

**HP1000SE PRO Ultrasonic**

**WiFi Internet Funk Wetterstation**

Manual (EN)

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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:

QTY	Item Description
1	Display Console
1	Indoor sensor unit(temp/humidity/pressure)
1	Solar powered ultrasonic anemometer with Light and UV, air temperature/humidity sensor integrated( optional heater for climate with snow/ice conditions available)
1	Rain gauge
2	U-Bolts set for mounting on a pole (2pcs/set)
2	Threaded nuts for U-Bolts set (M5 size) (4pcs/set)
1	Metal mounting plate set to be used with U-Bolts (1pcs/set)
1	Mounting arm for ultrasonic anemometer
1	Mounting bracelet for ultrasonic anemometer
1	Mini wrench for M5 bolts
1	Stainless steel filter for rain gauge collector
1	AC adapter
1	User manual (this manual)

**Table 1: Package content**

**Note:** The console operates using an AC adapter. The included 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.

**Note:** The console can store historical data on a memory card. This memory card is **not included**. If you want to use one you will need a microSD memory

card. The supported max capacity of the card is 32G(Format: FAT32). A 1GB card will store more than 10 years' data. There is also no requirement on the speed class of this card as data writing happens infrequently and is not speed critical.

**Note:** Batteries for the ultrasonic anemometer and the rain gauge sensor are not included. You will need 2 AA size Lithium battery for the ultrasonic anemometer, which is primarily for startup and backup purpose. After setup and during normal operation, the unit is getting its power from solar cell. One AA size battery, alkaline or Lithium (recommended for colder climates) is required for the rain gauge. Two AA size alkaline batteries are required for the indoor sensor.

**Note:** There are two sets of U-bolts in the box, one is for the ultrasonic anemometer sensor and the other one is for the rain gauge sensor.

**Note:** The rain gauge can also be mounted to a surface using two screws, so the stainless-steel pole (not included) is not always necessary.

# 3 Overview

## 3.1 Display Console

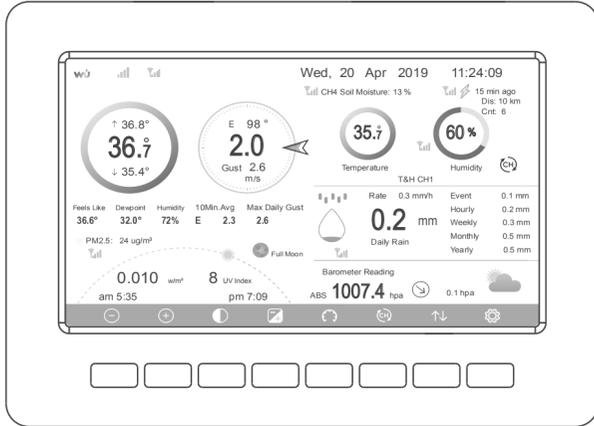


Figure 1: Display console screen

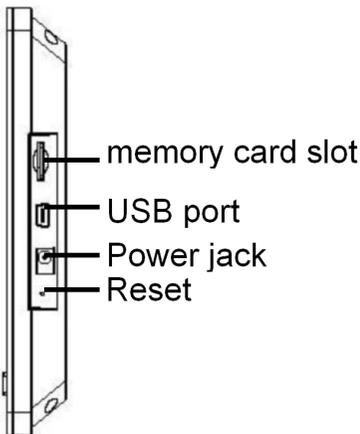
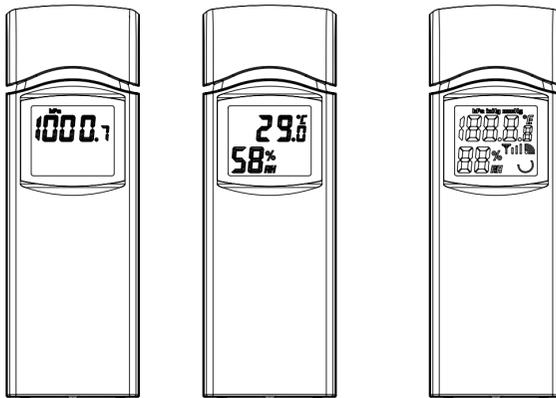


Figure 2 Display console side views

**Note:** The USB port in the console is only for factory internal use, not available for users.

You can use a microSD card for the firmware update.( microSD card not included). Update firmware process: visit [www.froggit.de](http://www.froggit.de) for available update, copy “user.bin” file onto microSD card main root. Insert SD card while display in operation, it will immediately show an update process, follow the instruction to complete update.

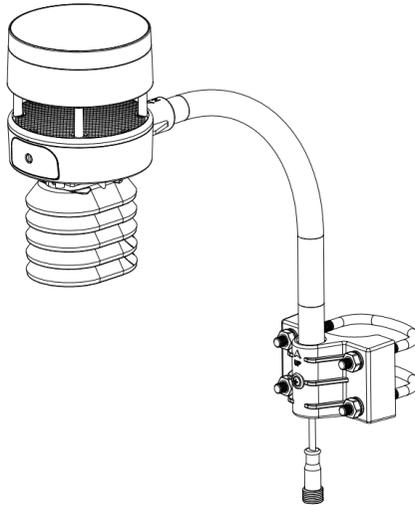
### 3.2 Indoor sensor



**Figure 3: Indoor sensor 2 display variations**

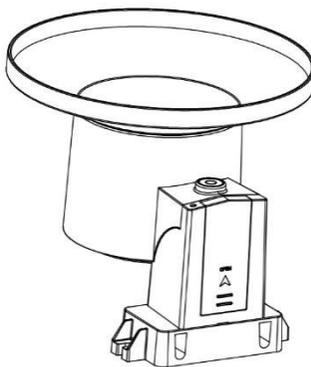
The indoor sensor will display indoor temperature, humidity and barometric pressure alternately.

### 3.3 Ultrasonic anemometer with 6-in-1 sensors



**Figure 4: Solar powered ultrasonic anemometer with integrated solar & uv, thermo-hygrometer sensor**

### 3.4 Rain Sensor



**Figure 5: Self emptying rain gauge**

## 3.5 Features

- 7" large TFT (high resolution) colored display console
- Two background (dark/light) themes selectable
- Indoor temperature, humidity
- Absolute and Relative barometric pressure
- Wind speed, wind direction, rainfall, outdoor temperature and humidity, solar radiation and UV.
- Calculates dew point, wind chill, heat index, moon phase and sunset/sunrise time
- Weather forecast & alarm
- View historical records of sensors and graph directly on the console
- Collects sensor data from various supported wireless sensors.
- Additional/optional sensors supported:
  - Up to 8 DP50 multi-channel temperature and humidity sensors
  - Up to 8 DP100 soil moisture sensors
  - Up to 4 DP200 PM2.5 air quality sensors
  - Up to 4 DP70 water leak sensors
  - One DP60 lightning sensor
- Pushes sensor data to cloud weather services:
  - <https://www.ecowitt.net>
  - <https://www.wunderground.com>
  - <https://www.weathercloud.com/>
  - <https://www.wow.com>
  - Custom own server data hosting possible when server data exchange is compatible with either Wunderground or Ecowitt protocol.
- Manage sensor calibration setup.
- Manage sensor via sensor ID.
- Data storage service on Ecowitt server: <https://ecowitt.net>
  - Stores data for past year days at 5-minute intervals
  - Stores data for past 2 years at 30-minute intervals

**Note:** The optional DP50, DP60, DP70, DP100, DP200 can be purchased separately. 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:** There's a built-in heat plate in the 6-in-1 sensor package body, if the lowest temperature at your place is below  $-3^{\circ}\text{C}$ , or  $26.6^{\circ}\text{F}$ , and the weather is mostly snowy or rainy, then you may need to activate the heater by supplying an external 5V/1A power to the sensor heating element for melting accumulated snow or ice, which can influence wind measurement accuracy significantly. The extension cord can be purchased separately.

## 4 Set up Guide

Before you start, you will need a screwdriver (size PH0, not provided) and find the wrench (size M5) included in package.

**Note:** We suggest you assemble all components of the weather station, including base unit in one location so you can easily test functionality. After testing, place the outdoor sensors 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 possible to reset the rain total to 0 via WS View app.

### **Attention:**

- Follow the suggested order for battery installation (outdoor sensor(s) first, indoor sensor(s) second, optional base unit last).
- Ensure batteries are installed with correct polarity (+/-).
- Only use new batteries for all battery-operated sensors.
- Avoid rechargeable batteries being used.
- If outdoor temperature may go below 32 F or 0 C for prolonged periods, Lithium based batteries are suggested over alkaline type batteries for any outdoor sensor.
- When outdoor temperature is above 10.0C ( 50.0F), it is forbidden to feed power to the heating thermostat which can lead to permanent damage due to excessive heat built up inside and cause unpredictable damage to the system itself or data accuracy.

### **4.1 Site Survey**

Location of various sensors is paramount to good data collection. Abbreviated instructions follow, but for a detailed reference, see: <https://www.weather.gov/media/epz/mesonet/CWOP-Siting.pdf>.

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

## Anemometer

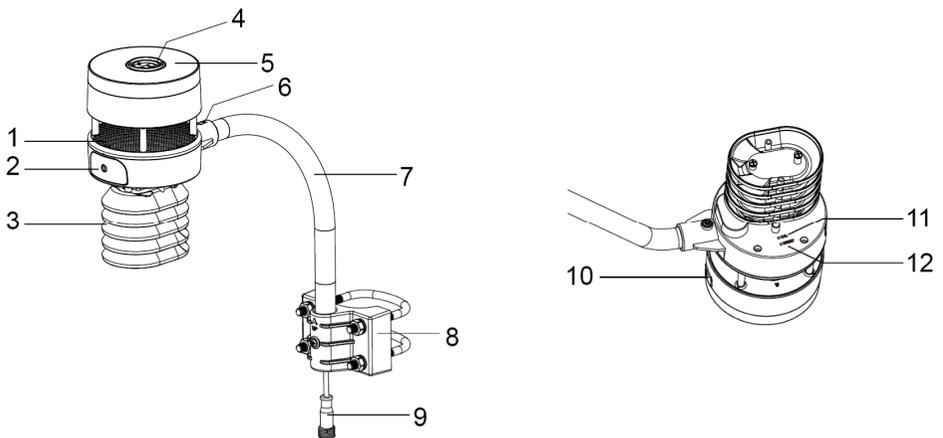
- Ideally mounted at least 32 feet, or 10 meters above ground level.
- Try to make the anemometer the highest object around. 7 feet, or 2.75 meters) or more above the surrounding obstructions is best.

## Rain Gauge

- Ideally mounted at a height of 4 to 6 feet, or 1.5 to 2 meters above the ground.
- Ideally located at a horizontal distance of 4 times the height, above the rain gauge, of the nearest obstruction.
- Ensure the rain gauge is mounted level to the ground, away from any horizontal surface that can introduce rain-splashing or surrounding snow buildup.

## 4.2 Ultrasonic Anemometer package assembly

See Figure 6 to locate and understand all the parts of the ultrasonic anemometer package with UV & light, thermo-hygrometer sensors, once fully assembled.



**Figure 6: Sensor package assembly components**

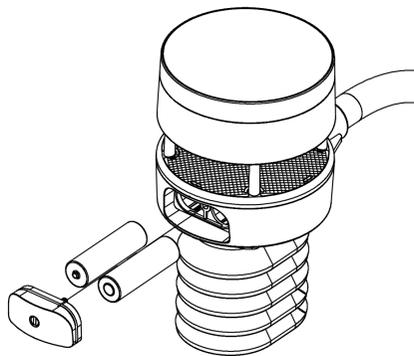
1. Surface tension conditioner layer ( patent pending)	7. Mounting arm
2. Battery compartment	8. Mounting bracelet and U-bolt set
3. Temperature & humidity sensor	9. Power cord for built-in heater
4. Light & UV sensor, LED indicator	10. USB port (factory use only )
5. Solar Panel	11. Calibration button (factory use only )
6. NORTH alignment indicator	12. Reset button

**Table 2: Sensor package assembly component list**

### 4.2.1 Install batteries in sensor package

Open the battery compartment with a screwdriver and insert 2 AA Lithium batteries in the battery compartment, and press “Reset” button, the LED indicator on the back of the sensor package (item 4) will turn on for 3 seconds and then flash once every 4.8 seconds indicating sensor data transmission. If you did not pay attention, you may have missed the initial indication. You can always press the reset button to start over. Make sure you see the flash once every 4.8 seconds.

If sensor has been put outside for some time, and solar panel has charged up the internal accumulator fully or partially, if you install the 2 AA backup Lithium battery, the system might not start up properly. So you can always make a system reset by press the “Reset” button.



**Figure 7: Battery installation diagram**

**Note:** Please make sure the battery is inserted correctly for its polarity as the system needs its initial power from this backup battery to start up the system before solar panel charges up the accumulator and supply system power afterwards. when in high altitude area,during wintertime, sunshine time is short, thus system needs to be powered from this backup battery, we recommend Lithium batteries to be used for cold weather climates. Please avoid alkaline batteries, especially when internal heater is to be activated during cold and wet weather conditions as when heater activated, the trapped heat inside will warm up internally, and alkaline batteries are extremely susceptible to leakage when temperature is over certain limits. So Alkaline batteries are forbidden to be used with this anemometer when heater function is activated.

