adjustment. We will outline a reliable procedure below, which requires adjusting both pressure offsets. 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.

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 console to use them for now.
2. Determine the altitude, or elevation above sea level, of your station's console. This measurement is necessary to account for the difference in air pressure caused by the elevation of your console. 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 console 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 console is. If you are on a ground floor and have the console 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 console 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 input +1.6 (nearest rounded value we can input). Remember we assume "ABS PRESS OFFSET" to be 0, so check and change that as well if necessary.

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" 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 (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. Make sure your console is displaying REL barometric pressure and compare its 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 an offset of -3.8 in the settings for ABS PRESS OFFSET.
10. For a more precise procedure, locate a very precise barometer that you can place right next to the console, you would adjust "ABS PRESS OFFSET" until the ABS pressure reads identical. You would then still apply the calculated "REL PRESS OFFSET" as above, and then, as a final step, further adjust "REL PRESS OFFSET" until it displays the

reference value from the 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.

5.2.8 Alarm Mode

In ALARM mode you can activate alarms that will alert you to the presence of alarmingly high or low sensor values. From normal mode, you can enter alarm mode by pressing the ALARM key. By pressing the ALARM key once you will enter “high” alarm mode where you can set or change alarm conditions for alarmingly high sensor values. Pressing ALARM again will activate “low” alarm mode, for alarmingly low values. High alarm mode also includes a conventional time-based alarm (alarm clock).

When an alarm condition is met, the alarm will sound a loud beep, and the alarm icon () will flash. The message panel will display a message appropriate for the alarm condition. Press any button to silence the alarm beep. The flashing alarm icon will stay until the alarm condition itself is no longer satisfied (e.g. temperature drops below alarm value, etc.)

Once in alarm mode use the LEFT/RIGHT keys to witch between the various possible alarms and use the UP/DOWN keys to change the value setting for a particular alarm. The SET button is used to switch a particular alarm from enabled (ON) to disabled (OFF). To leave alarm mode, press the HISTORY button or it will happen after 30 seconds of inactivity.

5.2.8.1 HIGH ALARM SETTING

In the "high" alarm mode, the following alarms are available by cycling through them using the UP/DOWN keys.

1.TIME ALARM: Set alarm to activate at a specified time
2.IN TEMP HIGH ALARM: Set value at which an "indoor temperature high" alarm will activate
3.IN HUMI HIGH ALARM: Set value at which an "indoor humidity high" alarm will activate
4.OUT TEMP HIGH ALARM: Set value at which an "outdoor temperature high" alarm will activate
5.OUT HUMI HIGH ALARM: Set value at which an "outdoor humidity high" alarm will activate
6.ABS BARO HIGH ALARM: Set value at which an "absolute barometric pressure high" alarm will activate
7.REL BARO HIGH ALARM: Set value at which an "relative barometric pressure high" alarm will activate
8.WIND HIGH ALARM: Set value at which an "wind speed high" alarm will activate
9.GUST HIGH ALARM: Set value at which an "wind gust speed high" alarm will activate
10.DEW POINT HIGH ALARM: Set value at which an "dew point high" alarm will activate
11.HEAT INDEX HIGH ALARM: Set value at which an "heat index high" alarm will activate
12.RAIN RATE HIGH ALARM: Set value at which an "rain rate high" alarm will activate
13.RAIN DAY HIGH ALARM: Set value at which an "rain total for day high" alarm will activate

5.2.8.2 LOW ALARM SETTING

The “low” alarm mode is quite similar to the “high” alarm mode but does not have the “time alarm” setting and omits setting for which a low alarm does not make sense and adds settings for which only a low alarm makes sense.

1.IN TEMP LOW ALARM: Set value at which an “indoor temperature low” alarm will activate
2.IN HUMI LOW ALARM: Set value at which an “indoor humidity low” alarm will activate
3.OUT TEMP LOW ALARM: Set value at which an “outdoor temperature low” alarm will activate
4.OUT HUMI LOW ALARM: Set value at which an “outdoor humidity low” alarm will activate
5.ABS BARO LOW ALARM: Set value at which an “absolute barometric pressure low” alarm will activate
6.REL BARO LOW ALARM: Set value at which an “relative barometric pressure low” alarm will activate
7.WIND CHILL LOW ALARM: Set value at which an “wind chill low” alarm will activate
8.DEW POINT LOW ALARM: Set value at which an “dew point low” alarm will activate

5.2.9 Max/Min Mode

The Max/Min mode is used to inspect maximum or minimum recorded values for sensors. The mode is activated by pressing the MIN/MAX button. Once in Max/Min mode, continued pressed will cycle through the following categories:

1.TODAY MAX: Maximum recorded values for the current day
2.HISTORY MAX: Maximum recorded values since last reset
3.TODAY MIN: Minimum recorded values for the current day
4.HISTORY MIN: Minimum recorded values since last reset

Within each category you can use the ≺/≻ buttons to switch among max/min records of the various weather values. Each minimum or maximum will be displayed in its respective display segment, while a message in the message panel will indicate what kind of minimum or maximum is currently selected.

A currently displayed minimum or maximum value can be cleared from the historical record by holding down the SET button for two seconds.

Return to normal mode by pressing the HISTORY button or it will happen after 30 seconds of inactivity.

5.2.10 History Mode

History mode allows you to inspect the historical records of all available weather values. The console stores up to 3,552 records, where each record contains a complete set of weather values at a particular point in time, along with a time stamp. The recordings are made at a fixed interval that can be set through settings (see section 5.2.3). At the standard 5-minute interval that means 296 hours, or a little over 12 days. Once the recording storage is full, the oldest recording will be overwritten by a newer one, thus always keeping the 3,552 newest ones.

Enter history mode from normal mode by pressing the HISTORY button. The message panel will then show either “HISTORY NONE RECORD” if no records are stored, or it will display a message like “HISTORY P/R 1.07” and “YEAR 2018”.

History records are kept in “pages” of 32 records each. The “P/R” number in the message indicates the current page and record number: in the example above page 1 record number 7. The values themselves are displayed in their respective display segments. You can cycle through record numbers using the UP/DOWN keys, and through pages using the LEFT/RIGHT keys.

When in history mode it is also possible to clear all historical records. Do this by holding down the SET button for 2 seconds.

6 Other Console Functions

6.1 Weather Trend Indicators

Symbols next to the indoor and outdoor temperature and humidity values indicate the general direction of change in respective values. The symbols that appear are shown in the table below. The indicators are all based on observation in 30-minute intervals and appear under the listed conditions.

