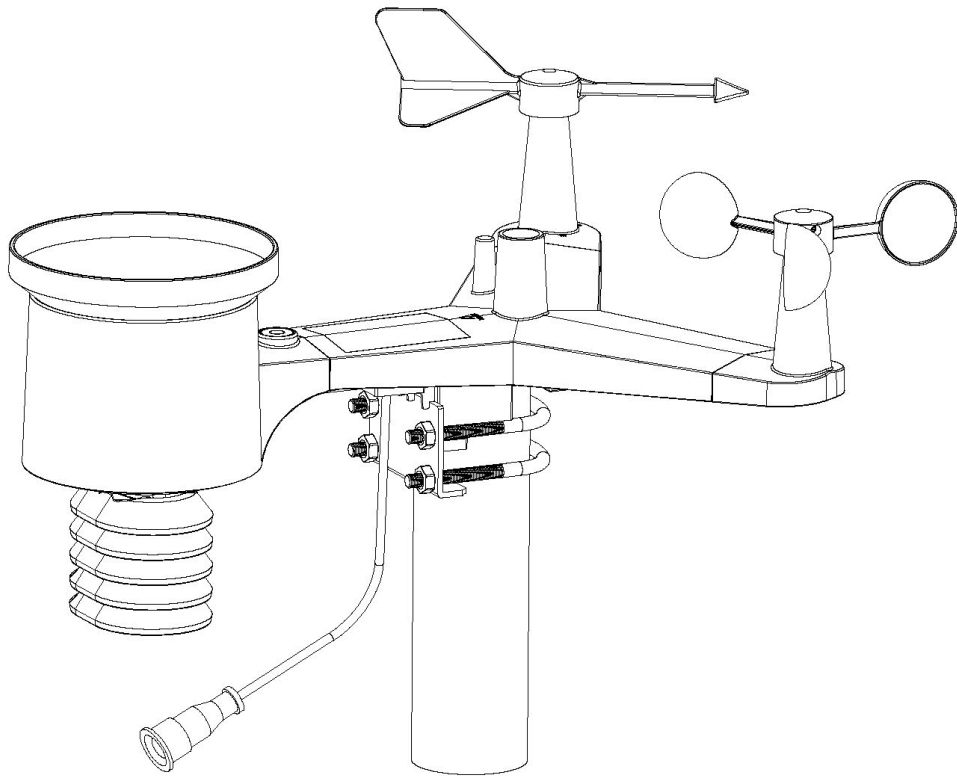


PROFESSIONAL WEATHER STATION

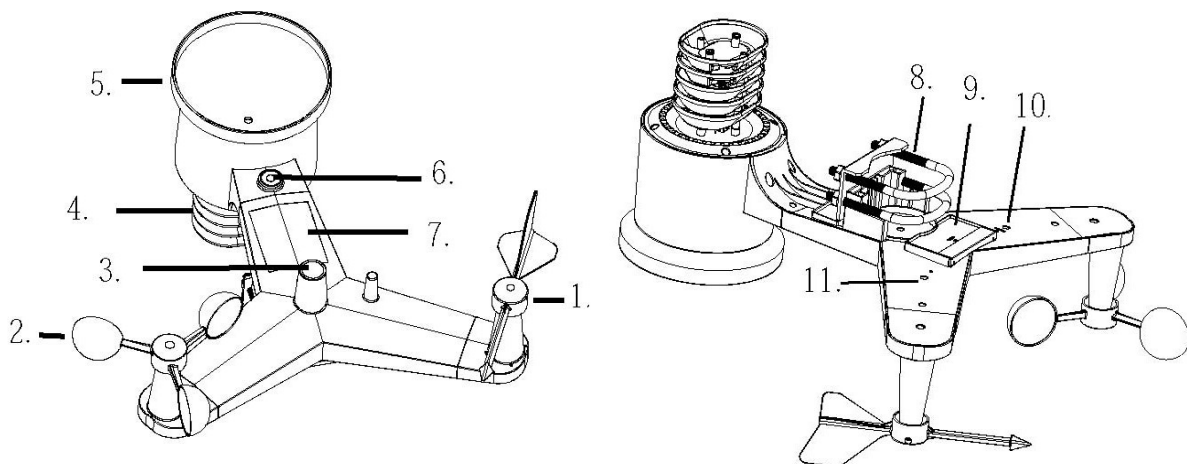
Operation Manual



1 Contents

QTY	Item
1	Y shape outdoor sensor(Thermo-hygrometer / Rain Gauge / Wind Speed Sensor /Transmitter), a 0.5m wire with female connector coming out of the bottom sending data from sensors using UART communication protocol
1	Wind Vane
1	U-bolt with mounting clamps
1	2m cable with male connector, another side crimp with RJ11 connector
1	Zip bag for 1pc 10mm single-head wrench

2. Overview



1. Wind Vane
2. Wind Speed Sensor
3. UV sensor/ Light sensor
4. Thermo-hygro sensor
5. Rain collector