## **4.2.2 Mount ultrasonic anemometer assembly**

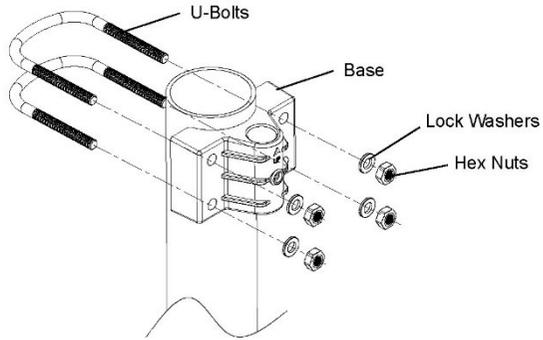
### **4.2.2.1 Before you mount**

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

### **4.2.2.2 Mounting**

- You can attach a pole(not included) to a permanent structure and then attach the sensor package to it (see Figure 8-12).
- The U-Bolts will accommodate a pole diameter of 1.25-2 inches (pole not included).

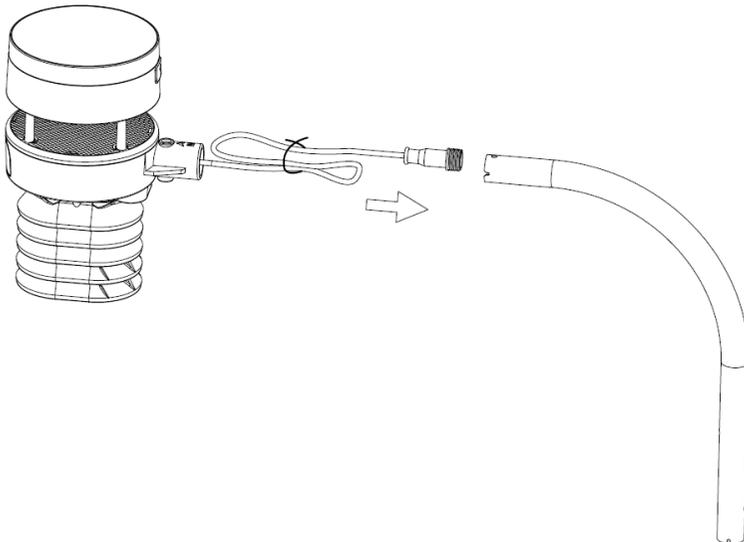
1. Install the base on a pole (1.25inch~2inch) as Figure 8.

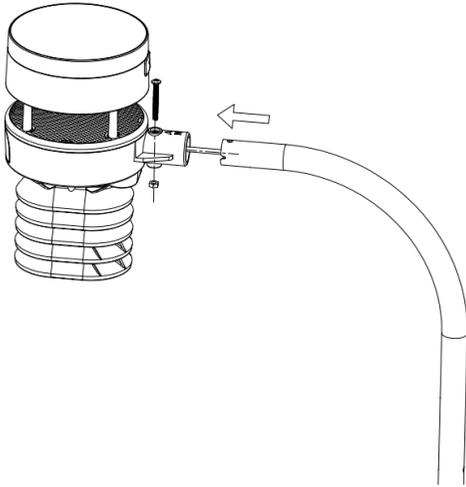


**Figure 8: Sensor package mounting diagram 5-1**

2. Pass the connector cord through the arm tube as Figure 9:

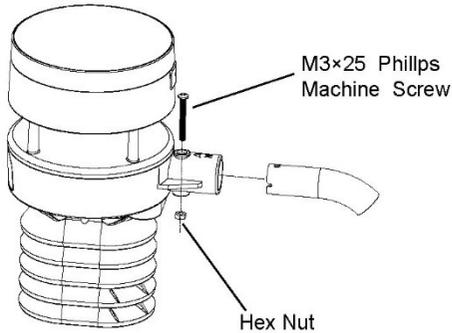
If you don't need to power up the heater, we suggest you tie up the power cord and keep in th tube. This can make the installation looks neat and tidy. You may place it out when needed.





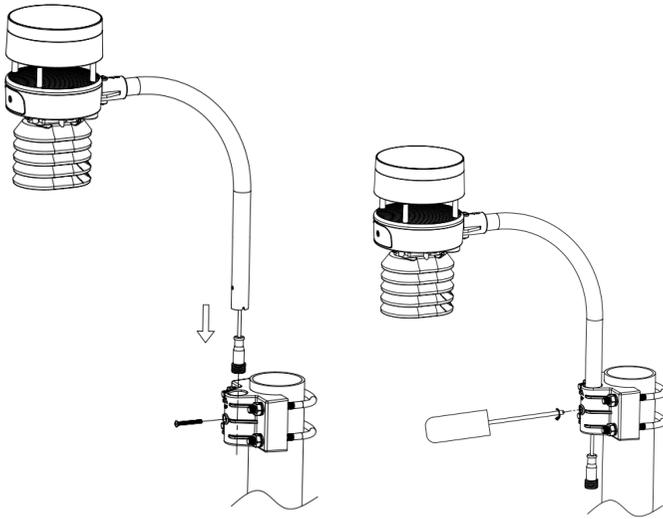
**Figure 9: Sensor package mounting diagram 5-2**

3. Attaching the arm tube to the Ultrasonic Sensor as Figure 10.



**Figure 10: Sensor package mounting diagram 5-3**

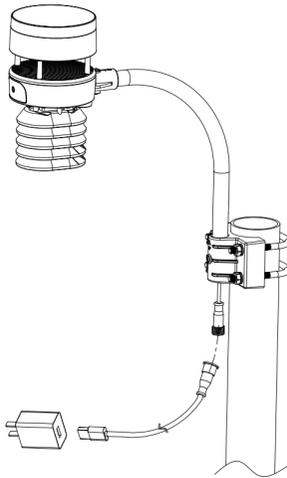
4. Insert the arm tube into the base as Figure 11. Be sure to line up the small hole in the arm with the holes in the base. Insert the machine screw through the holes in the base and arm.



**Figure 11: Sensor package mounting diagram 5-4**

Make sure the mounting pole is vertical, or very close to it. Use a level as needed.

5. If optional extension cord is added, connect the cord to the connector and insert the USB port into the AC adaptor as Figure 10 show:



**Figure 12: Sensor package mounting diagram 5-5**

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 tighten 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 connector tube of the sensor package (item 6). You must rotate the whole sensor package until this arrow points due north. 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:** In Southern hemisphere, it is not necessary to change the orientation to SOUTH as its solar panel is a rounded type and it is orientation free for its charging capability.

Make sure the mounting tube for the sensor package is installed vertically (use a level at 90-degree offsets around the tube). Adjust the mounting pipe as necessary. Next also make sure the mounting of the anemometer body on the pipe is level. If it is not, wind direction and speed readings may not operate correctly or accurately. Adjust the mounting assembly as necessary.

Make sure you check, and correct if necessary, the north orientation again, 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.

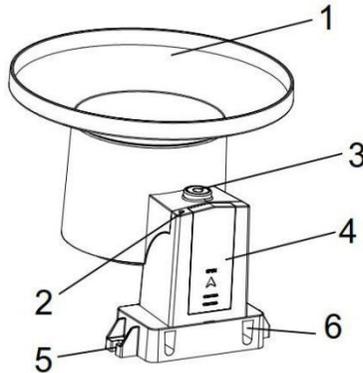
### **4.2.3 Reset Button and Transmitter LED**

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

Using a bent-open paperclip, press and hold the RESET BUTTON (item 12) 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 4.8 seconds.

### 4.3 Rain Gauge Sensor Set Up and Installation

See Figure 13 to locate and understand all the parts of the rain gauge sensor once fully assembled.



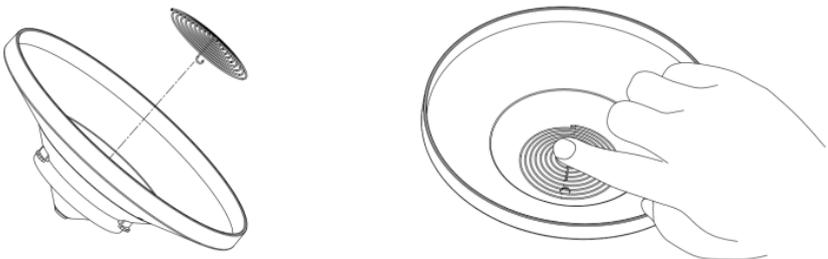
**Figure 13: Sensor assembly components**

1	Rain collector funnel	4	Battery compartment door
2	LED Indicator	5	Surface installation screw hole
3	Bubble level	6	U-bolt installation hole

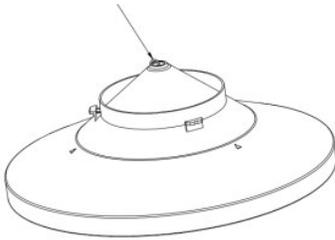
**Table 3: Sensor assembly detailed items**

#### 4.3.1 Install rain gauge filter

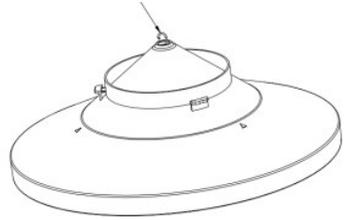
There's a stainless steel filter included in the package. It's aimed to stop leaves or bird's dropping to avoid the obstruction of the cone hole. The installation is simple: press the filter until the hook is inside the outlet hole and self -locked. The spring tension will keep the filter sit tight on the funnel.



Hook the filter hook on the edge to install.



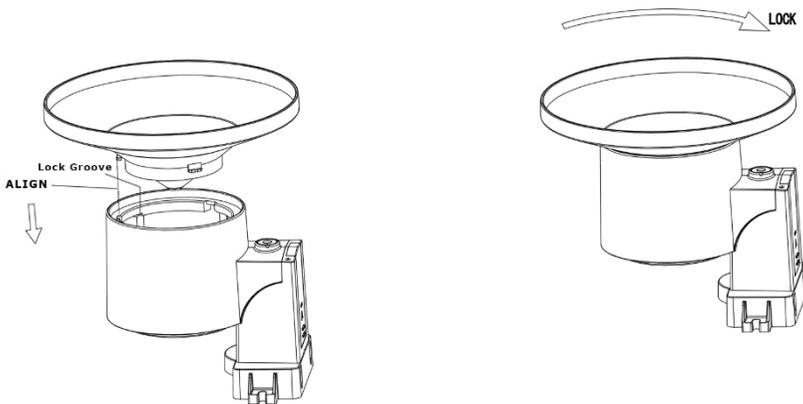
Take out the filter hook from the edge to uninstall.



**Figure 14: Rain gauge filter in/un-installation diagram**

### 4.3.2 Install rain collector top

Align the rain collector top with the rain bucket, pay attention to the lock groove position as shown on the left side in Figure 15. Next, lock the top clockwise to the lock groove position, as shown on the right side of the figure, until it comes to a stop and the top cannot be removed from the bucket. Failure to do this may cause the collector top to blow away in strong winds!



**Figure 15: Rain collector top installation diagram**

### 4.3.3 Install Batteries in rain gauge sensor

Remove the battery door on the back of the sensor by sliding it in the direction of the arrow. Insert one AA battery as described and put compartment door back and slide it in the opposite direction to lock. **Make sure battery door is firmly press and closed properly, which is extremely important in preventing any water entering inside.**



**Figure 16: Rain gauge sensor battery installation diagram**

The LED indicator on the top of the battery door (item 2) will turn on for 4 seconds and then flash once every 49 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 49 seconds, everything should be OK.

**Note:** If no LED light up or is lighted permanently, make sure the battery is inserted the correct way or a proper reset is happened. Do not install the battery backwards. You can permanently damage the outdoor sensor.

We recommend lithium batteries for cold weather climates, but alkaline batteries are sufficient for most climates.

### 4.3.4 Mounting

#### 4.3.4.1 Before you mount

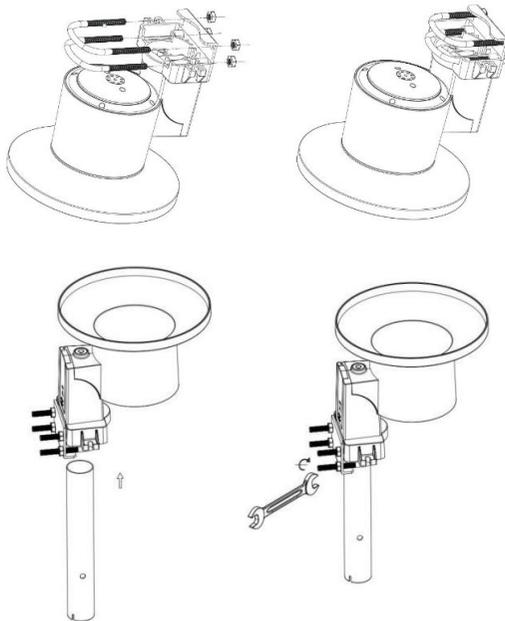
Before proceeding with the outdoor mounting detailed in this section, you may want to skip to setup instructions in section 4.5 and onwards first, while you keep the assembled rain gauge sensor nearby (although preferably not closer than 5 ft. from the gateway). This will make any troubleshooting and

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.

#### 4.3.4.2 Mounting with U-bolts

The mounting assembly includes two U-Bolts and a bracket that tightens around a 1-2" diameter pole using the four U-Bolt and nuts. The package Not included the pole D32/H200 (diameter 32mm = 1.26", length 200mm = 7.87") stainless steel tube for this purpose.

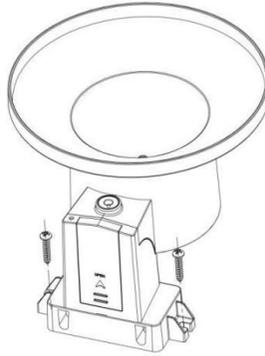


**Figure 17: Rain gauge installation with U-bolts**

**Note:** Use the bubble level on the side of the rain gauge as a guide to verify that the sensor is leveled (for proper measurements).