Indicator	Meaning	Temperature	Humidity
	Rising	Increase at least 1.8F (1C)	Increase at least 10%
	Steady	Change less than 1.8F (1C)	Change less than 10%
	Falling	Decrease at least 1.8F (1C)	Decrease at least 10%

Table 5: Weather trend indicators

6.2 Sunset and Sunrise Time Setting

The sunrise and sunset time are determined by the device location and time zone setup of the weather station

After publishing data to www.ecowitt.net dashboard as is instructed in 8.2.1, please log in on this website. Edit the Device Location and Timezone under the device menu and sunset and sunrise time will be display on Console display.

6.3 Moon Phases

The phase of the moon for the current day (night) are displayed as an icon in the segment that displays moon phase, RF signal strength, and storage utilization. If the “arrow” is in this segment, the message panel will also describe the moon phase in words. The table below shows the possible icons and their descriptions. Note that icons mimic the actual appearance of the moon and therefore are different for installations in the northern hemisphere vs. southern hemisphere.

Northern Hemisphere	Description	Southern Hemisphere
	NEW MOON	
	WAXING CRESCENT MOON	
	FIRST QUARTER MOON	
	WAXING GIBBOUS MOON	
	FULL MOON	
	WANING GIBBOUS MOON	
	LAST QUARTER MOON	
	WANING CRESCENT MOON	

Table 6: Moon phases

6.4 RF Reception strength

The strength of RF signal reception from the outdoor sensor package can be checked by looking at the item 7.2.1. The strongest signal is indicated by three bars of increasing length. Less signal quality may show 2, 1 or no bars. This may be helpful when you seem to have reception problems.

6.5 Recording storage capacity used

The console can store historical sensor data on internal storage. The storage is permanent and will not be lost if there is a power outage. There is room for 3,552 records and you can see how much of this storage is used by inspecting

the “storage capacity used” indicator. This is found in the same segment as the moon phases and RF signal strength indicator and is depicted as a circle with marks at 0%, 25%, 50%, 75% (100% is when the circle is full). Once the full capacity is used new data will replace the oldest stored data (the circle will remain full).

6.6 Beaufort Wind Force Scale

If you have selected the use of Beaufort wind speed units, you can use the table below for reference. The Beaufort scale is based on qualitative wind conditions and how they would affect a ship’s (frigate) sails (so yes, it is an “old” standard). It is therefore less precise than the other scales but is still in use in various locales.

Wind speed	Beaufort number	Description
0 - 1 mph, or 0 - 1.6 km/h	0	Calm
1 - 3 mph, or 1.6 - 4.8 km/h	1	Light air
3 - 7 mph, or 4.8 - 11.3 km/h	2	Light breeze
7 - 12 mph, or 11.3 -1 9.3 km/h	3	Gentile breeze
12 - 18 mph, or 19.3 - 29.0 km/h	4	Moderate breeze
18 - 24 mph, or 29.0 - 38.6 km/h	5	Fresh breeze
24 - 31 mph, or 38.6 - 49.9 km/h	6	String breeze
31 - 38 mph, or 49.9 - 61.2 km/h	7	Near gale
38 - 46 mph, or 61.2 - 74.1 km/h	8	Gale
46 - 54 mph, or 74.1 - 86.9 km/h	9	Strong gale
55 - 63 mph, or 88.5 - 101.4 km/h	10	Storm
64 - 73 mph, or 103 - 117.5 km/h	11	Violent storm
74 mph and above, or 119.1 km/h and above	12	Hurricane

Table 7: Beaufort wind force scale

7 Publishing to Internet Weather Services

Your console is capable of sending your sensor data to select internet-based weather services. The supported services are shown in the table below:

Service	Website	Description
Ecowitt Weather	https://www.ecowitt.net	Ecowitt is a new weather server that can host a bunch of sensors that other services don't support.
Weather Underground	https://www.wunderground.com	Weather Underground is a free weather hosting service that allows you to send and view your weather station data real-time, view graphs and gauges, import text data for more detailed analysis and use iPhone, iPad and Android applications available at Wunderground.com. Weather Underground is a subsidiary of The Weather Channel and IBM.
WOW	http://wow.metoffice.gov.uk/	WOW is a UK based weather observation website.
Weather Cloud	https://weathercloud.net	Weathercloud is a real-time weather social network formed by observers from around the world.
Customized Website		Supports uploading to your customized website, if the website has the same protocol with Wunderground or Ecowitt

Table 8: Supported weather services

7.1 Wi-Fi Connection for the Weather Station Console

To send weather data to these services you must connect your console to the internet via Wi-Fi. The console can only operate using Wi-Fi when the external power adapter is connected and plugged in!

Note: If you are testing the setup with the outdoor sensor package nearby and indoor, you may want to consider connecting to Wi-Fi, but not yet configuring any of the weather services. The reason is that while indoor the temperatures and humidity recorded by the outdoor sensor, and as reported to the weather service(s) will reflect indoor conditions, and not outdoor conditions. Therefore, they will be incorrect. Furthermore, the rainfall bucket may be tripped during handling, causing rain to register while it may not actually have been raining. One way to prevent this is to follow all instructions, except to use an incorrect password, on purpose! Then, after final outdoor installation, come back and change the password after clearing console history. That will start uploading to the services with a clean slate.

7.1.2 Configure Device – Connect your console with WIFI

The console 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 console so that it can later connect to your preferred Wi-Fi network.

Please follow the following procedure:

5.Download the mobile application (WS View Plus) from the iOS App Store or Google Play store, as appropriate for your device.

6.Power your console with the included AC adapter and ensure it is in Wi-Fi configuration mode (Wi-Fi icon and M-B flashing). If it is not, follow the procedure to put it in that mode (hold Down + ALARM buttons for about 5 seconds).

7.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. In order to prevent some phone connect to your mobile network automatically, it is recommend to switch off mobile data service during the configuration process.