6. Bubble level
7. Solar panel
8. U-Bolt
9. Battery compartment
10. Reset button
11. LED Indicator: light on for 4s if the unit power up. Then the LED will flash once every 16 seconds (the sensor transmission update period).

3. Setting Started

3.1. Install U-bolts and mounting pole

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 1, 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 8.

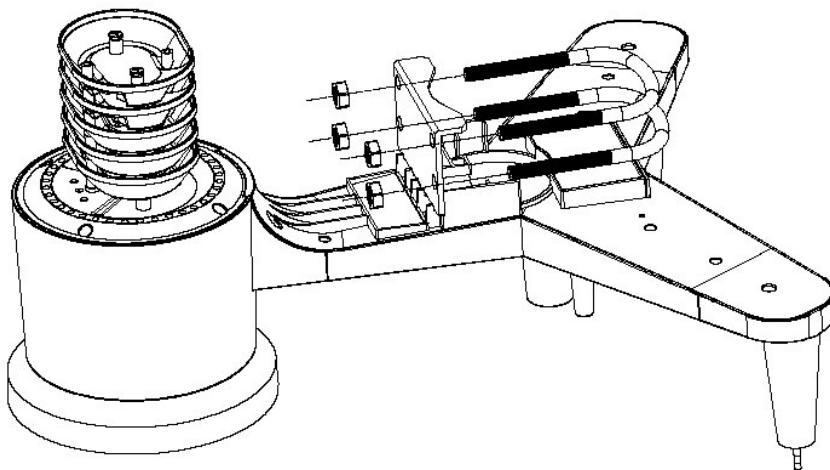


Figure 1

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 9.

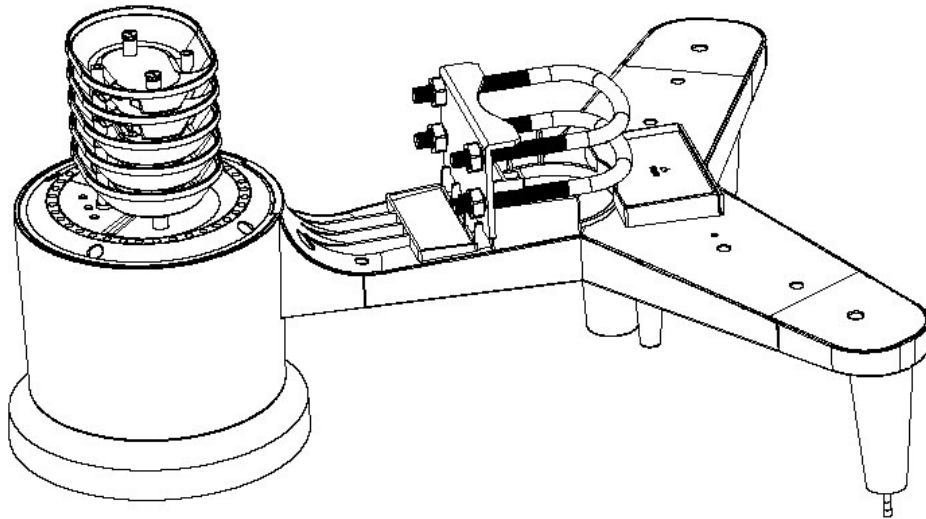


Figure 2

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.