#### 4.3.4.3 Mounting with screws

The mounting assembly also includes two screws for installation on a flat surface.



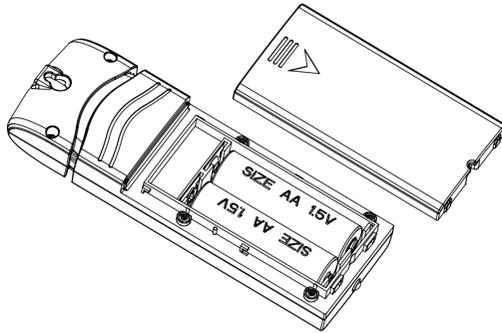
**Figure 18: Rain gauge sensor mounting with screws installation diagram**

**Note:** Use the bubble level beside the rain sensor as a guide to verify that the sensor is leveled. Use shims as necessary to achieve level installation.

### 4.4 Indoor Sensor Set Up

**Note:** To avoid permanent damage, please take note of the battery polarity before inserting the batteries. Looking at Figure 4 from left to right the left-most (or bottom) battery is to be installed with its + terminal pointing down, and the other battery with its + terminal pointing up.

Remove the battery door on the back of the sensor by sliding it in the direction of the arrow. Insert two AA batteries as described and put compartment door back and slide it in the opposite direction to lock.



**Figure 4: Indoor sensor battery installation**

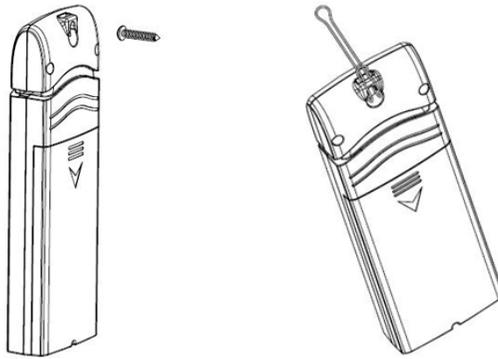
#### **4.4.1 Sensor Placement**

The best mounting location for the indoor sensor is in a location that never receives direct sunlight, not even through windows. Also, do not install in a location where a nearby radiant heat source (radiator, heaters, etc.) will affect it. Direct sunlight and radiant heat sources will result in inaccurate temperature readings.

The sensor is meant to provide indoor conditions for display on the console, but if you would rather have a second source for outdoor conditions instead, you can mount this unit outside. The unit is weatherproof, but besides heeding the placement instructions above, you should also attempt to mount the unit under cover (eave or awning or similar).

To mount or hang the unit on a wall or wood beam:

- Use a screw or nail to affix the remote sensor to the wall, as shown on the left side of Figure , or
- Hang the remote sensor using a string, as shown in right side of Figure



**Figure 20: Indoor sensor mounting**

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

## 4.5 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 base unit:

- **Indoor/outdoor 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 base unit 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 base unit, 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 base unit.

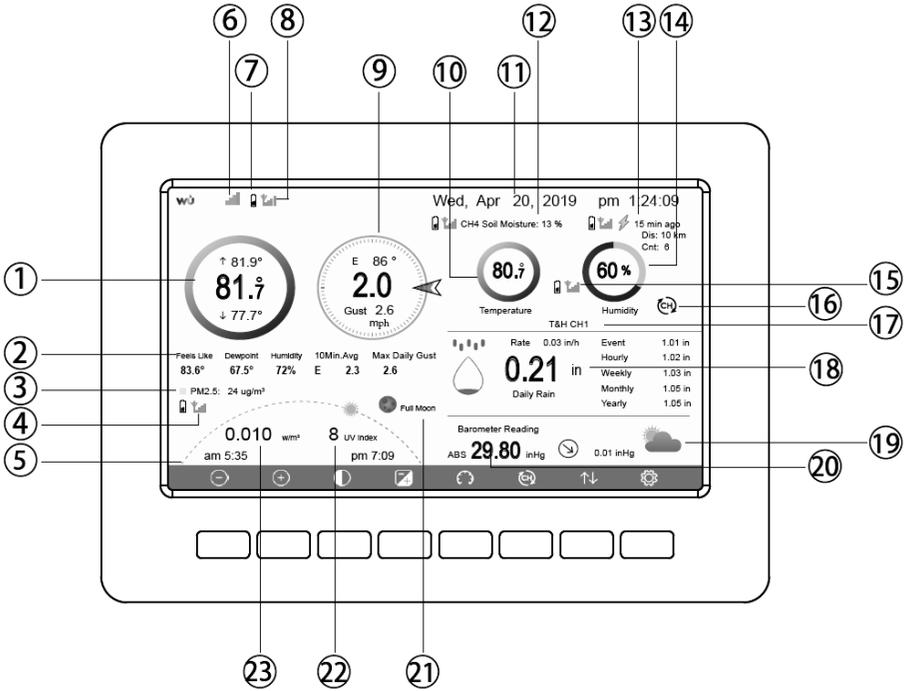
The following table shows different transmission media and expected signal strength reductions. Each “wall” or obstruction decreases the transmission range by the factor shown below.

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 4: RF Signal Strength reduction**

## 4.6 Console Display

See Figure 21 to help you identify elements of the console's display screen.



**Figure 21: Display Console Screen Layout**

<b>No</b>	<b>Description</b>	<b>No</b>	<b>Description</b>
1	Outdoor temperature	13	Last lightning strikes detected time / distance; daily counts (optional DP60 sensor)
2	Outdoor Feels Like/Dew point/Humidity/10Min. Average Wind Direction/Max Daily Gust	14	Indoor humidity
3	PM2.5 concentration(optional DP200 sensor)	15	RF signal bar for multi-channel temperature and humidity sensor(optional sensor)
4	RF signal bar for PM2.5 sensor(optional DP200 sensor)	16	Multi-channel temperature and humidity sensor cycle display mode icon(optional sensor)
5	Sunrise / Sunset Time	17	Multi-channel temperature and humidity sensor channel number (optional sensor)
6	Wi-Fi signal bar	18	Rain fall Daily/Event/Hourly/Weekly/ Monthly/Yearly
7	Low battery power indicator for each sensor	19	Weather forecast
8	RF signal bar for outdoor sensor array	20	ABS/REL Barometer
9	Wind direction/Wind speed/Gust	21	Moon Phase
10	Indoor temperature	22	UV
11	Date and time	23	Solar Radiation
12	Soil moisture(optional DP100 sensor)		

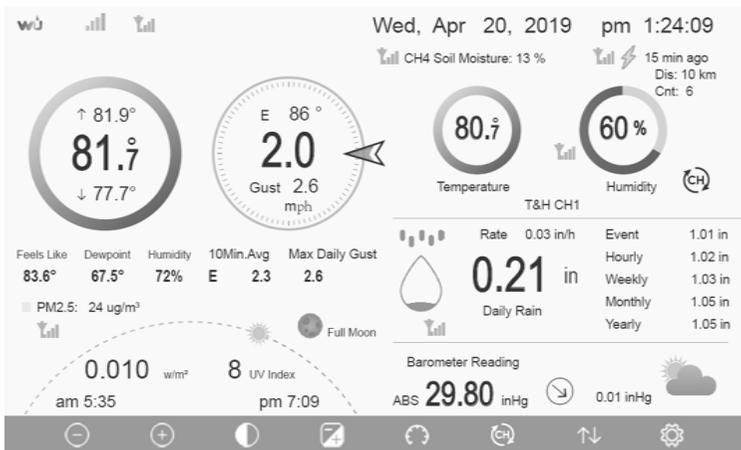
**Table: Display console detailed items**

## 4.6.1 Initial Display Console Set Up

Immediately after power up (inserting power adapter), the unit will turn on the display, and the unit will start to look for reception of the indoor and outdoor sensor data. This may take up to 3 minutes.



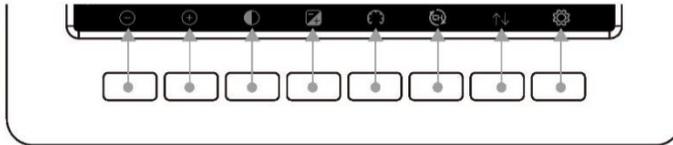
### Dark Background Display



### Light Background Display

**Note:** Sunrise/sunset time display will only work properly when GEO location has been set up correctly. GEO setup can be carried out under setup menu.

### 4.6.2 Key functions



**Figure: Buttons around the display**

There is a set of eight keys on the bottom of the display console. The following tables briefly explains the function of these keys.

Icon	Description
	<b>Brightness control key</b> Press this key to decrease the brightness
	<b>Brightness control key</b> Press this key to enhance the brightness
	<b>Backlight on/off key</b> Press this key to on/off the backlight
	<b>Background key</b> Press this key to choose between dark background display and light background display
	<b>Pressure display key</b> Press this key to choose the display between Absolute pressure and Relative pressure.
	<b>Channel key</b> Press this key to Shift the display between indoor temp & humidity, Multiple Channel temp& humidity and scroll automatically mode
	<b>History key</b> Press this key once to view Max/Min record; Press twice to enter History mode; Press three times to enter Graph Mode; Press four

	times to enter optional Multi-channel Sensors Display Mode
	<b>Setting key</b> Press this key to enter Setting Mode

**Table: Console buttons**

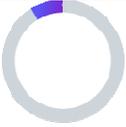
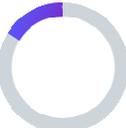
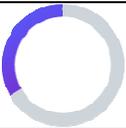
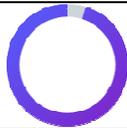
## 4.6.3 Main interface icons explain

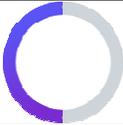
### 4.6.3.1 Temperature Icon

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

**Note:** please refer to the online manual for colorful display.

### 4.6.3.2 Humidity Icon

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

50 to 60		
----------	--	--

**4.6.3.3 Current wind direction indication , 10-minute average wind direction indication .**

**4.6.3.4 Hourly Rainfall Icon**

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

**4.7 Multiple Channel Selection and Scroll Mode**

The multi-channel temp and humidity sensor is an optional sensor, not included in the package. If you have multiple wireless sensors, while in

normal mode, press the  key to toggle display in sequence of indoor, ch1, ch2....ch8, scroll display. Please note if only CH2 is received, it will skip CH1, and toggle only between indoor and already learned sensors.

While in Scroll display mode, the scroll icon  will be displayed next to the indoor humidity, and will scroll every 5 seconds.

**Note:** For all optional sensor(s), the history data will be saved to a microSD card(not included).

## 4.8 History Mode

### 4.8.1 View and Reset MAX/MIN

While in normal display, press the  key once to view and reset minimum and maximums.

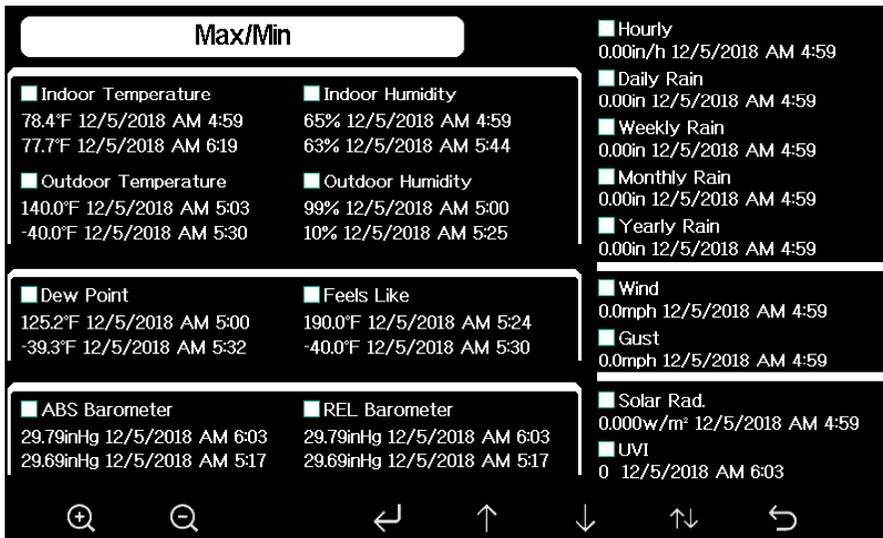


Figure: Max/Min Screen

Icon	Description
	<p><b>Selection key</b></p> <p>Press this key to select the weather MAX/MIN record which need to clear</p>

	<p><b>Selection key</b> Press this key to select the weather MAX/MIN record which need to clear</p>
	<p><b>Enter key</b> While the desired weather MAX/MIN record selected , press this key to popup Message Box "Clear the Max/Min record?". Press  key or  key to select YES or NO. Press the  key or  key to confirm the selection.</p>
	<p><b>Up arrow key</b> Press this key to change the activated option field</p>
	<p><b>Down arrow key</b> Press this key to change the activated option field</p>
	<p><b>History key</b> Press this key to select History data display.</p>
	<p><b>Return key</b> Press this key to return to normal display mode</p>

#### 4.8.2 History Record Mode

While in normal display, press the  key twice to enter History Record Mode.

