WS0207 Wireless Rain Gauge with Temperature and Humidity User Manual

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1. Introduction

Thank you for your purchase of the WS0207 Wireless Rain Gauge with Temperature and Humidity. The collector component of this wireless rain gauge is self emptying with an extra large 5” collector for enhanced accuracy. The main unit features a 24 hour total rainfall display or accumulative rainfall total display, large number display in inches or millimeters and customizable rain monitor alert.
Please read this manual in its entirety to fully enjoy the benefits and features of this product. Please keep this manual for future reference.
The following user guide provides step by step instructions for installation, operation and troubleshooting.

2. Warnings

Warning: Any metal object may attract a lightning strike, including your Wireless Rain Collector mounting pole. Never install the Wireless Rain Collector in a storm.

Warning: Installing your Wireless Rain Collector 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 Wireless Rain Collector on a clear, dry day.

3. Getting Started

Note: Insert batteries in the remote transmitters(Wireless Rain Collector and Thermo-hygrometers) first, display console second.

The WS0207 weather station consists of a display console (receiver), one wireless thermos-hygrometers (remote transmitters) and one wireless rain gauge transmitter.

3.1 Quick Start Guide

Although the manual is comprehensive, much of the information contained may be intuitive. In addition, the manual may 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, along with references to the pertinent sections.

3.2 Parts List

The WS0207 weather station consists of the following parts (as referenced in Figure 1).

QTY	Item	Image
1	Display Console Frame Dimensions (LxHxW): 6.1x 3.3x1.0inch (155X84X24mm) LCD Dimensions (LxW): 4.33 x 2.32 inch (59 x 110mm)	
1	Remote Thermo-hygrometer Sensor Dimensions: 2.95x2.1x0.87inch (75x53x22mm)	
1	Wireless Rain Gauge Dimensions: 5.35x4.72x4.72inch (136x120x120mm)	

QTY	Item	Image
2	Tapping screws for Rain Gauge	
1	Manual	
1	Power Adapter	
6	Detachable Metal Bird Spikes	
(optional, sold separately)		
4	Metal thin flat ring washer	
4	Pole mounting U-bolt / Hex nuts (M5)/Metal thin flat ring washer	
2	U.Bolt (M5) V.Dimensions: 2.36x2.36x0.2inch W.(60x 60 x 5mm)	
1	Stainless Steel L-shaped base Dimensions: 2.95x1.57x0.98inch (75x 40 x 15mm)	
1	Single-head wrench (M5) Dimensions: 2.56x0.79x0.08inch (65x 20 x 2mm)	
1	Stainless Steel Mounting Pole Dimensions: Φ1.58x10.63inch (Φ40 x 270mm)	

Figure 1

3.3 Recommend Tools

- Precision screwdriver (for small Phillips screws)
- Adjustable Wrench
- Hammer and nail for hanging remote Thermo-hygrometer sensor

3.4 Insert Batteries into The Wireless Rain Gauge Transmitter

1. Use a thumb to separate lower base with the upper cover. Pull the upper cover upward as shown below in Figure 2.

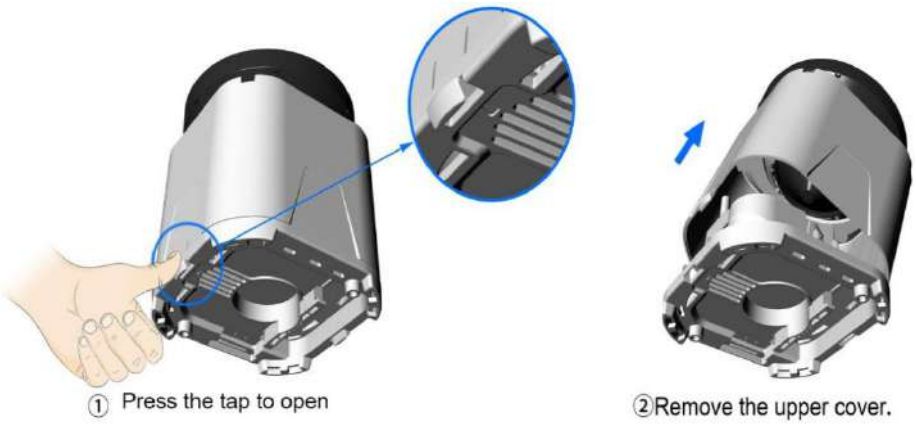


Figure 2

2. Locate the battery boor on the rain gauge transmitter, pull out the battery compartment. Insert 2xAA fresh batteries in the battery compartment.(Lithium batteries are recommended for cold weather environments), as show in Figure 3.



Figure 3

3. The Rain gauge sensor LED indicator will light for 3 seconds, and then flash once per 60 seconds thereafter. Each time it flashes, the sensor is transmitting data as show in Figure 4.