3.2. Install wind vane

Push the wind vane onto the shaft on the top of the sensor, until it goes further, as shown in figure 3.

Tighten the set screw, with a Philips screwdriver(size PH0), until the wind vane cannot be removed from the axle, as shown in figure 4. Make sure the wind vane spin freely. The wind vane's movement has a small amount of friction, which is helpful in providing steady wind direction measurements.

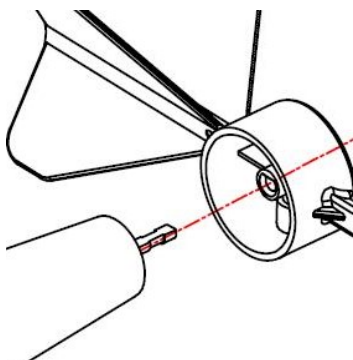


Figure 3

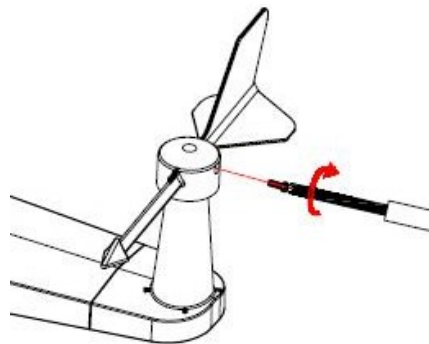


Figure 4

There are four alphabet letter of “N”, “E”, “S” and “W” around the wind direction, representing for the direction of North, East, South and West. Wind direction sensor has to be adjusted so that the directions on the sensor are matching with your real

location. Permanent wind direction error will be introduced when the wind direction sensor is not positioned correctly during installation.

3.3. Install wind speed

Push the wind speed into the shaft. as shown in figure 5. Tighten the set screw with as shown in figure 5. Make sure the wind speed spin freely.

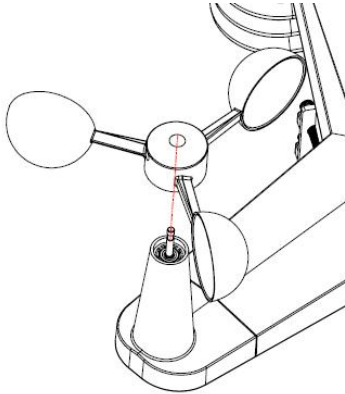


Figure 5

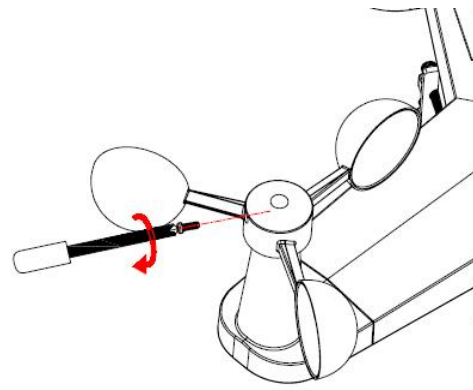


Figure 6

3.4. Install Batteries

Insert 2XAA batteries in the battery compartment. The LED indicator on the back of the transmitter will turn on for four seconds and normally flash once every 16 seconds (the sensor transmission update period).