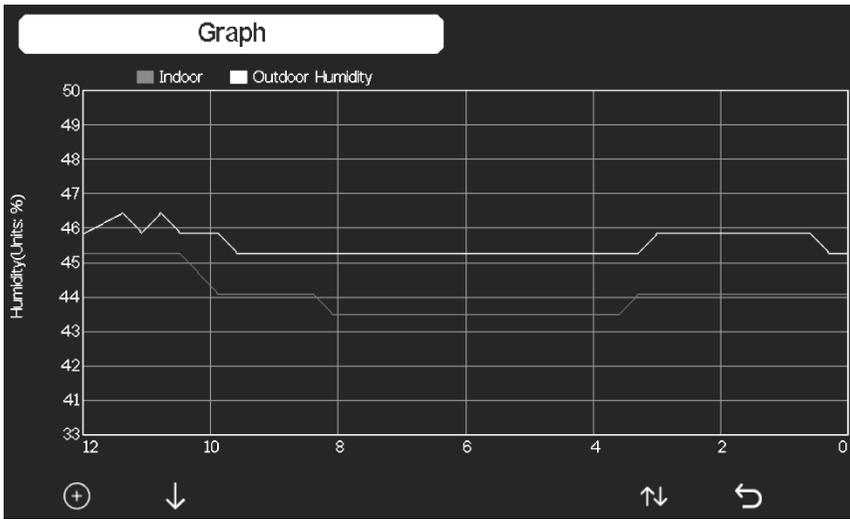
No	Time	Indoor Temperature (°F)	Indoor Humidity (%)	Outdoor Temperature (°F)	Outdoor Humidity (%)	Dew Point (°F)	Feels Like (°F)	Wind (mph)
2689	12/5/2018 AM 6:40	77.7	65	68.9	47	47.8	68.9	2.5
2690	12/5/2018 AM 6:45	77.7	65	68.9	47	47.8	68.9	2.5
2691	12/5/2018 AM 6:50	77.7	65	68.9	47	47.8	68.9	2.2
2692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

Figure : History record Screen

Icon	Description
	<b>File Select key</b> Press this key to clear all history record
	<b>Page Select key</b> Press this key to enter particular page of the history data. Each page contains 16sets data.
	<b>Scroll left key</b> Press this key to view the left of the scrollable area.
	<b>Scroll right key</b> Press this key to view the right of the scrollable area.
	<b>Page up key</b> Press this key to scroll up the page you are viewing
	<b>Page down key</b> Press this key to scroll down the page you are viewing
	<b>History key</b> Press this key to select the Max/Min record or History.
	<b>Return key</b> Press this key to return to previous mode







Press  to shift the data display of 12/24/48/72H. Press  to view the graph of the following data:

- Indoor outdoor humidity
- Dew Point and Feels like
- Indoor outdoor temperature
- Wind speed and Gust
- Wind Direction
- UVI
- Solar radiation
- Rainfall hourly and daily
- Barometer(REL & ABS)

#### 4.8.4 Optional Sensor Display Mode

For optional DP100 soil moisture sensor and DP200 PM2.5 sensor, only the first channel data will display on the main screen of the console. To view the full display of multi-channel sensors you can do this:

While in Graph Mode, press the  key once to enter Optional Sensor Display Mode.

CH1 27.1°C 67%	CH2 27.2°C 67%	CH3 27.3°C 66%	CH4 27.3°C 66%	CH5 27.1°C 67%	CH6 27.4°C 67%	CH7 27.3°C 66%	CH8 27.3°C 66%
Soil CH1 0%	Soil CH2 0%	Soil CH3 0%	Soil CH4 0%	Soil CH5 0%	Soil CH6 0%	Soil CH7 0%	Soil CH8 32%
PM2.5 CH2 29ug/m <sup>3</sup> Moderate AQI 87 24H 68	PM2.5 CH3 31ug/m <sup>3</sup> Moderate AQI 91 24H 93	Water CH2 Normal	Water CH4 Normal	Lightning 20 min ago Dis 20km Cnt 5			
							

## 4.9 Setting Mode

While in normal display, press the  key to enter Setting Mode. You can select the below sub-mode by pressing the  key



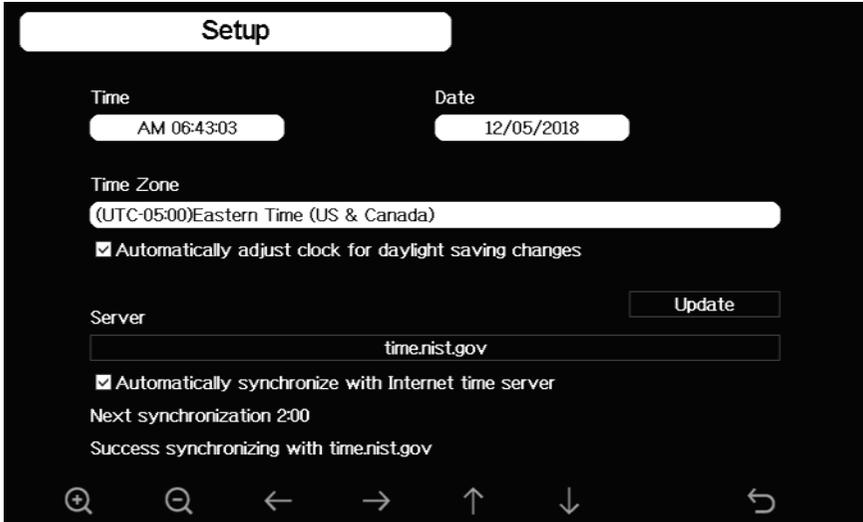
**Figure : Setup Menu Screen**

Icon	Description
	<b>Select key</b> Press this key to select the unit or scrolls the value
	<b>Select key</b> Press this key to select the unit or scrolls the value.
	<b>Left key</b> Press this key to select the set value.
	<b>Right key</b> Press this key to select the set value.
	<b>Up arrow key</b> Press this key to change the activated option field
	<b>Down arrow key</b> Press this key to change the activated option field
	<b>Set key</b> Press this key to select the Setting sub-Mode
	<b>Return key</b> Press this key to return to previous mode

## 4.9.1 Date and Time setting

While in Menu Setting Mode, press  key to select Date and Time

Setup field, press  or  key to enter Date and Time Setup mode:



**Figure : Time and date Setup Screen**

### 1) Time setting (hour/minute/second)

Press  key to select time setting field, and the hour digit will turn red, press the  or  key to change the hour setting. Press  to set the minute, the minute digit will turn red, press the  or  key to change the minute setting. Press  to set the second, and the second digit will turn red, press the  or  key to change the second setting

### 2) Date setting

Press  key to select Date setting field, the day digit on focus turns red, press the  or  key to change the day setting. Press  to set the month, then month digit focused will turn red, press the  or  key to change the month setting. Press  to set the year, the year digit on focus will turn red, press the  or  key to change the year setting

### 3) Time zone setting

Press  key to select Time zone setting field, press the  or  key to change the time zone setting. Press  key to select Update field, press the  or  key to update the time immediately.

### 4) Automatically synchronize with internet time server

The time server is time.nist.gov. Press the  or  key to tick "Automatically synchronize with internet time server" and press "update" to synchronize with time server immediately. Console time will be updated at 2:01am automatically when internet access is possible.

## 4.9.2 Time Format setting

Press  to change the time format between hour: minute: second (h:mm:ss), hour: minute: second AM (h:mm:ss AM) and AM hour: minute: second (AM h:mm:ss).

### 4.9.3 Date Format setting

Press  to change the time format between DD-MM-YYYY, YYYY-MM-DD and MM-DD-YYYY

### 4.9.4 Temperature unit setting

Press  to change the temperature units of measure between °F and °C.

### 4.9.5 Barometric unit

Press  to change the temperature units of measure between inHg, mmHg and hPa

### 4.9.6 Wind speed unit

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

### 4.9.7 Rainfall unit

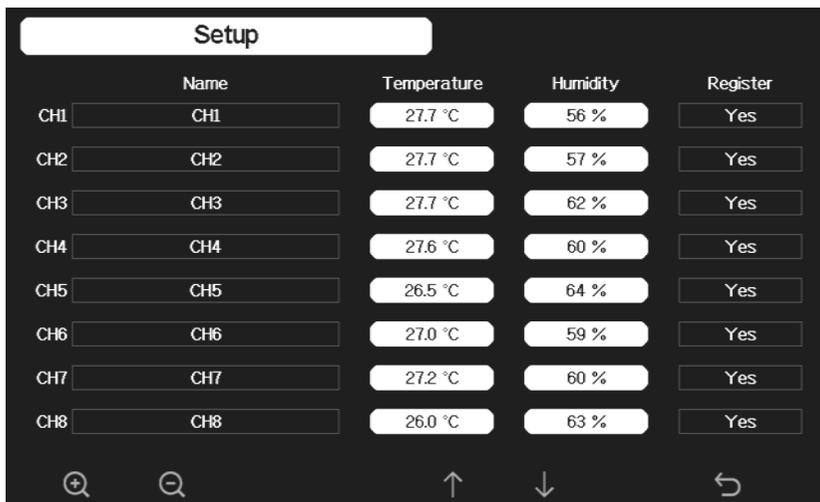
Press  to change the rainfall units of measure between in and mm

### 4.9.8 Solar Rad. Unit

Press  to change the solar radiation units of measure between W/m<sup>2</sup>, lux and fc.

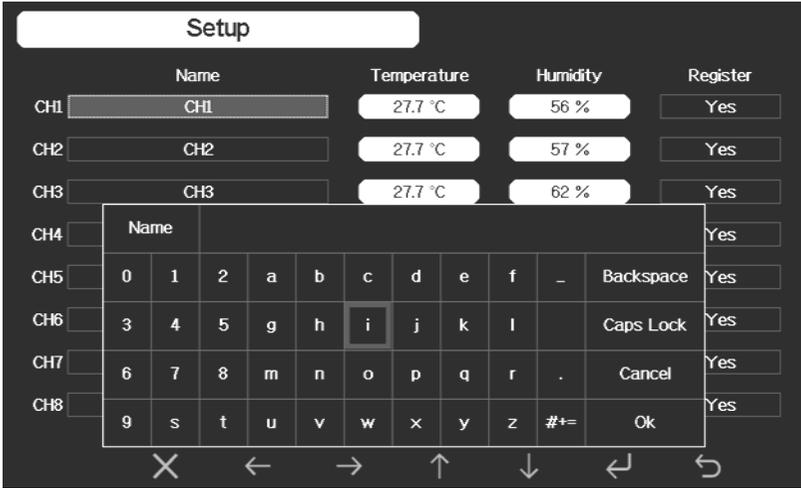
### 4.9.9 Multi Channel Sensor

In Multi channel sensor Setup Screen, you can rename the sensor or register the sensor again while the sensor lost connection to console display.



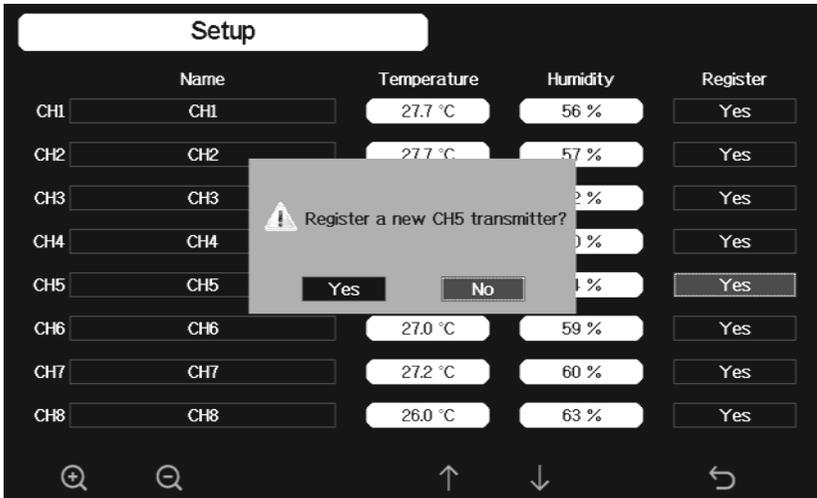
**Figure : Multi channel sensor Setup Screen**

Press  or  key to select Name setting field, the name on focus turns green, press the  or  key to pop up the keyboard to enter the sensor name. Press     to scroll to the character and press  to select the character. Press  to return to the setup page.