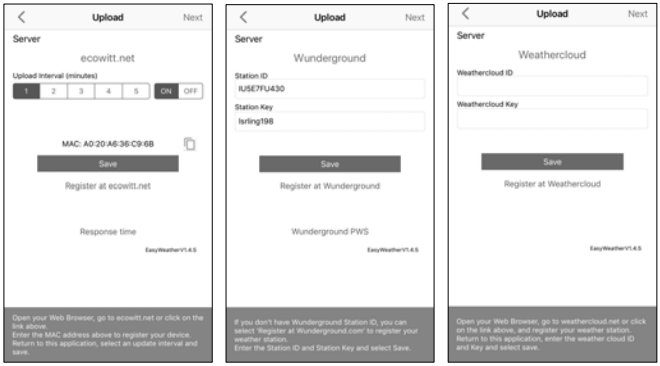
8.Press “+” on the my devices page, and then follow the instructions listed on the APP.

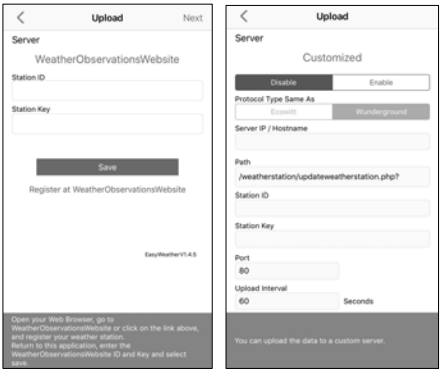
If not successfully, please contact the customer service to resolve the issue.

7.2 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 device from the device list. This will bring you to the “Upload” screen for the device.

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

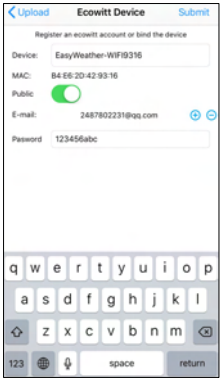




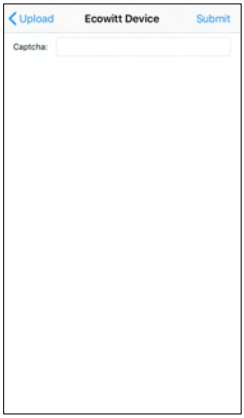
7.2.1 Ecowitt Weather

It's recommended to use the Ecowitt Weather server to monitor and record your sensors' data. Configure as follows:

- 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.



- 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 Plus 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 Plus app, please go to the website (https://www.ecowitt.net) to register and add the device.

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

You may add a shortcut to the ecowitt.net website on the home page of your phone so that you can visit it just like an app.

7.2.2 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".

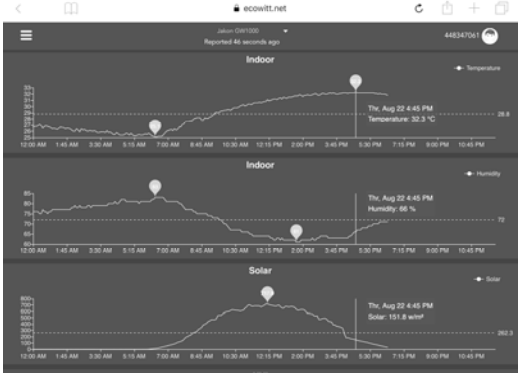
https://www.ecowitt.net/home/index?id=STATIONID

Note: If you want to share your station data with other users, you'll need to set your data to be public. Other users need to log in the ecowitt.net first to view your data.

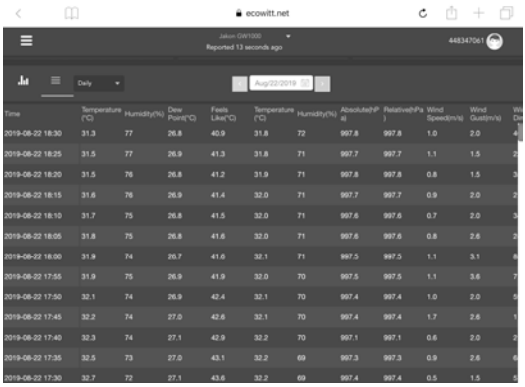
It will show a page such as this, where you can look at today's data and historical data as well.

Dashboard

Graph display

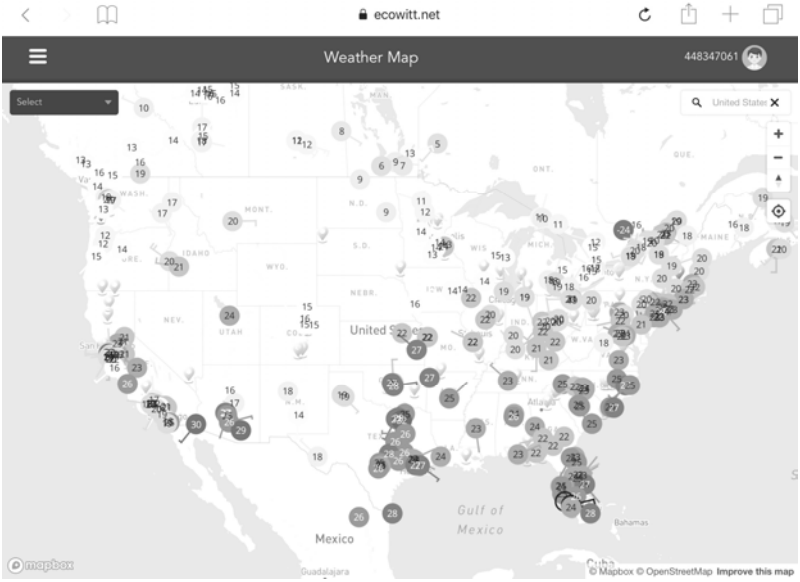


List display

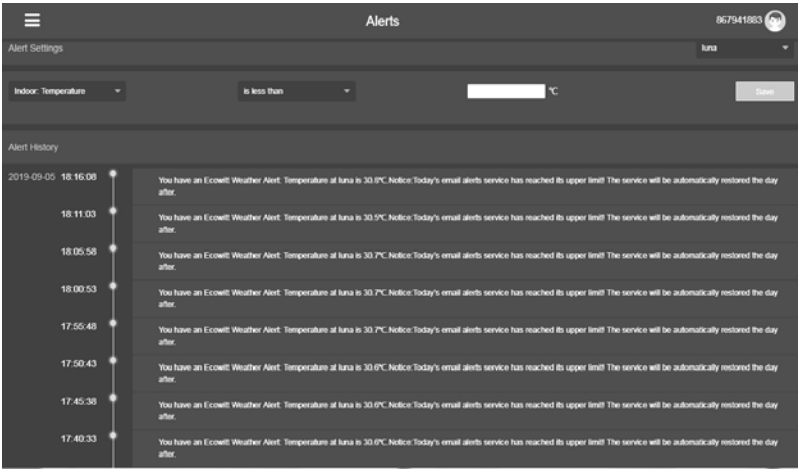


Time	Temperature (°C)	Humidity(%)	Dew Point(°C)	Feels Like(°C)	Temperature (°C)	Humidity(%)	Absolute(hPa)	Relative(hPa)	Wind Speed(m/s)	Wind Gust(m/s)	Wi Di
2019-08-22 18:30	31.3	77	26.8	40.9	31.8	72	997.8	997.8	1.0	2.0	4
2019-08-22 18:25	31.5	77	26.9	41.3	31.8	71	997.7	997.7	1.1	1.5	2
2019-08-22 18:20	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