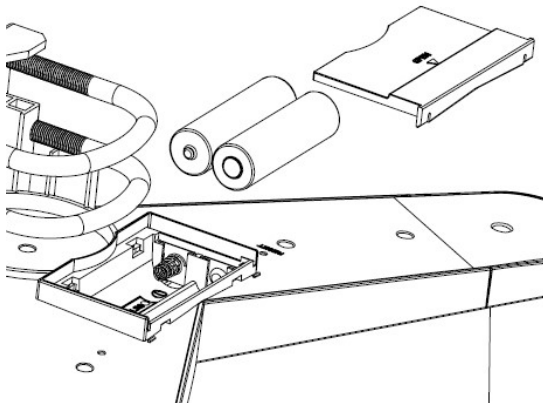


Figure 7

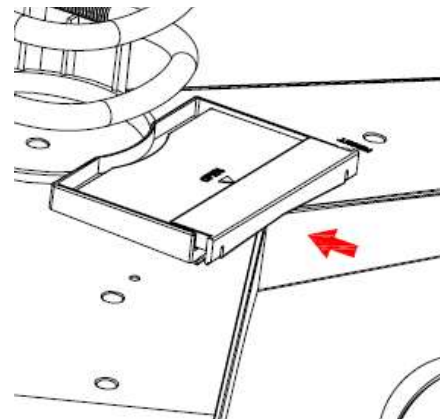


Figure 8

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 batteries backwards.

You can permanently damage the outdoor sensor

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

3.5 Pre-Installation Checkout and Site Survey

3.5.1 Pre Installation Checkout

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

3.5.2 Site Survey

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

1. You must clean the rain gauge every few months and change the rechargeable batteries every 2-3 years. Provide easy access to the weather station.
2. Avoid radiant heat transfer from buildings and structures. In general, install the sensor array at least 5' from any building, structure, ground, or roof top.
3. Avoid wind and rain obstructions. The rule of thumb is to install the sensor array at least four times the distance of the height of the tallest obstruction. For example, if the building is 20' tall, and the mounting pole is 6' tall, install $4 \times (20 - 6) = 56'$ away.
4. Wireless Range. The radio communication between receiver and transmitter in an open field can reach a distance of up to 100meter, providing there are no interfering obstacles such as buildings, trees, vehicles, high voltage lines. Wireless signals will not penetrate metal buildings. Under most conditions, the maximum wireless range is 100'.
5. Radio interference such as PCs, radios or TV sets can, in the worst case, entirely cut off radio communication. Please take this into consideration when choosing console or mounting locations. Make sure your display console is at least five feet away from any electronic device to avoid interference.

3.6. Mount assembled outdoor sensor package

You can attach a pipe to a permanent structure and then attach the sensor package to it (see Figure 9). The U-Bolts will accommodate a pipe diameter of 1-2 inches (pipe not included).

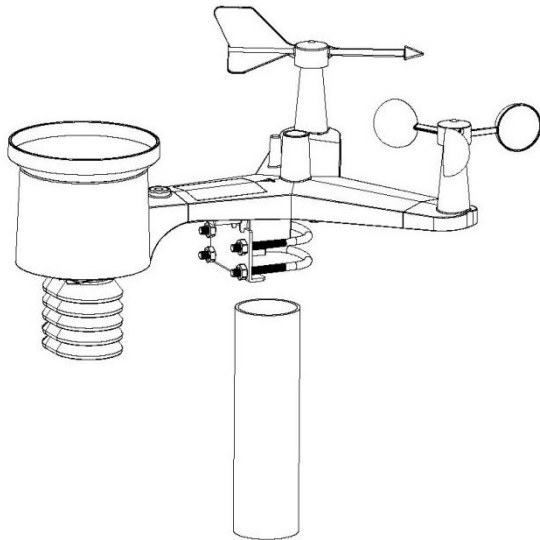


Figure 9

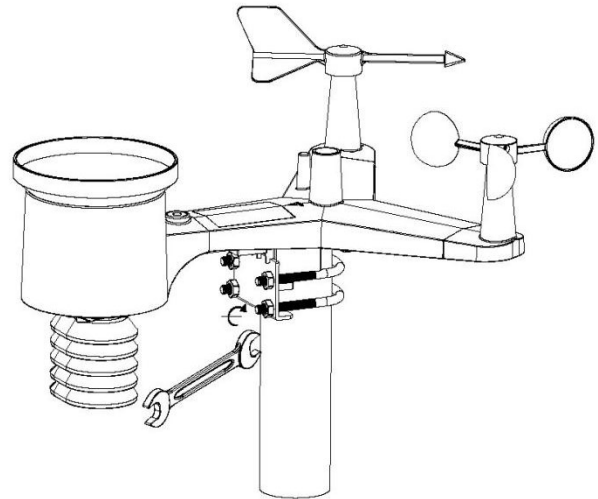


Figure 10

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.