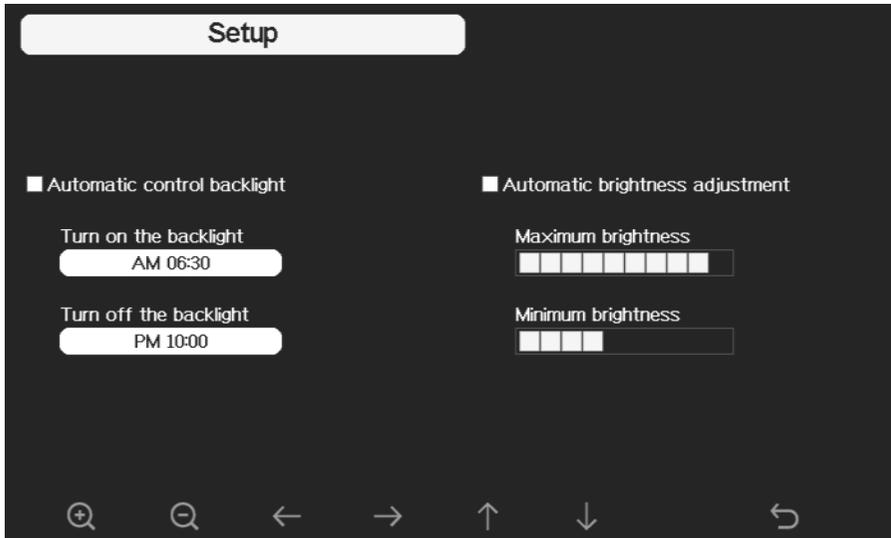
**Figure : rename the sensor Screen**

Press  or  key to select Register setting field, press the  or  key to register the selected sensor



## 4.9.10 Backlight setting

While in Menu Setting Mode, press  key to select Backlight Setup field, press  or  key to enter backlight Setup mode:



**Figure : Backlight Setting Screen**

Automatic control backlight: select this option, the backlight will auto turn on and off according the set time

Turn on the backlight: set the time of turning on backlight

Turn off the backlight: set the time of turning off backlight

Automatic brightness adjustment: select this option, the brightness will change according to the light intensity measured from outdoor sensor

Maximum brightness: set the maximum brightness while it is the highest light intensity

Minimum brightness: set the minimum brightness while it is the weakest light intensity

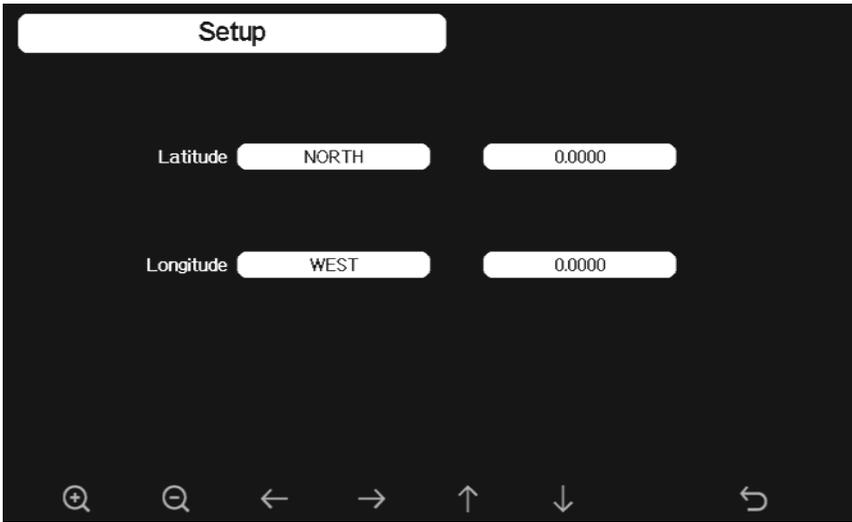
Icon	Description
	<b>Select key</b> Press this key to select the unit or scrolls the value
	<b>Select key</b> Press this key to select the unit or scrolls the value.
	<b>Left key</b> Press this key to select the set value.
	<b>Right key</b> Press this key to select the set value.
	<b>Up arrow key</b> Press this key to change the activated option field
	<b>Down arrow key</b> Press this key to change the activated option field
	<b>Return key</b> Press this key to return to previous mode

If the auto backlight turn-on time has been set, you can press  key to turn off the backlight within the turn on time. Backlight will turn on again automatically at next turn on time. You can press any key to turn on the backlight for 60s within the turn off time

#### 4.9.11 Longitude: Latitude setting

While in Menu Setting Mode, press  key to select Longitude: Latitude

Setup field, press  or  key to enter Longitude Latitude Setup mode:



**Figure : Longitude and Latitude Setting Screen**

The sunrise/sunset times will be calculating automatically base on the Longitude and Latitude. Your location GEO info can be found on mobile compass page. Two digits after decimal should be enough for this feature to be working correctly.

#### **4.9.12 Barometric display**

Press  to change the barometer display between REL (relative pressure) and ABS (absolute pressure)

#### **4.9.13 Rainfall season (default: January)**

Press  to change the beginning of the rainfall yearly season month. The default is January. Rainfall season influence the annual rainfall maximum, minimum and total value. When one month was selected, the annual rainfall and annual max/min rainfall were zero clearing at 0:00 of the first day of the selected month.

## 4.9.14 Storing Interval (1-240minutes Selectable)

## 4.9.15 Weather Server

You may jump to section 4.9.16 now to have your console connected with your Wi-Fi network first. Then back to section 4.9.15 to have cloud data hosting setup completed.

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

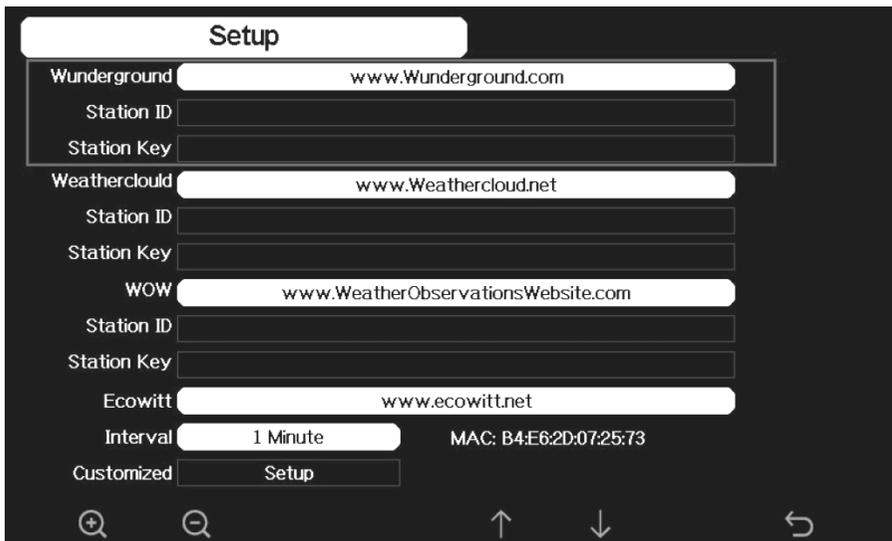
Service	Description
Weather Underground	Site: <a href="https://wunderground.com">https://wunderground.com</a> provides local & long-range weather forecasts, weather reports, maps & tropical weather conditions for locations worldwide.
WOW	Site: <a href="https://wow.metoffice.gov.uk">https://wow.metoffice.gov.uk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

**Table: Supported weather services**

**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.

Press  or  key to enter Weather Server set up mode. The device can be configured to send real-time data to wunderground.com®. Enter the Station ID and Password obtained from Wunderground.com.



**Figure : Weather Server setup screen**

				
scroll value up	scroll value down	Scroll field up	Scroll field down	return to Setup

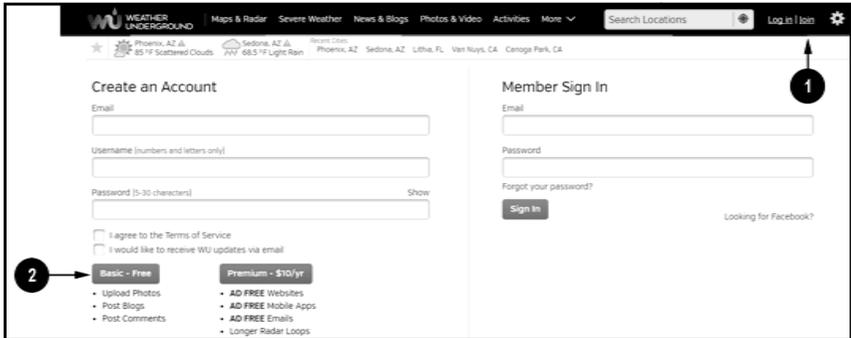


- 1) **Set Station ID.** Press  to highlight the Station ID. Enter your station ID. Press  to display the keyboard. Press     to scroll to the character and press  to select the character. Press  to return to the setup page.
  
- 2) **Set Station Key.** Press  to highlight the station key. Enter your password obtained from according weather server. Press  to display the keyboard. Press     to scroll to the character and press  to select the character. Press  to return to the setup page.

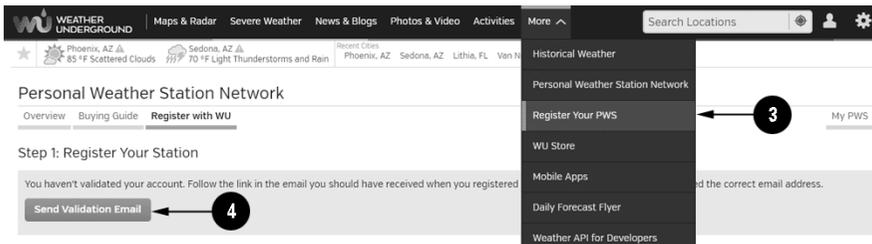
### 4.9.15.1 Registering with and using wunderground.com

Perform the following steps to get the Station ID and Password on wunderground.com:

1. Visit Wunderground.com and select the **Join** link (1) at the top of the page and select the **Free** (2) sign up option.

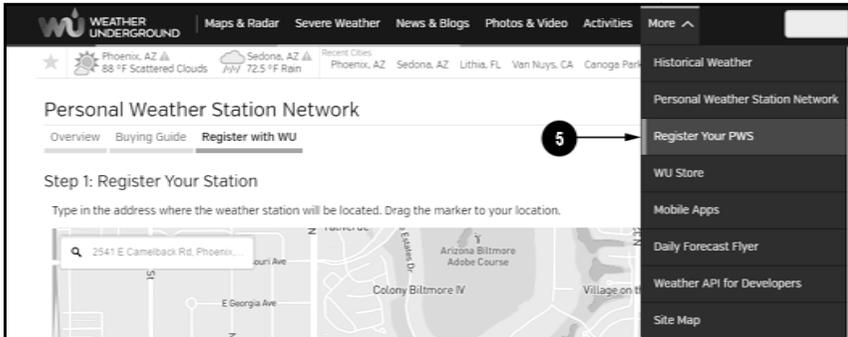


2. Select **More | Register Your PWS** (3)

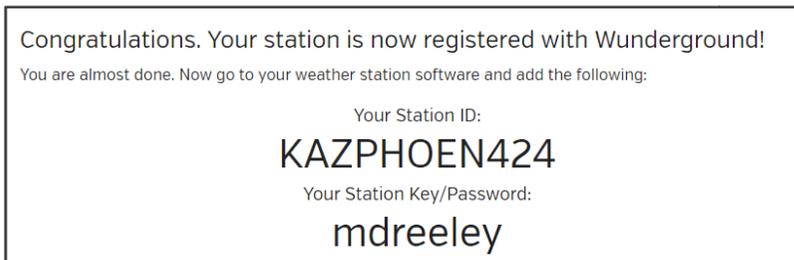


3. Click **Send Validation Email** (4). Respond to the validation email from Wunderground.com (it may take a few minutes).

4. Select **More | Register Your PWS (5)** again. This time you will be asked details about your weather station. Go ahead and fill out the form



After completing the weather station, you will see something like this:



Your station ID will have the form: KSSCCCC###, where K is for USA station (I for international), SS is your state, CCCC is an abbreviation for your city and ### is the station number in that city. In the example above, you see station 424 in the state of Arizona (AZ) in the United States (K).

5. Take note of the station ID and key/password and enter it in the Weather Server:



**Figure 31: Weather Server setup screen**

				
scroll value up	scroll value down	Scroll field up	Scroll field down	return to Setup



- 1) **Set Station ID.** Press  to highlight the Station ID. Enter your station ID. Press  to display the keyboard. Press     to scroll to the character and press  to select the character. Press  to return to the setup page.
- 2) **Set Station Key.** Press  to highlight the station key. Enter your password obtained from according weather server. Press  to display the keyboard. Press     to scroll to the character and press  to select the character. Press  to return to the setup page.

#### 4.9.15.2 Viewing data on wunderground.com

The most basic way to observe your weather station's data is 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:

(📶) Darwin (+9:30 Zone) Test Station **IDARWIN13** About this PWS Report Comments  
 Forecast for Darwin, AU > -12.460 130.841 > 66 ft  
 PWS Data PWS Widgets WunderStation My PWS  
 PWS viewed 3 times since July 1, 2018

Satellite Webcam Icon



Mapbox © Mapbox © OpenStreetMap | Improve this map

View WunderMap

Weather History for Darwin, [IDARWIN13]

◀ Previous      Daily Mode      July      6      2018      View      Next ▶

**Summary**  
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	--

Current Conditions station reported 0 second ago

# 78.4 °F

Feels Like 78.4 °F

12.1

Wind from **ENE**  
Gusts **12.5** mph

Dew Point: 66.2 °F      UV: 0.0

Humidity: 66%      Solar: 0 w/m<sup>2</sup>

Precip Rate: 0.00 in/hr      Soil Moisture: --

Precip Accum: 0.00 in      Soil Temp: --

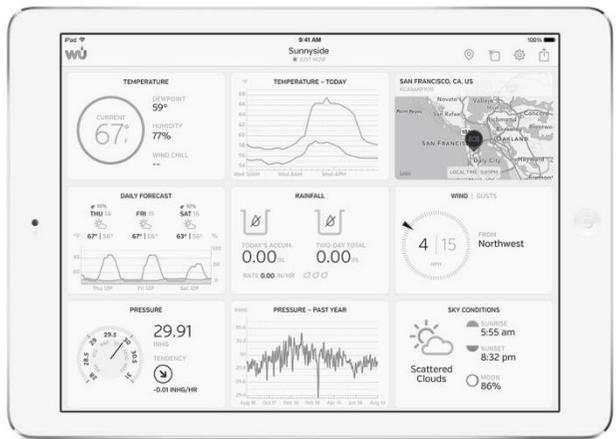
Pressure: 29.80 in      Leaf Wetness: --

7:08 AM      6:33 PM

☾ Waning Gibbous | 50% Illuminated

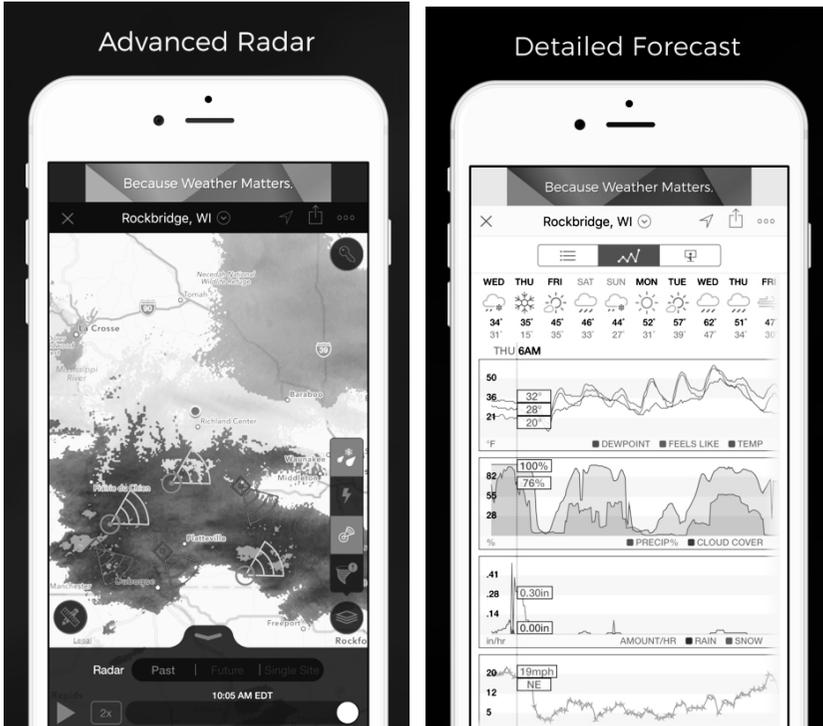
There are also some very useful mobile apps. The URLs provided here go to the Web version of the application pages. You can also find them directly from the iOS or Google Play stores:

- 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/id48615480>

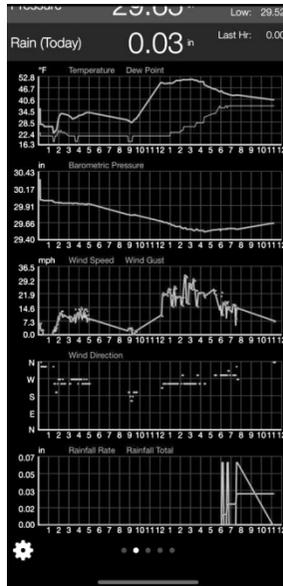
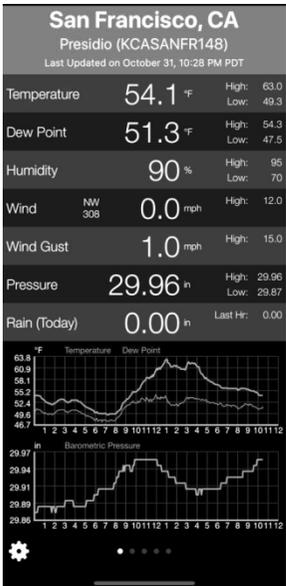
[8](#)

<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>



### 4.9.15.3 Registering with and using Ecowitt Weather

You can also use the Ecowitt Weather server to monitor and record all your sensors' data. Configure as follows:

- On the Weather Server page, set the reporting interval time(default: 1 minute).
- Visit the website: <https://www.ecowitt.net> on your computer and finish the registration on the page.
  - Press the upper left menu button and select Devices.
  - Press Add Device and input all the information needed(The MAC address can be found on the Weather Server page).
  - Press Save.
  - Press Dashboard on the menu. Your sensor data would be available on the dashboard within several minutes.

**Note:** When select device address on map, please wait until the map displays before selecting your address.

You may add a shortcut to the [ecowitt.net](https://www.ecowitt.net) website on the home page of your phone so that you can visit it just like opening an app.

### 4.9.15.4 Viewing data on [ecowitt.net](https://www.ecowitt.net)

You can observe your sensor's data by using the [ecowitt.net](https://www.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>

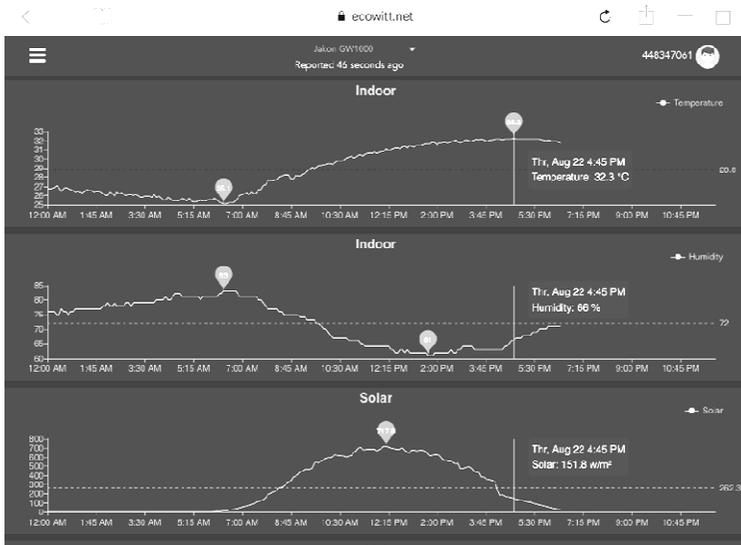
Note: If you want to share your station data with other users, you'll need to set your data to be public. Other users need to log in the [ecowitt.net](https://www.ecowitt.net) first to view your data.

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

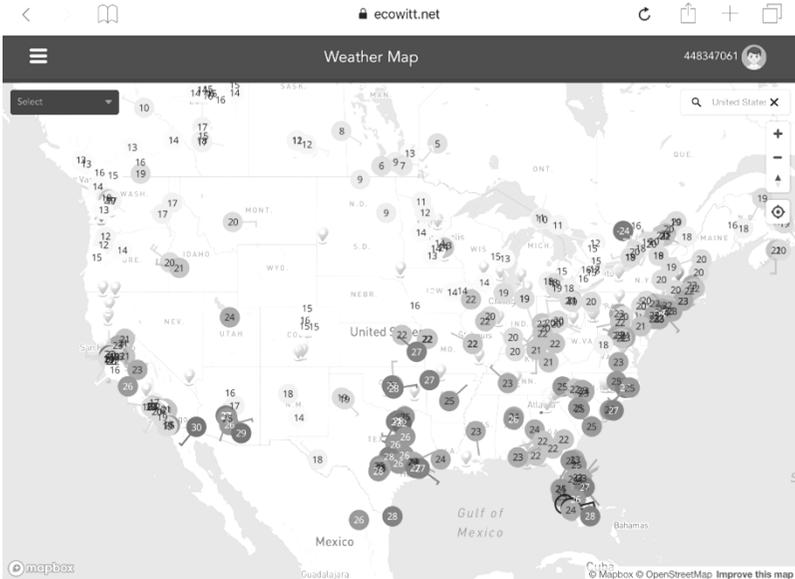
6:37 PM Thu Aug 22 ecowitt.net 78%

Juke GW1000  
Reported 13 seconds ago 448347061

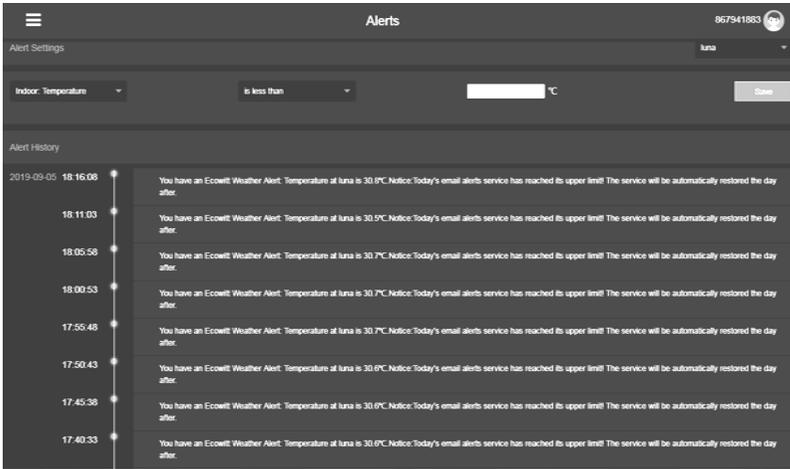
Daily Aug/22/2019

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)	Wind Dir
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	8
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



## 4.9.15.5 Customized server setup

For highly experienced users, it offers the option to send data to the user's own server. Press the "setup" button to enter Customized setup screen,



Figure : Server setup screen

Select Enable button and select the protocol type. The website should has the same protocol with Wunderground or Ecowitt. Input all the information needed.

**Customized**

State

Protocol Type

IP/Hostname

Port

Interval

Station ID

Station Key

**Customized**

State

Protocol Type

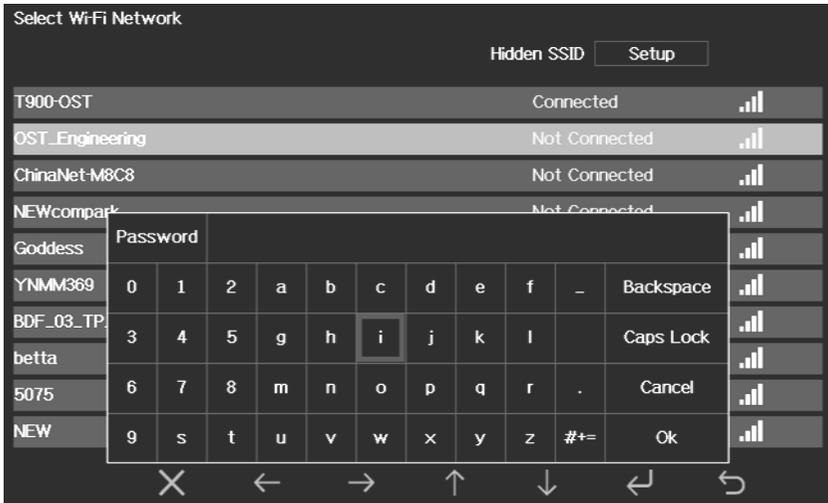
IP/Hostname

Port

Interval

## 4.9.16 Connect Console to Your Router: Wi-Fi scan

Entering this mode, system will display all the available Wi-Fi networks. Select the SSID that you want console to be connected with (only supports 2.4GHz band Wi-Fi network ), and enter passer word as required.



Press  or  key to select the Wi-Fi network. Press  key to confirm and enter the password. Press  key to return to normal display mode. It is possible that your network is not listed when Wi-Fi Scan is performed. Press  button and restart Wi-Fi Scan, this will usually solve the problem.

Only after connect to WLAN you can upload the data to weather website. If the Wi-Fi network connects successfully, the icon  will show on the left top of the console display. If the data upload to Wunderground.com successfully, the icon  will show on the left top of the console display.

If the Wi-Fi network you would like to connect is with a hidden SSID, please follow below steps to connect:

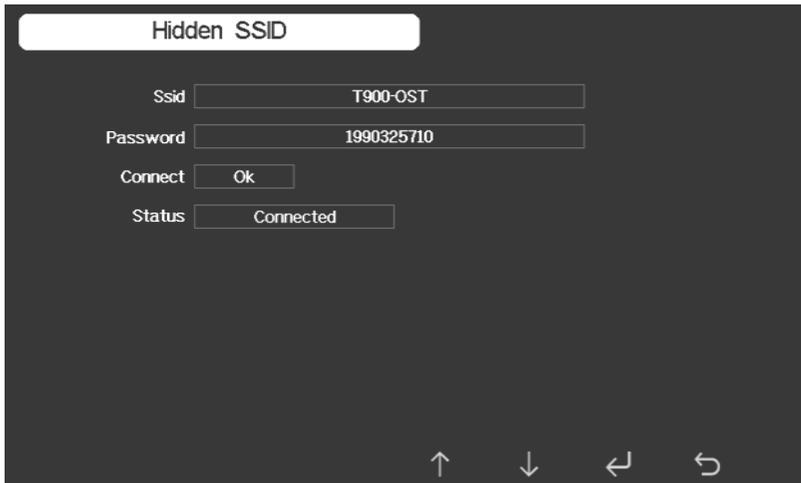
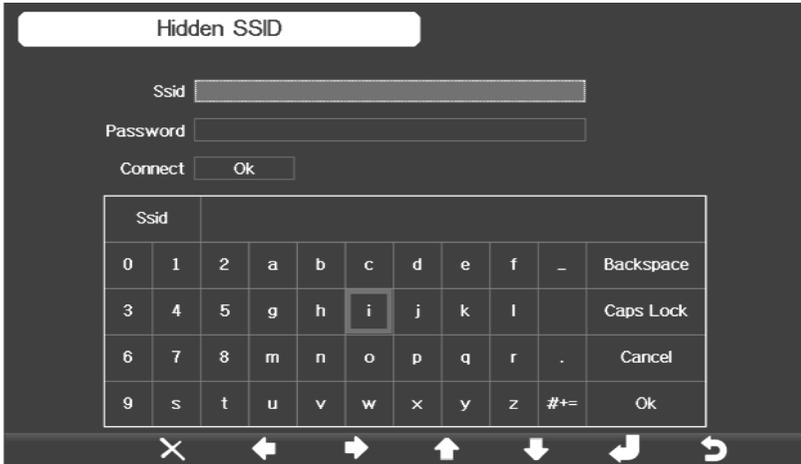
1) Press   to select Hidden SSID setup, and press  key directly to enter.

2).Press  to highlight the SSID. Press  to display the keyboard and enter your SSID. Press     to scroll to the character and press  to enter the character. Press  to return to the setup page.

3). Press  to highlight the Password. Press  to display the keyboard and start to enter your password.. Press     to scroll to the character and press  to enter the character. Press  to return to the setup page.

4).Press  to highlight the “OK” button beside “Connect ” to start connecting.

After connected successfully, the status will display” Connected”.



### 4.9.17 Background

While in Menu Setting Mode, press  key to select Background Setup field, press  or  key to choose between dark background display and light background display

## 4.9.18 Alarm Setting Mode



Icon	Description
	<b>Select key</b> Press this key to select the unit or scrolls the value
	<b>Select key</b> Press this key to select the unit or scrolls the value.
	<b>Left key</b> Press this key to select the set value.
	<b>Right key</b> Press this key to select the set value.
	<b>Up arrow key</b> Press this key to change the activated option field
	<b>Down arrow key</b> Press this key to change the activated option field
	<b>Set key</b> Press this key to select the Setting sub-Mode
	<b>Return key</b> Press this key to return to previous mode

The first row is high alarm value and the second row is low alarm value. When weather alarm condition has been triggered, that particular

alarm will sound for 120 second and the corresponding icon will flash until the weather condition doesn't meet the user set level. Press any key to mute the alarm.

### 4.9.19 Calibration Mode



Icon	Description
	<b>Select key</b> Press this key to select the unit or scrolls the value
	<b>Select key</b> Press this key to select the unit or scrolls the value.
	<b>Left key</b> Press this key to select the set value.
	<b>Right key</b> Press this key to select the set value.
	<b>Up arrow key</b> Press this key to change the activated option field
	<b>Down arrow key</b> Press this key to change the activated option field
	<b>Set key</b> Press this key to select the Setting sub-Mode
	<b>Return key</b> Press this key to return to previous mode

To adjust the parameter, press  to scroll to the parameter you wish to change. Press  to highlight the sign (positive vs. negative, if applicable) and significant digit. Press  or  to change the calibrated value.

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

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

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

other weather stations) are not a good source and have their own margin of error. Using a local weather station in your area is also a poor source due to changes in location, timing (airport weather stations are only updated once per hour) and possible calibration errors (many official weather stations are not properly installed and calibrated).

Place the sensor in a shaded, controlled environment next to the fluid thermometer, and allow the sensor to stabilize for 3 hours. Compare this temperature to the fluid thermometer and adjust the console to match the fluid thermometer.

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

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

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

To compare pressure conditions from one location to another, meteorologists correct pressure to sea-level conditions. Because the air pressure decreases as you rise in altitude, the sea-level corrected pressure (the pressure your location would be at if located at sea-level) is generally higher than your measured pressure.

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

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

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

- (4) Only use this if you improperly installed the weather station sensor array, and did not point the direction reference to true north.
- (5) The default conversion factor based on the wavelength for bright sunlight is  $126.7 \text{ lux} / \text{w/m}^2$ . This variable can be adjusted by photovoltaic experts based on the light wavelength of interest, but for most weather station owners, is accurate for typical applications, such as calculating evapotranspiration and solar panel efficiency.
- (6) Wind speed is the most sensitive to installation constraints. The rule of thumb for properly installing a wind speed sensor is 4 x the distance of the tallest obstruction. For example, if your house is 20' tall and you mount the sensor on a 5' pole:

$$\text{Distance} = 4 \times (20 - 5)' = 60' \text{ or } = 4 \times (6.10 - 1.52) = 18.32\text{m}.$$

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

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

Without a calibrated source, wind speed can be difficult to measure. We recommend using a calibrated wind meter (not included) and a constant speed, high speed fan.

- (7) The rain collector is calibrated at the factory based on the funnel diameter. The bucket tips every 0.01” or 0.1m of rain (referred to as resolution). The accumulated rainfall can be compared to a sight glass rain gauge with an aperture of at least 4” or 0.1m. Make sure you periodically clean the rain gauge funnel.

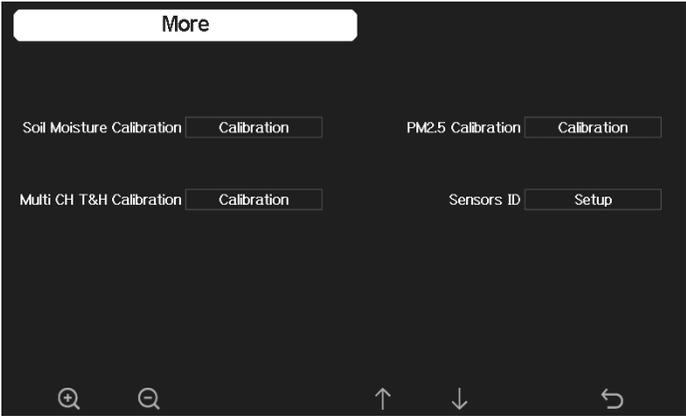
**Note:** The purpose of calibration is to fine tune or correct for any sensor error associated with the devices margin of error. Errors can occur due to electronic variation (example, the temperature sensor is a resistive thermal device or RTD, the humidity sensor is a capacitance device), mechanical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

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

**Note:** UV Calibration MUST be performed every 2 to 3 months to improve results. Over time, UV Index may alter results based on bright and strong sunlight conditions. This is why diligent UV Calibration is recommended.

#### **4.9.20 More**

On the More page, you can set the Calibration for the optional multi-channel soil moisture/PM2.5/temp and humidity sensor. You can also view or manage all the sensors ID on the Sensors ID Setup page.



**Calibration**

Channel	Soil Moisture	Now AD	0%AD	100%AD	Customize	Reset
1	3%	83	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
2	62%	320	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
3	0%	26	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
4	51%	268	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
5	29%	188	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
6	0%	26	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
7	66%	335	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>
8	63%	323	<input type="text" value="70"/>	<input type="text" value="500"/>	<input type="button" value="OFF"/>	<input type="button" value="Reset"/>

**Calibration**

Channel	PM2.5	PM2.5 Offset	Reset
1	2ug/m <sup>3</sup>	<input type="text" value="0"/>	<input type="button" value="Reset"/>
2	1ug/m <sup>3</sup>	<input type="text" value="0"/>	<input type="button" value="Reset"/>
3	3ug/m <sup>3</sup>	<input type="text" value="0"/>	<input type="button" value="Reset"/>
4	2ug/m <sup>3</sup>	<input type="text" value="0"/>	<input type="button" value="Reset"/>

Calibration					
Channel	Temperature	Humidity	Temp. Offset	Humi. Offset	Reset
1	--	--	0.0	0	Reset
2	82.2°F	45%	0.0	0	Reset
3	80.8°F	46%	0.0	0	Reset
4	81.0°F	47%	0.0	0	Reset
5	81.0°F	46%	0.0	0	Reset
6	81.3°F	47%	0.0	0	Reset
7	14.7°F	49%	0.0	0	Reset
8	81.3°F	45%	0.0	0	Reset

Note:

To calibrate the optional soil moisture sensor, please refer to the manual of the DP100 soil moisture sensor.

To calibrate the PM2.5 sensor, you'll need to find a reliable source, such as professional devices from your local air quality service.

To calibrate the temp and humidity sensor, please refer to section 4.9.19.

## Sensor ID Setup

On this page you can set the following:

- View sensor ID, signal strength and battery power condition. 1-4 bars means 1-4 successful successive signal receptions without missed ones.
- Register the sensor when offline.
- Enable or disable the sensor.
- Input the Sensor ID when offline.

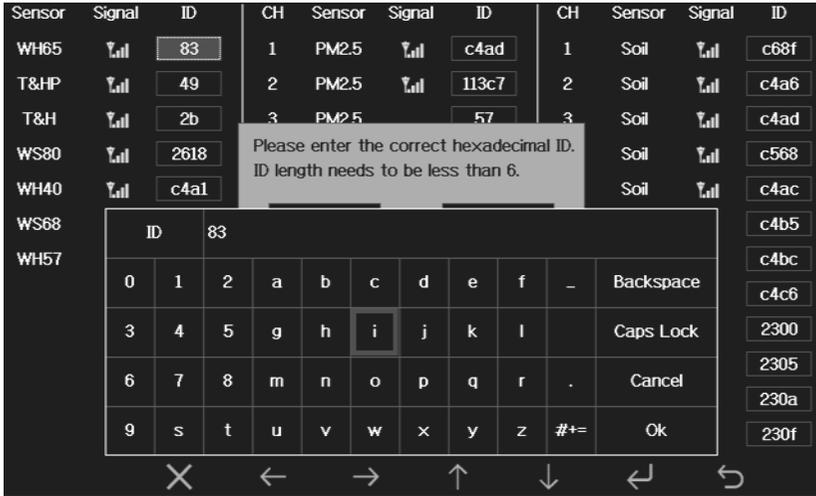
Sensor	Signal	ID	CH	Sensor	Signal	ID	CH	Sensor	Signal	ID
WH65	📶	83	1	PM2.5	📶	c4ad	1	Soil	📶	c68f
T&HP	📶	49	2	PM2.5	📶	113c7	2	Soil	📶	c4a6
T&H	📶	2b	3	PM2.5	📶	57	3	Soil	📶	c4ad
WS80	📶	2618	4	PM2.5	📶	e	4	Soil	📶	c568
WH40	📶	c4a1	1	T&H	📶	18	5	Soil	📶	c4ac
WS68	📶	334	2	T&H	📶	8a	6	Soil	📶	c4b5
WH57	📶	d4db	3	T&H	📶	11	7	Soil	📶	c4bc
			4	T&H	📶	bc	8	Soil	📶	c4c6
			5	T&H	📶	66	1	WH55	📶	2300
			6	T&H	📶	8e	2	WH55	📶	2305
			7	T&H	📶	19	3	WH55	📶	230a
			8	T&H	📶	17	4	WH55	📶	230f

Sensor	Signal	ID	CH	Sensor	Signal	ID	CH	Sensor	Signal	ID
WH65	📶	83	1	PM2.5	📶	c4ad	1	Soil	📶	c68f
T&HP	📶	49	2	PM2.5	📶	113c7	2	Soil	📶	c4a6
T&H	📶	2b	3	PM2.5	📶	57	3	Soil	📶	c4ad
WS80	📶	2618						Soil	📶	c568
WH40	📶	c4a1						Soil	📶	c4ac
WS68	📶	334						Soil	📶	c4b5
WH57	📶	d4db						Soil	📶	c4bc
								Soil	📶	c4c6
			6	T&H	📶	8e	2	WH55	📶	2305
			7	T&H	📶	19	3	WH55	📶	230a
			8	T&H	📶	17	4	WH55	📶	230f

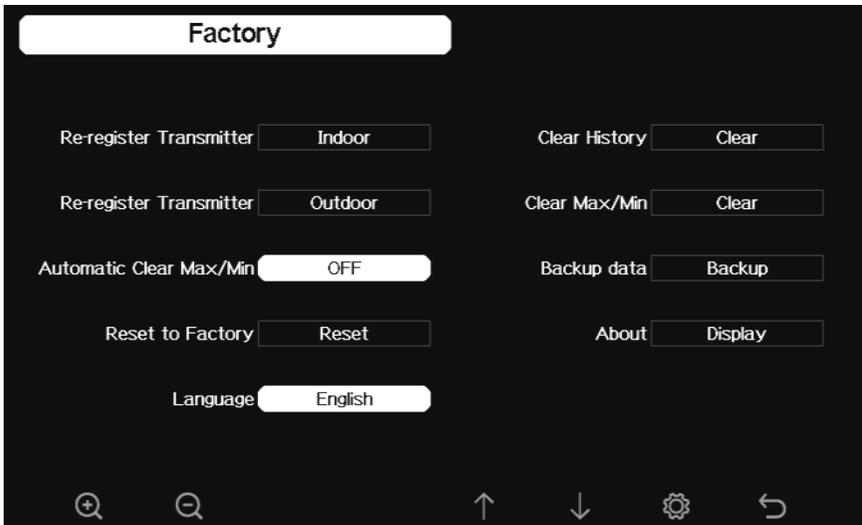
Please enter the correct hexadecimal ID.  
ID length needs to be less than 6.

Register      Disable

Save      Cancel



## 4.9.21 Factory reset



### 4.9.21.1 Re-register indoor transmitter

Press  or  key to select re-register indoor transmitter. Press  or  key to popup the Message Box "Register a new indoor

transmitter?" Press  or  to select Yes or No. Press the  or  key to confirm the selection.

#### 4.9.21.2 Re-register outdoor transmitter

Please reference section 5.13.1. Procedures and settings are similar to re-register indoor transmitter.

#### 4.9.21.3 Automatic Clear Max/Min

To turn on/off automatically clear Max/Min record at 0:00hr every day.

Press  or  key to select Automatic clear Max/Min. Press  or  key to switch on/off.

When it is selected with ON option, min/max will be presented as daily min/max, and with OFF option selected, it is for history min/max record.

#### 4.9.21.4 Reset to Factory

Press  or  key to select Reset to Factory. Press  or  key to popup the Message Box "Reset to factory default?" Press  or  to select Yes or No. Press the  or  key to confirm the selection.

#### 4.9.21.5 Clear History

Press  or  key to select Clear History. Press  or  key to popup the Message Box "Clear the history record?" Press  or  to

select Yes or No. Press the  or  key to confirm the selection.

#### 4.9.21.6 Clear Max/Min

Press  or  key to select Clear Max/Min. Press  or  key to popup the Message Box "Clear the max/min record?" Press  or  to select Yes or No. Press the  or  key to confirm the selection.

#### 4.9.21.7 Backup data

Press  or  key to select Backup data. Press  or  key to popup the Message Box "Copy history data to SD card?" Press  or  to select OK or Cancel. Press the  or  key to confirm the selection.

Note: You need to insert a SD card(not included) into the console before using this function.

#### 4.9.21.8 About information



Note: This figure is just for reference(model and frequency will change according to different market). The actual display console may be with higher firmware version than this manual described because we will update the firmware occasionally.

#### 4.9.21.9 Language

Press  or  key to select Language. Press  or  key to switch different language display.

## 5 Other Console Functions

### 5.1 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 - 19.3 km/h	3	Gentle 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 3: Beaufort wind force scale**

## 5.2 Weather Forecasting

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

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

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

## 5.3 Lightning Alert

The lightning icon  will appear if the Dew Point exceeds 70 F. This means there is a chance of lightning storms forming.

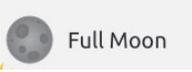
## 5.4 Weather Forecasting Description and Limitations

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

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

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

## 5.5 Moon Phase

In the event the moon phase is 100%, the icon  will appear in its place. In the event of 0%, the word “New Moon” will appear in its place.

Moon Phase	Image	Moon Phase	Image
Day 1		Day 14	
Day 2		Day 15	

Day 3		Day 16	
Day 4		Day 17	
Day 5		Day 18	
Day 6		Day 19	
Day 7		Day 20	
Day 8		Day 21	
Day 9		Day 22	
Day 10		Day 23	
Day 11		Day 24	
Day 12		Day 25	
Day 13 Full Moon		Day 26 New Moon	

## 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 counterclockwise 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.

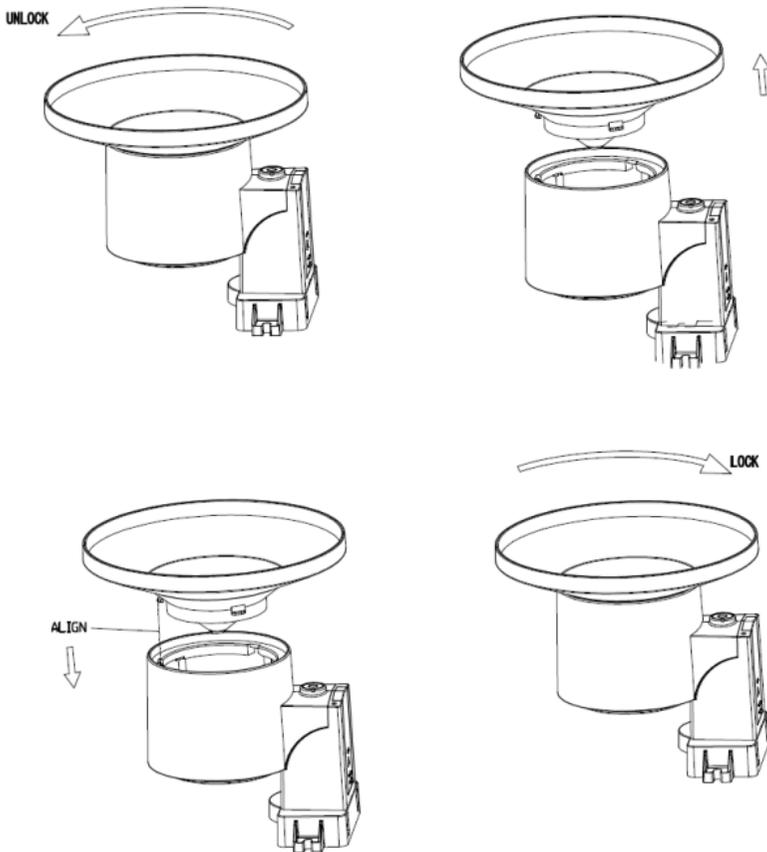


Figure 5: Rain gauge maintenance

## **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 should be replaced every 1-2 years. In applications where data dropouts cannot be tolerated, check the batteries every 3 months and apply a corrosion preventing compound (not included) on the battery terminals for protection.

## **Prevent snow build up**

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

## **Rain Gauge Accuracy Cross Check**

To tell if the rain gauge is accurate or not, it is not correct to compare to a rain meter nearby around. Because it is not necessary having a same rain intensity, even if they are not far from each other. To judge if your rain meter is correct or not, you may do the following:

1. Use a narrowed neck bottle that can sit under the rain gauge water outlet holes. Collect the water during a rain event and measure its weight. E.g. 353 g.
2. 353 g equals 353 ml, divided by rain collector size of 250 cm<sup>2</sup>, you get  $353/250 = 1.412 \text{ cm} = 14.1 \text{ mm}$ .
3. Compare the rain readings from your gateway to your local rain event reading, or a reading from a calibrated manual gauge, to see if they are matching or not.
4. Since there may be some water left in the tip bucket, and also some on the rain collector itself, the observed rain is normally slightly less than the actual rainfall, but this is normally within 5%. If the deviation is larger than this, then you can change rain calibration settings accordingly, or contact the customer service for replacement.

## 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>Wireless remote (thermo-hygrometer) not reporting in to console.</p> <p>There are dashes on the display console.</p>	<p>The maximum line of sight communication range is about 600'. Move the sensor assembly closer to the display console.</p> <p>Resynchronize the remote sensor(s). Install a fresh set of batteries in the remote sensor(s).</p> <p>Make sure the remote sensors are not transmitting through solid metal (acts as an RF shield), or earth barrier (down a hill).</p> <p>Radio Frequency (RF) Sensors cannot transmit through metal barriers (example, aluminum siding) or multiple, thick walls.</p> <p>Move the display console around electrical noise generating devices, such as computers, TVs and other wireless transmitters or receivers.</p>
<p>Outdoor sensor does not communicate to the display console.</p>	<p>The sensor may have initiated properly and the data is registered by the console as invalid, and the console must be reset. Press the reset button as described in Section Installation.</p> <p>With an open ended paperclip, press the reset button for 3 seconds to completely discharge the voltage.</p> <p>Take out the batteries and wait one minute, while covering the solar panel to drain the voltage.</p> <p>Put batteries back in and resync with console by powering down and up the console with the sensor array about 10 feet away.</p>

Problem	Solution
	<p>Bring the sensor array inside the house (you can disconnect it from the rest of the sensors). The LED next to the battery compartment will flash according to the reporting time on the specifications. If the LED is not flashing as that...</p> <p>Replace the batteries in the sensor. If the batteries were recently replaced, check the polarity. If the sensor is flashing normally, proceed to the next step.</p> <p>There may be a temporary loss of communication due to reception loss related to interference or other location factors,</p> <p>or the batteries may have been changed in the sensor and the console has not been reset. The solution may be as simple as <b>powering down and up the console</b>.</p> <p>Replace the batteries in the sensor.</p> <p>With the sensor and console 10 feet away from each other, remove AC power from the display console and wait 10 seconds. Re-connect power.</p>
Temperature sensor reads too high in the day time.	<p>Make certain that the sensor is not too close to heat generating sources or structures, such as buildings, pavement, walls or air conditioning units.</p> <p>Use the calibration feature to offset installation issues related to radiant heat sources.</p>
Absolute pressure does not agree with official reporting station	<p>You may be viewing the relative pressure, not the absolute pressure.</p> <p>Select the absolute pressure. Make sure you properly calibrate the sensor to an official local weather station. Reference Section 4.9.19 for details.</p>
Rain gauge reports rain when it is not raining	<p>An unstable mounting solution (sway in the mounting pole) may result in the tipping bucket incorrectly incrementing rainfall. Make sure you</p>

Problem	Solution
Data not reporting to Wunderground.com	<p data-bbox="434 146 868 172">have a stable, level mounting solution.</p> <ol data-bbox="483 193 1013 1023" style="list-style-type: none"> <li data-bbox="483 193 1013 443">1. Confirm your password is correct. It is the password you registered on Wunderground.com. Your Wunderground.com password cannot begin with a non-alphanumeric character (a limitation of Wundeground.com, not the station). Example, \$oewkrf is not a valid password, but oewkrf\$ is valid.</li> <li data-bbox="483 464 1013 619">2. Confirm your station ID is correct. The station ID is all caps, and the most common issue is substituting an O for a 0 (or visa versa). Example, KAZPHOEN11, not KAZPH0EN11</li> <li data-bbox="483 639 1013 730">3. If there's a number "1" on the station key ,try to input the lower case of letter “L” to replace it.</li> <li data-bbox="483 751 1013 842">4. Make sure the date and time is correct on the console. If incorrect, you may be reporting old data, not real time data.</li> <li data-bbox="483 863 1013 954">5. Make sure your time zone is set properly. If incorrect, you may be reporting old data, not real time data.</li> <li data-bbox="483 975 1013 1023">6. Check your router firewall settings. The console sends data via Port 80.</li> </ol>
No WiFi connection	<ol data-bbox="483 1066 1013 1453" style="list-style-type: none"> <li data-bbox="483 1066 1013 1342">1. Check for WiFi signal strength symbol on the display . If wireless connectivity is successful and reporting to Wunderground.com, the WiFi icon  will be displayed the home page.</li> <li data-bbox="483 1362 1013 1453">2. Make sure your modem WiFi settings are correct (network name, password and security settings).</li> </ol>

## 8 Specifications

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

Outdoor sensor	Specification
Transmission distance in open field	100m
RF Frequency	868 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	±4%
Humidity resolution	1%
Rain volume display range	0 – 6000 mm
Rain volume accuracy	± 5%
Rain volume resolution	0.1mm/0.01inch
Wind speed range	0 – 40 m/s (0 ~ 89mph)
Wind speed accuracy	<10m/s, +/-0.5m/s ≥10m/s, +/-5%
Wind direction accuracy	<10m/s, +-10° ≥10m/s, ±15°
UV-Index range	0 - 15
Light range	0 – 300 kLux
Light accuracy	± 15%
Sensor reporting interval	Anemometer sensor : 4.8s (wind speed sampling: 4s when less than 3m/s; 2s when wind speed > 3m/s but < 5m/s 1s when wind speed > 5m/s ) rain gauge sensor: 49s

**Table 7: Outdoor sensor specification**

**Note:**

- When the maximum wind speed of the last 4s is  $\geq 5\text{m/s}$ , the wind speed is detected by 1s; when the maximum wind speed of the last 4s is  $\geq 3\text{m/s}$  and less than  $5\text{m/s}$ , the wind speed is detected by 2s; when the maximum wind speed of the last 4s is  $< 3\text{m/s}$ , the wind speed is detected by 4s.
- The wind speed reading will be a real-time value (The latest sampling data will be reporting to the receiver).
- The wind gust reading will be the max wind speed in the past 28s.
- When the wind speed is lower than  $5\text{m/s}$ , the dispersion of wind direction will increase.

Indoor sensor	Specification
Temperature range	$-40^{\circ}\text{C} - 60^{\circ}\text{C}$ ( $-40^{\circ}\text{F} - 140^{\circ}\text{F}$ )
Temperature resolution	$0.1^{\circ}\text{C}$ , or $0.1^{\circ}\text{F}$
Humidity range	$10\% \sim 99\%$
Humidity resolution	$1\%$
Barometric pressure range	$300 - 1,100\text{ hPa}$ ( $8.85 - 32.5\text{ inHg}$ )
Barometric pressure accuracy	$\pm 3\text{ hPa}$ in $700 - 1,100\text{ hPa}$ range
Barometric pressure resolution	$0.1\text{ hPa}$ ( $0.01\text{ inHg}$ )
Sensor reporting interval	48 seconds
Alarm Duration	120 seconds

**Table 8: Indoor sensor specification**

Power	Specification
Base station/console	5V DC Adapter (included)
Indoor sensor	2 x AA 1.5 Alkaline batteries (not included)
Rain gauge sensor	1 x AA 1.5V LR6 Alkaline (not included), or 1 x AA 1.5V Lithium battery (not included)
Anemometer sensor	Solar panel (built-in): $6.5\text{V}/4\text{mA}$
Anemometer sensor (backup)	2 x AA 1.5V Lithium battery (not included)

**Table 9: Power specification**

Note: 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.

**Caution !**

This booklet may contain errors or misprints. The information is contains is regularly checked and correction are included in subsequence editions. We disclaim any responsibility for any printing error, or their consequences. The specification of this product may change without prior notice.

## **General safety instructions**

### **Danger of asphyxiation:**

Keep all packaging materials (plastic bags, rubber bands, etc.) away from children. There is a danger of suffocation!

### **Danger of burns:**

Caution! Leaking / leaking battery acid can lead to burns! Avoid contact of battery acid with eyes, mucous membranes and skin. In case of contact, rinse the affected areas immediately with clear water and consult a doctor.

### **Risk of electric shock:**

Children must not be unattended with the device, because the device contains electronic parts which are operated by means of a power source. The device may only be used as described in the instructions. If not, there is a risk of electric shock.

### **Danger of fire & explosion:**

Use only recommended batteries. Never short-circuit the unit or batteries. Never throw the device or batteries into a fire! Overheating and improper handling may result in short circuits which can cause fires and explosions.

### **Important:**

If there is a defect, contact your dealer immediately. Never disassemble the device! The dealer will contact the service department. Never expose the device to water! Protect the device from vibrations. Only use recommended batteries. Never mix batteries - Always replace empty batteries with a complete set of full power batteries. If the unit is not powered for a longer period of time or is not in use, remove the batteries from the unit. The manufacturer accepts no liability for incorrectly inserted batteries!



Notes on the return of batteries according to §12 BatterieVO: Batteries do not belong in the household waste. Please dispose of all batteries as required by law, disposal in domestic waste is expressly prohibited. Batteries and rechargeable batteries can be dispensed free of charge at municipal collection points or in the shops on the spot.

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declaration of conformity

Hereby we declare, HS-Group GmbH & Co.KG, Escherstr. 31, 50733 D-Cologne, that this product is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

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