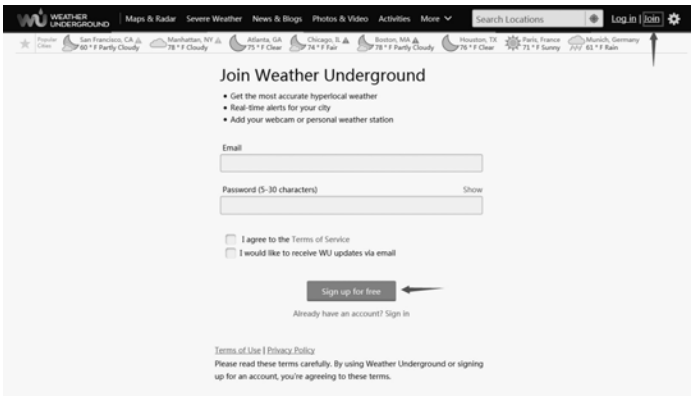


7.3 Weather Underground

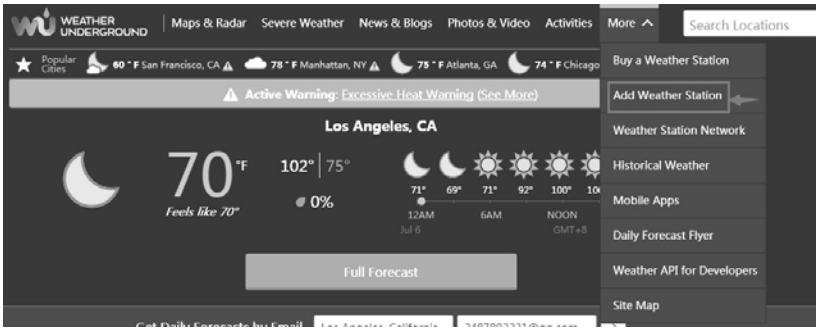
If you are planning to use wunderground.com you must have an account and register a (new) personal weather station. You may do so on the Wunderground uploading page in the WS View Plus application:

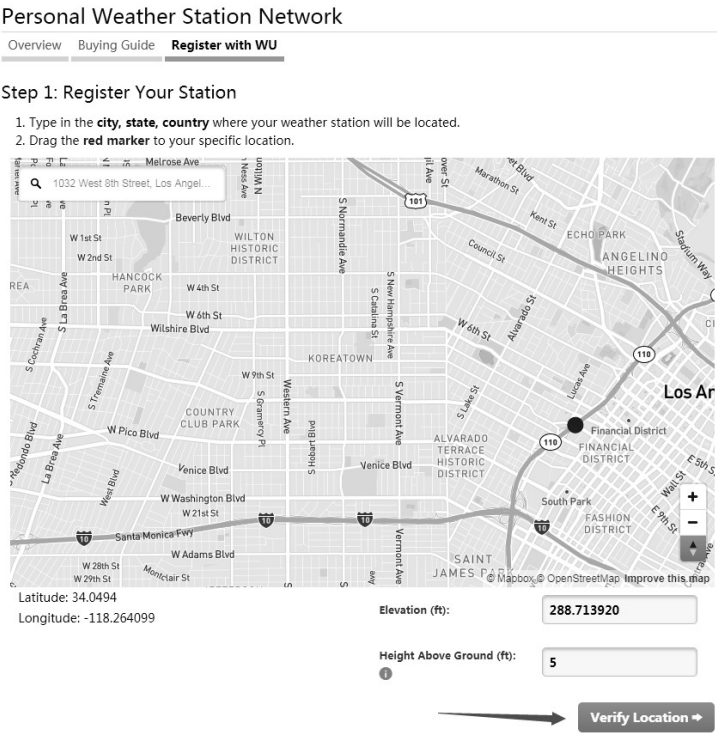
- Press Register at Wunderground.com and finish the registration on the page：

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





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

After submitting the form, you will see the following:

- 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(for Android version) or select your station on the Stations(for iOS version) . You'll see the current WU data, including graphs on the screen within hours.