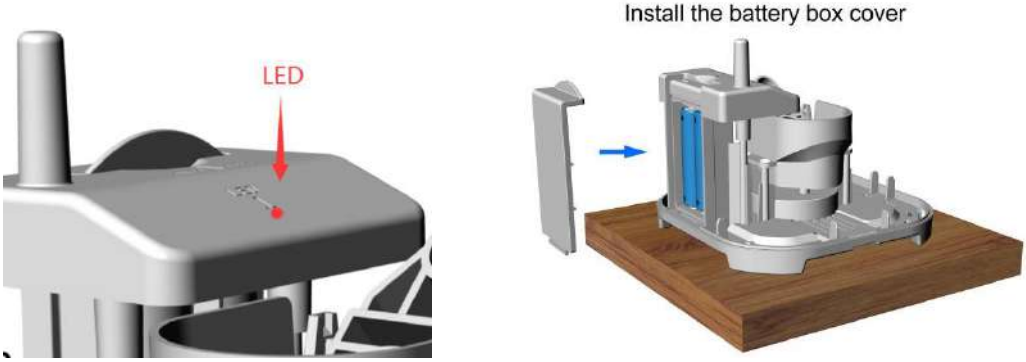


Figure 4

4. Close the battery door. Make sure the gasket (around the battery compartment) is properly seated in its trace prior to closing the door.

3.5 Insert Batteries into The Thermo-hygrometer Transmitter

Locate the battery door on the back of the Thermo-hygrometer sensor, **push downwards along the arrow direction** and open the battery compartment.

Note: If the battery door is closed tightly, push harder to open the battery door (Make sure there is no water on your hands). as shown in Figure 5.



Figure 5

1. **BEFORE** inserting the batteries, locate the dip switches on the inside cover of the lid of the transmitter.
   Figure 6 displays all four switches in the OFF position (factory default setting).

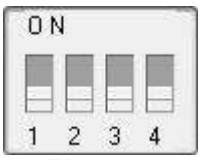


Figure 6

2. **Channel Number:** The WS0207 supports up to eight transmitters. To set each channel number (the default is Channel 1), change Dip Switches 1, 2 and 3, as referenced in Table 1.
3. **Temperature Units of Measure:** To change the transmitter display units of measure (°F vs. °C), change Dip Switch 4, as referenced in Table 1.

DIP SWITCH				FUNCTION
1	**2**	**3**	**4**	
DOWN	DOWN	DOWN	---	Channel 1
DOWN	DOWN	UP	---	Channel 2
DOWN	UP	DOWN	---	Channel 3
DOWN	UP	UP	---	Channel 4
UP	DOWN	DOWN	---	Channel 5
UP	DOWN	UP	---	Channel 6
UP	UP	DOWN	---	Channel 7
UP	UP	UP	---	Channel 8
---	---	---	DOWN	°F
---	---	---	UP	°C

Table 1

4. Insert two AAA batteries. (with the negative terminal of the battery in contact with each spring). Lithium batteries are recommended for cold weather environments.
5. After inserting the batteries, the remote sensor LED indicator will light for 4 seconds, and then flash once per 60 seconds thereafter. Each time it flashes, the sensor is transmitting data.
6. Verify the correct channel number (CH) and temperature units of measure (°F vs. °C) are on the display, as shown in Figure 7.

(1) temperature
(2) temperature units (°F vs. °C)
(3) channel number
(4) relative humidity

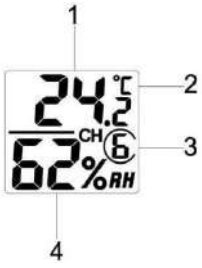


Figure 7

4. Display Console

4.1 A Set of Product

The Display Console, Remote Thermo-hygrometer and Wireless Rain Gauge are shown in Figure 8.



Figure 8

4.2 Display Console Set Up

It is recommended to plug in the power supply to reduce the battery consumption and extend the service life.

Note: The sensor array must be powered and updating before powering up the console, or the console will time out searching for the sensors. Power the console last.
If you power up the console first, you will need to re-synchronize the sensors.
Make certain the station sensor array is at least 3' away from the console and within 100' of the console. If the station is too close or too far away, it may not receive a proper signal. If you have more than one Thermo-hygrometer transmitter, make sure they are all powered up and transmitting on different channels.
Plug in the power supply as shown below in Figure 9.



Figure 9

The display will beep once and all of the LCD segments will light up for a few seconds to verify all segments are operating properly.

Note: The character contrast is best from a slightly elevated viewing angle.

The unit will instantly display indoor temperature, humidity, and time. The rain, outdoor temperature and humidity will update on the display within a few minutes. **Do not Press any menu buttons** until the outside transmitters report in, otherwise the outdoor sensor search mode will be terminated. When the outdoor transmitter data has been received, the console will automatically switch to the normal mode from which all further settings can be performed.