Now you will need to align the whole package in the proper direction by rotating it on top of the mounting pipe as needed. There are four alphabet letter of “N”, “E”, “S” and “W” around the wind direction, representing for the direction of North, East, South and 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 included) to prevent further rotation.

Note: This orientation is correct for installations in the northern hemisphere. If you are installing in the southern hemisphere, the correct orientation to achieve the same optimal positioning is to have the “WEST” arrow actually point due EAST! This has the side effect, however, of lining up the 0 reading of the wind direction with SOUTH. This needs to be corrected using a 180-degree offset in the calibration settings (see section 6.7 Calibration Mode).

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

3.7 Reset Button and Transmitter LED

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

With an open ended paperclip, press and hold the **RESET BUTTON** for three seconds to completely discharge the voltage.

Take out the batteries and wait one minute, while covering the solar panel to drain the voltage.

Put batteries back in and resynchronize with console by powering down and up the console with the sensor array about 3 meter away.

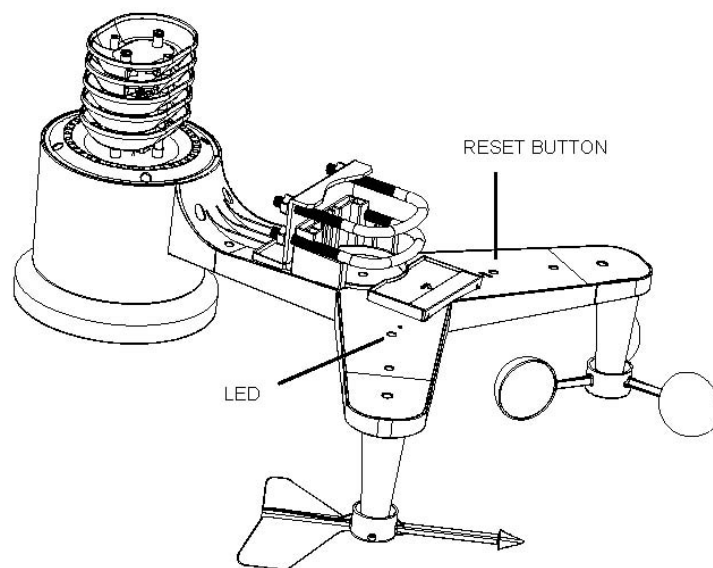
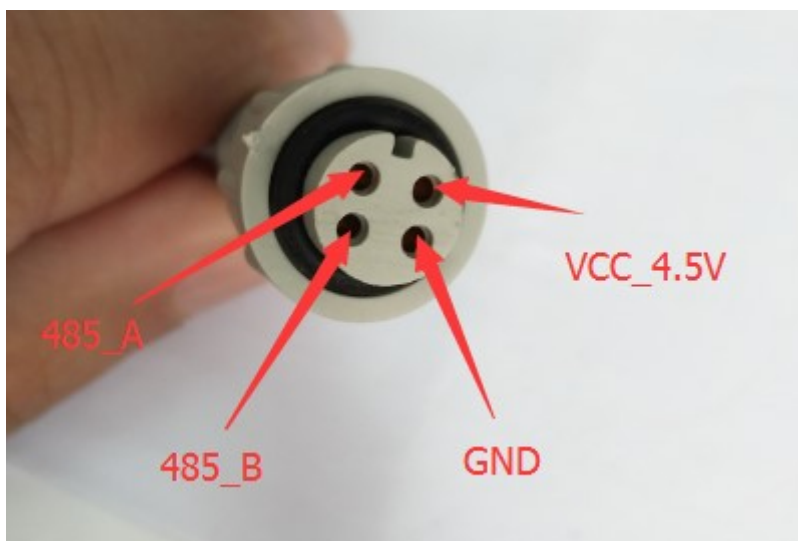