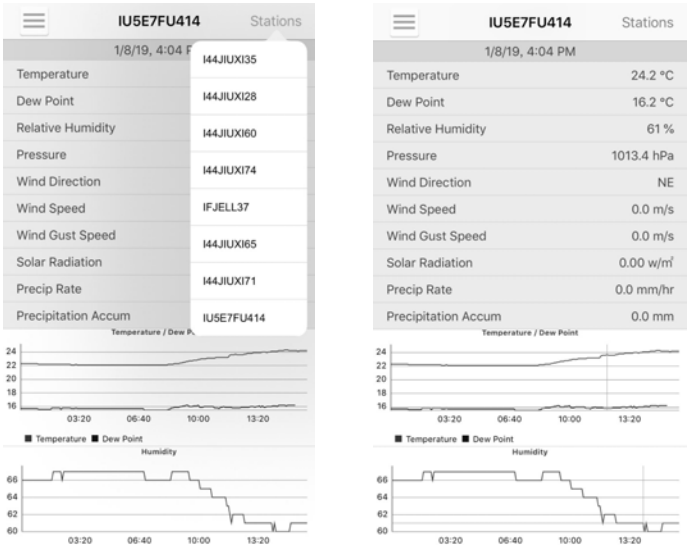


Figure 25

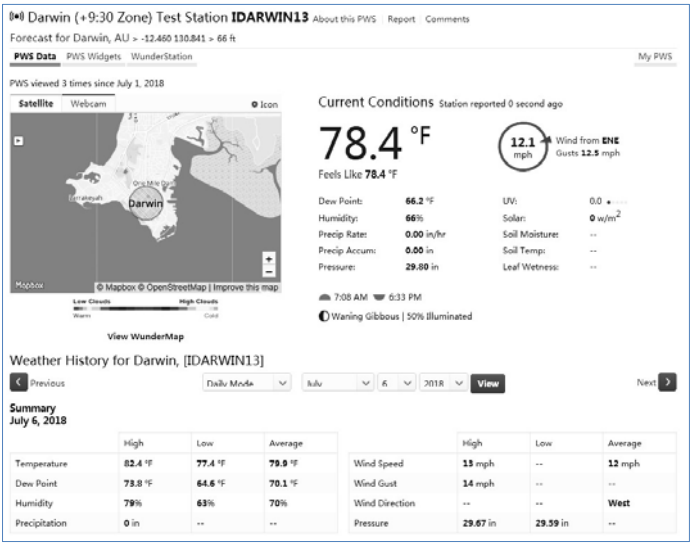
Note: **WU Dashboard** shows the data obtained from WU server. This requires that your mobile device can reach the Internet and therefore this is possible even when you are not on your home Wi-Fi network, such as when using cellular data.

7.4 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.



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:

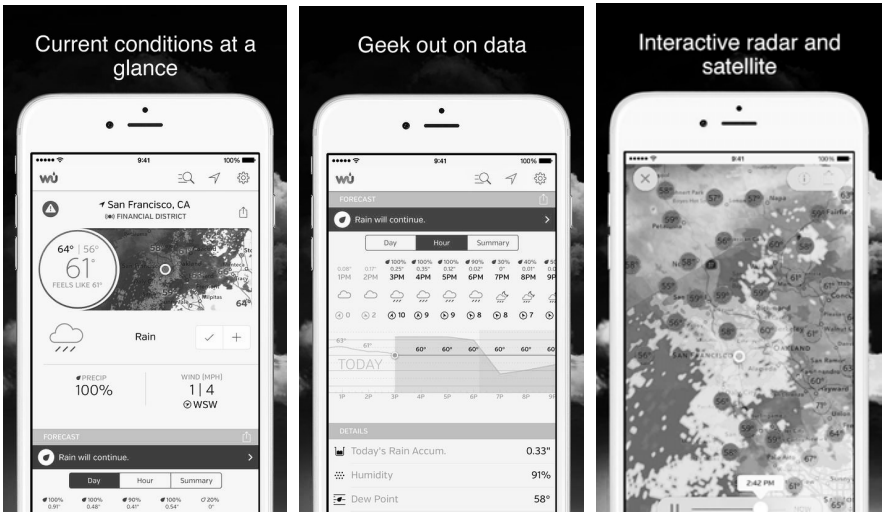
WunderStation: iPad application for viewing your station's data and graphs**:**

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

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:

https://itunes.apple.com/us/app/pws-weather-station-monitor/id713705929

7.5 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.

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

7.6 Manage Wunderground

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

7.7 Manage Ecowitt

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

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

7.8 Unit Settings

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


Display Settings
Temperature
°C
°F
Pressure
hPa
inHg
mmHg
Wind
km/h
mph
m/s
knots
Rain
mm
in
Light
w/m²
lux
fc

8 PC Software Operation

Software to monitor your weather station or set values is available for your computer or laptop. The following operating systems are supported: Windows version XP, Vista, 7, 8 or 10. You may download the software from: http://download.ecowitt.net/down/softwave?n=WeatherSmartIP

8.1 Installation and configuration

After downloading, install the software by decompressing the archive named "**WeatherSmartIP**." You will then have a file called "**WeatherSmartIP Setup.exe**". Double click it to start installation.

After making sure your PC is on the same network segment as your console (using Wi-Fi or Ethernet cable), start the **WeatherSmartIP** application that is now installed and select the IP address on that network segment that your computer is using(this window will pop out when your PC has more than one IP addresses):

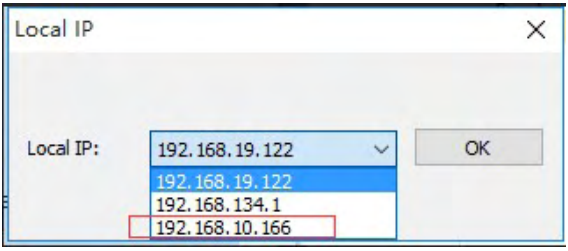


Figure: PC Software – IP selection

Most computers have only one IP address, but if yours has more than one and if you don't know which IP address is the correct one, go to your control panel and inspect the properties of the Wi-Fi network that the console is connected to:

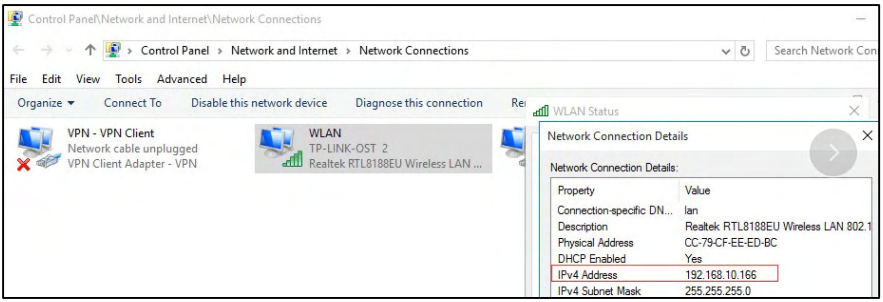


Figure: Determining Wi-Fi network addresses

Now, choose “Select Device” from the System menu and select the IP address that your console is using (you can find this information in the mobile application’s “Device List”). If you only have one weather station you should only be offered one choice.

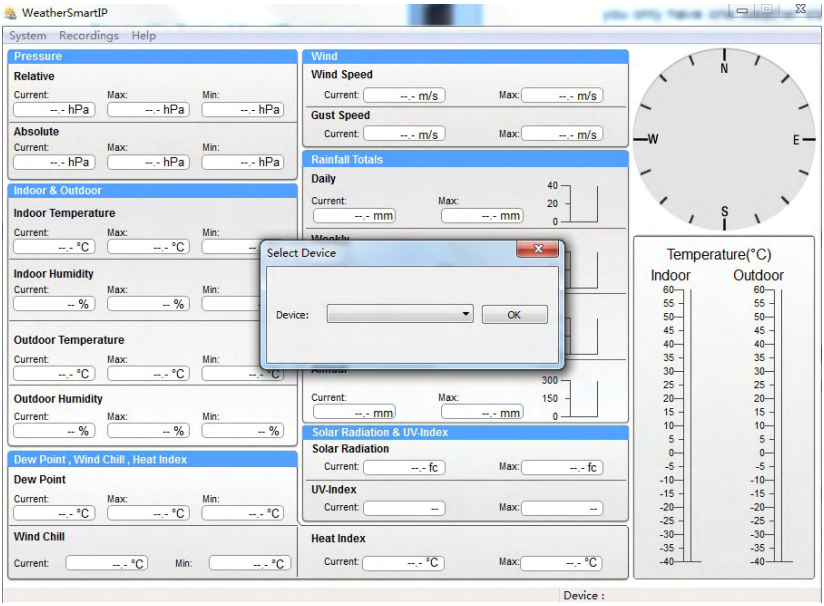


Figure: PC Software – weather station selection

Once connected, the software will display the current weather data from the console:

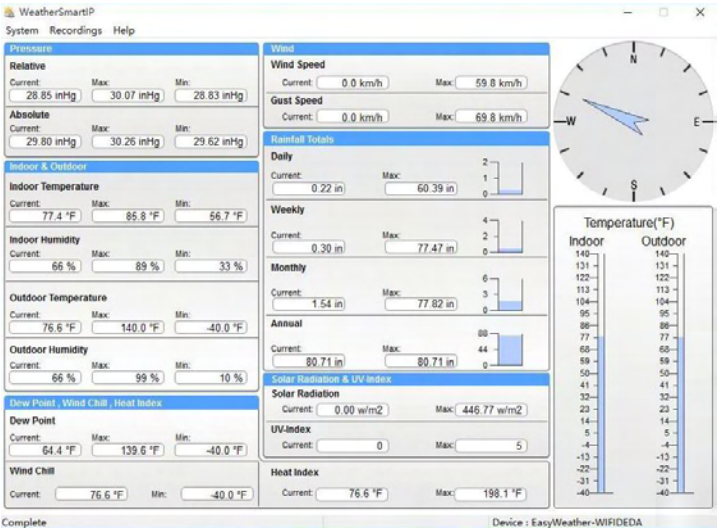


Figure: PC Software – Current weather data

8.2 Basic Functions

Basic functions are located under the “System” menu:

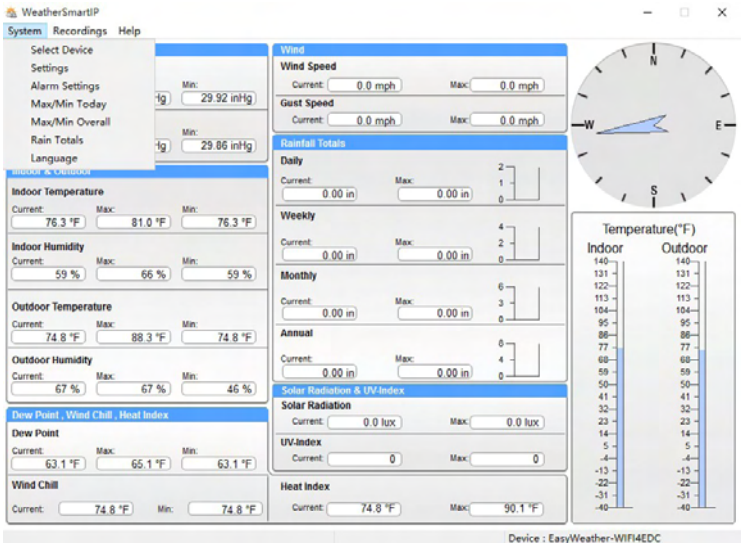


Figure: PC Software – System Menu

8.2.1 Setting

The “Setting” option gives you access to a screen where you can control time settings, display units, and what sensor values will be displayed. You can also switch keypad beeps on or off:

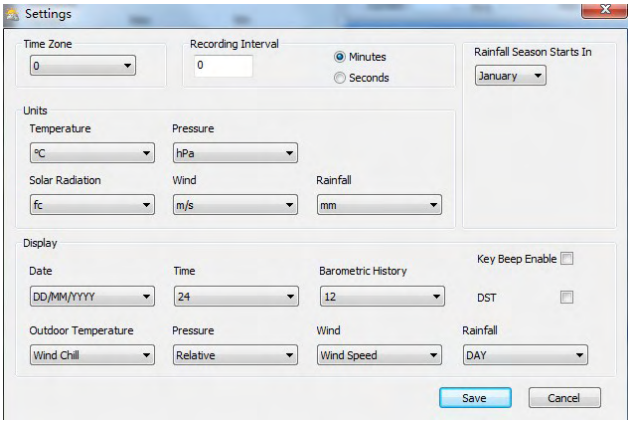
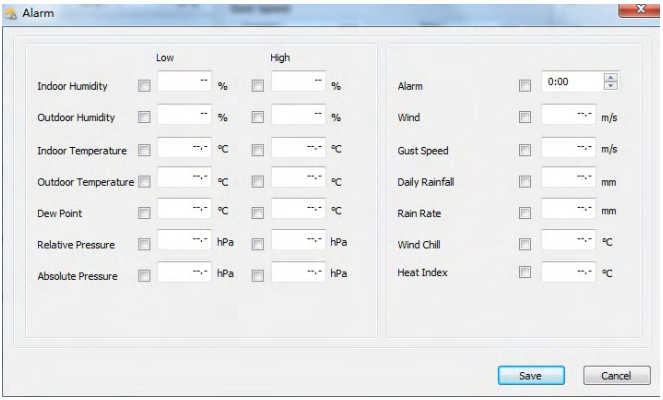


Figure: PC Software – Setting screen

8.2.2 Alarm

The “Alarm” option gives you access to inspect or change the various alarm settings that can also be controlled directly on the console (see section 5.2.8).



8.2.3 Max/Min Today

The “Max/Min Today” option presents a screen where you can see all maxima and minima of weather values for the current day. There is also a “Clear” button which allows you to clear these values (causing new extremes to be recorded for the remainder of the day).

Figure: PC Software – Current day Max/Min data

8.2.4 Max/Min Overall

The “Max/Min Overall” option is similar to the “Max/Min Today” option, but rather than showing extreme values for the current day, it shows extreme values across the recorded history (up to 3,552 records). Each extreme value will be presented along with date and time when it occurred. Here too there is a “Clear” button that will erase all these extremes (not the historical data itself).

