PROFESSIONAL WEATHER STATION

Operation Manual

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1. Introduction

Thank you for your purchase of the Solar Powered Wireless WiFi Weather Station. The following user guide provides step by step instructions for installation, operation and troubleshooting.

2. Warnings and Cautions

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

⚠ **Warning:** Installing your weather station in a high location may result in injury or death. Perform as much of the initial check out and operation on the ground and inside a building or home. Only install the weather station on a clear, dry day.

3. Quick Start Guide

Although the manual is comprehensive, much of the information contained may be intuitive. In addition, the manual does not flow properly because the sections are organized by components.

The following Quick Start Guide provides only the necessary steps to install, operate the weather station, and upload to the internet, along with references to the pertinent sections.

Required		
Step	**Description**	**Section**
1	Assemble and power up the outdoor sensor	5.2.1 – 5.2.3
2	Power up the display console and synchronize with the outdoor sensor	5.3
5	Mount the sensor array	5.2.5
3	Set date and time on console	6.3.1
4	Calibrate the relative pressure to sea-level conditions (local airport) on console	6.7
6	Reset the rain to zero on console	6.4.10
Optional		
7	Configure WiFi	8
8	Register and upload to Weather Server	8

4. Pre-Installation Checkout and Site Survey

4.1 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.

4.2 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 x (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 330 feet, providing there are no interfering obstacles such as buildings, trees, vehicles, high voltage lines. Wireless signals will not penetrate metal buildings. Under most conditions, the maximum wireless range is 100'.
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.

5. Setting Started

5.1 Contents

QTY	Item
1	Display Console
1	All-in-one outdoor sensor(Thermo-hygrometer / Rain Gauge / Wind Speed Sensor /Transmitter)
1	Wind Vane
1	5V DC Adapter
1	Pole
1	U-bolt with mounting clamps
1	User manual
3	AA rechargeable batteries

5.2 Sensor Array Set Up

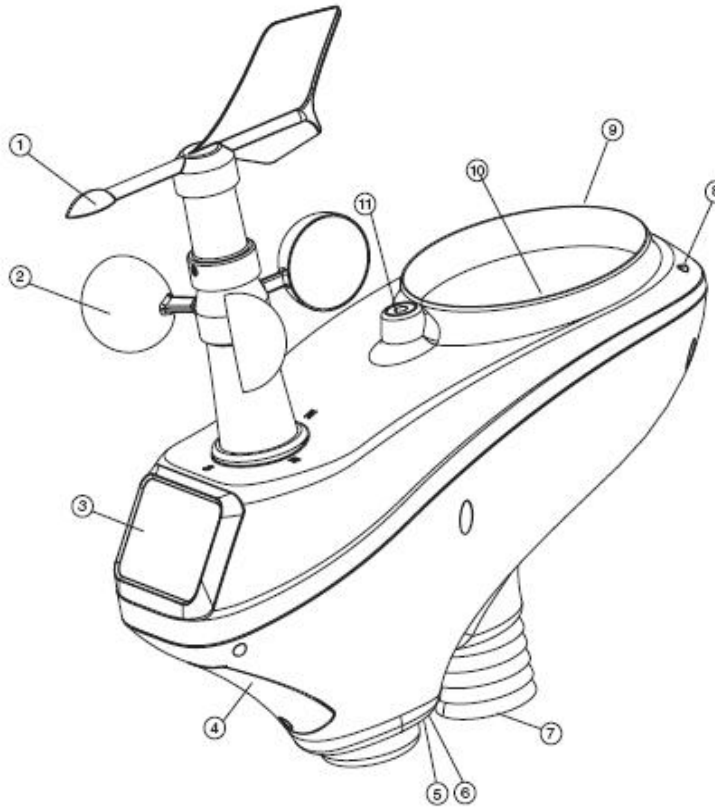
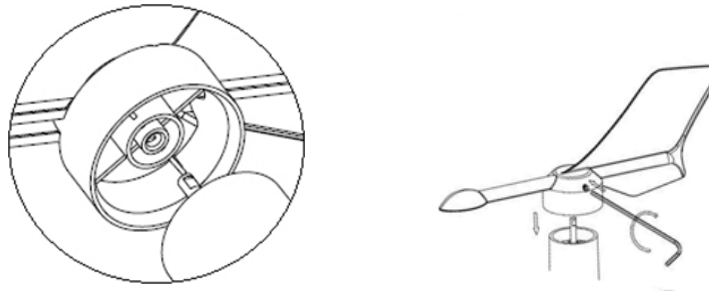


Figure 1

1. Wind Vane
2. Wind Speed Sensor
3. Solar panel
4. Battery compartment
5. 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).
6. Reset button
7. Thermo-hygro sensor
8. UV sensor
9. Light sensor
10. Rain collector
11. Bubble level

5.2.1 Install Wind Vane

Reference Figure 2. (a) Locate and align the flat key on the wind vane shaft to the flat key on the wind vane and push the vane on to the shaft. (b) tighten the set screw with the hex wrench (included).



(a) **(b)**

Figure 2

5.2.2 Install Mounting Pole

Reference Figure 3. Remove the mounting pole collar by rotating counter clockwise.

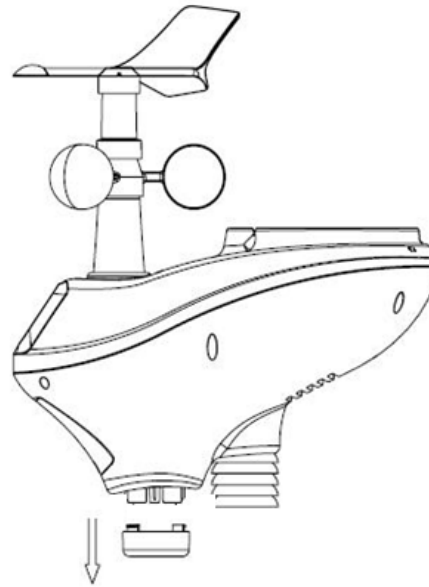


Figure 3

Reference Figure 4. Locate and align the groove on the sensor array and mounting pole.

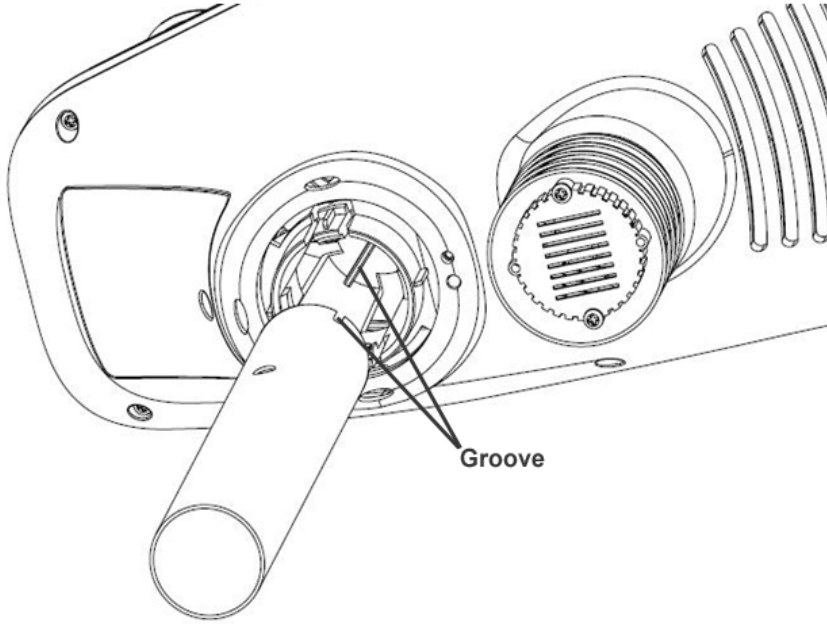


Figure 4

Reference Figure 5. Turn the mounting pole collar to lock the pole into place by rotating clockwise.

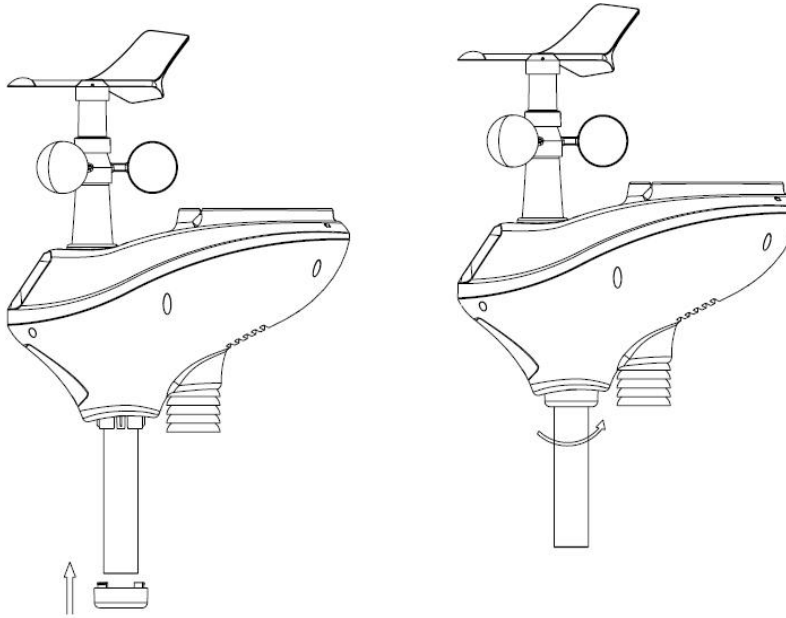


Figure 5

5.2.3 Install Batteries

Reference Figure 6. Locate the battery door on the bottom of the sensor array. Turn the set screw counter clockwise to open the battery compartment. Insert the 3xAA rechargeable batteries (included). The LED indicator on the bottom of the sensor array will turn on for four seconds and normally flash once per 16 seconds (the transmission update period).

Close the battery door and tighten the set screw.

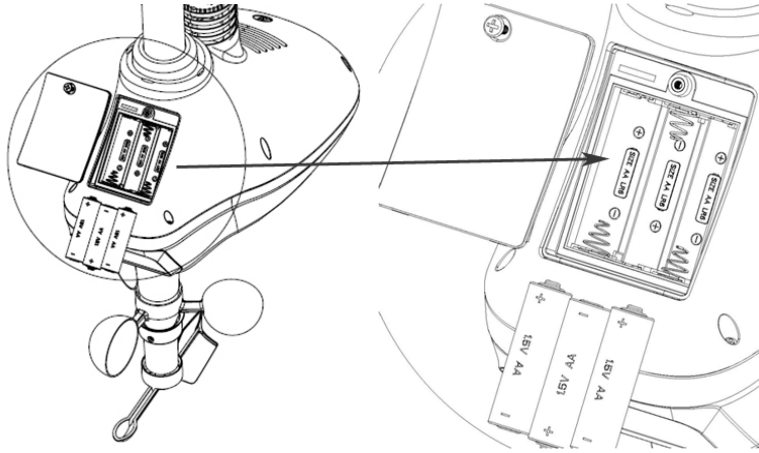


Figure 6

5.2.4 Mount Weather Station

There are two methods for attaching your weather station:

A. Option 1: Mounting Clamps. Fasten the mounting pole to your mounting pole or bracket (purchased separately) with the two U-bolts, mounting pole brackets and nuts, as shown in Figure 7. Tighten the mounting pole to your mounting pole with the U-Bolt assembly. Make sure your mounting pole is as far away from the temperature sensor as possible, as shown in Figure 7.

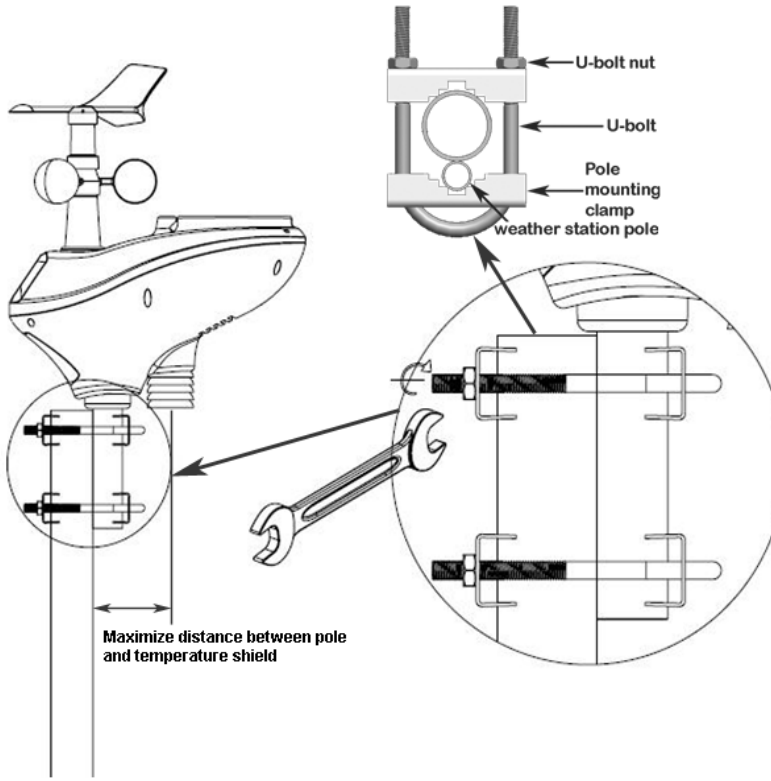


Figure 7

B. Option 2: Swedged Pole Mount. Insert the swedged end of the included mounting pole into the open end of any standard mounting pole solution (1 3/8" diameter) available from Ambient Weather, as shown in Figure 8. For more information on mounting solutions, visit:

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

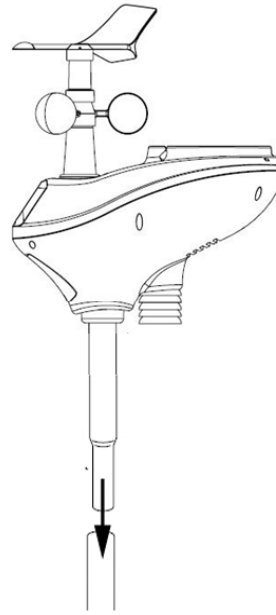


Figure 8

1. Reference Figure 9. Locate the four wind vane compass rose indicators of N, E, S, W (representing North, East, South and West). Align the compass rose direction upon final installation with a compass or GPS.

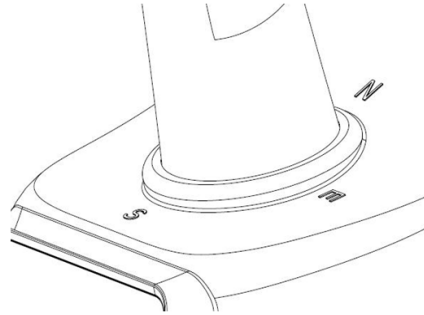


Figure 9

2. Reference Figure 10. Make sure the sensor array is completely level upon final installation. Failure to do so will result in inaccurate rain gauge readings.

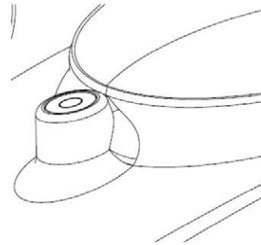


Figure 10

5.2.5 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 the ObserverIP receiver by powering down and up the ObserverIP receiver with the sensor array about 10 feet away.

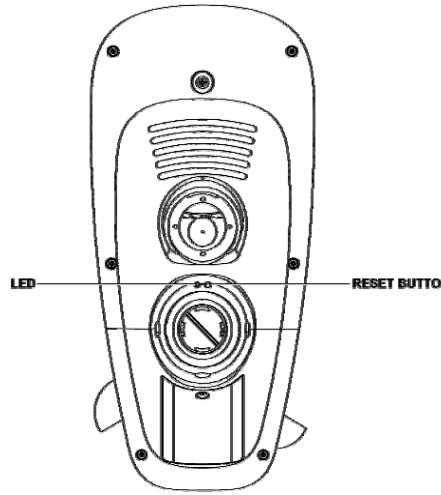


Figure 11

5.3 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.**

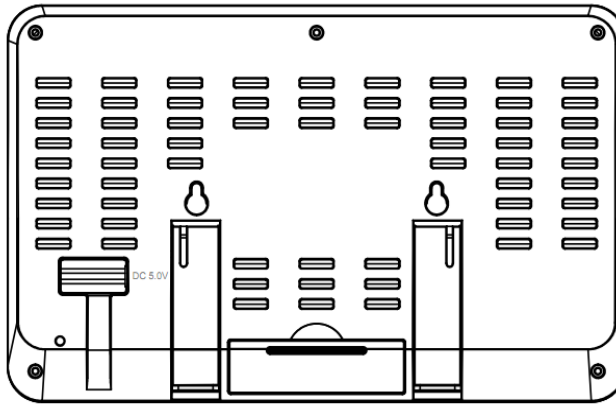
Wireless communication is susceptible to interference, distance, walls and metal barriers. We recommend the following best practices for trouble free wireless communication.

1. **Electro-Magnetic Interference (EMI)**. Keep the console several feet away from computer monitors and TVs.
2. **Radio Frequency Interference (RFI).** If you have other 433 MHz devices and communication is intermittent, try turning off these other devices for troubleshooting purposes. You may need to relocate the transmitters or receivers to avoid intermittent communication.
3. **Line of Sight Rating.** This device is rated at 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.
4. **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%

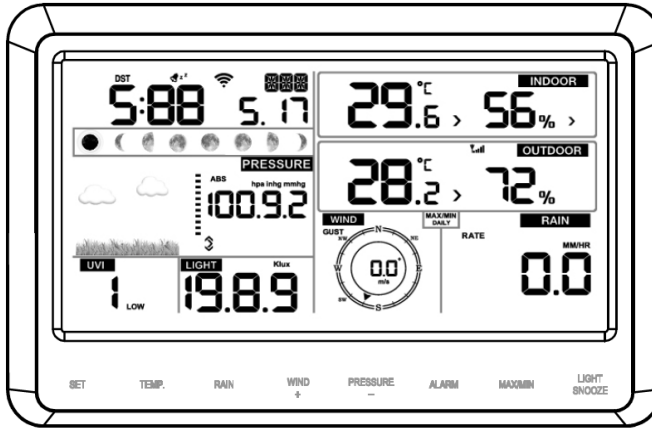
5.4 Display console



1. Insert the 5V AC adaptor into the back of the display console

Note: Place the outdoor sensor array about 5 to 10 feet from the display console and wait several minutes for the remote sensors to synchronize with the display console.

2. Insert 3 AAA batteries into the display console (optional).
3. Keep both sensor and the display console together for 15 minutes to lock in the sensor signals.
4. (Optional)-Spin the wind cups to simulate wind speed. Take the sensor to the sink and slowly drip water into the rain bucket to simulate rain.
5. After 15miuntes, follow the mounting instructions for proper placement of sensors.

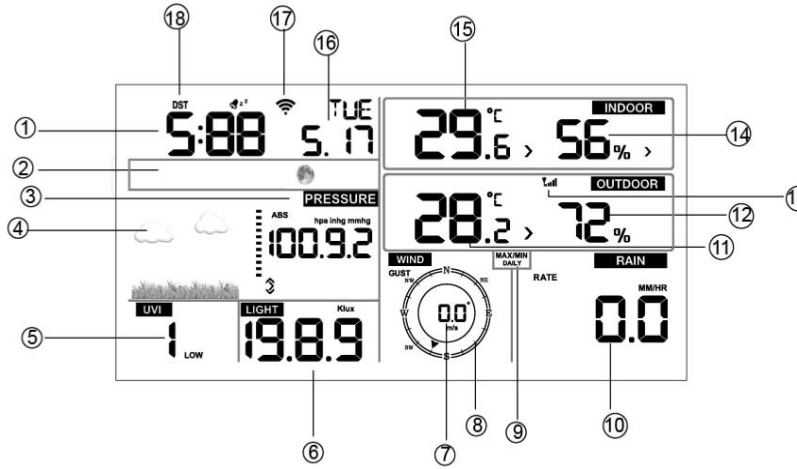


Note: Your display console should have readings in all sections. Wind and Rain will show 0's (connected) until wind or rian occur or are simulated.

Note: If you only use battery to power up display console, you must press LIGHT/SNOOZE key to light up the LCD before press any other key.

6. Display Console Operation

6.1 Screen Display



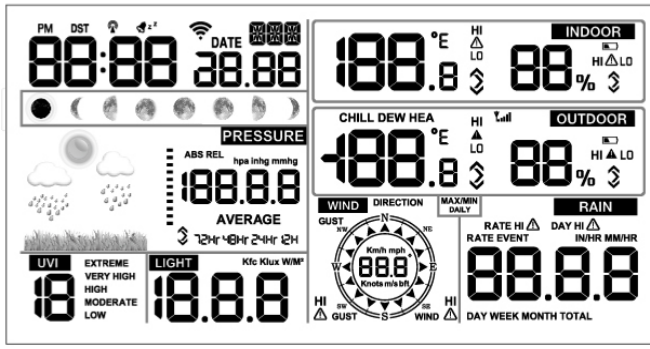
1.Time	10. Rain fall
2. Moon phase	11. Outdoor temperature
3. Barometric Pressure	12. Outdoor humidity
4. Weather forecast	13. RF icon
5. UV index	14. Indoor humidity
6. Light	15. Indoor temperature
7. Wind speed	16. Date
8. Wind direction	17. WIFI icon
9. MAX/MIN Daily	18. DST

6.2 Initial Display Console Set Up

Connect the power adapter to power up the display console.

The unit will show software version number 2 seconds after power reset.

The unit will turn on all segments of the LCD for 3 seconds after power reset, the unit will start to register the outdoor channel for 3 minutes.



6.3 Key function

The console has eight keys for easy operation

Key	Description
SET	Hold this key to enter setting mode
TEMP.	Press this key to view wind Chill, Heat Index, Dew Point Temperature Press the TEMP key 5s, will register new transmitter.
RAIN	Press this key to view Rain Rate, event, Rain Day, Rain Week, Rain Month, and Rain total Press the RAIN key 2s to reset current display rain
WIND +	Press this key to view wind/gust and wind direction
PRESSURE	Press this key to view Absolute Pressure average of 12hr, 24hr, 48hr and 72hr Press and hold 2s this key to view the absolute and relative pressure
ALARM	Press this key to view the alarm value of Temperature / Humidity/rain rate/rain day/wind
MAX/MIN	Press this key to view the MAX/MIN value of Temperature / Humidity/rain rate/rain day/wind/UVI/LIGHT/Absolute Pressure
LIGHT /SNOOZE	Press this key to adjust LCD backlight brightness: HI/MID/OFF

Note:

1) When power on, press **SET** key to reset the weather station and clear all records memory, and clears all user settings to default.
2) When power on, press **TEMP.** key to skip receive RF signal.
3) In Setting mode,pressing **WIND/+** or **PRESSURE/-** key select the unit or scrolls the value;keeping press and holding **WIND/+** or **PRESSURE/-** key for 2 second will increase/decrease digits in great steps.
4) The setting procedure can be exited at any time by either pressing the **LIGHT /SNOOZE** key or waiting for the 30-second time-out to take effect.

6.4 Setting mode

Pressing the **SET** key for 2 seconds to enter setting model,the basic settings can now be performed in the following order:

6.4.1 BEEP:

- Press the **SET** key for 2 seconds to select the beep section, ON/OFF section digits will start flashing, press the **WIND/+** or **PRESSURE/-** key to select ON or OFF.

“BEEP ON” will make the Beep sound on every key press. If you do not want the beep sound to be heard, select “BEEP OFF”

6.4.2 MAX/MIN Daily:

- Press the **SET** key twice to select the **MAX/MIN Daily** section, ON/OFF section digits will start flashing,press the **WIND/+** or **PRESSURE/-** key to select ON or OFF . (Default is ON,ON: clear at 0:00 every day).

6.4.3 DST(daylight saving time):

- Press the **SET** key third time to select the **Daylight saving time** section, ON/OFF section digits will start flashing,press the **WIND/+** or **PRESSURE/-** key to select ON or OFF . (default ON, only WWVB)

6.4.4 Time zone

- Press the **SET** key forth time to select the **Time zone** section, time zone section digits will start flashing,press the **WIND/+** or **PRESSURE/-** key to select the value . (level: -12 to +12,default: -5)

6.4.5 Time / Date

- Press the **SET** key fifth time to select the 12/24 hour format section (default: 24hr).
- Press the **SET** key sixth time to select the hour section.
- Press the **SET** key seventh time to select the minutes section.
- Press the **SET** key eighth time to select DD-MM or MM-DD format. (Default DD-MM format)
- Press the **SET** key ninth time to select year.
- Press the **SET** key tenth time to select month.
- Press the **SET** key again time to select day.

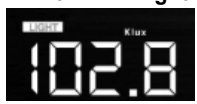
Note: Press the **WIND/+** or **PRESSURE/-**key to set the value.
Note: If user to change minute value, second will auto clear to 0.

6.4.6 Pressure

- Press the **SET** key 12th to select ABS. Pressure unit (hpa, mmhg or inhg;default: hpa).
- Press the **SET** key 13th to select REL. Pressure value.

Note: Press the **WIND/+** or **PRESSURE/-** key to select the value.
Note: in normal mode,press and release the **PRESSURE/-** key to view the average of 12hr, 24hr, 48hr and 72hr pressure. Press and hold 2s the **PRESSURE/-** key to view the absolute and relative pressure

6.4.7 Light



- Press the **SET** key 14th to select light unit (lux, fc, w/m2;default: w/m2).

6.4.8 Temperature

- Press the **SET** key 15th to select in/outdoor temperature unit (C or F;default: C).
- In normal model,press the **TEMP.** key to view wind Chill, Heat Index, Dew Point Temperature. Press the **TEMP.** key for 5 second, will register new transmitter.

Note: every 60 second the unit will measure indoor temperature, indoor humidity and pressure. If temperature is to lower than minimum range, will display --.-, if it is higher than highest range, will display --.-.

6.4.9 Wind speed

- Press the **SET** key 16th to select wind speed unit (km/h, mph, knots, m/s, bft;default: km/h).
- In normal mode,press and release the **WIND/+** key to view the wind, gust and wind direction.

6.4.10 Rain

- Press the **SET** key 17th to select rainfall unit (in/mm; default: mm).
- In normal mode,press and release the RAIN key to view rain of rate, event, day, week, month and total.
- Press the **RAIN** key for 2 seconds to reset current display rain.

Note:

Reset week rain, will auto reset day rain

Reset month rain, will auto reset week and day rain.

Reset total rain, will auto reset month, week and day rain.

Note:

Rain rate: the last 10 minutes rainfall multiplication 6.

Rain event: when rainfall, begin the rain event, if one day (00:00-24:00) not rainfall or rainfall less 10 mm, the rain event is over.

Day: defined by calendar day i.e. 0:00 - 24:00 with current date.

Week: defined by calendar week i.e. Sunday – Saturday.

Month: defined by calendar Month i.e. January 1 - January 31.
Total: running total since station was powered up

Note: the transmitter will send the wind speed, wind direction, rainfall every 16 second

6.4.11 Moon phase

- Press the **SET** key 18th to select Northern or Southern Hemisphere

6.5 Alarm mode

6.5.1 Display of Alarm value

1) Press and release **ALARM** key to display high alarm

2) Press **ALARM** key again to display low alarm

Note:
- Press **RAIN** key to select display rate or day rain alarm data.
- Press **WIND/+**key to select display wind or gust alarm data.
- Press **ALARM** key third time or press **LIGHT /SNOOZE** key back to normal mode

6.5.2 Alarm mode setting:

1) Press and hold for 2 seconds **ALARM** key enter alarm setting mode:
2) Press the **WIND/+** or **PRESSURE/-** to arm/disarm alerts and adjust alert values.
3) Press the **SET** key to confirm & move to the next item.
4) Press the **ALARM** key to on/off the alarm

Note: when alert is triggered, the current triggering source icon for time, HI icon for high value and LO icon for low value will be flashing, indicating alert is triggered.

Note: press **ALARM** key third time back to normal mode or press **LIGHT /SNOOZE** key back to normal mode.

6.5.3 Alarm Setting Order:

1) Time alarm setting
2) Indoor high temperature setting
3) Indoor low temperature setting
4) Indoor high humidity setting
5) Indoor low humidity setting
6) Outdoor high temperature setting
7) Outdoor low temperature setting
8) Outdoor high humidity setting
9) Outdoor low humidity setting
10) High wind setting
11) High gust setting
12) Rain rate high setting
13) Rain day high setting

6.6 Max/min mode

6.6.1 Press and release **MAX/MIN** key to display MAX data

- Press **TEMP.** key to view wind chill, heat index and dew point max.
- Press **RAIN** key to view rain rate, rain day, rain week and rain month max.
- Press **WIND/+** to view wind and gust max.
- Press **PRESSURE/-** to hold 2 seconds to view pressure absolute and relative max.

6.6.2 Press again to display min data

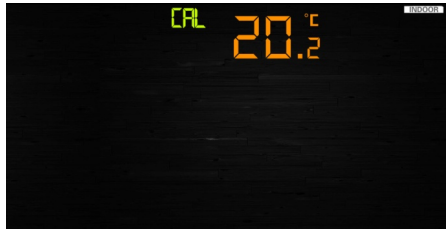
- Press **TEMP.** key to view wind chill and dew point min.
- Press **PRESSURE/-**to hold 2 seconds to view pressure absolute and relative min.

Note: press and hold 2s MAX/MIN button to reset all max or min.

press **MAX/MIN** key third time back to normal mode or press **LIGHT /SNOOZE** key back to normal mode.

6.7 Calibration mode

Hold the **TEMP.** and **MAX/MIN** key together for 5 seconds to enter calibration mode.



- Press the **WIND/+**and **PRESSURE/-** key to adjust values.
- Press the **SET** key to confirm & move to the next item.
- Press the **ALARM** key to reset any adjusted value.
- Press the **LIGHT /SNOOZE** key at any time to exit.

6.7.1 Calibration Order:

1) Indoor temperature offset calibrated (range +/-9F, default: 0 degrees)
2) Indoor humidity offset calibrated (range +/-9%)
3) Outdoor temperature offset calibrated (range +/-9F, default: 0 degrees)
4) Outdoor humidity offset calibrated (range +/-9%)
5) Absolute pressure offset calibrated (range +/-10hpa)
6) Wind direction offset calibrated (adjust by degree)
7) Wind speed factor adjust, default 100% (range50% to 150%)
8) Rain factor adjust, default 100% (range50% to 150%)

6.8 Other Features

6.8.1 Factory Reset/Clear Memory

1) When power on, press **TEMP.** key to skip receive RF signal.
2) When power on, full display after press **WIND/+** and **PRESSURE/-** key to reset the weather station and clear all records memory, and clears all user settings to default.
3) Press the **LIGHT /SNOOZE** key for 5 seconds, will register new transmitter.

6.8.2 Backlight (constant backlight requires operation with DC adapter.

1) with AC adaptor.
   Press **LIGHT /SNOOZE** key to change the LCD backlight brightness:

HI/MID/OFF

2) without DC adaptor
   In normal mode for 15 seconds without touch keys into sleep mode,the backlight will be closed, the touch keys will be disable.
3) Hold the **LIGHT /SNOOZE** key in sleep mode or plug in the DC adapter wake up equipment.(You must hold the **LIGHT /SNOOZE** key waiting for backlight light to loosen the button)

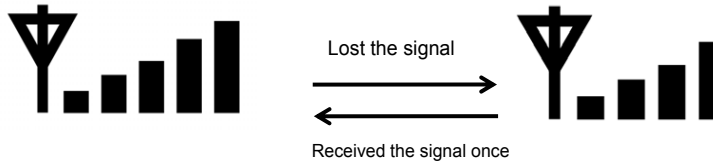
6.8.3 Tendency indicators

- 3 hrs comparison which changes on every ½ hour
- Eg. : At 3:00 - compare to 12:00 data; at 3:30 -compare to 12:30 ….. etc

Tendency indicators		Humidity	Temperature	Pressure
↗	Rising	Rising > 3%	Rising >= 1C/2F	Rising > 1hpa
→	Steady	Change <= 3%	Change < 1C/2F	Change <= 1hpa
↘	Falling	Falling > 3%	Falling >= 1C/2F	Falling > 1hpa

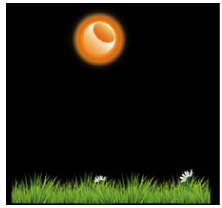
6.8.4 Wireless Signal Strength Indicator

During the synchronization, it will reduce one signal segment if it has not received the signal once from the transmitter. It will increase one signal segment if it has received the signal once.



6.8.5 Weather forecast: Sunny, Partly sunny, Cloudy, Rainy, Stormy and Snowy

When Outdoor temperature is below 32 F (0 C)and the forecast is RAINY or STORMY, the LCD will display SNOWY.

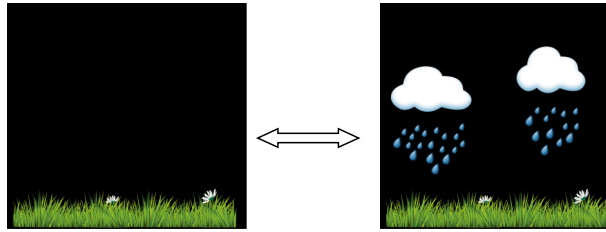

Sunny


Partly sunny

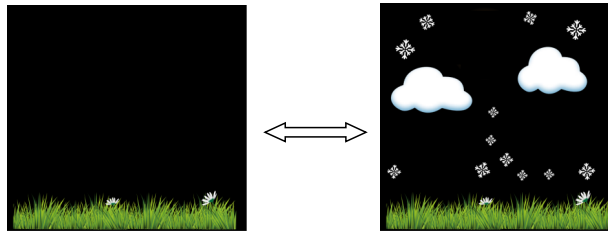

Cloudy

Rainy

Snowy



Storm rainy



Storm Snowy

Note: Snowy icon will appear in place of rainy icon when the outdoor temperature is below 32 F (0˚C).

6.8.6 Snooze

When time alarming, press **LIGHT /SNOOZE** key to snooze time alarm mode, press other key exit snooze mode.

In snooze mode after 10 minutes the alarm again.

7. Specification:

Outdoor data

Transmission distance in open field	:	100m(330 feet)
Frequency	:	433MHz/868MHz/915 MHz
Temperature range	:	-40˚C--60˚C (14℉ to + 140℉)
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	:	0.3mm (if rain volume < 1000mm) 1mm (if rain volume > 1000mm)
Wind speed	:	0-50m/s (0~100mph) (show --- if outside range)
Accuracy:		+/- 1m/s (wind speed< 5m/s) +/-10% (wind speed > 5m/s)
Light	:	0-400k Lux
Accuracy	:	+/-15%
Measuring interval outdoor sensor:		16 sec

Indoor data

Indoor temperature range	:	-10˚C--60˚C (14℉ to + 140℉) (show --- if outside range)
Resolution	:	0.1˚C
Measuring range rel. humidity	:	10%～99%
Resolution	:	1%
Measuring range air pressure	:	300-1100hPa (8.85-32.5inHg)
Accuracy	:	+/-3hpa under 700-1100hPa
Resolution	:	0.1hPa (0.01inHg)
Alarm duration	:	120 sec

Power consumption

Base station	:	5V DC adaptor (included) or 3xAAA alkaline batteries (not included)
Remote sensor	:	3xAA rechargeable batteries (included)

8. WIFI connection setting on mobile

When connect to WIFI, not measuring the indoor temperature, and receive the indoor transmitter replace it.

If connect WIFI module, must power by DC, otherwise the WIFI not work.

WIFI only support upload the current data to weather server and time will be Internet time.

Weather server

a)wunderground

b)weatherbug

c)weathercloud

When customer first power up the device, display is in factory default mode, which will force wifi entering auto configuring mode: the wifi icon will flash rapidly indicating wifi has not been connected to any router before.

If device has been setup for wifi being connected to router, a manual wifi provisioning process need to be enabled. To enabling wifi provisioning process manually, please do this:

press “Rain” and “Alarm“ button at the same time for 4s, display will force wifi module on board entering auto configuring mode: the wifi icon will start flashing rapidly, indicating that WIFI provisioning process will start again.

Steps

1. Start APP on your mobile device: **WS Tool.**
2. App will scan for any devices that has already connected to router

Press “add device” button to start adding a new display device to your outer.

3. Enter router password. Router SSID is always same as your mobile device that is being connected to router. So router SSID is not selectable. Press confirm to start the provisioning process.

4. Now you can see new device with ID is added. You may touch “Easy Weather – WIFIxxxx”label area to start WU
5. Tap to select which weather server to be connected.
6. Enter your PWS ID and password.

Now your weather station is connected for weather server. Download WU app to check your weather station records.