While in the search mode, the remote search icon will be constantly displayed. If you have more than one thermo-hygrometer sensor (up to eight thermo-hygrometer sensors are supported), the display will automatically toggle between sensors until all sensors have reported in.

If it does not update, please reference the troubleshooting guide in Section 13.

Note: If the power adapter is plugged in, **AC ON** will display in the time area for three seconds when powered up. Conversely, if the power adapter is not plugged in, **AC OFF** will be displayed.

Note: The power adapter is intended to be correctly oriented in a vertical or floor mounted position. The prongs are not designed to hold the plug in place if it is plugged into a ceiling, under-the-table or cabinet outlet.

You can use batteries as the second power source. Remove the battery door on the back of the display, as shown in Figure 10. Insert four fresh AAA (alkaline or lithium) batteries in the back of the display console.



Figure 10

Replace the battery door, and fold out the desk stand and place the console in the upright position.

4.3 Sensor Operation Verification

The following steps verify proper operation of the sensors prior to installing the sensor array.

1. Verify proper operation of the rain gauge. Tip the sensor array back and forth several times. You should hear a “clicking”sound within the rain gauge. Verify the rain reading on the display console is not reading 0.00. Each “click”represents 0.01 inches of rainfall.
2. Verify proper operation of the indoor and outdoor temperature. Verify the indoor and outdoor temperature match closely with the console in the same location.
The sensors should be within 2°C (4°F) (the accuracy is ±1°C/2°F). Allow about 30 minutes for both sensors to stabilize.
3. Verify proper operation of the indoor and outdoor humidity. Verify the indoor and outdoor humidity match closely with the console in the same location. The sensors should be within 10% (the accuracy is ± 5%). Allow about 30 minutes for both sensors to stabilize.

5. Weather Station Installation

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.

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 batteries every two years. Provide easy access to the weather station.
2. Avoid radiant heat transfer from buildings and structures. In general, install the thermo-hygrometer in a shaded area on the north side of a structure.install the rain gauge at least 5' from any building, structure, ground, or roof top.
3. Avoid 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. Use common sense. If the rain gauge is installed next to a tall building, the rain will not be accurate.
4. Wireless Range Gauge. The radio communication between receiver and transmitter in an open field can reach a distance of up to 300 feet, providing there are no interfering obstacles such as buildings, trees, vehicles, high voltage lines. Wireless signals will not penetrate metal buildings. Most applications will only reach 100 feet due to building obstructions, walls and interference.

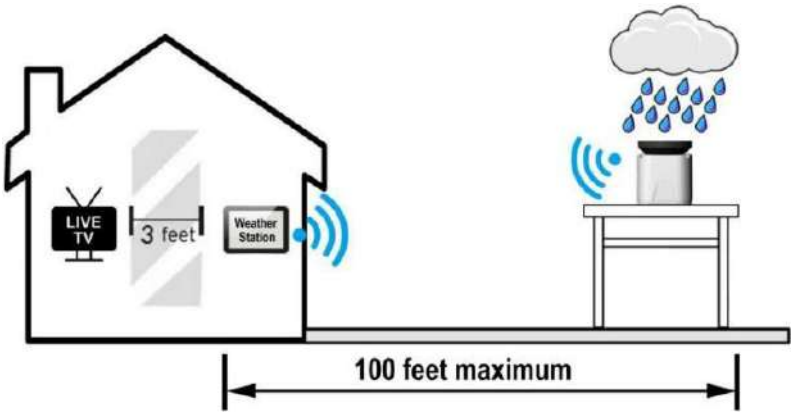


Figure 11

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 three feet away from any electronic device to avoid interference.

5.3 Best Practices for Wireless Communication

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%

Table 2

6. Final Installation of Sensors

6.1 Rain Gauge Transmitter Installation.

Note: **Removable Rain Collector Funnel**

The Funnel is specially designed with a large 5” opening to maximize the rain collection area.The funnel is removable for easy cleaning. To remove, simply rotate the funnel in counter clockwise direction and pull out.

Note: **Collector Upper Casing**

The Collector Upper Casing encloses the sensor/battery compartment component and seals the collection tipping bucket from wind and non-metered rain drops.To remove upper casing from lower casing, press inward on side tabs and lift up carefully.

Note: **Collector Lower Casing Base**

The Collector Lower Casing Base supports the entire rain gauge and also serves as a mounting base. It is very important that the base be placed on a flat, level surface for proper operation.

Note: **Debris and Foreign Matter**

The wireless rain collector was designed with materials suitable for outdoor use. However, certain environmental conditions may require periodic cleaning of the collector components. If the funnel becomes extremely dirty, rain water may not flow correctly into the rain collector.More extensive clearing out and cleaning of the funnel and other components may be required in these cases.It is recommended that the funnel be checked and cleaned periodically to ensure proper operation of the rain gauge system.

Note: **Winter Climates**

The wireless rain collector is designed to collect and record liquid rainfall only, it will not detect or record snowfall levels.It is recommended that the rain collector be brought indoors if you live in an area that has extreme cold weather, ice and snow during the winter months.

6.1.1 Level Surface Mounting of Rain Collector

It is recommended that the rain collector be mounted to a solid, level surface with limited grass growth such as a deck railing or similar surface.



Figure 12

To mount the rain collector, first separate the lower casing base from the upper casing.
Next locate the two holes within the lower casing base.
Use only hand tools (power tools may slip during use, possibly damaging sensitive rain collector components) to secure the lower casing base to the chosen surface with appropriate hardware.
Re-attach upper casing.as shown in Figure 13.



Figure 13

6.1.2 Pole Mounting of the Rain Gauge

(Mounting poles and U-bots are sold separately)
Tighten the rain gauge to your mounting pole or bracket with two U-bolts and four M5 nuts ,as shown in Figure 14.



Figure 14

6.1.3 Install Stainless Steel Spikes

There are 6 Bird Spikes included.
Step 1: Fit fixing clips for the bird spikes into the six positions of the funnel.



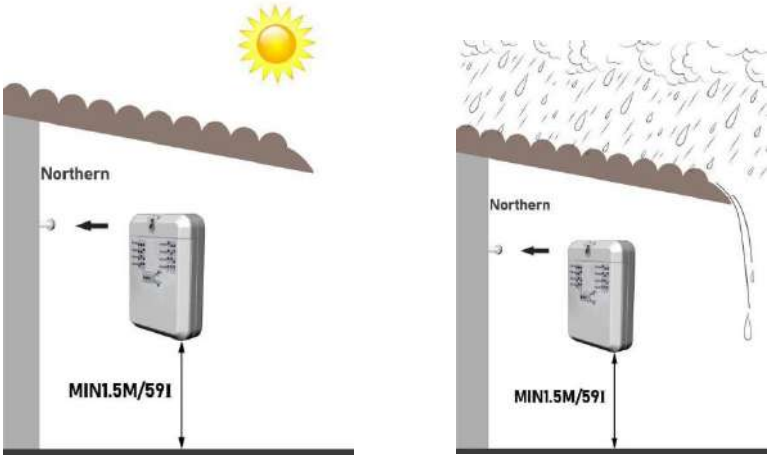
Figure 15

Step 2: After installation, check whether the reversed fixing is firm and vertical to prevent the bird spikes from falling off.



Figure 16

6.2 Thermo-hygrometer Transmitter Installation. It is recommended you mount the Thermo-hygrometer sensor outside in a shaded area. A north facing wall is preferred because it is in the shade most of the day. Direct sunlight and radiant heat sources will result in inaccurate temperature readings. Although the sensor is water resistant, it is best to mount in a well protected area, such as under an eve. Use a screw or nail (not included) to affix the remote sensor to the wall, as shown in Figure 17.



Keep out of sun Keep out of rain

Figure 17

7. Low Battery Icon

A low battery indicator icon is shown in the display window for thermo-hygrometer sensor. When the low battery icon appears (the battery voltage is lower than 2.4V), replace the batteries in the sensor with fresh batteries. Be sure to never mix old and new batteries, and never mix battery types such as alkaline and lithium together.

8. Console Operation

Note: The console has five keys for easy operation: **HISTORY** key, **SET** key， **ALARM** key, , **CHANNEL**（**+**）and **SNOOZE/LIGHT** key.

8.1 Quick Display Mode

Note: To exit the Quick Display Mode at any time, press the **SNOOZE/LIGHT** button on the top of the display console.

While in Normal Mode, press (do not hold) the **SET** key to enter the Quick Display Mode as follows:

- Once for date and year.
- Twice for between Channel Temp and Dew Point.
- Three times for rainfall.
- Four times for 72h or 24h graph record

1. **Time, Date and Year .** Press the **CHANNEL or HISTORY** key to toggle between date and year .
2. **Channel dew point.** Press (do not hold) **SET** key again, the CH temp area will flash. Press **CHANNEL or HISTORY** key to toggle between **Temp,** and **Dew Point**.
3. **Rainfall.** Press the **CHANNEL/+** or **HISTORY/-** key to toggle between 1h, 24h, week, month and total.

To clear the 1h, 24h, week, month or total rain, press the CHANNEL/+ or HISTORY/- button to choose 1h, 24h, week, month or total rainfall. The 1h, 24h, week, month or total rain will flash. Press and hold the SET button for five seconds until 1h, 24h, week, month or total rain reads 0.00.

Note: Rainfall periods are calculated as below:
1H=From start of the hour to the current time. (For example, at 08:25, 1H rainfall means rainfall amount from 08:00 to 08:25)
24H=From start of the day to the current time. (For example, at 08:25, 24H rainfall means rainfall amount from 00:00 to 08:25)
Week=From start of the week to the current time. (For example, at 08:25 of Thursday, Week rainfall means rainfall amount from 00:00 of this Sunday to 08:25 this Thursday.)
Month=From start of the month to the current time. (For example, at 08:25 of Oct. 20, Month rainfall means rainfall amount from 00:00 of 1st Oct. to 08:25 20th Oct.)
Total=Total rainfall amount from the first powering on or the latest reset the total manually.

4. **72h or 24h Graph Record.** Press the **CHANNEL** or **HISTORY** key to toggle between the last -72 hours or -24 hours record time. Each bar represents the corresponding data and time for rainfall,IN/CH temperature or humidity.(default is -72 hours)

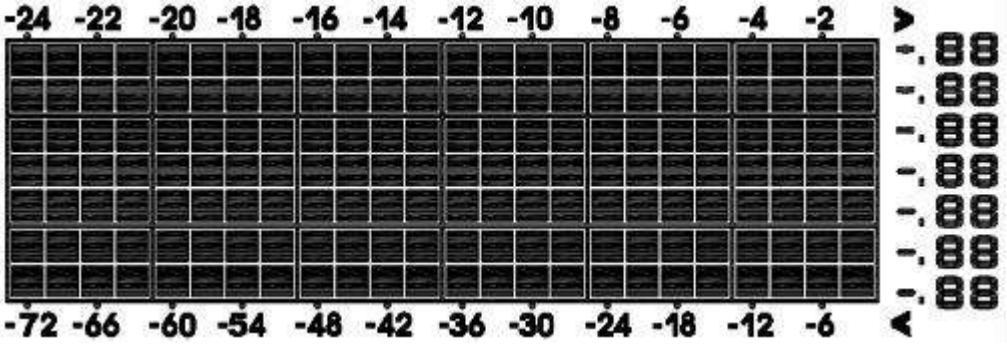


Figure 18

Note: The graph displays hours on the horizontal or x-axis (the most recent data to the right of the graph). For example, 0h is the current data and -12 is 12 hours ago. The vertical axis or y-axis auto-scales, displays the deviation from the current value (the most recent data will always display 0). For example, when in temperature mode, if the bar displays 0.4, this represents 0.4 degrees higher than the current value.

8.2 Set (Program) Mode

While in Normal Mode, **press and hold** the **SET** key for at least three seconds to enter the Set Mode. The first setting will begin flashing. You can press the **SET** key again to skip any step, as defined below.

Note: In the Set mode, press the [+] key or [-] key to change or scroll the value. Hold the [+] key or [-] key for three seconds to increase/decrease rapidly.

Note: To exit the Set mode at any time, press the **LIGHT** button on the top of the display console.

1. **12/24 Hour Format (default: 24h):**. Press the **SET** key again to adjust the 12/24 hour format setting (FMT). Press the [+] key or [-] key to change between 12 hour and 24 hour format.
2. **Change Hour.** Press the **SET** key again to set the hour. Press the [+] key or **[-]** key to adjust the hour up or down.
3. **Change Minute.** Press the **SET** key again to set the minute. Press the [+] key or [-] key to adjust the minute up or down.
4. **Date Format (default: DD-MM):** Press the **SET** key again to enter the day/month format mode. Press the [+] key to switch between MM-DD, DD-MM.
5. **Change Month.** Press the **SET** key again to set the calendar month. Press the [+] key or [-] key to adjust the calendar month.
6. **Change Day.** Press the **SET** key again to set the calendar day. Press the [+] key or [-] key to adjust the calendar day.
7. **Change Year.** Press the **SET** key again to set the calendar year. Press the [+] key or [-] key to adjust the calendar year.
8. **Max/Min Clearing (default:** ON**)**. Press the **SET** key again to set the max/min clearing mode (CLR). The Max/Min can be programmed to clear daily (at midnight) or manually. Press the [+] key or [-] key to switch between "Clears 24h" and Clears Manually.
9. **Temperature Units of Measure (default:** °C**):**. Press the **SET** key again to change the temperature units of measure (the **UNITSET** icon will be displayed). Press the [+] key or [-] key to switch between °F and °C units of measure.
10. **Rainfall Units of Measure (default: mm)**. Press the **SET** key again to change the Rainfall units of measure. Press [+] key or [-] key to toggle the rainfall units between mm and inch.

Note: Press the **HISTORY/-** key and install the battery simultaneously, the RESET will display and restore to factory default settings.

8.3 Channel Selection

Press the **CHANNEL/+** button to switch the display between remote thermo-hygrometer sensors 1 through 8, and scroll mode . In scroll mode, all of the detected outdoor thermo-hygrometer sensors will be displayed in five second intervals.

8.4 Sensor Search Mode

If any of the sensor communication is lost, dashes (--.-) will be displayed on the screen. To reacquire the signal:

Press and hold the **CHANNEL/+** button for 3 seconds to enter sensor search mode, press [+] key or [-] key to toggle between **CH(1 - 8), RAIN and ALL .**

1. If a specific channel is lost, press the **CHANNEL/+** button to display this specific channel and press **SET** key to confirm, the search icon will be displayed constantly for 3 minutes. Once the signal is reacquired, the remote search icon will turn off, and the current values will be displayed.

Note: In search mode, the **CH(1-8)** will display the current specific channel.

2. If rain sensor channel is lost, press the **CHANNEL/+** button to **RAIN** and press **SET** key to confirm, the remote search icon will be constantly displayed for up to 3 minutes. Once the signal is reacquired, the remote search icon will turn off, and the current values will be displayed.
3. If new sensors are added, subtracted, or multiple sensor channels are lost, press the **CHANNEL/+** button to display **ALL** and press **SET** key to confirm, the remote search icon will be constantly displayed for up to 3 minutes. Once the signal is reacquired, the remote search icon will turn off, and the current values will be displayed.

8.5 History Graph Mode

In normal mode, press the **HISTORY/- key** to toggle between:

- the rainfall graph (the **RAIN** icon is displayed in time area)
- indoor temperature graph (the **TEMP-IN** icon is displayed in time area)
- indoor humidity graph (the **HUMI-IN** icon is displayed in time area)
- Channel temperature graph (the **TEMP OUT** icon is displayed in time area)
- Channel humidity graph (the **HUMI OUT** icon is displayed in time area)

Note: The **OUT** humidity and temperature graphs are the ones of the current displayed channel.

8.6 Reset Min/Max Record

Note: If you own more than one thermo-hygrometer sensor, the minimum and maximum value of all channels will be cleaned in cleaning mode.

In normal mode, press (do not hold) the **ALARM** key**,** the **MAX** icon will be displayed. Press the **HISTORY/-** key to view rainfall(1h, 24h, week or month) max value.

Press the **SET** key for three seconds to clear the maximum values of rainfall, dew point, temperature and humidity. The maximum values will now display the current values.

Press the **ALARM** key again (do not hold), the **MIN** icon will be displayed. Press the **HISTORY/-** key to view pressure (dew point or temp) min value.

Press the **SET** key for three seconds to clear the minimum values of dew point and temperature and humidity. The minimum values will now display the current values.

Press the **LIGHT** key to exit the min/max checking and cleaning mode, return to normal display mode.

8.7 Back Light Mode When Powered by Batteries

If the LED is off, press the **LIGHT** button once. The backlight will turn on for five seconds, and if no operation is performed for three seconds, the backlight will turn off.

Press and hold the **LIGHT** button for three seconds, and the backlight will turn on permanently, and display **LED ON** icon will be displayed for three seconds in the time field.
If the LED is on, press and hold the **LIGHT** button for three seconds, and the LED will turn off.

Note: If plugged into AC power, the time area will display **AC ON** and the backlight will remain on. It is not recommended leaving the backlight on for a long period of time when operating on batteries only, or the batteries will run down quickly.

8.8 Adjustment or Calibration

Note: The calibrated value can only be adjusted on the console. The remote sensor(s) always displays the un-calibrated or measured value.

Note: The measured humidity range is between 10 and 99%. Humidity cannot be accurately measured outside of this range. Thus, the humidity cannot be calibrated below 10% or above 99%.

The purpose of calibration is to fine tune or correct for any sensor error associated with the devices margin of error. The measurement can be adjusted from the console to calibrate to a known source.

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. They are in a different location and typically update once per hour.

The purpose of your weather station is to measure conditions of your surroundings, which vary significantly from location to location.

The WS0207 supports up to eight remote sensors. Each of the eight sensors can be calibrated.

8.8.1 Temperature Calibration

In normal mode, press and hold the **SET** and **CHANNEL/+** keys at the same time for five seconds to enter the temperature calibration mode. The indoor temperature will begin flashing.

Press the [+] or [-] key to increase or decrease the temperature reading (in increments of 0.1). Press and hold the [+] or [-] key for three seconds to increase or decrease rapidly.

Press the **ALARM** key to reset current value.(calibration range from +9F to -9F).

Press the **SET** key switch to next channel (1through 8). To exit the calibration mode at any time, press the **LIGHT** button on the top of the display console. If no operation is performed, the calibration mode will timeout in 30 seconds.

8.8.2 Setting Calibrated Humidity

In normal mode, press and hold the **SET** and **HISTORY/-** keys at the same time for five seconds to enter the humidity calibration mode. The indoor humidity will begin flashing.

Press the [+] or [-] key to increase or decrease the humidity reading (in increments of 1%). Press and hold the [+] or [-] key for three seconds to increase or decrease rapidly.

Press the **ALARM** key to reset current value.(calibration range from +9% to -9%).

Press the **SET** key switch to next channel (1through 8). To exit the calibration mode at any time, press the **LIGHT** button on the top of the display console. If no operation is performed, the calibration mode will timeout in 30 seconds.

Note: Humidity is a difficult parameter to measure accurately and drifts over time. The calibration feature allows you to zero out this error. To calibrate humidity, you will need an accurate source, such as a sling psychrometer or Humidipaks One Step Calibration kit.

8.8.3 Setting Calibrated Rainfall

In normal mode, press and hold the **SET** and **ALARM** keys at the same time for five seconds to enter the rainfall calibration mode. The rainfall will begin flashing.

Press the [+] or [-] key to increase or decrease the rainfall reading. Press and hold the [+] or [-] key for three seconds to increase or decrease rapidly.

To exit the calibration mode at any time, press the **LIGHT** button on the top of the display console. If no operation is performed, the calibration mode will timeout in 30 seconds.

Calibrated Rain = Calibration factor x Measured Rain

Discussion: The rain collector is calibrated at the factory based on the funnel diameter. The bucket tips every 0.01” 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”.

Note: that debris and insects can collect inside the tipping mechanism (they make a good spiders nest). Carefully remove the funnel and inspect the tipping mechanism for debris prior to calibration.

9. Alarm Mode

The WS0207 includes time alarm, temperature alarm and humidity alarm features for indoor and Channel 1 and dew point alarm for Channel 1, rainfall(1h and 24h) alarm.

9.1 Alarm Operation

When an alarm condition is exceeded, the alarm icon will flash (visual) and the alarm beeper will sound (audible). To silence the beeper, press any key. The alarm beeper can be permanently silenced by referencing Section 9.4.

9.2 Viewing the High and Low Alarms

Time, indoor, channel 1, rainfall(1h and 24h) alarms are supported. Channels 2-8 alarms are not supported.

To view the current alarm settings, **press and hold** the **ALARM** key for three seconds to enter the alarm mode.

Next, press the **ALARM** key to view the HI and LOW alarm along with the alarm time. Press the **SET** key to view rainfall(1h and 24h) high alarm .

Press the **LIGHT** key at any time to return to the normal mode.

9.3 Setting the Alarms

In **alarm** mode, press and hold the **SET** key for three seconds. The alarm parameter will begin flashing. To adjust the alarm parameter, press the [+] or [-] key to increase or decrease the alarm setting slowly, or press and hold the [+] or [-] key for three seconds to increase or decrease the alarm setting rapidly.

Press the **ALARM** key to turn on (the alarm icon will appear) and off the alarm.

To save the alarm setting and proceed to the next alarm parameter, press (do not hold) the **SET** key.

Press the **LIGHT** key twice at any time to return to the normal mode. After 30 seconds of inactivity, the alarm mode will time out and return to normal mode.

The following is a list of the individual alarm parameters that are set (in order):

1.Alarm hour
2.Alarm minute
3.Outdoor (channel 1) temperature high alarm
4.Outdoor (channel 1) temperature low alarm
5.Outdoor(channel 1) humidity high alarm
6.Outdoor(channel 1) humidity low alarm
7.Outdoor (channel 1) dew point high alarm
8.Outdoor (channel 1) dew point low alarm
9.Indoor temperature high alarm
10.Indoor temperature low alarm
11.Indoor humidity high alarm
12.Indoor humidity low alarm
13.Rainfall (1h) high alarm
14.Rainfall (24h) high alarm

9.4 Alarm and Command Key Beeper ON/OFF Mode

The beeper can be silenced for both alarms and key strokes.
In normal mode, press and hold the **HISTORY/-** key for three seconds to toggle the beeper on or off (depending on the current setting).

The **BUZZON** (beeper on) or **BUZZOFF** (beeper off) icon will appear in the time area for three seconds. Press and hold the **HISTORY/-** key again for three seconds to toggle the **BUZZON** or **BUZZOFF** command.

10. Glossary of Terms

Term	Definition
Accuracy	Accuracy is defined as the ability of a measurement to match the actual value of the quantity being measured.
Hygrometer	A hygrometer is a device that measures relative humidity. Relative humidity is a term used to describe the amount or percentage of water vapor that exists in air.
Range	Range is defined as the amount or extent a value can be measured.
Resolution	Resolution is defined as the number of significant digits (decimal places) to which a value is being reliably measured.

11. Specifications

11.1 Wireless Specifications

- Line of sight wireless transmission (in open air): 300feet.
- Frequency: 433 MHz
- Update Rate: 60 seconds for Wireless rain gauge and thermo-hygrometer sensors.

11.2 Measurement Specifications

The following table provides specifications for the measured parameters.

Measurement	Range	Accuracy	Resolution
Indoor Temperature	32 to 140 °F 0 to 60 °C	± 2 °F ± 1 °C	0.1 °F 0.1 °C
Outdoor Temperature	-40 to 140 °F -40 to 60 °C	± 2 °F ± 1 °C	0.1 °F 0.1 °C
Indoor Humidity	10 to 99 %	± 5% (only guaranteed between 20 to 90%)	1 %
Outdoor Humidity	10 to 99%	± 5% (only guaranteed between 20 to 90%)	1 %
Rainfall	0 to 393in 0 to 9999mm	<0.6in: ±0.04in, 0.6in to 393in: ±7% <15mm: ±1 mm, 15mm to 9999mm: ±7%	<39.4in (0.012in) >39.4in (0.04in) <1000mm (0.3mm) >1000mm (1mm)

11.3 Power Consumption

- Base station (display console) : 4 x AAA 1.5V Alkaline or Lithium batteries (not included)
- Adaptor: 6V~ 500mA
- Thermo-hygrometer Sensor : 2 x AAA alkaline batteries or Lithium batteries (not included)
- Rain Gauge sensor: 2xAA alkaline batteries or Lithium batteries (not included)
- Battery life: Minimum 12 months for base station with excellent reception. Intermittent reception and multiple sensors may reduce the battery life.
  Minimum 12 months for sensors (use lithium batteries in cold weather climates less than -20 °C/-4°F)

12. Maintenance

1. Clean the rain gauge once every 3 months
   - Unscrew the rain collector funnel by turning it 30°counter clockwise.
   - Gently remove the rain collector funnel.
   - Clean and remove any debris or insects.
   - Install the collector funnel after it has been cleaned and completely dried.

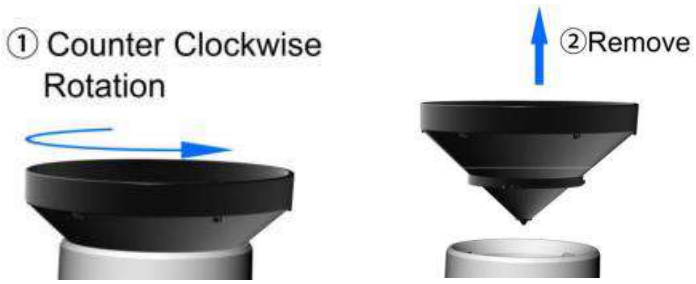


Figure 19

2.Replace the rain gauge and thermo-hygrometer transmitter batteries once every 1-2 years.

Note: If it is difficult to open by hand after installing the level surface, you can use a screw driver to separate lower base with the upper cover of the rain gauge.



Figure 20

13. Troubleshooting Guide

Problem	Solution
Wireless remote not reporting in to console. There are dashes (--.-) on the display console.	If any of the sensor communication is lost, dashes (--.-) will be displayed on the screen. To reacquire the signal, press and hold the **CHANNEL/+** button for 3 seconds, choose the lost sensor and press **SET** button, and the remote search icon will be constantly displayed. Once the signal is reacquired, the remote search icon will turn off, and the current values will be displayed. The maximum line of sight communication range is 300 feet and 100 feet under most conditions. Move the sensor assembly closer to the display console. If the sensor assembly is too close (less than 1.5m), move the sensor assembly away from the display console. Make sure the remote sensor LCD display is working and the transmitter light is flashing once per 60 seconds.

Problem	Solution
	Install a fresh set of batteries in the remote thermo-hygrometer. For cold weather environments, install lithium batteries. Make sure the remote sensors are not transmitting through solid metal (acts as an RF shield), or earth barrier (down a hill). Move the display console around electrical noise generating devices, such as computers, TVs and other wireless transmitters or receivers. Move the remote sensor to a higher location. Move the remote sensor to a closer location.
Temperature sensor reads too high in the day time.	Make sure the thermo-hygrometer is mounted in a shaded area. The pre preferred location is a north facing wall because it is in the shade most of the day.
Indoor and Outdoor Temperature do not agree	Allow up to one hour for the sensors to stabilize due to signal filtering. The indoor and outdoor temperature sensors should agree within 4 °F (the sensor accuracy is ± 2 °F). Use the calibration feature to match the indoor and outdoor temperature to a known source.
Indoor and Outdoor Humidity do not agree	Allow up to one hour for the sensors to stabilize due to signal filtering. The indoor and outdoor humidity sensors should agree within 10 % (the sensor accuracy is ± 5 %). Use the calibration feature to match the indoor and outdoor humidity to a known source.
Display console contrast is weak	Replace console batteries with a fresh set of batteries.
Outdoor color does not change as expected.	Make sure the outdoor sensor is assigned to Channel 1.
Rain gauge reports rain when it is not raining	Make sure you have a stable mounting solution. Move the rain gauge from the pole mount to a flat, stable mount (fixed, flat structure).
Suspected rain measurement Inaccuracy	If you suspect the rainfall measurement is not accurate, make certain the rain collector batteries are fresh. Check that the collector is mounted to a level surface and that no foreign debris or plant matter is preventing the flow of rainfall into the collector. See “Maintenance.” Make certain that the internal tipping bucket is allowed to move freely and is not obstructed by any foreign objects or debris.