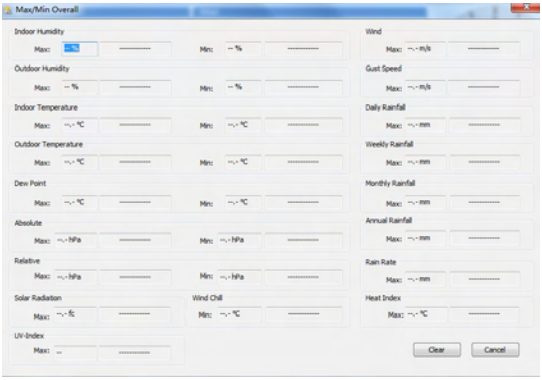


Figure: PC Software – Historical Max/Min data

8.2.5 Rain Totals

The currently accumulated rain totals for different periods can be seen, and changed, on this screen:

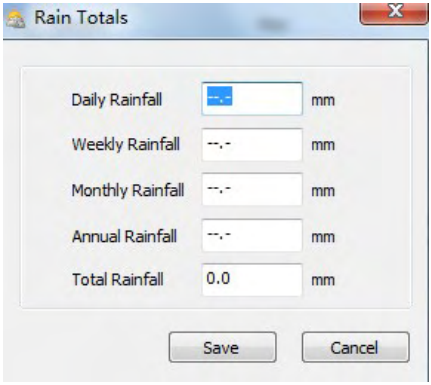


Figure: PC Software – Rain Totals settings

Any changes you make here will be immediately reflected in the console.

8.3 Record Functions

Access to the full historical data record is available through the “Record” menu:

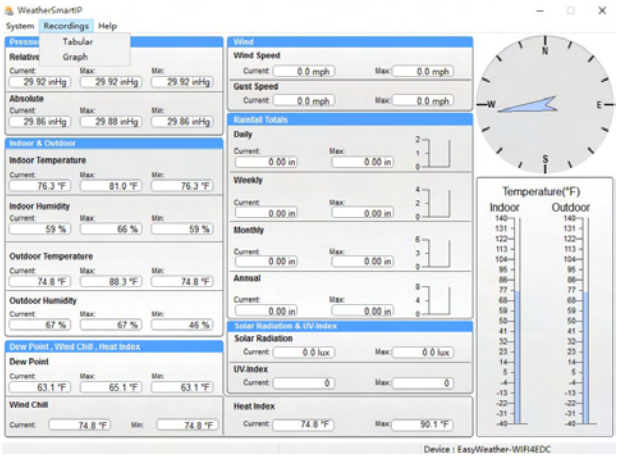


Figure: PC Software – Record Menu

8.3.1 Tabular

The “Tabular” option presents a screen listing all historical data in text format. Data is presented in tabular format. The data range can be controlled and a “Search” function is available for the data in the date range. Other buttons allow for clearing the data stored in the PC software (“Clear Data”) and data in the historical record storage on the console (“Clear Memory”). Finally, the “Export” button allows export of the data in the table in CSV format.

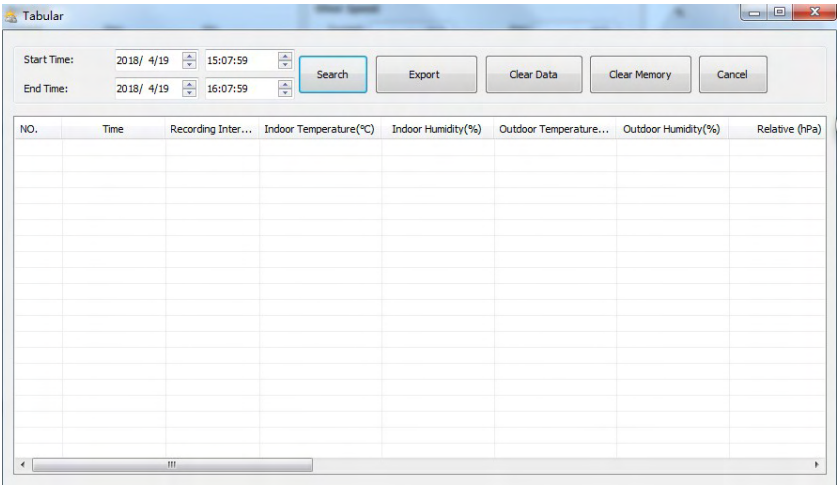


Figure: PC Software – Tabular historical data

8.3.2 Graph

The “Graph” option gives access to the same data as does the “Historical” option, but instead of a tabular presentation, you are given a graphical representation. Data range and search are also available here. You will use a popup menu to select the type of data you wish to see graphed (temperature, humidity, wind, etc.). You can export any graph as an image:

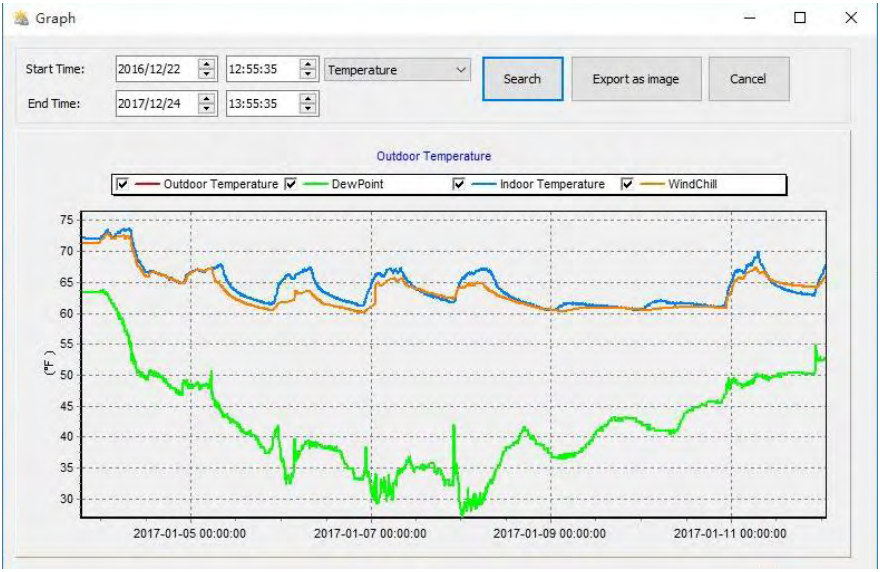


Figure: PC Software – Graphical historical data

9 Maintenance

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

1.**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.

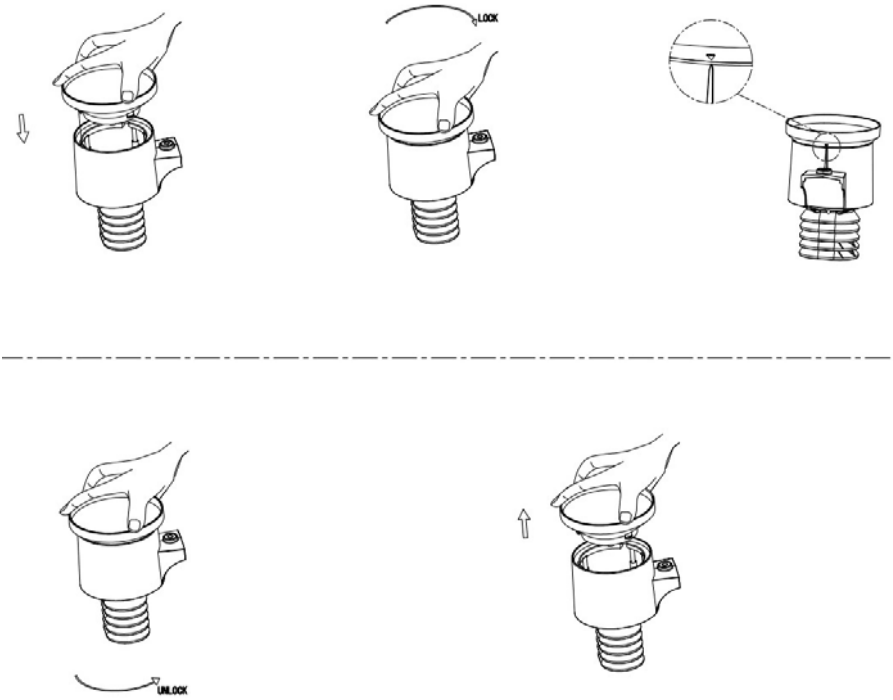


Figure: Rain gauge installation & maintenance

2.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.

3.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.

4.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.

10 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
Outdoor sensor not reporting to console Dashes (--) on the display console	Check that the outdoor transmission LED on the bottom is flashing approximately every 16 seconds. See Figure 2 item 9. If the batteries were recently (re)placed, check correct polarity was used and/or reseat 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 you have fresh batteries in the display console. If the batteries may have been changed in the remote and/or the console, and the console has not been reset, the solution may be as simple as **powering cycling** the console: remove both batteries and external adapter for about 10 seconds and reconnect. If you still have problems, bring the outdoor sensor to a location about 10 ft. away from the console for testing. Power cycle the console as described above. Do not touch any buttons for several minutes to allow the console to “discover” the outdoor sensor.
Intermittent problems with outdoor sensor reception on console	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). To troubleshoot, install a fresh set of batteries in the remote sensor array and console. For cold weather environments, install lithium batteries. If problems remain with fresh batteries, ensure power adapter is not too close to the console, and the console is not close to other electrical noise generating devices such as TVs, monitors, computers and transmitting devices. If you still have intermittent problems move sensor and console 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 console. Relocate sensor and console as necessary to avoid

Problem	Solution
	obstacles. Depending on natural barriers you may also have to move the outdoor sensor higher and/or closer.
Indoor and Outdoor Temperature do not agree during indoor testing	During installation testing it is useful to test with both console and outdoor unit in the same room. Allow up to one hour for the sensors to stabilize and adjust to room temperature. The indoor and outdoor temperature sensors should agree within 4 °F (the sensor accuracy is ± 2 °F). If these values still disagree, use calibration offsets for one or both sensors (see section 5.2.7) to adjust to a known good reference temperature.
Indoor and Outdoor Humidity do not agree during indoor testing	The procedure here is that same as for outdoor/indoor temperature. The sensors should agree within 10 % (the sensor accuracy is ± 5 %) If these values still disagree, use calibration offsets for one or both sensors (see section 5.2.7) to adjust to a known good reference humidity.
Relative pressure does not agree with official reporting station	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. Redo the pressure calibration procedure described in section 5.2.7.1. The barometer is only accurate to ± 0.09 inHg (3 hPa) within the following relative pressure range: 20.67 to 32.50 inHg (700 – 1,100 hPa), which corresponds to an altitude of 9,000 ft. (2,750 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).
Time is incorrect	Make sure your time zone and daylight savings time setting is correct at Ecowitt Weather server. If not connected to the Internet via Wi-Fi, you may also have to manually set the correct time.
The forecast icon is not accurate	The weather station console must run for several days to trend barometric pressure properly and start producing reasonable forecasts.

Problem	Solution
	The weather forecast is an estimation or generalization of weather changes in the next 24 to 48 hours and varies from location to location. The pressure trend is a simplified tool for projecting weather conditions and is never to be relied upon as an accurate method to predict the weather.
Moon phase is not correct	Check your calendar date and make sure it is correct.
Display console contrast is weak	Replace console batteries with a fresh set of batteries and/or make sure external power adapter is connected and functioning.
Data not reporting to Wunderground .com	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 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. 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.” Make sure the date, time and time zone is correct on the Ecowitt Weather server. 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 console 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	Check for Wi-Fi symbol on the display. If wireless connectivity is operational, the Wi-Fi icon  will be displayed in the time segment on the console. If the symbol is not displayed, but you do remember configuring it successfully before, check that the console external power adapter is plugged in and functional. Wi-Fi use demand more energy than batteries alone can provide.

Problem	Solution
	If you have never been able to configure Wi-Fi to a working state, make sure your Wi-Fi supports 2.4 GHz signals (801 type B or G, or N). The console does **not support** Wi-Fi that uses the 5 GHz spectrum. Make sure you configured the correct SSID and password. Repeat the procedure if necessary to verify. The console does not support so-called "captive Wi-Fi" networks. These are typically "guest" type networks where users have to agree to terms and conditions before being connected.

11 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 United States: 915 MHz
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 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 9: Outdoor sensor specification

Indoor sensor	Specification
Temperature range	0°C – 50°C (32°F - 122°F)
Temperature resolution	0.1°C, or 0.1°F
Humidity range	10% ~ 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)
Sensor reporting interval	48 seconds

Table 10: Indoor sensor specification

Power	Specification
Base station/console	5V DC Adapter (included)
Base station/console	3 x AA 1.5V LR6 Alkaline (not included)
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 11: 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.

12 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.