Figure 11

3.8 Cable pin definition



Wiring Color	Description	Remark
Black	GND	GND
Green	VDD	4.5~12V DC
Red	3483_A	3483_A
Yellow	3483_B	3483_B

3.9 Best Practices for Wireless Communication

 **Note:** To insure proper communication, mount the remote sensor(s) upright on a vertical surface, such as a wall. **Do not lay the sensor flat.**

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

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

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

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

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

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

4. Specification:

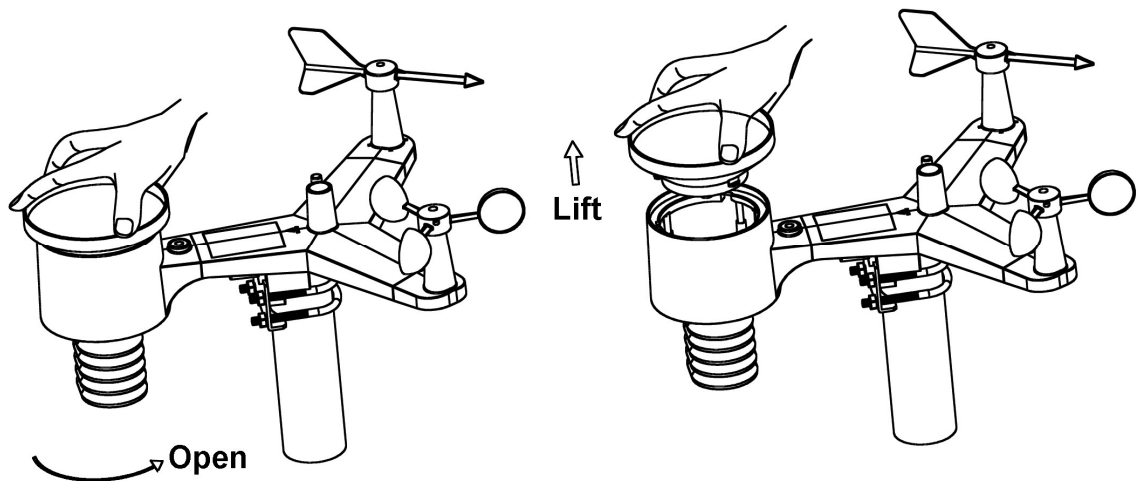
Temperature range	:	-40°C--60°C
Accuracy	:	+ / - 1°C
Resolution	:	0.1°C
Measuring range rel. humidity	:	10% ~ 99%
Accuracy	:	+/- 5%
Rain volume display	:	0 – 6000mm (show --- if outside range)
Accuracy	:	+ / - 10%
Resolution	:	0.1mm (if rain volume < 1000mm) 1mm (if rain volume > 1000mm)
Wind speed (range)	:	0-50m/s (0~100mph) (show --- if outside range)
Accuracy:		+/- 1m/s (wind speed < 5m/s) +/-10% (wind speed > 5m/s)
Light	:	0-200k Lux
Accuracy	:	+/-15%
UVI Range	:	0-15
Accuracy	:	+/-2
Measuring interval outdoor sensor:		16 s

Power consumption

- Remote sensor : 2x AA batteries (not included), The primary power source is the solar panel. The batteries provide backup power when there is limited solar energy

5. Maintenance

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



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

6. Attachement

Attachement1: WH24/WH65 UART Display PC software:

WH24 and WH65 all in one outdoor sensor share the same PC software to reading the data. WH65L select the wind gain 0.51

WH24 / WH65 UART Display

COM	COM1	Buffer: Clean
Baud	9600	
Parity	NONE	
Bits	8	
Stop	1	

Open

ID:

Type	WH24 wind gain: 1.12
Wind d	WH24 wind gain: 1.12
	WH65 wind gain: 0.51

Temperature:
Humidity:
Wind Speed:
Gust Speed: